Cutting Tools



2025

솔리드

2026

터닝 / 로테이팅 / 솔리드

KORLOY

2025▸2026
KORLOY SOLID TOOLS

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초경(超硬)합금 절삭공구 제품의 안전 길라잡이

코오로이(KORLOY)는 좋은 품질과 안전한 제품을 만들기 위해 노력하고 있습니다. 코오로이 제품을 사용하실 때에는 아래에 기술한 안전 길라잡이 내용을 주의 깊게 읽으신 후 사용하여 주시기 바랍니다. 귀사의 협조에 감사드립니다.

* 본 안전 길라잡이는 초경(超硬)합금 절삭공구 재료의 취급 및 사용에 대한 일반적인 사항에 대해서 기술하였습니다.
* 상세한 내용은 취급설명서, 사용설명서, 또는 카탈로그를 참조하시거나 당사로 문의해 주시기 바랍니다.
* 이후 당사의 승인 없이 행해진 개조 등의 사양 변경으로 발생한 사고 등에 대해서는 당사가 책임을 지지 않습니다.

1 PL에 대한 공지사항

2002년 7월1일 시행된 제조물 책임법(PL법)에 의해 당사에서는 제품의 포장지에 경고라벨(Label) 또는 주의라벨 부착을 실시하고 있습니다. 다만 공구 본체에는 구체적인 주의사항 등의 표시는 하지 않습니다. 모든 초경(超硬)공구 재료의 취급과 더불어 사용하기 전에 반드시 본 안전 길라잡이를 읽어 주시오. 또한 귀사의 안전교육의 일환으로서 본 안전 길라잡이 내용을 실제의 취급자 및 사용자에게 철저히 주지(周知) 시켜 주시기 바랍니다.

2 초경(超硬)합금 절삭공구 재료의 기본 특징

초경(超硬)공구 재료는 텅스텐(W), 티타늄(Ti), 알루미늄(Al), 실리콘(Si), 탄탈륨(Ta), 보론(B) 등의 탄화물, 질화물, 탄 · 질화물, 산화물에 결합재로서 첨가된 코발트(Co), 니켈(Ni), 크롬(Cr), 몰디브레늄(Mo) 등의 금속 성분을 포함하고 있으며 비중이 매우 높고 경도가 높습니다. 일반적으로 냄새는 없으나 사용 재료 및 처리 방법에 따라 다양한 외관 색상을 지니는 특징을 가지고 있습니다.

3 초경(超硬)합금 절삭공구 및 재료의 취급 시 주의사항

01) 초경(超硬)소재는 매우 단단한 반면 깨어지기 쉬운 재료로서의 특성을 가지고 있습니다. 따라서 충격과 무리한 체결 등으로 파손 될 수 있으니 주의하여 취급해 주십시오.

02) 초경(超硬)소재는 비중이 매우 높아 대형 제품이나 수량이 많을 경우 대단히 무거우므로 중량물(重量物)로 취급하여 주십시오.

03) 초경(超硬)재료는 금속재료와는 열팽창률이 다릅니다. 이 때문에 열 박음 및 억지 맞춤 제품은 사용 온도가 설계치와 달리 현저히 높거나 낮을 경우 깨짐이 발생할 수도 있습니다.

04) 초경(超硬)공구는 날 끝이 매우 예리한 제품이 있습니다. 공구의 날 끝을 맨손으로 만지면 상처를 입을 위험이 있으니 주의하여 주십시오. 특히 공구를 케이스(Case)로부터 꺼낼 시 바닥에 떨어뜨리거나 날 끝이 직접 손에 닿지 않도록 주의하여 주십시오.

05) 초경(超硬)재료는 연삭유나 윤활유 기타 수분 등으로 인해 부식되면 강도 저하를 초래하여 사용 시 파손이 일어날 수 있기 때문에 보관 상태에 주의하여 부식이 일어나지 않도록 하여 주십시오.

06) 공구를 취급하기 전에 취급설명서, 사용설명서 또는 카탈로그(Catalogue)를 참조하여 주십시오.

07) 소정의 용도 이외의 목적으로 초경(超硬)공구 재료를 사용하는 것은 기계와 공구의 파손을 초래하여 대단히 위험하기 때문에 용도 외의 목적으로 사용하지 말아 주십시오.

4 초경(超硬)합금 절삭공구의 가공(연삭, 방전, 용접 등) 시 주의사항

01) 공구는 표면 상태에 따라 강도가 현저히 저하될 수 있으므로 다이아몬드 연삭 휠(Wheel)을 사용하여 주십시오.

02) 초경(超硬) 공구는 연마하거나 연삭할 때 분진이 발생합니다. 분진에는 코발트(Co) 등 몸에 유해한 성분이 함유되어 있으므로 다량 또는 장기적으로 흡입하였을 경우 호흡기 장애 등 만성적 질환의 원인이 될 수 있기 때문에 집진장치나 보호마스크 등의 보호구를 사용하여 주십시오. 또한 피부에 묻었거나 눈에 들어간 경우에는 과민반응을 일으켜 염증 등의 원인이 될 수 있으므로 즉시 흐르는 물로 깨끗이 씻어 내고 전문가와 상의하십시오.

03) 초경(超硬)소재 또는 용접형 제품을 연삭한 경우 폐수 중에는 유해 금속 성분이 들어 있기 때문에 환경문제를 일으킬 수 있으므로 폐수 처리를 하여 주십시오.

04) 초경(超硬)공구를 재 연삭한 후에는 균열(Crack)이 없음을 반드시 확인하여 주십시오.

05) 초경(超硬)소재 혹은 제품에 레이저(Laser), 전기 펜(Pen) 등으로 마킹(Marking) 하면 균열이 일어날 수 있습니다. 균열은 공구의 수명을 급격히 저하시키기 때문에 주의하여 주십시오.

06) 초경(超硬)소재를 방전 가공하면 표면에 잔류 균열이 발생하여 강도 저하를 초래할 수 있기 때문에 필요하면 연삭 등으로 균열을 완전히 제거하여 주십시오.

07) 초경(超硬)소재를 용접할 경우에는 용접 재료의 녹는(용융) 온도 보다 낮거나 높게 하면 탈락과 파손이 일어날 수 있기 때문에 주의하여 주십시오.

08) 비수용성 연삭유를 사용하는 경우 과열, 불꽃 등에 의해 화재가 발생할 수 있으므로 반드시 방화 대책을 수립하여 주십시오.

5 초경(超硬)합금 절삭공구의 가공(연삭, 방전, 용접 등) 시 주의사항

구분	위 험 요 소
절삭공구류	• 예리한 날끝을 직접 손으로 만지면 상처를 입을 위험이 있습니다.
	• 잘못된 사용방법이나 사용조건이 부적절한 경우 공구의 파손과 비산(飛散)을 초래, 상처를 입을 위험이 있습니다.
	• 극심한 부하나 과도한 마모는 절삭저항의 급격한 증가를 초래하여 공구가 파손되어 상처를 입을 위험이 있습니다.
	• 절삭가공 시 배출되는 칩(Chip)은 매우 날카롭고 뜨거워 상처나 화상의 위험이 있습니다.
	• 공구와 가공물은 절삭 시 고온으로 됩니다. 가공 직후 직접 손으로 만지면 화상의 위험이 있습니다.
	• 절삭 중에 발생하는 불꽃과 파손에 의한 발열, 뜨거운 칩에 의해 인화되어 화재 및 폭발의 위험이 있습니다.
	• 고속 작업의 경우, 기계의 밸런스(Balance)가 나빠지고 떨림이 발생하게 되며, 진동에 의하여 공구가 파손되어 상처를 입을 위험이 있습니다.
	• 가공물에 생기는 버(Burr)를 맨손으로 만지면 상처를 입을 수 있습니다.
	• 가공 중에 가공물이 움직이면 공구의 파손이 발생하여 상처를 입을 수 있습니다.
	• 공구는 통상적으로 우회전으로 사용합니다. 역회전으로 사용 시 공구의 파손을 유발, 상처를 입을 수 있습니다.
인덱서블류	• 인써트(Insert)와 부품이 확실히 고정되지 않으면 절삭 중에 탈락, 비산 되어 상처를 입을 위험이 있습니다.
	• 파이프(Pipe) 등의 보조 지그(Zig)를 이용하여 너무 무리하게 체결하면 인써트와 공구가 파손되어 탈락, 비산의 위험이 있습니다.
	• 공구를 고속 회전으로 사용하는 경우 원심력에 의해 부품이나 인써트가 튀어나올 수 있어 매우 위험합니다.
회전공구류	• 카터(Cutter) 류는 예리한 날끝을 가지고 있기 때문에 직접 손으로 만지면 상처 입을 위험이 있습니다.
	• 공구가 회전 중에 장갑을 착용하면 회전 공구에 감겨 들어갈 위험이 있습니다. 또한 신체나 의복이 접촉되면 대단히 위험합니다.
	• 편심 회전과 밸런스(Balance)가 나쁘고 떨림이 있으면, 진동이 발생하여 공구가 파손, 비산에 의한 상처를 입을 수 있습니다.
	• 가공물을 회전시켜 구멍을 가공할 경우 관통 시 절삭 끝부분의 원판형 칩은 고속으로 튀어나올 수가 있으며, 예리하기 때문에 위험합니다.
	• 극소경 드릴(Drill)에서는 끝부분이 뾰족하고 매우 예리하여 맨손으로 직접 만지면 상처를 입거나 부러져 비산하는 경우가 있어 위험합니다.
용접형 공구	• 팁(Tip)의 탈락, 파손 등에 의한 상처 입을 위험이 있습니다.
기타	• 수차례 용접을 되풀이하면 사용 중에 팁이 파손되기 쉽게 되어 위험합니다.
	• 소정의 용도 이외의 목적으로 사용하는 것은 기계와 공구의 파손을 초래, 대단히 위험합니다.

구분	안 전 대 책
절삭공구류	• 특히 케이스로부터 꺼낼 때나 기계에 장착할 때는 보호장갑 등의 보호구를 사용하여 주십시오.
	• 안전 커버(Cover)나 보호안경 등의 보호구를 사용해 주십시오. • 추천 조건의 범위 내에서 사용하여 주십시오. • 취급설명서, 카탈로그 등을 참조하여 주십시오.
	• 안전 커버나 보호안경 등의 보호구를 사용하여 주십시오. • 공구 교환 주기를 빨리하여 주십시오.
	• 안전 커버나 보호안경 등의 보호구를 사용하여 주십시오. • 칩 제거 시는 기계를 멈추고 보호장갑을 착용한 후 갈고리 등 전용 공구를 사용하여 주십시오.
	• 보호장갑 등의 보호구를 사용하여 주십시오.
	• 인화나 폭발의 위험이 있는 곳에서는 사용하지 말아 주십시오. • 비수용성 절삭유를 사용하는 경우 방화 대책을 세워 주십시오.
	• 안전 커버나 보호안경 등의 보호구를 사용하여 주십시오. • 작업 전에 반드시 시운전을 실시하여 떨림, 진동, 이상음이 없는지 확인하여 주십시오.
	• 맨손으로는 절대 만지지 말아 주십시오. • 보호장갑 등의 보호구를 사용하여 주십시오.
	• 가공물이 움직이지 않도록 단단히 고정하여 주십시오.
	• 역회전으로는 사용하지 말아 주십시오. • 좌회전의 경우 포장에 표시되어 있으니 확인하여 주십시오.
인덱서블류	• 인써트와 부품이 확실히 고정되어 졌는지를 확인해 주시고 반드시 순정(부)품 만을 사용하여 주십시오.
	• 파이프 등의 보조 지그를 사용하지 말아 주십시오.
	• 추천조건의 범위 내에서 사용하여 주십시오. • 안전 커버와 보호안경 등의 보호구를 사용하여 주십시오.
회전공구류	• 보호장갑 등의 보호구를 사용하여 주십시오.
	• 회전 중에는 장갑을 착용하지 말아 주십시오. • 회전 공구에 신체나 의복이 접촉되지 않도록 주의해 주십시오.
	• 회전속도는 추천 조건의 범위 내에서 사용하여 주십시오. • 정기적으로 회전부의 정도 및 밸런스를 보정하여 주십시오.
	• 안전 커버와 보호안경 등의 보호구를 사용하여 주십시오.
	• 취급할 때에는 안전면에서 충분히 주의하여 주십시오. • 보호장갑, 보호안경 등을 사용하여 주십시오.
용접형 공구	• 사용 전에 확실히 용접되어 있는지 확인하여 주시오. • 고온으로 되는 조건에서는 사용하지 말아 주시오.
기타	• 수 차례 용접 되어진 팁은 강도가 저하 되어져 있기 때문에 사용하지 말아 주십시오.
	• 정해진 사용 방법을 준수하여 주십시오.

홈페이지 소개

1) 인터넷을 이용해서 홈페이지에 접속해 주십시오

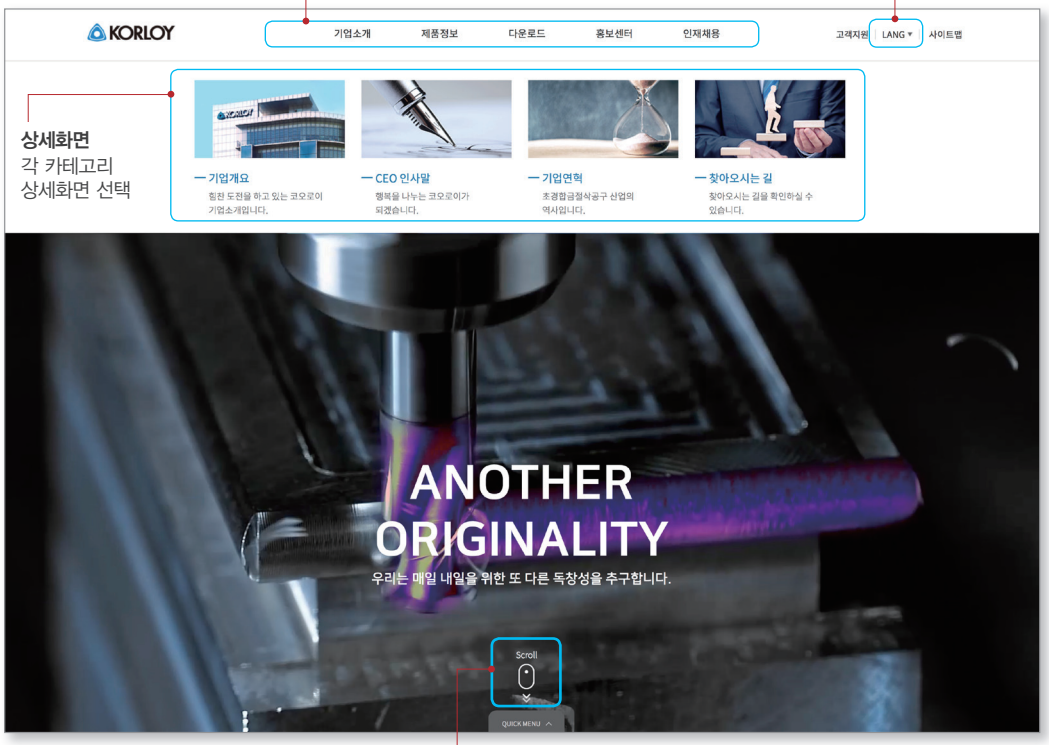
» **http://www.korloy.com** (코오로이 홈페이지)

2) 카테고리를 선택하여 클릭 하십시오

메인화면 안내

전체 카테고리 검색
원하는 항목별 검색이 가능

언어별 선택
각국 언어별 사이트로 이동

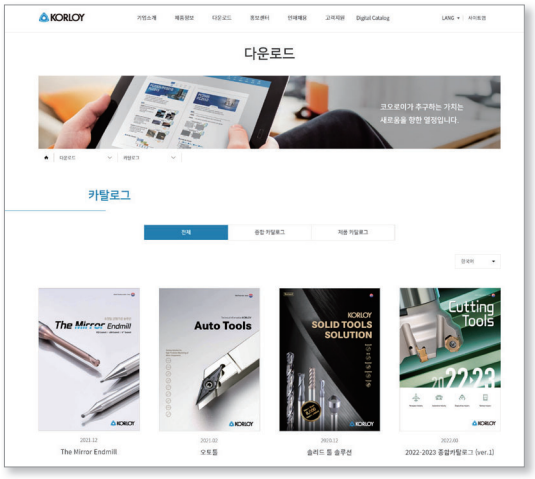


상세화면
각 카테고리
상세화면 선택

퀵 메뉴
마우스를 스크롤하면 빠르게 제품 정보 및 코오로이 뉴스 등을 확인 가능

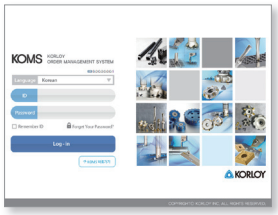
상세화면에서 필요한 자료 검색

» 기술자료 다운로드



기술자료 다운로드 : 다양한 기술자료 섹션별 다운로드 및 검색가능

» KOMS 바로가기



» 정품인증 바로가기



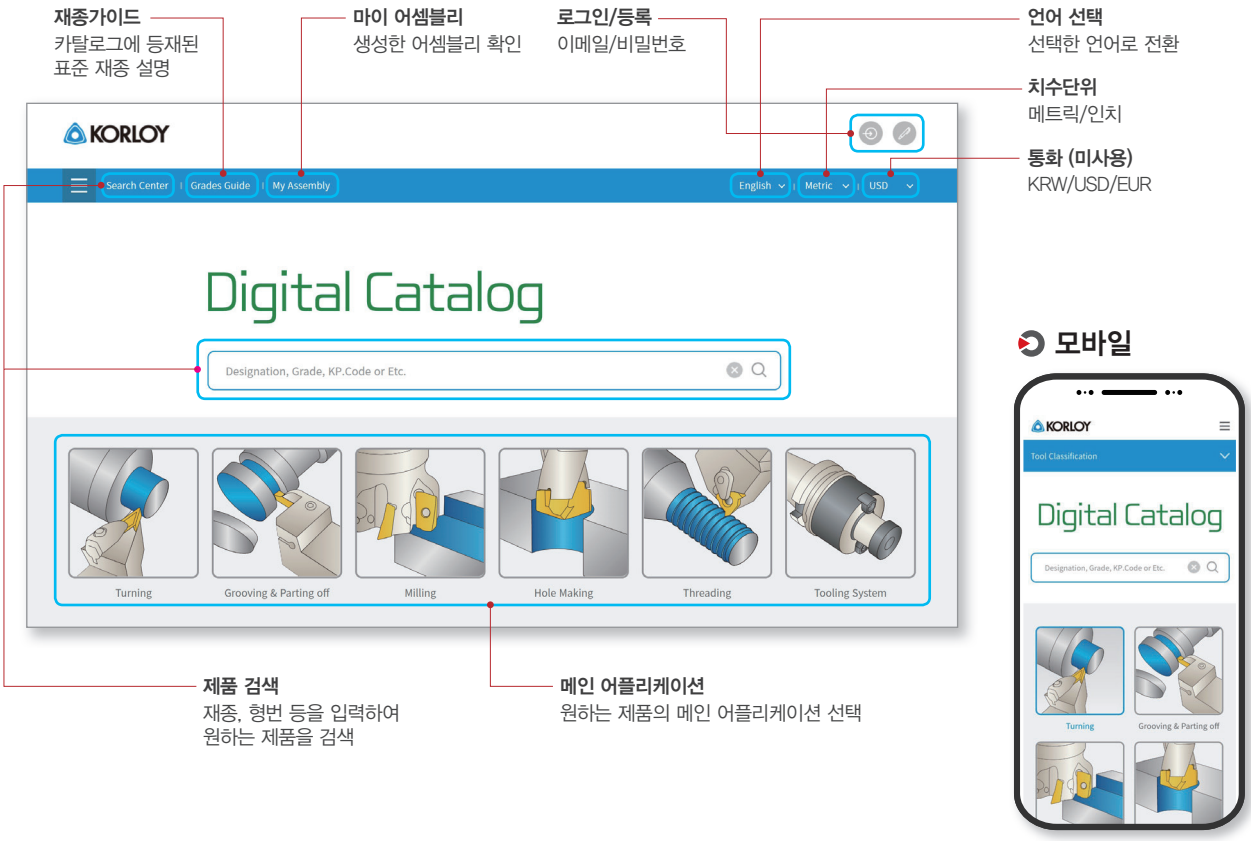
디지털 카탈로그(Digital Catalog) 소개

1) PC 또는 모바일에서 디지털 카탈로그에 접속해 주십시오

» **https://catalog.korloy.com**

2) 메인화면 안내

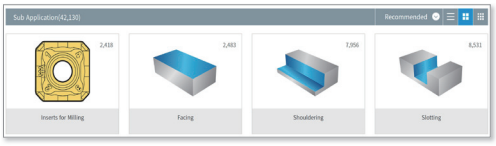
PC



모바일

세부 화면

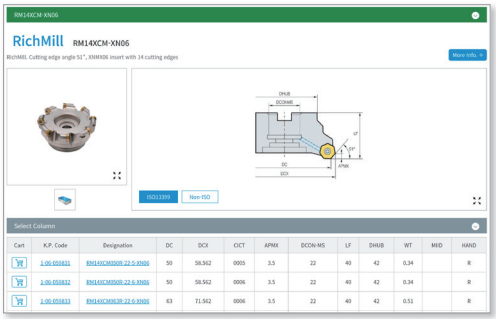
» 서브 어플리케이션



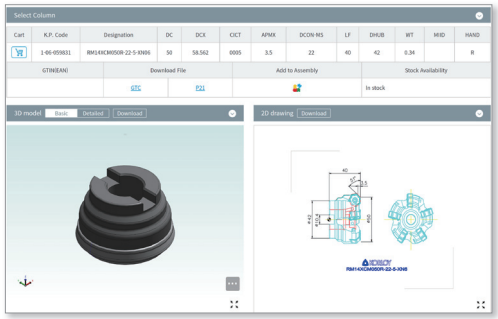
» 아이템 그룹



» 아이템



» 아이템 데이터, 2/3D 모델링 등



온라인전시관 소개

1) 인터넷을 이용해서 홈페이지에 접속해 주십시오

» https://www.korloy.com/ko/prcenter/media_list.do#online

2) 메인화면 안내



① **미니맵** | 원하는 전시관으로 이동
② **안내데스크** | 국문/영문 소개
③ **사이드메뉴** | 원하는 항목별 검색 가능
④ **제품명/설명** | 국문/영문
⑤ **동영상** | 제품 홍보영상
⑥ **테크뉴스** | 제품 테크뉴스 확인
⑦ **제품 상세정보** | 제품 정보 및 홍보영상 확인
⑧ **3D 모델링** | 3D 모델링뷰 확인
※ 모바일로 접속가능

세부화면

» 신제품관



» 산업관



» 툴링가이드



» 역사관



» 스마트팩토리



» 포스터



툴키퍼(Tool Keeper)소개

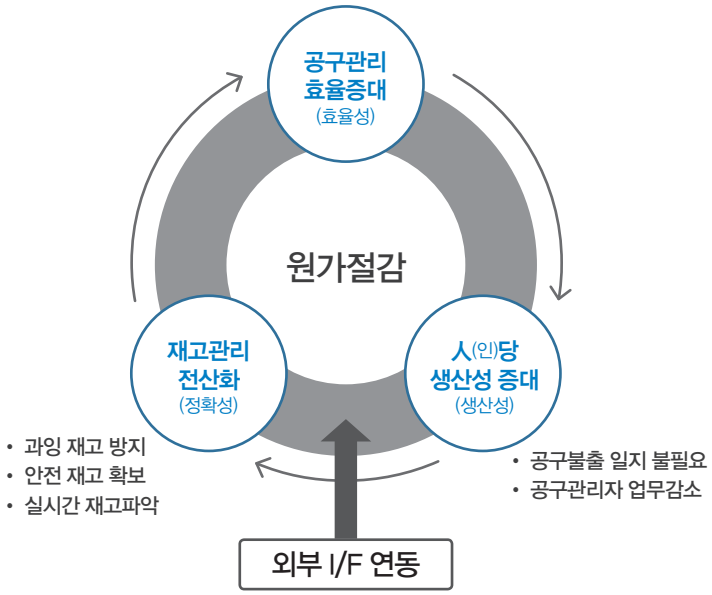
툴키퍼 (Tool Keeper)

현장 맞춤형 소프트웨어로, 모든 공구(자재)의 입 • 출고를 24시간 제어 및 관리할 수 있는 4차 산업혁명을 선도하는 스마트 공구관리 시스템



툴키퍼 특징

- 월 실적자료 검색(수량/금액)
- 입/출고 이력/현황 검색
- 통계자료 전산화(사용실적 등)



- 과잉 재고 방지
- 안전 재고 확보
- 실시간 재고파악

- 공구불출 일지 불필요
- 공구관리자 업무감소

더욱 강력해진 SMART형 (SOFTWARE : V3)

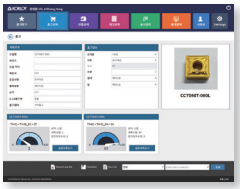
» 툴키퍼 프로그램



• 로그인 : 지문인식, 언어 변경 가능



• 제품 검색기능 강화 (바코드/색인어)

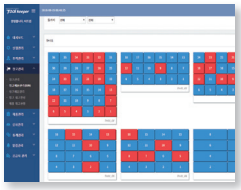


• 제품 이미지 추가 기능 탑재

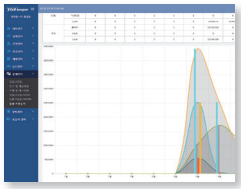
» 관리자 프로그램



• 초기화면 대쉬보드 (주요 자료 현황판)



• 안전재고/발주관리 알림 기능 탑재



• 통계 관리 다운로드 가능

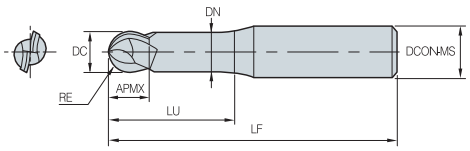


KORLOY 서버 이용시 혜택

- 스마트 앱을 통한 간편출고 기능 서비스
- 자동 백업/복구 서비스
- 월간 리포트 구독 서비스

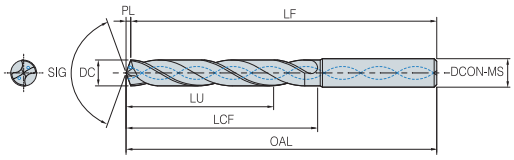
ISO13399 용어 설명집

엔드밀



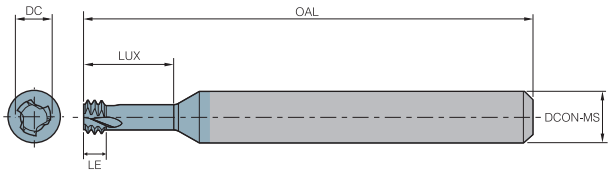
ISO13399 Property Symbols	Property Name(영문)
AP	절삭깊이(Axial depth)
APMX	최대 절삭 깊이(Depth of cut maximum)
BHTA	바디 하프 테이퍼 각도(Body half taper angle)
CA	충돌각도(Collision Angle)
CHW	코너 챔퍼 폭(Corner chamfer width)
DC	절삭 직경(Cutting diameter)
DCON-MS	연결 직경 – 기계측(Connection diameter machine side)
DCX	최대 절삭 직경(Cutting diameter maximum)
DN	목 직경(Neck diameter)
FHA	플루트 헬릭스각(Flute helix angle)
KCH	코너 챔퍼(Corner chamfer)
L	절삭날 길이(Length)
LF	기능 길이(Functional length)
LS	샹크 길이(Shank length)
LU	유효 길이(최대 추천)(Usable length (max. recommended))
LUX	최대 사용 가능 길이(Usable length maximum)
NOF	플루트 수(Flute count)
OAL	전체 길이(Overall length)
PSIR	공구 리드각(Tool lead angle)
RE	코너 반경(Corner radius)
WT	품목 무게(Weight of item)

드릴, 리머



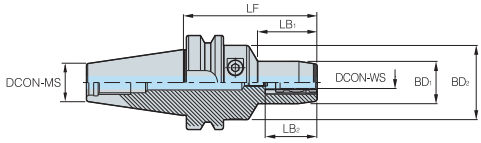
ISO13399 Property Symbols	Property Name(영문)
CW	절삭 폭(Cutting width)
DC	절삭 직경(Cutting diameter)
DCN	최소 절삭 직경(Cutting diameter minimum)
DCON-MS	접촉 표면 직경 – 기계측(Contact surface diameter machine side)
L	절삭날 길이(Cutting edge length)
LCF	칩 플루트 길이(Length chip flute)
LF	기능 길이(Functional length)
LH	헤드 길이(Head length)
LS	샹크 길이(Shank length)
LU	유효 길이(최대 추천)(Usable length (max. recommended))
NOF	플루트 수(Flute count)
OAL	전체 길이(Overall length)
PL	포인트 길이(Point length)
SDL	스텝 직경 길이(Step diameter length)
SIG	포인트 각도(Point angle)
ULDR	사용 가능 길이, 직경 비율(Usable length diameter ratio)
WT	품목 무게(Weight of item)

솔리드 나사엔드밀



ISO13399 Property Symbols	Property Name(영문)
APMX	최대 절삭 깊이(Depth of cut maximum)
BSG	기본 표준 그룹(Basic standard group)
CZCMS	연결 크기 코드 – 기계측(Connection size code machine side)
DC	절삭 직경(Cutting diameter)
DCN	최소 절삭 직경(Cutting diameter minimum)
DCONMS	연결 직경 – 기계측(Connection diameter machine side)
DCX	최대 절삭 직경(Cutting diameter maximum)
DN	목 직경(Neck diameter)
LE	유효 길이(Effective length)
LF	기능 길이(Functional length)
LS	샹크 길이(Shank length)
LU	유효 길이(최대 추천)(Usable length (max. recommended))
LUX	최대 사용 가능 길이(Usable length maximum)
NOF	플루트 수(Flute count)
NT	날 카운트(Tooth count)
OAL	전체 길이(Overall length)
PHD	탭전 드릴 직경(Premachined hole diameter)
PL	포인트 길이(Point length)
SIG	포인트 각도(Point angle)
TCDMM	샹크 직경 공차(Shank diameter tolerance)
TCTR	나사 공차 등급(Thread tolerance class)
TD	나사 직경(Thread diameter)
TDZ	나사 직경 크기(Thread diameter size)
THCHT	나사 가공 챔퍼 형태(Threading chamfer type)
THFT	나사 형태 유형(Form type)
THL	나사 길이(Thread length)
TP	나사 피치(Thread pitch)
TPI	인치당 나사 수(Threads per inch)

툴링시스템



ISO13399 Property Symbols	Property Name(영문)
ADJ	거리조정나사(Adjust Screw)
BD	바디 직경(Body diameter)
DCON-MS	접촉 표면 직경 – 기계측(Contact surface diameter machine side
DCON-WS	접촉 표면 직경 – 가공물측(Contact surface diameter workpiece side)
LB	바디 길이(Body length)
LF	기능 길이(Functional length)
LSC	클램핑 길이(Clamping length)
OAL	전체 길이(Overall length)
RADW	바디 반경 폭(Radial body width)
RPMX	최대 회전 속도(Rotational speed maximum)
SSL	볼트간 거리(Set Screw sength)
SSZ	볼트 사이즈M(Set Screw Size)
TDZ	나사 직경 크기(Thread diameter size)
WT	품목 무게(Weight of item)

Super Endmill

Inconel718, Hastelloy, Waspaloy 등 니켈계 내열합금 가공에 최적화
(*HRSA : Heat Resistance Super Alloy, 내열합금)



내열합금(티타늄, 인코넬) 가공용 엔드밀 시리즈

Super Endmill For HRSA For Ti

» 항공/발전 산업군의 엔진, 터빈 등의 난삭재 부품 가공
» 절삭열 감소와 우수한 칩 배출성으로 난삭재 가공에 최적화

제품정보 : B13 페이지

초정밀 금형가공 솔루션

The Mirror Endmill

PCD 볼 엔드밀 » 초정밀 피삭재, 고경도 금형 폴리싱 가공용
» 날이 없는 PCD 구형 볼 엔드밀로 최적의 면조도 구현

cBN 볼 엔드밀 » 초정밀 경면 피삭재, HRC60 이상의 금형 가공용
» 고속 가공시 뛰어난 면조도 및 생산성 향상

제품정보 : B22 페이지



The Mirror Endmill

HRC60 이상의 고경도 금형 초정밀 가공에 적합

PCD, cBN전용 재종으로 공구 내마모성 향상



고속, 고경도용 엔드밀

H-Star Endmill

» 초미립 모재 적용으로 공구의 인선강도 향상

» 신규코팅 적용으로 고속가공시 날부 고온 내산화성, 경도 유지

» 고속가공에 적합한 인선부 설계로 안정적인 성능 유지

제품정보 : B24 페이지

H-Star Endmill

HRC50~63 고경도 피삭재의 고속가공에 적합

롱 넥, 리브, 테이퍼 넥 등의 제원으로 다양한 형상의 가공 프로세스에 적합



범용 중경도 엔드밀(HRC30~50)

U-Star Endmill

» 금형 가공 시 황삭 및 중 · 정삭, 곡면과 경사면, 특수 형상 등 광범위한 가공 방식 대응

» 고인성 모재 적용으로 가공 시 높은 내치핑성, 경도 유지

» 최신의 코팅기술로 높은 내산화성 및 인선 강도

제품정보 : B92 페이지

U-Star Endmill

HRC30~50 중경도의 합금강, 탄소강, 금형강 등 가공에 적합

미니어처 타입, 테이퍼 넥, 구형 볼 등 다양한 형상 시리즈 보유



고효율 러핑 엔드밀

R+ Endmill

» 고효율 러핑 인선 적용으로 우수한 가공 효율 확보

» 특수 인선 설계와 부등분할, 부등리드 적용으로 절삭 부하 감소

제품정보 : B186 페이지

R+ Endmill

러핑에 최적화된 인선형상 적용

가공 효율 우수 – 중삭, 황삭 가공용 형상 적용



S-Star Endmill

스테인리스(STS) 가공 시 최적 성능을 발휘
(보통강, 합금강, 소입강 가공 가능)

강력한 커팅엣지 구현으로 공구수명 증대

스테인리스 가공용 엔드밀

S-Star Endmill

» 내산화성이 강화된 스페셜 코팅 적용

» 고경사각과 유선형 칩포켓이 형성되어 있어 칩 배출이 용이

» 인선 내치핑성을 극복하기 위해 특수설계된 날끝 형성

제품정보 : B193 페이지



알루미늄 가공용 엔드밀

A-Star Endmill

» 더블 여유각 채용(인선강성 향상으로 탁월한 생산성 효과)

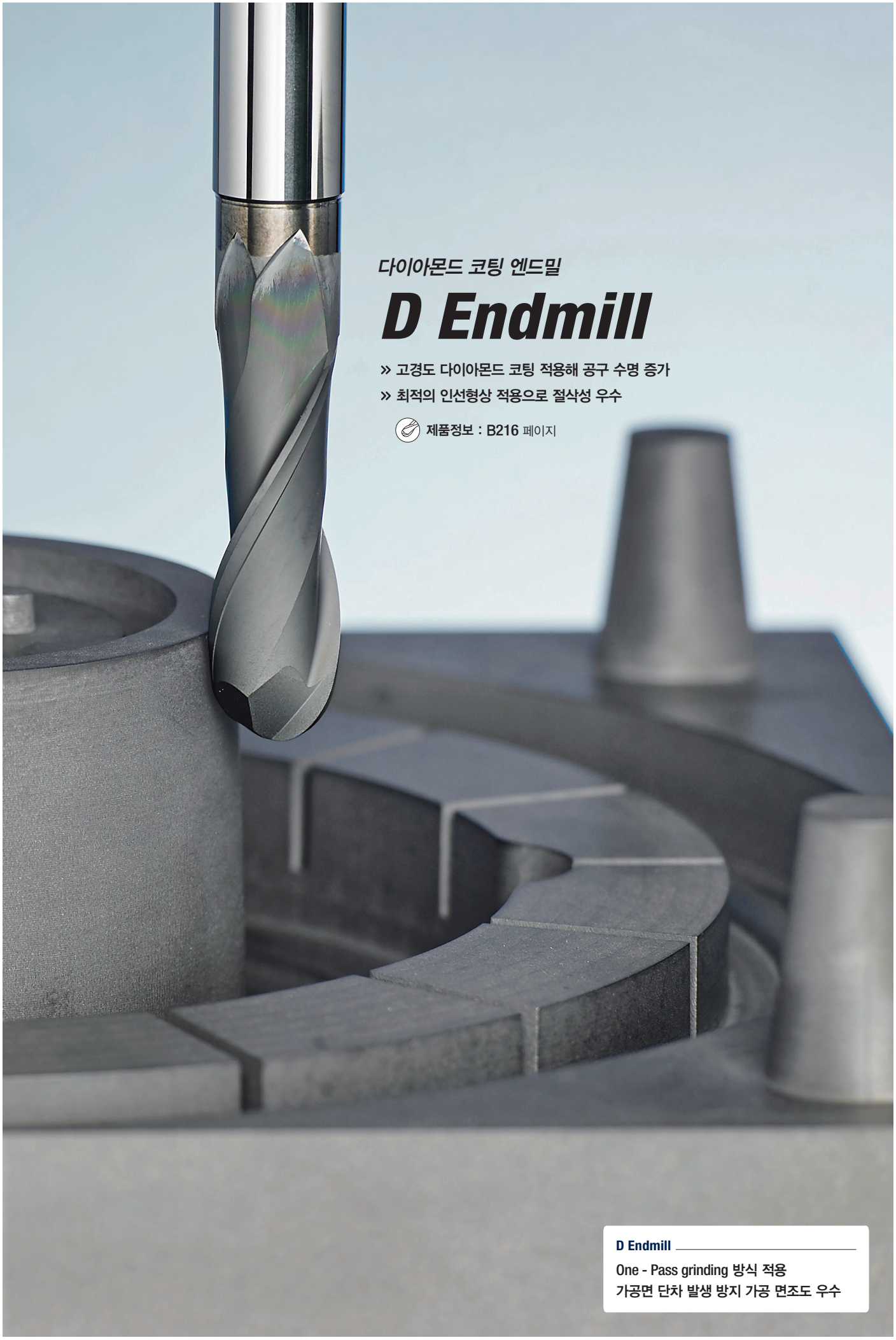
» 샤프엣지 구현(황삭/사상용에서도 적용 가능한 샤프한 인선엣지 구현)

» U플루트 형상으로 고이송 가공에서도 효과적인 칩 배출

제품정보 : B205 페이지

A-Star Endmill

독자적인 U 플루트 형상 디자인



다이아몬드 코팅 엔드밀

D Endmill

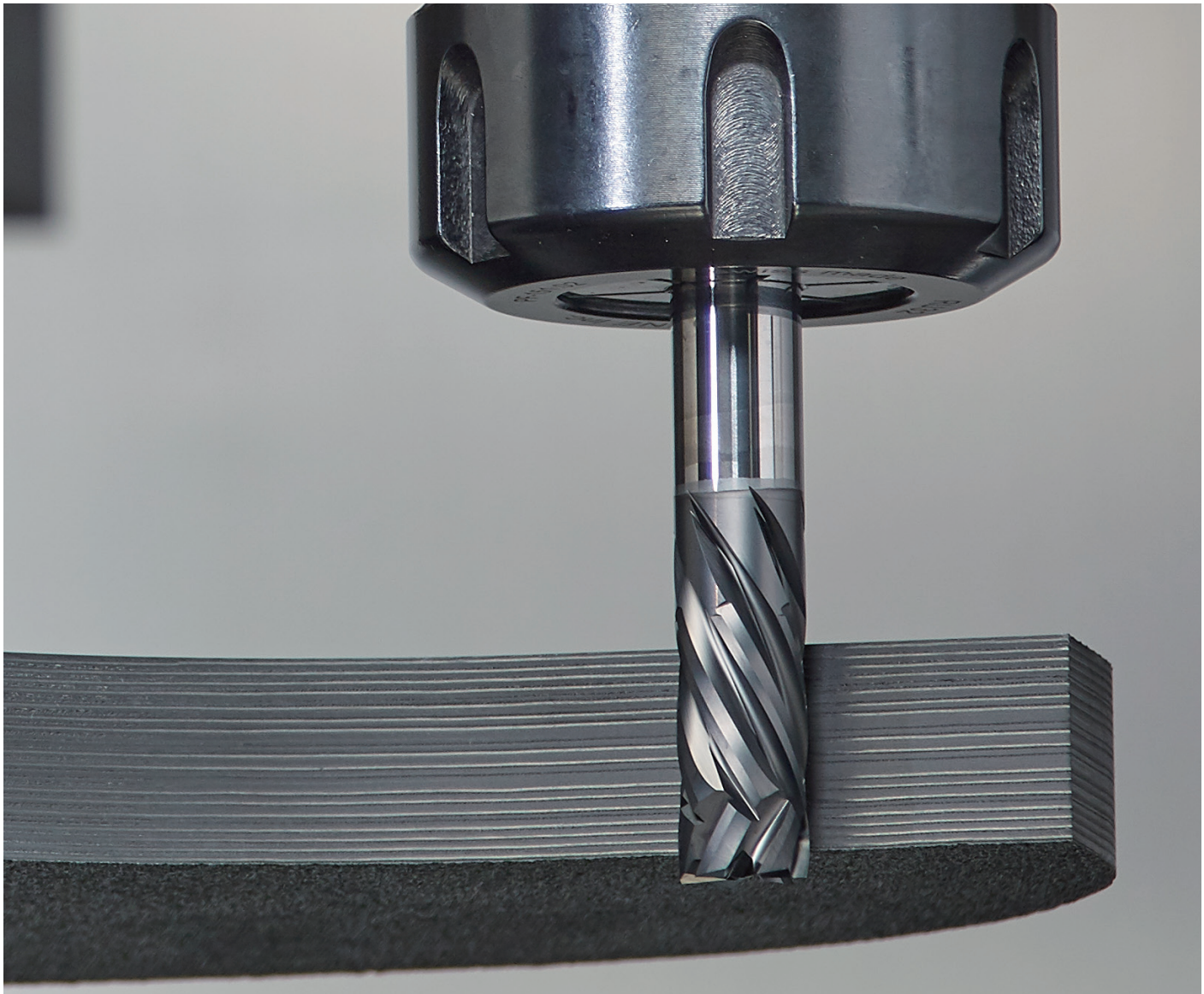
» 고경도 다이아몬드 코팅 적용해 공구 수명 증가

» 최적의 인선형상 적용으로 절삭성 우수

제품정보 : B216 페이지

D Endmill

One - Pass grinding 방식 적용
가공면 단차 발생 방지 가공 면조도 우수



복합소재 가공용 라우터 엔드밀

Composite Router Endmill

» 표면박리 & 버 발생 억제를 위한 형상설계

» 고능률 가공을 통한 생산성 향상

제품정보 : B224 페이지

Composite Router Endmill

Nano–Crystalline 다이아몬드 코팅 적용으로 공구수명 우수

복합소재(CFRP, GFRP 등) 가공에 최적화된 라우터 엔드밀

Zirconia, Titanium, Co–Cr, Wax, PMMA 등
치아보철 가공용 엔드밀

T Endmill

» 인선 형상 최적화로 가공면 단차 발생 억지 및 가공 면조도 우수
» 가공기별 맞춤 형상 대응으로 차별화된 공구 제공

제품정보 : B228 페이지



T Endmill
맞춤 대응을 통한 다양한 치아보철 피삭재 및
덴탈 밀링머신 적용 가능

치아보철 종류별 맞춤 재종 대응으로 최적의 가공 성능 확보



Multi 가공이 가능한 다기능, 고능률 엔드밀

M+ Endmill

» 하나의 엔드밀로 다양한 가공 가능
드릴(Drilling), 경사(Ramping), 홈(Slotting), 측면(Side Milling)
» 탁월한 공구 강성으로 절삭저항 감소 및 표면조도 향상

제품정보 : B251 페이지

M+ Endmill
크롬 계열 코팅 적용으로 절삭 능력 향상



자동차 부품 등 다양한 피삭재의 고능률 구멍 가공 실현

MSD Plus

» 자동차 부품 등 다양한 피삭재의 고능률 구멍 가공 실현

» 칩 포켓 확대로 인한 칩 배출 우수

제품정보 : C6 페이지

MSD Plus

신규 PC325U 재종 추가로 내마모성 향상

MLD Plus

신규 PC315G 재종 추가로 내마모성 향상

고정밀 · 고품질의 깊은 홀 가공을 위한 최적의 공구

MLD Plus

» 가이드 마진 추가로 가공 안정성 확보

제품정보 : C25 페이지



인코넬, 티타늄 홀 가공 전용

MSD Plus-S

» 최적의 인선형상과 칩 포켓 구현으로 가공 안정성 확보

» 고온 내치핑성이 우수한 코팅 적용으로 공구 수명 향상

제품정보 : C11 페이지

MSD Plus-S

항공, 에너지, 발전, 자동차 산업의 내열합금 가공 전용
마하 솔리드 드릴

가공 안정성 확보를 통한 생산성 향상 / 내마모성 향상



CFRP 피삭재의 홀 가공을 위한 최적의 공구

MSD Plus for CFRP

» 인선부 절미 향상으로 CFRP 피삭재 가공시 버(Burr) 감소, 우수한 홀 품질

제품정보 : C16 페이지

MSD Plus for CFRP

신규 ND2100 다이아코팅 재종 적용으로 내마모성 우수



경사면, 곡면, 평면 등
다양한 가공물의 홀 가공을 위한 최적의 공구

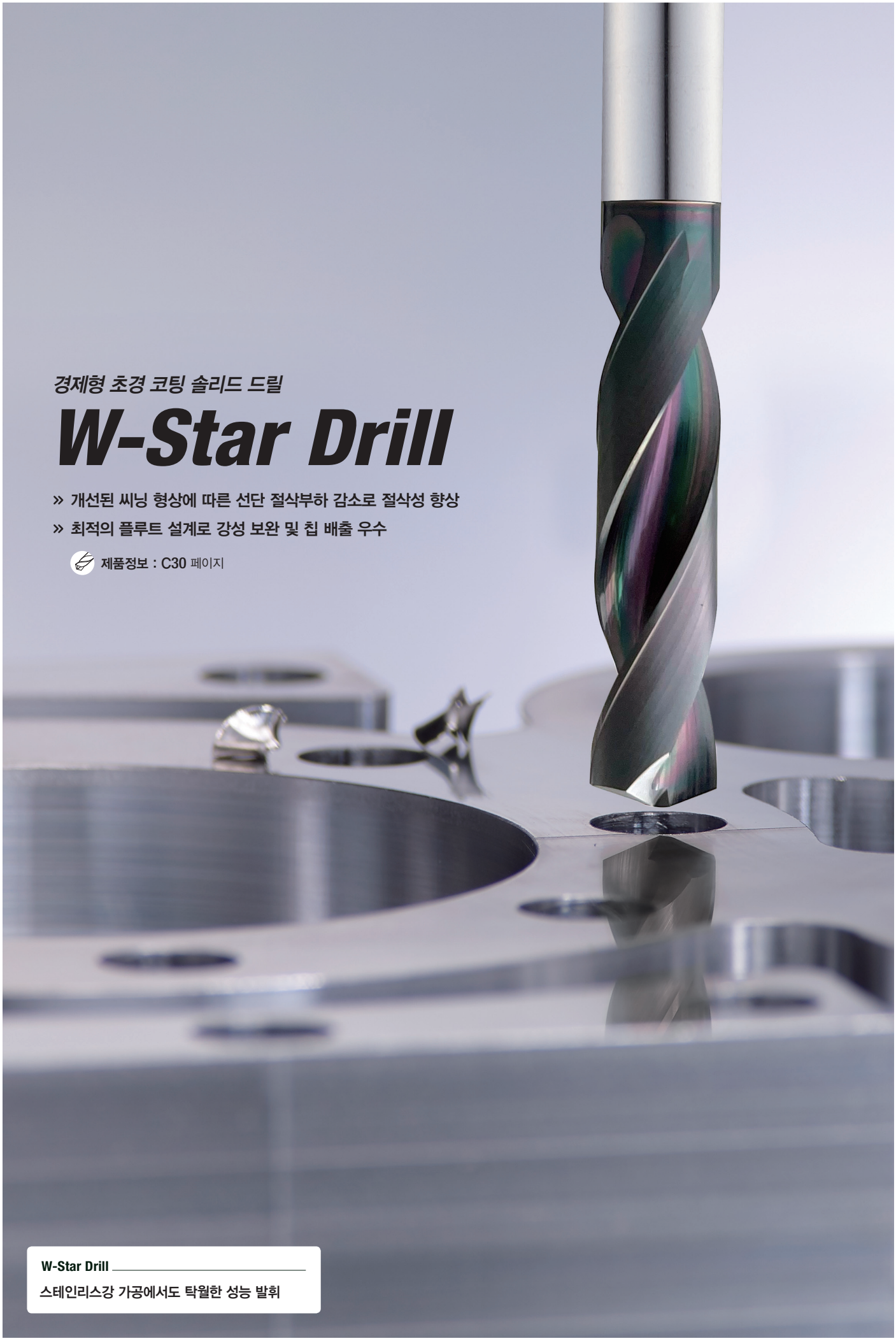
MSFD

» 선단각 180° 형상으로 경사면 등 고품질 홀 가공 가능

제품정보 : C18 페이지

MSFD

인선부 호닝, 면취 적용을 통한 내치핑성, 내융착성 향상 및 버(Burr) 최소화



경제형 초경 코팅 솔리드 드릴

W-Star Drill

» 개선된 씨닝 형상에 따른 선단 절삭부하 감소로 절삭성 향상

» 최적의 플루트 설계로 강성 보완 및 칩 배출 우수

제품정보 : C30 페이지

W-Star Drill

스테인리스강 가공에서도 탁월한 성능 발휘



비철금속, 연강 가공용 초경 솔리드 드릴

SSD-N

» 안정된 제품 성능으로 생산성 증가

제품정보 : C35 페이지

SSD-N

연강, 비철류의 다양한 피삭재 가공에 적용



PCD Drill
고정밀급 Premium PCD 드릴

고능률 가공이 가능한 PCD 드릴

PCD Drill

» 다양한 영역 가공이 가능한 고기능성 드릴
- Cone type 드릴
- Sandwich type 드릴

» 탁월한 정밀도 및 표면조도 구현

제품정보 : C39 페이지

고능률 가공이 가능한 다양한 카운터 싱크

Counter Sink

» 고능률 가공을 위한 부등 분할(Unequal Division) & 부등 리드(Unequal Lead) 적용

» 향상된 절삭성으로 고정밀의 안정적인 가공 가능

» 신규박막 적용으로 가공안정성과 높은 수명 확보

제품정보 : C55 페이지

Counter Sink
빠르고 안정적인 초경 / 하이스 카운터싱크



GRADES

재종

코오로이 신재종은 피삭재별 경도와 인성이 최적화된 전용모재를 사용하고 있으며,
최첨단의 PVD 및 CVD코팅장비를 사용하여 고온경도, 내산화성이 우수한
PVD코팅 및 고온 내열성, 내마모성이 향상된 CVD코팅을 개발하여 적용하고 있습니다.
또한, 표면조도를 획기적으로 개선시킨 최신 공법을 적용하여
고객의 생산성 향상에 기여하고 있습니다.

Technical information for GRADES

재종 가이드

A28 코오로이 재종 일람표
A29 코오로이 재종 분류

솔리드 재종

A30 솔리드 엔드밀 재종 선정
A32 솔리드 엔드밀 재종
A33 솔리드 드릴 재종 선정
A34 솔리드 드릴 재종
A35 다이아몬드 코팅 재종
A36 DLC 코팅 재종
A37 PCD 인써트 재종

코오로이 재종 일람표

재종 일람표

구분	코팅	재종	ISO						엔드밀	드릴
			P	M	K	S	N	H		
			강	스테인리스강	주철	내열합금	비철금속	고경도강		
초경	PVD	PC210C					N10-N20		•	
		PC215G	P15-P30	M15-M25	K15-K30					•
		PC303W	P05-P15	M05-M15	K05-K15				•	
		PC305H	P05-P15	M05-M15	K05-K15			H05-H15	•	
		PC315G	P15-P30	M15-M25	K15-K30					•
		PC315W	P15-P30	M15-M25	K15-K30	S15-S25	N15-N25		•	
		PC320	P20-P35	M20-M30	K20-K35	S20-S30	N15-N25		•	
		PC325		M15-M25		S15-S25			•	
		PC320W	P20-P35	M20-M30	K20-K35	S20-S30	N15-N25			•
		PC325T		M20-M30		S15-S25				•
		PC325U	P20-P35	M20-M30	K20-K35					•
		PC2510				S05-S15			•	
		SL		M20-M30		S15-S25			•	
		UL		M20-M30		S15-S25			•	
	비코팅	FA1	P10-P20		K10-K20		N10-N20			•
		FG2	P05-P25	M05-M25	K05-K25		N05-N25	H15-H30		•
		H01					N10-N20		•	
		H05S					N10-N20		•	
다이아코팅	CVD	ND2100					N01-N10		•	•
		ND3000					N01-N05		•	
PCD	비코팅	DP90					N01-N20		•	•
		DP150					N05-N25		•	•
		DP200					N10-N30		•	•

선정기준

피삭재		ISO	적용범위
P	강	P01	
		P10	PC303W, PC305H, FA1, FG2
		P20	PC215G, PC315G, PC315W, PC320, PC320W, PC325U
		P30	
		P40	
M	스테인리스강	M01	
		M10	PC303W, PC305H, FG2
		M20	PC215G, PC315G, PC315W, PC320, PC325, PC320W, PC325T, PC325U, SL, UL
		M30	
K	주철	K01	
		K10	PC303W, PC305H, FA1, FG2
		K20	PC215G, PC315G, PC315W, PC320, PC320W, PC325U
		K30	
		K40	
S	내열합금	S01	
		S10	PC2510
		S20	PC315W, PC320, PC325, PC320W, PC325T, SL, UL
		S30	
N	비철금속	N01	ND2100, ND3000, DP90
		N10	PC210C, FA1, FG2, H01, H05S, DP150, DP200
		N20	PC315W, PC320, PC320W
		N30	ND3000
H	고경도강	H01	
		H10	PC305H
		H20	FG2
		H30	

코오로이 재종 분류

절삭공구용

솔리드 엔드밀	P M K	강용	PC305H	PC303W	PC315W	PC320	PC325
	S	내열합금용	SL	UL	PC2510	PC325	
	H	열처리강	PC305H				
	N	비철금속용	ND3000	ND2100	PC210C	H01	H05S
솔리드 드릴	P M K	강용	PC325U	PC215G	PC315G	PC320W	
	S	내열합금용	PC325T				
	N	비철금속용	FG2	FA1	ND2100		
PCD	N	비철금속용	DP90	DP150	DP200		

솔리드 엔드밀 재종 선정기준

피삭재		ISO	적용범위
P	강	P01	
		P10	PC305H, PC303W
		P20	PC315W
		P30	PC320
		P40	
M	스테인리스강	M01	
		M10	PC305H, PC303W
		M20	PC315W, PC320, PC325
		M30	
K	주철	K01	
		K10	PC305H, PC303W
		K20	PC315W, PC320
		K30	
		K40	
S	내열합금	S01	
		S10	PC2510
		S20	SL, UL, PC325
		S30	
N	비철금속	N01	ND3000, ND2100
		N05	
		N10	H01, H05S, PC210C
		N20	
H	고경도강	H01	
		H10	PC305H
		H20	

솔리드 드릴 재종 선정기준

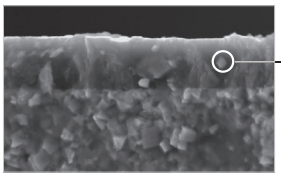
피삭재		ISO	적용범위
P	강	P01	
		P10	
		P20	PC215G, PC315G, PC325U, PC320W
		P30	
M	스테인리스강	M01	
		M10	
		M20	PC215G, PC315G, PC320W, PC325U
		M30	
K	주철	K01	
		K10	
		K20	PC215G, PC315G, PC320W, PC325U
		K30	
N	비철금속	N01	ND2100
		N10	FG2, FA1
		N20	
S	내열합금	S10	
		S20	PC325T

솔리드 엔드밀 재종 선정

SL

- 표면처리 기술을 더하여 내용착성, 내치핑성, 가공 안정성 향상

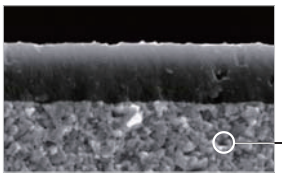
특징



UL

- 독자적인 윤활 코팅 기술을 적용하여 칩 처리성, 내용착성 향상

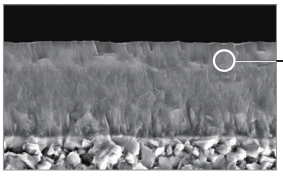
특징



PC305H

- 고경도용 모재 + 고경도용 코팅 적용하여 내마모성 향상, 마찰열에 의한 안정성 확보

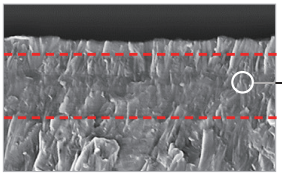
특징



PC303W / PC315W

- Multi layer 박막으로 내마모성과 내산화성 향상
- Cr 함유를 통한 윤활성 향상
- 마찰열에 의한 안정성 확보

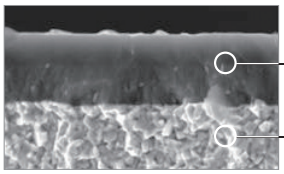
특징



PC305H

- 내치핑성과 내마모성이 우수한 박막
- 황삭~정삭가공까지 광범위한 적용가능

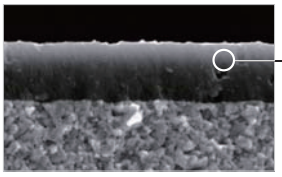
특징



PC305H

- Multi layer 적용
- Cr 함유를 통한 윤활성 향상
- 마찰열에 대한 안정성 확보
- 박막 두께를 향상을 통한 내마모성 확보

특징

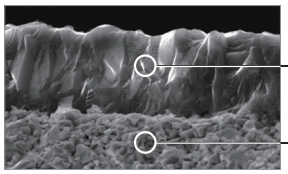


솔리드 엔드밀 재종 선정

PC210C

- 윤활성 및 내마모성, 내치핑성이 우수한 K-Silver 코팅
- 동, 황동, 청동 및 비철금속 피삭재 가공에 적합
- 동 전극 가공 시 우수한 절삭 수명 및 가공 면조도 보장

특징

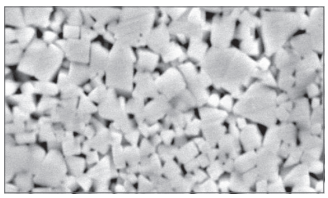


PC2510

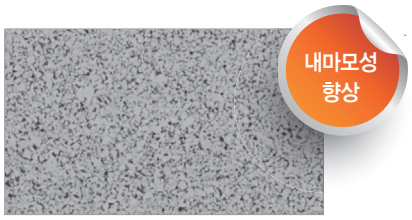
- 향상된 표면조도를 제공하는 코팅 후처리 기술 적용
- 초미립 고인성 모재를 적용하여 안정적인 인성을 바탕으로 고경도강의 단속 및 열충격이 큰 습식 가공용에 최적화된 재종

특징

1. 고인성 초미립 모재기술 적용



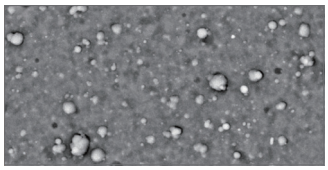
[미립 재종]



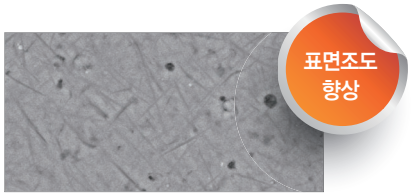
[초미립 재종]

고인성과 우수한 내마모성을 갖춘 모재로
Titanium 가공 시 인선부 집중되는 열충격에 최적화

2. 코팅 후처리 기술 적용



[일반 코팅]



[코팅 후처리]

코팅 후처리 기술을 적용하여
향상된 표면조도를 제공

솔리드 엔드밀 재종

제품별 재종 현황

품 목	초경		하이스	
	코팅	논코팅	코팅	논코팅
Super Endmill	SL, UL	-	-	-
The Mirror Endmill	-	PCD, cBN	-	-
H-Star Endmill	PC305H	-	-	-
U-Star Endmill	PC303W, PC315W	-	-	-
I+ Endmill	PC320	-	-	-
R+ Endmill	PC10T, PC20T, PC30T, PC40T	FN30T	HC10T, HC20T, HC30T	HN20T, HN30T
S-Star Endmill	PC325	-	-	-
A-Star Endmill	-	H05S	-	-
D Endmill	ND3000	-	-	-
Composite Router Endmill	ND2100	-	-	-
T Endmill	PC2510, ND3000	H01	-	-
C-Max	PC210C	-	-	-
M+ Endmill	PC40T	-	-	-
PCD Endmill	-	DP200	-	-

재종의 특징

재 종	ISO	특 징
SL	M20 ~ M30, S15 ~ S25	• 인코넬 전용 내산화성 및 고온경도가 우수한 코팅 적용 • 인선부 결손 억제, 내마모성 향상
UL	M20 ~ M30, S15 ~ S25	• 티타늄 전용 독자적인 윤활 코팅 기술을 적용하여 칩 처리성, 내용착성 향상 • 내치핑성이 강화된 모재 적용
PC305H	P05 ~ P15, M05 ~ M15 K05 ~ K15, H05 ~ H15	• 신규 AlTiSiN계 박막 적용으로 고함량의 Si성분, 내마모성 향상, 마찰열에 의한 안정성 확보
PC303W	P05 ~ P15, M05 ~ M15, K05 ~ K15	• Multi layer 박막으로 내마모성과 내산화성 향상 • Cr함유를 통한 윤활성 향상 및 마찰열에 의한 안정성 확보
PC315W	P15 ~ P30, M15 ~ M25, K15 ~ K35 S15 ~ S25, N15 ~ N25	
PC320	N15 ~ N25, P20 ~ P35, K20 ~ K35 M20 ~ M30, S20 ~ S30	• 일반 범용 강의 저속/중속 가공용 • 내치핑성 및 내마모성이 우수한 신개념 코팅 적용 • 초미립 모재 적용 및 코팅 조합에 의한 고속 절삭 가공 시 내마모 및 내용착성 우수
PC325	M15 ~ M25, S15 ~ S25	• 스테인리스강 및 내열합금 강의 저속/중속 가공용 • 내용착성 및 내산화성이 우수한 신개념 코팅 적용 • 초미립 모재 적용 및 코팅 조합에 의한 고속 절삭 가공 시 내마모 및 내용착성 우수
ND3000	N01 ~ N05	• 흑연전극 고/중속 가공용 • 내마모성 윤활성이 우수한 다이아몬드 코팅 적용
ND2100	N01 ~ N10	• 복합소재 가공용 • 밀착력이 우수한 다이아몬드 코팅 적용
PC210C	N10 ~ N20	• 동, 동전극 고/중속 가공용 • 아크릴류 고/중속 가공용 • 윤활성, 내마모성이 우수한 K-Silver 코팅 및 내치핑성이 우수한 모재적용

제품의 특징

제 품	용 도	특 징
Super Endmill	내열합금 가공 엔드밀	• 고윤활성 코팅, 특수 표면 처리 기술을 적용하여 내용착성, 내치핑성, 가공 안전성 향상
The Mirror Endmill	초정밀 금형가공 엔드밀	• H_RC60이상의 고경도 금형 초정밀 가공에 적합 • PCD, cBN전용 재종으로 공구 내마모성 향상
H-Star Endmill	고경도용 엔드밀, H_RC50~63	• H_RC50~63 고경도강 가공용 초경 엔드밀 • 날경 및 레디우스 고정밀 공차 적용으로 정밀가공에 적합
U-Star Endmill	범용 중경도 엔드밀, H_RC30~50	• H_RC30~50 중경도강, 금형강 가공용 초경 엔드밀 • AlCrN계 박막적용을 통한 내마모성, 윤활성 향상
I+ Endmill	경제형 범용 엔드밀, H_RC~45	• H_RC45 이하 탄소강, 합금강, 주철, 프리하든강 등 다양한 피삭재 가공에 탁월 • 초미립 모재 신규 코팅 적용으로 공구 수명을 향상
R+ Endmill	고효율 러핑 엔드밀	• 고효율 러핑 인선 적용으로 우수한 가공 효율 확보 • 특수 인선 설계와 부등분할, 부등리드 적용으로 절삭 부하 감소
S-Star Endmill	스테인리스강 가공 엔드밀	• 스테인리스강에 최적화한 인선 설계로 돌발 치핑을 최소화하여 안정적 가공 • 내산화성, 표면경도가 높은 신규코팅 적용으로 스테인리스강 계열 및 티타늄, 니켈 등에 우수한 성능 구현
A-Star Endmill	알루미늄용 엔드밀	• 초미립 초경소재를 사용함으로써 높은 인성을 요구하는 알루미늄 가공 시 칩의 용착을 방지하였고, 채터링 진동을 최소화 • 높은 이송 조건에서도 양호한 절삭이 가능
D Endmil	다이아몬드 코팅 엔드밀	• 흑연(그라파이트), 세라믹 가공용 다이아몬드 코팅 엔드밀 • 고경도, 고순도 다이아몬드 코팅 적용으로 내마모성 우수 • 우수한 코팅 밀착력으로 고속, 중(重) 절삭가공에 최적화 • 절미형상 및 인선형상 최적화로 절삭성 및 가공 면조도 우수
Composite Router Endmil	복합소재 가공용 라우터 엔드밀	• 복합소재(CFRP & GFRP) 가공용 라우터 엔드밀 • 표면박리, 섬유 뜯김, 버 발생 억제 형상 적용하여 가공결함 최소화 • 고경도, 고순도 Nano-Crystalline 다이아몬드 코팅 적용으로 내마모, 내박리성 우수
T Endmill	덴탈용 엔드밀	• 치아보철 소재(Zirconia, Titanium, Co-Cr, Wax, PMMA, Glass ceramic) 가공용 엔드밀 • 국·내외 치과 덴탈 밀링 가공기별 전용공구 맞춤 제작
C-Max	동 가공용 엔드밀	• 윤활성 및 내마모성 내치핑성이 우수한 K-Silver코팅과 최적의 모재 적용 • 동, 황동, 청동 및 비철금속 피삭재 가공에 적합
M+ Endmill	다기능 엔드밀	• 하나의 엔드밀로 다양한 가공 가능 – 드릴(Drilling), 경사(Ramping), 홈(Slotting), 측면(Side Milling) • 탁월한 공구 강성으로 절삭저항 감소 및 표면조도 향상
PCD Endmill	비철금속 가공용 엔드밀	• 비철금속(알루미늄합금, 카본, 흑연, 강화플라스틱) 가공에 최적

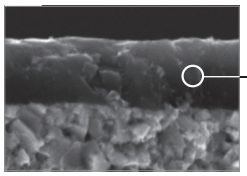
솔리드 드릴 재종 선정

마하 드릴(MSD) 재종

PC325U

- 표면처리 적용하여 윤활성 향상, 가공 부하 감소
- 내용착성의 증가로 안정적인 공구 수명 확보

특징



윤활성이 높은 신규 코팅으로 중/고속 영역에서 내용착성 증가

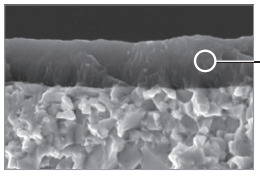
탄소강 영역에서 내마모성 증대

마하 드릴(MSD) 재종

PC325T

- 고온의 내열합금 가공에서 뛰어난 내마모성 실현
- 우수한 표면조도에 의한 마찰저항 감소 및 칩 배출 향상

특징



우수한 내열성 및 내산화성을 통한 공구 수명 향상

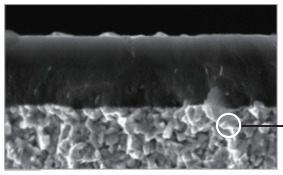
매끄러운 코팅 표면을 통한 윤활성 향상, 우수한 품질 구현

마하 롱 드릴(MLD) 재종

PC215G/PC315G

- 초미립 모재를 사용하여 내마모성 향상
- 코팅 윤활성 증가로 마찰 저항 감소 및 칩 배출 우수

특징



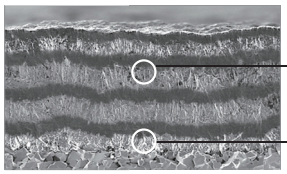
초미립 모재로 우수한 내마모성 확보

복합소재 가공용 재종

ND2100

- 나노 다이아몬드 입자와 마이크로 다이아몬드 입자를 교대 적층한 다층 코팅 기술을 적용하여 내마모성과 윤활성이 탁월함
- 특수 전처리 기술을 적용하여 코팅과 모재 간 밀착력 우수
- CFRP 가공 시 최적의 성능 발휘

특징



다층 코팅 기술 적용

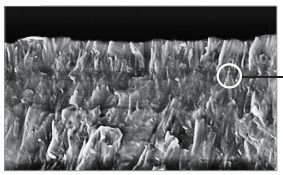
고밀착력 코팅 기술 적용

경제형 초경 코팅 솔리드 드릴 재종

PC320W

- 플루트 윤활성 향상에 따른 칩 배출 향상
- 다층 코팅으로 내마모성과 내산화성 향상

특징



신규 AlCrN 코팅

솔리드 드릴 재종

제품별 재종 현황

품 목	재 종	
	코팅	초경
MSD Plus	PC325U	FG2
MSD Plus-S	PC325T	-
MLD Plus	PC215G, PC315G	FG2
MSD Plus for CFRP	ND2100	-
MSFD	PC325U	-
W-Star Drill	PC320W	-
SSD-N	-	FA1, FG2

재종의 특징

재 종	ISO	특 징
PC325U	P20 ~ P35, M20 ~ M30, K20 ~ K35	• 강, 주철 스테인리스강의 범용성이 우수한 재종 • 내마모성 및 내치핑성이 우수하고 안정적인 절삭성능 확보 • 윤활성이 높은 신규 코팅으로 중/고속 영역에서 내용착성 증가
PC325T	M20 ~ M30, S15 ~ S25	• 고온의 내열합금 가공에서 뛰어난 내마모성 실현 • 내마모성 및 내치핑성이 우수하고 안정적인 절삭성능 확보
PC215G	P15 ~ P30, M15 ~ M25, K15 ~ K30	• 강, 주철 등 범용성이 우수한 재종 • 내마모성 및 내치핑성이 우수하고 안정적인 절삭성능 확보
PC315G	P15 ~ P30, M15 ~ M25, K15 ~ K30	• 강, 주철, 스테인리스강의 범용성이 우수한 재종 • 내마모성 및 내치핑성이 우수하고 안정적인 절삭성능 확보 • 윤활성이 높은 신규 코팅으로 중/고속 영역에서 내용착성 증가
ND2100	N01 ~ N10	• 복합소재 가공용 • 밀착력이 우수한 다이아몬드 코팅 적용
PC320W	S20 ~ S30, P20 ~ P35,M20 ~ M30 K20 ~ K35, N15 ~ N25	• 플루트 윤활성 향상에 따른 칩 배출 향상 • 다층 코팅으로 내마모성과 내산화성 향상
FG2	P05 ~ P25, M05 ~ M25, KO5 ~ K25 N05 ~ N25, H15 ~ H30	• 초미립 모재 사용으로 내마모성 및 내치핑성 향상
FA1	P10 ~ P20, K10 ~ K20, N10 ~ N20	

제품의 특징

구 분	특 징
MSD Plus	• 윤활성이 높은 신규 코팅으로 중/고속 영역에서 내용착성 증가 • 탄소강 영역에서 내마모성 증대 • 인선부, 플루트부 마찰 저항 감소
MSD Plus-S	• 고온 내마모성과 내치핑성이 우수한 내열합금 홀 가공 전용 공구 • 표면조도가 우수한 신규 코팅 적용으로 마찰저항 감소 및 칩 배출 향상 • 인선 치핑 및 공구 파손 예방으로 생산성 증가
MLD Plus	• Straight 인선 형상 적용으로 강성 증가 • 칩 포켓 확대 및 플루트 표면조도 향상으로 인한 칩 배출 우수 • 더블 마진 적용으로 가공 안정성 확보
MSD Plus for CFRP	• CFRP 피삭재의 홀 가공을 위한 최적의 공구 • 다이아코팅 재종 적용으로 내마모성 우수 • 인선부 절미 향상으로 CFRP 피삭재 가공시 버 감소
MSFD	• 선단각 180° 형상으로 경사면 등 고품질 홀 가공 가능 • 인선부 호닝, 면취 적용을 통한 내치핑성, 내용착성 향상 • 일반드릴 대비 버(Burr) 최소화
W-Star Drill	• 개선된 씨닝 형상에 따른 선단 절삭부하 감소로 절삭성 향상 • 최적의 플루트 설계로 강성 보완 및 칩 배출 우수 • 스테인리스강 가공에서도 탁월한 성능 발휘
SSD-N	• 안정된 제품 수명으로 생산성 증가 • 연강, 비철류의 다양한 피삭재 가공에 적용

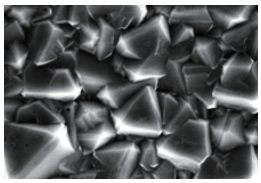
다이아몬드 코팅 재종

흑연/세라믹 가공용 재종

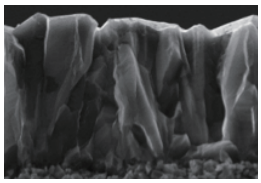
ND3000

- 고순도, 고경도 SP3 결정 구조의 다이아몬드 코팅 기술 적용
- 다이아코팅 전용 모재 사용으로 코팅과 모재간 밀착력 향상
- 흑연, 세라믹 가공 시 탁월한 수명 보장

특징



ND3000 표면



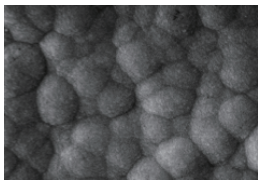
ND3000 코팅 단면

복합소재 가공용 재종

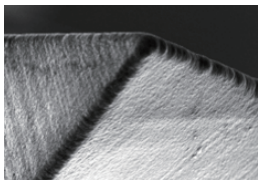
ND2100

- Nano-crystalline Diamond 입자 제어 기술을 적용하여 내마모 및 내면조도 향상
- 다이아코팅 전용 모재 사용으로 내박리성 향상
- Sharp edge 구현으로 고품질, 고정밀 가공이 가능 복합소재 가공 시 탁월한 수명 보장

특징

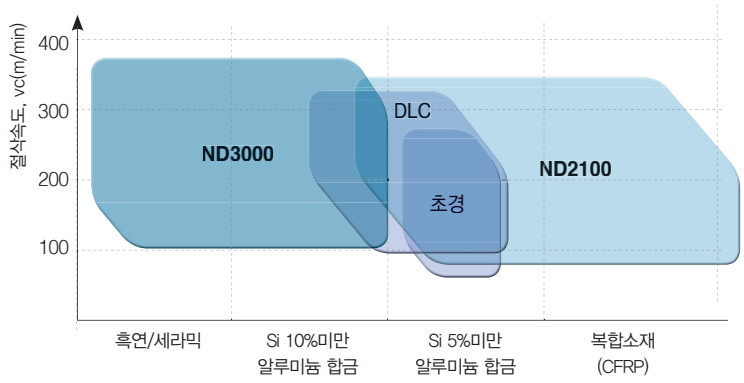


ND2100 표면



ND2100 샤프 엣지

적용영역



선정기준

피삭재			재 종	ISO	적용범위
N	비철금속	흑연/세라믹	**ND3000**	N01	ND3000
		Al 합금	**ND3000** **ND2100**	N05	ND2100
		복합소재	**ND2100**	N10	

다이아몬드 코팅 재종의 특징

재 종	ISO	특 징
ND3000	N01 ~ N05	• 흑연/세라믹/Al합금의 고속/연속/황삭 가공용 • 내마모성 및 내박리성이 우수하고 뛰어난 절삭성능 확보 • 고순도 Sp3 구조의 고경도 Diamond 코팅
ND2100	N05 ~ N10	• 복합소재 및 Al합금의 고속/연속/사상 가공용 • Sharp edge 유지가 우수하여 안정적인 절삭성능 확보 • 입자 제어 기술을 적용한 Nano-cyrstalline Diamond 코팅

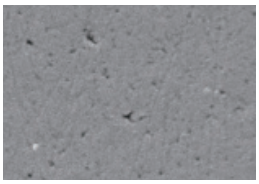
DLC 코팅 재종

비철금속 가공용 DLC 코팅 재종

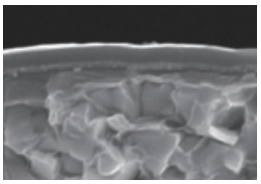
PD1005/PD1010

- 고경도, 저마찰 DLC(Diamond Liked Carbon) 코팅 기술 적용
- 극대화된 내마모성과 윤활성으로 가공성 향상 및 가공품질 우수
- 피삭재 별 최적화된 모재 적용으로 안정적이고, 긴 공구수명 확보
- 알루미늄, Al-Si 합금, 구리 등의 비철금속 가공에 적합

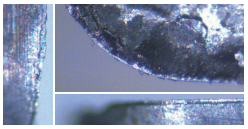
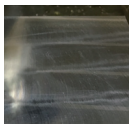
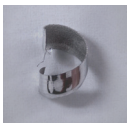
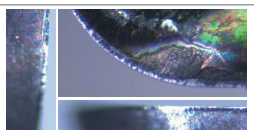
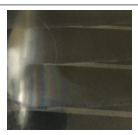
특징



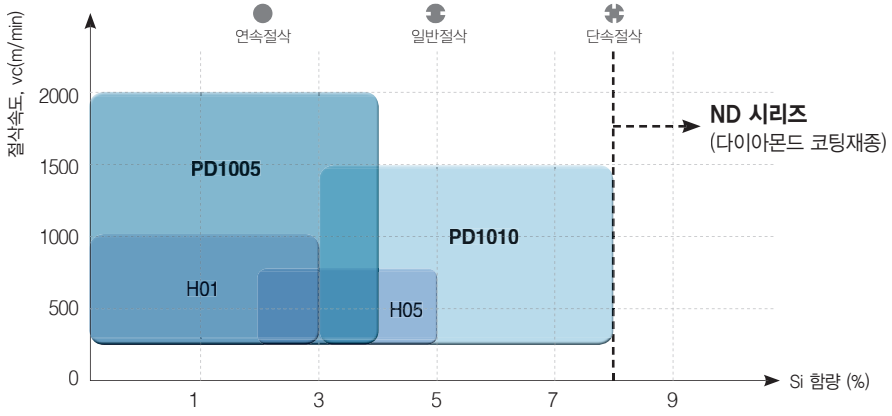
부드러운 코팅 표면



고경도 DLC 코팅

재종	내마모성, 내용착성	피삭재 면조도	칩컬
초경 (비코팅)			
DLC (PD1010)			

적용영역



선정기준

피삭재			재 종	ISO	적용범위
N	비철금속	알루미늄, 구리 (연질 비철금속)	**PD1005**	N05	
		알루미늄 합금	**PD1005 PD1010**	N10	PD1005
		Al-Si 합금 (경질 비철금속)	**PD1010**	N15	PD1010

재종의 특징

재 종	ISO	특 징
PD1005	N05	• 알루미늄, 구리 등의 고속/연속 가공용 • 내마모성 및 내용착성이 우수하여 뛰어난 절삭성능 구현 • 고경도, 저마찰 특성의 고성능 DLC 코팅
PD1010	N10	• 알루미늄 합금, Al-Si 합금의 중고속/단속 가공용 • 향상된 모재 내치핑성으로 안정적인 공구수명 제공 • 고경도, 저마찰 특성의 고성능 DLC 코팅

PCD 인써트 재종

특징

코오로이 PCD 제품은 고온, 고압 제조공정에 의해 다이아몬드 다결정(Polycrystalline)들이 고밀도로 결합되도록 제조되어
매우 높은 경도와 탁월한 내마모성을 확보
또한 다이아몬드 결정의 입도제어 기술을 통해 PCD 시리즈 제품을 보유하고 있어, 다양한 가공품을 폭넓게 가공할 수 있음
코오로이 PCD 제품을 통해 뛰어난 가공품 표면조도, 우수한 가공정밀도와 긴 수명의 공구성능을 경험할 수 있음

- 알루미늄합금, 동합금 가공에 우수
- 세라믹, 고실리콘(Si)함유 알루미늄합금, 석재 등의 가공에 우수
- 고무, 카본, 그라파이트(Graphite), 목재등의 가공에 우수

PCD 재종

재 종	특 징	적용영역	입자크기(㎛)	경도(Hk)	항절력(Gpa)
DP90	미립 다이아몬드 입자를 사용하여 초경(超硬)합금 고Si 알루미늄합금등의 가공에 적합한 우수한 내마모성을 보유	초경합금 세라믹 황삭 고Si 알루미늄합금 석재류 가공	25 ~ 30	50 ~ 65	≒1.10
DP150	입자간 결합력이 뛰어난 미립 다이아몬드를 사용, 비철계금속, 그라파이트 등의 가공에 적합	고Si 알루미늄합금 동(구리) 합금 고무, 목재, 카본	5 ~ 10	50 ~ 60	≒1.95
DP200	초미립 입자를 사용 날카로운 절인 가공이 용이하고 인성이 우수하여 비철계금속 가공에 적합	플라스틱 목재 알루미늄 정밀사상가공	~ 2	45 ~ 55	≒2.45

추천절삭조건

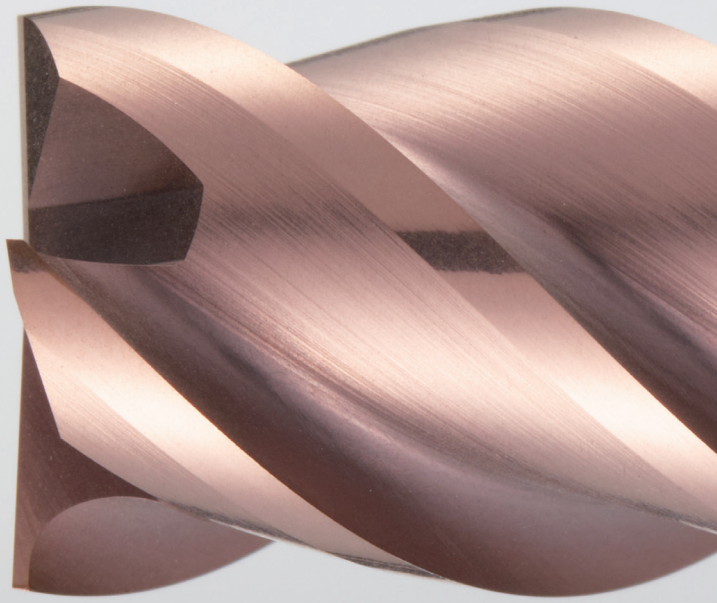
피삭재	절삭속도(m/min)	이 송 터닝(mm/rev) 밀링(mm/t)	절입깊이(mm)	추천재종	
				1차	2차
알루미늄 합금(Si4%~8%)	1000 ~ 3000	0.1 ~ 0.6	~ 3	DP150	DP200
알루미늄 합금(Si9%~14%)	600 ~ 2500	0.1 ~ 0.5	~ 3	DP150	DP200
알루미늄 합금(Si15%~18%)	300 ~ 700	0.1 ~ 0.4	~ 3	DP150	DP200
동(구리) 합금	~ 1000	0.05 ~ 0.2	~ 3	DP150	DP200
강화 플라스틱	~ 1000	0.1 ~ 0.3	~ 2	DP150	DP200
목재	~ 4000	0.1 ~ 0.4	-	DP150	DP200
초경합금	10 ~ 30	~ 0.2	~ 0.5	DP90	DP150

PART 3

ENDMILLS

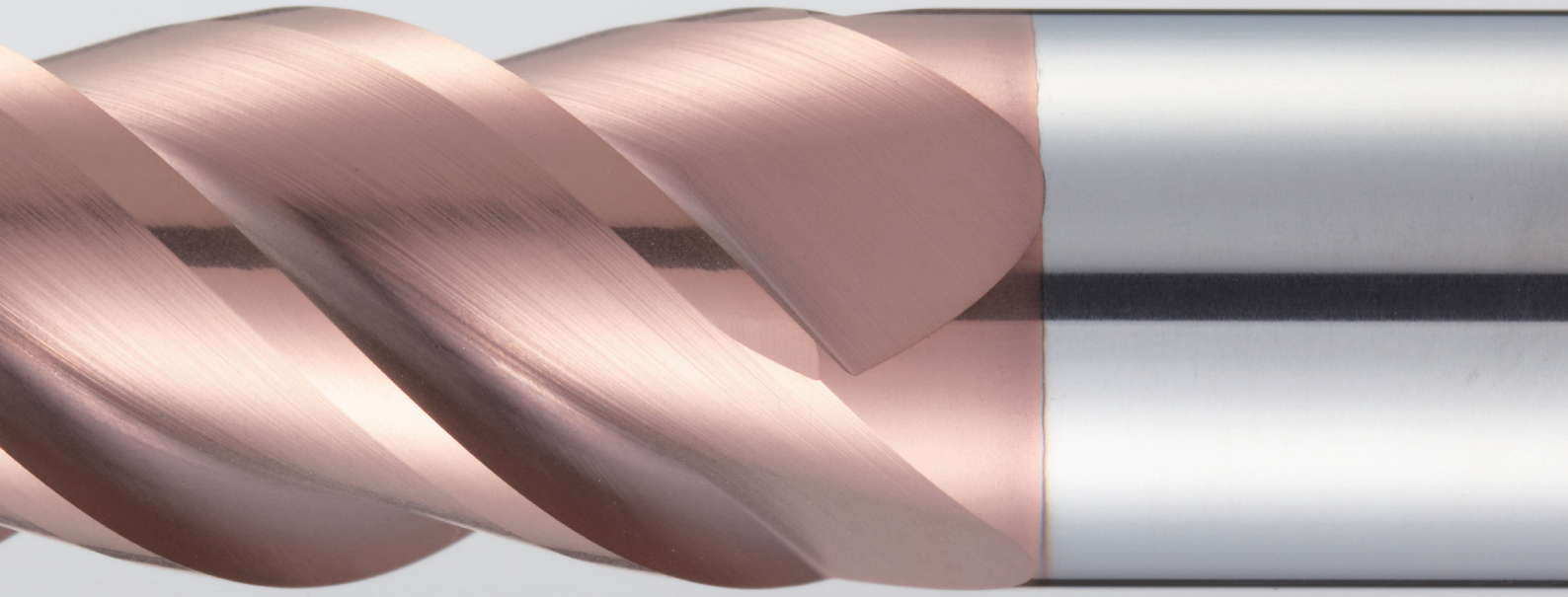
엔드밀

코오로이 엔드밀 제품은 툴링 노하우를 바탕으로
고객의 요구와 시장변화에 맞춰 최신의 기술력으로
최상의 품질을 갖춘 제품을 제공하고 있으며
생산성 향상과 고품질 가공을 위한 가치 실현을 하고 있습니다.



Technical information for ENDMILLS

B3 엔드밀 형번표기법
B5 엔드밀 일람표
B11 엔드밀 선정 가이드
B13 **Super Endmill for HRSA** [내열합금 가공용 HRSA]
B17 **Super Endmill for Ti** [내열합금 가공용 Ti]
B22 **The Mirror Endmill** [초정밀 금형 가공용]
B24 **H-Star Endmill** [고경도강 가공용 엔드밀(HRC50~63)]
B92 **U-Star Endmill** [범용 중경도 엔드밀(HRC30~50)]
B174 **I+ Endmill** [경제형 범용 엔드밀(HRC ~45)]
B186 **R+ Endmill** [고효율 러핑 엔드밀]
B193 **S-Star Endmill** [스테인리스강 가공용 엔드밀]
B205 **A-Star Endmill** [알루미늄 가공용 엔드밀]
B216 **D Endmill** [다이아몬드 코팅 엔드밀]
B224 **Composite Router Endmill** [복합소재 가공용 라우터 엔드밀]
B228 **T Endmill** [치아보철 가공용 엔드밀]
B247 **C-Max** [동 전극 가공용 엔드밀]
B251 **M+ Endmill** [다기능 범용 엔드밀]
B252 **PCD Endmill** [비철금속 가공용 엔드밀]
B253 스페셜 엔드밀 주문양식



D B E 2 040 - 050 -

1	2	3	4	5	6
제품명	구분	엔드밀	날수	공구직경	전장

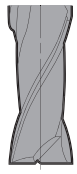
1 제품명

D B E 2 040-050-R T-V N S

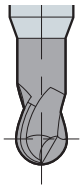
Z, IP, ZP	: 범용 엔드밀	SSEA, AP	: 알루미늄 엔드밀
ES	: 고속, 고경도 엔드밀	SP	: 스테인리스 엔드밀
C	: 동, 동합금 엔드밀	CC	: 복합소재 가공용 엔드밀
D	: 흑연, 비철금속 엔드밀	T	: 덴탈 엔드밀
FM	: 고이송 엔드밀	S	: 내열합금 엔드밀

2 구분

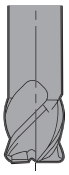
D B E 2 040-050-R T-V N S



플랫 엔드밀 (Flat) — F



볼 엔드밀 (Ball) — B



레디우스 엔드밀 (Radius) — R

3 엔드밀

D B E 2 040-050-R T-V N S

4 날수

D B E 2 040-050-R T-V N S



2날 — 2



3날 — 3



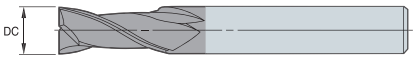
4날 — 4



6날 — 6

5 공구직경

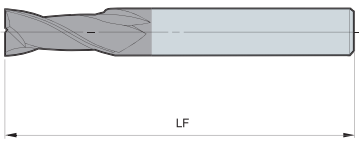
D B E 2 040-050-R T-V N S



공구직경	
표기법	DC(mm)
040	Ø4
060	Ø6
080	Ø8
100	Ø10

6 전장

D B E 2 040-050-R T-V N S



전 장	
표기법	LF(mm)
050	50
080	80
100	100

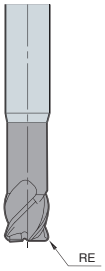
※ 알루미늄(SSEA), 용접형(ZSE) 엔드밀은 본 표기법에 적용되지 않음

R02 T00 - V05 N12 S06

7 코너 "r"크기 | 8 테이퍼각도 | 9 인선길이 | 10 목부길이 | 11 샹크직경

7 코너 "r"크기

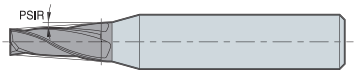
DBE2040-050-RT-VNS



코너 "r"	
표기법	RE(mm)
R02	r 0.2
R05	r 0.5
R10	r 1.0
R15	r 1.5

8 테이퍼각도

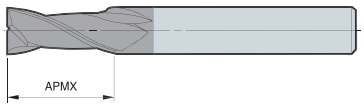
DBE2040-050-RT-VNS



테이퍼각도	
표기법	PSIR(°)
T10	1°
T15	1.5°
T20	2°

9 인선길이

DBE2040-050-RT-VNS

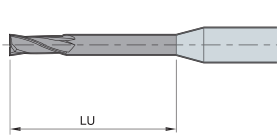


인선길이	
표기법	APMX(mm)
V05	5
V10	10
V15	15

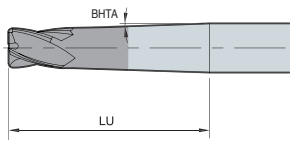
※ 스페셜 대응시 형번 표기법 적용함

10 목부길이

DBE2040-050-RT-VNS



롱넥



테이퍼 롱넥

LU (mm) : 목부길이

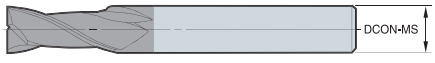
BHTA : 바디하프테이퍼각

롱 넥	
표기법	LU(mm)
N05	5
N08	8
N10	10
N12	12

테이퍼 롱넥	
표기법	LU + BHTA(°)
N0510	5+1°
N0815	8+1.5°
N1020	10+2°
N1225	12+2.5°

11 샹크직경

DBE2040-050-RT-VNS



샹크직경	
표기법	DCON-MS
S06	Ø6
S08	Ø8
S10	Ø10
S12	Ø12
S16	Ø16

B 엔드밀 일람표

품목	용도	품명	형번	형 상	코팅	날수	공구직경 (DC)		피삭재						페이지
									P	M	K	N	S	H	
							Min	Max	강	스테인리스강	주철	비철금속	내열합금	고경도재	
Super Endmill	HRSA	플랫	SFES		SL	4	3.0	20.0					◎		B14
		레디우스	SRES		SL	4	3.0	20.0					◎		B15
	Ti/STS	플랫	SFET		UL	4	3.0	20.0		◎			◎		B18
		레디우스	SRET		UL	4	3.0	20.0		◎			◎		B19
		볼	SBET		UL	2	4.0	12.0		◎			◎		B20
			SBET		UL	4	4.0	12.0		◎			◎		B21
The Mirror Endmill	초정밀 금형가공용	볼	PCD-MBE		-	-	0.3	2.0	◎					◎	B22
			cBN-MBE		-	2	0.4	2.0						◎	B23
		레디우스	cBN-MRE		-	2	0.4	2.0						◎	B23
H-Star Endmill	고속, 고경도용	플랫	ESE702		AlTiN	2	0.1	20.0			◎		○	◎	B26
			ESE712		AlTiN	2	1.0	6.0			◎		○	◎	B27
			ESE704		AlTiN	4	1.0	20.0			◎		○	◎	B28
			ESE714		AlTiN	4	1.0	12.0			◎		○	◎	B29
			ESE724(6)		AlTiN	4/6	1.0	12.0			◎		○	◎	B30
			ESE744		AlTiN	4	1.0	12.0			◎		○	◎	B31
			ESE716		AlTiN	6	6.0	20.0			◎		○	◎	B32
			ESRE712		AlTiN	2	0.1	12.0			◎		○	◎	B33
			ESRE714		AlTiN	4	0.5	12.0			◎		○	◎	B36
			ESXE704		AlTiN	4	1.0	12.0			◎		○	◎	B38
			ESXE714		AlTiN	4	2.0	12.0			◎		○	◎	B38
			ESLNS20		AlTiN	2	0.1	5.0			◎		○	◎	B39
			ESLNS40		AlTiN	4	1.0	5.0			◎		○	◎	B43
		레디우스	ESR702		AlTiN	2	1.0	12.0			◎		○	◎	B45
			ESR732		AlTiN	2	1.0	12.0			◎		○	◎	B48
			ESR704		AlTiN	4	1.0	12.0			◎		○	◎	B49
			ESR714		AlTiN	4	3.0	12.0			◎		○	◎	B51
			ESR724		AlTiN	4	6.0	12.0			◎		○	◎	B51
			ESR734		AlTiN	4	1.0	12.0			◎		○	◎	B52
			ESR706		AlTiN	6	6.0	12.0			◎		○	◎	B53

◎: 매우적합 ○: 적합

품목	용도	품명	형번	형 상	코팅	날수	공구직경 (DC)		피삭재						페이지
									P	M	K	N	S	H	
							Min	Max	강	스테인리스강	주철	비철금속	내열합금	고경도재	
H-Star Endmill	고속, 고경도용	레디우스	ESR736		AlTiN	6	6.0	12.0			◎		○	◎	B53
			ESRR712		AlTiN	2	0.2	16.0			◎		○	◎	B54
			ESRR714		AlTiN	4	0.5	20.0			◎		○	◎	B60
			ESXR704		AlTiN	4	2.0	12.0			◎		○	◎	B67
			ESLNR20		AlTiN	2	0.2	3.0			◎		○	◎	B68
			ESTNR20		AlTiN	2	0.2	3.0			◎		○	◎	B72
		고이송	ESPM4		AlTiN	4	3.0	12.0			◎		○	◎	B74
		볼	ESB702		AlTiN	2	0.1	12.0			◎		○	◎	B75
			ESB712		AlTiN	2	1.0	12.0			◎		○	◎	B76
			ESB703		AlTiN	3	2.0	12.0			◎		○	◎	B77
			ESB734		AlTiN	4	2.0	10.0			◎		○	◎	B78
			ESRB712		AlTiN	2	0.1	12.0			◎		○	◎	B79
			ESLNB20		AlTiN	2	0.1	5.0			◎		○	◎	B83
			ESTNB20		AlTiN	2	0.2	10.0			◎		○	◎	B87
			ESTNB30		AlTiN	3	2.0	5.0			◎		○	◎	B91
U-Star Endmill	범용, 중경도용	플랫	UE502		AlCrN	2	0.1	25.0	◎	○	○			◎	B94
			UE512		AlCrN	2	0.1	12.0	◎	○	○			◎	B96
			UE522		AlCrN	2	1.0	25.0	◎	○	○			◎	B99
			UXE502		AlCrN	2	0.1	20.0	◎	○	○			◎	B101
			UE504H		AlCrN	4	1.0	20.0	◎	○	○			◎	B103
			UE514		AlCrN	4	1.0	12.0	◎	○	○			◎	B104
			UE524		AlCrN	4	1.0	25.0	◎	○	○			◎	B106
			ULE504		AlCrN	4	3.0	16.0	◎	○	○			◎	B108
			UE504		AlCrN	4	0.8	25.0	◎	○	○			◎	B109
			UXE504		AlCrN	4	1.0	20.0	◎	○	○			◎	B110
			UE506		AlCrN	6	6.0	20.0	◎	○	○			◎	B111
			UTE502		AlCrN	2	0.3	10.0	◎	○	○			◎	B112
			UTE504		AlCrN	4	0.8	10.0	◎	○	○			◎	B114

◎: 매우적합 ○: 적합

품목	용도	품명	형번	형 상	코팅	날수	공구직경 (DC)		피삭재						페이지
							Min	Max	P 강	M 스테인리스강	K 주철	N 비철금속	S 내열합금	H 고경도재	
U-Star Endmill	범용, 중경도용	레디우스	UR502		AlCrN	2	0.2	20.0	◎	○	○			◎	B117
			UR512		AlCrN	2	0.2	20.0	◎	○	○			◎	B120
			UR542		AlCrN	2	0.2	4.0	◎	○	○			◎	B126
			UR504		AlCrN	4	3.0	20.0	◎	○	○			◎	B132
			UR544		AlCrN	4	1.0	4.0	◎	○	○			◎	B133
			UXR504		AlCrN	4	1.0	20.0	◎	○	○			◎	B137
			UXR514		AlCrN	4	1.0	20.0	◎	○	○			◎	B140
			UR506		AlCrN	6	6.0	20.0	◎	○	○			◎	B145
			UDR503		AlCrN	3	6.0	20.0	◎	○	○			◎	B146
			USPM4		AlCrN	4	1.0	20.0	◎	○	○			◎	B147
			UTR504		AlCrN	4	0.8	2.5	◎	○	○			◎	B148
		볼	UB502		AlCrN	2	1.0	25.0	◎	○	○			◎	B152
			UB502P		AlCrN	2	0.1	12.0	◎	○	○			◎	B154
			UB512		AlCrN	2	0.1	12.0	◎	○	○			◎	B155
			UB512S6		AlCrN	2	0.5	2.0	◎	○	○			◎	B159
			UB532		AlCrN	2	3.0	12.0	◎	○	○			◎	B160
			UB542		AlCrN	2	0.1	12.0	◎	○	○			◎	B161
			USB502		AlCrN	2	3.0	20.0	◎	○	○			◎	B168
			UB503		AlCrN	3	1.0	12.0	◎	○	○			◎	B169
			UB504		AlCrN	4	1.0	12.0	◎	○	○			◎	B169
			UTB502		AlCrN	2	0.3	2.0	◎	○	○			◎	B170
		러핑	UF50		AlCrN	3~5	3.0	25.0	◎	○	○			◎	B171
			UF51		AlCrN	3~5	3.0	25.0	◎	○	○			◎	B172
			UF51H		AlCrN	3~5	3.0	25.0	◎	○	○			◎	B173
i+ Endmill	범용	플랫	IPFE2000		AlTiN	2	1	20	◎	○	◎		○		B175
			IPLFE2000		AlTiN	2	1	20	◎	○	◎		○		B176
			IPFE4000		AlCrN	4	1	20	◎	○	◎		○		B177
			IPLFE4000		AlTiN	4	1	20	◎	○	◎		○		B178

◎: 매우적합 ○: 적합

품목	용도	품명	형번	형 상	코팅	날수	공구직경 (DC)		피삭재						페이지
									P	M	K	N	S	H	
							Min	Max	강	스테인리스강	주철	비철금속	내열합금	고경도재	
I+ Endmill	범용	볼	IPBE2000		AlTiN	2	1	20	◎	○	◎		○		B179
			IPLBE2000		AlTiN	2	1	16	◎	○	◎		○		B180
			IPBE4000		AlTiN	4	1	20	◎	○	◎		○		B181
			IPRE2000		AlTiN	2	1	12	◎	○	◎		○		B182
		레디우스	IPLRE2000		AlTiN	2	3	12	◎	○	◎		○		B183
			IPRE4000		AlTiN	4	2	12	◎	○	◎		○		B184
			IPLRE4000		AlTiN	4	3	12	◎	○	◎		○		B185
R+ Endmill	알루미늄용	러핑	RPAE		Carbide, Non	3	6.0	25.0				◎			B188
	범용		RPE-FP-H		Carbide, TiAlN	4	5.0	20.0	◎	○	◎		○		B188
			RPLE-FP-H		Carbide, TiAlN	4	5.0	20.0	◎	○	◎		○		B189
			RPE-XG		Carbide, TiAlN	4	5.0	20.0	◎	○	◎		○		B189
			RPE-FP-L		Carbide, TiAlN	4	5.0	20.0	◎	○	◎		○		B190
			RPE-RG		Carbide, TiAlCrN	4	5.0	20.0	◎	○	◎		○		B190
			RPE-RG		HSS, TiAlN	4	6.0	20.0	◎	○	◎		○		B191
			RPE-FF		HSS, TiAlN	4	6.0	20.0	◎	○	◎		○		B191
			RPE-FP		HSS, TiAlN	4	6.0	20.0	◎	○	◎		○		B192
			RPE-RG		HSS, TiCN HSS, TiN	4	6.0	50.0	◎	○	◎		○		B192
S-Star Endmill	STS용	플랫	SPFE2000		AlCrN	2	1.0	20.0	○	◎			○		B194
			SPFE3000		AlCrN	3	1.0	20.0	○	◎			○		B195
			SPFE4000		AlCrN	4	1.0	20.0	○	◎			○		B196
			SPFE6000		AlCrN	6	6.0	20.0	○	◎			○		B197
		레디우스	SPRE4000		AlCrN	4	1.0	20.0	○	◎			○		B198
			SPRE5000		AlCrN	5	6.0	20.0	○	◎			○		B200
			SPRE7000		AlCrN	7	6.0	20.0	○	◎			○		B201
		볼	SPBE2000		AlCrN	2	1.0	12.0	○	◎			○		B202
			SPBE4000		AlCrN	4	3.0	20.0	○	◎			○		B203
		러핑	SPXE3000 SPXE4000 SPXE5000		AlCrN	3~5	3.0	20.0	○	◎			○		B204

◎: 매우적합 ○: 적합

B 엔드밀 일람표

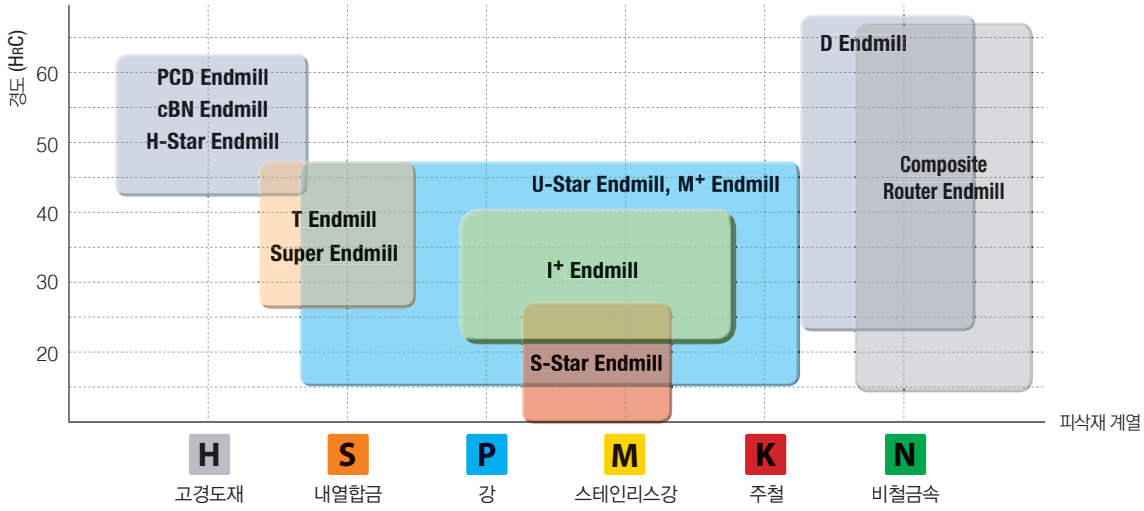
품목	용도	품명	형번	형 상	코팅	날수	공구직경 (DC)		피삭재						페이지
									P	M	K	N	S	H	
							Min	Max	강	스테인리스강	주철	비철금속	내열합금	고경도재	
A-Star Endmill	알루미늄용	플랫	APFE		Non	2	2.5	20.0	○			◎			B206
					Non	3	2.5	20.0	○			◎			B206
		미들 플랫	APMFE		Non	2	3.0	20.0	○			◎			B207
					Non	3	3.0	20.0	○			◎			B207
		롱 플랫	APLFE		Non	2	3.0	20.0	○			◎			B208
					Non	3	3.0	20.0	○			◎			B208
		볼	APBE		Non	2	1.0	12.0	○			◎			B209
		숏 플랫	AFE		Non	3	1.0	20.0	○			◎			B210
		플랫			Non	3	1.0	20.0	○			◎			B211
		롱 플랫			Non	3	1.0	20.0	○			◎			B212
		러핑	APRE		Non	3	4.0	25.0	○			◎			B214
		웨이브 러핑	RPAE		Carbide, Non	3	6.0	25.0				◎			B215
D Endmill	그라파이트, 세라믹용	플랫	DFE		Diamond	2	1.0	12.0				◎			B217
					Diamond	4	2.0	12.0				◎			B218
		레디우스	DRE		Diamond	2	0.5	3.0				◎			B219
					Diamond	4	2.0	12.0				◎			B220
		볼	DBE		Diamond	2	0.6	12.0				◎			B221
					Diamond	4	2.0	12.0				◎			B223
Composite Router Endmill	복합소재 CFRP, GFRP	플랫	CCDR		Diamond	4	6.0	8.0				◎			B225
					Diamond	6	10.0	12.0				◎			B225
			CCHR		Diamond	4	6.0	8.0				◎			B225
					Diamond	6	10.0	12.0				◎			B225
			CCR		Diamond	2	4.0	12.0				◎			B226
			CCLR		Diamond	4	4.0	12.0				◎			B226
			CCRR		Diamond	6	6.0	8.0				◎			B227
					Diamond	8	10.0	12.0				◎			B227

◎: 매우적합 ○: 적합

품목	용도	품명	형번	형 상	코팅	날수	공구직경 (DC)		피삭재						페이지
									P	M	K	N	S	H	
							Min	Max	강	스테인리스강	주철	비철금속	내열합금	고경도재	
T Endmill	덴탈, 지르코니아	볼	TZBE		Diamond	2	0.6	3.0				◎			B230
	덴탈, 메탈		TTBE		Diamond	2	0.6	3.0					◎		B230
	덴탈, 왁스		TWBE		-	2	0.6	3.0				◎			B230
C-Max	동, 동합금용	플랫	CFE2000		CrN	2	1	12	○			◎			B247
		롱 플랫	CFNE2000		CrN	2	0.5	4	○			◎			B248
		볼	CBE2000		CrN	2	1	12	○			◎			B249
		롱 볼	CBNE2000		CrN	2	0.5	4	○			◎			B249
		레디우스	CRE2000		CrN	2	2	12	○			◎			B250
		롱 레디우스	CRNE2000		CrN	2	1	4	○			◎			B250
M+ Endmill	멀티	플랫	MPRE		TACrN	4	3.0	20.0	◎	○	◎		○		B251
PCD Endmill	비철, 고속용	플랫	PDE		-	1	4.6	6.0				◎			B252
					-	2	6.0	12.0				◎			B252

◎: 매우적합 ○: 적합

적용영역



가공 형태별 공구 선정 가이드

● 1순위 추천 ◑ 2순위 추천 ○ 추천하지 않음

구분	날수	 정밀정삭	 정삭	 황삭	 슬롯밀링	 플런징	 모방가공	 트로코이달 밀링
플랫/ 레디우스	2날	○	○	◑	●	●	○	○
	3날	○	◑	◑	●	◑	○	○
	4날	●	●	●	●	○	○	●
	6날이상	●	●	○	○	○	○	●
볼	2날	○	○	○	●	○	●	○
	4날	○	○	○	◑	○	●	○

- 최대한 짧은 길이의 공구 선택을 추천드립니다.
- 안정적인 가공으로 긴 공구수명 구현이 가능하며 우수한 면조도를 얻을 수 있습니다.

라인업 및 특징

피삭재	용도	제품명	타입	날수	인경 (공차)	사진 / 표준형번 수	특징
H	고경도 (~HRC65)	The Mirror Endmill (PCD)	B	-	0.3~2	 6 형번	• 날이 없는 PCD 구형 볼 엔드밀 • 초정밀 제작으로 나노급 면조도 구현
	고경도 (~HRC65)	The Mirror Endmill (cBN)	B	2	0.4~2	 9 형번	• 고속가공시 뛰어난 면조도 및 생산성 향상 • 초정밀 제작으로 안정적인 수명확보 및 면조도 향상
	고경도 (HRC50~63)	H-Star Endmill	F B R	2~6	1.0~20	 3,007 형번	• 고경도/고속 가공용(HRC50~63) • 고경도강 가공에 최적화된 인선처리 적용으로, 초기 내치핑성 보완 및 내마모성 향상
P K	범용(중경도) (HRC30~50)	U-Star Endmill	F B R	2~6	0.1~25	 4,585 형번	• 중경도 가공용(HRC30~50) 고성능 범용 • 다양한 피삭재 가공 (금형강, 중경도강, 탄소강, 합금강, 주철, 프리하든강 등)
	범용 (~HRC45)	I+ Endmill	F B R	2~4	1.0~20	 412 형번	• 넓은 가공범위의 범용 엔드밀로 경제성 우수 • 인성이 우수한 모재 및 내마모성 향상된 코팅 적용
M	스테인리스강	S-Star Endmill	F B R R	2~7	1.0~20	 218 형번	• 스테인리스 가공 시 최적 성능 • 내산화성 우수 • Neck적용 및 트로코이달 가공
S	HRSA	Super Endmill	F R	4	3.0~20	 162 형번	• 내열합금 가공용 엔드밀 • 인코넬, 하스텔로이, 와스팔로이, 듀플렉스 등 니켈계 내열합금 가공에 최적화
	Titanium	Super Endmill	F R	2/4	1.0~20	 64 형번	• 티타늄합금 가공에 최적화된 인선 절삭부하 및 열발생을 억제하고 칩배출 문제 개선 • 고인성 모재와 고윤활 박막을 적용으로 불규칙적인 공구파손 및 용착발생 최소화
N	비철금속, 알루미늄	A-Star Endmill	F B R	2~3	1.0~20	 187 형번	• U플루트 형상으로 고이송 가공에도 효과적인 칩 배출 • 더블 여유각(인선 강성 향상)
	복합소재	Composite Router Endmill	F	2~8	4.0~12	 44 형번	• 복합소재 가공용 라우터 • Nano–Crystalline 다이아 코팅 적용으로 성능 우수
	그라파이트, 세라믹	D Endmill	F B R	2~4	0.6~12	 280 형번	• 고경도 다이아 코팅 적용하여 공구 수명 증가 • One-Pass grinding 방식 적용, 가공 면조도 우수
	덴탈, 메탈, 왁스, 지르코니아	T Endmill	B	2	0.6~3	 214 형번	• Zirconia, Titanium, Co–Cr, Wax, PMMA 등 치아보철 가공용 엔드밀 • 다양한 치아보철 피삭재 및 덴탈 밀링머신 적용 가능
	동전극	C-Max Endmill	F B R	2	0.5~12	 94 형번	• K-silver코팅 적용(내마모,내치핑) • 동,황동,청동 및 비철금속 적합
범용 특수	다기능	M+ Endmill	F D	4	3.0~20	 32 형번	• 다양한 가공(드릴, 밀링 등)이 가능한 멀티 엔드밀
	러핑	R+ Endmill	R	2~4	5.0~25	 204 형번	• 절삭부하 최소화한 형상의 황삭용 러핑 엔드밀

내열합금(티타늄, 인코넬) 가공용 엔드밀 시리즈

Super Endmill for HRSA

- Super Endmill For HRSA 는 포지티브 경사각 및 부등분할을 적용하여 절삭성 및 가공 안정성이 향상되었습니다. 또한 고온 경도가 우수한 신규 박막은 공구 인선부의 결손을 억제하고, 내마모성을 향상시켜 내열합금 가공 시 우수한 공구 수명을 나타냅니다.

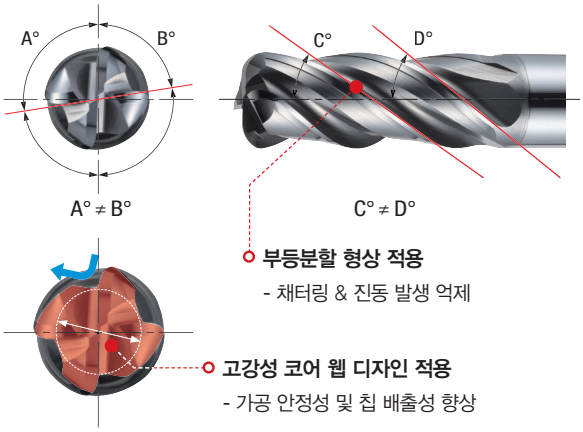
형번표기법

S	RE	S	4	120	-	080	-	R30
Super Endmill	공구직경	피삭재	날수	공구직경		전장길이		코너R
	FE: 플랫 RE: 레디우스 BE: 볼	S: Super alloy • Inconel718 • Waspaloy • Hastelloy T: Titanium/STS	4: 4날	120: Ø12.0mm		080: 80mm		R30: 30mm

특징

- **항공/발전 산업** – 엔진, 터빈 부품 등의 내열합금 가공 전용 엔드밀
- **절미형 인선 형상** – 절삭부하 감소 및 가공경화 억제
- **공구 수명 향상** – 고인성 모재 및 내마모 우수 신규재종 적용

SRES4000 (레디우스)



부등분할 형상 적용
- 채터링 & 진동 발생 억제

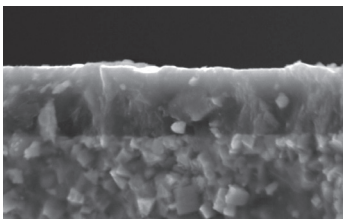
고강성 코어 웹 디자인 적용
- 가공 안정성 및 칩 배출성 향상

SFES4000 (플랫)



코너 게쉬 랜드 형상 적용
- 인선 강성 우수

재종 특징



SL 코팅 (Super Lubricating coating)

- **고윤활성 코팅, 특수 표면처리 기술 적용**
  - 표면처리 기술을 더하여 내용착성, 내치핑성, 가공 안정성 향상

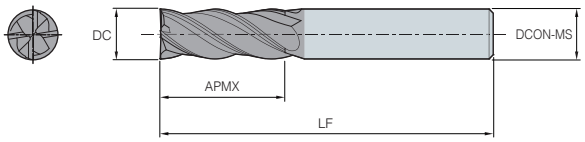
SFES4000

플랫



DC	공구직경공차
Ø3 ~ Ø6	0.00 ~ -0.015
Ø8 ~ Ø20	0.00 ~ -0.020







(mm)

형 번		DC	DCON-MS	APMX	LF
SFES	4030-050	3	6	8	50
	4040-050	4	6	10	50
	4050-060	5	6	15	60
	4060-060	6	6	15	60
	4080-070	8	8	20	70
	4100-075	10	10	25	75
	4120-080	12	12	30	80
	4140-090	14	14	35	90
	4160-100	16	16	42	100
	4200-100	20	20	48	100

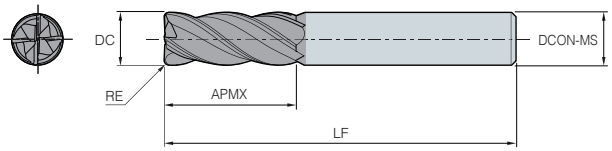
SRES4000

레디우스

4 | H·A 35°/38° | h6 shank | SL 코팅 | RE공차 ±0.01

DC	공구직경공차
Ø3 ~ Ø6	0.00 ~ -0.015
Ø8 ~ Ø20	0.00 ~ -0.020







(mm)

형 번		DC	DCON-MS	APMX	LF	RE
SRES	4030-055-R02	3	6	8	55	0.2
	4030-055-R03	3	6	8	55	0.3
	4030-055-R05	3	6	8	55	0.5
	4040-055-R02	4	6	10	55	0.2
	4040-055-R03	4	6	10	55	0.3
	4040-055-R05	4	6	10	55	0.5
	4040-070-R02	4	6	10	70	0.2
	4040-070-R03	4	6	10	70	0.3
	4040-070-R05	4	6	10	70	0.5
	4050-055-R02	5	6	15	55	0.2
	4050-055-R03	5	6	15	55	0.3
	4050-055-R05	5	6	15	55	0.5
	4050-090-R02	5	6	15	90	0.2
	4050-090-R03	5	6	15	90	0.3
	4050-090-R05	5	6	15	90	0.5
	4060-060-R03	6	6	15	60	0.3
	4060-060-R05	6	6	15	60	0.5
	4060-060-R08	6	6	15	60	0.8
	4060-060-R10	6	6	15	60	1
	4060-060-R15	6	6	15	60	1.5
	4060-060-R20	6	6	15	60	2
	4060-090-R03	6	6	15	90	0.3
	4060-090-R05	6	6	15	90	0.5
	4060-090-R08	6	6	15	90	0.8
	4060-090-R10	6	6	15	90	1
	4060-090-R15	6	6	15	90	1.5
	4060-090-R20	6	6	15	90	2
	4080-070-R03	8	8	20	70	0.3
	4080-070-R05	8	8	20	70	0.5
	4080-070-R08	8	8	20	70	0.8
	4080-070-R10	8	8	20	70	1
	4080-070-R15	8	8	20	70	1.5
	4080-070-R20	8	8	20	70	2
	4080-070-R25	8	8	20	70	2.5
	4080-070-R30	8	8	20	70	3
	4080-100-R03	8	8	20	100	0.3
	4080-100-R05	8	8	20	100	0.5
	4080-100-R08	8	8	20	100	0.8
	4080-100-R10	8	8	20	100	1
	4080-100-R15	8	8	20	100	1.5
	4080-100-R20	8	8	20	100	2
	4080-100-R25	8	8	20	100	2.5

형 번		DC	DCON-MS	APMX	LF	RE
SRES	4080-100-R30	8	8	20	100	3
	4100-075-R03	10	10	25	75	0.3
	4100-075-R05	10	10	25	75	0.5
	4100-075-R08	10	10	25	75	0.8
	4100-075-R10	10	10	25	75	1
	4100-075-R15	10	10	25	75	1.5
	4100-075-R20	10	10	25	75	2
	4100-075-R25	10	10	25	75	2.5
	4100-075-R30	10	10	25	75	3
	4100-100-R03	10	10	25	100	0.3
	4100-100-R05	10	10	25	100	0.5
	4100-100-R08	10	10	25	100	0.8
	4100-100-R10	10	10	25	100	1
	4100-100-R15	10	10	25	100	1.5
	4100-100-R20	10	10	25	100	2
	4100-100-R25	10	10	25	100	2.5
	4100-100-R30	10	10	25	100	3
	4120-080-R05	12	12	30	80	0.5
	4120-080-R08	12	12	30	80	0.8
	4120-080-R10	12	12	30	80	1
	4120-080-R15	12	12	30	80	1.5
	4120-080-R20	12	12	30	80	2
	4120-080-R25	12	12	30	80	2.5
	4120-080-R30	12	12	30	80	3
	4120-080-R35	12	12	30	80	3.5
	4120-080-R40	12	12	30	80	4
	4120-110-R05	12	12	30	110	0.5
	4120-110-R08	12	12	30	110	0.8
	4120-110-R10	12	12	30	110	1
	4120-110-R15	12	12	30	110	1.5
	4120-110-R20	12	12	30	110	2
	4120-110-R25	12	12	30	110	2.5
	4120-110-R30	12	12	30	110	3
	4120-110-R35	12	12	30	110	3.5
	4120-110-R40	12	12	30	110	4
	4140-090-R05	14	14	35	90	0.5
	4140-090-R08	14	14	35	90	0.8
	4140-090-R10	14	14	35	90	1
	4140-090-R15	14	14	35	90	1.5
	4140-090-R20	14	14	35	90	2
	4140-090-R30	14	14	35	90	3
	4140-150-R05	14	14	35	150	0.5

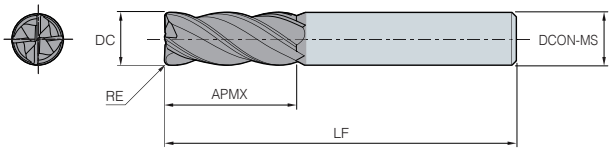
SRES4000

레디우스

4 | H·A 35°/38° | h6 shank | SL 코팅 | RE공차 ±0.01

DC	공구직경공차
Ø3 ~ Ø6	0.00 ~ -0.015
Ø8 ~ Ø20	0.00 ~ -0.020







(mm)

형 번		DC	DCON-MS	APMX	LF	RE
SRES	4140-150-R08	14	14	35	150	0.8
	4140-150-R10	14	14	35	150	1
	4140-150-R15	14	14	35	150	1.5
	4140-150-R20	14	14	35	150	2
	4140-150-R30	14	14	35	150	3
	4160-100-R05	16	16	42	100	0.5
	4160-100-R08	16	16	42	100	0.8
	4160-100-R10	16	16	42	100	1
	4160-100-R15	16	16	42	100	1.5
	4160-100-R20	16	16	42	100	2
	4160-100-R25	16	16	42	100	2.5
	4160-100-R30	16	16	42	100	3
	4160-100-R35	16	16	42	100	3.5
	4160-100-R40	16	16	42	100	4
	4160-100-R50	16	16	42	100	5
	4160-100-R60	16	16	42	100	6
	4160-150-R05	16	16	42	150	0.5
	4160-150-R08	16	16	42	150	0.8
	4160-150-R10	16	16	42	150	1
	4160-150-R15	16	16	42	150	1.5
	4160-150-R20	16	16	42	150	2
	4160-150-R25	16	16	42	150	2.5
	4160-150-R30	16	16	42	150	3
	4160-150-R35	16	16	42	150	3.5
	4160-150-R40	16	16	42	150	4
	4160-150-R50	16	16	42	150	5
	4160-150-R60	16	16	42	150	6
	4180-100-R05	18	20	45	100	0.5
	4180-100-R08	18	20	45	100	0.8
	4180-100-R10	18	20	45	100	1

형 번		DC	DCON-MS	APMX	LF	RE
SRES	4180-100-R15	18	20	45	100	1.5
	4180-100-R20	18	20	45	100	2
	4180-100-R30	18	20	45	100	3
	4180-150-R05	18	20	45	150	0.5
	4180-150-R08	18	20	45	150	0.8
	4180-150-R10	18	20	45	150	1
	4180-150-R15	18	20	45	150	1.5
	4180-150-R20	18	20	45	150	2
	4180-150-R30	18	20	45	150	3
	4200-100-R05	20	20	48	100	0.5
	4200-100-R10	20	20	48	100	1
	4200-100-R15	20	20	48	100	1.5
	4200-100-R20	20	20	48	100	2
	4200-100-R25	20	20	48	100	2.5
	4200-100-R30	20	20	48	100	3
	4200-100-R35	20	20	48	100	3.5
	4200-100-R40	20	20	48	100	4
	4200-100-R50	20	20	48	100	5
	4200-100-R60	20	20	48	100	6
	4200-150-R05	20	20	48	150	0.5
	4200-150-R10	20	20	48	150	1
	4200-150-R15	20	20	48	150	1.5
	4200-150-R20	20	20	48	150	2
	4200-150-R25	20	20	48	150	2.5
	4200-150-R30	20	20	48	150	3
	4200-150-R35	20	20	48	150	3.5
	4200-150-R40	20	20	48	150	4
	4200-150-R50	20	20	48	150	5
	4200-150-R60	20	20	48	150	6

내열합금(티타늄) 가공용 엔드밀 시리즈

Super Endmill for Ti

• Super Endmill For Ti 는 티타늄 합금 가공에 최적화된 인선설계와 큰 칩 포켓의 플루트 디자인 설계로 절삭부하 및 열 발생을 억제하고, 칩 배출 문제를 개선했습니다. 또한 고인성 모재와 고윤활 박막을 적용하여 불규칙적인 공구파손 및 용착 발생을 최소화하여 최고의 공구 수명을 발휘합니다.

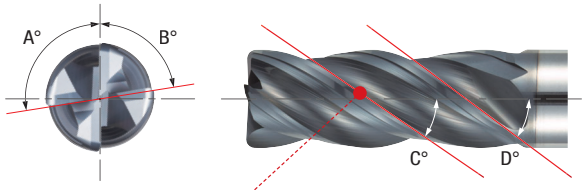
형번표기법

S	RE	T	4	120	-	080	-	R30
Super Endmill	공구직경	피삭재	날수	공구직경		전장길이		코너R
	FE: 플랫 RE: 레디우스 BE: 볼	S: Super alloy • Inconel718 • Waspaloy • Hastelloy T: Titanium/STS	4: 4날	120: Ø12.0mm		080: 80mm		R30: 30mm

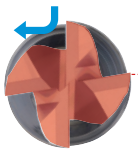
특징

• 티타늄, 스테인리스강 등 가공용 엔드밀
• 공구 수명 향상 – 고인성 모재 및 고윤활성 박막 적용

SFET (플랫) / SRET (레디우스)

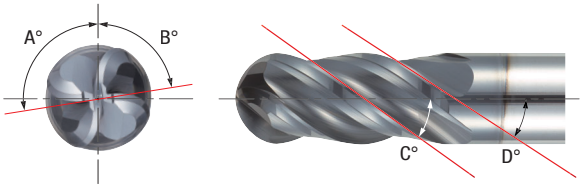


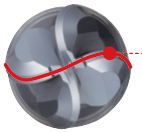
부등분할 형상 적용
- 채터링 & 진동 발생 억제



큰 칩 포켓 및 유선형 플루트 디자인 적용
- 우수한 칩 배출성

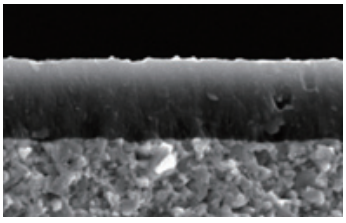
SBET (볼)





S-Curve 인선 형상 적용
- 가공부하 저감

재종 특징



UL 코팅 (Ultra Lubricating coating)

• 독자적인 윤활 코팅 기술을 적용하여 칩 처리성, 내용착성 향상
• 내치핑성이 강화된 모재 적용

SFET4000

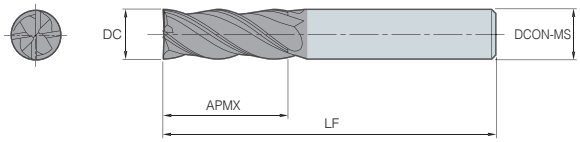
플랫

4 | H·A 35°/38° | h6 shank | UL 코팅

DC	공구직경공차
Ø3 ~ Ø6	0.00 ~ -0.015
Ø8 ~ Ø20	0.00 ~ -0.020







(mm)

형 번		DC	DCON-MS	APMX	LF
SFET	4030-050	3	6	8	50
	4040-050	4	6	10	50
	4050-060	5	6	15	60
	4060-060	6	6	15	60
	4080-070	8	8	20	70
	4100-075	10	10	25	75
	4120-080	12	12	30	80
	4160-100	16	16	42	100
	4200-100	20	20	48	100

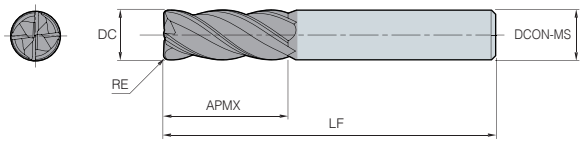
SRET4000

레디우스

4 | H·A 35°/38° | h6 shank | UL 코팅 | RE공차 ±0.01

DC	공구직경공차
Ø3 ~ Ø6	0.00 ~ -0.015
Ø8 ~ Ø20	0.00 ~ -0.020







(mm)

형 번		DC	DCON-MS	APMX	LF	RE
SRET	4030-050-R02	3	6	8	50	0.2
	4030-050-R05	3	6	8	50	0.5
	4040-050-R02	4	6	10	50	0.2
	4040-050-R05	4	6	10	50	0.5
	4050-060-R02	5	6	15	60	0.2
	4050-060-R05	5	6	15	60	0.5
	4050-060-R10	5	6	15	60	1
	4060-060-R03	6	6	15	60	0.3
	4060-060-R05	6	6	15	60	0.5
	4060-060-R10	6	6	15	60	1
	4080-070-R03	8	6	20	70	0.3
	4080-070-R05	8	8	20	70	0.5
	4080-070-R10	8	8	20	70	1
	4100-075-R03	10	8	25	75	0.3
	4100-075-R05	10	8	25	75	0.5
	4100-075-R10	10	10	25	75	1
	4100-075-R15	10	10	25	75	1.5
	4100-075-R20	10	10	25	75	2
	4120-080-R05	12	12	30	80	0.5
	4120-080-R10	12	12	30	80	1
	4120-080-R15	12	16	30	80	1.5
	4120-080-R20	12	16	30	80	2
	4120-080-R25	12	16	30	80	2.5
	4120-080-R30	12	16	30	80	3
	4160-100-R05	16	20	42	100	0.5
	4160-100-R10	16	20	42	100	1
	4200-100-R05	20	20	48	100	0.5
	4200-100-R10	20	20	48	100	1

SBET2000

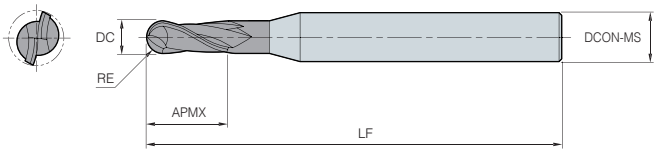
볼

2 | H·A 30° | h6 shank | UL 코팅 | RE공차 ±0.01

DC	공구직경공차
Ø4 ~ Ø6	0.00 ~ -0.015
Ø8 ~ Ø12	0.00 ~ -0.020







(mm)

형 번		DC	DCON-MS	APMX	LF	RE
SBET	2040-050	4	6	8	50	2
	2040-070	4	6	8	70	2
	2050-060	5	6	12	60	2.5
	2050-080	5	6	12	80	2.5
	2060-060	6	6	12	60	3
	2060-090	6	6	12	90	3
	2080-070	8	8	16	70	4
	2080-100	8	8	16	100	4
	2100-075	10	10	20	75	5
	2100-100	10	10	20	100	5
	2120-080	12	12	25	80	6
	2120-100	12	12	25	100	6

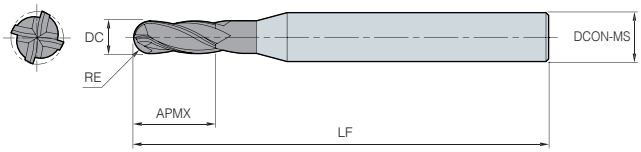
SBET4000

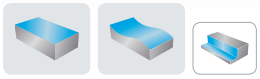
볼

4 | H·A 38°/40° | UL 코팅 | RE공차 ±0.01

DC	공구직경공차
Ø4 ~ Ø6	0.00 ~ -0.015
Ø8 ~ Ø12	0.00 ~ -0.020







(mm)

형 번		DC	DCON-MS	APMX	LF	RE
SBET	4040-050	4	6	8	50	2
	4040-070	4	6	8	70	2
	4050-060	5	6	12	60	2.5
	4050-080	5	6	12	80	2.5
	4060-060	6	6	12	60	3
	4060-090	6	6	12	90	3
	4080-070	8	8	16	70	4
	4080-100	8	8	16	100	4
	4100-075	10	10	20	75	5
	4100-100	10	10	20	100	5
	4120-080	12	12	25	80	6
	4120-100	12	12	25	100	6

초정밀 금형가공 솔루션

The Mirror Endmill

- HRC60이상의 고경도 금형 초정밀 가공에 접합
- PCD, cBN전용 재종으로 공구 내마모성 향상

PCD Endmill



초정밀 피삭재, 고경도 금형 폴리싱 가공용

- 날이 없는 PCD 구형 볼 엔드밀로 최적의 면조도 구현
- 초정밀 제작으로 나노급 면조도 구현
- PCD 전용 재종 적용으로 공구 내마모성 향상

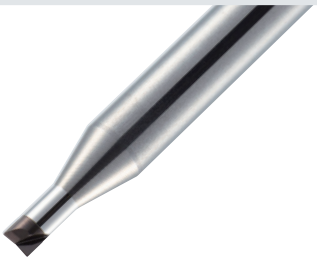
cBN Endmill (Ball)



초정밀 경면 피삭재, HRC60 이상의 금형 가공용

- 고속 가공 시 뛰어난 면조도 및 생산성 향상
- cBN 전용 재종 적용으로 공구 내마모성 향상
- 인선 강화형 형상으로 수명확보
- 초정밀 제작으로 안정적인 수명확보 및 면조도 향상

cBN Endmill (Radius)



초정밀 피삭재, HRC60 이상의 금형 가공 중정삭용

- 고속 가공 시 생산성 향상
- cBN 전용 재종 적용으로 공구 내마모성 향상
- 매끄러운 인선 연결로 뛰어난 면조도 확보
- 인선 강화형 형상으로 수명확보

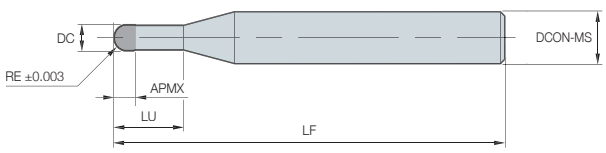
PCD-MBE

볼



h3 shank

DC	공구직경공차
Ø0.3 ~ Ø2	0 ~ -0.008mm ±0.003mm



(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
PCD-MBE	0003-048-N007S04	0.3	4	0.15	0.75	48	0.15
	0004-048-N010S04	0.4	4	0.2	1	48	0.2
	0006-048-N015S04	0.6	4	0.3	1.5	48	0.3
	0010-048-N025S04	1	4	0.5	2.5	48	0.5
	0015-048-N040S04	1.5	4	0.75	4	48	0.75
	0020-048-N050S04	2	4	1	5	48	1

cBN-MBE2000

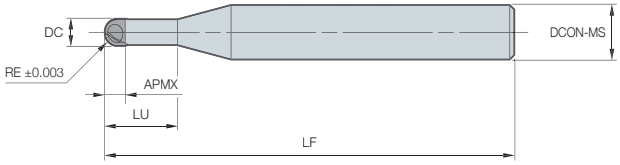
볼





2 | H·A 0° | h4 shank

DC	공구직경공차
Ø0.4 ~ Ø2	0 ~ -0.008mm ±0.003mm



(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
cBN-MBE	2004-050-N005S04	0.4	4	0.33	0.5	50	0.2
	2004-050-N010S04	0.4	4	0.33	1	50	0.2
	2005-050-N010S04	0.5	4	0.38	1	50	0.25
	2006-050-N015S04	0.6	4	0.5	1.5	50	0.3
	2008-050-N020S04	0.8	4	0.6	2	50	0.4
	2010-050-N025S04	1	4	0.7	2.5	50	0.5
	2012-050-N030S04	1.2	4	0.8	3	50	0.6
	2015-050-N040S04	1.5	4	1	4	50	0.75
	2020-050-N050S04	2	4	1.2	5	50	1

cBN-MRE2000

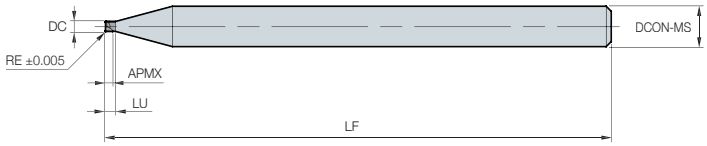
레디우스





2 | H·A 0° | h4 shank

DC	공구직경공차
Ø0.4 ~ Ø2	0 ~ -0.008mm ±0.003mm



(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
cBN-MRE	2004-050-R005-N005S04	0.4	4	0.24	0.5	50	0.05
	2004-050-R005-N010S04	0.4	4	0.24	1	50	0.05
	2004-050-R010-N005S04	0.4	4	0.24	0.5	50	0.1
	2004-050-R010-N010S04	0.4	4	0.24	1	50	0.1
	2005-050-R005-N005S04	0.5	4	0.3	0.5	50	0.05
	2005-050-R005-N010S04	0.5	4	0.3	1	50	0.05
	2005-050-R010-N005S04	0.5	4	0.3	0.5	50	0.1
	2005-050-R010-N010S04	0.5	4	0.3	1	50	0.1
	2010-050-R010-N010S04	1	4	0.7	1	50	0.1
	2010-050-R010-N020S04	1	4	0.7	2	50	0.1
	2010-050-R010-N030S04	1	4	0.7	3	50	0.1
	2010-050-R010-N040S04	1	4	0.7	5	50	0.1
	2010-050-R020-N010S04	1	4	0.7	1	50	0.2
	2010-050-R020-N020S04	1	4	0.7	2	50	0.2
	2015-050-R010-N030S04	1.5	4	0.85	3	50	0.1
	2015-050-R010-N045S04	1.5	4	0.85	4.5	50	0.1
	2015-050-R010-N075S04	1.5	4	0.85	7.5	50	0.1
	2015-050-R020-N045S04	1.5	4	0.85	4.5	50	0.2
	2020-050-R010-N040S04	2	4	0.85	4	50	0.1
	2020-050-R010-N060S04	2	4	0.85	6	50	0.1
	2020-050-R010-N100S04	2	4	0.85	10	50	0.1
	2020-050-R020-N040S04	2	4	0.85	4	50	0.2
	2020-050-R020-N060S04	2	4	0.85	6	50	0.2
	2020-050-R020-N100S04	2	4	0.85	10	50	0.2

※ Ø1.5~2.0 날장 0.85mm 이상 필요시 1.2mm까지 스페셜 제작 가능합니다.

고경도 가공용 엔드밀 (HRC50~63)

H-Star Endmill

- **고경도용 코팅 채택** – 신규 PC305H 박막 적용으로 고함량의 Si 성분, 내마모성 향상, 마찰열에 대한 안정성 확보
- **고경도용 모재 채택** – 초미립 WC + Co 9%의 조성, 인선 특성 확보를 통한 범용성 확대
- **인선처리 적용** – 고경도강 가공 시 초기 내치핑성 보완, 내마모성 향상 및 안정적인 가공 유도

형번표기법

ES	R	70	4	100	15	32	-	10
H-Star Endmill	구분	길이/샹크 타입	날수	공구직경	코너R	유효장		샹크직경

구분
- B : 볼
- E : 플랫
- R : 레디우스
- XE : 플랫(부등분할)
- XR : 레디우스(부등분할)
- PM : 고이송
- RB : 리브 볼
- RE : 리브 플랫
- RR : 리브 레디우스
- LNB : 롱 넥 볼
- TNB : 테이퍼 넥 볼
- LNS : 롱 넥 플랫
- LNR : 롱 넥 레디우스

길이/샹크 타입
- 70 : 넥
- 71 : 스트레이트, 넥
- 72 : 롱 샹크 넥
- 73 : 롱 샹크
- 74 : 헬릭스 35°

날수
- 2 : 2날
- 3 : 3날
- 4 : 4날
- 6 : 6날

공구직경
- 010 : Ø1.0mm
- 060 : Ø6.0mm
- 065 : Ø6.5mm
- 100 : Ø10.0mm

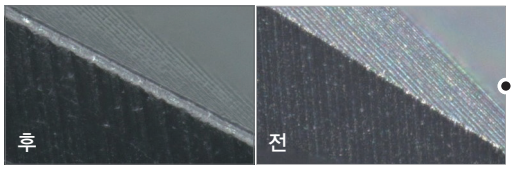
코너R
- 05 : 0.5mm
- 15 : 1.5mm
- 20 : 2.0mm

유효장
- 10 : 10mm
- 12 : 12mm
- 32 : 32mm

샹크직경
- 06 : Ø6.0mm
- 10 : Ø10.0mm
- 12 : Ø12.0mm

특징

• 인선처리 적용



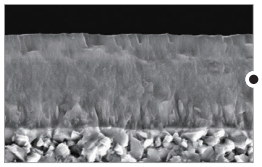
- 고경도강 가공 시 초기 내치핑성 보완
- 내마모성 향상 및 안정적인 가공 유도

• 고경도용 모재 채택

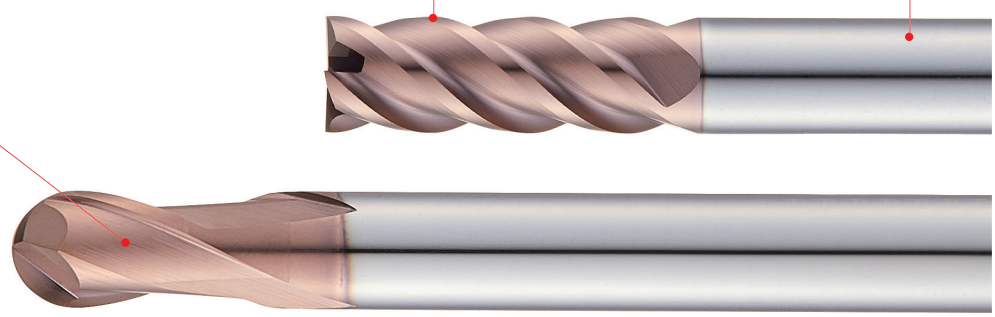


- 초미립 WC + Co, 9%의 조성
- 인선 특성 확보를 통한 범용성 확대

• 고경도용 코팅 채택 (PC305H)



- 고함량의 Si 성분
- 내마모성 향상
- 마찰열에 대한 안정성 확보



라인업

형 번	형 상	품 명	공구직경	부등분할	페이지
ESE702		2날 넥 타입 플랫 엔드밀	Ø0.1 ~ 20.0		B26
ESE712		2날 플랫 엔드밀	Ø1.0 ~ 12.0		B27
ESE704		4날 넥 타입 플랫 엔드밀	Ø1.0 ~ 20.0		B28
ESE714		4날 하이 헬릭스 플랫 엔드밀	Ø1.0 ~ 12.0		B29
ESE724(6)		4&6날 하이 헬릭스 플랫 엔드밀	Ø1.0 ~ 12.0		B30
ESE744		4날 하이 헬릭스 플랫 엔드밀	Ø1.0 ~ 12.0		B31
ESE716		6날 하이 헬릭스 플랫 엔드밀	Ø6.0 ~ 20.0		B32
ESRE712		2날 리브 플랫 엔드밀	Ø0.1 ~ 12.0		B33~B35
ESRE714		4날 리브 플랫 엔드밀	Ø0.5 ~ 12.0		B36~B37
ESXE704		4날 넥 타입 플랫 엔드밀	Ø1.0 ~ 12.0	•	B38
ESXE714		4날 플랫 엔드밀	Ø2.0 ~ 12.0	•	B38
ESLNS20		2날 롱 넥 플랫 엔드밀	Ø0.1 ~ 5.0		B39~B42
ESLNS40		4날 롱 넥 플랫 엔드밀	Ø1.0 ~ 5.0		B43~B44
ESR702		2날 넥 타입 레디우스 엔드밀	Ø1.0 ~ 12.0		B45~B47
ESR732		2날 롱 샹크 레디우스 엔드밀	Ø1.0 ~ 12.0		B48
ESR704		4날 넥 타입 레디우스 엔드밀	Ø1.0 ~ 12.0		B49~B50
ESR714		4날 레디우스 엔드밀	Ø3.0 ~ 12.0		B51
ESR724		4날 넥 타입 레디우스 엔드밀	Ø6.0 ~ 12.0		B51
ESR734		4날 롱 샹크 레디우스 엔드밀	Ø1.0 ~ 12.0		B52
ESR706		6날 넥 타입 레디우스 엔드밀	Ø6.0 ~ 12.0		B53
ESR736		6날 레디우스 엔드밀	Ø6.0 ~ 12.0		B53
ESRR712		2날 리브 레디우스 엔드밀	Ø0.2 ~ 16.0		B54~B59
ESRR714		4날 리브 레디우스 엔드밀	Ø0.5 ~ 20.0		B60~B66
ESXR704		4날 넥 타입 레디우스 엔드밀	Ø1.0 ~ 12.0	•	B67
ESLNR20		2날 롱 넥 레디우스 엔드밀	Ø0.2 ~ 3.0		B68~B71
ESTNR20		2날 테이퍼 넥 레디우스 엔드밀	Ø0.2 ~ 3.0		B72~B73
ESPM4		4날 넥 타입 레디우스 엔드밀	Ø3.0 ~ 12.0		B74
ESB702		2날 넥 타입 볼 엔드밀	Ø0.1 ~ 12.0		B75
ESB712		2날 볼 엔드밀	Ø1.0 ~ 12.0		B76
ESB703		3날 넥 타입 볼 엔드밀	Ø2.0 ~ 12.0		B77
ESB734		4날 15° 헬릭스 볼 엔드밀	Ø2.0 ~ 10.0		B78
ESRB712		2날 리브 볼 엔드밀	Ø0.1 ~ 12.0		B79~B82
ESLNB20		2날 롱 넥 볼 엔드밀	Ø0.1 ~ 5.0		B83~B86
ESTNB20		2날 테이퍼 넥 볼 엔드밀	Ø0.2 ~ 10.0		B87~B90
ESTNB30		3날 테이퍼 넥 볼 엔드밀	Ø2.0 ~ 5.0		B91

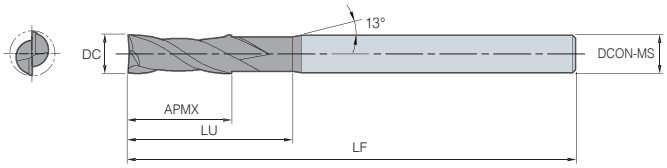
ESE702

2날 넥 타입 플랫

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







(mm)

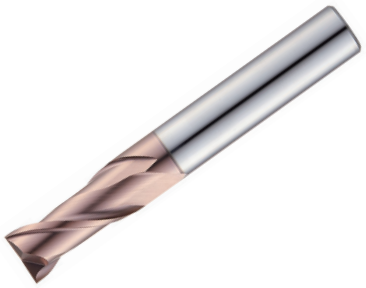
형 번		DC	DCON-MS	APMX	LU	LF
ESE	702001	0.1	4	0.2	-	40
	702002	0.2	4	0.4	-	40
	702003	0.3	4	0.5	-	40
	702004	0.4	4	0.7	-	40
	702005	0.5	4	1	-	40
	702006	0.6	4	1.2	-	40
	702007	0.7	4	1.4	-	40
	702008	0.8	4	1.6	-	40
	702009	0.9	4	2	-	40
	702010	1	6	1.5	-	40
	702010S4	1	4	1.5	-	40
	702015	1.5	6	2.2	-	40
	702020	2	6	3	6	40
	702020S4	2	4	3	6	40
	702025	2.5	6	4	6	40
	702030	3	6	4	7	45
	702035	3.5	6	6	9	45
	702040	4	6	6	9	45
	702045	4.5	6	6	10	45
	702050	5	6	6	11	50
	702060	6	6	7	14	50
	702080	8	8	9	18	60
	702100	10	10	12	25	75
	702120	12	12	15	30	75
	702160	16	16	18	38	90
	702200	20	20	24	45	100

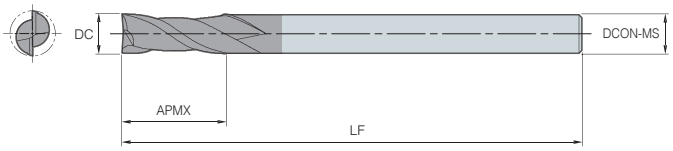
ESE712

2날 플랫

CARBIDE | 2 | H·A 35° | 재종 PC305H | h5 shank

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LF
ESE	712010	1	6	3	40
	712010-02	1	6	2	40
	712010-02S4	1	4	2	40
	712010-04	1	6	4	40
	712012	1.2	6	3	40
	712015	1.5	6	4	40
	712015S4	1.5	4	4	40
	712015-06	1.5	6	6	40
	712015-08	1.5	6	8	40
	712020	2	6	5	40
	712020S4	2	4	5	40
	712020-08	2	6	8	40
	712020-10	2	6	10	50
	712025	2.5	6	6	40
	712025S4	2.5	4	6	40
	712030	3	6	8	45
	712030S4	3	4	8	45
	712030-10	3	6	10	50
	712030-12	3	6	12	50
	712035	3.5	6	10	45
	712040	4	6	10	45
	712040S4	4	4	10	45
	712040-12	4	6	12	50
	712040-16	4	6	16	60
	712045	4.5	6	11	45
	712050	5	6	13	50
	712055	5.5	6	13	50
	712060	6	6	13	50
	712060-15	6	6	15	60
	712065	6.5	8	16	60
	712070	7	8	18	60
	712080	8	8	19	60
	712100	10	10	22	70
	712100-25	10	10	25	70
	712120	12	12	26	75
	712120-30	12	12	30	75

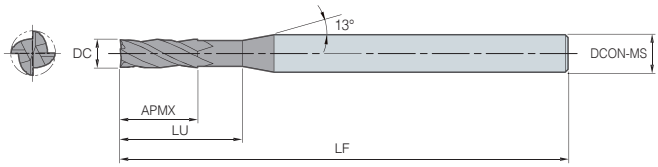
ESE704

4날 넥 타입 플랫

CARBIDE | 4 | H·A 30° | 재종 PC305H | h5 shank

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







(mm)

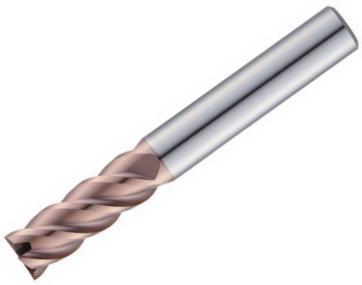
형 번		DC	DCON-MS	APMX	LU	LF
ESE	704010	1	6	1.5	-	40
	704010S4	1	4	1.5	-	40
	704015	1.5	6	2.2	-	40
	704015S4	1.5	4	2.2	-	40
	704020	2	6	3	6	40
	704020S4	2	4	3	6	40
	704025	2.5	6	4	6	40
	704025S4	2.5	4	4	6	40
	704030	3	6	4	7	45
	704030S4	3	4	4	7	45
	704035	3.5	6	5	9	45
	704040	4	6	5	9	45
	704040S4	4	4	5	9	45
	704045	4.5	6	6	10	45
	704050	5	6	6	11	50
	704060	6	6	7	14	50
	704080	8	8	9	18	60
	704100	10	10	12	25	75
	704120	12	12	15	30	75
	704160	16	16	18	38	90
	704200	20	20	24	45	100

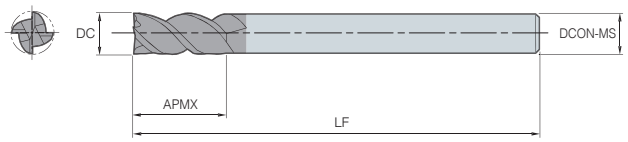
ESE714

4날 하이 헬릭스 플랫

CARBIDE | 4 | H·A 45° | 재종 PC305H | h5 shank

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

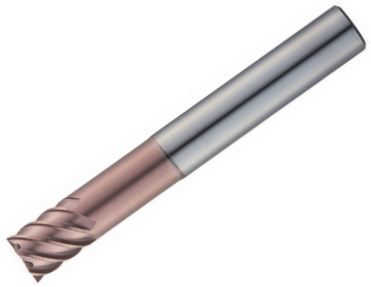
형 번		DC	DCON-MS	APMX	LF
ESE	714010	1	6	2.5	40
	714010S4	1	4	2.5	40
	714012	1.2	6	3	40
	714015	1.5	6	4	40
	714015S4	1.5	4	4	40
	714020	2	6	5	40
	714020S4	2	4	5	40
	714025	2.5	6	6	40
	714025S4	2.5	4	6	40
	714030	3	6	8	45
	714030S4	3	4	8	45
	714035	3.5	6	9	45
	714040	4	6	10	45
	714040S4	4	4	10	45
	714050	5	6	13	50
	714060	6	6	13	50
	714060-15	6	6	15	60
	714060-15L	6	6	15	90
	714080	8	8	19	60
	714080L	8	8	19	100
	714100	10	10	22	70
	714100-25	10	10	25	70
	714100-25L	10	10	25	100
	714120	12	12	26	75
	714120-30	12	12	30	80
	714120-30L	12	12	30	100

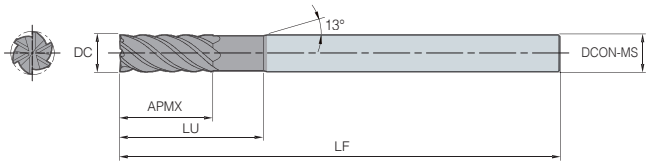
ESE724(6)

4&6날 하이 헬릭스 플랫

CARBIDE | 4 | 6 | H·A 45° | H·A 60° | 재종 PC305H | h5 shank

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

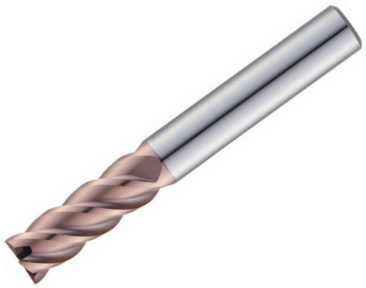
형 번		DC	DCON-MS	APMX	LU	LF	NOF
ESE	724010	1	6	1.5	5	45	4
	724015	1.5	6	2.2	6	45	4
	724020	2	6	3	8	45	4
	724030	3	6	4	9	50	4
	724040	4	6	5	12	50	4
	724040S4L	4	4	5	12	75	4
	724050	5	6	6	15	50	4
	726060	6	6	7	20	60	6
	726080	8	8	9	25	70	6
	726100	10	10	12	32	75	6
	726120	12	12	15	38	80	6

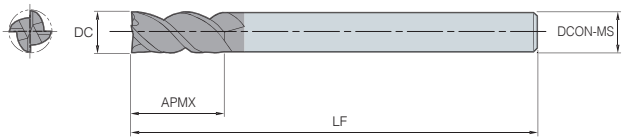
ESE744

4날 플랫

CARBIDE | 4 | H·A 35° | 재종 PC305H | h5 shank

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

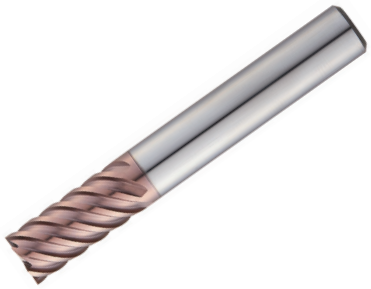
형 번		DC	DCON-MS	APMX	LF
ESE	744010S3	1	3	2.5	40
	744010S4	1	4	2.5	40
	744010	1	6	2.5	40
	744012S3	1.2	3	3	40
	744012S4	1.2	4	3	40
	744015S3	1.5	3	4	40
	744015S4	1.5	4	4	40
	744015	1.5	6	4	40
	744020S3	2	3	6	40
	744020S4	2	4	6	40
	744020	2	6	6	40
	744025S3	2.5	3	8	45
	744025S4	2.5	4	8	45
	744025	2.5	6	8	45
	744030S3	3	3	8	50
	744030S4	3	4	8	45
	744030	3	6	8	45
	744035	3.5	6	10	45
	744040S4	4	4	11	45
	744040	4	6	11	45
	744045	4.5	6	11	45
	744050	5	6	13	50
	744055	5.5	6	13	50
	744060	6	6	13	50
	744080	8	8	19	60
	744100	10	10	22	70
	744120	12	12	26	75

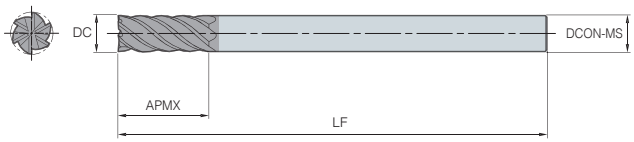
ESE716

6날 하이 헬릭스 플랫

CARBIDE | 6 | H·A 50° | 재종 PC305H | h5 shank

DC	공구직경공차
Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







(mm)

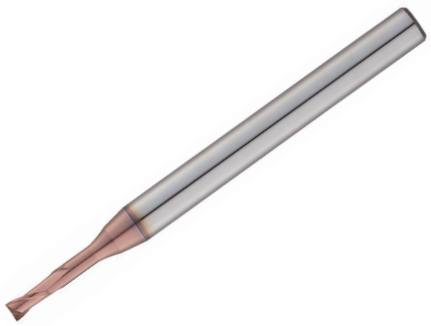
	형 번	DC	DCON-MS	APMX	LF
ESE	716060	6	6	13	50
	716080	8	8	18	60
	716100	10	10	22	70
	716120	12	12	26	75
	716160	16	16	35	90
	716200	20	20	44	100

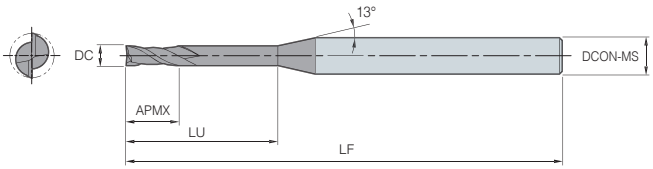
ESRE712

2날 리브 플랫

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







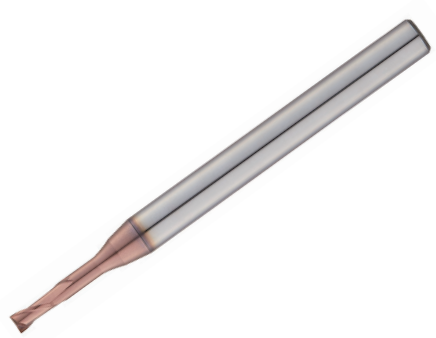
(mm)

	형 번	DC	DCON-MS	APMX	LU	LF
ESRE	712001003	0.1	4	0.15	0.3	40
	712001005	0.1	4	0.15	0.5	40
	71200101	0.1	4	0.15	1	40
	712002005	0.2	4	0.3	0.5	40
	712002015	0.2	4	0.3	1.5	40
	71200201	0.2	4	0.3	1	40
	71200202	0.2	4	0.3	2	40
	712003015	0.3	4	0.5	1.5	40
	71200301	0.3	4	0.5	1	40
	712003025	0.3	4	0.5	2.5	40
	71200302	0.3	4	0.5	2	40
	71200303	0.3	4	0.5	3	40
	71200304	0.3	4	0.5	4	40
	71200305	0.3	4	0.5	5	40
	712004015	0.4	4	0.6	1.5	40
	71200401	0.4	4	0.6	1	40
	712004025	0.4	4	0.6	2.5	40
	71200402	0.4	4	0.6	2	40
	71200403	0.4	4	0.6	3	40
	71200404	0.4	4	0.6	4	40
	71200405	0.4	4	0.6	5	40
	71200406	0.4	4	0.6	6	40
	71200408	0.4	4	0.6	8	40
	71200410	0.5	4	0.6	10	40
	712005015	0.5	4	0.7	1.5	45
	71200501	0.5	4	0.7	1	45
	712005025	0.5	4	0.7	2.5	45
	71200502	0.5	4	0.7	2	45
	71200503	0.5	4	0.7	3	45
	71200504	0.5	4	0.7	4	45
	71200505	0.5	4	0.7	5	45
	71200506	0.5	4	0.7	6	45
	71200508	0.5	4	0.7	8	45
	71200510	0.5	4	0.7	10	45
	71200512	0.5	4	0.7	12	45
	71200514	0.5	4	0.7	14	45
	71200516	0.5	4	0.7	16	45
	71200602	0.6	4	0.9	2	45

	형 번	DC	DCON-MS	APMX	LU	LF
ESRE	71200603	0.6	4	0.9	3	45
	71200604	0.6	4	0.9	4	45
	71200605	0.6	4	0.9	5	45
	71200606	0.6	4	0.9	6	45
	71200608	0.6	4	0.9	8	45
	71200610	0.6	4	0.9	10	45
	71200612	0.6	4	0.9	12	45
	71200614	0.6	4	0.9	14	45
	71200616	0.6	4	0.9	16	45
	71200702	0.7	4	1.2	2	45
	71200704	0.7	4	1.2	4	45
	71200706	0.7	4	1.2	6	45
	71200708	0.7	4	1.2	8	45
	71200710	0.7	4	1.2	10	45
	71200712	0.7	4	1.2	12	45
	71200802	0.8	4	1.2	2	45
	71200803	0.8	4	1.2	3	45
	71200804	0.8	4	1.2	4	45
	71200805	0.8	4	1.2	5	45
	71200806	0.8	4	1.2	6	45
	71200808	0.8	4	1.2	8	45
	71200810	0.8	4	1.2	10	45
	71200812	0.8	4	1.2	12	45
	71200814	0.8	4	1.2	14	45
	71200816	0.8	4	1.2	16	45
	71200820	0.8	4	1.2	20	50
	71200906	0.9	4	1.3	6	45
	71200908	0.9	4	1.3	8	45
	71200910	0.9	4	1.3	10	45
	71201002	1	4	1.5	2	50
	71201003	1	4	1.5	3	50
	71201004	1	4	1.5	4	50
	71201005	1	4	1.5	5	50
	71201006	1	4	1.5	6	50
	71201007	1	4	1.5	7	50
	71201008	1	4	1.5	8	50
	71201010	1	4	1.5	10	50
	71201012	1	4	1.5	12	50

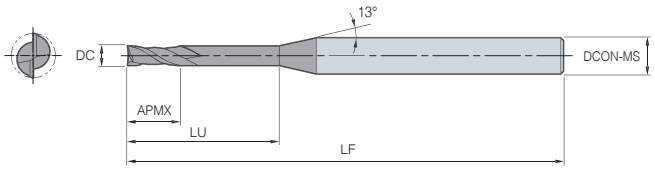
ESRE712

2날 리브 플랫



CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LU	LF
ESRE	71201014	1	4	1.5	14	50
	71201016	1	4	1.5	16	50
	71201018	1	4	1.5	18	50
	71201020	1	4	1.5	20	50
	71201022	1	4	1.5	22	60
	71201026	1	4	1.5	26	60
	71201030	1	4	1.5	30	70
	71201040	1	4	1.5	40	80
	71201050	1	4	1.5	50	100
	71201204	1.2	4	1.8	4	50
	71201206	1.2	4	1.8	6	50
	71201208	1.2	4	1.8	8	50
	71201210	1.2	4	1.8	10	50
	71201212	1.2	4	1.8	12	50
	71201214	1.2	4	1.8	14	50
	71201216	1.2	4	1.8	16	50
	71201220	1.2	4	1.8	20	50
	71201226	1.2	4	1.8	26	60
	71201230	1.2	4	1.8	30	70
	71201406	1.4	4	2.1	6	50
	71201408	1.4	4	2.1	8	50
	71201410	1.4	4	2.1	10	50
	71201414	1.4	4	2.1	14	50
	71201416	1.4	4	2.1	16	50
	71201420	1.4	4	2.1	20	50
	71201504	1.5	4	2.3	4	50
	71201505	1.5	4	2.3	5	50
	71201506	1.5	4	2.3	6	50
	71201507	1.5	4	2.3	7	50
	71201508	1.5	4	2.3	8	50
	71201510	1.5	4	2.3	10	50
	71201512	1.5	4	2.3	12	50
	71201514	1.5	4	2.3	14	50
	71201516	1.5	4	2.3	16	50
	71201518	1.5	4	2.3	18	50
	71201520	1.5	4	2.3	20	50
	71201522	1.5	4	2.3	22	60
	71201526	1.5	4	2.3	26	60

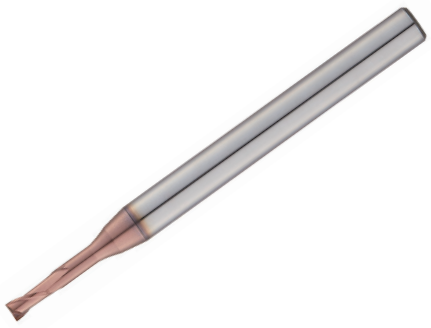
	형 번	DC	DCON-MS	APMX	LU	LF
ESRE	71201530	1.5	4	2.3	30	70
	71201608	1.6	4	2.3	8	50
	71201610	1.6	4	2.3	10	50
	71201612	1.6	4	2.3	12	50
	71201616	1.6	4	2.3	16	50
	71201620	1.6	4	2.3	20	50
	71201808	1.8	4	2.7	8	50
	71201810	1.8	4	2.7	10	50
	71201812	1.8	4	2.7	12	50
	71201816	1.8	4	2.7	16	50
	71201820	1.8	4	2.7	20	50
	71202006	2	4	3	6	50
	71202008	2	4	3	8	50
	71202010	2	4	3	10	50
	71202012	2	4	3	12	50
	71202014	2	4	3	14	50
	71202016	2	4	3	16	50
	71202018	2	4	3	18	50
	71202020	2	4	3	20	50
	71202022	2	4	3	22	60
	71202026	2	4	3	26	60
	71202030	2	4	3	30	70
	71202035	2	4	3	35	70
	71202040	2	4	3	40	80
	71202045	2	4	3	45	90
	71202050	2	4	3	50	100
	71202060	2	4	3	60	110
	71202508	2.5	4	4	8	50
	71202510	2.5	4	4	10	50
	71202512	2.5	4	4	12	50
	71202514	2.5	4	4	14	50
	71202516	2.5	4	4	16	50
	71202518	2.5	4	4	18	50
	71202520	2.5	4	4	20	50
	71202522	2.5	4	4	22	60
	71202526	2.5	4	4	26	60
	71202530	2.5	4	4	30	70
	71202535	2.5	4	4	35	70

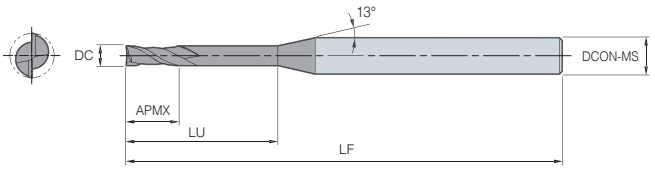
ESRE712

2날 리브 플랫

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







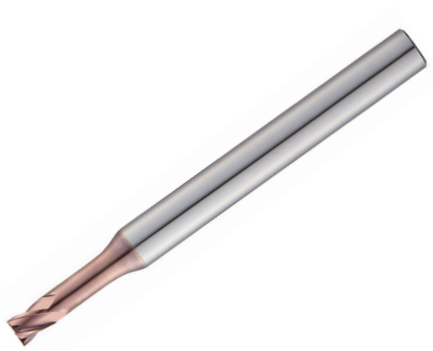
(mm)

	형 번	DC	DCON-MS	APMX	LU	LF
ESRE	71202540	2.5	4	4	40	80
	71202545	2.5	4	4	45	90
	71202550	2.5	4	4	50	100
	71203006	3	6	4.5	6	50
	71203008	3	6	4.5	8	50
	71203010	3	6	4.5	10	50
	71203012	3	6	4.5	12	50
	71203014	3	6	4.5	14	60
	71203016	3	6	4.5	16	60
	71203018	3	6	4.5	18	60
	71203020	3	6	4.5	20	60
	71203022	3	6	4.5	22	65
	71203026	3	6	4.5	26	65
	71203030	3	6	4.5	30	70
	71203035	3	6	4.5	35	70
	71203040	3	6	4.5	40	80
	71203045	3	6	4.5	45	90
	71203050	3	6	4.5	50	100
	71203060	3	6	4.5	60	100
	71204008	4	6	6	8	50
	71204010	4	6	6	10	50
	71204012	4	6	6	12	50
	71204014	4	6	6	14	60
	71204016	4	6	6	16	60
	71204018	4	6	6	18	60
	71204020	4	6	6	20	60
	71204022	4	6	6	22	65
	71204026	4	6	6	26	65

	형 번	DC	DCON-MS	APMX	LU	LF
ESRE	71204030	4	6	6	30	70
	71204035	4	6	6	35	70
	71204040	4	6	6	40	80
	71204045	4	6	6	45	90
	71204050	4	6	6	50	100
	71204060	4	6	6	60	100
	71205016	5	6	8	16	60
	71205020	5	6	8	20	60
	71205026	5	6	8	26	65
	71205030	5	6	8	30	70
	71205035	5	6	8	35	75
	71205040	5	6	8	40	80
	71205050	5	6	8	50	90
	71205060	5	6	8	60	100
	71206015	6	6	9	15	60
	71206020	6	6	9	20	60
	71206030	6	6	9	30	70
	71206032	6	6	9	32	90
	71208025	8	8	12	25	70
	71208030	8	8	12	30	80
	71208042	8	8	12	42	100
	71210030	10	10	15	30	75
	71210035	10	10	15	35	80
	71210045	10	10	15	45	100
	71212035	12	12	20	35	80
	71212040	12	12	20	40	90
	71212050	12	12	20	50	110

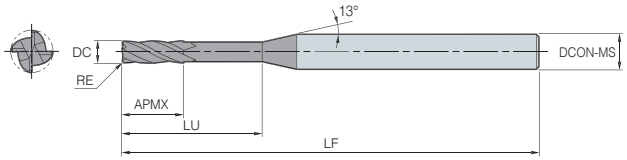
ESRE714

4날 리브 플랫



CARBIDE | 4 | H·A 30° | 재종 PC305H | h5 shank

DC	공구직경공차
Ø0.5 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LU	LF
ESRE	71400501	0.5	4	0.5	1	40
	71400502	0.5	4	0.5	2	40
	71400503	0.5	4	0.5	3	45
	71400504	0.5	4	0.5	4	45
	71400505	0.5	4	0.5	5	45
	71400506	0.5	4	0.5	6	45
	71400508	0.5	4	0.5	8	45
	71400510	0.5	4	0.5	10	50
	71400601	0.6	4	0.6	1	45
	71400602	0.6	4	0.6	2	45
	71400603	0.6	4	0.6	3	45
	71400604	0.6	4	0.6	4	45
	71400605	0.6	4	0.6	5	45
	71400606	0.6	4	0.6	6	45
	71400608	0.6	4	0.6	8	45
	71400610	0.6	4	0.6	10	50
	71400612	0.6	4	0.6	12	50
	71400702	0.7	4	0.7	2	45
	71400704	0.7	4	0.7	4	45
	71400706	0.7	4	0.7	6	45
	71400708	0.7	4	0.7	8	45
	71400710	0.7	4	0.7	10	50
	71400801	0.8	4	0.8	1	40
	71400802	0.8	4	0.8	2	40
	71400803	0.8	4	0.8	3	40
	71400804	0.8	4	0.8	4	40
	71400805	0.8	4	0.8	5	40
	71400806	0.8	4	0.8	6	40
	71400808	0.8	4	0.8	8	40
	71400810	0.8	4	0.8	10	50
	71400812	0.8	4	0.8	12	50
	71400816	0.8	4	0.8	16	50
	71401002	1	4	1	2	45
	71401003	1	4	1	3	45
	71401004	1	4	1	4	45
	71401006	1	4	1	6	45
	71401008	1	4	1	8	45
	71401010	1	4	1	10	50
	71401012	1	4	1	12	50
	71401014	1	4	1	14	50

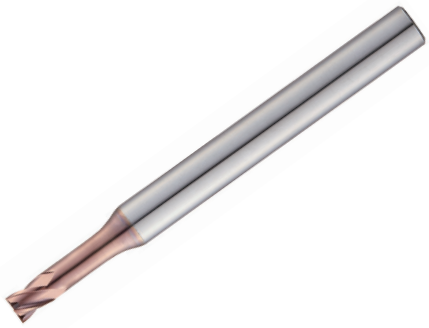
	형 번	DC	DCON-MS	APMX	LU	LF
ESRE	71401016	1	4	1	16	50
	71401018	1	4	1	18	60
	71401020	1	4	1	20	60
	71401204	1.2	4	1.2	4	45
	71401206	1.2	4	1.2	6	45
	71401208	1.2	4	1.2	8	45
	71401210	1.2	4	1.2	10	50
	71401212	1.2	4	1.2	12	50
	71401216	1.2	4	1.2	16	50
	71401218	1.2	4	1.2	18	60
	71401220	1.2	4	1.2	20	60
	71401406	1.4	4	1.4	6	45
	71401408	1.4	4	1.4	8	45
	71401410	1.4	4	1.4	10	50
	71401412	1.4	4	1.4	12	50
	71401414	1.4	4	1.4	14	50
	71401416	1.4	4	1.4	16	50
	71401504	1.5	4	1.5	4	45
	71401506	1.5	4	1.5	6	45
	71401508	1.5	4	1.5	8	45
	71401510	1.5	4	1.5	10	50
	71401512	1.5	4	1.5	12	50
	71401516	1.5	4	1.5	16	50
	71401518	1.5	4	1.5	18	60
	71401520	1.5	4	1.5	20	60
	71401525	1.5	4	1.5	25	60
	71401530	1.5	4	1.5	30	70
	71401606	1.6	4	1.6	6	45
	71401608	1.6	4	1.6	8	45
	71401610	1.6	4	1.6	10	50
	71401612	1.6	4	1.6	12	50
	71401614	1.6	4	1.6	14	50
	71401616	1.6	4	1.6	16	50
	71401618	1.6	4	1.6	18	60
	71401620	1.6	4	1.6	20	60
	71401625	1.6	4	1.6	25	70
	71401806	1.8	4	1.8	6	45
	71401808	1.8	4	1.8	8	45
	71401810	1.8	4	1.8	10	50
	71401812	1.8	4	1.8	12	50

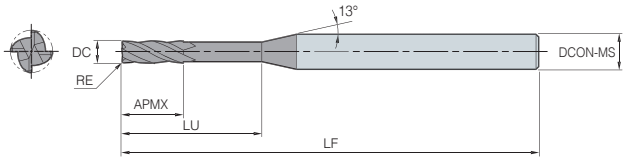
ESRE714

4날 리브 플랫

CARBIDE | 4 | H·A 30° | 재종 PC305H | h5 shank

DC	공구직경공차
Ø0.5 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF
ESRE	71401816	1.8	4	1.8	16	50
	71401820	1.8	4	1.8	20	60
	71401825	1.8	4	1.8	25	70
	71402004	2	4	2	4	45
	71402006	2	4	2	6	45
	71402008	2	4	2	8	45
	71402010	2	4	2	10	50
	71402012	2	4	2	12	50
	71402014	2	4	2	14	50
	71402016	2	4	2	16	50
	71402018	2	4	2	18	50
	71402020	2	4	2	20	50
	71402022	2	4	2	22	60
	71402025	2	4	2	25	60
	71402030	2	4	2	30	70
	71402510	2.5	4	2.5	10	50
	71402512	2.5	4	2.5	12	50
	71402516	2.5	4	2.5	16	50
	71402520	2.5	4	2.5	20	50
	71402525	2.5	4	2.5	25	60
	71402530	2.5	4	2.5	30	70
	71403006	3	6	3	6	45
	71403008	3	6	3	8	45
	71403010	3	6	3	10	50
	71403012	3	6	3	12	50
	71403016	3	6	3	16	55
	71403020	3	6	3	20	60
	71403025	3	6	3	25	65
	71403030	3	6	3	30	70
	71403035	3	6	3	35	75
	71403040	3	6	3	40	80
	71403045	3	6	3	45	90
	71403050	3	6	3	50	100
	71403060	3	6	3	60	110
	71403512	3.5	6	3.5	12	50
	71403516	3.5	6	3.5	16	55
	71403520	3.5	6	3.5	20	60
	71403525	3.5	6	3.5	25	65
	71403530	3.5	6	3.5	30	70
	71403535	3.5	6	3.5	35	75

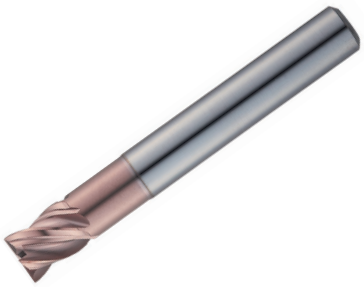
	형 번	DC	DCON-MS	APMX	LU	LF
ESRE	71403540	3.5	6	3.5	40	80
	71404006	4	6	4	6	50
	71404008	4	6	4	8	50
	71404010	4	6	4	10	50
	71404012	4	6	4	12	50
	71404016	4	6	4	16	55
	71404020	4	6	4	20	60
	71404025	4	6	4	25	65
	71404030	4	6	4	30	70
	71404040	4	6	4	40	80
	71404045	4	6	4	45	90
	71404050	4	6	4	50	100
	71404060	4	6	4	60	110
	71404512	4.5	6	4.5	12	50
	71404516	4.5	6	4.5	16	55
	71404520	4.5	6	4.5	20	60
	71404525	4.5	6	4.5	25	65
	71404530	4.5	6	4.5	30	70
	71404540	4.5	6	4.5	40	80
	71405016	5	6	5	16	60
	71405020	5	6	5	20	60
	71405025	5	6	5	25	65
	71405030	5	6	5	30	70
	71405040	5	6	5	40	80
	71405050	5	6	5	50	100
	71405060	5	6	5	60	110
	71406020	6	6	6	20	60
	71406030	6	6	6	30	75
	71406040	6	6	6	40	80
	71406050	6	6	6	50	90
	71406060	6	6	6	60	100
	71408025	8	8	12	25	65
	71408040	8	8	12	40	100
	71408050	8	8	12	50	110
	71410030	10	10	15	30	70
	71410050	10	10	15	50	100
	71410060	10	10	15	60	120
	71412040	12	12	18	40	80
	71412060	12	12	18	60	110
	71412070	12	12	18	70	130

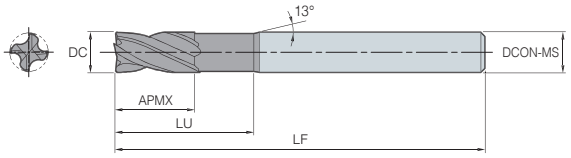
ESXE704

4날 넥 타입 플랫

CARBIDE | 4 | H·A Multi | 재종 PC305H | h5 shank

DC	공구직경공차
ALL	0.000 ~ -0.020







(mm)

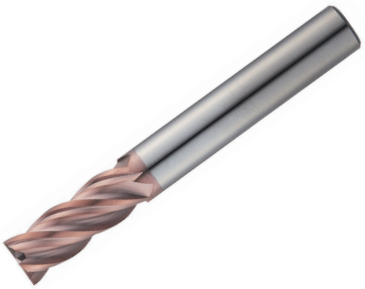
형 번		DC	DCON-MS	APMX	LU	LF
ESXE	704010	1	4	1.5	4	45
	704020	2	4	3	6	45
	704030	3	6	4	7	45
	704040	4	6	5	9	45
	704060	6	6	7	14	50
	704080	8	8	9	18	60
	704100	10	10	12	25	75
	704120	12	12	15	30	75

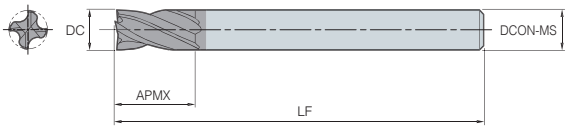
ESXE714

4날 플랫

CARBIDE | 4 | H·A Multi | 재종 PC305H | h5 shank

DC	공구직경공차
ALL	0.000 ~ -0.020







(mm)

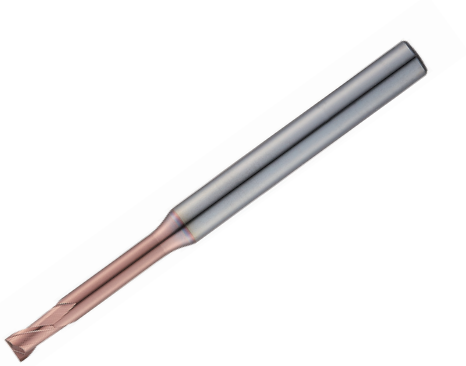
형 번		DC	DCON-MS	APMX	LF
ESXE	714020	2	4	5	45
	714030	3	6	8	45
	714040	4	6	10	45
	714040S4	4	4	10	45
	714060	6	6	16	50
	714080	8	8	20	60
	714100	10	10	25	75
	714120	12	12	35	85

ESLNS20

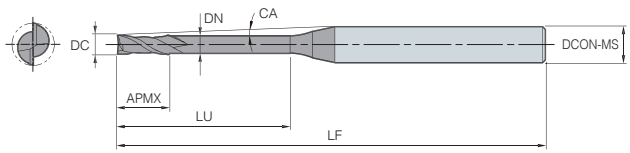
2날 롱 넥 플랫

CARBIDE | 2 | H·A 45° | 재종 PC305H | h5 shank

DC	공구직경공차
ALL	0.000 ~ -0.012





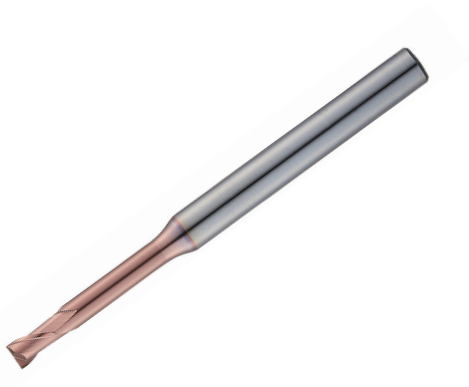


(mm)

형 번		DC	DCON-MS	APMX	LU	LF	DN	CA	가공물 구배각별 유효길이				
									0.5°	1°	1.5°	2°	3°
ESLNS	2001-0.3	0.1	4	0.15	0.3	45	0.08	11.6	0.4	0.4	0.5	0.5	0.5
	2001-0.5	0.1	4	0.15	0.5	45	0.08	11.4	0.6	0.7	0.7	0.7	0.8
	2001-1	0.1	4	0.15	1	45	0.08	10.9	1.2	1.2	1.2	1.3	1.4
	2002-0.5	0.2	4	0.3	0.5	50	0.17	11.3	1.2	1.3	1.5	1.7	2
	2002-1	0.2	4	0.3	1	50	0.17	10.8	1.7	1.9	2.2	2.4	2.7
	2002-1.5	0.2	4	0.3	1.5	50	0.17	10.3	2.3	2.5	2.8	3	3.4
	2003-1	0.3	4	0.45	1	50	0.27	10.8	1.7	1.9	2.2	2.4	2.7
	2003-1.5	0.3	4	0.45	1.5	50	0.27	10.3	2.3	2.5	2.8	3	3.4
	2003-2	0.3	4	0.45	2	50	0.27	9.8	2.8	3.1	3.4	3.6	4.1
	2003-2.5	0.3	4	0.45	2.5	50	0.27	9.4	3.4	3.7	4	4.3	4.7
	2003-3	0.3	4	0.45	3	50	0.27	9	3.9	4.3	4.6	4.9	5.4
	2004-1	0.4	4	0.6	1	50	0.37	10.7	1.7	1.9	2.2	2.4	2.7
	2004-1.5	0.4	4	0.6	1.5	50	0.37	10.2	2.3	2.5	2.8	3	3.4
	2004-2	0.4	4	0.6	2	50	0.37	9.7	2.8	3.1	3.4	3.6	4.1
	2004-2.5	0.4	4	0.6	2.5	50	0.37	9.3	3.4	3.7	4	4.3	4.7
	2004-3	0.4	4	0.6	3	50	0.37	8.9	3.9	4.3	4.6	4.9	5.4
	2004-3.5	0.4	4	0.6	3.5	50	0.37	8.6	4.5	4.9	5.2	5.5	6
	2004-4	0.4	4	0.6	4	50	0.37	8.2	5	5.4	5.8	6.1	6.6
	2004-5	0.4	4	0.6	5	50	0.37	7.6	6.1	6.6	6.9	7.3	7.8
	2004-6	0.4	4	0.6	6	50	0.37	7.1	7.2	7.7	8.1	8.4	9
	2005-1	0.5	4	0.75	1	50	0.47	10.7	1.7	1.9	2.2	2.4	2.7
	2005-1.5	0.5	4	0.75	1.5	50	0.47	10.2	2.3	2.5	2.8	3	3.4
	2005-2	0.5	4	0.75	2	50	0.47	9.7	2.8	3.1	3.4	3.6	4.1
	2005-2.5	0.5	4	0.75	2.5	50	0.47	9.3	3.4	3.7	4	4.3	4.7
	2005-3	0.5	4	0.75	3	50	0.47	8.9	3.9	4.3	4.6	4.9	5.4
	2005-4	0.5	4	0.75	4	50	0.47	8.1	5	5.4	5.8	6.1	6.6
	2005-5	0.5	4	0.75	5	50	0.47	7.5	6.1	6.6	6.9	7.3	7.8
	2005-6	0.5	4	0.75	6	50	0.47	7	7.2	7.7	8.1	8.4	9
	2005-8	0.5	4	0.75	8	50	0.47	6.2	9.3	9.9	10.3	10.7	11.4
	2006-2	0.6	4	0.9	2	50	0.57	9.6	2.8	3.1	3.4	3.6	4.1
	2006-4	0.6	4	0.9	4	50	0.57	6.9	7.2	7.7	8.1	8.4	9
	2006-6	0.6	4	0.9	6	50	0.57	6.1	9.3	9.9	10.3	10.7	11.4
	2006-8	0.6	4	0.9	8	50	0.57	5.4	11.5	12.1	12.6	13	13.7
	2006-10	0.6	4	0.9	10	50	0.57	9.6	2.8	3.1	3.4	3.6	4.1
	2007-2	0.7	4	1.05	2	50	0.67	8	5	5.4	5.8	6.1	6.6
	2007-4	0.7	4	1.05	4	50	0.67	6.9	7.2	7.7	8.1	8.4	9
	2007-6	0.7	4	1.05	6	50	0.67	6	9.3	9.9	10.3	10.7	11.4
	2007-8	0.7	4	1.05	8	50	0.67	5.3	11.5	12.1	12.6	13	13.7
	2007-10	0.7	4	1.2	10	50	0.77	7.9	5	5.4	5.8	6.1	6.6
	2008-4	0.8	4	1.2	4	50	0.77	6.8	7.2	7.7	8.1	8.4	9

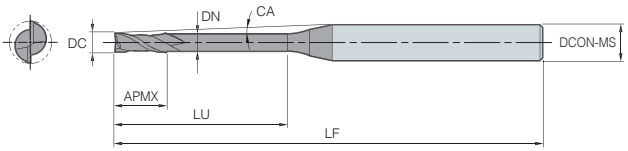
ESLNS20

2날 롱 넥 플랫



CARBIDE | 2 | H·A 45° | 재종 PC305H | h5 shank

DC	공구직경공차
ALL	0.000 ~ -0.012





(mm)

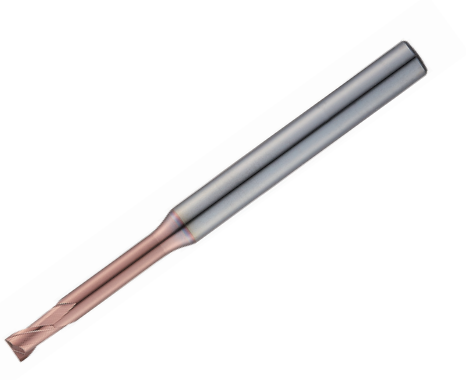
형 번		DC	DCON-MS	APMX	LU	LF	DN	CA	가공물 구배각별 유효길이				
									0.5°	1°	1.5°	2°	3°
ESLNS	2008-6	0.8	4	1.2	6	50	0.77	5.9	9.3	9.9	10.3	10.7	11.4
	2008-8	0.8	4	1.2	8	50	0.77	5.2	11.5	12.1	12.6	13	13.7
	2008-10	0.8	4	1.2	10	50	0.77	4.7	13.6	14.2	14.8	15.2	16
	2008-12	0.8	4	1.2	12	55	0.77	6.7	7.2	7.7	8.1	8.4	9.1
	2009-6	0.9	4	1.35	6	50	0.86	5.8	9.4	9.9	10.4	10.7	11.4
	2009-8	0.9	4	1.35	8	50	0.86	5.1	11.5	12.1	12.6	13	13.7
	2009-10	0.9	4	1.35	10	55	0.86	4.6	13.6	14.3	14.8	15.2	16
	2009-12	0.9	4	1.35	12	55	0.86	9.4	2.9	3.2	3.4	3.7	4.1
	2010-2	1	4	1.5	2	50	0.96	7.7	5.1	5.5	5.8	6.1	6.6
	2010-4	1	4	1.5	4	50	0.96	6.6	7.2	7.7	8.1	8.4	9.1
	2010-6	1	4	1.5	6	50	0.96	5.7	9.4	9.9	10.4	10.7	11.4
	2010-8	1	4	1.5	8	50	0.96	5	11.5	12.1	12.6	13	13.7
	2010-10	1	4	1.5	10	55	0.96	4.5	13.6	14.3	14.8	15.2	16
	2010-12	1	4	1.5	12	55	0.96	4.1	15.7	16.4	17	17.4	18.7
	2010-14	1	4	1.5	14	60	0.96	3.8	17.8	18.6	19.1	19.6	21.3
	2010-16	1	4	1.5	16	60	0.96	3.2	22	22.8	23.5	24	26.6
	2010-20	1	4	1.5	20	60	0.96	6.3	7.3	7.7	8.1	8.5	9.1
	2012-6	1.2	4	1.8	6	50	1.15	5.5	9.4	9.9	10.4	10.8	11.4
	2012-8	1.2	4	1.8	8	50	1.15	4.8	11.5	12.1	12.6	13	13.7
	2012-10	1.2	4	1.8	10	50	1.15	11.5	12.1	12.6	13	13.7	16
	2012-12	1.2	4	1.8	12	55	1.15	4.3	13.6	14.3	14.8	15.2	16
	2012-16	1.2	4	1.8	16	55	1.15	3.6	17.8	18.6	19.2	19.7	21.3
	2014-6	1.4	4	2.1	6	50	1.34	6.1	7.3	7.8	8.1	8.5	9.1
	2014-8	1.4	4	2.1	8	50	1.34	5.3	9.4	10	10.4	10.8	11.5
	2014-10	1.4	4	2.1	10	50	1.34	4.6	11.6	12.1	12.6	13	13.8
	2014-12	1.4	4	2.1	12	55	1.34	4.1	13.7	14.3	14.8	15.3	16.1
	2014-14	1.4	4	2.1	14	55	1.34	3.7	15.8	16.5	17	17.5	18.7
	2014-16	1.4	4	2.1	16	55	1.34	3.4	17.9	18.6	19.2	19.7	21.4
	2015-4	1.5	4	2.25	4	50	1.44	7.2	5.2	5.5	5.9	6.2	6.7
	2015-6	1.5	4	2.25	6	50	1.44	6	7.3	7.8	8.1	8.5	9.1
	2015-8	1.5	4	2.25	8	50	1.44	5.1	9.4	10	10.4	10.8	11.5
	2015-10	1.5	4	2.25	10	50	1.44	4.5	11.6	12.1	12.6	13	13.8
	2015-12	1.5	4	2.25	12	55	1.44	4	13.7	14.3	14.8	15.3	16.1
	2015-14	1.5	4	2.25	14	55	1.44	3.6	15.8	16.5	17	17.5	18.7
	2015-16	1.5	4	2.25	16	55	1.44	3.3	17.9	18.6	19.2	19.7	-
	2015-18	1.5	4	2.25	18	60	1.44	3	20	20.7	21.3	21.9	-
	2015-20	1.5	4	2.25	20	60	1.44	2.8	22	22.9	23.5	24.1	-
	2015-25	1.5	4	2.25	25	65	1.44	2.4	27.3	28.1	28.8	30	-
	2016-6	1.6	4	2.4	6	50	1.54	5.9	7.3	7.8	8.1	8.5	9.1
	2016-8	1.6	4	2.4	8	50	1.54	5	9.4	10	10.4	10.8	11.5

ESLNS20

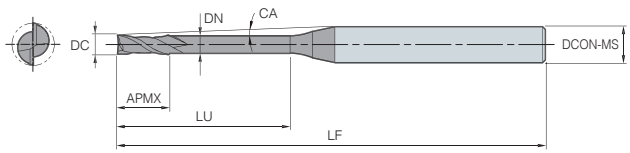
2날 롱 넥 플랫

CARBIDE | 2 | H·A 45° | 재종 PC305H | h5 shank

DC	공구직경공차
ALL	0.000 ~ -0.012





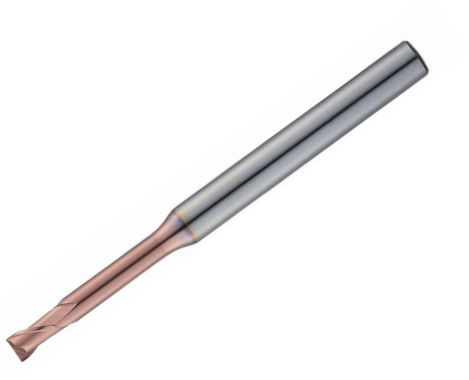


(mm)

형 번		DC	DCON-MS	APMX	LU	LF	DN	CA	가공물 구배각별 유효길이				
									0.5°	1°	1.5°	2°	3°
ESLNS	2016-10	1.6	4	2.4	10	50	1.54	4.4	11.6	12.1	12.6	13	13.8
	2016-12	1.6	4	2.4	12	55	1.54	3.9	13.7	14.3	14.8	15.3	16.1
	2016-14	1.6	4	2.4	14	55	1.54	3.5	15.8	16.5	17	17.5	18.7
	2016-16	1.6	4	2.4	16	55	1.54	3.2	17.9	18.6	19.2	19.7	21.4
	2016-18	1.6	4	2.4	18	60	1.54	2.9	20	20.7	21.3	21.9	-
	2016-20	1.6	4	2.4	20	60	1.54	2.7	22	22.9	23.5	24.1	-
	2018-6	1.8	4	2.7	6	50	1.73	5.6	7.4	7.8	8.2	8.5	9.1
	2018-8	1.8	4	2.7	8	50	1.73	4.8	9.5	10	10.4	10.8	11.5
	2018-10	1.8	4	2.7	10	50	1.73	4.2	11.6	12.2	12.6	13	13.8
	2018-12	1.8	4	2.7	12	55	1.73	3.7	13.7	14.3	14.8	15.3	16.1
	2018-14	1.8	4	2.7	14	55	1.73	3.3	15.8	16.5	17	17.5	18.8
	2018-16	1.8	4	2.7	16	55	1.73	3	17.9	18.6	19.2	19.7	-
	2018-18	1.8	4	2.7	18	60	1.73	2.7	20	20.7	21.3	21.9	-
	2018-20	1.8	4	2.7	20	60	1.73	2.5	22.1	22.9	23.5	24.1	-
	2020-4	2	4	3	4	50	1.92	6.5	5.3	5.6	5.9	6.2	6.7
	2020-6	2	4	3	6	50	1.92	5.3	7.4	7.8	8.2	8.5	9.1
	2020-8	2	4	3	8	50	1.92	4.5	9.5	10	10.4	10.8	11.5
	2020-10	2	4	3	10	50	1.92	3.9	11.6	12.2	12.7	13.1	13.8
	2020-12	2	4	3	12	55	1.92	3.4	13.7	14.3	14.9	15.3	16.1
	2020-14	2	4	3	14	55	1.92	3.1	15.8	16.5	17	17.5	18.8
	2020-16	2	4	3	16	55	1.92	2.8	17.9	18.6	19.2	19.7	-
	2020-18	2	4	3	18	60	1.92	2.6	20	20.8	21.4	21.9	-
	2020-20	2	4	3	20	60	1.92	2.4	22.1	22.9	23.5	24.1	-
	2020-25	2	4	3	25	65	1.92	2	27.3	28.2	28.9	-	-
	2020-30	2	4	3	30	70	1.92	1.7	32.5	33.4	34.4	-	-
	2025-8	2.5	4	3.75	8	50	2.4	3.7	9.6	10.1	10.5	10.9	11.5
	2025-10	2.5	4	3.75	10	50	2.4	3.1	11.7	12.2	12.7	13.1	13.8
	2025-12	2.5	4	3.75	12	55	2.4	2.7	13.8	14.4	14.9	15.3	-
	2025-14	2.5	4	3.75	14	55	2.4	2.4	15.9	16.5	17.1	17.5	-
	2025-16	2.5	4	3.75	16	55	2.4	2.2	18	18.7	19.2	19.7	-
	2025-18	2.5	4	3.75	18	55	2.4	2	20.1	20.8	21.4	-	-
	2025-20	2.5	4	3.75	20	60	2.4	1.8	22.1	22.9	23.5	-	-
	2025-25	2.5	4	3.75	25	60	2.4	1.5	27.3	28.2	-	-	-
	2025-30	2.5	4	3.75	30	70	2.4	1.3	32.6	33.5	-	-	-
	2030-8	3	6	4.5	8	55	2.88	5.6	9.6	10.1	10.5	10.9	11.5
	2030-10	3	6	4.5	10	55	2.88	5	11.7	12.3	12.7	13.1	13.8
	2030-12	3	6	4.5	12	60	2.88	4.5	13.8	14.4	14.9	15.4	16.3
	2030-14	3	6	4.5	14	60	2.88	4.1	15.9	16.6	17.1	17.6	18.9
	2030-16	3	6	4.5	16	60	2.88	3.7	18	18.7	19.3	19.8	21.6
	2030-18	3	6	4.5	18	60	2.88	3.4	20.1	20.8	21.4	21.9	24.2

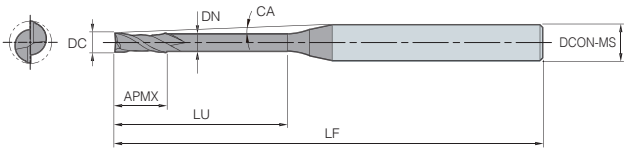
ESLNS20

2날 롱 넥 플랫



CARBIDE | 2 | H·A 45° | 재종 PC305H | h5 shank

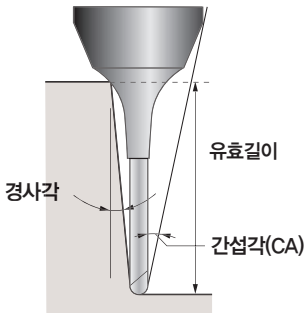
DC	공구직경공차
ALL	0.000 ~ -0.012

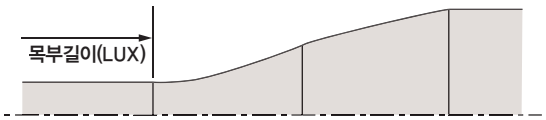




(mm)

형 번		DC	DCON-MS	APMX	LU	LF	DN	CA	가공물 구배각별 유효길이				
									0.5°	1°	1.5°	2°	3°
ESLNS	2030-20	3	6	4.5	20	65	2.88	3.2	22.2	23	23.6	24.2	26.9
	2030-25	3	6	4.5	25	70	2.88	2.7	27.4	28.2	28.9	30.2	-
	2030-30	3	6	4.5	30	75	2.88	2.4	32.6	33.5	34.5	36.2	-
	2030-35	3	6	4.5	35	80	2.88	2.1	37.7	38.7	40.2	42.2	-
	2030-40	3	6	4.5	40	90	2.88	1.9	42.9	43.9	45.9	-	-
	2040-12	4	6	6	12	60	3.85	3.4	13.9	14.5	15	15.4	16.3
	2040-16	4	6	6	16	60	3.85	2.8	18.1	18.8	19.3	19.8	-
	2040-20	4	6	6	20	70	3.85	2.3	22.3	23	23.6	24.3	-
	2040-25	4	6	6	25	70	3.85	2	27.4	28.3	28.9	-	-
	2040-30	4	6	6	30	80	3.85	1.7	32.6	33.5	34.6	-	-
	2040-35	4	6	6	35	80	3.85	1.5	37.8	38.8	-	-	-
	2040-40	4	6	6	40	90	3.85	1.3	42.9	44	-	-	-
	2040-45	4	6	6	45	90	3.85	1.2	48.1	49.4	-	-	-
	2040-50	4	6	6	50	100	3.85	1.1	53.2	54.8	-	-	-
	2050-16	5	6	7.5	16	60	4.85	1.5	18.1	18.8	-	-	-
	2050-20	5	6	7.5	20	60	4.85	1.3	22.3	23	-	-	-
	2050-25	5	6	7.5	25	70	4.85	1.1	27.4	28.3	-	-	-
	2050-30	5	6	7.5	30	70	4.85	0.9	32.6	-	-	-	-
	2050-35	5	6	7.5	35	80	4.85	0.8	37.8	-	-	-	-
	2050-40	5	6	7.5	40	90	4.85	0.7	42.9	-	-	-	-
	2050-50	5	6	7.5	50	100	4.85	0.6	53.2	-	-	-	-





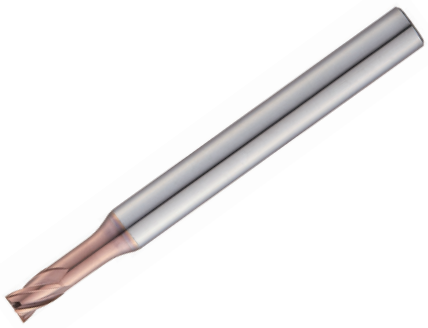
※ 표시된 유효길이는 공작물과의 간섭을 막기 위한 기본 값입니다.
가공환경의 적절한 제어가 필요합니다.

ESLNS40

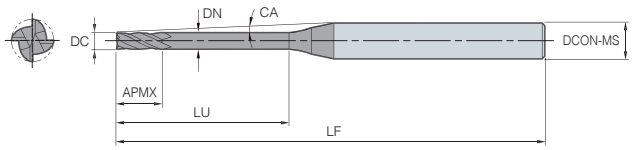
4날 롱 넥 플랫

CARBIDE | 4 | H·A 30° | 재종 PC305H | h5 shank

DC	공구직경공차
ALL	0.000 ~ -0.012





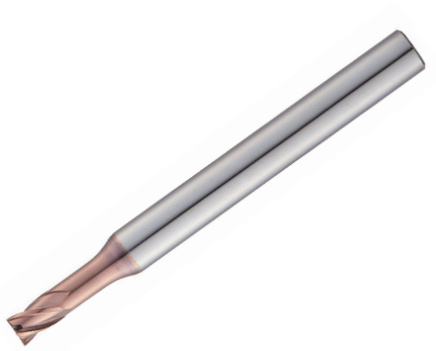


(mm)

형 번		DC	DCON-MS	APMX	LU	LF	DN	CA	가공물 구배각별 유효길이				
									0.5°	1°	1.5°	2°	3°
ESLNS	4010-4	1	4	1.5	4	50	0.96	7.7	5.1	5.5	5.8	6.1	6.6
	4010-6	1	4	1.5	6	50	0.96	6.6	7.2	7.7	8.1	8.4	9.1
	4010-8	1	4	1.5	8	50	0.96	5.7	9.4	9.9	10.4	10.7	11.4
	4010-10	1	4	1.5	10	50	0.96	5	11.5	12.1	12.6	13	13.7
	4015-4	1.5	4	2.25	4	50	1.44	7.2	5.2	5.5	5.9	6.2	6.7
	4015-6	1.5	4	2.25	6	50	1.44	6	7.3	7.8	8.1	8.5	9.1
	4015-8	1.5	4	2.25	8	50	1.44	5.1	9.4	10	10.4	10.8	11.5
	4015-10	1.5	4	2.25	10	50	1.44	4.5	11.6	12.1	12.6	13	13.8
	4015-12	1.5	4	2.25	12	55	1.44	4	13.7	14.3	14.8	15.3	16.1
	4015-14	1.5	4	2.25	14	55	1.44	3.6	15.8	16.5	17	17.5	18.7
	4015-16	1.5	4	2.25	16	55	1.44	3.3	17.9	18.6	19.2	19.7	-
	4015-18	1.5	4	2.25	18	60	1.44	3	20	20.7	21.3	21.9	-
	4015-20	1.5	4	2.25	20	60	1.44	2.8	22	22.9	23.5	24.1	-
	4015-25	1.5	4	2.25	25	65	1.44	2.4	27.3	28.1	28.8	30	-
	4020-4	2	4	3	4	50	1.92	6.5	5.3	5.6	5.9	6.2	6.7
	4020-6	2	4	3	6	50	1.92	5.3	7.4	7.8	8.2	8.5	9.1
	4020-8	2	4	3	8	50	1.92	4.5	9.5	10	10.4	10.8	11.5
	4020-10	2	4	3	10	50	1.92	3.9	11.6	12.2	12.7	13.1	13.8
	4020-12	2	4	3	12	55	1.92	3.4	13.7	14.3	14.9	15.3	16.1
	4020-14	2	4	3	14	55	1.92	3.1	15.8	16.5	17	17.5	18.8
	4020-16	2	4	3	16	55	1.92	2.8	17.9	18.6	19.2	19.7	-
	4020-18	2	4	3	18	60	1.92	2.6	20	20.8	21.4	21.9	-
	4020-20	2	4	3	20	60	1.92	2.4	22.1	22.9	23.5	24.1	-
	4020-25	2	4	3	25	65	1.92	2	27.3	28.2	28.9	-	-
	4020-30	2	4	3	30	70	1.92	1.7	32.5	33.4	34.4	-	-
	4025-8	2.5	4	3.75	8	50	2.4	3.7	9.6	10.1	10.5	10.9	11.5
	4025-10	2.5	4	3.75	10	50	2.4	3.1	11.7	12.2	12.7	13.1	13.8
	4025-12	2.5	4	3.75	12	55	2.4	2.7	13.8	14.4	14.9	15.3	-
	4025-14	2.5	4	3.75	14	55	2.4	2.4	15.9	16.5	17.1	17.5	-
	4025-16	2.5	4	3.75	16	55	2.4	2.2	18	18.7	19.2	19.7	-
	4025-18	2.5	4	3.75	18	60	2.4	2	20.1	20.8	21.4	-	-
	4025-20	2.5	4	3.75	20	60	2.4	1.8	22.1	22.9	23.5	-	-
	4025-25	2.5	4	3.75	25	65	2.4	1.5	27.3	28.2	-	-	-
	4025-30	2.5	4	3.75	30	70	2.4	1.3	32.6	33.5	-	-	-
	4030-8	3	6	4.5	8	55	2.88	5.6	9.6	10.1	10.5	10.9	11.5
	4030-10	3	6	4.5	10	55	2.88	5	11.7	12.3	12.7	13.1	13.8

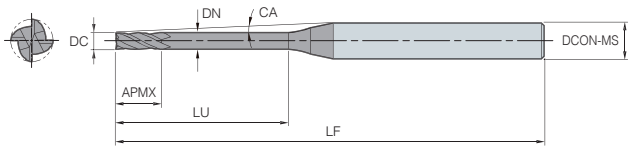
ESLNS40

4날 롱 넥 플랫



CARBIDE | 4 | H·A 30° | 재종 PC305H | h5 shank

DC	공구직경공차
ALL	0.000 ~ -0.012





(mm)

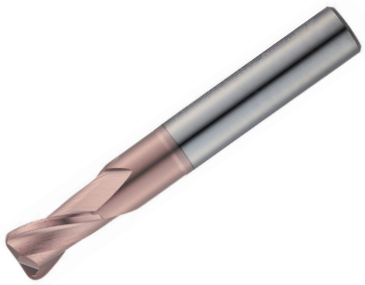
	형 번	DC	DCON-MS	APMX	LU	LF	DN	CA	가공물 구배각별 유효길이				
									0.5°	1°	1.5°	2°	3°
ESLNS	4030-12	3	6	4.5	12	60	2.88	4.5	13.8	14.4	14.9	15.4	16.3
	4030-14	3	6	4.5	14	60	2.88	4.1	15.9	16.6	17.1	17.6	18.9
	4030-16	3	6	4.5	16	60	2.88	3.7	18	18.7	19.3	19.8	21.6
	4030-18	3	6	4.5	18	60	2.88	3.4	20.1	20.8	21.4	21.9	24.2
	4030-20	3	6	4.5	20	65	2.88	3.2	22.2	23	23.6	24.2	26.9
	4030-25	3	6	4.5	25	70	2.88	2.7	27.4	28.2	28.9	30.2	-
	4030-30	3	6	4.5	30	75	2.88	2.4	32.6	33.5	34.5	36.2	-
	4030-35	3	6	4.5	35	80	2.88	2.1	37.7	38.7	40.2	42.2	-
	4030-40	3	6	4.5	40	90	2.88	1.9	42.9	43.9	45.9	-	-
	4040-12	4	6	6	12	60	3.85	3.4	13.9	14.5	15	15.4	16.3
	4040-16	4	6	6	16	60	3.85	2.8	18.1	18.8	19.3	19.8	-
	4040-20	4	6	6	20	70	3.85	2.3	22.3	23	23.6	24.3	-
	4040-25	4	6	6	25	70	3.85	2	27.4	28.3	28.9	-	-
	4040-30	4	6	6	30	80	3.85	1.7	32.6	33.5	34.6	-	-
	4040-35	4	6	6	35	80	3.85	1.5	37.8	38.8	-	-	-
	4040-40	4	6	6	40	90	3.85	1.3	42.9	44	-	-	-
	4040-45	4	6	6	45	90	3.85	1.2	48.1	49.4	-	-	-
	4040-50	4	6	6	50	100	3.85	1.1	53.2	54.8	-	-	-
	4050-16	5	6	7.5	16	60	4.85	1.5	18.1	18.8	-	-	-
	4050-20	5	6	7.5	20	60	4.85	1.3	22.3	23	-	-	-
	4050-25	5	6	7.5	25	70	4.85	1.1	27.4	28.3	-	-	-
	4050-30	5	6	7.5	30	70	4.85	0.9	32.6	-	-	-	-
	4050-35	5	6	7.5	35	80	4.85	0.8	37.8	-	-	-	-
	4050-40	5	6	7.5	40	90	4.85	0.7	42.9	-	-	-	-
	4050-50	5	6	7.5	50	100	4.85	0.6	53.2	-	-	-	-

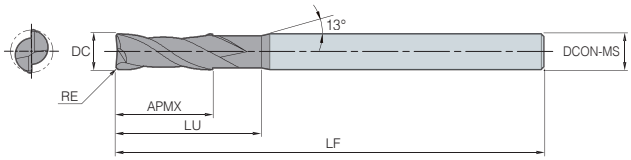
ESR702

2날 넥 타입 레디우스

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESR	70201000503S4	1	4	1.5	3	50	0.05
	70201000504S4	1	4	1.5	4	50	0.05
	70201000506S4	1	4	1.5	6	50	0.05
	70201000508S4	1	4	1.5	8	50	0.05
	70201000510S4	1	4	1.5	10	50	0.05
	7020100103S4	1	4	1.5	3	50	0.1
	7020100104	1	6	1.5	4	50	0.1
	7020100104S4	1	4	1.5	4	50	0.1
	7020100106	1	6	1.5	6	50	0.1
	7020100106S4	1	4	1.5	6	50	0.1
	7020100108S4	1	4	1.5	8	50	0.1
	7020100110S4	1	4	1.5	10	50	0.1
	7020100203S4	1	4	1.5	3	50	0.2
	7020100204	1	6	1.5	4	50	0.2
	7020100204S4	1	4	1.5	4	50	0.2
	7020100206	1	6	1.5	6	50	0.2
	7020100206S4	1	4	1.5	6	50	0.2
	7020100208S4	1	4	1.5	8	50	0.2
	7020100210	1	6	1.5	10	50	0.2
	7020100210S4	1	4	1.5	10	50	0.2
	7020100212	1	6	1.5	12	50	0.2
	7020100303S4	1	4	1.5	3	50	0.3
	7020100304S4	1	4	1.5	4	50	0.3
	7020100306S4	1	4	1.5	6	50	0.3
	7020100308S4	1	4	1.5	8	50	0.3
	7020100310S4	1	4	1.5	10	50	0.3
	7020120208	1.2	6	2	8	50	0.2
	7020120212	1.2	6	2	12	50	0.2
	70201500504S4	1.5	4	2.5	4	50	0.05
	70201500506S4	1.5	4	2.5	6	50	0.05
	70201500508S4	1.5	4	2.5	8	50	0.05
	70201500510S4	1.5	4	2.5	10	50	0.05
	70201500512S4	1.5	4	2.5	12	50	0.05
	7020150104S4	1.5	4	2.5	4	50	0.1
	7020150106S4	1.5	4	2.5	6	50	0.1
	7020150108S4	1.5	4	2.5	8	50	0.1
	7020150110S4	1.5	4	2.5	10	50	0.1
	7020150112S4	1.5	4	2.5	12	50	0.1
	7020150204	1.5	6	2.5	4	50	0.2

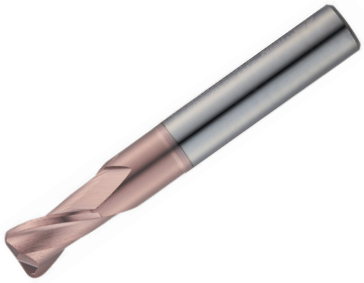
	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESR	7020150204S4	1.5	4	2.5	4	50	0.2
	7020150206	1.5	6	2.5	6	50	0.2
	7020150206S4	1.5	4	2.5	6	50	0.2
	7020150208	1.5	6	2.5	8	50	0.2
	7020150208S4	1.5	4	2.5	8	50	0.2
	7020150210	1.5	6	2.5	10	50	0.2
	7020150210S4	1.5	4	2.5	10	50	0.2
	7020150212S4	1.5	4	2.5	12	50	0.2
	7020150215	1.5	6	2.5	15	50	0.2
	7020150304S4	1.5	4	2.5	4	50	0.3
	7020150306S4	1.5	4	2.5	6	50	0.3
	7020150308S4	1.5	4	2.5	8	50	0.3
	7020150310S4	1.5	4	2.5	10	50	0.3
	7020150312S4	1.5	4	2.5	12	50	0.3
	7020150504S4	1.5	4	2.5	4	50	0.5
	7020150506S4	1.5	4	2.5	6	50	0.5
	7020150508S4	1.5	4	2.5	8	50	0.5
	7020150510S4	1.5	4	2.5	10	50	0.5
	7020150512S4	1.5	4	2.5	12	50	0.5
	7020200106S4	2	4	3	6	50	0.1
	7020200108	2	6	3	8	50	0.1
	7020200108S4	2	4	3	8	50	0.1
	7020200110S4	2	4	3	10	50	0.1
	7020200112	2	6	3	12	50	0.1
	7020200112S4	2	4	3	12	50	0.1
	7020200116S4	2	4	3	16	50	0.1
	7020200120S4	2	4	3	20	50	0.1
	7020200206	2	6	3	6	50	0.2
	7020200206S4	2	4	3	6	50	0.2
	7020200208S4	2	4	3	8	50	0.2
	7020200209	2	6	3	9	50	0.2
	7020200210S4	2	4	3	10	50	0.2
	7020200212S4	2	4	3	12	50	0.2
	7020200216	2	6	3	16	50	0.2
	7020200216S4	2	4	3	16	50	0.2
	7020200220S4	2	4	3	20	50	0.2
	7020200306	2	6	3	6	50	0.3
	7020200306S4	2	4	3	6	50	0.3
	7020200308S4	2	4	3	8	50	0.3

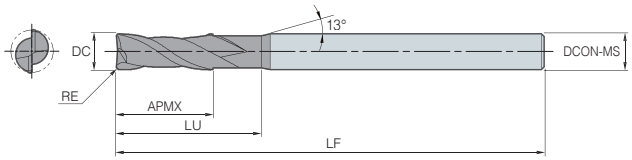
ESR702

2날 넥 타입 레디우스

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESR	7020200310S4	2	4	3	10	50	0.3
	7020200312S4	2	4	3	12	50	0.3
	7020200316S4	2	4	3	16	50	0.3
	7020200320S4	2	4	3	20	50	0.3
	7020200506	2	6	3	6	50	0.5
	7020200506S4	2	4	3	6	50	0.5
	7020200508S4	2	4	3	8	50	0.5
	7020200509	2	6	3	9	50	0.5
	7020200510S4	2	4	3	10	50	0.5
	7020200512	2	6	3	12	50	0.5
	7020200512S4	2	4	3	12	50	0.5
	7020200516	2	6	3	16	50	0.5
	7020200516S4	2	4	3	16	50	0.5
	7020200520S4	2	4	3	20	50	0.5
	7020250208S4	2.5	4	3.5	8	50	0.2
	7020250210S4	2.5	4	3.5	10	50	0.2
	7020250212S4	2.5	4	3.5	12	50	0.2
	7020250216S4	2.5	4	3.5	16	50	0.2
	7020250308S4	2.5	4	3.5	8	50	0.3
	7020250310S4	2.5	4	3.5	10	50	0.3
	7020250312S4	2.5	4	3.5	12	50	0.3
	7020250316S4	2.5	4	3.5	16	50	0.3
	7020250508S4	2.5	4	3.5	8	50	0.5
	7020250510S4	2.5	4	3.5	10	50	0.5
	7020250512S4	2.5	4	3.5	12	50	0.5
	7020250516S4	2.5	4	3.5	16	50	0.5
	7020300108	3	6	4.5	8	55	0.1
	7020300110	3	6	4.5	10	55	0.1
	7020300112	3	6	4.5	12	55	0.1
	7020300116	3	6	4.5	16	55	0.1
	7020300120	3	6	4.5	20	60	0.1
	7020300208	3	6	4.5	8	55	0.2
	7020300209	3	6	4.5	9	55	0.2
	7020300210	3	6	4.5	10	55	0.2
	7020300212	3	6	4.5	12	55	0.2
	7020300216	3	6	4.5	16	55	0.2
	7020300208	3	6	4.5	8	55	0.2
	7020300209	3	6	4.5	9	55	0.2
	7020300210	3	6	4.5	10	55	0.2

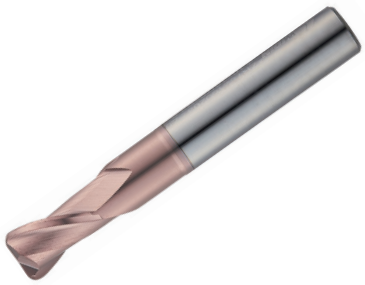
	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESR	7020300212	3	6	4.5	12	55	0.2
	7020300216	3	6	4.5	16	55	0.2
	7020300220	3	6	4.5	20	60	0.2
	7020300308	3	6	4.5	8	55	0.3
	7020300309	3	6	4.5	9	55	0.3
	7020300310	3	6	4.5	10	55	0.3
	7020300312	3	6	4.5	12	55	0.3
	7020300314	3	6	4.5	14	55	0.3
	7020300316	3	6	4.5	16	55	0.3
	7020300320	3	6	4.5	20	60	0.3
	7020300508	3	6	4.5	8	55	0.5
	7020300509	3	6	4.5	9	55	0.5
	7020300510	3	6	4.5	10	55	0.5
	7020300512	3	6	4.5	12	55	0.5
	7020300516	3	6	4.5	16	55	0.5
	7020300520	3	6	4.5	20	60	0.5
	7020301008	3	6	4.5	8	55	1
	7020301010	3	6	4.5	10	55	1
	7020301012	3	6	4.5	12	55	1
	7020301016	3	6	4.5	16	55	1
	7020301020	3	6	4.5	20	60	1
	7020301025	3	6	4.5	25	60	1
	7020400110	4	6	6	10	55	0.1
	7020400112	4	6	6	12	55	0.1
	7020400116	4	6	6	16	55	0.1
	7020400120	4	6	6	20	60	0.1
	7020400125	4	6	6	25	60	0.1
	7020400210	4	6	6	10	55	0.2
	7020400212	4	6	6	12	55	0.2
	7020400216	4	6	6	16	55	0.2
	7020400220	4	6	6	20	60	0.2
	7020400225	4	6	6	25	60	0.2
	7020400310	4	6	6	10	55	0.3
	7020400312	4	6	6	12	55	0.3
	7020400316	4	6	6	16	55	0.3
	7020400320	4	6	6	20	60	0.3
	7020400325	4	6	6	25	60	0.3
	7020400510	4	6	6	10	55	0.5
	7020400512	4	6	6	12	55	0.5

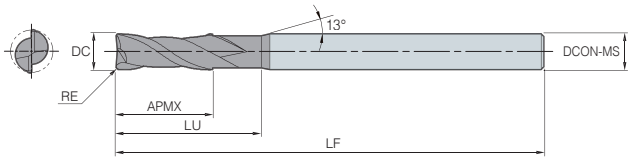
ESR702

2날 넥 타입 레디우스

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESR	7020400516	4	6	6	16	55	0.5
	7020400520	4	6	6	20	60	0.5
	7020400525	4	6	6	25	60	0.5
	7020400530	4	6	6	30	70	0.5
	7020401010	4	6	6	10	55	1
	7020401012	4	6	6	12	55	1
	7020401016	4	6	6	16	55	1
	7020401020	4	6	6	20	60	1
	7020401025	4	6	6	25	60	1
	7020401030	4	6	6	30	70	1
	7020500318	5	6	8	18	60	0.3
	7020600220	6	6	9	20	60	0.2
	7020600320	6	6	9	20	60	0.3
	7020600520	6	6	9	20	60	0.5
	7020601020	6	6	9	20	60	1
	7020601520	6	6	9	20	60	1.5
	7020602020	6	6	9	20	60	2

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESR	7020800225	8	8	12	25	60	0.2
	7020800325	8	8	12	25	60	0.3
	7020800525	8	8	12	25	60	0.5
	7020801025	8	8	12	25	60	1
	7020801525	8	8	12	25	60	1.5
	7021000232	10	10	15	32	70	0.2
	7021000332	10	10	15	32	70	0.3
	7021000532	10	10	15	32	70	0.5
	7021001032	10	10	15	32	70	1
	7021001532	10	10	15	32	70	1.5
	7021002032	10	10	15	32	70	2
	7021200338	12	12	18	38	80	0.3
	7021200538	12	12	18	38	80	0.5
	7021201038	12	12	18	38	80	1
	7021201538	12	12	18	38	80	1.5
	7021202038	12	12	18	38	80	2

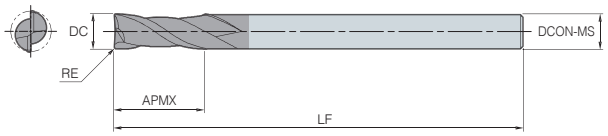
ESR732

2날 롱 샹크 레디우스

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LF	RE
ESR	73201001	1	6	2	50	0.1
	73201002	1	6	2	50	0.2
	73201003	1	6	2	50	0.3
	73201501	1.5	6	3	50	0.1
	73201502	1.5	6	3	50	0.2
	73201503	1.5	6	3	50	0.3
	73201505	1.5	6	3	50	0.5
	73202001	2	6	5	50	0.1
	73202002	2	6	5	50	0.2
	73202003	2	6	5	50	0.3
	73202005	2	6	5	50	0.5
	73202501	2.5	6	7	60	0.1
	73202502	2.5	6	7	60	0.2
	73202503	2.5	6	7	60	0.3
	73202505	2.5	6	7	60	0.5
	73203001	3	6	8	60	0.1
	73203002	3	6	8	60	0.2
	73203003	3	6	8	60	0.3
	73203005	3	6	8	60	0.5
	73204001	4	6	10	70	0.1
	73204002	4	6	10	70	0.2
	73204003	4	6	10	70	0.3
	73204005	4	6	10	70	0.5
	73204010	4	6	10	70	1
	73205001	5	6	13	80	0.1

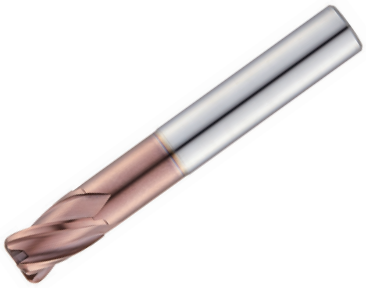
	형 번	DC	DCON-MS	APMX	LF	RE
ESR	73205002	5	6	13	80	0.2
	73205003	5	6	13	80	0.3
	73205005	5	6	13	80	0.5
	73205010	5	6	13	80	1
	73206001	6	6	15	90	0.1
	73206002	6	6	15	90	0.2
	73206003	6	6	15	90	0.3
	73206005	6	6	15	90	0.5
	73206010	6	6	15	90	1
	73208001	8	8	20	100	0.1
	73208002	8	8	20	100	0.2
	73208003	8	8	20	100	0.3
	73208005	8	8	20	100	0.5
	73208010	8	8	20	100	1
	73208020	8	8	20	100	2
	73210002	10	10	25	100	0.2
	73210003	10	10	25	100	0.3
	73210005	10	10	25	100	0.5
	73210010	10	10	25	100	1
	73210020	10	10	25	100	2
	73212002	12	12	30	110	0.2
	73212003	12	12	30	110	0.3
	73212005	12	12	30	110	0.5
	73212010	12	12	30	110	1
	73212020	12	12	30	110	2

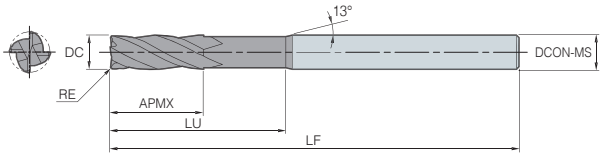
ESR704

4날 넥 타입 레디우스

CARBIDE | 4 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESR	7040100103S4	1	4	2	3	50	0.1
	7040100104S4	1	4	2	4	50	0.1
	7040100106S4	1	4	2	6	50	0.1
	7040100203S4	1	4	2	3	50	0.2
	7040100204S4	1	4	2	4	50	0.2
	7040100206S4	1	4	2	6	50	0.2
	7040100303S4	1	4	2	3	50	0.3
	7040100304S4	1	4	2	4	50	0.3
	7040100306S4	1	4	2	6	50	0.3
	7040150104S4	1.5	4	2.5	4	50	0.1
	7040150106S4	1.5	4	2.5	6	50	0.1
	7040150204S4	1.5	4	2.5	4	50	0.2
	7040150206S4	1.5	4	2.5	6	50	0.2
	7040150304S4	1.5	4	2.5	4	50	0.3
	7040150306S4	1.5	4	2.5	6	50	0.3
	7040200106S4	2	4	3	6	50	0.1
	7040200108S4	2	4	3	8	50	0.1
	7040200206S4	2	4	3	6	50	0.2
	7040200208	2	6	3	8	50	0.2
	7040200208S4	2	4	3	8	50	0.2
	7040200210	2	6	3	10	50	0.2
	7040200212	2	6	3	12	50	0.2
	7040200306S4	2	4	3	6	50	0.3
	7040200308S4	2	4	3	8	50	0.3
	7040200506S4	2	4	3	6	50	0.5
	7040200508S4	2	4	3	8	50	0.5
	7040250106S4	2.5	4	3.5	6	50	0.1
	7040300108	3	6	4	8	55	0.1
	7040300110	3	6	4	10	55	0.1
	7040300112	3	6	4	12	55	0.1
	7040300116	3	6	4	16	55	0.1
	7040300120	3	6	4	20	60	0.1
	7040300208	3	6	4	8	55	0.2
	7040300210	3	6	4	10	55	0.2
	7040300212	3	6	4	12	55	0.2
	7040300216	3	6	4	16	55	0.2

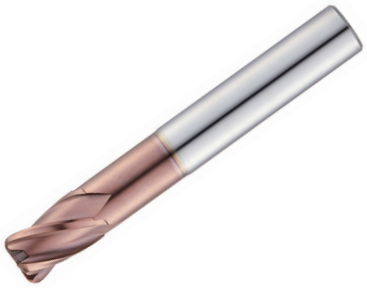
	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESR	7040300220	3	6	4	20	60	0.2
	7040300308	3	6	4	8	55	0.3
	7040300309	3	6	4	9	55	0.3
	7040300310	3	6	4	10	55	0.3
	7040300312	3	6	4	12	55	0.3
	7040300316	3	6	4	16	55	0.3
	7040300320	3	6	4	20	60	0.3
	7040300508	3	6	4	8	55	0.5
	7040300509	3	6	4	9	55	0.5
	7040300510	3	6	4	10	55	0.5
	7040300512	3	6	4	12	55	0.5
	7040300516	3	6	4	16	55	0.5
	7040300520	3	6	4	20	60	0.5
	7040301008	3	6	4	8	55	1
	7040301010	3	6	4	10	55	1
	7040301012	3	6	4	12	55	1
	7040301016	3	6	4	16	55	1
	7040301020	3	6	4	20	60	1
	7040400110	4	6	6	10	55	0.1
	7040400112	4	6	6	12	55	0.1
	7040400116	4	6	6	16	55	0.1
	7040400120	4	6	6	20	60	0.1
	7040400125	4	6	6	25	60	0.1
	7040400210	4	6	6	10	55	0.2
	7040400212	4	6	6	12	55	0.2
	7040400216	4	6	6	16	55	0.2
	7040400220	4	6	6	20	60	0.2
	7040400225	4	6	6	25	60	0.2
	7040400310	4	6	6	10	55	0.3
	7040400312	4	6	6	12	55	0.3
	7040400316	4	6	6	16	55	0.3
	7040400320	4	6	6	20	60	0.3
	7040400325	4	6	6	25	60	0.3
	7040400510	4	6	6	10	55	0.5
	7040400512	4	6	6	12	55	0.5
	7040400516	4	6	6	16	55	0.5

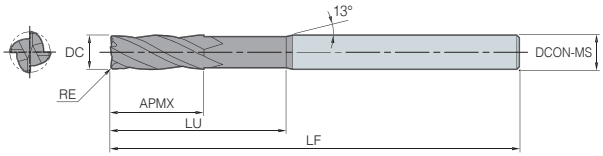
ESR704

4날 넥 타입 레디우스

CARBIDE | 4 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESR	7040400520	4	6	6	20	60	0.5
	7040400525	4	6	6	25	60	0.5
	7040401010	4	6	6	10	55	1
	7040401012	4	6	6	12	55	1
	7040401016	4	6	6	16	55	1
	7040401020	4	6	6	20	60	1
	7040401025	4	6	6	25	60	1
	7040600220	6	6	9	20	60	0.2
	7040600320	6	6	9	20	60	0.3
	7040600520	6	6	9	20	60	0.5
	7040601020	6	6	9	20	60	1
	7040601520	6	6	9	20	60	1.5
	7040602020	6	6	9	20	60	2
	7040800225	8	8	12	25	60	0.2
	7040800325	8	8	12	25	60	0.3

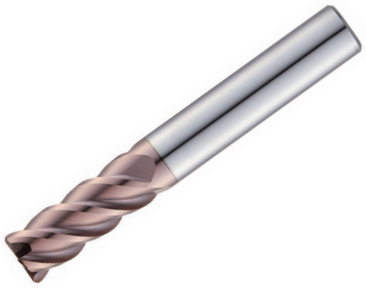
	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESR	7040800525	8	8	12	25	60	0.5
	7040801025	8	8	12	25	60	1
	7040801525	8	8	12	25	60	1.5
	7040802025	8	8	12	25	60	2
	7041000232	10	10	15	32	70	0.2
	7041000332	10	10	15	32	70	0.3
	7041000532	10	10	15	32	70	0.5
	7041001032	10	10	15	32	70	1
	7041001532	10	10	15	32	70	1.5
	7041002032	10	10	15	32	70	2
	7041200338	12	12	18	38	80	0.3
	7041200538	12	12	18	38	80	0.5
	7041201038	12	12	18	38	80	1
	7041201538	12	12	18	38	80	1.5
	7041202038	12	12	18	38	80	2

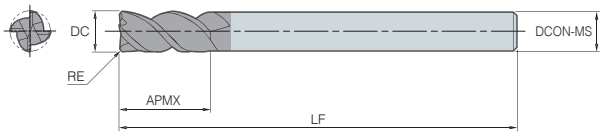
ESR714

4날 레디우스

CARBIDE | 4 | H·A 45° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø3 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LF	RE
ESR	7140303	3	6	8	50	0.3
	7140305S4	3	4	8	50	0.5
	7140305	3	6	8	50	0.5
	7140403	4	6	11	50	0.3
	7140405	4	6	11	50	0.5
	7140405S4	4	4	11	50	0.5
	7140410	4	6	11	50	1
	7140603	6	6	15	60	0.3
	7140605	6	6	15	60	0.5
	7140610	6	6	15	60	1
	7140803	8	8	20	60	0.3
	7140805	8	8	20	60	0.5
	7140810	8	8	20	60	1
	7140815	8	8	20	60	1.5
	7140820	8	8	20	60	2

형 번		DC	DCON-MS	APMX	LF	RE
ESR	7141003	10	10	25	70	0.3
	7141005	10	10	25	70	0.5
	7141010	10	10	25	70	1
	7141015	10	10	25	70	1.5
	7141020	10	10	25	70	2
	7141025	10	10	25	70	2.5
	7141030	10	10	25	70	3
	7141203	12	12	30	80	0.3
	7141205	12	12	30	80	0.5
	7141210	12	12	30	80	1
	7141215	12	12	30	80	1.5
	7141220	12	12	30	80	2
	7141225	12	12	30	80	2.5
	7141230	12	12	30	80	3

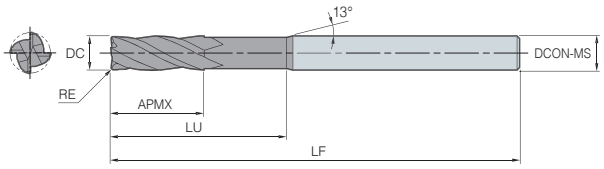
ESR724

4날 넥 타입 레디우스

CARBIDE | 4 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC60이하) | RE공차 ±0.015 (DC6초과)

DC	공구직경공차
Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
ESR	7240600520	6	6	9	20	90	0.5
	7240601020	6	6	9	20	90	1
	7240800525	8	8	12	25	100	0.5
	7240801025	8	8	12	25	100	1
	7241000532	10	10	15	32	100	0.5

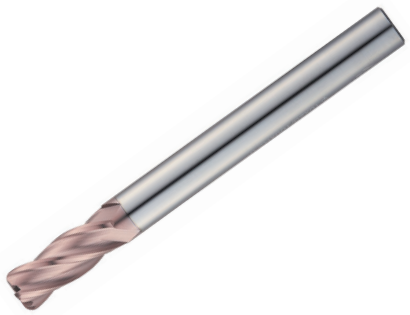
형 번		DC	DCON-MS	APMX	LU	LF	RE
ESR	7241001032	10	10	15	32	100	1
	7241002032	10	10	15	32	100	2
	7241200538	12	12	18	38	110	0.5
	7241201038	12	12	18	38	110	1
	7241202038	12	12	18	38	110	2

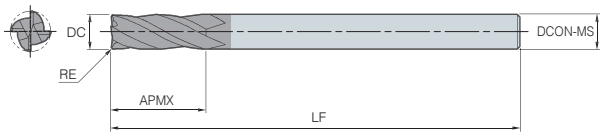
ESR734

4날 롱 샹크 레디우스

CARBIDE | 4 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LF	RE
ESR	73401001	1	6	2	50	0.1
	73401002	1	6	2	50	0.2
	73401003	1	6	2	50	0.3
	73401501	1.5	6	3	50	0.1
	73401502	1.5	6	3	50	0.2
	73401503	1.5	6	3	50	0.3
	73401505	1.5	6	3	50	0.5
	73402001	2	6	5	50	0.1
	73402002	2	6	5	50	0.2
	73402003	2	6	5	50	0.3
	73402005	2	6	5	50	0.5
	73402501	2.5	6	7	60	0.1
	73402502	2.5	6	7	60	0.2
	73402503	2.5	6	7	60	0.3
	73402505	2.5	6	7	60	0.5
	73403001	3	6	8	60	0.1
	73403002	3	6	8	60	0.2
	73403003	3	6	8	60	0.3
	73403005	3	6	8	60	0.5
	73404001	4	6	10	70	0.1
	73404002	4	6	10	70	0.2
	73404002S4	4	4	10	70	0.2
	73404003	4	6	10	70	0.3
	73404005	4	6	10	70	0.5
	73404005S4	4	4	10	70	0.5
	73404010	4	6	10	70	1
	73405001	5	6	13	80	0.1

	형 번	DC	DCON-MS	APMX	LF	RE
ESR	73405002	5	6	13	80	0.2
	73405003	5	6	13	80	0.3
	73405005	5	6	13	80	0.5
	73405010	5	6	13	80	1
	73406001	6	6	15	90	0.1
	73406002	6	6	15	90	0.2
	73406003	6	6	15	90	0.3
	73406005	6	6	15	90	0.5
	73406010	6	6	15	90	1
	73408001	8	8	20	100	0.1
	73408002	8	8	20	100	0.2
	73408003	8	8	20	100	0.3
	73408005	8	8	20	100	0.5
	73408010	8	8	20	100	1
	73408020	8	8	20	100	2
	73410002	10	10	25	100	0.2
	73410003	10	10	25	100	0.3
	73410005	10	10	25	100	0.5
	73410010	10	10	25	100	1
	73410020	10	10	25	100	2
	73412002	12	12	30	110	0.2
	73412003	12	12	30	110	0.3
	73412005	12	12	30	110	0.5
	73412010	12	12	30	110	1
	73412010L	12	12	30	150	1
	73412020	12	12	30	110	2

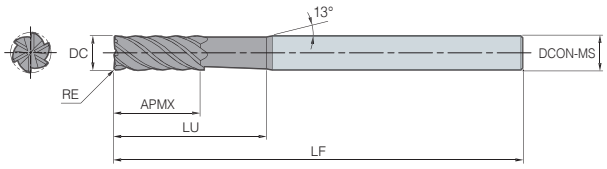
ESR706

6날 넥 타입 레디우스

CARBIDE | 6 | H·A 45° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

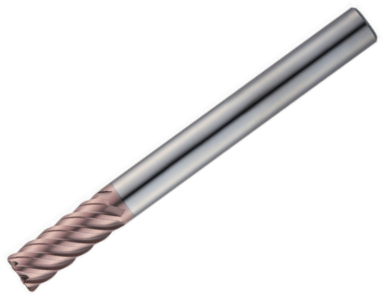
	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESR	7060600314	6	6	6	14	50	0.3
	7060600514	6	6	6	14	50	0.5
	7060800524	8	8	8	24	60	0.5
	7060801024	8	8	8	24	60	1
	7061000530	10	10	10	30	70	0.5
	7061001030	10	10	10	30	70	1
	7061200530	12	12	12	30	75	0.5
	7061201030	12	12	12	30	75	1

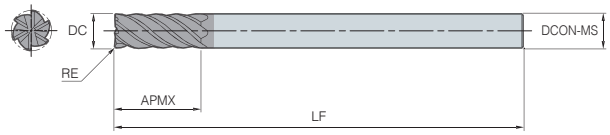
ESR736

6날 레디우스

CARBIDE | 6 | H·A 45° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC60이하) | RE공차 ±0.015 (DC6초과)

DC	공구직경공차
Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015





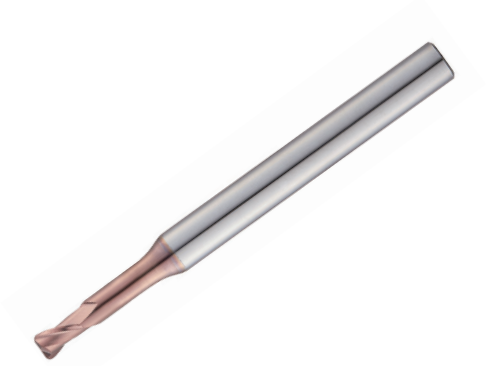


(mm)

	형 번	DC	DCON-MS	APMX	LF	RE
ESR	73606005	6	6	15	90	0.5
	73606010	6	6	15	90	1
	73608005	8	8	20	100	0.5
	73608010	8	8	20	100	1
	73610005	10	10	25	100	0.5
	73610010	10	10	25	100	1
	73612005	12	12	30	110	0.5
	73612010	12	12	30	110	1

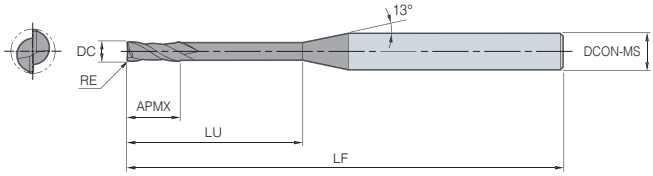
ESRR712

2날 리브 레디우스



CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø16	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	712002002005	0.2	4	0.2	0.5	40	0.02
	71200200201	0.2	4	0.2	1	40	0.02
	712002002015	0.2	4	0.2	1.5	40	0.02
	712002005005	0.2	4	0.2	0.5	40	0.05
	71200200501	0.2	4	0.2	1	40	0.05
	712002005015	0.2	4	0.2	1.5	40	0.05
	71200300201	0.3	4	0.3	1	40	0.02
	71200300202	0.3	4	0.3	2	40	0.02
	71200300203	0.3	4	0.3	3	40	0.02
	71200300501	0.3	4	0.3	1	40	0.05
	71200300502	0.3	4	0.3	2	40	0.05
	71200300503	0.3	4	0.3	3	40	0.05
	71200400201	0.4	4	0.4	1	40	0.02
	71200400202	0.4	4	0.4	2	40	0.02
	71200400203	0.4	4	0.4	3	40	0.02
	71200400204	0.4	4	0.4	4	40	0.02
	71200400501	0.4	4	0.4	1	40	0.05
	71200400502	0.4	4	0.4	2	40	0.05
	71200400503	0.4	4	0.4	3	40	0.05
	71200400504	0.4	4	0.4	4	40	0.05
	71200401001	0.4	4	0.4	1	40	0.1
	712004010015	0.4	4	0.4	1.5	40	0.1
	71200401002	0.4	4	0.4	2	40	0.1
	71200401003	0.4	4	0.4	3	40	0.1
	71200401004	0.4	4	0.4	4	40	0.1
	71200500201	0.5	4	0.5	1	45	0.02
	712005002015	0.5	4	0.5	1.5	45	0.02
	71200500202	0.5	4	0.5	2	45	0.02
	712005002025	0.5	4	0.5	2.5	45	0.02
	71200500203	0.5	4	0.5	3	45	0.02
	71200500204	0.5	4	0.5	4	45	0.02
	71200500205	0.5	4	0.5	5	45	0.02
	71200500206	0.5	4	0.5	6	45	0.02
	71200500208	0.5	4	0.5	8	45	0.02
	71200500210	0.5	4	0.5	10	45	0.02
	71200500501	0.5	4	0.5	1	45	0.05
	712005005015	0.5	4	0.5	1.5	45	0.05
	71200500502	0.5	4	0.5	2	45	0.05
	712005005025	0.5	4	0.5	2.5	45	0.05

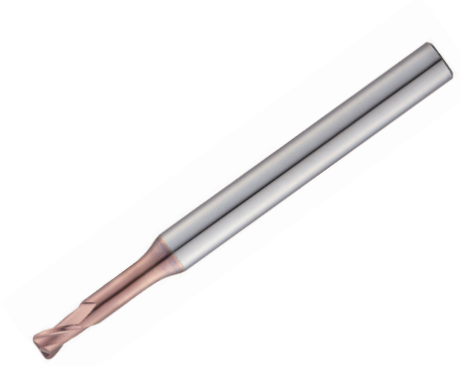
	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71200500503	0.5	4	0.5	3	45	0.05
	71200500504	0.5	4	0.5	4	45	0.05
	71200500505	0.5	4	0.5	5	45	0.05
	71200500506	0.5	4	0.5	6	45	0.05
	71200500508	0.5	4	0.5	8	45	0.05
	71200500510	0.5	4	0.5	10	45	0.05
	71200501001	0.5	4	0.5	1	45	0.1
	712005010015	0.5	4	0.5	1.5	45	0.1
	71200501002	0.5	4	0.5	2	45	0.1
	712005010025	0.5	4	0.5	2.5	45	0.1
	71200501003	0.5	4	0.5	3	45	0.1
	71200501004	0.5	4	0.5	4	45	0.1
	71200501005	0.5	4	0.5	5	45	0.1
	71200501006	0.5	4	0.5	6	45	0.1
	71200501008	0.5	4	0.5	8	45	0.1
	71200501010	0.5	4	0.5	10	45	0.1
	71200600202	0.6	4	0.6	2	45	0.02
	71200600203	0.6	4	0.6	3	45	0.02
	71200600204	0.6	4	0.6	4	45	0.02
	71200600206	0.6	4	0.6	6	45	0.02
	71200600208	0.6	4	0.6	8	45	0.02
	71200600210	0.6	4	0.6	10	45	0.02
	71200600212	0.6	4	0.6	12	50	0.02
	71200600502	0.6	4	0.6	2	45	0.05
	71200600503	0.6	4	0.6	3	45	0.05
	71200600504	0.6	4	0.6	4	45	0.05
	71200600506	0.6	4	0.6	6	45	0.05
	71200600508	0.6	4	0.6	8	45	0.05
	71200600510	0.6	4	0.6	10	45	0.05
	71200600512	0.6	4	0.6	12	50	0.05
	71200601002	0.6	4	0.6	2	45	0.1
	71200601003	0.6	4	0.6	3	45	0.1
	71200601004	0.6	4	0.6	4	45	0.1
	71200601006	0.6	4	0.6	6	45	0.1
	71200601008	0.6	4	0.6	8	45	0.1
	71200601010	0.6	4	0.6	10	45	0.1
	71200601012	0.6	4	0.6	12	50	0.1
	71200701002	0.7	4	0.7	2	45	0.1
	71200701004	0.7	4	0.7	4	45	0.1

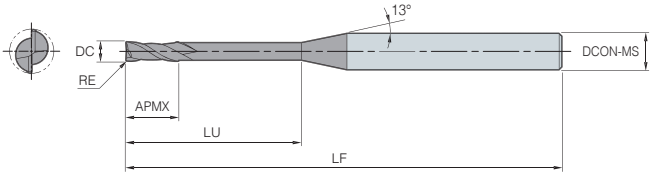
ESRR712

2날 리브 레디우스

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø16	0.000 ~ -0.015







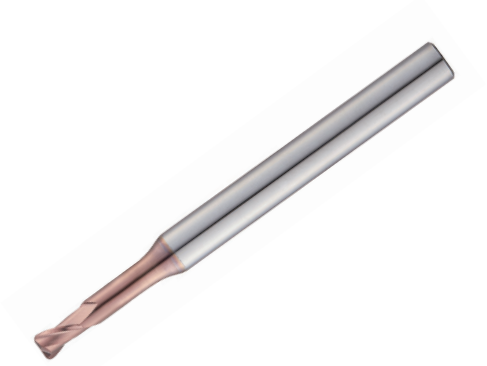
(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71200701006	0.7	4	0.7	6	45	0.1
	71200701008	0.7	4	0.7	8	45	0.1
	71200701010	0.7	4	0.7	10	45	0.1
	71200800202	0.8	4	0.8	2	45	0.02
	71200800204	0.8	4	0.8	4	45	0.02
	71200800206	0.8	4	0.8	6	45	0.02
	71200800208	0.8	4	0.8	8	45	0.02
	71200800210	0.8	4	0.8	10	45	0.02
	71200800212	0.8	4	0.8	12	50	0.02
	71200800502	0.8	4	0.8	2	45	0.05
	71200800504	0.8	4	0.8	4	45	0.05
	71200800506	0.8	4	0.8	6	45	0.05
	71200800508	0.8	4	0.8	8	45	0.05
	71200800510	0.8	4	0.8	10	45	0.05
	71200800512	0.8	4	0.8	12	50	0.05
	71200801002	0.8	4	0.8	2	45	0.1
	71200801004	0.8	4	0.8	4	45	0.1
	71200801006	0.8	4	0.8	6	45	0.1
	71200801008	0.8	4	0.8	8	45	0.1
	71200801010	0.8	4	0.8	10	45	0.1
	71200801012	0.8	4	0.8	12	50	0.1
	71200802002	0.8	4	0.8	2	45	0.2
	71200802004	0.8	4	0.8	4	45	0.2
	71200802006	0.8	4	0.8	6	45	0.2
	71200802008	0.8	4	0.8	8	45	0.2
	71200802010	0.8	4	0.8	10	45	0.2
	71200802012	0.8	4	0.8	12	50	0.2
	71201000204	1	4	1	4	45	0.02
	71201000206	1	4	1	6	45	0.02
	71201000208	1	4	1	8	45	0.02
	71201000210	1	4	1	10	50	0.02
	71201000212	1	4	1	12	50	0.02
	71201000214	1	4	1	14	50	0.02
	71201000216	1	4	1	16	50	0.02
	71201000220	1	4	1	20	50	0.02
	71201000504	1	4	1	4	45	0.05
	71201000506	1	4	1	6	45	0.05
	71201000508	1	4	1	8	45	0.05
	71201000510	1	4	1	10	50	0.05

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71201000512	1	4	1	12	50	0.05
	71201000514	1	4	1	14	50	0.05
	71201000516	1	4	1	16	50	0.05
	71201000520	1	4	1	20	50	0.05
	71201001004	1	4	1	4	45	0.1
	71201001006	1	4	1	6	45	0.1
	71201001008	1	4	1	8	45	0.1
	71201001010	1	4	1	10	50	0.1
	71201001012	1	4	1	12	50	0.1
	71201001014	1	4	1	14	50	0.1
	71201001016	1	4	1	16	50	0.1
	71201001020	1	4	1	20	50	0.1
	71201002004	1	4	1	4	45	0.2
	71201002006	1	4	1	6	45	0.2
	71201002008	1	4	1	8	45	0.2
	71201002010	1	4	1	10	50	0.2
	71201002012	1	4	1	12	50	0.2
	71201002014	1	4	1	14	50	0.2
	71201002016	1	4	1	16	50	0.2
	71201002020	1	4	1	20	50	0.2
	71201003004	1	4	1	4	45	0.3
	71201003006	1	4	1	6	45	0.3
	71201003008	1	4	1	8	45	0.3
	71201003010	1	4	1	10	50	0.3
	71201003012	1	4	1	12	50	0.3
	71201003014	1	4	1	14	50	0.3
	71201003016	1	4	1	16	50	0.3
	71201003020	1	4	1	20	50	0.3
	71201200204	1.2	4	1.2	4	45	0.02
	71201200206	1.2	4	1.2	6	45	0.02
	71201200208	1.2	4	1.2	8	45	0.02
	71201200210	1.2	4	1.2	10	50	0.02
	71201200212	1.2	4	1.2	12	50	0.02
	71201200214	1.2	4	1.2	14	50	0.02
	71201200216	1.2	4	1.2	16	50	0.02
	71201200220	1.2	4	1.2	20	50	0.02
	71201200504	1.2	4	1.2	4	45	0.05
	71201200506	1.2	4	1.2	6	45	0.05
	71201200508	1.2	4	1.2	8	45	0.05

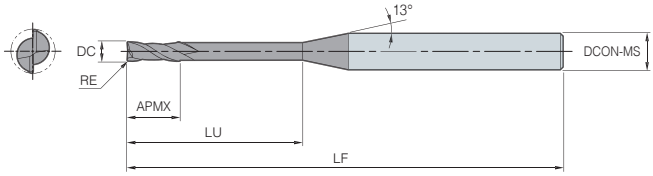
ESRR712

2날 리브 레디우스



CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø16	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71201200510	1.2	4	1.2	10	50	0.05
	71201200512	1.2	4	1.2	12	50	0.05
	71201200514	1.2	4	1.2	14	50	0.05
	71201200516	1.2	4	1.2	16	50	0.05
	71201200520	1.2	4	1.2	20	50	0.05
	71201201004	1.2	4	1.2	4	45	0.1
	71201201006	1.2	4	1.2	6	45	0.1
	71201201008	1.2	4	1.2	8	45	0.1
	71201201010	1.2	4	1.2	10	50	0.1
	71201201012	1.2	4	1.2	12	50	0.1
	71201201014	1.2	4	1.2	14	50	0.1
	71201201016	1.2	4	1.2	16	50	0.1
	71201201020	1.2	4	1.2	20	50	0.1
	71201202004	1.2	4	1.2	4	45	0.2
	71201202006	1.2	4	1.2	6	45	0.2
	71201202008	1.2	4	1.2	8	45	0.2
	71201202010	1.2	4	1.2	10	50	0.2
	71201202012	1.2	4	1.2	12	50	0.2
	71201202014	1.2	4	1.2	14	50	0.2
	71201202016	1.2	4	1.2	16	50	0.2
	71201202020	1.2	4	1.2	20	50	0.2
	71201203004	1.2	4	1.2	4	45	0.3
	71201203006	1.2	4	1.2	6	45	0.3
	71201203008	1.2	4	1.2	8	45	0.3
	71201203010	1.2	4	1.2	10	50	0.3
	71201203012	1.2	4	1.2	12	50	0.3
	71201203014	1.2	4	1.2	14	50	0.3
	71201203016	1.2	4	1.2	16	50	0.3
	71201203020	1.2	4	1.2	20	50	0.3
	71201500204	1.5	4	1.5	4	45	0.02
	71201500206	1.5	4	1.5	6	45	0.02
	71201500208	1.5	4	1.5	8	45	0.02
	71201500210	1.5	4	1.5	10	50	0.02
	71201500212	1.5	4	1.5	12	50	0.02
	71201500214	1.5	4	1.5	14	50	0.02
	71201500216	1.5	4	1.5	16	50	0.02
	71201500220	1.5	4	1.5	20	50	0.02
	71201500504	1.5	4	1.5	4	45	0.05
	71201500506	1.5	4	1.5	6	45	0.05

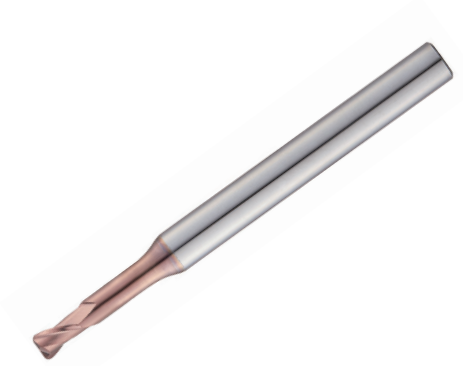
	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71201500508	1.5	4	1.5	8	45	0.05
	71201500510	1.5	4	1.5	10	50	0.05
	71201500512	1.5	4	1.5	12	50	0.05
	71201500514	1.5	4	1.5	14	50	0.05
	71201500516	1.5	4	1.5	16	50	0.05
	71201500520	1.5	4	1.5	20	50	0.05
	71201501004	1.5	4	1.5	4	45	0.1
	71201501006	1.5	4	1.5	6	45	0.1
	71201501008	1.5	4	1.5	8	45	0.1
	71201501010	1.5	4	1.5	10	50	0.1
	71201501012	1.5	4	1.5	12	50	0.1
	71201501014	1.5	4	1.5	14	50	0.1
	71201501016	1.5	4	1.5	16	50	0.1
	71201501020	1.5	4	1.5	20	50	0.1
	71201502004	1.5	4	1.5	4	45	0.2
	71201502006	1.5	4	1.5	6	45	0.2
	71201502008	1.5	4	1.5	8	45	0.2
	71201502010	1.5	4	1.5	10	50	0.2
	71201502012	1.5	4	1.5	12	50	0.2
	71201502014	1.5	4	1.5	14	50	0.2
	71201502016	1.5	4	1.5	16	50	0.2
	71201502020	1.5	4	1.5	20	50	0.2
	71201503004	1.5	4	1.5	4	45	0.3
	71201503006	1.5	4	1.5	6	45	0.3
	71201503008	1.5	4	1.5	8	45	0.3
	71201503010	1.5	4	1.5	10	50	0.3
	71201503012	1.5	4	1.5	12	50	0.3
	71201503014	1.5	4	1.5	14	50	0.3
	71201503016	1.5	4	1.5	16	50	0.3
	71201503020	1.5	4	1.5	20	50	0.3
	71201505004	1.5	4	1.5	4	45	0.5
	71201505006	1.5	4	1.5	6	45	0.5
	71201505008	1.5	4	1.5	8	45	0.5
	71201505010	1.5	4	1.5	10	50	0.5
	71201505012	1.5	4	1.5	12	50	0.5
	71201505014	1.5	4	1.5	14	50	0.5
	71201505016	1.5	4	1.5	16	50	0.5
	71201505020	1.5	4	1.5	20	50	0.5
	71202000206	2	4	2	6	45	0.02

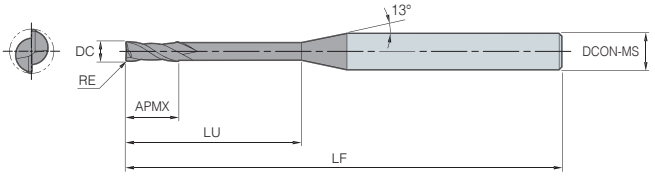
ESRR712

2날 리브 레디우스

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø16	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
ESRR	71202000208	2	4	2	8	45	0.02
	71202000210	2	4	2	10	50	0.02
	71202000212	2	4	2	12	50	0.02
	71202000214	2	4	2	14	50	0.02
	71202000216	2	4	2	16	50	0.02
	71202000220	2	4	2	20	50	0.02
	71202000225	2	4	2	25	60	0.02
	71202000506	2	4	2	6	45	0.05
	71202000508	2	4	2	8	45	0.05
	71202000510	2	4	2	10	50	0.05
	71202000512	2	4	2	12	50	0.05
	71202000514	2	4	2	14	50	0.05
	71202000516	2	4	2	16	50	0.05
	71202000520	2	4	2	20	50	0.05
	71202000525	2	4	2	25	60	0.05
	71202001006	2	4	2	6	45	0.1
	71202001008	2	4	2	8	45	0.1
	71202001010	2	4	2	10	50	0.1
	71202001012	2	4	2	12	50	0.1
	71202001014	2	4	2	14	50	0.1
	71202001016	2	4	2	16	50	0.1
	71202001020	2	4	2	20	50	0.1
	71202001025	2	4	2	25	60	0.1
	71202001030	2	4	2	30	70	0.1
	71202002006	2	4	2	6	45	0.2
	71202002008	2	4	2	8	45	0.2
	71202002010	2	4	2	10	50	0.2
	71202002012	2	4	2	12	50	0.2
	71202002014	2	4	2	14	50	0.2
	71202002016	2	4	2	16	50	0.2
	71202002020	2	4	2	20	50	0.2
	71202002025	2	4	2	25	60	0.2
	71202002030	2	4	2	30	70	0.2
	71202003006	2	4	2	6	45	0.3
	71202003008	2	4	2	8	45	0.3
	71202003010	2	4	2	10	50	0.3
	71202003012	2	4	2	12	50	0.3
	71202003014	2	4	2	14	50	0.3
	71202003016	2	4	2	16	50	0.3

형 번		DC	DCON-MS	APMX	LU	LF	RE
ESRR	71202003020	2	4	2	20	50	0.3
	71202003025	2	4	2	25	60	0.3
	71202003030	2	4	2	30	70	0.3
	71202005006	2	4	2	6	45	0.5
	71202005008	2	4	2	8	45	0.5
	71202005010	2	4	2	10	50	0.5
	71202005012	2	4	2	12	50	0.5
	71202005014	2	4	2	14	50	0.5
	71202005016	2	4	2	16	50	0.5
	71202005020	2	4	2	20	50	0.5
	71202005025	2	4	2	25	60	0.5
	71202005030	2	4	2	30	70	0.5
	71202501010	2.5	4	2.5	10	50	0.1
	71202501016	2.5	4	2.5	16	50	0.1
	71202501020	2.5	4	2.5	20	50	0.1
	71202501025	2.5	4	2.5	25	60	0.1
	71202501030	2.5	4	2.5	30	70	0.1
	71202502010	2.5	4	2.5	10	50	0.2
	71202502016	2.5	4	2.5	16	50	0.2
	71202502020	2.5	4	2.5	20	50	0.2
	71202503010	2.5	4	2.5	10	50	0.3
	71202503016	2.5	4	2.5	16	50	0.3
	71202503020	2.5	4	2.5	20	50	0.3
	71202505010	2.5	4	2.5	10	50	0.5
	71202505016	2.5	4	2.5	16	50	0.5
	71202505020	2.5	4	2.5	20	50	0.5
	71203001010	3	6	3	10	50	0.1
	71203001012	3	6	3	12	50	0.1
	71203001016	3	6	3	16	55	0.1
	71203001020	3	6	3	20	60	0.1
	71203001025	3	6	3	25	65	0.1
	71203001030	3	6	3	30	70	0.1
	71203001035	3	6	3	35	75	0.1
	71203001040	3	6	3	40	80	0.1
	71203002010	3	6	3	10	50	0.2
	71203002012	3	6	3	12	50	0.2
	71203002016	3	6	3	16	55	0.2
	71203002020	3	6	3	20	60	0.2
	71203002025	3	6	3	25	65	0.2

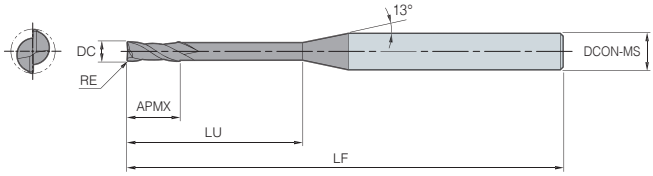
ESRR712

2날 리브 레디우스



CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø16	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71203002030	3	6	3	30	70	0.2
	71203002035	3	6	3	35	75	0.2
	71203002040	3	6	3	40	80	0.2
	71203003010	3	6	3	10	50	0.3
	71203003012	3	6	3	12	50	0.3
	71203003016	3	6	3	16	55	0.3
	71203003020	3	6	3	20	60	0.3
	71203003025	3	6	3	25	65	0.3
	71203003030	3	6	3	30	70	0.3
	71203003035	3	6	3	35	75	0.3
	71203003040	3	6	3	40	80	0.3
	71203005010	3	6	3	10	50	0.5
	71203005012	3	6	3	12	50	0.5
	71203005016	3	6	3	16	55	0.5
	71203005020	3	6	3	20	60	0.5
	71203005025	3	6	3	25	65	0.5
	71203005030	3	6	3	30	70	0.5
	71203005035	3	6	3	35	75	0.5
	71203005040	3	6	3	40	80	0.5
	71203010010	3	6	3	10	50	1
	71203010012	3	6	3	12	50	1
	71203010016	3	6	3	16	55	1
	71203010020	3	6	3	20	60	1
	71203010025	3	6	3	25	65	1
	71203010030	3	6	3	30	70	1
	71203010035	3	6	3	35	75	1
	71203010040	3	6	3	40	80	1
	71204001012	4	6	4	12	50	0.1
	71204001016	4	6	4	16	55	0.1
	71204001020	4	6	4	20	60	0.1
	71204001025	4	6	4	25	65	0.1
	71204001030	4	6	4	30	70	0.1
	71204001035	4	6	4	35	75	0.1
	71204001040	4	6	4	40	80	0.1
	71204002012	4	6	4	12	50	0.2
	71204002016	4	6	4	16	55	0.2
	71204002020	4	6	4	20	60	0.2
	71204002025	4	6	4	25	65	0.2
	71204002030	4	6	4	30	70	0.2

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71204002035	4	6	4	35	75	0.2
	71204002040	4	6	4	40	80	0.2
	71204003012	4	6	4	12	50	0.3
	71204003016	4	6	4	16	55	0.3
	71204003020	4	6	4	20	60	0.3
	71204003025	4	6	4	25	65	0.3
	71204003030	4	6	4	30	70	0.3
	71204003035	4	6	4	35	75	0.3
	71204003040	4	6	4	40	80	0.3
	71204005012	4	6	4	12	50	0.5
	71204005016	4	6	4	16	55	0.5
	71204005020	4	6	4	20	60	0.5
	71204005025	4	6	4	25	65	0.5
	71204005030	4	6	4	30	70	0.5
	71204005035	4	6	4	35	75	0.5
	71204005040	4	6	4	40	80	0.5
	71204010012	4	6	4	12	50	1
	71204010016	4	6	4	16	55	1
	71204010020	4	6	4	20	60	1
	71204010025	4	6	4	25	65	1
	71204010030	4	6	4	30	70	1
	71204010035	4	6	4	35	75	1
	71204010040	4	6	4	40	80	1
	71205002015	5	6	6	15	60	0.2
	71205002025	5	6	6	25	70	0.2
	71205002030	5	6	6	30	70	0.2
	71205002040	5	6	6	40	80	0.2
	71205005015	5	6	6	15	60	0.5
	71205005025	5	6	6	25	70	0.5
	71205005030	5	6	6	30	70	0.5
	71205005040	5	6	6	40	80	0.5
	71205010015	5	6	6	15	60	1
	71205010025	5	6	6	25	70	1
	71205010030	5	6	6	30	70	1
	71205010040	5	6	6	40	80	1
	71206001020	6	6	7	20	60	0.1
	71206001040	6	6	7	40	80	0.1
	71206002020	6	6	7	20	60	0.2
	71206002040	6	6	7	40	80	0.2

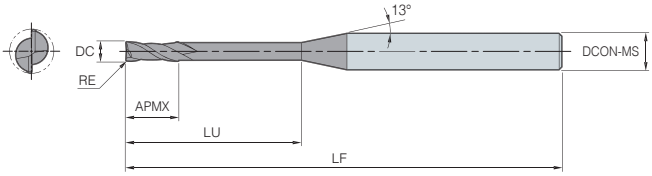
ESRR712

2날 리브 레디우스



CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø16	0.000 ~ -0.015





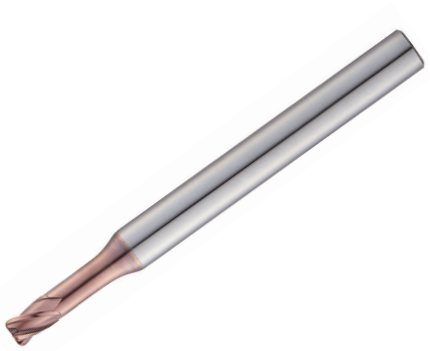
(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71206003020	6	6	7	20	60	0.3
	71206003040	6	6	7	40	80	0.3
	71206005020	6	6	7	20	60	0.5
	71206005040	6	6	7	40	80	0.5
	71206010020	6	6	7	20	60	1
	71206010040	6	6	7	40	80	1
	71206015020	6	6	7	20	60	1.5
	71206015040	6	6	7	40	80	1.5
	71208002022	8	8	9	22	65	0.2
	71208003022	8	8	9	22	65	0.3
	71208005022	8	8	9	22	65	0.5
	71208010022	8	8	9	22	65	1
	71208015022	8	8	9	22	65	1.5
	71210002024	10	10	11	24	70	0.2

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71210003024	10	10	11	24	70	0.3
	71210005024	10	10	11	24	70	0.5
	71210010024	10	10	11	24	70	1
	71210015024	10	10	11	24	70	1.5
	71210020024	10	10	11	24	70	2
	71212002026	12	12	13	26	80	0.2
	71212003026	12	12	13	26	80	0.3
	71212005026	12	12	13	26	80	0.5
	71212010026	12	12	13	26	80	1
	71212015026	12	12	13	26	80	1.5
	71212020026	12	12	13	26	80	2
	71212030026	12	12	13	26	80	3
	71216005035	16	16	20	35	110	0.5
	71216010035	16	16	20	35	110	1

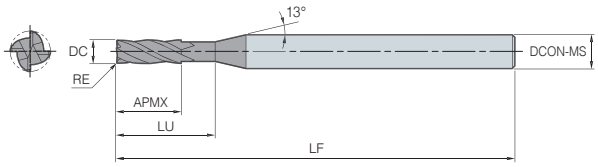
ESRR714

4날 리브 레디우스



CARBIDE | 4 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6초과)

DC	공구직경공차
Ø0.5 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71400500502	0.5	4	0.5	2	45	0.05
	71400500504	0.5	4	0.5	4	45	0.05
	71400500506	0.5	4	0.5	6	45	0.05
	71400500508	0.5	4	0.5	8	45	0.05
	71400501002	0.5	4	0.5	2	45	0.1
	71400501004	0.5	4	0.5	4	45	0.1
	71400501006	0.5	4	0.5	6	45	0.1
	71400501008	0.5	4	0.5	8	45	0.1
	71400600502	0.6	4	0.6	2	45	0.05
	71400600504	0.6	4	0.6	4	45	0.05
	71400600506	0.6	4	0.6	6	45	0.05
	71400600508	0.6	4	0.6	8	45	0.05
	71400601002	0.6	4	0.6	2	45	0.1
	71400601004	0.6	4	0.6	4	45	0.1
	71400601006	0.6	4	0.6	6	45	0.1
	71400601008	0.6	4	0.6	8	45	0.1
	71400700502	0.7	4	0.7	2	45	0.05
	71400700504	0.7	4	0.7	4	45	0.05
	71400700506	0.7	4	0.7	6	45	0.05
	71400700508	0.7	4	0.7	8	45	0.05
	71400701002	0.7	4	0.7	2	45	0.1
	71400701004	0.7	4	0.7	4	45	0.1
	71400701006	0.7	4	0.7	6	45	0.1
	71400701008	0.7	4	0.7	8	45	0.1
	71400800202	0.8	4	0.8	2	45	0.02
	71400800204	0.8	4	0.8	4	45	0.02
	71400800206	0.8	4	0.8	6	45	0.02
	71400800208	0.8	4	0.8	8	45	0.02
	71400800210	0.8	4	0.8	10	45	0.02
	71400800212	0.8	4	0.8	12	50	0.02
	71400800502	0.8	4	0.8	2	45	0.05
	71400800504	0.8	4	0.8	4	45	0.05
	71400800506	0.8	4	0.8	6	45	0.05
	71400800508	0.8	4	0.8	8	45	0.05
	71400800510	0.8	4	0.8	10	45	0.05
	71400800512	0.8	4	0.8	12	50	0.05
	71400801002	0.8	4	0.8	2	45	0.1
	71400801004	0.8	4	0.8	4	45	0.1
	71400801006	0.8	4	0.8	6	45	0.1

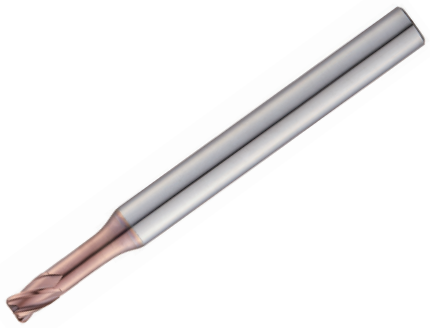
	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71400801008	0.8	4	0.8	8	45	0.1
	71400801010	0.8	4	0.8	10	45	0.1
	71400801012	0.8	4	0.8	12	50	0.1
	71401000204	1	4	1	4	45	0.02
	71401000206	1	4	1	6	45	0.02
	71401000208	1	4	1	8	45	0.02
	71401000210	1	4	1	10	50	0.02
	71401000212	1	4	1	12	50	0.02
	71401000214	1	4	1	14	50	0.02
	71401000216	1	4	1	16	50	0.02
	71401000220	1	4	1	20	50	0.02
	71401000503	1	4	1	3	45	0.05
	71401000504	1	4	1	4	45	0.05
	71401000506	1	4	1	6	45	0.05
	71401000508	1	4	1	8	45	0.05
	71401000510	1	4	1	10	50	0.05
	71401000512	1	4	1	12	50	0.05
	71401000514	1	4	1	14	50	0.05
	71401000516	1	4	1	16	50	0.05
	71401000520	1	4	1	20	50	0.05
	71401001003	1	4	1	3	45	0.1
	71401001004	1	4	1	4	45	0.1
	71401001006	1	4	1	6	45	0.1
	71401001008	1	4	1	8	45	0.1
	71401001010	1	4	1	10	50	0.1
	71401001012	1	4	1	12	50	0.1
	71401001014	1	4	1	14	50	0.1
	71401001016	1	4	1	16	50	0.1
	71401001020	1	4	1	20	50	0.1
	71401002003	1	4	1	3	45	0.2
	71401002004	1	4	1	4	45	0.2
	71401002006	1	4	1	6	45	0.2
	71401002008	1	4	1	8	45	0.2
	71401002010	1	4	1	10	50	0.2
	71401002012	1	4	1	12	50	0.2
	71401002014	1	4	1	14	50	0.2
	71401002016	1	4	1	16	50	0.2
	71401002020	1	4	1	20	50	0.2
	71401003003	1	4	1	3	45	0.3

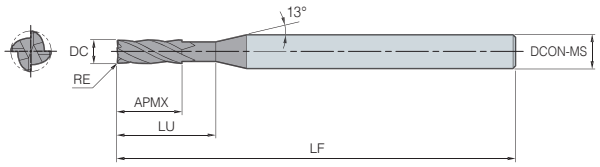
ESRR714

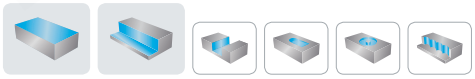
4날 리브 레디우스

CARBIDE | 4 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.5 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







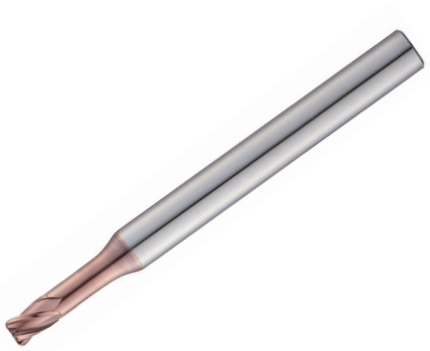
(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71401003004	1	4	1	4	45	0.3
	71401003006	1	4	1	6	45	0.3
	71401003008	1	4	1	8	45	0.3
	71401003010	1	4	1	10	50	0.3
	71401003012	1	4	1	12	50	0.3
	71401003014	1	4	1	14	50	0.3
	71401003016	1	4	1	16	50	0.3
	71401003020	1	4	1	20	50	0.3
	71401200204	1.2	4	1.2	4	45	0.02
	71401200206	1.2	4	1.2	6	45	0.02
	71401200208	1.2	4	1.2	8	45	0.02
	71401200210	1.2	4	1.2	10	50	0.02
	71401200212	1.2	4	1.2	12	50	0.02
	71401200214	1.2	4	1.2	14	50	0.02
	71401200216	1.2	4	1.2	16	50	0.02
	71401200220	1.2	4	1.2	20	50	0.02
	71401200503	1.2	4	1.2	3	45	0.05
	71401200504	1.2	4	1.2	4	45	0.05
	71401200506	1.2	4	1.2	6	45	0.05
	71401200508	1.2	4	1.2	8	45	0.05
	71401200510	1.2	4	1.2	10	50	0.05
	71401200512	1.2	4	1.2	12	50	0.05
	71401200514	1.2	4	1.2	14	50	0.05
	71401200516	1.2	4	1.2	16	50	0.05
	71401200520	1.2	4	1.2	20	50	0.05
	71401201003	1.2	4	1.2	3	45	0.1
	71401201004	1.2	4	1.2	4	45	0.1
	71401201006	1.2	4	1.2	6	45	0.1
	71401201008	1.2	4	1.2	8	45	0.1
	71401201010	1.2	4	1.2	10	50	0.1
	71401201012	1.2	4	1.2	12	50	0.1
	71401201014	1.2	4	1.2	14	50	0.1
	71401201016	1.2	4	1.2	16	50	0.1
	71401201020	1.2	4	1.2	20	50	0.1
	71401202003	1.2	4	1.2	3	45	0.2
	71401202004	1.2	4	1.2	4	45	0.2
	71401202006	1.2	4	1.2	6	45	0.2
	71401202008	1.2	4	1.2	8	45	0.2
	71401202010	1.2	4	1.2	10	50	0.2

	형 번	DC	DCON-MS	APMX	LU	RE	LF
ESRR	71401202012	1.2	4	1.2	12	0.2	50
	71401202014	1.2	4	1.2	14	0.2	50
	71401202016	1.2	4	1.2	16	0.2	50
	71401202020	1.2	4	1.2	20	0.2	50
	71401203003	1.2	4	1.2	3	0.3	45
	71401203004	1.2	4	1.2	4	0.3	45
	71401203006	1.2	4	1.2	6	0.3	45
	71401203008	1.2	4	1.2	8	0.3	45
	71401203010	1.2	4	1.2	10	0.3	50
	71401203012	1.2	4	1.2	12	0.3	50
	71401203016	1.2	4	1.2	16	0.3	50
	71401203020	1.2	4	1.2	20	0.3	50
	71401500206	1.5	4	1.5	6	0.02	45
	71401500208	1.5	4	1.5	8	0.02	45
	71401500210	1.5	4	1.5	10	0.02	50
	71401500212	1.5	4	1.5	12	0.02	50
	71401500214	1.5	4	1.5	14	0.02	50
	71401500216	1.5	4	1.5	16	0.02	50
	71401500220	1.5	4	1.5	20	0.02	50
	71401500222	1.5	4	1.5	22	0.02	60
	71401500504	1.5	4	1.5	4	0.05	45
	71401500506	1.5	4	1.5	6	0.05	45
	71401500508	1.5	4	1.5	8	0.05	45
	71401500510	1.5	4	1.5	10	0.05	50
	71401500512	1.5	4	1.5	12	0.05	50
	71401500514	1.5	4	1.5	14	0.05	50
	71401500516	1.5	4	1.5	16	0.05	50
	71401500520	1.5	4	1.5	20	0.05	50
	71401500522	1.5	4	1.5	22	0.05	60
	71401500526	1.5	4	1.5	26	0.05	60
	71401501004	1.5	4	1.5	4	0.1	45
	71401501006	1.5	4	1.5	6	0.1	45
	71401501008	1.5	4	1.5	8	0.1	45
	71401501010	1.5	4	1.5	10	0.1	50
	71401501012	1.5	4	1.5	12	0.1	50
	71401501014	1.5	4	1.5	14	0.1	50
	71401501016	1.5	4	1.5	16	0.1	50
	71401501020	1.5	4	1.5	20	0.1	50
	71401501022	1.5	4	1.5	22	0.1	60

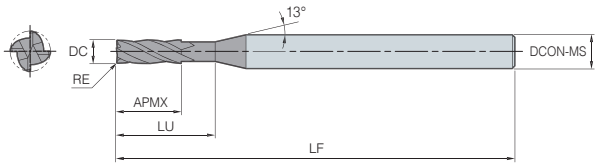
ESRR714

4날 리브 레디우스



CARBIDE | 4 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.5 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015





(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
ESRR	71401501026	1.5	4	1.5	26	60	0.1
	71401502004	1.5	4	1.5	4	45	0.2
	71401502006	1.5	4	1.5	6	45	0.2
	71401502008	1.5	4	1.5	8	45	0.2
	71401502010	1.5	4	1.5	10	50	0.2
	71401502012	1.5	4	1.5	12	50	0.2
	71401502014	1.5	4	1.5	14	50	0.2
	71401502016	1.5	4	1.5	16	50	0.2
	71401502020	1.5	4	1.5	20	50	0.2
	71401502022	1.5	4	1.5	22	60	0.2
	71401502025	1.5	4	1.5	25	60	0.2
	71401503004	1.5	4	1.5	4	45	0.3
	71401503006	1.5	4	1.5	6	45	0.3
	71401503008	1.5	4	1.5	8	45	0.3
	71401503010	1.5	4	1.5	10	50	0.3
	71401503012	1.5	4	1.5	12	50	0.3
	71401503014	1.5	4	1.5	14	50	0.3
	71401503016	1.5	4	1.5	16	50	0.3
	71401503020	1.5	4	1.5	20	50	0.3
	71401503022	1.5	4	1.5	22	60	0.3
	71401503025	1.5	4	1.5	25	60	0.3
	71401505004	1.5	4	1.5	4	45	0.5
	71401505006	1.5	4	1.5	6	45	0.5
	71401505008	1.5	4	1.5	8	45	0.5
	71401505010	1.5	4	1.5	10	50	0.5
	71401505012	1.5	4	1.5	12	50	0.5
	71401505014	1.5	4	1.5	14	50	0.5
	71401505016	1.5	4	1.5	16	50	0.5
	71401505020	1.5	4	1.5	20	50	0.5
	71401505022	1.5	4	1.5	22	60	0.5
	71401505025	1.5	4	1.5	25	60	0.5
	71402000206	2	4	2	6	45	0.02
	71402000208	2	4	2	8	45	0.02
	71402000210	2	4	2	10	50	0.02
	71402000212	2	4	2	12	50	0.02
	71402000214	2	4	2	14	50	0.02
	71402000216	2	4	2	16	50	0.02
	71402000220	2	4	2	20	50	0.02
	71402000225	2	4	2	25	60	0.02

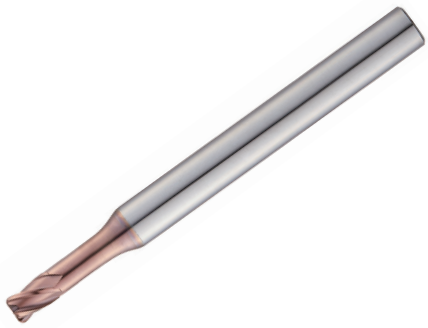
형 번		DC	DCON-MS	APMX	LU	LF	RE
ESRR	71402000230	2	4	2	30	70	0.02
	71402000506	2	4	2	6	45	0.05
	71402000508	2	4	2	8	45	0.05
	71402000510	2	4	2	10	50	0.05
	71402000512	2	4	2	12	50	0.05
	71402000514	2	4	2	14	50	0.05
	71402000516	2	4	2	16	50	0.05
	71402000520	2	4	2	20	50	0.05
	71402000525	2	4	2	25	60	0.05
	71402000530	2	4	2	30	70	0.05
	71402001006	2	4	2	6	45	0.1
	71402001008	2	4	2	8	45	0.1
	71402001010	2	4	2	10	50	0.1
	71402001012	2	4	2	12	50	0.1
	71402001014	2	4	2	14	50	0.1
	71402001016	2	4	2	16	50	0.1
	71402001020	2	4	2	20	50	0.1
	71402001022	2	4	2	22	60	0.1
	71402001025	2	4	2	25	60	0.1
	71402001030	2	4	2	30	70	0.1
	71402002006	2	4	2	6	45	0.2
	71402002008	2	4	2	8	45	0.2
	71402002010	2	4	2	10	50	0.2
	71402002012	2	4	2	12	50	0.2
	71402002014	2	4	2	14	50	0.2
	71402002016	2	4	2	16	50	0.2
	71402002020	2	4	2	20	50	0.2
	71402002022	2	4	2	22	60	0.2
	71402002025	2	4	2	25	60	0.2
	71402002030	2	4	2	30	70	0.2
	71402003006	2	4	2	6	45	0.3
	71402003008	2	4	2	8	45	0.3
	71402003010	2	4	2	10	50	0.3
	71402003012	2	4	2	12	50	0.3
	71402003014	2	4	2	14	50	0.3
	71402003016	2	4	2	16	50	0.3
	71402003020	2	4	2	20	50	0.3
	71402003022	2	4	2	22	60	0.3
	71402003025	2	4	2	25	60	0.3

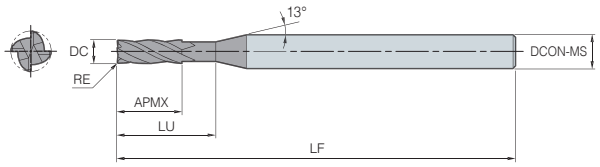
ESRR714

4날 리브 레디우스

CARBIDE | 4 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.5 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







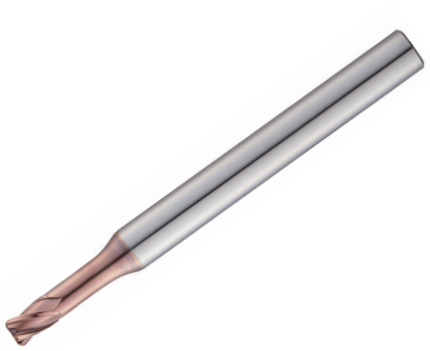
(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
ESRR	71402003030	2	4	2	30	70	0.3
	71402005006	2	4	3	6	45	0.5
	71402005008	2	4	2	8	45	0.5
	71402005010	2	4	2	10	50	0.5
	71402005012	2	4	2	12	50	0.5
	71402005014	2	4	2	14	50	0.5
	71402005016	2	4	2	16	50	0.5
	71402005020	2	4	2	20	50	0.5
	71402005022	2	4	2	22	60	0.5
	71402005025	2	4	2	25	60	0.5
	71402005030	2	4	2	30	70	0.5
	71402501008	2.5	4	2.5	8	45	0.1
	71402501010	2.5	4	2.5	10	50	0.1
	71402501012	2.5	4	2.5	12	50	0.1
	71402501014	2.5	4	2.5	14	50	0.1
	71402501016	2.5	4	2.5	16	50	0.1
	71402501020	2.5	4	2.5	20	50	0.1
	71402501025	2.5	4	2.5	25	60	0.1
	71402501030	2.5	4	2.5	30	70	0.1
	71402502008	2.5	4	2.5	8	45	0.2
	71402502010	2.5	4	2.5	10	50	0.2
	71402502012	2.5	4	2.5	12	50	0.2
	71402502014	2.5	4	2.5	14	50	0.2
	71402502016	2.5	4	2.5	16	50	0.2
	71402502020	2.5	4	2.5	20	50	0.2
	71402502025	2.5	4	2.5	25	60	0.2
	71402502030	2.5	4	2.5	30	70	0.2
	71402503008	2.5	4	2.5	8	45	0.3
	71402503010	2.5	4	2.5	10	50	0.3
	71402503012	2.5	4	2.5	12	50	0.3
	71402503014	2.5	4	2.5	14	50	0.3
	71402503016	2.5	4	2.5	16	50	0.3
	71402503020	2.5	4	2.5	20	50	0.3
	71402503025	2.5	4	2.5	25	60	0.3
	71402503030	2.5	4	2.5	30	70	0.3
	71402505008	2.5	4	2.5	8	45	0.5
	71402505010	2.5	4	2.5	10	50	0.5
	71402505012	2.5	4	2.5	12	50	0.5
	71402505014	2.5	4	2.5	14	50	0.5

형 번		DC	DCON-MS	APMX	LU	LF	RE
ESRR	71402505016	2.5	4	2.5	16	50	0.5
	71402505020	2.5	4	2.5	20	50	0.5
	71402505025	2.5	4	2.5	25	60	0.5
	71402505030	2.5	4	2.5	30	70	0.5
	71403001008	3	6	3	8	45	0.1
	71403001010	3	6	3	10	50	0.1
	71403001012	3	6	3	12	50	0.1
	71403001014	3	6	3	14	50	0.1
	71403001016	3	6	3	16	55	0.1
	71403001020	3	6	3	20	60	0.1
	71403001025	3	6	3	25	65	0.1
	71403001030	3	6	3	30	70	0.1
	71403001035	3	6	3	35	75	0.1
	71403001040	3	6	3	40	80	0.1
	71403001045	3	6	3	45	90	0.1
	71403002008	3	6	3	8	45	0.2
	71403002010	3	6	3	10	50	0.2
	71403002012	3	6	3	12	50	0.2
	71403002014	3	6	3	14	50	0.2
	71403002016	3	6	3	16	55	0.2
	71403002020	3	6	3	20	60	0.2
	71403002025	3	6	3	25	65	0.2
	71403002030	3	6	3	30	70	0.2
	71403002035	3	6	3	35	75	0.2
	71403002040	3	6	3	40	80	0.2
	71403002045	3	6	3	45	90	0.2
	71403003008	3	6	3	8	45	0.3
	71403003010	3	6	3	10	50	0.3
	71403003012	3	6	3	12	50	0.3
	71403003014	3	6	3	14	50	0.3
	71403003016	3	6	3	16	55	0.3
	71403003020	3	6	3	20	60	0.3
	71403003025	3	6	3	25	65	0.3
	71403003030	3	6	3	30	70	0.3
	71403003035	3	6	3	35	75	0.3
	71403003040	3	6	3	40	80	0.3
	71403003045	3	6	3	45	90	0.3
	71403005008	3	6	3	8	45	0.5
	71403005010	3	6	3	10	50	0.5

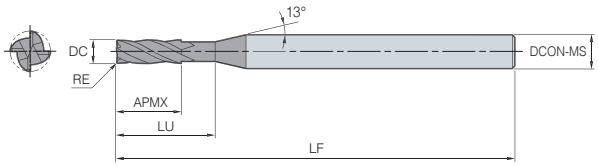
ESRR714

4날 리브 레디우스



CARBIDE | 4 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.5 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71403005012	3	6	3	12	50	0.5
	71403005014	3	6	3	14	50	0.5
	71403005016	3	6	3	16	55	0.5
	71403005020	3	6	3	20	60	0.5
	71403005025	3	6	3	25	65	0.5
	71403005030	3	6	3	30	70	0.5
	71403005035	3	6	3	35	75	0.5
	71403005040	3	6	3	40	80	0.5
	71403005045	3	6	3	45	90	0.5
	71403005050	3	6	3	50	100	0.5
	71403010008	3	6	3	8	45	1
	71403010010	3	6	3	10	50	1
	71403010012	3	6	3	12	50	1
	71403010014	3	6	3	14	50	1
	71403010016	3	6	3	16	55	1
	71403010020	3	6	3	20	60	1
	71403010025	3	6	3	25	65	1
	71403010030	3	6	3	30	70	1
	71403010035	3	6	3	35	75	1
	71403010040	3	6	3	40	80	1
	71403010045	3	6	3	45	90	1
	71403010050	3	6	3	50	100	1
	71404001010	4	6	4	10	50	0.1
	71404001012	4	6	4	12	50	0.1
	71404001013	4	6	4	13	55	0.1
	71404001016	4	6	4	16	55	0.1
	71404001020	4	6	4	20	60	0.1
	71404001025	4	6	4	25	65	0.1
	71404001030	4	6	4	30	70	0.1
	71404001035	4	6	4	35	75	0.1
	71404001040	4	6	4	40	80	0.1
	71404001045	4	6	4	45	90	0.1
	71404001050	4	6	4	50	100	0.1
	71404002010	4	6	4	10	50	0.2
	71404002012	4	6	4	12	50	0.2
	71404002013	4	6	4	13	55	0.2
	71404002016	4	6	4	16	55	0.2
	71404002020	4	6	4	20	60	0.2
	71404002025	4	6	4	25	65	0.2

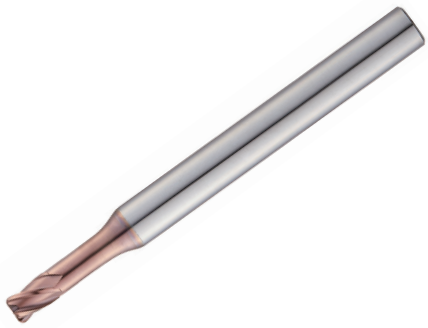
	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71404002030	4	6	4	30	70	0.2
	71404002035	4	6	4	35	75	0.2
	71404002040	4	6	4	40	80	0.2
	71404002045	4	6	4	45	90	0.2
	71404002050	4	6	4	50	100	0.2
	71404003010	4	6	4	10	50	0.3
	71404003012	4	6	4	12	50	0.3
	71404003013	4	6	4	13	55	0.3
	71404003016	4	6	4	16	55	0.3
	71404003020	4	6	4	20	60	0.3
	71404003025	4	6	4	25	65	0.3
	71404003030	4	6	4	30	70	0.3
	71404003035	4	6	4	35	75	0.3
	71404003040	4	6	4	40	80	0.3
	71404003045	4	6	4	45	90	0.3
	71404003050	4	6	4	50	100	0.3
	71404005010	4	6	4	10	50	0.5
	71404005012	4	6	4	12	50	0.5
	71404005013	4	6	4	13	55	0.5
	71404005016	4	6	4	16	55	0.5
	71404005020	4	6	4	20	60	0.5
	71404005025	4	6	4	25	65	0.5
	71404005030	4	6	4	30	70	0.5
	71404005035	4	6	4	35	75	0.5
	71404005040	4	6	4	40	80	0.5
	71404005045	4	6	4	45	90	0.5
	71404005050	4	6	4	50	100	0.5
	71404005055	4	6	4	55	100	0.5
	71404010010	4	6	4	10	50	1
	71404010012	4	6	4	12	50	1
	71404010013	4	6	4	13	55	1
	71404010016	4	6	4	16	55	1
	71404010020	4	6	4	20	60	1
	71404010025	4	6	4	25	65	1
	71404010030	4	6	4	30	70	1
	71404010035	4	6	4	35	75	1
	71404010040	4	6	4	40	80	1
	71404010045	4	6	4	45	90	1
	71404010050	4	6	4	50	100	1

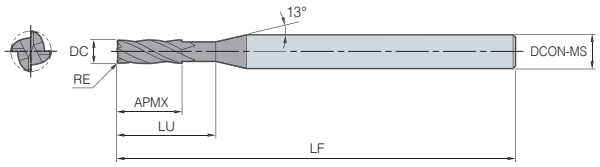
ESRR714

4날 리브 레디우스

CARBIDE | 4 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.5 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







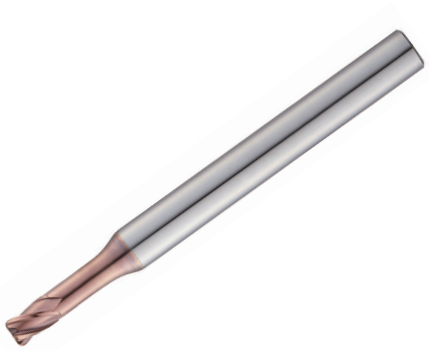
(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71404010055	4	6	4	55	100	1
	71405001016	5	6	5	16	60	0.1
	71405001030	5	6	5	30	70	0.1
	71405001040	5	6	5	40	80	0.1
	71405002016	5	6	5	16	60	0.2
	71405002030	5	6	5	30	70	0.2
	71405002040	5	6	5	40	80	0.2
	71405003016	5	6	5	16	60	0.3
	71405003030	5	6	5	30	70	0.3
	71405003040	5	6	5	40	80	0.3
	71405005016	5	6	5	16	60	0.5
	71405005030	5	6	5	30	70	0.5
	71405005040	5	6	5	40	80	0.5
	71405005050	5	6	5	50	100	0.5
	71405005060	5	6	5	60	110	0.5
	71405010016	5	6	5	16	60	1
	71405010030	5	6	5	30	70	1
	71405010040	5	6	5	40	80	1
	71405010050	5	6	5	50	100	1
	71405010060	5	6	5	60	110	1
	71405015015	5	6	5	15	60	1.5
	71405020015	5	6	5	15	60	2
	71406001020	6	6	7	20	60	0.1
	71406001040	6	6	7	40	80	0.1
	71406001050	6	6	7	50	100	0.1
	71406002020	6	6	7	20	60	0.2
	71406002040	6	6	7	40	80	0.2
	71406002050	6	6	7	50	100	0.2
	71406003020	6	6	7	20	60	0.3
	71406003030	6	6	7	30	70	0.3
	71406003040	6	6	7	40	80	0.3
	71406003050	6	6	7	50	100	0.3
	71406005020	6	6	7	20	60	0.5
	71406005030	6	6	7	30	70	0.5
	71406005040	6	6	7	40	80	0.5
	71406005050	6	6	7	50	100	0.5
	71406005060	6	6	7	60	110	0.5
	71406010020	6	6	7	20	60	1
	71406010030	6	6	7	30	70	1

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71406010040	6	6	7	40	80	1
	71406010050	6	6	7	50	100	1
	71406010060	6	6	7	60	110	1
	71406015020	6	6	7	20	60	1.5
	71406015040	6	6	7	40	80	1.5
	71406015050	6	6	7	50	100	1.5
	71406020020	6	6	7	20	60	2
	71406020030	6	6	7	30	70	2
	71406020040	6	6	7	40	80	2
	71406020050	6	6	7	50	100	2
	71408001025	8	8	9	25	70	0.1
	71408002022	8	8	9	22	65	0.2
	71408002040	8	8	9	40	100	0.2
	71408003022	8	8	9	22	65	0.3
	71408003040	8	8	9	40	100	0.3
	71408005022	8	8	9	22	65	0.5
	71408005035	8	8	9	35	100	0.5
	71408005040	8	8	9	40	100	0.5
	71408005050	8	8	9	50	120	0.5
	71408005060	8	8	9	60	120	0.5
	71408010022	8	8	9	22	65	1
	71408010035	8	8	9	35	100	1
	71408010040	8	8	9	40	100	1
	71408010050	8	8	9	50	120	1
	71408010060	8	8	9	60	120	1
	71408015022	8	8	9	22	65	1.5
	71408015040	8	8	9	40	100	1.5
	71408020022	8	8	9	22	65	2
	71408020040	8	8	9	40	100	2
	71408020050	8	8	9	50	120	2
	71410001030	10	10	11	30	75	0.1
	71410002024	10	10	11	24	70	0.2
	71410002040	10	10	11	40	100	0.2
	71410003024	10	10	11	24	70	0.3
	71410003040	10	10	11	40	100	0.3
	71410005024	10	10	11	24	70	0.5
	71410005040	10	10	11	40	100	0.5
	71410005050	10	10	11	50	120	0.5
	71410005060	10	10	11	60	120	0.5

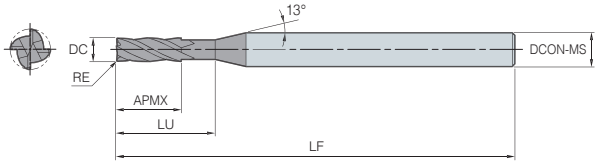
ESRR714

4날 리브 레디우스



CARBIDE | 4 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.5 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71410010024	10	10	11	24	70	1
	71410010040	10	10	11	40	100	1
	71410010050	10	10	11	50	120	1
	71410010060	10	10	11	60	120	1
	71410015024	10	10	11	24	70	1.5
	71410015040	10	10	11	40	100	1.5
	71410020024	10	10	11	24	70	2
	71410020040	10	10	11	40	100	2
	71410020050	10	10	11	50	120	2
	71410025024	10	10	11	24	70	2.5
	71412002032	12	12	13	32	80	0.2
	71412003026	12	12	13	26	80	0.3
	71412003045	12	12	13	45	110	0.3
	71412005026	12	12	13	26	80	0.5
	71412005040	12	12	13	40	110	0.5
	71412005060	12	12	13	60	130	0.5

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRR	71412010026	12	12	13	26	80	1
	71412010040	12	12	13	40	110	1
	71412010060	12	12	13	60	130	1
	71412015026	12	12	13	26	80	1.5
	71412020026	12	12	13	26	80	2
	71412020040	12	12	13	40	110	2
	71412030026	12	12	13	26	80	3
	71416005035	16	16	20	35	100	0.5
	71416005050	16	20	35	50	150	0.5
	71416010035	16	16	20	35	100	1
	71416010050	16	20	35	50	150	1
	71420005040	20	20	25	40	100	0.5
	71420005055	20	20	40	55	150	0.5
	71420010040	20	20	25	40	100	1
	71420010055	20	20	40	55	150	1

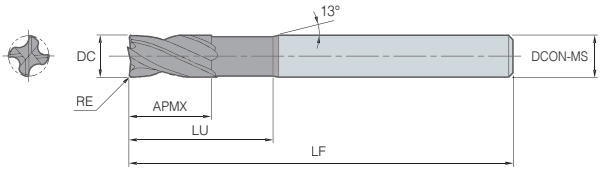
ESXR704

4날 넥 타입 레디우스

CARBIDE | 4 | H·A Multi | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
ALL	0.000 ~ -0.020







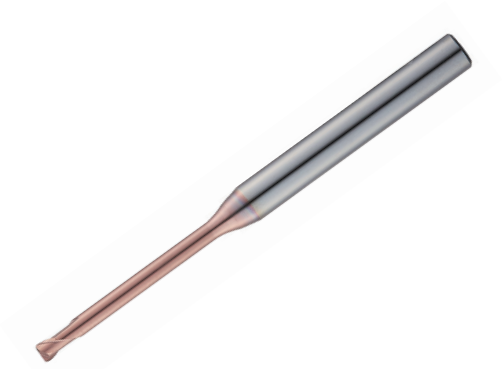
(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
ESXR	70401000504	1	4	1.5	4	45	0.05
	70402000506	2	4	3	6	45	0.05
	70402000507	2	4	2.5	7	50	0.05
	7040200107	2	4	2.5	7	50	0.1
	7040300107	3	6	4	7	45	0.1
	7040300109	3	6	4	9	55	0.1
	7040300209	3	6	4	9	55	0.2
	7040300309	3	6	4	9	55	0.3
	7040300312	3	6	4	12	55	0.3
	7040300316	3	6	4	16	55	0.3
	7040400109	4	6	5	9	45	0.1
	7040400212	4	6	5	12	55	0.2
	7040400212S4	4	4	5	12	55	0.2
	7040400312	4	6	5	12	55	0.3
	7040400316	4	6	5	16	55	0.3
	7040400320	4	6	5	20	55	0.3
	7040400512	4	6	5	12	55	0.5
	7040400516	4	6	5	16	55	0.5
	7040400516S4	4	4	5	16	55	0.5
	7040400520	4	6	5	20	55	0.5
	7040401012	4	6	5	12	55	1
	7040500116	5	6	6	16	60	0.1
	7040500216	5	6	6	16	60	0.2
	7040500316	5	6	6	16	60	0.3
	7040500516	5	6	6	16	60	0.5
	7040501016	5	6	6	16	60	1
	7040600120	6	6	7	20	60	0.1
	7040600214	6	6	7	14	50	0.2

형 번		DC	DCON-MS	APMX	LU	LF	RE
ESXR	7040600220	6	6	7	20	60	0.2
	7040600320	6	6	7	20	60	0.3
	7040600520	6	6	7	20	60	0.5
	7040601020	6	6	7	20	60	1
	7040601520	6	6	7	20	60	1.5
	7040800125	8	8	9	25	60	0.1
	7040800218	8	8	9	18	60	0.2
	7040800225	8	8	9	25	60	0.2
	7040800325	8	8	9	25	60	0.3
	7040800525	8	8	9	25	60	0.5
	7040801025	8	8	9	25	60	1
	7040801525	8	8	9	25	60	1.5
	7040802025	8	8	9	25	60	2
	7041000225	10	10	12	25	75	0.2
	7041000232	10	10	11	32	75	0.2
	7041000332	10	10	11	32	75	0.3
	7041000532	10	10	11	32	75	0.5
	7041001032	10	10	11	32	75	1
	7041001532	10	10	11	32	75	1.5
	7041002032	10	10	11	32	75	2
	7041200238	12	12	12	38	75	0.2
	7041200330	12	12	15	30	75	0.3
	7041200338	12	12	12	38	75	0.3
	7041200538	12	12	12	38	75	0.5
	7041201038	12	12	12	38	75	1
	7041201538	12	12	12	38	75	1.5
	7041202038	12	12	12	38	75	2

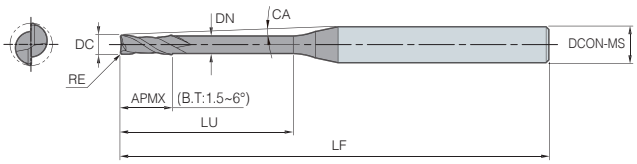
ESLNR20

2날 롱 넥 레디우스



CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012





(mm)

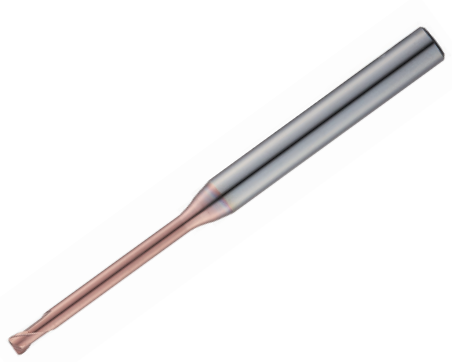
	형 번	DC	DCON-MS	APMX	LU	LF	DN	CA	RE	가공물 구배각별 유효길이				
										0.5°	1°	1.5°	2°	3°
ESLNR	2002-0.5-005	0.2	4	0.15	0.5	50	0.17	11.4	0.05	0.9	1	1	1.1	12
	2002-1-005	0.2	4	0.15	1	50	0.17	10.9	0.05	1.6	1.7	1.9	2	2.3
	2002-1.5-005	0.2	4	0.15	1.5	50	0.17	10.3	0.05	2.1	2.3	2.5	2.7	3
	2002-2-005	0.2	4	0.15	2	50	0.17	9.9	0.05	2.8	3.1	3.4	3.6	4.1
	2003-1-005	0.3	4	0.25	1	50	0.27	10.8	0.05	1.4	1.5	1.6	1.7	1.9
	2003-1.5-005	0.3	4	0.25	1.5	50	0.27	10.3	0.05	2.1	2.3	2.5	2.7	3
	2003-2.5-005	0.3	4	0.25	2.5	50	0.27	9.8	0.05	2.7	2.9	3.1	3.3	3.6
	2003-2-005	0.3	4	0.25	2	50	0.27	9.4	0.05	3.2	3.5	3.7	3.9	4.3
	2003-3-005	0.3	4	0.25	3	50	0.27	9	0.05	3.9	4.3	4.6	4.9	5.4
	2004-1-005	0.4	4	0.3	1	50	0.37	10.8	0.05	1.4	1.5	1.6	1.7	1.9
	2004-1.5-005	0.4	4	0.3	1.5	50	0.37	10.3	0.05	2	2.1	2.2	2.3	2.5
	2004-2-005	0.4	4	0.3	2	50	0.37	9.8	0.05	2.7	2.9	3.1	3.3	3.6
	2004-2.5-005	0.4	4	0.3	2.5	50	0.37	9.4	0.05	3.2	3.5	3.7	3.9	4.3
	2004-3-005	0.4	4	0.3	3	50	0.37	9	0.05	3.8	4	4.3	4.5	4.9
	2004-3.5-005	0.4	4	0.3	3.5	50	0.37	8.6	0.05	4.3	4.6	4.9	5.1	5.5
	2004-4-005	0.4	4	0.3	4	50	0.37	8.3	0.05	5	5.4	5.8	6.1	6.6
	2004-2-01	0.4	4	0.3	2	50	0.37	9.8	0.1	2.7	2.9	3.1	3.3	3.6
	2004-3-01	0.4	4	0.3	3	50	0.37	9	0.1	3.8	4	4.3	4.5	4.9
	2004-4-01	0.4	4	0.3	4	50	0.37	8.3	0.1	5	5.4	5.8	6.1	6.6
	2005-1-005	0.5	4	0.35	1	50	0.47	10.8	0.05	1.4	1.5	1.6	1.7	1.9
	2005-2-005	0.5	4	0.35	2	50	0.47	9.7	0.05	2.5	2.6	2.8	2.9	3.1
	2005-3-005	0.5	4	0.35	3	50	0.47	8.9	0.05	3.8	4	4.3	4.5	4.9
	2005-4-005	0.5	4	0.35	4	50	0.47	8.2	0.05	4.8	5.2	5.4	5.7	6.1
	2005-5-005	0.5	4	0.35	5	50	0.47	7.6	0.05	6.1	6.6	6.9	7.3	7.8
	2005-6-005	0.5	4	0.35	6	50	0.47	7	0.05	7.2	7.7	8.1	8.4	9
	2005-1-01	0.5	4	0.35	1	50	0.47	10.8	0.1	1.4	1.5	1.6	1.7	1.9
	2005-2-01	0.5	4	0.35	2	50	0.47	9.8	0.1	2.5	2.6	2.8	2.9	3.1
	2005-3-01	0.5	4	0.35	3	50	0.47	8.9	0.1	3.8	4	4.3	4.5	4.9
	2005-4-01	0.5	4	0.35	4	50	0.47	8.2	0.1	4.8	5.2	5.4	5.7	6.1
	2005-5-01	0.5	4	0.35	5	50	0.47	7.6	0.1	6.1	6.5	6.9	7.2	7.8
	2005-6-01	0.5	4	0.35	6	50	0.47	7.1	0.1	7.2	7.7	8.1	8.4	9
	2006-2-01	0.6	4	0.4	2	50	0.57	9.7	0.1	2.5	2.6	2.8	2.9	3.1
	2006-4-01	0.6	4	0.4	4	50	0.57	8.1	0.1	4.8	5.2	5.4	5.7	6.1
	2006-6-01	0.6	4	0.4	6	50	0.57	7	0.1	7.2	7.7	8.1	8.4	9

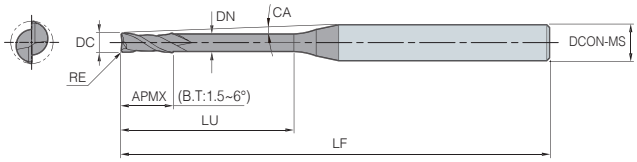
ESLNR20

2날 롱 넥 레디우스

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012





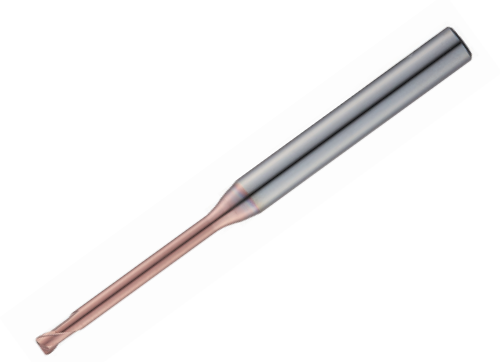


(mm)

형 번		DC	DCON-MS	APMX	LU	LF	DN	CA	RE	가공물 구배각별 유효길이				
										0.5°	1°	1.5°	2°	3°
ESLNR	2006-8-01	0.6	4	0.4	8	50	0.57	6.1	0.1	9.3	9.9	10.3	10.7	11
	2006-10-01	0.6	4	0.4	10	50	0.57	5.5	0.1	11.5	12.1	12.5	13	13.7
	2008-4-01	0.8	4	0.5	4	50	4	8	0.1	4.8	5.2	5.4	5.7	6.1
	2008-6-01	0.8	4	0.5	6	50	6	6.8	0.1	7	7.4	7.7	7.9	8.4
	2008-8-01	0.8	4	0.5	8	50	8	5.9	0.1	9.3	9.9	10.3	10.7	11.4
	2008-12-01	0.8	4	0.5	12	50	12	4.7	0.1	13.6	14.2	14.7	15.2	16
	2008-4-02	0.8	4	0.5	4	50	4	8	0.2	4.8	5.1	5.4	5.6	6.1
	2008-6-02	0.8	4	0.5	6	50	6	6.9	0.2	7	7.3	7.7	7.9	8.4
	2010-4-01	1	4	0.8	4	50	0.94	7.7	0.1	4.7	4.9	5.1	5.2	5.5
	2010-6-01	1	4	0.8	6	50	0.94	6.6	0.1	7.1	7.4	7.7	8	8.5
	2010-8-01	1	4	0.8	8	50	0.94	5.7	0.1	9.2	9.6	9.9	10.2	10.8
	2010-10-01	1	4	0.8	10	50	0.94	5.1	0.1	11.6	12.1	12.6	13	13.7
	2010-12-01	1	4	0.8	12	55	0.94	4.5	0.1	13.7	14.3	14.8	15.3	16
	2010-16-01	1	4	0.8	16	60	0.94	3.8	0.1	17.9	18.6	19.2	19.7	21.3
	2010-20-01	1	4	0.8	20	60	0.94	3.2	0.1	22	22.8	23.5	24	26.7
	2010-4-02	1	4	0.8	4	50	0.94	7.8	0.2	4.7	4.9	5.1	5.2	5.5
	2010-6-02	1	4	0.8	6	50	0.94	6.6	0.2	7.1	7.4	7.7	8	8.5
	2010-8-02	1	4	0.8	8	50	0.94	5.8	0.2	9.2	9.6	9.9	10.2	10.8
	2010-10-02	1	4	0.8	10	50	0.94	5.1	0.2	11.6	12.1	12.6	13	13.7
	2010-12-02	1	4	0.8	12	55	0.94	4.6	0.2	13.7	14.3	14.8	15.2	16
	2010-16-02	1	4	0.8	16	60	0.94	3.8	0.2	17.9	18.6	19.2	19.7	21.3
	2010-20-02	1	4	0.8	20	60	0.94	3.2	0.2	22	22.8	23.5	24	26.6
	2010-6-03	1	4	0.8	6	50	0.94	6.7	0.3	7.1	7.4	7.7	8	8.4
	2010-10-03	1	4	0.8	10	50	0.94	5.1	0.3	11.5	12.1	12.6	13	13.7
	2010-16-03	1	4	0.8	16	60	0.94	3.8	0.3	17.9	18.6	19.1	19.6	21.3
	2010-20-03	1	4	0.8	20	60	0.94	3.2	0.3	22	22.8	23.5	24	26.6
	2015-4-01	1.5	4	1.35	4	50	1.42	7.2	0.1	4.8	4.9	5.1	5.3	5.5
	2015-8-01	1.5	4	1.35	8	50	1.42	5.2	0.1	9.2	9.6	10	10.3	10.8
	2015-12-01	1.5	4	1.35	12	55	1.42	4	0.1	13.4	13.9	14.3	14.7	16.1
	2015-15-01	1.5	4	1.35	15	55	1.42	3.5	0.1	16.9	17.6	18.1	18.6	20.1
	2015-20-01	1.5	4	1.35	20	60	1.42	2.8	0.1	22.1	22.9	23.5	24.1	-
	2015-4-02	1.5	4	1.35	4	50	1.42	7.3	0.2	4.7	4.9	5.1	5.3	5.5
	2015-8-02	1.5	4	1.35	8	50	1.42	5.2	0.2	9.2	9.6	10	10.3	10.8
	2015-12-02	1.5	4	1.35	12	55	1.42	4.1	0.2	13.4	13.9	14.3	14.7	16.1

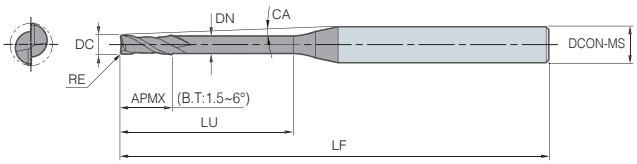
ESLNR20

2날 롱 넥 레디우스



CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012



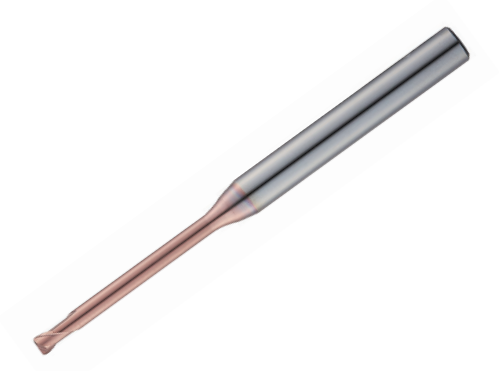


(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	DN	CA	RE	가공물 구배각별 유효길이				
										0.5°	1°	1.5°	2°	3°
ESLNR	2015-15-02	1.5	4	1.35	15	55	1.42	3.5	0.2	16.9	17.5	18.1	18.6	20
	2015-20-02	1.5	4	1.35	20	60	1.42	2.8	0.2	22.1	22.9	23.5	24.1	-
	2015-8-03	1.5	4	1.35	8	50	1.42	5.2	0.3	9.2	9.6	10	10.3	10.8
	2015-15-03	1.5	4	1.35	15	55	1.42	3.5	0.3	16.9	17.5	18.1	18.6	20
	2015-20-03	1.5	4	1.35	20	60	1.42	2.8	0.3	22.1	22.9	23.5	24	-
	2020-6-02	2	4	1.7	6	50	1.92	5.4	0.2	6.8	7.1	7.3	7.5	8.1
	2020-8-02	2	4	1.7	8	50	1.92	4.6	0.2	8.9	9.2	9.4	9.7	10.8
	2020-12-02	2	4	1.7	12	55	1.92	3.5	0.2	13.4	13.9	14.3	14.7	16.1
	2020-16-02	2	4	1.7	16	55	1.92	2.8	0.2	17.6	18.1	18.6	19.3	-
	2020-20-02	2	4	1.7	20	60	1.92	2.4	0.2	22.1	22.9	23.5	24.1	-
	2020-25-02	2	4	1.7	25	65	1.92	2	0.2	27.3	28.2	28.8	-	-
	2020-30-02	2	4	1.7	30	70	1.92	1.7	0.2	32.5	33.4	34.4	-	-
	2020-8-03	2	4	1.7	8	50	1.92	4.6	0.3	8.9	9.2	9.4	9.7	10.7
	2020-16-03	2	4	1.7	16	55	1.92	2.8	0.3	17.6	18.1	18.6	19.3	-
	2020-20-03	2	4	1.7	20	60	1.92	2.4	0.3	22.1	22.9	23.5	24	-
	2020-6-05	2	4	1.7	6	50	1.92	5.5	0.5	6.8	7.1	7.3	7.4	8
	2020-8-05	2	4	1.7	8	50	1.92	4.7	0.5	8.9	9.2	9.4	9.6	10.7
	2020-12-05	2	4	1.7	12	55	1.92	3.5	0.5	13.4	13.9	14.3	14.6	16
	2020-16-05	2	4	1.7	16	55	1.92	2.9	0.5	17.6	18.1	18.6	19.2	-
	2020-20-05	2	4	1.7	20	60	1.92	2.4	0.5	22.1	22.9	23.5	24	-
	2020-25-05	2	4	1.7	25	65	1.92	2	0.5	27.3	28.1	28.8	-	-
	2020-30-05	2	4	1.7	30	70	1.92	1.7	0.5	32.5	33.4	34.3	-	-
	2020-8-08	2	4	1.7	8	50	1.92	4.8	0.8	8.9	9.2	9.4	9.6	10.6
	2020-16-08	2	4	1.7	16	55	1.92	2.9	0.8	17.6	18.1	18.6	19.2	-
	2020-20-08	2	4	1.7	20	60	1.92	2.4	0.8	22.1	22.8	23.5	24	-
	2030-8-02	3	6	2.5	8	55	2.86	5.7	0.2	9	9.3	9.5	9.9	10.9
	2030-12-02	3	6	2.5	12	60	2.86	4.5	0.2	13.1	13.5	14	14.7	16.2
	2030-16-02	3	6	2.5	16	60	2.86	3.8	0.2	17.7	18.2	18.7	19.5	21.6
	2030-20-02	3	6	2.5	20	65	2.86	3.2	0.2	21.8	22.4	23.1	24.2	26.9
	2030-30-02	3	6	2.5	30	75	2.86	2.4	0.2	32.6	33.5	34.5	36.2	-
	2030-35-02	3	6	2.5	35	80	2.86	2.1	0.2	37.7	38.7	40.2	42.2	-
	2030-8-03	3	6	2.5	8	55	2.86	5.7	0.3	9	9.3	9.5	9.9	10.9
	2030-16-03	3	6	2.5	16	60	2.86	3.8	0.3	17.7	18.2	18.7	19.4	21.5
	2030-20-03	3	6	2.5	20	65	2.86	3.2	0.3	21.8	22.4	23.1	24.2	26.8

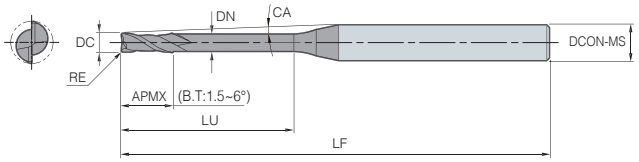
ESLNR20

2날 롱 넥 레디우스



CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01

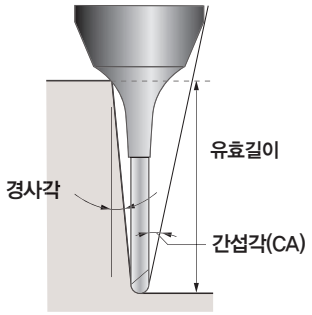
DC	공구직경공차
ALL	0.000 ~ -0.012

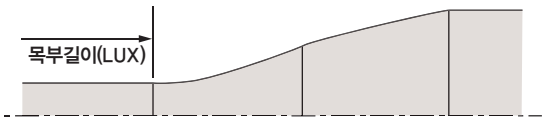




(mm)

형 번		DC	DCON-MS	APMX	LU	LF	DN	CA	RE	가공물 구배각별 유효길이				
										0.5°	1°	1.5°	2°	3°
ESLNR	2030-30-03	3	6	2.5	30	75	2.86	2.4	0.3	32.6	33.5	34.5	36.2	-
	2030-8-05	3	6	2.5	8	55	2.86	5.8	0.5	9	9.3	9.5	9.8	10.8
	2030-12-05	3	6	2.5	12	60	2.86	4.6	0.5	13.1	13.5	13.9	14.6	16.2
	2030-16-05	3	6	2.5	16	60	2.86	3.8	0.5	17.7	18.2	18.7	19.4	21.5
	2030-20-05	3	6	2.5	20	65	2.86	3.2	0.5	21.8	22.4	23.1	24.2	26.8
	2030-30-05	3	6	2.5	30	75	2.86	2.4	0.5	32.6	33.5	34.5	36.1	-
	2030-35-05	3	6	2.5	35	80	2.86	2.1	0.5	37.7	38.7	40.2	42.1	-





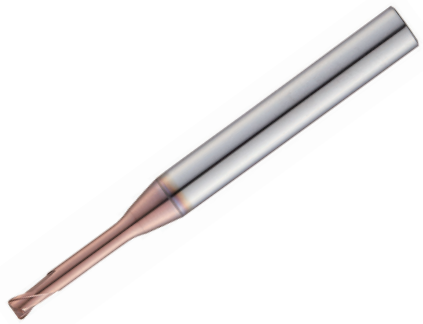
※ 표시된 유효길이는 공작물과의 간섭을 막기 위한 기본 값입니다.
가공환경의 적절한 제어가 필요합니다.

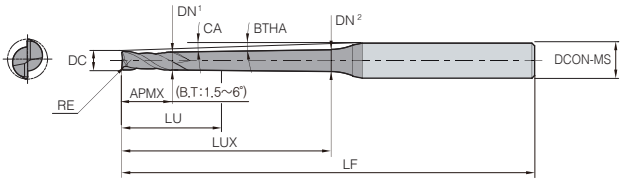
ESTNR20

2날 테이퍼 넥 레디우스

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012







(mm)

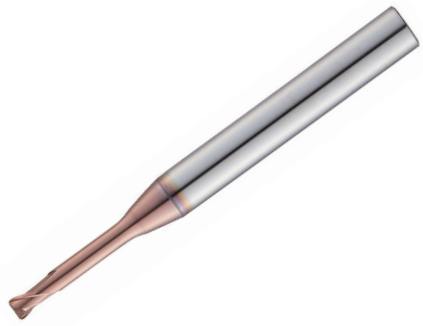
형 번		DC	DCON-MS	APMX	LU	LUX	CA	BTHA	DN1	DN2	LF	RE	가공물 구배각별 유효길이				
													0.5°	1°	1.5°	2°	3°
ESTNR	2002-2-09005	0.2	4	0.15	1.1	2	0.9	10	0.17	0.23	50	0.05	-	2.8	3.1	3.4	3.9
	2004-4-09005	0.4	4	0.3	1.25	4	0.9	8.4	0.37	0.49	50	0.05	-	4.9	5.3	5.7	6.3
	2004-5-09005	0.4	4	0.3	1.25	5	0.9	7.8	0.37	0.52	50	0.05	-	5.9	6.4	6.8	7.5
	2004-4-0901	0.4	4	0.3	1.25	4	0.9	8.5	0.37	0.49	50	0.1	-	4.9	5.3	5.7	6.3
	2004-5-0901	0.4	4	0.3	1.25	5	0.9	7.9	0.37	0.52	50	0.1	-	5.9	6.4	6.8	7.5
	2005-5-0901	0.5	4	0.35	1.3	5	0.9	7.8	0.47	0.62	50	0.1	-	5.9	6.4	6.8	7.5
	2005-8-0901	0.5	4	0.35	1.3	8	0.9	6.4	0.47	0.71	50	0.1	-	9	9.7	10.2	11
	2005-10-0901	0.5	4	0.35	1.3	10	0.9	5.8	0.47	0.77	55	0.1	-	11	11.8	12.4	13.2
	2006-12-0901	0.6	4	0.4	1.35	12	0.9	5.1	0.57	0.93	55	0.1	-	13	13.9	14.5	15.5
	2006-15-0901	0.6	4	0.4	1.35	15	0.9	4.5	0.57	13	55	0.1	-	16.1	17.1	17.8	18.8
	2008-6-0402	0.8	4	0.5	2.64	6	0.4	7	0.77	0.85	50	0.2	6.6	7.1	7.5	7.8	8.3
	2008-12-0902	0.8	4	0.5	1.45	12	0.9	5	0.77	1.13	55	0.2	-	13	13.9	14.5	15.5
	2010-8-0402	1	6	0.8	5.09	8	0.4	7.4	0.94	14	55	0.2	8.8	9.3	9.7	10.1	10.6
	2010-10-0902	1	6	0.8	5.09	10	0.9	6.8	0.94	1.23	55	0.2	-	11.2	11.9	12.4	13.3
	2010-15-0902	1	6	0.8	2.7	15	0.9	5.6	0.94	1.39	60	0.2	-	16.3	17.2	17.8	18.8
	2010-20-0902	1	6	0.8	2.7	20	0.9	4.8	0.94	1.54	65	0.2	-	21.3	22.4	23.2	24.7
	2010-25-0902	1	6	0.8	2.7	25	0.9	4.1	0.94	1.7	70	0.2	-	26.4	27.6	28.5	30.9
	2010-30-0902	1	6	0.8	2.7	30	0.9	3.7	0.94	1.86	75	0.2	-	31.5	32.8	33.7	37
	2010-35-0902	1	6	0.8	2.7	35	0.9	3.3	0.94	22	80	0.2	-	36.5	38	39	43.2
	2010-8-0403	1	6	0.8	2.7	8	0.4	7.4	0.94	14	55	0.3	8.8	9.3	9.7	10	10.6
	2010-15-0903	1	6	0.8	2.7	15	0.9	5.6	0.94	1.39	60	0.3	-	16.3	17.2	17.8	18.8
	2010-25-0903	1	6	0.8	2.7	25	0.9	4.2	0.94	1.7	70	0.3	-	26.4	27.6	28.5	30.8
	2010-30-0903	1	6	0.8	2.7	30	0.9	3.7	0.94	1.86	75	0.3	-	31.5	32.8	33.7	37
	2015-10-0402	1.5	6	1.35	7.07	10	0.4	6.4	1.42	1.54	55	0.2	11	11.5	11.9	12.3	13
	2015-15-0902	1.5	6	1.35	7.07	15	0.9	5.3	1.42	1.85	60	0.2	-	16.4	17.3	17.9	18.9
	2015-20-0902	1.5	6	1.35	3.89	20	0.9	4.5	1.42	21	65	0.2	-	21.5	22.5	23.2	24.9
	2015-25-0902	1.5	6	1.35	3.89	25	0.9	3.9	1.42	2.16	70	0.2	-	26.6	27.7	28.5	31
	2015-30-0902	1.5	6	1.35	3.89	30	0.9	3.4	1.42	2.32	75	0.2	-	31.6	32.9	33.8	37.1
	2015-10-0403	1.5	6	1.35	3.89	10	0.4	6.4	1.42	1.54	55	0.3	11	11.5	11.9	12.3	13
	2015-20-0903	1.5	6	1.35	3.89	20	0.9	4.5	1.42	21	65	0.3	-	21.5	22.5	23.2	24.8
	2015-25-0903	1.5	6	1.35	3.89	25	0.9	3.9	1.42	2.16	70	0.3	-	26.5	27.7	28.5	31
	2015-30-0903	1.5	6	1.35	3.89	30	0.9	3.4	1.42	2.32	75	0.3	-	31.6	32.9	33.8	37.1
	2020-30-0902	2	6	1.7	7.42	30	0.9	3.1	1.92	2.81	70	0.2	-	31.6	32.9	33.8	37.2
	2020-40-0902	2	6	1.7	7.42	40	0.9	2.5	1.92	3.12	80	0.2	-	41.8	43.3	44.6	-
	2020-50-0902	2	6	1.7	7.42	50	0.9	2.1	1.92	3.44	90	0.2	-	51.9	53.6	55.7	-
	2020-12-0403	2	6	1.7	7.42	12	0.4	5.5	1.92	2.06	55	0.3	13	13.6	14.1	14.5	15.6
	2020-20-0903	2	6	1.7	4.24	20	0.9	4.1	1.92	2.5	65	0.3	-	21.5	22.5	23.2	24.9
	2020-30-0903	2	6	1.7	4.24	30	0.9	3.1	1.92	2.81	70	0.3	-	31.6	32.9	33.8	37.1

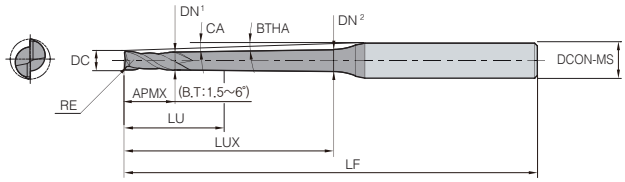
ESTNR20

2날 테이퍼 넥 레디우스

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012

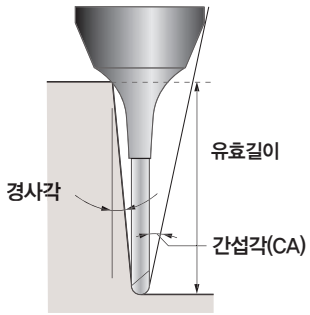


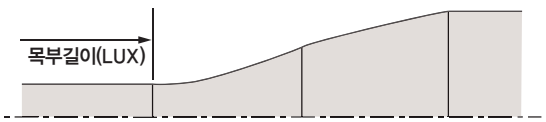




(mm)

형 번		DC	DCON-MS	APMX	LU	LUX	CA	BTHA	DN1	DN2	LF	RE	가공물 구배각별 유효길이				
													0.5°	1°	1.5°	2°	3°
ESTNR	2020-40-0903	2	6	1.7	4.24	40	0.9	2.5	1.92	3.12	80	0.3	-	41.7	43.3	44.6	-
	2020-50-0903	2	6	1.7	4.24	50	0.9	2.1	1.92	3.44	90	0.3	-	51.8	53.6	55.7	-
	2020-8-0405	2	6	1.7	4.24	8	0.4	6.8	1.92	2.01	50	0.5	8.7	9	9.3	9.5	10.4
	2020-12-0405	2	6	1.7	4.24	12	0.4	5.6	1.92	2.06	55	0.5	13	13.6	14.1	14.4	15.5
	2020-16-0405	2	6	1.7	4.24	16	0.4	4.7	1.92	2.12	60	0.5	17	17.8	18.3	18.7	20.7
	2020-20-0905	2	6	1.7	4.24	20	0.9	4.2	1.92	2.5	65	0.5	-	21.5	22.5	23.2	24.8
	2020-25-0905	2	6	1.7	4.24	25	0.9	3.6	1.92	2.65	65	0.5	-	26.6	27.7	28.5	30.9
	2020-30-0905	2	6	1.7	4.24	30	0.9	3.1	1.92	2.81	70	0.5	-	31.6	32.9	33.8	37.1
	2020-40-0905	2	6	1.7	4.24	40	0.9	2.5	1.92	3.12	80	0.5	-	41.7	43.2	44.6	-
	2020-50-0905	2	6	1.7	4.24	50	0.9	2.1	1.92	3.44	90	0.5	-	51.8	53.6	55.6	-
	2030-40-0902	3	6	2.5	6.95	40	0.9	2	2.86	4.04	80	0.2	-	42	43.4	-	-
	2030-50-0902	3	6	2.5	6.95	50	0.9	1.6	2.86	4.35	90	0.2	-	52.1	53.7	-	-
	2030-60-0902	3	6	2.5	6.95	60	0.9	1.4	2.86	4.67	100	0.2	-	62.2	-	-	-
	2030-40-0903	3	6	2.5	6.95	40	0.9	2	2.86	4.04	80	0.3	-	42	43.4	-	-
	2030-50-0903	3	6	2.5	6.95	50	0.9	1.7	2.86	4.35	90	0.3	-	52.1	53.7	-	-
	2030-60-0903	3	6	2.5	6.95	60	0.9	1.4	2.86	4.67	100	0.3	-	62.2	-	-	-
	2030-40-0905	3	6	2.5	6.95	40	0.9	2	2.86	4.04	80	0.5	-	42	43.4	-	-
	2030-50-0905	3	6	2.5	6.95	50	0.9	1.7	2.86	4.35	90	0.5	-	52.1	53.7	-	-
	2030-60-0905	3	6	2.5	6.95	60	0.9	1.4	2.86	4.67	100	0.5	-	62.1	-	-	-





※ 표시된 유효길이는 공작물과의 간섭을 막기 위한 기본 값입니다.
가공환경의 적절한 제어가 필요합니다.

ESPM4

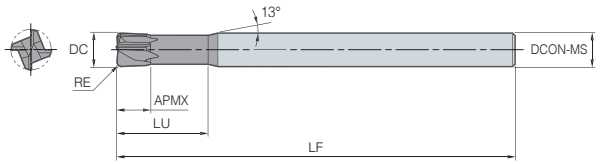
4날 넥 타입 레디우스

CARBIDE | 4 | H·A 0° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø3 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
ESPM	4030-05	3	6	1.2	8	50	0.5
	4040-05	4	6	1.5	10	50	0.5
	4060-05	6	6	2.5	12	60	0.5
	4060-10	6	6	2.5	12	60	1
	4060-15	6	6	2.5	12	60	1.5
	4060-15L	6	6	2.5	12	90	1.5
	4080-10	8	8	3.5	16	60	1
	4080-20	8	8	3.5	16	60	2
	4080-20L	8	8	3.5	16	100	2
	4100-10	10	10	4	20	70	1
	4100-20	10	10	4	20	70	2
	4100-20L	10	10	4	20	100	2
	4120-20	12	12	5	25	80	2
	4120-30	12	12	5	25	80	3
	4120-30L	12	12	5	25	110	3

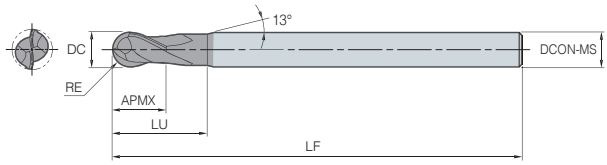
ESB702

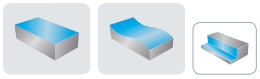
2날 넥 타입 볼

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.008 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
ESB	702001	0.1	0.15	4	-	40	0.05
	702002	0.2	0.3	4	-	40	0.1
	702003	0.3	0.5	4	-	40	0.15
	702004	0.4	0.6	4	-	40	0.2
	702005	0.5	0.7	4	-	40	0.25
	702006	0.6	0.9	4	-	40	0.3
	702007	0.7	1.1	4	-	40	0.35
	702008	0.8	1.2	4	-	40	0.4
	702009	0.9	1.4	4	-	40	0.45
	702010	1	1.5	6	3	50	0.5
	702010S4	1	1.5	4	-	45	0.5
	702015	1.5	2.0	6	4	50	0.75
	702015S4	1.5	2.0	4	-	45	0.75
	702020	2	2.5	6	5	50	1
	702020S4	2	2.5	4	-	45	1
	702025	2.5	3.0	6	7	50	1.25
	702030	3	4.0	6	10	60	1.5
	702030S	3	4.0	6	10	50	1.5
	702030S4	3	4.0	4	-	45	1.5
	702031	3	4.0	6	10	70	1.5
	702040	4	5.0	6	10	60	2
	702040S	4	5.0	6	10	50	2
	702040S4	4	5.0	4	-	45	2
	702041	4	5.0	6	10	70	2
	702050	5	6.0	6	12	60	2.5
	702060	6	7.0	6	12	60	3
	702061	6	7.0	6	12	90	3
	702080	8	9.0	8	15	70	4
	702081	8	9.0	8	15	100	4
	702100	10	11.0	10	25	75	5
	702101	10	11.0	10	25	100	5
	702120	12	12	12	25	80	6
	702121	12	12	12	25	110	6

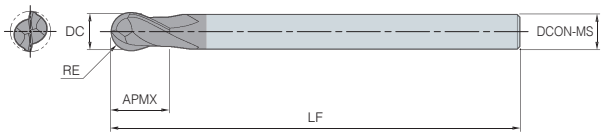
ESB712

2날 볼

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.008 (DC6 초과)

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

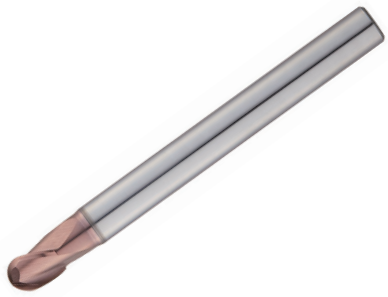
형 번		DC	DCON-MS	APMX	LF	RE
ESB	712010	1	6	2.5	50	0.5
	712010S	1	6	1.5	40	0.5
	712010S4	1	4	2.5	50	0.5
	712012	1.2	6	3	50	0.6
	712015	1.5	6	4	50	0.75
	712015S	1.5	6	2.5	40	0.75
	712015S4	1.5	4	4	50	0.75
	712020	2	6	5	50	1
	712020S	2	6	3	40	1
	712020S4	2	4	5	50	1
	712025	2.5	6	7	60	1.25
	712030	3	6	8	60	1.5
	712030S	3	6	4.5	50	1.5
	712030S4	3	4	8	60	1.5
	712040	4	6	8	70	2
	712040S	4	6	6	50	2
	712050	5	6	10	80	2.5
	712050S	5	6	7.5	50	2.5
	712060	6	6	12	90	3
	712060S	6	6	9	50	3
	712080S	8	8	12	50	4
	712081	8	8	14	100	4
	712100	10	10	18	100	5
	712100S	10	10	15	60	5
	712120	12	12	22	110	6
	712120S	12	12	18	60	6

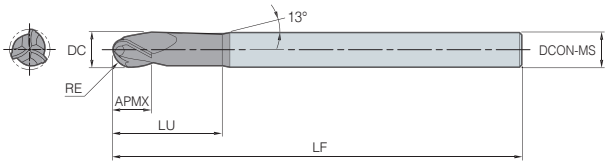
ESB703

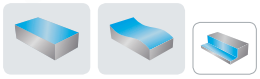
3날 넥 타입 볼

CARBIDE | 3 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.008 (DC6 초과)

DC	공구직경공차
Ø2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

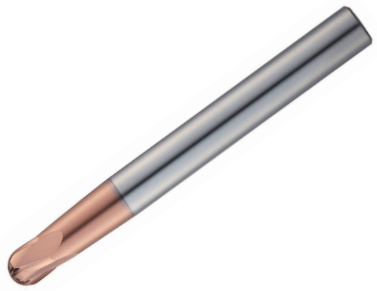
형 번		DC	DCON-MS	APMX	LU	LF	RE
ESB	703020	2	6	2.5	5	50	1
	703025	2.5	6	3	7	50	1.25
	703030	3	6	4	10	60	1.5
	703030S	3	6	4	10	50	1.5
	703031	3	6	4	10	70	1.5
	703040	4	6	5	10	60	2
	703040S	4	6	5	10	50	2
	703041	4	6	5	10	70	2
	703050	5	6	6	12	60	2.5
	703060	6	6	7	12	60	3
	703061	6	6	7	12	90	3
	703080	8	8	9	15	70	4
	703081	8	8	9	15	100	4
	703100	10	10	11	25	75	5
	703101	10	10	11	25	100	5
	703120	12	12	12	25	80	6
	703121	12	12	12	25	110	6

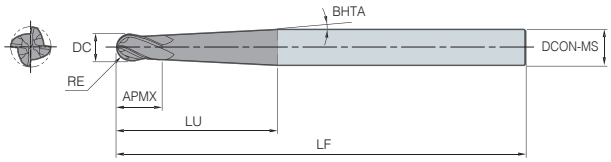
ESB734

4날 15° 헬릭스 볼

CARBIDE | 4 | H·A 15° | 재종 PC305H | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.008 (DC6 초과)

DC	공구직경공차
Ø2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø10	0.000 ~ -0.015







(mm)

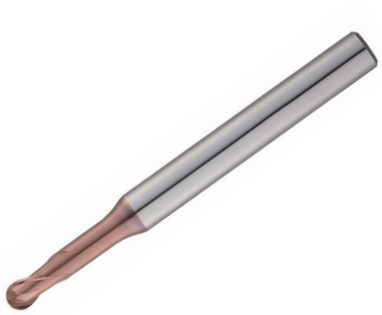
형 번		DC	DCON-MS	APMX	LU	LF	RE	BHTA
ESB	734020-2.5	2	4	2	25	60	1	2.5
	734020-3.5	2	4	2	18	60	1	3.5
	734025-2.5	2.5	4	3	20	60	1.25	2.5
	734025-3.0	2.5	4	3	17	60	1.25	3
	734030-2.0	3	6	3	46	70	1.5	2
	734030-2.5	3	6	3	37	70	1.5	2.5
	734040-2.0	4	6	4	33	70	2	2
	734040-2.5	4	6	4	27	70	2	2.5
	734050-2.5	5	6	5	16	70	2.5	2.5
	734060-1.5	6	8	6	44	100	3	1.5
	734060-2.5	6	8	6	29	100	3	2.5
	734080-1.5	8	10	8	46	100	4	1.5
	734080-2.5	8	10	8	31	100	4	2.5
	734100-1.5	10	12	10	48	110	5	1.5
	734100-2.5	10	12	10	33	110	5	2.5

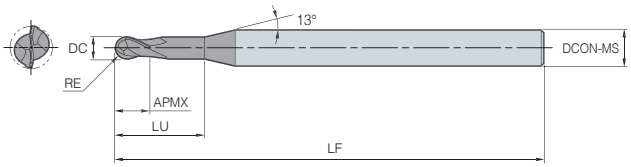
ESRB712

2날 리브 볼

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.008 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRB	712001002	0.1	4	0.1	0.2	40	0.05
	712001003	0.1	4	0.1	0.3	40	0.05
	712001005	0.1	4	0.1	0.5	40	0.05
	71200101	0.1	4	0.1	1	40	0.05
	712002005	0.2	4	0.2	0.5	40	0.1
	712002015	0.2	4	0.2	1.5	40	0.1
	71200201	0.2	4	0.2	1	40	0.1
	71200202	0.2	4	0.2	2	40	0.1
	71200203	0.2	4	0.2	3	40	0.1
	712003015	0.3	4	0.3	1.5	40	0.15
	71200301	0.3	4	0.3	1	40	0.15
	712003025	0.3	4	0.3	2.5	40	0.15
	71200302	0.3	4	0.3	2	40	0.15
	71200303	0.3	4	0.3	3	40	0.15
	71200304	0.3	4	0.3	4	40	0.15
	71200305	0.3	4	0.3	5	40	0.15
	712004015	0.4	4	0.4	1.5	40	0.2
	71200401	0.4	4	0.4	1	40	0.2
	712004025	0.4	4	0.4	2.5	40	0.2
	71200402	0.4	4	0.4	2	40	0.2
	71200403	0.4	4	0.4	3	40	0.2
	71200404	0.4	4	0.4	4	40	0.2
	71200405	0.4	4	0.4	5	40	0.2
	71200406	0.4	4	0.4	6	40	0.2
	71200408	0.4	4	0.4	8	40	0.2
	71200410	0.4	4	0.4	10	40	0.2
	712005015	0.5	4	0.5	1.5	45	0.25
	71200501	0.5	4	0.5	1	45	0.25
	71200501S6	0.5	6	0.5	1	45	0.25
	712005025	0.5	4	0.5	2.5	45	0.25
	71200502	0.5	4	0.5	2	45	0.25
	71200502S6	0.5	6	0.5	2	45	0.25
	71200503	0.5	4	0.5	3	45	0.25
	71200504	0.5	4	0.5	4	45	0.25
	71200504S6	0.5	6	0.5	4	45	0.25
	71200505	0.5	4	0.5	5	45	0.25
	71200506	0.5	4	0.5	6	45	0.25
	71200508	0.5	4	0.5	8	45	0.25
	71200510	0.5	4	0.5	10	45	0.25

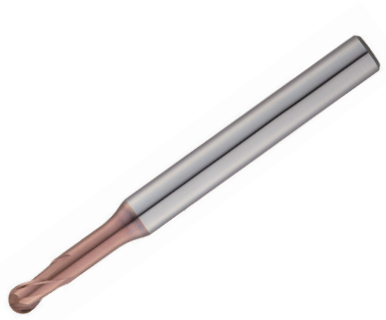
	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRB	71200512	0.5	4	0.5	12	45	0.25
	71200514	0.5	4	0.5	14	45	0.25
	71200516	0.5	4	0.5	16	45	0.25
	71200601	0.6	4	0.6	1	45	0.3
	71200601S6	0.6	6	0.6	1	45	0.3
	71200602	0.6	4	0.6	2	45	0.3
	71200602S6	0.6	6	0.6	2	45	0.3
	71200603	0.6	4	0.6	3	45	0.3
	71200603S6	0.6	6	0.6	3	45	0.3
	71200604	0.6	4	0.6	4	45	0.3
	71200604S6	0.6	6	0.6	4	45	0.3
	71200605	0.6	4	0.6	5	45	0.3
	71200605S6	0.6	6	0.6	5	45	0.3
	71200606	0.6	4	0.6	6	45	0.3
	71200606S6	0.6	6	0.6	6	45	0.3
	71200608	0.6	4	0.6	8	45	0.3
	71200608S6	0.6	6	0.6	8	45	0.3
	71200610	0.6	4	0.6	10	45	0.3
	71200610S6	0.6	6	0.6	10	45	0.3
	71200612	0.6	4	0.6	12	45	0.3
	71200612S6	0.6	6	0.6	12	45	0.3
	71200614	0.6	4	0.6	14	45	0.3
	71200614S6	0.6	6	0.6	14	45	0.3
	71200616	0.6	4	0.6	16	45	0.3
	71200616S6	0.6	6	0.6	16	50	0.3
	71200702	0.7	4	0.7	2	45	0.35
	71200704	0.7	4	0.7	4	45	0.35
	71200706	0.7	4	0.7	6	45	0.35
	71200708	0.7	4	0.7	8	45	0.35
	71200710	0.7	4	0.7	10	45	0.35
	71200712	0.7	4	0.7	12	45	0.35
	71200801	0.8	4	0.8	1	45	0.4
	71200801S6	0.8	6	0.8	1	45	0.4
	71200802	0.8	4	0.8	2	45	0.4
	71200802S6	0.8	6	0.8	2	45	0.4
	71200803	0.8	4	0.8	3	45	0.4
	71200803S6	0.8	6	0.8	3	45	0.4
	71200804	0.8	4	0.8	4	45	0.4
	71200804S6	0.8	6	0.8	4	45	0.4

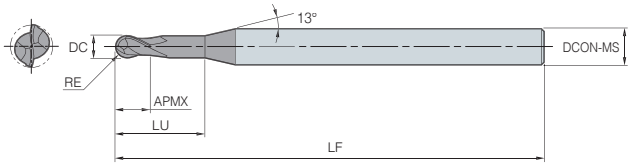
ESRB712

2날 리브 볼

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.008 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRB	71200805	0.8	4	0.8	5	45	0.4
	71200805S6	0.8	6	0.8	5	45	0.4
	71200806	0.8	4	0.8	6	45	0.4
	71200806S6	0.8	6	0.8	6	45	0.4
	71200808	0.8	4	0.8	8	45	0.4
	71200808S6	0.8	6	0.8	8	45	0.4
	71200810	0.8	4	0.8	10	45	0.4
	71200810S6	0.8	6	0.8	10	45	0.4
	71200812	0.8	4	0.8	12	45	0.4
	71200812S6	0.8	6	0.8	12	45	0.4
	71200814	0.8	4	0.8	14	45	0.4
	71200814S6	0.8	6	0.8	14	45	0.4
	71200816	0.8	4	0.8	16	45	0.4
	71200816S6	0.8	6	0.8	16	50	0.4
	71200820	0.8	4	0.8	20	50	0.4
	71200820S6	0.8	6	0.8	20	55	0.4
	71200904	0.9	4	0.9	4	45	0.45
	71200906	0.9	4	0.9	6	45	0.45
	71200908	0.9	4	0.9	8	45	0.45
	71200910	0.9	4	0.9	10	45	0.45
	71201002	1	4	1	2	50	0.5
	71201002S6	1	6	1	2	50	0.5
	71201003	1	4	1	3	50	0.5
	71201003S6	1	6	1	3	50	0.5
	71201004	1	4	1	4	50	0.5
	71201004S6	1	6	1	4	50	0.5
	71201005	1	4	1	5	50	0.5
	71201005S6	1	6	1	5	50	0.5
	71201006	1	4	1	6	50	0.5
	71201006S6	1	6	1	6	50	0.5
	71201007	1	4	1	7	50	0.5
	71201007S6	1	6	1	7	50	0.5
	71201008	1	4	1	8	50	0.5
	71201008S6	1	6	1	8	50	0.5
	71201009	1	4	1	9	50	0.5
	71201009S6	1	6	1	9	50	0.5
	71201010	1	4	1	10	50	0.5
	71201010S6	1	6	1	10	50	0.5
	71201012	1	4	1	12	50	0.5

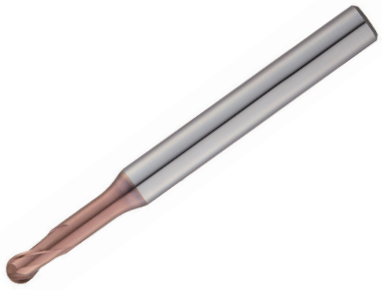
	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRB	71201012S6	1	6	1	12	50	0.5
	71201014	1	4	1	14	50	0.5
	71201014S6	1	6	1	14	50	0.5
	71201016	1	4	1	16	50	0.5
	71201016S6	1	6	1	16	50	0.5
	71201018	1	4	1	18	50	0.5
	71201018S6	1	6	1	18	50	0.5
	71201020	1	4	1	20	55	0.5
	71201020S6	1	6	1	20	55	0.5
	71201022	1	4	1	22	60	0.5
	71201022S6	1	6	1	22	60	0.5
	71201026	1	4	1	26	60	0.5
	71201026S6	1	6	1	26	60	0.5
	71201030	1	4	1	30	70	0.5
	71201030S6	1	6	1	30	70	0.5
	71201040	1	4	1	40	80	0.5
	71201050	1	4	1	50	100	0.5
	71201204	1.2	4	1.2	4	50	0.6
	71201206	1.2	4	1.2	6	50	0.6
	71201208	1.2	4	1.2	8	50	0.6
	71201210	1.2	4	1.2	10	50	0.6
	71201212	1.2	4	1.2	12	50	0.6
	71201216	1.2	4	1.2	16	50	0.6
	71201220	1.2	4	1.2	20	50	0.6
	71201226	1.2	4	1.2	26	60	0.6
	71201406	1.4	4	1.4	6	50	0.7
	71201408	1.4	4	1.4	8	50	0.7
	71201410	1.4	4	1.4	10	50	0.7
	71201412	1.4	4	1.4	12	50	0.7
	71201416	1.4	4	1.4	16	50	0.7
	71201503	1.5	4	1.5	3	50	0.75
	71201503S6	1.5	6	1.5	3	50	0.75
	71201504	1.5	4	1.5	4	50	0.75
	71201504S6	1.5	6	1.5	4	50	0.75
	71201505	1.5	4	1.5	5	50	0.75
	71201506	1.5	4	1.5	6	50	0.75
	71201506S6	1.5	6	1.5	6	50	0.75
	71201507	1.5	4	1.5	7	50	0.75
	71201508	1.5	4	1.5	8	50	0.75

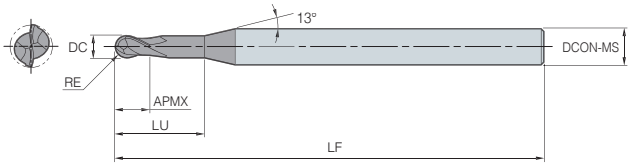
ESRB712

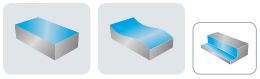
2날 리브 볼

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.008 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRB	71201508S6	1.5	6	1.5	8	50	0.75
	71201510	1.5	4	1.5	10	50	0.75
	71201510S6	1.5	6	1.5	10	50	0.75
	71201512	1.5	4	1.5	12	50	0.75
	71201512S6	1.5	6	1.5	12	50	0.75
	71201514	1.5	4	1.5	14	50	0.75
	71201514S6	1.5	6	1.5	14	50	0.75
	71201516	1.5	4	1.5	16	50	0.75
	71201516S6	1.5	6	1.5	16	50	0.75
	71201518	1.5	4	1.5	18	50	0.75
	71201518S6	1.5	6	1.5	18	50	0.75
	71201520	1.5	4	1.5	20	55	0.75
	71201520S6	1.5	6	1.5	20	55	0.75
	71201522	1.5	4	1.5	22	60	0.75
	71201522S6	1.5	6	1.5	22	60	0.75
	71201526	1.5	4	1.5	26	60	0.75
	71201526S6	1.5	6	1.5	26	60	0.75
	71201530	1.5	4	1.5	30	70	0.75
	71201530S6	1.5	6	1.5	30	70	0.75
	71201535	1.5	4	1.5	35	70	0.75
	71201535S6	1.5	6	1.5	35	70	0.75
	71201540	1.5	4	1.5	40	80	0.75
	71201540S6	1.5	6	1.5	40	80	0.75
	71201604	1.6	4	1.6	4	50	0.8
	71201606	1.6	4	1.6	6	50	0.8
	71201608	1.6	4	1.6	8	50	0.8
	71201610	1.6	4	1.6	10	50	0.8
	71201612	1.6	4	1.6	12	50	0.8
	71201616	1.6	4	1.6	16	50	0.8
	71201620	1.6	4	1.6	20	50	0.8
	71201804	1.8	4	1.8	4	50	0.9
	71201806	1.8	4	1.8	6	50	0.9
	71201808	1.8	4	1.8	8	50	0.9
	71201810	1.8	4	1.8	10	50	0.9
	71201812	1.8	4	1.8	12	50	0.9
	71201816	1.8	4	1.8	16	50	0.9
	71201820	1.8	4	1.8	20	50	0.9
	71202004	2	4	2	4	50	1
	71202004S6	2	6	2	4	50	1

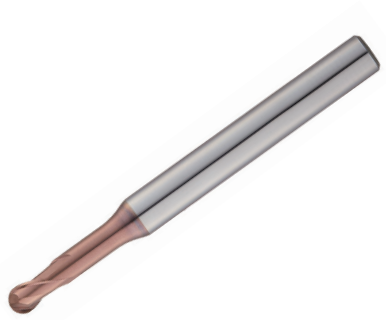
	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRB	71202006	2	4	2	6	50	1
	71202006S6	2	6	2	6	50	1
	71202008	2	4	2	8	50	1
	71202008S6	2	6	2	8	50	1
	71202010	2	4	2	10	50	1
	71202010S6	2	6	2	10	50	1
	71202012	2	4	2	12	50	1
	71202012S6	2	6	2	12	50	1
	71202014	2	4	2	14	50	1
	71202014S6	2	6	2	14	50	1
	71202016	2	4	2	16	50	1
	71202016S6	2	6	2	16	50	1
	71202018	2	4	2	18	55	1
	71202018S6	2	6	2	18	55	1
	71202020	2	4	2	20	55	1
	71202020S6	2	6	2	20	55	1
	71202022	2	4	2	22	60	1
	71202022S6	2	6	2	22	60	1
	71202026	2	4	2	26	60	1
	71202026S6	2	6	2	26	60	1
	71202030	2	4	2	30	70	1
	71202030S6	2	6	2	30	70	1
	71202035	2	4	2	35	70	1
	71202035S6	2	6	2	35	70	1
	71202040	2	4	2	40	80	1
	71202040S6	2	6	2	40	80	1
	71202045	2	4	2	45	90	1
	71202045S6	2	6	2	45	90	1
	71202050	2	4	2	50	100	1
	71202050S6	2	6	2	50	100	1
	71202060	2	4	2	60	110	1
	71202508	2.5	4	2.5	8	50	1.25
	71202510	2.5	4	2.5	10	50	1.25
	71202512	2.5	4	2.5	12	50	1.25
	71202516	2.5	4	2.5	16	50	1.25
	71202520	2.5	4	2.5	20	50	1.25
	71202522	2.5	4	2.5	22	60	1.25
	71202526	2.5	4	2.5	26	60	1.25
	71202530	2.5	4	2.5	30	70	1.25

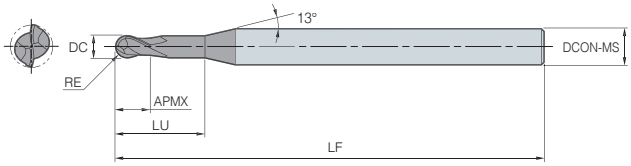
ESRB712

2날 리브 볼

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.008 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRB	71202535	2.5	4	2.5	35	70	1.25
	71202540	2.5	4	2.5	40	80	1.25
	71202545	2.5	4	2.5	45	90	1.25
	71202550	2.5	4	2.5	50	100	1.25
	71203006	3	6	3	6	50	1.5
	71203008	3	6	3	8	50	1.5
	71203010	3	6	3	10	50	1.5
	71203012	3	6	3	12	50	1.5
	71203014	3	6	3	14	60	1.5
	71203016	3	6	3	16	60	1.5
	71203018	3	6	3	18	60	1.5
	71203020	3	6	3	20	60	1.5
	71203022	3	6	3	22	65	1.5
	71203026	3	6	3	26	65	1.5
	71203030	3	6	3	30	70	1.5
	71203035	3	6	3	35	70	1.5
	71203040	3	6	3	40	80	1.5
	71203045	3	6	3	45	90	1.5
	71203050	3	6	3	50	100	1.5
	71203060	3	6	3	60	100	1.5
	71203510	3.5	6	3	10	50	1.75
	71203516	3.5	6	3	16	60	1.75
	71203520	3.5	6	3	20	60	1.75
	71203526	3.5	6	3	26	65	1.75
	71203530	3.5	6	3	30	70	1.75
	71204008	4	6	4	8	50	2
	71204010	4	6	4	10	50	2
	71204012	4	6	4	12	50	2
	71204014	4	6	4	14	60	2
	71204016	4	6	4	16	60	2
	71204018	4	6	4	18	60	2
	71204020	4	6	4	20	60	2
	71204022	4	6	4	22	65	2
	71204026	4	6	4	26	65	2

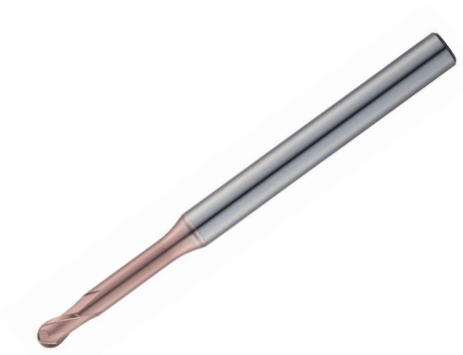
	형 번	DC	DCON-MS	APMX	LU	LF	RE
ESRB	71204030	4	6	4	30	70	2
	71204035	4	6	4	35	70	2
	71204040	4	6	4	40	80	2
	71204045	4	6	4	45	90	2
	71204050	4	6	4	50	100	2
	71204055	4	6	4	55	100	2
	71204060	4	6	4	60	100	2
	71205015	5	6	6	15	60	2.5
	71205020	5	6	6	20	60	2.5
	71205026	5	6	6	26	65	2.5
	71205030	5	6	6	30	70	2.5
	71205035	5	6	6	35	70	2.5
	71205040	5	6	6	40	80	2.5
	71205045	5	6	6	45	90	2.5
	71205050	5	6	6	50	100	2.5
	71205055	5	6	6	55	100	2.5
	71205060	5	6	6	60	100	2.5
	7120602090	6	6	12	20	90	3
	71206020	6	6	8	20	60	3
	7120603090	6	6	12	30	90	3
	71206030	6	6	8	30	60	3
	71208025100	8	8	14	25	100	4
	71208025	8	8	10	25	70	4
	71208035100	8	8	14	35	100	4
	71208035	8	8	10	35	70	4
	71210030100	10	10	18	30	100	5
	71210030	10	10	12	30	75	5
	71210040100	10	10	18	40	100	5
	71210040	10	10	12	40	75	5
	71212032110	12	12	22	32	110	6
	71212032	12	12	14	32	80	6
	71212045110	12	12	22	45	110	6
	71212045	12	12	14	45	80	6

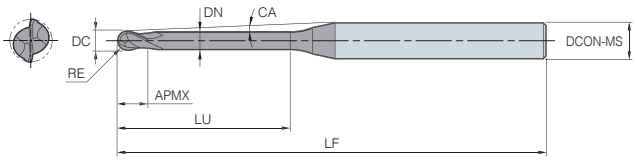
ESLNB20

2날 롱 넥 볼

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.008 (DC6 초과)

DC	공구직경공차
ALL	0.000 ~ -0.012





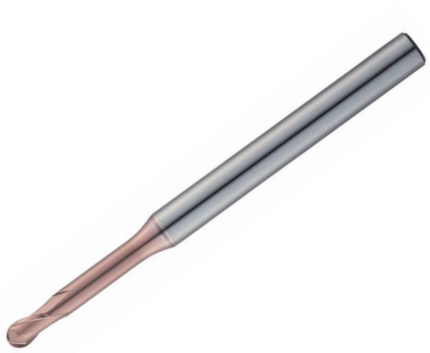


(mm)

형 번		DC	DCON-MS	APMX	LU	LF	DN	CA	RE	가공물 구배각별 유효길이				
										0.5°	1°	1.5°	2°	3°
ESLNB	2001-0.2	0.1	4	0.08	0.2	45	0.08	11.8	0.05	0.3	0.3	0.3	0.4	0.4
	2001-0.3	0.1	4	0.08	0.3	45	0.08	11.7	0.05	0.4	0.4	0.5	0.5	0.5
	2001-0.5	0.1	4	0.08	0.5	45	0.08	11.4	0.05	0.6	0.7	0.7	0.7	0.8
	2002-0.5	0.2	4	0.15	0.5	50	0.17	11.5	0.1	1.2	1.3	1.5	1.6	2
	2002-1	0.2	4	0.15	1	50	0.17	10.9	0.1	1.7	1.9	2.1	2.3	2.7
	2002-1.5	0.2	4	0.15	1.5	50	0.17	10.4	0.1	2.3	2.5	2.8	3	3.4
	2002-2	0.2	4	0.15	2	50	0.17	9.9	0.1	2.8	3.1	3.4	3.6	4.1
	2002-2.5	0.2	4	0.15	2.5	50	0.17	9.5	0.1	3.4	3.7	4	4.2	4.7
	2002-3.0	0.2	4	0.15	3	50	0.17	9.1	0.1	3.9	4.3	4.6	4.9	5.4
	2003-1	0.3	4	0.25	1	50	0.27	10.9	0.15	1.7	1.9	2.1	2.3	2.7
	2003-1.5	0.3	4	0.25	1.5	50	0.27	10.4	0.15	2.3	2.5	2.7	3	3.4
	2003-2	0.3	4	0.25	2	50	0.27	9.9	0.15	2.8	3.1	3.4	3.6	4
	2003-2.5	0.3	4	0.25	2.5	50	0.27	9.5	0.15	3.4	3.7	4	4.2	4.7
	2003-3	0.3	4	0.25	3	50	0.27	9.1	0.15	3.9	4.3	4.6	4.8	5.3
	2004-1	0.4	4	0.3	1	50	0.37	11	0.2	1.7	1.9	2.1	2.3	2.7
	2004-1.5	0.4	4	0.3	1.5	50	0.37	10.4	0.2	2.3	2.5	2.7	2.9	3.4
	2004-2	0.4	4	0.3	2	50	0.37	9.9	0.2	2.8	3.1	3.4	3.6	4
	2004-2.5	0.4	4	0.3	2.5	50	0.37	9.5	0.2	3.4	3.7	4	4.2	4.7
	2004-3	0.4	4	0.3	3	50	0.37	9.1	0.2	3.9	4.3	4.6	4.8	5.3
	2004-3.5	0.4	4	0.3	3.5	50	0.37	8.7	0.2	4.5	4.8	5.2	5.4	6
	2004-4	0.4	4	0.3	4	50	0.37	8.3	0.2	5	5.4	5.7	6	6.6
	2004-4.5	0.4	4	0.3	4.5	50	0.37	8	0.2	5.6	6	6.3	6.6	7.2
	2005-1	0.5	4	0.35	1	50	0.47	11	0.25	1.7	1.9	2.1	2.3	2.6
	2005-2	0.5	4	0.35	2	50	0.47	9.9	0.25	2.8	3.1	3.3	3.6	4
	2005-3	0.5	4	0.35	3	50	0.47	9	0.25	3.9	4.3	4.6	4.8	5.3
	2005-4	0.5	4	0.35	4	50	0.47	8.3	0.25	5	5.4	5.7	6	6.6
	2005-5	0.5	4	0.35	5	50	0.47	7.7	0.25	6.1	6.5	6.9	7.2	7.8
	2005-6	0.5	4	0.35	6	50	0.47	7.1	0.25	7.2	7.6	8	8.4	9
	2005-8	0.5	4	0.35	8	50	0.47	6.3	0.25	9.3	9.9	10.3	10.7	11.4
	2006-1	0.6	4	0.4	1	50	0.57	11	0.3	1.7	1.9	2.1	2.3	2.6
	2006-2	0.6	4	0.4	2	50	0.57	9.9	0.3	2.8	3.1	3.3	3.6	4
	2006-3	0.6	4	0.4	3	50	0.57	9	0.3	3.9	4.3	4.5	4.8	5.3
	2006-4	0.6	4	0.4	4	50	0.57	8.3	0.3	5	5.4	5.7	6	6.6
	2006-5	0.6	4	0.4	5	50	0.57	7.6	0.3	6.1	6.5	6.9	7.2	7.8
	2006-6	0.6	4	0.4	6	50	0.57	7.1	0.3	7.2	7.6	8	8.4	9
	2006-7	0.6	4	0.4	7	50	0.57	6.6	0.3	8.3	8.8	9.2	9.5	10.2

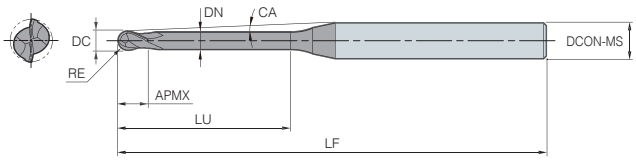
ESLNB20

2날 롱 넥 볼



CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.008 (DC6 초과)

DC	공구직경공차
ALL	0.000 ~ -0.012





(mm)

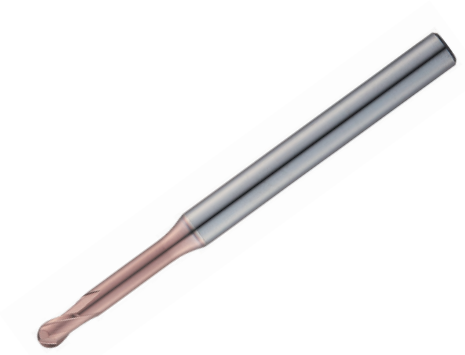
형 번		DC	DCON-MS	APMX	LU	LF	DN	CA	RE	가공물 구배각별 유효길이				
										0.5°	1°	1.5°	2°	3°
ESLNB	2006-8	0.6	4	0.4	8	50	0.57	6.2	0.3	9.3	9.9	10.3	10.7	11.4
	2006-9	0.6	4	0.4	9	50	0.57	5.8	0.3	10.4	10.9	11.4	11.8	12.5
	2006-10	0.6	4	0.4	10	50	0.57	5.5	0.3	11.4	12	12.5	12.9	13.7
	2006-12	0.6	4	0.4	12	50	0.57	5	0.3	13.6	14.2	14.7	15.2	16
	2008-2	0.8	4	0.5	2	50	0.77	9.9	0.4	2.8	3.1	3.3	3.5	4
	2008-4	0.8	4	0.5	4	50	0.77	8.2	0.4	5	5.4	5.7	6	6.5
	2008-5	0.8	4	0.5	5	50	0.77	7.5	0.4	6.1	6.5	6.9	7.2	7.8
	2008-6	0.8	4	0.5	6	50	0.77	7	0.4	7.2	7.6	8	8.4	9
	2008-8	0.8	4	0.5	8	50	0.77	6.1	0.4	9.3	9.8	10.3	10.7	11.3
	2008-10	0.8	4	0.5	10	50	0.77	5.4	0.4	11.4	12	12.5	12.9	13.7
	2010-2	1	4	0.8	2	50	0.96	9.9	0.5	2.9	3.1	3.3	3.5	4
	2010-3	1	4	0.8	3	50	0.96	8.9	0.5	4	4.3	4.5	4.8	5.3
	2010-4	1	4	0.8	4	50	0.96	8.1	0.5	5	5.4	5.7	6	6.5
	2010-5	1	4	0.8	5	50	0.96	7.4	0.5	6.1	6.5	6.9	7.2	7.8
	2010-6	1	4	0.8	6	50	0.96	6.8	0.5	7.2	7.7	8	8.4	9
	2010-7	1	4	0.8	7	50	0.96	6.3	0.5	8.3	8.8	9.2	9.5	10.2
	2010-8	1	4	0.8	8	50	0.96	5.9	0.5	9.3	9.9	10.3	10.7	11.3
	2010-9	1	4	0.8	9	50	0.96	5.5	0.5	10.4	11	11.4	11.8	12.5
	2010-10	1	4	0.8	10	50	0.96	5.2	0.5	11.5	12	12.5	12.9	13.7
	2010-12	1	4	0.8	12	55	0.96	4.6	0.5	13.6	14.2	14.7	15.2	15.9
	2010-14	1	4	0.8	14	55	0.96	4.2	0.5	15.7	16.4	16.9	17.4	18.5
	2010-16	1	4	0.8	16	55	0.96	3.8	0.5	17.8	18.5	19.1	19.6	21.2
	2010-18	1	4	0.8	18	60	0.96	3.5	0.5	19.9	20.7	21.3	21.8	23.8
	2010-20	1	4	0.8	20	60	0.96	3.3	0.5	22	22.8	23.4	24	26.5
	2012-4	1.2	4	1.1	4	50	1.15	7.9	0.6	5.1	5.4	5.7	6	6.5
	2012-6	1.2	4	1.1	6	50	1.15	6.6	0.6	7.2	7.7	8	8.4	9
	2012-8	1.2	4	1.1	8	50	1.15	5.7	0.6	9.4	9.9	10.3	10.7	11.3
	2012-10	1.2	4	1.1	10	50	1.15	5	0.6	11.5	12.1	12.5	12.9	13.7
	2012-12	1.2	4	1.1	12	55	1.15	4.5	0.6	13.6	14.2	14.7	15.2	15.9
	2014-8	1.4	4	1.3	8	50	1.34	5.5	0.7	9.4	9.9	10.3	10.7	11.3
	2014-12	1.4	4	1.3	12	55	1.34	4.3	0.7	13.6	14.2	14.7	15.2	15.9
	2014-16	1.4	4	1.3	16	55	1.34	3.5	0.7	17.8	18.5	19.1	19.6	21.2
	2015-4	1.5	4	1.35	4	50	1.44	7.7	0.75	5.1	5.4	5.7	6	6.5
	2015-6	1.5	4	1.35	6	50	1.44	6.4	0.75	7.3	7.7	8	8.4	9
	2015-8	1.5	4	1.35	8	50	1.44	5.4	0.75	9.4	9.9	10.3	10.7	11.3
	2015-10	1.5	4	1.35	10	50	1.44	4.7	0.75	11.5	12.1	12.5	12.9	13.7

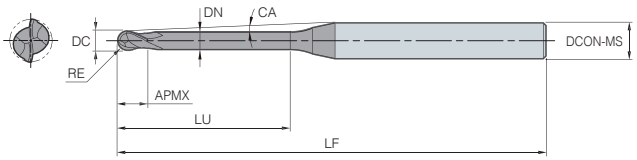
ESLNB20

2날 롱 넥 볼

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.008 (DC6 초과)

DC	공구직경공차
ALL	0.000 ~ -0.012





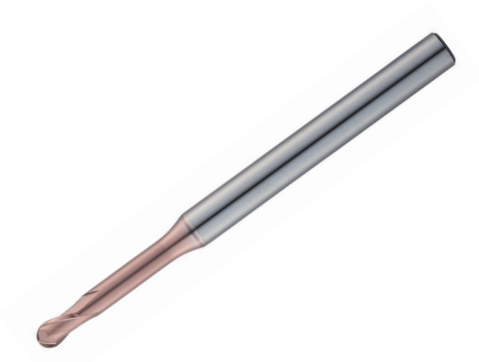


(mm)

형 번		DC	DCON-MS	APMX	LU	LF	DN	CA	RE	가공물 구배각별 유효길이				
										0.5°	1°	1.5°	2°	3°
ESLNB	2015-12	1.5	4	1.35	12	55	1.44	4.2	0.75	13.6	14.2	14.7	15.2	15.9
	2015-14	1.5	4	1.35	14	55	1.44	3.8	0.75	15.7	16.4	16.9	17.4	18.5
	2015-16	1.5	4	1.35	16	55	1.44	3.4	0.75	17.8	18.5	19.1	19.6	21.1
	2015-20	1.5	4	1.35	20	60	1.44	2.9	0.75	22	22.8	23.4	24	-
	2016-8	1.6	4	1.4	8	50	1.54	5.3	0.8	9.4	9.9	10.3	10.7	11.3
	2016-10	1.6	4	1.4	10	55	1.54	4.6	0.8	11.5	12.1	12.5	12.9	13.7
	2016-12	1.6	4	1.4	12	55	1.54	4.1	0.8	13.6	14.2	14.7	15.2	15.9
	2016-16	1.6	4	1.4	16	55	1.54	3.3	0.8	17.8	18.5	19.1	19.6	21.1
	2016-20	1.6	4	1.4	20	60	1.54	2.8	0.8	22	22.8	23.4	24	-
	2018-8	1.8	4	1.6	8	50	1.73	5.1	0.9	9.4	9.9	10.3	10.7	11.3
	2018-12	1.8	4	1.6	12	55	1.73	3.9	0.9	13.7	14.3	14.7	15.2	15.9
	2018-16	1.8	4	1.6	16	55	1.73	3.1	0.9	17.9	18.6	19.1	19.6	21.1
	2018-20	1.8	4	1.6	20	60	1.73	2.6	0.9	22	22.8	23.4	24	-
	2020-3	2	4	1.7	3	50	1.92	8.3	1	4.1	4.4	4.6	4.8	5.2
	2020-4	2	4	3	4	50	1.92	7.3	1	5.2	5.5	5.8	6	6.5
	2020-6	2	4	3	6	50	1.92	5.8	1	7.3	7.7	8.1	8.4	9
	2020-8	2	4	3	8	50	1.92	4.9	1	9.5	9.9	10.3	10.7	11.3
	2020-10	2	4	3	10	50	1.92	4.2	1	11.6	12.1	12.6	12.9	13.6
	2020-12	2	4	3	12	55	1.92	3.7	1	13.7	14.3	14.8	15.2	15.9
	2020-14	2	4	3	14	55	1.92	3.2	1	15.8	16.4	16.9	17.4	18.5
	2020-16	2	4	3	16	55	1.92	2.9	1	17.9	18.6	19.1	19.6	-
	2020-18	2	4	3	18	60	1.92	2.7	1	20	20.7	21.3	21.8	-
	2020-20	2	4	3	20	60	1.92	2.4	1	22.1	22.8	23.4	24	-
	2020-22	2	4	3	22	60	1.92	2.3	1	24.1	24.9	25.6	26.3	-
	2020-25	2	4	3	25	65	1.92	2	1	27.3	28.1	28.8	-	-
	2020-30	2	4	3	30	70	1.92	1.7	1	32.4	33.4	34.2	-	-
	2020-35	2	4	3	35	75	1.92	1.5	1	37.6	38.6	-	-	-
	2020-40	2	4	3	40	80	1.92	1.4	1	42.8	43.8	-	-	-
	2025-10	2.5	4	4	10	50	2.4	3.4	1.25	11.6	12.1	12.6	13	13.6
	2025-16	2.5	4	4	16	55	2.4	2.3	1.25	17.9	18.6	19.1	19.6	-
	2025-20	2.5	4	4	20	60	2.4	1.9	1.25	22.1	22.8	23.5	-	-
	2030-8	3	6	4	8	55	2.88	6.2	1.5	9.6	10	10.4	10.7	11.3
	2030-10	3	6	4	10	55	2.88	5.5	1.5	11.7	12.2	12.6	13	13.6
	2030-13	3	6	4	13	60	2.88	4.6	1.5	14.8	15.4	15.9	16.3	17.1
	2030-16	3	6	4	16	60	2.88	4	1.5	18	18.6	19.1	19.6	21.1
	2030-18	3	6	4	18	60	2.88	3.6	1.5	20	20.7	21.3	21.8	23.7

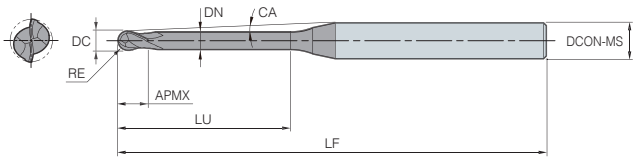
ESLNB20

2날 롱 넥 볼



CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.008 (DC6 초과)

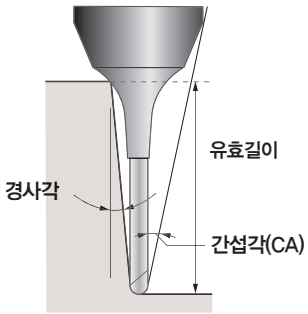
DC	공구직경공차
ALL	0.000 ~ -0.012

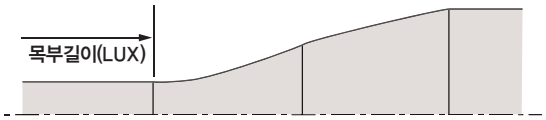




(mm)

형 번		DC	DCON-MS	APMX	LU	LF	DN	CA	RE	가공물 구배각별 유효길이				
										0.5°	1°	1.5°	2°	3°
ESLNB	2030-20	3	6	4	20	65	2.88	3.4	1.5	22.1	22.9	23.5	24	26.4
	2030-25	3	6	4	25	70	2.88	2.8	1.5	27.3	28.2	28.8	29.9	-
	2030-30	3	6	4	30	75	2.88	2.5	1.5	32.5	33.4	34.3	35.9	-
	2030-35	3	6	4	35	80	2.88	2.2	1.5	37.7	38.7	40	41.9	-
	2040-10	4	6	5	10	55	3.9	4.5	2	11.6	12.1	12.5	12.9	13.5
	2040-13	4	6	5	13	60	3.9	3.6	2	14.7	15.3	15.8	16.2	17
	2040-16	4	6	5	16	60	3.9	3.1	2	17.9	18.5	19.1	19.5	20.9
	2040-20	4	6	5	20	65	3.9	2.5	2	22.1	22.8	23.4	23.9	-
	2040-25	4	6	5	25	70	3.9	2.1	2	27.3	28.1	28.8	29.8	-
	2040-30	4	6	5	30	75	3.9	1.8	2	32.4	33.4	34.2	-	-
	2040-35	4	6	5	35	80	3.9	1.6	2	37.6	38.6	39.9	-	-
	2040-40	4	6	5	40	80	3.9	1.4	2	42.8	43.8	-	-	-
	2040-45	4	6	5	45	90	3.9	1.2	2	47.9	49.1	-	-	-
	2040-50	4	6	5	50	100	3.9	1.1	2	53.1	54.5	-	-	-
	2050-20	5	6	6	20	65	4.9	1.4	2.5	22	22.8	-	-	-
	2050-25	5	6	6	25	70	4.9	1.2	2.5	27.2	28.1	-	-	-
	2050-30	5	6	6	30	75	4.9	1	2.5	32.4	-	-	-	-
	2050-35	5	6	6	35	80	4.9	0.8	2.5	42.8	-	-	-	-
	2050-40	5	6	6	40	90	4.9	0.7	2.5	42.8	-	-	-	-





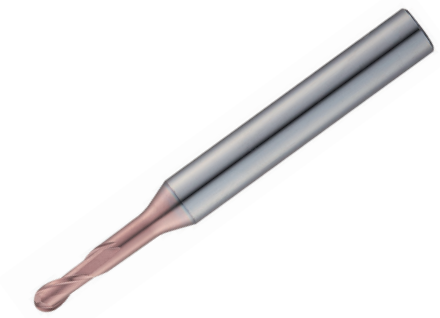
※ 표시된 유효길이는 공작물과의 간섭을 막기 위한 기본 값입니다.
가공환경의 적절한 제어가 필요합니다.

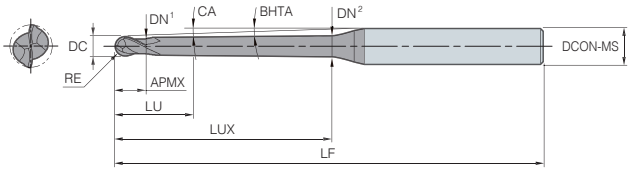
ESTNB20

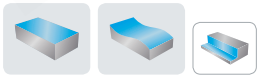
2날 테이퍼 넥 볼

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø10	0.000 ~ -0.015





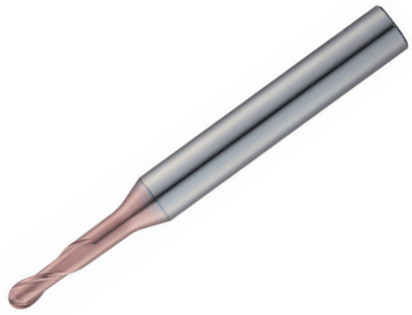


(mm)

형 번		DC	DCON-MS	APMX	LU	LUX	LF	DN1	DN2	RE	BHTA	CA	가공물 구배각별 유효길이				
													0.5°	1°	1.5°	2°	3°
ESTNB	2002-1-04	0.2	4	0.15	1.35	1	50	0.17	0.18	0.1	0.4	10.9	1.5	1.7	1.8	2	2.3
	2002-1.5-04	0.2	4	0.15	1.77	1.5	50	0.17	0.19	0.1	0.4	10.4	2	2.2	2.4	2.6	2.9
	2002-2-09	0.2	4	0.15	1.1	2	50	0.17	0.23	0.1	0.9	10.1	-	2.8	3.1	3.4	3.9
	2002-2.5-09	0.2	4	0.15	1.1	2.5	50	0.17	0.24	0.1	0.9	9.6	-	3.3	3.7	4	4.5
	2003-2-04	0.3	4	0.25	2.19	2	50	0.28	0.29	0.15	0.4	10	2.5	2.8	3	3.2	3.5
	2003-3-09	0.3	4	0.25	1.2	3	50	0.28	0.36	0.15	0.9	9.3	-	3.8	4.2	4.5	5.1
	2003-4-09	0.3	4	0.25	1.2	4	50	0.28	0.39	0.15	0.9	8.6	-	4.8	5.3	5.7	6.3
	2004-2-04	0.4	4	0.3	2.2	2	50	0.37	0.39	0.2	0.4	10	2.5	2.8	3	3.2	3.5
	2004-3-04	0.4	4	0.3	2.44	3	50	0.37	0.41	0.2	0.4	9.1	3.6	3.9	4.1	4.4	4.8
	2004-4-04	0.4	4	0.3	2.44	4	50	0.37	0.42	0.2	0.4	8.4	4.7	5.2	5.6	5.9	6.5
	2004-4-09	0.4	4	0.3	1.25	4	50	0.37	0.49	0.2	0.9	8.5	-	4.8	5.3	5.7	6.3
	2004-5-04	0.4	4	0.3	2.44	5	50	0.37	0.44	0.2	0.4	7.8	5.7	6.3	6.7	7.1	7.7
	2004-5-09	0.4	4	0.3	1.25	5	50	0.37	0.52	0.2	0.9	7.9	-	5.9	6.4	6.8	7.5
	2005-4-04	0.5	4	0.35	2.49	4	50	0.47	0.52	0.25	0.4	8.4	4.6	5	5.3	5.5	5.9
	2005-8-09	0.5	4	0.35	1.3	8	50	0.47	0.71	0.25	0.9	6.5	-	8.9	9.6	10.1	10.9
	2005-12-09	0.5	4	0.35	1.3	12	50	0.47	0.84	0.25	0.9	5.3	-	13	13.9	14.5	15.4
	20054-2-04	0.54	4	0.37	1.8	2	50	0.52	0.54	0.27	0.4	10	2.3	2.5	2.7	2.8	3
	20054-4-04	0.54	4	0.37	1.8	4	50	0.52	0.57	0.27	0.4	8.4	4.5	4.9	5.2	5.5	5.9
	20054-5-04	0.54	4	0.37	1.8	5	50	0.52	0.59	0.27	0.4	7.8	5.5	6	6.3	6.6	7.1
	20054-6-04	0.54	4	0.37	1.8	6	50	0.52	0.6	0.27	0.4	7.2	6.7	7.3	7.8	8.2	8.8
	20054-6.5-04	0.54	4	0.37	1.8	6.5	50	0.52	0.61	0.27	0.4	7	7.2	7.9	8.3	8.7	9.4
	20054-7-04	0.54	4	0.37	1.8	7	50	0.52	0.61	0.27	0.4	6.8	7.7	8.4	8.9	9.3	10
	2006-2-04	0.6	4	0.4	2.17	2	50	0.57	0.59	0.3	0.4	10	2.4	2.5	2.7	2.8	3
	2006-4-04	0.6	4	0.4	2.54	4	50	0.57	0.62	0.3	0.4	8.4	4.6	5	5.2	5.5	5.9
	2006-6-04	0.6	4	0.4	2.54	6	50	0.57	0.65	0.3	0.4	7.2	6.8	7.4	7.8	8.2	8.8
	2006-6-09	0.6	4	0.4	1.35	6	50	0.57	0.75	0.3	0.9	7.3	-	6.9	7.5	7.9	8.6
	2006-8-09	0.6	4	0.4	1.35	8	50	0.57	0.81	0.3	0.9	6.4	-	8.9	9.6	10.1	10.9
	2006-10-04	0.6	4	0.4	2.54	10	50	0.57	0.7	0.3	0.4	5.6	10.8	11.7	12.2	12.7	13.5
	2006-10-09	0.6	4	0.4	1.35	10	50	0.57	0.87	0.3	0.9	5.7	-	11	11.8	12.3	13.2
	2006-12-09	0.6	4	0.4	1.35	12	55	0.57	0.93	0.3	0.9	5.2	-	13	13.9	14.5	15.4
	2006-15-04	0.6	4	0.4	2.54	15	55	0.57	0.77	0.3	0.4	4.4	15.9	17	17.6	18.2	19.2
	2006-15-09	0.6	4	0.4	1.35	15	55	0.57	1.03	0.3	0.9	4.5	-	16.1	17.1	17.7	18.8
	2008-4-04	0.8	4	0.5	2.64	4	50	0.77	0.82	0.4	0.4	8.3	4.6	4.9	5.2	5.5	5.9
	2008-6-04	0.8	4	0.5	2.64	6	50	0.77	0.85	0.4	0.4	7.1	6.6	7.1	7.5	7.7	8.3
	2008-8-09	0.8	4	0.5	1.45	8	50	0.77	1.01	0.4	0.9	6.3	-	8.9	9.6	10.1	10.9
	2008-12-09	0.8	4	0.5	1.45	12	55	0.77	1.13	0.4	0.9	5	-	13	13.9	14.5	15.4

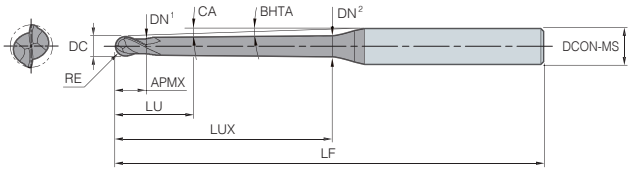
ESTNB20

2날 테이퍼 넥 볼



CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø10	0.000 ~ -0.015





(mm)

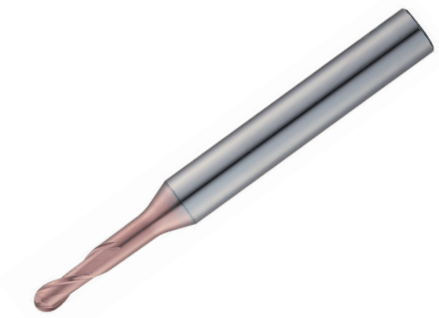
형 번		DC	DCON-MS	APMX	LU	LUX	LF	DN1	DN2	RE	BHTA	CA	가공물 구배각별 유효길이				
													0.5°	1°	1.5°	2°	3°
ESTNB	2008-16-09	0.8	4	0.5	1.45	16	55	0.77	1.26	0.4	0.9	4.2	-	17.1	18.1	18.8	19.9
	2009-4-04	0.9	4	0.6	3.46	4	50	0.86	0.91	0.45	0.4	8.2	4.5	4.7	4.9	5.1	5.4
	2009-8-04	0.9	4	0.6	3.46	8	55	0.86	0.96	0.45	0.4	6.1	8.7	9.3	9.7	10	10.6
	2009-12-04	0.9	4	0.6	3.46	12	55	0.86	1.02	0.45	0.4	4.8	12.9	13.8	14.4	14.9	15.7
	2009-16-04	0.9	4	0.6	3.46	16	60	0.86	1.08	0.45	0.4	4	17	18	18.7	19.3	20.5
	2009-18-04	0.9	4	0.6	3.46	18	65	0.86	1.1	0.45	0.4	3.7	19.1	20.1	20.9	21.5	23.1
	2009-20-04	0.9	4	0.6	3.46	20	65	0.86	1.13	0.45	0.4	3.4	21.1	22.2	23	23.6	25.6
	2009-22-04	0.9	4	0.6	3.46	22	65	0.86	1.16	0.45	0.4	3.2	23.1	24.3	25.1	25.8	28.2
	2009-24-04	0.9	4	0.6	3.46	24	70	0.86	1.19	0.45	0.4	3	25.2	26.4	27.2	27.9	-
	2010-6-04	1	6	0.8	5.09	6	50	0.94	1.01	0.5	0.4	8.3	6.8	7.2	7.5	7.8	8.3
	2010-8-04	1	6	0.8	5.09	8	55	0.94	1.04	0.5	0.4	7.5	8.8	9.3	9.7	10	10.6
	2010-10-04	1	6	0.8	5.09	10	55	0.94	1.07	0.5	0.4	6.8	11	11.7	12.3	12.7	13.5
	2010-10-09	1	6	0.8	2.7	10	55	0.94	1.23	0.5	0.9	6.9	-	11.2	11.9	12.4	13.2
	2010-15-09	1	6	0.8	2.7	15	60	0.94	1.39	0.5	0.9	5.7	-	16.2	17.1	17.8	18.8
	2010-20-04	1	6	0.8	5.09	20	65	0.94	1.21	0.5	0.4	4.7	21.2	22.3	23	23.6	25.7
	2010-20-09	1	6	0.8	2.7	20	65	0.94	1.54	0.5	0.4	4.8	-	21.3	22.4	23.1	24.6
	2010-25-09	1	6	0.8	2.7	25	70	0.94	1.7	0.5	0.4	4.2	-	26.4	27.6	28.4	30.8
	2010-30-04	1	6	0.8	5.09	30	75	0.94	1.35	0.5	0.4	3.6	31.3	32.7	33.6	34.8	38.5
	2010-30-09	1	6	0.8	2.7	30	75	0.94	1.86	0.5	0.9	3.7	-	31.4	32.8	33.7	36.9
	2010-35-09	1	6	0.8	2.7	35	80	0.94	2.02	0.5	0.9	3.3	-	36.5	38	39	43.1
	2010-40-09	1	6	0.8	2.7	40	85	0.94	2.17	0.5	0.9	3	-	41.6	43.2	44.4	-
	2010-50-09	1	6	0.8	2.7	50	95	0.94	2.49	0.5	0.9	2.5	-	51.7	53.5	55.5	-
	2010-60-09	1	6	0.8	2.7	60	105	0.94	2.8	0.5	0.9	2.2	-	61.8	63.8	66.6	-
	2010-70-09	1	6	0.8	2.7	70	115	0.94	3.11	0.5	0.9	1.9	-	71.9	74	-	-
	2015-8-04	1.5	6	1.35	7.07	8	55	1.42	1.51	0.75	0.4	7.3	8.9	9.4	9.7	10	10.6
	2015-10-04	1.5	6	1.35	7.07	10	55	1.42	1.54	0.75	0.4	6.6	10.9	11.5	11.9	12.2	12.9
	2015-12-04	1.5	6	1.35	7.07	12	55	1.42	1.57	0.75	0.4	6	13	13.6	14	14.4	15.4
	2015-15-09	1.5	6	1.35	3.89	15	60	1.42	1.85	0.75	0.9	5.4	-	16.4	17.2	17.8	18.8
	2015-20-09	1.5	6	1.35	3.89	20	65	1.42	2.01	0.75	0.9	4.5	-	21.4	22.4	23.2	24.7
	2015-30-09	1.5	6	1.35	3.89	30	75	1.42	2.32	0.75	0.9	3.4	-	31.5	32.9	33.7	37
	2018-4-04	1.8	6	1.6	4.38	4	50	1.73	1.76	0.9	0.4	9.2	4.6	4.8	4.9	5.1	5.4
	2018-8-04	1.8	6	1.6	6.61	8	50	1.73	1.82	0.9	0.4	7.1	8.6	9	9.2	9.4	10.2
	2018-12-04	1.8	6	1.6	6.61	12	55	1.73	1.88	0.9	0.4	5.8	12.9	13.5	14	14.4	15.4
	2018-16-04	1.8	6	1.6	6.61	16	60	1.73	1.93	0.9	0.4	4.9	17	17.7	18.3	18.7	20.5
	2018-20-04	1.8	6	1.6	6.61	20	65	1.73	1.99	0.9	0.4	4.3	21.2	22.3	23	23.6	25.6
	2018-24-04	1.8	6	1.6	6.61	24	65	1.73	2.04	0.9	0.4	3.8	25.3	26.5	27.3	27.9	30.8

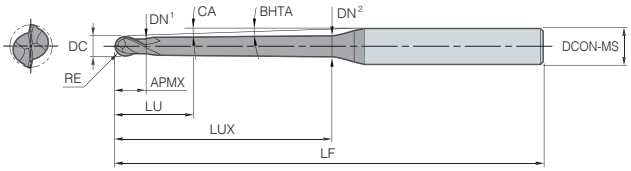
ESTNB20

2날 테이퍼 넥 볼

CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø10	0.000 ~ -0.015





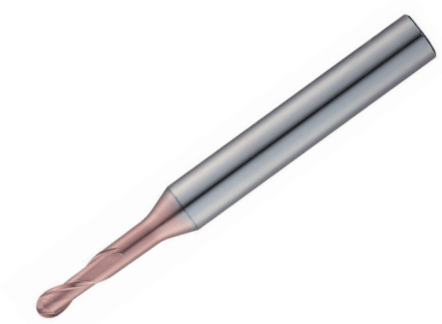


(mm)

형 번		DC	DCON-MS	APMX	LU	LUX	LF	DN1	DN2	RE	BHTA	CA	가공물 구배각별 유효길이				
													0.5°	1°	1.5°	2°	3°
ESTNB	2018-28-04	1.8	6	1.6	6.61	28	70	1.73	2.1	0.9	0.4	3.4	29.4	30.6	31.5	32.4	35.9
	2018-32-04	1.8	6	1.6	6.61	32	70	1.73	2.15	0.9	0.4	3	33.4	34.8	35.7	37.1	-
	2018-36-04	1.8	6	1.6	6.61	36	75	1.73	2.21	0.9	0.4	2.8	37.5	38.9	39.9	41.7	-
	2018-38-04	1.8	6	1.6	6.61	38	80	1.73	2.24	0.9	0.4	2.7	39.5	41	42	44	-
	2018-40-04	1.8	6	1.6	6.61	40	80	1.73	2.27	0.9	0.4	2.6	41.5	43.1	44.2	46.3	-
	2020-8-04	2	6	1.7	7.42	8	50	1.92	2.01	1	0.4	7	8.7	9	9.2	9.5	10.2
	2020-12-04	2	6	1.7	7.42	12	55	1.92	2.06	1	0.4	5.7	13	13.6	14	14.4	15.4
	2020-16-04	2	6	1.7	7.42	16	60	1.92	2.12	1	0.4	4.8	17	17.7	18.3	18.7	20.5
	2020-20-04	2	6	1.7	7.42	20	65	1.92	2.18	1	0.4	4.1	21.3	22.3	23	23.6	25.6
	2020-20-09	2	6	1.7	4.24	20	65	1.92	2.5	1	0.9	4.2	-	21.4	22.4	23.2	24.6
	2020-25-09	2	6	1.7	4.24	25	65	1.92	2.65	1	0.9	3.6	-	26.5	27.7	28.5	30.8
	2020-30-04	2	6	1.7	7.42	30	70	1.92	2.32	1	0.4	3.1	31.4	32.7	33.6	34.8	38.5
	2020-30-09	2	6	1.7	4.24	30	70	1.92	2.81	1	0.9	3.2	-	31.6	32.9	33.7	36.9
	2020-35-09	2	6	1.7	4.24	35	75	1.92	2.97	1	0.9	2.8	-	36.6	38	39	-
	2020-40-04	2	6	1.7	7.42	40	80	1.92	2.46	1	0.4	2.5	41.5	43.1	44.2	46.3	-
	2020-40-09	2	6	1.7	4.24	40	80	1.92	3.12	1	0.9	2.6	-	41.7	43.2	44.5	-
	2020-50-09	2	6	1.7	4.24	50	90	1.92	3.44	1	0.9	2.1	-	51.5	53.5	55.5	-
	2020-60-09	2	6	1.7	4.24	60	100	1.92	3.75	1	0.9	1.8	-	61.9	63.8	-	-
	2020-70-09	2	6	1.7	4.24	70	110	1.92	4.07	1	0.9	1.8	-	72	74.1	-	-
	2030-8-04	3	6	2.5	8.5	8	50	2.86	2.94	1.5	0.4	6.3	8.8	9.1	9.3	9.5	10.3
	2030-16-04	3	6	2.5	12.52	16	55	2.86	3.05	1.5	0.4	4.1	17.2	17.8	18.3	18.7	20.6
	2030-20-04	3	6	2.5	12.52	20	60	2.86	3.1	1.5	0.4	3.4	21.2	22	22.6	23.3	25.7
	2030-30-04	3	6	2.5	12.52	30	70	2.86	3.24	1.5	0.4	2.5	31.6	32.8	33.7	34.9	-
	2030-30-09	3	6	2.5	6.95	30	70	2.86	3.72	1.5	0.9	2.6	-	31.8	33	33.8	-
	2030-40-04	3	6	2.5	12.52	40	80	2.86	3.38	1.5	0.4	2	41.7	43.2	44.3	-	-
	2030-40-09	3	6	2.5	6.95	40	80	2.86	4.04	1.5	0.9	2	-	41.9	43.3	-	-
	2030-50-09	3	6	2.5	6.95	50	90	2.86	4.35	1.5	0.9	1.7	-	52	53.6	-	-
	2030-60-09	3	6	2.5	6.95	60	100	2.86	4.67	1.5	0.9	1.4	-	62.1	-	-	-
	2030-70-09	3	6	2.5	6.95	70	110	2.86	4.98	1.5	0.9	1.2	-	72.1	-	-	-
	2040-20-10	4	8	8	12.01	20	70	3.86	4.28	2	1	5	20.5	21.6	22.3	22.8	23.5
	2040-30-10	4	8	8	12.01	30	80	3.86	4.63	2	1	3.51	22	31.6	32.5	33.2	34.16
	2040-40-10	4	8	8	12.01	40	90	3.86	4.98	2	1	2.7	22	42	43.4	44.3	-
	2040-50-10	4	8	8	12.01	50	100	3.86	5.33	2	1	2.2	22	52	53.6	54.7	-
	2040-60-10	4	8	8	12.01	60	110	3.86	5.68	2	1	1.9	22	62	63.8	-	-
	2050-30-10	5	8	10	14.01	30	80	4.86	5.56	2.5	1	2.8	25.5	31.7	32.6	33.2	-
	2050-40-10	5	8	10	14.01	40	90	4.86	5.91	2.5	1	2.1	25.5	41.7	42.8	43.5	-

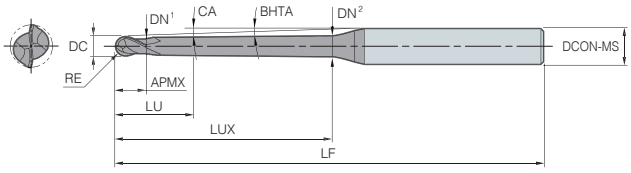
ESTNB20

2날 테이퍼 넥 볼



CARBIDE | 2 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

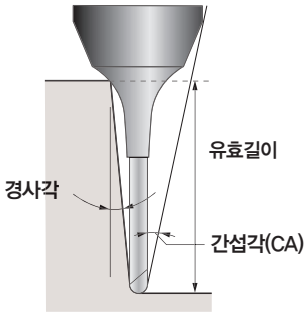
DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø10	0.000 ~ -0.015

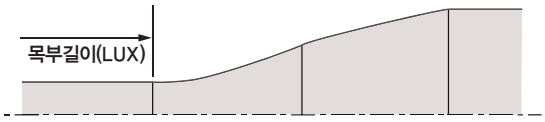




(mm)

형 번		DC	DCON-MS	APMX	LU	LUX	LF	DN1	DN2	RE	BHTA	CA	가공물 구배각별 유효길이				
													0.5°	1°	1.5°	2°	3°
ESTNB	2050-60-10	5	8	10	14.01	60	110	4.86	6.61	2.5	1	1.5	25.5	62.1	-	-	-
	2060-30-10	6	8	12	16.01	30	80	5.86	6.49	3	1	1.9	29	31.8	32.6	-	-
	2060-40-10	6	8	12	16.01	40	90	5.86	6.84	3	1	1.5	29	41.8	-	-	-
	2060-50-10	6	8	12	16.01	50	100	5.86	7.19	3	1	1.2	29	51.8	-	-	-
	2060-60-10	6	10	12	16.01	60	110	5.86	7.54	3	1	1.9	29	62.2	63.9	-	-
	2060-70-10	6	10	12	16.01	70	120	5.86	7.89	3	1	1.7	29	72.2	74.1	-	-
	2060-80-10	6	10	12	16.01	80	130	5.86	8.23	3	1	1.5	29	82.2	-	-	-
	2080-50-10	8	10	14	18.01	50	110	7.86	9.12	4	1	1.2	32	51.9	-	-	-
	2080-60-10	8	10	14	18.01	60	120	7.86	9.47	4	1	1	32	-	-	-	-
	2080-70-10	8	10	14	18.01	70	130	7.86	9.82	4	1	0.9	32	-	-	-	-
	2080-80-10	8	12	14	18.01	80	140	7.86	10.16	4	1	1.5	32	82.3	-	-	-
	2100-60-10	10	12	18	22.01	60	130	9.86	11.33	5	1	1.1	39	62.1	-	-	-
	2100-75-10	10	12	18	22.01	75	140	9.86	11.85	5	1	0.9	39	-	-	-	-





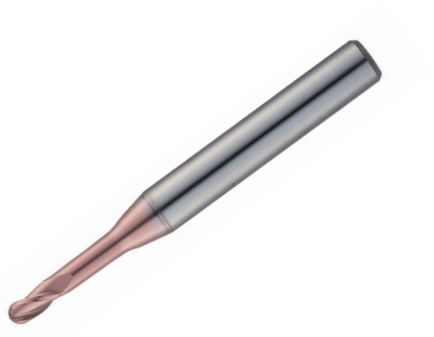
※ 표시된 유효길이는 공작물과의 간섭을 막기 위한 기본 값입니다.
가공환경의 적절한 제어가 필요합니다.

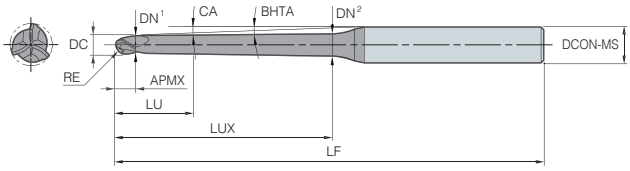
ESTNB30

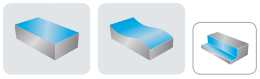
3날 테이퍼 넥 볼

CARBIDE | 3 | H·A 30° | 재종 PC305H | h5 shank | RE공차 ±0.005

DC	공구직경공차
ALL	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LU	LUX	LF	DN1	DN2	RE	BTHA	CA	가공물 구배각별 유효길이				
													0.5°	1°	1.5°	2°	3°
ESTNB	3020-8-04	2	6	1.7	7.42	8	50	1.92	2.01	1	0.4	7	8.7	9	9.2	9.5	10.2
	3020-12-04	2	6	1.7	7.42	12	55	1.92	2.06	1	0.4	5.7	13	13.6	14	14.4	15.4
	3020-16-04	2	6	1.7	7.42	16	60	1.92	2.12	1	0.4	4.8	17	17.7	18.3	18.7	20.5
	3020-20-04	2	6	1.7	7.42	20	65	1.92	2.18	1	0.4	4.1	21.3	22.3	23	23.6	25.6
	3020-20-09	2	6	1.7	4.24	20	65	1.92	2.5	1	0.9	4.2	-	21.4	22.4	23.2	24.6
	3020-25-09	2	6	1.7	4.24	25	65	1.92	2.65	1	0.9	3.6	-	26.5	27.7	28.5	30.8
	3020-30-04	2	6	1.7	7.42	30	70	1.92	2.32	1	0.4	3.1	31.4	32.7	33.6	34.8	38.5
	3020-30-09	2	6	1.7	4.24	30	70	1.92	2.81	1	0.9	3.2	-	31.6	32.9	33.7	36.9
	3020-35-09	2	6	1.7	4.24	35	75	1.92	2.97	1	0.9	2.8	-	36.6	38	39	-
	3020-40-04	2	6	1.7	7.42	40	80	1.92	2.46	1	0.4	2.5	41.5	43.1	44.2	46.3	-
	3020-40-09	2	6	1.7	4.24	40	80	1.92	3.12	1	0.9	2.6	-	41.7	43.2	44.5	-
	3020-50-09	2	6	1.7	4.24	50	90	1.92	3.44	1	0.9	2.1	-	51.8	53.5	55.5	-
	3020-60-09	2	6	1.7	4.24	60	100	1.92	3.75	1	0.9	1.8	-	61.9	63.8	-	-
	3020-70-09	2	6	1.7	4.24	70	110	1.92	4.07	1	0.9	1.6	-	72	74.1	-	-
	3030-8-04	3	6	2.5	8.5	8	50	2.86	2.94	1.5	0.4	6.3	8.8	9.1	9.3	9.5	10.3
	3030-16-04	3	6	2.5	12.52	16	55	2.86	3.05	1.5	0.4	4.1	17.2	17.8	18.3	18.7	20.6
	3030-20-04	3	6	2.5	12.52	20	60	2.86	3.1	1.5	0.4	3.4	21.2	22	22.6	23.3	25.7
	3030-30-04	3	6	2.5	12.52	30	70	2.86	3.24	1.5	0.4	2.5	31.6	32.8	33.7	34.9	-
	3030-30-09	3	6	2.5	6.95	30	70	2.86	3.72	1.5	0.9	2.6	-	31.8	33	33.8	-
	3030-40-04	3	6	2.5	12.52	40	80	2.86	3.38	1.5	0.4	2	41.7	43.2	44.3	-	-
	3030-40-09	3	6	2.5	6.95	40	80	2.86	4.04	1.5	0.9	2	-	41.9	43.3	-	-
	3030-50-09	3	6	2.5	6.95	50	90	2.86	4.35	1.5	0.9	1.7	-	52	53.6	-	-
	3030-60-09	3	6	2.5	6.95	60	100	2.86	4.67	1.5	0.9	1.4	-	62.1	-	-	-
	3030-70-09	3	6	2.5	6.95	70	110	2.86	4.98	1.5	0.9	1.2	-	72.1	-	-	-
	3040-20-10	4	8	8	12.01	20	70	3.86	4.28	2	1	5	20.5	21.6	22.3	22.8	23.5
	3040-30-10	4	8	8	12.01	30	80	3.86	4.63	2	1	3.6	22	31.6	32.5	33.2	34.1
	3040-40-10	4	8	8	12.01	40	90	3.86	4.98	2	1	2.7	22	42	43.4	44.3	-
	3040-50-10	4	8	8	12.01	50	100	3.86	5.33	2	1	2.2	22	52	53.6	54.7	-
	3040-60-10	4	8	8	12.01	60	110	3.86	5.68	2	1	1.9	22	62	63.8	-	-
	3050-30-10	5	8	10	14.01	30	80	4.86	5.56	2.5	1	2.8	25.5	31.7	32.6	33.2	-
	3050-40-10	5	8	10	14.01	40	90	4.86	5.91	2.5	1	2.1	25.5	41.7	42.8	43.5	-
	3050-60-10	5	8	10	12.52	60	110	4.86	6.61	2.5	1	1.5	25.5	62.1	-	-	-

범용 중경도 엔드밀 (HRC30~50)

U-Star Endmill

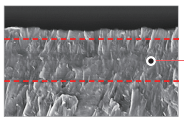
- AlCrN계 박막 적용을 통한 내마모성, 윤활성 향상
- 초미립자 소재(PC303W)를 적용한 볼 엔드밀의 인선 강도 향상
- 고인성 소재(PC315W)를 적용한 플랫 엔드밀의 내치핑성 향상
- 복잡한 금형가공에 적합한 다양한 형상, 제원의 제품군 보유
- h5샹크, 날경 및 레디우스 고정밀 공차 적용으로 정밀 가공에 적합

형번표기법

U	R	51	2	010	10	50	100	S3
U-Star Endmill	구분	길이/샹크 타입	날수	공구직경	코너R	유효장	전장	샹크직경
	B: 볼 SB: 스트레이트 볼 E: 플랫 R: 레디우스 SPM: 고이송 XE: 강력 절삭용 XR: 멀티 헬릭스 레디우스 TE: 테이퍼 TR: 테이퍼 레디우스 TB: 테이퍼 볼 DR: 더블 레디우스 F: 러핑 LE: 플랫(선반용)	50: 일반 51: 넥 52: 롱 샹크 53: 롤리팝 54: 테이퍼 넥	2: 2날 3: 3날 4: 4날 5: 5날 6: 6날	10: Ø1.0mm 60: Ø6.0mm 250: Ø25.0mm	5: 0.05mm 10: 0.10mm 20: 0.20mm	5 : 0.5mm 10 : 10mm 50 : 50mm	50: 50mm 100: 100mm 150: 150mm	S3: Ø3mm S6: Ø6mm S20: Ø20mm

특징

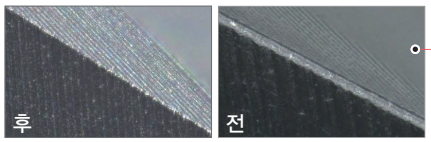
• AlCrN계 신규 코팅



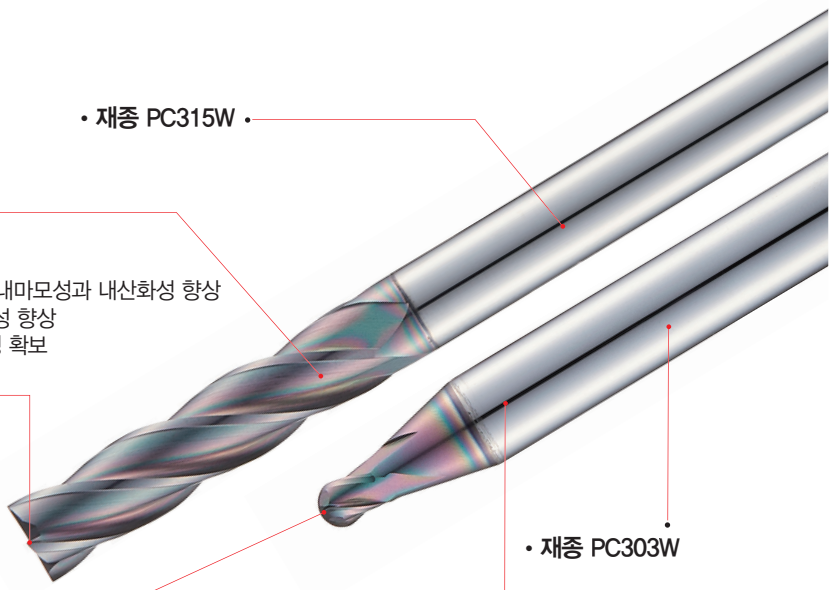
- Multi layer 박막으로 내마모성과 내산화성 향상
- Cr 함유를 통한 윤활성 향상
- 마찰열에 의한 안정성 확보

• 재종 PC315W •

• 인선처리 적용

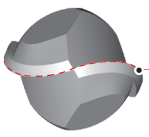


- 초기 절입 시 내치핑성 보완
- 금형가공 특성 대응을 위한 안정적인 가공 유도



• 재종 PC303W

• S커브 게쉬형상 채택



- 가공부하 분산을 통한 절삭성, 내마모성 향상

• 중경도용 소재 채택



- 소재 분리 적용(PC303W, PC315W)을 통한 공구 특성의 극대화, 범용 가공성 확대

라인업

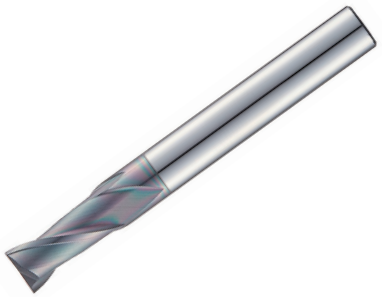
형 번	형 상	품 명	공구직경	부등분할	페이지
UE502		2날 플랫 엔드밀	Ø0.1 ~ 25.0		B94
UE512		2날 롱 넥 플랫 엔드밀	Ø0.1 ~ 12.0		B95
UE522		2날 플랫 엔드밀	Ø1.0 ~ 25.0		B96~B98
UXE502		2날 강력 절삭용 플랫 엔드밀	Ø0.1 ~ 20.0		B99~B102
UE504H		4날 45° 헬릭스 플랫 엔드밀	Ø1.0 ~ 20.0		B103
UE514		4날 롱 넥 플랫 엔드밀	Ø1.0 ~ 12.0		B104~B105
UE524		4날 플랫 엔드밀	Ø1.0 ~ 25.0		B106~B107
ULE504		4날 자동 선반용 플랫 엔드밀	Ø3.0 ~ 16.0		B108
UE504		4날 플랫 엔드밀	Ø0.8 ~ 25.0	•	B109
UXE504		4날 강력 절삭용 플랫 엔드밀	Ø1.0 ~ 20.0	•	B110
UE506		6날 플랫 엔드밀	Ø6.0 ~ 20.0		B111
UTE502		2날 테이퍼 플랫 엔드밀	Ø0.3 ~ 10.0		B112~B113
UTE504		4날 테이퍼 플랫 엔드밀	Ø0.8 ~ 10.0		B114~B116
UR502		2날 레디우스 엔드밀	Ø0.2 ~ 20.0		B117~B119
UR512		2날 넥 타입 레디우스 엔드밀	Ø0.2 ~ 20.0		B120~B125
UR542		2날 테이퍼 넥 레디우스 엔드밀	Ø0.2 ~ 4.0		B126~B131
UR504		4날 레디우스 엔드밀	Ø3.0 ~ 20.0		B132
UR544		4날 테이퍼 넥 레디우스 엔드밀	Ø1.0 ~ 4.0	•	B133~B136
UXR504		4날 멀티 헬릭스 레디우스 엔드밀	Ø1.0 ~ 20.0		B137~B139
UXR514		4날 멀티 헬릭스 넥 레디우스 엔드밀	Ø1.0 ~ 20.0	•	B140~1B44
UR506		6날 레디우스 엔드밀	Ø6.0 ~ 20.0	•	B145
UDR503		3날 더블 레디우스 엔드밀	Ø6.0 ~ 20.0		B146
USPM4		4날 고이송 레디우스 엔드밀	Ø1.0 ~ 20.0		B147
UTR504		4날 테이퍼 레디우스 엔드밀	Ø0.8 ~ 2.5		B148~B151
UB502		2날 볼 엔드밀	Ø1.0 ~ 25.0		B152~B153
UB502P		2날 고정밀 볼 엔드밀	Ø0.1 ~ 12.0		B154
UB512		2날 롱 넥 볼 엔드밀	Ø0.1 ~ 12.0		B155~B158
UB512S6		2날 롱 넥 볼 엔드밀(자루경 6)	Ø0.5 ~ 2.0		B159
UB532		2날 롤리팝 스타일 볼 엔드밀	Ø3.0 ~ 12.0		B160
UB542		2날 테이퍼 넥 볼 엔드밀	Ø0.1 ~ 12.0		B161~B167
USB502		2날 스트레이트 볼 엔드밀	Ø3.0 ~ 20.0		B168
UB503		3날 볼 엔드밀	Ø1.0 ~ 12.0		B169
UB504		4날 볼 엔드밀	Ø1.0 ~ 12.0		B169
UTB502		2날 테이퍼 볼 엔드밀	Ø0.3 ~ 2.0		B170
UF50		3~5날 챔퍼 피치 러핑 엔드밀	Ø3.0 ~ 25.0		B171
UF51		3~5날 파인 피치 러핑 엔드밀	Ø3.0 ~ 25.0		B172
UF51H		3~5날 45° 헬릭스 파인 피치 러핑 엔드밀	Ø3.0 ~ 25.0		B173

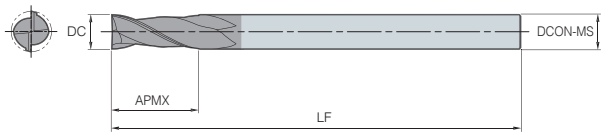
UE502

2날 플랫

CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø6.5 ~ Ø25	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LF
UE	502001S3	0.1	3	0.2	40
	502001	0.1	4	0.2	40
	5020015	0.15	4	0.3	40
	502002S3	0.2	3	0.4	40
	502002	0.2	4	0.4	40
	5020025	0.25	4	0.5	40
	502003S3	0.3	3	0.6	40
	502003	0.3	4	0.6	40
	5020035	0.35	4	0.7	40
	502004S3	0.4	3	0.8	40
	502004	0.4	4	0.8	40
	5020045	0.45	4	0.9	40
	502005S3	0.5	3	1	40
	502005	0.5	4	1	40
	5020055	0.55	4	1.1	40
	502006S3	0.6	3	1.2	40
	502006	0.6	4	1.2	40
	5020065	0.65	4	1.3	40
	502007S3	0.7	3	1.4	40
	502007	0.7	4	1.4	40
	5020075	0.75	4	1.5	40
	502008S3	0.8	3	1.6	40
	502008	0.8	4	1.6	40
	5020085	0.85	4	1.7	40
	502009S3	0.9	3	1.8	40
	502009	0.9	4	1.8	40
	5020095	0.95	4	2	40
	502010S3	1	3	2.5	50
	502010S4	1	4	2.5	50
	502010	1	6	2.5	50
	502011S4	1.1	4	3	50
	502012S3	1.2	3	3	50
	502012S4	1.2	4	3	50
	502012	1.2	6	3	50
	502013S4	1.3	4	3	50
	502014S4	1.4	4	4	50

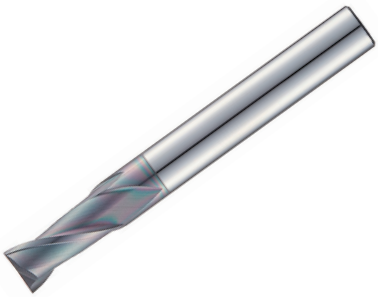
	형 번	DC	DCON-MS	APMX	LF
UE	502015S3	1.5	3	4	50
	502015S4	1.5	4	4	50
	502015	1.5	6	4	50
	502016S4	1.6	4	4	50
	502017S4	1.7	4	4	50
	502018S4	1.8	4	5	50
	502019S4	1.9	4	5	50
	502020S3	2	3	6	50
	502020S4	2	4	6	50
	502020	2	6	6	50
	502021S4	2.1	4	6	50
	502022S4	2.2	4	6	50
	502023S4	2.3	4	6	50
	502024S4	2.4	4	6	50
	502025S3	2.5	3	7	50
	502025	2.5	6	7	50
	502025S4	2.5	4	8	50
	502026S4	2.6	4	8	50
	502027S4	2.7	4	8	50
	502028S4	2.8	4	8	50
	502029S4	2.9	4	8	50
	502030S3	3	3	8	50
	502030S4	3	4	8	50
	502030	3	6	8	50
	502035S4	3.5	4	10	50
	502035	3.5	6	10	50
	502040080S4	4	4	10	80
	502040S4	4	4	10	50
	502040	4	6	10	50
	502045	4.5	6	14	50
	502050	5	6	15	60
	502055	5.5	6	15	60
	502060	6	6	15	60
	502065	6.5	8	18	60
	502070	7	8	20	60
	502075	7.5	8	20	60

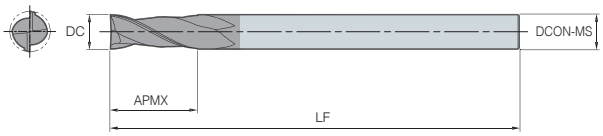
UE502

2날 플랫

CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø6.5 ~ Ø25	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LF
UE	502080	8	8	20	70
	502085	8.5	10	22	70
	502090	9	10	22	70
	502095	9.5	10	24	70
	502100	10	10	25	75
	502105	10.5	12	26	75
	502110	11	12	30	75
	502115	11.5	12	30	80
	502120	12	12	30	80
	502130	13	12	35	100
	502140S16	14	16	35	100
	502140	14	14	35	100
	502140S12	14	12	35	100

형 번		DC	DCON-MS	APMX	LF
UE	502150	15	16	38	100
	502160	16	16	40	100
	502170	17	16	42	100
	502180	18	18	45	100
	502180S16	18	16	45	100
	502190	19	20	45	100
	502200	20	20	45	100
	502210	21	20	45	100
	502220	22	20	45	100
	502230	23	25	50	120
	502240	24	25	50	120
	502250	25	25	50	120

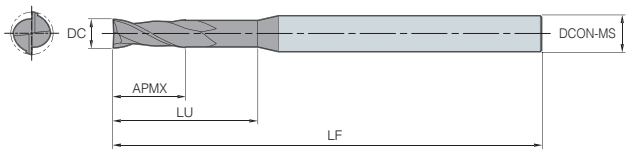
UE512

2날 롱 넥 플랫

CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF
UE	512001003	0.1	4	0.15	0.3	40
	512001005	0.1	4	0.15	0.5	40
	51200101	0.1	4	0.15	1	40
	512002005	0.2	4	0.3	0.5	40
	51200201	0.2	4	0.3	1	40
	512002015	0.2	4	0.3	1.5	40
	51200202	0.2	4	0.3	2	40
	51200301	0.3	4	0.5	1	40
	512003015	0.3	4	0.5	1.5	40
	51200302	0.3	4	0.5	2	40
	512003025	0.3	4	0.5	2.5	40
	51200303	0.3	4	0.5	3	40
	51200304	0.3	4	0.5	4	40
	51200305	0.3	4	0.5	5	40
	51200401	0.4	4	0.6	1	40
	512004015	0.4	4	0.6	1.5	40
	51200402	0.4	4	0.6	2	40
	512004025	0.4	4	0.6	2.5	40
	51200403	0.4	4	0.6	3	40
	51200404	0.4	4	0.6	4	40
	51200405	0.4	4	0.6	5	40
	51200406	0.4	4	0.6	6	40
	51200408	0.4	4	0.6	8	40
	51200410	0.4	4	0.6	10	40
	51200501	0.5	4	0.7	1	45
	512005015	0.5	4	0.7	1.5	45
	51200502	0.5	4	0.7	2	45
	512005025	0.5	4	0.7	2.5	45
	51200503	0.5	4	0.7	3	45
	51200504	0.5	4	0.7	4	45
	51200505	0.5	4	0.7	5	45
	51200506	0.5	4	0.7	6	45
	51200508	0.5	4	0.7	8	45
	51200510	0.5	4	0.7	10	45
	51200512	0.5	4	0.7	12	45
	51200514	0.5	4	0.7	14	45
	51200516	0.5	4	0.7	16	45

	형 번	DC	DCON-MS	APMX	LU	LF
UE	51200602	0.6	4	0.9	2	45
	51200603	0.6	4	0.9	3	45
	51200604	0.6	4	0.9	4	45
	51200605	0.6	4	0.9	5	45
	51200606	0.6	4	0.9	6	45
	51200608	0.6	4	0.9	8	45
	51200610	0.6	4	0.9	10	45
	51200612	0.6	4	0.9	12	45
	51200614	0.6	4	0.9	14	45
	51200616	0.6	4	0.9	16	45
	51200702	0.7	4	1.2	2	45
	51200704	0.7	4	1.2	4	45
	51200706	0.7	4	1.2	6	45
	51200708	0.7	4	1.2	8	45
	51200710	0.7	4	1.2	10	45
	51200712	0.7	4	1.2	12	45
	51200802	0.8	4	1.2	2	45
	51200803	0.8	4	1.2	3	45
	51200804	0.8	4	1.2	4	45
	51200805	0.8	4	1.2	5	45
	51200806	0.8	4	1.2	6	45
	51200808	0.8	4	1.2	8	45
	51200810	0.8	4	1.2	10	45
	51200812	0.8	4	1.2	12	45
	51200814	0.8	4	1.2	14	45
	51200816	0.8	4	1.2	16	45
	51200820	0.8	4	1.2	20	45
	51200906	0.9	4	1.3	6	45
	51200908	0.9	4	1.3	8	45
	51200910	0.9	4	1.3	10	45
	51201002	1	4	1.5	2	50
	51201003	1	4	1.5	3	50
	51201004	1	4	1.5	4	50
	51201005	1	4	1.5	5	50
	51201006	1	4	1.5	6	50
	51201007	1	4	1.5	7	50
	51201008	1	4	1.5	8	50

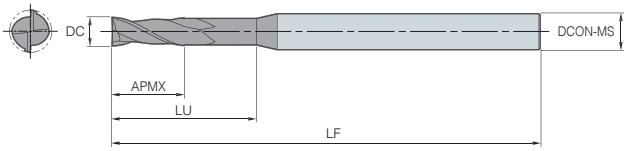
UE512

2날 롱 넥 플랫

CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF
UE	51201010	1	4	1.5	10	50
	51201012	1	4	1.5	12	50
	51201014	1	4	1.5	14	50
	51201016	1	4	1.5	16	50
	51201018	1	4	1.5	18	50
	51201020	1	4	1.5	20	50
	51201022	1	4	1.5	22	60
	51201026	1	4	1.5	26	60
	51201030	1	4	1.5	30	70
	51201040	1	4	1.5	40	80
	51201050	1	4	1.5	50	100
	51201204	1.2	4	1.8	4	50
	51201206	1.2	4	1.8	6	50
	51201208	1.2	4	1.8	8	50
	51201210	1.2	4	1.8	10	50
	51201212	1.2	4	1.8	12	50
	51201214	1.2	4	1.8	14	50
	51201216	1.2	4	1.8	16	50
	51201220	1.2	4	1.8	20	50
	51201226	1.2	4	1.8	26	60
	51201230	1.2	4	1.8	30	70
	51201406	1.4	4	2.1	6	50
	51201408	1.4	4	2.1	8	50
	51201410	1.4	4	2.1	10	50
	51201414	1.4	4	2.1	14	50
	51201416	1.4	4	2.1	16	50
	51201420	1.4	4	2.1	20	50
	51201504	1.5	4	2.3	4	50
	51201505	1.5	4	2.3	5	50
	51201506	1.5	4	2.3	6	50
	51201507	1.5	4	2.3	7	50
	51201508	1.5	4	2.3	8	50
	51201510	1.5	4	2.3	10	50
	51201512	1.5	4	2.3	12	50
	51201514	1.5	4	2.3	14	50
	51201516	1.5	4	2.3	16	50
	51201518	1.5	4	2.3	18	50

	형 번	DC	DCON-MS	APMX	LU	LF
UE	51201520	1.5	4	2.3	20	50
	51201522	1.5	4	2.3	22	60
	51201526	1.5	4	2.3	26	60
	51201530	1.5	4	2.3	30	70
	51201608	1.6	4	2.3	8	50
	51201610	1.6	4	2.3	10	50
	51201612	1.6	4	2.3	12	50
	51201616	1.6	4	2.3	16	50
	51201620	1.6	4	2.3	20	50
	51201808	1.8	4	2.7	8	50
	51201810	1.8	4	2.7	10	50
	51201812	1.8	4	2.7	12	50
	51201816	1.8	4	2.7	16	50
	51201820	1.8	4	2.7	20	50
	51202006	2	4	3	6	50
	51202008	2	4	3	8	50
	51202010	2	4	3	10	50
	51202012	2	4	3	12	50
	51202014	2	4	3	14	50
	51202016	2	4	3	16	50
	51202018	2	4	3	18	50
	51202020	2	4	3	20	50
	51202022	2	4	3	22	60
	51202026	2	4	3	26	60
	51202030	2	4	3	30	70
	51202035	2	4	3	35	70
	51202040	2	4	3	40	80
	51202045	2	4	3	45	90
	51202050	2	4	3	50	100
	51202060	2	4	3	60	110
	51202508	2.5	4	4	8	50
	51202510	2.5	4	4	10	50
	51202512	2.5	4	4	12	50
	51202514	2.5	4	4	14	50
	51202516	2.5	4	4	16	50
	51202518	2.5	4	4	18	50
	51202520	2.5	4	4	20	50

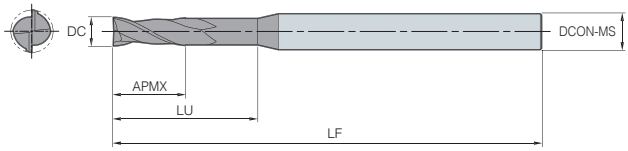
UE512

2날 롱 넥 플랫



CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LU	LF
UE	51202522	2.5	4	4	22	60
	51202526	2.5	4	4	26	60
	51202530	2.5	4	4	30	70
	51202535	2.5	4	4	35	70
	51202540	2.5	4	4	40	80
	51202545	2.5	4	4	45	90
	51202550	2.5	4	4	50	100
	51203006	3	6	4.5	6	50
	51203008	3	6	4.5	8	50
	51203010	3	6	4.5	10	50
	51203012	3	6	4.5	12	50
	51203014	3	6	4.5	14	60
	51203016	3	6	4.5	16	60
	51203018	3	6	4.5	18	60
	51203020	3	6	4.5	20	60
	51203022	3	6	4.5	22	65
	51203026	3	6	4.5	26	65
	51203030	3	6	4.5	30	70
	51203035	3	6	4.5	35	70
	51203040	3	6	4.5	40	80
	51203045	3	6	4.5	45	90
	51203050	3	6	4.5	50	100
	51203060	3	6	4.5	60	100
	51204008	4	6	6	8	50
	51204010	4	6	6	10	50
	51204012	4	6	6	12	50
	51204014	4	6	6	14	60
	51204016	4	6	6	16	60
	51204018	4	6	6	18	60
	51204020	4	6	6	20	60

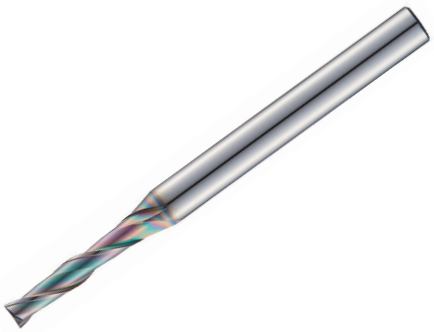
	형 번	DC	DCON-MS	APMX	LU	LF
UE	51204022	4	6	6	22	65
	51204026	4	6	6	26	65
	51204030	4	6	6	30	70
	51204035	4	6	6	35	70
	51204040	4	6	6	40	80
	51204045	4	6	6	45	90
	51204050	4	6	6	50	100
	51204060	4	6	6	60	100
	51205016	5	6	8	16	60
	51205020	5	6	8	20	60
	51205026	5	6	8	26	65
	51205030	5	6	8	30	70
	51205035	5	6	8	35	75
	51205040	5	6	8	40	80
	51205050	5	6	8	50	90
	51205060	5	6	8	60	100
	51206015	6	6	9	15	60
	51206020	6	6	9	20	60
	51206030	6	6	9	30	70
	51206032	6	6	9	32	90
	51208025	8	8	12	25	70
	51208030	8	8	12	30	80
	51208042	8	8	12	42	100
	51210030	10	10	15	30	75
	51210035	10	10	15	35	80
	51210045	10	10	15	45	100
	51212035	12	12	20	35	80
	51212040	12	12	20	40	90
	51212050	12	12	20	50	110

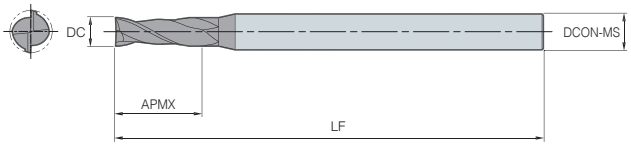
UE522

2날 플랫

CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø6.5 ~ Ø25	0.000 ~ -0.015







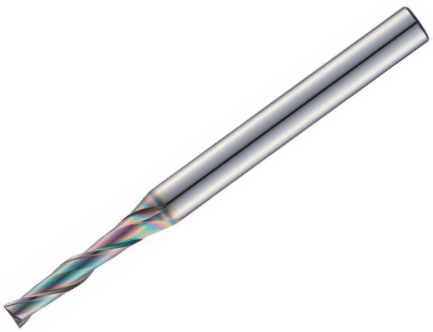
(mm)

	형 번	DC	DCON-MS	APMX	LF
UE	52201003	1	6	3	60
	52201004	1	6	4	60
	52201005	1	6	5	60
	52201006	1	6	6	60
	52201007	1	6	7	60
	52201008	1	6	8	60
	52201010	1	6	10	60
	52201012	1	6	12	60
	52201204	1.2	6	4	60
	52201206	1.2	6	6	60
	52201208	1.2	6	8	60
	52201210	1.2	6	10	60
	52201212	1.2	6	12	60
	52201506	1.5	6	6	60
	52201508	1.5	6	8	60
	52201510	1.5	6	10	60
	52201512	1.5	6	12	60
	52201514	1.5	6	14	60
	52201516	1.5	6	16	60
	52202008	2	6	8	60
	52202010	2	6	10	60
	52202012	2	6	12	60
	52202014	2	6	14	60
	52202016	2	6	16	60
	52202510	2.5	6	10	60
	52202512	2.5	6	12	60
	52202516	2.5	6	16	60
	52202520	2.5	6	20	60
	52202526	2.5	6	26	60
	52203010	3	6	10	70
	52203012	3	6	12	70
	52203014	3	6	14	70
	52203016	3	6	16	70
	52203016S3	3	3	16	100
	52203020	3	6	20	70
	52203026	3	6	26	70
	52203030	3	6	30	70

	형 번	DC	DCON-MS	APMX	LF
UE	52204012	4	6	12	70
	52204016	4	6	16	70
	52204020	4	6	20	70
	52204020S4	4	4	20	100
	52204026	4	6	26	70
	52204030	4	6	30	70
	52205015	5	6	15	70
	52205020	5	6	20	70
	52205025100	5	6	25	100
	52205025	5	6	25	70
	52205030	5	6	30	80
	52205035	5	6	35	90
	52205040	5	6	40	100
	52206015080	6	6	15	80
	52206015	6	6	15	60
	52206020090	6	6	20	90
	52206020	6	6	20	70
	52206025	6	6	25	75
	52206030150	6	6	30	150
	52206030100	6	6	30	100
	52206030	6	6	30	80
	52206035	6	6	35	90
	52206040120	6	6	40	120
	52206040	6	6	40	90
	52206045	6	6	45	150
	52207035	7	8	35	85
	52208020	8	8	20	100
	52208025	8	8	25	80
	52208030100	8	8	30	100
	52208030	8	8	30	80
	52208035	8	8	35	90
	52208040150	8	8	40	150
	52208040120	8	8	40	120
	52208040	8	8	40	90
	52208045	8	8	45	100
	52208050150	8	8	50	150
	52208050	8	8	50	100

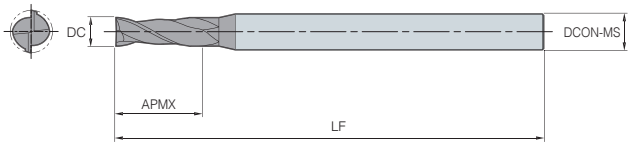
UE522

2날 플랫



CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø6.5 ~ Ø25	0.000 ~ -0.015





(mm)

형 번		DC	DCON-MS	APMX	LF
UE	52209045	9	10	45	100
	52210025	10	10	25	100
	52210030100	10	10	30	100
	52210030	10	10	30	80
	52210035	10	10	35	90
	52210040120	10	10	40	120
	52210040	10	10	40	90
	52210045	10	10	45	100
	52210050200	10	10	50	200
	52210050150	10	10	50	150
	52210050	10	10	50	100
	52210055	10	10	55	150
	52210060200	10	10	60	200
	52210060155	10	10	60	155
	52210060	10	10	60	110
	52211050	11	12	50	110
	52212035	12	12	35	90
	52212040120	12	12	40	120
	52212040	12	12	40	100
	52212045	12	12	45	130
	52212050150	12	12	50	150
	52212050	12	12	50	100
	52212055	12	12	55	110
	52212060200	12	12	60	200
	52212060150	12	12	60	150
	52212060	12	12	60	110
	52212065	12	12	65	150
	52212070200	12	12	70	200
	52212070	12	12	70	120
	52214040	14	16	40	110
	52214050	14	16	50	110
	52214060150	14	16	60	150

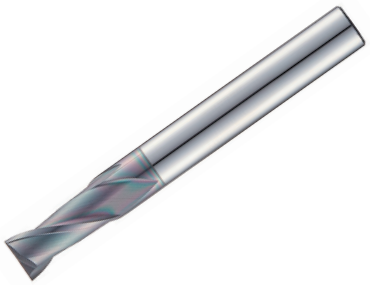
형 번		DC	DCON-MS	APMX	LF
UE	52214060	14	16	60	120
	52216040150	16	16	40	150
	52216040	16	16	40	120
	52216050150	16	16	50	150
	52216050	16	16	50	110
	52216060	16	16	60	120
	52216070200	16	16	70	200
	52216070150	16	16	70	150
	52216070	16	16	70	130
	52216080	16	16	80	150
	52216090	16	16	90	150
	522160110	16	16	110	200
	522160120	16	16	120	250
	52218050	18	20	50	120
	52218060	18	18	60	120
	52218070	18	20	70	130
	522180100	18	20	100	200
	52220050150	20	20	50	150
	52220050	20	20	50	110
	52220060	20	20	60	130
	52220070	20	20	70	130
	52220080	20	20	80	150
	52220090200	20	20	90	200
	52220090	20	20	90	150
	522200110	20	20	110	200
	522200120	20	20	120	250
	52222075	22	20	75	150
	522220110	22	20	110	200
	52225070	25	25	70	150
	52225090	25	25	90	150
	522250110	25	25	110	200
	522250120	25	25	120	250

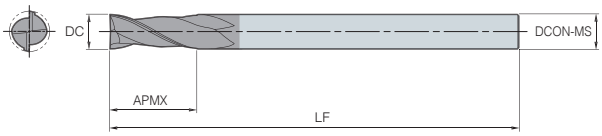
UXE502

2날 강력 절삭용 플랫

CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø6.5 ~ Ø20	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LF
UXE	502001001	0.1	4	0.1	40
	502001	0.1	4	0.2	40
	502001003	0.1	4	0.3	40
	502002002	0.2	4	0.2	40
	502002	0.2	4	0.4	40
	502002006	0.2	4	0.6	40
	502003003	0.3	4	0.3	40
	502003	0.3	4	0.6	40
	502003009	0.3	4	0.9	40
	502004004	0.4	4	0.4	40
	502004	0.4	4	0.8	40
	502004012	0.4	4	1.2	40
	502005005	0.5	4	0.5	40
	502005	0.5	4	1	40
	502005015	0.5	4	1.5	40
	502006006	0.6	4	0.6	40
	502006	0.6	4	1.2	40
	502006018	0.6	4	1.8	40
	502007007	0.7	4	0.7	40
	502007	0.7	4	1.4	40
	502007021	0.7	4	2.1	40
	502008008	0.8	4	0.8	40
	502008	0.8	4	1.6	40
	502008024	0.8	4	2.4	40
	502009009	0.9	4	0.9	40
	502009	0.9	4	1.8	40
	502009027	0.9	4	2.7	40
	50201001	1	6	1	40
	50201002	1	6	2	40
	502010	1	6	2.5	50
	50201003	1	6	3	50
	50201004	1	6	4	50
	50201006	1	6	6	50
	50201202	1.2	6	2	40
	502012	1.2	6	3	50
	50201204	1.2	6	4	50
	50201206	1.2	6	6	50

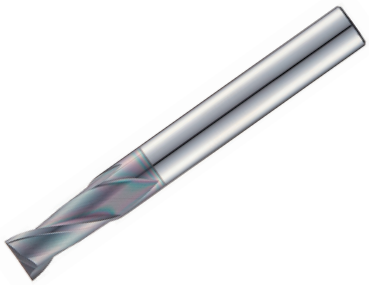
	형 번	DC	DCON-MS	APMX	LF
UXE	502015015	1.5	6	1.5	40
	50201503	1.5	6	3	40
	502015	1.5	6	4	50
	50201506	1.5	6	6	50
	50201508	1.5	6	8	50
	50201510	1.5	6	10	50
	50202002	2	6	2	40
	50202004	2	6	4	40
	502020	2	6	6	50
	50202008	2	6	8	50
	50202010	2	6	10	50
	50202012	2	6	12	50
	502025025	2.5	6	2.5	40
	50202505	2.5	6	5	40
	502025	2.5	6	7	50
	50202510	2.5	6	10	50
	50202512	2.5	6	12	50
	50203003	3	6	3	40
	50203006	3	6	6	40
	502030	3	6	8	50
	50203010	3	6	10	50
	50203012	3	6	12	50
	50203014	3	6	14	50
	50203510	3.5	6	10	50
	50204004	4	6	4	40
	50204008	4	6	8	40
	502040	4	6	10	50
	50204012	4	6	12	50
	50204014	4	6	14	50
	50204016	4	6	16	50
	50204511	4.5	6	11	50
	50205005	5	6	5	50
	50205010	5	6	10	50
	502050	5	6	15	60
	50205020	5	6	20	60
	50205025	5	6	25	60
	50205513	5.5	6	13	50

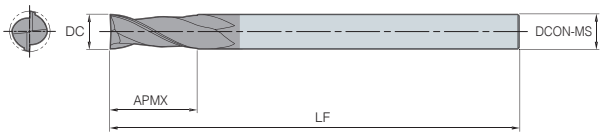
UXE502

2날 강력 절삭용 플랫

CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø6.5 ~ Ø20	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LF
UXE	50206006	6	6	6	50
	50206012	6	6	12	50
	502060	6	6	15	60
	50206020	6	6	20	60
	50206025	6	6	25	60
	50206513	6.5	8	13	60
	50207018	7	8	18	60
	50208016	8	8	16	60
	502080	8	8	20	70
	50208025	8	8	25	70
	50208030	8	8	30	70
	50210022	10	10	22	65

형 번		DC	DCON-MS	APMX	LF
UXE	502100	10	10	25	75
	50210030	10	10	30	75
	50210035	10	10	35	75
	50212026	12	12	26	70
	502120	12	12	30	80
	50212035	12	12	35	80
	50212040	12	12	40	80
	502140	14	16	35	100
	502160	16	16	32	100
	50216040	16	16	40	100
	502180	18	20	45	100
	502200	20	20	45	100

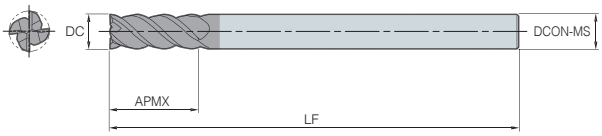
UE504H

4날 45° 헬릭스 플랫

CARBIDE | 4 | H·A 45° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LF
UE	504H010	1	6	2.5	50
	504H01004	1	6	4	60
	504H01006	1	6	6	60
	504H015	1.5	6	4	50
	504H01506	1.5	6	6	60
	504H01508	1.5	6	8	60
	504H020	2	6	6	50
	504H02008	2	6	8	60
	504H02010	2	6	10	60
	504H030	3	6	8	50
	504H03010	3	6	10	70
	504H03012	3	6	12	70
	504H03016	3	6	16	70
	504H040	4	6	10	50
	504H04012	4	6	12	70
	504H04016	4	6	16	70
	504H04020	4	6	20	70
	504H050	5	6	15	50
	504H05030	5	6	30	80
	504H060	6	6	15	60
	504H06020	6	6	20	70

형 번		DC	DCON-MS	APMX	LF
UE	504H06030	6	6	30	80
	504H080	8	8	20	70
	504H08030	8	8	30	80
	504H08035	8	8	35	90
	504H08040	8	8	40	90
	504H100	10	10	25	75
	504H10030	10	10	30	80
	504H10040	10	10	40	90
	504H10050	10	10	50	100
	504H120	12	12	30	80
	504H12040	12	12	40	90
	504H12050	12	12	50	100
	504H12060	12	12	60	110
	504H160	16	16	40	100
	504H16050	16	16	50	110
	504H16060	16	16	60	120
	504H160110	16	16	110	200
	504H200	20	20	45	100
	504H20060	20	20	60	120
	504H20070	20	20	70	130
	504H200110	20	20	110	200

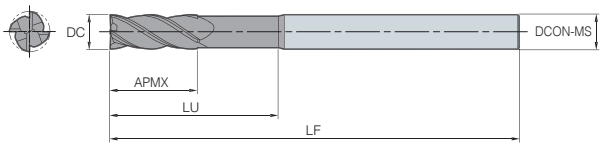
UE514

4날 롱 넥 플랫



CARBIDE | 4 | H·A 35° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LU	LF
UE	51401002	1	4	1.5	2	50
	51401003	1	4	1.5	3	50
	51401004	1	4	1.5	4	50
	51401005	1	4	1.5	5	50
	51401006	1	4	1.5	6	50
	51401007	1	4	1.5	7	50
	51401008	1	4	1.5	8	50
	51401010	1	4	1.5	10	50
	51401012	1	4	1.5	12	50
	51401014	1	4	1.5	14	50
	51401016	1	4	1.5	16	50
	51401018	1	4	1.5	18	50
	51401020	1	4	1.5	20	50
	51401022	1	4	1.5	22	60
	51401026	1	4	1.5	26	60
	51401030	1	4	1.5	30	70
	51401040	1	4	1.5	40	80
	51401050	1	4	1.5	50	100
	51401204	1.2	4	1.8	4	50
	51401206	1.2	4	1.8	6	50
	51401208	1.2	4	1.8	8	50
	51401210	1.2	4	1.8	10	50
	51401212	1.2	4	1.8	12	50
	51401214	1.2	4	1.8	14	50
	51401216	1.2	4	1.8	16	50
	51401220	1.2	4	1.8	20	50
	51401226	1.2	4	1.8	26	60
	51401230	1.2	4	1.8	30	70
	51401504	1.5	4	2.3	4	50
	51401505	1.5	4	2.3	5	50
	51401506	1.5	4	2.3	6	50
	51401507	1.5	4	2.3	7	50
	51401508	1.5	4	2.3	8	50
	51401510	1.5	4	2.3	10	50
	51401512	1.5	4	2.3	12	50
	51401514	1.5	4	2.3	14	50
	51401516	1.5	4	2.3	16	50

	형 번	DC	DCON-MS	APMX	LU	LF
UE	51401518	1.5	4	2.3	18	50
	51401520	1.5	4	2.3	20	50
	51401522	1.5	4	2.3	22	60
	51401526	1.5	4	2.3	26	60
	51401530	1.5	4	2.3	30	70
	51402006	2	4	3	6	50
	51402008	2	4	3	8	50
	51402010	2	4	3	10	50
	51402012	2	4	3	12	50
	51402014	2	4	3	14	50
	51402016	2	4	3	16	50
	51402018	2	4	3	18	50
	51402020	2	4	3	20	50
	51402022	2	4	3	22	60
	51402026	2	4	3	26	60
	51402030	2	4	3	30	70
	51402035	2	4	3	35	70
	51402040	2	4	3	40	80
	51402045	2	4	3	45	90
	51402050	2	4	3	50	100
	51402060	2	4	3	60	110
	51402508	2.5	4	4	8	50
	51402510	2.5	4	4	10	50
	51402512	2.5	4	4	12	50
	51402514	2.5	4	4	14	50
	51402516	2.5	4	4	16	50
	51402518	2.5	4	4	18	50
	51402520	2.5	4	4	20	50
	51402522	2.5	4	4	22	60
	51402526	2.5	4	4	26	60
	51402530	2.5	4	4	30	70
	51402535	2.5	4	4	35	70
	51402540	2.5	4	4	40	80
	51402545	2.5	4	4	45	90
	51402550	2.5	4	4	50	100
	51403006	3	6	4.5	6	50
	51403008	3	6	4.5	8	50

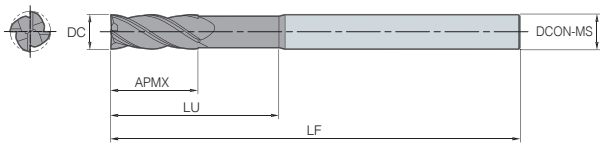
UE514

4날 롱 넥 플랫

CARBIDE | 4 | H·A 35° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF
UE	51403010	3	6	4.5	10	50
	51403012	3	6	4.5	12	50
	51403014	3	6	4.5	14	60
	51403016	3	6	4.5	16	60
	51403018	3	6	4.5	18	60
	51403020	3	6	4.5	20	60
	51403022	3	6	4.5	22	65
	51403026	3	6	4.5	26	65
	51403030	3	6	4.5	30	70
	51403035	3	6	4.5	35	70
	51403040	3	6	4.5	40	80
	51403045	3	6	4.5	45	90
	51403050	3	6	4.5	50	100
	51403060	3	6	4.5	60	100
	51404008	4	6	4.5	8	50
	51404010	4	6	4.5	10	50
	51404012	4	6	4.5	12	50
	51404014	4	6	4.5	14	60
	51404016	4	6	4.5	16	60
	51404018	4	6	4.5	18	60
	51404020	4	6	4.5	20	60
	51404022	4	6	4.5	22	65
	51404026	4	6	4.5	26	65
	51404030	4	6	4.5	30	70
	51404035	4	6	4.5	35	70

	형 번	DC	DCON-MS	APMX	LU	LF
UE	51404040	4	6	4.5	40	80
	51404045	4	6	4.5	45	90
	51404050	4	6	4.5	50	100
	51404060	4	6	4.5	60	100
	51405016	5	6	8	16	60
	51405020	5	6	8	20	60
	51405026	5	6	8	26	65
	51405030	5	6	8	30	70
	51405035	5	6	8	35	75
	51405040	5	6	8	40	80
	51405050	5	6	8	50	90
	51405060	5	6	8	60	100
	51406015	6	6	9	15	60
	51406020	6	6	9	20	60
	51406030	6	6	9	30	70
	51406032	6	6	9	32	90
	51408025	8	8	12	25	70
	51408030	8	8	12	30	80
	51408042	8	8	12	42	100
	51410030	10	10	15	30	75
	51410035	10	10	15	35	80
	51410045	10	10	15	45	100
	51412035	12	12	20	35	80
	51412040	12	12	20	40	90
	51412050	12	12	20	50	110

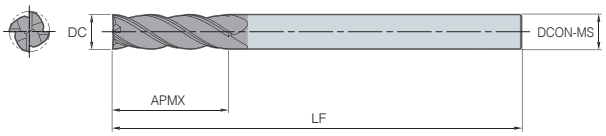
UE524

4날 플랫



CARBIDE | 4 | H·A 35° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø7 ~ Ø25	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LF
UE	52401003	1	6	3	60
	52401004	1	6	4	60
	52401005	1	6	5	60
	52401006	1	6	6	60
	52401007	1	6	7	60
	52401008	1	6	8	60
	52401010	1	6	10	60
	52401012	1	6	12	60
	52401204	1.2	6	4	60
	52401206	1.2	6	6	60
	52401208	1.2	6	8	60
	52401210	1.2	6	10	60
	52401212	1.2	6	12	60
	52401506	1.5	6	6	60
	52401508	1.5	6	8	60
	52401510	1.5	6	10	60
	52401512	1.5	6	12	60
	52401514	1.5	6	14	60
	52401516	1.5	6	16	60
	52401520	1.5	6	20	60
	52401526	1.5	6	26	60
	52402008	2	6	8	60
	52402008S4	2	4	8	40
	52402010	2	6	10	60
	52402012	2	6	12	60
	52402014	2	6	14	60
	52402016	2	6	16	60
	52402510	2.5	6	10	60
	52402512	2.5	6	12	60
	52402516	2.5	6	16	60
	52402520	2.5	6	20	60
	52402526	2.5	6	26	60
	52403010	3	6	10	70
	52403012	3	6	12	70
	52403014	3	6	14	70
	52403016	3	6	16	70
	52403016S3	3	3	16	100
	52403020	3	6	20	70
	52403026	3	6	26	70
	52403030	3	6	30	70
	52403035	3	6	35	90

	형 번	DC	DCON-MS	APMX	LF
UE	52404012	4	6	12	70
	52404016	4	6	16	70
	52404020	4	6	20	70
	52404020S4	4	4	20	100
	52404026	4	6	26	70
	52404030	4	6	30	70
	52405015	5	6	15	70
	52405020	5	6	20	70
	52405025100	5	6	25	100
	52405025	5	6	25	70
	52405030	5	6	30	80
	52405035	5	6	35	90
	52405040	5	6	40	100
	52406015080	6	6	15	80
	52406015	6	6	15	60
	52406020090	6	6	20	90
	52406020	6	6	20	70
	52406025	6	6	25	75
	52406030150	6	6	30	150
	52406030100	6	6	30	100
	52406030	6	6	30	80
	52406030100	6	6	30	100
	52406030	6	6	30	80
	52406035	6	6	35	90
	52406040120	6	6	40	120
	52406040	6	6	40	90
	52406045	6	6	45	150
	52407035	7	8	35	85
	52408020	8	8	20	100
	52408025	8	8	25	80
	52408030100	8	8	30	100
	52408030	8	8	30	80
	52408035	8	8	35	90
	52408040150	8	8	40	150
	52408040120	8	8	40	120
	52408040	8	8	40	90
	52408045	8	8	45	100
	52408050150	8	8	50	150
	52408050	8	8	50	100
	52408060	8	8	60	155
	52408080	8	8	80	200

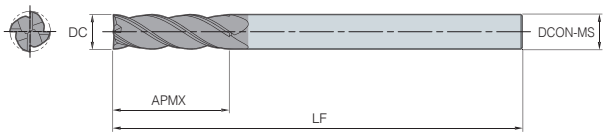
UE524

4날 플랫

CARBIDE | 4 | H·A 35° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø7 ~ Ø25	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LF
UE	52409045	9	10	45	100
	52410025	10	10	25	100
	524100100	10	10	30	100
	52410030	10	10	30	80
	52410035	10	10	35	90
	52410040120	10	10	40	120
	52410040	10	10	40	90
	52410045	10	10	45	100
	52410050200	10	10	50	200
	52410050150	10	10	50	150
	52410050	10	10	50	100
	52410055	10	10	55	150
	52410060200	10	10	60	200
	52410060155	10	10	60	155
	52410060	10	10	60	110
	52410080200	10	10	80	200
	52411050	11	12	50	110
	52412030	12	12	30	110
	52412035	12	12	35	90
	52412040120	12	12	40	120
	52412040	12	12	40	100
	52412045	12	12	45	130
	52412050150	12	12	50	150
	52412050	12	12	50	100
	52412055	12	12	55	110
	52412060200	12	12	60	200
	52412060150	12	12	60	150
	52412060	12	12	60	110
	52412065	12	12	65	150
	52412070200	12	12	70	200
	52412070	12	12	70	120
	52412080	12	12	80	200
	52414040	14	16	40	110
	52414050	14	16	50	110
	52414060	14	16	60	150

형 번		DC	DCON-MS	APMX	LF
UE	52416040	16	16	40	150
	52416050150	16	16	50	150
	52416050	16	16	50	110
	52416060	16	16	60	120
	52416070200	16	16	70	200
	52416070150	16	16	70	150
	52416070	16	16	70	130
	52416080	16	16	80	150
	52416090	16	16	90	150
	524160100	16	16	100	200
	524160110	16	16	110	200
	524160120	16	16	120	250
	52418050	18	20	50	120
	52418070	18	20	70	130
	524180100	18	20	100	200
	52420050150	20	20	50	150
	52420050	20	20	50	110
	52420060	20	20	60	130
	52420070	20	20	70	130
	52420080	20	20	80	150
	52420090200	20	20	90	200
	52420090	20	20	90	150
	524200100	20	20	100	200
	524200110	20	20	110	200
	524200120	20	20	120	250
	524200130	20	20	130	250
	52422075	22	20	75	150
	524220110	22	20	110	200
	52425070	25	25	70	150
	52425090	25	25	90	150
	524250100	25	25	100	200
	524250110	25	25	110	200
	524250120	25	25	120	250
	524250150	25	25	150	250

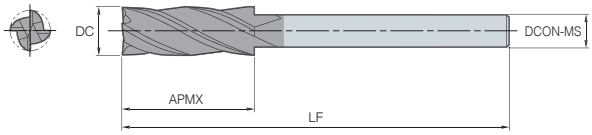
ULE504

4날 자동 선반용 플랫

CARBIDE | 4 | H·A 30° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø3 ~ Ø6	0.000 ~ -0.012
Ø7 ~ Ø16	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LF
ULE	504030S04	3	4	3	35
	504040S04	4	4	4	35
	504060S06	6	6	6	35
	504070S07	7	7	20	45
	504080S08	8	8	8	45
	504080S06	8	6	8	35
	504080S07	8	7	15	45
	504090S07	9	7	15	45
	504100S06	10	6	10	35
	504100S10	10	10	15	45
	504100S07	10	7	15	45
	504110S07	11	7	15	45
	504120S10	12	10	12	45
	504120S06	12	6	12	35
	504120S07	12	7	15	45
	504120-25S10	12	10	25	55
	504130S10	13	10	25	55
	504140S10	14	10	25	55
	504140S07	14	7	25	55
	504160S10	16	10	25	60

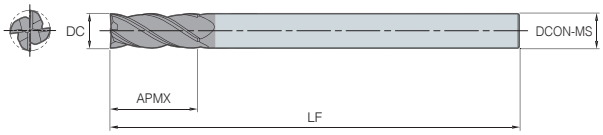
UE504

4날 플랫

CARBIDE | 4 | H·A 34°/36° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø0.8 ~ Ø6	0.000 ~ -0.012
Ø6.5 ~ Ø25	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LF
UE	504008	0.8	4	1.6	40
	504009	0.9	4	1.8	40
	504010	1	6	2.5	50
	504012	1.2	6	3	50
	504015	1.5	6	4	50
	504020	2	6	6	50
	504025	2.5	6	7	50
	504030	3	6	8	50
	504035	3.5	6	10	50
	504040	4	6	10	50
	504045	4.5	6	14	50
	504050	5	6	15	60
	504055	5.5	6	15	60
	504060	6	6	15	60
	504065	6.5	8	18	60
	504070	7	8	20	60
	504075	7.5	8	20	60
	504080	8	8	20	70
	504085	8.5	10	22	70
	504090	9	10	22	70
	504095	9.5	10	24	70
	504100	10	10	25	75

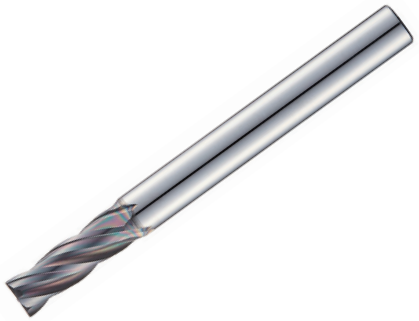
형 번		DC	DCON-MS	APMX	LF
UE	504105	10.5	12	26	75
	504110	11	12	30	75
	504115	11.5	12	30	80
	504120	12	12	30	80
	504125	12.5	12	30	80
	504130	13	12	35	100
	504140	14	16	35	100
	504140S14	14	14	35	100
	504140S12	14	12	35	100
	504150	15	16	38	100
	504160	16	16	40	100
	504170	17	16	42	100
	504180	18	18	45	100
	504180S16	18	16	45	100
	504190	19	20	45	100
	504200	20	20	45	100
	504210	21	20	45	100
	504220	22	20	45	100
	504230	23	25	50	120
	504240	24	25	50	120
	504250	25	25	50	120

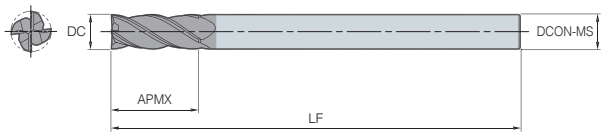
UXE504

4날 강력 절삭용 플랫

CARBIDE | 4 | H·A 34°/36° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LF
UXE	50401001	1	6	1	40
	50401002	1	6	2	40
	504010	1	6	2.5	50
	50401003	1	6	3	50
	50401004	1	6	4	50
	50401006	1	6	6	50
	50401202	1.2	6	2	40
	504012	1.2	6	3	50
	50401204	1.2	6	4	50
	50401206	1.2	6	6	50
	504015015	1.5	6	1.5	40
	50401503	1.5	6	3	40
	504015	1.5	6	4	50
	50401506	1.5	6	6	50
	50401508	1.5	6	8	50
	50401510	1.5	6	10	50
	50402002	2	6	2	40
	50402004	2	6	4	40
	504020	2	6	6	50
	50402008	2	6	8	50
	50402010	2	6	10	50
	50402012	2	6	12	50
	504025025	2.5	6	2.5	40
	50402505	2.5	6	5	40
	504025	2.5	6	7	50
	50402510	2.5	6	10	50
	50402512	2.5	6	12	50
	50403003	3	6	3	40
	50403006	3	6	6	40
	504030	3	6	8	50
	50403010	3	6	10	50
	50403012	3	6	12	50
	50403014	3	6	14	50

형 번		DC	DCON-MS	APMX	LF
UXE	50404004	4	6	4	40
	50404008	4	6	8	40
	504040	4	6	10	50
	50404012	4	6	12	50
	50404014	4	6	14	50
	50404016	4	6	16	50
	50405005	5	6	5	50
	50405010	5	6	10	50
	504050	5	6	15	60
	50405020	5	6	20	60
	50405025	5	6	25	60
	50406006	6	6	6	50
	50406012	6	6	12	50
	504060	6	6	15	60
	50406020	6	6	20	60
	50406025	6	6	25	60
	50408016	8	8	16	60
	504080	8	8	20	70
	50408025	8	8	25	70
	50408030	8	8	30	70
	50410022	10	10	22	65
	504100	10	10	25	75
	50410030	10	10	30	75
	50410035	10	10	35	75
	50412026	12	12	26	70
	504120	12	12	30	80
	50412035	12	12	35	80
	50412040	12	12	40	80
	504140	14	16	35	100
	50416032	16	16	32	100
	504160	16	16	40	100
	504180	18	20	45	100
	504200	20	20	45	100

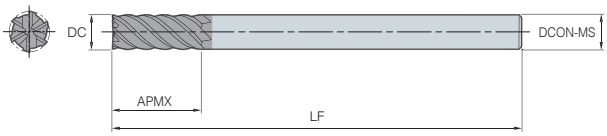
UE506

6날 플랫

CARBIDE | 6 | H·A 45° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø6	0.000 ~ -0.012
Ø7 ~ Ø25	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LF
UE	506060	6	6	15	60
	50606020	6	6	20	70
	50606030110	6	6	30	110
	50606030	6	6	30	80
	506070	7	8	18	60
	506080	8	8	20	70
	50608030	8	8	30	80
	50608035	8	8	35	90
	50608040130	8	8	40	130
	50608040	8	8	40	90
	506090	9	10	22	70
	506100	10	10	25	75
	50610030	10	10	30	80
	50610040	10	10	40	90
	50610050150	10	10	50	150
	50610050	10	10	50	100
	506110	11	12	26	75
	506120	12	12	30	80
	50612040	12	12	40	90
	50612050	12	12	50	100

	형 번	DC	DCON-MS	APMX	LF
UE	50612060150	12	12	60	150
	50612060	12	12	60	110
	506130	13	14	32	85
	506140	14	14	32	85
	506160	16	16	40	100
	50616050	16	16	50	110
	50616060	16	16	60	120
	50616090	16	16	90	150
	506160110250	16	16	110	250
	506160110	16	16	110	200
	506180	18	18	44	100
	506200	20	20	45	100
	50620060	20	20	60	120
	50620070	20	20	70	130
	506200110300	20	20	110	300
	506200110250	20	20	110	250
	506200110	20	20	110	200
	506250	25	25	50	120
	506251	25	25	92	180

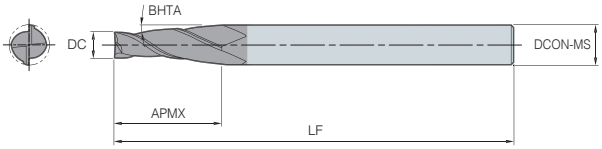
UTE502

2날 테이퍼 플랫

CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø0.3 ~ Ø6	0.000 ~ -0.012
Ø7 ~ Ø10	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	BHTA	LF
UTE	502003005	0.3	4	1.2	0.5	40
	50200301	0.3	4	1.2	1	40
	502003015	0.3	4	1.2	1.5	40
	50200302	0.3	4	1.2	2	40
	50200303	0.3	4	1.5	3	40
	50200305	0.3	4	1.5	5	40
	50200307	0.3	4	1.5	7	40
	50200310	0.3	4	1.5	10	40
	502004005	0.4	4	1.6	0.5	40
	50200401	0.4	4	1.6	1	40
	502004015	0.4	4	1.6	1.5	40
	50200402	0.4	4	1.6	2	40
	50200403	0.4	4	1.6	3	40
	50200405	0.4	4	2	5	40
	50200407	0.4	4	2	7	40
	50200410	0.4	4	2	10	40
	502005005	0.5	4	2	0.5	45
	50200501	0.5	4	2	1	45
	502005015	0.5	4	2	1.5	45
	50200502	0.5	4	2	2	45
	50200503	0.5	4	2	3	45
	50200505	0.5	4	2.5	5	45
	50200507	0.5	4	2.5	7	45
	50200510	0.5	4	2.5	10	45
	502006005	0.6	4	2.4	0.5	45
	50200601	0.6	4	2.4	1	45
	502006015	0.6	4	2.4	1.5	45
	50200602	0.6	4	2.4	2	45
	50200603	0.6	4	2.4	3	45
	50200605	0.6	4	3	5	45
	50200607	0.6	4	3	7	45
	50200610	0.6	4	3	10	45
	502007005	0.7	4	2.8	0.5	45
	50200701	0.7	4	2.8	1	45
	502007015	0.7	4	2.8	1.5	45
	50200702	0.7	4	2.8	2	45

	형 번	DC	DCON-MS	APMX	BHTA	LF
UTE	50200703	0.7	4	2.8	3	45
	50200705	0.7	4	3.5	5	45
	50200707	0.7	4	3.5	7	45
	50200710	0.7	4	3.5	10	45
	502008005	0.8	4	3.2	0.5	45
	50200801	0.8	4	3.2	1	45
	502008015	0.8	4	3.2	1.5	45
	50200802	0.8	4	3.2	2	45
	50200803	0.8	4	3.2	3	45
	50200805	0.8	4	4	5	45
	50200807	0.8	4	4	7	45
	50200810	0.8	4	4	10	45
	502010005	1	4	4	0.5	50
	50201001	1	4	4	1	50
	502010015	1	4	4	1.5	50
	50201002	1	4	6	2	50
	50201003	1	4	6	3	50
	50201005	1	4	8	5	50
	50201007	1	4	8	7	50
	50201010	1	4	8	10	50
	502015005	1.5	4	6	0.5	50
	50201501	1.5	4	6	1	50
	502015015	1.5	4	6	1.5	50
	50201502	1.5	4	8	2	50
	50201503	1.5	4	8	3	50
	50201505	1.5	4	10	5	50
	50201507	1.5	4	10	7	50
	50201510	1.5	6	10	10	50
	502020005	2	4	8	0.5	50
	50202001	2	4	8	1	50
	502020015	2	4	8	1.5	50
	50202002	2	4	10	2	50
	50202003	2	4	10	3	50
	50202005	2	6	12	5	50
	50202007	2	6	12	7	50
	50202010	2	8	12	10	50

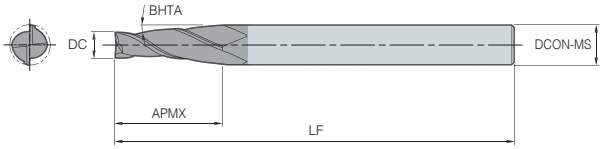
UTE502

2날 테이퍼 플랫

CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø0.3 ~ Ø6	0.000 ~ -0.012
Ø7 ~ Ø10	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	BHTA	LF
UTE	502025005	2.5	6	10	0.5	50
	50202501	2.5	6	10	1	50
	502025015	2.5	6	10	1.5	50
	50202502	2.5	6	12	2	50
	50202503	2.5	6	12	3	50
	50202505	2.5	6	14	5	50
	50202507	2.5	6	14	7	50
	50202510	2.5	8	14	10	50
	502030005	3	6	12	0.5	50
	50203001	3	6	12	1	50
	502030015	3	6	12	1.5	50
	50203002	3	6	14	2	50
	50203003	3	6	14	3	50
	50203005	3	6	16	5	50
	50203007	3	8	16	7	50
	50203010	3	10	16	10	50
	502040005	4	6	16	0.5	60
	50204001	4	6	16	1	60
	502040015	4	6	16	1.5	60
	50204002	4	6	16	2	60
	50204003	4	6	19	3	60
	50204005	4	8	22	5	65
	50204007	4	8	16	7	65
	50204010	4	10	17	10	65
	502060005	6	8	20	0.5	65
	50206001	6	8	20	1	65
	502060015	6	8	20	1.5	65
	50206002	6	8	20	2	65

	형 번	DC	DCON-MS	APMX	BHTA	LF
UTE	50206003	6	8	19	3	65
	50206005	6	10	22	5	75
	50206007	6	12	24	7	75
	50206010	6	12	17	10	75
	502070005	7	8	28	0.5	70
	50207001	7	8	28	1	70
	502070015	7	10	28	1.5	70
	50207002	7	10	28	2	80
	50207003	7	10	28	3	80
	50207005	7	12	28	5	80
	502080005	8	10	35	0.5	90
	50208001	8	10	35	1	90
	502080015	8	10	35	1.5	90
	50208002	8	10	28	2	90
	50208003	8	12	38	3	90
	50208005	8	16	45	5	100
	50208007	8	16	32	7	90
	50208010	8	20	34	10	100
	50208010S25	8	25	48	10	150
	502100005	10	12	40	0.5	90
	50210001	10	12	40	1	90
	502100015	10	12	38	1.5	90
	50210002	10	16	40	2	75
	50210003	10	16	40	3	100
	50210005	10	16	34	5	100
	50210007	10	20	40	7	90
	50210010	10	25	42	10	100

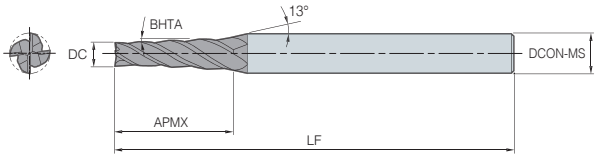
UTE504

4날 테이퍼 플랫

CARBIDE | 4 | H·A 30° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø0.8 ~ Ø6	0.000 ~ -0.012
Ø7 ~ Ø10	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	BHTA	LF
UTE	50400800504	0.8	4	4	0.5	45
	50400800506	0.8	4	6	0.5	45
	50400800508	0.8	4	8	0.5	45
	50400800510	0.8	4	10	0.5	45
	50400800512	0.8	4	12	0.5	45
	50400801004	0.8	4	4	1	45
	50400801006	0.8	4	6	1	45
	50400801008	0.8	4	8	1	45
	50400801010	0.8	4	10	1	45
	50400801012	0.8	4	12	1	45
	50400801504	0.8	4	4	1.5	45
	50400801506	0.8	4	6	1.5	45
	50400801508	0.8	4	8	1.5	45
	50400801510	0.8	4	10	1.5	45
	50400801512	0.8	4	12	1.5	45
	50400802004	0.8	4	4	2	45
	50400802006	0.8	4	6	2	45
	50400802008	0.8	4	8	2	45
	50400802010	0.8	4	10	2	45
	50400802012	0.8	4	12	2	45
	50401000504	1	4	4	0.5	50
	50401000506	1	4	6	0.5	50
	50401000508	1	4	8	0.5	50
	50401000510	1	4	10	0.5	50
	50401000512	1	4	12	0.5	50
	50401000516	1	4	16	0.5	50
	50401001004	1	4	4	1	50
	50401001006	1	4	6	1	50
	50401001008	1	4	8	1	50
	50401001010	1	4	10	1	50
	50401001012	1	4	12	1	50
	50401001016	1	4	16	1	50
	50401001504	1	4	4	1.5	50
	50401001506	1	4	6	1.5	50
	50401001508	1	4	8	1.5	50
	50401001510	1	4	10	1.5	50
	50401001512	1	4	12	1.5	50

	형 번	DC	DCON-MS	APMX	BHTA	LF
UTE	50401001516	1	4	16	1.5	50
	50401002004	1	4	4	2	50
	50401002006	1	4	6	2	50
	50401002008	1	4	8	2	50
	50401002010	1	4	10	2	50
	50401002012	1	4	12	2	50
	50401002016	1	4	16	2	50
	50401003004	1	4	4	3	50
	50401003006	1	4	6	3	50
	50401003008	1	4	8	3	50
	50401003010	1	4	10	3	50
	50401003012	1	4	12	3	50
	50401003016	1	4	16	3	50
	50401200506	1.2	4	6	0.5	50
	50401200508	1.2	4	8	0.5	50
	50401200510	1.2	4	10	0.5	50
	50401200512	1.2	4	12	0.5	50
	50401200516	1.2	4	16	0.5	50
	50401201006	1.2	4	6	1	50
	50401201008	1.2	4	8	1	50
	50401201010	1.2	4	10	1	50
	50401201012	1.2	4	12	1	50
	50401201016	1.2	4	16	1	50
	50401201506	1.2	4	6	1.5	50
	50401201508	1.2	4	8	1.5	50
	50401201510	1.2	4	10	1.5	50
	50401201512	1.2	4	12	1.5	50
	50401201516	1.2	4	16	1.5	50
	50401202006	1.2	4	6	2	50
	50401202008	1.2	4	8	2	50
	50401202010	1.2	4	10	2	50
	50401202012	1.2	4	12	2	50
	50401202016	1.2	4	16	2	50
	50401203006	1.2	4	6	3	50
	50401203008	1.2	4	8	3	50
	50401203010	1.2	4	10	3	50
	50401203012	1.2	4	12	3	50

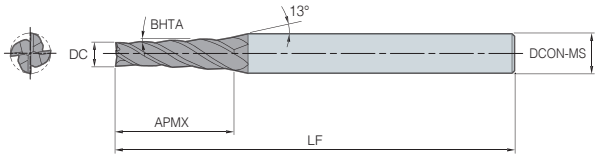
UTE504

4날 테이퍼 플랫

CARBIDE | 4 | H·A 30° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø0.8 ~ Ø6	0.000 ~ -0.012
Ø7 ~ Ø10	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	BHTA	LF
UTE	50401203016	1.2	4	16	3	50
	50401500506	1.5	4	6	0.5	50
	50401500508	1.5	4	8	0.5	50
	50401500510	1.5	4	10	0.5	50
	50401500512	1.5	4	12	0.5	50
	50401500516	1.5	4	16	0.5	50
	50401500520	1.5	4	20	0.5	60
	50401501006	1.5	4	6	1	50
	50401501008	1.5	4	8	1	50
	50401501010	1.5	4	10	1	50
	50401501012	1.5	4	12	1	50
	50401501016	1.5	4	16	1	50
	50401501020	1.5	4	20	1	60
	50401501506	1.5	4	6	1.5	50
	50401501508	1.5	4	8	1.5	50
	50401501510	1.5	4	10	1.5	50
	50401501512	1.5	4	12	1.5	50
	50401501516	1.5	4	16	1.5	50
	50401501520	1.5	4	20	1.5	60
	50401502006	1.5	4	6	2	50
	50401502008	1.5	4	8	2	50
	50401502010	1.5	4	10	2	50
	50401502012	1.5	4	12	2	50
	50401502016	1.5	4	16	2	50
	50401502020	1.5	4	20	2	60
	50401503006	1.5	4	6	3	50
	50401503008	1.5	4	8	3	50
	50401503010	1.5	4	10	3	50
	50401503012	1.5	4	12	3	50
	50401503016	1.5	4	16	3	50
	50401503020	1.5	4	20	3	60
	50402000508	2	4	8	0.5	50
	50402000510	2	4	10	0.5	50
	50402000512	2	4	12	0.5	50
	50402000516	2	4	16	0.5	50
	50402000520	2	4	20	0.5	60
	50402000525	2	4	25	0.5	60

	형 번	DC	DCON-MS	APMX	BHTA	LF
UTE	50402001008	2	4	8	1	50
	50402001010	2	4	10	1	50
	50402001012	2	4	12	1	50
	50402001016	2	4	16	1	50
	50402001020	2	4	20	1	60
	50402001025	2	4	25	1	60
	50402001508	2	4	8	1.5	50
	50402001510	2	4	10	1.5	50
	50402001512	2	4	12	1.5	50
	50402001516	2	4	16	1.5	50
	50402001520	2	4	20	1.5	60
	50402001525	2	4	25	1.5	60
	50402002008	2	4	8	2	50
	50402002010	2	4	10	2	50
	50402002012	2	4	12	2	50
	50402002016	2	4	16	2	50
	50402002020	2	4	20	2	60
	50402002025	2	4	25	2	60
	50402003008	2	4	8	3	50
	50402003010	2	4	10	3	50
	50402003012	2	4	12	3	50
	50402003016	2	4	16	3	50
	50402003020	2	6	20	3	60
	50402003025	2	6	25	3	60
	50402500510	2.5	4	10	0.5	50
	50402500512	2.5	4	12	0.5	50
	50402500516	2.5	4	16	0.5	50
	50402500520	2.5	4	20	0.5	60
	50402500525	2.5	4	25	0.5	60
	50402500530	2.5	4	30	0.5	60
	50402501010	2.5	4	10	1	50
	50402501012	2.5	4	12	1	50
	50402501016	2.5	4	16	1	50
	50402501020	2.5	4	20	1	60
	50402501025	2.5	4	25	1	60
	50402501030	2.5	4	30	1	60
	50402501510	2.5	4	10	1.5	50

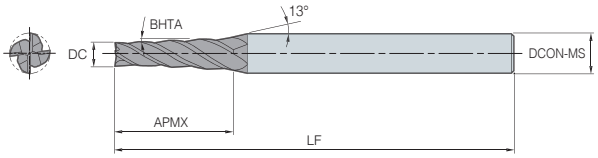
UTE504

4날 테이퍼 플랫

CARBIDE | 4 | H·A 30° | 재종 PC315W | h5 shank

DC	공구직경공차
Ø0.8 ~ Ø6	0.000 ~ -0.012
Ø7 ~ Ø10	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	BHTA	LF
UTE	UTE50402501512	2.5	4	12	1.5	50
	UTE50402501516	2.5	4	16	1.5	50
	UTE50402501520	2.5	4	20	1.5	60
	UTE50402501525	2.5	4	25	1.5	60
	UTE50402501530	2.5	6	30	1.5	60
	UTE50402502010	2.5	4	10	2	50
	UTE50402502012	2.5	4	12	2	50
	UTE50402502016	2.5	4	16	2	50
	UTE50402502020	2.5	4	20	2	60
	UTE50402502025	2.5	6	25	2	60
	UTE50402502030	2.5	6	30	2	60
	UTE50402503010	2.5	4	10	3	50
	UTE50402503012	2.5	4	12	3	50
	UTE50402503016	2.5	6	16	3	50
	UTE50402503020	2.5	6	20	3	60
	UTE50402503025	2.5	6	25	3	60
	UTE50402503030	2.5	6	30	3	60
	UTE504030005	3	6	12	0.5	50
	UTE50403001	3	6	12	1	50
	UTE504030015	3	6	12	1.5	50
	UTE50403002	3	6	14	2	50
	UTE50403003	3	6	14	3	50
	UTE50403005	3	6	16	5	50
	UTE50403007	3	8	16	7	50
	UTE50403010	3	10	16	10	50
	UTE504040005	4	6	16	0.5	60
	UTE50404001	4	6	16	1	60
	UTE504040015	4	6	16	1.5	60
	UTE50404002	4	6	16	2	60
	UTE50404003	4	6	19	3	60
	UTE50404005	4	8	22	5	65
	UTE50404007	4	8	16	7	65

	형 번	DC	DCON-MS	APMX	BHTA	LF
UTE	UTE50404010	4	10	17	10	65
	UTE504060005	6	8	20	0.5	65
	UTE50406001	6	8	20	1	65
	UTE504060015	6	8	20	1.5	65
	UTE50406002	6	8	20	2	65
	UTE50406003	6	8	19	3	65
	UTE50406005	6	10	22	5	75
	UTE50406007	6	12	24	7	75
	UTE50406010	6	12	17	10	75
	UTE504070005	7	8	28	0.5	70
	UTE50407001	7	8	28	1	70
	UTE504070015	7	10	28	1.5	70
	UTE50407002	7	10	28	2	80
	UTE50407003	7	10	28	3	80
	UTE50407005	7	12	28	5	80
	UTE504080005	8	10	35	0.5	90
	UTE50408001	8	10	35	1	90
	UTE504080015	8	10	35	1.5	90
	UTE50408002	8	10	28	2	90
	UTE50408003	8	12	38	3	90
	UTE50408005	8	16	45	5	100
	UTE50408007	8	16	32	7	90
	UTE50408010	8	20	34	10	100
	UTE504100005	10	12	40	0.5	90
	UTE50410001	10	12	40	1	90
	UTE504100015	10	12	38	1.5	90
	UTE50410002	10	16	40	2	90
	UTE50410003	10	16	40	3	100
	UTE50410005	10	16	34	5	100
	UTE50410007	10	20	40	7	90
	UTE50410010	10	25	42	10	100

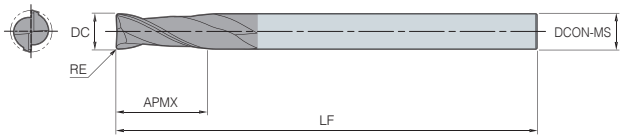
UR502

2날 레디우스



CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø7 ~ Ø20	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LF	RE
UR	502002002	0.2	4	0.4	40	0.02
	502002005	0.2	4	0.4	40	0.05
	502003002	0.3	4	0.6	40	0.02
	502003005	0.3	4	0.6	40	0.05
	502004005	0.4	4	0.8	40	0.05
	50200401	0.4	4	0.8	40	0.1
	502005005	0.5	4	1	40	0.05
	50200501	0.5	4	1	40	0.1
	502006005	0.6	4	1.2	40	0.05
	50200601	0.6	4	1.2	40	0.1
	50200602	0.6	4	1.2	40	0.2
	502007005	0.7	4	1.4	40	0.05
	50200701	0.7	4	1.4	40	0.1
	50200702	0.7	4	1.4	40	0.2
	502008005	0.8	4	1.6	40	0.05
	50200801	0.8	4	1.6	40	0.1
	50200802	0.8	4	1.6	40	0.2
	502009005	0.9	4	1.8	40	0.05
	50200901	0.9	4	1.8	40	0.1
	502010005	1	6	2.5	50	0.05
	50201001	1	6	2.5	50	0.1
	50201002	1	6	2.5	50	0.2
	50201003	1	6	2.5	50	0.3
	502012005	1.2	6	3	50	0.05
	50201201	1.2	6	3	50	0.1
	50201202	1.2	6	3	50	0.2
	50201203	1.2	6	3	50	0.3
	502015005	1.5	6	4	50	0.05
	50201501	1.5	6	4	50	0.1
	50201502	1.5	6	4	50	0.2
	50201503	1.5	6	4	50	0.3
	50201505	1.5	6	4	50	0.5
	50202001	2	6	6	50	0.1
	50202002	2	6	6	50	0.2
	50202003	2	6	6	50	0.3
	50202005	2	6	6	50	0.5
	50202501	2.5	6	7	60	0.1
	50202502	2.5	6	7	60	0.2
	50202503	2.5	6	7	60	0.3

	형 번	DC	DCON-MS	APMX	LF	RE
UR	50202505	2.5	6	7	60	0.5
	50203001	3	6	8	60	0.1
	50203002	3	6	8	60	0.2
	50203003	3	6	8	60	0.3
	50203005	3	6	8	60	0.5
	50203010	3	6	8	60	1
	50203501	3.5	6	10	70	0.1
	50203502	3.5	6	10	70	0.2
	50203503	3.5	6	10	70	0.3
	50203505	3.5	6	10	70	0.5
	50204001	4	6	10	70	0.1
	50204001100S4	4	4	10	100	0.1
	50204001S4	4	4	10	70	0.1
	50204002	4	6	10	70	0.2
	50204002100S4	4	4	10	100	0.2
	50204002S4	4	4	10	70	0.2
	50204003	4	6	10	70	0.3
	50204003100S4	4	4	10	100	0.3
	50204003S4	4	4	10	70	0.3
	50204005	4	6	10	70	0.5
	50204005100S4	4	4	10	100	0.5
	50204005S4	4	4	10	70	0.5
	50204010	4	6	10	70	1
	50204010100S4	4	4	10	100	1
	50204010S4	4	4	10	70	1
	50204501	4.5	6	11	80	0.1
	50204502	4.5	6	11	80	0.2
	50204503	4.5	6	11	80	0.3
	50204505	4.5	6	11	80	0.5
	50205001	5	6	13	90	0.1
	50205002	5	6	13	90	0.2
	50205003	5	6	13	90	0.3
	50205005	5	6	13	90	0.5
	50205010	5	6	13	90	1
	50205501	5.5	6	13	90	0.1
	50205502	5.5	6	13	90	0.2
	50205503	5.5	6	13	90	0.3
	50205505	5.5	6	13	90	0.5
	50205510	5.5	6	13	90	1

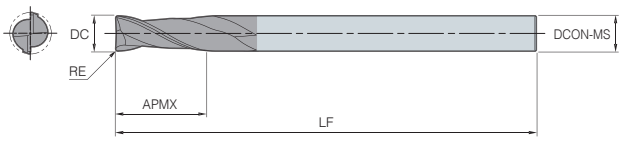
UR502

2날 레디우스



CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø7 ~ Ø20	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LF	RE
UR	50206001	6	6	15	90	0.1
	50206002	6	6	15	90	0.2
	50206003	6	6	15	90	0.3
	5020600360	6	6	15	60	0.3
	50206005	6	6	15	90	0.5
	50206005110	6	6	15	110	0.5
	50206005130	6	6	15	130	0.5
	5020600560	6	6	15	60	0.5
	50206010	6	6	15	90	1
	50206010110	6	6	15	110	1
	50206010130	6	6	15	130	1
	5020601060	6	6	15	60	1
	50206015	6	6	15	90	1.5
	50206020	6	6	15	90	2
	50207001	7	8	16	90	0.1
	50207002	7	8	16	90	0.2
	50207003	7	8	16	90	0.3
	50207005	7	8	16	90	0.5
	50207010	7	8	16	90	1
	50207020	7	8	16	90	2
	50208001	8	8	20	100	0.1
	50208002	8	8	20	100	0.2
	50208003	8	8	20	100	0.3
	5020800370	8	8	20	70	0.3
	50208005	8	8	20	100	0.5
	50208005120	8	8	20	120	0.5
	50208005150	8	8	20	150	0.5
	5020800570	8	8	20	70	0.5
	50208010	8	8	20	100	1
	50208010120	8	8	20	120	1
	50208010150	8	8	20	150	1
	5020801070	8	8	20	70	1
	50208015	8	8	20	100	1.5
	50208020	8	8	20	100	2
	50208025	8	8	20	100	2.5
	50208030	8	8	20	100	3
	50210001	10	10	25	100	0.1
	50210002	10	10	25	100	0.2
	50210003	10	10	25	100	0.3

	형 번	DC	DCON-MS	APMX	LF	RE
UR	5021000375	10	10	25	75	0.3
	50210005	10	10	25	100	0.5
	50210005130	10	10	25	130	0.5
	50210005150	10	10	25	150	0.5
	5021000575	10	10	25	75	0.5
	50210010	10	10	25	100	1
	50210010130	10	10	25	130	1
	50210010150	10	10	25	150	1
	5021001075	10	10	25	75	1
	50210015	10	10	25	100	1.5
	50210020	10	10	25	100	2
	50210025	10	10	25	100	2.5
	50210030	10	10	25	100	3
	50210040	10	10	25	100	4
	50211002	11	12	25	110	0.2
	50211003	11	12	25	110	0.3
	50211005	11	12	25	110	0.5
	50211010	11	12	25	110	1
	50211020	11	12	25	110	2
	50212001	12	12	30	110	0.1
	50212002	12	12	30	110	0.2
	50212003	12	12	30	110	0.3
	5021200380	12	12	30	80	0.3
	50212005	12	12	30	110	0.5
	50212005130	12	12	30	130	0.5
	50212005150	12	12	30	150	0.5
	5021200580	12	12	30	80	0.5
	50212010	12	12	30	110	1
	50212010130	12	12	30	130	1
	50212010150	12	12	30	150	1
	5021201080	12	12	30	80	1
	50212015	12	12	30	110	1.5
	50212020	12	12	30	110	2
	50212025	12	12	30	110	2.5
	50212030	12	12	30	110	3
	50212040	12	12	30	110	4
	50212050	12	12	30	110	5
	50214005	14	16	30	150	0.5
	50214010	14	16	30	150	1

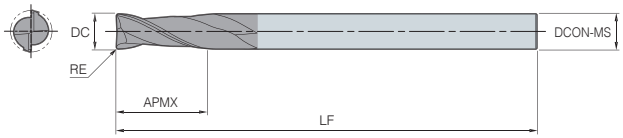
UR502

2날 레디우스



CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø7 ~ Ø20	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LF	RE
UR	50214020	14	16	30	150	2
	50216005	16	16	32	150	0.5
	50216010	16	16	32	150	1
	50216015	16	16	32	150	1.5
	50216020	16	2	32	150	16
	50210030	16	3	32	150	16

	형 번	DC	DCON-MS	APMX	LF	RE
UR	50220005	20	0.5	38	150	20
	50220010	20	1	38	150	20
	50220015	20	1.5	38	150	20
	50220020	20	2	38	150	20
	50220030	20	3	38	150	20

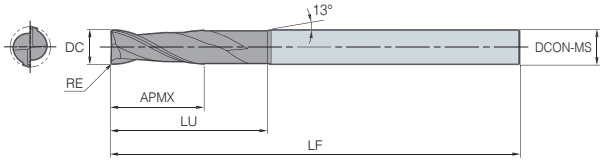
UR512

2날 넥 타입 레디우스

CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
UR	512002002005	0.2	4	0.3	0.5	40	0.02
	51200200201	0.2	4	0.3	1	40	0.02
	512002002015	0.2	4	0.3	1.5	40	0.02
	51200200202	0.2	4	0.3	2	40	0.02
	512002005005	0.2	4	0.3	0.5	40	0.05
	51200200501	0.2	4	0.3	1	40	0.05
	512002005015	0.2	4	0.3	1.5	40	0.05
	51200200502	0.2	4	0.3	2	40	0.05
	51200300201	0.3	4	0.5	1	40	0.02
	51200300202	0.3	4	0.5	2	40	0.02
	51200300203	0.3	4	0.5	3	40	0.02
	51200300501	0.3	4	0.5	1	40	0.05
	51200300502	0.3	4	0.5	2	40	0.05
	51200300503	0.3	4	0.5	3	40	0.05
	51200400501	0.4	4	0.6	1	40	0.05
	512004005015	0.4	4	0.6	1.5	40	0.05
	51200400502	0.4	4	0.6	2	40	0.05
	512004005025	0.4	4	0.6	2.5	40	0.05
	51200400503	0.4	4	0.6	3	40	0.05
	51200400504	0.4	4	0.6	4	40	0.05
	5120040101	0.4	4	0.6	1	40	0.1
	51200401015	0.4	4	0.6	1.5	40	0.1
	5120040102	0.4	4	0.6	2	40	0.1
	51200401025	0.4	4	0.6	2.5	40	0.1
	5120040103	0.4	4	0.6	3	40	0.1
	5120040104	0.4	4	0.6	4	40	0.1
	51200500501	0.5	4	0.7	1	45	0.05
	512005005015	0.5	4	0.7	1.5	45	0.05
	51200500502	0.5	4	0.7	2	45	0.05
	512005005025	0.5	4	0.7	2.5	45	0.05
	51200500503	0.5	4	0.7	3	45	0.05
	51200500504	0.5	4	0.7	4	45	0.05
	51200500505	0.5	4	0.7	5	45	0.05
	51200500506	0.5	4	0.7	6	45	0.05
	5120050101	0.5	4	0.7	1	45	0.1
	51200501015	0.5	4	0.7	1.5	45	0.1
	5120050102	0.5	4	0.7	2	45	0.1
	51200501025	0.5	4	0.7	2.5	45	0.1

형 번		DC	DCON-MS	APMX	LU	LF	RE
UR	5120050103	0.5	4	0.7	3	45	0.1
	5120050104	0.5	4	0.7	4	45	0.1
	5120050105	0.5	4	0.7	5	45	0.1
	5120050106	0.5	4	0.7	6	45	0.1
	51200600502	0.6	4	0.9	2	45	0.05
	51200600503	0.6	4	0.9	3	45	0.05
	51200600504	0.6	4	0.9	4	45	0.05
	51200600506	0.6	4	0.9	6	45	0.05
	51200600508	0.6	4	0.9	8	45	0.05
	51200600510	0.6	4	0.9	10	45	0.05
	5120060102	0.6	4	0.9	2	45	0.1
	5120060103	0.6	4	0.9	3	45	0.1
	5120060104	0.6	4	0.9	4	45	0.1
	5120060106	0.6	4	0.9	6	45	0.1
	5120060108	0.6	4	0.9	8	45	0.1
	5120060110	0.6	4	0.9	10	45	0.1
	5120060202	0.6	4	0.9	2	45	0.2
	5120060203	0.6	4	0.9	3	45	0.2
	5120060204	0.6	4	0.9	4	45	0.2
	5120060206	0.6	4	0.9	6	45	0.2
	5120060208	0.6	4	0.9	8	45	0.2
	5120060210	0.6	4	0.9	10	45	0.2
	51200700502	0.7	4	1.2	2	45	0.05
	51200700504	0.7	4	1.2	4	45	0.05
	51200700506	0.7	4	1.2	6	45	0.05
	51200700508	0.7	4	1.2	8	45	0.05
	51200700510	0.7	4	1.2	10	45	0.05
	5120070102	0.7	4	1.2	2	45	0.1
	5120070104	0.7	4	1.2	4	45	0.1
	5120070106	0.7	4	1.2	6	45	0.1
	5120070108	0.7	4	1.2	8	45	0.1
	5120070110	0.7	4	1.2	10	45	0.1
	5120070202	0.7	4	1.2	2	45	0.2
	5120070204	0.7	4	1.2	4	45	0.2
	5120070206	0.7	4	1.2	6	45	0.2
	5120070208	0.7	4	1.2	8	45	0.2
	5120070210	0.7	4	1.2	10	45	0.2
	51200800502	0.8	4	1.2	2	45	0.05

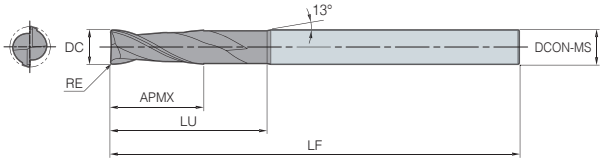
UR512

2날 넥 타입 레디우스

CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UR	51200800503	0.8	4	1.2	3	45	0.05
	51200800504	0.8	4	1.2	4	45	0.05
	51200800506	0.8	4	1.2	6	45	0.05
	51200800508	0.8	4	1.2	8	45	0.05
	51200800510	0.8	4	1.2	10	45	0.05
	5120080102	0.8	4	1.2	2	45	0.1
	5120080103	0.8	4	1.2	3	45	0.1
	5120080104	0.8	4	1.2	4	45	0.1
	5120080106	0.8	4	1.2	6	45	0.1
	5120080108	0.8	4	1.2	8	45	0.1
	5120080110	0.8	4	1.2	10	45	0.1
	5120080202	0.8	4	1.2	2	45	0.2
	5120080203	0.8	4	1.2	3	45	0.2
	5120080204	0.8	4	1.2	4	45	0.2
	5120080206	0.8	4	1.2	6	45	0.2
	5120080208	0.8	4	1.2	8	45	0.2
	5120080210	0.8	4	1.2	10	45	0.2
	51201000503	1	4	1.5	3	50	0.05
	51201000504	1	4	1.5	4	50	0.05
	51201000506	1	4	1.5	6	50	0.05
	51201000508	1	4	1.5	8	50	0.05
	51201000510	1	4	1.5	10	50	0.05
	51201000512	1	4	1.5	12	50	0.05
	51201000514	1	4	1.5	14	50	0.05
	51201000516	1	4	1.5	16	50	0.05
	51201000520	1	4	1.5	20	50	0.05
	5120100103	1	4	1.5	3	50	0.1
	5120100104	1	4	1.5	4	50	0.1
	5120100106	1	4	1.5	6	50	0.1
	5120100108	1	4	1.5	8	50	0.1
	5120100110	1	4	1.5	10	50	0.1
	5120100112	1	4	1.5	12	50	0.1
	5120100114	1	4	1.5	14	50	0.1
	5120100116	1	4	1.5	16	50	0.1
	5120100120	1	4	1.5	20	50	0.1
	5120100203	1	4	1.5	3	50	0.2
	5120100204	1	4	1.5	4	50	0.2
	5120100206	1	4	1.5	6	50	0.2

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UR	5120100208	1	4	1.5	8	50	0.2
	5120100210	1	4	1.5	10	50	0.2
	5120100212	1	4	1.5	12	50	0.2
	5120100214	1	4	1.5	14	50	0.2
	5120100216	1	4	1.5	16	50	0.2
	5120100220	1	4	1.5	20	50	0.2
	5120100303	1	4	1.5	3	50	0.3
	5120100304	1	4	1.5	4	50	0.3
	5120100306	1	4	1.5	6	50	0.3
	5120100308	1	4	1.5	8	50	0.3
	5120100310	1	4	1.5	10	50	0.3
	5120100312	1	4	1.5	12	50	0.3
	5120100314	1	4	1.5	14	50	0.3
	5120100316	1	4	1.5	16	50	0.3
	5120100320	1	4	1.5	20	50	0.3
	51201200503	1.2	4	1.8	3	50	0.05
	51201200504	1.2	4	1.8	4	50	0.05
	51201200506	1.2	4	1.8	6	50	0.05
	51201200508	1.2	4	1.8	8	50	0.05
	51201200510	1.2	4	1.8	10	50	0.05
	51201200512	1.2	4	1.8	12	50	0.05
	51201200516	1.2	4	1.8	16	50	0.05
	51201200520	1.2	4	1.8	20	50	0.05
	5120120103	1.2	4	1.8	3	50	0.1
	5120120104	1.2	4	1.8	4	50	0.1
	5120120106	1.2	4	1.8	6	50	0.1
	5120120108	1.2	4	1.8	8	50	0.1
	5120120110	1.2	4	1.8	10	50	0.1
	5120120112	1.2	4	1.8	12	50	0.1
	5120120116	1.2	4	1.8	16	50	0.1
	5120120120	1.2	4	1.8	20	50	0.1
	5120120203	1.2	4	1.8	3	50	0.2
	5120120204	1.2	4	1.8	4	50	0.2
	5120120206	1.2	4	1.8	6	50	0.2
	5120120208	1.2	4	1.8	8	50	0.2
	5120120210	1.2	4	1.8	10	50	0.2
	5120120212	1.2	4	1.8	12	50	0.2
	5120120216	1.2	4	1.8	16	50	0.2

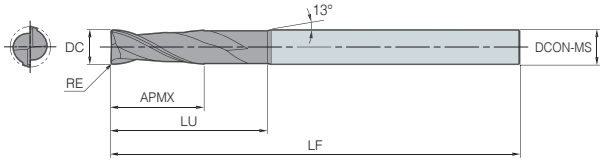
UR512

2날 넥 타입 레디우스

CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
UR	5120120220	1.2	4	1.8	20	50	0.2
	5120120303	1.2	4	1.8	3	50	0.3
	5120120304	1.2	4	1.8	4	50	0.3
	5120120306	1.2	4	1.8	6	50	0.3
	5120120308	1.2	4	1.8	8	50	0.3
	5120120310	1.2	4	1.8	10	50	0.3
	5120120312	1.2	4	1.8	12	50	0.3
	5120120316	1.2	4	1.8	16	50	0.3
	5120120320	1.2	4	1.8	20	50	0.3
	51201500504	1.5	4	2.3	4	50	0.05
	51201500506	1.5	4	2.3	6	50	0.05
	51201500508	1.5	4	2.3	8	50	0.05
	51201500510	1.5	4	2.3	10	50	0.05
	51201500512	1.5	4	2.3	12	50	0.05
	51201500514	1.5	4	2.3	14	50	0.05
	51201500516	1.5	4	2.3	16	50	0.05
	51201500520	1.5	4	2.3	20	50	0.05
	51201500522	1.5	4	2.3	22	60	0.05
	51201500526	1.5	4	2.3	26	60	0.05
	5120150104	1.5	4	2.3	4	50	0.1
	5120150106	1.5	4	2.3	6	50	0.1
	5120150108	1.5	4	2.3	8	50	0.1
	5120150110	1.5	4	2.3	10	50	0.1
	5120150112	1.5	4	2.3	12	50	0.1
	5120150114	1.5	4	2.3	14	50	0.1
	5120150116	1.5	4	2.3	16	50	0.1
	5120150120	1.5	4	2.3	20	50	0.1
	5120150122	1.5	4	2.3	22	60	0.1
	5120150126	1.5	4	2.3	26	60	0.1
	5120150204	1.5	4	2.3	4	50	0.2
	5120150206	1.5	4	2.3	6	50	0.2
	5120150208	1.5	4	2.3	8	50	0.2
	5120150210	1.5	4	2.3	10	50	0.2
	5120150212	1.5	4	2.3	12	50	0.2
	5120150214	1.5	4	2.3	14	50	0.2
	5120150216	1.5	4	2.3	16	50	0.2
	5120150220	1.5	4	2.3	20	50	0.2
	5120150222	1.5	4	2.3	22	60	0.2

형 번		DC	DCON-MS	APMX	LU	LF	RE
UR	5120150226	1.5	4	2.3	26	60	0.2
	5120150304	1.5	4	2.3	4	50	0.3
	5120150306	1.5	4	2.3	6	50	0.3
	5120150308	1.5	4	2.3	8	50	0.3
	5120150310	1.5	4	2.3	10	50	0.3
	5120150312	1.5	4	2.3	12	50	0.3
	5120150314	1.5	4	2.3	14	50	0.3
	5120150316	1.5	4	2.3	16	50	0.3
	5120150320	1.5	4	2.3	20	50	0.3
	5120150322	1.5	4	2.3	22	60	0.3
	5120150326	1.5	4	2.3	26	60	0.3
	5120150504	1.5	4	2.3	4	50	0.5
	5120150506	1.5	4	2.3	6	50	0.5
	5120150508	1.5	4	2.3	8	50	0.5
	5120150510	1.5	4	2.3	10	50	0.5
	5120150512	1.5	4	2.3	12	50	0.5
	5120150514	1.5	4	2.3	14	50	0.5
	5120150516	1.5	4	2.3	16	50	0.5
	5120150520	1.5	4	2.3	20	50	0.5
	5120150522	1.5	4	2.3	22	60	0.5
	5120150526	1.5	4	2.3	26	60	0.5
	5120200106	2	4	3	6	50	0.1
	5120200108	2	4	3	8	50	0.1
	5120200110	2	4	3	10	50	0.1
	5120200112	2	4	3	12	50	0.1
	5120200114	2	4	3	14	50	0.1
	5120200116	2	4	3	16	50	0.1
	5120200120	2	4	3	20	50	0.1
	5120200122	2	4	3	22	60	0.1
	5120200126	2	4	3	26	60	0.1
	5120200130	2	4	3	30	70	0.1
	5120200206	2	4	3	6	50	0.2
	5120200208	2	4	3	8	50	0.2
	5120200210	2	4	3	10	50	0.2
	5120200212	2	4	3	12	50	0.2
	5120200214	2	4	3	14	50	0.2
	5120200216	2	4	3	16	50	0.2
	5120200220	2	4	3	20	50	0.2

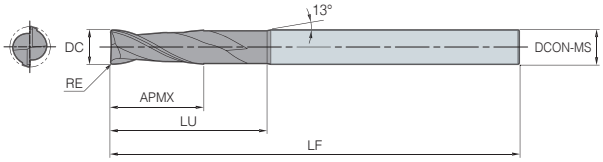
UR512

2날 넥 타입 레디우스

CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UR	5120200222	2	4	3	22	60	0.2
	5120200226	2	4	3	26	60	0.2
	5120200230	2	4	3	30	70	0.2
	5120200306	2	4	3	6	50	0.3
	5120200308	2	4	3	8	50	0.3
	5120200310	2	4	3	10	50	0.3
	5120200312	2	4	3	12	50	0.3
	5120200314	2	4	3	14	50	0.3
	5120200316	2	4	3	16	50	0.3
	5120200320	2	4	3	20	50	0.3
	5120200322	2	4	3	22	60	0.3
	5120200326	2	4	3	26	60	0.3
	5120200330	2	4	3	30	70	0.3
	5120200506	2	4	3	6	50	0.5
	5120200508	2	4	3	8	50	0.5
	5120200510	2	4	3	10	50	0.5
	5120200512	2	4	3	12	50	0.5
	5120200514	2	4	3	14	50	0.5
	5120200516	2	4	3	16	50	0.5
	5120200520	2	4	3	20	50	0.5
	5120200522	2	4	3	22	60	0.5
	5120200526	2	4	3	26	60	0.5
	5120200530	2	4	3	30	70	0.5
	5120250108	2.5	4	4	8	50	0.1
	5120250110	2.5	4	4	10	50	0.1
	5120250112	2.5	4	4	12	50	0.1
	5120250114	2.5	4	4	14	50	0.1
	5120250116	2.5	4	4	16	50	0.1
	5120250120	2.5	4	4	20	50	0.1
	5120250126	2.5	4	4	26	60	0.1
	5120250130	2.5	4	4	30	70	0.1
	5120250208	2.5	4	4	8	50	0.2
	5120250210	2.5	4	4	10	50	0.2
	5120250212	2.5	4	4	12	50	0.2
	5120250214	2.5	4	4	14	50	0.2
	5120250216	2.5	4	4	16	50	0.2
	5120250220	2.5	4	4	20	50	0.2
	5120250226	2.5	4	4	26	60	0.2

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UR	5120250230	2.5	4	4	30	70	0.2
	5120250308	2.5	4	4	8	50	0.3
	5120250310	2.5	4	4	10	50	0.3
	5120250312	2.5	4	4	12	50	0.3
	5120250314	2.5	4	4	14	50	0.3
	5120250316	2.5	4	4	16	50	0.3
	5120250320	2.5	4	4	20	50	0.3
	5120250326	2.5	4	4	26	60	0.3
	5120250330	2.5	4	4	30	70	0.3
	5120250508	2.5	4	4	8	50	0.5
	5120250510	2.5	4	4	10	50	0.5
	5120250512	2.5	4	4	12	50	0.5
	5120250514	2.5	4	4	14	50	0.5
	5120250516	2.5	4	4	16	50	0.5
	5120250520	2.5	4	4	20	50	0.5
	5120250526	2.5	4	4	26	60	0.5
	5120250530	2.5	4	4	30	70	0.5
	5120300108	3	6	4.5	8	50	0.1
	5120300110	3	6	4.5	10	50	0.1
	5120300112	3	6	4.5	12	50	0.1
	5120300114	3	6	4.5	14	60	0.1
	5120300116	3	6	4.5	16	60	0.1
	5120300120	3	6	4.5	20	60	0.1
	5120300126	3	6	4.5	26	65	0.1
	5120300130	3	6	4.5	30	70	0.1
	5120300135	3	6	4.5	35	70	0.1
	5120300140	3	6	4.5	40	80	0.1
	5120300208	3	6	4.5	8	50	0.2
	5120300210	3	6	4.5	10	50	0.2
	5120300212	3	6	4.5	12	50	0.2
	5120300214	3	6	4.5	14	60	0.2
	5120300216	3	6	4.5	16	60	0.2
	5120300220	3	6	4.5	20	60	0.2
	5120300226	3	6	4.5	26	65	0.2
	5120300230	3	6	4.5	30	70	0.2
	5120300235	3	6	4.5	35	70	0.2
	5120300240	3	6	4.5	40	80	0.2
	5120300308	3	6	4.5	8	50	0.3

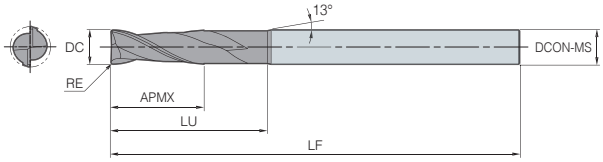
UR512

2날 넥 타입 레디우스

CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UR	5120300310	3	6	4.5	10	50	0.3
	5120300312	3	6	4.5	12	50	0.3
	5120300314	3	6	4.5	14	60	0.3
	5120300316	3	6	4.5	16	60	0.3
	5120300320	3	6	4.5	20	60	0.3
	5120300326	3	6	4.5	26	65	0.3
	5120300330	3	6	4.5	30	70	0.3
	5120300335	3	6	4.5	35	70	0.3
	5120300340	3	6	4.5	40	80	0.3
	5120300508	3	6	4.5	8	50	0.5
	5120300510	3	6	4.5	10	50	0.5
	5120300512	3	6	4.5	12	50	0.5
	5120300514	3	6	4.5	14	60	0.5
	5120300516	3	6	4.5	16	60	0.5
	5120300520	3	6	4.5	20	60	0.5
	5120300526	3	6	4.5	26	65	0.5
	5120300530	3	6	4.5	30	70	0.5
	5120300535	3	6	4.5	35	70	0.5
	5120300540	3	6	4.5	40	80	0.5
	5120301008	3	6	4.5	8	50	1
	5120301010	3	6	4.5	10	50	1
	5120301012	3	6	4.5	12	50	1
	5120301014	3	6	4.5	14	60	1
	5120301016	3	6	4.5	16	60	1
	5120301020	3	6	4.5	20	60	1
	5120301026	3	6	4.5	26	65	1
	5120301030	3	6	4.5	30	70	1
	5120301035	3	6	4.5	35	70	1
	5120301040	3	6	4.5	40	80	1
	5120400110	4	6	6	10	50	0.1
	5120400112	4	6	6	12	50	0.1
	5120400114	4	6	6	14	60	0.1
	5120400116	4	6	6	16	60	0.1
	5120400120	4	6	6	20	60	0.1
	5120400126	4	6	6	26	65	0.1
	5120400130	4	6	6	30	65	0.1
	5120400135	4	6	6	35	70	0.1
	5120400140	4	6	6	40	80	0.1

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UR	5120400145	4	6	6	45	90	0.1
	5120400150	4	6	6	50	100	0.1
	5120400210	4	6	6	10	50	0.2
	5120400212	4	6	6	12	50	0.2
	5120400214	4	6	6	14	60	0.2
	5120400216	4	6	6	16	60	0.2
	5120400220	4	6	6	20	60	0.2
	5120400226	4	6	6	26	65	0.2
	5120400230	4	6	6	30	65	0.2
	5120400235	4	6	6	35	70	0.2
	5120400240	4	6	6	40	80	0.2
	5120400245	4	6	6	45	90	0.2
	5120400250	4	6	6	50	100	0.2
	5120400310	4	6	6	10	50	0.3
	5120400312	4	6	6	12	50	0.3
	5120400314	4	6	6	14	60	0.3
	5120400316	4	6	6	16	60	0.3
	5120400320	4	6	6	20	60	0.3
	5120400326	4	6	6	26	65	0.3
	5120400330	4	6	6	30	65	0.3
	5120400335	4	6	6	35	70	0.3
	5120400340	4	6	6	40	80	0.3
	5120400345	4	6	6	45	90	0.3
	5120400350	4	6	6	50	100	0.3
	5120400510	4	6	6	10	50	0.5
	5120400512	4	6	6	12	50	0.5
	5120400514	4	6	6	14	60	0.5
	5120400516	4	6	6	16	60	0.5
	5120400520	4	6	6	20	60	0.5
	5120400526	4	6	6	26	65	0.5
	5120400530	4	6	6	30	65	0.5
	5120400535	4	6	6	35	70	0.5
	5120400540	4	6	6	40	80	0.5
	5120400545	4	6	6	45	90	0.5
	5120400550	4	6	6	50	100	0.5
	5120401010	4	6	6	10	50	1
	5120401012	4	6	6	12	50	1
	5120401014	4	6	6	14	60	1

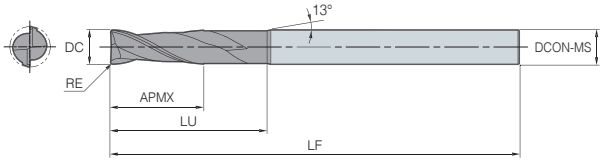
UR512

2날 넥 타입 레디우스

CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01 (DC6 이하) | RE공차 ±0.015 (DC6 초과)

DC	공구직경공차
Ø0.2 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UR	5120401016	4	6	6	16	60	1
	5120401020	4	6	6	20	60	1
	5120401026	4	6	6	26	65	1
	5120401030	4	6	6	30	65	1
	5120401035	4	6	6	35	70	1
	5120401040	4	6	6	40	80	1
	5120401045	4	6	6	45	90	1
	5120401050	4	6	6	50	100	1
	51205001	5	6	8	15	60	0.1
	51205002	5	6	8	15	60	0.2
	51205003	5	6	8	15	60	0.3
	51205005	5	6	8	15	60	0.5
	51205010	5	6	8	15	60	1
	51205015	5	6	8	15	60	1.5
	51205020	5	6	8	15	60	2
	51206001	6	6	9	20	60	0.1
	51206002	6	6	9	20	60	0.2
	51206003	6	6	9	20	60	0.3
	5120600390	6	6	15	30	90	0.3
	51206005	6	6	9	20	60	0.5
	5120600590	6	6	15	30	90	0.5
	51206010	6	6	9	20	60	1
	5120601090	6	6	15	30	90	1
	51206015	6	6	9	20	60	1.5
	51206020	6	6	9	20	60	2
	51208001	8	8	12	25	70	0.1
	51208002	8	8	12	25	70	0.2
	51208003	8	8	12	25	70	0.3
	51208003100	8	8	20	35	100	0.3
	51208005	8	8	12	25	70	0.5
	51208005100	8	8	20	35	100	0.5

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UR	51208010	8	8	12	25	70	1
	51208010100	8	8	20	35	100	1
	51208015	8	8	12	25	70	1.5
	51208020	8	8	12	25	70	2
	51210001	10	10	15	30	75	0.1
	51210002	10	10	15	30	75	0.2
	51210003	10	10	15	30	75	0.3
	51210003100	10	10	25	40	100	0.3
	51210005	10	10	15	30	75	0.5
	51210005100	10	10	25	40	100	0.5
	51210010	10	10	15	30	75	1
	51210010100	10	10	25	40	100	1
	51210015	10	10	15	30	75	1.5
	51210020	10	10	15	30	75	2
	51212002	12	12	18	32	80	0.2
	51212003	12	12	18	32	80	0.3
	51212003110	12	12	30	45	110	0.3
	51212005	12	12	18	32	80	0.5
	51212005110	12	12	30	45	110	0.5
	51212010	12	12	18	32	80	1
	51212010110	12	12	30	45	110	1
	51212015	12	12	18	32	80	1.5
	51212020	12	12	18	32	80	2
	51216005	16	16	20	35	100	0.5
	51216005150	16	16	35	50	150	0.5
	51216010	16	16	20	35	100	1
	51216010150	16	16	35	50	150	1
	51220005	20	20	25	40	100	0.5
	51220005150	20	20	40	55	150	0.5
	51220010	20	20	25	40	100	1
	51220010150	20	20	40	55	150	1

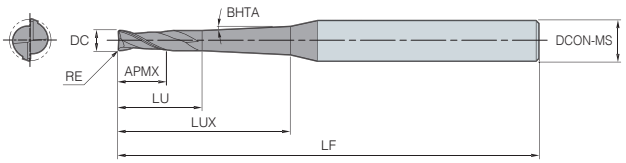
UR542

2날 테이퍼 넥 레디우스



CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012





(mm)

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	5420020050101	0.2	4	0.3	0.4	1	40	1	0.05
	5420020050102	0.2	4	0.3	0.4	2	40	1	0.05
	5420020050103	0.2	4	0.3	0.4	3	40	1	0.05
	5420020050201	0.2	4	0.3	0.4	1	40	2	0.05
	5420020050202	0.2	4	0.3	0.4	2	40	2	0.05
	5420020050203	0.2	4	0.3	0.4	3	40	2	0.05
	5420030050102	0.3	4	0.5	0.6	2	40	1	0.05
	5420030050103	0.3	4	0.5	0.6	3	40	1	0.05
	5420030050104	0.3	4	0.5	0.6	4	40	1	0.05
	5420030050105	0.3	4	0.5	0.6	5	40	1	0.05
	5420030050202	0.3	4	0.5	0.6	2	40	2	0.05
	5420030050203	0.3	4	0.5	0.6	3	40	2	0.05
	5420030050204	0.3	4	0.5	0.6	4	40	2	0.05
	5420030050205	0.3	4	0.5	0.6	5	40	2	0.05
	5420040050102	0.4	4	0.6	0.8	2	50	1	0.05
	5420040050103	0.4	4	0.6	0.8	3	50	1	0.05
	5420040050104	0.4	4	0.6	0.8	4	50	1	0.05
	5420040050105	0.4	4	0.6	0.8	5	50	1	0.05
	5420040050106	0.4	4	0.6	0.8	6	50	1	0.05
	5420040050202	0.4	4	0.6	0.8	2	50	2	0.05
	5420040050203	0.4	4	0.6	0.8	3	50	2	0.05
	5420040050204	0.4	4	0.6	0.8	4	50	2	0.05
	5420040050205	0.4	4	0.6	0.8	5	50	2	0.05
	5420040050206	0.4	4	0.6	0.8	6	50	2	0.05
	542004010102	0.4	4	0.6	0.8	2	50	1	0.1
	542004010103	0.4	4	0.6	0.8	3	50	1	0.1
	542004010104	0.4	4	0.6	0.8	4	50	1	0.1
	542004010105	0.4	4	0.6	0.8	5	50	1	0.1
	542004010106	0.4	4	0.6	0.8	6	50	1	0.1
	542004010202	0.4	4	0.6	0.8	2	50	2	0.1
	542004010203	0.4	4	0.6	0.8	3	50	2	0.1
	542004010204	0.4	4	0.6	0.8	4	50	2	0.1
	542004010205	0.4	4	0.6	0.8	5	50	2	0.1

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	542004010206	0.4	4	0.6	0.8	6	50	2	0.1
	5420050050104	0.5	4	0.7	1	4	50	1	0.05
	5420050050106	0.5	4	0.7	1	6	50	1	0.05
	5420050050108	0.5	4	0.7	1	8	50	1	0.05
	5420050050110	0.5	4	0.7	1	10	50	1	0.05
	5420050050204	0.5	4	0.7	1	4	50	2	0.05
	5420050050206	0.5	4	0.7	1	6	50	2	0.05
	5420050050208	0.5	4	0.7	1	8	50	2	0.05
	5420050050210	0.5	4	0.7	1	10	50	2	0.05
	542005010104	0.5	4	0.7	1	4	50	1	0.1
	542005010106	0.5	4	0.7	1	6	50	1	0.1
	542005010108	0.5	4	0.7	1	8	50	1	0.1
	542005010110	0.5	4	0.7	1	10	50	1	0.1
	542005010204	0.5	4	0.7	1	4	50	2	0.1
	542005010206	0.5	4	0.7	1	6	50	2	0.1
	542005010208	0.5	4	0.7	1	8	50	2	0.1
	542005010210	0.5	4	0.7	1	10	50	2	0.1
	542006010104	0.6	4	0.9	1.2	4	50	1	0.1
	542006010106	0.6	4	0.9	1.2	6	50	1	0.1
	542006010108	0.6	4	0.9	1.2	8	50	1	0.1
	542006010110	0.6	4	0.9	1.2	10	50	1	0.1
	542006010112	0.6	4	0.9	1.2	12	50	1	0.1
	542006010204	0.6	4	0.9	1.2	4	50	2	0.1
	542006010206	0.6	4	0.9	1.2	6	50	2	0.1
	542006010208	0.6	4	0.9	1.2	8	50	2	0.1
	542006010210	0.6	4	0.9	1.2	10	50	2	0.1
	542006010212	0.6	4	0.9	1.2	12	50	2	0.1
	542006020104	0.6	4	0.9	1.2	4	50	1	0.2
	542006020106	0.6	4	0.9	1.2	6	50	1	0.2
	542006020108	0.6	4	0.9	1.2	8	50	1	0.2
	542006020110	0.6	4	0.9	1.2	10	50	1	0.2
	542006020112	0.6	4	0.9	1.2	12	50	1	0.2
	542006020204	0.6	4	0.9	1.2	4	50	2	0.2

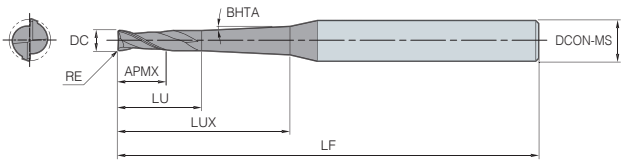
UR542

2날 테이퍼 넥 레디우스



CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012





(mm)

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	542006020206	0.6	4	0.9	1.2	6	50	2	0.2
	542006020208	0.6	4	0.9	1.2	8	50	2	0.2
	542006020210	0.6	4	0.9	1.2	10	50	2	0.2
	542006020212	0.6	4	0.9	1.2	12	50	2	0.2
	542008010104	0.8	4	1.2	1.6	4	50	1	0.1
	542008010106	0.8	4	1.2	1.6	6	50	1	0.1
	542008010108	0.8	4	1.2	1.6	8	50	1	0.1
	542008010110	0.8	4	1.2	1.6	10	50	1	0.1
	542008010112	0.8	4	1.2	1.6	12	50	1	0.1
	542008010116	0.8	4	1.2	1.6	16	50	1	0.1
	542008010204	0.8	4	1.2	1.6	4	50	2	0.1
	542008010206	0.8	4	1.2	1.6	6	50	2	0.1
	542008010208	0.8	4	1.2	1.6	8	50	2	0.1
	542008010210	0.8	4	1.2	1.6	10	50	2	0.1
	542008010212	0.8	4	1.2	1.6	12	50	2	0.1
	542008010216	0.8	4	1.2	1.6	16	50	2	0.1
	542008020104	0.8	4	1.2	1.6	4	50	1	0.2
	542008020106	0.8	4	1.2	1.6	6	50	1	0.2
	542008020108	0.8	4	1.2	1.6	8	50	1	0.2
	542008020110	0.8	4	1.2	1.6	10	50	1	0.2
	542008020112	0.8	4	1.2	1.6	12	50	1	0.2
	542008020116	0.8	4	1.2	1.6	16	50	1	0.2
	542008020204	0.8	4	1.2	1.6	4	50	2	0.2
	542008020206	0.8	4	1.2	1.6	6	50	2	0.2
	542008020208	0.8	4	1.2	1.6	8	50	2	0.2
	542008020210	0.8	4	1.2	1.6	10	50	2	0.2
	542008020212	0.8	4	1.2	1.6	12	50	2	0.2
	542008020216	0.8	4	1.2	1.6	16	50	2	0.2
	542010010106	1	4	1.5	2.5	6	50	1	0.1
	542010010108	1	4	1.5	2.5	8	50	1	0.1
	542010010110	1	4	1.5	2.5	10	50	1	0.1
	542010010112	1	4	1.5	2.5	12	50	1	0.1
	542010010116	1	4	1.5	2.5	16	50	1	0.1

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	542010010120	1	4	1.5	2.5	20	50	1	0.1
	542010010125	1	4	1.5	2.5	25	60	1	0.1
	542010010130	1	4	1.5	2.5	30	70	1	0.1
	542010010140	1	4	1.5	2.5	40	80	1	0.1
	542010010150	1	6	1.5	2.5	50	90	1	0.1
	542010010206	1	4	1.5	2.5	6	50	2	0.1
	542010010208	1	4	1.5	2.5	8	50	2	0.1
	542010010210	1	4	1.5	2.5	10	50	2	0.1
	542010010212	1	4	1.5	2.5	12	50	2	0.1
	542010010216	1	4	1.5	2.5	16	50	2	0.1
	542010010220	1	4	1.5	2.5	20	50	2	0.1
	542010010225	1	4	1.5	2.5	25	60	2	0.1
	542010010230	1	4	1.5	2.5	30	70	2	0.1
	542010010240	1	4	1.5	2.5	40	80	2	0.1
	542010010250	1	6	1.5	2.5	50	90	2	0.1
	542010020106	1	4	1.5	2.5	6	50	1	0.2
	542010020108	1	4	1.5	2.5	8	50	1	0.2
	542010020110	1	4	1.5	2.5	10	50	1	0.2
	542010020112	1	4	1.5	2.5	12	50	1	0.2
	542010020116	1	4	1.5	2.5	16	50	1	0.2
	542010020120	1	4	1.5	2.5	20	50	1	0.2
	542010020125	1	4	1.5	2.5	25	60	1	0.2
	542010020130	1	4	1.5	2.5	30	70	1	0.2
	542010020140	1	4	1.5	2.5	40	80	1	0.2
	542010020150	1	6	1.5	2.5	50	90	1	0.2
	542010020206	1	4	1.5	2.5	6	50	2	0.2
	542010020208	1	4	1.5	2.5	8	50	2	0.2
	542010020210	1	4	1.5	2.5	10	50	2	0.2
	542010020212	1	4	1.5	2.5	12	50	2	0.2
	542010020216	1	4	1.5	2.5	16	50	2	0.2
	542010020220	1	4	1.5	2.5	20	50	2	0.2
	542010020225	1	4	1.5	2.5	25	60	2	0.2
	542010020230	1	4	1.5	2.5	30	70	2	0.2

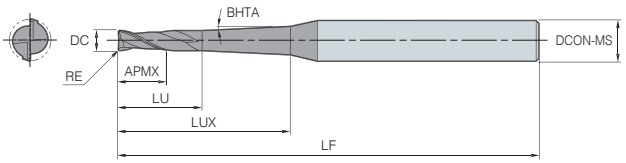
UR542

2날 테이퍼 넥 레디우스



CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012





(mm)

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	542010020240	1	4	1.5	2.5	40	80	2	0.2
	542010020250	1	6	1.5	2.5	50	90	2	0.2
	542012010108	1.2	4	1.8	3	8	50	1	0.1
	542012010112	1.2	4	1.8	3	12	50	1	0.1
	542012010116	1.2	4	1.8	3	16	50	1	0.1
	542012010120	1.2	4	1.8	3	20	50	1	0.1
	542012010125	1.2	4	1.8	3	25	60	1	0.1
	542012010130	1.2	4	1.8	3	30	70	1	0.1
	542012010208	1.2	4	1.8	3	8	50	2	0.1
	542012010212	1.2	4	1.8	3	12	50	2	0.1
	542012010216	1.2	4	1.8	3	16	50	2	0.1
	542012010220	1.2	4	1.8	3	20	50	2	0.1
	542012010225	1.2	4	1.8	3	25	60	2	0.1
	542012010230	1.2	4	1.8	3	30	70	2	0.1
	542012020108	1.2	4	1.8	3	8	50	1	0.2
	542012020112	1.2	4	1.8	3	12	50	1	0.2
	542012020116	1.2	4	1.8	3	16	50	1	0.2
	542012020120	1.2	4	1.8	3	20	50	1	0.2
	542012020125	1.2	4	1.8	3	25	60	1	0.2
	542012020130	1.2	4	1.8	3	30	70	1	0.2
	542012020208	1.2	4	1.8	3	8	50	2	0.2
	542012020212	1.2	4	1.8	3	12	50	2	0.2
	542012020216	1.2	4	1.8	3	16	50	2	0.2
	542012020220	1.2	4	1.8	3	20	50	2	0.2
	542012020225	1.2	4	1.8	3	25	60	2	0.2
	542012020230	1.2	4	1.8	3	30	70	2	0.2
	542015010108	1.5	4	2.3	3	8	50	1	0.1
	542015010110	1.5	4	2.3	3	10	50	1	0.1
	542015010112	1.5	4	2.3	3	12	50	1	0.1
	542015010116	1.5	4	2.3	3	16	50	1	0.1
	542015010120	1.5	4	2.3	3	20	50	1	0.1
	542015010125	1.5	4	2.3	3	25	60	1	0.1
	542015010130	1.5	4	2.3	3	30	70	1	0.1

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	542015010140	1.5	4	2.3	3	40	80	1	0.1
	542015010150	1.5	4	2.3	3	50	90	1	0.1
	542015010208	1.5	4	2.3	3	8	50	2	0.1
	542015010210	1.5	4	2.3	3	10	50	2	0.1
	542015010212	1.5	4	2.3	3	12	50	2	0.1
	542015010216	1.5	4	2.3	3	16	50	2	0.1
	542015010220	1.5	4	2.3	3	20	50	2	0.1
	542015010225	1.5	4	2.3	3	25	60	2	0.1
	542015010230	1.5	4	2.3	3	30	70	2	0.1
	542015010240	1.5	6	2.3	3	40	80	2	0.1
	542015010250	1.5	6	2.3	3	50	90	2	0.1
	542015020108	1.5	4	2.3	3	8	50	1	0.2
	542015020110	1.5	4	2.3	3	10	50	1	0.2
	542015020112	1.5	4	2.3	3	12	50	1	0.2
	542015020116	1.5	4	2.3	3	16	50	1	0.2
	542015020120	1.5	4	2.3	3	20	50	1	0.2
	542015020125	1.5	4	2.3	3	25	60	1	0.2
	542015020130	1.5	4	2.3	3	30	70	1	0.2
	542015020140	1.5	4	2.3	3	40	80	1	0.2
	542015020150	1.5	4	2.3	3	50	90	1	0.2
	542015020208	1.5	4	2.3	3	8	50	2	0.2
	542015020210	1.5	4	2.3	3	10	50	2	0.2
	542015020212	1.5	4	2.3	3	12	50	2	0.2
	542015020216	1.5	4	2.3	3	16	50	2	0.2
	542015020220	1.5	4	2.3	3	20	50	2	0.2
	542015020225	1.5	4	2.3	3	25	60	2	0.2
	542015020230	1.5	4	2.3	3	30	70	2	0.2
	542015020240	1.5	6	2.3	3	40	80	2	0.2
	542015020250	1.5	6	2.3	3	50	90	2	0.2
	542015030108	1.5	4	2.3	3	8	50	1	0.3
	542015030110	1.5	4	2.3	3	10	50	1	0.3
	542015030112	1.5	4	2.3	3	12	50	1	0.3
	542015030116	1.5	4	2.3	3	16	50	1	0.3

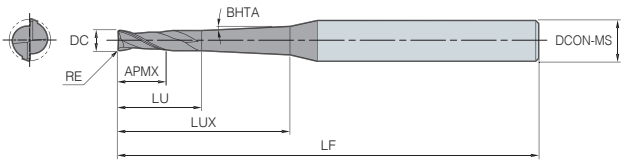
UR542

2날 테이퍼 넥 레디우스



CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012





(mm)

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	542015030120	1.5	4	2.3	3	20	50	1	0.3
	542015030125	1.5	4	2.3	3	25	60	1	0.3
	542015030130	1.5	4	2.3	3	30	70	1	0.3
	542015030140	1.5	4	2.3	3	40	80	1	0.3
	542015030150	1.5	4	2.3	3	50	90	1	0.3
	542015030208	1.5	4	2.3	3	8	50	2	0.3
	542015030210	1.5	4	2.3	3	10	50	2	0.3
	542015030212	1.5	4	2.3	3	12	50	2	0.3
	542015030216	1.5	4	2.3	3	16	50	2	0.3
	542015030220	1.5	4	2.3	3	20	50	2	0.3
	542015030225	1.5	4	2.3	3	25	60	2	0.3
	542015030230	1.5	4	2.3	3	30	70	2	0.3
	542015030240	1.5	6	2.3	3	40	80	2	0.3
	542015030250	1.5	6	2.3	3	50	90	2	0.3
	542020010110	2	4	2	5	10	50	1	0.1
	542020010112	2	4	2	5	12	50	1	0.1
	542020010116	2	4	2	5	16	50	1	0.1
	542020010120	2	4	2	5	20	50	1	0.1
	542020010125	2	4	2	5	25	60	1	0.1
	542020010130	2	4	2	5	30	70	1	0.1
	542020010140	2	6	2	5	40	80	1	0.1
	542020010150	2	6	2	5	50	100	1	0.1
	542020010160	2	6	2	5	60	100	1	0.1
	542020010180	2	6	2	5	80	140	1	0.1
	542020010210	2	4	2	5	10	50	2	0.1
	542020010212	2	4	2	5	12	50	2	0.1
	542020010216	2	4	2	5	16	50	2	0.1
	542020010220	2	4	2	5	20	50	2	0.1
	542020010225	2	4	2	5	25	60	2	0.1
	542020010230	2	4	2	5	30	70	2	0.1
	542020010240	2	6	2	5	40	80	2	0.1
	542020010250	2	6	2	5	50	100	2	0.1
	542020010260	2	6	2	5	60	100	2	0.1

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	542020010280	2	8	2	5	80	140	2	0.1
	542020020110	2	4	2	5	10	50	1	0.2
	542020020112	2	4	2	5	12	50	1	0.2
	542020020116	2	4	2	5	16	50	1	0.2
	542020020120	2	4	2	5	20	50	1	0.2
	542020020125	2	4	2	5	25	60	1	0.2
	542020020130	2	4	2	5	30	70	1	0.2
	542020020140	2	6	2	5	40	80	1	0.2
	542020020150	2	6	2	5	50	100	1	0.2
	542020020160	2	6	2	5	60	100	1	0.2
	542020020180	2	6	2	5	80	140	1	0.2
	542020020210	2	4	2	5	10	50	2	0.2
	542020020212	2	4	2	5	12	50	2	0.2
	542020020216	2	4	2	5	16	50	2	0.2
	542020020220	2	4	2	5	20	50	2	0.2
	542020020225	2	4	2	5	25	60	2	0.2
	542020020230	2	4	2	5	30	70	2	0.2
	542020020240	2	6	2	5	40	80	2	0.2
	542020020250	2	6	2	5	50	100	2	0.2
	542020020260	2	6	2	5	60	100	2	0.2
	542020020280	2	8	2	5	80	140	2	0.2
	542020030110	2	4	2	5	10	50	1	0.3
	542020030112	2	4	2	5	12	50	1	0.3
	542020030116	2	4	2	5	16	50	1	0.3
	542020030120	2	4	2	5	20	50	1	0.3
	542020030125	2	4	2	5	25	60	1	0.3
	542020030130	2	4	2	5	30	70	1	0.3
	542020030140	2	6	2	5	40	80	1	0.3
	542020030150	2	6	2	5	50	100	1	0.3
	542020030160	2	6	2	5	60	100	1	0.3
	542020030180	2	6	2	5	80	140	1	0.3
	542020030210	2	4	2	5	10	50	2	0.3
	542020030212	2	4	2	5	12	50	2	0.3

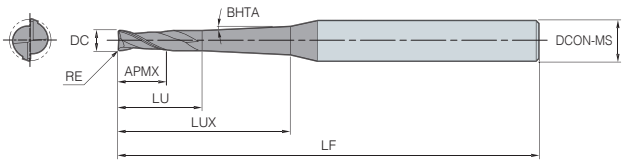
UR542

2날 테이퍼 넥 레디우스



CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012





(mm)

형 번		DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	542020030216	2	4	2	5	16	50	2	0.3
	542020030220	2	4	2	5	20	50	2	0.3
	542020030225	2	4	2	5	25	60	2	0.3
	542030050260	3	8	4.5	6	60	100	2	0.5
	542030050270	3	8	4.5	6	70	120	2	0.5
	542040020140	4	6	6	8	40	90	1	0.2
	542040020150	4	6	6	8	50	100	1	0.2
	542020030230	2	4	2	5	30	70	2	0.3
	542020030240	2	6	2	5	40	80	2	0.3
	542020030250	2	6	2	5	50	100	2	0.3
	542020030260	2	6	2	5	60	100	2	0.3
	542020030280	2	8	2	5	80	140	2	0.3
	542020050110	2	4	2	5	10	50	1	0.5
	542020050112	2	4	2	5	12	50	1	0.5
	542020050116	2	4	2	5	16	50	1	0.5
	542020050120	2	4	2	5	20	50	1	0.5
	542020050125	2	4	2	5	25	60	1	0.5
	542020050130	2	4	2	5	30	70	1	0.5
	542020050140	2	6	2	5	40	80	1	0.5
	542020050150	2	6	2	5	50	100	1	0.5
	542020050160	2	6	2	5	60	100	1	0.5
	542020050180	2	6	2	5	80	140	1	0.5
	542020050210	2	4	2	5	10	50	2	0.5
	542020050212	2	4	2	5	12	50	2	0.5
	542020050216	2	4	2	5	16	50	2	0.5
	542020050220	2	4	2	5	20	50	2	0.5
	542020050225	2	4	2	5	25	60	2	0.5
	542020050230	2	4	2	5	30	70	2	0.5
	542020050240	2	6	2	5	40	80	2	0.5
	542020050250	2	6	2	5	50	100	2	0.5
	542020050260	2	6	2	5	60	100	2	0.5
	542020050280	2	8	2	5	80	140	2	0.5
	542030020116	3	6	4.5	6	16	60	1	0.2

형 번		DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	542030020120	3	6	4.5	6	20	65	1	0.2
	542030020130	3	6	4.5	6	30	70	1	0.2
	542030020140	3	6	4.5	6	40	80	1	0.2
	542030020150	3	6	4.5	6	50	90	1	0.2
	542030020160	3	6	4.5	6	60	100	1	0.2
	542030020216	3	6	4.5	6	16	60	2	0.2
	542030020220	3	6	4.5	6	20	65	2	0.2
	542030020230	3	6	4.5	6	30	70	2	0.2
	542030020240	3	6	4.5	6	40	80	2	0.2
	542030020250	3	8	4.5	6	50	90	2	0.2
	542030020260	3	8	4.5	6	60	100	2	0.2
	542030020270	3	8	4.5	6	70	120	2	0.2
	542030030116	3	6	4.5	6	16	60	1	0.3
	542030030120	3	6	4.5	6	20	65	1	0.3
	542030030130	3	6	4.5	6	30	70	1	0.3
	542030030140	3	6	4.5	6	40	80	1	0.3
	542030030150	3	6	4.5	6	50	90	1	0.3
	542030030160	3	6	4.5	6	60	100	1	0.3
	542030030216	3	6	4.5	6	16	60	2	0.3
	542030030220	3	6	4.5	6	20	65	2	0.3
	542030030230	3	6	4.5	6	30	70	2	0.3
	542030030240	3	6	4.5	6	40	80	2	0.3
	542030030250	3	8	4.5	6	50	90	2	0.3
	542030030260	3	8	4.5	6	60	100	2	0.3
	542030030270	3	8	4.5	6	70	120	2	0.3
	542030050116	3	6	4.5	6	16	60	1	0.5
	542030050120	3	6	4.5	6	20	65	1	0.5
	542030050130	3	6	4.5	6	30	70	1	0.5
	542030050140	3	6	4.5	6	40	80	1	0.5
	542030050150	3	6	4.5	6	50	90	1	0.5
	542030050160	3	6	4.5	6	60	100	1	0.5
	542030050216	3	6	4.5	6	16	60	2	0.5
	542030050220	3	6	4.5	6	20	65	2	0.5

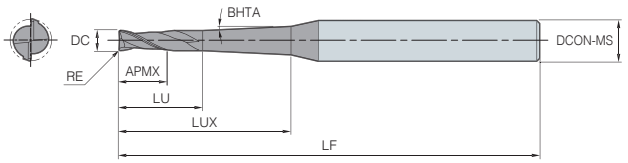
UR542

2날 테이퍼 넥 레디우스



CARBIDE | 2 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012





(mm)

형 번		DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	542030050230	3	6	4.5	6	30	70	2	0.5
	542030050240	3	6	4.5	6	40	80	2	0.5
	542030050250	3	8	4.5	6	50	90	2	0.5
	542040020160	4	6	6	8	60	110	1	0.2
	542040020170	4	8	6	8	70	120	1	0.2
	542040020240	4	8	6	8	40	90	2	0.2
	542040020250	4	8	6	8	50	100	2	0.2
	542040020260	4	8	6	8	60	110	2	0.2
	542040020270	4	10	6	8	70	120	2	0.2
	542040030140	4	6	6	8	40	90	1	0.3
	542040030150	4	6	6	8	50	100	1	0.3
	542040030160	4	6	6	8	60	110	1	0.3
	542040030170	4	8	6	8	70	120	1	0.3

형 번		DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	542040030240	4	8	6	8	40	90	2	0.3
	542040030250	4	8	6	8	50	100	2	0.3
	542040030260	4	8	6	8	60	110	2	0.3
	542040030270	4	10	6	8	70	120	2	0.3
	542040050140	4	6	6	8	40	90	1	0.5
	542040050150	4	6	6	8	50	100	1	0.5
	542040050160	4	6	6	8	60	110	1	0.5
	542040050170	4	8	6	8	70	120	1	0.5
	542040050240	4	8	6	8	40	90	2	0.5
	542040050250	4	8	6	8	50	100	2	0.5
	542040050260	4	8	6	8	60	110	2	0.5
	542040050270	4	10	6	8	70	120	2	0.5

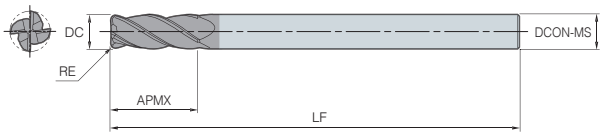
UR504

4날 레디우스



CARBIDE | 4 | H·A 40° | 재종 PC315W | h5 shank | RE공차 ±0.01

DC	공구직경공차
Ø3 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LF	RE
UR	50403002	3	6	8	60	0.2
	50403002S4	3	4	8	60	0.2
	50403003	3	6	8	60	0.3
	50403005	3	6	8	60	0.5
	50403005S4	3	4	8	60	0.5
	50404002	4	6	10	70	0.2
	50404002S4	4	4	10	70	0.2
	50404003	4	6	10	70	0.3
	50404005	4	6	10	70	0.5
	50404005S4	4	4	10	70	0.5
	50404010	4	6	10	70	1
	50404010S4	4	4	10	70	1
	50405002	5	6	13	90	0.2
	50405003	5	6	13	90	0.3
	50405003060	5	6	13	60	0.3
	50405005	5	6	13	90	0.5
	50405005060	5	6	13	60	0.5
	50405010	5	6	13	90	1
	50406002	6	6	13	90	0.2
	50406003	6	6	15	90	0.3
	50406003060	6	6	15	60	0.3
	50406005	6	6	15	90	0.5
	50406005060	6	6	15	60	0.5
	50406010	6	6	15	90	1
	50406010060	6	6	15	60	1
	50408003	8	8	20	100	0.3
	50408003070	8	8	20	70	0.3
	50408005	8	8	20	100	0.5
	50408005070	8	8	20	70	0.5
	50408010	8	8	20	100	1
	50408010070	8	8	20	70	1
	50408015	8	8	20	100	1.5
	50408020	8	8	20	100	2
	50410003	10	10	25	100	0.3

	형 번	DC	DCON-MS	APMX	LF	RE
UR	50410003075	10	10	25	75	0.3
	50410005	10	10	25	100	0.5
	50410005075	10	10	25	75	0.5
	50410010	10	10	25	100	1
	50410010075	10	10	25	75	1
	50410015	10	10	25	100	1.5
	50410020	10	10	25	100	2
	50410025	10	10	25	100	2.5
	50412003	12	12	30	110	0.3
	50412003080	12	12	30	80	0.3
	50412005	12	12	30	110	0.5
	50412005080	12	12	30	80	0.5
	50412010	12	12	30	110	1
	50412010080	12	12	30	80	1
	50412015	12	12	30	110	1.5
	50412020	12	12	30	110	2
	50412025	12	12	30	110	2.5
	50412030	12	12	30	110	3
	50416005	16	16	32	150	0.5
	50416005100	16	16	32	100	0.5
	50416010	16	16	32	150	1
	50416010100	16	16	32	100	1
	50416015	16	16	32	150	1.5
	50416015100	16	16	32	100	1.5
	50416020	16	16	32	150	2
	50416020100	16	16	32	100	2
	50420005	20	20	38	150	0.5
	50420005100	20	20	38	100	0.5
	50420010	20	20	38	150	1
	50420010100	20	20	38	100	1
	50420015	20	20	38	150	1.5
	50420015100	20	20	38	100	1.5
	50420020	20	20	38	150	2
	50420020100	20	20	38	100	2

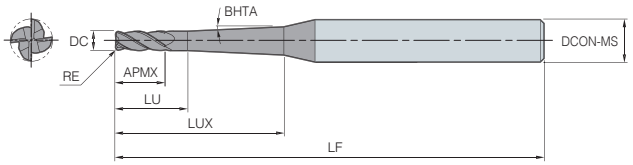
UR544

4날 테이퍼 넥 레디우스



CARBIDE | 4 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012





(mm)

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	544010010106	1	4	1.5	2.5	6	50	1	0.1
	544010010108	1	4	1.5	2.5	8	50	1	0.1
	544010010110	1	4	1.5	2.5	10	50	1	0.1
	544010010112	1	4	1.5	2.5	12	50	1	0.1
	544010010116	1	4	1.5	2.5	16	50	1	0.1
	544010010120	1	4	1.5	2.5	20	50	1	0.1
	544010010125	1	4	1.5	2.5	25	60	1	0.1
	544010010130	1	4	1.5	2.5	30	70	1	0.1
	544010010140	1	4	1.5	2.5	40	80	1	0.1
	544010010150	1	4	1.5	2.5	50	90	1	0.1
	544010010206	1	4	1.5	2.5	6	50	1	0.1
	544010010208	1	4	1.5	2.5	8	50	2	0.1
	544010010210	1	4	1.5	2.5	10	50	2	0.1
	544010010212	1	4	1.5	2.5	12	50	2	0.1
	544010010216	1	4	1.5	2.5	16	50	2	0.1
	544010010220	1	4	1.5	2.5	20	50	2	0.1
	544010010225	1	4	1.5	2.5	25	60	2	0.1
	544010010230	1	4	1.5	2.5	30	70	2	0.1
	544010010240	1	4	1.5	2.5	40	80	2	0.1
	544010010250	1	6	1.5	2.5	50	90	2	0.1
	544010020106	1	4	1.5	2.5	6	50	2	0.2
	544010020108	1	4	1.5	2.5	8	50	1	0.2
	544010020110	1	4	1.5	2.5	10	50	1	0.2
	544010020112	1	4	1.5	2.5	12	50	1	0.2
	544010020116	1	4	1.5	2.5	16	50	1	0.2
	544010020120	1	4	1.5	2.5	20	50	1	0.2
	544010020125	1	4	1.5	2.5	25	60	1	0.2
	544010020130	1	4	1.5	2.5	30	70	1	0.2
	544010020140	1	4	1.5	2.5	40	80	1	0.2
	544010020150	1	4	1.5	2.5	50	90	1	0.2
	544010020206	1	4	1.5	2.5	6	50	1	0.2
	544010020208	1	4	1.5	2.5	8	50	2	0.2
	544010020210	1	4	1.5	2.5	10	50	2	0.2
	544010020212	1	4	1.5	2.5	12	50	2	0.2
	544010020216	1	4	1.5	2.5	16	50	2	0.2
	544010020220	1	4	1.5	2.5	20	50	2	0.2

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	544010020225	1	4	1.5	2.5	25	60	2	0.2
	544010020230	1	4	1.5	2.5	30	70	2	0.2
	544010020240	1	4	1.5	2.5	40	80	2	0.2
	544010020250	1	6	1.5	2.5	50	90	2	0.2
	544012010108	1.2	4	1.8	3	8	50	2	0.1
	544012010112	1.2	4	1.8	3	12	50	1	0.1
	544012010116	1.2	4	1.8	3	16	50	1	0.1
	544012010120	1.2	4	1.8	3	20	50	1	0.1
	544012010125	1.2	4	1.8	3	25	60	1	0.1
	544012010130	1.2	4	1.8	3	30	70	1	0.1
	544012010208	1.2	4	1.8	3	8	50	1	0.1
	544012010212	1.2	4	1.8	3	12	50	2	0.1
	544012010216	1.2	4	1.8	3	16	50	2	0.1
	544012010220	1.2	4	1.8	3	20	50	2	0.1
	544012010225	1.2	4	1.8	3	25	60	2	0.1
	544012010230	1.2	4	1.8	3	30	70	2	0.1
	544012020108	1.2	4	1.8	3	8	50	2	0.2
	544012020112	1.2	4	1.8	3	12	50	1	0.2
	544012020116	1.2	4	1.8	3	16	50	1	0.2
	544012020120	1.2	4	1.8	3	20	50	1	0.2
	544012020125	1.2	4	1.8	3	25	60	1	0.2
	544012020130	1.2	4	1.8	3	30	70	1	0.2
	544012020208	1.2	4	1.8	3	8	50	1	0.2
	544012020212	1.2	4	1.8	3	12	50	2	0.2
	544012020216	1.2	4	1.8	3	16	50	2	0.2
	544012020220	1.2	4	1.8	3	20	50	2	0.2
	544012020225	1.2	4	1.8	3	25	60	2	0.2
	544012020230	1.2	4	1.8	3	30	70	2	0.2
	544015010108	1.5	4	2.3	3	8	50	2	0.1
	544015010110	1.5	4	2.3	3	10	50	1	0.1
	544015010112	1.5	4	2.3	3	12	50	1	0.1
	544015010116	1.5	4	2.3	3	16	50	1	0.1
	544015010120	1.5	4	2.3	3	20	50	1	0.1
	544015010125	1.5	4	2.3	3	25	60	1	0.1
	544015010130	1.5	4	2.3	3	30	70	1	0.1
	544015010140	1.5	4	2.3	3	40	80	1	0.1

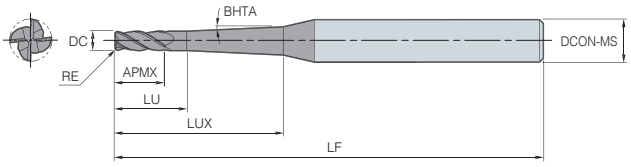
UR544

4날 테이퍼 넥 레디우스



CARBIDE | 4 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012





(mm)

형 번		DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	544015010150	1.5	4	2.3	3	50	90	1	0.1
	544015010208	1.5	4	2.3	3	8	50	1	0.1
	544015010210	1.5	4	2.3	3	10	50	2	0.1
	544015010212	1.5	4	2.3	3	12	50	2	0.1
	544015010216	1.5	4	2.3	3	16	50	2	0.1
	544015010220	1.5	4	2.3	3	20	50	2	0.1
	544015010225	1.5	4	2.3	3	25	60	2	0.1
	544015010230	1.5	4	2.3	3	30	70	2	0.1
	544015010240	1.5	6	2.3	3	40	80	2	0.1
	544015010250	1.5	6	2.3	3	50	90	2	0.1
	544015020108	1.5	4	2.3	3	8	50	2	0.2
	544015020110	1.5	4	2.3	3	10	50	1	0.2
	544015020112	1.5	4	2.3	3	12	50	1	0.2
	544015020116	1.5	4	2.3	3	16	50	1	0.2
	544015020120	1.5	4	2.3	3	20	50	1	0.2
	544015020125	1.5	4	2.3	3	25	60	1	0.2
	544015020130	1.5	4	2.3	3	30	70	1	0.2
	544015020140	1.5	4	2.3	3	40	80	1	0.2
	544015020150	1.5	4	2.3	3	50	90	1	0.2
	544015020208	1.5	4	2.3	3	8	50	1	0.2
	544015020210	1.5	4	2.3	3	10	50	2	0.2
	544015020212	1.5	4	2.3	3	12	50	2	0.2
	544015020216	1.5	4	2.3	3	16	50	2	0.2
	544015020220	1.5	4	2.3	3	20	50	2	0.2
	544015020225	1.5	4	2.3	3	25	60	2	0.2
	544015020230	1.5	4	2.3	3	30	70	2	0.2
	544015020240	1.5	6	2.3	3	40	80	2	0.2
	544015020250	1.5	6	2.3	3	50	90	2	0.2
	544015030108	1.5	4	2.3	3	8	50	2	0.3
	544015030110	1.5	4	2.3	3	10	50	1	0.3
	544015030112	1.5	4	2.3	3	12	50	1	0.3
	544015030116	1.5	4	2.3	3	16	50	1	0.3
	544015030120	1.5	4	2.3	3	20	50	1	0.3
	544015030125	1.5	4	2.3	3	25	60	1	0.3
	544015030130	1.5	4	2.3	3	30	70	1	0.3
	544015030140	1.5	4	2.3	3	40	80	1	0.3

형 번		DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	544015030150	1.5	4	2.3	3	50	90	1	0.3
	544015030208	1.5	4	2.3	3	8	50	1	0.3
	544015030210	1.5	4	2.3	3	10	50	2	0.3
	544015030212	1.5	4	2.3	3	12	50	2	0.3
	544015030216	1.5	4	2.3	3	16	50	2	0.3
	544015030220	1.5	4	2.3	3	20	50	2	0.3
	544015030225	1.5	4	2.3	3	25	60	2	0.3
	544015030230	1.5	4	2.3	3	30	70	2	0.3
	544015030240	1.5	6	2.3	3	40	80	2	0.3
	544015030250	1.5	6	2.3	3	50	90	2	0.3
	544020010110	2	4	2	5	10	50	2	0.1
	544020010112	2	4	2	5	12	50	1	0.1
	544020010116	2	4	2	5	16	50	1	0.1
	544020010120	2	4	2	5	20	50	1	0.1
	544020010125	2	4	2	5	25	60	1	0.1
	544020010130	2	4	2	5	30	70	1	0.1
	544020010140	2	6	2	5	40	80	1	0.1
	544020010150	2	6	2	5	50	100	1	0.1
	544020010160	2	6	2	5	60	100	1	0.1
	544020010180	2	6	2	5	80	140	1	0.1
	544020010210	2	4	2	5	10	50	1	0.1
	544020010212	2	4	2	5	12	50	2	0.1
	544020010216	2	4	2	5	16	50	2	0.1
	544020010220	2	4	2	5	20	50	2	0.1
	544020010225	2	4	2	5	25	60	2	0.1
	544020010230	2	4	2	5	30	70	2	0.1
	544020010240	2	6	2	5	40	80	2	0.1
	544020010250	2	6	2	5	50	100	2	0.1
	544020010260	2	6	2	5	60	100	2	0.1
	544020010280	2	8	2	5	80	140	2	0.1
	544020020110	2	4	2	5	10	50	2	0.2
	544020020112	2	4	2	5	12	50	1	0.2
	544020020116	2	4	2	5	16	50	1	0.2
	544020020120	2	4	2	5	20	50	1	0.2
	544020020125	2	4	2	5	25	60	1	0.2
	544020020130	2	4	2	5	30	70	1	0.2

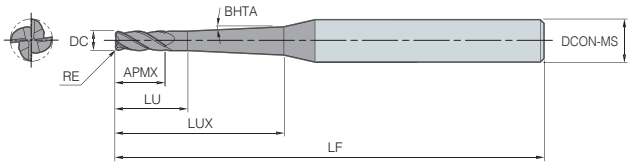
UR544

4날 테이퍼 넥 레디우스



CARBIDE | 4 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012





(mm)

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	544020020140	2	6	2	5	40	80	1	0.2
	544020020150	2	6	2	5	50	100	1	0.2
	544020020160	2	6	2	5	60	100	1	0.2
	544020020180	2	6	2	5	80	140	1	0.2
	544020020210	2	4	2	5	10	50	1	0.2
	544020020212	2	4	2	5	12	50	2	0.2
	544020020216	2	4	2	5	16	50	2	0.2
	544020020220	2	4	2	5	20	50	2	0.2
	544020020225	2	4	2	5	25	60	2	0.2
	544020020230	2	4	2	5	30	70	2	0.2
	544020020240	2	6	2	5	40	80	2	0.2
	544020020250	2	6	2	5	50	100	2	0.2
	544020020260	2	6	2	5	60	100	2	0.2
	544020020280	2	8	2	5	80	140	2	0.2
	544020030110	2	4	2	5	10	50	2	0.3
	544020030112	2	4	2	5	12	50	1	0.3
	544020030116	2	4	2	5	16	50	1	0.3
	544020030120	2	4	2	5	20	50	1	0.3
	544020030125	2	4	2	5	25	60	1	0.3
	544020030130	2	4	2	5	30	70	1	0.3
	544020030140	2	6	2	5	40	80	1	0.3
	544020030150	2	6	2	5	50	100	1	0.3
	544020030160	2	6	2	5	60	100	1	0.3
	544020030180	2	6	2	5	80	140	1	0.3
	544020030210	2	4	2	5	10	50	1	0.3
	544020030212	2	4	2	5	12	50	2	0.3
	544020030216	2	4	2	5	16	50	2	0.3
	544020030220	2	4	2	5	20	50	2	0.3
	544020030225	2	4	2	5	25	60	2	0.3
	544020030230	2	4	2	5	30	70	2	0.3
	544020030240	2	6	2	5	40	80	2	0.3
	544020030250	2	6	2	5	50	100	2	0.3
	544020030260	2	6	2	5	60	100	2	0.3
	544020030280	2	8	2	5	80	140	2	0.3
	544020050110	2	4	2	5	10	50	2	0.5
	544020050112	2	4	2	5	12	50	1	0.5

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	544020050116	2	4	2	5	16	50	1	0.5
	544020050120	2	4	2	5	20	50	1	0.5
	544020050125	2	4	2	5	25	60	1	0.5
	544020050130	2	4	2	5	30	70	1	0.5
	544020050140	2	6	2	5	40	80	1	0.5
	544020050150	2	6	2	5	50	100	1	0.5
	544020050160	2	6	2	5	60	100	1	0.5
	544020050180	2	6	2	5	80	140	1	0.5
	544020050210	2	4	2	5	10	50	1	0.5
	544020050212	2	4	2	5	12	50	2	0.5
	544020050216	2	4	2	5	16	50	2	0.5
	544020050220	2	4	2	5	20	50	2	0.5
	544020050225	2	4	2	5	25	60	2	0.5
	544020050230	2	4	2	5	30	70	2	0.5
	544020050240	2	6	2	5	40	80	2	0.5
	544020050250	2	6	2	5	50	100	2	0.5
	544020050260	2	6	2	5	60	100	2	0.5
	544020050280	2	8	2	5	80	140	2	0.5
	544030020116	3	6	4.5	6	16	60	2	0.2
	544030020120	3	6	4.5	6	20	65	1	0.2
	544030020130	3	6	4.5	6	30	70	1	0.2
	544030020140	3	6	4.5	6	40	80	1	0.2
	544030020150	3	6	4.5	6	50	90	1	0.2
	544030020160	3	6	4.5	6	60	100	1	0.2
	544030020216	3	6	4.5	6	16	60	1	0.2
	544030020220	3	6	4.5	6	20	65	2	0.2
	544030020230	3	6	4.5	6	30	70	2	0.2
	544030020240	3	6	4.5	6	40	80	2	0.2
	544030020250	3	8	4.5	6	50	90	2	0.2
	544030020260	3	8	4.5	6	60	100	2	0.2
	544030020270	3	8	4.5	6	70	120	2	0.2
	544030030116	3	6	4.5	6	16	60	2	0.3
	544030030120	3	6	4.5	6	20	65	1	0.3
	544030030130	3	6	4.5	6	30	70	1	0.3
	544030030140	3	6	4.5	6	40	80	1	0.3
	544030030150	3	6	4.5	6	50	90	1	0.3

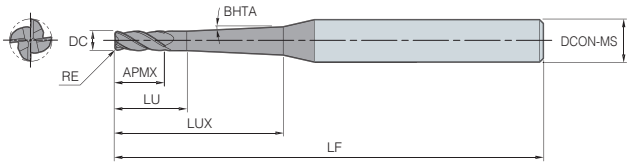
UR544

4날 테이퍼 넥 레디우스



CARBIDE | 4 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012





(mm)

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	544030030160	3	6	4.5	6	60	100	1	0.3
	544030030216	3	6	4.5	6	16	60	1	0.3
	544030030220	3	6	4.5	6	20	65	2	0.3
	544030030230	3	6	4.5	6	30	70	2	0.3
	544030030240	3	6	4.5	6	40	80	2	0.3
	544030030250	3	8	4.5	6	50	90	2	0.3
	544030030260	3	8	4.5	6	60	100	2	0.3
	544030030270	3	8	4.5	6	70	120	2	0.3
	544030050116	3	6	4.5	6	16	60	2	0.5
	544030050120	3	6	4.5	6	20	65	1	0.5
	544030050130	3	6	4.5	6	30	70	1	0.5
	544030050140	3	6	4.5	6	40	80	1	0.5
	544030050150	3	6	4.5	6	50	90	1	0.5
	544030050160	3	6	4.5	6	60	100	1	0.5
	544030050216	3	6	4.5	6	16	60	1	0.5
	544030050220	3	6	4.5	6	20	65	2	0.5
	544030050230	3	6	4.5	6	30	70	2	0.5
	544030050240	3	6	4.5	6	40	80	2	0.5
	544030050250	3	8	4.5	6	50	90	2	0.5
	544030050260	3	8	4.5	6	60	100	2	0.5
	544030050270	3	8	4.5	6	70	120	2	0.5
	544040020140	4	6	6	8	40	90	2	0.2
	544040020150	4	6	6	8	50	100	1	0.2

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UR	544040020160	4	6	6	8	60	110	1	0.2
	544040020170	4	8	6	8	70	120	1	0.2
	544040020240	4	8	6	8	40	90	1	0.2
	544040020250	4	8	6	8	50	100	2	0.2
	544040020260	4	8	6	8	60	110	2	0.2
	544040020270	4	10	6	8	70	120	2	0.2
	544040030140	4	6	6	8	40	90	2	0.3
	544040030150	4	6	6	8	50	100	1	0.3
	544040030160	4	6	6	8	60	110	1	0.3
	544040030170	4	8	6	8	70	120	1	0.3
	544040030240	4	8	6	8	40	90	1	0.3
	544040030250	4	8	6	8	50	100	2	0.3
	544040030260	4	8	6	8	60	110	2	0.3
	544040030270	4	10	6	8	70	120	2	0.3
	544040050140	4	6	6	8	40	90	2	0.5
	544040050150	4	6	6	8	50	100	1	0.5
	544040050160	4	6	6	8	60	110	1	0.5
	544040050170	4	8	6	8	70	120	1	0.5
	544040050240	4	8	6	8	40	90	1	0.5
	544040050250	4	8	6	8	50	100	2	0.5
	544040050260	4	8	6	8	60	110	2	0.5
	544040050270	4	10	6	8	70	120	2	0.5

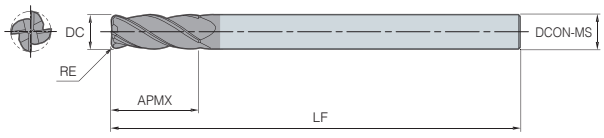
UXR504

4날 멀티 헬릭스 레디우스

CARBIDE | 4 | H·A 34°/36° | 재종 PC315W | h5 shank | RE공차 ±0.02

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø7 ~ Ø20	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LF	RE
UXR	504010005	1	6	2.5	50	0.05
	50401001	1	6	2.5	50	0.1
	50401002	1	6	2.5	50	0.2
	50401003	1	6	2.5	50	0.3
	504012005	1.2	6	3	50	0.05
	50401201	1.2	6	3	50	0.1
	50401202	1.2	6	3	50	0.2
	50401203	1.2	6	3	50	0.3
	504015005	1.5	6	4	50	0.05
	50401501	1.5	6	4	50	0.1
	50401502	1.5	6	4	50	0.2
	50401503	1.5	6	4	50	0.3
	50401505	1.5	6	4	50	0.5
	50402001	2	6	6	50	0.1
	50402002	2	6	6	50	0.2
	50402003	2	6	6	50	0.3
	50402005	2	6	6	50	0.5
	50402501	2.5	6	7	60	0.1
	50402502	2.5	6	7	60	0.2
	50402503	2.5	6	7	60	0.3
	50402505	2.5	6	7	60	0.5
	50403001	3	6	8	60	0.1
	50403002	3	6	8	60	0.2
	50403003	3	6	8	60	0.3
	50403005	3	6	8	60	0.5
	50403010	3	6	8	60	1
	50403501	3.5	6	10	70	0.1
	50403502	3.5	6	10	70	0.2
	50403503	3.5	6	10	70	0.3
	50403505	3.5	6	10	70	0.5
	50404001	4	6	10	70	0.1
	50404001100S4	4	4	10	100	0.1
	50404001S4	4	4	10	70	0.1
	50404002	4	6	10	70	0.2
	50404002100S4	4	4	10	100	0.2
	50404002S4	4	4	10	70	0.2

	형 번	DC	DCON-MS	APMX	LF	RE
UXR	50404003	4	6	10	70	0.3
	50404003100S4	4	4	10	100	0.3
	50404003S4	4	4	10	70	0.3
	50404005	4	6	10	70	0.5
	50404005100S4	4	4	10	100	0.5
	50404005S4	4	4	10	70	0.5
	50404010	4	6	10	70	1
	50404010100S4	4	4	10	100	1
	50404010S4	4	4	10	70	1
	50404501	4.5	6	11	80	0.1
	50404502	4.5	6	11	80	0.2
	50404503	4.5	6	11	80	0.3
	50404505	4.5	6	11	80	0.5
	50405001	5	6	13	90	0.1
	50405002	5	6	13	90	0.2
	50405003	5	6	13	90	0.3
	50405005	5	6	13	90	0.5
	50405010	5	6	13	90	1
	50405501	5.5	6	13	90	0.1
	50405502	5.5	6	13	90	0.2
	50405503	5.5	6	13	90	0.3
	50405505	5.5	6	13	90	0.5
	50405510	5.5	6	13	90	1
	50406001	6	6	15	90	0.1
	50406001060	6	6	15	60	0.1
	50406002	6	6	15	90	0.2
	50406002060	6	6	15	60	0.2
	50406003	6	6	15	90	0.3
	50406005	6	6	15	90	0.5
	50406005060	6	6	15	60	0.5
	50406005110	6	6	15	110	0.5
	50406005130	6	6	15	130	0.5
	50406010	6	6	15	90	1
	50406010060	6	6	15	60	1
	50406010110	6	6	15	110	1
	50406010130	6	6	15	130	1

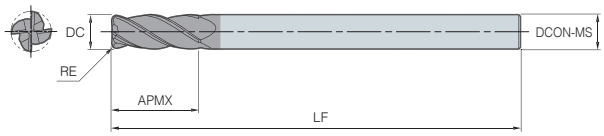
UXR504

4날 멀티 헬릭스 레디우스

CARBIDE | 4 | H·A 34°/36° | 재종 PC315W | h5 shank | RE공차 ±0.02

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø7 ~ Ø20	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LF	RE
UXR	50406015	6	6	15	90	1.5
	50406020	6	6	15	90	2
	50407001	7	8	16	90	0.1
	50407002	7	8	16	90	0.2
	50407003	7	8	16	90	0.3
	50407005	7	8	16	90	0.5
	50407010	7	8	16	90	1
	50407020	7	8	16	90	2
	50408001	8	8	20	100	0.1
	50408002	8	8	20	100	0.2
	50408003	8	8	20	100	0.3
	50408003070	8	8	20	70	0.3
	50408005	8	8	20	100	0.5
	50408005070	8	8	20	70	0.5
	50408005120	8	8	20	120	0.5
	50408005150	8	8	20	150	0.5
	50408010	8	8	20	100	1
	50408010070	8	8	20	70	1
	50408010120	8	8	20	120	1
	50408010150	8	8	20	150	1
	50408015	8	8	20	100	1.5
	50408015070	8	8	20	70	1.5
	50408020	8	8	20	100	2
	50408020070	8	8	20	70	2
	50408025	8	8	20	100	2.5
	50408030	8	8	20	100	3
	50410001	10	10	25	100	0.1
	50410002	10	10	25	100	0.2
	50410003	10	10	25	100	0.3
	50410003075	10	10	25	75	0.3
	50410005	10	10	25	100	0.5
	50410005075	10	10	25	75	0.5
	50410005130	10	10	22	130	0.5
	50410005150	10	10	22	150	0.5
	50410010	10	10	25	100	1
	50410010075	10	10	25	75	1

	형 번	DC	DCON-MS	APMX	LF	RE
UXR	50410010130	10	10	22	130	1
	50410010150	10	10	22	150	1
	50410015	10	10	25	100	1.5
	50410020	10	10	25	100	2
	50410025	10	10	25	100	2.5
	50410030	10	10	25	100	3
	50410040	10	10	25	100	4
	50411002	11	12	25	110	0.2
	50411003	11	12	25	110	0.3
	50411005	11	12	25	110	0.5
	50411010	11	12	25	110	1
	50411020	11	12	25	110	2
	50412001	12	12	30	110	0.1
	50412002	12	12	30	110	0.2
	50412003	12	12	30	110	0.3
	50412003080	12	12	30	80	0.3
	50412005	12	12	30	110	0.5
	50412005080	12	12	30	80	0.5
	50412005130	12	12	30	130	0.5
	50412005150	12	12	30	150	0.5
	50412010	12	12	30	110	1
	50412010080	12	12	30	80	1
	50412010130	12	12	30	130	1
	50412010150	12	12	30	150	1
	50412015	12	12	30	110	1.5
	50412015080	12	12	30	80	1.5
	50412020	12	12	30	110	2
	50412020080	12	12	30	80	2
	50412025	12	12	30	110	2.5
	50412025080	12	12	30	80	2.5
	50412030	12	12	30	110	3
	50412030080	12	12	30	80	3
	50412040	12	12	30	110	4
	50412050	12	12	30	110	5
	50414005	14	16	35	150	0.5
	50414010	14	16	35	150	1

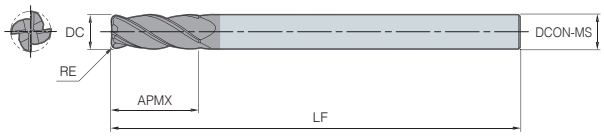
UXR504

4날 멀티 헬릭스 레디우스

CARBIDE | 4 | H·A 34°/36° | 재종 PC315W | h5 shank | RE공차 ±0.02

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø7 ~ Ø20	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LF	RE
UXR	50414020	14	16	35	150	2
	50416005	16	16	40	100	0.5
	50416005150	16	16	40	150	0.5
	50416010	16	16	40	100	1
	50416010150	16	16	40	150	1
	50416015	16	16	40	100	1.5
	50416015150	16	16	40	150	1.5
	50416020	16	16	40	100	2
	50416020150	16	16	40	150	2
	50416030	16	16	40	100	3

	형 번	DC	DCON-MS	APMX	LF	RE
UXR	50420005	20	20	45	110	0.5
	50420005150	20	20	45	150	0.5
	50420010	20	20	45	110	1
	50420010150	20	20	45	150	1
	50420015	20	20	45	110	1.5
	50420015150	20	20	45	150	1.5
	50420020	20	20	45	110	2
	50420020150	20	20	45	150	2
	50420030	20	20	45	110	3

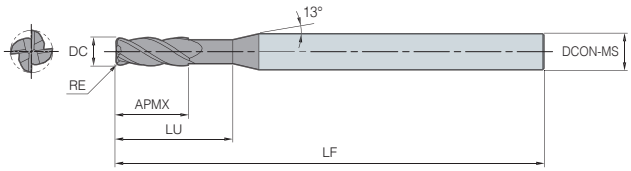
UXR514

4날 멀티 헬릭스 넥 레디우스

CARBIDE | 4 | H·A 34°/36° | 재종 PC315W | h5 shank | RE공차 ±0.02

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
UXR	51401000503	1	4	1.5	3	50	0.05
	51401000504	1	4	1.5	4	50	0.05
	51401000506	1	4	1.5	6	50	0.05
	51401000508	1	4	1.5	8	50	0.05
	51401000510	1	4	1.5	10	50	0.05
	51401000512	1	4	1.5	12	50	0.05
	51401000514	1	4	1.5	14	50	0.05
	51401000516	1	4	1.5	16	50	0.05
	51401000520	1	4	1.5	20	50	0.05
	5140100103	1	4	1.5	3	50	0.1
	5140100104	1	4	1.5	4	50	0.1
	5140100106	1	4	1.5	6	50	0.1
	5140100108	1	4	1.5	8	50	0.1
	5140100110	1	4	1.5	10	50	0.1
	5140100112	1	4	1.5	12	50	0.1
	5140100114	1	4	1.5	14	50	0.1
	5140100116	1	4	1.5	16	50	0.1
	5140100120	1	4	1.5	20	50	0.1
	5140100203	1	4	1.5	3	50	0.2
	5140100204	1	4	1.5	4	50	0.2
	5140100206	1	4	1.5	6	50	0.2
	5140100208	1	4	1.5	8	50	0.2
	5140100210	1	4	1.5	10	50	0.2
	5140100212	1	4	1.5	12	50	0.2
	5140100214	1	4	1.5	14	50	0.2
	5140100216	1	4	1.5	16	50	0.2
	5140100220	1	4	1.5	20	50	0.2
	5140100303	1	4	1.5	3	50	0.3
	5140100304	1	4	1.5	4	50	0.3
	5140100306	1	4	1.5	6	50	0.3
	5140100308	1	4	1.5	8	50	0.3
	5140100310	1	4	1.5	10	50	0.3
	5140100312	1	4	1.5	12	50	0.3
	5140100314	1	4	1.5	14	50	0.3
	5140100316	1	4	1.5	16	50	0.3
	5140100320	1	4	1.5	20	50	0.3

형 번		DC	DCON-MS	APMX	LU	LF	RE
UXR	51401200503	1.2	4	1.8	3	50	0.05
	51401200504	1.2	4	1.8	4	50	0.05
	51401200506	1.2	4	1.8	6	50	0.05
	51401200508	1.2	4	1.8	8	50	0.05
	51401200510	1.2	4	1.8	10	50	0.05
	51401200512	1.2	4	1.8	12	50	0.05
	51401200516	1.2	4	1.8	16	50	0.05
	51401200520	1.2	4	1.8	20	50	0.05
	5140120103	1.2	4	1.8	3	50	0.1
	5140120104	1.2	4	1.8	4	50	0.1
	5140120106	1.2	4	1.8	6	50	0.1
	5140120108	1.2	4	1.8	8	50	0.1
	5140120110	1.2	4	1.8	10	50	0.1
	5140120112	1.2	4	1.8	12	50	0.1
	5140120116	1.2	4	1.8	16	50	0.1
	5140120120	1.2	4	1.8	20	50	0.1
	5140120203	1.2	4	1.8	3	50	0.2
	5140120204	1.2	4	1.8	4	50	0.2
	5140120206	1.2	4	1.8	6	50	0.2
	5140120208	1.2	4	1.8	8	50	0.2
	5140120210	1.2	4	1.8	10	50	0.2
	5140120212	1.2	4	1.8	12	50	0.2
	5140120216	1.2	4	1.8	16	50	0.2
	5140120220	1.2	4	1.8	20	50	0.2
	5140120303	1.2	4	1.8	3	50	0.3
	5140120304	1.2	4	1.8	4	50	0.3
	5140120306	1.2	4	1.8	6	50	0.3
	5140120308	1.2	4	1.8	8	50	0.3
	5140120310	1.2	4	1.8	10	50	0.3
	5140120312	1.2	4	1.8	12	50	0.3
	5140120316	1.2	4	1.8	16	50	0.3
	5140120320	1.2	4	1.8	20	50	0.3
	51401500504	1.5	4	2.3	4	50	0.05
	51401500506	1.5	4	2.3	6	50	0.05
	51401500508	1.5	4	2.3	8	50	0.05
	51401500510	1.5	4	2.3	10	50	0.05

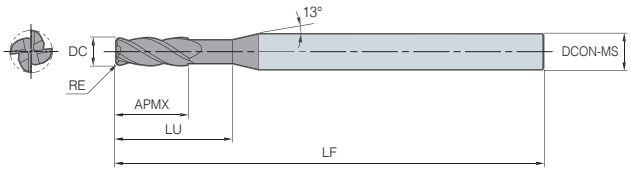
UXR514

4날 멀티 헬릭스 넥 레디우스

CARBIDE | 4 | H·A 34°/36° | 재종 PC315W | h5 shank | RE공차 ±0.02

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UXR	51401500512	1.5	4	2.3	12	50	0.05
	51401500514	1.5	4	2.3	14	50	0.05
	51401500516	1.5	4	2.3	16	50	0.05
	51401500520	1.5	4	2.3	20	50	0.05
	51401500522	1.5	4	2.3	22	60	0.05
	51401500526	1.5	4	2.3	26	60	0.05
	5140150104	1.5	4	2.3	4	50	0.1
	5140150106	1.5	4	2.3	6	50	0.1
	5140150108	1.5	4	2.3	8	50	0.1
	5140150110	1.5	4	2.3	10	50	0.1
	5140150112	1.5	4	2.3	12	50	0.1
	5140150114	1.5	4	2.3	14	50	0.1
	5140150116	1.5	4	2.3	16	50	0.1
	5140150120	1.5	4	2.3	20	50	0.1
	5140150122	1.5	4	2.3	22	60	0.1
	5140150126	1.5	4	2.3	26	60	0.1
	5140150204	1.5	4	2.3	4	50	0.2
	5140150206	1.5	4	2.3	6	50	0.2
	5140150208	1.5	4	2.3	8	50	0.2
	5140150210	1.5	4	2.3	10	50	0.2
	5140150212	1.5	4	2.3	12	50	0.2
	5140150214	1.5	4	2.3	14	50	0.2
	5140150216	1.5	4	2.3	16	50	0.2
	5140150220	1.5	4	2.3	20	50	0.2
	5140150222	1.5	4	2.3	22	60	0.2
	5140150226	1.5	4	2.3	26	60	0.2
	5140150304	1.5	4	2.3	4	50	0.3
	5140150306	1.5	4	2.3	6	50	0.3
	5140150308	1.5	4	2.3	8	50	0.3
	5140150310	1.5	4	2.3	10	50	0.3
	5140150312	1.5	4	2.3	12	50	0.3
	5140150314	1.5	4	2.3	14	50	0.3
	5140150316	1.5	4	2.3	16	50	0.3
	5140150320	1.5	4	2.3	20	50	0.3
	5140150322	1.5	4	2.3	22	60	0.3
	5140150326	1.5	4	2.3	26	60	0.3

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UXR	5140150504	1.5	4	2.3	4	50	0.5
	5140150506	1.5	4	2.3	6	50	0.5
	5140150508	1.5	4	2.3	8	50	0.5
	5140150510	1.5	4	2.3	10	50	0.5
	5140150512	1.5	4	2.3	12	50	0.5
	5140150514	1.5	4	2.3	14	50	0.5
	5140150516	1.5	4	2.3	16	50	0.5
	5140150520	1.5	4	2.3	20	50	0.5
	5140150522	1.5	4	2.3	22	60	0.5
	5140150526	1.5	4	2.3	26	60	0.5
	5140200106	2	4	3	6	50	0.1
	5140200108	2	4	3	8	50	0.1
	5140200110	2	4	3	10	50	0.1
	5140200112	2	4	3	12	50	0.1
	5140200114	2	4	3	14	50	0.1
	5140200116	2	4	3	16	50	0.1
	5140200120	2	4	3	20	50	0.1
	5140200122	2	4	3	22	60	0.1
	5140200126	2	4	3	26	60	0.1
	5140200130	2	4	3	30	70	0.1
	5140200206	2	4	3	6	50	0.2
	5140200208	2	4	3	8	50	0.2
	5140200210	2	4	3	10	50	0.2
	5140200212	2	4	3	12	50	0.2
	5140200214	2	4	3	14	50	0.2
	5140200216	2	4	3	16	50	0.2
	5140200220	2	4	3	20	50	0.2
	5140200222	2	4	3	22	60	0.2
	5140200226	2	4	3	26	60	0.2
	5140200230	2	4	3	30	70	0.2
	5140200306	2	4	3	6	50	0.3
	5140200308	2	4	3	8	50	0.3
	5140200310	2	4	3	10	50	0.3
	5140200312	2	4	3	12	50	0.3
	5140200314	2	4	3	14	50	0.3
	5140200316	2	4	3	16	50	0.3

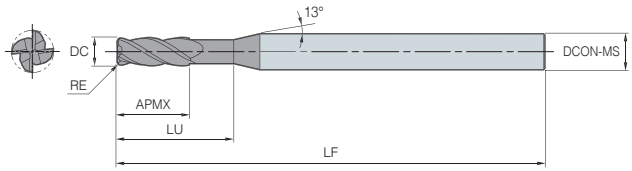
UXR514

4날 멀티 헬릭스 넥 레디우스



CARBIDE | 4 | H·A 34°/36° | 재종 PC315W | h5 shank | RE공차 ±0.02

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UXR	5140200320	2	4	3	20	50	0.3
	5140200322	2	4	3	22	60	0.3
	5140200326	2	4	3	26	60	0.3
	5140200330	2	4	3	30	70	0.3
	5140200506	2	4	3	6	50	0.5
	5140200508	2	4	3	8	50	0.5
	5140200510	2	4	3	10	50	0.5
	5140200512	2	4	3	12	50	0.5
	5140200514	2	4	3	14	50	0.5
	5140200516	2	4	3	16	50	0.5
	5140200520	2	4	3	20	50	0.5
	5140200522	2	4	3	22	60	0.5
	5140200526	2	4	3	26	60	0.5
	5140200530	2	4	3	30	70	0.5
	5140250108	2.5	4	4	8	50	0.1
	5140250110	2.5	4	4	10	50	0.1
	5140250112	2.5	4	4	12	50	0.1
	5140250114	2.5	4	4	14	50	0.1
	5140250116	2.5	4	4	16	50	0.1
	5140250120	2.5	4	4	20	50	0.1
	5140250126	2.5	4	4	26	60	0.1
	5140250130	2.5	4	4	30	70	0.1
	5140250208	2.5	4	4	8	50	0.2
	5140250210	2.5	4	4	10	50	0.2
	5140250212	2.5	4	4	12	50	0.2
	5140250214	2.5	4	4	14	50	0.2
	5140250216	2.5	4	4	16	50	0.2
	5140250220	2.5	4	4	20	50	0.2
	5140250226	2.5	4	4	26	60	0.2
	5140250230	2.5	4	4	30	70	0.2
	5140250308	2.5	4	4	8	50	0.3
	5140250310	2.5	4	4	10	50	0.3
	5140250312	2.5	4	4	12	50	0.3
	5140250314	2.5	4	4	14	50	0.3
	5140250316	2.5	4	4	16	50	0.3
	5140250320	2.5	4	4	20	50	0.3

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UXR	5140250326	2.5	4	4	26	60	0.3
	5140250330	2.5	4	4	30	70	0.3
	5140250508	2.5	4	4	8	50	0.5
	5140250510	2.5	4	4	10	50	0.5
	5140250512	2.5	4	4	12	50	0.5
	5140250514	2.5	4	4	14	50	0.5
	5140250516	2.5	4	4	16	50	0.5
	5140250520	2.5	4	4	20	50	0.5
	5140250526	2.5	4	4	26	60	0.5
	5140250530	2.5	4	4	30	70	0.5
	5140300108	3	6	4.5	8	50	0.1
	5140300110	3	6	4.5	10	50	0.1
	5140300112	3	6	4.5	12	50	0.1
	5140300114	3	6	4.5	14	60	0.1
	5140300116	3	6	4.5	16	60	0.1
	5140300120	3	6	4.5	20	60	0.1
	5140300126	3	6	4.5	26	65	0.1
	5140300130	3	6	4.5	30	70	0.1
	5140300135	3	6	4.5	35	70	0.1
	5140300140	3	6	4.5	40	80	0.1
	5140300208	3	6	4.5	8	50	0.2
	5140300210	3	6	4.5	10	50	0.2
	5140300212	3	6	4.5	12	50	0.2
	5140300214	3	6	4.5	14	60	0.2
	5140300216	3	6	4.5	16	60	0.2
	5140300220	3	6	4.5	20	60	0.2
	5140300226	3	6	4.5	26	65	0.2
	5140300230	3	6	4.5	30	70	0.2
	5140300235	3	6	4.5	35	70	0.2
	5140300240	3	6	4.5	40	80	0.2
	5140300308	3	6	4.5	8	50	0.3
	5140300310	3	6	4.5	10	50	0.3
	5140300312	3	6	4.5	12	50	0.3
	5140300314	3	6	4.5	14	60	0.3
	5140300316	3	6	4.5	16	60	0.3
	5140300320	3	6	4.5	20	60	0.3

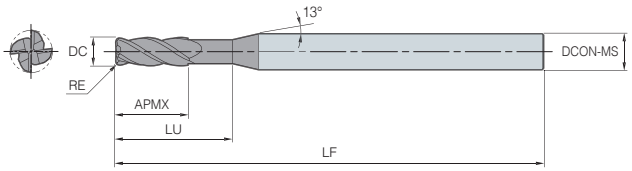
UXR514

4날 멀티 헬릭스 넥 레디우스

CARBIDE | 4 | H·A 34°/36° | 재종 PC315W | h5 shank | RE공차 ±0.02

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UXR	5140300326	3	6	4.5	26	65	0.3
	5140300330	3	6	4.5	30	70	0.3
	5140300335	3	6	4.5	35	70	0.3
	5140300340	3	6	4.5	40	80	0.3
	5140300508	3	6	4.5	8	50	0.5
	5140300510	3	6	4.5	10	50	0.5
	5140300512	3	6	4.5	12	50	0.5
	5140300514	3	6	4.5	14	60	0.5
	5140300516	3	6	4.5	16	60	0.5
	5140300520	3	6	4.5	20	60	0.5
	5140300526	3	6	4.5	26	65	0.5
	5140300530	3	6	4.5	30	70	0.5
	5140300535	3	6	4.5	35	70	0.5
	5140300540	3	6	4.5	40	80	0.5
	5140301008	3	6	4.5	8	50	1
	5140301010	3	6	4.5	10	50	1
	5140301012	3	6	4.5	12	50	1
	5140301014	3	6	4.5	14	60	1
	5140301016	3	6	4.5	16	60	1
	5140301020	3	6	4.5	20	60	1
	5140301026	3	6	4.5	26	65	1
	5140301030	3	6	4.5	30	70	1
	5140301035	3	6	4.5	35	70	1
	5140301040	3	6	4.5	40	80	1
	5140400110	4	6	6	10	50	0.1
	5140400112	4	6	6	12	50	0.1
	5140400114	4	6	6	14	60	0.1
	5140400116	4	6	6	16	60	0.1
	5140400120	4	6	6	20	60	0.1
	5140400126	4	6	6	26	65	0.1
	5140400130	4	6	6	30	70	0.1
	5140400135	4	6	6	35	70	0.1
	5140400140	4	6	6	40	80	0.1
	5140400145	4	6	6	45	90	0.1
	5140400150	4	6	6	50	100	0.1
	5140400210	4	6	6	10	50	0.2

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UXR	5140400212	4	6	6	12	50	0.2
	5140400214	4	6	6	14	60	0.2
	5140400216	4	6	6	16	60	0.2
	5140400220	4	6	6	20	60	0.2
	5140400226	4	6	6	26	65	0.2
	5140400230	4	6	6	30	70	0.2
	5140400235	4	6	6	35	70	0.2
	5140400240	4	6	6	40	80	0.2
	5140400245	4	6	6	45	90	0.2
	5140400250	4	6	6	50	100	0.2
	5140400310	4	6	6	10	50	0.3
	5140400312	4	6	6	12	50	0.3
	5140400314	4	6	6	14	60	0.3
	5140400316	4	6	6	16	60	0.3
	5140400320	4	6	6	20	60	0.3
	5140400326	4	6	6	26	65	0.3
	5140400330	4	6	6	30	70	0.3
	5140400335	4	6	6	35	70	0.3
	5140400340	4	6	6	40	80	0.3
	5140400345	4	6	6	45	90	0.3
	5140400350	4	6	6	50	100	0.3
	5140400510	4	6	6	10	50	0.5
	5140400512	4	6	6	12	50	0.5
	5140400514	4	6	6	14	60	0.5
	5140400516	4	6	6	16	60	0.5
	5140400520	4	6	6	20	60	0.5
	5140400526	4	6	6	26	65	0.5
	5140400530	4	6	6	30	70	0.5
	5140400535	4	6	6	35	70	0.5
	5140400540	4	6	6	40	80	0.5
	5140400545	4	6	6	45	90	0.5
	5140400550	4	6	6	50	100	0.5
	5140401010	4	6	6	10	50	1
	5140401012	4	6	6	12	50	1
	5140401014	4	6	6	14	60	1
	5140401016	4	6	6	16	60	1

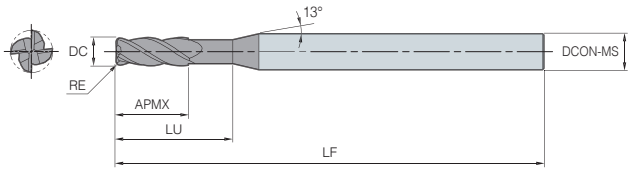
UXR514

4날 멀티 헬릭스 넥 레디우스



CARBIDE | 4 | H·A 34°/36° | 재종 PC315W | h5 shank | RE공차 ±0.02

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UXR	5140401020	4	6	6	20	60	1
	5140401026	4	6	6	26	65	1
	5140401030	4	6	6	30	70	1
	5140401035	4	6	6	35	70	1
	5140401040	4	6	6	40	80	1
	5140401045	4	6	6	45	90	1
	5140401050	4	6	6	50	100	1
	51405001	5	6	8	15	60	0.1
	51405002	5	6	8	15	60	0.2
	51405003	5	6	8	15	60	0.3
	51405005	5	6	8	15	60	0.5
	51405010	5	6	8	15	60	1
	51405015	5	6	8	15	60	1.5
	51405020	5	6	8	15	60	2
	51406001	6	6	9	20	60	0.1
	51406002	6	6	9	20	60	0.2
	51406003	6	6	9	20	60	0.3
	51406003090	6	6	15	30	90	0.3
	51406005	6	6	9	20	60	0.5
	51406005090	6	6	15	30	90	0.5
	51406010	6	6	9	20	60	1
	51406010090	6	6	15	30	90	1
	51406015	6	6	9	20	60	1.5
	51406020	6	6	9	20	60	2
	51408001	8	8	12	25	70	0.1
	51408002	8	8	12	25	70	0.2
	51408003	8	8	12	25	70	0.3
	51408003100	8	8	20	35	100	0.3
	51408005	8	8	12	25	70	0.5
	51408005100	8	8	20	35	100	0.5
	51408010	8	8	12	25	70	1

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UXR	51408010100	8	8	20	35	100	1
	51408015	8	8	12	25	70	1.5
	51408020	8	8	12	25	70	2
	51410001	10	10	15	30	75	0.1
	51410002	10	10	15	30	75	0.2
	51410003	10	10	15	30	75	0.3
	51410003100	10	10	25	40	100	0.3
	51410005	10	10	15	30	75	0.5
	51410005100	10	10	25	40	100	0.5
	51410010	10	10	15	30	75	1
	51410010100	10	10	25	40	100	1
	51410015	10	10	15	30	75	1.5
	51410020	10	10	15	30	75	2
	51412002	12	12	18	32	80	0.2
	51412003	12	12	18	32	80	0.3
	51412003110	12	12	30	45	110	0.3
	51412005	12	12	18	32	80	0.5
	51412005110	12	12	30	45	110	0.5
	51412010	12	12	18	32	80	1
	51412010110	12	12	30	45	110	1
	51412015	12	12	18	32	80	1.5
	51412020	12	12	18	32	80	2
	51416005	16	16	20	35	100	0.5
	51416005150	16	16	35	50	150	0.5
	51416010	16	16	20	35	100	1
	51416010150	16	16	35	50	150	1
	51420005	20	20	25	40	100	0.5
	51420005150	20	20	40	55	150	0.5
	51420010	20	20	25	40	100	1
	51420010150	20	20	40	55	150	1

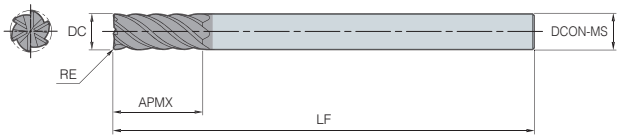
UR506

6날 레디우스

CARBIDE | 6 | H·A 45° | 재종 PC315W | h5 shank | RE공차 ±0.015

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LF	RE
UR	50606003	6	6	15	90	0.3
	50606005	6	6	15	90	0.5
	50606010	6	6	15	90	1
	50608003	8	8	20	100	0.3
	50608005	8	8	20	100	0.5
	50608010	8	8	20	100	1
	50610003	10	10	25	100	0.3
	50610005	10	10	25	100	0.5
	50610010	10	10	25	100	1
	50612003	12	12	30	110	0.3
	50612005	12	12	30	110	0.5
	50612010	12	12	30	110	1
	50616005	16	16	32	150	0.5
	50616010	16	16	32	150	1
	50616015	16	16	32	150	1.5
	50616020	16	16	32	150	2
	50620005	20	20	38	150	0.5
	50620010	20	20	38	150	1
	50620015	20	20	38	150	1.5
	50620020	20	20	38	150	2

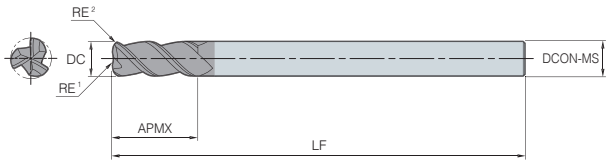
UDR503

3날 더블 레디우스



CARBIDE | 3 | H·A 45° | 재종 PC315W | h5 shank | RE공차 ±0.02

DC	공구직경공차
Ø6 Ø8 ~ Ø20	0.000 ~ -0.012 0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LF	RE¹	RE²
UDR	50306005	6	6	10	90	0.5	6
	50306010	6	6	10	90	1	6
	50306020	6	6	10	90	2	6
	50308005	8	8	16	100	0.5	8
	50308010	8	8	16	100	1	8
	50308020	8	8	16	100	2	8
	50310005	10	10	20	100	0.5	10
	50310010	10	10	20	100	1	10
	50310020	10	10	20	100	2	10
	50312005	12	12	24	110	0.5	12
	50312010	12	12	24	110	1	12
	50312020	12	12	24	110	2	12
	50316005	16	16	32	150	0.5	16
	50316010	16	16	32	150	1	16
	50320005	20	20	40	150	0.5	20
	50320010	20	20	40	150	1	20

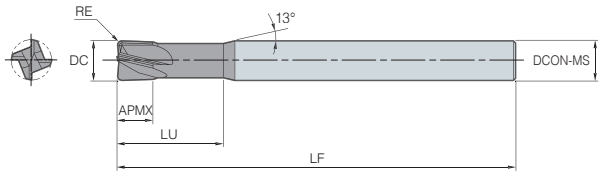
USPM4

4날 고이송 레디우스

CARBIDE | 4 | H·A 10° | 재종 PC315W | h5 shank | RE공차 ±0.02

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø20	0.000 ~ -0.015







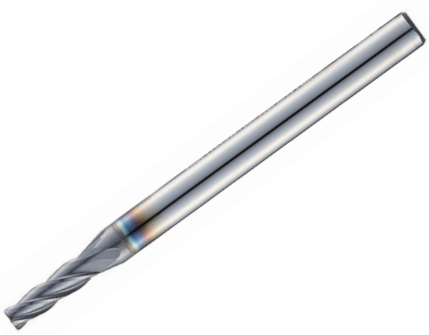
(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
USPM	4010-01	1	6	1	2.5	50	0.1
	4010-02	1	6	1	2.5	50	0.2
	4010-03	1	6	1	2.5	50	0.3
	4015-02	1.5	6	1.5	4	50	0.2
	4015-03	1.5	6	1.5	4	50	0.3
	4015-05	1.5	6	1.5	4	50	0.5
	4020-02	2	6	2	6	50	0.2
	4020-03	2	6	2	6	50	0.3
	4020-05	2	6	2	6	50	0.5
	4030-02	3	6	3	8	50	0.2
	4030-03	3	6	3	8	50	0.3
	4030-05	3	6	3	8	50	0.5
	4040-02	4	6	4	10	50	0.2
	4040-03	4	6	4	10	50	0.3
	4040-05	4	6	4	10	50	0.5
	4040-10	4	6	4	10	50	1
	4060-02	6	6	6	15	60	0.2
	4060-02L	6	6	6	15	90	0.2
	4060-03	6	6	6	15	60	0.3
	4060-03L	6	6	6	15	90	0.3
	4060-05	6	6	6	15	60	0.5
	4060-05L	6	6	6	15	90	0.5
	4060-10	6	6	6	15	60	1
	4060-10L	6	6	6	15	90	1
	4060-20	6	6	6	15	60	2
	4060-20L	6	6	6	15	90	2
	4080-02	8	8	8	20	70	0.2
	4080-02L	8	8	8	20	100	0.2
	4080-03	8	8	8	20	70	0.3
	4080-03L	8	8	8	20	100	0.3
	4080-05	8	8	8	20	70	0.5
	4080-05L	8	8	8	20	100	0.5
	4080-10	8	8	8	20	70	1
	4080-10L	8	8	8	20	100	1
	4080-20	8	8	8	20	70	2
	4080-20L	8	8	8	20	100	2

	형 번	DC	DCON-MS	APMX	LU	LF	RE
USPM	4100-02	10	10	10	25	75	0.2
	4100-02L	10	10	10	25	100	0.2
	4100-03	10	10	10	25	75	0.3
	4100-03L	10	10	10	25	100	0.3
	4100-05	10	10	10	25	75	0.5
	4100-05L	10	10	10	25	100	0.5
	4100-10	10	10	10	25	75	1
	4100-10L	10	10	10	25	100	1
	4100-15	10	10	10	25	75	1.5
	4100-15L	10	10	10	25	100	1.5
	4100-20	10	10	10	25	75	2
	4100-20L	10	10	10	25	100	2
	4120-03	12	12	12	30	80	0.3
	4120-03L	12	12	12	30	110	0.3
	4120-05	12	12	12	30	80	0.5
	4120-05L	12	12	12	30	110	0.5
	4120-10	12	12	12	30	80	1
	4120-10L	12	12	12	30	110	1
	4120-15	12	12	12	30	80	1.5
	4120-15L	12	12	12	30	110	1.5
	4120-20	12	12	12	30	80	2
	4120-20L	12	12	12	30	110	2
	4120-30	12	12	12	30	80	3
	4120-30L	12	12	12	30	110	3
	4160-05	16	16	16	35	100	0.5
	4160-05L	16	16	16	35	150	0.5
	4160-10	16	16	16	35	100	1
	4160-10L	16	16	16	35	150	1
	4160-20	16	16	16	35	100	2
	4160-20L	16	16	16	35	150	2
	4200-05	20	20	20	40	100	0.5
	4200-05L	20	20	20	40	150	0.5
	4200-10	20	20	20	40	100	1
	4200-10L	20	20	20	40	150	1
	4200-20	20	20	20	40	100	2
	4200-20L	20	20	20	40	150	2

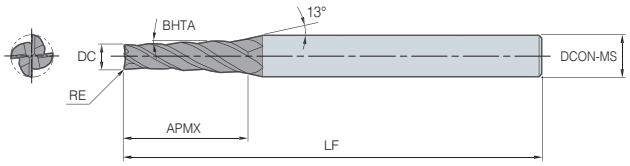
UTR504

4날 테이퍼 레디우스



CARBIDE | 4 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012





(mm)

	형 번	DC	DCON-MS	APMX	BHTA	LF	RE
UTR	504008010104	0.8	4	4	1	45	0.1
	504008010106	0.8	4	6	1	45	0.1
	504008010108	0.8	4	8	1	45	0.1
	5040080101504	0.8	4	4	1.5	45	0.1
	5040080101506	0.8	4	6	1.5	45	0.1
	5040080101508	0.8	4	8	1.5	45	0.1
	504008020104	0.8	4	4	1	45	0.2
	504008020106	0.8	4	6	1	45	0.2
	504008020108	0.8	4	8	1	45	0.2
	5040080201504	0.8	4	4	1.5	45	0.2
	5040080201506	0.8	4	6	1.5	45	0.2
	5040080201508	0.8	4	8	1.5	45	0.2
	504010010104	1	4	4	1	50	0.1
	504010010106	1	4	6	1	50	0.1
	504010010108	1	4	8	1	50	0.1
	504010010110	1	4	10	1	50	0.1
	504010010112	1	4	12	1	50	0.1
	5040100101504	1	4	4	1.5	50	0.1
	5040100101506	1	4	6	1.5	50	0.1
	5040100101508	1	4	8	1.5	50	0.1
	5040100101510	1	4	10	1.5	50	0.1
	5040100101512	1	4	12	1.5	50	0.1
	504010010204	1	4	4	2	50	0.1
	504010010206	1	4	6	2	50	0.1
	504010010208	1	4	8	2	50	0.1
	504010010210	1	4	10	2	50	0.1
	504010010212	1	4	12	2	50	0.1
	504010010304	1	4	4	3	50	0.1
	504010010306	1	4	6	3	50	0.1
	504010010308	1	4	8	3	50	0.1
	504010010310	1	4	10	3	50	0.1
	504010010312	1	4	12	3	50	0.1
	504010020104	1	4	4	1	50	0.2
	504010020106	1	4	6	1	50	0.2
	504010020108	1	4	8	1	50	0.2
	504010020110	1	4	10	1	50	0.2

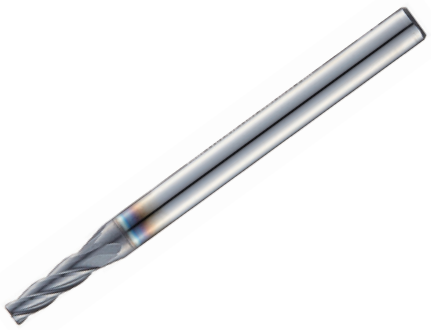
	형 번	DC	DCON-MS	APMX	BHTA	LF	RE
UTR	504010020112	1	4	12	1	50	0.2
	5040100201504	1	4	4	1.5	50	0.2
	5040100201506	1	4	6	1.5	50	0.2
	5040100201508	1	4	8	1.5	50	0.2
	5040100201510	1	4	10	1.5	50	0.2
	5040100201512	1	4	12	1.5	50	0.2
	504010020204	1	4	4	2	50	0.2
	504010020206	1	4	6	2	50	0.2
	504010020208	1	4	8	2	50	0.2
	504010020210	1	4	10	2	50	0.2
	504010020212	1	4	12	2	50	0.2
	504010020304	1	4	4	3	50	0.2
	504010020306	1	4	6	3	50	0.2
	504010020308	1	4	8	3	50	0.2
	504010020310	1	4	10	3	50	0.2
	504010020312	1	4	12	3	50	0.2
	504010030104	1	4	4	1	50	0.3
	504010030106	1	4	6	1	50	0.3
	504010030108	1	4	8	1	50	0.3
	504010030110	1	4	10	1	50	0.3
	504010030112	1	4	12	1	50	0.3
	5040100301504	1	4	4	1.5	50	0.3
	5040100301506	1	4	6	1.5	50	0.3
	5040100301508	1	4	8	1.5	50	0.3
	5040100301510	1	4	10	1.5	50	0.3
	5040100301512	1	4	12	1.5	50	0.3
	504010030204	1	4	4	2	50	0.3
	504010030206	1	4	6	2	50	0.3
	504010030208	1	4	8	2	50	0.3
	504010030210	1	4	10	2	50	0.3
	504010030212	1	4	12	2	50	0.3
	504010030304	1	4	4	3	50	0.3
	504010030306	1	4	6	3	50	0.3
	504010030308	1	4	8	3	50	0.3
	504010030310	1	4	10	3	50	0.3
	504010030312	1	4	12	3	50	0.3

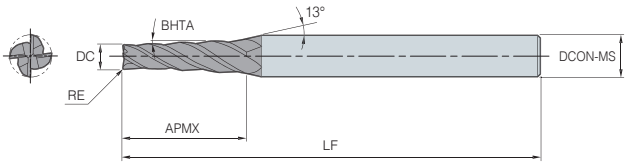
UTR504

4날 테이퍼 레디우스

CARBIDE | 4 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012







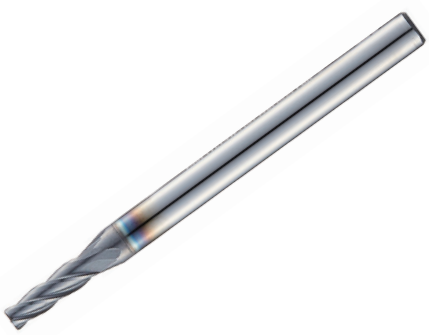
(mm)

형 번		DC	DCON-MS	APMX	BHTA	LF	RE
UTR	504012010106	1.2	4	6	1	50	0.1
	504012010108	1.2	4	8	1	50	0.1
	504012010110	1.2	4	10	1	50	0.1
	504012010112	1.2	4	12	1	50	0.1
	504012010206	1.2	4	6	2	50	0.1
	504012010208	1.2	4	8	2	50	0.1
	504012010210	1.2	4	10	2	50	0.1
	504012010212	1.2	4	12	2	50	0.1
	504012010306	1.2	4	6	3	50	0.1
	504012010308	1.2	4	8	3	50	0.1
	504012010310	1.2	4	10	3	50	0.1
	504012010312	1.2	4	12	3	50	0.1
	504012020106	1.2	4	6	1	50	0.2
	504012020108	1.2	4	8	1	50	0.2
	504012020110	1.2	4	10	1	50	0.2
	504012020112	1.2	4	12	1	50	0.2
	504012020206	1.2	4	6	2	50	0.2
	504012020208	1.2	4	8	2	50	0.2
	504012020210	1.2	4	10	2	50	0.2
	504012020212	1.2	4	12	2	50	0.2
	504012020306	1.2	4	6	3	50	0.2
	504012020308	1.2	4	8	3	50	0.2
	504012020310	1.2	4	10	3	50	0.2
	504012020312	1.2	4	12	3	50	0.2
	504012030106	1.2	4	6	1	50	0.3
	504012030108	1.2	4	8	1	50	0.3
	504012030110	1.2	4	10	1	50	0.3
	504012030112	1.2	4	12	1	50	0.3
	504012030206	1.2	4	6	2	50	0.3
	504012030208	1.2	4	8	2	50	0.3
	504012030210	1.2	4	10	2	50	0.3
	504012030212	1.2	4	12	2	50	0.3
	504012030306	1.2	4	6	3	50	0.3
	504012030308	1.2	4	8	3	50	0.3
	504012030310	1.2	4	10	3	50	0.3
	504012030312	1.2	4	12	3	50	0.3

형 번		DC	DCON-MS	APMX	BHTA	LF	RE
UTR	504015010106	1.5	4	6	1	50	0.1
	504015010108	1.5	4	8	1	50	0.1
	504015010110	1.5	4	10	1	50	0.1
	504015010112	1.5	4	12	1	50	0.1
	504015010116	1.5	4	16	1	50	0.1
	504015010120	1.5	4	20	1	60	0.1
	504015010206	1.5	4	6	2	50	0.1
	504015010208	1.5	4	8	2	50	0.1
	504015010210	1.5	4	10	2	50	0.1
	504015010212	1.5	4	12	2	50	0.1
	504015010216	1.5	4	16	2	50	0.1
	504015010220	1.5	4	20	2	60	0.1
	504015010306	1.5	4	6	3	50	0.1
	504015010308	1.5	4	8	3	50	0.1
	504015010310	1.5	4	10	3	50	0.1
	504015010312	1.5	4	12	3	50	0.1
	504015010316	1.5	4	16	3	50	0.1
	504015010320	1.5	4	20	3	60	0.1
	504015020106	1.5	4	6	1	50	0.2
	504015020108	1.5	4	8	1	50	0.2
	504015020110	1.5	4	10	1	50	0.2
	504015020112	1.5	4	12	1	50	0.2
	504015020116	1.5	4	16	1	50	0.2
	504015020120	1.5	4	20	1	60	0.2
	504015020206	1.5	4	6	2	50	0.2
	504015020208	1.5	4	8	2	50	0.2
	504015020210	1.5	4	10	2	50	0.2
	504015020212	1.5	4	12	2	50	0.2
	504015020216	1.5	4	16	2	50	0.2
	504015020220	1.5	4	20	2	60	0.2
	504015020306	1.5	4	6	3	50	0.2
	504015020308	1.5	4	8	3	50	0.2
	504015020310	1.5	4	10	3	50	0.2
	504015020312	1.5	4	12	3	50	0.2
	504015020316	1.5	4	16	3	50	0.2
	504015020320	1.5	4	20	3	60	0.2

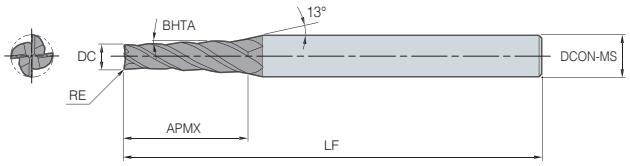
UTR504

4날 테이퍼 레디우스



CARBIDE | 4 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012





(mm)

	형 번	DC	DCON-MS	APMX	BHTA	LF	RE
UTR	504015030106	1.5	4	6	1	50	0.3
	504015030108	1.5	4	8	1	50	0.3
	504015030110	1.5	4	10	1	50	0.3
	504015030112	1.5	4	12	1	50	0.3
	504015030116	1.5	4	16	1	50	0.3
	504015030120	1.5	4	20	1	60	0.3
	504015030206	1.5	4	6	2	50	0.3
	504015030208	1.5	4	8	2	50	0.3
	504015030210	1.5	4	10	2	50	0.3
	504015030212	1.5	4	12	2	50	0.3
	504015030216	1.5	4	16	2	50	0.3
	504015030220	1.5	4	20	2	60	0.3
	504015030306	1.5	4	6	3	50	0.3
	504015030308	1.5	4	8	3	50	0.3
	504015030310	1.5	4	10	3	50	0.3
	504015030312	1.5	4	12	3	50	0.3
	504015030316	1.5	4	16	3	50	0.3
	504015030320	1.5	4	20	3	60	0.3
	504020010108	2	4	8	1	50	0.1
	504020010110	2	4	10	1	50	0.1
	504020010112	2	4	12	1	50	0.1
	504020010116	2	4	16	1	50	0.1
	504020010120	2	4	20	1	60	0.1
	504020010125	2	4	25	1	60	0.1
	504020010208	2	4	8	2	50	0.1
	504020010210	2	4	10	2	50	0.1
	504020010212	2	4	12	2	50	0.1
	504020010216	2	4	16	2	50	0.1
	504020010220	2	4	20	2	60	0.1
	504020010225	2	4	25	2	60	0.1
	504020010308	2	4	8	3	50	0.1
	504020010310	2	4	10	3	50	0.1
	504020010312	2	4	12	3	50	0.1
	504020010316	2	4	16	3	50	0.1
	504020010320	2	6	20	3	60	0.1
	504020010325	2	6	25	3	60	0.1

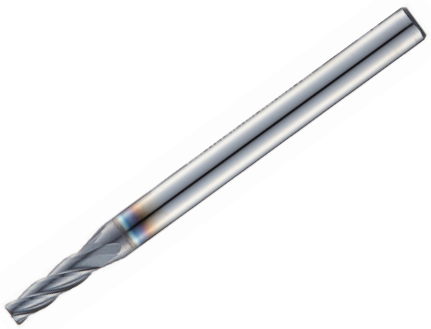
	형 번	DC	DCON-MS	APMX	BHTA	LF	RE
UTR	504020020108	2	4	8	1	50	0.2
	504020020110	2	4	10	1	50	0.2
	504020020112	2	4	12	1	50	0.2
	504020020116	2	4	16	1	50	0.2
	504020020120	2	4	20	1	60	0.2
	504020020125	2	4	25	1	60	0.2
	504020020208	2	4	8	2	50	0.2
	504020020210	2	4	10	2	50	0.2
	504020020212	2	4	12	2	50	0.2
	504020020216	2	4	16	2	50	0.2
	504020020220	2	4	20	2	60	0.2
	504020020225	2	4	25	2	60	0.2
	504020020308	2	4	8	3	50	0.2
	504020020310	2	4	10	3	50	0.2
	504020020312	2	4	12	3	50	0.2
	504020020316	2	4	16	3	50	0.2
	504020020320	2	6	20	3	60	0.2
	504020020325	2	6	25	3	60	0.2
	504020030108	2	4	8	1	50	0.3
	504020030110	2	4	10	1	50	0.3
	504020030112	2	4	12	1	50	0.3
	504020030116	2	4	16	1	50	0.3
	504020030120	2	4	20	1	60	0.3
	504020030125	2	4	25	1	60	0.3
	504020030208	2	4	8	2	50	0.3
	504020030210	2	4	10	2	50	0.3
	504020030212	2	4	12	2	50	0.3
	504020030216	2	4	16	2	50	0.3
	504020030220	2	4	20	2	60	0.3
	504020030225	2	4	25	2	60	0.3
	504020030308	2	4	8	3	50	0.3
	504020030310	2	4	10	3	50	0.3
	504020030312	2	4	12	3	50	0.3
	504020030316	2	4	16	3	50	0.3
	504020030320	2	6	20	3	60	0.3
	504020030325	2	6	25	3	60	0.3

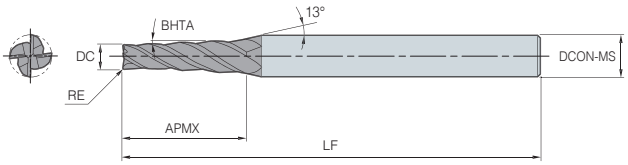
UTR504

4날 테이퍼 레디우스

CARBIDE | 4 | H·A 30° | 재종 PC315W | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012







(mm)

형 번		DC	DCON-MS	APMX	BHTA	LF	RE
UTR	504025010110	2.5	4	10	1	50	0.1
	504025010112	2.5	4	12	1	50	0.1
	504025010116	2.5	4	16	1	50	0.1
	504025010120	2.5	4	20	1	60	0.1
	504025010125	2.5	4	25	1	60	0.1
	504025010130	2.5	4	30	1	60	0.1
	504025010210	2.5	4	10	2	50	0.1
	504025010212	2.5	4	12	2	50	0.1
	504025010216	2.5	4	16	2	50	0.1
	504025010220	2.5	4	20	2	60	0.1
	504025010225	2.5	6	25	2	60	0.1
	504025010230	2.5	6	30	2	60	0.1
	504025010310	2.5	4	10	3	50	0.1
	504025010312	2.5	4	12	3	50	0.1
	504025010316	2.5	6	16	3	50	0.1
	504025010320	2.5	6	20	3	60	0.1
	504025010325	2.5	6	25	3	60	0.1
	504025010330	2.5	6	30	3	60	0.1
	504025020110	2.5	4	10	1	50	0.2
	504025020112	2.5	4	12	1	50	0.2
	504025020116	2.5	4	16	1	50	0.2
	504025020120	2.5	4	20	1	60	0.2
	504025020125	2.5	4	25	1	60	0.2
	504025020130	2.5	4	30	1	60	0.2
	504025020210	2.5	4	10	2	50	0.2
	504025020212	2.5	4	12	2	50	0.2
	504025020216	2.5	4	16	2	50	0.2

형 번		DC	DCON-MS	APMX	BHTA	LF	RE
UTR	504025020220	2.5	4	20	2	60	0.2
	504025020225	2.5	6	25	2	60	0.2
	504025020230	2.5	6	30	2	60	0.2
	504025020310	2.5	4	10	3	50	0.2
	504025020312	2.5	4	12	3	50	0.2
	504025020316	2.5	6	16	3	50	0.2
	504025020320	2.5	6	20	3	60	0.2
	504025020325	2.5	6	25	3	60	0.2
	504025020330	2.5	6	30	3	60	0.2
	504025030110	2.5	4	10	1	50	0.3
	504025030112	2.5	4	12	1	50	0.3
	504025030116	2.5	4	16	1	50	0.3
	504025030120	2.5	4	20	1	60	0.3
	504025030125	2.5	4	25	1	60	0.3
	504025030130	2.5	4	30	1	60	0.3
	504025030212	2.5	4	12	2	50	0.3
	504025030216	2.5	4	16	2	50	0.3
	504025030220	2.5	4	20	2	60	0.3
	504025030225	2.5	6	25	2	60	0.3
	504025030230	2.5	6	30	2	60	0.3
	504025030310	2.5	4	10	3	50	0.3
	504025030312	2.5	4	12	3	50	0.3
	504025030316	2.5	6	16	3	50	0.3
	504025030320	2.5	6	20	3	60	0.3
	504025030325	2.5	6	25	3	60	0.3
	504025030330	2.5	6	30	3	60	0.3

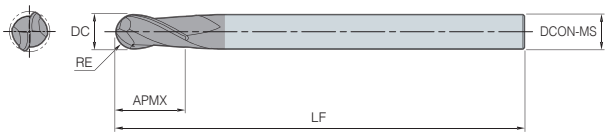
UB502

2날 볼



CARBIDE | 2 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.01 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø6.5 ~ Ø25	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LF	RE
UB	502001S	0.1	4	0.1	40	0.05
	502001	0.1	4	0.2	40	0.05
	502001S3	0.1	3	0.2	40	0.05
	5020015S	0.15	4	0.15	40	0.075
	5020015	0.15	4	0.3	40	0.075
	5020015S3	0.15	3	0.3	40	0.075
	502002S	0.2	4	0.2	40	0.1
	502002	0.2	4	0.4	40	0.1
	502002S3	0.2	3	0.4	40	0.1
	502003S	0.3	4	0.3	40	0.15
	502003	0.3	4	0.6	40	0.15
	502003S3	0.3	3	0.6	40	0.15
	502004S	0.4	4	0.4	40	0.2
	502004	0.4	4	0.8	40	0.2
	502004S3	0.4	3	0.8	40	0.2
	502005S	0.5	4	0.5	40	0.25
	502005	0.5	4	1	40	0.25
	502005S3	0.5	3	1	40	0.25
	502006S	0.6	4	0.6	40	0.3
	502006	0.6	4	1.2	40	0.3
	502006S3	0.6	3	1.2	40	0.3
	502007S	0.7	4	0.7	40	0.35
	502007	0.7	4	1.4	40	0.35
	502007S3	0.7	3	1.4	40	0.35
	502008S	0.8	4	0.8	40	0.4
	502008	0.8	4	1.6	40	0.4
	502008S3	0.8	3	1.6	40	0.4
	502009S	0.9	4	0.9	40	0.45
	502009	0.9	4	1.8	40	0.45
	502009S3	0.9	3	1.8	40	0.45
	502010S	1	6	1.5	40	0.5
	502010S3	1	3	2.5	50	0.5
	502010S4	1	4	2.5	50	0.5
	502010	1	6	2.5	50	0.5
	502010070	1	6	2.5	70	0.5
	502010100	1	6	2.5	100	0.5
	502012S	1.2	6	2	40	0.6

	형 번	DC	DCON-MS	APMX	LF	RE
UB	502012S3	1.2	3	3	50	0.6
	502012S4	1.2	4	3	50	0.6
	502012	1.2	6	3	50	0.6
	502012070	1.2	6	3	70	0.6
	502012100	1.2	6	3	100	0.6
	502015S	1.5	6	2.5	40	0.75
	502015S3	1.5	3	4	50	0.75
	502015S4	1.5	4	4	50	0.75
	502015	1.5	6	4	50	0.75
	502015070	1.5	6	4	70	0.75
	502015100	1.5	6	4	100	0.75
	502020S	2	6	3	40	1
	502020S3	2	3	5	50	1
	502020S4	2	4	5	50	1
	502020	2	6	5	50	1
	502020080	2	6	5	80	1
	502020100	2	6	5	100	1
	502025S	2.5	6	4	40	1.25
	502025S3	2.5	3	6	60	1.25
	502025S4	2.5	4	6	60	1.25
	502025	2.5	6	6	60	1.25
	502025080	2.5	6	6	80	1.25
	502025100	2.5	6	6	100	1.25
	502030S	3	6	4.5	40	1.5
	502030S3	3	3	6	60	1.5
	502030S4	3	4	6	60	1.5
	502030	3	6	6	60	1.5
	502030080	3	6	6	80	1.5
	502030100	3	6	6	100	1.5
	502035	3.5	6	8	70	1.75
	502040S	4	6	6	50	2
	502040S4	4	4	8	70	2
	502040	4	6	8	70	2
	502040100S4	4	4	8	100	2
	502040120S4	4	4	8	120	2
	502040100	4	6	8	100	2
	502040120	4	6	8	120	2

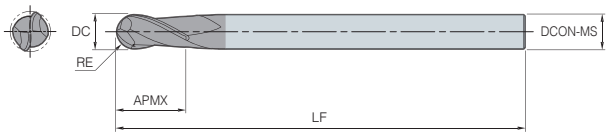
UB502

2날 볼

CARBIDE | 2 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.01 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø6.5 ~ Ø25	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LF	RE
UB	UB502045	4.5	6	9	80	2.25
	UB502050S	5	6	7.5	60	2.5
	UB502050	5	6	10	80	2.5
	UB502050S5	5	5	10	80	2.5
	UB502055	5.5	6	11	90	2.75
	UB502060S	6	6	9	50	3
	UB502060060	6	6	9	60	3
	UB502060080	6	6	9	80	3
	UB502060	6	6	12	90	3
	UB502060110	6	6	12	110	3
	UB502060130	6	6	12	130	3
	UB502060150	6	6	12	150	3
	UB502065	6.5	8	13	90	3.25
	UB502070	7	8	14	90	3.5
	UB502080S	8	8	12	50	4
	UB502080060	8	8	12	60	4
	UB502080080	8	8	12	80	4
	UB502080090	8	8	12	90	4
	UB502080	8	8	14	100	4
	UB502080130	8	8	14	130	4
	UB502080150	8	8	14	150	4
	UB502085	8.5	10	16	100	4.25
	UB502090	9	10	18	100	4.5
	UB502100S	10	10	15	50	5
	UB502100060	10	10	15	60	5
	UB502100080	10	10	15	80	5
	UB502100090	10	10	15	90	5
	UB502100	10	10	18	100	5
	UB502100130	10	10	18	130	5
	UB502100150	10	10	18	150	5

	형 번	DC	DCON-MS	APMX	LF	RE
UB	UB502100180	10	10	18	180	5
	UB502100200	10	10	18	200	5
	UB502110	11	12	20	100	5.5
	UB502120S	12	12	18	60	6
	UB502120080	12	12	18	80	6
	UB502120090	12	12	18	90	6
	UB502120100	12	12	18	100	6
	UB502120	12	12	24	110	6
	UB502120130	12	12	24	130	6
	UB502120150	12	12	24	150	6
	UB502120180	12	12	24	180	6
	UB502120200	12	12	24	200	6
	UB502130	13	12	24	100	6.5
	UB502140S12	14	12	26	100	7
	UB502140	14	14	26	100	7
	UB502140S16	14	16	26	100	7
	UB502150	15	16	28	140	7.5
	UB502160100	16	16	24	100	8
	UB502160130	16	16	24	130	8
	UB502160	16	16	30	150	8
	UB502160180	16	16	30	180	8
	UB502160200	16	16	30	200	8
	UB502180S16	18	16	34	150	9
	UB502180	18	18	34	150	9
	UB502200100	20	20	30	100	10
	UB502200130	20	20	30	130	10
	UB502200	20	20	38	150	10
	UB502200200	20	20	38	200	10
	UB502250120	25	25	50	120	12.5
	UB502250180	25	25	50	180	12.5

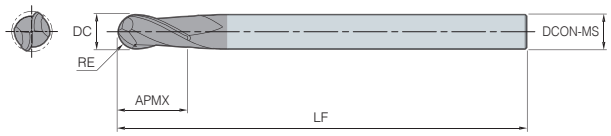
UB502P

2날 고정밀 볼



CARBIDE | 2 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.002 (DC6 이하) | RE공차 ±0.003 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015





(mm)

형 번		DC	DCON-MS	APMX	LF	RE
UB	UB502001P	0.1	4	0.2	40	0.05
	UB5020015P	0.15	4	0.3	40	0.075
	UB502002P	0.2	4	0.4	40	0.1
	UB502003P	0.3	4	0.6	40	0.15
	UB502004P	0.4	4	0.8	40	0.2
	UB502005P	0.5	4	1	40	0.25
	UB502006P	0.6	4	1.2	40	0.3
	UB502007P	0.7	4	1.4	40	0.35
	UB502008P	0.8	4	1.6	40	0.4
	UB502009P	0.9	4	1.8	40	0.45
	UB502010P	1	6	2.5	50	0.5
	UB502012P	1.2	6	3	50	0.6
	UB502015P	1.5	6	4	50	0.75
	UB502020P	2	6	5	50	1
	UB502025P	2.5	6	6	60	1.25
	UB502030P	3	6	6	60	1.5
	UB502040P	4	6	8	70	2
	UB502050P	5	6	10	80	2.5
	UB502060P	6	6	12	90	3
	UB502080P	8	8	14	100	4
	UB502100P	10	10	18	100	5
	UB502120P	12	12	24	110	6

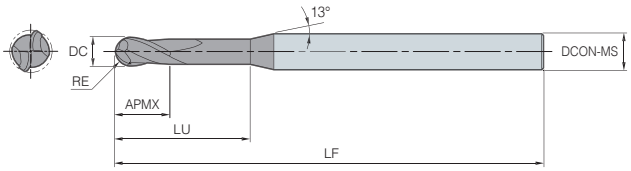
UB512

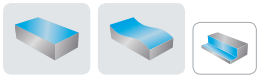
2날 롱 넥 볼

CARBIDE | 2 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.01 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UB	512001002	0.1	4	0.1	0.2	45	0.05
	512001003	0.1	4	0.1	0.3	45	0.05
	512001005	0.1	4	0.1	0.5	45	0.05
	51200101	0.1	4	0.1	1	45	0.05
	512002005	0.2	4	0.2	0.5	45	0.1
	51200201	0.2	4	0.2	1	45	0.1
	512002015	0.2	4	0.2	1.5	45	0.1
	51200202	0.2	4	0.2	2	45	0.1
	51200203	0.2	4	0.2	3	45	0.1
	51200301	0.3	4	0.3	1	45	0.15
	512003015	0.3	4	0.3	1.5	45	0.15
	51200302	0.3	4	0.3	2	45	0.15
	512003025	0.3	4	0.3	2.5	45	0.15
	51200303	0.3	4	0.3	3	45	0.15
	51200304	0.3	4	0.3	4	45	0.15
	51200305	0.3	4	0.3	5	45	0.15
	51200401	0.4	4	0.4	1	45	0.2
	512004015	0.4	4	0.4	1.5	45	0.2
	51200402	0.4	4	0.4	2	45	0.2
	512004025	0.4	4	0.4	2.5	45	0.2
	51200403	0.4	4	0.4	3	45	0.2
	51200404	0.4	4	0.4	4	45	0.2
	51200405	0.4	4	0.4	5	45	0.2
	51200406	0.4	4	0.4	6	45	0.2
	51200408	0.4	4	0.4	8	45	0.2
	51200410	0.4	4	0.4	10	45	0.2
	51200501	0.5	4	0.5	1	45	0.25
	512005015	0.5	4	0.5	1.5	45	0.25
	51200502	0.5	4	0.5	2	45	0.25
	512005025	0.5	4	0.5	2.5	45	0.25
	51200503	0.5	4	0.5	3	45	0.25
	51200504	0.5	4	0.5	4	45	0.25
	51200505	0.5	4	0.5	5	45	0.25
	51200506	0.5	4	0.5	6	45	0.25

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UB	51200508	0.5	4	0.5	8	45	0.25
	51200510	0.5	4	0.5	10	45	0.25
	51200512	0.5	4	0.5	12	45	0.25
	51200514	0.5	4	0.5	14	45	0.25
	51200516	0.5	4	0.5	16	45	0.25
	51200601	0.6	4	0.6	1	45	0.3
	51200602	0.6	4	0.6	2	45	0.3
	51200603	0.6	4	0.6	3	45	0.3
	51200604	0.6	4	0.6	4	45	0.3
	51200605	0.6	4	0.6	5	45	0.3
	51200606	0.6	4	0.6	6	45	0.3
	51200608	0.6	4	0.6	8	45	0.3
	51200610	0.6	4	0.6	10	45	0.3
	51200612	0.6	4	0.6	12	45	0.3
	51200614	0.6	4	0.6	14	45	0.3
	51200616	0.6	4	0.6	16	45	0.3
	51200702	0.7	4	0.7	2	45	0.35
	51200704	0.7	4	0.7	4	45	0.35
	51200706	0.7	4	0.7	6	45	0.35
	51200708	0.7	4	0.7	8	45	0.35
	51200710	0.7	4	0.7	10	45	0.35
	51200712	0.7	4	0.7	12	45	0.35
	51200801	0.8	4	0.8	1	45	0.4
	51200802	0.8	4	0.8	2	45	0.4
	51200803	0.8	4	0.8	3	45	0.4
	51200804	0.8	4	0.8	4	45	0.4
	51200805	0.8	4	0.8	5	45	0.4
	51200806	0.8	4	0.8	6	45	0.4
	51200807	0.8	4	0.8	7	45	0.4
	51200808	0.8	4	0.8	8	45	0.4
	51200810	0.8	4	0.8	10	45	0.4
	51200812	0.8	4	0.8	12	45	0.4
	51200814	0.8	4	0.8	14	45	0.4
	51200816	0.8	4	0.8	16	45	0.4

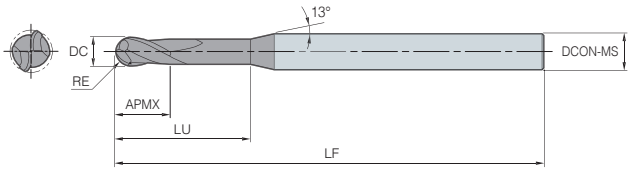
UB512

2날 롱 넥 볼



CARBIDE | 2 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.01 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UB	51200820	0.8	4	0.8	20	45	0.4
	51200904	0.9	4	0.9	4	45	0.45
	51200906	0.9	4	0.9	6	45	0.45
	51200908	0.9	4	0.9	8	45	0.45
	51200910	0.9	4	0.9	10	45	0.45
	51201002	1	4	1	2	50	0.5
	512010025	1	4	1	2.5	50	0.5
	51201003	1	4	1	3	50	0.5
	51201004	1	4	1	4	50	0.5
	51201005	1	4	1	5	50	0.5
	51201006	1	4	1	6	50	0.5
	51201007	1	4	1	7	50	0.5
	51201008	1	4	1	8	50	0.5
	51201009	1	4	1	9	50	0.5
	51201010	1	4	1	10	50	0.5
	51201012	1	4	1	12	50	0.5
	51201014	1	4	1	14	50	0.5
	51201016	1	4	1	16	50	0.5
	51201018	1	4	1	18	50	0.5
	51201020	1	4	1	20	55	0.5
	51201022	1	4	1	22	60	0.5
	51201026	1	4	1	26	60	0.5
	51201030	1	4	1	30	70	0.5
	51201040	1	4	1	40	80	0.5
	51201050	1	4	1	50	100	0.5
	51201204	1.2	4	1.2	4	50	0.6
	51201206	1.2	4	1.2	6	50	0.6
	51201208	1.2	4	1.2	8	50	0.6
	51201210	1.2	4	1.2	10	50	0.6
	51201212	1.2	4	1.2	12	50	0.6
	51201214	1.2	4	1.2	14	50	0.6
	51201216	1.2	4	1.2	16	50	0.6
	51201220	1.2	4	1.2	20	55	0.6
	51201226	1.2	4	1.2	26	60	0.6

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UB	51201406	1.4	4	1.4	6	50	0.7
	51201408	1.4	4	1.4	8	50	0.7
	51201410	1.4	4	1.4	10	50	0.7
	51201412	1.4	4	1.4	12	50	0.7
	51201416	1.4	4	1.4	16	50	0.7
	51201503	1.5	4	1.5	3	50	0.75
	51201504	1.5	4	1.5	4	50	0.75
	51201505	1.5	4	1.5	5	50	0.75
	51201506	1.5	4	1.5	6	50	0.75
	51201507	1.5	4	1.5	7	50	0.75
	51201508	1.5	4	1.5	8	50	0.75
	51201510	1.5	4	1.5	10	50	0.75
	51201512	1.5	4	1.5	12	50	0.75
	51201514	1.5	4	1.5	14	50	0.75
	51201516	1.5	4	1.5	16	50	0.75
	51201518	1.5	4	1.5	18	50	0.75
	51201520	1.5	4	1.5	20	55	0.75
	51201522	1.5	4	1.5	22	60	0.75
	51201526	1.5	4	1.5	26	60	0.75
	51201530	1.5	4	1.5	30	70	0.75
	51201535	1.5	4	1.5	35	70	0.75
	51201540	1.5	4	1.5	40	80	0.75
	51201604	1.6	4	1.6	4	50	0.8
	51201606	1.6	4	1.6	6	50	0.8
	51201608	1.6	4	1.6	8	50	0.8
	51201610	1.6	4	1.6	10	50	0.8
	51201612	1.6	4	1.6	12	50	0.8
	51201616	1.6	4	1.6	16	50	0.8
	51201620	1.6	4	1.6	20	50	0.8
	51201804	1.8	4	1.8	4	50	0.9
	51201806	1.8	4	1.8	6	50	0.9
	51201808	1.8	4	1.8	8	50	0.9
	51201810	1.8	4	1.8	10	50	0.9
	51201812	1.8	4	1.8	12	50	0.9

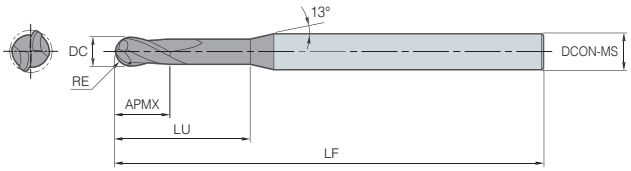
UB512

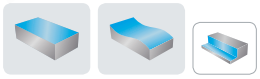
2날 롱 넥 볼

CARBIDE | 2 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.01 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UB	51201816	1.8	4	1.8	16	50	0.9
	51201820	1.8	4	1.8	20	50	0.9
	51202004	2	4	2	4	50	1
	51202005	2	4	2	5	50	1
	51202006	2	4	2	6	50	1
	51202008	2	4	2	8	50	1
	51202010	2	4	2	10	50	1
	51202012	2	4	2	12	50	1
	51202014	2	4	2	14	50	1
	51202016	2	4	2	16	50	1
	51202018	2	4	2	18	55	1
	51202020	2	4	2	20	55	1
	51202022	2	4	2	22	60	1
	51202026	2	4	2	26	60	1
	51202030	2	4	2	30	70	1
	51202035	2	4	2	35	70	1
	51202040	2	4	2	40	80	1
	51202045	2	4	2	45	90	1
	51202050	2	4	2	50	100	1
	51202060	2	4	2	60	110	1
	51202508	2.5	4	2.5	8	50	1.25
	51202510	2.5	4	2.5	10	50	1.25
	51202512	2.5	4	2.5	12	50	1.25
	51202516	2.5	4	2.5	16	50	1.25
	51202520	2.5	4	2.5	20	50	1.25
	51202522	2.5	4	2.5	22	60	1.25
	51202526	2.5	4	2.5	26	60	1.25
	51202530	2.5	4	2.5	30	70	1.25
	51202535	2.5	4	2.5	35	70	1.25
	51202540	2.5	4	2.5	40	80	1.25
	51202545	2.5	4	2.5	45	90	1.25
	51202550	2.5	4	2.5	50	100	1.25
	51203006	3	6	3	6	50	1.5
	51203008	3	6	3	8	50	1.5

	형 번	DC	DCON-MS	APMX	LU	LF	RE
UB	51203010	3	6	3	10	50	1.5
	51203012	3	6	3	12	50	1.5
	51203014	3	6	3	14	60	1.5
	51203016	3	6	3	16	60	1.5
	51203018	3	6	3	18	60	1.5
	51203020	3	6	3	20	60	1.5
	51203022	3	6	3	22	65	1.5
	51203026	3	6	3	26	65	1.5
	51203030	3	6	3	30	70	1.5
	51203035	3	6	3	35	70	1.5
	51203040	3	6	3	40	80	1.5
	51203045	3	6	3	45	90	1.5
	51203050	3	6	3	50	100	1.5
	51203060	3	6	3	60	100	1.5
	51204008	4	6	4	8	50	2
	51204010	4	6	4	10	50	2
	51204012	4	6	4	12	50	2
	51204014	4	6	4	14	60	2
	51204016	4	6	4	16	60	2
	51204018	4	6	4	18	60	2
	51204020	4	6	4	20	60	2
	51204022	4	6	4	22	65	2
	51204026	4	6	4	26	65	2
	51204030	4	6	4	30	70	2
	51204035	4	6	4	35	70	2
	51204040	4	6	4	40	80	2
	51204045	4	6	4	45	90	2
	51204050	4	6	4	50	100	2
	51204055	4	6	4	55	100	2
	51204060	4	6	4	60	100	2
	51205015	5	6	6	15	60	2.5
	51205020	5	6	6	20	60	2.5
	51205026	5	6	6	26	65	2.5
	51205030	5	6	6	30	70	2.5

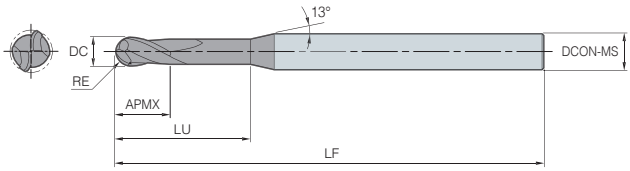
UB512

2날 롱 넥 볼



CARBIDE | 2 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.01 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015





(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
UB	51205035	5	6	6	35	70	2.5
	51205040	5	6	6	40	80	2.5
	51205045	5	6	6	45	90	2.5
	51205050	5	6	6	50	100	2.5
	51205055	5	6	6	55	100	2.5
	51205060	5	6	6	60	100	2.5
	51206020	6	6	8	20	60	3
	5120602090	6	6	12	20	90	3
	51206030	6	6	8	30	60	3
	5120603090	6	6	12	30	90	3
	51208025	8	8	10	25	70	4

형 번		DC	DCON-MS	APMX	LU	LF	RE
UB	51208025100	8	8	14	25	100	4
	51208035	8	8	10	35	70	4
	51208035100	8	8	14	35	100	4
	51210030	10	10	12	30	75	5
	51210030100	10	10	18	30	100	5
	51210040	10	10	12	40	75	5
	51210040100	10	10	18	40	100	5
	51212032	12	12	14	32	80	6
	51212032110	12	12	22	32	110	6
	51212045	12	12	14	45	80	6
	51212045110	12	12	22	45	110	6

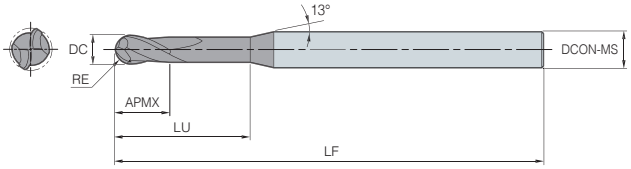
UB512S6

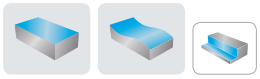
2날 롱 넥 볼(자루경 6)

CARBIDE | 2 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.005

DC	공구직경공차
ALL	0.000 ~ -0.012







(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
UB	51200501S6	0.5	6	0.5	1	45	0.25
	51200502S6	0.5	6	0.5	2	45	0.25
	51200504S6	0.5	6	0.5	4	45	0.25
	51200601S6	0.6	6	0.6	1	45	0.3
	51200602S6	0.6	6	0.6	2	45	0.3
	51200603S6	0.6	6	0.6	3	45	0.3
	51200604S6	0.6	6	0.6	4	45	0.3
	51200605S6	0.6	6	0.6	5	45	0.3
	51200606S6	0.6	6	0.6	6	45	0.3
	51200608S6	0.6	6	0.6	8	45	0.3
	51200610S6	0.6	6	0.6	10	45	0.3
	51200612S6	0.6	6	0.6	12	45	0.3
	51200614S6	0.6	6	0.6	14	45	0.3
	51200616S6	0.6	6	0.6	16	45	0.3
	51200801S6	0.8	6	0.8	1	45	0.4
	51200802S6	0.8	6	0.8	2	45	0.4
	51200803S6	0.8	6	0.8	3	45	0.4
	51200804S6	0.8	6	0.8	4	45	0.4
	51200805S6	0.8	6	0.8	5	45	0.4
	51200806S6	0.8	6	0.8	6	45	0.4
	51200808S6	0.8	6	0.8	8	45	0.4
	51200810S6	0.8	6	0.8	10	45	0.4
	51200812S6	0.8	6	0.8	12	45	0.4
	51200814S6	0.8	6	0.8	14	45	0.4
	51200816S6	0.8	6	0.8	16	45	0.4
	51200820S6	0.8	6	0.8	20	55	0.4
	51201002S6	1	6	1	2	50	0.5
	51201003S6	1	6	1	3	50	0.5
	51201004S6	1	6	1	4	50	0.5
	51201005S6	1	6	1	5	50	0.5
	51201006S6	1	6	1	6	50	0.5
	51201007S6	1	6	1	7	50	0.5
	51201008S6	1	6	1	8	50	0.5
	51201009S6	1	6	1	9	50	0.5
	51201010S6	1	6	1	10	50	0.5
	51201012S6	1	6	1	12	50	0.5
	51201014S6	1	6	1	14	50	0.5

형 번		DC	DCON-MS	APMX	LU	LF	RE
UB	51201016S6	1	6	1	16	50	0.5
	51201018S6	1	6	1	18	50	0.5
	51201020S6	1	6	1	20	55	0.5
	51201022S6	1	6	1	22	60	0.5
	51201026S6	1	6	1	26	60	0.5
	51201030S6	1	6	1	30	70	0.5
	51201503S6	1.5	6	1.5	3	50	0.75
	51201504S6	1.5	6	1.5	4	50	0.75
	51201506S6	1.5	6	1.5	6	50	0.75
	51201508S6	1.5	6	1.5	8	50	0.75
	51201510S6	1.5	6	1.5	10	50	0.75
	51201512S6	1.5	6	1.5	12	50	0.75
	51201514S6	1.5	6	1.5	14	50	0.75
	51201516S6	1.5	6	1.5	16	50	0.75
	51201518S6	1.5	6	1.5	18	50	0.75
	51201520S6	1.5	6	1.5	20	55	0.75
	51201522S6	1.5	6	1.5	22	60	0.75
	51201526S6	1.5	6	1.5	26	60	0.75
	51201530S6	1.5	6	1.5	30	70	0.75
	51201535S6	1.5	6	1.5	35	70	0.75
	51201540S6	1.5	6	1.5	40	80	0.75
	51202004S6	2	6	2	4	50	1
	51202006S6	2	6	2	6	50	1
	51202008S6	2	6	2	8	50	1
	51202010S6	2	6	2	10	50	1
	51202012S6	2	6	2	12	50	1
	51202014S6	2	6	2	14	50	1
	51202016S6	2	6	2	16	50	1
	51202018S6	2	6	2	18	50	1
	51202020S6	2	6	2	20	50	1
	51202022S6	2	6	2	22	60	1
	51202026S6	2	6	2	26	60	1
	51202030S6	2	6	2	30	70	1
	51202035S6	2	6	2	35	70	1
	51202040S6	2	6	2	40	80	1
	51202045S6	2	6	2	45	90	1
	51202050S6	2	6	2	50	100	1

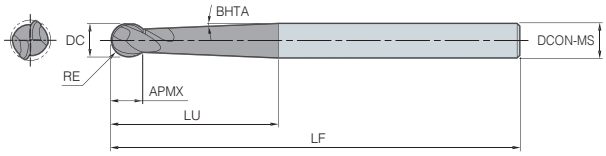
UB532

2날 롤리팝 스타일 볼



CARBIDE | 2 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.01

DC	공구직경공차
Ø3 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LU	LF	BHTA	RE
UB	532030	3	6	2.3	16	80	1.5	1.5
	532040	4	6	3.1	20	80	1.5	2
	532050	5	6	3.9	25	80	1.5	2.5
	532060	6	6	4.9	30	100	1.5	3
	532080	8	8	6.3	35	100	1.5	4
	532100	10	10	7.9	40	100	1.5	5
	532120	12	12	9.5	50	100	1.5	6

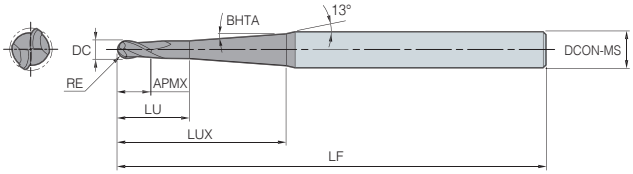
UB542

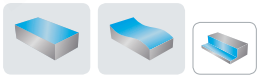
2날 테이퍼 넥 볼

CARBIDE | 2 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.01 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UB	54200105005	0.1	4	0.1	-	0.5	40	0.5	0.05
	5420010501	0.1	4	0.1	-	1	40	0.5	0.05
	54200110005	0.1	4	0.1	-	0.5	40	1	0.05
	5420011001	0.1	4	0.1	-	1	40	1	0.05
	54200115005	0.1	4	0.1	-	0.5	40	1.5	0.05
	5420011501	0.1	4	0.1	-	1	40	1.5	0.05
	54200120005	0.1	4	0.1	-	0.5	40	2	0.05
	5420012001	0.1	4	0.1	-	1	40	2	0.05
	54200130005	0.1	4	0.1	-	0.5	40	3	0.05
	5420013001	0.1	4	0.1	-	1	40	3	0.05
	5420020501	0.2	4	0.2	0.4	1	40	0.5	0.1
	5420020502	0.2	4	0.2	0.4	2	40	0.5	0.1
	5420020503	0.2	4	0.2	0.4	3	40	0.5	0.1
	5420021001	0.2	4	0.2	0.4	1	40	1	0.1
	5420021002	0.2	4	0.2	0.4	2	40	1	0.1
	5420021003	0.2	4	0.2	0.4	3	40	1	0.1
	5420021501	0.2	4	0.2	0.4	1	40	1.5	0.1
	5420021502	0.2	4	0.2	0.4	2	40	1.5	0.1
	5420021503	0.2	4	0.2	0.4	3	40	1.5	0.1
	5420022001	0.2	4	0.2	0.4	1	40	2	0.1
	5420022002	0.2	4	0.2	0.4	2	40	2	0.1
	5420022003	0.2	4	0.2	0.4	3	40	2	0.1
	5420023001	0.2	4	0.2	0.4	1	40	3	0.1
	5420023002	0.2	4	0.2	0.4	2	40	3	0.1
	5420023003	0.2	4	0.2	0.4	3	40	3	0.1
	5420025002	0.2	4	0.2	0.4	2	40	5	0.1
	5420025003	0.2	4	0.2	0.4	3	40	5	0.1
	5420030502	0.3	4	0.3	0.6	2	40	0.5	0.15
	5420030503	0.3	4	0.3	0.6	3	40	0.5	0.15
	5420030504	0.3	4	0.3	0.6	4	40	0.5	0.15
	5420030505	0.3	4	0.3	0.6	5	40	0.5	0.15
	5420031002	0.3	4	0.3	0.6	2	40	1	0.15
	5420031003	0.3	4	0.3	0.6	3	40	1	0.15
	5420031004	0.3	4	0.3	0.6	4	40	1	0.15
	5420031005	0.3	4	0.3	0.6	5	40	1	0.15
	5420031502	0.3	4	0.3	0.6	2	40	1.5	0.15

형 번		DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UB	5420031503	0.3	4	0.3	0.6	3	40	1.5	0.15
	5420031504	0.3	4	0.3	0.6	4	40	1.5	0.15
	5420031505	0.3	4	0.3	0.6	5	40	1.5	0.15
	5420032002	0.3	4	0.3	0.6	2	40	2	0.15
	5420032003	0.3	4	0.3	0.6	3	40	2	0.15
	5420032004	0.3	4	0.3	0.6	4	40	2	0.15
	5420032005	0.3	4	0.3	0.6	5	40	2	0.15
	5420033002	0.3	4	0.3	0.6	2	40	3	0.15
	5420033003	0.3	4	0.3	0.6	3	40	3	0.15
	5420033004	0.3	4	0.3	0.6	4	40	3	0.15
	5420033005	0.3	4	0.3	0.6	5	40	3	0.15
	5420035005	0.3	4	0.3	0.6	5	40	5	0.15
	5420040502	0.4	4	0.4	0.8	2	50	0.5	0.2
	5420040503	0.4	4	0.4	0.8	3	50	0.5	0.2
	5420040504	0.4	4	0.4	0.8	4	50	0.5	0.2
	5420040505	0.4	4	0.4	0.8	5	50	0.5	0.2
	5420040506	0.4	4	0.4	0.8	6	50	0.5	0.2
	5420041002	0.4	4	0.4	0.8	2	50	1	0.2
	5420041003	0.4	4	0.4	0.8	3	50	1	0.2
	5420041004	0.4	4	0.4	0.8	4	50	1	0.2
	5420041005	0.4	4	0.4	0.8	5	50	1	0.2
	5420041006	0.4	4	0.4	0.8	6	50	1	0.2
	5420041502	0.4	4	0.4	0.8	2	50	1.5	0.2
	5420041503	0.4	4	0.4	0.8	3	50	1.5	0.2
	5420041504	0.4	4	0.4	0.8	4	50	1.5	0.2
	5420041505	0.4	4	0.4	0.8	5	50	1.5	0.2
	5420041506	0.4	4	0.4	0.8	6	50	1.5	0.2
	5420042002	0.4	4	0.4	0.8	2	50	2	0.2
	5420042003	0.4	4	0.4	0.8	3	50	2	0.2
	5420042004	0.4	4	0.4	0.8	4	50	2	0.2
	5420042005	0.4	4	0.4	0.8	5	50	2	0.2
	5420042006	0.4	4	0.4	0.8	6	50	2	0.2
	5420043002	0.4	4	0.4	0.8	2	50	3	0.2
	5420043003	0.4	4	0.4	0.8	3	50	3	0.2
	5420043004	0.4	4	0.4	0.8	4	50	3	0.2
	5420043005	0.4	4	0.4	0.8	5	50	3	0.2

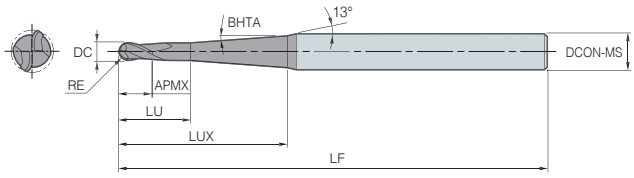
UB542

2날 테이퍼 넥 볼



CARBIDE | 2 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.01 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015





(mm)

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UB	5420043006	0.4	4	0.4	0.8	6	50	3	0.2
	5420045004	0.4	4	0.4	0.8	4	50	5	0.2
	5420045006	0.4	4	0.4	0.8	6	50	5	0.2
	5420050504	0.5	4	0.5	1	4	50	0.5	0.25
	5420050506	0.5	4	0.5	1	6	50	0.5	0.25
	5420050508	0.5	4	0.5	1	8	50	0.5	0.25
	5420050510	0.5	4	0.5	1	10	50	0.5	0.25
	5420051004	0.5	4	0.5	1	4	50	1	0.25
	5420051006	0.5	4	0.5	1	6	50	1	0.25
	5420051008	0.5	4	0.5	1	8	50	1	0.25
	5420051010	0.5	4	0.5	1	10	50	1	0.25
	5420051504	0.5	4	0.5	1	4	50	1.5	0.25
	5420051506	0.5	4	0.5	1	6	50	1.5	0.25
	5420051508	0.5	4	0.5	1	8	50	1.5	0.25
	5420051510	0.5	4	0.5	1	10	50	1.5	0.25
	5420052004	0.5	4	0.5	1	4	50	2	0.25
	5420052006	0.5	4	0.5	1	6	50	2	0.25
	5420052008	0.5	4	0.5	1	8	50	2	0.25
	5420052010	0.5	4	0.5	1	10	50	2	0.25
	5420053004	0.5	4	0.5	1	4	50	3	0.25
	5420053006	0.5	4	0.5	1	6	50	3	0.25
	5420053008	0.5	4	0.5	1	8	50	3	0.25
	5420053010	0.5	4	0.5	1	10	50	3	0.25
	5420060504	0.6	4	0.6	1.2	4	50	0.5	0.3
	5420060506	0.6	4	0.6	1.2	6	50	0.5	0.3
	5420060508	0.6	4	0.6	1.2	8	50	0.5	0.3
	5420060510	0.6	4	0.6	1.2	10	50	0.5	0.3
	5420060512	0.6	4	0.6	1.2	12	50	0.5	0.3
	5420061004	0.6	4	0.6	1.2	4	50	1	0.3
	5420061006	0.6	4	0.6	1.2	6	50	1	0.3
	5420061008	0.6	4	0.6	1.2	8	50	1	0.3
	5420061010	0.6	4	0.6	1.2	10	50	1	0.3
	5420061012	0.6	4	0.6	1.2	12	50	1	0.3
	5420061504	0.6	4	0.6	1.2	4	50	1.5	0.3
	5420061506	0.6	4	0.6	1.2	6	50	1.5	0.3
	5420061508	0.6	4	0.6	1.2	8	50	1.5	0.3

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UB	5420061510	0.6	4	0.6	1.2	10	50	1.5	0.3
	5420061512	0.6	4	0.6	1.2	12	50	1.5	0.3
	5420062004	0.6	4	0.6	1.2	4	50	2	0.3
	5420062006	0.6	4	0.6	1.2	6	50	2	0.3
	5420062008	0.6	4	0.6	1.2	8	50	2	0.3
	5420062010	0.6	4	0.6	1.2	10	50	2	0.3
	5420062012	0.6	4	0.6	1.2	12	50	2	0.3
	5420063004	0.6	4	0.6	1.2	4	50	3	0.3
	5420063006	0.6	4	0.6	1.2	6	50	3	0.3
	5420063008	0.6	4	0.6	1.2	8	50	3	0.3
	5420063010	0.6	4	0.6	1.2	10	50	3	0.3
	5420063012	0.6	4	0.6	1.2	12	50	3	0.3
	5420080504	0.8	4	0.8	1.6	4	50	0.5	0.4
	5420080506	0.8	4	0.8	1.6	6	50	0.5	0.4
	5420080508	0.8	4	0.8	1.6	8	50	0.5	0.4
	5420080510	0.8	4	0.8	1.6	10	50	0.5	0.4
	5420080512	0.8	4	0.8	1.6	12	50	0.5	0.4
	5420080516	0.8	4	0.8	1.6	16	50	0.5	0.4
	5420081004	0.8	4	0.8	1.6	4	50	1	0.4
	5420081006	0.8	4	0.8	1.6	6	50	1	0.4
	5420081008	0.8	4	0.8	1.6	8	50	1	0.4
	5420081010	0.8	4	0.8	1.6	10	50	1	0.4
	5420081012	0.8	4	0.8	1.6	12	50	1	0.4
	5420081016	0.8	4	0.8	1.6	16	50	1	0.4
	5420081504	0.8	4	0.8	1.6	4	50	1.5	0.4
	5420081506	0.8	4	0.8	1.6	6	50	1.5	0.4
	5420081508	0.8	4	0.8	1.6	8	50	1.5	0.4
	5420081510	0.8	4	0.8	1.6	10	50	1.5	0.4
	5420081512	0.8	4	0.8	1.6	12	50	1.5	0.4
	5420081516	0.8	4	0.8	1.6	16	50	1.5	0.4
	5420082004	0.8	4	0.8	1.6	4	50	2	0.4
	5420082006	0.8	4	0.8	1.6	6	50	2	0.4
	5420082008	0.8	4	0.8	1.6	8	50	2	0.4
	5420082010	0.8	4	0.8	1.6	10	50	2	0.4
	5420082012	0.8	4	0.8	1.6	12	50	2	0.4
	5420082016	0.8	4	0.8	1.6	16	50	2	0.4

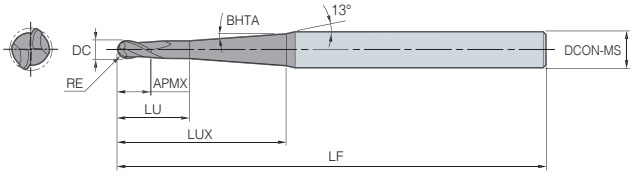
UB542

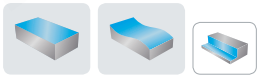
2날 테이퍼 넥 볼

CARBIDE | 2 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.01 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UB	5420083004	0.8	4	0.8	1.6	4	50	3	0.4
	5420083006	0.8	4	0.8	1.6	6	50	3	0.4
	5420083008	0.8	4	0.8	1.6	8	50	3	0.4
	5420083010	0.8	4	0.8	1.6	10	50	3	0.4
	5420083012	0.8	4	0.8	1.6	12	50	3	0.4
	5420083016	0.8	4	0.8	1.6	16	50	3	0.4
	5420100506	1	4	1	2.5	6	50	0.5	0.5
	5420100508	1	4	1	2.5	8	50	0.5	0.5
	5420100510	1	4	1	2.5	10	50	0.5	0.5
	5420100512	1	4	1	2.5	12	50	0.5	0.5
	5420100516	1	4	1	2.5	16	50	0.5	0.5
	5420100520	1	4	1	2.5	20	50	0.5	0.5
	5420100525	1	4	1	2.5	25	60	0.5	0.5
	5420100530	1	4	1	2.5	30	70	0.5	0.5
	5420100540	1	4	1	2.5	40	80	0.5	0.5
	5420100550	1	4	1	2.5	50	90	0.5	0.5
	5420101006	1	4	1	2.5	6	50	1	0.5
	5420101008	1	4	1	2.5	8	50	1	0.5
	5420101010	1	4	1	2.5	10	50	1	0.5
	5420101012	1	4	1	2.5	12	50	1	0.5
	5420101016	1	4	1	2.5	16	50	1	0.5
	5420101020	1	4	1	2.5	20	50	1	0.5
	5420101025	1	4	1	2.5	25	60	1	0.5
	5420101030	1	4	1	2.5	30	70	1	0.5
	5420101040	1	4	1	2.5	40	80	1	0.5
	5420101050	1	4	1	2.5	50	90	1	0.5
	5420101506	1	4	1	2.5	6	50	1.5	0.5
	5420101508	1	4	1	2.5	8	50	1.5	0.5
	5420101510	1	4	1	2.5	10	50	1.5	0.5
	5420101512	1	4	1	2.5	12	50	1.5	0.5
	5420101516	1	4	1	2.5	16	50	1.5	0.5
	5420101520	1	4	1	2.5	20	50	1.5	0.5
	5420101525	1	4	1	2.5	25	60	1.5	0.5
	5420101530	1	4	1	2.5	30	70	1.5	0.5
	5420101540	1	4	1	2.5	40	80	1.5	0.5
	5420101550	1	4	1	2.5	50	90	1.5	0.5

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UB	5420102006	1	4	1	2.5	6	50	2	0.5
	5420102008	1	4	1	2.5	8	50	2	0.5
	5420102010	1	4	1	2.5	10	50	2	0.5
	5420102012	1	4	1	2.5	12	50	2	0.5
	5420102016	1	4	1	2.5	16	50	2	0.5
	5420102020	1	4	1	2.5	20	50	2	0.5
	5420102025	1	4	1	2.5	25	60	2	0.5
	5420102030	1	4	1	2.5	30	70	2	0.5
	5420102040	1	4	1	2.5	40	80	2	0.5
	5420102050	1	6	1	2.5	50	90	2	0.5
	5420103006	1	4	1	2.5	6	50	3	0.5
	5420103008	1	4	1	2.5	8	50	3	0.5
	5420103010	1	4	1	2.5	10	50	3	0.5
	5420103012	1	4	1	2.5	12	50	3	0.5
	5420103016	1	4	1	2.5	16	50	3	0.5
	5420103020	1	4	1	2.5	20	50	3	0.5
	5420103025	1	4	1	2.5	25	60	3	0.5
	5420103030	1	6	1	2.5	30	70	3	0.5
	5420103040	1	6	1	2.5	40	80	3	0.5
	5420103050	1	6	1	2.5	50	90	3	0.5
	5420105030	1	6	1	2.5	30	70	5	0.5
	5420120508	1.2	4	1.2	3	8	50	0.5	0.6
	5420120512	1.2	4	1.2	3	12	50	0.5	0.6
	5420120516	1.2	4	1.2	3	16	50	0.5	0.6
	5420120520	1.2	4	1.2	3	20	50	0.5	0.6
	5420120525	1.2	4	1.2	3	25	60	0.5	0.6
	5420120530	1.2	4	1.2	3	30	70	0.5	0.6
	5420121008	1.2	4	1.2	3	8	50	1	0.6
	5420121012	1.2	4	1.2	3	12	50	1	0.6
	5420121016	1.2	4	1.2	3	16	50	1	0.6
	5420121020	1.2	4	1.2	3	20	50	1	0.6
	5420121025	1.2	4	1.2	3	25	60	1	0.6
	5420121030	1.2	4	1.2	3	30	70	1	0.6
	5420121508	1.2	4	1.2	3	8	50	1.5	0.6
	5420121512	1.2	4	1.2	3	12	50	1.5	0.6
	5420121516	1.2	4	1.2	3	16	50	1.5	0.6

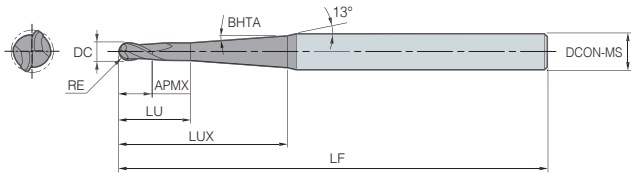
UB542

2날 테이퍼 넥 볼



CARBIDE | 2 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.01 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015





(mm)

형 번		DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UB	5420121520	1.2	4	1.2	3	20	50	1.5	0.6
	5420121525	1.2	4	1.2	3	25	60	1.5	0.6
	5420121530	1.2	4	1.2	3	30	70	1.5	0.6
	5420122008	1.2	4	1.2	3	8	50	2	0.6
	5420122012	1.2	4	1.2	3	12	50	2	0.6
	5420122016	1.2	4	1.2	3	16	50	2	0.6
	5420122020	1.2	4	1.2	3	20	50	2	0.6
	5420122025	1.2	4	1.2	3	25	60	2	0.6
	5420122030	1.2	4	1.2	3	30	70	2	0.6
	5420123008	1.2	4	1.2	3	8	50	3	0.6
	5420123012	1.2	4	1.2	3	12	50	3	0.6
	5420123016	1.2	4	1.2	3	16	50	3	0.6
	5420123020	1.2	4	1.2	3	20	50	3	0.6
	5420123025	1.2	4	1.2	3	25	60	3	0.6
	5420123030	1.2	6	1.2	3	30	70	5	0.6
	5420150508	1.5	4	1.5	4	8	50	0.5	0.75
	5420150510	1.5	4	1.5	4	10	50	0.5	0.75
	5420150512	1.5	4	1.5	4	12	50	0.5	0.75
	5420150516	1.5	4	1.5	4	16	50	0.5	0.75
	5420150520	1.5	4	1.5	4	20	50	0.5	0.75
	5420150525	1.5	4	1.5	4	25	60	0.5	0.75
	5420150530	1.5	4	1.5	4	30	70	0.5	0.75
	5420150540	1.5	4	1.5	4	40	80	0.5	0.75
	5420150550	1.5	4	1.5	4	50	90	0.5	0.75
	5420151008	1.5	4	1.5	4	8	50	1	0.75
	5420151010	1.5	4	1.5	4	10	50	1	0.75
	5420151012	1.5	4	1.5	4	12	50	1	0.75
	5420151016	1.5	4	1.5	4	16	50	1	0.75
	5420151020	1.5	4	1.5	4	20	50	1	0.75
	5420151025	1.5	4	1.5	4	25	60	1	0.75
	5420151030	1.5	4	1.5	4	30	70	1	0.75
	5420151040	1.5	4	1.5	4	40	80	1	0.75
	5420151050	1.5	4	1.5	4	50	90	1	0.75
	5420151508	1.5	4	1.5	4	8	50	1.5	0.75
	5420151510	1.5	4	1.5	4	10	50	1.5	0.75
	5420151512	1.5	4	1.5	4	12	50	1.5	0.75

형 번		DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UB	5420151516	1.5	4	1.5	4	16	50	1.5	0.75
	5420151520	1.5	4	1.5	4	20	50	1.5	0.75
	5420151525	1.5	4	1.5	4	25	60	1.5	0.75
	5420151530	1.5	4	1.5	4	30	70	1.5	0.75
	5420151540	1.5	4	1.5	4	40	80	1.5	0.75
	5420151550	1.5	4	1.5	4	50	90	1.5	0.75
	5420121016	1.2	4	1.2	3	16	50	1	0.6
	5420121020	1.2	4	1.2	3	20	50	1	0.6
	5420121025	1.2	4	1.2	3	25	60	1	0.6
	5420121030	1.2	4	1.2	3	30	70	1	0.6
	5420121508	1.2	4	1.2	3	8	50	1.5	0.6
	5420121512	1.2	4	1.2	3	12	50	1.5	0.6
	5420121516	1.2	4	1.2	3	16	50	1.5	0.6
	5420121520	1.2	4	1.2	3	20	50	1.5	0.6
	5420121525	1.2	4	1.2	3	25	60	1.5	0.6
	5420121530	1.2	4	1.2	3	30	70	1.5	0.6
	5420122008	1.2	4	1.2	3	8	50	2	0.6
	5420122012	1.2	4	1.2	3	12	50	2	0.6
	5420122016	1.2	4	1.2	3	16	50	2	0.6
	5420122020	1.2	4	1.2	3	20	50	2	0.6
	5420122025	1.2	4	1.2	3	25	60	2	0.6
	5420122030	1.2	4	1.2	3	30	70	2	0.6
	5420123008	1.2	4	1.2	3	8	50	3	0.6
	5420123012	1.2	4	1.2	3	12	50	3	0.6
	5420123016	1.2	4	1.2	3	16	50	3	0.6
	5420123020	1.2	4	1.2	3	20	50	3	0.6
	5420123025	1.2	4	1.2	3	25	60	3	0.6
	5420123030	1.2	6	1.2	3	30	70	5	0.6
	5420150508	1.5	4	1.5	4	8	50	0.5	0.75
	5420150510	1.5	4	1.5	4	10	50	0.5	0.75
	5420150512	1.5	4	1.5	4	12	50	0.5	0.75
	5420150516	1.5	4	1.5	4	16	50	0.5	0.75
	5420150520	1.5	4	1.5	4	20	50	0.5	0.75
	5420150525	1.5	4	1.5	4	25	60	0.5	0.75
	5420150530	1.5	4	1.5	4	30	70	0.5	0.75
	5420150540	1.5	4	1.5	4	40	80	0.5	0.75

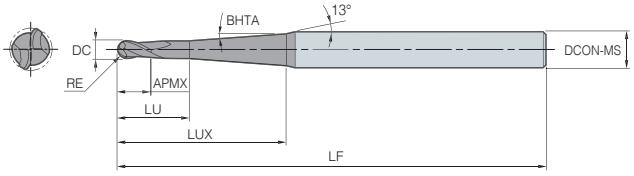
UB542

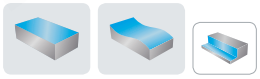
2날 테이퍼 넥 볼

CARBIDE | 2 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.01 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UB	5420150550	1.5	4	1.5	4	50	90	0.5	0.75
	5420151008	1.5	4	1.5	4	8	50	1	0.75
	5420151010	1.5	4	1.5	4	10	50	1	0.75
	5420151012	1.5	4	1.5	4	12	50	1	0.75
	5420151016	1.5	4	1.5	4	16	50	1	0.75
	5420151020	1.5	4	1.5	4	20	50	1	0.75
	5420151025	1.5	4	1.5	4	25	60	1	0.75
	5420151030	1.5	4	1.5	4	30	70	1	0.75
	5420151040	1.5	4	1.5	4	40	80	1	0.75
	5420151050	1.5	4	1.5	4	50	90	1	0.75
	5420151508	1.5	4	1.5	4	8	50	1.5	0.75
	5420151510	1.5	4	1.5	4	10	50	1.5	0.75
	5420151512	1.5	4	1.5	4	12	50	1.5	0.75
	5420151516	1.5	4	1.5	4	16	50	1.5	0.75
	5420151520	1.5	4	1.5	4	20	50	1.5	0.75
	5420151525	1.5	4	1.5	4	25	60	1.5	0.75
	5420151530	1.5	4	1.5	4	30	70	1.5	0.75
	5420151540	1.5	4	1.5	4	40	80	1.5	0.75
	5420151550	1.5	4	1.5	4	50	90	1.5	0.75
	5420152008	1.5	4	1.5	4	8	50	2	0.75
	5420152010	1.5	4	1.5	4	10	50	2	0.75
	5420152012	1.5	4	1.5	4	12	50	2	0.75
	5420152016	1.5	4	1.5	4	16	50	2	0.75
	5420152020	1.5	4	1.5	4	20	50	2	0.75
	5420152025	1.5	4	1.5	4	25	60	2	0.75
	5420152030	1.5	4	1.5	4	30	70	2	0.75
	5420152040	1.5	6	1.5	4	40	80	2	0.75
	5420152050	1.5	6	1.5	4	50	90	2	0.75
	5420153020	1.5	6	1.5	4	20	50	3	0.75
	5420153030	1.5	6	1.5	4	30	70	3	0.75
	5420153040	1.5	6	1.5	4	40	80	3	0.75
	5420153050	1.5	8	1.5	4	50	90	3	0.75
	5420155030	1.5	8	1.5	4	30	70	5	0.75
	5420200510	2	4	2	5	10	50	0.5	1
	5420200512	2	4	2	5	12	50	0.5	1
	5420200516	2	4	2	5	16	50	0.5	1

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UB	5420200520	2	4	2	5	20	50	0.5	1
	5420200525	2	4	2	5	25	60	0.5	1
	5420200530	2	4	2	5	30	70	0.5	1
	5420200540	2	4	2	5	40	80	0.5	1
	5420200550	2	6	2	5	50	100	0.5	1
	5420200560	2	6	2	5	60	100	0.5	1
	5420200580	2	6	2	5	80	140	0.5	1
	5420201010	2	4	2	5	10	50	1	1
	5420201012	2	4	2	5	12	50	1	1
	5420201016	2	4	2	5	16	50	1	1
	5420201020	2	4	2	5	20	50	1	1
	5420201025	2	4	2	5	25	60	1	1
	5420201030	2	4	2	5	30	70	1	1
	5420201040	2	6	2	5	40	80	1	1
	5420201050	2	6	2	5	50	100	1	1
	5420201060	2	6	2	5	60	100	1	1
	5420201080	2	6	2	5	80	140	1	1
	5420201510	2	4	2	5	10	50	1.5	1
	5420201512	2	4	2	5	12	50	1.5	1
	5420201516	2	4	2	5	16	50	1.5	1
	5420201520	2	4	2	5	20	50	1.5	1
	5420201525	2	4	2	5	25	60	1.5	1
	5420201530	2	6	2	5	30	70	1.5	1
	5420201540	2	6	2	5	40	80	1.5	1
	5420201550	2	6	2	5	50	100	1.5	1
	5420201560	2	6	2	5	60	100	1.5	1
	5420201580	2	6	2	5	80	140	1.5	1
	5420202010	2	4	2	5	10	50	2	1
	5420202012	2	4	2	5	12	50	2	1
	5420202016	2	4	2	5	16	50	2	1
	5420202020	2	4	2	5	20	55	2	1
	5420202025	2	4	2	5	25	60	2	1
	5420202030	2	4	2	5	30	70	2	1
	5420202040	2	6	2	5	40	80	2	1
	5420202050	2	6	2	5	50	90	2	1
	5420202060	2	6	2	5	60	100	2	1

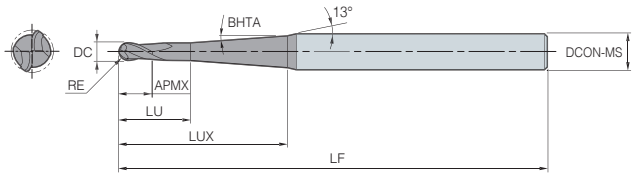
UB542

2날 테이퍼 넥 볼



CARBIDE | 2 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.01 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015





(mm)

형 번		DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UB	5420202080	2	8	2	5	80	140	2	1
	5420203030	2	6	2	5	30	70	3	1
	5420203040	2	6	2	5	40	80	3	1
	5420203050	2	8	2	5	50	90	3	1
	5420203060	2	8	2	5	60	100	3	1
	5420203080	2	10	2	5	80	140	3	1
	5420205030	2	8	2	5	30	70	5	1
	5420205040	2	10	2	5	40	90	5	1
	5420300516	3	6	4.5	6	16	60	0.5	1.5
	5420300520	3	6	4.5	6	20	65	0.5	1.5
	5420300530	3	6	4.5	6	30	70	0.5	1.5
	5420300540	3	6	4.5	6	40	80	0.5	1.5
	5420300550	3	6	4.5	6	50	90	0.5	1.5
	5420300560	3	6	4.5	6	60	100	0.5	1.5
	5420301016	3	6	4.5	6	16	60	1	1.5
	5420301020	3	6	4.5	6	20	65	1	1.5
	5420301030	3	6	4.5	6	30	70	1	1.5
	5420301040	3	6	4.5	6	40	80	1	1.5
	5420301050	3	6	4.5	6	50	90	1	1.5
	5420301060	3	6	4.5	6	60	100	1	1.5
	5420301070	3	6	4.5	6	70	120	1	1.5
	5420301516	3	6	4.5	6	16	60	1.5	1.5
	5420301520	3	6	4.5	6	20	65	1.5	1.5
	5420301530	3	6	4.5	6	30	70	1.5	1.5
	5420301540	3	6	4.5	6	40	80	1.5	1.5
	5420301550	3	6	4.5	6	50	90	1.5	1.5
	5420301560	3	6	4.5	6	60	100	1.5	1.5
	5420302016	3	6	4.5	6	16	60	2	1.5
	5420302020	3	6	4.5	6	20	65	2	1.5
	5420302030	3	6	4.5	6	30	70	2	1.5
	5420302040	3	6	4.5	6	40	80	2	1.5
	5420302050	3	8	4.5	6	50	90	2	1.5
	5420303030	3	6	4.5	6	30	70	3	1.5
	5420303040	3	8	4.5	6	40	90	3	1.5
	5420305030	3	8	4.5	6	30	70	5	1.5
	5420305040	3	10	4.5	6	40	90	5	1.5

형 번		DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UB	5420400540	4	6	6	8	40	90	0.5	2
	5420400550	4	6	6	8	50	100	0.5	2
	5420400560	4	6	6	8	60	110	0.5	2
	5420400570	4	6	6	8	70	120	0.5	2
	5420401040	4	6	6	8	40	90	1	2
	5420401050	4	6	6	8	50	100	1	2
	5420401060	4	8	6	8	60	110	1	2
	5420401070	4	8	6	8	70	120	1	2
	5420401540	4	6	6	8	40	90	1.5	2
	5420401550	4	8	6	8	50	100	1.5	2
	5420401560	4	8	6	8	60	110	1.5	2
	5420401570	4	8	6	8	70	120	1.5	2
	5420403050	4	10	6	8	50	100	3	2
	5420405050	4	12	6	8	50	100	5	2
	5420501060	5	8	10	13	60	120	1	2.5
	5420501560	5	8	10	13	60	120	1.5	2.5
	5420503040	5	8	10	13	40	120	3	2.5
	5420601060	6	8	12	15	60	120	1	3
	5420601090	6	10	12	15	90	150	1	3
	5420601560	6	10	12	15	60	120	1.5	3
	5420601590	6	10	12	15	90	150	1.5	3
	5420602060	6	10	12	15	60	120	2	3
	5420602090	6	12	12	15	90	150	2	3
	5420603060	6	12	12	15	60	120	3	3
	5420603090	6	14	12	15	90	150	3	3
	54208010100	8	12	14	18	100	150	1	4
	5420801070	8	10	14	18	70	130	1	4
	54208015100	8	14	14	18	100	150	1.5	4
	5420801570	8	12	14	18	70	130	1.5	4
	54208020100	8	14	14	18	100	150	2	4
	5420802070	8	12	14	18	70	130	2	4
	54208030100	8	18	14	18	100	150	3	4
	5420803070	8	14	14	18	70	130	3	4
	54210010100	10	14	18	22	100	200	1	5
	5421001070	10	12	18	22	70	130	1	5
	5421001080	10	14	18	22	80	150	1	5

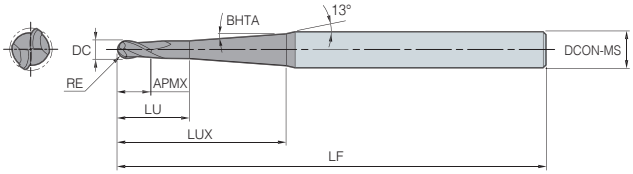
UB542

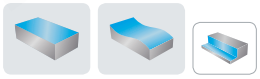
2날 테이퍼 넥 볼

CARBIDE | 2 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.01 (DC6 초과)

DC	공구직경공차
Ø0.1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UB	UB54210015100	10	16	18	22	100	200	1.5	5
	UB5421001570	10	14	18	22	70	130	1.5	5
	UB5421001580	10	14	18	22	80	150	1.5	5
	UB54210020100	10	16	18	22	100	200	2	5
	UB5421002070	10	14	18	22	70	130	2	5
	UB5421002080	10	16	18	22	80	150	2	5
	UB54210030100	10	20	18	22	100	200	3	5
	UB5421003070	10	16	18	22	70	130	3	5
	UB5421003080	10	18	18	22	80	150	3	5
	UB54212010100	12	16	22	25	100	200	1	6
	UB5421201060	12	14	22	25	60	130	1	6
	UB5421201080	12	14	22	25	80	150	1	6
	UB5421201090	12	16	22	25	90	180	1	6

	형 번	DC	DCON-MS	APMX	LU	LUX	LF	BHTA	RE
UB	UB54212015100	12	16	22	25	100	200	1.5	6
	UB5421201560	12	14	22	25	60	130	1.5	6
	UB5421201580	12	16	22	25	80	150	1.5	6
	UB5421201590	12	16	22	25	90	180	1.5	6
	UB54212020100	12	18	22	25	100	200	2	6
	UB5421202060	12	16	22	25	60	130	2	6
	UB5421202080	12	16	22	25	80	150	2	6
	UB5421202090	12	18	22	25	90	180	2	6
	UB54212030100	12	20	22	25	100	200	3	6
	UB5421203060	12	16	22	25	60	130	3	6
	UB5421203080	12	18	22	25	80	150	3	6
	UB5421203090	12	20	22	25	90	180	3	6

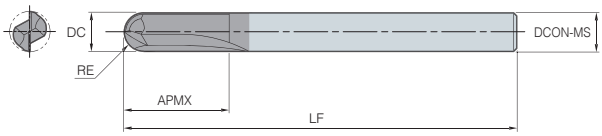
USB502

2날 스트레이트 볼



CARBIDE | 2 | H·A 0° | 재종 PC303W | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.01 (DC6 초과)

DC	공구직경공차
Ø3~ Ø6	0.00 ~ -0.012
Ø8~ Ø20	0.00 ~ -0.015





(mm)

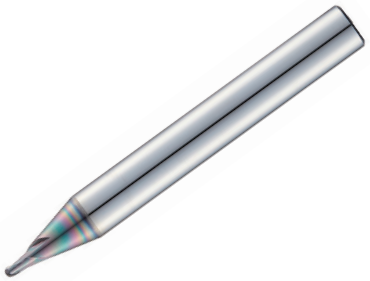
형 번		DC	DCON-MS	APMX	LF	RE
USB	502030	3	6	10	70	1.5
	502040	4	6	12	70	2
	502050	5	6	18	90	2.5
	502060	6	6	20	90	3
	502080	8	8	25	100	4
	502100	10	10	30	100	5
	502120	12	12	32	110	6
	502160	16	16	35	150	8
	502200	20	20	40	150	10

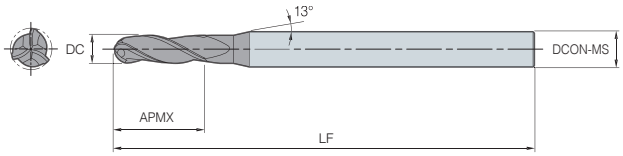
UB503

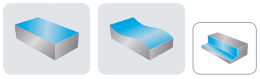
3날 볼

CARBIDE | 3 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.01 (DC6 초과)

DC	공구직경공차
Ø3 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

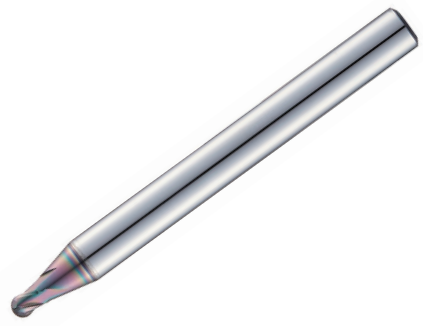
형 번		DC	DCON-MS	APMX	LF	RE
UB	503010	1	6	1	50	0.5
	503015	1.5	6	1.5	50	0.75
	503020	2	6	2	50	1
	503030	3	6	3	60	1.5
	503040	4	6	4	70	2
	503050	5	6	5	80	2.5
	503060	6	6	6	90	3
	503080	8	8	8	100	4
	503100	10	10	10	100	5
	503120	12	12	12	110	6

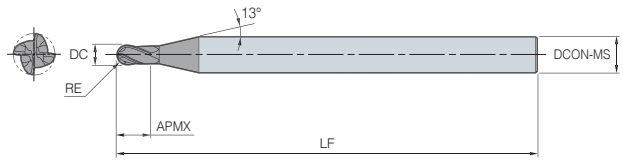
UB504

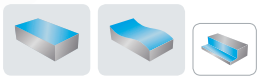
4날 볼

CARBIDE | 4 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.005 (DC6 이하) | RE공차 ±0.01 (DC6 초과)

DC	공구직경공차
Ø1 ~ Ø6	0.000 ~ -0.012
Ø8 ~ Ø12	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LF	RE
UB	504010	1	6	1	50	0.5
	504015	1.5	6	1.5	50	0.75
	504020	2	6	2	50	1
	504030	3	6	3	60	1.5
	504040	4	6	4	70	2
	504050	5	6	5	80	2.5
	504060	6	6	6	90	3
	504080	8	8	8	100	4
	504100	10	10	10	100	5
	504120	12	12	12	110	6

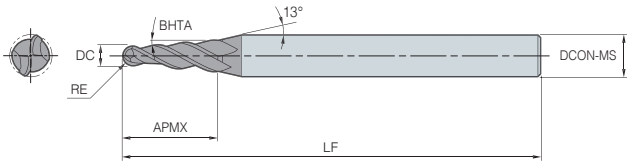
UTB502

2날 테이퍼 볼

CARBIDE | 2 | H·A 30° | 재종 PC303W | h5 shank | RE공차 ±0.01

DC	공구직경공차
ALL	0.000 ~ -0.012







(mm)

형	번	DC	DCON-MS	APMX	BHTA	LF	RE
UTB	502003005	0.3	4	1.2	0.5	40	0.15
	50200301	0.3	4	1.2	1	40	0.15
	502003015	0.3	4	1.2	1.5	40	0.15
	50200302	0.3	4	1.2	2	40	0.15
	50200303	0.3	4	1.2	3	40	0.15
	50200305	0.3	4	1.2	5	40	0.15
	50200307	0.3	4	1.5	7	40	0.15
	50200310	0.3	4	1.5	10	40	0.15
	502004005	0.4	4	1.6	0.5	40	0.2
	50200401	0.4	4	1.6	1	40	0.2
	502004015	0.4	4	1.6	1.5	40	0.2
	50200402	0.4	4	1.6	2	40	0.2
	50200403	0.4	4	1.6	3	40	0.2
	50200405	0.4	4	1.6	5	40	0.2
	50200407	0.4	4	2	7	40	0.2
	50200410	0.4	4	2	10	40	0.2
	502005005	0.5	4	2	0.5	45	0.25
	50200501	0.5	4	2	1	45	0.25
	502005015	0.5	4	2	1.5	45	0.25
	50200502	0.5	4	2	2	45	0.25
	50200503	0.5	4	2	3	45	0.25
	50200505	0.5	4	2	5	45	0.25
	50200507	0.5	4	2.5	7	45	0.25
	50200510	0.5	4	2.5	10	45	0.25
	502006005	0.6	4	2	0.5	45	0.3
	50200601	0.6	4	2	1	45	0.3
	502006015	0.6	4	2	1.5	45	0.3
	50200602	0.6	4	2	2	45	0.3
	50200603	0.6	4	2	3	45	0.3
	50200605	0.6	4	2	5	45	0.3
	50200607	0.6	4	2.5	7	45	0.3
	50200610	0.6	4	2.5	10	45	0.3
	502007005	0.7	4	2.5	0.5	45	0.35
	50200701	0.7	4	2.5	1	45	0.35
	502007015	0.7	4	2.5	1.5	45	0.35
	50200702	0.7	4	2.5	2	45	0.35

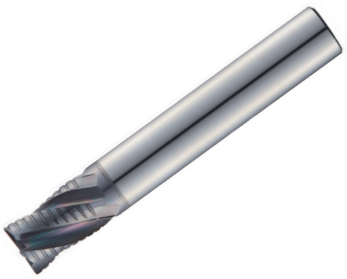
형	번	DC	DCON-MS	APMX	BHTA	LF	RE
UTB	50200703	0.7	4	2.5	3	45	0.35
	50200705	0.7	4	2.5	5	45	0.35
	50200707	0.7	4	3	7	45	0.35
	50200710	0.7	4	3	10	45	0.35
	502008005	0.8	4	3.2	0.5	45	0.4
	50200801	0.8	4	3.2	1	45	0.4
	502008015	0.8	4	3.2	1.5	45	0.4
	50200802	0.8	4	3.2	2	45	0.4
	50200803	0.8	4	3.2	3	45	0.4
	50200805	0.8	4	3.2	5	45	0.4
	50200807	0.8	4	3.2	7	45	0.4
	50200810	0.8	4	3.2	10	45	0.4
	502010005	1	4	4	0.5	50	0.5
	50201001	1	4	4	1	50	0.5
	502010015	1	4	4	1.5	50	0.5
	50201002	1	4	4	2	50	0.5
	50201003	1	4	4	3	50	0.5
	50201005	1	4	4	5	50	0.5
	50201007	1	4	4	7	50	0.5
	50201010	1	4	4	10	50	0.5
	502015005	1.5	4	6	0.5	50	0.75
	50201501	1.5	4	6	1	50	0.75
	502015015	1.5	4	6	1.5	50	0.75
	50201502	1.5	4	7	2	50	0.75
	50201503	1.5	4	8	3	50	0.75
	50201505	1.5	4	10	5	50	0.75
	50201507	1.5	4	10	7	50	0.75
	50201510	1.5	6	10	10	50	0.75
	502020005	2	4	6	0.5	50	1
	50202001	2	4	6	1	50	1
	502020015	2	4	6	1.5	50	1
	50202002	2	4	10	2	50	1
	50202003	2	4	10	3	50	1
	50202005	2	4	10	5	50	1
	50202007	2	6	10	7	50	1
	50202010	2	6	11	10	50	1

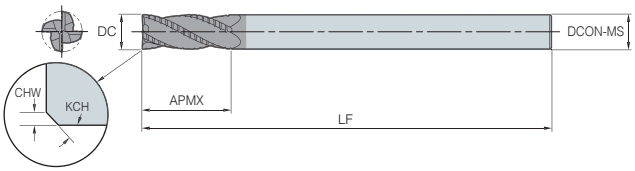
UF50

3~5날 챔퍼 피치 러핑

CARBIDE | 3 | 4 | 5 | H·A 29°/31° | 재종 PC303W | CHAMFERED | h5 shank | RE공차 ±0.025

DC	공구직경공차
Ø3 ~ Ø6	0.000 ~ -0.012
Ø7 ~ Ø25	0.000 ~ -0.015







(mm)

형 번		DC	DCON-MS	APMX	LF	KCH	CHW	NOF
UF	503030	3	6	8	50	45°	0.2	3
	503040	4	6	10	50	45°	0.2	3
	504050	5	6	13	50	45°	0.2	4
	504060	6	6	10	50	45°	0.2	4
	50406015	6	6	15	60	45°	0.2	4
	504070	7	8	18	70	45°	0.2	4
	504080	8	8	12	60	45°	0.2	4
	50408020	8	8	20	70	45°	0.2	4
	504090	9	10	22	75	45°	0.3	4
	504100	10	10	15	65	45°	0.3	4
	50410025	10	10	25	75	45°	0.3	4
	504110	11	12	27	80	45°	0.3	4
	504120	12	12	20	70	45°	0.3	4
	50412030	12	12	30	80	45°	0.3	4
	505130	13	12	35	100	45°	0.5	5
	505140S16	14	16	35	100	45°	0.5	5
	505140	14	14	35	100	45°	0.5	5
	505150	15	16	35	100	45°	0.5	5
	505160	16	16	25	80	45°	1	5
	50516040	16	16	40	100	45°	1	5
	505180S20	18	20	40	100	45°	1	5
	505180	18	18	40	100	45°	1	5
	505200	20	20	25	80	45°	1	5
	50520045	20	20	45	100	45°	1	5
	505250	25	25	45	100	45°	1	5

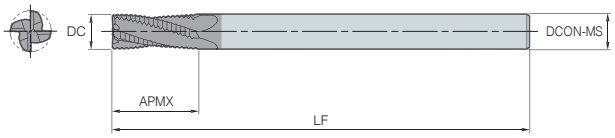
UF51

3~5날 파인 피치 러핑

CARBIDE | 3 | 4 | 5 | H·A 20° | 재종 PC303W | FINE | h5 shank

DC	공구직경공차
Ø3	0.000 ~ -0.040
Ø4 ~ Ø6	0.000 ~ -0.048
Ø7 ~ Ø10	0.000 ~ -0.058
Ø11 ~ Ø18	0.000 ~ -0.070
Ø20 ~ Ø25	0.000 ~ -0.084







(mm)

형 번		DC	DCON-MS	APMX	LF	NOF
UF	UF513030	3	6	8	50	3
	UF513040	4	6	10	50	3
	UF513050	5	6	13	50	3
	UF513060	6	6	15	60	3
	UF51306020	6	6	20	60	3
	UF513070	7	8	18	70	3
	UF513080	8	8	20	70	3
	UF51308025	8	8	25	70	3
	UF514090	9	10	22	75	4
	UF514100	10	10	25	75	4
	UF51410030	10	10	30	75	4
	UF514110	11	12	27	80	4
	UF514120	12	12	30	80	4
	UF51412035	12	12	35	80	4
	UF514130	13	12	35	100	4
	UF514140	14	16	35	100	4
	UF514160	16	16	40	100	4
	UF514180	18	18	40	100	4
	UF514200	20	20	50	100	4
	UF515250	25	25	50	100	5

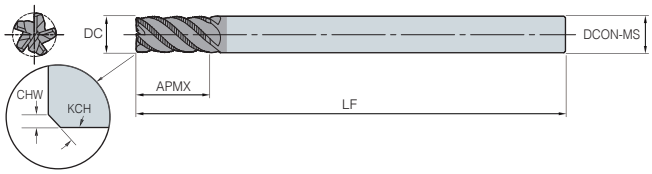
UF51H

3~5날 45° 헬릭스 파인 피치 러핑

CARBIDE | 3 | 4 | 5 | H·A 45° | 재종 PC303W | FINE | h5 shank | RE공차 ±0.025

DC	공구직경공차
Ø3 ~ Ø6	0.000 ~ -0.012
Ø7 ~ Ø25	0.000 ~ -0.015







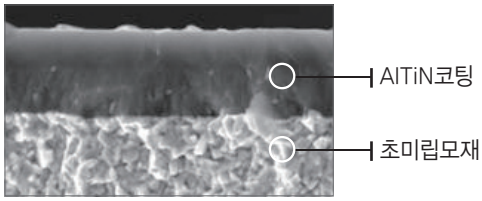
(mm)

형 번		DC	DCON-MS	APMX	LF	KCH	CHW	NOF
UF	513030H	3	6	8	50	45°	0.2	3
	513040H	4	6	10	50	45°	0.2	3
	514050H	5	6	13	50	45°	0.3	4
	514060H	6	6	10	50	45°	0.3	4
	51406015H	6	6	15	60	45°	0.3	4
	514070H	7	8	18	70	45°	0.4	4
	514080H	8	8	12	60	45°	0.4	4
	51408020H	8	8	20	70	45°	0.4	4
	514090H	9	10	22	75	45°	0.4	4
	514100H	10	10	15	65	45°	0.4	4
	51410025H	10	10	25	75	45°	0.4	4
	514110H	11	12	27	80	45°	0.5	4
	514120H	12	12	20	70	45°	0.5	4
	51412030H	12	12	30	80	45°	0.5	4
	515130H	13	12	35	100	45°	0.5	5
	515140S16H	14	16	35	100	45°	0.5	5
	515140H	14	14	35	100	45°	0.5	5
	515160H	16	16	25	80	45°	0.5	5
	51516040H	16	16	40	100	45°	0.5	5
	515180S20H	18	20	40	100	45°	0.5	5
	515180H	18	18	40	100	45°	0.5	5
	515200H	20	20	25	80	45°	0.5	5
	51520045H	20	20	45	100	45°	0.5	5
	515250H	25	25	45	100	45°	0.5	5

황삭가공에서 정삭가공까지 광범위한 적용 가능

I+ Endmill

- 인성이 우수한 모재 및 내마모성이 우수한 코팅적용
  - 내치핑성과 내마모성이 뛰어난 코팅을 적용하여 공구수명 향상
- 광범위한 가공 영역(범용)
  - 황삭가공에서 정삭가공까지 광범위한 적용 가능
  - 피삭재 경도 HRC45이하 적용 가능
- 생산성 향상
  - 우수한 가공성능과 합리적인 가격으로 원가절감

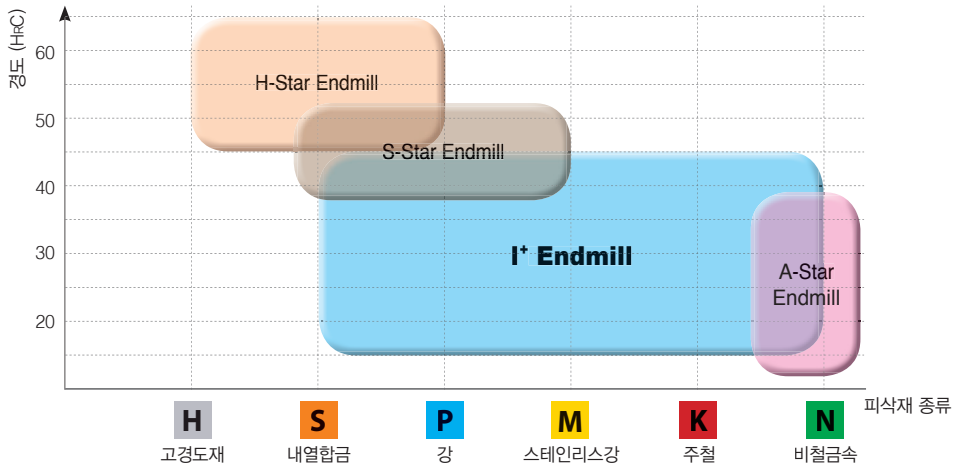


PC320

형번표기법

IP	(L)	ER	4	060	-	075	(-R05	V30	S6)
I+ Endmill	길이	구분	날수	공구직경		전장	코너R	인선길이	샹크직경
	L : Long	BE : Ball Endmill FE : Flat Endmill RE : Radius Endmill	2 : 2날 4 : 4날	020 : Ø2.0mm 060 : Ø6.0mm 200 : Ø20.0mm		075 : 75mm 100 : 100mm	R05 : 0.5mm R10 : 1.0mm R20 : 2.0mm	V30 :30mm	S6 : Ø6mm S : Ø8mm

적용 영역



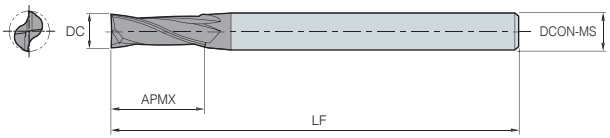
IPFE2000

플랫

2 | H·A 35° | h6 shank | 재종 PC320

DC	공구직경공차
Ø1 ~ Ø12	0.000 ~ -0.020
Ø14 ~ Ø20	0.000 ~ -0.030







(mm)

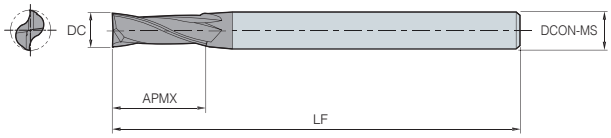
형 번		DC	DCON-MS	APMX	LF
IPFE	2010-050-S3	1	3	3	50
	2010-050-S4	1	4	3	50
	2010-050	1	6	3	50
	2015-050-S3	1.5	3	4	50
	2015-050-S4	1.5	4	4	50
	2015-050	1.5	6	4	50
	2020-050-S3	2	3	6	50
	2020-050-S4	2	4	6	50
	2020-050	2	6	6	50
	2025-050-S3	2.5	3	8	50
	2025-050-S4	2.5	4	8	50
	2025-050	2.5	6	8	50
	2030-050-S3	3	3	8	50
	2030-050-S4	3	4	8	50
	2030-050	3	6	8	50
	2035-050-S4	3.5	4	10	50
	2035-050	3.5	6	10	50
	2040-050-S4	4	4	11	50
	2040-050	4	6	11	50
	2045-050	4.5	6	13	50
	2050-050	5	6	13	50
	2055-050	5.5	6	13	50
	2060-050	6	6	16	50
	2065-060	6.5	8	16	60
	2070-060	7	8	16	60
	2075-060	7.5	8	19	60
	2080-060	8	8	20	60
	2085-075	8.5	10	20	75
	2090-075	9	10	20	75
	2095-075	9.5	10	25	75
	2100-075	10	10	25	75
	2105-075	10.5	12	25	75
	2110-075	11	12	30	75
	2115-075	11.5	12	30	75
	2120-075	12	12	32	75
	2140-100	14	16	40	100
	2160-100	16	16	40	100
	2180-100	18	20	45	100
	2200-100	20	20	45	100

IPLFE2000

롱 플랫







2	H·A 35°	h6 shank	재종 PC320

DC	공구직경공차
Ø1 ~ Ø12	0.000 ~ -0.020
Ø14 ~ Ø20	0.000 ~ -0.030

롱 샹크형(Long Shank Type)

(mm)

형 번		DC	DCON-MS	APMX	LF
IPLFE	2060-075	6	6	16	75
	2060-100	6	6	16	100
	2080-075	8	8	20	75
	2080-100	8	8	20	100
	2100-100	10	10	25	100
	2100-150	10	10	25	150
	2120-100	12	12	32	100
	2120-150	12	12	32	150

롱 플루트형(Long Flute Type)

(mm)

형 번		DC	DCON-MS	APMX	LF
IPLFE	2010-050-V7S4	1	4	7	50
	2015-050-V9S4	1.5	4	9	50
	2020-050-V12S4	2	4	12	50
	2025-050-V12S4	2.5	4	12	50
	2030-060-V15S6	3	6	15	60
	2035-060-V15S6	3.5	6	15	60
	2040-075-V20S6	4	6	20	75
	2045-075-V20S6	4.5	6	20	75
	2050-075-V25S6	5	6	25	75
	2055-075-V25S6	5.5	6	25	75
	2060-075-V30S6	6	6	30	75
	2070-100-V30S8	7	8	30	100
	2080-100-V40S8	8	8	40	100
	2090-100-V40S10	9	10	40	100
	2100-100-V40S10	10	10	40	100
	2110-100-V40S12	11	12	40	100
	2120-100-V50S12	12	12	50	100
	2140-150-V50S16	14	16	50	150
	2160-150-V60S16	16	16	60	150
	2200-200-V90S20	20	20	90	200

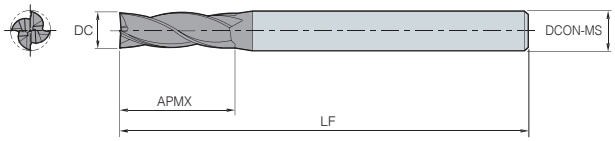
IPFE4000

플랫

4 | H·A 35° | h6 shank | 재종 PC320

DC	공구직경공차
Ø1 ~ Ø12	0.000 ~ -0.020
Ø14 ~ Ø20	0.000 ~ -0.030







(mm)

형 번		DC	DCON-MS	APMX	LF
IPFE	4010-050-S3	1	3	3	50
	4010-050-S4	1	4	3	50
	4010-050	1	6	3	50
	4015-050-S3	1.5	3	4	50
	4015-050-S4	1.5	4	4	50
	4015-050	1.5	6	4	50
	4020-050-S3	2	3	6	50
	4020-050-S4	2	4	6	50
	4020-050	2	6	6	50
	4025-050-S3	2.5	3	8	50
	4025-050-S4	2.5	4	8	50
	4025-050	2.5	6	8	50
	4030-050-S3	3	3	8	50
	4030-050-S4	3	4	8	50
	4030-050	3	6	8	50
	4035-050-S4	3.5	4	10	50
	4035-050	3.5	6	10	50
	4040-050-S4	4	4	11	50
	4040-050	4	6	11	50
	4045-050	4.5	6	13	50
	4050-050	5	6	13	50
	4055-050	5.5	6	13	50
	4060-050	6	6	16	50
	4065-060	6.5	8	16	60
	4070-060	7	8	16	60
	4075-060	7.5	8	19	60
	4080-060	8	8	20	60
	4085-075	8.5	10	20	75
	4090-075	9	10	20	75
	4095-075	9.5	10	25	75
	4100-075	10	10	30	75
	4105-075	10.5	12	30	75
	4110-075	11	12	30	75
	4115-075	11.5	12	30	75
	4120-075	12	12	32	75
	4140-100	14	16	40	100
	4160-100	16	16	40	100
	4180-100	18	20	45	100
	4200-100	20	20	45	100

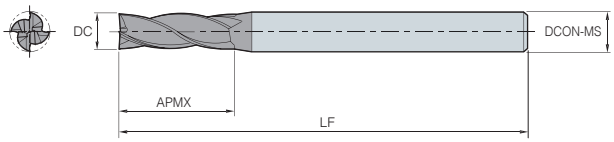
IPLFE4000

롱 플랫

4 | H·A 35° | h6 shank | 재종 PC320

DC	공구직경공차
Ø1 ~ Ø12	0.000 ~ -0.020
Ø14 ~ Ø20	0.000 ~ -0.030







롱 샹크형(Long Shank Type)

(mm)

형 번		DC	DCON-MS	APMX	LF
IPLFE	4060-075	6	6	16	75
	4060-100	6	6	16	100
	4080-075	8	8	20	75
	4080-100	8	8	20	100
	4100-100	10	10	30	100
	4100-150	10	10	30	150
	4120-100	12	12	32	100
	4120-150	12	12	32	150

롱 플루트형(Long Flute Type)

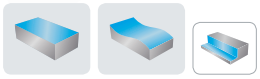
(mm)

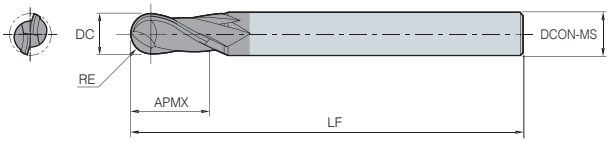
형 번		DC	DCON-MS	APMX	LF
IPLFE	4010-050-V6S4	1	4	6	50
	4015-050-V9S4	1.5	4	9	50
	4020-050-V12S4	2	4	12	50
	4025-050-V12S4	2.5	4	12	50
	4030-060-V15S6	3	6	15	60
	4035-060-V15S6	3.5	6	15	60
	4040-075-V20S6	4	6	20	75
	4045-075-V20S6	4.5	6	20	75
	4050-075-V25S6	5	6	25	75
	4055-075-V25S6	5.5	6	25	75
	4060-075-V30S6	6	6	30	75
	4070-100-V30S8	7	8	30	100
	4080-100-V40S8	8	8	40	100
	4090-100-V40S10	9	10	40	100
	4100-100-V40S10	10	10	40	100
	4110-100-V40S12	11	12	40	100
	4120-100-V50S12	12	12	50	100
	4140-150-V50S16	14	16	50	150
	4160-150-V60S16	16	16	60	150
	4200-200-V90S20	20	20	90	200

IPBE2000

볼







2	H·A 35°	h6 shank	재종 PC320

DC	공구직경공차
Ø1 ~ Ø12	0.000 ~ -0.020
Ø14 ~ Ø20	0.000 ~ -0.030

(mm)

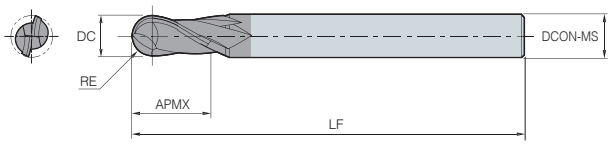
형 번		DC	DCON-MS	APMX	LF	RE
IPBE	2010-050-S3	1	3	2	50	0.5
	2010-050-S4	1	4	2	50	0.5
	2010-050	1	6	2	50	0.5
	2015-050-S3	1.5	3	3	50	0.75
	2015-050-S4	1.5	4	3	50	0.75
	2015-050	1.5	6	3	50	0.75
	2020-050-S3	2	3	4	50	1
	2020-050-S4	2	4	4	50	1
	2020-050	2	6	4	50	1
	2025-050-S3	2.5	3	5	50	1.25
	2025-050-S4	2.5	4	5	50	1.25
	2025-050	2.5	6	5	50	1.25
	2030-050-S3	3	3	6	50	1.5
	2030-050-S4	3	4	6	50	1.5
	2030-050	3	6	6	50	1.5
	2035-050-S4	3.5	4	7	50	1.75
	2035-050	3.5	6	7	50	1.75
	2040-050-S4	4	4	8	50	2
	2040-050	4	6	8	50	2
	2045-050	4.5	6	9	50	2.25
	2050-050	5	6	10	50	2.5
	2060-050	6	6	12	50	3
	2070-060	7	8	14	60	3.5
	2080-060	8	8	16	60	4
	2090-075	9	10	18	75	4.5
	2100-075	10	10	20	75	5
	2120-075	12	12	24	75	6
	2140-100	14	16	28	100	7
	2160-100	16	16	32	100	8
	2180-100	18	20	36	100	9
	2200-100	20	20	40	100	10

IPLBE2000

롱 볼







2	H·A 35°	h6 shank	재종 PC320

DC	공구직경공차
Ø1 ~ Ø12	0.000 ~ -0.020
Ø16	0.000 ~ -0.030

(mm)

형 번		DC	DCON-MS	APMX	LF	RE
IPLBE	2010-075	1	6	2	75	0.5
	2010-100	1	6	2	100	0.5
	2015-075	1.5	6	3	75	0.75
	2015-100	1.5	6	3	100	0.75
	2020-075	2	6	4	75	1
	2020-100	2	6	4	100	1
	2025-075	2.5	6	5	75	1.25
	2025-100	2.5	6	5	100	1.25
	2030-075	3	6	6	75	1.5
	2030-100	3	6	6	100	1.5
	2035-100	3.5	6	7	100	1.75
	2040-075	4	6	8	75	2
	2040-100	4	6	8	100	2
	2050-075	5	6	10	75	2.5
	2050-100	5	6	10	100	2.5
	2060-075	6	6	12	75	3
	2060-100	6	6	12	100	3
	2060-150	6	6	12	150	3
	2080-075	8	8	16	75	4
	2080-100	8	8	16	100	4
	2080-150	8	8	16	150	4
	2100-100	10	10	20	100	5
	2100-150	10	10	20	150	5
	2100-200	10	10	20	200	5
	2120-100	12	12	24	100	6
	2120-150	12	12	24	150	6
	2120-200	12	12	24	200	6
	2160-150	16	16	32	150	8
	2160-200	16	16	32	200	8

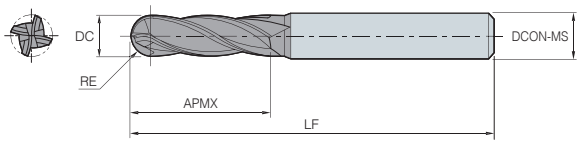
IPBE4000

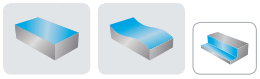
볼

4 | H·A 35° | h6 shank | 재종 PC320

DC	공구직경공차
Ø1 ~ Ø12	0.000 ~ -0.020
Ø14 ~ Ø20	0.000 ~ -0.030







(mm)

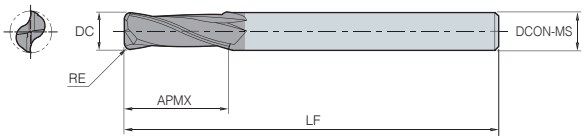
형 번		DC	DCON-MS	APMX	LF	RE
IPBE	4010-050-S4	1	4	2	50	0.5
	4010-050	1	6	2	50	0.5
	4015-050-S4	1.5	4	3	50	0.75
	4015-050	1.5	6	3	50	0.75
	4020-050-S4	2	4	4	50	1
	4020-050	2	6	4	50	1
	4025-050-S4	2.5	4	5	50	1.25
	4025-050	2.5	6	5	50	1.25
	4030-050-S3	3	3	6	50	1.5
	4030-050-S4	3	4	6	50	1.5
	4030-050	3	6	6	50	1.5
	4035-050-S4	3.5	4	7	50	1.75
	4035-050	3.5	6	7	50	1.75
	4040-050-S4	4	4	8	50	2
	4040-050	4	6	8	50	2
	4045-050	4.5	6	9	50	2.25
	4050-050	5	6	10	50	2.5
	4060-050	6	6	12	50	3
	4070-060	7	8	14	60	3.5
	4080-060	8	8	16	60	4
	4090-075	9	10	18	75	4.5
	4100-075	10	10	20	75	5
	4120-075	12	12	24	75	6
	4140-100	14	16	28	100	7
	4160-100	16	16	32	100	8
	4180-100	18	20	36	100	9
	4200-100	20	20	40	100	10

IPRE2000

레디우스







2	H·A 35°	h6 shank	재종 PC320

DC	공구직경공차
ALL	0.000 ~ -0.020

(mm)

형 번		DC	DCON-MS	APMX	LF	RE
IPRE	2010-050-R01	1	4	3	50	0.1
	2010-050-R02	1	4	3	50	0.2
	2010-050-R03	1	4	3	50	0.3
	2015-050-R02	1.5	4	4	50	0.2
	2015-050-R03	1.5	4	4	50	0.3
	2020-050-R02	2	4	6	50	0.2
	2020-050-R03	2	4	6	50	0.3
	2020-050-R05	2	4	6	50	0.5
	2025-050-R02	2.5	4	8	50	0.2
	2030-050-R02-S3	3	3	8	50	0.2
	2030-050-R03-S3	3	3	8	50	0.3
	2030-050-R05-S3	3	3	8	50	0.5
	2030-050-R10-S3	3	3	8	50	1
	2030-050-R02	3	4	8	50	0.2
	2030-050-R03	3	4	8	50	0.3
	2030-050-R05	3	4	8	50	0.5
	2030-050-R10	3	4	8	50	1
	2040-050-R02	4	4	10	50	0.2
	2040-050-R03	4	4	10	50	0.3
	2040-050-R05	4	4	10	50	0.5
	2040-050-R10	4	4	10	50	1
	2040-050-R15	4	4	10	50	1.5
	2050-050-R02	5	6	13	50	0.2
	2050-050-R03	5	6	13	50	0.3
	2050-050-R05	5	6	13	50	0.5
	2050-050-R10	5	6	13	50	1
	2060-050-R02	6	6	15	50	0.2

형 번		DC	DCON-MS	APMX	LF	RE
IPRE	2060-050-R03	6	6	15	50	0.3
	2060-050-R05	6	6	15	50	0.5
	2060-050-R10	6	6	15	50	1
	2060-050-R15	6	6	15	50	1.5
	2060-050-R20	6	6	15	50	2
	2080-060-R03	8	8	20	60	0.3
	2080-060-R05	8	8	20	60	0.5
	2080-060-R10	8	8	20	60	1
	2080-060-R15	8	8	20	60	1.5
	2080-060-R20	8	8	20	60	2
	2080-060-R25	8	8	20	60	2.5
	2080-060-R30	8	8	20	60	3
	2100-075-R03	10	10	25	75	0.3
	2100-075-R05	10	10	25	75	0.5
	2100-075-R10	10	10	25	75	1
	2100-075-R15	10	10	25	75	1.5
	2100-075-R20	10	10	25	75	2
	2100-075-R25	10	10	25	75	2.5
	2100-075-R30	10	10	25	75	3
	2120-075-R03	12	12	30	75	0.3
	2120-075-R05	12	12	30	75	0.5
	2120-075-R10	12	12	30	75	1
	2120-075-R15	12	12	30	75	1.5
	2120-075-R20	12	12	30	75	2
	2120-075-R25	12	12	30	75	2.5
	2120-075-R30	12	12	30	75	3

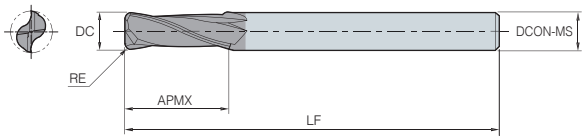
IPLRE2000

롱 레디우스

2 | H·A 35° | h6 shank | 재종 PC320

DC	공구직경공차
ALL	0.000 ~ -0.020







(mm)

형 번		DC	DCON-MS	APMX	LF	RE
IPLRE	2030-075-R03	3	3	8	75	0.3
	2030-075-R05	3	3	8	75	0.5
	2030-075-R10	3	3	8	75	1
	2040-075-R03	4	4	10	75	0.3
	2040-075-R05	4	4	10	75	0.5
	2040-075-R10	4	4	10	75	1
	2040-075-R15	4	4	10	75	1.5
	2060-100-R03	6	6	15	100	0.3
	2060-100-R05	6	6	15	100	0.5
	2060-100-R10	6	6	15	100	1
	2060-100-R15	6	6	15	100	1.5
	2060-100-R20	6	6	15	100	2
	2080-100-R03	8	8	20	100	0.5
	2080-100-R05	8	8	20	100	0.5
	2080-100-R10	8	8	20	100	1
	2080-100-R15	8	8	20	100	1.5
	2080-100-R20	8	8	20	100	2
	2080-100-R25	8	8	20	100	2.5
	2080-100-R30	8	8	20	100	0.3
	2100-100-R03	10	10	25	100	0.3
	2100-100-R05	10	10	25	100	0.5
	2100-100-R10	10	10	25	100	1
	2100-100-R15	10	10	25	100	1.5
	2100-100-R20	10	10	25	100	2
	2100-100-R25	10	10	25	100	2.5
	2100-100-R30	10	10	25	100	0.3
	2120-100-R03	12	12	30	100	0.3
	2120-100-R05	12	12	30	100	0.5
	2120-100-R10	12	12	30	100	1
	2120-100-R15	12	12	30	100	1.5
	2120-100-R20	12	12	30	100	2
	2120-100-R25	12	12	30	100	2.5
	2120-100-R30	12	12	30	100	3

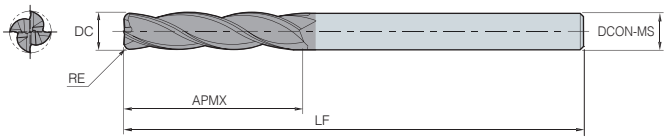
IPRE4000

레디우스

4 | H·A 35° | h6 shank | 재종 PC320

DC	공구직경공차
ALL	0.000 ~ -0.020







(mm)

형 번		DC	DCON-MS	APMX	LF	RE
IPRE	4020-050-R02	2	4	6	50	0.2
	4020-050-R03	2	4	6	50	0.3
	4020-050-R05	2	4	6	50	0.5
	4025-050-R02	2.5	4	8	50	0.2
	4030-050-R02-S3	3	3	8	50	0.2
	4030-050-R03-S3	3	3	8	50	0.3
	4030-050-R05-S3	3	3	8	50	0.5
	4030-050-R10-S3	3	3	8	50	1
	4030-050-R02	3	4	8	50	0.2
	4030-050-R03	3	4	8	50	0.3
	4030-050-R05	3	4	8	50	0.5
	4030-050-R10	3	4	8	50	1
	4040-050-R02	4	4	10	50	0.2
	4040-050-R03	4	4	10	50	0.3
	4040-050-R05	4	4	10	50	0.5
	4040-050-R10	4	4	10	50	1
	4040-050-R15	4	4	10	50	1.5
	4050-050-R02	5	6	13	50	0.2
	4050-050-R03	5	6	13	50	0.3
	4050-050-R05	5	6	13	50	0.5
	4050-050-R10	5	6	13	50	1
	4060-050-R02	6	6	15	50	0.2
	4060-050-R03	6	6	15	50	0.3
	4060-050-R05	6	6	15	50	0.5
	4060-050-R10	6	6	15	50	1
	4060-050-R15	6	6	15	50	1.5
	4060-050-R20	6	6	15	50	2
	4080-060-R03	8	8	20	60	0.3
	4080-060-R05	8	8	20	60	0.5
	4080-060-R10	8	8	20	60	1
	4080-060-R15	8	8	20	60	1.5
	4080-060-R20	8	8	20	60	2
	4080-060-R25	8	8	20	60	2.5
	4080-060-R30	8	8	20	60	3
	4100-075-R03	10	10	25	75	0.3
	4100-075-R05	10	10	25	75	0.5
	4100-075-R10	10	10	25	75	1
	4100-075-R15	10	10	25	75	1.5
	4100-075-R20	10	10	25	75	2
	4100-075-R25	10	10	25	75	2.5
	4100-075-R30	10	10	25	75	3
	4120-075-R03	12	12	30	75	0.3
	4120-075-R05	12	12	30	75	0.5
	4120-075-R10	12	12	30	75	1
	4120-075-R15	12	12	30	75	1.5
	4120-075-R20	12	12	30	75	2
	4120-075-R25	12	12	30	75	2.5
	4120-075-R30	12	12	30	75	3

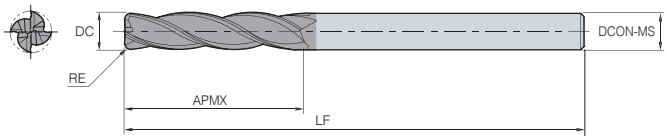
IPLRE4000

롱 레디우스

4 | H·A 35° | h6 shank | 재종 PC320

DC	공구직경공차
ALL	0.000 ~ -0.020







(mm)

형 번		DC	DCON-MS	APMX	LF	RE
IPLRE	4030-075-R03	3	3	8	75	0.3
	4030-075-R05	3	3	8	75	0.5
	4030-075-R10	3	3	8	75	1
	4040-075-R03	4	4	10	75	0.3
	4040-075-R05	4	4	10	75	0.5
	4040-075-R10	4	4	10	75	1
	4040-075-R15	4	4	10	75	1.5
	4060-100-R03	6	6	15	100	0.3
	4060-100-R05	6	6	15	100	0.5
	4060-100-R10	6	6	15	100	1
	4060-100-R15	6	6	15	100	1.5
	4060-100-R20	6	6	15	100	2
	4080-100-R03	8	8	20	100	0.3
	4080-100-R05	8	8	20	100	0.5
	4080-100-R10	8	8	20	100	1
	4080-100-R15	8	8	20	100	1.5
	4080-100-R20	8	8	20	100	2
	4080-100-R25	8	8	20	100	2.5
	4080-100-R30	8	8	20	100	3
	4100-100-R03	10	10	25	100	0.3
	4100-100-R05	10	10	25	100	0.5
	4100-100-R10	10	10	25	100	1
	4100-100-R15	10	10	25	100	1.5
	4100-100-R20	10	10	25	100	2
	4100-100-R25	10	10	25	100	2.5
	4100-100-R30	10	10	25	100	3
	4120-100-R03	12	12	30	100	0.3
	4120-100-R05	12	12	30	100	0.5
	4120-100-R10	12	12	30	100	1
	4120-100-R15	12	12	30	100	1.5
	4120-100-R20	12	12	30	100	2
	4120-100-R25	12	12	30	100	2.5
	4120-100-R30	12	12	30	100	3

고효율 러핑 엔드밀 시리즈

R+ Endmill

- 고효율 러핑 인선 적용으로 우수한 가공 효율 확보
- 특수 인선 설계와 부등분할, 부등리드 적용으로 절삭 부하 감소

형번표기법

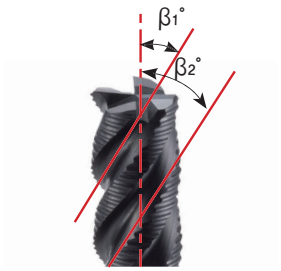
RP(A)E	4	080	-	075	-	RG	(-H)
Roughing Plus (Aluminium) Endmill	날수	가공직경 080 : Ø8		전장 075 : 75mm		인선정보	헬릭스각 H: High Helix L: Low Helix

〈인선형상〉
F : 파인피치(Fine Pitch)
M : 미디움피치(Medium Pitch)
R : 러핑피치(Roughing Pitch)
X : 2날 정삭, 2날 황

〈플루트형상〉
P : 부등분할/부등리드(Irregular Flutes/Leads)
F : 부등분할(Irregular Flutes)
L : 부등리드(Irregular L

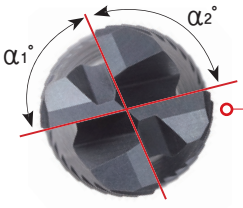
특징

- 가공 효율 우수 – 중삭, 황삭 가공용 형상 적용
- 가공 수명 증가 – 신재종 적용으로 공구 수명 증가
- 절삭성 향상 – 러핑에 최적화된 인선형상 적용



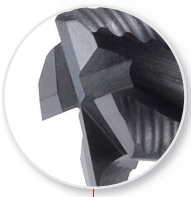
($\beta_1^\circ \neq \beta_2^\circ$)

- 부등리드 적용,
  가공 부하 분산



($\alpha_1^\circ \neq \alpha_2^\circ$)

- 채터링 방지를 위한
  부등분할 적용



- **절삭 저항 감소**
  - 중삭, 황삭 인선 구현
  - 엣지형상 적용



- **부드러운 절삭**
  - Serration인선 구현
  - 3 Combo R 적용

재종표기법

초경 러핑(Carbide Roughing)		하이스 러핑(HSS Roughing)	
FN30T	초경, Non코팅	HN30T	분말 하이스, Non코팅
PC10T	초경, TiCN코팅	HN20T	하이스, Non코팅
PC20T	초경, TiN코팅	HC10T	하이스, TiCN코팅
PC30T	초경, TiAlN코팅	HC20T	하이스, TiN코팅
PC40T	초경, TiAlCrN코팅	HC30T	분말 하이스, TiAlN코팅

재종표기법

형 번	형 상	품 명	공구직경	페이지
RPAE		3날 Al용 웨이브 러핑	Ø6.0 ~ 25.0	B188
RPE-FP-H		4날 파인피치 표준형 러핑	Ø5.0 ~ 20.0	B188
RPLE-FP-H		4날 파인피치 롱타입 러핑	Ø5.0 ~ 20.0	B189
RPE-XG		4날 정 · 황삭용 러핑	Ø5.0 ~ 20.0	B189
RPE-FP-L		4날 파인피치 러핑	Ø5.0 ~ 20.0	B190
RPE-RG		4날 표준형 러핑	Ø5.0 ~ 20.0	B190
RPE-RG		4날 러핑	Ø6.0 ~ 20.0	B191
RPE-FF		4날 파인피치 러핑	Ø6.0 ~ 20.0	B191
RPE-FP		4날 파인피치 러핑	Ø6.0 ~ 20.0	B192
RPE-RG		4날 황삭용 러핑	Ø6.0 ~ 50.0	B192

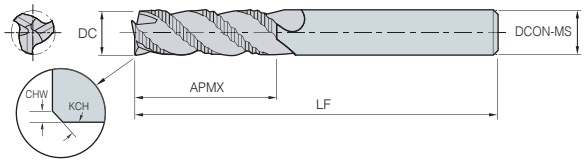
RPAE (Carbide)

Al용 웨이브 러핑

3 | H·A 45° | h6 shank | 재종 PC30T

DC	공구직경공차
~ Ø6 ~ Ø25	0.000 ~ -0.050







(mm)

형 번		DC	DCON-MS	APMX	LF	CHW	KCH
RPAE	3060-063	6.0	6	18	63	0.3	45°
	3070-063	7.0	8	23	63	0.3	45°
	3080-063	8.0	8	23	63	0.3	45°
	3090-080	9.0	10	30	80	0.3	45°
	3100-080	10.0	10	30	80	0.3	45°
	3110-080	11.0	12	32	80	0.5	45°
	3120-080	12.0	12	32	80	0.5	45°
	3140-080	14.0	14	32	80	0.5	45°
	3160-105	16.0	16	48	105	0.5	45°
	3180-105	18.0	18	48	105	0.5	45°
	3200-105	20.0	20	50	105	0.5	45°
	3250-105	25.0	25	50	105	0.5	45°

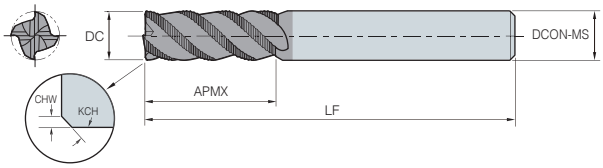
RPE-FP-H (Carbide, 하이헬릭스, 부등분할, 부등리드)

파인피치 표준형 러핑

4 | H·A 40°/42° | h6 shank | 재종 PC30T

DC	공구직경공차
Ø5 ~ Ø20	0.000 ~ -0.050







(mm)

형 번		DC	DCON-MS	APMX	LF	CHW	KCH
RPE	4050-057-FP-H	5.0	6	13	57	0.3	45°
	4060-057-FP-H	6.0	6	13	57	0.5	45°
	4080-063-FP-H	8.0	8	19	63	0.5	45°
	4100-072-FP-H	10.0	10	22	72	0.5	45°
	4120-082-FP-H	12.0	12	26	82	0.5	45°
	4140-082-FP-H	14.0	16	26	82	0.6	45°
	4160-092-FP-H	16.0	16	32	92	0.6	45°
	4180-092-FP-H	18.0	20	32	92	0.6	45°
	4200-0104-FP-H	20.0	20	38	104	0.6	45°

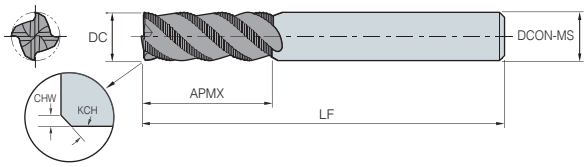
RPLE-FP-H (Carbide, 하이헬릭스, 부등분할, 부등리드)

파인피치 롱타입 러핑

4 | H·A 40°/42° | h6 shank | 재종 PC30T

DC	공구직경공차
Ø5 ~ Ø20	0.000 ~ -0.050







(mm)

형 번		DC	DCON-MS	APMX	LF	CHW	KCH
RPLE	4050-063-FP-H	5.0	6	19	63	0.3	45°
	4060-063-FP-H	6.0	8	19	63	0.5	45°
	4080-072-FP-H	8.0	8	28	72	0.5	45°
	4100-082-FP-H	10.0	10	34	82	0.5	45°
	4120-097-FP-H	12.0	12	40	97	0.5	45°
	4140-097-FP-H	14.0	16	40	97	0.6	45°
	4160-108-FP-H	16.0	16	48	108	0.6	45°
	4180-108-FP-H	18.0	20	48	108	0.6	45°
	4200-122-FP-H	20.0	20	56	122	0.6	45°

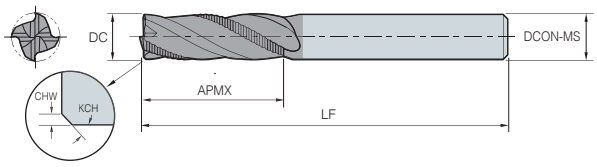
RPE-XG (Carbide)

정·황삭용 러핑

4 | H·A 30° | h6 shank | 재종 PC30T

DC	공구직경공차
Ø5 ~ Ø20	0.000 ~ -0.050







(mm)

형 번		DC	DCON-MS	APMX	LF	CHW	KCH
RPE	4060-052-XG	6.0	6	14	52	0.25	45°
	4070-063-XG	7.0	8	18	63	0.3	45°
	4080-063-XG	8.0	8	18	63	0.3	45°
	4090-080-XG	9.0	10	22	80	0.3	45°
	4100-080-XG	10.0	10	22	80	0.3	45°
	4110-080-XG	11.0	12	26	80	0.4	45°
	4120-080-XG	12.0	12	26	80	0.4	45°
	4140-080-XG	14.0	14	30	80	0.4	45°
	4160-105-XG	16.0	16	34	105	0.6	45°
	4180-105-XG	18.0	18	38	105	0.6	45°
	4200-105-XG	20.0	20	42	105	0.6	45°

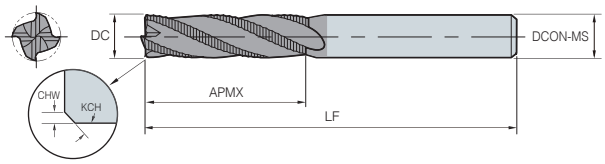
RPE-FP-L (Carbide, 부등분할, 부등리드)

파인피치 러핑

4 | H·A 18°/23° | h6 shank | 재종 PC30T

DC	공구직경공차
Ø5 ~ Ø20	0.000 ~ -0.050







(mm)

형 번		DC	DCON-MS	APMX	LF	CHW	KCH
RPE	4050-060-FP-L	5.0	6	13	60	0.3	45°
	4060-080-FP-L	6.0	8	13	80	0.5	45°
	4080-080-FP-L	8.0	8	19	80	0.5	45°
	4100-080-FP-L	10.0	10	22	80	0.5	45°
	4120-080-FP-L	12.0	12	26	80	0.5	45°
	4140-085-FP-L	14.0	16	26	85	0.6	45°
	4160-100-FP-L	16.0	16	32	100	0.6	45°
	4180-100-FP-L	18.0	20	32	100	0.6	45°
	4200-105-FP-L	20.0	20	38	105	0.6	45°

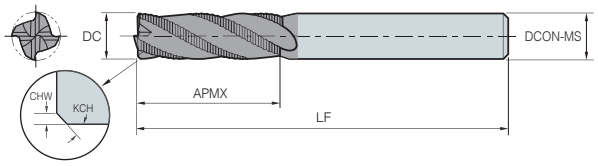
RPE-RG (Carbide)

표준형 러핑

4 | H·A 30° | h6 shank | 재종 PC40T

DC	공구직경공차
Ø5 ~ Ø20	0.000 ~ -0.050







(mm)

형 번		DC	DCON-MS	APMX	LF	CHW	KCH
RPE	4050-050-RG	5.0	6	13	50	0.3	45°
	4060-050-RG	6.0	6	16	50	0.3	45°
	4080-060-RG	8.0	8	20	60	0.3	45°
	4100-075-RG	10.0	10	25	75	0.3	45°
	4120-080-RG	12.0	12	30	80	0.4	45°
	4140-100-RG	14.0	16	35	100	0.6	45°
	4160-100-RG	16.0	16	40	100	0.6	45°
	4180-110-RG	18.0	20	40	110	0.6	45°
	4200-110-RG	20.0	20	45	110	0.6	45°

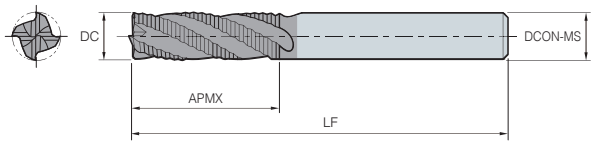
RPE-RG (HSS PM)

4날 러핑

4 | H·A 30° | HSS PM | h6 shank | 재종 HN30T HC30T

DC	공구직경공차
Ø6 ~ Ø20	±0.1







(mm)

형 번		DC	DCON-MS	APMX	LF
RPE	4060-060-RG	6.0	6	20	60
	4070-070-RG	7.0	10	20	70
	4080-075-RG	8.0	10	25	75
	4090-075-RG	9.0	10	30	75
	4100-085-RG	10.0	10	35	85
	4120-100-RG	12.0	12	40	100
	4140-100-RG	14.0	16	40	100
	4160-110-RG	16.0	16	50	110
	4180-110-RG	18.0	20	50	110
	4200-125-RG	20.0	20	60	125

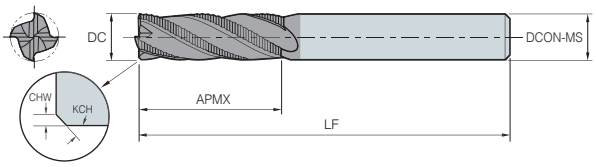
RPE-FF (HSS PM, 부등분할)

파인피치 러핑

4 | H·A 25°/30° | HSS PM | h6 shank | 재종 HC30T

DC	공구직경공차
Ø6 ~ Ø20	±0.1







(mm)

형 번		DC	DCON-MS	APMX	LF	CHW	KCH
RPE	4060-060-FF	6.0	6	20	60	0.5	45°
	4070-070-FF	7.0	10	20	70	0.5	45°
	4080-075-FF	8.0	10	25	75	0.5	45°
	4090-075-FF	9.0	10	30	75	0.5	45°
	4100-085-FF	10.0	10	35	85	0.5	45°
	4120-100-FF	12.0	12	40	100	0.6	45°
	4140-100-FF	14.0	12	40	100	0.6	45°
	4160-110-FF	16.0	16	50	110	0.6	45°
	4180-110-FF	18.0	16	50	110	0.6	45°
	4200-125-FF	20.0	20	60	125	0.6	45°

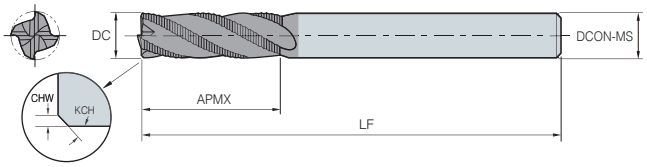
RPE-FP (HSS PM, 부등분할, 부등리드)

파인피치 러핑



4 | H·A 25°/30° | HSS PM | h6 shank | 재종 HC30T

DC	공구직경공차
Ø6 ~ Ø12	0.000 ~ -0.050
Ø12.1 ~ Ø20	0.000 ~ -0.100





(mm)

형 번		DC	DCON-MS	APMX	LF	CHW	KCH
RPE	4060-080-FP	6.0	6	13	80	0.5	45°
	4070-080-FP	7.0	10	16	80	0.5	45°
	4080-085-FP	8.0	10	19	85	0.5	45°
	4090-095-FP	9.0	10	19	95	0.5	45°
	4100-100-FP	10.0	10	22	100	0.5	45°

형 번		DC	DCON-MS	APMX	LF	CHW	KCH
RPE	4120-110-FP	12.0	12	26	110	0.6	45°
	4140-110-FP	14.0	12	26	110	0.6	45°
	4160-125-FP	16.0	16	32	125	0.6	45°
	4180-125-FP	18.0	16	32	125	0.6	45°
	4200-140-FP	20.0	20	38	140	0.6	45°

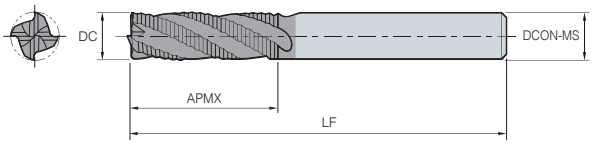
RPE-RG (HSS)

황삭용 러핑



4 | H·A 30° | HSS Co 8% | h6 shank | 재종 HN20T HC20T HC10T

DC	공구직경공차
Ø6 ~ Ø50	±0.1





(mm)

형 번		DC	DCON-MS	APMX	LF
RPE	4060-060-RG	6.0	6	15	60
	4070-065-RG	7.0	8	20	65
	4080-065-RG	8.0	8	20	65
	4090-075-RG	9.0	10	25	75
	4100-075-RG	10.0	10	25	75
	4110-080-RG	11.0	12	30	80
	4120-080-RG	12.0	12	30	80
	4130-090-RG	13.0	12	35	90
	4140-090-RG	14.0	12	35	90
	4150-095-RG	15.0	12	40	95
	4160-095-RG	16.0	16	40	95
	4170-095-RG	17.0	16	40	95
	4180-105-RG	18.0	16	40	105
	4190-110-RG	19.0	16	45	110
	4200-110-RG	20.0	20	45	110
	4210-110-RG	21.0	20	45	110
	4220-110-RG	22.0	20	45	110
	4230-110-RG	23.0	20	45	110

형 번		DC	DCON-MS	APMX	LF
RPE	4240-120-RG	24.0	25	50	120
	4250-120-RG	25.0	25	50	120
	4260-120-RG	26.0	25	50	120
	4270-125-RG	27.0	25	55	125
	4280-125-RG	28.0	25	55	125
	4300-125-RG	30.0	25	55	125
	4320-145-RG	32.0	32	60	145
	4340-145-RG	34.0	32	60	145
	4350-145-RG	35.0	32	60	145
	4360-145-RG	36.0	32	60	145
	4380-150-RG	38.0	32	65	150
	4400-150-RG	40.0	32	65	150
	4420-155-RG	42.0	42	65	155
	4440-155-RG	44.0	42	65	155
	4450-160-RG	45.0	42	70	160
	4460-160-RG	46.0	42	70	160
	4500-160-RG	50.0	42	70	160

스테인리스강 가공용 엔드밀 시리즈

S-Star Endmill

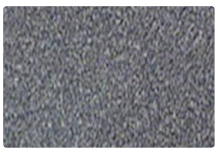
- 강력한 커팅엣지 구현으로 공구수명 향상
- 내산화성이 강화된 스페셜 코팅 적용
- 고경사각과 유선형 칩 포켓이 형성되어 있어 칩 배출이 용이
- 공구직경화성을 극복하기 위해 특수 설계된 날끝 형성
- 스테인리스(STS) 가공 시 최적 성능을 발휘
- 보통강, 합금강, 소입강 가공 가능
- 다목적 가공 가능(측면, 홈, 경사 가공 등)

형번표기법

SP FE 4 120 - 075 (-V00N00) - R10 (-N)

- **SP** — **S Plus Endmill**
- **FE** — **구분**
  - FE : Flat Endmill
  - RE : Radius Endmill
  - BE : Ball Endmill
  - XE : Roughing Endmill
- **4** — **날수**
  - 4: 4날
- **120** — **공구직경**
  - 120: Ø12.0mm
- **075** — **전장**
  - 075 : 75mm
- **(-V00N00)** — **인선길이**
  - V10: 10mm
  - **목부길이**
  - N20: 20mm
- **R10** — **코너 형상**
  - R10: 1.0 mm
  - C05: 0.5 mm
- **(-N)**
  - N: Nick type

특징



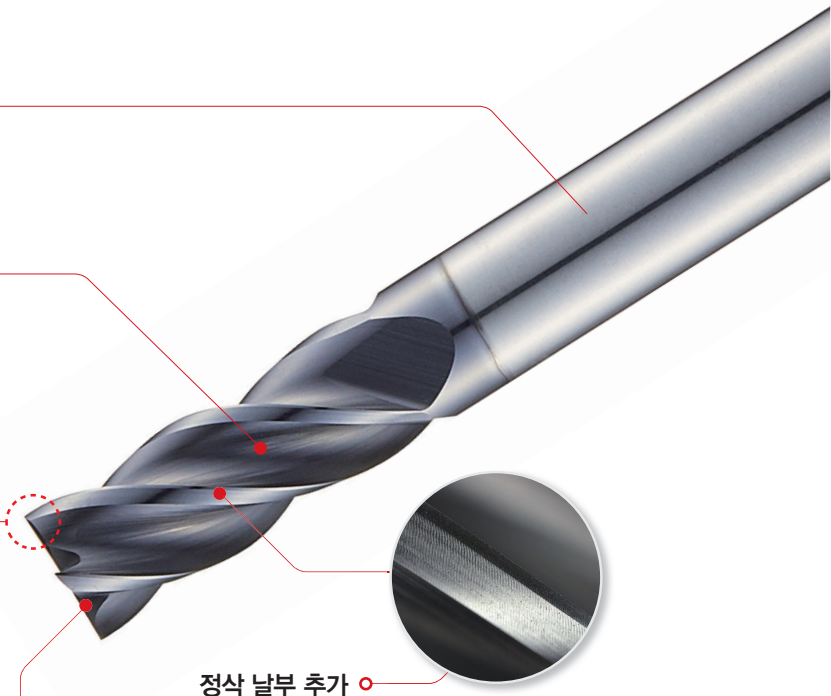
고인성 모재 채택 (재종 PC325)

- 고인성 모재 채택을 통한 내치핑성, 가공 안정성 확보



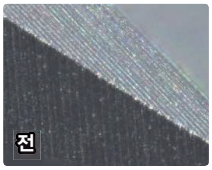
AlCrN계 박막 사이즈별 두께 적용

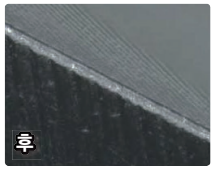
- Multi layer 적용
- Cr 함유를 통한 윤활성 향상
- 마찰열에 대한 안정성 확보
- 박막 두께 향상을 통한 내마모성 확보



인선 처리 적용

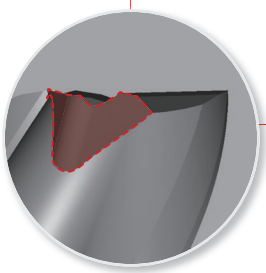
- 가공 시 초기 내치핑성 보완
- 내마모성 향상 및 안정적인 가공 유도
- 인선 처리 안정화로 품질 향상





정삭 날부 추가

- 1차 O.D 연삭 조도 향상을 통한 가공면 조도 향상
- 인선 품질 확보, 내용착성 향상



부등분할 / R게쉬 적용

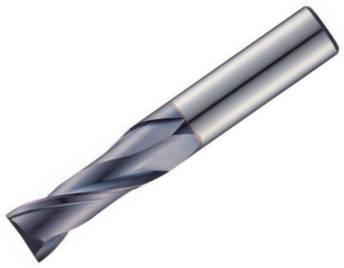
- R형 게쉬 형상 채택을 통한 칩 배출력 향상
- 숄더링 가공 시 안정성 확보

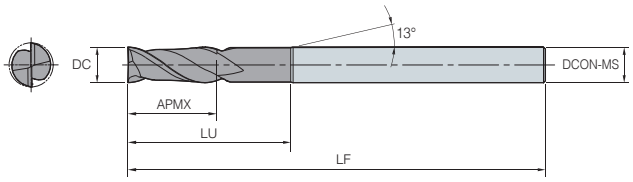
SPFE2000

2날 플랫

2 | H·A 36° | h5 shank | 재종 PC325

DC	공구직경공차
Ø1 ~ Ø5	0.000 ~ -0.015
Ø6	0.000 ~ -0.020
Ø8 ~ Ø20	0.000 ~ -0.030







(mm)

형 번		DC	DCON-MS	APMX	LU	LF
SPFE	2010-050	1	6	2.5	7.5	50
	2012-050	1.2	6	3	8	50
	2015-050	1.5	6	4	9	50
	2020-050	2	6	6	11	50
	2025-050	2.5	6	7	12	50
	2030-055	3	6	8	13	55
	2040-055	4	6	10	15	55
	2050-055	5	6	15	20	55
	2060-060	6	6	15	22	60
	2080-070	8	8	20	32	70
	2100-075	10	10	25	33	75
	2120-080	12	12	30	35	80
	2140-090	14	16	35	42	90
	2160-100	16	16	42	52	100
	2180-100	18	16	45	-	100
	2200-100	20	20	48	50	100

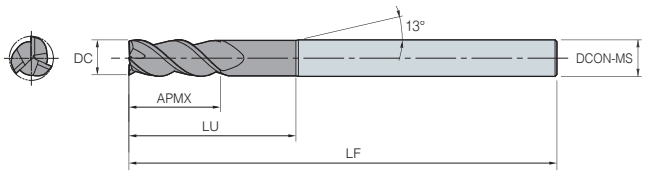
SPFE3000

3날 플랫

3 | H·A 42°/45° | h5 shank | 재종 PC325

DC	공구직경공차
Ø1 ~ Ø5	0.000 ~ -0.015
Ø6	0.000 ~ -0.020
Ø8 ~ Ø20	0.000 ~ -0.030







(mm)

형 번		DC	DCON-MS	APMX	LU	LF
SPFE	3010-050	1	6	2.5	7.5	50
	3012-050	1.2	6	3	8	50
	3015-050	1.5	6	4	9	50
	3020-050	2	6	6	11	50
	3025-050	2.5	6	7	12	50
	3030-055	3	6	8	13	55
	3030-060-V10	3	6	10	15	60
	3040-055	4	6	10	15	55
	3040-060-V12	4	6	12	17	60
	3050-055	5	6	13	18	55
	3060-060	6	6	15	22	60
	3060-065-V20	6	6	20	27	65
	3080-070	8	8	20	32	70
	3080-080-V30	8	8	30	42	80
	3100-075	10	10	25	33	75
	3100-085-V35	10	10	35	43	85
	3120-080	12	12	30	35	80
	3120-090-V40	12	12	40	45	90
	3140-090	14	16	35	42	90
	3160-100	16	16	42	52	100
	3180-100	18	16	45	-	100
	3200-100	20	20	48	50	100

• 적용 피삭재

◎: 매우적합 ○: 적합

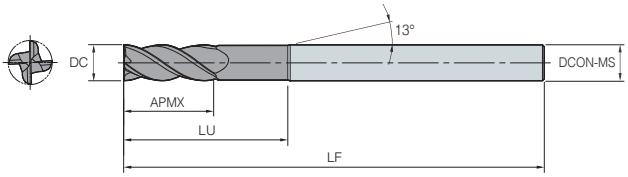
탄소강 (~HB225)	합금강 (HB225~325)	프리하든강 (HRC30~50)	열처리강		주철 ~FCD500	알루미늄	스테인리스강	Ti 합금	Ni 합금
			SKD61 (~HRC55)	SKD11 (HRC55~)					
○	○	○					◎	○	○

SPFE4000

4날 플랫







DC	공구직경공차
Ø1 ~ Ø5.5	0.000 ~ -0.015
Ø6 ~ Ø7	0.000 ~ -0.020
Ø8 ~ Ø20	0.000 ~ -0.030

(mm)

형 번		DC	DCON-MS	APMX	LU	LF
SPFE	4010-050	1	6	2.5	7.5	50
	4012-050	1.2	6	3	8	50
	4015-050	1.5	6	4	9	50
	4020-050	2	6	6	11	50
	4025-050	2.5	6	7	12	50
	4030-055	3	6	8	13	55
	4030-060-V10	3	6	10	15	60
	4035-055	3.5	6	10	15	55
	4040-055	4	6	10	15	55
	4040-060-V12	4	6	12	17	60
	4045-055	4.5	6	12	17	55
	4050-055	5	6	15	20	55
	4055-060	5.5	6	15	20	60
	4060-060	6	6	15	22	60
	4060-065-V20	6	6	20	27	65
	4065-060	6.5	8	15	22	60
	4070-080	7	8	20	42	80
	4080-070	8	8	20	32	70
	4080-070-V25	8	8	25	32	70
	4080-080-V30	8	8	30	42	80
	4085-070	8.5	10	20	28	70
	4090-080	9	10	25	38	80
	4100-075	10	10	25	33	75
	4100-085-V35	10	10	35	43	85
	4120-080	12	12	30	35	80
	4120-090-V40	12	12	40	45	90
	4140-090	14	16	35	42	90
	4160-100	16	16	42	52	100
	4180-100	18	16	45	-	100
	4200-100	20	20	48	50	100

• 적용 피삭재

◎: 매우적합 ○: 적합

탄소강 (~HB225)	합금강 (HB225~325)	프리하든강 (HRC30~50)	열처리강		주철 ~FCD500	알루미늄	스테인리스강	Ti 합금	Ni 합금
			SKD61 (~HRC55)	SKD11 (HRC55~)					
○	○	○					◎	○	○

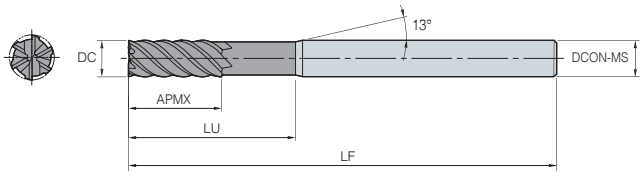
SPFE6000

6날 플랫

6 | H·A 45° | h5 shank | 재종 PC325

DC	공구직경공차
Ø6 Ø8 ~ Ø20	0.000 ~ -0.020 0.000 ~ -0.030







(mm)

형 번		DC	DCON-MS	APMX	LU	LF
SPFE	6060-060	6	6	15	22	60
	6080-070	8	8	20	32	70
	6100-075	10	10	25	33	75
	6120-080	12	12	30	35	80
	6160-100	16	16	42	52	100
	6200-100	20	20	48	50	100

• 적용 피삭재

◎: 매우적합 ○: 적합

탄소강 (~ HB225)	합금강 (HB225 ~ 325)	프리하든강 (HRC30 ~ 50)	열처리강		주철 ~ FCD500	알루미늄	스테인리스강	Ti 합금	Ni 합금
			SKD61 (~ HRC55)	SKD11 (HRC55 ~)					
○	○	○					◎	○	○

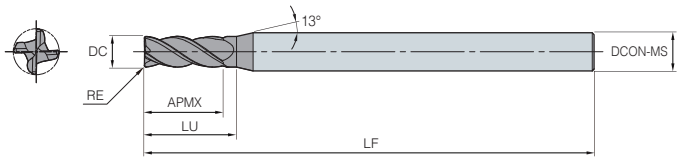
SPRE4000

4날 레디우스

4 | H·A 35°/37° | h5 shank | 재종 PC325

DC	공구직경공차
Ø1 ~ Ø5.5	0.000 ~ -0.015
Ø6 ~ Ø7	0.000 ~ -0.020
Ø8 ~ Ø20	0.000 ~ -0.030







(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
SPRE	4010-050-R01	1	6	2.5	7.5	50	0.1
	4010-050-R02	1	6	2.5	7.5	50	0.2
	4012-050-R01	1.2	6	3	8	50	0.1
	4015-050-R01	1.5	6	4	9	50	0.1
	4015-050-R02	1.5	6	4	9	50	0.2
	4020-050-R01	2	6	6	11	50	0.1
	4020-050-R02	2	6	6	11	50	0.2
	4025-050-R02	2.5	6	7	12	50	0.2
	4030-055-R02	3	6	8	13	55	0.2
	4030-055-R03	3	6	8	13	55	0.3
	4030-055-R05	3	6	8	13	55	0.5
	4040-055-R02	4	6	10	15	55	0.2
	4040-055-R03	4	6	10	15	55	0.3
	4040-055-R05	4	6	10	15	55	0.5
	4050-055-R02	5	6	15	20	55	0.2
	4050-055-R03	5	6	15	20	55	0.3
	4050-055-R05	5	6	15	20	55	0.5
	4060-060-R03	6	6	15	22	60	0.3
	4060-060-R05	6	6	15	22	60	0.5
	4060-060-R10	6	6	15	22	60	1
	4070-060-R03	7	8	15	22	60	0.3
	4080-070-R02	8	8	20	32	70	0.2
	4080-070-R03	8	8	20	32	70	0.3
	4080-070-R05	8	8	20	32	70	0.5
	4080-070-R10	8	8	20	32	70	1
	4100-075-R03	10	10	25	33	75	0.3
	4100-075-R05	10	10	25	33	75	0.5
	4100-075-R10	10	10	25	33	75	1
	4100-075-R15	10	10	25	33	75	1.5
	4100-075-R20	10	10	25	33	75	2
	4100-075-R30	10	10	25	33	75	3
	4120-080-R03	12	12	30	35	80	0.3
	4120-080-R05	12	12	30	80	12	0.5

• 적용 피삭재

◎: 매우적합 ○: 적합

탄소강 (~HB225)	합금강 (HB225~325)	프리하든강 (HRC30~50)	열처리강		주철 ~FCD500	알루미늄	스테인리스강	Ti 합금	Ni 합금
			SKD61 (~HRC55)	SKD11 (HRC55~)					
○	○	○					◎	○	○

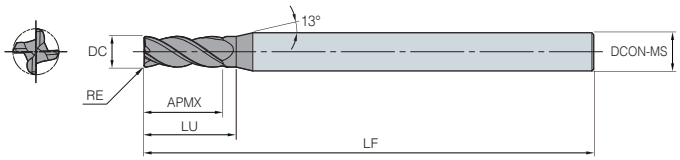
SPRE4000

4날 레디우스

4 | H·A 35°/37° | h5 shank | 재종 PC325

DC	공구직경공차
Ø1 ~ Ø5.5	0.000 ~ -0.015
Ø6 ~ Ø7	0.000 ~ -0.020
Ø8 ~ Ø20	0.000 ~ -0.030







(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
SPRE	4120-080-R10	12	12	30	35	80	1
	4120-080-R15	12	12	30	35	80	1.5
	4120-080-R20	12	12	30	35	80	2
	4120-080-R30	12	12	30	35	80	3
	4120-080-R40	12	12	30	35	80	4
	4140-090-R05	14	16	35	42	90	0.5
	4140-090-R10	14	16	35	42	90	1
	4140-090-R20	14	16	35	42	90	2
	4140-090-R30	14	16	35	42	90	3
	4140-090-R40	14	16	35	42	90	4
	4160-100-R05	16	16	42	52	100	0.5
	4160-100-R10	16	16	42	52	100	1
	4160-100-R20	16	16	42	52	100	2
	4160-100-R30	16	16	42	52	100	3
	4160-100-R40	16	16	42	52	100	4
	4160-100-R50	16	16	42	52	100	5
	4180-100-R05	18	16	45	-	100	0.5
	4200-100-R05	20	20	48	50	100	0.5
	4200-100-R10	20	20	48	50	100	1
	4200-100-R20	20	20	48	50	100	2
	4200-100-R30	20	20	48	50	100	3
	4200-100-R40	20	20	48	50	100	4
	4200-100-R50	20	20	48	50	100	5

• 적용 피삭재

◎: 매우적합 ○: 적합

탄소강 (~ HB225)	합금강 (HB225 ~ 325)	프리하든강 (HRC30 ~ 50)	열처리강		주철 ~ FCD500	알루미늄	스테인리스강	Ti 합금	Ni 합금
			SKD61 (~ HRC55)	SKD11 (HRC55 ~)					
○	○	○					◎	○	○

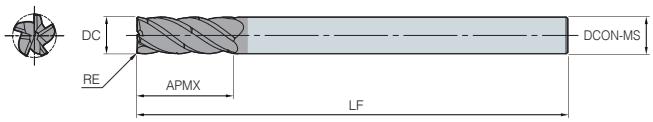
SPRE5000

5날 니크 타입 레디우스

5 | H·A 35°/38° | h5 shank | 재종 PC325

DC	공구직경공차
Ø6	0.000 ~ -0.020
Ø8 ~ Ø20	0.000 ~ -0.030







(mm)

형 번		DC	DCON-MS	APMX	LF	RE
SPRE	5060-060-R05-N	6	6	15	60	0.5
	5060-070-R05-N	6	6	24	70	0.5
	5080-070-R05-N	8	8	20	70	0.5
	5080-090-R05-N	8	8	32	90	0.5
	5100-075-R05-N	10	10	25	75	0.5
	5100-100-R05-N	10	10	40	100	0.5
	5120-080-R05-N	12	12	30	80	0.5
	5120-080-R10-N	12	12	30	80	1
	5120-080-R20-N	12	12	30	80	2
	5120-080-R30-N	12	12	30	80	3
	5120-110-R05-N	12	12	48	110	0.5
	5160-100-R05-N	16	16	42	100	0.5
	5160-100-R10-N	16	16	42	100	1
	5160-100-R20-N	16	16	42	100	2
	5160-100-R30-N	16	16	42	100	3
	5160-100-R40-N	16	16	42	100	4
	5160-130-R05-N	16	16	65	130	0.5
	5200-110-R05-N	20	20	48	110	0.5
	5200-130-R05-N	20	20	65	130	0.5

• 적용 피삭재

◎: 매우적합 ○: 적합

탄소강 (~HB225)	합금강 (HB225~325)	프리하든강 (HRC30~50)	열처리강		주철 ~FCD500	알루미늄	스테인리스강	Ti 합금	Ni 합금
			SKD61 (~HRC55)	SKD11 (HRC55~)					
○	○	○					◎	○	○

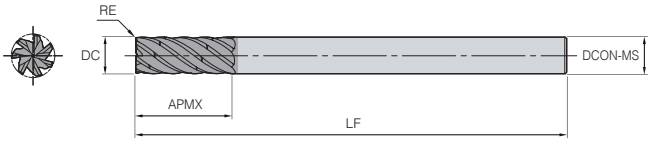
SPRE7000

7날 니크 타입 레디우스

7 | H·A 35°/38° | h5 shank | 재종 PC325

DC	공구직경공차
Ø6	0.000 ~ -0.020
Ø8 ~ Ø20	0.000 ~ -0.030







(mm)

형 번		DC	DCON-MS	APMX	LF	RE
SPRE	7060-060-R05-N	6	6	15	60	0.5
	7060-070-R05-N	6	6	24	70	0.5
	7080-070-R05-N	8	8	20	70	0.5
	7080-090-R05-N	8	8	32	90	0.5
	7100-075-R05-N	10	10	25	75	0.5
	7100-100-R05-N	10	10	40	100	0.5
	7120-080-R05-N	12	12	30	80	0.5
	7120-080-R10-N	12	12	30	80	1
	7120-080-R20-N	12	12	30	80	2
	7120-080-R30-N	12	12	30	80	3
	7120-080-R40-N	12	12	30	80	4
	7120-110-R05-N	12	12	48	110	0.5
	7160-100-R05-N	16	16	42	100	0.5
	7160-100-R10-N	16	16	42	100	1
	7160-100-R20-N	16	16	42	100	2
	7160-100-R30-N	16	16	42	100	3
	7160-100-R40-N	16	16	42	100	4
	7160-100-R50-N	16	16	42	100	5
	7160-130-R05-N	16	16	65	130	0.5
	7200-110-R05-N	20	20	48	110	0.5
	7200-130-R05-N	20	20	65	130	0.5

• 적용 피삭재

◎: 매우적합 ○: 적합

탄소강 (~ HB225)	합금강 (HB225 ~ 325)	프리하든강 (HRC30 ~ 50)	열처리강		주철 ~ FCD500	알루미늄	스테인리스강	Ti 합금	Ni 합금
			SKD61 (~ HRC55)	SKD11 (HRC55 ~)					
○	○	○					◎	○	○

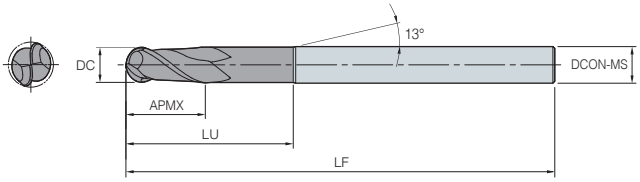
SPBE2000

2날 볼

2 | H·A 38° | h5 shank | 재종 PC325

DC	공구직경공차
Ø1 ~ Ø5 Ø6 Ø8 ~ Ø12	0.000 ~ -0.015 0.000 ~ -0.020 0.000 ~ -0.030







(mm)

형 번		DC	DCON-MS	APMX	LU	LF
SPBE	2010-050	1	6	3	8	50
	2020-050	2	6	6	11	50
	2030-050	3	6	8	13	50
	2030-070	3	6	8	13	70
	2040-050	4	6	10	15	50
	2040-070	4	6	10	15	70
	2050-050	5	6	13	18	50
	2050-080	5	6	13	18	80
	2060-050	6	6	13	20	50
	2060-090	6	6	13	52	90
	2080-060	8	8	19	24	60
	2080-100	8	8	19	62	100
	2100-070	10	10	22	30	70
	2100-100	10	10	22	58	100
	2120-075	12	12	26	30	75
	2120-110	12	12	26	63	110

• 적용 피삭재

◎: 매우적합 ○: 적합

탄소강 (~HB225)	합금강 (HB225~325)	프리하든강 (HRC30~50)	열처리강		주철 ~FCD500	알루미늄	스테인리스강	Ti 합금	Ni 합금
			SKD61 (~HRC55)	SKD11 (HRC55~)					
○	○	○					◎	○	○

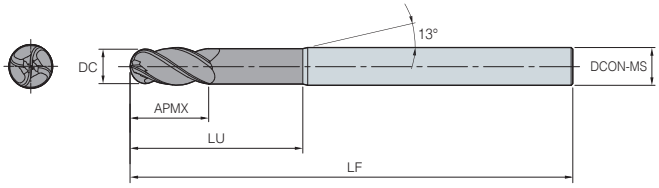
SPBE4000

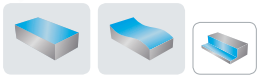
4날 볼

4 | H·A 35°/37° | h5 shank | 재종 PC325

DC	공구직경공차
Ø3 ~ Ø5	0.000 ~ -0.015
Ø6	0.000 ~ -0.020
Ø8 ~ Ø20	0.000 ~ -0.030







(mm)

형 번		DC	DCON-MS	APMX	LU	LF
SPBE	4030-060	3	8	13	60	6
	4040-070	4	8	13	70	6
	4050-080	5	12	17	80	6
	4060-090	6	12	52	90	6
	4080-100	8	16	62	100	8
	4100-100	10	20	58	100	10
	4120-100	12	25	53	100	12
	4160-100	16	30	50	100	16
	4200-100	20	38	48	100	20

• 적용 피삭재

◎: 매우적합 ○: 적합

탄소강 (~HB225)	합금강 (HB225~325)	프리하든강 (HRC30~50)	열처리강		주철 ~FCD500	알루미늄	스테인리스강	Ti 합금	Ni 합금
			SKD61 (~HRC55)	SKD11 (HRC55~)					
○	○	○					◎	○	○

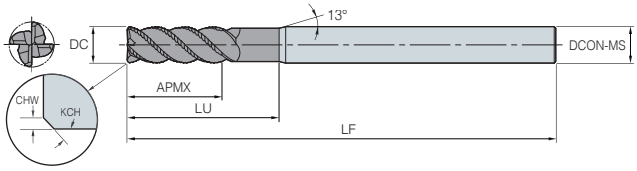
SPXE3000/4000/5000

3~5날 러핑

3 4 5 H·A 45° h5 shank 재종 PC325

DC	공구직경공차
Ø3 ~ Ø20	0.000 ~ -0.050







(mm)

형 번		DC	DCON-MS	APMX	LU	LF	CHW	KCH
SPXE	3030-050-C02	3	6	8	13	50	0.2	45°
	3040-050-C02	4	6	10	15	50	0.2	45°
	4050-050-C03	5	6	13	18	50	0.3	45°
	4060-060-C03	6	6	13	22	60	0.3	45°
	4060-060-V10N20S6-C03	6	6	10	20	60	0.3	45°
	4070-070-C04	7	8	18	32	70	0.4	45°
	4080-070-C04	8	8	19	32	70	0.4	45°
	4080-070-V12N25S8-C04	8	8	12	25	70	0.4	45°
	4090-070-C04	9	10	20	28	70	0.4	45°
	4100-075-C04	10	10	22	33	75	0.4	45°
	4100-075-V15N30S10-C04	10	10	15	30	75	0.4	45°
	4110-080-C05	11	12	25	33	80	0.5	45°
	4120-080-C05	12	12	26	35	80	0.5	45°
	4120-080-V20N35S12-C05	12	12	20	35	80	0.5	45°
	5060-060-C05	6	6	13	22	60	0.5	45°
	5080-065-C05	8	8	19	27	65	0.5	45°
	5100-070-C05	10	10	22	30	70	0.5	45°
	5120-080-C05	12	12	26	35	80	0.5	45°
	5140-090-C05	14	16	28	40	90	0.5	45°
	5160-100-C05	16	16	32	50	100	0.5	45°
	5160-100-V42-C05	16	16	42	52	100	0.5	45°
	5200-100-C05	20	20	38	48	100	0.5	45°
	5200-100-V45-C05	20	20	45	50	100	0.5	45°

• 적용 피삭재

◎: 매우적합 ○: 적합

탄소강 (~HB225)	합금강 (HB225~325)	프리하든강 (HRC30~50)	열처리강		주철 ~FCD500	알루미늄	스테인리스강	Ti 합금	Ni 합금
			SKD61 (~HRC55)	SKD11 (HRC55~)					
○	○	○					◎	○	○

알루미늄용 가공용 엔드밀

A-Star Endmill

- 알루미늄용 사상, 중삭, 황삭 가공용 엔드밀
- 다양한 솔루션 제공 – 다양한 가공 프로세스에 적합한 공구 제공
- 가공 효율성 향상 – 최신 기술의 특수 인선과 플루트 적용

특징



라인업

형 번	형 상	품 명	공구직경	페이지
APFE		2~3날 플랫 엔드밀	Ø2.5~20.0	B206
APMFE		2~3날 미들 플랫 엔드밀	Ø3.0~20.0	B207
APLFE		2~3날 롱 플랫 엔드밀	Ø3.0~20.0	B208
APBE		2날 볼 엔드밀	Ø1.0~12.0	B209
AFE		3날 숏 플랫 엔드밀	Ø1.0~20.0	B210
AFE		3날 플랫 엔드밀	Ø1.0~20.0	B211
AFE		3날 롱 플랫 엔드밀	Ø1.0~20.0	B212
APRE		3날 러핑 엔드밀	Ø4.0~25.0	B214
RPAE		3날 웨이브 러핑 엔드밀	Ø6.0~25.0	B215

APFE2000/3000

2~3날 플랫





2 | 3 | H·A 50° | h6 shank | 재종 H05S

DC	공구직경공차
Ø1 ~ Ø5	0.000 ~ -0.020
Ø6 ~ Ø8	0.000 ~ -0.025
Ø10 ~ Ø20	0.000 ~ -0.030

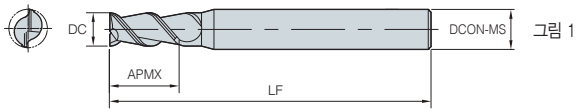


그림 1

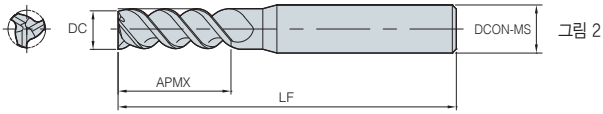


그림 2

(mm)

형 번		DC	DCON-MS	APMX	LF	그림
APFE	2020-050-S4	2	4	6	50	1
	2025-050	2.5	6	8	50	1
	2030-050	3	6	9	50	1
	2040-050	4	6	12	50	1
	2050-050	5	6	15	50	1
	2060-050	6	6	18	50	1
	2080-060	8	8	20	60	1
	2100-075	10	10	30	75	1
	2120-075	12	12	32	75	1
	2160-100	16	16	45	100	1
	2200-100	20	20	45	100	1
	3020-050-S4	2	4	6	50	2
	3025-050	2.5	6	8	50	2
	3030-050	3	6	9	50	2
	3040-050	4	6	12	50	2
	3050-050	5	6	15	50	2
	3060-050	6	6	18	50	2
	3080-060	8	8	20	60	2
	3100-075	10	10	30	75	2
	3120-075	12	12	32	75	2
	3160-100	16	16	45	100	2
	3200-100	20	20	45	100	2

APFE2000/3000

2~3날 플랫





DC	공구직경공차
Ø1 ~ Ø5	0.000 ~ -0.020
Ø6 ~ Ø8	0.000 ~ -0.025
Ø10 ~ Ø20	0.000 ~ -0.030

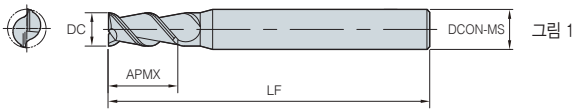


그림 1

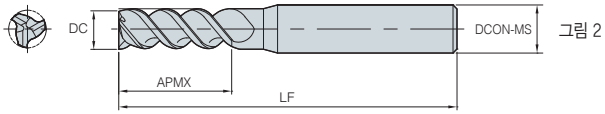


그림 2

(mm)

형 번		DC	DCON-MS	APMX	LF	그림
APFE	2030-060	3	6	11	60	1
	2040-060	4	6	14	60	1
	2050-060	5	6	17	60	1
	2060-065	6	6	22	65	1
	2080-065	8	8	25	65	1
	2100-080	10	10	37	80	1
	2120-080	12	12	40	80	1
	2160-110	16	16	55	110	1
	2200-125	20	20	60	125	1
	3030-060	3	6	11	60	2
	3040-060	4	6	14	60	2
	3050-060	5	6	17	60	2
	3060-065	6	6	22	65	2
	3080-065	8	8	25	65	2
	3100-080	10	10	37	80	2
	3120-080	12	12	40	80	2
	3160-110	16	16	55	110	2
	3200-125	20	20	60	125	2

APLFE2000/3000

2~3날 롱 플랫







DC	공구직경공차
Ø1 ~ Ø5	0.000 ~ -0.020
Ø6 ~ Ø8	0.000 ~ -0.025
Ø10 ~ Ø20	0.000 ~ -0.030

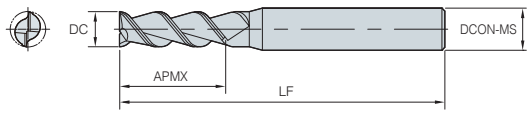


그림 1

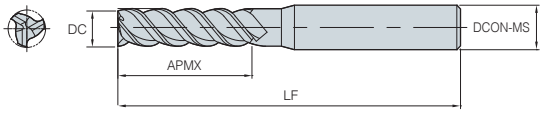


그림 2

(mm)

형 번		DC	DCON-MS	APMX	LF	그림
APLFE	2030-060	3	6	12	60	1
	2040-060	4	6	16	60	1
	2050-060	5	6	20	60	1
	2060-075	6	6	25	75	1
	2080-075	8	8	32	75	1
	2100-100	10	10	45	100	1
	2120-100	12	12	45	100	1
	2160-150	16	16	65	150	1
	2200-150	20	20	75	150	1
	3030-060	3	6	12	60	2
	3040-060	4	6	16	60	2
	3050-060	5	6	20	60	2
	3060-075	6	6	25	75	2
	3080-075	8	8	32	75	2
	3100-100	10	10	45	100	2
	3120-100	12	12	45	100	2
	3160-150	16	16	65	150	2
	3200-150	20	20	75	150	2

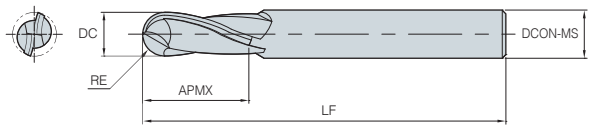
APBE2000

2날 볼

2 | H·A 25° | h6 shank | 재종 H05S

DC	공구직경공차
Ø1 ~ Ø5	0.000 ~ -0.020
Ø6 ~ Ø8	0.000 ~ -0.025
Ø10 ~ Ø20	0.000 ~ -0.030





(mm)

형 번		DC	DCON-MS	APMX	LF	RE
APBE	2010-050	1	4	2	50	0.5
	2015-050	1.5	4	3	50	0.75
	2020-050	2	4	4	50	1
	2025-050	2.5	4	5	50	1.25
	2030-050	3	4	6	50	1.5
	2035-050	3.5	4	7	50	1.75
	2040-050	4	4	8	50	2
	2045-050	4.5	6	9	50	2.25
	2050-050	5	6	10	50	2.5
	2055-050	5.5	6	11	50	2.75
	2060-050	6	6	12	50	3
	2080-060	8	8	16	60	4
	2100-075	10	10	20	75	5
	2120-075	12	12	24	75	6

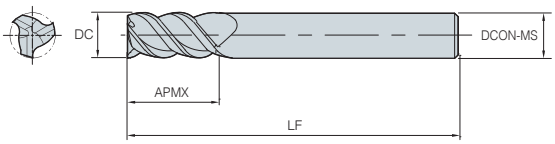
AFE3000

3날 숏 플랫

3 | H·A 45° | h6 shank | 재종 H05S

DC	공구직경공차
Ø1 ~ Ø12	0.000 ~ -0.020
Ø16 ~ Ø20	0.000 ~ -0.030







(mm)

형 번		DC	DCON-MS	APMX	LF
AFE	3010-040-V2S6	1	6	2	40
	3010-040-V2.5S6	1	6	2.5	40
	3015-040-V3S6	1.5	6	3	40
	3020-040-V3S6	2	6	3	40
	3030-045-V4S6	3	6	4	45
	3030-045-V8S6	3	6	8	45
	3040-045-V5S6	4	6	5	45
	3040-045-V8S6	4	6	8	45
	3040-045-V11S6	4	6	11	45
	3050-045-V6S6	5	6	6	45
	3060-050-V7S6	6	6	7	50
	3060-050-V13S6	6	6	13	50
	3080-060-V9S8	8	8	9	60
	3080-060-V19S8	8	8	19	60
	3100-065-V11S10	10	10	11	65
	3100-065-V22S10	10	10	22	65
	3120-070-V13S12	12	12	13	70
	3120-070-V26S12	12	12	26	70
	3160-090-V18S16	16	16	18	90
	3160-090-V32S16	16	16	32	90
	3200-090-V22S20	20	20	22	90
	3200-090-V38S20	20	20	38	90

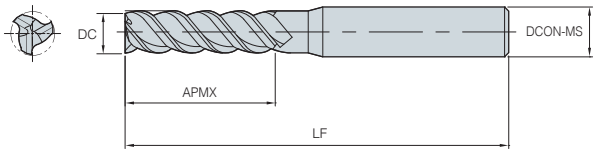
AFE3000

3날 플랫

3 | H·A 45° | h6 shank | 재종 H05S

DC	공구직경공차
Ø1 ~ Ø12	0.000 ~ -0.020
Ø16 ~ Ø20	0.000 ~ -0.030







(mm)

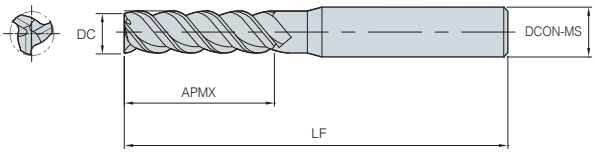
형 번		DC	DCON-MS	APMX	LF
AFE	3010-050-V3S6	1	6	3	50
	3015-050-V5S6	1.5	6	5	50
	3020-050-V6S6	2	6	6	50
	3030-055-V11S6	3	6	11	55
	3040-055-V13S6	4	6	13	55
	3050-055-V17S6	5	6	17	55
	3060-060-V17S6	6	6	17	60
	3080-070-V22S8	8	8	22	70
	3100-075-V27S10	10	10	27	75
	3120-080-V32S12	12	12	32	80
	3160-100-V42S16	16	16	42	100
	3200-100-V48S20	20	20	48	100

AFE3000

3날 롱 플랫







3 | H·A 45° | h6 shank | 재종 H05S

DC	공구직경공차
Ø1 ~ Ø12	0.000 ~ -0.020
Ø16 ~ Ø20	0.000 ~ -0.030

(mm)

형 번		DC	DCON-MS	APMX	LF
AFE	3010-060-V4S6	1	6	4	60
	3010-060-V6S6	1	6	6	60
	3015-060-V6S6	1.5	6	6	60
	3015-060-V8S6	1.5	6	8	60
	3015-060-V10S6	1.5	6	10	60
	3020-060-V8S6	2	6	8	60
	3020-060-V10S6	2	6	10	60
	3020-060-V12S6	2	6	12	60
	3030-065-V15S6	3	6	15	65
	3030-070-V20S6	3	6	20	70
	3030-075-V25S6	3	6	25	75
	3030-080-V30S6	3	6	30	80
	3040-065-V16S6	4	6	16	65
	3040-070-V20S6	4	6	20	70
	3040-075-V26S6	4	6	26	75
	3040-080-V30S6	4	6	30	80
	3060-060-V22S6	6	6	22	60
	3060-070-V25S6	6	6	25	70
	3060-075-V30S6	6	6	30	75
	3060-080-V35S6	6	6	35	80
	3060-090-V42S6	6	6	42	90
	3060-100-V50S6	6	6	50	100
	3080-080-V28S8	8	8	28	80
	3080-080-V30S8	8	8	30	80
	3080-085-V35S8	8	8	35	85
	3080-090-V40S8	8	8	40	90
	3080-095-V45S8	8	8	45	95
	3080-100-V50S8	8	8	50	100
	3080-105-V55S8	8	8	55	105
	3080-110-V65S8	8	8	65	110
	3100-090-V32S10	10	10	32	90
	3100-090-V35S10	10	10	35	90
	3100-090-V40S10	10	10	40	90
	3100-100-V45S10	10	10	45	100
	3100-100-V50S10	10	10	50	100

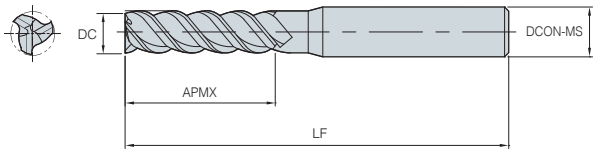
AFE3000

3날 롱 플랫

3 | H·A 45° | h6 shank | 재종 H05S

DC	공구직경공차
Ø1 ~ Ø12	0.000 ~ -0.020
Ø16 ~ Ø20	0.000 ~ -0.030







(mm)

형 번		DC	DCON-MS	APMX	LF
AFE	3100-110-V55S10	10	10	55	110
	3100-110-V60S10	10	10	60	110
	3100-120-V65S10	10	10	65	120
	3120-095-V40S12	12	12	40	95
	3120-100-V45S12	12	12	45	100
	3120-100-V50S12	12	12	50	100
	3120-110-V55S12	12	12	55	110
	3120-110-V60S12	12	12	60	110
	3120-120-V65S12	12	12	65	120
	3120-120-V70S12	12	12	70	120
	3120-135-V75S12	12	12	75	135
	3160-105-V52S16	16	16	52	105
	3160-110-V55S16	16	16	55	110
	3160-130-V65S16	16	16	65	130
	3160-150-V75S16	16	16	75	150
	3160-160-V85S16	16	16	85	160
	3160-180-V95S16	16	16	95	180
	3160-190-V105S16	16	16	105	190
	3160-200-V115S16	16	16	115	200
	3200-110-V55S20	20	20	55	110
	3200-130-V65S20	20	20	65	130
	3200-150-V75S20	20	20	75	150
	3200-160-V85S20	20	20	85	160
	3200-180-V95S20	20	20	95	180
	3200-190-V105S20	20	20	105	190
	3200-200-V115S20	20	20	115	200
	3200-220-V125S20	20	20	125	220

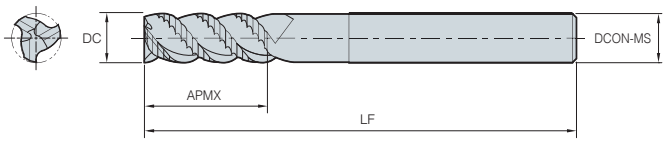
APRE3000

3날 러핑

DC	공구직경공차
Ø1 ~ Ø8	0.000 ~ -0.070
Ø8.5 ~ Ø25	0.000 ~ -0.010







(mm)

형 번		DC	DCON-MS	APMX	LF
APRE	3040-050	4	6	8	50
	3050-050	5	6	13	50
	3060-050	6	6	15	50
	3065-060	6.5	8	16	60
	3070-060	7	8	16	60
	3075-060	7.5	8	20	60
	3080-060	8	8	20	60
	3085-075	8.5	10	20	75
	3090-075	9	10	20	75
	3095-075	9.5	10	22	75
	3100-075	10	10	25	75
	3110-075	11	12	30	75
	3120-075	12	12	30	75
	3130-075	13	14	30	75
	3140-075	14	16	32	75
	3150-075	15	16	32	75
	3160-100	16	16	35	100
	3170-100	17	20	35	100
	3180-100	18	20	35	100
	3200-100	20	20	45	100
	3250-105	25	25	50	105

RPAE3000

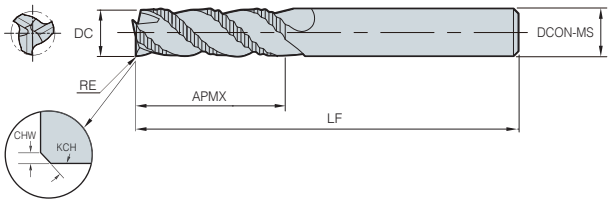
3날 웨이브 러핑

3 | H·A 45° | h6 shank | 재종 FN30T

DC	공구직경공차
Ø6 ~ Ø10	0.000 ~ -0.058
Ø11 ~ Ø18	0.000 ~ -0.070
Ø20 ~ Ø25	0.000 ~ -0.084







(mm)

형 번		DC	DCON-MS	APMX	LF	KCH	CHW
RPAE	3060-063	6	6	18	63	45°	0.3
	3070-063	7	8	23	63	45°	0.3
	3080-063	8	8	23	63	45°	0.3
	3090-080	9	10	30	80	45°	0.3
	3100-080	10	10	30	80	45°	0.3
	3110-080	11	12	32	80	45°	0.5
	3120-080	12	12	32	80	45°	0.5
	3140-080	14	14	32	80	45°	0.5
	3160-105	16	16	48	105	45°	0.5
	3180-105	18	18	48	105	45°	0.5
	3200-105	20	20	50	105	45°	0.5
	3250-105	25	25	50	105	45°	0.5

다이아몬드 코팅 엔드밀 시리즈

D Endmill

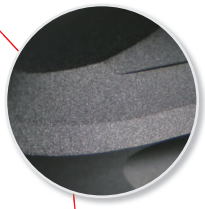
- 탄젠셜 컷팅 엣지 형상 구현으로 가공 면조도 우수
- 고경도 다이아몬드 코팅 적용해 공구 수명 증가
- 최적의 인선형상 적용으로 절삭성 우수

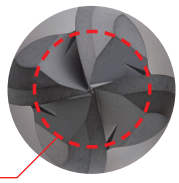
형번표기법

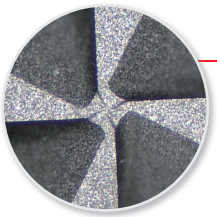
D	FE	2	030	-	080	-	N200	S04
D Endmill	구분	날수	인경		전장		유효장 목부길이	샹크직경
	F : Flat Endmill B : Ball Endmill	2: 2날						

특징

- **탄젠셜 컷팅 엣지 형상**
  - One–Pass grinding 방식 적용
  - 가공면 단차 발생 방지 가공 면조도 우수
  - D Endmill 볼 타입 2날, 4날에 적용







- **센터매치 볼 형상(4날)**
  - 고이송 가공에 적합한 볼 포인트 형상
  - 강성 보완 및 가공 면조도 우수

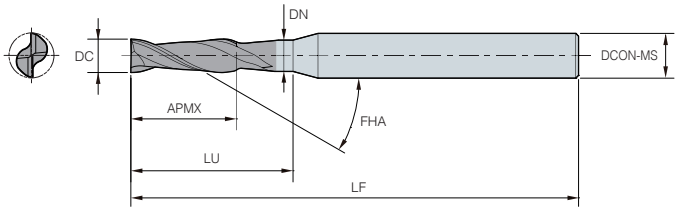
DFE2000

플랫

2 | H·A 30° | h6 shank | 재종 ND3000

DC	공구직경공차
Ø0.2 ~ Ø5	0.000 ~ -0.020
Ø6 ~ Ø12	0.000 ~ -0.030







(mm)

형 번		DC	DCON-MS	APMX	LU	LF	DN
DFE	2002-045-N004S04	0.2	4	0.4	-	45	-
	2003-045-N006S04	0.3	4	0.6	-	45	-
	2004-045-N008S04	0.4	4	0.8	-	45	-
	2005-045-N010S04	0.5	4	1	-	45	-
	2006-045-N012S04	0.6	4	1.2	-	45	-
	2007-045-N015S04	0.7	4	1.5	-	45	-
	2008-045-N020S04	0.8	4	2	-	45	-
	2009-045-N025S04	0.9	4	2.5	-	45	-
	2010-045-N030S04	1	4	3	-	45	0.95
	2010-045-N050S04	1	4	3	5	45	0.95
	2010-060-N050S04	1	4	3	5	60	0.95
	2010-060-N100S04	1	4	3	10	60	0.95
	2010-060-N150S04	1	4	3	15	60	0.95
	2010-060-N200S04	1	4	3	20	60	0.95
	2010-060-N250S04	1	4	3	25	60	0.95
	2015-060-N050S04	1.5	4	4	5	60	1.425
	2015-060-N060S04	1.5	4	4	6	60	1.425
	2015-060-N100S04	1.5	4	4	10	60	1.425
	2015-060-N150S04	1.5	4	4	15	60	1.425
	2015-060-N200S04	1.5	4	4	20	60	1.425
	2015-060-N250S04	1.5	4	4	25	60	1.425
	2020-045-N060S04	2	4	6	-	45	1.9
	2020-045-N080S04	2	4	6	8	45	1.9
	2020-080-N080S04	2	4	6	8	80	1.9
	2020-080-N100S04	2	4	6	10	80	1.9
	2020-080-N120S04	2	4	6	12	80	1.9
	2020-080-N150S04	2	4	6	15	80	1.9
	2020-080-N200S04	2	4	6	20	80	1.9

형 번		DC	DCON-MS	APMX	LU	LF	DN
DFE	2020-080-N250S04	2	4	6	25	80	1.9
	2020-080-N300S04	2	4	6	30	80	1.9
	2020-080-N400S04	2	4	6	40	80	1.9
	2030-050-N100S06	3	6	9	10	50	2.85
	2030-080-N100S04	3	4	9	10	80	2.85
	2030-080-N120S04	3	4	9	12	80	2.85
	2030-080-N200S04	3	4	9	20	80	2.85
	2030-080-N250S04	3	4	9	25	80	2.85
	2030-080-N300S04	3	4	9	30	80	2.85
	2030-080-N400S04	3	4	9	40	80	2.85
	2040-050-N120S06	4	6	12	-	50	2.85
	2040-050-N160S06	4	6	12	16	50	3.8
	2040-080-N160S04	4	4	12	16	80	3.8
	2050-060-N150S06	5	6	15	-	60	4.75
	2050-060-N200S06	5	6	15	20	60	4.75
	2050-110-N200S06	5	6	15	20	110	4.75
	2060-060-N180S06	6	6	18	-	60	6
	2060-110-N250S06	6	6	18	25	110	5.7
	2060-150-N250S06	6	6	18	25	150	5.7
	2080-070-N250S08	8	8	25	-	70	8
	2080-150-N400S08	8	8	25	40	150	7.6
	2100-080-N300S10	10	10	30	-	80	10
	2100-150-N500S10	10	10	30	50	150	9.5
	2100-160-N500S10	10	10	30	50	160	9.5
	2120-080-N250S12	12	12	25	-	80	12
	2120-080-N350S12	12	12	35	-	80	12
	2120-150-N600S12	12	12	35	60	150	11.4
	2120-160-N600S12	12	12	35	60	160	11.4

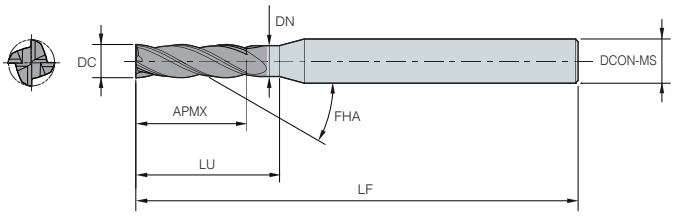
DFE4000

플랫

4 | H·A 30° | h6 shank | 재종 ND3000

DC	공구직경공차
Ø2 ~ Ø4	0.000 ~ -0.020
Ø6 ~ Ø12	0.000 ~ -0.030







(mm)

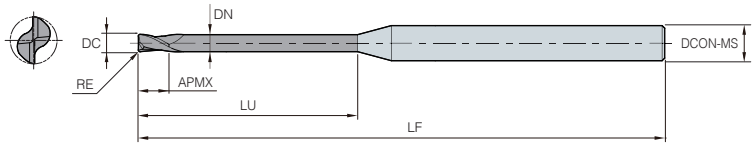
형 번		DC	DCON-MS	APMX	LU	LF	DN
DFE	4020-045-N060S04	2	4	6	8	45	1.9
	4020-060-N100S04	2	4	10	12	60	1.9
	4030-050-N100S06	3	6	10	12	50	2.85
	4030-060-N150S03	3	3	15	-	60	2.85
	4030-060-N150S04	3	4	15	18	60	2.85
	4040-050-N120S06	4	6	12	-	50	2.85
	4040-050-N150S06	4	6	15	18	50	3.8
	4040-080-N200S04	4	4	20	-	80	4
	4060-060-N180S06	6	6	18	-	60	6
	4060-110-N300S06	6	6	30	-	110	6
	4060-150-N300S06	6	6	30	-	150	6
	4080-070-N250S08	8	8	25	-	70	8
	4080-110-N400S08	8	8	40	-	110	8
	4080-150-N400S08	8	8	40	-	150	8
	4100-080-N250S10	10	10	25	-	80	10
	4100-110-N400S10	10	10	40	-	110	10
	4100-150-N500S10	10	10	50	-	150	10
	4120-080-N300S12	12	12	30	-	80	12
	4120-110-N400S12	12	12	40	-	110	12
	4120-110-N450S12	12	12	45	-	110	12
	4120-150-N500S12	12	12	50	-	150	12
	4120-150-N550S12	12	12	55	-	150	12

DRE2000

레디우스







2	H·A 30°	h6 shank	재종 ND3000

DC	공구직경공차
ALL	0.000 ~ -0.020

(mm)

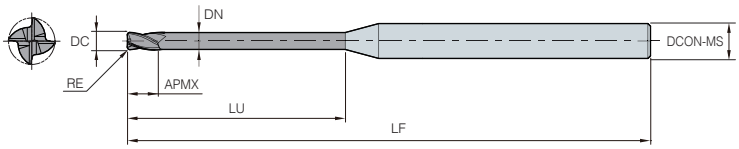
형 번		DC	DCON-MS	APMX	LU	LF	RE	DN
DRE	2005-060-N050S04-R005	0.5	4	1	5	60	0.05	-
	2005-060-N080S04-R005	0.5	4	1	8	60	0.05	-
	2005-060-N100S04-R005	0.5	4	1	10	60	0.05	-
	2006-060-N060S04-R005	0.6	4	1.2	6	60	0.05	-
	2006-060-N090S04-R005	0.6	4	1.2	9	60	0.05	-
	2006-060-N120S04-R005	0.6	4	1.2	12	60	0.05	-
	2008-060-N040S04-R005	0.8	4	1.6	4	60	0.05	-
	2008-060-N080S04-R005	0.8	4	1.6	8	60	0.05	-
	2008-060-N100S04-R005	0.8	4	1.6	10	60	0.05	-
	2010-060-N050S04-R005	1	4	2	5	60	0.05	-
	2010-060-N100S04-R005	1	4	2	10	60	0.05	-
	2010-060-N100S04-R02	1	4	2	10	60	0.2	-
	2010-060-N150S04-R02	1	4	2	15	60	0.2	-
	2010-060-N200S04-R005	1	4	2	20	60	0.05	-
	2010-060-N200S04-R02	1	4	2	20	60	0.2	-
	2015-060-N050S04-R005	1.5	4	3	5	60	0.05	-
	2015-060-N100S04-R005	1.5	4	3	10	60	0.05	-
	2015-060-N150S04-R005	1.5	4	3	15	60	0.05	-
	2015-060-N150S04-R02	1.5	4	3	15	60	0.2	-
	2015-060-N200S04-R005	1.5	4	3	20	60	0.05	-
	2015-060-N200S04-R02	1.5	4	3	20	60	0.2	-
	2020-060-N120S04-R02	2	4	3.5	12	60	0.2	-
	2020-060-N120S04-R03	2	4	3.5	12	60	0.3	-
	2020-060-N180S04-R03	2	4	3.5	18	60	0.3	-
	2020-060-N250S04-R02	2	4	3.5	25	60	0.2	-
	2020-060-N250S04-R03	2	4	3.5	25	60	0.3	-
	2020-060-N300S04-R02	2	4	3.5	30	60	0.2	-
	2020-060-N300S04-R03	2	4	3.5	30	60	0.3	-
	2030-080-N100S04-R02	3	4	4	10	80	0.2	-
	2030-080-N200S04-R02	3	4	4	20	80	0.2	-
	2030-080-N200S04-R03	3	4	4	20	80	0.3	-
	2030-080-N300S04-R02	3	4	4	30	80	0.2	-
	2030-080-N400S04-R02	3	4	4	40	80	0.2	-
	2030-080-N400S04-R03	3	4	4	40	80	0.3	-

DRE4000

레디우스







4	H·A 30°	h6 shank	재종 ND3000

DC	공구직경공차
Ø0.2 ~ Ø4	0.000 ~ -0.020
Ø6 ~ Ø12	0.000 ~ -0.030

(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE	DN
DRE	4020-060-N120S04-R03	2	4	3.5	12	60	0.3	-
	4020-060-N180S04-R02	2	4	3.5	18	60	0.2	-
	4020-060-N180S04-R03	2	4	3.5	18	60	0.3	-
	4020-060-N250S04-R02	2	4	3.5	25	60	0.2	-
	4020-060-N250S04-R03	2	4	3.5	25	60	0.3	-
	4020-060-N300S04-R02	2	4	3.5	30	60	0.2	-
	4020-060-N300S04-R03	2	4	3.5	30	60	0.3	-
	4030-080-N100S04-R05	3	4	4	10	80	0.5	-
	4030-080-N200S04-R03	3	4	4	20	80	0.3	-
	4030-080-N200S04-R05	3	4	4	20	80	0.5	-
	4030-080-N300S04-R03	3	4	4	30	80	0.3	-
	4030-080-N300S04-R05	3	4	4	30	80	0.5	-
	4030-080-N400S04-R03	3	4	4	40	80	0.3	-
	4030-080-N400S04-R05	3	4	4	40	80	0.5	-
	4040-100-N200S04-R03	4	4	6	20	100	0.3	-
	4060-110-N250S06-R03	6	6	9	25	110	0.3	-
	4060-110-N250S06-R05	6	6	9	25	110	0.5	-
	4060-150-N300S06-R05	6	6	9	30	150	0.5	-
	4080-110-N300S08-R03	8	8	12	30	110	0.3	-
	4080-110-N300S08-R05	8	8	12	30	110	0.5	-
	4080-150-N400S08-R05	8	8	12	40	150	0.5	-
	4100-110-N350S10-R05	10	10	15	35	110	0.5	-
	4100-160-N450S10-R05	10	10	15	45	160	0.5	-
	4120-110-N400S12-R05	12	12	18	40	110	0.5	-
	4120-160-N450S12-R05	12	12	18	45	160	0.5	-

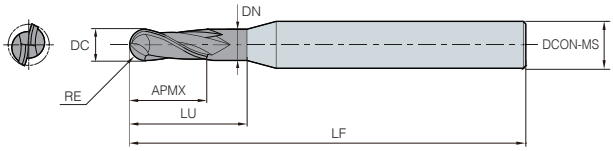
DBE2000

볼

2 | H·A 30° | h6 shank | 재종 ND3000

DC	공구직경공차
Ø0.3 ~ Ø5	0.000 ~ -0.020
Ø6 ~ Ø12	0.000 ~ -0.030







(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE	DN
DBE	2003-045-N012S04	0.3	4	1.2	-	45	0.15	-
	2003-045-N020S04	0.3	4	1.2	2	45	0.15	-
	2004-045-N015S04	0.4	4	1.5	-	45	0.2	-
	2004-045-N020S04	0.4	4	1.5	2	45	0.2	-
	2004-045-N030S04	0.4	4	1.5	3	45	0.2	-
	2004-045-N040S04	0.4	4	1.5	4	45	0.2	-
	2004-045-N050S04	0.4	4	1.5	5	45	0.2	-
	2005-045-N020S04	0.5	4	2	-	45	0.25	-
	2005-045-N030S04	0.5	4	2	3	45	0.25	-
	2005-045-N040S04	0.5	4	2	4	45	0.25	-
	2005-045-N050S04	0.5	4	2	5	45	0.25	-
	2005-045-N060S04	0.5	4	2	6	45	0.25	-
	2006-045-N020S04	0.6	4	2	2	45	0.3	0.6
	2006-045-N030S04	0.6	4	2	3	45	0.3	0.6
	2006-045-N040S04	0.6	4	2	4	45	0.3	0.57
	2006-045-N050S04	0.6	4	2	5	45	0.3	0.57
	2006-045-N060S04	0.6	4	2	6	45	0.3	0.57
	2006-045-N080S04	0.6	4	2	8	45	0.3	0.57
	2006-045-N100S04	0.6	4	2	10	45	0.3	0.57
	2008-045-N030S04	0.8	4	2.5	3	45	0.4	0.76
	2008-045-N040S04	0.8	4	2.5	4	45	0.4	0.76
	2008-045-N050S04	0.8	4	2.5	5	45	0.4	0.76
	2008-045-N060S04	0.8	4	2.5	6	45	0.4	0.76
	2008-045-N080S04	0.8	4	2.5	8	45	0.4	0.76
	2008-045-N100S04	0.8	4	2.5	10	45	0.4	0.76
	2010-060-N030S04	1	4	3	3	60	0.5	0.95
	2010-060-N040S04	1	4	3	4	60	0.5	0.95
	2010-060-N050S04	1	4	3	5	60	0.5	0.95
	2010-060-N060S04	1	4	3	6	60	0.5	0.95
	2010-060-N080S04	1	4	3	8	60	0.5	0.95
	2010-060-N100S04	1	4	3	10	60	0.5	0.95
	2010-060-N120S04	1	4	3	12	60	0.5	0.95
	2010-060-N150S04	1	4	3	15	60	0.5	0.95
	2010-060-N200S04	1	4	3	20	60	0.5	0.95
	2010-080-N250S04	1	4	3	25	80	0.5	0.95
	2010-080-N300S04	1	4	3	30	80	0.5	0.95
	2010-080-N350S04	1	4	3	35	80	0.5	0.95
	2010-080-N400S04	1	4	3	40	80	0.5	0.95
	2015-060-N050S04	1.5	4	4	5	60	0.75	1.425
	2015-060-N080S04	1.5	4	4	8	60	0.75	1.425
	2015-080-N100S04	1.5	4	4	10	80	0.75	1.425
	2015-080-N120S04	1.5	4	4	12	80	0.75	1.425
	2015-080-N150S04	1.5	4	4	15	80	0.75	1.425
	2015-080-N180S04	1.5	4	4	18	80	0.75	1.425
	2015-080-N200S04	1.5	4	4	20	80	0.75	1.425
	2015-080-N250S04	1.5	4	4	25	80	0.75	1.425
	2015-080-N300S04	1.5	4	4	30	80	0.75	1.425
	2015-080-N350S04	1.5	4	4	35	80	0.75	1.425
	2015-080-N400S04	1.5	4	4	40	80	0.75	1.425
	2020-060-N060S04	2	4	6	-	60	1	1.9
	2020-060-N080S04	2	4	6	8	60	1	1.9
	2020-080-N100S04	2	4	6	10	80	1	1.9
	2020-080-N150S04	2	4	6	15	80	1	1.9
	2020-080-N200S04	2	4	6	20	80	1	1.9
	2020-080-N250S04	2	4	6	25	80	1	1.9
	2020-080-N300S04	2	4	6	30	80	1	1.9
	2020-080-N350S04	2	4	6	35	80	1	1.9
	2020-100-N400S04	2	4	6	40	100	1	1.9
	2020-100-N450S04	2	4	6	45	100	1	1.9
	2020-100-N500S04	2	4	6	50	100	1	1.9
	2020-100-N600S04	2	4	6	60	100	1	2.85
	2030-060-N100S04	3	4	9	10	60	1.5	2.85
	2030-100-N150S04	3	4	9	15	100	1.5	2.85
	2030-100-N150S06	3	6	9	15	100	1.5	2.85
	2030-100-N200S04	3	4	9	20	100	1.5	2.85
	2030-100-N250S04	3	4	9	25	100	1.5	2.85
	2030-100-N300S04	3	4	9	30	100	1.5	2.85
	2030-100-N350S04	3	4	9	35	100	1.5	2.85
	2030-100-N400S04	3	4	9	40	100	1.5	2.85
	2030-100-N500S04	3	4	9	50	100	1.5	2.85
	2030-100-N600S04	3	4	9	60	100	1.5	2.85
	2040-060-N160S04	4	4	12	16	60	2	3.8

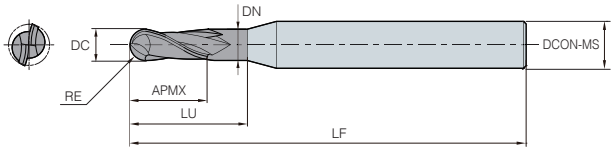
DBE2000

볼

2 | H·A 30° | h6 shank | 재종 ND3000

DC	공구직경공차
Ø0.3 ~ Ø5	0.000 ~ -0.020
Ø6 ~ Ø12	0.000 ~ -0.030







(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE	DN
DBE	2040-080-N160S04	4	4	12	16	80	2	3.8
	2040-080-N300S04	4	4	12	30	80	2	3.8
	2040-100-N160S04	4	4	12	16	100	2	3.8
	2040-100-N400S04	4	4	12	40	100	2	3.8
	2040-130-N160S04	4	4	12	16	130	2	3.8
	2040-130-N400S04	4	4	12	40	130	2	3.8
	2040-150-N160S04	4	4	12	16	150	2	3.8
	2040-150-N500S04	4	4	12	50	150	2	3.8
	2050-110-N200S06	5	6	15	20	110	2.5	4.75
	2060-080-N250S06	6	6	20	25	80	3	5.7
	2060-110-N250S06	6	6	20	25	110	3	5.7
	2060-110-N400S06	6	6	20	40	110	3	5.7
	2060-150-N300S06	6	6	20	30	150	3	5.7
	2060-150-N500S06	6	6	20	50	150	3	5.7
	2080-080-N300S08	8	8	25	30	80	4	7.6

형 번		DC	DCON-MS	APMX	LU	LF	RE	DN
DBE	2080-110-N300S08	8	8	25	30	110	4	7.6
	2080-110-N400S08	8	8	25	40	110	4	7.6
	2080-150-N500S08	8	8	25	50	150	4	7.6
	2080-200-N400S08	8	8	25	40	200	4	7.6
	2100-080-N400S10	10	10	30	40	80	5	9.5
	2100-110-N400S10	10	10	30	40	110	5	9.5
	2100-110-N500S10	10	10	30	50	110	5	9.5
	2100-150-N600S10	10	10	30	60	150	5	9.5
	2100-160-N600S10	10	10	30	60	160	5	9.5
	2100-200-N500S10	10	10	30	50	200	5	9.5
	2120-110-N500S12	12	12	35	50	110	6	11.4
	2120-150-N500S12	12	12	35	50	150	6	11.4
	2120-160-N500S12	12	12	35	50	160	6	11.4
	2120-200-N600S12	12	12	35	60	200	6	11.4

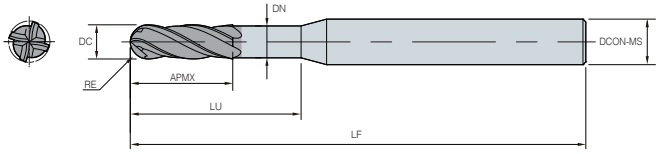
DBE4000

볼

4 | H·A 30° | h6 shank | 재종 ND3000

DC	공구직경공차
Ø1 ~ Ø4	0.000 ~ -0.020
Ø6 ~ Ø12	0.000 ~ -0.030







(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE	DN
DBE	4010-060-N030S04	1	4	3	-	60	0.5	-
	4010-060-N050S04	1	4	3	5	60	0.5	-
	4010-060-N100S04	1	4	3	10	60	0.5	-
	4010-060-N150S04	1	4	3	15	60	0.5	-
	4010-060-N200S04	1	4	3	20	60	0.5	-
	4010-060-N250S04	1	4	3	25	60	0.5	-
	4015-045-N040S04	1.5	4	4	-	45	0.75	-
	4015-050-N040S04	1.5	4	4	-	50	0.75	-
	4015-060-N100S04	1.5	4	4	10	60	0.75	-
	4015-060-N150S04	1.5	4	4	15	60	0.75	-
	4015-060-N200S04	1.5	4	4	20	60	0.75	-
	4015-060-N250S04	1.5	4	4	25	60	0.75	-
	4020-060-N080S04	2	4	6	8	60	1	1.9
	4020-080-N100S04	2	4	6	10	80	1	1.9
	4020-080-N200S04	2	4	6	20	80	1	1.9
	4020-080-N300S04	2	4	6	30	80	1	1.9
	4020-080-N400S04	2	4	6	40	80	1	1.9
	4030-060-N100S04	3	4	9	10	60	1.5	2.85
	4030-100-N150S04	3	4	9	15	100	1.5	2.85
	4030-100-N200S04	3	4	9	20	100	1.5	2.85
	4030-100-N300S04	3	4	9	30	100	1.5	2.85

형 번		DC	DCON-MS	APMX	LU	LF	RE	DN
DBE	4030-100-N400S04	3	4	9	40	100	1.5	2.85
	4030-100-N500S04	3	4	9	50	100	1.5	2.85
	4040-060-N160S04	4	4	12	16	60	2	-
	4040-080-N160S04	4	4	12	16	80	2	-
	4040-100-N160S04	4	4	12	16	100	2	-
	4040-130-N160S04	4	4	12	16	130	2	-
	4060-080-N250S06	6	6	20	25	80	3	-
	4060-110-N250S06	6	6	20	25	110	3	-
	4060-150-N300S06	6	6	20	30	150	3	-
	4080-080-N300S08	8	8	25	30	80	4	-
	4080-110-N300S08	8	8	25	30	110	4	-
	4080-150-N350S08	8	8	25	35	150	4	-
	4080-200-N400S08	8	8	25	40	200	4	-
	4100-080-N350S10	10	10	30	35	80	5	-
	4100-110-N350S10	10	10	30	35	110	5	-
	4100-150-N400S10	10	10	30	40	150	5	-
	4100-160-N400S10	10	10	30	40	160	5	-
	4100-200-N500S10	10	10	30	50	200	5	-
	4120-110-N500S12	12	12	35	50	110	6	-
	4120-150-N500S12	12	12	35	50	150	6	-
	4120-200-N600S12	12	12	35	60	200	6	-

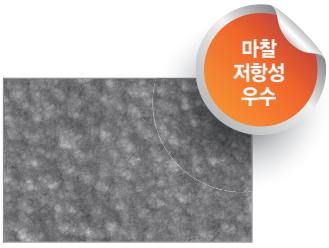
복합소재 가공용 라우터 엔드밀

Composite Router Endmill

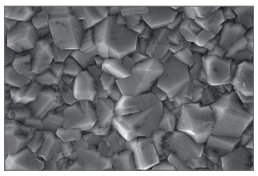
- 복합소재(CFRP, GFRP 등) 가공에 최적화된 라우터 엔드밀
- Nano-Crystalline 다이아몬드 코팅 적용으로 공구수명 우수
- 표면박리 & 버 발생 억제를 위한 형상설계
- 고능률 가공을 통한 생산성 향상

특징

- 복합소재 가공용 다이아몬드 코팅 재종 ND2100
- 고경도 다이아몬드 코팅(Hv 8,000이상) 적용
- Nano-Crystalline 다이아몬드 코팅 마찰저항성 및 내용착 우수
- 다이아몬드 코팅 전용 모재 적용 내박리성 향상



나노-다이아몬드 코팅


기존 다이아몬드 코팅

CCDR (Dual Helix Router Endmill)

- 상, 하면 표면박리 억제를 위한 듀얼헬릭스 적용
- 형상 윤곽, 홈, 정삭 가공용 엔드밀



CCHR (High-performance Router Endmill)

- 고능률 가공을 위한 멀티플루트 니크형상 적용
- 형상 윤곽, 홈, 황삭 가공용 엔드밀



CCR (Router Endmill)

- 낮은 진동 및 낮은 절상저항의 다운컷 형상설계
- 형상 윤곽, 홈, 황삭가공용 엔드밀



CCLR (Low Helix Router Endmill)

- 낮은 축방향 절삭저항으로 버 발생 억제
- 형상 윤곽, 막힌 홈, 정삭 가공용 엔드밀



CCRR (Reverse Helix Router Endmill)

- 좌비틀림 형상으로 피삭재 분리 억제
- 형상 윤곽, 관통 홈, 정삭 가공용 엔드밀



CCDR4000/6000

플랫

4 | 6 | H·A 30°-30° | h5 shank | 재종 ND2100

DC	공구직경공차
Ø6 ~ Ø12	0.000 ~ -0.030



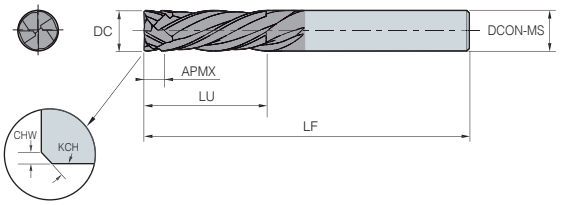


그림 1

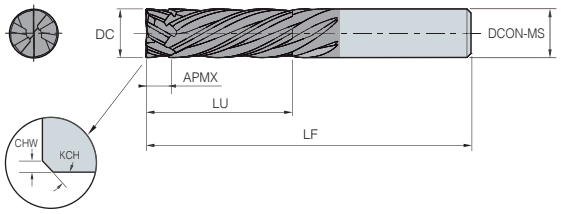


그림 2



(mm)

형 번		DC	DCON-MS	APMX	LU	LF	KCH	CHW	그림
CCDR	4060-065	6	6	3	18	65	45°	0.1	1
	4080-075	8	8	4	24	75	45°	0.2	1
	6100-085	10	10	5	30	85	45°	0.2	2
	6120-100	12	12	6	36	100	45°	0.2	2

CCHR4000/6000

플랫

4 | 6 | H·A 15° | h5 shank | 재종 ND2100

DC	공구직경공차
Ø6 ~ Ø12	0.000 ~ -0.050



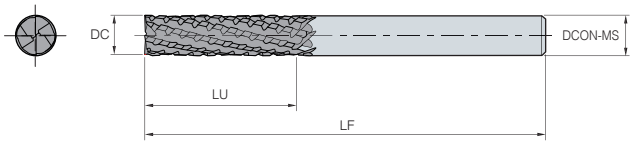


그림 1

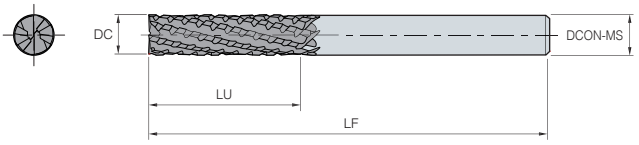


그림 2



(mm)

형 번		DC	DCON-MS	APMX	LF	그림
CCHR	4060-065	6	6	18	65	1
	4080-075	8	8	24	75	1
	6100-085	10	10	30	85	2
	6120-100	12	12	36	100	2

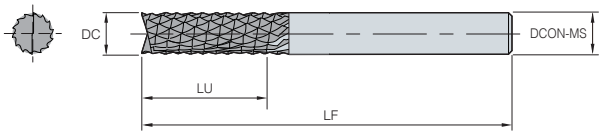
CCR2000

플랫

2 | H·A -27° | h5 shank | 재종 ND2100

DC	공구직경공차
Ø4 ~ Ø12	-0.020 ~ -0.080







(mm)

형 번		DC	DCON-MS	APMX	LF
CCR	2040-050	4	4	12	50
	2050-050	5	5	15	50
	2060-065	6	6	18	65
	2080-075	8	8	24	75
	2100-085	10	10	30	85
	2120-100	12	12	36	100

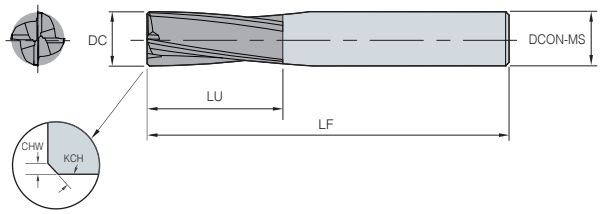
CCLR4000

플랫

4 | H·A 15° | h5 shank | 재종 ND2100

DC	공구직경공차
Ø4 ~ Ø12	0.000 ~ -0.030







(mm)

형 번		DC	DCON-MS	APMX	LF	KCH	CHW
CCLR	4040-050	4	4	12	50	45°	0.1
	4050-050	5	5	15	50	45°	0.1
	4060-065	6	6	18	65	45°	0.1
	4080-075	8	8	24	75	45°	0.2
	4100-085	10	10	30	85	45°	0.2
	4120-100	12	12	36	100	45°	0.2

CCRR6000/8000

플랫

6 | 8 | H·A -25° | h5 shank | 재종 ND2100

DC	공구직경공차
Ø6 ~ Ø12	0.000 ~ -0.030



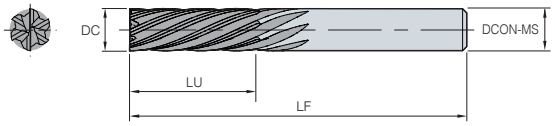


그림 1

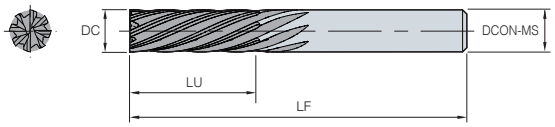


그림 2



(mm)

형 번		DC	DCON-MS	APMX	LF	그림
CCRR	6060-065	6	6	18	65	1
	6080-075	8	8	24	75	1
	8100-085	10	10	30	85	2
	8120-100	12	12	36	100	2

맞춤 대응을 통한 다양한 치아보철 피삭재 및 덴탈 밀링머신 적용 가능

T Endmill

- Zirconia, Titanium, Co-Cr, Wax, PMMA 등 치아보철 가공용 엔드밀
- 치아보철 종류별 맞춤 재종 대응으로 최적의 가공 성능 확보
- 인선 형상 최적화로 가공면 단차 발생 억지 및 가공 면조도 우수
- 가공기별 맞춤 형상 대응으로 차별화된 공구 제공

특징

T Z BE 2 030 - 050 - N100 S04 (Z-MATCH)

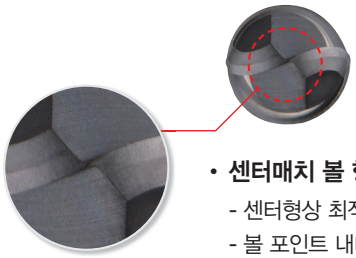
T	Z	BE	2	030	050	N100	S04	(Z-MATCH)
T Endmill	피삭재	구분	날수	공구직경	전장	넥장	자루경	가공기 메이커
	Z : Zirconia T : Ti/Co-Cr W : Wax/PMMA	BE : Ball Endmill FE : Flat Endmill RE : Radius Endmill	2 : 2Flute	030 : 3mm	050 : 50mm	N100 : 10mm	S04 : 4mm	

특징

- **가공 장비별 전용 공구 대응**
  - 다양화된 치과의료기기 시장의 요구 충족
- **피삭재별 맞춤 재종 대응**
  - 다양한 임플란트용 소재에서 최적의 가공 성능 확보
- **최적의 인선형상 적용**
  - 절삭성 우수

- **탄젠셜 컷팅 엣지 형상**
  - One-Pass grinding 방식 적용
  - 가공면 단차 발생 방지 가공 면조도 우수



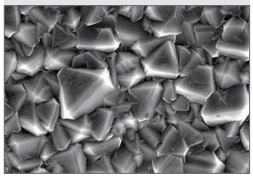


- **센터매치 볼 형상**
  - 센터형상 최적화로 볼 포인트 여유각 확보
  - 볼 포인트 내마모성 우수 및 절삭성 확보

Zirconia 가공용 재종

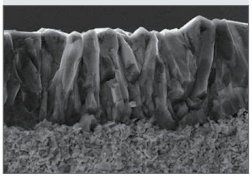
- ND3000 개발(다이아몬드 코팅 재종)
  - 흑연, 세라믹 가공에 우수한 고경도 다이아몬드 코팅
  - 우수한 코팅 밀착력으로 고속, 중(重) 절삭가공에 최적화

ND3000 표면



고경도(Hv 10,000) 다이아몬드 코팅 적용하여 내마모성 우수

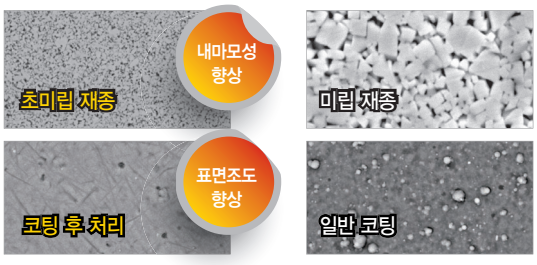
ND3000 코팅 단면



전용 모재 적용하여 밀착력 우수, 내박리성 향상

Titanium, Co-Cr 가공용 재종

- PC2510 개발(PVD 코팅 재종)
  - 향상된 표면 조도를 제공하는 코팅 후 처리 기술 적용
  - 초미립 고인성 모재를 적용하여 안정적인 인성을 바탕으로 고경도강의 단속 및 열충격이 큰 습식가공용에 최적화된 재종



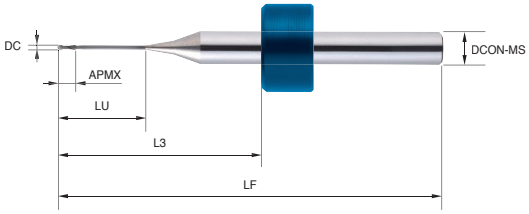
맞춤 공구 제작

• 멈춤링의 유무 및 기타 공구 제원의 경우 맞춤 주문 제작이 가능합니다

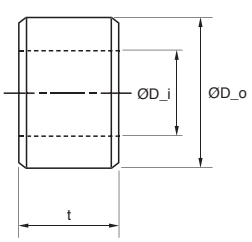
[Data Sheet]

가공기 메이커	
피삭재	
공구형상 구분	
공구직경 (DC)	
샹크직경 (DCON-MS)	
인 장 (APMX)	
유효길이 (LU)	
스탑링 위치 (L_3)	
전 장 (LF)	
스탑링 형태	

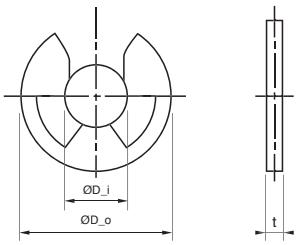
※ Data sheet를 작성하시어 인근 KORLOY 영업소로 발송하시면 맞춤 제작이 가능합니다



[멈춤 링 제원]



〈 플라스틱 링 〉



〈 E형 링 〉

(mm)

구 분	멈춤 링			샹크 직경		
	ØD_o	ØD_i	t	Ø3	Ø4	~ Ø6
플라스틱 링	Ø7.55	Ø3	4.45	●		
	Ø7.7	Ø4	5.0		●	
	Ø10.5	~ Ø6	6.5			●
E형 링	~ Ø6.0	Ø2.5	0.4	●		

※ 필요한 멈춤 링 제원을 작성하시어 인근 KORLOY 영업소로 발송하시면 맞춤 제작이 가능합니다

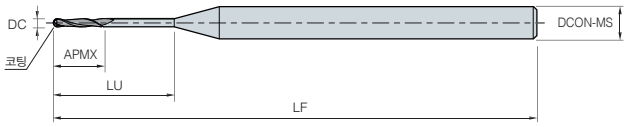
ROLAND Type

(DWX-30, DWX-50, DWX-51D, DWX-52D)

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø0.3 ~ Ø1 Ø2	0.000 ~ -0.015 0.000 ~ -0.020







(mm)

형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2003-050-N015S04(ROLAND)	-	0.3	4	1.5	20	50	DC/2
	2006-050-N12(ROLAND)	PVD	0.6	4	1.5	12	50	DC/2
	2010-050-N16(ROLAND)	DIA	1	4	2	16	50	DC/2
	2020-050-N20(ROLAND)	DIA	2	4	3	20	50	DC/2
TWBE	2010-050-N16(ROLAND)	-	1	4	2.2	16	50	DC/2
	2020-050-N20(ROLAND)	-	2	4	3.2	20	50	DC/2
ETRE	006050-S4M325-R	전착 DIA	0.6	4	10	10	50	DC/2
	010050-S4M170-R	전착 DIA	1	4	12	12	50	DC/2
	020050-S4M120-R	전착 DIA	2	4	17	17	50	DC/2

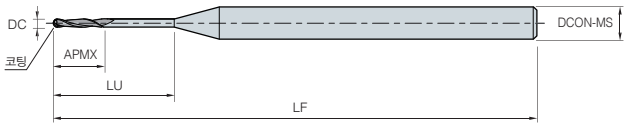
IMES-ICORE Type

(250i, 340i, 450i)

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø0.3 ~ Ø1 Ø2 ~ Ø13	0.000 ~ -0.015 0.000 ~ -0.020







(mm)

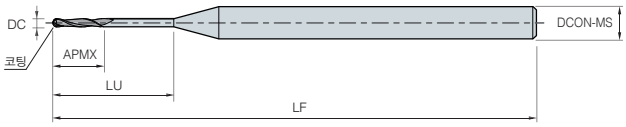
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2003-048-N015S03(450I)	PVD	0.3	3	1.8	3	48	DC/2
	2006-048-N080S03(450I)	PVD	0.6	3	1.5	8	48	DC/2
	2010-048-N14(450I)	DIA	1	3	4.5	14	48	DC/2
	2025-048-N20(450I)	DIA	2.5	3	6	20	48	DC/2
	2006-053-N090S06(450IS6)	PVD	0.6	6	3	9	53	DC/2
	2010-053-N142S06(450IS6)	DIA	1	6	4.5	14.2	53	DC/2
	2025-053-N201S06(450IS6)	DIA	2.5	6	7.5	20.1	53	DC/2
TWBE	2010-048-N140S03(250I340I450I)	-	1	3	4.5	14	48	DC/2
	2025-048-N200S03(250I340I450I)	-	2.5	3	6	20	48	DC/2
TTBE	2010-040-N090S03(450i)	PVD	1	3	2	9	40	DC/2
	2020-040-N120S03(450i)	PVD	2	3	4	12	40	DC/2
	2030-0385-N120S03(450i)	PVD	3	3	4	12	38.5	DC/2
ETND	006039-S3M325-T5(450i)	전착 DIA	10.3	3	10.3	10.3	39.8	DC/2
ETRE	010039-S3M230(450i)	전착 DIA	10.2	3	10.2	10.2	39.8	DC/2
	025039-S3M120(450i)	전착 DIA	13	3	13	13	39.8	DC/2

WIELAND SELECT Type

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0	0.000 ~ -0.015
Ø1.1 ~ Ø3.0	0.000 ~ -0.020







(mm)

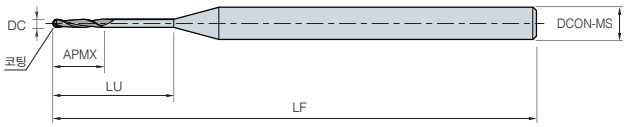
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2007-040-N145S03(WIELAND)	PVD	0.7	3	2.5	14.5	40	DC/2
	2010-040-N145S03(WIELAND)	DIA	1	3	4.5	14.5	40	DC/2
	2025-040-N200S03(WIELAND)	DIA	2.5	3	7.5	20	40	DC/2
TWBE	2010-040-N145S03(WIELAND)	-	1	3	4.5	14.5	40	DC/2
	2025-040-N200S03(WIELAND)	-	2.5	3	7.5	20	40	DC/2

WIELAND MINI Type

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0	0.000 ~ -0.015
Ø1.1 ~ Ø3.0	0.000 ~ -0.020







(mm)

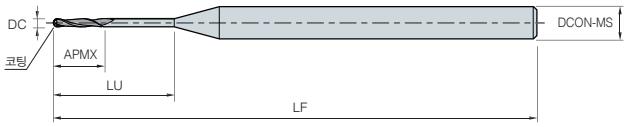
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2010-035-N140S03(WIELAND MINI)	-	1	3	4.5	14	35	DC/2
	2025-035-N200S03(WIELAND MINI)	-	2.5	3	6	20	35	DC/2

AMANN GIRRBACH Type (CERA-MILL)

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0 Ø1.1 ~ Ø3.0	0.000 ~ -0.015 0.000 ~ -0.020







(mm)

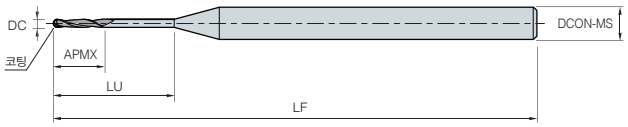
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2006-047-N135S03(CERAMILL)	PVD	0.6	3	2.4	13.5	47	DC/2
	2010-047-N165S03(CERAMILL)	DIA	1	3	2	16.5	47	DC/2
	2025-047-N180S03(CERAMILL)	DIA	2.5	3	4	18	47	DC/2
TWBE	2010-047-N165S03(CERAMILL)	-	1	3	2	16.5	47	DC/2
	2025-047-N180S03(CERAMILL)	-	2.5	3	4	18	47	DC/2

VHF-S1 Type

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0 Ø1.1 ~ Ø3.0	0.000 ~ -0.015 0.000 ~ -0.020







(mm)

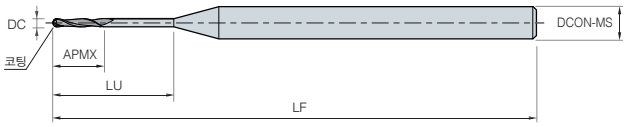
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2006-035-N030S03(VHF S1)	PVD	0.6	3	1.5	3	35	DC/2
	2010-040-N145S03(VHF S1)	DIA	1	3	5	14.5	40	DC/2
	2020-040-N160S03(VHF S1)	DIA	2	3	4	16	40	DC/2
TWBE	2010-040-N145S03(VHF S1)	-	1	3	5	14.5	40	DC/2
	2020-040-N160S03(VHF S1)	-	2	3	4	16	40	DC/2

VHF-K4/CM Type

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0	0.000 ~ -0.015
Ø1.1 ~ Ø3.0	0.000 ~ -0.020







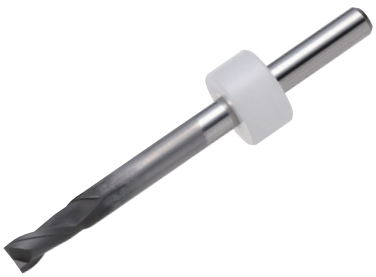
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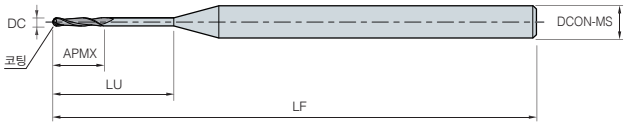
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TWBE	2006-035-N030S03(VHF K4)	-	0.6	3	1	3	35	DC/2
	2010-035-N160S03(VHF K4)	-	1	3	2	16	35	DC/2
	3020-035-N160S03(VHF K4)	-	2	3	4	16	35	DC/2

CHARLY Type

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0	0.000 ~ -0.015
Ø1.1 ~ Ø3.0	0.000 ~ -0.020







(mm)

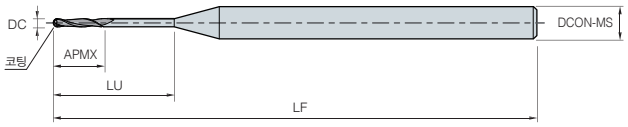
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2005-0385-N100S03(CHARLY)	PVD	0.5	3	1.5	10	38.5	DC/2
	2010-0385-N120S03(CHARLY)	DIA	1	3	2	12	38.5	DC/2
	2015-0385-N120S03(CHARLY)	DIA	1.5	3	3	12	38.5	DC/2
TZFE	2030-0385-N060S03(CHARLY)-DY	DIA	3	3	6	-	38.5	DC/2
TZBE	2010-0385-N120S03(CHARLY)-N	-	1	3	2	12	38.5	DC/2
	2015-0385-N120S03(CHARLY)-N	-	1.5	3	3	12	38.5	DC/2
	2030-0385-N060S03(CHARLY)-N	-	3	3	6	-	38.5	DC/2

ZIRKONZAHN M5 Type

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0	0.000 ~ -0.015
Ø1.1 ~ Ø3.0	0.000 ~ -0.020







(mm)

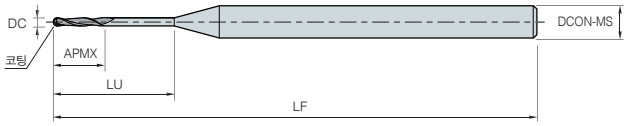
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2010-057-N120S03(ZIRKON)-DYD	DIA	1	3	6	12	57	DC/2
	2020-057-N180S03(ZIRKON)-DYD	DIA	2	3	10	18	57	DC/2
	2003-057-N060S03(ZIRKONZAHN)-DY	-	0.3	3	3	6	57	DC/2
	2005-057-N100S03(ZIRKONZHAN)-DY	-	0.5	3	3	10	57	DC/2
	2010-057-N120S03(ZIRKONZHAN)-DY	-	1	3	6	12	57	DC/2
	2020-057-N180S03(ZIRKONZHAN)-DY	-	2	3	10	18	57	DC/2

ZIRKONZAHN M1/M4 Type

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0	0.000 ~ -0.015
Ø1.1 ~ Ø3.0	0.000 ~ -0.020







(mm)

형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2005-050-N108S06(ZIRKON M1)	PVD	0.5	6	3.5	10.8	50	DC/2
	2010-050-N120S06(ZIRKON M1)	DIA	1	6	6	12	50	DC/2
	2020-050-N180S06(ZIRKON M1)	DIA	2	6	10	18	50	DC/2
	2005-050-N095S06(ZIRKON M1)	-	0.5	6	3	9.5	50	DC/2
	2010-050-N120S06(ZIRKON M1)-N	-	1	6	6	12	50	DC/2
	2020-050-N180S06(ZIRKON M1)-N	-	2	6	10	18	50	DC/2
TTBE	2010-050-N120S06(ZIRKON M1)	PVD	1	6	1	12	50	DC/2
	2020-050-N120S06(ZIRKON M1)	PVD	2	6	3	12	50	DC/2
	2030-050-N180S06(ZIRKON M1)	PVD	3	6	4	18	50	DC/2

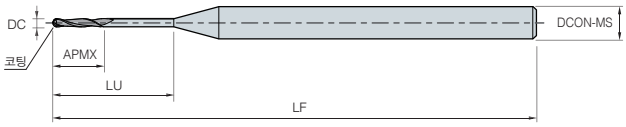
SIRONA Type

(MC-X5)

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0	0.000 ~ -0.015
Ø1.1 ~ Ø3.0	0.000 ~ -0.020







(mm)

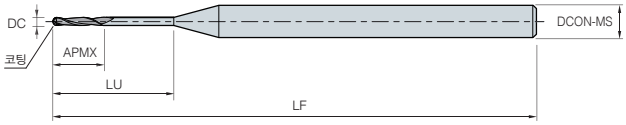
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2005-042-N060S03(MC-X5)	PVD	0.5	3	1	6	42	DC/2
	2010-043-N170S03(MC-X5)	DIA	1	3	3	17	43	DC/2
	4025-044-N240S03(MC-X5)	DIA	2.5	3	5	24	44	DC/2
TWBE	2010-043-N170S03(MC-X5)	-	1	3	3	17	43	DC/2
	2025-044-N240S3(MC-X5)	-	2.5	3	5	24	44	DC/2

YENA Type

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0	0.000 ~ -0.015
Ø1.1 ~ Ø3.0	0.000 ~ -0.020







(mm)

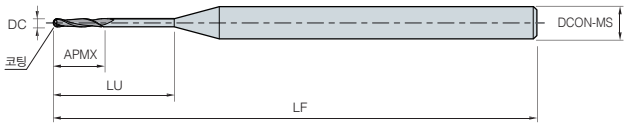
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2010-045-N160S04(YENA)-DY	DIA	1	4	3	16	45	DC/2
	2020-045-N160S04(YENA)-DY	DIA	2	4	3	16	45	DC/2
TWBE	2010-045-N160S04(YENA)-DY	-	1	4	3	16	45	DC/2
	2020-045-N160S04(YENA)-DY	-	2	4	3	16	45	DC/2
TTBE	2020-045-N122S04(YENA)	PVD	2	4	3.6	12.2	45	DC/2
	2030-045-N125S04(YENA)	PVD	3	4	5.5	12.5	45	DC/2

LEZIRTH Type

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0	0.000 ~ -0.015
Ø1.1 ~ Ø3.0	0.000 ~ -0.020







(mm)

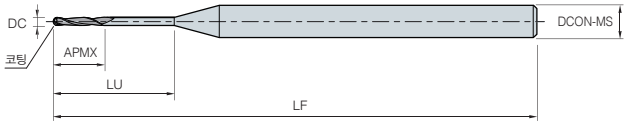
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TTBE	2010-050-V1.2N8S6	PVD	1	6	1.2	8	50	DC/2
	2015-045-V1.7N8.5S6	PVD	1.5	6	1.7	8.5	45	DC/2
TTE	2020-050-V2.2N12S6	PVD	2	6	2.2	12	50	DC/2
	2030-060-V3.5N16S6	PVD	3	6	3.5	16	60	DC/2

ARUM Type (4X/5X-100)

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0	0.000 ~ -0.015
Ø1.1 ~ Ø3.0	0.000 ~ -0.020







(mm)

형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2006-063-N120S06(4X-100)	PVD	0.6	6	1.5	12	63	DC/2
	2010-063-N160S06(4X-100)	DIA	1	6	2.5	16	63	DC/2
	2020-063-N200S06(4X-100)	DIA	2	6	6	20	63	DC/2
TWBE	2010-063-N160S06(4X-100)	-	1	6	2.5	16	63	DC/2
	2020-063-N200S06(4X-100)	-	2	6	6	20	63	DC/2

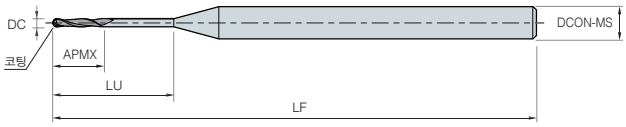
ARUM Type

(5X–150)

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0 Ø1.1 ~ Ø3.0	0.000 ~ -0.015 0.000 ~ -0.020







(mm)

형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2006-045-N100S04(5X-100)	PVD	0.6	4	1.5	10	45	DC/2
	2010-050-N161S04(5X-100)-K	DIA	1	4	2.5	16.1	50	DC/2
	2020-050-N181S04(5X-100)	DIA	2	4	6.5	18.1	50	DC/2
TWBE	2010-050-N161S04(5X-100)	-	1	4	2.5	16.1	50	DC/2
	2020-050-N181S04(5X-100)	-	2	4	6.5	18.1	50	DC/2
ETND	006041-C4M325-T7	전착 DIA	0.6	4	8	8	41	DC/2
	010044-C4M170	전착 DIA	1	4	10	10	44	DC/2
	015044-C4M140	전착 DIA	1.5	4	10	10	44	DC/2
	025044-C4M120	전착 DIA	2.5	4	12	12	44	DC/2

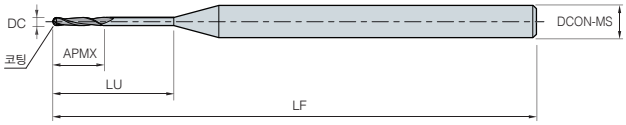
ARUM Type

(5X–200)

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0 Ø1.1 ~ Ø3.0	0.000 ~ -0.015 0.000 ~ -0.020







(mm)

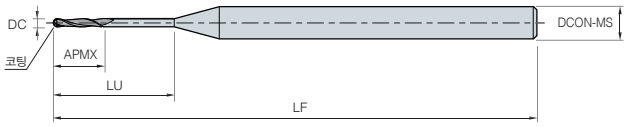
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2006-050-N080S06(5X-200)	PVD	0.6	6	1.6	8	50	DC/2
	2010-053-N140S06(5X-200)	DIA	1	6	2	14	53	DC/2
	2020-055-N200S06(5X-200)	DIA	2	6	6	20	55	DC/2
TWBE	2010-053-N140S06(5X-200)	-	1	6	2	14	53	DC/2
	2020-055-N200S06(5X-200)	-	2	6	6	20	55	DC/2
ETND	006050-H6M270-T7	전착 DIA	0.6	6	8	8	50	DC/2
ETRE	010050-H6M200	전착 DIA	1	6	10	10	50	DC/2
	015050-H6M170	전착 DIA	1.5	6	10	10	50	DC/2
	025050-H6M140	전착 DIA	2.5	6	12	12	50	DC/2

ARUM Type (5X-300)

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0 Ø1.1 ~ Ø3.0	0.000 ~ -0.015 0.000 ~ -0.020







(mm)

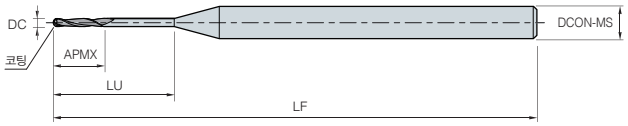
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2003-045-N120S04(5X-300)	PVD	0.3	4	0.6	12	45	DC/2
	2006-045-N100S04(5X-300)	PVD	0.6	4	1.2	10	45	DC/2
	2010-050-N160S04(5X-300)	DIA	1	4	2	16	50	DC/2
	2020-050-N180S04(5X-300)	DIA	2	4	6	18	50	DC/2
TWBE	2010-050-N160S04(5X-300)	-	1	4	2	16	50	DC/2
	2020-050-N180S04(5X-300)	-	2	4	6	18	50	DC/2

ARUM Type (Metal Tool)

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0 Ø1.1 ~ Ø3.0	0.000 ~ -0.015 0.000 ~ -0.020







(mm)

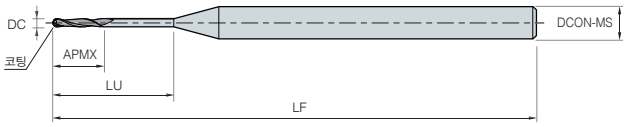
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TTBE	2010-050-N100S06(ARUM)-DY	PVD	1	6	2	10	50	DC/2
	2015-050-N100S06(ARUM)-DY	PVD	1.5	6	3	10	50	DC/2
	2020-050-N120S06(ARUM)-DY	PVD	2	6	4	12	50	DC/2
	2025-050-N140S06(ARUM)-DY	PVD	2.5	6	8	14	50	DC/2
	2030-050-N120S06(ARUM)-DY	PVD	3	6	6	12	50	DC/2

Z-MATCH/CAMELEON Type

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0	0.000 ~ -0.015
Ø1.1 ~ Ø3.0	0.000 ~ -0.020







(mm)

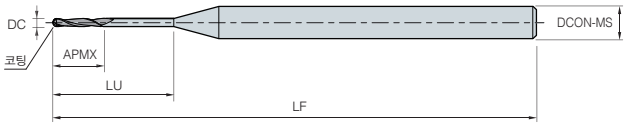
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2005-055-N8(Z-MATCH)	PVD	0.5	6	1.5	8	55	DC/2
	2010-055-N16(Z-MATCH)	DIA	1	6	3	16	55	DC/2
	2020-055-N20(Z-MATCH)	DIA	2	6	6	20	55	DC/2
TWBE	2010-055-N160S06(Z-MATCH)	-	1	6	3	16	55	DC/2
	2020-055-N200S06(Z-MATCH)	-	2	6	6	20	55	DC/2

CAMELEON CS Type

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0	0.000 ~ -0.015
Ø1.1 ~ Ø3.0	0.000 ~ -0.020







(mm)

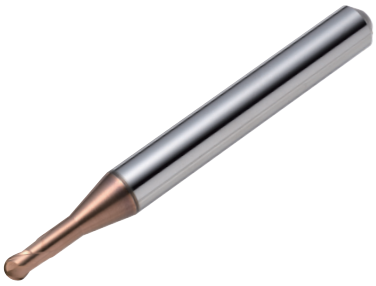
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2005-040-N080S03(CAMELEON CS)	PVD	0.5	3	1	8	40	DC/2
	2010-040-N160S03(CAMELEON CS)	DIA	1	3	2	16	40	DC/2
	2020-040-N200S03(CAMELEON CS)	DIA	2	3	4	20	40	DC/2
TWBE	2010-040-N160S03(CAMELEON CS)	-	1	3	2	16	40	DC/2
	2020-040-N200S03(CAMELEON CS)	-	2	3	4	20	40	DC/2

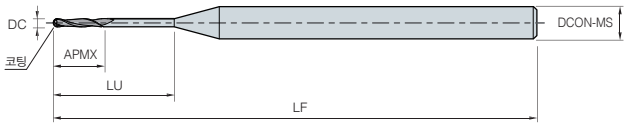
CAMELEON Type

(Metal Tool)

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0 Ø1.1 ~ Ø3.0	0.000 ~ -0.015 0.000 ~ -0.020







(mm)

형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TTBE	2015-045-N7(Z-MATCH-M)	PVD	1.5	6	3	7	45	DC/2
	2020-045-N7(Z-MATCH-M)	PVD	2	6	3	7	45	DC/2
	2030-045-N10(Z-MATCH-M)	PVD	3	6	4	10	45	DC/2
	2015-055-N8(CAMELEON-M)	PVD	1.5	6	1.5	8	55	DC/2
	2020-055-N8(CAMELEON-M)	PVD	2	6	2	8	55	DC/2
	2030-055-N10(CAMELEON-M)	PVD	3	6	3	10	55	DC/2

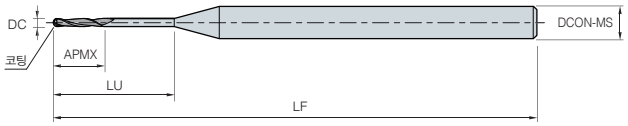
RND Type

(DS200-5Z, DM-100, DS-4WA)

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0 Ø1.1 ~ Ø3.0	0.000 ~ -0.015 0.000 ~ -0.020







(mm)

형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2006-045-N120S03(DS200-5Z)	PVD	0.6	3	1.2	12	45	DC/2
	2010-045-N180S03(DS200-5Z)	DIA	1	3	3	18	45	DC/2
	2020-045-N200S03(DS200-5Z)	DIA	2	3	4	20	45	DC/2
TWBE	2010-045-N180S03(DS200-5Z)	-	1	3	3	18	45	DC/2
	2020-045-N200S03(DS200-5Z)	-	2	3	4	20	45	DC/2
TTBE	2015-050-N100S06(RND)-DY	PVD	1.5	6	3	10	50	DC/2
	2020-050-N130S06(RND)-DY	PVD	2	6	4	13	50	DC/2
	2030-050-N120S06(RND)-DY	PVD	3	6	6	12	50	DC/2

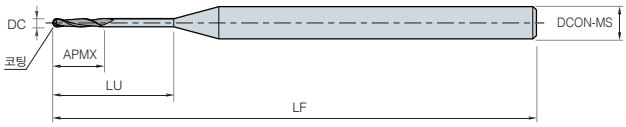
MANIX Type

(Metal Tool)

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0 Ø1.1 ~ Ø3.0	0.000 ~ -0.015 0.000 ~ -0.020







(mm)

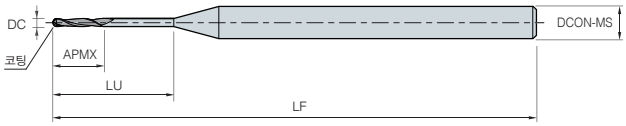
형 번		코팅	DC	DCON-MS	APMX	LU	LF	DC
TZBE	2006-045-N145S04(ZX-5SD)	PVD	0.6	4	1	14.5	45	DC/2
	2010-050-N160S04(ZX-5SD)	DIA	1	4	3	16	50	DC/2
	2020-050-N200S04(ZX-5SD)	DIA	2	4	6	20	50	DC/2
TWBE	2010-050-N165S04(MANIX)	-	1	4	2.8	16.5	50	DC/2
	2020-050-N200S04(MANIX)	-	2	4	5	20	50	DC/2
TTBE	2015-045-N105S06(MANIX)	PVD	1.5	6	2	10.5	45	DC/2
	2020-045-N125S06(MANIX)	PVD	2	6	4.8	12.5	45	DC/2
	2025-045-N120S06(MANIX)	PVD	2.5	6	3	12	45	DC/2
	2030-045-N125S06(MANIX)	PVD	3	6	4	12.5	45	DC/2

승원 DI Type

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0 Ø1.1 ~ Ø3.0	0.000 ~ -0.015 0.000 ~ -0.020







(mm)

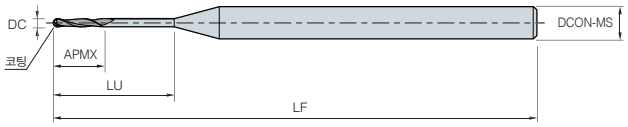
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TTBE	2015-050-N100S06(승원 DI-M)	PVD	1.5	6	8	10	50	DC/2
	2020-050-N120S06(승원 DI-M)	PVD	2	6	8	12	50	DC/2

PROTECH INNOTION Type (Proden, Prodia, Nexus)

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0 Ø1.1 ~ Ø3.0	0.000 ~ -0.015 0.000 ~ -0.020







(mm)

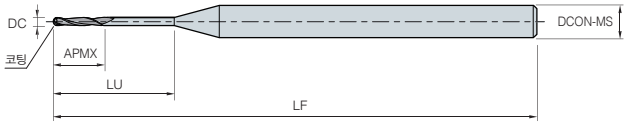
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TTBE	2006-060-N115S06(PRODEN)	PVD	0.6	6	2.2	11.5	60	DC/2
	2010-060-N180S06(PRODEN)	DIA	1	6	3	18	60	DC/2
	2020-060-N200S06(PRODEN)	DIA	2	6	5	20	60	DC/2
TWBE	2010-060-N180S06(PRODEN)	-	1	6	3	18	60	DC/2
	2020-060-N200S06(PRODEN)	-	2	6	5	20	60	DC/2

PROTECH INNOTION Type (Metal Tool–Monster, Nexus, Protech)

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0 Ø1.1 ~ Ø3.0	0.000 ~ -0.015 0.000 ~ -0.020







(mm)

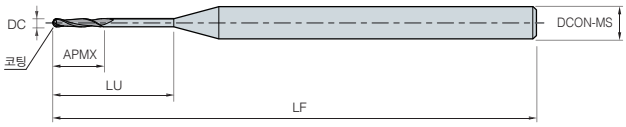
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TTBE	2010-051-N100S06(NEXUS)	PVD	1	6	2	10	51	DC/2
	2015-051-N100S06(NEXUS)	PVD	1.5	6	2	10	51	DC/2
	2020-051-N120S06(NEXUS)	PVD	2	6	3	12	51	DC/2
	2030-051-N120S06(NEXUS)	PVD	3	6	4.5	12	51	DC/2

CERACUBE/TRION-Z Type

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0	0.000 ~ -0.015
Ø1.1 ~ Ø3.0	0.000 ~ -0.020







(mm)

형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2005-050-N22(TRION-Z)	PVD	0.5	4	2	22	50	DC/2
	2010-050-N18(TRION-Z)	DIA	1	4	3	18	50	DC/2
	2020-050-N20(TRION-Z)	DIA	2	4	7	20	50	DC/2
TWBE	2010-050-N180S04(TRION-Z)	-	1	4	3	18	50	DC/2
	2020-050-N200S04(TRION-Z)	-	2	4	7	20	50	DC/2

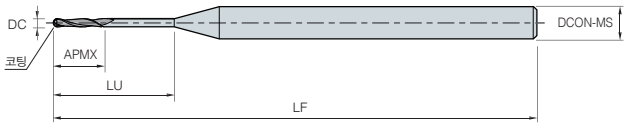
DENTIUM Type

(Rainbow, Rainbow-Mill, Rainbow-Mill Zr 2nd)

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0 Ø1.1 ~ Ø3.0	0.000 ~ -0.015 0.000 ~ -0.020







(mm)

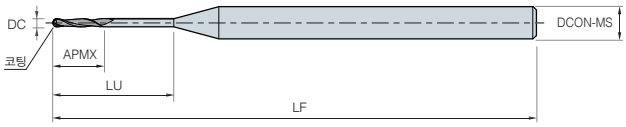
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2005-050-N080S06(DENTIUM)	DIA	0.5	6	2	8	50	DC/2
	2010-050-N160S06(DENTIUM)	DIA	1	6	3	16	50	DC/2
	2020-050-N180S06(DENTIUM)	DIA	2	6	6	18	50	DC/2
	2005-043-N080S03(DENTIUM)	DIA	0.5	3	2	8	43	DC/2
	2010-050-N160S03(DENTIUM)	DIA	1	3	3	16	50	DC/2
	2020-050-N180S03(DENTIUM)	DIA	2	3	6	18	50	DC/2
	2005-045-N080S04(DENTIUM)	DIA	0.5	4	2	8	45	DC/2
	2010-045-N160S04(DENTIUM)	DIA	1	4	3	16	45	DC/2
	2025-045-N180S04(DENTIUM)	DIA	2.5	4	6	18	45	DC/2
TWBE	2005-050-N080S06(DENTIUM)	-	0.5	6	2	8	50	DC/2
	2010-050-N160S06(DENTIUM)	-	1	6	3	16	50	DC/2
	2020-050-N180S06(DENTIUM)	-	2	6	6	18	50	DC/2
	2010-050-N160S03(DENTIUM)	-	1	3	3	16	50	DC/2
	2020-050-N180S03(DENTIUM)	-	2	3	6	18	50	DC/2
	2010-045-N160S04(DENTIUM)	-	1	4	3	16	45	DC/2
	2025-045-N180S04(DENTIUM)	-	2.5	4	6	18	45	DC/2
TTBE	2010-050-N100S06(DENTIUM)	PVD	1	6	2	10	50	DC/2
	2015-050-N100S06(DENTIUM)	PVD	1.5	6	3	10	50	DC/2
	2020-050-N120S06(DENTIUM)	PVD	2	6	4	12	50	DC/2
	2030-050-N120S06(DENTIUM)	PVD	3	6	6	12	50	DC/2
ETRE	006050-H6M325-D(DENTIUM)	전착 DIA	0.6	6	6	6	50	DC/2
	010050-H6M170-D(DENTIUM)	전착 DIA	1	6	10	10	50	DC/2
	020050-H6M120-D(DENTIUM)	전착 DIA	2	6	12	12	50	DC/2
	006040-H3M325-D(DENTIUM)	전착 DIA	0.6	3	6	6	40	DC/2
	010045-H3M170-D(DENTIUM)	전착 DIA	1	3	10	10	45	DC/2
	020045-H3M120-D(DENTIUM)	전착 DIA	2	3	12	12	45	DC/2
	006045-H4M325-D(DENTIUM)	전착 DIA	0.6	4	6	6	45	DC/2
	010045-H4M170-D(DENTIUM)	전착 DIA	1	4	10	10	45	DC/2
	020045-H4M120-D(DENTIUM)	전착 DIA	2	4	12	12	45	DC/2

DOF Type

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0	0.000 ~ -0.015
Ø1.1 ~ Ø3.0	0.000 ~ -0.020







(mm)

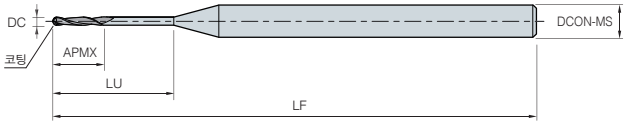
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2010-044-N19(DOF)	DIA	1	3	6	19	44	DC/2
	2020-044-N20(DOF)	DIA	2	3	8	20	44	DC/2
TWBE	2010-044-N19(DOF)	-	1	3	6	19	44	DC/2
	2020-044-N20(DOF)	-	2	3	8	20	44	DC/2

ELBEN Type

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0	0.000 ~ -0.015
Ø1.1 ~ Ø3.0	0.000 ~ -0.020







(mm)

형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TZBE	2006-043-N080S06(ELBEN)	PVD	0.6	6	1.2	8	43	DC/2
	2010-050-N160S06(ELBEN)	DIA	1	6	3	16	50	DC/2
	2020-050-N200S06(ELBEN)	DIA	2	6	6	20	50	DC/2
TWBE	2010-050-N160S06(ELBEN)	-	1	6	3	16	50	DC/2
	2020-050-N200S06(ELBEN)	-	2	6	6	20	50	DC/2
TTBE	2010-045-N050S06(ELBEN)	PVD	1	6	2	5	45	DC/2
	2020-045-N120S06(ELBEN)	PVD	2	6	4	12	45	DC/2
	2030-045-N150S06(ELBEN)	PVD	3	6	6	15	45	DC/2

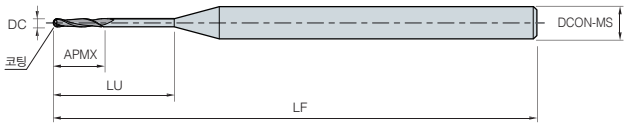
CEREC Type

(MC-XL)

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0 Ø1.1 ~ Ø3.0	0.000 ~ -0.015 0.000 ~ -0.020







(mm)

형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
ETRE	018038-T35M230-12	DIA	1.73	3.5	8	12	38.1	DC/2
	009038-T35M230-12S	DIA	0.9	3.5	4	12	38.1	DC/2

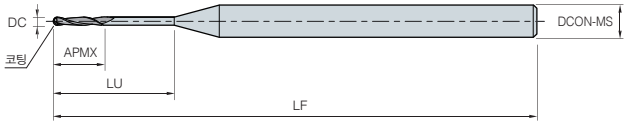
UGINT Type

(D-100, D-200)

2 | H·A 30° | h5 shank | 재종 PC2510 PC2010 | 재종 ND3000

DC	공구직경공차
Ø1.0 Ø1.1 ~ Ø3.0	0.000 ~ -0.015 0.000 ~ -0.020







(mm)

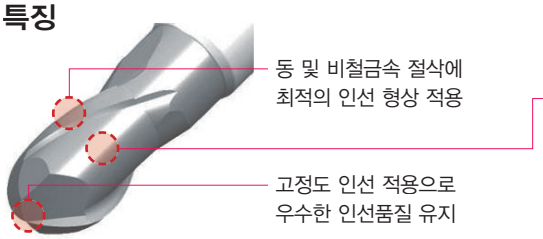
형 번		코팅	DC	DCON-MS	APMX	LU	LF	RE
TTBE	2007-040-N145S03(D-100)	PVD	0.7	3	2.5	14.5	40	DC/2
	2010-040-N145S03(D-100)	DIA	1	3	5	14.5	40	DC/2
	2020-040-N160S03(D-100)	DIA	2	3	4	16	40	DC/2
	2006-043-N080S06(D-200)	PVD	0.6	6	1.2	8	43	DC/2
	2010-050-N160S06(D-200)	DIA	1	6	3	16	50	DC/2
	2020-050-N200S06(D-200)	DIA	2	6	6	20	50	DC/2
TWBE	2010-040-N145S03(D-100)	-	1	3	5	14.5	40	DC/2
	2020-040-N160S03(D-100)	-	2	3	4	16	40	DC/2
	2010-050-N160S06(D-200)	-	1	6	3	16	50	DC/2
	2020-050-N200S06(D-200)	-	2	6	6	20	50	DC/2
TTBE	2015-050-N100S06(D-200)	PVD	1.5	6	7.4	10.2	50	DC/2
	2020-050-N120S06(D-200)	PVD	2	6	7.6	12.1	50	DC/2

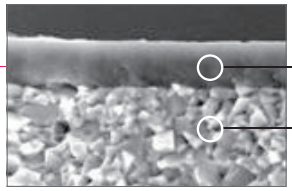
동 전극 가공용 엔드밀

C-Max
Copper

- 윤활성 및 내마모성 내치핑성이 우수한 K-Silver 코팅과 최적의 모재를 적용
- 동, 황동, 청동 및 비철금속 피삭재 가공에 적합
- 기본 볼, 플랫, 레디우스 적용과 롱넥 타입을 구성하여 폭넓은 대응이 가능
- 동 전극 가공 시 우수한 절삭수명 및 가공 면조도 보장

특징





PC210C

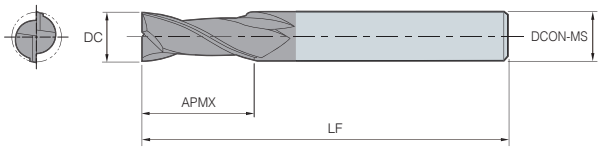
CFE2000

플랫

2 | H·A 30° | 재종 PC210C

DC	공구직경공차
Ø0.5 ~ Ø6	0.00 ~ 0.01
Ø8 ~ Ø12	0.00 ~ 0.02







(mm)

형 번		DC	DCON-MS	APMX	LF
CFE	2010-040	1	4	2.5	40
	2015-040	1.5	4	4	40
	2020-045	2	4	5	45
	2030-045	3	6	8	45
	2040-050	4	6	11	50
	2050-060	5	6	13	60
	2060-060	6	6	13	60
	2080-060	8	8	19	60
	2100-070	10	10	22	70
	2120-075	12	12	26	75

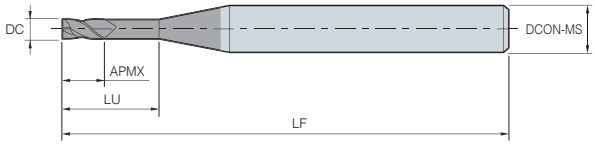
CFNE2000

롱넥 플랫

2 | H·A 30° | 재종 PC210C

DC	공구직경공차
Ø0.5 ~ Ø6	0.00 ~ 0.01
Ø8 ~ Ø12	0.00 ~ 0.02







(mm)

형 번		DC	DCON-MS	APMX	LU	LF
CFNE	2005-045-N2	0.5	4	0.8	2	45
	2005-045-N4	0.5	4	0.8	4	45
	2005-045-N6	0.5	4	0.8	6	45
	2005-050-N8	0.5	4	0.8	8	50
	2010-045-N4	1	4	1.5	4	45
	2010-045-N6	1	4	1.5	6	45
	2010-050-N8	1	4	1.5	8	50
	2010-050-N10	1	4	1.5	10	50
	2015-045-N6	1.5	4	2.3	6	45
	2015-050-N8	1.5	4	2.3	8	50
	2015-050-N10	1.5	4	2.3	10	50
	2015-050-N12	1.5	4	2.3	12	50
	2020-045-N6	2	4	3	6	45
	2020-050-N8	2	4	3	8	50
	2020-050-N10	2	4	3	10	50
	2020-055-N12	2	4	3	12	50
	2030-050-N10	3	4	4.5	10	50
	2030-050-N12	3	4	4.5	12	50
	2030-060-N14	3	4	4.5	14	60
	2030-060-N16	3	4	4.5	16	60
	2040-050-N12	4	6	6	12	50
	2040-050-N16	4	6	6	16	50
	2040-060-N20	4	6	6	20	60

CBE2000

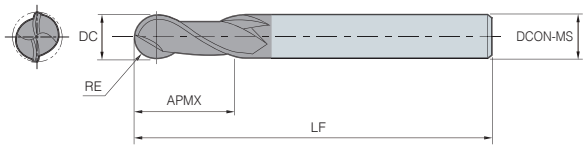
볼





2 | H·A 30° | 재종 PC210C | RE공차 ±0.005

DC	공구직경공차
Ø0.5 ~ Ø6	0.00 ~ 0.01
Ø8 ~ Ø12	0.00 ~ 0.02



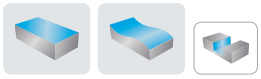
(mm)

형 번		DC	DCON-MS	APMX	LF	RE
CBE	2010-050	1	4	2.5	50	0.5
	2015-050	1.5	4	4	50	0.75
	2020-050	2	4	5	50	1
	2030-060	3	6	8	60	1.2
	2040-070	4	6	8	70	2
	2050-080	5	6	10	80	2.5
	2060-080	6	6	12	80	3
	2080-090	8	8	14	90	4
	2100-100	10	10	18	100	5
	2120-110	12	12	22	110	6

CBNE2000

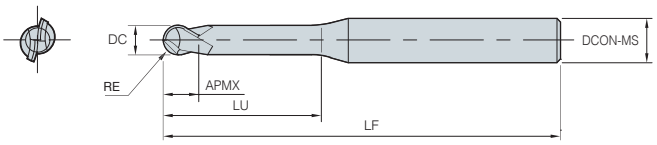
롱넥 볼





2 | H·A 30° | 재종 PC210C

DC	공구직경공차
Ø0.5 ~ Ø6	0.00 ~ 0.01
Ø8 ~ Ø12	0.00 ~ 0.02



(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
CBNE	2005-045-N2	0.5	4	0.5	2	45	0.25
	2005-045-N4	0.5	4	0.5	4	45	0.25
	2005-045-N6	0.5	4	0.5	6	45	0.25
	2005-050-N8	0.5	4	0.5	8	50	0.25
	2010-045-N4	1	4	1	4	45	0.5
	2010-045-N6	1	4	1	6	45	0.5
	2010-050-N8	1	4	1	8	50	0.5
	2010-050-N10	1	4	1	10	50	0.5
	2015-050-N8	1.5	4	1.5	8	50	0.75
	2015-050-N10	1.5	4	1.5	10	50	0.75
	2015-050-N12	1.5	4	1.5	12	50	0.75
	2015-055-N14	1.5	4	1.5	14	55	0.75
	2020-050-N8	2	4	2	8	50	1
	2020-050-N10	2	4	2	10	50	1
	2020-050-N12	2	4	2	12	50	1
	2020-055-N14	2	4	2	14	55	1
	2030-050-N10	3	4	3	10	50	1.5
	2030-050-N12	3	4	3	12	50	1.5
	2030-055-N14	3	4	3	14	55	1.5
	2030-055-N16	3	4	3	16	60	1.5
	2040-060-N16	4	6	4	16	60	2
	2040-060-N20	4	6	4	20	60	2
	2040-070-N25	4	6	4	25	70	2
	2040-070-N30	4	6	4	30	70	2

CRE2000

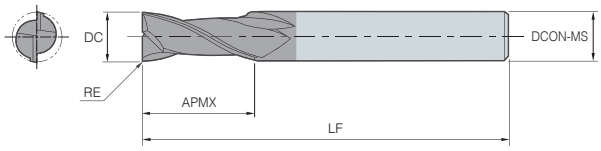
레디우스





2 | H·A 30° | 재종 PC210C | RE공차 ±0.005

DC	공구직경공차
Ø0.5 ~ Ø6	0.00 ~ 0.01
Ø8 ~ Ø12	0.00 ~ 0.02



(mm)

형 번		DC	DCON-MS	APMX	LF	RE
CRE	2020-045-R05	2	4	5	45	0.5
	2030-045-R05	3	6	8	45	0.5
	2040-050-R05	4	6	11	50	0.5
	2050-060-R05	5	6	13	60	0.5
	2060-060-R05	6	6	13	60	0.5
	2080-060-R10	8	8	19	60	1
	2100-070-R10	10	10	22	70	1
	2120-075-R10	12	12	26	75	1

CRNE2000

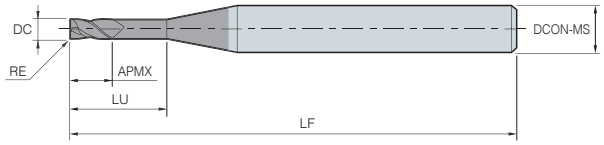
롱넥 레디우스





2 | H·A 30° | 재종 PC210C | RE공차 ±0.005

DC	공구직경공차
Ø0.5 ~ Ø6	0.00 ~ 0.01
Ø8 ~ Ø12	0.00 ~ 0.02



(mm)

형 번		DC	DCON-MS	APMX	LU	LF	RE
CRNE	2010-045-R02N4	1	4	1.5	4	45	0.2
	2010-045-R02N6	1	4	1.5	6	45	0.2
	2010-050-R02N8	1	4	1.5	8	50	0.2
	2010-050-R02N10	1	4	1.5	10	50	0.2
	2015-045-R02N6	1.5	4	2.3	6	45	0.2
	2015-050-R02N8	1.5	4	2.3	8	50	0.2
	2015-050-R02N10	1.5	4	2.3	10	50	0.2
	2015-050-R02N12	1.5	4	2.3	12	50	0.2
	2020-045-R05N6	2	4	3	6	45	0.5
	2020-050-R05N8	2	4	3	8	50	0.5
	2020-050-R05N10	2	4	3	10	50	0.5
	2020-055-R05N12	2	4	3	12	50	0.5
	2030-050-R05N10	3	4	4.5	10	50	0.5
	2030-050-R05N12	3	4	4.5	12	50	0.5
	2030-060-R05N14	3	4	4.5	14	60	0.5
	2030-060-R05N16	3	4	4.5	16	60	0.5
	2040-050-R05N12	4	6	6	12	50	0.5
	2040-050-R05N16	4	6	6	16	50	0.5
	2040-060-R05N20	4	6	6	20	60	0.5

Multi 가공이 가능한 다기능, 고능률 엔드밀

M+ Endmill

- 하나의 엔드밀로 다양한 가공 가능 – 드릴(Drilling), 경사(Ramping), 홈(Slotting), 측면(Side Milling)
- 탁월한 공구 강성으로 절삭저항 감소 및 표면조도 향상
- 크롬 계열 코팅 적용으로 절삭 능력 향상

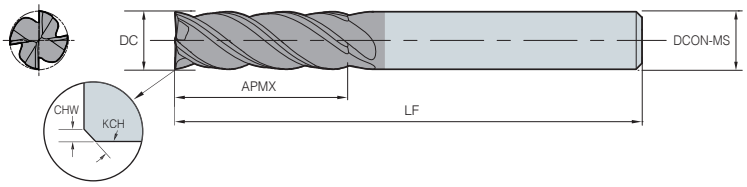
MPRE4000-B

플랫



DC	공구직경공차
Ø3 ~ Ø20	0 .00 ~ -0.03







(mm)

형 번		DC	DCON-MS	APMX	LF	KCH	CHW
MPRE	4030-054	3	6	5	54	-	-
	4040-054	4	6	11	54	45°	0.04
	4050-054	5	6	13	54	45°	0.05
	4060-054	6	6	13	54	45°	0.06
	4080-065(-B)	8	8	19	65	45°	0.08
	4100-075(-B)	10	10	22	75	45°	0.1
	4120-082(-B)	12	12	26	82	45°	0.12
	4140-082(-B)	14	14	26	82	45°	0.12
	4160-100(-B)	16	16	32	100	45°	0.16
	4200-105(-B)	20	20	38	105	45°	0.2

※ (–B) 타입은 Weldon(Flat) 타입임.

긴수명과 우수한 표면조도 실현 가능

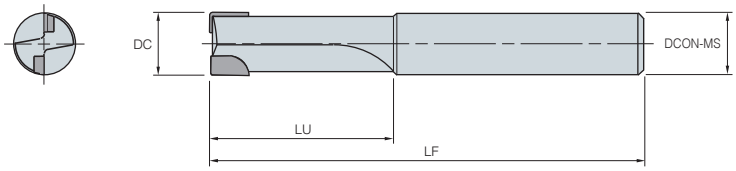
PCD Endmill

- 비철금속 가공 시 버(Burr) 발생 제어 가능
- 1000형 : 비철금속(알루미늄합금, 동합금 등)의 사상가공 용도
- 2000형 : 알루미늄합금, 카본, 흑연, 강화플라스틱(GFRP, CFRP)의 가공에 최적

PDE1000/2000

플랫







(mm)

형 번		DC	DCON-MS	LU	LF
PDE	1040	4	6	15	45
	1050	5	6	15	50
	1060	6	6	20	60
	2060	6	8	20	60
	2070	7	8	20	60
	2080	8	8	20	60
	2090	9	10	25	70
	2100	10	10	25	70
	2120	12	12	25	75

스페셜 엔드밀 주문양식



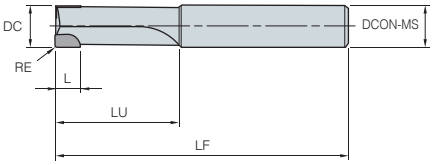


그림 1

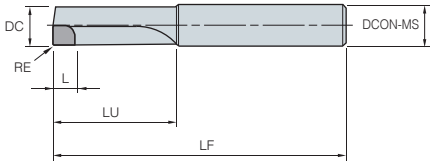
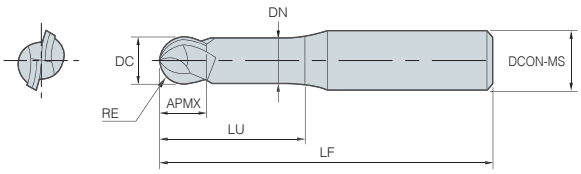


그림 2

형 번	그 림	날 수 (NOF)	치 수(mm)					
			DC	DCON-MS	RE	L	LU	LF
PDES								

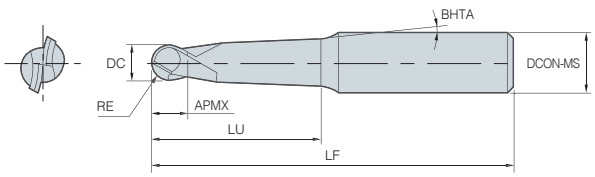
※ 고객의 요구에 따라 기타 특수형도 수주 제작합니다





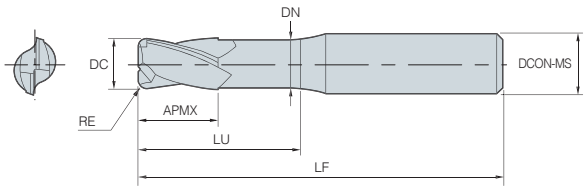
형 번	날 수 (NOF)	반 경 (RE)	공구직경 (DC)	샹크직경 (DCON-MS)	목부직경 (DN)	인 장 (APMX)	유효길이 (LU)	전 장 (LF)





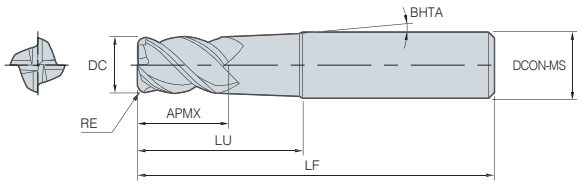
형 번	날 수 (NOF)	반 경 (RE)	공구직경 (DC)	샹크직경 (DCON-MS)	인 장 (APMX)	유효길이 (LU)	전 장 (LF)	테이퍼각 (BHTA)





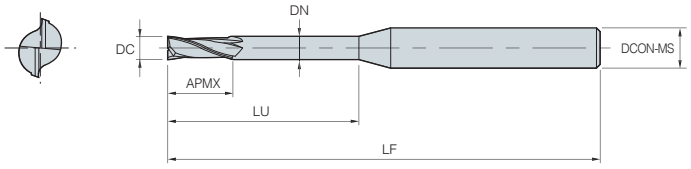
형 번	날 수 (NOF)	공구직경 (DC)	샹크직경 (DCON-MS)	목부직경 (DN)	코너R (RE)	인 장 (APMX)	유효길이 (LU)	전 장 (LF)



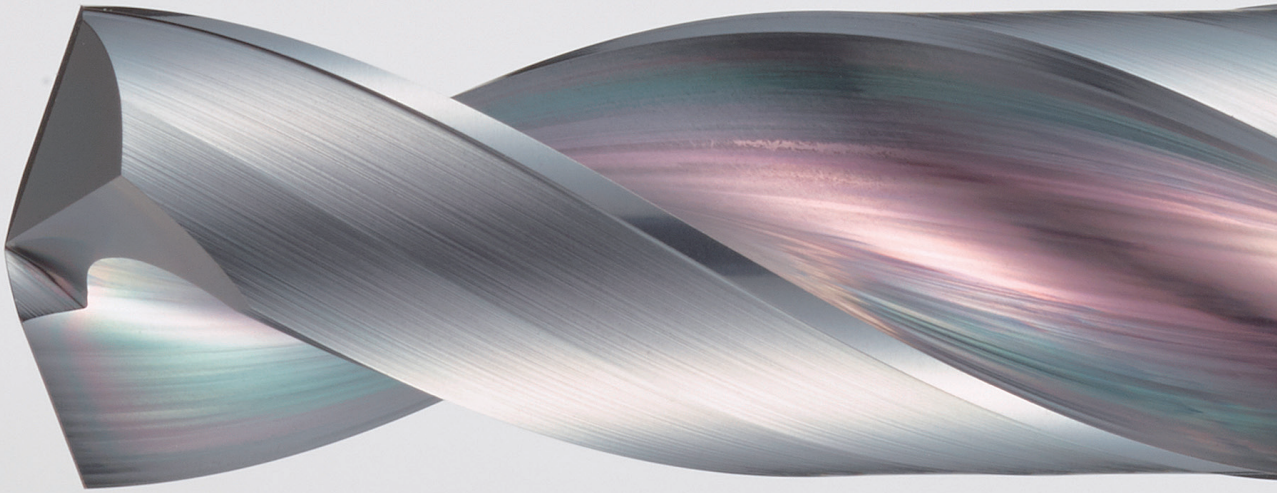


형 번	날 수 (NOF)	공구직경 (DC)	코너R (RE)	샹크직경 (DCON-MS)	인 장 (APMX)	유효길이 (LU)	전 장 (LF)	테이퍼각 (BHTA)





형 번	날 수 (NOF)	공구직경 (DC)	샹크직경 (DCON-MS)	목부직경 (DN)	인 장 (APMX)	유효길이 (LU)	전 장 (LF)

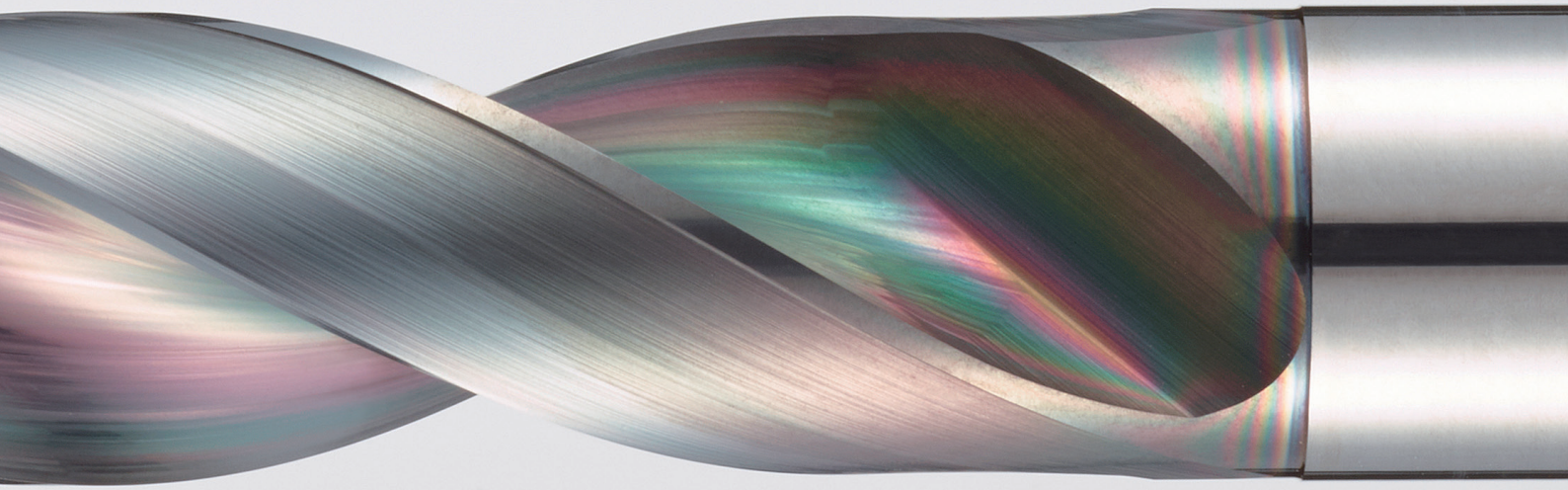


PART

DRILL

드릴

코오로이 드릴은 연구개발과 툴링 노하우를 바탕으로
DRILL제품에 최고, 최신의 기술력으로 Hole Making 부분에서
생산성과 고품질 가공의 선두주자가 될 수 있도록
모든 솔루션을 제공합니다.



Technical information for ENDMILLS

C3 드릴 일람표
C5 드릴 선정 가이드
C6 **MSD Plus** [마하 솔리드 드릴 플러스]
C11 **MSD Plus-S** [마하 솔리드 드릴 플러스-S]
C16 **MSD Plus for CFRP** [CFRP 가공용 마하 솔리드 드릴 플러스]
C18 **MSFD** [마하 솔리드 플랫 드릴]
C25 **MLD Plus** [마하 롱 드릴 플러스]
C29 마하 스텝 드릴 주문양식
C30 **W-Star Drill** [W-Star 드릴]
C35 **SSD-N** [SSD-N 솔리드 드릴]
C38 **Burnishing Drill** [버니싱 드릴]
C39 **PCD Drill** [PCD 드릴]
C42 **Gun Drill** [건 드릴]
C48 **Chucking/Machine Reamer** [척킹/머신리머]
C50 **PCD Reamer** [PCD 리머]
C51 **Cermet/Broach Reamer** [써메트 리머/브로치 리머]
C52 **Chamfer Tool** [챔퍼툴]
C55 **Counter Sink** [카운터 싱크]

C 드릴 일람표

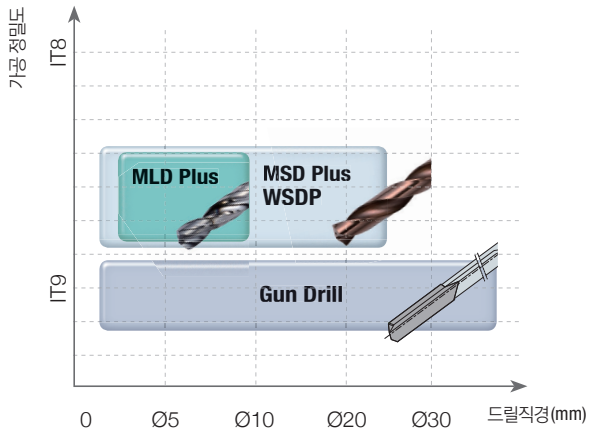
솔리드 드릴 일람표

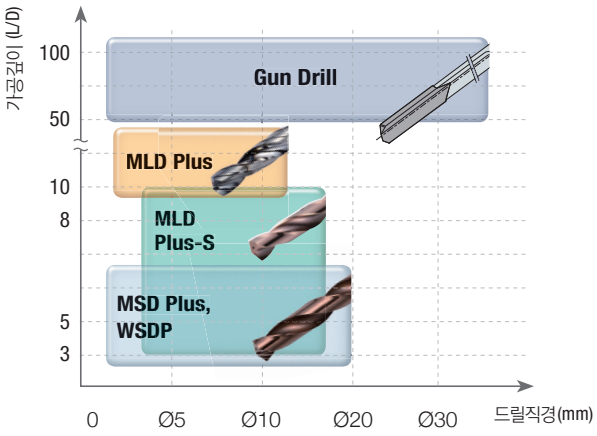
품 목	제품명	형 번	형 상	드릴직경(Ø)	가공 깊이	페이지
초경솔리드 드릴	마하 솔리드 드릴 플러스	MSDPH		Ø2.5 ~ Ø20.0	3D ~ 7D	C7
	마하 솔리드 드릴 플러스-S	MSDPH-S		Ø3.0 ~ Ø16.0	3D ~ 10D	C12
	마하 솔리드 드릴 플러스 CFRP	MSDP-C		Ø3.0 ~ Ø12.7	5D	C21
	마하 솔리드 플랫 드릴	MSFD		Ø2.5 ~ Ø16.0	2D	C23
		MSFDH		Ø2.5 ~ Ø16.0	3D	C26
	마하 롱 드릴 플러스	MLD		Ø3.0 ~ Ø10.0	10D ~ 25D	C30
	W-Star 드릴	WSDP		Ø1.0 ~ Ø20.0	5D, 7D	C34
	SSD-N 솔리드 드릴	SSD-N		Ø1.0 ~ Ø13.0	-	C40
	버니싱 드릴	BDS		Ø4.0 ~ Ø16.0	5D ~ 7D	C42
		BDT		Ø4.2 ~ Ø10.3	2D ~ 4D	C42
	PCD 드릴	PDD		Ø5.0 ~ Ø12.0	5D	C43
		CPD		Ø2.0 ~ Ø8.0	3D ~ 5D	C44
		CPDL		Ø2.0 ~ Ø8.0	12D ~ 45D	C44
		SPD		Ø4.0 ~ Ø16.0	4D ~ 5D	C45
	건 드릴	KGDS		Ø3.0 ~ Ø33.0	50D ~ 100D	C50
		KGDT		Ø6.0 ~ Ø26.5	50D ~ 100D	C51

리머/챔퍼 일람표

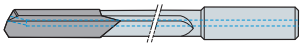
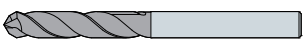
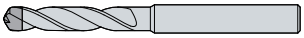
품 목	형 번		형 상	드릴직경(ø)	가공 깊이	페이지
Reamer (리머)	척킹/머신 리머	SCRS		Ø5.0~Ø20.0	2D~3D	C52
		SCRH		Ø5.0~Ø20.0	2D~3D	C52
		TCRS		Ø7.0~Ø30.0	2D~3D	C53
		TMRS		Ø7.0~Ø30.0	3D~5D	C53
	PCD 리머	PDR		Ø5.0~Ø20.0	3D~5D	C54
	써메트 리머	KCR		Ø6.0~Ø30.0	3D~7D	C55
	브로치 리머	HBRE		Ø3.0~Ø25.0	3D~7D	C55
Chamfer (챔퍼)	챔퍼툴	CET		Ø3.0~Ø16.0	-	C56
		CCT		Ø3.0~Ø12.0	-	C57
	카운터싱크	CSPC		Ø6.0~Ø20.0	-	C59
		CSNC3000		Ø10.0~Ø30.0	-	C59
		CSNC1000		Ø10.0~Ø30.0	-	C60
		CSHC		Ø10.0~Ø30.0	-	C60
		CSPH		Ø6.3~Ø25.0	-	C61
		CSNH3000		Ø10.0~Ø50.0	-	C61
		CSNH1000		Ø10.0~Ø50.0	-	C62
		CSHH		Ø10.0~Ø50.0	-	C62

적용영역





라인업 및 특징

피삭재	용도	제품명	쿨런트	드릴직경 (공차)	가공 깊이	도면	특징
P M K	범용	MSD Plus	내부	Ø1.0~20.0 (h7)	3D ~ 7D		• 자동차 부품 등 다양한 피삭재에 고능률 가공이 가능
		MLD Plus (Long drill)	내부	Ø3.0~10.0 (h7)	10D ~ 25D		• 고정밀 · 고품질의 깊은 구멍 가공용
		W-Star Drill (WSDP)	외부	Ø1.0~20.0 (h7)	5D, 7D		• 경제형 초경 코팅 솔리드 드릴
		MSFD	내부/외부	Ø2.5~12.0 (h7)	2D ~ 3D		• 경사면, 곡면, 평면 등 다양한 형상의 구멍 가공용 플랫 드릴
		Gun Drill	–	Ø3.0~33.0 (h7)	50D ~ 100D		• 깊은구멍(50D~100D)의 고능률 가공 가능 • 이형 주문 가능
S	HRSA	MSD Plus-S	내부	Ø3.0~16.0 (h7)	3D ~ 10D		• 내열합금 가공용 • 항공, 에너지, 발전, 자동차 등의 난삭재용
N	CFRP	MSD Plus for CFRP	외부	Ø3.0~12.7 (m7)	5D		• CFRP 피삭재 가공용
	비철금속, 알루미늄	SSD-N	외부	Ø1.0~13.0 (h7)	-		• 비철금속, 연강 가공용 비코팅 드릴
		PCD Drill	외부	Ø2.0~12.0 (h7)	-		• 탁월한 정밀도, 표면조도 • 콘/샌드위치 타입

다양한 피삭재의 고능률 구멍 가공 실현

MSD Plus

마하 솔리드 드릴 플러스

형번표기법

스페셜 타입

MSDP(H) 040 - 5 P - 100 - 5S

오일 홀
있음 : MSDPH

드릴직경 (DC)
040 : Ø4.0mm
(소수1자리 00.0)

표준타입
절입깊이 (L/D)
3D, 5D, 7D

스페셜타입
Flute 길이
100 : 100 mm

적용 피삭재
P : 범용 – 탄소강, 합금강
M : 스테인리스강
K : 주철 전용
N : 알루미늄, 황동

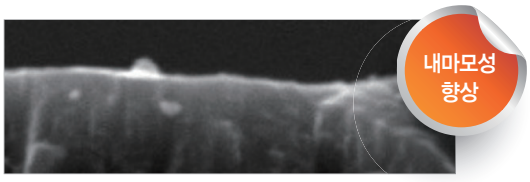
드릴전장
100L : 100mm

샹크직경
5S : Ø5mm

특징

신재종(PC325U) 적용

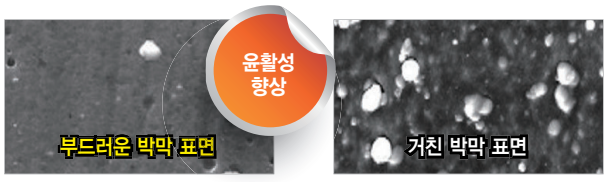
- 윤활성이 높은 신규 박막으로 중/고속 영역에서 내용착성 증가
- 탄소강 영역에서 내마모성 증대



PC325U

박막표면

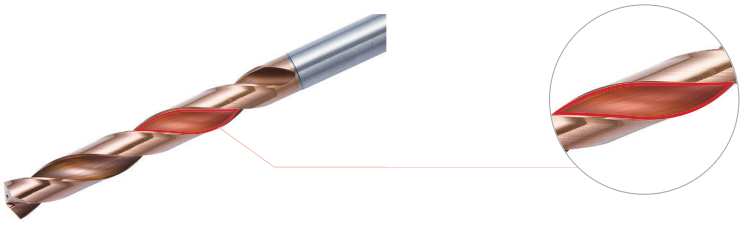
- 내용착성 증가, 절삭 및 가공 부하 감소
- 인선부, 플루트부 마찰 저항 감소



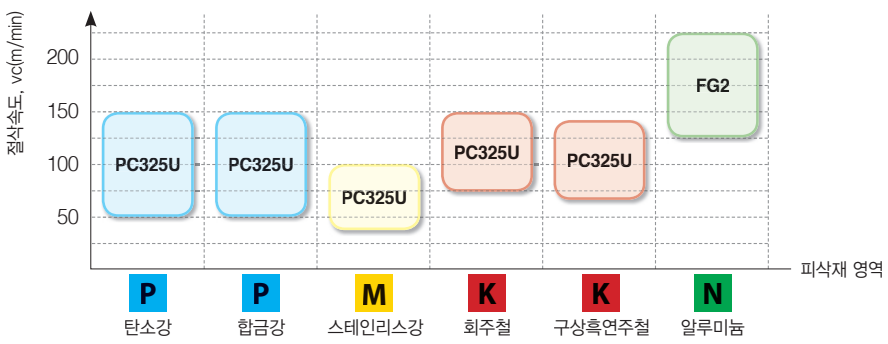
PC325U 타사

플루트 형상

- 칩 포켓 확대로 인한 칩 배출성 우수

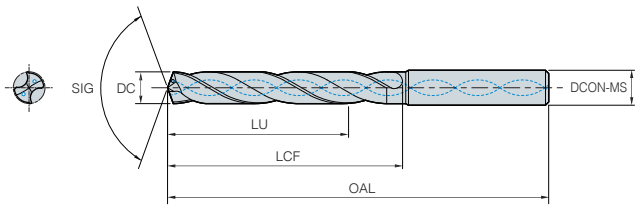


적용영역



MSDPH-□(P/M/K/N)





구 분	P	M	K	N
재종	PC325U			FG2
드릴직경공차	h7			
샹크직경공차	h6			
선단각(SIG)	140°			135°
비틀림각	30°			
씨닝형상	X type			
급유방식	내부/외부			

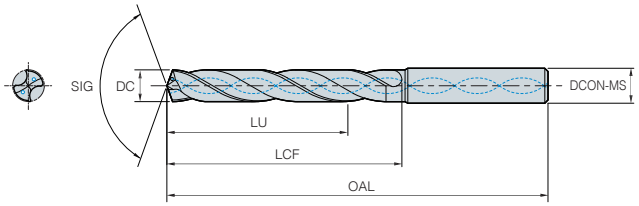
P강 M 스테인리스강 K주철 N비철금속

(mm)

형 번		DC	DCON-MS	3P,M,K,N			5P,M,K,N			7P,M,K,N		
				LU	LCF	OAL	LU	LCF	OAL	LU	LCF	OAL
MSDPH	025 - □P,M,K,N	2.5	3	7.5	14	53	12.5	20	66	17.5	30	70
	026 - □P,M,K,N	2.6	3	7.8	17	53	13	20	66	18.2	30	70
	027 - □P,M,K,N	2.7	3	8.1	17	53	13.5	20	66	18.9	30	70
	028 - □P,M,K,N	2.8	3	8.4	17	53	14	20	66	19.6	30	70
	029 - □P,M,K,N	2.9	3	8.7	17	53	14.5	20	66	20.3	30	70
	030 - □P,M,K,N	3	3	9	17	53	15	20	66	21	30	70
	031 - □P,M,K,N	3.1	4	9.3	20	58	15.5	28	74	21.7	30	70
	032 - □P,M,K,N	3.2	4	9.6	20	58	16	28	74	22.4	30	70
	033 - □P,M,K,N	3.3	4	9.9	20	58	16.5	28	74	23.1	30	70
	034 - □P,M,K,N	3.4	4	10.2	20	58	17	28	74	23.8	37.5	75
	035 - □P,M,K,N	3.5	4	10.5	20	58	17.5	28	74	24.5	37.5	75
	036 - □P,M,K,N	3.6	4	10.8	22	58	18	32	74	25.2	37.5	75
	037 - □P,M,K,N	3.7	4	11.1	22	58	18.5	32	74	25.9	37.5	75
	038 - □P,M,K,N	3.8	4	11.4	22	58	19	32	74	26.6	37.5	75
	039 - □P,M,K,N	3.9	4	11.7	22	58	19.5	32	74	27.3	37.5	75
	040 - □P,M,K,N	4	4	12	22	58	20	32	74	28	37.5	75
	041 - □P,M,K,N	4.1	5	12.3	24	62	20.5	36	82	28.7	37.5	75
	042 - □P,M,K,N	4.2	5	12.6	24	62	21	36	82	29.4	37.5	75
	043 - □P,M,K,N	4.3	5	12.9	24	62	21.5	36	82	30.1	45	85
	044 - □P,M,K,N	4.4	5	13.2	24	62	22	36	82	30.8	45	85
	045 - □P,M,K,N	4.5	5	13.5	24	62	22.5	36	82	31.5	45	85
	046 - □P,M,K,N	4.6	5	13.8	26	62	23	38	82	32.2	45	85
	047 - □P,M,K,N	4.7	5	14.1	26	62	23.5	38	82	32.9	45	85
	048 - □P,M,K,N	4.8	5	14.4	26	62	24	38	82	33.6	50	90
	049 - □P,M,K,N	4.9	5	14.7	26	62	24.5	38	82	34.3	50	90
	050 - □P,M,K,N	5	5	15	26	62	25	38	82	35	50	90
	051 - □P,M,K,N	5.1	6	15.3	28	66	25.5	44	82	35.7	50	90
	052 - □P,M,K,N	5.2	6	15.6	28	66	26	44	82	36.4	50	90
	053 - □P,M,K,N	5.3	6	15.9	28	66	26.5	44	82	37.1	50	90
	054 - □P,M,K,N	5.4	6	16.2	28	66	27	44	82	37.8	50	90
	055 - □P,M,K,N	5.5	6	16.5	28	66	27.5	44	82	38.5	57	97
	056 - □P,M,K,N	5.6	6	16.8	28	66	28	44	82	39.2	57	97
	057 - □P,M,K,N	5.7	6	17.1	28	66	28.5	44	82	39.9	57	97
	058 - □P,M,K,N	5.8	6	17.4	28	66	29	44	82	40.6	57	97
	059 - □P,M,K,N	5.9	6	17.7	28	66	29.5	44	82	41.3	57	97
	060 - □P,M,K,N	6	6	18	28	66	30	44	82	42	57	97
	061 - □P,M,K,N	6.1	7	18.3	34	74	30.5	50	91	42.7	66	106
	062 - □P,M,K,N	6.2	7	18.6	34	74	31	50	91	43.4	66	106
	063 - □P,M,K,N	6.3	7	18.9	34	74	31.5	50	91	44.1	66	106
	064 - □P,M,K,N	6.4	7	19.2	34	74	32	50	91	44.8	66	106
	065 - □P,M,K,N	6.5	7	19.5	34	74	32.5	50	91	45.5	66	106
	066 - □P,M,K,N	6.6	7	19.8	34	74	33	50	91	46.2	66	106
	067 - □P,M,K,N	6.7	7	20.1	34	74	33.5	50	91	46.9	66	106
	068 - □P,M,K,N	6.8	7	20.4	34	74	34	50	91	47.6	66	106

MSDPH-□(P/M/K/N)





구 분	P	M	K	N
재종	PC325U			FG2
드릴직경공차	h7			
샹크직경공차	h6			
선단각(SIG)	140°			135°
비틀림각	30°			
씨닝형상	X type			
급유방식	내부/외부			

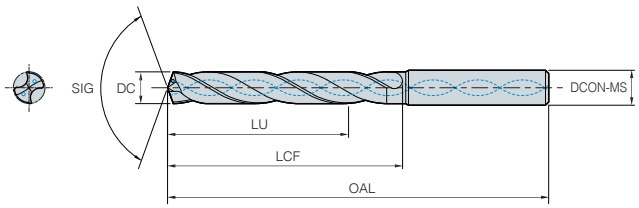
P강 M스테인리스강 K주철 N비철금속

(mm)

형 번		DC	DCON-MS	3P,M,K,N			5P,M,K,N			7P,M,K,N		
				LU	LCF	OAL	LU	LCF	OAL	LU	LCF	OAL
MSDPH	069 - □P,M,K,N	6.9	7	20.7	34	74	34.5	50	91	48.3	76	116
	070 - □P,M,K,N	7	7	21	34	74	35	50	91	49	76	116
	071 - □P,M,K,N	7.1	8	21.3	41	79	35.5	53	91	49.7	76	116
	072 - □P,M,K,N	7.2	8	21.6	41	79	36	53	91	50.4	76	116
	073 - □P,M,K,N	7.3	8	21.9	41	79	36.5	53	91	51.1	76	116
	074 - □P,M,K,N	7.4	8	22.2	41	79	37	53	91	51.8	76	116
	075 - □P,M,K,N	7.5	8	22.5	41	79	37.5	53	91	52.5	76	116
	076 - □P,M,K,N	7.6	8	22.8	41	79	38	53	91	53.2	76	116
	077 - □P,M,K,N	7.7	8	23.1	41	79	38.5	53	91	53.9	76	116
	078 - □P,M,K,N	7.8	8	23.4	41	79	39	53	91	54.6	76	116
	079 - □P,M,K,N	7.9	8	23.7	41	79	39.5	53	91	55.3	76	116
	080 - □P,M,K,N	8	8	24	43	84	40	58	98	56	87	131
	081 - □P,M,K,N	8.1	9	24.3	43	84	40.5	58	98	56.7	87	131
	082 - □P,M,K,N	8.2	9	24.6	43	84	41	58	98	57.4	87	131
	083 - □P,M,K,N	8.3	9	24.9	43	84	41.5	58	98	58.1	87	131
	084 - □P,M,K,N	8.4	9	25.2	43	84	42	58	98	58.8	87	131
	085 - □P,M,K,N	8.5	9	25.5	43	84	42.5	58	98	59.5	87	131
	086 - □P,M,K,N	8.6	9	25.8	43	84	43	58	98	60.2	87	131
	087 - □P,M,K,N	8.7	9	26.1	43	84	43.5	58	98	60.9	87	131
	088 - □P,M,K,N	8.8	9	26.4	43	84	44	58	98	61.6	87	131
	089 - □P,M,K,N	8.9	9	26.7	43	84	44.5	58	98	62.3	87	131
	090 - □P,M,K,N	9	9	27	43	84	45	58	98	63	87	131
	091 - □P,M,K,N	9.1	10	27.3	47	89	45.5	61	105	63.7	95	139
	092 - □P,M,K,N	9.2	10	27.6	47	89	46	61	105	64.4	95	139
	093 - □P,M,K,N	9.3	10	27.9	47	89	46.5	61	105	65.1	95	139
	094 - □P,M,K,N	9.4	10	28.2	47	89	47	61	105	65.8	95	139
	095 - □P,M,K,N	9.5	10	28.5	47	89	47.5	61	105	66.5	95	139
	096 - □P,M,K,N	9.6	10	28.8	47	89	48	61	105	67.2	95	139
	097 - □P,M,K,N	9.7	10	29.1	47	89	48.5	61	105	67.9	95	139
	098 - □P,M,K,N	9.8	10	29.4	47	89	49	61	105	68.6	95	139
	099 - □P,M,K,N	9.9	10	29.7	47	89	49.5	61	105	69.3	95	139
	100 - □P,M,K,N	10	10	30	47	89	50	61	105	70	95	139
	101 - □P,M,K,N	10.1	11	30.3	55	95	50.5	68	114	70.7	106	155
	102 - □P,M,K,N	10.2	11	30.6	55	95	51	68	114	71.4	106	155
	103 - □P,M,K,N	10.3	11	30.9	55	95	51.5	68	114	72.1	106	155
	104 - □P,M,K,N	10.4	11	31.2	55	95	52	68	114	72.8	106	155
	105 - □P,M,K,N	10.5	11	31.5	55	95	52.5	68	114	73.5	106	155
	106 - □P,M,K,N	10.6	11	31.8	55	95	53	68	114	74.2	106	155
	107 - □P,M,K,N	10.7	11	32.1	55	95	53.5	68	114	74.9	106	155
	108 - □P,M,K,N	10.8	11	32.4	55	95	54	68	114	75.6	106	155
	109 - □P,M,K,N	10.9	11	32.7	55	95	54.5	68	114	76.3	106	155
	110 - □P,M,K,N	11	11	33	55	95	55	68	114	77	106	155
	111 - □P,M,K,N	11.1	12	33.3	55	102	55.5	71	120	77.7	114	163
	112 - □P,M,K,N	11.2	12	33.6	55	102	56	71	120	78.4	114	163

MSDPH-□(P/M/K/N)





구 분	P	M	K	N
재종	PC325U			FG2
드릴직경공차	h7			
샹크직경공차	h6			
선단각(SIG)	140°			135°
비틀림각	30°			
씨닝형상	X type			
급유방식	내부/외부			

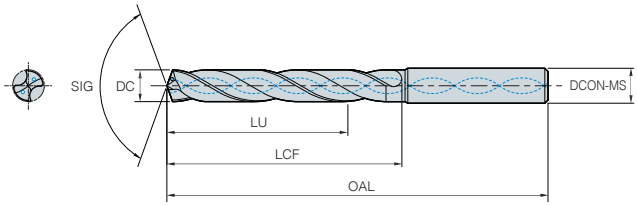
P강 M 스테인리스강 K주철 N비철금속

(mm)

형 번		DC	DCON-MS	3P,M,K,N			5P,M,K,N			7P,M,K,N		
				LU	LCF	OAL	LU	LCF	OAL	LU	LCF	OAL
MSDPH	113 - □P,M,K,N	11.3	12	33.9	55	102	56.5	71	120	79.1	114	163
	114 - □P,M,K,N	11.4	12	34.2	55	102	57	71	120	79.8	114	163
	115 - □P,M,K,N	11.5	12	34.5	55	102	57.5	71	120	80.5	114	163
	116 - □P,M,K,N	11.6	12	34.8	55	102	58	71	120	81.2	114	163
	117 - □P,M,K,N	11.7	12	35.1	55	102	58.5	71	120	81.9	114	163
	118 - □P,M,K,N	11.8	12	35.4	55	102	59	71	120	82.6	114	163
	119 - □P,M,K,N	11.9	12	35.7	55	102	59.5	71	120	83.3	114	163
	120 - □P,M,K,N	12	12	36	55	102	60	71	120	84	114	163
	121 - □P,M,K,N	12.1	13	36.3	60	107	60.5	77	124	84.7	133	182
	122 - □P,M,K,N	12.2	13	36.6	60	107	61	77	124	85.4	133	182
	123 - □P,M,K,N	12.3	13	36.9	60	107	61.5	77	124	86.1	133	182
	124 - □P,M,K,N	12.4	13	37.2	60	107	62	77	124	86.8	133	182
	125 - □P,M,K,N	12.5	13	37.5	60	107	62.5	77	124	87.5	133	182
	126 - □P,M,K,N	12.6	13	37.8	60	107	63	77	124	88.2	133	182
	127 - □P,M,K,N	12.7	13	38.1	60	107	63.5	77	124	88.9	133	182
	128 - □P,M,K,N	12.8	13	38.4	60	107	64	77	124	89.6	133	182
	129 - □P,M,K,N	12.9	13	38.7	60	107	64.5	77	124	90.3	133	182
	130 - □P,M,K,N	13	13	39	60	107	65	77	124	91	133	182
	131 - □P,M,K,N	13.1	14	39.3	62	107	65.5	80	133	91.7	133	182
	132 - □P,M,K,N	13.2	14	39.6	62	107	66	80	133	92.4	133	182
	133 - □P,M,K,N	13.3	14	39.9	62	107	66.5	80	133	93.1	133	182
	134 - □P,M,K,N	13.4	14	40.2	62	107	67	80	133	93.8	133	182
	135 - □P,M,K,N	13.5	14	40.5	62	107	67.5	80	133	94.5	133	182
	136 - □P,M,K,N	13.6	14	40.8	62	107	68	80	133	95.2	133	182
	137 - □P,M,K,N	13.7	14	41.1	62	107	68.5	80	133	95.9	133	182
	138 - □P,M,K,N	13.8	14	41.4	62	107	69	80	133	96.6	133	182
	139 - □P,M,K,N	13.9	14	41.7	62	107	69.5	80	133	97.3	133	182
	140 - □P,M,K,N	14	14	42	62	107	70	80	133	98	133	182
	141 - □P,M,K,N	14.1	15	42.3	65	115	70.5	85	143	98.7	152	204
	142 - □P,M,K,N	14.2	15	42.6	65	115	71	85	143	99.4	152	204
	143 - □P,M,K,N	14.3	15	42.9	65	115	71.5	85	143	100.1	152	204
	144 - □P,M,K,N	14.4	15	43.2	65	115	72	85	143	100.8	152	204
	145 - □P,M,K,N	14.5	15	43.5	65	115	72.5	85	143	101.5	152	204
	146 - □P,M,K,N	14.6	15	43.8	65	115	73	85	143	102.2	152	204
	147 - □P,M,K,N	14.7	15	44.1	65	115	73.5	85	143	102.9	152	204
	148 - □P,M,K,N	14.8	15	44.4	65	115	74	85	143	103.6	152	204
	149 - □P,M,K,N	14.9	15	44.7	65	115	74.5	85	143	104.3	152	204
	150 - □P,M,K,N	15	15	45	65	115	75	85	143	105	152	204
	151 - □P,M,K,N	15.1	16	45.3	68	115	75.5	88	143	105.7	152	204
	152 - □P,M,K,N	15.2	16	45.6	68	115	76	88	143	106.4	152	204
	153 - □P,M,K,N	15.3	16	45.9	68	115	76.5	88	143	107.1	152	204
	154 - □P,M,K,N	15.4	16	46.2	68	115	77	88	143	107.8	152	204
	155 - □P,M,K,N	15.5	16	46.5	68	115	77.5	88	143	108.5	152	204
	156 - □P,M,K,N	15.6	16	46.8	68	115	78	88	143	109.2	152	204

MSDPH-□(P/M/K/N)





구 분	P	M	K	N
재종	PC325U			FG2
드릴직경공차	h7			
샹크직경공차	h6			
선단각(SIG)	140°			135°
비틀림각	30°			
씨닝형상	X type			
급유방식	내부/외부			

P강 M스테인리스강 K주철 N비철금속

(mm)

형 번		DC	DCON-MS	3P,M,K,N			5P,M,K,N			7P,M,K,N		
				LU	LCF	OAL	LU	LCF	OAL	LU	LCF	OAL
MSDPH	157 - □ P,M,K,N	15.7	16	47.1	68	115	78.5	88	143	109.9	152	204
	158 - □ P,M,K,N	15.8	16	47.4	68	115	79	88	143	110.6	152	204
	159 - □ P,M,K,N	15.9	16	47.7	68	115	79.5	88	143	111.3	152	204
	160 - □ P,M,K,N	16	16	48	68	115	80	88	143	112	152	204
	161 - □ P,M,K,N	16.1	17	48.3	73	123	80.5	93	153	112.7	171	223
	162 - □ P,M,K,N	16.2	17	48.6	73	123	81	93	153	113.4	171	223
	163 - □ P,M,K,N	16.3	17	48.9	73	123	81.5	93	153	114.1	171	223
	164 - □ P,M,K,N	16.4	17	49.2	73	123	82	93	153	114.8	171	223
	165 - □ P,M,K,N	16.5	17	49.5	73	123	82.5	93	153	115.5	171	223
	166 - □ P,M,K,N	16.6	17	49.8	73	123	83	93	153	116.2	171	223
	167 - □ P,M,K,N	16.7	17	50.1	73	123	83.5	93	153	116.9	171	223
	168 - □ P,M,K,N	16.8	17	50.4	73	123	84	93	153	117.6	171	223
	169 - □ P,M,K,N	16.9	17	50.7	73	123	84.5	93	153	118.3	171	223
	170 - □ P,M,K,N	17	17	51	73	123	85	93	153	119	171	223
	171 - □ P,M,K,N	17.1	18	51.3	73	123	85.5	98	153	119.7	171	223
	172 - □ P,M,K,N	17.2	18	51.6	73	123	86	98	153	120.4	171	223
	173 - □ P,M,K,N	17.3	18	51.9	73	123	86.5	98	153	121.1	171	223
	174 - □ P,M,K,N	17.4	18	52.2	73	123	87	98	153	121.8	171	223
	175 - □ P,M,K,N	17.5	18	52.5	73	123	87.5	98	153	122.5	171	223
	176 - □ P,M,K,N	17.6	18	52.8	73	123	88	98	153	123.2	171	223
	177 - □ P,M,K,N	17.7	18	53.1	73	123	88.5	98	153	123.9	171	223
	178 - □ P,M,K,N	17.8	18	53.4	73	123	89	98	153	124.6	171	223
	179 - □ P,M,K,N	17.9	18	53.7	73	123	89.5	98	153	125.3	171	223
	180 - □ P,M,K,N	18	18	54	73	123	90	98	153	126	171	223
	181 - □ P,M,K,N	18.1	19	54.3	79	131	90.5	103	153	126.7	190	244
	182 - □ P,M,K,N	18.2	19	54.6	79	131	91	103	153	127.4	190	244
	183 - □ P,M,K,N	18.3	19	54.9	79	131	91.5	103	153	128.1	190	244
	184 - □ P,M,K,N	18.4	19	55.2	79	131	92	103	153	128.8	190	244
	185 - □ P,M,K,N	18.5	19	55.5	79	131	92.5	103	153	129.5	190	244
	186 - □ P,M,K,N	18.6	19	55.8	79	131	93	103	153	130.2	190	244
	187 - □ P,M,K,N	18.7	19	56.1	79	131	93.5	103	153	130.9	190	244
	188 - □ P,M,K,N	18.8	19	56.4	79	131	94	103	153	131.6	190	244
	189 - □ P,M,K,N	18.9	19	56.7	79	131	94.5	103	153	132.3	190	244
	190 - □ P,M,K,N	19	19	57	79	131	95	103	153	133	190	244
	191 - □ P,M,K,N	19.1	20	57.3	79	131	95.5	107	153	133.7	190	244
	192 - □ P,M,K,N	19.2	20	57.6	79	131	96	107	153	134.4	190	244
	193 - □ P,M,K,N	19.3	20	57.9	79	131	96.5	107	153	135.1	190	244
	194 - □ P,M,K,N	19.4	20	58.2	79	131	97	107	153	135.8	190	244
	195 - □ P,M,K,N	19.5	20	58.5	79	131	97.5	107	153	136.5	190	244
	196 - □ P,M,K,N	19.6	20	58.8	79	131	98	107	153	137.2	190	244
	197 - □ P,M,K,N	19.7	20	59.1	79	131	98.5	107	153	137.9	190	244
	198 - □ P,M,K,N	19.8	20	59.4	79	131	99	107	153	138.6	190	244
	199 - □ P,M,K,N	19.9	20	59.7	79	131	99.5	107	153	139.3	190	244
	200 - □ P,M,K,N	20	20	60	79	131	100	107	153	140	190	244

항공, 에너지, 발전, 자동차 산업의 내열합금 가공 전용 공구

MSD Plus-S

마하 솔리드 드릴 플러스-S

- 가공 안정성 확보를 통한 생산성 향상 – 최적의 인선형상과 칩 포켓 구현으로 가공 안정성 확보
- 내마모성 향상 – 고온 내치핑성이 우수한 코팅 적용으로 공구 수명 향상

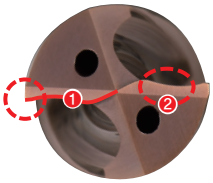
형번표기법

스페셜 타입

MSDP(H)	060	-	5	S	-	100L	-	5S
오일 홀	드릴직경 (DC)		표준타입	적용 피삭재		드릴전장		샹크직경
없음 : MSDP 있음 : MSDPH	060 : Ø6.0mm 소수1자리(00.0)		절입깊이(L/D) 3D, 5D	S : 내열합금		100L : 100mm		5S : Ø5mm
			스페셜타입 Flute 길이 50 : 50mm					

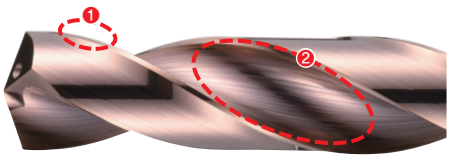
특징

- 노치 제어 인선 형상 및 최적의 인선처리 적용으로 치핑 및 파손 방지



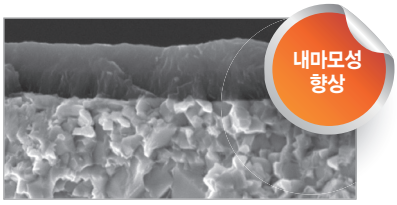
① 저절삭 저항의 인선 형상
② 열배출에 최적화된 선단 여유각 및 형상 적용

- 최적의 마진 및 백테이퍼 플루트 형상

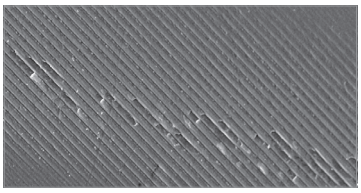


① 공구의 마찰 저항과 절삭 온도를 감소
② 칩 포켓 확대로 칩 배출성 향상

- PC325T 신재종 적용으로 내열성 및 내산화성 향상
- 우수한 표면조도에 의한 윤활성 증가로 마찰저항 감소 및 칩 배출 향상
- 고온의 내열합금 가공에서 뛰어난 내마모성 실현



PC325T

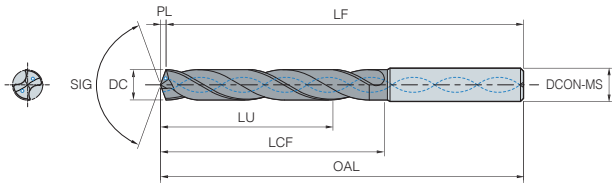


부드러운 코팅 표면



MSDPH-S (3D, 5D)





구 분	S
재종	PC325T
드릴직경공차	h7
샹크직경공차	h6
선단각(SIG)	140°
비틀림각	30°
씨닝형상	X type
규격	DIN 6537
샹크타입	DIN 6535 HA
급유방식	내부

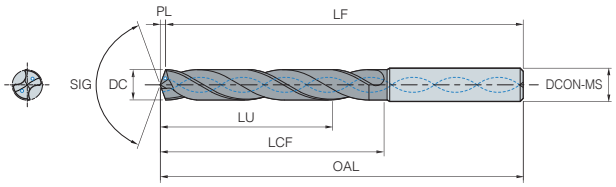
S 내열합금

(mm)

형 번		DC	DCON-MS	3S					5S				
				LU	LCF	LF	OAL	PL	LU	LCF	LF	OAL	PL
MSDPH	030-□S	3	6	9	20	61.5	62	0.5	15	28	65.5	66	0.5
	031-□S	3.1	6	9.3	20	61.4	62	0.6	15.5	28	65.4	66	0.6
	0318-□S	3.18	6	9.54	20	61.4	62	0.6	15.9	28	65.4	66	0.6
	032-□S	3.2	6	9.6	20	61.4	62	0.6	16	28	65.4	66	0.6
	033-□S	3.3	6	9.9	20	61.4	62	0.6	16.5	28	65.4	66	0.6
	034-□S	3.4	6	10.2	20	61.4	62	0.6	17	28	65.4	66	0.6
	035-□S	3.5	6	10.5	20	61.4	62	0.6	17.5	28	65.4	66	0.6
	0357-□S	3.57	6	10.71	20	61.4	62	0.6	17.85	28	65.4	66	0.6
	036-□S	3.6	6	10.8	20	61.3	62	0.7	18	28	65.3	66	0.7
	037-□S	3.7	6	11.1	20	61.3	62	0.7	18.5	28	65.3	66	0.7
	038-□S	3.8	6	11.4	24	65.3	66	0.7	19	36	73.3	74	0.7
	039-□S	3.9	6	11.7	24	65.3	66	0.7	19.5	36	73.3	74	0.7
	0397-□S	3.97	6	11.91	24	65.3	66	0.7	19.85	36	73.3	74	0.7
	040-□S	4	6	12	24	65.3	66	0.7	20	36	73.3	74	0.7
	041-□S	4.1	6	12.3	24	65.3	66	0.7	20.5	36	73.3	74	0.7
	042-□S	4.2	6	12.6	24	65.2	66	0.8	21	36	73.2	74	0.8
	043-□S	4.3	6	12.9	24	65.2	66	0.8	21.5	36	73.2	74	0.8
	0437-□S	4.37	6	13.11	24	65.2	66	0.8	21.85	36	73.2	74	0.8
	044-□S	4.4	6	13.2	24	65.2	66	0.8	22	36	73.2	74	0.8
	045-□S	4.5	6	13.5	24	65.2	66	0.8	22.5	36	73.2	74	0.8
	046-□S	4.6	6	13.8	24	65.2	66	0.8	23	36	73.2	74	0.8
	047-□S	4.7	6	14.1	24	65.1	66	0.9	23.5	36	73.1	74	0.9
	0476-□S	4.76	6	14.28	28	65.1	66	0.9	23.8	44	81.1	82	0.9
	048-□S	4.8	6	14.4	28	65.1	66	0.9	24	44	81.1	82	0.9
	049-□S	4.9	6	14.7	28	65.1	66	0.9	24.5	44	81.1	82	0.9
	050-□S	5	6	15	28	65.1	66	0.9	25	44	81.1	82	0.9
	051-□S	5.1	6	15.3	28	65.1	66	0.9	25.5	44	81.1	82	0.9
	0516-□S	5.16	6	15.48	28	65.1	66	0.9	25.8	44	81.1	82	0.9
	052-□S	5.2	6	15.6	28	65.1	66	0.9	26	44	81.1	82	0.9
	053-□S	5.3	6	15.9	28	65	66	1	26.5	44	81	82	1
	054-□S	5.4	6	16.2	28	65	66	1	27	44	81	82	1
	055-□S	5.5	6	16.5	28	65	66	1	27.5	44	81	82	1
	0556-□S	5.56	6	16.68	28	65	66	1	27.8	44	81	82	1
	056-□S	5.6	6	16.8	28	65	66	1	28	44	81	82	1
	057-□S	5.7	6	17.1	28	65	66	1	28.5	44	81	82	1
	058-□S	5.8	6	17.4	28	64.9	66	1.1	29	44	80.9	82	1.1
	059-□S	5.9	6	17.7	28	64.9	66	1.1	29.75	44	80.9	82	1.1
	0595-□S	5.9	6	17.7	28	64.9	66	1.1	29.75	44	80.9	82	1.1
	060-□S	6	6	18	28	64.9	66	1.1	30	44	80.9	82	1.1

MSDPH-S (3D, 5D)





구 분	S
재종	PC325T
드릴직경공차	h7
샹크직경공차	h6
선단각(SIG)	140°
비틀림각	30°
씨닝형상	X type
규격	DIN 6537
샹크타입	DIN 6535 HA
급유방식	내부

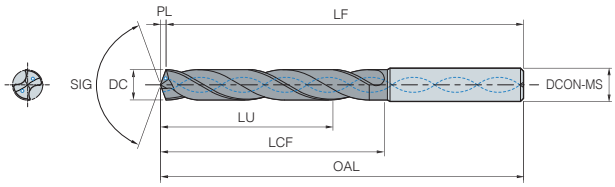
S 내열합금

(mm)

	형 번	DC	DCON-MS	3S					5S				
				LU	LCF	LF	OAL	PL	LU	LCF	LF	OAL	PL
MSDPH	061-□S	6.1	8	18.3	34	77.9	79	1.1	30.5	53	89.9	91	1.1
	062-□S	6.2	8	18.6	34	77.9	79	1.1	31	53	89.9	91	1.1
	063-□S	6.3	8	18.9	34	77.9	79	1.1	31.5	53	89.9	91	1.1
	0635-□S	6.35	8	19.05	34	77.8	79	1.2	31.75	53	89.8	91	1.2
	064-□S	6.4	8	19.2	34	77.8	79	1.2	32	53	89.8	91	1.2
	065-□S	6.5	8	19.5	34	77.8	79	1.2	32.5	53	89.8	91	1.2
	066-□S	6.6	8	19.8	34	77.8	79	1.2	33	53	89.8	91	1.2
	067-□S	6.7	8	20.1	34	77.8	79	1.2	33.5	53	89.8	91	1.2
	0675-□S	6.75	8	20.25	34	77.8	79	1.2	33.75	53	89.8	91	1.2
	068-□S	6.8	8	20.4	34	77.8	79	1.2	34	53	89.8	91	1.2
	069-□S	6.9	8	20.7	34	77.7	79	1.3	34.5	53	89.7	91	1.3
	070-□S	7	8	21	34	77.7	79	1.3	35	53	89.7	91	1.3
	071-□S	7.1	8	21.3	41	77.7	79	1.3	35.5	53	89.7	91	1.3
	0714-□S	7.14	8	21.42	41	77.7	79	1.3	35.7	53	89.7	91	1.3
	072-□S	7.2	8	21.6	41	77.7	79	1.3	36	53	89.7	91	1.3
	073-□S	7.3	8	21.9	41	77.7	79	1.3	36.5	53	89.7	91	1.3
	074-□S	7.4	8	22.2	41	77.7	79	1.3	37	53	89.7	91	1.3
	075-□S	7.5	8	22.5	41	77.6	79	1.4	37.5	53	89.6	91	1.4
	0754-□S	7.54	8	22.62	41	77.6	79	1.4	37.7	53	89.6	91	1.4
	076-□S	7.6	8	22.8	41	77.6	79	1.4	38	53	89.6	91	1.4
	077-□S	7.7	8	23.1	41	77.6	79	1.4	38.5	53	89.6	91	1.4
	078-□S	7.8	8	23.4	41	77.6	79	1.4	39	53	89.6	91	1.4
	079-□S	7.9	8	23.7	41	77.6	79	1.4	39.5	53	89.6	91	1.4
	0794-□S	7.94	8	23.82	41	77.6	79	1.4	39.7	53	89.6	91	1.4
	080-□S	8	8	24	41	77.5	79	1.5	40	53	89.5	91	1.5
	081-□S	8.1	10	24.3	47	87.5	89	1.5	40.5	61	101.5	103	1.5
	082-□S	8.2	10	24.6	47	87.5	89	1.5	41	61	101.5	103	1.5
	083-□S	8.3	10	24.9	47	87.5	89	1.5	41.5	61	101.5	103	1.5
	0833-□S	8.33	10	24.99	47	87.5	89	1.5	41.65	61	101.5	103	1.5
	084-□S	8.4	10	25.2	47	87.5	89	1.5	42	61	101.5	103	1.5
	085-□S	8.5	10	25.5	47	87.5	89	1.5	42.5	61	101.5	103	1.5
	086-□S	8.6	10	25.8	47	87.4	89	1.6	43	61	101.4	103	1.6
	087-□S	8.7	10	26.1	47	87.4	89	1.6	43.5	61	101.4	103	1.6
	0873-□S	8.73	10	26.19	47	87.4	89	1.6	43.65	61	101.4	103	1.6
	088-□S	8.8	10	26.4	47	87.4	89	1.6	44	61	101.4	103	1.6
	089-□S	8.9	10	26.7	47	87.4	89	1.6	44.5	61	101.4	103	1.6
	090-□S	9	10	27	47	87.4	89	1.6	45	61	101.4	103	1.6
	091-□S	9.1	10	27.3	47	87.3	89	1.7	45.5	61	101.3	103	1.7
	0913-□S	9.13	10	27.39	47	87.3	89	1.7	45.65	61	101.3	103	1.7

MSDPH-S (3D, 5D)





구 분	S
재종	PC325T
드릴직경공차	h7
샹크직경공차	h6
선단각(SIG)	140°
비틀림각	30°
씨닝형상	X type
규격	DIN 6537
샹크타입	DIN 6535 HA
급유방식	내부

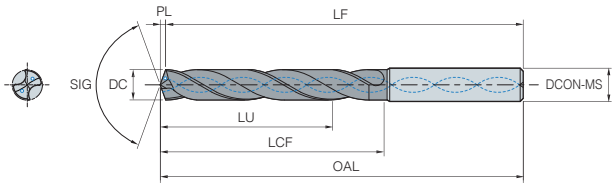
S 내열합금

(mm)

	형 번	DC	DCON-MS	3S					5S				
				LU	LCF	LF	OAL	PL	LU	LCF	LF	OAL	PL
MSDPH	092-□S	9.2	10	27.6	47	87.3	89	1.7	46	61	101.3	103	1.7
	093-□S	9.3	10	27.9	47	87.3	89	1.7	46.5	61	101.3	103	1.7
	094-□S	9.4	10	28.2	47	87.3	89	1.7	47	61	101.3	103	1.7
	095-□S	9.5	10	28.5	47	87.3	89	1.7	47.5	61	101.3	103	1.7
	0953□S-□S	9.53	10	28.59	47	87.3	89	1.7	47.65	61	101.3	103	1.7
	096-□S	9.6	10	28.8	47	87.3	89	1.7	48	61	101.3	103	1.7
	097-□S	9.7	10	29.1	47	87.2	89	1.8	48.5	61	101.2	103	1.8
	098-□S	9.8	10	29.4	47	87.2	89	1.8	49	61	101.2	103	1.8
	099-□S	9.9	10	29.7	47	87.2	89	1.8	49.5	61	101.2	103	1.8
	0992-□S	9.92	10	29.76	47	87.2	89	1.8	49.6	61	101.2	103	1.8
	100-□S	10	10	30	47	87.2	89	1.8	50	61	101.2	103	1.8
	101-□S	10.1	12	30.3	55	100.2	102	1.8	50.5	71	116.2	118	1.8
	102-□S	10.2	12	30.6	55	100.1	102	1.9	51	71	116.1	118	1.9
	103-□S	10.3	12	30.9	55	100.1	102	1.9	51.5	71	116.1	118	1.9
	1032-□S	10.32	12	30.96	55	100.1	102	1.9	51.6	71	116.1	118	1.9
	104-□S	10.4	12	31.2	55	100.1	102	1.9	52	71	116.1	118	1.9
	105-□S	10.5	12	31.5	55	100.1	102	1.9	52.5	71	116.1	118	1.9
	106-□S	10.6	12	31.8	55	100.1	102	1.9	53	71	116.1	118	1.9
	107-□S	10.7	12	32.1	55	100.1	102	1.9	53.5	71	116.1	118	1.9
	1072-□S	10.72	12	32.16	55	100	102	2	53.6	71	116	118	2
	108-□S	10.8	12	32.4	55	100	102	2	54	71	116	118	2
	109-□S	10.9	12	32.7	55	100	102	2	54.5	71	116	118	2
	110-□S	11	12	33	55	100	102	2	55	71	116	118	2
	111-□S	11.1	12	33.3	55	100	102	2	55.5	71	116	118	2
	1111-□S	11.11	12	33.33	55	100	102	2	55.55	71	116	118	2
	112-□S	11.2	12	33.6	55	100	102	2	56	71	116	118	2
	113-□S	11.3	12	33.9	55	99.9	102	2.1	56.5	71	115.9	118	2.1
	114-□S	11.4	12	34.2	55	99.9	102	2.1	57	71	115.9	118	2.1
	115-□S	11.5	12	34.5	55	99.9	102	2.1	57.5	71	115.9	118	2.1
	1151-□S	11.51	12	34.53	55	99.9	102	2.1	57.55	71	115.9	118	2.1
	116-□S	11.6	12	34.8	55	99.9	102	2.1	58	71	115.9	118	2.1
	117-□S	11.7	12	35.1	55	99.9	102	2.1	58.5	71	115.9	118	2.1
	118-□S	11.8	12	35.4	55	99.9	102	2.1	59	71	115.9	118	2.1
	119-□S	11.9	12	35.7	55	99.8	102	2.2	59.5	71	115.8	118	2.2
	1191-□S	11.91	12	35.73	55	99.8	102	2.2	59.55	71	115.8	118	2.2
	120-□S	12	12	36	55	99.8	102	2.2	60	71	115.8	118	2.2
	121-□S	12.1	14	36.3	60	104.8	107	2.2	60.5	77	121.8	124	2.2
	122-□S	12.2	14	36.6	60	104.8	107	2.2	61	77	121.8	124	2.2
	123-□S	12.3	14	36.9	60	104.8	107	2.2	61.5	77	121.8	124	2.2

MSDPH-S (3D, 5D)





구 분	S
재종	PC325T
드릴직경공차	h7
샹크직경공차	h6
선단각(SIG)	140°
비틀림각	30°
씨닝형상	X type
규격	DIN 6537
샹크타입	DIN 6535 HA
급유방식	내부

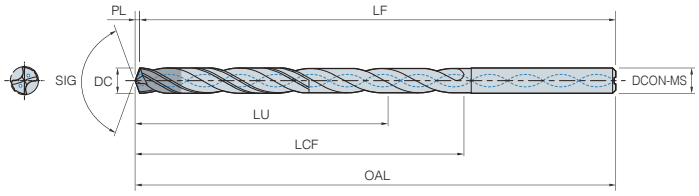
S 내열합금

(mm)

	형 번	DC	DCON-MS	3S					5S				
				LU	LCF	LF	OAL	PL	LU	LCF	LF	OAL	PL
MSDPH	124-□S	12.4	14	37.2	60	104.7	107	2.3	62	77	121.7	124	2.3
	125-□S	12.5	14	37.5	60	104.7	107	2.3	62.5	77	121.7	124	2.3
	126-□S	12.6	14	37.8	60	104.7	107	2.3	63	77	121.7	124	2.3
	127-□S	12.7	14	38.1	60	104.7	107	2.3	63.5	77	121.7	124	2.3
	128-□S	12.8	14	38.4	60	104.7	107	2.3	64	77	121.7	124	2.3
	129-□S	12.9	14	38.7	60	104.7	107	2.3	64.5	77	121.7	124	2.3
	130-□S	13	14	39	60	104.6	107	2.4	65	77	121.6	124	2.4
	131-□S	13.1	14	39.3	60	104.6	107	2.4	65.5	77	121.6	124	2.4
	132-□S	13.2	14	39.6	60	104.6	107	2.4	66	77	121.6	124	2.4
	133-□S	13.3	14	39.9	60	104.6	107	2.4	66.5	77	121.6	124	2.4
	134-□S	13.4	14	40.2	60	104.6	107	2.4	67	77	121.6	124	2.4
	1349-□S	13.49	14	40.47	60	104.5	107	2.5	67.45	77	121.5	124	2.5
	135-□S	13.5	14	40.5	60	104.5	107	2.5	67.5	77	121.5	124	2.5
	136-□S	13.6	14	40.8	60	104.5	107	2.5	68	77	121.5	124	2.5
	137-□S	13.7	14	41.1	60	104.5	107	2.5	68.5	77	121.5	124	2.5
	138-□S	13.8	14	41.4	60	104.5	107	2.5	69	77	121.5	124	2.5
	139-□S	13.9	14	41.7	60	104.5	107	2.5	69.5	77	121.5	124	2.5
	140-□S	14	14	42	60	104.5	107	2.5	70	77	121.5	124	2.5
	141-□S	14.1	16	42.3	65	112.4	115	2.6	70.5	83	130.4	133	2.6
	142-□S	14.2	16	42.6	65	112.4	115	2.6	71	83	130.4	133	2.6
	1429-□S	14.29	16	42.87	65	112.4	115	2.6	71.45	83	130.4	133	2.6
	143-□S	14.3	16	42.9	65	112.4	115	2.6	71.5	83	130.4	133	2.6
	144-□S	14.4	16	43.2	65	112.4	115	2.6	72	83	130.4	133	2.6
	145-□S	14.5	16	43.5	65	112.4	115	2.6	72.5	83	130.4	133	2.6
	146-□S	14.6	16	43.8	65	112.3	115	2.7	73	83	130.3	133	2.7
	147-□S	14.7	16	44.1	65	112.3	115	2.7	73.5	83	130.3	133	2.7
	148-□S	14.8	16	44.4	65	112.3	115	2.7	74	83	130.3	133	2.7
	149-□S	14.9	16	44.7	65	112.3	115	2.7	74.5	83	130.3	133	2.7
	150-□S	15	16	45	65	112.3	115	2.7	75	83	130.3	133	2.7
	151-□S	15.1	16	45.3	65	112.3	115	2.7	75.5	83	130.3	133	2.7
	152-□S	15.2	16	45.6	65	112.2	115	2.8	76	83	130.2	133	2.8
	153-□S	15.3	16	45.9	65	112.2	115	2.8	76.5	83	130.2	133	2.8
	154-□S	15.4	16	46.2	65	112.2	115	2.8	77	83	130.2	133	2.8
	155-□S	15.5	16	46.5	65	112.2	115	2.8	77.5	83	130.2	133	2.8
	156-□S	15.6	16	46.8	65	112.2	115	2.8	78	83	130.2	133	2.8
	157-□S	15.7	16	47.1	65	112.1	115	2.9	78.5	83	130.1	133	2.9
	158-□S	15.8	16	47.4	65	112.1	115	2.9	79	83	130.1	133	2.9
	1587-□S	15.87	16	47.61	65	112.1	115	2.9	79.35	83	130.1	133	2.9
	159-□S	15.9	16	47.7	65	112.1	115	2.9	79.5	83	130.1	133	2.9
	160-□S	16	16	48	65	112.1	115	2.9	80	88	130.1	133	2.9

MSDPH-S (8D, 10D)





구 분	S
코팅유무	PC325T
드릴직경공차	h7
샹크직경공차	h6
SIG	140°
비틀림각	30°
씨닝형상	XR Type
급유방식	내부

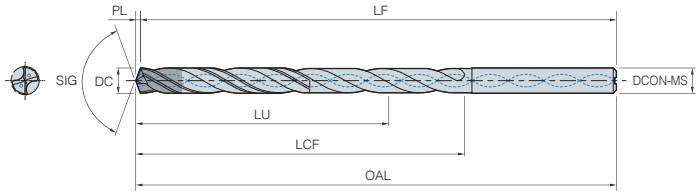
S 내열합금

(mm)

형 번		DC	DCON-MS	8S					10S				
				LU	LCF	LF	OAL	PL	LU	LCF	LF	OAL	PL
MSDPH	030-□S	3	3	24	33	82.5	83	0.5	30	39	88.5	89	0.5
	031-□S	3.1	4	24.8	38	93.4	94	0.6	31	45	101.4	102	0.6
	0318-□S	3.18	4	25.44	38	93.4	94	0.6	31.8	45	101.4	102	0.6
	032-□S	3.2	4	25.6	38	93.4	94	0.6	32	45	101.4	102	0.6
	033-□S	3.3	4	26.4	38	93.4	94	0.6	33	45	101.4	102	0.6
	034-□S	3.4	4	27.2	38	93.4	94	0.6	34	45	101.4	102	0.6
	035-□S	3.5	4	28	38	93.4	94	0.6	35	45	101.4	102	0.6
	0357-□S	3.57	4	28.56	44	93.4	94	0.6	35.7	52	101.4	102	0.6
	036-□S	3.6	4	28.8	44	93.3	94	0.7	36	52	101.3	102	0.7
	037-□S	3.7	4	29.6	44	93.3	94	0.7	37	52	101.3	102	0.7
	038-□S	3.8	4	30.4	44	93.3	94	0.7	38	52	101.3	102	0.7
	039-□S	3.9	4	31.2	44	93.3	94	0.7	39	52	101.3	102	0.7
	0397-□S	3.97	4	31.76	44	93.3	94	0.7	39.7	52	101.3	102	0.7
	040-□S	4	4	32	44	93.3	94	0.7	40	52	101.3	102	0.7
	041-□S	4.1	5	32.8	49	104.3	105	0.7	41	58	114.3	115	0.7
	042-□S	4.2	5	33.6	49	104.2	105	0.8	42	58	114.2	115	0.8
	043-□S	4.3	5	34.4	49	104.2	105	0.8	43	58	114.2	115	0.8
	0437-□S	4.37	5	34.96	49	104.2	105	0.8	43.7	58	114.2	115	0.8
	044-□S	4.4	5	35.2	49	104.2	105	0.8	44	58	114.2	115	0.8
	045-□S	4.5	5	36	49	104.2	105	0.8	45	58	114.2	115	0.8
	046-□S	4.6	5	36.8	55	104.2	105	0.8	46	65	114.2	115	0.8
	047-□S	4.7	5	37.6	55	104.1	105	0.9	47	65	114.1	115	0.9
	0476-□S	4.76	5	38.08	55	104.1	105	0.9	47.6	65	114.1	115	0.9
	048-□S	4.8	5	38.4	55	104.1	105	0.9	48	65	114.1	115	0.9
	049-□S	4.9	5	39.2	55	104.1	105	0.9	49	65	114.1	115	0.9
	050-□S	5	5	40	55	104.1	105	0.9	50	65	114.1	115	0.9
	051-□S	5.1	6	40.8	60	115.1	116	0.9	51	71	127.1	128	0.9
	0516-□S	5.16	6	41.28	60	115.1	116	0.9	51.6	71	127.1	128	0.9
	052-□S	5.2	6	41.6	60	115.1	116	0.9	52	71	127.1	128	0.9
	053-□S	5.3	6	42.4	60	115	116	1	53	71	127	128	1
	054-□S	5.4	6	43.2	60	115	116	1	54	71	127	128	1
	055-□S	5.5	6	44	60	115	116	1	55	71	127	128	1
	0556-□S	5.56	6	44.48	66	115	116	1	55.6	78	127	128	1
	056-□S	5.6	6	44.8	66	115	116	1	56	78	127	128	1
	057-□S	5.7	6	45.6	66	115	116	1	57	78	127	128	1
	058-□S	5.8	6	46.4	66	114.9	116	1.1	58	78	126.9	128	1.1
	0595-□S	5.95	6	47.6	66	114.9	116	1.1	59.5	78	126.9	128	1.1
	059-□S	5.95	6	47.6	66	114.9	116	1.1	59.5	78	126.9	128	1.1
	060-□S	6	6	48	66	114.9	116	1.1	60	78	126.9	128	1.1

MSDPH-S (8D, 10D)





구 분	S
코팅유무	PC325T
드릴직경공차	h7
샹크직경공차	h6
SIG	140°
비틀림각	30°
씨닝형상	XR Type
급유방식	내부

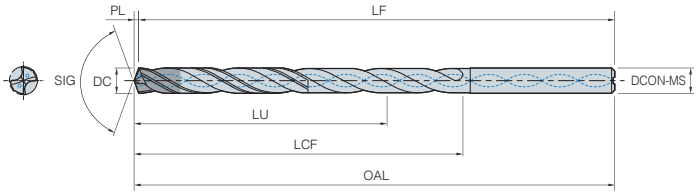
S 내열합금

(mm)

	형 번	DC	DCON-MS	8S					10S				
				LU	LCF	LF	OAL	PL	LU	LCF	LF	OAL	PL
MSDPH	061-□S	6.1	7	48.8	71	125.9	127	1.1	61	84	139.9	141	1.1
	062-□S	6.2	7	49.6	71	125.9	127	1.1	62	84	139.9	141	1.1
	063-□S	6.3	7	50.4	71	125.9	127	1.1	63	84	139.9	141	1.1
	0635-□S	6.35	7	50.8	71	125.8	127	1.2	63.5	84	139.8	141	1.2
	064-□S	6.4	7	51.2	71	125.8	127	1.2	64	84	139.8	141	1.2
	065-□S	6.5	7	52	71	125.8	127	1.2	65	84	139.8	141	1.2
	066-□S	6.6	7	52.8	77	125.8	127	1.2	66	91	139.8	141	1.2
	067-□S	6.7	7	53.6	77	125.8	127	1.2	67	91	139.8	141	1.2
	0675-□S	6.75	7	54	77	125.8	127	1.2	67.5	91	139.8	141	1.2
	068-□S	6.8	7	54.4	77	125.8	127	1.2	68	91	139.8	141	1.2
	069-□S	6.9	7	55.2	77	125.7	127	1.3	69	91	139.7	141	1.3
	070-□S	7	7	56	77	125.7	127	1.3	70	91	139.7	141	1.3
	071-□S	7.1	8	56.8	82	136.7	138	1.3	71	97	152.7	154	1.3
	0714-□S	7.14	8	57.12	82	136.7	138	1.3	71.4	97	152.7	154	1.3
	072-□S	7.2	8	57.6	82	136.7	138	1.3	72	97	152.7	154	1.3
	073-□S	7.3	8	58.4	82	136.7	138	1.3	73	97	152.7	154	1.3
	074-□S	7.4	8	59.2	82	136.7	138	1.3	74	97	152.7	154	1.3
	075-□S	7.5	8	60	82	136.6	138	1.4	75	97	152.6	154	1.4
	0754-□S	7.54	8	60.32	88	136.6	138	1.4	75.4	104	152.6	154	1.4
	076-□S	7.6	8	60.8	88	136.6	138	1.4	76	104	152.6	154	1.4
	077-□S	7.7	8	61.6	88	136.6	138	1.4	77	104	152.6	154	1.4
	078-□S	7.8	8	62.4	88	136.6	138	1.4	78	104	152.6	154	1.4
	079-□S	7.9	8	63.2	88	136.6	138	1.4	79	104	152.6	154	1.4
	0794-□S	7.94	8	63.52	88	136.6	138	1.4	79.4	104	152.6	154	1.4
	080-□S	8	8	64	88	136.5	138	1.5	80	104	152.5	154	1.5
	081-□S	8.1	9	64.8	93	147.5	149	1.5	81	110	165.5	167	1.5
	082-□S	8.2	9	65.6	93	147.5	149	1.5	82	110	165.5	167	1.5
	083-□S	8.3	9	66.4	93	147.5	149	1.5	83	110	165.5	167	1.5
	0833-□S	8.33	9	66.64	93	147.5	149	1.5	83.3	110	165.5	167	1.5
	084-□S	8.4	9	67.2	93	147.5	149	1.5	84	110	165.5	167	1.5
	085-□S	8.5	9	68	93	147.5	149	1.5	85	110	165.5	167	1.5
	086-□S	8.6	9	68.8	99	147.4	149	1.6	86	117	165.4	167	1.6
	087-□S	8.7	9	69.6	99	147.4	149	1.6	87	117	165.4	167	1.6
	0873-□S	8.73	9	69.84	99	147.4	149	1.6	87.3	117	165.4	167	1.6
	088-□S	8.8	9	70.4	99	147.4	149	1.6	88	117	165.4	167	1.6
	089-□S	8.9	9	71.2	99	147.4	149	1.6	89	117	165.4	167	1.6
	090-□S	9	9	72	99	147.4	149	1.6	90	117	165.4	167	1.6
	091-□S	9.1	10	72.8	110	168.3	170	1.7	91	130	188.3	190	1.7
	0913-□S	9.13	10	73.04	110	168.3	170	1.7	91.3	130	188.3	190	1.7

MSDPH-S (8D, 10D)





구 분	S
코팅유무	PC325T
드릴직경공차	h7
샹크직경공차	h6
SIG	140°
비틀림각	30°
씨닝형상	XR Type
급유방식	내부

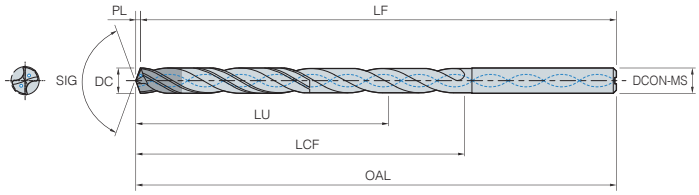
S 내열합금

(mm)

형 번		DC	DCON-MS	8S					10S				
				LU	LCF	LF	OAL	PL	LU	LCF	LF	OAL	PL
MSDPH	092-□S	9.2	10	73.6	110	168.3	170	1.7	92	130	188.3	190	1.7
	093-□S	9.3	10	74.4	110	168.3	170	1.7	93	130	188.3	190	1.7
	094-□S	9.4	10	75.2	110	168.3	170	1.7	94	130	188.3	190	1.7
	095-□S	9.5	10	76	110	168.3	170	1.7	95	130	188.3	190	1.7
	0953-□S	9.53	10	76.24	110	168.3	170	1.7	95.3	130	188.3	190	1.7
	096-□S	9.6	10	76.8	110	168.3	170	1.7	96	130	188.3	190	1.7
	097-□S	9.7	10	77.6	110	168.2	170	1.8	97	130	188.2	190	1.8
	098-□S	9.8	10	78.4	110	168.2	170	1.8	98	130	188.2	190	1.8
	099-□S	9.9	10	79.2	110	168.2	170	1.8	99	130	188.2	190	1.8
	0992-□S	9.92	10	79.36	110	168.2	170	1.8	99.2	130	188.2	190	1.8
	100-□S	10	10	80	110	168.2	170	1.8	100	130	188.2	190	1.8
	101-□S	10.1	11	80.8	121	179.2	181	1.8	101	143	201.2	203	1.8
	102-□S	10.2	11	81.6	121	179.1	181	1.9	102	143	201.1	203	1.9
	103-□S	10.3	11	82.4	121	179.1	181	1.9	103	143	201.1	203	1.9
	1032-□S	10.32	11	82.56	121	179.1	181	1.9	103.2	143	201.1	203	1.9
	104-□S	10.4	11	83.2	121	179.1	181	1.9	104	143	201.1	203	1.9
	105-□S	10.5	11	84	121	179.1	181	1.9	105	143	201.1	203	1.9
	106-□S	10.6	11	84.8	121	179.1	181	1.9	106	143	201.1	203	1.9
	107-□S	10.7	11	85.6	121	179.1	181	1.9	107	143	201.1	203	1.9
	1072-□S	10.72	11	85.76	121	179	181	2	107.2	143	201	203	2
	108-□S	10.8	11	86.4	121	179	181	2	108	143	201	203	2
	109-□S	10.9	11	87.2	121	179	181	2	109	143	201	203	2
	110-□S	11	11	88	121	179	181	2	110	143	201	203	2
	111-□S	11.1	12	88.8	132	190	192	2	111	156	214	216	2
	1111-□S	11.11	12	88.88	132	190	192	2	111.1	156	214	216	2
	112-□S	11.2	12	89.6	132	190	192	2	112	156	214	216	2
	113-□S	11.3	12	90.4	132	189.9	192	2.1	113	156	213.9	216	2.1
	114-□S	11.4	12	91.2	132	189.9	192	2.1	114	156	213.9	216	2.1
	115-□S	11.5	12	92	132	189.9	192	2.1	115	156	213.9	216	2.1
	1151-□S	11.51	12	92.08	132	189.9	192	2.1	115.1	156	213.9	216	2.1
	116-□S	11.6	12	92.8	132	189.9	192	2.1	116	156	213.9	216	2.1
	117-□S	11.7	12	93.6	132	189.9	192	2.1	117	156	213.9	216	2.1
	118-□S	11.8	12	94.4	132	189.9	192	2.1	118	156	213.9	216	2.1
	119-□S	11.9	12	95.2	132	189.8	192	2.2	119	156	213.8	216	2.2
	1191-□S	11.91	12	95.28	132	189.8	192	2.2	119.1	156	213.8	216	2.2
	120-□S	12	12	96	132	189.8	192	2.2	120	156	213.8	216	2.2
	121-□S	12.1	13	96.8	143	200.8	203	2.2	121	169	226.8	229	2.2
	122-□S	12.2	13	97.6	143	200.8	203	2.2	122	169	226.8	229	2.2
	123-□S	12.3	13	98.4	143	200.8	203	2.2	123	169	226.8	229	2.2

MSDPH-S (8D, 10D)





구 분	S
코팅유무	PC325T
드릴직경공차	h7
샹크직경공차	h6
SIG	140°
비틀림각	30°
씨닝형상	XR Type
급유방식	내부

S 내열합금

(mm)

형 번		DC	DCON-MS	8S					10S				
				LU	LCF	LF	OAL	PL	LU	LCF	LF	OAL	PL
MSDPH	124-□S	12.4	13	99.2	143	200.7	203	2.3	124	169	226.7	229	2.3
	125-□S	12.5	13	100	143	200.7	203	2.3	125	169	226.7	229	2.3
	126-□S	12.6	13	100.8	143	200.7	203	2.3	126	169	226.7	229	2.3
	127-□S	12.7	13	101.6	143	200.7	203	2.3	127	169	226.7	229	2.3
	128-□S	12.8	13	102.4	143	200.7	203	2.3	128	169	226.7	229	2.3
	129-□S	12.9	13	103.2	143	200.7	203	2.3	129	169	226.7	229	2.3
	130-□S	13	13	104	143	200.6	203	2.4	130	169	226.6	229	2.4
	131-□S	13.1	14	104.8	154	211.6	214	2.4	131	182	239.6	242	2.4
	132-□S	13.2	14	105.6	154	211.6	214	2.4	132	182	239.6	242	2.4
	133-□S	13.3	14	106.4	154	211.6	214	2.4	133	182	239.6	242	2.4
	134-□S	13.4	14	107.2	154	211.6	214	2.4	134	182	239.6	242	2.4
	1349-□S	13.49	14	107.92	154	211.5	214	2.5	134.9	182	239.5	242	2.5
	135-□S	13.5	14	108	154	211.5	214	2.5	135	182	239.5	242	2.5
	136-□S	13.6	14	108.8	154	211.5	214	2.5	136	182	239.5	242	2.5
	137-□S	13.7	14	109.6	154	211.5	214	2.5	137	182	239.5	242	2.5
	138-□S	13.8	14	110.4	154	211.5	214	2.5	138	182	239.5	242	2.5
	139-□S	13.9	14	111.2	154	211.5	214	2.5	139	182	239.5	242	2.5
	140-□S	14	14	112	154	211.5	214	2.5	140	182	239.5	242	2.5
	141-□S	14.1	15	112.8	165	222.4	225	2.6	141	195	252.4	255	2.6
	142-□S	14.2	15	113.6	165	222.4	225	2.6	142	195	252.4	255	2.6
	1429-□S	14.29	15	114.32	165	222.4	225	2.6	142.9	195	252.4	255	2.6
	143-□S	14.3	15	114.4	165	222.4	225	2.6	143	195	252.4	255	2.6
	144-□S	14.4	15	115.2	165	222.4	225	2.6	144	195	252.4	255	2.6
	145-□S	14.5	15	116	165	222.4	225	2.6	145	195	252.4	255	2.6
	146-□S	14.6	15	116.8	165	222.3	225	2.7	146	195	252.3	255	2.7
	147-□S	14.7	15	117.6	165	222.3	225	2.7	147	195	252.3	255	2.7
	148-□S	14.8	15	118.4	165	222.3	225	2.7	148	195	252.3	255	2.7
	149-□S	14.9	15	119.2	165	222.3	225	2.7	149	195	252.3	255	2.7
	150-□S	15	15	120	165	222.3	225	2.7	150	195	252.3	255	2.7
	151-□S	15.1	16	120.8	176	233.3	236	2.7	151	208	265.3	268	2.7
	152-□S	15.2	16	121.6	176	233.2	236	2.8	152	208	265.2	268	2.8
	153-□S	15.3	16	122.4	176	233.2	236	2.8	153	208	265.2	268	2.8
	154-□S	15.4	16	123.2	176	233.2	236	2.8	154	208	265.2	268	2.8
	155-□S	15.5	16	124	176	233.2	236	2.8	155	208	265.2	268	2.8
	156-□S	15.6	16	124.8	176	233.2	236	2.8	156	208	265.2	268	2.8
	157-□S	15.7	16	125.6	176	233.1	236	2.9	157	208	265.1	268	2.9
	158-□S	15.8	16	126.4	176	233.1	236	2.9	158	208	265.1	268	2.9
	1587-□S	15.87	16	126.96	176	233.1	236	2.9	158.7	208	265.1	268	2.9
	159-□S	15.9	16	127.2	176	233.1	236	2.9	159	208	265.1	268	2.9
	160-□S	16	16	128	176	233.1	236	2.9	160	208	265.1	268	2.9

CFRP 피삭재의 홀 가공을 위한 최적의 공구

MSD Plus for CFRP

CFRP 가공용 마하 솔리드 드릴 플러스

- 신규 ND2100 다이아코팅 재종 적용으로 내마모성 우수
- 인선각도 최적화를 통한 버(Burr) 품질 우수

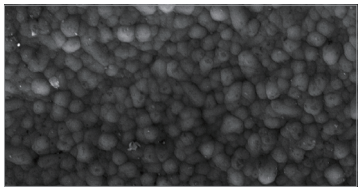
형번표기법

스페셜 타입

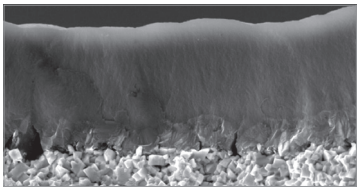
MSDP	060	-	5	C	-	100L	-	6S
Mach Solid Drill Plus	드릴직경 (DC) 060 : Ø6.0mm (소수1자리 00.0)		표준타입 절입깊이(L/D) 스페셜타입 절입깊이(L/D)	적용 피삭재 C : CFRP		드릴전장 100L : 100mm		샹크직경 6S : Ø6mm

특징

- CFRP 가공 전용 다이아몬드 코팅 적용
- CFRP 절삭가공에 최적화된 다이아몬드 코팅 전용 모재 (ND2100)

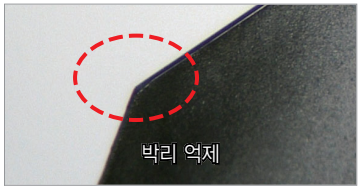


고경도 다이아몬드 코팅으로
절삭 형상 유지

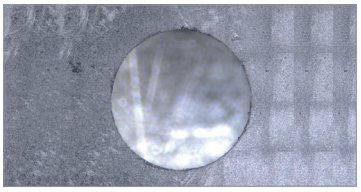


다이아몬드 코팅과 모재간의
우수한 밀착력

- 우수한 인선 형상을 유지하여 버(Burr) 억제

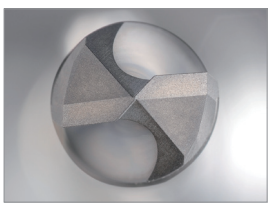


경사면 마모, 박리 억제

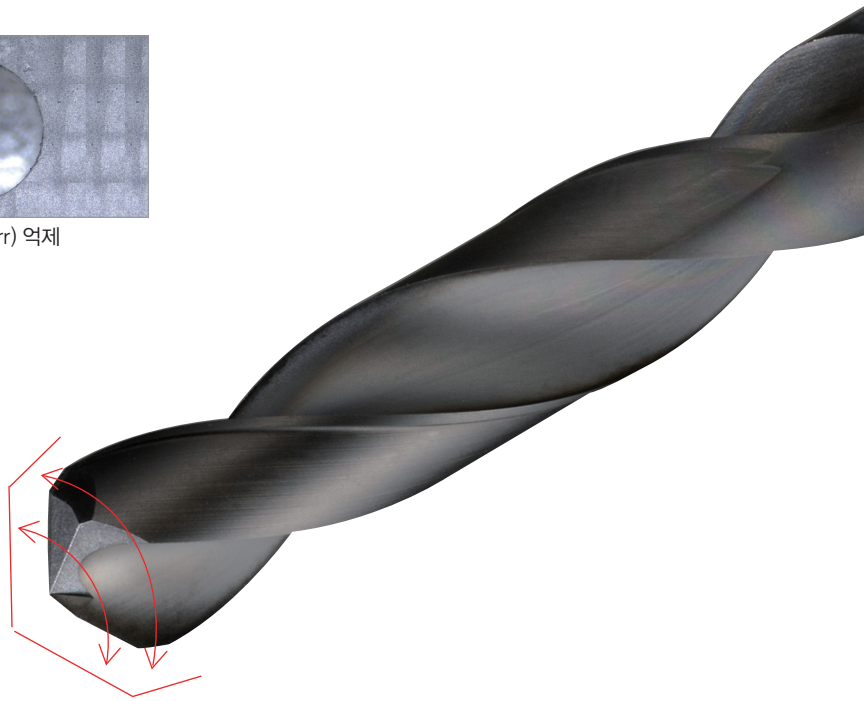


피삭재 버(Burr) 억제

- 2단 선단 형상 적용으로 절삭부하 감소
- 코너 인선각도 최적화를 통한 버량 감소
- 인선부 강도를 보강하여 내마모성 향상

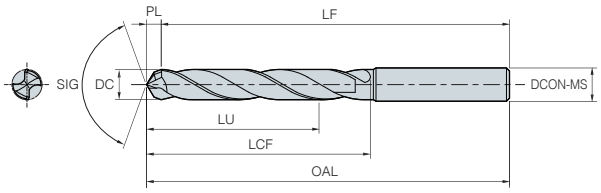


신규 ND2100 개발



MSDP-5C





구 분	C
재종	ND2100
드릴직경공차	m7
샹크직경공차	h6
선단각(SIG)	118°
비틀림각	30°
씨닝형상	X type
급유방식	외부

C CFRP

(mm)

형 번		DC		DCON-MS	5C		
		mm	inch		LU	LCF	OAL
MSDP	030	3	-	6	15	28.7	66
	040	4	-	6	20	37.2	74
	0476	4.76	3/16	6	23.8	45.5	82
	050	5	-	6	25	45.6	82
	060	6	-	6	30	46	82
	0635	6.35	1/4	8	31.75	55.2	91
	070	7	-	8	35	55.4	91
	0794	7.94	5/16	8	39.7	55.8	91
	080	8	-	8	40	55.9	91
	090	9	-	10	45	64.3	103
	0952	9.52	3/8	10	47.6	64.5	103
	100	10	-	10	50	64.7	103
	110	11	-	12	55	75.1	118
	1111	11.11	7/16	12	55.55	75.2	118
	120	12	-	12	60	75.5	118
	127	12.7	1/2	14	63.5	75.8	124

경사면, 곡면, 평면 등 다양한 가공물의 홀 가공을 위한 최적의 공구

MSFD

마하 솔리드 플랫 드릴

- 선단각 180° 형상으로 경사면 등 고품질 홀 가공 가능
- 인선부 호닝, 면취 적용을 통한 내치핑성, 내용착성 향상 및 일반드릴 대비 버(Burr) 최소화

형번표기법

스페셜 타입

MSFD(H) 060 - 2 P - 100L - 6S

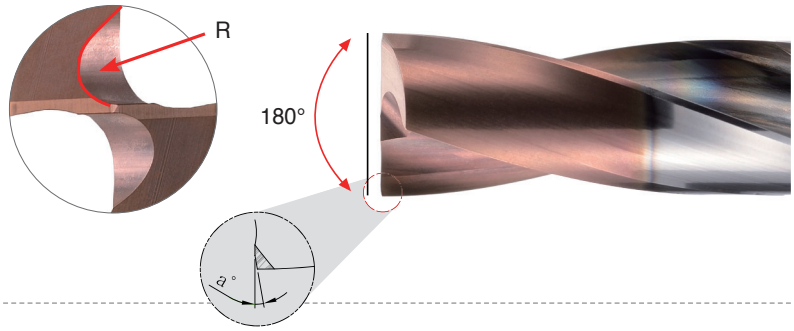
오일홀	드릴직경 (DC)	표준타입	적용 피삭재	드릴전장	샹크직경
없음 : MSFD 있음 : MSFDH	060 : Ø6.0mm (소수1자리 00.0)	절입깊이(L/D) 2D, 3D	P : 범용 – 탄소강, 합금강	100L : 100mm	6S : Ø6mm

스페셜타입

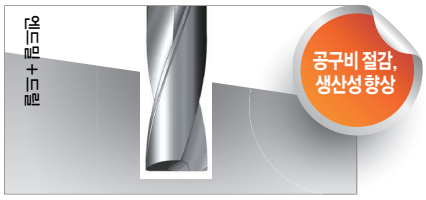
절입깊이(L/D)
2D, 3D

특징

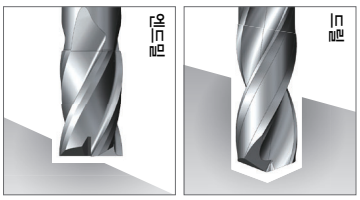
- 선단각 180° 형상으로 경사면 피삭재의 드릴링 가공 시 진직도 우수
- 선단 코너부 챔퍼 적용으로 내치핑성 향상 및 공구수명 증가
- 씨닝부 R형상으로 선단 칩 포켓 확대



- MSFD 공구 한 가지로 엔드밀 + 드릴 가공을 동시 수행 가능



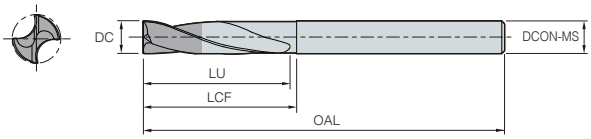
MSFD



종래 가공 방법 및 사용 공구

MSFD-2P





구 분	P
재종	PC325U
드릴직경공차	H7
샹크직경공차	h6
선단각(SIG)	180°
비틀림각	20°
씨닝형상	R type
급유방식	외부

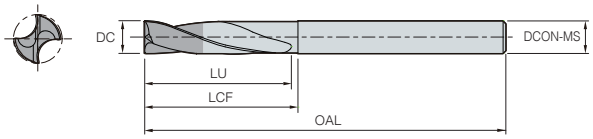
P강

(mm)

형 번		DC	DCON-MS	2P		
				LU	LCF	OAL
MSFD	025-2P	2.5	4	5	10.5	50
	026-2P	2.6	4	5.2	10.9	50
	027-2P	2.7	4	5.4	11.3	50
	028-2P	2.8	4	5.6	11.8	50
	029-2P	2.9	4	5.8	12.2	50
	030-2P	3	6	6	12.6	50
	031-2P	3.1	6	6.2	13	50
	032-2P	3.2	6	6.4	13.4	50
	033-2P	3.3	6	6.6	13.9	50
	034-2P	3.4	6	6.8	14.3	50
	035-2P	3.5	6	7	14.7	50
	036-2P	3.6	6	7.2	15.1	50
	037-2P	3.7	6	7.4	15.5	50
	038-2P	3.8	6	7.6	16	50
	039-2P	3.9	6	7.8	16.4	50
	040-2P	4	6	8	16.8	50
	041-2P	4.1	6	8.2	17.2	60
	042-2P	4.2	6	8.4	17.6	60
	043-2P	4.3	6	8.6	18.1	60
	044-2P	4.4	6	8.8	18.5	60
	045-2P	4.5	6	9	18.9	60
	046-2P	4.6	6	9.2	19.3	60
	047-2P	4.7	6	9.4	19.7	60
	048-2P	4.8	6	9.6	20.2	60
	049-2P	4.9	6	9.8	20.6	60
	050-2P	5	6	10	21	60
	051-2P	5.1	6	10.2	21.4	60
	052-2P	5.2	6	10.4	21.8	60
	053-2P	5.3	6	10.6	22.3	60
	054-2P	5.4	6	10.8	22.7	60
	055-2P	5.5	6	11	23.1	60
	056-2P	5.6	6	11.2	23.5	60
	057-2P	5.7	6	11.4	23.9	60
	058-2P	5.8	6	11.6	24.4	60
	059-2P	5.9	6	11.8	24.8	60
	060-2P	6	6	12	25.2	60
	061-2P	6.1	8	12.2	25.6	70
	062-2P	6.2	8	12.4	26	70
	063-2P	6.3	8	12.6	26.5	70
	064-2P	6.4	8	12.8	26.9	70
	065-2P	6.5	8	13	27.3	70
	066-2P	6.6	8	13.2	27.7	70
	067-2P	6.7	8	13.4	28.1	70
	068-2P	6.8	8	13.6	28.6	70
	069-2P	6.9	8	13.8	29	70
	070-2P	7	8	14	29.4	70

MSFD-2P





구 분	P
재종	PC325U
드릴직경공차	H7
샹크직경공차	h6
선단각(SIG)	180°
비틀림각	20°
씨닝형상	R type
급유방식	외부

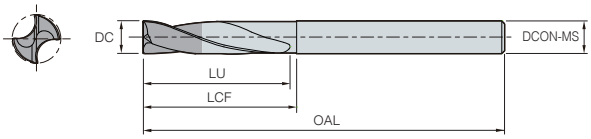
P 강

(mm)

형 번		DC	DCON-MS	2P		
				LU	LCF	OAL
MSFD	071-2P	7.1	8	14.2	29.8	70
	072-2P	7.2	8	14.4	30.2	70
	073-2P	7.3	8	14.6	30.7	70
	074-2P	7.4	8	14.8	31.1	70
	075-2P	7.5	8	15	31.5	70
	076-2P	7.6	8	15.2	31.9	70
	077-2P	7.7	8	15.4	32.3	70
	078-2P	7.8	8	15.6	32.8	70
	079-2P	7.9	8	15.8	33.2	70
	080-2P	8	8	16	33.6	70
	081-2P	8.1	10	16.2	34	80
	082-2P	8.2	10	16.4	34.4	80
	083-2P	8.3	10	16.6	34.9	80
	084-2P	8.4	10	16.8	35.3	80
	085-2P	8.5	10	17	35.7	80
	086-2P	8.6	10	17.2	36.1	80
	087-2P	8.7	10	17.4	36.5	80
	088-2P	8.8	10	17.6	37	80
	089-2P	8.9	10	17.8	37.4	80
	090-2P	9	10	18	37.8	80
	091-2P	9.1	10	18.2	38.2	80
	092-2P	9.2	10	18.4	38.6	80
	093-2P	9.3	10	18.6	39.1	80
	094-2P	9.4	10	18.8	39.5	80
	095-2P	9.5	10	19	39.9	80
	096-2P	9.6	10	19.2	40.3	80
	097-2P	9.7	10	19.4	40.7	80
	098-2P	9.8	10	19.6	41.2	80
	099-2P	9.9	10	19.8	41.6	80
	100-2P	10	10	20	42	80
	101-2P	10.1	12	20.2	42.4	90
	102-2P	10.2	12	20.4	42.8	90
	103-2P	10.3	12	20.6	43.3	90
	104-2P	10.4	12	20.8	43.7	90
	105-2P	10.5	12	21	44.1	90
	106-2P	10.6	12	21.2	44.5	90
	107-2P	10.7	12	21.4	44.9	90
	108-2P	10.8	12	21.6	45.4	90
	109-2P	10.9	12	21.8	45.8	90
	110-2P	11	12	22	46.2	90
	111-2P	11.1	12	22.2	46.6	90
	112-2P	11.2	12	22.4	47	90
	113-2P	11.3	12	22.6	47.5	90
	114-2P	11.4	12	22.8	47.9	90
	115-2P	11.5	12	23	48.3	90
	116-2P	11.6	12	23.2	48.7	90

MSFD-2P





구 분	P
재종	PC325U
드릴직경공차	H7
샹크직경공차	h6
선단각(SIG)	180°
비틀림각	20°
씨닝형상	R type
급유방식	외부

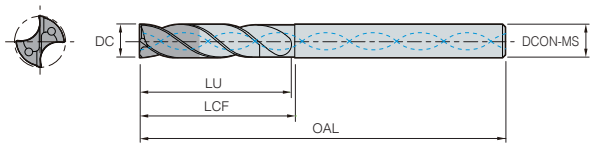
P강

(mm)

형 번		DC	DCON-MS	2P		
				LU	LCF	OAL
MSFD	117-2P	11.7	12	23.4	49.1	90
	118-2P	11.8	12	23.6	49.6	90
	119-2P	11.9	12	23.8	50	90
	120-2P	12	12	24	50.4	90
	121-2P	12.1	14	24.2	50.8	100
	122-2P	12.2	14	24.4	51.2	100
	123-2P	12.3	14	24.6	51.7	100
	124-2P	12.4	14	24.8	52.1	100
	125-2P	12.5	14	25	52.5	100
	126-2P	12.6	14	25.2	52.9	100
	127-2P	12.7	14	25.4	53.3	100
	128-2P	12.8	14	25.6	53.8	100
	129-2P	12.9	14	25.8	54.2	100
	130-2P	13	14	26	54.6	100
	131-2P	13.1	14	26.2	55	100
	132-2P	13.2	14	26.4	55.4	100
	133-2P	13.3	14	26.6	55.9	100
	134-2P	13.4	14	26.8	56.3	100
	135-2P	13.5	14	27	56.7	110
	136-2P	13.6	14	27.2	57.1	110
	137-2P	13.7	14	27.4	57.5	110
	138-2P	13.8	14	27.6	58	110
	139-2P	13.9	14	27.8	58.4	110
	140-2P	14	14	28	58.8	110
	141-2P	14.1	16	28.2	59.2	110
	142-2P	14.2	16	28.4	59.6	110
	143-2P	14.3	16	28.6	60.1	110
	144-2P	14.4	16	28.8	60.5	110
	145-2P	14.5	16	29	60.9	110
	146-2P	14.6	16	29.2	61.3	110
	147-2P	14.7	16	29.4	61.7	110
	148-2P	14.8	16	29.6	62.2	110
	149-2P	14.9	16	29.8	62.6	110
	150-2P	15	16	30	63	110
	151-2P	15.1	16	30.2	65	115
	152-2P	15.2	16	30.4	65	115
	153-2P	15.3	16	30.6	65.1	115
	154-2P	15.4	16	30.8	65.1	115
	155-2P	15.5	16	31	65.1	115
	156-2P	15.6	16	31.2	67.1	115
	157-2P	15.7	16	31.4	67.1	115
	158-2P	15.8	16	31.6	67.2	115
	159-2P	15.9	16	31.8	67.2	115
	160-2P	16	16	32	67.2	115

MSFDH-3P





구 분	P
재종	PC325U
드릴직경공차	H7
샹크직경공차	h6
선단각(SIG)	180°
비틀림각	20°
씨닝형상	R type
급유방식	내부

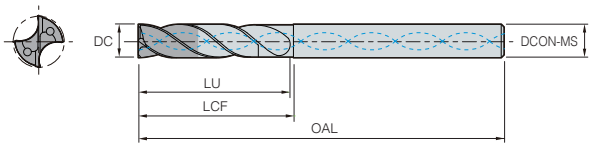
P 강

(mm)

형 번		DC	DCON-MS	3P		
				LU	LCF	OAL
MSFDH	025-3P	2.5	3	7.5	17	58
	026-3P	2.6	3	7.8	17	58
	027-3P	2.7	3	8.1	17	58
	028-3P	2.8	3	8.4	17	58
	029-3P	2.9	3	8.7	17	58
	030-3P	3	6	9	20	62
	031-3P	3.1	6	9.3	20	62
	032-3P	3.2	6	9.6	20	62
	033-3P	3.3	6	9.9	20	62
	034-3P	3.4	6	10.2	20	62
	035-3P	3.5	6	10.5	20	62
	036-3P	3.6	6	10.8	20	62
	037-3P	3.7	6	11.1	20	62
	038-3P	3.8	6	11.4	24	66
	039-3P	3.9	6	11.7	24	66
	040-3P	4	6	12	24	66
	041-3P	4.1	6	12.3	24	66
	042-3P	4.2	6	12.6	24	66
	043-3P	4.3	6	12.9	24	66
	044-3P	4.4	6	13.2	24	66
	045-3P	4.5	6	13.5	24	66
	046-3P	4.6	6	13.8	24	66
	047-3P	4.7	6	14.1	24	66
	048-3P	4.8	6	14.4	28	66
	049-3P	4.9	6	14.7	28	66
	050-3P	5	6	15	28	66
	051-3P	5.1	6	15.3	28	66
	052-3P	5.2	6	15.6	28	66
	053-3P	5.3	6	15.9	28	66
	054-3P	5.4	6	16.2	28	66
	055-3P	5.5	6	16.5	28	66
	056-3P	5.6	6	16.8	28	66
	057-3P	5.7	6	17.1	28	66
	058-3P	5.8	6	17.4	28	66
	059-3P	5.9	6	17.7	28	66
	060-3P	6	6	18	28	66
	061-3P	6.1	8	18.3	34	79
	062-3P	6.2	8	18.6	34	79
	063-3P	6.3	8	18.9	34	79
	064-3P	6.4	8	19.2	34	79
	065-3P	6.5	8	19.5	34	79
	066-3P	6.6	8	19.8	34	79
	067-3P	6.7	8	20.1	34	79
	068-3P	6.8	8	20.4	34	79
	069-3P	6.9	8	20.7	34	79
	070-3P	7	8	21	34	79

MSFDH-3P





구 분	P
재종	PC325U
드릴직경공차	H7
샹크직경공차	h6
선단각(SIG)	180°
비틀림각	20°
씨닝형상	R type
급유방식	내부

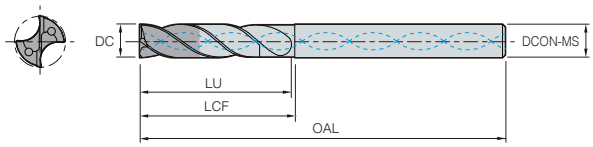
P강

(mm)

형 번		DC	DCON-MS	3P		
				LU	LCF	OAL
MSFDH	071-3P	7.1	8	21.3	41	79
	072-3P	7.2	8	21.6	41	79
	073-3P	7.3	8	21.9	41	79
	074-3P	7.4	8	22.2	41	79
	075-3P	7.5	8	22.5	41	79
	076-3P	7.6	8	22.8	41	79
	077-3P	7.7	8	23.1	41	79
	078-3P	7.8	8	23.4	41	79
	079-3P	7.9	8	23.7	41	79
	080-3P	8	8	24	41	79
	081-3P	8.1	10	24.3	47	89
	082-3P	8.2	10	24.6	47	89
	083-3P	8.3	10	24.9	47	89
	084-3P	8.4	10	25.2	47	89
	085-3P	8.5	10	25.5	47	89
	086-3P	8.6	10	25.8	47	89
	087-3P	8.7	10	26.1	47	89
	088-3P	8.8	10	26.4	47	89
	089-3P	8.9	10	26.7	47	89
	090-3P	9	10	27	47	89
	091-3P	9.1	10	27.3	47	89
	092-3P	9.2	10	27.6	47	89
	093-3P	9.3	10	27.9	47	89
	094-3P	9.4	10	28.2	47	89
	095-3P	9.5	10	28.5	47	89
	096-3P	9.6	10	28.8	47	89
	097-3P	9.7	10	29.1	47	89
	098-3P	9.8	10	29.4	47	89
	099-3P	9.9	10	29.7	47	89
	100-3P	10	10	30	47	89
	101-3P	10.1	12	30.3	55	102
	102-3P	10.2	12	30.6	55	102
	103-3P	10.3	12	30.9	55	102
	104-3P	10.4	12	31.2	55	102
	105-3P	10.5	12	31.5	55	102
	106-3P	10.6	12	31.8	55	102
	107-3P	10.7	12	32.1	55	102
	108-3P	10.8	12	32.4	55	102
	109-3P	10.9	12	32.7	55	102
	110-3P	11	12	33	55	102
	111-3P	11.1	12	33.3	55	102
	112-3P	11.2	12	33.6	55	102
	113-3P	11.3	12	33.9	55	102
	114-3P	11.4	12	34.2	55	102
	115-3P	11.5	12	34.5	55	102
	116-3P	11.6	12	34.8	55	102

MSFDH-3P





구 분	P
재종	PC325U
드릴직경공차	H7
샹크직경공차	h6
선단각(SIG)	180°
비틀림각	20°
씨닝형상	R type
급유방식	내부

P 강

(mm)

형 번		DC	DCON-MS	3P		
				LU	LCF	OAL
MSFDH	117-3P	11.7	12	35.1	55	102
	118-3P	11.8	12	35.4	55	102
	119-3P	11.9	12	35.7	55	102
	120-3P	12	12	36	55	102
	121-3P	12.1	14	36.3	60	107
	122-3P	12.2	14	36.6	60	107
	123-3P	12.3	14	36.9	60	107
	124-3P	12.4	14	37.2	60	107
	125-3P	12.5	14	37.5	60	107
	126-3P	12.6	14	37.8	60	107
	127-3P	12.7	14	38.1	60	107
	128-3P	12.8	14	38.4	60	107
	129-3P	12.9	14	38.7	60	107
	130-3P	13.0	14	39	60	107
	131-3P	13.1	14	39.3	60	107
	132-3P	13.2	14	39.6	60	107
	133-3P	13.3	14	39.9	60	107
	134-3P	13.4	14	40.2	60	107
	135-3P	13.5	14	40.5	60	107
	136-3P	13.6	14	40.8	60	107
	137-3P	13.7	14	41.1	60	107
	138-3P	13.8	14	41.4	60	107
	139-3P	13.9	14	41.7	60	107
	140-3P	14.0	14	42	60	107
	141-3P	14.1	16	42.3	65	115
	142-3P	14.2	16	42.6	65	115
	143-3P	14.3	16	42.9	65	115
	144-3P	14.4	16	43.2	65	115
	145-3P	14.5	16	43.5	65	115
	146-3P	14.6	16	43.8	65	115
	147-3P	14.7	16	44.1	65	115
	148-3P	14.8	16	44.4	65	115
	149-3P	14.9	16	44.7	65	115
	150-3P	15.0	16	45	65	115
	151-3P	15.1	16	45.3	65	115
	152-3P	15.2	16	45.6	65	115
	153-3P	15.3	16	45.9	65	115
	154-3P	15.4	16	46.2	65	115
	155-3P	15.5	16	46.5	65	115
	156-3P	15.6	16	46.8	65	115
	157-3P	15.7	16	47.1	65	115
	158-3P	15.8	16	47.4	65	115
	159-3P	15.9	16	47.7	65	115
	160-3P	16.0	16	48	65	115

고정밀 · 고품질의 깊은 홀 가공을 위한 최적의 공구

MLD Plus

마하 롱 드릴 플러스

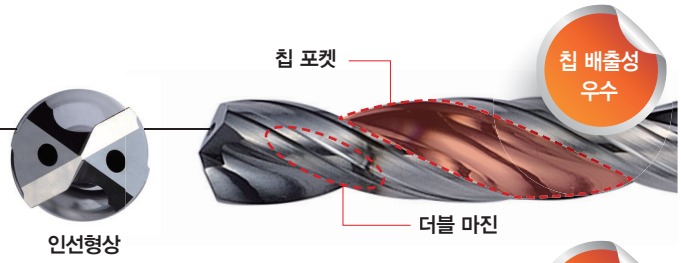
형번표기법

스페셜 타입

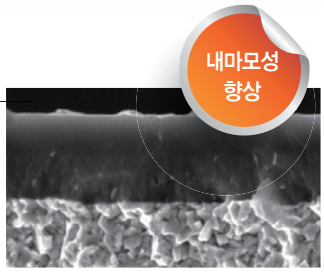
MLD	0600N	-	10	P	-	100L	-	10S
Mach Long Solid Drill Plus (MLD Plus)	드릴직경(DC) 0600 : Ø6.00mm (소수2자리 0.00)		표준타입 절입깊이(L/D) 10D, 15D, 20D, 25D 스페셜타입 Flute 길이 100 : 100mm	적용 피삭재 P : 탄소강, 합금강 K : 주철 N : 알루미늄, 동합금		드릴전장 100L : 100mm		샹크직경 10S : Ø10mm

특징

- **인선 및 플루트 형상**
  - Straight 인선 형상 적용으로 강성 증가
  - 칩 포켓 확대 및 플루트 표면조도 향상으로 인한 칩 배출 우수
  - 더블 마진 적용으로 가공 안정성 확보



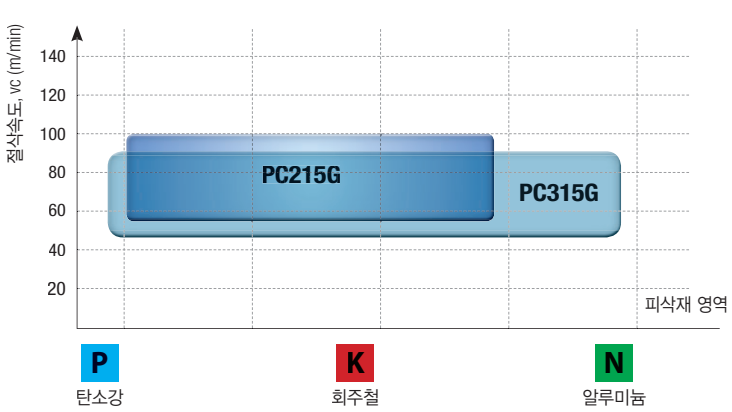
- **신재종(PC315G) 적용**
  - 초미립 모재 사용 및 신규 박막 적용
  - 박막 윤활성 증대로 인한 마찰 저항 감소, 칩 배출 우수
  - 내마모성 향상으로 가공수명 증대



PC315G

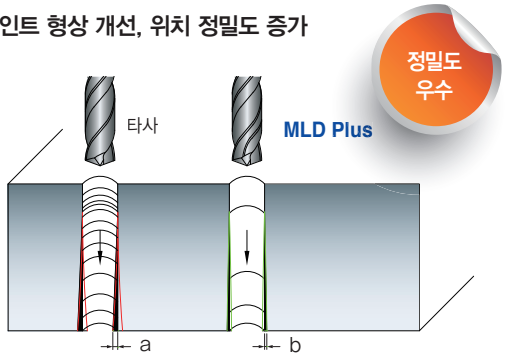
적용영역

- PC215G – 고속, 주철, 합금강 영역에서 성능 우수
- PC315G – 중, 저속, 탄소강, 주철 등 범용 영역에서 성능 우수



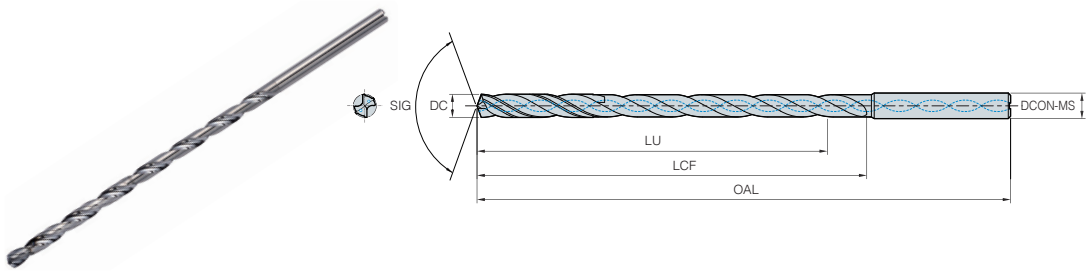
[가공 정밀도]

- **가공 정밀도 개선**
  - 홀 굽힘 현상 감소, 홀 내벽 면조도 향상, 홀 사이즈 균일성 증가
- **포인트 형상 개선, 위치 정밀도 증가**



MLD Plus 타사 대비 가공 홀 굽힘 현상 감소 (a > b)

MLD-□□(P/K/N)



구 분	P	K	N
재종	PC215G PC315G		FG2
드릴직경공차	h7		
샹크직경공차	h6		
선단각(SIG)	135°		
비틀림각	30°		
씨닝형상	X type		
급유방식	내부		

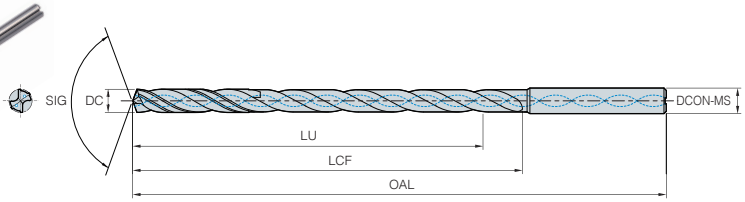
P강 K주철 N비철금속

(mm)

형 번		DC	DCON-MS	10P,K,N		15P,K,N		20P,K,N		25P,K,N	
				LCF	OAL	LCF	OAL	LCF	OAL	LCF	OAL
MLD	0300N - □□P,K,N	3	3	40	90	55	105	70	120	-	-
	0310N - □□P,K,N	3.1	4	45	100	60	125	80	140	-	-
	0320N - □□P,K,N	3.2	4	45	100	60	125	80	140	-	-
	0330N - □□P,K,N	3.3	4	45	100	60	125	80	140	-	-
	0340N - □□P,K,N	3.4	4	50	100	65	125	85	140	-	-
	0350N - □□P,K,N	3.5	4	50	100	65	125	85	140	-	-
	0360N - □□P,K,N	3.6	4	50	100	65	125	85	140	-	-
	0370N - □□P,K,N	3.7	4	50	100	65	125	85	140	-	-
	0380N - □□P,K,N	3.8	4	50	100	75	125	90	140	-	-
	0390N - □□P,K,N	3.9	4	50	100	75	125	90	140	-	-
	0400N - □□P,K,N	4	4	50	100	75	125	90	140	115	165
	0410N - □□P,K,N	4.1	5	55	115	75	140	100	165	120	190
	0420N - □□P,K,N	4.2	5	55	115	75	140	100	165	120	190
	0430N - □□P,K,N	4.3	5	60	115	85	140	110	165	135	190
	0440N - □□P,K,N	4.4	5	60	115	85	140	110	165	135	190
	0450N - □□P,K,N	4.5	5	60	115	85	140	110	165	135	190
	0460N - □□P,K,N	4.6	5	60	115	85	140	110	165	135	190
	0470N - □□P,K,N	4.7	5	60	115	85	140	110	165	135	190
	0480N - □□P,K,N	4.8	5	65	115	90	140	115	165	140	190
	0490N - □□P,K,N	4.9	5	65	115	90	140	115	165	140	190

MLD-□□(P/K/N)





구 분	P	K	N
재종	PC215G PC315G		FG2
드릴직경공차	h7		
샹크직경공차	h6		
선단각(SIG)	135°		
비틀림각	30°		
씨닝형상	X type		
급유방식	내부		

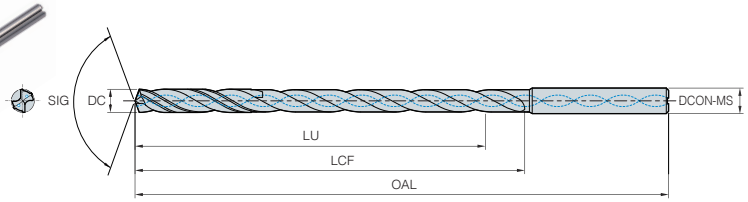
P강 K주철 N비철금속

(mm)

형 번		DC	DCON-MS	10P,K,N		15P,K,N		20P,K,N		25P,K,N	
				LCF	OAL	LCF	OAL	LCF	OAL	LCF	OAL
MLD	0500N - □□P,K,N	5	5	65	115	90	140	115	165	140	190
	0510N - □□P,K,N	5.1	6	70	128	95	160	120	190	150	220
	0520N - □□P,K,N	5.2	6	70	128	95	160	120	190	150	220
	0530N - □□P,K,N	5.3	6	70	128	95	160	120	190	150	220
	0540N - □□P,K,N	5.4	6	78	128	110	160	140	190	170	220
	0550N - □□P,K,N	5.5	6	78	128	110	160	140	190	170	220
	0560N - □□P,K,N	5.6	6	78	128	110	160	140	190	170	220
	0570N - □□P,K,N	5.7	6	78	128	110	160	140	190	170	220
	0580N - □□P,K,N	5.8	6	78	128	110	160	140	190	170	220
	0590N - □□P,K,N	5.9	6	78	128	110	160	140	190	170	220
	0600N - □□P,K,N	6	6	78	128	110	160	140	190	170	220
	0610N - □□P,K,N	6.1	7	87	140	120	175	155	210	190	250
	0620N - □□P,K,N	6.2	7	87	140	120	175	155	210	190	250
	0630N - □□P,K,N	6.3	7	87	140	120	175	155	210	190	250
	0640N - □□P,K,N	6.4	7	87	140	120	175	155	210	190	250
	0650N - □□P,K,N	6.5	7	87	140	120	175	155	210	190	250
	0660N - □□P,K,N	6.6	7	87	140	120	175	155	210	190	250
	0670N - □□P,K,N	6.7	7	87	140	120	175	155	210	190	250
	0680N - □□P,K,N	6.8	7	90	140	125	175	160	210	200	250
	0690N - □□P,K,N	6.9	7	90	140	125	175	160	210	200	250

MLD-□□(P/K/N)





구 분	P	K	N
재종	PC215G PC315G		FG2
드릴직경공차	h7		
샹크직경공차	h6		
선단각(SIG)	135°		
비틀림각	30°		
씨닝형상	X type		
급유방식	내부		

P강 K주철 N비철금속

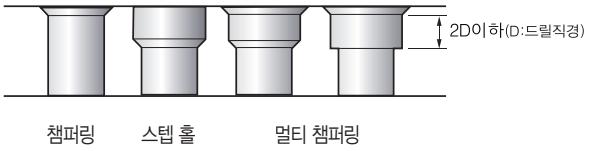
(mm)

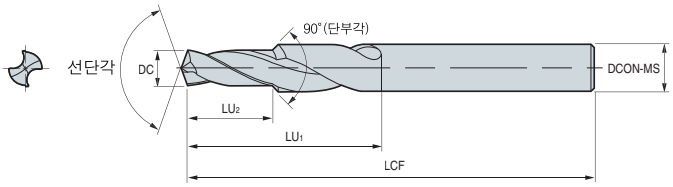
형 번		DC	DCON-MS	10P,K,N		15P,K,N		20P,K,N		25P,K,N	
				LCF	OAL	LCF	OAL	LCF	OAL	LCF	OAL
MLD	0700N - □□P,K,N	7	7	90	140	125	175	160	210	200	250
	0710N - □□P,K,N	7.1	8	100	155	135	195	170	230	-	-
	0720N - □□P,K,N	7.2	8	100	155	135	195	170	230	-	-
	0730N - □□P,K,N	7.3	8	100	155	135	195	170	230	-	-
	0740N - □□P,K,N	7.4	8	100	155	135	195	170	230	-	-
	0750N - □□P,K,N	7.5	8	100	155	135	195	170	230	-	-
	0760N - □□P,K,N	7.6	8	105	155	145	195	180	230	-	-
	0770N - □□P,K,N	7.7	8	105	155	145	195	180	230	-	-
	0780N - □□P,K,N	7.8	8	105	155	145	195	180	230	-	-
	0790N - □□P,K,N	7.9	8	105	155	145	195	180	230	-	-
	0800N - □□P,K,N	8	8	105	155	145	195	180	230	-	-
	0810N - □□P,K,N	8.1	9	110	165	155	210	195	260	-	-
	0820N - □□P,K,N	8.2	9	110	165	155	210	195	260	-	-
	0830N - □□P,K,N	8.3	9	110	165	155	210	195	260	-	-
	0840N - □□P,K,N	8.4	9	110	165	155	210	195	260	-	-
	0850N - □□P,K,N	8.5	9	110	165	155	210	195	260	-	-
	0860N - □□P,K,N	8.6	9	115	165	160	210	210	260	-	-
	0870N - □□P,K,N	8.7	9	115	165	160	210	210	260	-	-
	0880N - □□P,K,N	8.8	9	115	165	160	210	210	260	-	-
	0890N - □□P,K,N	8.9	9	115	165	160	210	210	260	-	-
	0900N - □□P,K,N	9	9	115	165	160	210	210	260	-	-
	0910N - □□P,K,N	9.1	10	125	190	170	240	-	-	-	-
	0920N - □□P,K,N	9.2	10	125	190	170	240	-	-	-	-
	0930N - □□P,K,N	9.3	10	125	190	170	240	-	-	-	-
	0940N - □□P,K,N	9.4	10	125	190	170	240	-	-	-	-
	0950N - □□P,K,N	9.5	10	125	190	170	240	-	-	-	-
	0960N - □□P,K,N	9.6	10	130	190	180	240	-	-	-	-
	0970N - □□P,K,N	9.7	10	130	190	180	240	-	-	-	-
	0980N - □□P,K,N	9.8	10	130	190	180	240	-	-	-	-
	0990N - □□P,K,N	9.9	10	130	190	180	240	-	-	-	-
	1000N - □□P,K,N	10	10	130	190	180	240	-	-	-	-

마하 스텝 드릴 주문양식

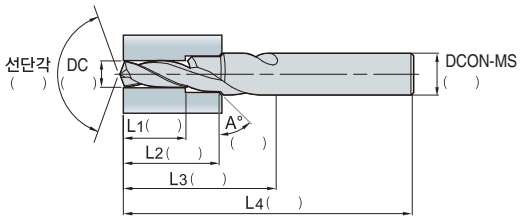
MSDPHS 드릴직경 -유효인장 -인장 -드릴전장L -샹크직경S

- 오일홀 타입 : MSDHS
- DC
- LU_1
- LU_2
- LCF
- DCON-MS

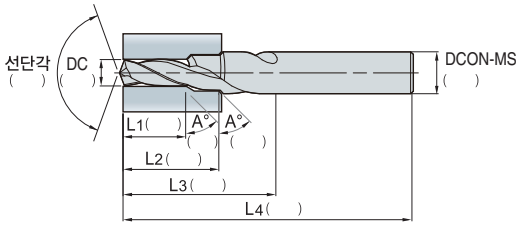




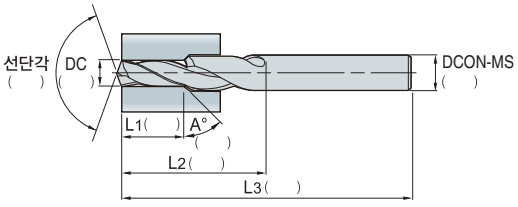
□ 멀티 챔퍼링 (급유방식 : 내부□ 외부□)



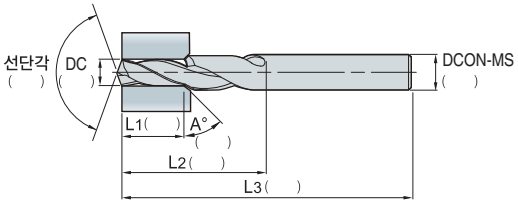
□ 멀티 챔퍼링 (급유방식 : 내부□ 외부□)



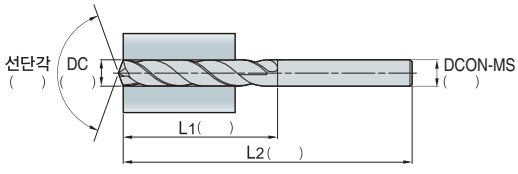
□ 스텝홀 (급유방식 : 내부□ 외부□)



□ 챔퍼링 (급유방식 : 내부□ 외부□)



□ 드릴링 (급유방식 : 내부□ 외부□)



경제형 초경 코팅 솔리드 드릴

W-Star Drill

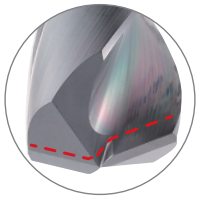
- 개선된 씨닝 형상에 따른 선단 절삭부하 감소로 절삭성 향상
- 최적의 플루트 설계로 강성 보완 및 칩 배출 우수
- 스테인리스강 가공에서도 탁월한 성능 발휘

형번표기법

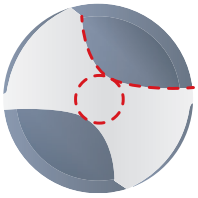
스페셜 타입

WSDP	040	-	5D	-	100L	-	5S
W-Star Drill Plus	드릴직경(DC) 040 = Ø4.0mm		절입깊이(L/D) 5D, 7D 스페셜타입 Flute 길이 100 : 100mm		드릴전장 100L: 100mm		샹크직경 5S : Ø5.0mm

특징

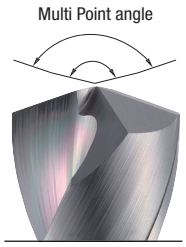


- **XR 씨닝 형상**
  - 유선형 씨닝으로 선단 절삭부하 감소
  - 칩 절삭력 개선

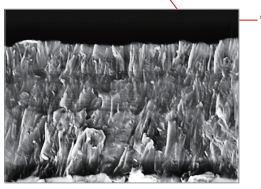


SECTION A-A'

- **최적의 플루트**
  - 칩 포켓 확대적용으로 칩 배출성 우수



- **Multi Point angle**
  - 최적의 Point angle로 절삭력 분산
  - 1차 Point angle을 유선형으로 설계



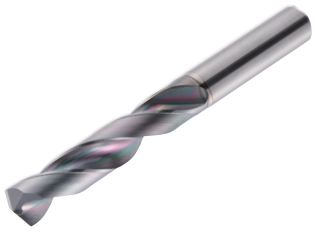
- **신규 AlCrN 코팅**
  - 플루트 윤활성 향상에 따른 칩 배출 향상
  - 다층 코팅으로 내마모성과 내산화성 향상

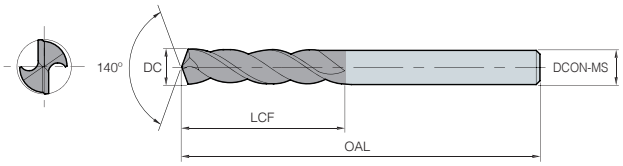
적용영역

◎: 1차 추천 ○: 2차 추천

P					M	K
탄소강	합금강	프리하든강	열처리강		스테인리스강	주철
			STD61(~HRC55)	STD11(HRC55~63)		
◎	◎	○	-	-	◎	○

WSDP-□D





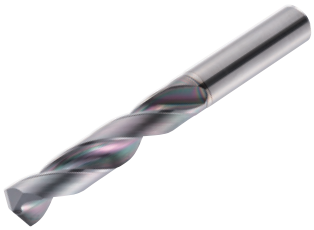
구 분	P	M	K
재종	PC320W		
드릴직경공차	h7		
샹크직경공차	h6		
선단각(SIG)	140°		
비틀림각	유선형		
씨닝형상	XR type		
급유방식	외부		

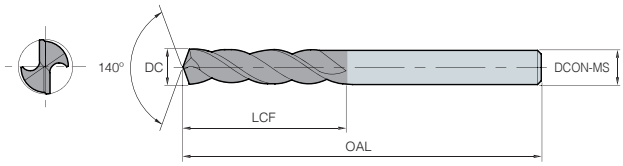
P강 K스테인리스강 K주철

(mm)

형 번		DC	DCON-MS	5D		7D	
				LCF	OAL	LCF	OAL
WSDP	010 - □D	1	3	8	38	12	60
	011 - □D	1.1	3	9	42	12	60
	012 - □D	1.2	3	10	42	12	60
	013 - □D	1.3	3	10	42	15	60
	014 - □D	1.4	3	11	42	15	60
	015 - □D	1.5	3	11	42	15	60
	016 - □D	1.6	3	12	42	20	60
	017 - □D	1.7	3	12	42	20	60
	018 - □D	1.8	3	13	42	20	60
	019 - □D	1.9	3	13	42	20	60
	020 - □D	2	3	18	50	25	66
	021 - □D	2.1	3	18	50	25	66
	022 - □D	2.2	3	18	50	25	66
	023 - □D	2.3	3	18	50	25	66
	024 - □D	2.4	3	18	50	30	66
	025 - □D	2.5	3	18	50	30	66
	026 - □D	2.6	3	18	50	30	66
	027 - □D	2.7	3	18	50	30	66
	028 - □D	2.8	3	18	50	30	66
	029 - □D	2.9	3	18	50	30	66
	030 - □D	3	3	20	55	45	80
	031 - □D	3.1	4	20	55	45	80
	032 - □D	3.2	4	20	55	45	80
	033 - □D	3.3	4	20	55	45	80
	034 - □D	3.4	4	20	55	45	80
	035 - □D	3.5	4	20	55	45	80
	036 - □D	3.6	4	25	55	45	80
	037 - □D	3.7	4	25	55	45	80
	038 - □D	3.8	4	25	55	45	80
	039 - □D	3.9	4	25	55	45	80
	040 - □D	4	4	25	55	45	80
	041 - □D	4.1	5	25	55	45	80
	042 - □D	4.2	5	33	63	45	80
	043 - □D	4.3	5	33	63	45	80
	044 - □D	4.4	5	33	63	45	80
	045 - □D	4.5	5	33	63	45	80
	046 - □D	4.6	5	33	63	45	80
	047 - □D	4.7	5	33	63	45	80
	048 - □D	4.8	5	33	63	45	80
	049 - □D	4.9	5	33	63	45	80
	050 - □D	5	5	33	63	45	80
	051 - □D	5.1	6	33	63	45	80
	052 - □D	5.2	6	36	66	50	83
	053 - □D	5.3	6	36	66	50	83
	054 - □D	5.4	6	36	66	50	83
	055 - □D	5.5	6	36	66	50	83
	056 - □D	5.6	6	36	66	50	83
	057 - □D	5.7	6	36	66	50	83

WSDP-□D





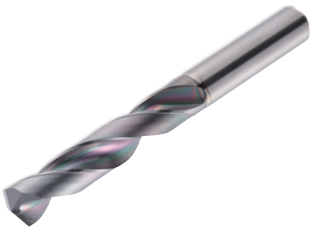
구 분	P	M	K
재종	PC320W		
드릴직경공차	h7		
샹크직경공차	h6		
선단각(SIG)	140°		
비틀림각	유선형		
씨닝형상	XR type		
급유방식	외부		

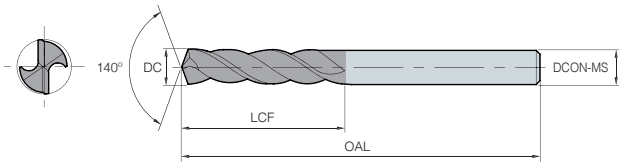
P강 K스테인리스강 K주철

(mm)

형 번		DC	DCON-MS	5D		7D	
				LCF	OAL	LCF	OAL
WSDP	058 - □D	5.8	6	36	66	50	83
	059 - □D	5.9	6	36	66	50	83
	060 - □D	6	6	36	66	50	83
	061 - □D	6.1	7	36	66	50	83
	062 - □D	6.2	7	42	75	53	85
	063 - □D	6.3	7	42	75	53	85
	064 - □D	6.4	7	42	75	53	85
	065 - □D	6.5	7	42	75	53	85
	066 - □D	6.6	7	42	75	53	85
	067 - □D	6.7	7	42	75	53	85
	068 - □D	6.8	7	42	75	53	85
	069 - □D	6.9	7	42	75	53	85
	070 - □D	7	7	42	75	53	85
	071 - □D	7.1	8	42	75	53	85
	072 - □D	7.2	8	46	80	58	90
	073 - □D	7.3	8	46	80	58	90
	074 - □D	7.4	8	46	80	58	90
	075 - □D	7.5	8	46	80	58	90
	076 - □D	7.6	8	46	80	58	90
	077 - □D	7.7	8	46	80	58	90
	078 - □D	7.8	8	46	80	58	90
	079 - □D	7.9	8	46	80	58	90
	080 - □D	8	8	46	80	58	90
	081 - □D	8.1	9	46	80	58	90
	082 - □D	8.2	9	50	85	64	98
	083 - □D	8.3	9	50	85	64	98
	084 - □D	8.4	9	50	85	64	98
	085 - □D	8.5	9	50	85	64	98
	086 - □D	8.6	9	50	85	64	98
	087 - □D	8.7	9	50	85	64	98
	088 - □D	8.8	9	50	85	64	98
	089 - □D	8.9	9	50	85	64	98
	090 - □D	9	9	50	85	64	98
	091 - □D	9.1	10	50	85	64	98
	092 - □D	9.2	10	55	90	68	105
	093 - □D	9.3	10	55	90	68	105
	094 - □D	9.4	10	55	90	68	105
	095 - □D	9.5	10	55	90	68	105
	096 - □D	9.6	10	55	90	68	105
	097 - □D	9.7	10	55	90	68	105
	098 - □D	9.8	10	55	90	68	105
	099 - □D	9.9	10	55	90	68	105
	100 - □D	10	10	55	90	68	105
	101 - □D	10.1	11	55	90	68	105
	102 - □D	10.2	11	57	95	73	110
	103 - □D	10.3	11	57	95	73	110
	104 - □D	10.4	11	57	95	73	110
	105 - □D	10.5	11	57	95	73	110

WSDP-□D





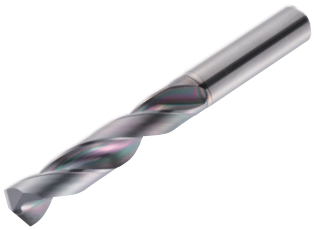
구 분	P	M	K
재종	PC320W		
드릴직경공차	h7		
샹크직경공차	h6		
선단각(SIG)	140°		
비틀림각	유선형		
씨닝형상	XR type		
급유방식	외부		

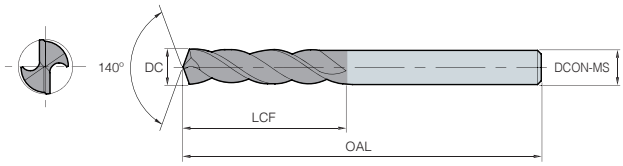
P강 K스테인리스강 K주철

(mm)

형 번		DC	DCON-MS	5D		7D	
				LCF	OAL	LCF	OAL
WSDP	106 - □D	10.6	11	57	95	73	110
	107 - □D	10.7	11	57	95	73	110
	108 - □D	10.8	11	57	95	73	110
	109 - □D	10.9	11	57	95	73	110
	110 - □D	11	11	57	95	73	110
	111 - □D	11.1	12	57	95	73	110
	112 - □D	11.2	12	63	102	80	120
	113 - □D	11.3	12	63	102	80	120
	114 - □D	11.4	12	63	102	80	120
	115 - □D	11.5	12	63	102	80	120
	116 - □D	11.6	12	63	102	80	120
	117 - □D	11.7	12	63	102	80	120
	118 - □D	11.8	12	63	102	80	120
	119 - □D	11.9	12	63	102	80	120
	120 - □D	12	12	63	102	80	120
	121 - □D	12.1	13	63	102	80	120
	122 - □D	12.2	13	63	102	90	137
	123 - □D	12.3	13	63	102	90	137
	124 - □D	12.4	13	63	102	90	137
	125 - □D	12.5	13	63	102	90	137
	126 - □D	12.6	13	63	102	90	137
	127 - □D	12.7	13	63	102	90	137
	128 - □D	12.8	13	63	102	90	137
	129 - □D	12.9	13	63	102	90	137
	130 - □D	13	13	63	102	90	137
	131 - □D	13.1	14	63	102	90	137
	132 - □D	13.2	14	65	107	96	147
	133 - □D	13.3	14	65	107	96	147
	134 - □D	13.4	14	65	107	96	147
	135 - □D	13.5	14	65	107	96	147
	136 - □D	13.6	14	65	107	96	147
	137 - □D	13.7	14	65	107	96	147
	138 - □D	13.8	14	65	107	96	147
	139 - □D	13.9	14	65	107	96	147
	140 - □D	14	14	65	107	96	147
	141 - □D	14.1	15	65	107	96	147
	142 - □D	14.2	15	67	111	100	153
	143 - □D	14.3	15	67	111	100	153
	144 - □D	14.4	15	67	111	100	153
	145 - □D	14.5	15	67	111	100	153
	146 - □D	14.6	15	67	111	100	153
	147 - □D	14.7	15	67	111	100	153
	148 - □D	14.8	15	67	111	100	153
	149 - □D	14.9	15	67	111	100	153
	150 - □D	15	15	67	111	100	153
	151 - □D	15.1	16	67	111	100	153
	152 - □D	15.2	16	69	115	112	160
	153 - □D	15.3	16	69	115	112	160

WSDP-□D





구 분	P	M	K
재종	PC320W		
드릴직경공차	h7		
샹크직경공차	h6		
선단각(SIG)	140°		
비틀림각	유선형		
씨닝형상	XR type		
급유방식	외부		

P강 K스테인리스강 K주철

(mm)

형 번		DC	DCON-MS	5D		7D	
				LCF	OAL	LCF	OAL
WSDP	154 - □D	15.4	16	69	115	112	160
	155 - □D	15.5	16	69	115	112	160
	156 - □D	15.6	16	69	115	112	160
	157 - □D	15.7	16	69	115	112	160
	158 - □D	15.8	16	69	115	112	160
	159 - □D	15.9	16	69	115	112	160
	160 - □D	16	16	69	115	112	160
	161 - □D	16.1	17	69	115	112	160
	162 - □D	16.2	17	71	119	112	160
	163 - □D	16.3	17	71	119	112	160
	164 - □D	16.4	17	71	119	112	160
	165 - □D	16.5	17	71	119	112	160
	166 - □D	16.6	17	71	119	112	160
	167 - □D	16.7	17	71	119	112	160
	168 - □D	16.8	17	71	119	112	160
	169 - □D	16.9	17	71	119	112	160
	170 - □D	17	17	71	119	112	160
	171 - □D	17.1	18	71	119	112	160
	172 - □D	17.2	18	74	123	112	160
	173 - □D	17.3	18	74	123	112	160
	174 - □D	17.4	18	74	123	112	160
	175 - □D	17.5	18	74	123	112	160
	176 - □D	17.6	18	74	123	112	160
	177 - □D	17.7	18	74	123	112	160
	178 - □D	17.8	18	74	123	112	160
	179 - □D	17.9	18	74	123	112	160
	180 - □D	18	18	74	123	112	160
	181 - □D	18.1	19	74	123	112	160
	182 - □D	18.2	19	76	127	112	160
	183 - □D	18.3	19	76	127	112	160
	184 - □D	18.4	19	76	127	112	160
	185 - □D	18.5	19	76	127	112	160
	186 - □D	18.6	19	76	127	112	160
	187 - □D	18.7	19	76	127	112	160
	188 - □D	18.8	19	76	127	112	160
	189 - □D	18.9	19	76	127	112	160
	190 - □D	19	19	76	127	112	160
	191 - □D	19.1	20	76	127	112	160
	192 - □D	19.2	20	80	131	112	160
	193 - □D	19.3	20	80	131	112	160
	194 - □D	19.4	20	80	131	112	160
	195 - □D	19.5	20	80	131	112	160
	196 - □D	19.6	20	80	131	112	160
	197 - □D	19.7	20	80	131	112	160
	198 - □D	19.8	20	80	131	112	160
	199 - □D	19.9	20	80	131	112	160
	200 - □D	20	20	80	131	112	160

비철금속, 연강 가공용 초경 솔리드 드릴

SSD-N

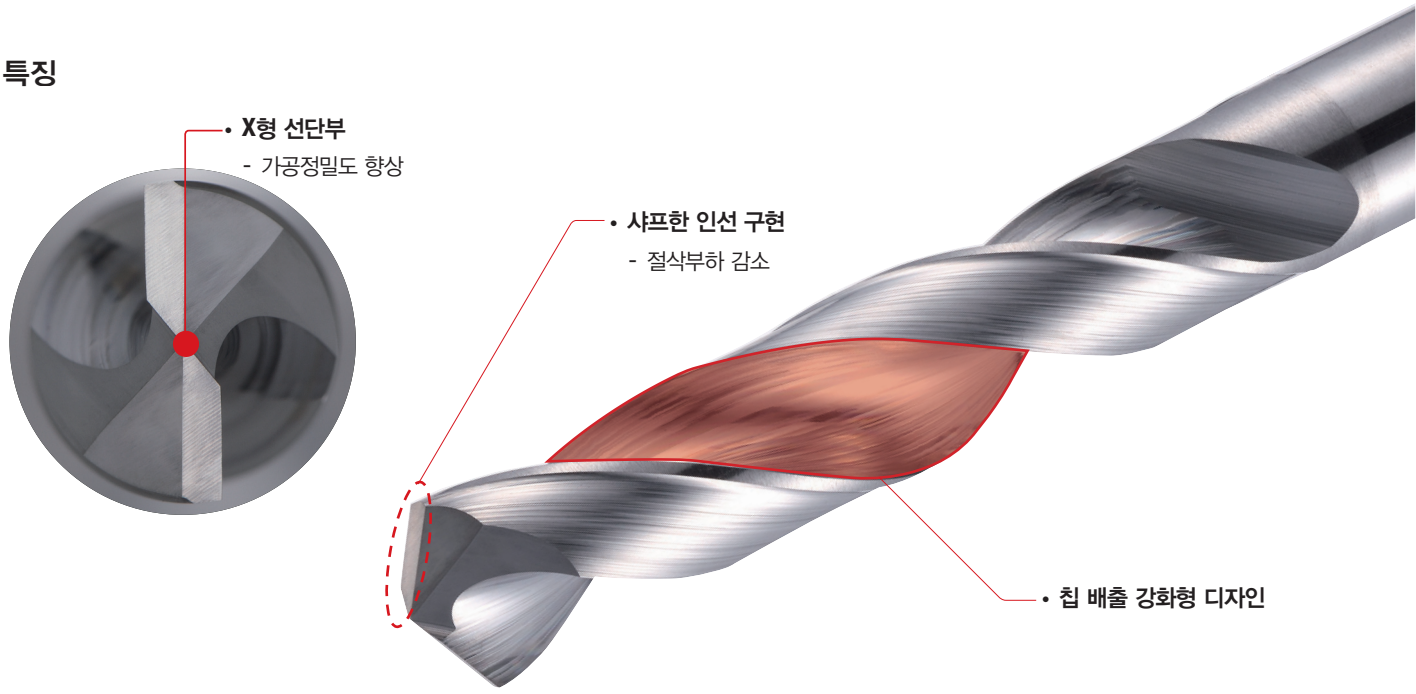
- 안정된 제품 성능으로 생산성 증가
- 연강, 비철류의 다양한 피삭재 가공에 적용

형번표기법

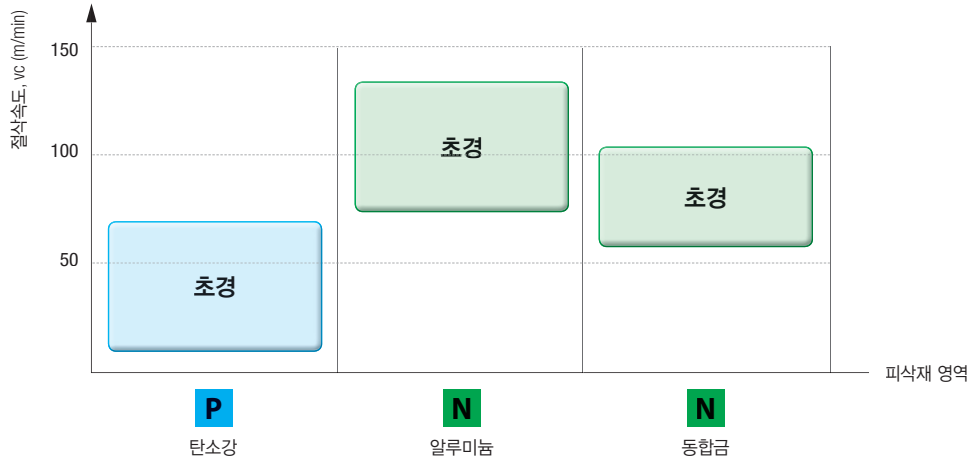
스페셜 타입

SSD	010	-	N	10	-	60L	-	6S
Solid Spiral Drill	**드릴직경 (DC)** 010 = Ø1.0mm		Nonferrous	**Flute 길이** 10 : 10mm		**드릴전장** 60L : 60mm		**샹크직경** 6S : Ø6.0mm

특징

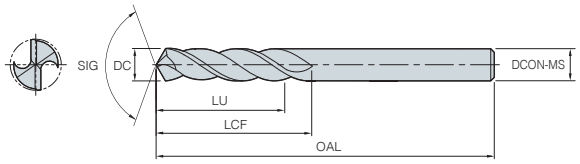


적용영역



SSD-N





코팅유무	무
드릴직경공차	h8
샹크직경공차	h7
선단각(SIG)	118°
비틀림각	30°
씨닝형상	X type
급유방식	외부

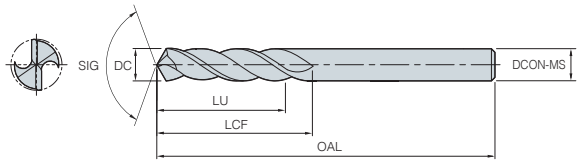
(mm)

형 번		DC	DCON-MS	LCF	OAL
SSD	010-N	1	1	10	38
	011-N	1.1	1.1	10	38
	012-N	1.2	1.2	10	38
	013-N	1.3	1.3	13	38
	014-N	1.4	1.4	13	38
	015-N	1.5	1.5	13	38
	016-N	1.6	1.6	13	38
	017-N	1.7	1.7	13	38
	018-N	1.8	1.8	13	38
	019-N	1.9	1.9	13	38
	020-N	2	2	16	45
	021-N	2.1	2.1	16	45
	022-N	2.2	2.2	16	45
	023-N	2.3	2.3	16	45
	024-N	2.4	2.4	18	50
	025-N	2.5	2.5	20	50
	026-N	2.6	2.6	20	50
	027-N	2.7	2.7	22	50
	028-N	2.8	2.8	22	50
	029-N	2.9	2.9	22	50
	030-N	3	3	22	50
	031-N	3.1	3.1	25	50
	032-N	3.2	3.2	25	50
	033-N	3.3	3.3	25	50
	034-N	3.4	3.4	25	50
	035-N	3.5	3.5	25	50
	036-N	3.6	3.6	28	55
	037-N	3.7	3.7	28	55
	038-N	3.8	3.8	28	55
	039-N	3.9	3.9	28	55
	040-N	4	4	28	55
	041-N	4.1	4.1	30	60
	042-N	4.2	4.2	30	60
	043-N	4.3	4.3	30	60
	044-N	4.4	4.4	30	60
	045-N	4.5	4.5	30	60
	046-N	4.6	4.6	33	65
	047-N	4.7	4.7	33	65
	048-N	4.8	4.8	35	65
	049-N	4.9	4.9	35	65
	050-N	5	5	35	65
	051-N	5.1	5.1	35	65
	052-N	5.2	5.2	35	65
	053-N	5.3	5.3	35	65

형 번		DC	DCON-MS	LCF	OAL
SSD	054-N	5.4	5.4	35	65
	055-N	5.5	5.5	35	65
	056-N	5.6	5.6	38	75
	057-N	5.7	5.7	38	75
	058-N	5.8	5.8	38	75
	059-N	5.9	5.9	38	75
	060-N	6	6	38	75
	061-N	6.1	6.1	38	75
	062-N	6.2	6.2	38	75
	063-N	6.3	6.3	38	75
	064-N	6.4	6.4	38	75
	065-N	6.5	6.5	38	75
	066-N	6.6	6.6	45	80
	067-N	6.7	6.7	45	80
	068-N	6.8	6.8	45	80
	069-N	6.9	6.9	45	80
	070-N	7	7	45	80
	071-N	7.1	7.1	45	80
	072-N	7.2	7.2	45	80
	073-N	7.3	7.3	45	80
	074-N	7.4	7.4	45	80
	075-N	7.5	7.5	45	80
	076-N	7.6	7.6	50	85
	077-N	7.7	7.7	50	85
	078-N	7.8	7.8	50	85
	079-N	7.9	7.9	50	85
	080-N	8	8	50	85
	081-N	8.1	8.1	50	85
	082-N	8.2	8.2	50	85
	083-N	8.3	8.3	50	85
	084-N	8.4	8.4	50	85
	085-N	8.5	8.5	50	85
	086-N	8.6	8.6	50	95
	087-N	8.7	8.7	50	95
	088-N	8.8	8.8	50	95
	089-N	8.9	8.9	50	95
	090-N	9	9	50	95
	091-N	9.1	9.1	50	95
	092-N	9.2	9.2	50	95
	093-N	9.3	9.3	50	95
	094-N	9.4	9.4	50	95
	095-N	9.5	9.5	50	95
	096-N	9.6	9.6	50	95
	097-N	9.7	9.7	50	95

SSD-N





코팅유무	무
드릴직경공차	h8
샹크직경공차	h7
선단각(SIG)	118°
비틀림각	30°
씨닝형상	X type
급유방식	외부

(mm)

형 번		DC	DCON-MS	LCF	OAL
SSD	098-N	9.8	9.8	50	95
	099-N	9.9	9.9	55	100
	100-N	10	10	55	100
	101-N	10.1	10.1	55	115
	102-N	10.2	10.2	55	115
	103-N	10.3	10.3	55	115
	104-N	10.4	10.4	55	115
	105-N	10.5	10.5	55	115
	106-N	10.6	10.6	60	115
	107-N	10.7	10.7	60	115
	108-N	10.8	10.8	60	115
	109-N	10.9	10.9	60	115

형 번		DC	DCON-MS	LCF	OAL
SSD	110-N	11	11	65	115
	111-N	11.1	11.1	65	120
	112-N	11.2	11.2	75	120
	113-N	11.3	11.3	75	120
	115-N	11.5	11.5	75	120
	118-N	11.8	11.8	75	120
	119-N	11.9	11.9	75	120
	120-N	12	12	75	120
	124-N	12.4	12.4	75	125
	125-N	12.5	12.5	75	125
	130-N	13	13	75	130

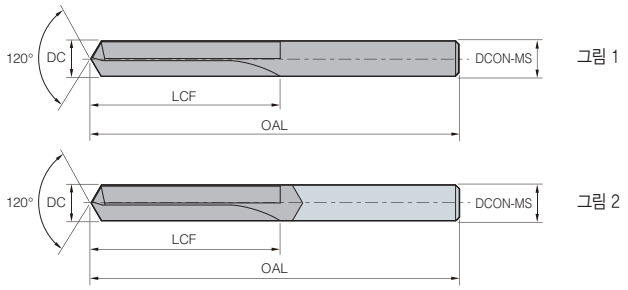
Burnishing Drill

버니싱 드릴

BDS

버니싱 드릴





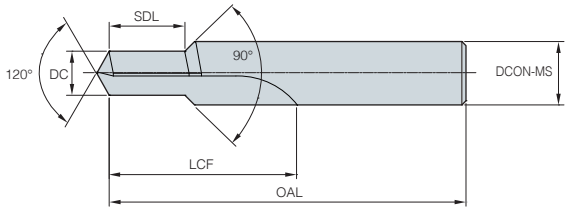
(mm)

형 번		DC	DCON-MS	LCF	OAL	그림
BDS	040S	4	4	35	80	1
	050S	5	5	40	85	1
	060S	6	6	50	95	1
	070S	7	7	55	100	1
	080S	8	8	65	110	1
	090S	9	9	70	120	1
	100S	10	10	80	130	1
	110S	11	11	90	140	1
	120B	12	12	95	150	2
	130B	13	16	105	160	2
	140B	14	16	110	170	2
	150B	15	16	120	185	2
	160B	16	16	125	190	2

BDT

스텝버니싱 드릴





(mm)

형 번		DC	DCON-MS	SDL	LCF	OAL	Tap
BDT	M05080 - ℓ1	4.2	6	35	9~15	90	M5XP0.8
	M06100 - ℓ1	5.0	7	40	11~18	95	M6XP1.0
	M08125 - ℓ1	6.8	10	50	15~24	105	M8XP1.25
	M10125 - ℓ1	8.8	12	55	17~30	110	M10XP1.25
	M10150 - ℓ1	8.5	12	55	17~30	110	M10XP1.5
	M12125 - ℓ1	10.8	14	60	19~36	120	M12XP1.25
	M12150 - ℓ1	10.5	14	60	19~36	120	M12XP1.5
	M12175 - ℓ1	10.3	14	60	19~36	120	M12XP1.75

알루미늄 합금의 고정도 홀가공용

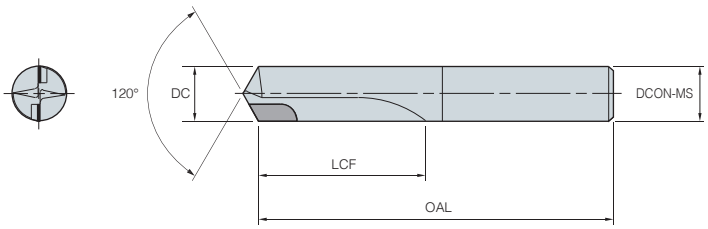
PCD Drill

- 알루미늄 합금의 고정도 홀가공용
- IT등급 7~8급 홀가공 가능
- 고강성 설비 및 고정도 홀더사용 권장

PDD

브레이징 타입





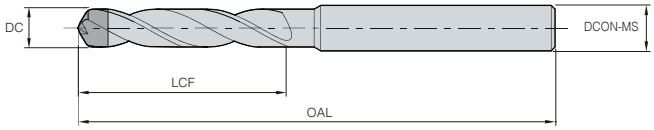
(mm)

형 번		DC	DCON-MS	LCF	OAL
PDD	0500	5.0	5.0	30	80
	0550	5.5	5.5	30	80
	0600	6.0	6.0	30	80
	0650	6.5	6.5	40	95
	0700	7.0	7.0	40	95
	0750	7.5	7.5	45	100
	0800	8.0	8.0	45	100
	0850	8.5	8.5	50	110
	0900	9.0	9.0	50	110
	0950	9.5	9.5	55	115
	1000	10.0	10.0	55	115
	1050	10.5	10.5	60	120
	1100	11.0	11.0	60	120
	1150	11.5	11.5	65	125
	1200	12.0	12.0	65	125

CPD

표준 콘 타입





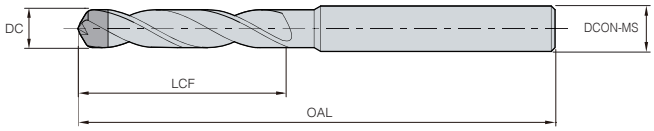
(mm)

형 번		DC	DCON-MS	LCF	OAL
CPD	020~030	2.0~3.0	4	10	43
	031~035	3.1~3.5	4	15	43
	036~040	3.6~4.0	4	15	43
	041~050	4.1~5.0	6	20	53
	051~060	5.1~6.0	6	25	63
	061~070	6.1~7.0	8	30	79
	071~080	7.1~8.0	8	35	79

CPDL

롱 콘 타입





(mm)

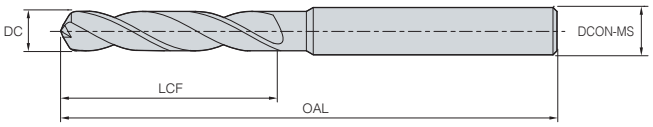
형 번		DC	DCON-MS	LCF	OAL
CPDL	020~030	2.0~3.0	4	90	160
	031~035	3.1~3.5	4	90	160
	036~040	3.6~4.0	4	90	160
	041~050	4.1~5.0	6	90	160
	051~060	5.1~6.0	6	90	160
	061~070	6.1~7.0	8	90	160
	071~080	7.1~8.0	8	90	160

※ 다양한 영역 가공이 가능한 고기능성 드릴 : 콘 타입 드릴(CPD)
※ 탁월한 정밀도 및 표면조도 구현
※ 고정밀급 Primium PCD 드릴

SPD

표준 샌드위치 타입





(mm)

형 번		DC	DCON-MS	LCF	OAL
SPD	040	4.0	4	20	43
	045	4.5	6	20	53
	050	5.0	6	25	63
	055	5.5	6	25	63
	060	6.0	6	25	63
	065	6.5	8	30	79
	070	7.0	8	35	79
	075	7.5	8	35	79
	080	8.0	8	35	79
	085	8.5	10	60	110
	090	9.0	10	60	110
	095	9.5	10	60	110
	100	10.0	10	60	110
	105	10.5	10	60	110
	110	11.0	12	70	110
	115	11.5	12	70	110
	120	12.0	12	80	150
	125	12.5	12	80	150
	130	13.0	14	80	150
	135	13.5	14	80	150
	140	14.0	14	80	150
	145	14.5	14	80	150
	150	15.0	16	80	150
	160	16.0	16	80	150

※ 다양한 영역 가공이 가능한 고기능성 드릴 : 샌드위치 타입 드릴(SPD)
※ 탁월한 정밀도 및 표면조도 구현
※ 고정밀급 Primium PCD 드릴

재연삭 사용이 가능하며, 사용한 건 드릴은 초경부위를 교환하여 재생 가능

Gun Drill

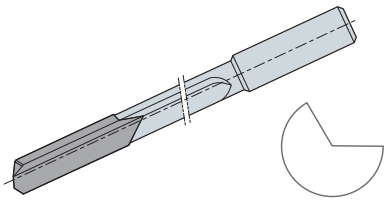
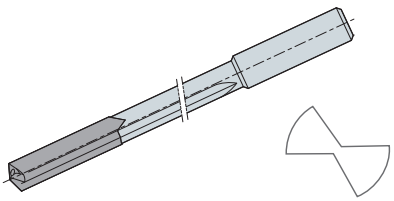
건 드릴

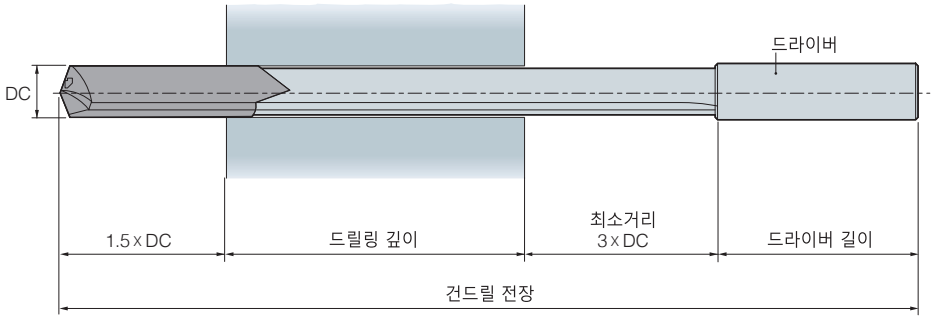
- 깊은 구멍가공(50～100×D)에서 고능률 가공 가능
- 고정도 구멍가공 가능(구멍정도 : IT9, 면조도 : Ra 0.1～3.0S)
- 독자적인 인선형상과 가이드패드의 채용으로 안정적인 품질관리가 가능
- 고객의 요구에 의하여 인선형상 및 드라이버의 사양을 변경 제작가능
- 주문시 전장 지정 필요

형번표기법

KGD	S	12.05	- 1500	/ D30
구 분	인선형태	드릴직경	드릴전장	드라이버 규격
KORLOY Gun Drill	S : Single T : Twin	Ø12.05mm	1500mm	D30

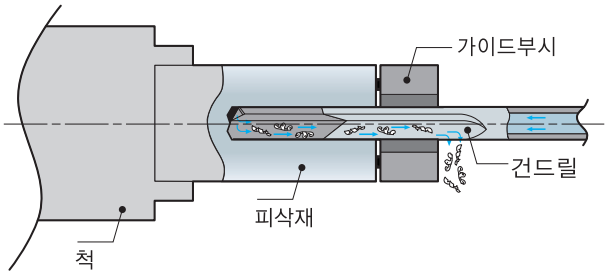
특징

구 분	싱글 립 타입(Single Lip type)	트윈 립 타입(Twin Lip type)
형 상		
적용드릴직경	Ø3.0～Ø30.0	Ø8.0～Ø24.0
가 공 깊 이	≥ 2,000mm	≥ 1,000mm
구 멍 공 차	IT9	IT10
면 조 도	Ra 0.1～3.0μm	Ra 1.0～4.0μm
적 용	모든 재질에 적용 가능	칩처리가 양호한 피삭재에 적용 싱글 립 타입보다 이송을 증가 시켜 사용 가능



- 주문시에 위의 형번표기법과 그림을 참고하여 형번 선정
- 드라이버 규격은 C49페이지를 참고하여 적용
- 주문 시에는 전장 지정

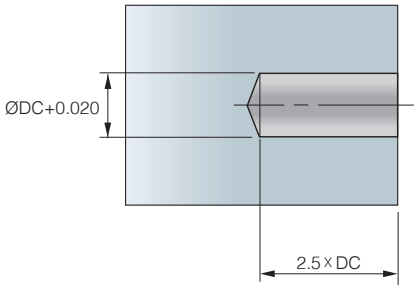
전용장비에서의 건 드릴 작업



- 건 드릴은 드릴링시에 스스로 중심을 잡을 수 없기 때문에 따라서, 피삭재의 중심으로 진입하기 위해서는 중심을 잡아주는 보조장치인 가이드부시 사용

머시닝센터에서의 건 드릴 작업

❶ 파이롯트홀 가공

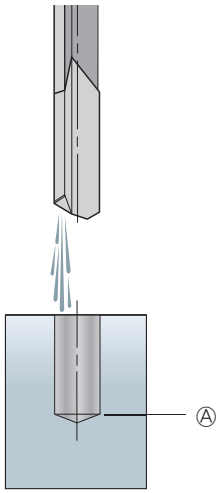


- 건 드릴 전용기에서 작업시에는 가이드부시가 있어서 파이롯트홀 불필요
- 그러나 일반적인 머시닝센터에서 건 드릴 작업을 할 경우에는 가이드부시가 없으므로 가이드부시 역할의 파이롯트홀 필요
- 파이롯트홀은 건 드릴 직경보다 +0.01~+0.02(H7) 크게 만들며, 가공깊이는 2.5×DC 정도 가공
- 파이롯트홀 가공용 드릴은 마하 드릴(MSD)을 사용



마하 드릴(MSD)

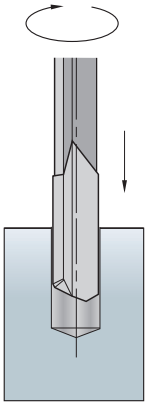
❷ 파이롯트홀로 건 드릴 이동



❶ 건 드릴이 파이롯트홀안에 진입 하기 전에는 회전금지

❷ 건 드릴은 절삭유를 공급하면서 파이롯트홀에 진입

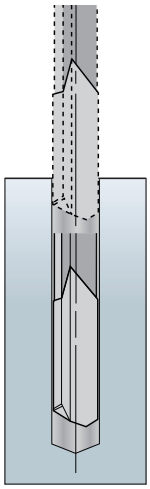
❸ 건 드릴 작업 시작



❶ 스핀들 회전

❷ 건 드릴이 이송을 하며 가공

❹ 건 드릴 가공 후



❶ 급속 복귀

❷ 파이롯트홀 위치 Ⓐ에 정지

❸ 건 드릴 회전정지, 절삭유공급정지

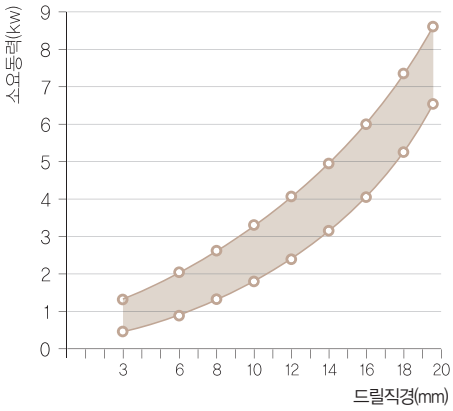
❹ 건 드릴을 피삭재에서 이탈

기술자료

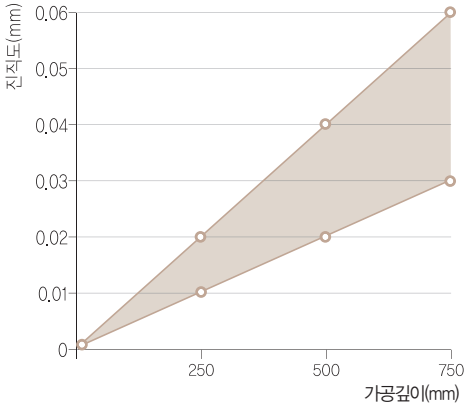
홀의 진직도는 아래의 여러 요소에 의하여 결정

• 드릴직경과 깊이, 절삭조건과 가공 형태, 피삭재의 질과 균일성, 가공 공구 및 설비의 상태, 드릴 부시

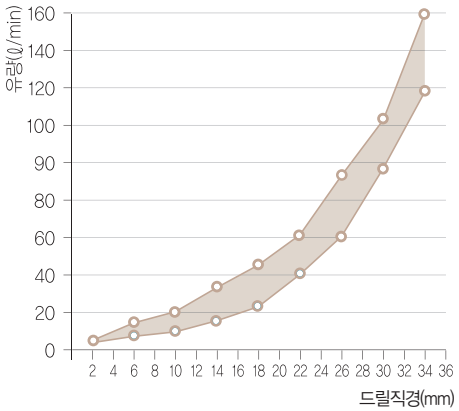
소요동력



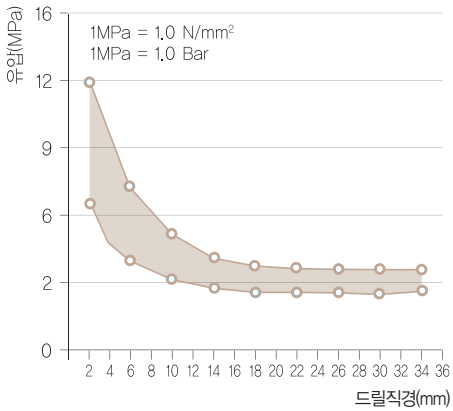
진직도



절삭유량



절삭유압



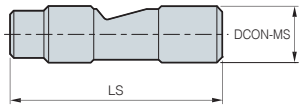
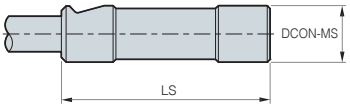
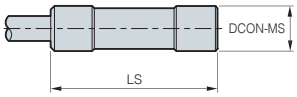
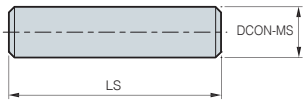
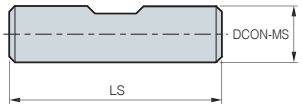
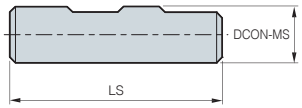
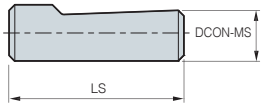
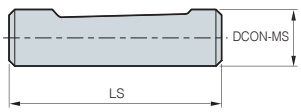
※ 상기 그래프는 일반적인 수치를 나타낸 것으로 공구 및 피삭재의 상태 등 여러 요소에 의하여 변경될 수 있음

• **절삭유의 압력 및 유량** – 효과적인 칩 배출과 절삭날의 냉각을 위해서 강한 압력으로 절삭유 사용

• **불순물 제거 : 필터의 사용** – 20μm 미만의 필터를 사용. 불순물은 절삭유의 흐름을 방해하고 공구의 마모 및 냉각 펌프, 주축 부하의 상승

• **절삭유의 온도** – 적정 절삭유 온도 : 20℃~22℃ 절삭유 온도가 50℃ 이상에서는 사용 방지

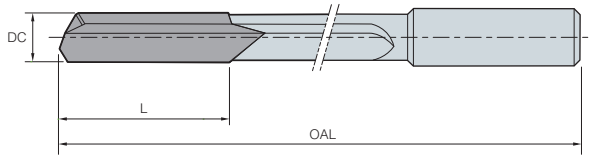
드라이버 규격

드라이버 형식	형 상	규격	DC×L		초경 타입	
			DC×L	나사	Tipped	Solid
Central Clamping Surface 15°		D01	10*40		•	•
		D02	16*45		•	
		D03	19.05*69.8		•	
		D04	25*70		•	
		D05	25.4*69.8		•	
Frontal Clamping Surface 15°		D06	16*50		•	
Central Clamping Tapered		D07	12.7*38.1		•	•
		D08	16*70			
		D09	19.05*69.8		•	
		D10	20*70			
Cylindrical DIN1835A DIN6535HA		D11	4*28		•	•
		D12	6*36		•	•
		D13	10*40		•	•
		D14	16*48		•	•
		D15	20*50		•	
		D16	25*56		•	
Weldon DIN1835B		D17	10*40		•	•
		D18	12*45		•	•
		D19	16*48		•	•
		D20	20*50		•	•
Weldon DIN6535HB		D21	25*56		•	
		D22	32*60		•	
		D23	40*70			
Whistle Notch DIN1835E		D24	10*40		•	•
		D25	12*45		•	•
		D26	16*48		•	•
		D27	20*50		•	•
		D28	25*56		•	
		D29	32*60		•	
Whistle Notch DIN6535HE		D30	10*40		•	•
		D31	12*45		•	•
		D32	16*48		•	•
		D33	20*50		•	•

※ 이형품 제작도 가능. 주문시 형상 및 치수를 지정

KGDS

싱글 립 타입



형번 호칭 범례	
O.OO	건 드릴직경
□□□□	전장
D□□	드라이버 규격

(mm)

형 번		DC	L
KGDS	O.OO-□□□□/D□□	3.00~3.49	19
	O.OO-□□□□/D□□	3.50~3.99	19
	O.OO-□□□□/D□□	4.00~4.49	23
	O.OO-□□□□/D□□	4.50~4.99	23
	O.OO-□□□□/D□□	5.00~5.49	24
	O.OO-□□□□/D□□	5.50~5.99	26
	O.OO-□□□□/D□□	6.00~6.49	27
	O.OO-□□□□/D□□	6.50~6.99	28
	O.OO-□□□□/D□□	7.00~7.49	29
	O.OO-□□□□/D□□	7.50~7.99	30
	O.OO-□□□□/D□□	8.00~8.49	31
	O.OO-□□□□/D□□	8.50~8.99	31
	O.OO-□□□□/D□□	9.00~8.49	31
	O.OO-□□□□/D□□	9.50~9.99	31
	O.OO-□□□□/D□□	10.00~10.49	31
	O.OO-□□□□/D□□	10.50~10.99	32
	O.OO-□□□□/D□□	11.00~11.49	35
	O.OO-□□□□/D□□	11.50~11.99	35
	O.OO-□□□□/D□□	12.00~12.49	38
	O.OO-□□□□/D□□	12.50~12.99	38
	O.OO-□□□□/D□□	13.00~13.99	38
	O.OO-□□□□/D□□	14.00~14.99	38
	O.OO-□□□□/D□□	15.00~15.99	39
	O.OO-□□□□/D□□	16.00~16.99	39
	O.OO-□□□□/D□□	17.00~17.99	40
	O.OO-□□□□/D□□	18.00~18.99	41
	O.OO-□□□□/D□□	19.00~19.99	41
	O.OO-□□□□/D□□	20.00~20.99	44
	O.OO-□□□□/D□□	21.00~21.99	46
	O.OO-□□□□/D□□	22.00~22.99	49
	O.OO-□□□□/D□□	23.00~23.99	51
	O.OO-□□□□/D□□	24.00~24.99	52
	O.OO-□□□□/D□□	25.00~25.99	54
	O.OO-□□□□/D□□	26.00~26.99	54
	O.OO-□□□□/D□□	27.00~27.99	54
	O.OO-□□□□/D□□	28.00~28.99	54
	O.OO-□□□□/D□□	29.00~29.99	56
	O.OO-□□□□/D□□	30.00~30.99	59
	O.OO-□□□□/D□□	31.00~31.99	61
	O.OO-□□□□/D□□	32.00~32.99	61

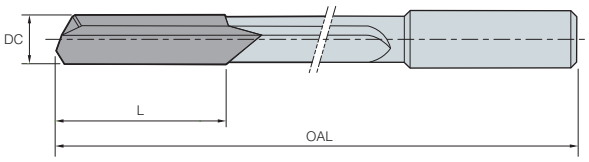
※ 주문시 전장 및 드라이버 번호(또는 도면 첨부)를 표기

제작 가능 전장

형 번	드릴직경	제작 가능 전장				
		250mm	500mm	1000mm	1500mm	2000mm
KGDS	3.00~3.49	○	○	○		
	3.50~32.99	○	○	○	○	○

KGDT

싱글 립 타입



형번 호칭 범례	
O.OO	건 드릴직경
□□□□	전장
D□□	드라이버 규격

(mm)

형 번		DC	L
KGDT	O.OO-□□□□/D□□	8.00~8.49	38
	O.OO-□□□□/D□□	8.50~8.99	38
	O.OO-□□□□/D□□	9.00~8.49	40
	O.OO-□□□□/D□□	9.50~9.99	40
	O.OO-□□□□/D□□	10.00~10.49	40
	O.OO-□□□□/D□□	10.50~10.99	40
	O.OO-□□□□/D□□	11.00~11.49	45
	O.OO-□□□□/D□□	11.50~11.99	45
	O.OO-□□□□/D□□	12.00~12.49	45
	O.OO-□□□□/D□□	12.50~12.99	48
	O.OO-□□□□/D□□	13.00~13.99	48
	O.OO-□□□□/D□□	14.00~14.99	48
	O.OO-□□□□/D□□	15.00~15.99	48
	O.OO-□□□□/D□□	16.00~16.99	50
	O.OO-□□□□/D□□	17.00~17.99	50
	O.OO-□□□□/D□□	18.00~18.99	50
	O.OO-□□□□/D□□	19.00~19.99	50
	O.OO-□□□□/D□□	20.00~20.99	55
	O.OO-□□□□/D□□	21.00~21.99	55
	O.OO-□□□□/D□□	22.00~22.99	55
	O.OO-□□□□/D□□	23.00~23.99	60

※ 주문시 전장 및 드라이버 번호(또는 도면 첨부)를 표기

제작 가능 전장

형 번	드릴직경	제작 가능 전장				
		250mm	500mm	1000mm	1500mm	2000mm
KGDT	8.00~23.99	○	○	○		

Chucking / Machine Reamer

척킹 리머

SCRS



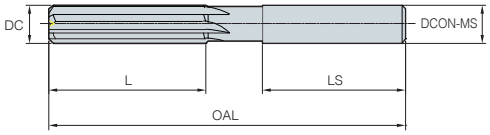


그림 1

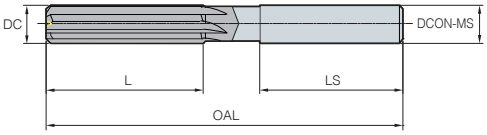


그림 2

(mm)

형 번		NOF	DC	DCON-MS	L	LS	OAL	그림
SCRS	050S	4	5	6	20	40	100	1
	060S	4	6	6	20	40	115	1
	070S	4	7	8	20	40	125	1
	080S	4	8	8	20	40	135	1
	090S	4	9	10	20	45	140	1
	100B	4	10	10	25	50	145	2
	110B	4	11	12	25	50	150	2
	120B	4	12	12	25	50	160	2
	130B	4	13	16	25	50	165	2
	140B	6	14	16	25	50	170	2
	150B	6	15	16	30	50	180	2
	160B	6	16	16	30	50	190	2
	180B	6	18	20	30	55	210	2
	200B	6	20	20	40	60	230	2

※ SCRS___S : Solid 타입, SCRS___B : Brazing 타입

SCRH



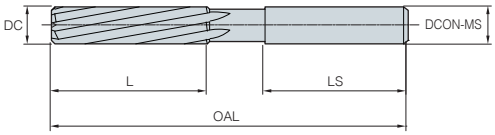


그림 1

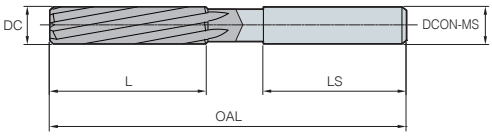


그림 2

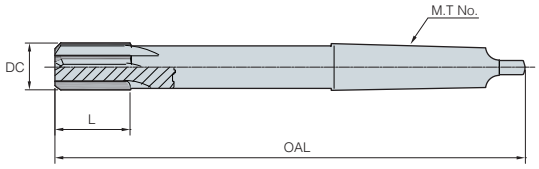
(mm)

형 번		NOF	DC	DCON-MS	L	LS	OAL	그림
SCRH	050S	4	5	6	20	40	100	1
	060S	4	6	6	20	40	115	1
	070S	4	7	8	20	40	125	1
	080S	4	8	8	20	40	135	1
	090S	4	9	10	20	45	140	1
	100B	4	10	10	25	50	145	2
	110B	4	11	12	25	50	150	2
	120B	4	12	12	25	50	160	2
	130B	4	13	16	25	50	165	2
	140B	6	14	16	25	50	170	2
	150B	6	15	16	30	50	180	2
	160B	6	16	16	30	50	190	2
	180B	6	18	20	30	55	210	2
	200B	6	20	20	40	60	230	2

※ SCRS___S : Solid 타입, SCRS___B : Brazing 타입

TCRS



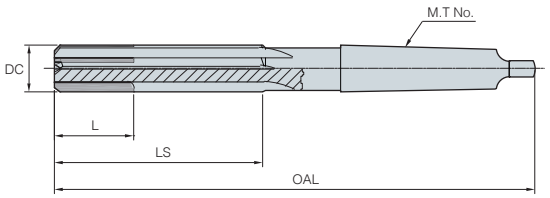


(mm)

형 번		NOF	DC	L	OAL	M.T No.
TCRS	070	4	7	20	150	1
	080	4	8	20	150	1
	090	4	9	20	160	1
	100	4	10	25	160	1
	110	4	11	25	170	1
	120	4	12	25	170	1
	130	4	13	25	180	1
	140	6	14	25	190	1
	150	6	15	30	200	2
	160	6	16	30	200	2
	180	6	18	30	220	2
	200	6	20	40	230	2
	250	6	25	40	260	3
	280	8	28	40	270	3
	300	8	30	50	290	3

TMRS





(mm)

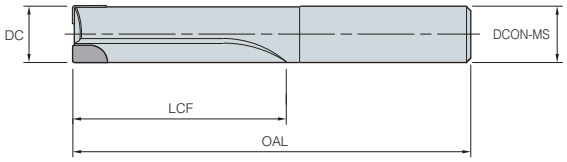
형 번		NOF	DC	L	LS	OAL	M.T No.
TMRS	070	4	7	60	60	150	1
	080	4	8	70	70	150	1
	090	4	9	70	70	160	1
	100	4	10	75	75	170	1
	110	4	11	75	75	170	1
	120	4	12	80	40	180	1
	130	4	13	85	40	190	1
	140	6	14	90	45	210	1
	150	6	15	90	45	215	2
	160	6	16	100	50	220	2
	180	6	18	105	50	225	2
	200	6	20	120	50	240	2
	250	6	25	130	50	270	3
	280	8	28	140	50	280	3
	300	8	30	150	50	290	3

PCD Reamer

PCD 리머

PDR





(mm)

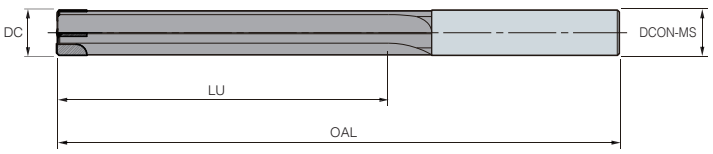
형 번		NOF	DC	DCON-MS	LCF	OAL
PDR	2050	2	5	6	30	65
	2060	2	6	6	40	75
	2070	2	7	8	40	75
	2080	2	8	8	40	75
	2090	2	9	10	40	85
	2100	2	10	10	40	85
	2120	2	12	12	50	95
	2140	2	14	16	50	95
	2150	2	15	16	50	100
	4160	4	16	16	50	100
	4180	4	18	20	60	110
	4200	4	20	20	60	110

Cermet Reamer

써메트 리머

KCR





(mm)

형 번		NOF	DC	DCON-MS	LU	OAL
KCR	060~079-25-70L	2	6.0~7.9	8	25	70
	080~099-035-90L	2	8.0~9.9	10	35	90
	100~119-050-100L	4	10.0~11.9	12	50	100
	120~159-060-110L	4	12.0~15.9	12	60	110
	160~199-060-110L	4	16.0~19.9	16	60	110
	200~259-060-110L	4	20.0~25.9	20	60	110
	260~300-070-130L	4	26.0~30.0	25	70	130

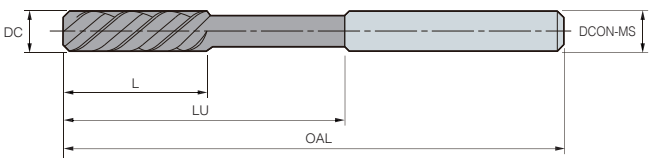
※ 플루트(LU) 및 전장(OAL)은 조정 가능하며 최대 전장은 150mm 이내로 적용 바랍니다.

Broach Reamer

브로치 리머

HBRE





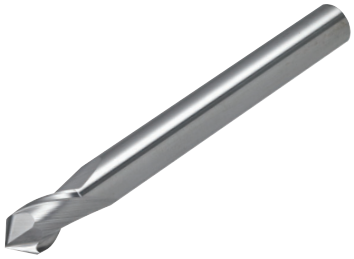
(mm)

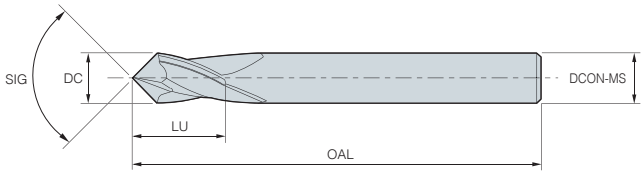
형 번		NOF	DC	DCON-MS	L	LU	OAL	타입
HBRE	030	3	3	3	20	40	70	Solid
	040	3	4	4	25	40	70	Solid
	060	4	6	6	30	50	80	Solid
	080	4	8	8	30	60	100	Solid
	100	4	10	10	30	60	100	Solid
	120	4	12	12	40	70	120	Top Solid
	160	6	16	16	40	80	130	Top Solid
	200	6	20	20	50	90	150	Top Solid
	250	6	25	25	50	90	150	Top Solid

Chamfer Tool

챔퍼툴

CET





(mm)

형 번		DC	DCON-MS	LU	OAL	SIG
CET	060-030	3	3	5.5	50	60°
	060-040	4	4	7	50	60°
	060-060	6	6	10	60	60°
	060-080	8	8	13	70	60°
	060-100	10	10	16	70	60°
	060-120	12	12	18	80	60°
	060-160	16	16	24	100	60°
	090-030	3	3	5.5	50	90°
	090-040	4	4	7	50	90°
	090-060	6	6	10	60	90°
	090-080	8	8	13	70	90°
	090-100	10	10	16	70	90°
	090-120	12	12	18	80	90°
	090-160	16	16	24	100	90°
	120-030	3	3	5.5	50	120°
	120-040	4	4	7	50	120°
	120-060	6	6	10	60	120°
	120-080	8	8	13	70	120°
	120-100	10	10	16	70	120°
	120-120	12	12	18	80	120°
	120-160	16	16	24	100	120°

CCT



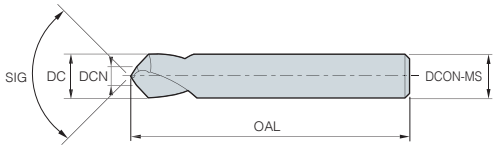


그림 1

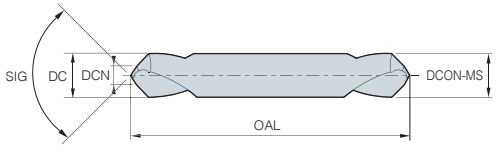


그림 2

(mm)

형 번		DC = DCON-MS	DCN	OAL	SIG	그림
CCT	060-030	3	1	40	60°	1
	060-040	4	1.5	40	60°	1
	060-060	6	2	50	60°	1
	060-080	8	2.5	60	60°	1
	060-100	10	3	70	60°	1
	060-120	12	4	80	60°	1
	060-160	16	5	100	60°	1
	060T-030	3	1	40	60°	2
	060T-040	4	1.5	40	60°	2
	060T-060	6	2	50	60°	2
	060T-080	8	2.5	60	60°	2
	060T-100	10	3	70	60°	2
	060T-120	12	4	80	60°	2
	060T-160	16	5	100	60°	2
	060T-030L	3	1	100	60°	2
	060T-040L	4	1.5	100	60°	2
	060T-060L	6	2	100	60°	2
	060T-080L	8	2.5	120	60°	2
	060T-100L	10	3	120	60°	2
	060T-120L	12	4	150	60°	2
	090-030	3	1	40	90°	1
	090-040	4	1.5	40	90°	1
	090-060	6	2	50	90°	1
	090-080	8	2.5	60	90°	1
	090-100	10	3	70	90°	1
	090-120	12	4	80	90°	1
	090-160	16	5	100	90°	1
	090T-030	3	1	40	90°	2
	090T-040	4	1.5	40	90°	2
	090T-060	6	2	50	90°	2
	090T-080	8	2.5	60	90°	2
	090T-100	10	3	70	90°	2
	090T-120	12	4	80	90°	2
	090T-160	16	5	100	90°	2
	090T-030L	3	1	100	90°	2
	090T-040L	4	1.5	100	90°	2
	090T-060L	6	2	100	90°	2
	090T-080L	8	2.5	120	90°	2
	090T-100L	10	3	120	90°	2
	090T-120L	12	4	150	90°	2
	120-030	3	1	40	120°	1
	120-040	4	1.5	40	120°	1
	120-060	6	2	50	120°	1
	120-080	8	2.5	60	120°	1

CCT



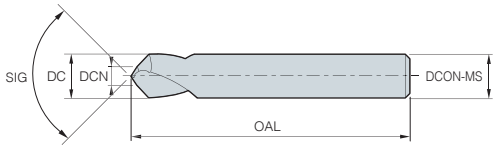


그림 1

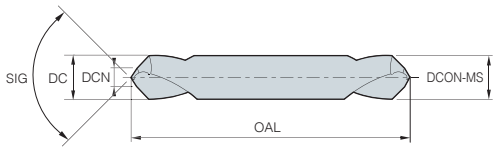


그림 2

(mm)

형 번		DC = DCON-MS	DCN	OAL	SIG	그림
CCT	120-100	10	3	70	120°	1
	120-120	12	4	80	120°	1
	120-160	16	5	100	120°	1
	120T-030	3	1	40	120°	2
	120T-040	4	1.5	40	120°	2
	120T-060	6	2	50	120°	2
	120T-080	8	2.5	60	120°	2
	120T-100	10	3	70	120°	2
	120T-120	12	4	80	120°	2
	120T-160	16	5	100	120°	2
	120T-030L	3	1	100	120°	2
	120T-040L	4	1.5	100	120°	2
	120T-060L	6	2	100	120°	2
	120T-080L	8	2.5	120	120°	2
	120T-100L	10	3	120	120°	2
	120T-120L	12	4	150	120°	2

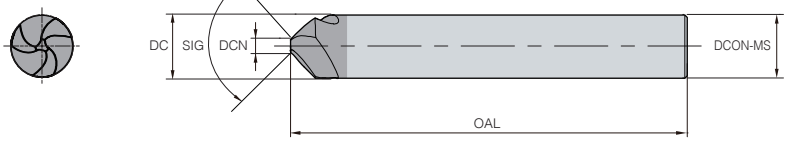
Counter Sink

카운터싱크

CSPC3000

3 | Unequal Division /Lead | h6 shank | 재종 PC40T | DC ±0.5mm





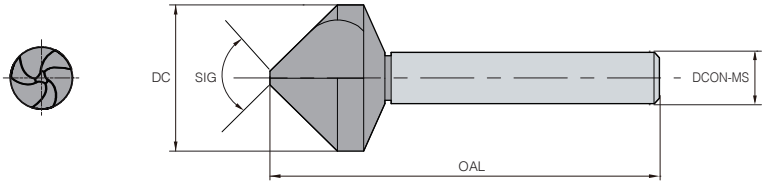
(mm)

형 번		DC	DCON-MS	DCN	OAL	SIG
CSPC	3060-050	6	6	1.5	50	90°
	3080-060	8	8	2	60	90°
	3100-070	10	10	2.5	70	90°
	3120-075	12	12	2.8	75	90°
	3160-080	16	16	3.2	80	90°
	3200-090	20	20	3.5	90	90°

CSNC3000

3 | Straight Type | h9 shank | 재종 PC20T | DC ±1.0mm





(mm)

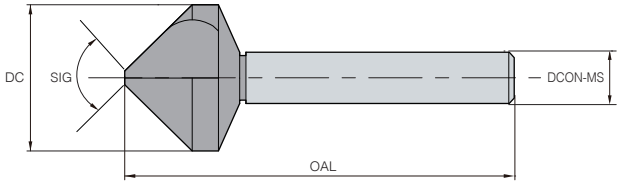
형 번		DC	DCON-MS	가공범위	OAL	SIG
CSNC	3100-047	10	6	2.0~9.0	47	90°
	3150-053	15	8	3.0~14.0	53	90°
	3200-057	20	10	4.0~19.0	57	90°
	3250-067	25	12	5.0~24.0	67	90°
	3300-075	30	12	6.0~29.0	75	90°

※ 상기 표준규격 外 Order made 제작 가능함.

CSNC1000

1 | Straight Type | h9 shank | 재종 PC20T | DC ±1.0mm



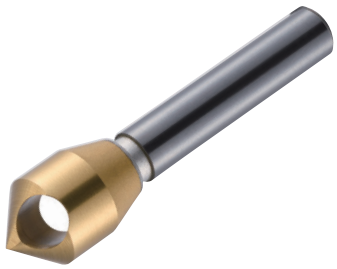


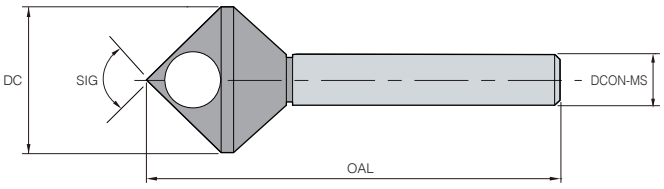
(mm)

형 번		DC	DCON-MS	가공범위	OAL	SIG
CSNC	1100-048	10.0	6	2.0~9.0	48	90°
	1150-054	15.0	8	2.0~14.0	54	90°
	1200-059	20.0	10	2.0~19.0	59	90°
	1250-069	25.0	12	3.0~24.0	69	90°
	1300-077	30.0	12	4.0~29.0	77	90°

CSHC1000

1 | Hole Type | h9 shank | 재종 PC20T | DC ±1.0mm





(mm)

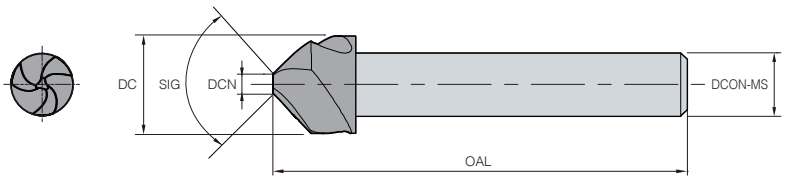
형 번		DC	DCON-MS	가공범위	OAL	SIG
CSHC	1100-045	10.0	6	4.0~8.0	45	90°
	1150-055	15.0	8	5.0~12.0	55	90°
	1200-070	20.0	10	8.0~15.0	70	90°
	1250-075	25.0	12	10.0~20.0	75	90°
	1300-085	30.0	12	12.0~25.0	85	90°

※ 상기 표준규격 外 Order made 제작 가능함.

CSPH3000

3 | Unequal Division /Lead | h8 shank | 재종 PC40T | DC ±0.5mm





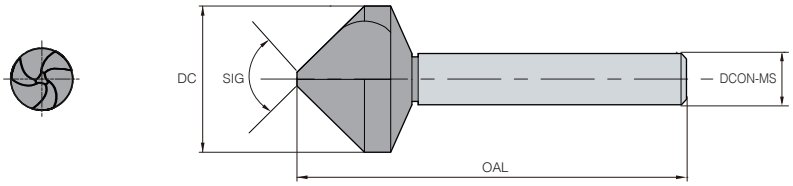
(mm)

형 번		DC	DCON-MS	DCN	OAL	SIG
CSPH	3063-045	6.3	5	1.5	45	90°
	3083-050	8.3	6	2	50	90°
	3104-050	10.4	6	2.5	50	90°
	3124-056	12.4	8	2.8	56	90°
	3165-060	16.5	10	3.2	60	90°
	3205-063	20.5	10	3.5	63	90°
	3250-068	25	10	3.8	68	90°

CSNH3000

3 | Straight Type | h9 shank | 재종 HC10T HC20T | DC ±1.0mm ±1°





(mm)

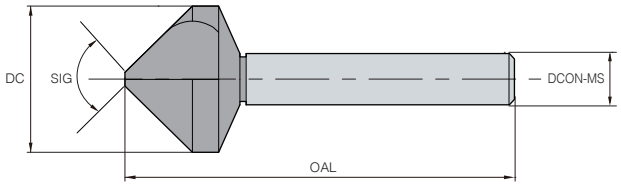
형 번		DC	DCON-MS	가공범위	OAL	SIG
CSNH	3100-050	10	6	3~9	50	90°
	3150-055	15	8	3~14	55	90°
	3200-060	20	10	4~19	60	90°
	3250-068	25	12	5~24	68	90°
	3300-079	30	12	6~29	79	90°
	3350-085	35	12	7~34	85	90°
	3400-090	40	12	8~39	90	90°
	3450-095	45	16	9~44	95	90°
	3500-100	50	16	12~49	100	90°

※ 상기 표준규격 外 Order made 제작 가능함.

CSNH1000

1 | Straight Type | h9 shank | 재종 HC10T HC20T | DC ±1.0mm





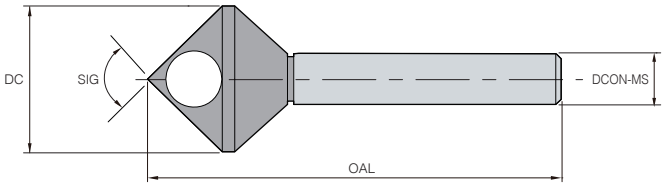
(mm)

형 번		DC	DCON-MS	가공범위	OAL	SIG
CSNH	1100-070	10	6	2~9	50	90°
	1150-075	15	8	2~14	55	90°
	1200-090	20	10	2~19	60	90°
	1250-080	25	12	2~24	70	90°
	1300-090	30	12	6~29	75	90°
	1350-080	35	12	7~34	80	90°
	1400-085	40	12	8~39	85	90°
	1450-087	45	12	9~44	87	90°
	1500-090	50	12	12~49	90	90°

CSHH1000

1 | Hole Type | h9 shank | 재종 HC10T HC20T | DC ±1.0mm





(mm)

형 번		DC	DCON-MS	가공범위	OAL	SIG
CSHH	1100-070	10	6	3~9	50	90°
	1150-075	15	8	5~12	60	90°
	1200-090	20	10	8~15	65	90°
	1250-080	25	12	10~20	74	90°
	1300-090	30	12	12~25	85	90°
	1350-095	35	16	14~30	95	90°
	1400-105	40	16	16~35	105	90°
	1450-120	45	16	18~40	120	90°
	1500-130	50	16	20~45	130	90°

※ 상기 표준규격 外 Order made 제작 가능함.

PART

THREADING

나사

코오로이 나사공구는 다양한 나사 형상 및 피치에
대응 가능하도록 준비되어 있습니다.
언제나 우수한 품질로 완벽한 나사가공 성능을 제공합니다.



Technical information for THREADING

D3 솔리드 나사엔드밀 형번표기법
D4 나사가공 기술안내

내부급유식 / 헬리컬 플루트

D5 ISO메트릭
D6 미국 유니파이(UNC,UNF,UNEF)
D7 휘트워드(BSW, BSF)
D8 브리티쉬 표준 파이프 나사(BSP(G))
D9 내셔널 파이프 나사(NPT)
D9 내셔널 파이프 나사 파인피치(NPTF)
D10 브리티쉬 표준 파이프 나사 (BSPT)
D10 UNJ

외부급유식 / 헬리컬 플루트

D11 ISO메트릭
D14 미국 유니파이(UNC,UNF,UNEF)
D15 브리티쉬 표준 파이프 나사(BSP)
D15 브리티쉬 표준 파이프 나사 (BSPT)
D16 내셔널 파이프 나사(NPT)
D16 내셔널 파이프 나사 파인피치(NPTF)

외부급유식 / 스트레이트 플루트

D17 ISO메트릭
D18 브리티쉬 표준 파이프 나사(BSP)
D18 브리티쉬 표준 파이프 나사 (BSPT)
D19 내셔널 파이프 나사(NPT)
D19 내셔널 파이프 나사 파인피치(NPTF)

깊은 나사 / 롱타입

D20 ISO메트릭
D20 부분 프로파일–TP60

깊은 나사 / 범용

D21 ISO메트릭
D22 미국 유니파이(UNC,UNF)
D23 UNJ
D23 MJ

깊은 나사 / 덴탈용

D24 ISO메트릭
D24 미국 유니파이(UNC)

깊은 나사 / 고경도용

D25 ISO메트릭
D26 미국 유니파이(UNC,UNF)

D27 **Tap-Star** [고성능 나사가공 탭]

솔리드 나사엔드밀 형번표기법

STM D 3T 03 012 L034 - I 0.35 ISO TM3

1	2	3	4	5	6	7	8	9	10
품명	인선 형태	잇 수	샹크직경	인선직경	인선길이	용도	피치	나사구분	날 수

1 품 명
STM D 3T 03 012 L034 - I 0.35 ISO TM3

Solid Threading Endmill

2 인선 형태
STM D 3T 03 012 L034 - I 0.35 ISO TM3

HC : Heli Cool
HCR : Heli Radial Cooling
HCC : Heli Cool Chamfering
HCD : Heli Cool C/F & Drilling
H : Helical
S : Straight
D : Deep Threading

3 잇 수
STM D 3T 03 012 L034 - I 0.35 ISO TM3

1T : 잇수 1
3T : 잇수 3
2L : 잇수 2, 좌 플루트

4 샹크직경(mm)
STM D 3T 03 012 L034 - I 0.35 ISO TM3

03 : 3.0

5 인선직경(mm)
STM D 3T 03 012 L034 - I 0.35 ISO TM3

012 : 1.20

6 인선길이(mm)
STM D 3T 03 012 L034 - I 0.35 ISO TM3

L034 : 3.4

7 용 도
STM D 3T 03 012 L034 - I 0.35 ISO TM3

I : 내경용
EI : 외경용/내경용

8 피 치
STM D 3T 03 012 L034 - I 0.35 ISO TM3

mm : 0.35 ~ 3.0 tpi : 72 ~ 12

9 나사구분
STM D 3T 03 012 L034 - I 0.35 ISO TM3

ISO 메트릭
미국 유니파이(UN)
UNJ
MJ
휘트워드(BSW, BSF, BSP, BSB)
내셔널 파이프 나사(NPT)
내셔널 파이프 나사 파인피치(NTPF)
BSP
브리티쉬 표준 파이프 나사(BSPT)
TP60 - 테이퍼 60˚

10 날 수
STM D 3T 03 012 L034 - I 0.35 ISO TM3

TM3-3날
TM5-5날

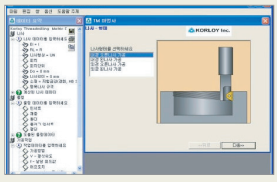
TM-INFO
사용설명서

CNC프로그램 구성기
TM-INFO 은 고객의 밀링 나사 가공에 대한 CNC프로그램을 짧은 시간안에 구현

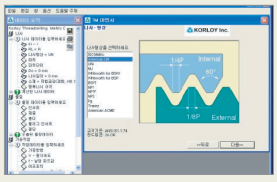
▶ 다국어
▶ 윈도우에 구동 적합



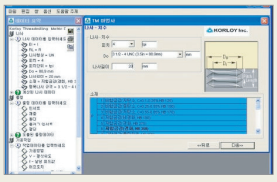
1 나사타입 선택



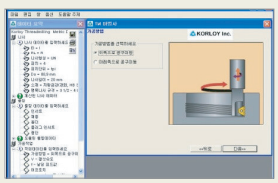
2 나사 스탠다드 선택



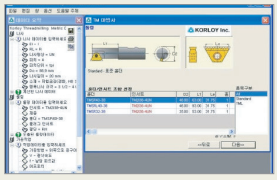
3 나사 파라메터값 입력



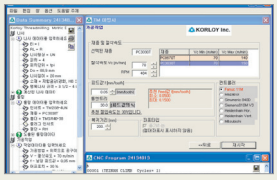
4 가공방법 선택



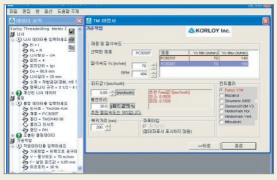
5 공구선택



6 가공데이터 및 컨트롤러 확정



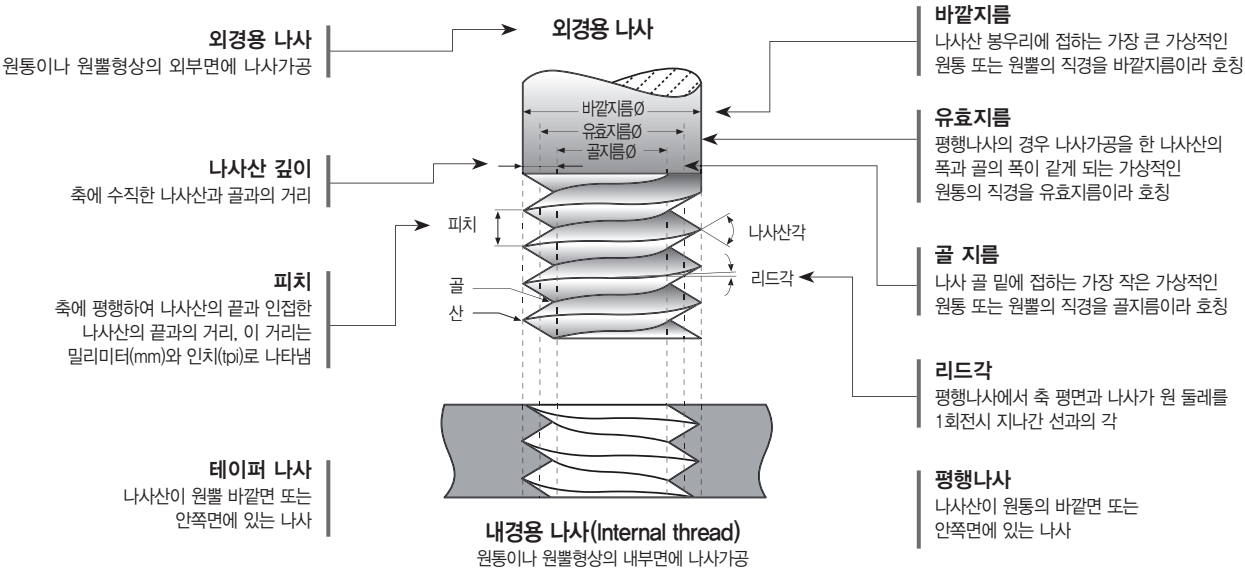
7 완료



download
다운로드를 위해 당사 홈페이지를 방문하세요
http://www.korloy.com

나사가공 기술안내

나사용어

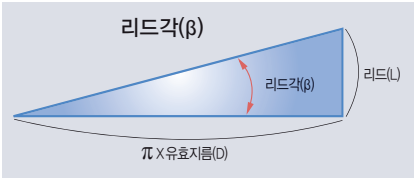




축을 기준으로 나사산이 왼쪽으로 올라가는 나사



축을 기준으로 나사산이 오른쪽으로 올라가는 나사. 특별한 경우를 제외하고는 주로 우승수 나사를 사용

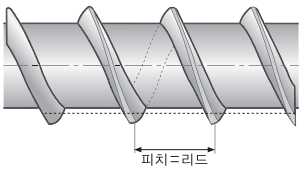


리드는 나사가 축을 기준으로 1회전시 진행한 거리
리드는 나사 줄 수 곱하기 피치
리드각(β)은 유효원둘레(π×D)와 리드(L)로 계산

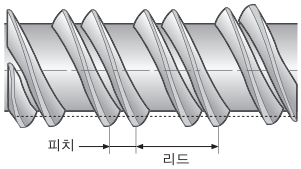
여러줄 나사 가공

- 여러 줄 나사는 축 직각 단면에서 볼 때 나사산의 시각이 여러줄인 나사산을 말함. 리드는 피치 곱하기 줄수

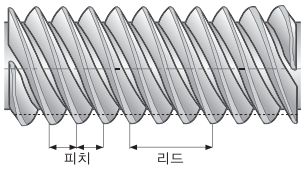
1줄 나사가공



2줄 나사가공



3줄 나사가공



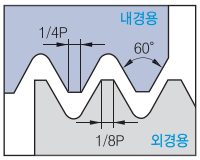
적용재종

적용 재종	적용 및 특징		적용 형번
PC9070M	솔리드 전용	• 중절삭을 포함한 범용 코팅 – 내마모 향상을 위한 TiCN계열	헬릭스 플루트깊은 가공용
PC9060M	솔리드 전용	• 스트레이트 플루트에 최적화된 범용 코팅 – 내마모성이 우수한 TiAlN계열	스트레이트플루트

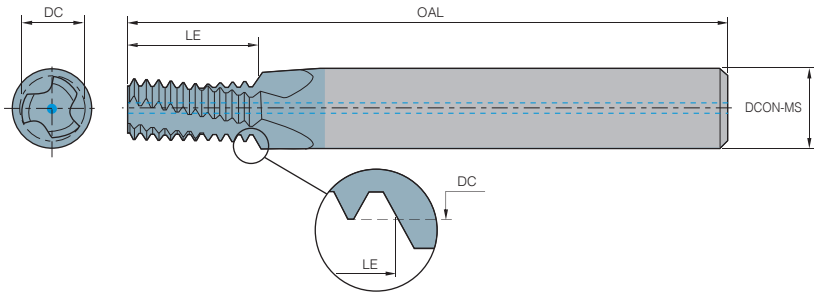
ISO메트릭

내부급유식 나사가공 엔드밀/헬리컬 플루트

내경용



규격 : R262(DIN 13)
TCTR : 6H



(LE≤1.5×나사경)

나 사		피치 (TP)	형 번		PC9070M	치 수(mm)				날수	나사산수	*보어경
보통나사	가는나사					DC	DCON-MS	LE	OAL	NOF	NT	PHD
M3×0.5	M3.5~M16×0.5	0.50	STMHC	04024L04-I0.50ISO		2.40	4	4.7	45	3	9	2.5
M4×0.7		0.70		04031L06-I0.70ISO		3.15	4	6.6	45	3	9	3.3
M5×0.8		0.80		04039L07-I0.80ISO		3.90	4	7.6	45	3	9	4.2
M6×1.0	M8~M40×1.0	1.00		06048L09-I1.00ISO	●	4.80	6	9.5	57	3	9	5.0
M8×1.25		1.25		08065L13-I1.25ISO		6.50	8	13.1	61	3	10	6.8
M10×1.5	M12~M48×1.5	1.50		10082L15-I1.50ISO		8.20	10	15.7	73	3	10	8.5
M12×1.75		1.75		10099L18-I1.75ISO		9.90	10	18.4	73	4	10	10.2
M14×2.0	M17~M80×2.0	2.00		12116L21-I2.00ISO		11.60	12	21.0	73	4	10	12.0
M16×2.0	M17~M80×2.0	2.00		14136L25-I2.00ISO		13.60	14	25.0	92	4	12	14.0

(LE≤2×나사경)

나 사		피치 (TP)	형 번		PC9070M	치 수(mm)				날수	나사산수	*보어경
보통나사	가는나사					DC	DCON-MS	LE	OAL	NOF	NT	PHD
M3×0.5	M3.5~M16×0.5	0.50	STMHC	04024L06-I0.50ISO		2.40	4	6.2	45	3	12	2.5
	M4×0.5	0.50		04032L08-I0.50ISO		3.20	4	8.2	45	3	16	3.5
	M5×0.5	0.50		06042L10-I0.50ISO		4.20	6	10.2	57	3	20	4.5
M4×0.7		0.70		04031L08-I0.70ISO		3.15	4	8.7	45	3	12	3.3
	M6×0.75	0.75		06050L12-I0.75ISO		5.00	6	12.4	57	3	16	5.3
M5×0.8		0.80		04039L10-I0.80ISO		3.90	4	10.8	45	3	13	4.2
M6×1.0	M8~M40×1.0	1.00		06048L12-I1.00ISO	●	4.80	6	12.5	57	3	12	5.0
	M8×1.0	1.00		08067L16-I1.00ISO		6.70	8	16.5	61	3	16	7.0
	M10×1.0	1.00		10087L20-I1.00ISO		8.70	10	20.5	73	3	20	9.0
	M12×1.0	1.00		12107L24-I1.00ISO	●	10.70	12	24.5	73	4	24	11.0
M8×1.25		1.25		08065L16-I1.25ISO	●	6.50	8	16.9	61	3	13	6.8
	M10×1.25	1.25		10085L20-I1.25ISO	●	8.50	10	20.6	73	3	16	8.8
M10×1.5	M12~M48×1.5	1.50		10082L20-I1.50ISO	●	8.20	10	20.2	73	3	13	8.5
	M12×1.5	1.50		10099L24-I1.50ISO	●	9.90	10	24.7	73	4	16	10.5
	M14×1.5	1.50		12119L29-I1.50ISO		11.90	12	29.2	80	4	19	12.5
	M16×1.5	1.50		14139L32-I1.50ISO	●	13.90	14	32.2	92	4	21	14.5
M12×1.75		1.75		10099L25-I1.75ISO		9.90	10	25.4	73	4	14	10.2
M14×2.0	M17~M80×2.0	2.00		12116L29-I2.00ISO		11.60	12	29.0	80	4	14	12.0
M16×2.0	M17~M80×2.0	2.00		14136L33-I2.00ISO		13.60	14	33.0	92	4	16	14.0
M18×2.5		2.50		16148L36-I2.50ISO		14.80	16	36.2	92	4	14	15.5
M 20×2.5		2.50		18171L41-I2.50ISO		17.10	18	41.2	102	4	16	17.5
M 24×3.0		3.00		20199L49-I3.00ISO		19.90	20	49.5	102	4	16	21.0

* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

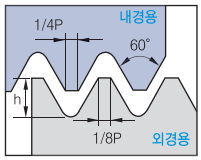
최대나사길이 = LE − $\frac{\text{피치}}{4}$

● : 재고 관리 형번

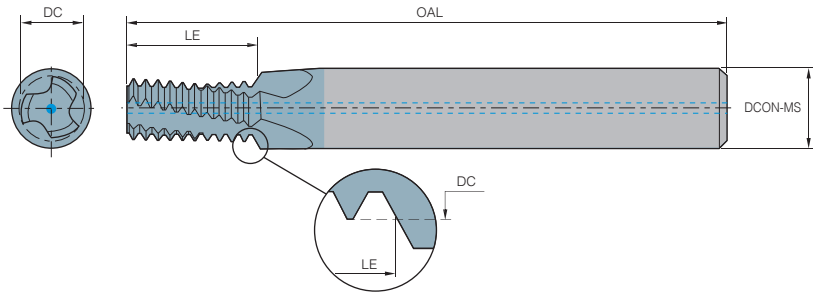
미국 유니파이(UNC,UNF,UNEF)

내부급유식 나사가공 엔드밀/헬리컬 플루트

내경용



규격 : ANSI B1.1.74
TCTR : 2B



(LE≤1.5×나사경)

나 사			피치 (tpi)	형 번		PC9070M	치 수(mm)				날수	나사산수	*보어경
UNC	UNF	UNEF					DC	DCON-MS	LE	OAL	NOF	NT	PHD
No.10~24	5/16″ ,3/8″x24	9/16″~11/16″x24	24	STMHC	04035L07-I24UNC		3.58	4	7.9	45	3	7	3.8
No.10~24	5/16″ ,3/8″x24	9/16″~11/16″x24	24		06041L08-I24UNC		4.15	6	9.0	57	3	8	4.5
1/4″x20	7/16″ ,1/2″x20	3/4″~1″x20	20		06048L09-I20UNC		4.88	6	9.5	57	3	7	5.2
5/16″x18	9/16″ ,5/8″x18	11/16″~1 11/16″x18	18		08061L11-I18UNC		6.15	8	12.0	61	3	8	6.5
3/8″x16	3/4″x16		16		08076L15-I16UNC		7.65	8	15.1	61	3	9	8.0
7/16″x14	7/8″x14		14		10090L17-I14UNC		9.00	10	17.2	73	3	9	9.3
1/2″x13			13		12104L20-I13UNC		10.35	12	20.5	73	4	10	10.8
9/16″x12	1″~1 1/2″x12		12		12118L22-I12UNC		11.80	12	22.2	73	4	10	12.3

(LE≤2×나사경)

나 사			피치 (tpi)	형 번		PC9070M	치 수(mm)				날수	나사산수	*보어경
UNC	UNF	UNEF					DC	DCON-MS	LE	OAL	NOF	NT	PHD
	No.10~32	No. 12~3/8″x32	32	STMHC	04038L09-I32UNF		3.80	4	9.9	45	3	12	4.0
		No. 12~3/8″x32	32		06044L11-I32UNEF		4.40	6	11.5	57	3	14	4.7
	No.12, 1/4″x28	7/16″; 1/2″x28	28		06043L11-I28UNF		4.30	6	11.3	57	3	12	4.6
	1/4″x28	7/16″; 1/2″x28	28		06052L13-I28UNF		5.15	6	13.1	57	3	14	5.5
		7/16″; 1/2″x28	28		10099L22-I28UNEF		9.90	10	22.2	73	3	24	10.2
No.10~24	5/16″, 3/8″x24	9/16″~11/16″x24	24		04035L10-I24UNC		3.58	4	10.0	45	3	9	3.8
No.12~24	5/16″, 3/8″x24	9/16″~11/16″x24	24		06041L11-I24UNC		4.15	6	11.1	57	3	10	4.5
	5/16″, 3/8″x24	9/16″~11/16″x24	24		08066L16-I24UNF		6.68	8	16.4	61	3	15	6.8
	3/8″x24	9/16″~11/16″x24	24		10082L19-I24UNF		8.20	10	19.6	73	3	18	8.5
		9/16″~11/16″x24	24		14129L29-I24UNEF		12.90	14	29.1	92	4	27	13.2
1/4″x20	7/16″, 1/2″x20	3/4″~1″x20	20		06048L13-I20UNC		4.88	6	13.3	57	3	10	5.2
	7/16″, 1/2″x20	3/4″~1″x20	20		10096L22-I20UNF		9.60	10	22.2	73	3	17	9.8
	1/2″x20	3/4″~1″x20	20		12111L26-I20UNF		11.10	12	26.0	80	3	20	11.5
		3/4″~1″x20	20		18174L38-I20UNEF		17.40	18	38.7	102	4	30	17.8
5/16″x18	9/16″, 5/8″x18	11/16″~1 11/16″x18	18		08061L16-I18UNC		6.15	8	16.2	61	3	11	6.5
	9/16″, 5/8″x18	11/16″~1 11/16″x18	18		14125L28-I18UNF		12.50	14	28.9	92	4	20	12.8
	5/8″x18	11/16″~1 11/16″x18	18		16141L31-I18UNF		14.10	16	31.7	92	4	22	14.5
3/8″x16	3/4″x16		16		08076L19-I16UNC		7.65	8	19.8	61	3	12	8.0
	3/4″x16		16		18170L38-I16UNF		17.00	18	38.8	102	4	24	17.5
7/16″x14	7/8″x14		14		10090L22-I14UNC		9.00	10	22.7	73	3	12	9.3
	7/8″x14		14		20199L44-I14UNF		19.90	20	44.4	102	4	24	20.5
1/2″x13			13		12104L26-I13UNC		10.35	12	26.4	80	4	13	10.8
9/16″x12	1″~1 1/2″x12		12		12118L28-I12UNC		11.80	12	28.6	80	4	13	12.3
	1″~1 1/2″x12		12		20199L51-I12UNF		19.90	20	51.9	102	4	24	23.5
5/8″x11			11		14131L33-I11UNC		13.10	14	33.5	92	4	14	13.5
3/4″x10			10		16159L39-I10UNC		15.90	16	39.4	92	4	15	16.5
7/8″x9			9		20190L46-I9UNC		19.00	20	46.6	102	4	16	19.5
1″x8			8		20199L52-I8UNC		19.90	20	52.4	102	4	16	22.0

* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

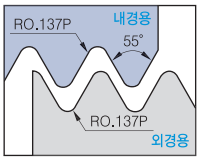
최대나사길이 = LE − $\frac{\text{피치}}{4}$

● : 재고 관리 형번

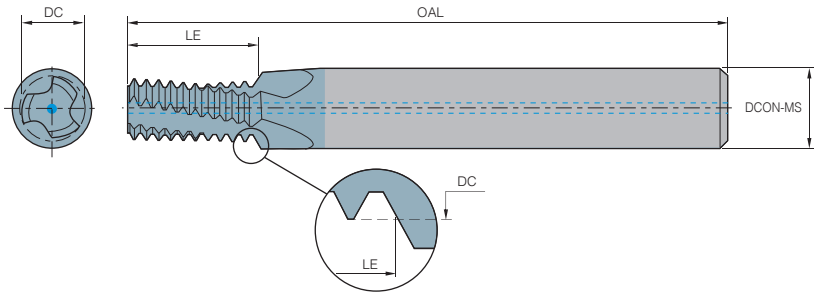
휘트워드(BSW,BSF)

내부급유식 나사가공 엔드밀/헬리컬 플루트

외경용/내경용



규격 : B.S.84:1956,
DIN 259, ISO228/1:1982
TCTR : Medium class A



(LE≤2×나사경)

나 사		피치 (tpi)	형 번		PC9070M	치 수(mm)				날수	나사산수	*보어경
BSW	BSF					DC	DCON-MS	LE	OAL	NOF	NT	PHD
	1/4″×26	26	STMHC	06050L13-EI26BSF		5.00	6	13.2	57	3	13	5.3
	5/16″×22	22		08063L16-EI22BSF		6.35	8	16.7	61	3	14	6.7
1/4″×20	3/8″×20	20		06044L13-EI20BSW		4.45	6	13.3	57	3	10	5.0
	3/8″×20	20		08076L19-EI20BSF		7.65	8	19.7	61	3	15	8.2
5/16″×18	7/16″×18	18		06058L16-EI18BSW		5.85	6	16.2	57	3	11	6.5
	7/16″×18	18		10092L23-EI18BSF		9.20	10	23.3	73	3	16	9.7
3/8″×16	1/2″, 9/16″×16	16		08072L19-EI16BSW		7.20	8	19.8	61	3	12	7.9
	1/2″, 9/16″×16	16		12105L26-EI16BSF		10.50	12	26.2	80	4	16	11.1
	9/16″×16	16		14122L29-EI16BSF		12.15	14	29.4	92	4	18	12.6
7/16″×14	5/8″, 11/16″×14	14		10085L22-EI14BSW		8.50	10	22.7	73	3	12	9.2
	5/8″, 11/16″×14	14		14134L31-EI14BSF		13.40	14	31.7	92	4	17	14.0
	11/16″×14	14		16150L35-EI14BSF		15.00	16	35.4	92	4	19	15.6
1/2″×12	3/4″×12	12		10096L26-EI12BSW		9.65	10	26.5	73	3	12	10.5
9/16″×12	3/4″×12	12		12113L28-EI12BSW		11.25	12	28.6	80	4	13	12.1
	3/4″×12	12		18162L39-EI12BSF		16.20	18	39.2	102	4	18	16.8
5/8″×11	7/8″×11	11		14126L33-EI11BSW		12.60	14	33.5	92	4	14	13.4
11/16″×11		11		16142L35-EI11BSW		14.20	16	35.8	92	4	15	15.0

* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

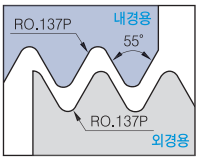
최대나사길이 = LE − $\frac{\text{피치}}{4}$

● : 재고 관리 형번

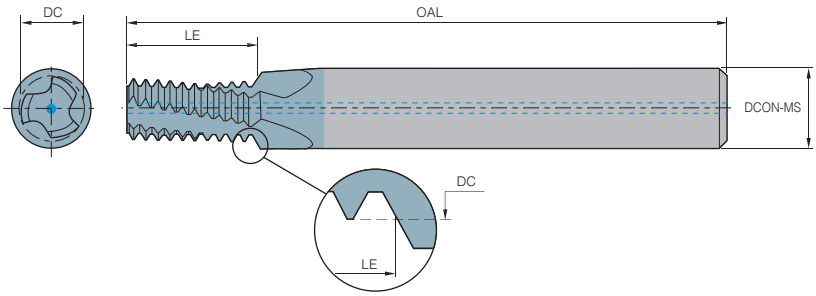
브리티쉬 표준 파이프 나사(BSP)

내부급유식 나사가공 엔드밀/헬리컬 플루트

내경용



규격 : B.S.2779:1956
TCTR : Medium class



(LE≤1.5×나사경)

나 사 Standard	피치 (tpi)	형 번		PC9070M	치 수(mm) DC	DCON-MS	LE	OAL	날수 NOF	나사산수 NT	*보어경 PHD
1/16″, 1/8″x28	28	STMHC	STMHC08064L12-EI28BSP		6.4	8	12.2	61	3	13	6.7
1/8″x28	28		STMHC10082L15-EI28BSP		8.2	10	15.0	73	3	16	8.7
1/4″, 3/8″x19	19		STMHC12110L20-EI19BSP		11.0	12	20.7	80	4	15	11.8
3/8″x19	19		STMHC16145L26-EI19BSP		15.2	16	26.1	92	4	19	15.2
1″-4″x11	11		STMHC20199L42-EI11BSP		30.7	20	42.7	102	4	18	30.7

(LE≤2×나사경)

나 사 Standard	피치 (tpi)	형 번		PC9070M	치 수(mm) DC	DCON-MS	LE	OAL	날수 NOF	나사산수 NT	*보어경 PHD
1/16″, 1/8″x28	28	STMHC	STMHC08064L15-EI28BSP		6.4	8	15.9	61	3	13	6.7
1/8″x28	28		STMHC10082L19-EI28BSP		8.2	10	19.5	73	3	16	8.7
1/4″, 3/8″x19	19		STMHC12110L27-EI19BSP		11.0	12	27.4	80	4	15	11.8
3/8″x19	19		STMHC16145L34-EI19BSP		15.2	16	34.1	92	4	25	15.2
1/2″-7/8″x14	14		STMHC18179L42-EI14BSP		19.0	18	42.6	102	4	23	19.0

* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

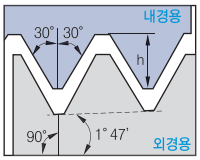
최대나사길이 = $LE - \frac{\text{피치}}{4}$

● : 재고 관리 형번

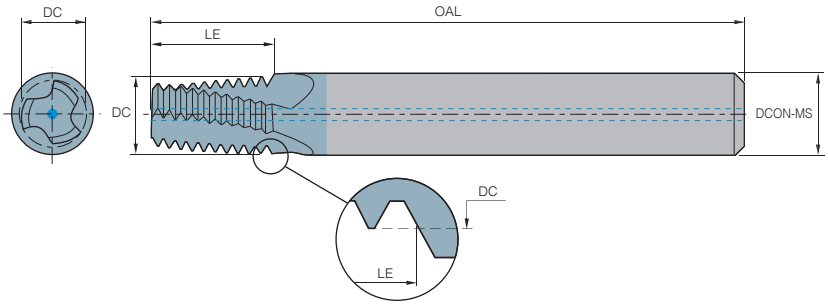
내셔널 파이프 나사(NPT)

내부급유식 나사가공 엔드밀/헬리컬 플루트

외경용/내경용



규격 : USAS B2.1:1968
TCTR : Standard NPT

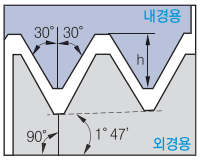


나 사 Standard	피치 (tpi)	형 번		PC9070M	치 수(mm) DC	DCON-MS	LE	OAL	날수 NOF	나사산수 NT	*보어경 PHD
1/16″×27	27.0	STMHC	06059L09-EI27NPT		5.90	6	9.9	57	3	10	6.3
1/8″×27	27.0		08076L09-EI27NPT		7.65	8	9.9	61	3	10	8.5
1/4″×18	18.0		10099L14-EI18NPT	●	9.90	10	14.8	73	3	10	11.1
3/8″×18	18.0		12111L14-EI18NPT		11.15	12	14.8	73	4	10	14.5
1/2″, 3/4″×14	14.0		16142L19-EI14NPT		14.25	16	19.0	92	4	10	17.7, 23.0
1″, 1 1/14, 1 1/2″, 2″×11.5	11.5		20196L23-EI11.5NPT		19.60	20	23.2	102	4	10	29.0, 37.7, 44.0, 56.0
2 1/2″×8 ; 3″×8	8.0		20196L33-EI8NPT		19.60	20	33.3	102	4	10	66.5, 82.1

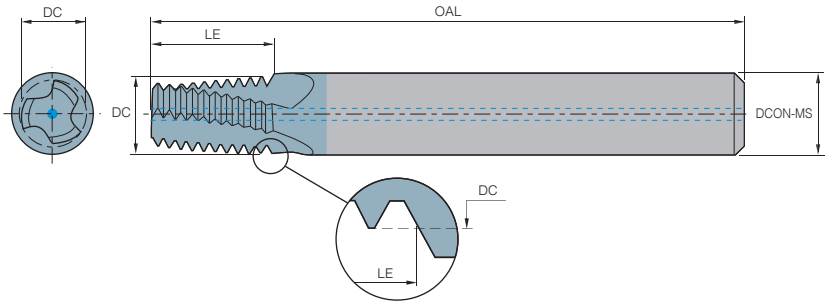
내셔널 파이프 나사 파인피치(NPTF)

내부급유식 나사가공 엔드밀/헬리컬 플루트

외경용/내경용



규격 : ANSI 1.20.3–1976
TCTR : Standard NPTF



나 사 Standard	피치 (tpi)	형 번		PC9070M	치 수(mm) DC	DCON-MS	LE	OAL	날수 NOF	나사산수 NT	*보어경 PHD
1/16″×27	27.0	STMHC	06059L09-EI27NPTF	●	5.90	6	9.9	57	3	10	6.3
1/8″×27	27.0		08076L09-EI27NPTF		7.65	8	9.9	61	3	10	8.5
1/4″×18	18.0		10099L14-EI18NPTF		9.90	10	14.8	73	3	10	11.1
3/8″×18	18.0		12111L14-EI18NPTF		11.15	12	14.8	73	4	10	14.5
1/2″, 3/4″×14	14.0		16142L19-EI14NPTF		14.25	16	19.0	92	4	10	17.7, 23.4
1″, 1 1/14, 1 1/2″, 2″×11.5	11.5		20196L23-EI11.5NPTF		19.60	20	23.2	102	4	10	29.0, 37.7, 43.7, 55.6
2 1/2″×8 ; 3″×8	8.0		20196L33-EI8NPTF		19.60	20	33.3	102	4	10	66.3, 82.1

* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

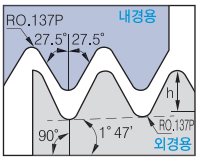
최대나사길이 = LE − $\frac{\text{피치}}{4}$

● : 재고 관리 형번

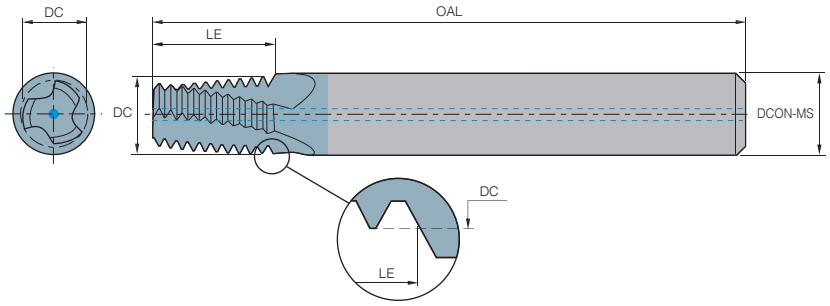
브리티쉬 표준 파이프 나사(BSPT)

내부급유식 나사가공 엔드밀/헬리컬 플루트

외경용/내경용



규격 : B.S.21:1985
TCTR : Standard BSPT

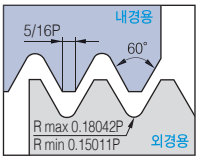


나 사 Standard	피치 (tpi)	형 번		PC9070M	치 수(mm) DC	DCON-MS	LE	OAL	날수 NOF	나사산수 NT	*보어경 PHD
1/16″×28	28	STMHC	06059L10-EI28BSPT		5.90	6	10.2	57	3	11	6.7
1/8″×28	28		08076L10-EI28BSPT		7.65	8	10.2	61	3	11	8.7
1/4″×19	19		10099L15-EI19BSPT		9.90	10	15.4	73	3	11	11.8
3/8″×19	19		12111L15-EI19BSPT		11.15	12	15.4	73	4	11	15.2
1/2″, 3/4″×14	14		16142L22-EI14BSPT		14.25	16	22.7	92	4	12	19.0
1″, 1 1/2″, 2″, 2 1/2″×11	11		20196L28-EI11BSPT		19.60	20	28.9	102	4	12	30.7

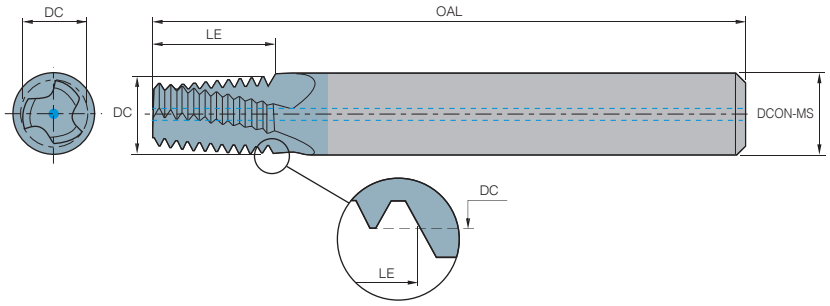
UNJ

내부급유식 나사가공 엔드밀/헬리컬 플루트

외경용/내경용



규격 : MIL-S-8879C
TCTR : 3B



나 사 UNJC	UNJF	UNEF/UNJ	피치 (tpi)	형 번		PC9070M	치 수(mm) DC	DCON-MS	LE	OAL	날수 NOF	나사산수 NT	*보어경 PHD
0.138″(#6)	0.190″(#10)	0.216(#12)/0.4375(7/16″)	32	STMHC	04027L07-I32UNJ		2.7	4	7.5	45	3	9	2.80
-	0.250″(1/4″)	0.4375″(7/16″)/0.5625″(9/16″)	28		06054L13-I28UNJ		5.4	6	13.1	57	3	14	5.60
0.190″(#10)	0.3125″(5/16″)	0.5625″(9/16″)/-	24		04037L09-I24UNJ		3.7	4	10	45	3	9	4.00
-	0.3125″(5/16″)	0.5625″(9/16″)/-	24		08067L15-I24UNJ		6.7	8	16.4	61	3	15	7.00
0.250″(1/4″)	0.4375″(7/16″)	0.750″(3/4″)/0.3125″(5/16″)	20		06050L12-I20UNJ		5.0	6	13.3	57	3	10	5.30
-	0.4375″(7/16″)	0.750″(3/4″)/0.5625″(9/16″)	20		10096L21-I20UNJ		9.6	10	22.2	73	4	17	10.00
0.3125″(5/16″)	0.5625″(9/16″)	1.0625″(1 1/16″)/-	18		08064L15-I18UNJ		6.4	8	16.2	61	3	11	6.75
0.375″(3/8″)	0.750″(3/4″)	-/0.4375″(7/16″)	16		08077L19-I16UNJ		7.7	8	19.8	61	3	12	8.10
0.4375″(7/16″)	0.875″(7/8″)	-	14		10092L21-I14UNJ		9.2	10	22.7	73	4	12	9.50
0.500″(1/2″)	-	-	13		10099L25-I13UNJ		9.9	10	26.4	73	4	13	11.00

* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

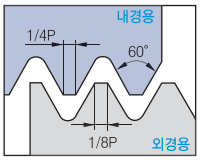
최대나사길이 = LE − $\frac{\text{피치}}{4}$

● : 재고 관리 형번

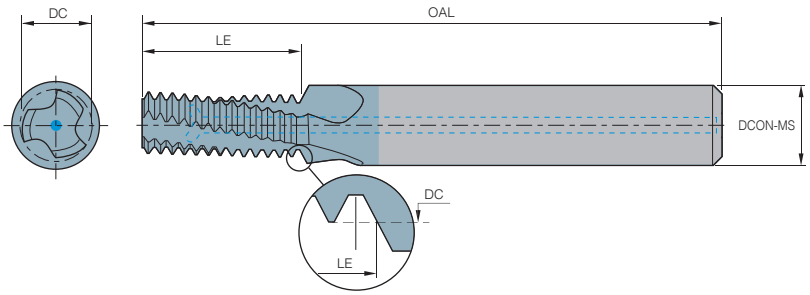
ISO메트릭

외부급유식 나사가공 엔드밀/헬리컬 플루트

내경용



규격 : R262(DIN 13)
TCTR : 6H



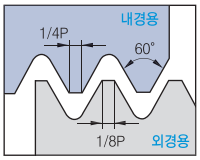
(LE≤2×나사경)

나 사		피치 (TP)	형 번		PC9070M	치 수(mm)				날수	나사산수	*보어경
M 콜스피치	M 파인피치					DC	DCON-MS	LE	OAL	NOF	NT	PHD
M6×1.0	M8~M40×1.0	1.0	STMHCR	06048L12-I1.00ISO		4.8	6	12.5	57	3	12	5.0
	M10×1.0	1.0		10087L20-I1.00ISO		8.7	10	20.5	73	3	20	9.0
	M12×1.0	1.0		12107L24-I1.00ISO		10.7	12	24.5	73	4	24	11.0
M8×1.25		1.25		08065L16-I1.25ISO		6.5	8	16.9	64	3	13	6.8
M10×1.5	M12~M48×1.5	1.5		10082L20-I1.50ISO		8.2	10	20.3	73	3	13	8.5
	M12×1.5	1.5		10099L24-I1.50ISO		9.9	10	24.8	73	4	16	10.5
	M14×1.5	1.5		12119L29-I1.50ISO		11.9	12	29.3	84	4	19	12.5
	M16×1.5	1.5		14139L32-I1.50ISO		13.9	14	32.3	84	4	21	14.5
M12×1.75		1.75		10099L25-I1.75ISO		9.9	10	25.4	73	4	14	10.2

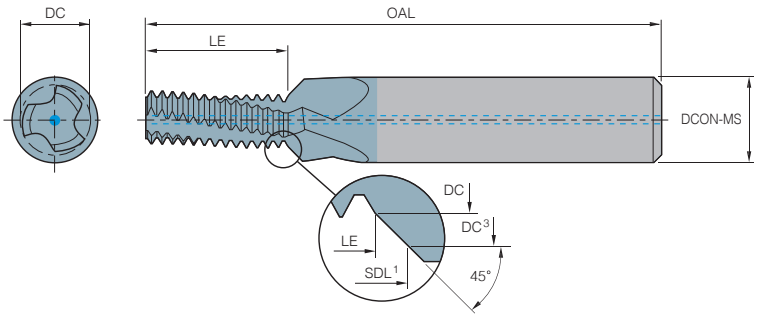
ISO메트릭

내부급유식 나사가공 엔드밀, 챔퍼링 겸용/헬리컬 플루트

내경용



규격 : R262(DIN 13)
TCTR : 6H



(LE≤2×나사경)

나 사		피치 (TP)	형 번		PC9070M	치 수(mm)						날수	나사산수	*보어경
M 콜스피치	M 파인피치					DC	DCON-MS	LE	DC3	SDL1	OAL	NOF	NT	PHD
M6×1.0	M8~M40×1.0	1.0	STMHCC	08048L12-I1.00ISO		4.8	8	12.5	6.3	13.3	61	3	12	5.0
	M10×1.0	1.0		12087L20-I1.00ISO		8.7	12	20.5	10.3	21.3	73	3	20	9.0
	M12×1.0	1.0		14107L24-I1.00ISO		10.7	14	24.5	12.3	25.3	80	4	24	11.0
M8×1.25		1.25		10065L16-I1.25ISO		6.5	10	16.9	8.3	17.8	73	3	13	6.8
M10×1.5	M12~M48×1.5	1.5		12082L20-I1.50ISO		8.2	12	20.3	10.3	21.3	80	3	13	8.5
	M12×1.5	1.5		14099L24-I1.50ISO		9.9	14	24.8	12.3	26.0	80	4	16	10.5
	M14×1.5	1.5		16119L29-I1.50ISO		11.9	16	29.3	14.3	60.5	92	4	19	12.5
	M16×1.5	1.5		18139L32-I1.50ISO		13.9	18	32.3	16.3	33.5	92	4	21	14.5
M12×1.75		1.75		14099L25-I1.75ISO		9.9	14	24.5	12.3	26.6	80	4	14	10.2

* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

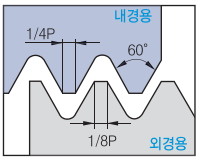
최대나사길이 = LE − $\frac{\text{피치}}{4}$

● : 재고 관리 형번

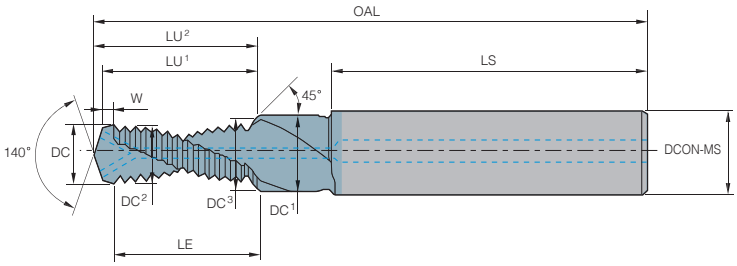
ISO메트릭

내부급유식 나사가공 엔드밀, 드릴링, 챔퍼링 겸용/헬리컬 플루트

내경용



규격 : R262(DIN 13)
TCTR : 6H



(LE≤2×나사경)

나 사	피치	형 번		PC9070M	치 수(mm)												날수	나사산수
ISO 2D M 콜스피치	(TP)				OAL	LU²	LU¹	LS	W	LE	DC	DCON-MS	DC¹	DC³	DC²		NOF	NT
M6×1.0	1.0	STMHCD	IM6×1.0ISO-2D		62.0	14.5	13.7	36	1.0	12.7	5.0	8	6.6	6.3	4.85		2	11
M8×1.25	1.25		IM8×1.25ISO-2D		74.0	18.2	17.1	40	1.3	15.8	6.8	10	9.0	8.3	6.45		2	11
M10×1.5	1.5		IM10×1.5ISO-2D		79.0	23.4	22.1	45	1.5	20.6	8.5	12	11.0	10.3	8.08		2	12
M12×1.75	1.75		IM12×1.75ISO-2D		89.0	27.1	25.5	45	1.5	24.0	10.3	14	13.5	12.3	9.74		2	12

나 사	피치	형 번		PC9070M	치 수(mm)												날수	나사산수
ISO 2.5D M 콜스피치	(TP)				OAL	LU²	LU¹	LS	W	LE	DC	DCON-MS	DC¹	DC³	DC²		NOF	NT
M6×1.0	1.0	STMHCD	IM6×1.0ISO-2.5D		62.0	16.5	15.7	36	1.0	14.7	5.0	8	6.6	6.3	4.85		2	13
M8×1.25	1.25		IM8×1.25ISO-2.5D		74.0	23.2	22.1	40	1.3	20.8	6.8	10	9.0	8.3	6.45		2	15
M10×1.5	1.5		IM10×1.5ISO-2.5D		79.0	27.9	26.6	45	1.5	25.1	8.5	12	11.0	10.3	8.08		2	15

* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

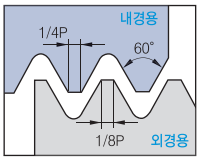
최대나사길이 = LE − $\frac{\text{피치}}{4}$

● : 재고 관리 형번

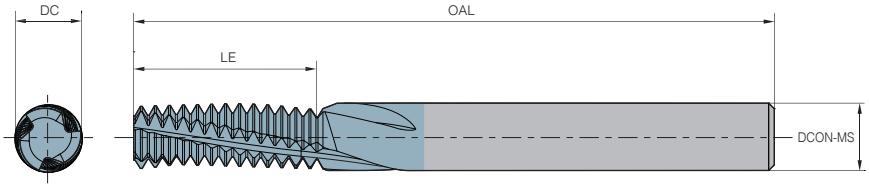
ISO메트릭

외부급유식 나사가공 엔드밀/헬리컬 플루트

외경용/내경용



규격 : R262(DIN 13)
TCTR : 6g/6H



외경용

(LE≤2×나사경)

나 사		피치 (TP)	형 번		PC9070M	치 수(mm)				날수	나사산수
M 콜스피치	M 파인피치					DC	DCON-MS	LE	OAL	NOF	NT
M3x0.5		0.50	STMH	04039L06-E0.5ISO		3.9	4	6	45	3	12
M4.5x0.7		0.75		04039L09-E0.75ISO		3.9	4	9	45	3	12
M6x1.0		1.00		04039L12-E1.0ISO		3.9	4	12	45	3	12
M8x1.25		1.25		06059L16-E1.25ISO		5.9	6	16.25	57	3	13
M10x1.5		1.50		08079L21-E1.5ISO	●	7.9	8	21	63	3	14
M14x2.0		2.00		10099L28-E2.0ISO		9.9	10	28	73	4	14

내경용

(LE≤2×나사경)

나 사		피치 (TP)	형 번		PC9070M	치 수(mm)				날수	나사산수	*보어경
M 콜스피치	M 파인피치					DC	DCON-MS	LE	OAL	NOF	NT	PHD
M3x0.5	M3.5-M16x0.5	0.50	STMH	04022L06-I0.5ISO		2.2	4	6.0	45	3	12	2.5
	M4x0.5	0.50		04030L08-I0.5ISO		3.0	4	8.0	45	3	16	3.5
	M3x0.5	0.50		04039L10-I0.5ISO		3.9	4	6.0	45	3	12	4.5
M4x0.7		0.70		04028L08-I0.7ISO		2.8	4	8.4	45	3	12	3.3
	M6x0.75	0.75		04039L12-I0.75ISO		3.9	4	9.0	45	3	12	5.3
M5x0.8		0.80		04035L10-I0.8ISO		3.5	4	10.4	45	3	13	4.2
M6x1.0	M8-M40x1.0	1.00		04039L12-I1.0ISO		3.9	4	12.0	45	3	12	5.0
	M8x1.0	1.00		06059L16-I1.0ISO		5.9	6	16.0	57	3	16	7.0
	M10x1.0	1.00		08079L20-I1.0ISO	●	7.9	8	20.0	63	3	20	9.0
	M12x1.0	1.00		10099L24-I1.0ISO	●	3.9	10	12.0	45	3	12	11.0
M8x1.25		1.25		06058L16-I1.25ISO		5.8	6	16.25	57	3	13	6.8
	M10x1.25	1.25		08077L20-I1.25ISO	●	5.9	6	16.25	57	3	13	8.8
M10x1.5	M12-M48x1.5	1.50		08077L21-I1.5ISO	●	7.7	8	21.0	63	3	14	8.5
	M12x1.5	1.50		10094L24-I1.5ISO	●	7.9	8	21.0	63	3	14	10.5
	M14x1.5	1.50		12112L28-I1.5ISO	●	9.4	10	24.0	73	4	16	12.5
	M16x1.5	1.50		12119L33-I1.5ISO	●	11.2	12	28.5	83	4	19	14.5
M12x1.75		1.75		10087L24-I1.75ISO	●	8.7	10	24.5	73	4	14	10.2
M14x2.0	M17-M80x2.0	2.00		10099L28-I2.0ISO	●	9.9	10	28.0	73	4	14	12.0
M16x2.0	M17-M80x2.0	2.00		12119L32-I2.0ISO	●	9.9	10	28.0	73	4	14	14.0
M18-M22x2.5		2.50		16139L40-I2.5ISO		13.9	16	40.0	92	5	16	15.5
M24x3.0		3.00		16159L42-I3.0ISO		15.9	16	42.0	92	4	14	21.0

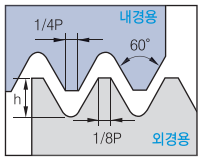
* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

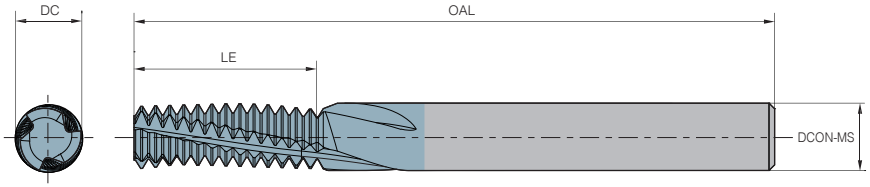
● : 재고 관리 형번

미국 유니파이(UNC,UNF,UNEF)

외부급유식 나사가공 엔드밀/헬리컬 플루트

외경용/내경용





규격 : ANSI B1.1.74
TCTR : 2A/2B

외경용

(LE≤2×나사경)

나 사		피치 (tpi)	형번		PC9070M	치 수(mm)				날수	나사산수
UNC	UNF					DC	DCON-MS	LE	OAL	NOF	NT
No.8-32		32	STMH	04039L09-E32UNC		3.9	4	8.7	45	3	11
	No.12-28	28		04039L12-E28UNF		3.9	4	11.8	45	3	13
No.12-24		24		04039L12-E24UNC		3.9	4	11.6	45	3	11
1/4″x20		20		04039L13-E20UNC		3.9	4	12.7	45	3	10
5/16″x18		18		06059L17-E18UNC		5.9	6	16.9	57	3	12
3/8″x16		16		08079L19-E16UNC		7.9	8	19.1	63	3	12
9/16″x12		12		12119L30-E12UNC		11.9	12	29.6	83	4	14

내경용

(LE≤2×나사경)

나 사			피치 (tpi)	형번		PC9070M	치 수(mm)				날수	나사산수	*보어경
UNC	UNF	UNEF					DC	DCON-MS	LE	OAL	NOF	NT	PHD
	No.8-36		36	STMH	04030L09-I36UNF		3.0	4	8.5	45	3	12	3.5
	No.10-32	No.12-3/8″x32	32		04033L11-I32UNF		3.3	4	11.1	45	3	14	4.0
	No.12-28,1/4″x28	7/16″,1/2″x28	28		04038L12-I28UNF		3.8	4	11.8	45	3	13	4.6
	1/4″x28	7/16″,1/2″x28	28		06046L13-I28UNF		4.6	6	12.7	57	3	14	5.5
		7/16″,1/2″x28	28		10092L23-I28UNEF		9.2	10	22.7	73	4	25	10.2
No.10-24	5/16″,3/8″x24	9/16″-11/16″x24	24		04029L11-I24UNC		2.9	4	10.6	45	3	10	3.8
No.12-24	5/16″,3/8″x24	9/16″-11/16″x24	24		04035L12-I24UNC		3.5	4	11.6	45	3	11	4.5
5/16″,	3/8″x24	9/16″-11/16″x24	24		06057L16-I24UNF		5.7	6	15.9	57	3	15	6.8
	3/8″x24	9/16″-11/16″x24	24		08074L19-I24UNF		7.4	8	19.1	63	3	18	8.5
		9/16″-11/16″x24	24		12119L29-I24UNEF		11.9	12	28.6	83	4	27	13.2
1/4″x20	7/16″,1/2″x20	3/4″-1″x20	20		04039L13-I20UNC		3.9	4	12.7	45	3	10	5.2
7/16″,	1/2″x20	3/4″-1″x20	20		10085L23-I20UNF		8.5	10	22.9	73	4	18	9.8
	1/2″x20	3/4″-1″x20	20		10099L26-I20UNF		9.9	10	25.4	73	4	20	11.5
		3/4″-1″x20	20		16159L38-I20UNEF		15.9	16	38.1	92	5	30	17.8
5/16″x18	9/16″,5/8″x18	11/16″-1 11/16″x18	18		06052L17-I18UNC		5.2	6	16.9	57	3	12	6.5
9/16″,	5/8″x18	11/16″-1 11/16″x18	18		12113L30-I18UNF		11.3	12	29.6	83	4	21	12.8
5/8″x18	11/16″-1	11/16″x18	18		12119L33-I18UNF		11.9	12	32.5	83	4	23	14.5
3/8″x16	3/4″x16		16		08067L19-I16UNC		6.7	8	19.1	63	3	12	8.0
	3/4″x16		16		16159L38-I16UNF		15.9	16	38.1	92	4	24	17.5
7/16″x14	7/8″x14		14		08076L24-I14UNC		7.6	8	23.6	63	4	13	9.3
	7/8″x14		14		20187L44-I14UNF		18.7	20	43.5	104	4	24	20.5
1/2″x13			13		10089L26-I13UNC		8.9	10	25.4	73	4	13	10.8
9/16″x12	1″-1 1/2″x12		12		12103L30-I12UNC		10.3	12	29.6	83	4	14	12.3
	1″-1 1/2″x12		12		20199L51-I12UNF		19.9	20	50.8	104	5	24	23.5
5/8″x11			11		12110L32-I11UNC		11.0	12	32.3	83	4	14	13.5
3/4″x10			10		16135L38-I10UNC		13.5	16	38.1	92	5	15	16.5
7/8″x9			9		16152L45-I9UNC		15.2	16	45.2	92	4	16	19.5
1″x8			8		20170L51-I8UNC		17.0	20	50.8	104	4	16	22.0

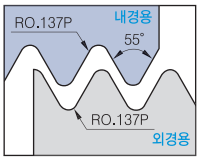
* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

● : 재고 관리 형번

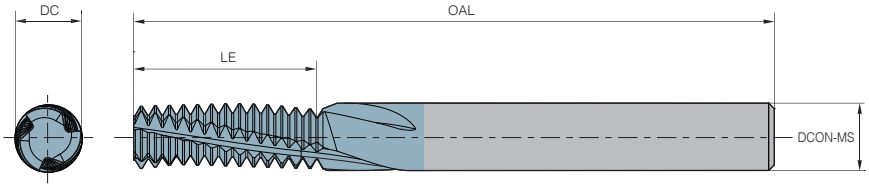
브리티쉬 표준 파이프 나사(UBSP(G))

외부급유식 나사가공 엔드밀/헬리컬 플루트

외경용/내경용



규격 : B.S.2779:1956
TCTR : Medium class



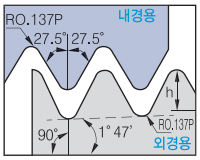
(LE≤2×나사경)

나 사 Standard	피치 (tpi)	형번		PC9070M	치 수(mm) DC	DCON-MS	LE	OAL	날수 NOF	나사산수 NT	*보어경 PHD
1/16″x28,1/8″x28	28	STMH	06058L16-EI28BSP		5.8	6	16.3	57	3	18	6.7
1/8″x28	28		08077L20-EI28BSP		7.7	8	20.0	63	3	22	8.7
1/4″x19, 3/8″x19	19		10099L27-EI19BSP		9.9	10	26.7	73	4	20	11.8
3/8″x19	19		16134L33-EI19BSP		13.4	16	33.4	92	4	25	15.2
1/2″, 3/4″x14	14		16157L44-EI14BSP		15.7	16	43.5	92	5	24	19.0
1″, 1 1/2″, 2″, 2 1/2″x11	11		20199L42-EI11BSP		19.9	20	41.6	104	5	18	30.7

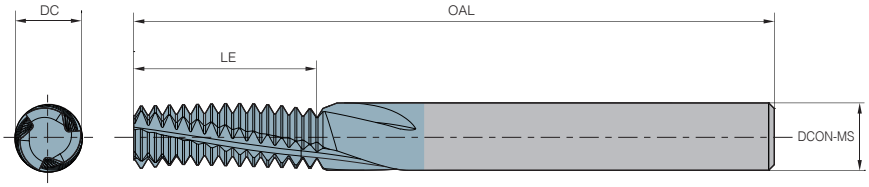
브리티쉬 표준 파이프 나사(BSPT)

외부급유식 나사가공 엔드밀/헬리컬 플루트

외경용/내경용



규격 : B.S.21:1985
TCTR : Standard BSPT



나 사 Standard	피치 (tpi)	형번		PC9070M	치 수(mm) DC	DCON-MS	LE	OAL	날수 NOF	나사산수 NT	*보어경 PHD
1/16″x28	28	STMH	06058L16-EI28BSPT		5.8	6	16.3	57	3	18	6.7
1/8″x28	28		08077L20-EI28BSPT		7.7	8	20.0	63	3	22	8.7
1/4″x19	19		10099L27-EI19BSPT		9.9	10	26.7	73	4	20	11.8
3/8″x19	19		16134L33-EI19BSPT		13.4	16	33.4	92	4	25	15.2
1/2″, 3/4″x14	14		16157L44-EI14BSPT		15.7	16	43.5	92	5	24	19.0
1″, 1 1/2″, 2″, 2 1/2″x11	11		20199L42-EI11BSPT		19.9	20	41.6	104	5	18	30.7

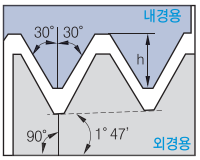
* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

● : 재고 관리 형번

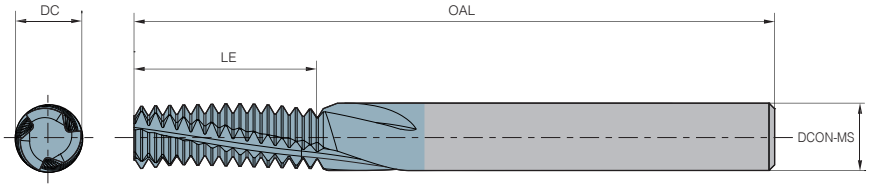
내셔널 파이프 나사(NPT)

외부급유식 나사가공 엔드밀/헬리컬 플루트

외경용/내경용



규격 : USAS B2.1:1968
TCTR : Standard NPT

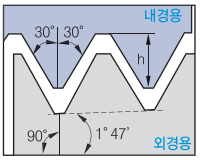


나 사 Standard	피치 (tpi)	형번		PC9070M	치 수(mm) DC	DCON-MS	LE	OAL	날수 NOF	나사산수 NT	*보어경 PHD
1/16″x27	27.0	STMH	06053L09-EI27NPT		5.3	6	9.4	57	3	10	6.3
1/8″x27	27.0		08075L09-EI27NPT		7.5	8	9.4	63	4	10	8.5
1/4″x18	18.0		10094L14-EI18NPT		9.4	10	14.1	73	4	10	11.1
3/8″x18	18.0		12119L14-EI18NPT		11.9	12	14.1	83	4	10	14.5
1/2″, 3/4″x14	14.0		16155L25-EI14NPT		15.5	16	25.4	92	5	14	17.7, 23.0
1″-2″x11.5	11.5		20199L33-EI11.5NPT		19.9	20	33.1	104	5	15	29.0-56.0
2 1/2″, 3″x8	8.0		20199L38-EI8NPT		19.9	20	38.1	104	4	12	66.0

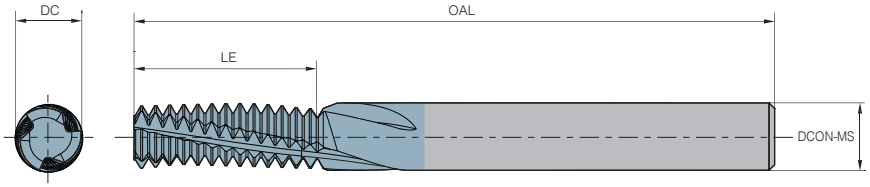
내셔널 파이프 나사 파인피치(NPTF)

외부급유식 나사가공 엔드밀/헬리컬 플루트

외경용/내경용



규격 : ANSI 1.20.3–1976
TCTR : Standard NPTF



나 사 Standard	피치 (tpi)	형번		PC9070M	치 수(mm) DC	DCON-MS	LE	OAL	날수 NOF	나사산수 NT	*보어경 PHD
1/16″x27	27.0	STMH	06053L09-EI27NPTF		5.3	6	9.4	57	3	10	6.3
1/8″x27	27.0		08075L09-EI27NPTF		7.5	8	9.4	63	4	10	8.4
1/4″x18	18.0		10094L14-EI18NPTF		9.4	10	14.1	73	4	10	11.1
3/8″x18	18.0		12119L14-EI18NPTF		11.9	12	14.1	83	4	10	14.7
1/2″, 3/4″x14	14.0		16155L25-EI14NPTF		15.5	16	25.4	92	5	14	17.9, 23.4
1″-2″x11.5	11.5		20199L33-EI11.5NPTF		19.9	20	33.1	104	5	15	29.4-56.2
2 1/2″, 3″x8	8.0		20199L38-EI8NPTF		19.9	20	38.1	104	4	12	67.0

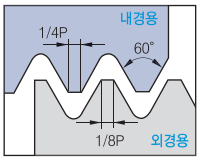
* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

● : 재고 관리 형번

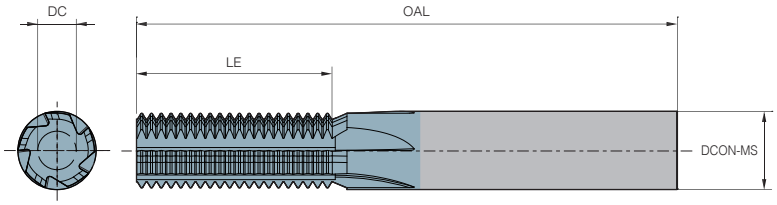
ISO메트릭

외부급유식 나사가공 엔드밀/스트레이트 플루트

외경용/내경용



규격 : R262(DIN 13)
TCTR : 6g/6H



외경용

나 사 Standard	피치 (TP)	형번		PC9060M	치 수(mm) DC	DCON-MS	LE	OAL	날수 NOF	나사산수 NT	*보어경 PHD
M3	0.50	STMS	06059-E0.5ISO		5.9	6	15.0	57	3	30	0.31
M4.5	0.75		08079-E0.75ISO		7.9	8	19.5	63	3	26	0.46
M4.5	0.75		08079-E0.75ISO-TM5		7.9	8	19.5	63	5	26	0.46
M6	1.00		10099-E1.0ISO		9.9	10	24.0	72	5	24	0.61
M10	1.50		12119-E1.5ISO		11.9	12	30.0	83	5	20	0.92
M14	2.00		12119-E2.0ISO		11.9	12	30.0	83	5	15	1.23
M24	3.00		16159-E3.0ISO		15.9	16	36.0	92	5	12	1.84
M36	4.00		16159-E4.0ISO		15.9	16	40.0	92	5	10	2.45
M64	6.00		20199-E6.0ISO		19.9	20	36.0	104	5	6	3.68

내경용

나 사 Standard	피치 (TP)	형번		PC9060M	치 수(mm) DC	DCON-MS	LE	OAL	날수 NOF	나사산수 NT	*보어경 PHD
M4.5	0.75	STMS	04030-I0.75ISO		3	4	6.75	42	3	9	0.43
M8	0.75		06059-I0.75ISO		5.9	6	15.0	57	3	20	0.43
M5	0.8		04036-I0.8ISO		3.6	4	8.0	42	3	10	0.46
M6	1.0		06040-I1.0ISO		4	6	9.0	57	3	9	0.58
M12	1.0		08079-I1.0ISO		7.9	8	20.0	63	3, 5	20	0.58
M12	1.0		08079-I1.0ISO-TM5		7.9	8	20.0	63	3, 5	20	0.58
M8	1.25		06050-I1.25ISO		5	6	12.5	57	3	10	0.72
M10	1.5		06059-I1.5ISO		5.9	6	15.0	57	3	10	0.87
M14	1.5		10099-I1.5ISO		9.9	10	24.0	72	5	16	0.87
M18	1.5		12119-I1.5ISO		11.9	12	30.0	83	5	20	0.87
M12	1.75		08079-I1.75ISO		7.9	8	19.25	63	3, 5	11	1.01
M12	1.75		08079-I1.75ISO-TM5		7.9	8	19.25	63	3, 5	11	1.01
M16	2.0		10099-I2.0ISO		9.9	10	24.0	72	5	12	1.15
M18	2.0		12119-I2.0ISO		11.9	12	30.0	83	5	15	1.15
M20	2.5		12119-I2.5ISO		11.9	12	30.0	83	5	12	1.44
M24	3.0		16159-I3.0ISO		15.9	16	36.0	92	5	12	1.73
M30	3.5		16159-I3.5ISO		15.9	16	38.5	92	5	11	2.02
M36	4.0		16159-I4.0ISO		15.9	16	40.0	92	5	10	2.31
M48	5.0		20199-I5.0ISO		19.9	20	40.0	104	5	8	2.89
M64	6.0		20199-I6.0ISO		19.9	20	36.0	104	5	6	3.46

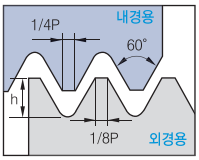
* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

● : 재고 관리 형번

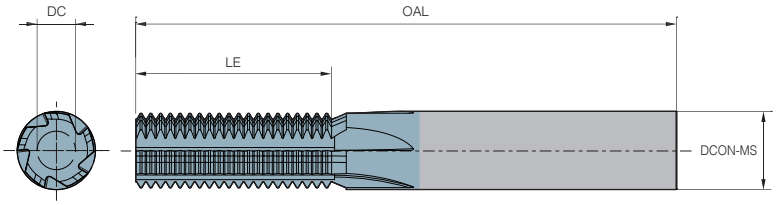
브리티쉬 표준 파이프 나사(BSP)

외부급유식 나사가공 엔드밀/스트레이트 플루트

외경용/내경용



규격 : B.S.2779:1956
TCTR : Medium class

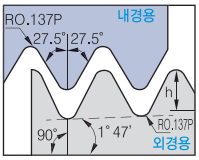


나 사	피치	형번		PC9060M	치 수(mm)				날수	나사산수	*보어경
Standard	(tpi)				DC	DCON-MS	LE	OAL	NOF	NT	PHD
1/16″	28	STMS	06059-EI28BSP		5.9	6	14.51	57	3	16	0.58
1/4″	19		08079-EI19BSP		7.9	8	18.72	63	3	14	0.86
1/4″	19		08079-EI19BSP-TM5		7.9	8	18.72	63	5	14	0.86
1/2″	14		12119-EI14BSP		11.9	12	29.03	83	5	16	1.16
1″	11		16159-EI11BSP		15.9	16	34.64	92	5	15	1.48

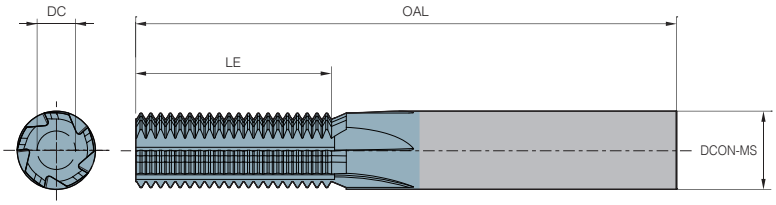
브리티쉬 표준 파이프 나사(BSPT)

외부급유식 나사가공 엔드밀/스트레이트 플루트

외경용/내경용



규격 : B.S.21 : 1985
TCTR : Standard BSPT



나 사	피치	형번		PC9060M	치 수(mm)				날수	나사산수	*보어경
Standard	(tpi)				DC	DCON-MS	LE	OAL	NOF	NT	PHD
1/16″	28	STMS	06059-EI28BSPT		5.9	6	9.98	57	3	11	0.58
1/4″	19		08079-EI19BSPT		7.9	8	14.71	63	3	11	0.86
1/4″	19		08079-EI19BSPT-TM5		7.9	8	14.71	63	5	11	0.86
1/2″	14		12119-EI14BSPT		11.9	12	19.96	83	5	11	1.16
1″	11		16159-EI11BSPT		15.9	16	39.25	92	5	17	1.48

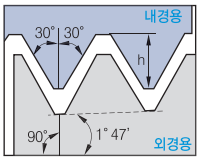
* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

● : 재고 관리 형번

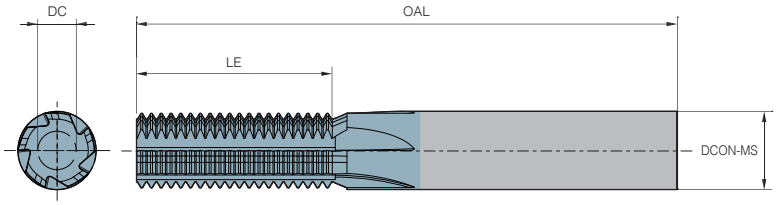
내셔널 파이프 나사(NPT)

외부급유식 나사가공 엔드밀/스트레이트 플루트

외경용/내경용



규격 : USAS B2.1:1968
TCTR : Standard NPT

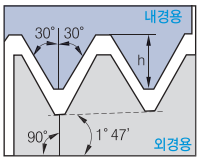


나 사 Standard	피치 (tpi)	형번		PC9060M	치 수(mm) DC	DCON-MS	LE	OAL	날수 NOF	나사산수 NT	*보어경 PHD
1/16″	27.0	STMS	06059-EI27NPT		5.9	6	9.41	57	3	10	0.66
1/4″	18.0		08079-EI18NPT		7.9	8	14.11	63	3	10	1.01
1/4″	18.0		08079-EI18NPT-TM5		7.9	8	14.11	63	5	10	1.01
1/2″	14.0		12119-EI14NPT		11.9	12	19.96	83	5	11	1.33
1″	11.5		16159-EI11.5NPT		15.9	16	26.50	92	5	12	1.64
2 1/2″	8.0		16159-EI8NPT		15.9	16	38.10	92	5	12	2.42

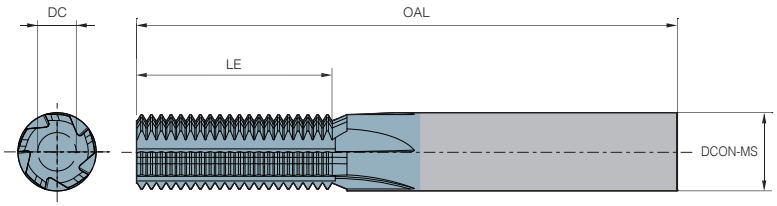
내셔널 파이프 나사 파인피치(NPTF)

외부급유식 나사가공 엔드밀/스트레이트 플루트

외경용/내경용



규격 : ANSI 1.20.3-1976
TCTR : Standard NPTF



나 사 Standard	피치 (tpi)	형번		PC9060M	치 수(mm) DC	DCON-MS	LE	OAL	날수 NOF	나사산수 NT	*보어경 PHD
1/16″	27	STMS	06059-EI27NPTF		5.9	6	9.41	57	3	10	0.64
1/4″	18		08079-EI18NPTF		7.9	8	14.11	63	3	10	1.00
1/2″	14		12119-EI14NPTF		11.9	12	19.96	83	5	11	1.35
1″	11.5		16159-EI11.5NPTF		15.9	16	26.50	92	5	12	1.63
2 1/2″	8		16159-EI8NPTF		15.9	16	38.10	92	5	12	2.38

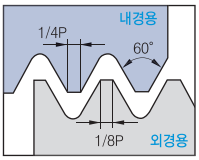
* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

● : 재고 관리 형번

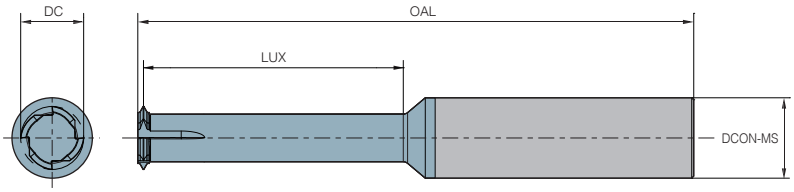
ISO메트릭

깊은 나사가공 엔드밀/롱타입 툴

내경용



규격 : R262(DIN 13)
TCTR : 6H



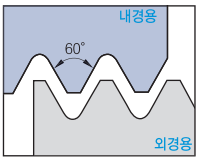
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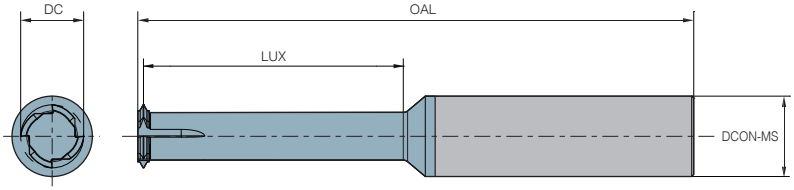
나 사 Standard	피치 (tpi)	형번	PC9070M	치 수(mm) DC	DCON-MS	LE	LUX	OAL	날수 NOF	나사산수 NT	*보어경 PHD
M6x1	1.00	STMD1T 08041-I1.0ISO		4.1	8	1.0	19	63	3	1	5.0
M8x1.25	1.25	10058-I1.25ISO		5.8	10	1.25	26	73	3	1	6.8
M10x1.5	1.50	10077-I1.50ISO		7.7	10	1.5	32	73	3	1	8.5
M12x1.5	1.50	12094-I1.50ISO		9.4	12	1.5	38	83	4	1	10.5
M12x1.75	1.75	12087-I1.75ISO		8.7	12	1.75	38	83	4	1	10.2
M14x2	2.00	16102-I2.0ISO		10.2	16	2	44	92	4	1	12.0
M16x2	2.00	16122-I2.0ISO		12.2	16	2.0	50	100	4	1	14.0
M18x2.5	2.50	16129-I2.5ISO		12.9	16	2.5	57	108	5	1	15.5
M20x2.5	2.50	16148-I2.5ISO		14.8	16	2.5	63	114	5	1	17.5

부분 프로파일-TP60

깊은 나사가공 엔드밀/롱타입 툴

내경용





나 사 M 콜스피치	M 파인피치	최소 나사 UN, UNF, UNEF	피치 TP	tpi	형번	PC9070M	치 수(mm) DC	DCON-MS	LUX	OAL	날수 NOF	나사산수 NT
M5x0.8	M5x0.5, M5X0.75	No.10-56UNS, No.10-48UNS, No.10-40UNS, No.10-36UNS, No.10-32UNF	0.5-0.8	32-56	STMD1T 04390L160-ITA60		3.9	4	16	45	4	1
M6x1.0	M6x0.5, M6X0.75	No.12-56UNS, No.12-48UNS, 1/4 -40UNS, 1/4 -36UNS, 1/4 -32UNEF, 1/4 -28UNF, 1/4 -27UNS, 1/4 -24UNS	0.5-1.0	24-56	06485L200-ITB60		4.85	6	20	51	5	1
M8x1.25	M7x0.5, M7x0.75, M7.5x1.0	5/16 -48UNS, 5/16 -40UNS, 5/16 -36UNS, 5/16 -32UNEF, 5/16 -28UN, 5/16 -27UNS, 5/16 -24UNS, 5/16 -20UN	0.5-1.25	20-48	06590L250-ITF60		5.9	6	25	64	5	1
	M10.5x0.5, M11x0.75, M11x1.0	7/16 -32UN, 7/16 -28UNEF, 7/16 -27UNS, 7/16 -24UNS	0.5-1.0	24-56	10990L350-ITB60		9.9	10	35	73	6	1
M10x1.5	M10x1.0, M10X1.25	3/8 -24UNF, 3/8 -20UN, 7/16 -18UNS, 7/16 -16UN	1.0-1.50	16-24	08790L320-ITC60		7.9	8	32	63	6	1
M12x1.75	M12x1.0, M12X1.25, M12x1.5	1/2 -24UNS, 1/2 -20UNS, 1/2 -18UNS, 1/2 -16UNS, 1/2 -14UNS	1.0-1.75	14-24	10990L380-ITD60		9.9	10	38	73	6	1
	M13.5x1.0, M14x1.25, M14x1.5	9/16 -24UNEF	1.0-1.75	14-24	12119L450-ITD60		11.9	12	45	83	6	1

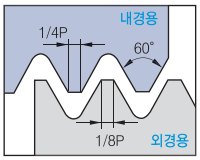
* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

● : 재고 관리 형번

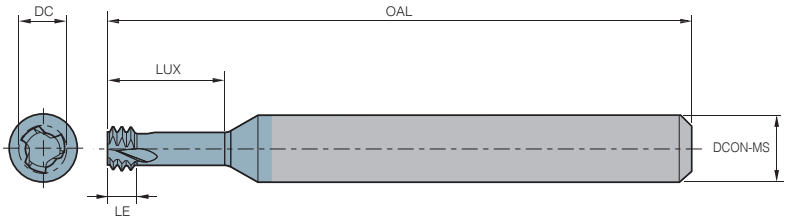
ISO메트릭

깊은 나사가공 엔드밀/범용

내경용



규격 : R262(DIN 13)
TCTR : 6H



(LE≤2×나사경)

나 사		피치 (TP)	형번		PC9070M	치 수(mm)					날수	나사산수	*보어경
M 콜스피치	M 파인피치					DC	DCON-MS	LE	LUX	OAL	NOF	NT	PHD
M1.6x0.35		0.35	STMD3T	03012L034-I0.35ISO		1.20	3	1.05	3.4	30	3	3	1.25
M2x0.4		0.40		06015L042-I0.40ISO		1.55	6	1.2	4.2	57	3	3	1.60
M2.2x0.45		0.45		06016L046-I0.45ISO		1.65	6	1.35	4.6	57	3	3	1.75
M2.5x0.45		0.45		06019L052-I0.45ISO		1.95	6	1.35	5.2	57	3	3	2.05
M3x0.5	M3.5-M16x0.5	0.50		06024L062-I0.50ISO		2.40	6	1.5	6.2	57	3	3	2.50
M3.5x0.6		0.60		06027L073-I0.60ISO		2.75	6	1.8	7.3	57	3	3	2.90
M4x0.7		0.70		06031L083-I0.70ISO		3.15	6	2.1	8.3	57	3	3	3.30
M5x0.8		0.80		06040L104-I0.80ISO		4.05	6	2.4	10.4	57	3	3	4.20
M6x1.0	M8-M40x1.0	1.00		06048L125-I1.00ISO		4.80	6	3.0	12.5	57	3	3	5.00
M8x1.25		1.25		08065L166-I1.25ISO		6.50	8	3.75	16.6	63	3	3	6.80
M10x1.5	M12-M48x1.50	1.50		10082L208-I1.50ISO		8.20	10	4.5	20.8	73	3	3	8.50
M12x1.75		1.75		10099L250-I1.75ISO		9.90	10	5.25	25.0	73	3	3	10.30
M16x2.0		2.00		12119L330-I2.00ISO		11.90	12	6.0	33.0	83	3	3	14.00
M20x2.5		2.50		16159L413-I2.50ISO		15.90	16	7.5	41.3	92	3	3	17.50

(LE≤3×나사경)

나 사		피치 (TP)	형번		PC9070M	치 수(mm)					날수	나사산수	*보어경
M 콜스피치	M 파인피치					DC	DCON-MS	LE	LUX	OAL	NOF	NT	PHD
M1.6X0.35		0.35	STMD3T	03012L050-I0.35ISO		1.20	3	1.05	5.0	30	3	3	1.25
M2x0.4		0.40		03015L062-I0.40ISO		1.55	3	1.2	6.2	30	3	3	1.60
M2X0.4		0.40		06015L062-I0.40ISO		1.55	6	1.2	6.2	57	3	3	1.60
M2.5x0.45		0.45		03019L077-I0.45ISO		1.95	3	1.35	7.7	30	3	3	2.05
M2.5x0.45		0.45		06019L077-I0.45ISO		1.95	6	1.35	7.7	57	3	3	2.05
M3X0.5	M3.5-M16x0.5	0.50		03024L092-I0.50ISO		2.40	3	1.5	9.2	30	3	3	2.50
M3x0.5	M3.5-M16x0.5	0.50		06024L092-I0.50ISO		2.40	6	1.5	9.2	57	3	3	2.50
M4x0.7		0.70		06031L123-I0.70ISO		3.15	6	2.1	12.3	57	3	3	3.30
M5x0.8		0.80		06040L154-I0.80ISO		4.05	6	2.4	15.4	57	3	3	4.20
M6x1.0	M8-M40x1.0	1.00		06048L185-I1.00ISO		4.80	6	3	18.5	57	3	3	5.00
M8x1.25		1.25		08065L246-I1.25ISO		6.50	8	3.75	24.6	63	3	3	6.80

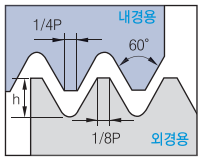
* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

● : 재고 관리 형번

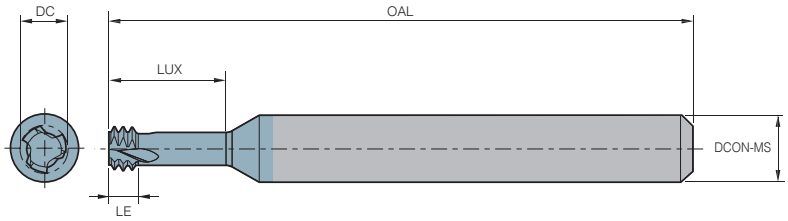
미국 유니파이(UNC,UNF)

깊은 나사가공 엔드밀/범용

외경용/내경용



규격 : ANSI B1.1.74
TCTR : 2B



(LE≤2×나사경)

나 사		피치 (tpi)	형번		PC9070M	치 수(mm)					날수	나사산수	*보어경
UNC	UNF					DC	DCON-MS	LE	LUX	OAL	NOF	NT	PHD
	No.1-72	72	STMD3T	06014L039-I72UN		1.45	6	1.06	3.9	57	3	3	1.6
No.1-64	No.2-64	64		06014L042-I64UN		1.40	6	1.19	4.2	57	3	3	1.5
No.2-56	No.3-56	56		06016L050-I56UN		1.65	6	1.36	5.0	57	3	3	1.8
No.3-48	No.4-48	48		06019L060-I48UN		1.90	6	1.59	6.0	57	3	3	2.1
No.4,No.5-40	No.6-40	40		06021L060-I40UN		2.10	6	1.91	6.0	57	3	3	2.3
No.5-40	No.6-40	40		06024L072-I40UN		2.45	6	1.91	7.2	57	3	3	2.6
	No.8-36	36		06033L087-I36UN		3.30	6	2.12	8.7	57	3	3	3.5
No.6,No.8-32	No.10-32	32		06025L074-I32UN		2.55	6	2.38	7.4	57	3	3	2.8
No.8-32	No.10-32	32		06032L100-I32UN		3.20	6	2.38	10.0	57	3	3	3.5
	No.10-32	32		06038L103-I32UN		3.80	6	2.38	10.3	57	3	3	4.0
	1/4″x28	28		06052L132-I28UN		5.25	6	2.72	13.2	57	3	3	5.5
No.10-24	5/16″x24	24		06035L102-I24UN		3.58	6	3.18	10.2	57	3	3	3.9
	5/16″x24	24		08066L165-I24UN		6.68	8	3.18	16.5	63	3	3	6.9
1/4″x20	7/16″x20	20		06048L134-I20UN		4.88	6	3.81	13.4	57	3	3	5.2
	7/16″x20	20		10095L230-I20UN		9.55	10	3.81	23.0	73	3	3	9.9
5/16″x18		18		08061L169-I18UN		6.15	8	4.23	16.9	63	3	3	6.6
3/8″x16		16		08067L191-I16UN		6.70	8	4.76	19.1	63	3	3	8.0
7/16″x14		14		10090L233-I14UN		9.00	10	5.44	23.3	73	3	3	9.4

(LE≤3×나사경)

나 사		피치 (tpi)	형번		PC9070M	치 수(mm)					날수	나사산수	*보어경
M 콜스피치	M 파인피치					DC	DCON-MS	LE	LUX	OAL	NOF	NT	PHD
	No.1-72	72	STMD3T	03014L057-I72UN		1.45	3	1.06	5.75	30	3	3	1.6
	No.1-72	72		06014L057-I72UN		1.45	6	1.06	5.75	57	3	3	1.6
No.2-56	No.3-56	56		03016L070-I56UN		1.65	3	1.36	7.00	30	3	3	1.8
No.4, No.5-40	No.6-40	40		03021L090-I40UN		2.10	3	1.91	9.00	30	3	3	2.3
No.4, No.5-40	No.6-40	40		06021L090-I40UN		2.10	6	1.91	9.00	57	3	3	2.3
No.5-40	No.6-40	40		06024L100-I40UN		2.45	6	1.91	10.00	57	3	3	2.6
No.6, No.8-32	No.10-32	32		03025L110-I32UN		2.55	3	2.38	11.00	30	3	3	2.8
No.6, No.8-32	No.10-32	32		06025L110-I32UN		2.55	6	2.38	11.00	57	3	3	2.8
No.8-32	No.10-32	32		06032L130-I32UN		3.20	6	2.38	13.00	57	3	3	3.4
	No.10-32	32		06038L150-I32UN		3.80	6	2.38	15.10	57	3	3	4.0
	1/4″x28	28		06052L196-I28UN		5.25	6	2.72	19.60	57	3	3	5.5
	5/16″x24	24		08066L245-I24UN		6.68	8	3.18	24.50	63	3	3	6.9
1/4″x20	7/16″x20	20		06048L198-I20UN		4.88	6	3.81	19.80	57	3	3	5.1
5/16″x18		18		08061L239-I18UN		6.15	8	4.23	24.00	63	3	3	6.6

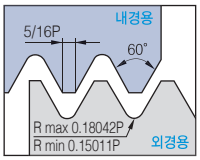
* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

● : 재고 관리 형번

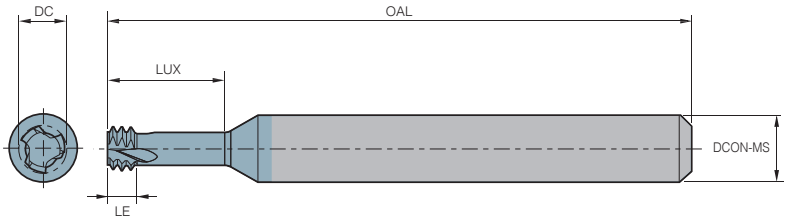
UNJ(UNJC,UNJF)

깊은 나사가공 엔드밀/범용

내경용



규격 : MIL-S-8879C
TCTR : 3B



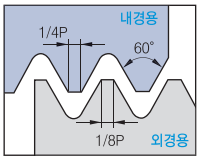
(LE≤3×나사경)

나 사		피치 (tpi)	형번		PC9070M	치 수(mm)					날수	나사산수	*보어경
UNJC	UNJF					DC	DCON-MS	LE	LUX	OAL	NOF	NT	PHD
0.138″(#6)	0.190″(#10)	32	STMD3T	06027L110-I32UNJ		2.7	6	2.38	11.0	57	3	3	2.80
	0.250″(1/4″)	28		06054L195-I28UNJ		5.4	6	2.72	19.5	57	3	3	5.60
0.190″(#10)		24		06037L149-I24UNJ		3.7	6	3.18	14.9	57	3	3	4.00
	0.3125″(5/16″)	24		08067L241-I24UNJ		6.7	8	3.18	24.1	63	3	3	7.00
0.250″(1/4″)		20		06050L195-I20UNJ		5.0	6	3.81	19.5	57	3	3	5.30
	0.4375″(7/16″)	20		10096L335-I20UNJ		9.6	10	3.81	33.5	73	3	3	10.00
0.3125″(5/16″)	0.5625″(9/16″)	18		08064L241-I18UNJ		6.4	8	4.23	24.1	63	3	3	6.75
0.375″(3/8″)	0.750″(3/4″)	16		08077L290-I16UNJ		7.7	8	4.76	29.0	63	3	3	8.10
0.4375″(7/16″)	0.875″(7/8″)	14		10092L335-I14UNJ		9.2	10	5.44	33.5	73	3	3	9.50
0.500″(1/2″)		13		10099L385-I13UNJ		9.9	10	5.86	38.5	73	3	3	11.00

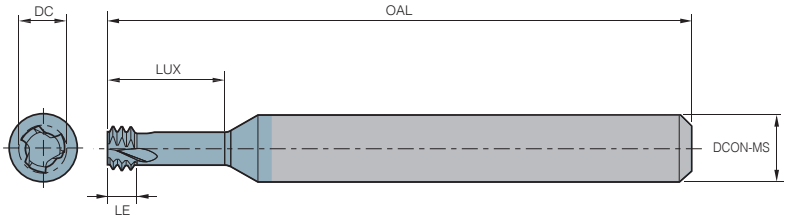
MJ

깊은 나사가공 엔드밀/범용

내경용



규격 : ISO 5855
TCTR : 4h/6h-4H/5H



(LE≤3×나사경)

나 사	피치 (TP)	형번		PC9070M	치 수(mm)					날수	나사산수	*보어경
Standard					DC	DCON-MS	LE	LUX	OAL	NOF	NT	PHD
MJ3x0.5	0.5	STMD3T	06024L092-I0.5MJ		2.40	6	1.5	9.2	57	3	3	2.60
MJ3.5x0.6	0.6		06028L110-I0.6MJ		2.85	6	1.8	11.0	57	3	3	3.00
MJ4x0.7	0.7		06031L123-I0.7MJ		3.15	6	2.1	12.3	57	3	3	3.40
MJ5x0.8	0.8		06040L154-I0.8MJ		4.05	6	2.4	15.4	57	3	3	4.30
MJ6x1.0	1		06048L185-I1.0MJ		4.80	6	3	18.5	57	3	3	5.10
MJ8x1.25	1.25		08065L246-I1.25MJ		6.50	8	3.75	24.6	63	3	3	6.90
MJ10x1.5	1.5		10082L308-I1.50MJ		8.20	10	4.5	30.8	73	3	3	8.70
MJ12x1.75	1.75		10099L370-I1.75MJ		9.90	10	5.25	37.0	73	3	3	10.40
MJ14x2	2		12119L425-I2.0MJ		11.90	12	6.0	42.5	83	3	3	12.25

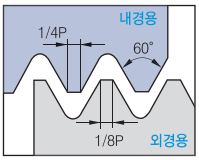
* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

● : 재고 관리 형번

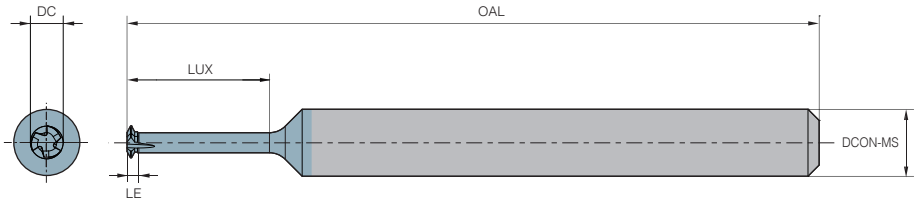
ISO메트릭

깊은 나사가공 엔드밀/덴탈용

내경용



규격 : R262(DIN 13)
TCTR : 6H



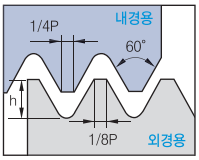
(LE≤3×나사경)

나 사		피치 (mm)	형번		PC9070M	치 수(mm)					날수	나사산수	*보어경
M 콜스피치	M 파인피치					DC	DCON-MS	LE	LUX	OAL	NOF	NT	PHD
M1.0x0.25	M1.4x0.25	0.25	STMD1T	03007L031-I0.25ISO		0.70	3	0.25	3.1	31	3	1	0.75
M1.2x0.25	M1.4x0.25	0.25		03009L038-I0.25ISO		0.90	3	0.25	3.8	31	3	1	0.95
M1.4x0.3	-	0.3		03011L044-I0.30ISO		1.05	3	0.30	4.4	31	3	1	1.15
M1.6x0.35	-	0.35		03012L050-I0.35ISO		1.20	3	0.35	5.0	31	3	1	1.30
M1.8x0.35	M2.0x0.35	0.35		03014L056-I0.35ISO		1.40	3	0.35	5.6	31	3	1	1.50
M2.0x0.4	-	0.4		03015L062-I0.40ISO		1.50	3	0.40	6.2	31	3	1	1.65
M2.5x0.45	-	0.45		03019L077-I0.45ISO		1.95	3	0.45	7.7	31	3	1	2.10

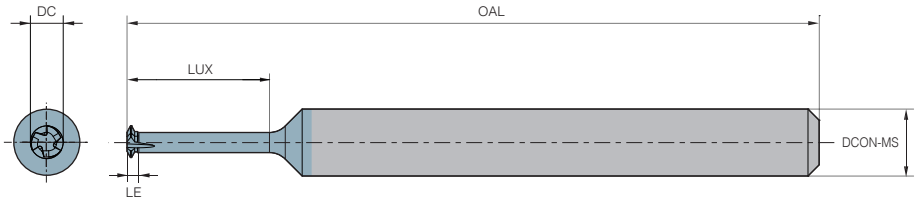
미국 유니파이(UNF)

깊은 나사가공 엔드밀/덴탈용

내경용



규격 : ANSI B1.1.74
TCTR : 2B



(LE≤3×나사경)

나 사	피치 (tpi)	형번		PC9070M	치 수(mm)					날수	나사산수	*보어경
UNF					DC	DCON-MS	LE	LUX	OAL	NOF	NT	PHD
0-80	80	STMD1T	03011L046-I80UN		1.15	3	0.32	4.6	31	3	1	1.3
1-72	72		03014L065-I72UN		1.45	3	0.35	6.5	31	3	1	1.6

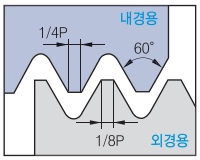
* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

● : 재고 관리 형번

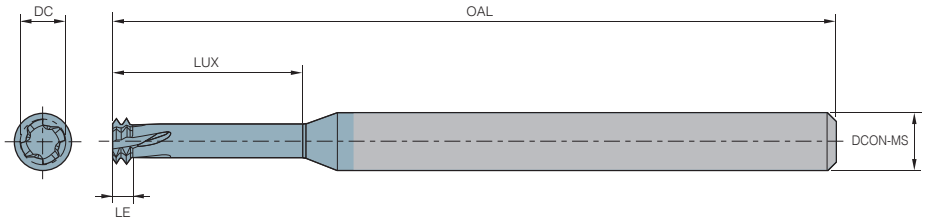
ISO메트릭

깊은 나사가공 엔드밀/고경도용

내경용



규격 : R262(DIN 13)
TCTR : 6H

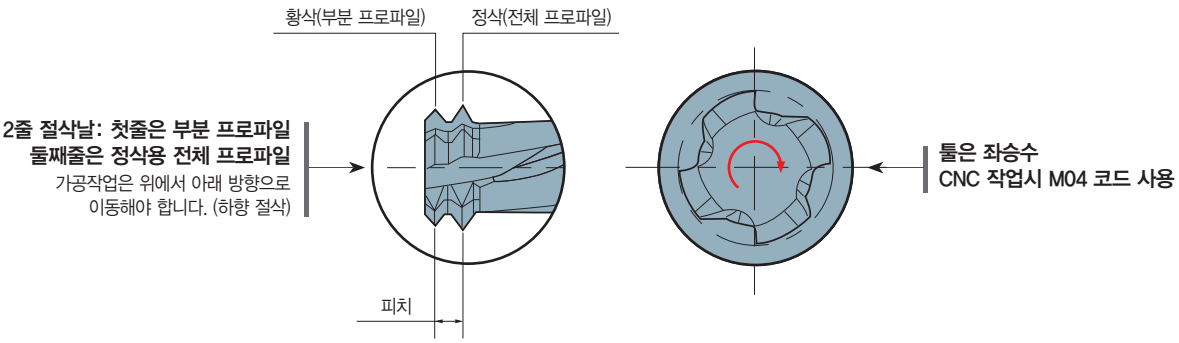


(LE≤2×나사경)

나 사		피치 (TP)	형번		PC9070M	치 수(mm)					날수	나사산수	*보어경
M 콜스피치	M 파인피치					DC	DCON-MS	LE	LUX	OAL	NOF	NT	PHD
M2x0.4		0.40	STMD2L	06015L042-I0.4ISO		1.55	6	0.40	4.60	76	4	2	1.60
M2.2x0.45		0.45		06016L046-I0.45ISO		1.65	6	0.45	5.05	76	4	2	1.80
M2.5x0.45		0.45		06019L052-I0.45ISO		1.95	6	0.45	5.65	76	4	2	2.05
M3x0.5	M3.5-M16x0.5	0.50		06024L062-I0.5ISO		2.40	6	0.50	6.75	76	4	2	2.55
M3.5x0.6		0.60		06027L073-I0.6ISO		2.75	6	0.60	7.90	76	4	2	2.95
M4x0.7		0.70		06031L083-I0.7ISO		3.15	6	0.70	9.05	76	4	2	3.35
M5x0.8		0.80		06040L104-I0.8ISO		4.05	6	0.80	11.20	76	4	2	4.30
M6x1.0	M8-M40x1.0	1.00		06048L125-I1.0ISO		4.80	6	1.00	13.5	76	5	2	5.10
M8x1.25		1.25		08065L166-I1.25ISO		6.50	8	1.25	17.85	80	5	2	6.80
M10x1.5	M12-M48x1.50	1.50		08079L208-I1.50ISO		7.90	8	1.50	22.30	80	6	2	8.60
M12x1.75		1.75		10099L250-I1.75ISO		9.90	10	1.75	26.75	101	6	2	10.40

(LE≤3×나사경)

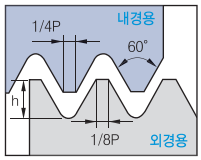
나 사		피치 (TP)	형번		PC9070M	치 수(mm)					날수	나사산수	*보어경
M 콜스피치	M 파인피치					DC	DCON-MS	LE	LUX	OAL	NOF	NT	PHD
M2x0.4		0.40	STMD2L	06015L062-I0.4ISO		1.55	6	0.40	6.60	76	4	2	1.60
M2.5x0.45		0.45		06019L077-I0.45ISO		1.95	6	0.45	8.15	76	4	2	2.05
M3x0.5	M3.5-M16x0.5	0.50		06024L092-I0.5ISO		2.40	6	0.50	9.75	76	4	2	2.55
M4x0.7		0.70		06031L123-I0.7ISO		3.15	6	0.70	13.05	76	4	2	3.35
M5x0.8		0.80		06040L154-I0.8ISO		4.05	6	0.80	16.20	76	4	2	4.30
M6x1.0	M8-M40x1.0	1.00		06048L185-I1.0ISO		4.80	6	1.00	19.50	76	5	2	5.10
M8x1.25		1.25		08065L246-I1.25ISO		6.50	8	1.25	25.85	80	5	2	6.80



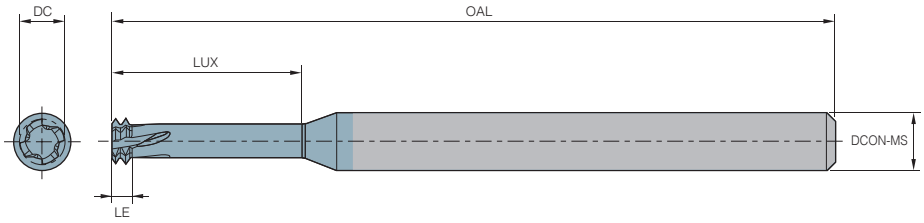
미국 유니파이(UNC,UNF)

깊은 나사가공 엔드밀/고경도용

내경용



규격 : ANSI B1.1.74
공차 : 2B



(LE≤2×나사경)

나 사		피치 (tpi)	형번		PC9070M	치 수(mm)					날수	나사산수	*보어경
UNC	UNF					DC	DCON-MS	LE	LUX	OAL	NOF	NT	PHD
No.2-56	No.3-56	56	STMD2L	06016L050-I56UN		1.65	6	0.45	5.45	76	4	2	1.80
No.3-48	No.4-48	48		06019L060-I48UN		1.90	6	0.53	6.53	76	4	2	2.10
No.4-40, No.5-40	No.6-40	40		06021L060-I40UN		2.10	6	0.64	6.64	76	4	2	2.35
No.5-40	No.6-40	40		06024L072-I40UN		2.45	6	0.64	7.84	76	4	2	2.65
	No.8-36	36		06033L087-I36UN		3.30	6	0.71	9.41	76	4	2	3.55
No.6-32, No.8-32	No.10-32	32		06025L074-I32UN		2.55	6	0.79	8.20	76	4	2	2.85
No.8-32	No.10-32	32		06032L100-I32UN		3.20	6	0.79	10.79	76	4	2	3.50
	No.10-32	32		06037L100-I32UN		3.70	6	0.79	10.80	76	4	2	4.17
	1/4″x28	28		06052L132-I28UN		5.25	6	0.91	14.11	76	5	2	5.55
No.10-24	5/16″x24	24		06035L102-I24UN		3.58	6	1.06	11.26	76	4	2	3.90
	5/16″x24	24		08066L165-I24UN		6.68	8	1.06	17.56	80	5	2	7.00
1/4″-20	7/16″x20	20		06048L134-I20UN		4.88	6	1.27	14.67	76	5	2	5.20
	7/16″x20	20		10095L230-I20UN		9.55	10	1.27	24.27	101	6	2	9.90
5/16″x18		18		08061L160-I18UN		6.15	8	1.42	18.17	80	4	2	6.50
3/8″x16		16		08076L197-I16UN		7.65	8	1.59	21.29	80	5	2	8.00
7/16″x14		14		10090L233-I14UN		9.00	10	1.82	25.11	101	6	2	9.50
1/2″x13		13		10099L256-I13UN		9.90	10	1.95	27.55	101	6	2	10.90

(LE≤3×나사경)

나 사		피치 (tpi)	형번		PC9070M	치 수(mm)					날수	나사산수	*보어경
UNC	UNF					DC	DCON-MS	LE	LUX	OAL	NOF	NT	PHD
No.4-40, No.5-40	No.6-40	40	STMD2L	06021L090-I40UN		2.10	6	0.64	9.64	76	4	2	2.35
No.5-40	No.6-40	40		06024L100-I40UN		2.45	6	0.64	10.64	76	4	2	2.65
No.6-32, No.8-32	No.10-32	32		06025L110-I32UN		2.55	6	0.79	11.79	76	4	2	2.85
No.8-32	No.10-32	32		06032L130-I32UN		3.20	6	0.79	13.79	76	4	2	3.50
	1/4″x28	28		06052L196-I28UN		5.25	6	0.91	20.51	76	5	2	5.55
	5/16″x24	24		08066L245-I24UN		6.68	8	1.06	25.56	80	5	2	7.00
1/4″x20	7/16″x20	20		06048L198-I20UN		4.88	6	1.27	21.07	76	5	2	5.20
5/16″x18		18		08061L240-I18UN		6.15	8	1.42	26.17	80	4	2	6.50
7/16″x14		14		10090L335-I14UN		9.00	10	1.82	35.31	101	6	2	9.50

* 보어경(Bore Diameter)은 가능한 최소나사경을 적용

● : 재고 관리 형번

고성능 나사가공 탭

Tap-Star

- 내치핑성 강화를 위한 고인성 하이스 모재
- 다양한 피삭재 가공에 최적합한 형상 설계

형번표기법

S	V	R	O	M	09	100	40	S
Tap-Star	**모재** V : HSSE	**형상** Q : 스파이럴 플루트 (DIN) D : 스파이럴 포인트 (DIN) G : 스트레이트 플루트 (DIN) P : 스파이럴 플루트 (JIS) N : 스파이럴 포인트 (JIS) S : 스트레이트 플루트 (JIS)	**표면처리** O : Bright A : TiAlN N : Nitride	**나사종류** M : 미터 나사	**호칭경** 06 : M6 12 : M12	**피치** 050 : 0.5 100 : 1.0 150 : 1.5	**챔퍼산수** 15 : 1.5P 25 : 2.5P 50 : 5.0P	**오일홈** S : 1홈 M : 4홈

특징

내치핑성 강화

- 고인성 하이스 모재
- 챔퍼부 특수 인선처리

내마모성 강화

- 고온 내산화성이 우수한 TiAlN 코팅

최적화 형상

- 원활한 칩 배출을 위한 플루트 형상
- 내치핑 향상을 위한 최적의 여유각 설계

경제적인 공구비용

- 최고의 성능 및 품질 제공

최적의 플루트 형상

– 원활한 칩 배출



아이콘 가이드

샹크 타입		공구 형상		코팅		피삭재		챔퍼 리드		나사 타입		나사 공차		모재	
DIN	DIN	Spiral flute	SFT	Un-coated	Bright	Black ring	P(K)	Form C (chamfer lead 2 ~ 3 Thread)	C form	M	M	6H	6H	HSSE	HSSE
JIS	JIS	Spiral point	SPT	Nitride	Nitride	Green ring	K	Form B (chamfer lead 4 ~ 5 Thread)	B form	MF	MF	ISO H2/3/4	H2/3/4		
-	-	Straight	STT	TiAlN	TiAlN	Blue ring	M(H)	Form E (chamfer lead 1.5 ~ 2 Thread)	E form	-	-	-	-		
-	-	-	-	-	-	Yellow ring	N	-	-	-	-	-	-	-	-

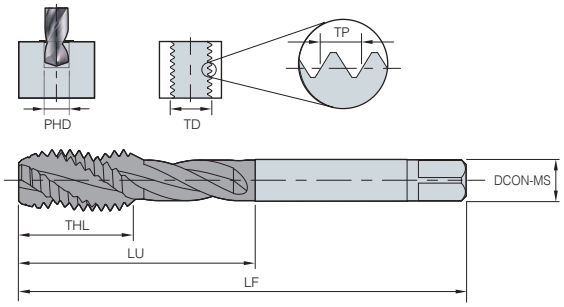
라인업

구 분		형 번	형 상	제품명	코 팅	규 격	
						Min.	Max.
DIN	스파이럴	SVQAM		스파이럴 플루트 탭	TiAlN	M2	M24
		SVQNM			Nitride	M2	M24
		SVQOM			-	M2	M24
	포인트	SVDAM		스파이럴 포인트 탭	TiAlN	M2	M24
		SVDNM			Nitride	M2	M24
		SVDOM			-	M2	M24
	스트레이트	SVGAM		스트레이트 플루트 탭	TiAlN	M3	M24
JIS	스파이럴	SVPAM		스파이럴 플루트 탭	TiAlN	M2	M24
		SVPNM			Nitride	M2	M24
		SVPOM			-	M2	M24
	포인트	SVNAM		스파이럴 포인트 탭	TiAlN	M2	M24
		SVNNM			Nitride	M2	M24
		SVNOM			-	M2	M24
	스트레이트	SVSAM		스트레이트 플루트 탭	TiAlN	M3	M24

SVQAM

스파이럴 플루트 탭





DIN | SFT | TiAlN | P(K) | C form | M MF | 6H | HSSE

(mm)

형	번	TDZ	TP	LU	CZCMS	DCON-MS	TD	LF	THL	NOF	PHD	BSG
SVQAM	0204025	M2	0.4	13.5	2.8 x 2.1	2.8	2	45	8	3	1.6	DIN371
	025045025	M2.5	0.45	15	2.8 x 2.1	2.8	3	50	9	3	2.1	DIN371
	0305025	M3	0.5	17	3.5 x 2.7	3.5	3	56	6	3	2.5	DIN371
	0407025	M4	0.7	20.5	4.5 x 3.4	4.5	4	63	7.5	3	3.3	DIN371
	0508025	M5	0.8	25	6 x 4.9	6	5	70	9	3	4.2	DIN371
	0610025	M6	1	26	6 x 4.9	6	6	80	11	3	5	DIN371
	0812525	M8	1.25	34	8 x 6.2	8	8	90	13	3	6.8	DIN371
	1015025	M10	1.5	38	10 x 8	10	10	100	16	3	8.5	DIN371
	1217525	M12	1.75	40	9 x 7	9	12	110	18	3	10.2	DIN376
	1420025	M14	2	45	11 x 9	11	14	110	20	4	12	DIN376
	1620025	M16	2	52	12 x 9	12	16	110	20	4	14	DIN376
	1825025	M18	2.5	55	14 x 11	14	18	125	22	4	15.5	DIN376
	2025025	M20	2.5	58	16 x 12	16	20	140	25	4	17.5	DIN376
	2225025	M22	2.5	63	18 x 14.5	18	22	140	25	4	19.5	DIN376
	2430025	M24	3	66	18 x 14.5	18	24	160	28	4	21	DIN376
	0405025	MF4	0.5	20.5	2.8 x 2.1	2.8	4	63	7.5	3	3.5	DIN374
	0505025	MF5	0.5	24	3.5 x 2.7	3.5	5	70	8	3	4.5	DIN374
	0507525	MF5	0.75	24	3.5 x 2.7	3.5	5	70	8	3	4.8	DIN374
	0605025	MF6	0.5	26	4.5 x 3.4	4.5	6	80	8	3	5.5	DIN374
	0607525	MF6	0.75	29	4.5 x 3.4	4.5	6	80	8	3	5.3	DIN374
	0807525	MF8	0.75	34	6 x 4.9	6	8	80	10	3	7.3	DIN374
	0810025	MF8	1	34	6 x 4.9	6	8	90	10	3	7	DIN374
	1007525	MF10	0.75	38	7 x 5.5	7	10	90	14	3	9.3	DIN374
	1010025	MF10	1	38	7 x 5.5	7	10	90	14	3	9	DIN374
	1012525	MF10	1.25	38	7 x 5.5	7	10	100	14	3	8.8	DIN374
	1210025	MF12	1	48	9 x 7	9	12	100	14	3	11	DIN374
	1212525	MF12	1.25	48	9 x 7	9	12	100	14	3	10.8	DIN374
	1215025	MF12	1.5	48	9 x 7	9	12	100	14	3	10.5	DIN374
	1410025	MF14	1	48	11 x 9	11	14	100	18	3	13	DIN374
	1412525	MF14	1.25	48	11 x 9	11	14	100	18	3	12.8	DIN374
	1415025	MF14	1.5	48	11 x 9	11	14	100	18	3	12.5	DIN374
	1610025	MF16	1	52	12 x 9	12	16	100	18	3	15	DIN374
	1612525	MF16	1.25	52	12 x 9	12	16	100	18	3	14.8	DIN374
	1615025	MF16	1.5	52	12 x 9	12	16	100	18	3	14.5	DIN374
	1815025	MF18	1.5	55	14 x 11	14	18	110	18	4	16.5	DIN374
	1820025	MF18	2	55	14 x 11	14	18	125	22	4	16	DIN374
	2015025	MF20	1.5	58	16 x 12	16	20	125	25	4	18.5	DIN374
	2020025	MF20	2	58	16 x 12	16	20	140	25	4	18	DIN374
	2215025	MF22	1.5	63	18 x 14.5	18	22	125	25	4	20.5	DIN374
	2415025	MF24	1.5	66	18 x 14.5	18	24	140	25	4	22.5	DIN374
	2420025	MF24	2	66	18 x 14.5	18	24	140	27	4	22	DIN374

• 적용 피삭재

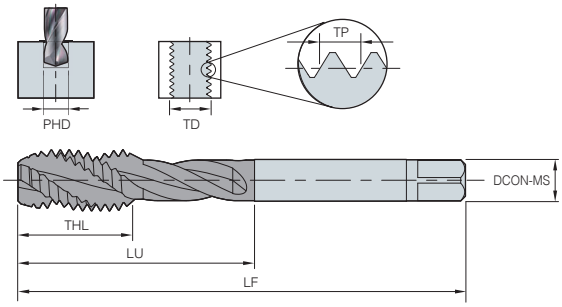
◎ : 매우적합 ○ : 적합

구분	탄소강			합금강	조질강			스테인리스강	공구강	주강	주철	강인주철	동	황동	황동주물	청동	알루미늄 압연재	알루미늄 합금주물	마그네슘 합금주물	아연 합금주물	티타늄 합금		열경화성 플라스틱	열가소성 플라스틱
	C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	STS	SKD	SC	GC	GCD	Cu	Bs	BsC	PB	Al	AC ADC	MC	ZDC	Ti	Ni	-	-
	◎	◎	◎	◎	○					◎	○	○						◎						

SVQNM

스파이럴 플루트 탭





DIN | SFT | TiAlN | P(K) | C form | M MF | 6H | HSSE

(mm)

형 번		TDZ	TP	LU	CZCMS	DCON-MS	TD	LF	THL	NOF	PHD	BSG
SVQNM	0204025	M2	0.4	13.5	2.8 x 2.1	2.8	2	45	8	3	1.6	DIN371
	025045025	M2.5	0.45	15	2.8 x 2.1	2.8	3	50	9	3	2.1	DIN371
	0305025	M3	0.5	17	3.5 x 2.7	3.5	3	56	6	3	2.5	DIN371
	0407025	M4	0.7	20.5	4.5 x 3.4	4.5	4	63	7.5	3	3.3	DIN371
	0508025	M5	0.8	25	6 x 4.9	6	5	70	9	3	4.2	DIN371
	0610025	M6	1	26	6 x 4.9	6	6	80	11	3	5	DIN371
	0812525	M8	1.25	34	8 x 6.2	8	8	90	13	3	6.8	DIN371
	1015025	M10	1.5	38	10 x 8	10	10	100	16	3	8.5	DIN371
	1217525	M12	1.75	40	9 x 7	9	12	110	18	3	10.2	DIN376
	1420025	M14	2	45	11 x 9	11	14	110	20	4	12	DIN376
	1620025	M16	2	52	12 x 9	12	16	110	20	4	14	DIN376
	1825025	M18	2.5	55	14 x 11	14	18	125	22	4	15.5	DIN376
	2025025	M20	2.5	58	16 x 12	16	20	140	25	4	17.5	DIN376
	2225025	M22	2.5	63	18 x 14.5	18	22	140	25	4	19.5	DIN376
	2430025	M24	3	66	18 x 14.5	18	24	160	28	4	21	DIN376
	0405025	MF4	0.5	20.5	2.8 x 2.1	2.8	4	63	7.5	3	3.5	DIN374
	0505025	MF5	0.5	24	3.5 x 2.7	3.5	5	70	8	3	4.5	DIN374
	0607525	MF6	0.75	29	4.5 x 3.4	4.5	6	80	8	3	5.3	DIN374
	0807525	MF8	0.75	34	6 x 4.9	6	8	80	10	3	7.3	DIN374
	0810025	MF8	1	34	6 x 4.9	6	8	90	10	3	7	DIN374
	1007525	MF10	0.75	38	7 x 5.5	7	10	90	14	3	9.3	DIN374
	1010025	MF10	1	38	7 x 5.5	7	10	90	14	3	9	DIN374
	1012525	MF10	1.25	38	7 x 5.5	7	10	100	14	3	8.8	DIN374
	1210025	MF12	1	48	9 x 7	9	12	100	14	3	11	DIN374
	1212525	MF12	1.25	48	9 x 7	9	12	100	14	3	10.8	DIN374
	1215025	MF12	1.5	48	9 x 7	9	12	100	14	3	10.5	DIN374
	1410025	MF14	1	48	11 x 9	11	14	100	18	3	13	DIN374
	1415025	MF14	1.5	48	11 x 9	11	14	100	18	3	12.5	DIN374
	1610025	MF16	1	52	12 x 9	12	16	100	18	3	15	DIN374
	1615025	MF16	1.5	52	12 x 9	12	16	100	18	3	14.5	DIN374
	1815025	MF18	1.5	55	14 x 11	14	18	110	18	4	16.5	DIN374
	1820025	MF18	2	55	14 x 11	14	18	125	22	4	16	DIN374
	2015025	MF20	1.5	58	16 x 12	16	20	125	25	4	18.5	DIN374
	2215025	MF22	1.5	63	18 x 14.5	18	22	125	25	4	20.5	DIN374
	2415025	MF24	1.5	66	18 x 14.5	18	24	140	25	4	22.5	DIN374
	2420025	MF24	2	66	18 x 14.5	18	24	140	27	4	22	DIN374

• 적용 피삭재

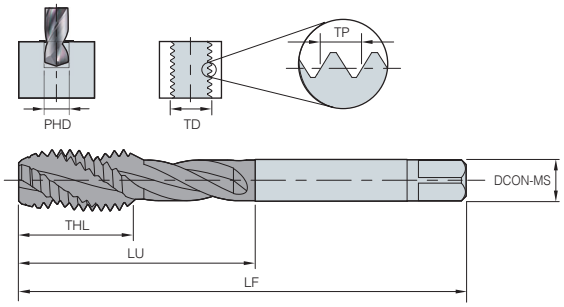
◎ : 매우적합 ○ : 적합

구분	탄소강			합금강	조질강			스테인리스강	공구강	주강	주철	강인주철	동	황동	황동주물	청동	알루미늄 압연재	알루미늄 합금주물	마그네슘 합금주물	아연 합금주물	티타늄 합금		열경화성 플라스틱	열가소성 플라스틱
	C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	STS	SKD	SC	GC	GCD	Cu	Bs	BsC	PB	Al	AC ADC	MC	ZDC	Ti	Ni	-	-
	○	○	○	○	○			◎	○	○	○	◎						○			○	○	○	

SVQOM

스파이럴 플루트 탭





DIN | SFT | Bright | N | C form | M MF | 6H | HSSE

(mm)

형 번		TDZ	TP	LU	CZCMS	DCON-MS	TD	LF	THL	NOF	PHD	BSG
SVQOM	0204025	M2	0.4	13.5	2.8 x 2.1	2.8	2	45	8	3	1.6	DIN371
	025045025	M2.5	0.45	15	2.8 x 2.1	2.8	3	50	9	3	2.1	DIN371
	0305025	M3	0.5	17	3.5 x 2.7	3.5	3	56	6	3	2.5	DIN371
	0407025	M4	0.7	20.5	4.5 x 3.4	4.5	4	63	7.5	3	3.3	DIN371
	0508025	M5	0.8	25	6 x 4.9	6	5	70	9	3	4.2	DIN371
	0610025	M6	1	26	6 x 4.9	6	6	80	11	3	5	DIN371
	0812525	M8	1.25	34	8 x 6.2	8	8	90	13	3	6.8	DIN371
	1015025	M10	1.5	38	10 x 8	10	10	100	16	3	8.5	DIN371
	1217525	M12	1.75	40	9 x 7	9	12	110	18	3	10.2	DIN376
	1420025	M14	2	45	11 x 9	11	14	110	20	4	12	DIN376
	1620025	M16	2	52	12 x 9	12	16	110	20	4	14	DIN376
	1825025	M18	2.5	55	14 x 11	14	18	125	22	4	15.5	DIN376
	2025025	M20	2.5	58	16 x 12	16	20	140	25	4	17.5	DIN376
	2225025	M22	2.5	63	18 x 14.5	18	22	140	25	4	19.5	DIN376
	2430025	M24	3	66	18 x 14.5	18	24	160	28	4	21	DIN376
	0405025	MF4	0.5	20.5	2.8 x 2.1	2.8	4	63	7.5	3	3.5	DIN374
	0505025	MF5	0.5	24	3.5 x 2.7	3.5	5	70	8	3	4.5	DIN374
	0607525	MF6	0.75	29	4.5 x 3.4	4.5	6	80	8	3	5.3	DIN374
	0807525	MF8	0.75	34	6 x 4.9	6	8	80	10	3	7.3	DIN374
	0810025	MF8	1	34	6 x 4.9	6	8	90	10	3	7	DIN374
	1007525	MF10	0.75	38	7 x 5.5	7	10	90	14	3	9.3	DIN374
	1010025	MF10	1	38	7 x 5.5	7	10	90	14	3	9	DIN374
	1012525	MF10	1.25	38	7 x 5.5	7	10	100	14	3	8.8	DIN374
	1210025	MF12	1	48	9 x 7	9	12	100	14	3	11	DIN374
	1212525	MF12	1.25	48	9 x 7	9	12	100	14	3	10.8	DIN374
	1215025	MF12	1.5	48	9 x 7	9	12	100	14	3	10.5	DIN374
	1410025	MF14	1	48	11 x 9	11	14	100	18	3	13	DIN374
	1415025	MF14	1.5	48	11 x 9	11	14	100	18	3	12.5	DIN374
	1610025	MF16	1	52	12 x 9	12	16	100	18	3	15	DIN374
	1615025	MF16	1.5	52	12 x 9	12	16	100	18	3	14.5	DIN374
	1815025	MF18	1.5	55	14 x 11	14	18	110	18	4	16.5	DIN374
	1820025	MF18	2	55	14 x 11	14	18	125	22	4	16	DIN374
	2015025	MF20	1.5	58	16 x 12	16	20	125	25	4	18.5	DIN374
	2215025	MF22	1.5	63	18 x 14.5	18	22	125	25	4	20.5	DIN374
	2415025	MF24	1.5	66	18 x 14.5	18	24	140	25	4	22.5	DIN374
	2420025	MF24	2	66	18 x 14.5	18	24	140	27	4	22	DIN374

• 적용 피삭재

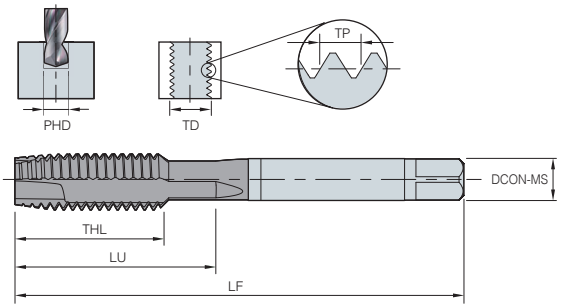
◎ : 매우적합 ○ : 적합

구분	탄소강			합금강	조질강			스테인리스강	공구강	주강	주철	강인주철	동	황동	황동주물	청동	알루미늄 압연재	알루미늄 합금주물	마그네슘 합금주물	아연 합금주물	티타늄 합금		열경화성 플라스틱	열가소성 플라스틱
	C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	STS	SKD	SC	GC	GCD	Cu	Bs	BsC	PB	Al	AC ADC	MC	ZDC	Ti	Ni	-	-
													◎	◎	◎	◎	◎	◎	○	○			◎	

SVDAM

스파이럴 포인트 탭





DIN | SPT | TiAlN | P(K) | B form | M MF | 6H | HSSE

(mm)

형	번	TDZ	TP	LU	CZCMS	DCON-MS	TD	LF	THL	NOF	PHD	BSG
SVDAM	0204050	M2	0.4	13.5	2.8 x 2.1	2.8	2	45	8	3	1.6	DIN371
	022045050	M2.2	0.45	15	2.8 x 2.1	2.8	2	45	9	3	1.8	DIN371
	025045050	M2.5	0.45	15	2.8 x 2.1	2.8	3	50	9	3	2.1	DIN371
	0305050	M3	0.5	18	3.5 x 2.7	3.5	3	56	11	3	2.5	DIN371
	03506050	M3.5	0.6	20	4 x 3	4	4	56	13	3	2.9	DIN371
	0407050	M4	0.7	21	4.5 x 3.4	4.5	4	63	13	3	3.3	DIN371
	0508050	M5	0.8	25	6 x 4.9	6	5	70	16	3	4.2	DIN371
	0610050	M6	1	30	6 x 4.9	6	6	80	19	3	5	DIN371
	0812550	M8	1.25	35	8 x 6.2	8	8	90	22	3	6.8	DIN371
	1015050	M10	1.5	39	10 x 8	10	10	100	24	3	8.5	DIN371
	1217550	M12	1.75	40	9 x 7	9	12	110	29	3	10.2	DIN376
	1420050	M14	2	45	11 x 9	11	14	110	30	3	12	DIN376
	1620050	M16	2	52	12 x 9	12	16	110	32	3	14	DIN376
	1825050	M18	2.5	55	14 x 11	14	18	125	34	3	15.5	DIN376
	2025050	M20	2.5	58	16 x 12	16	20	140	34	4	17.5	DIN376
	2225050	M22	2.5	63	18 x 14.5	18	22	140	34	4	19.5	DIN376
	2430050	M24	3	66	18 x 14.5	18	24	160	38	4	21	DIN376
	0405050	MF4	0.5	18	2.8 x 2.1	2.8	4	63	10	3	3.5	DIN374
	0505050	MF5	0.5	25	3.5 x 2.7	3.5	5	70	12	3	4.5	DIN374
	0507550	MF5	0.75	25	3.5 x 2.7	3.5	5	70	12	3	4.8	DIN374
	0605050	MF6	0.5	25	4.5 x 3.4	4.5	6	80	14	3	5.5	DIN374
	0607550	MF6	0.75	25	4.5 x 3.4	4.5	6	80	14	3	5.3	DIN374
	0807550	MF8	0.75	35	6 x 4.9	6	8	80	19	3	7.3	DIN374
	0810050	MF8	1	35	6 x 4.9	6	8	90	22	3	7	DIN374
	1007550	MF10	0.75	39	7 x 5.5	7	10	90	20	3	9.3	DIN374
	1010050	MF10	1	39	7 x 5.5	7	10	90	20	3	9	DIN374
	1012550	MF10	1.25	39	7 x 5.5	7	10	100	24	3	8.8	DIN374
	1210050	MF12	1	48	9 x 7	9	12	100	22	3	11	DIN374
	1212550	MF12	1.25	48	9 x 7	9	12	100	22	3	10.8	DIN374
	1215050	MF12	1.5	48	9 x 7	9	12	100	22	3	10.5	DIN374
	1410050	MF14	1	48	11 x 9	11	14	100	22	3	13	DIN374
	1412550	MF14	1.25	48	11 x 9	11	14	100	22	3	12.8	DIN374
	1415050	MF14	1.5	48	11 x 9	11	14	100	22	3	12.5	DIN374
	1610050	MF16	1	52	12 x 9	12	16	100	22	3	15	DIN374
	1612550	MF16	1.25	52	12 x 9	12	16	100	22	3	14.8	DIN374
	1615050	MF16	1.5	52	12 x 9	12	16	100	22	3	14.5	DIN374
	1815050	MF18	1.5	55	14 x 11	14	18	110	25	4	16.5	DIN374
	1820050	MF18	2	55	14 x 11	14	18	125	34	4	16	DIN374
	2015050	MF20	1.5	58	16 x 12	16	20	125	25	4	18.5	DIN374
	2020050	MF20	2	58	16 x 12	16	20	140	34	4	18	DIN374
	2215050	MF22	1.5	63	18 x 14.5	18	22	125	25	4	20.5	DIN374
	2415050	MF24	1.5	66	18 x 14.5	18	24	140	28	4	22.5	DIN374
	2420050	MF24	2	66	18 x 14.5	18	24	140	28	4	22	DIN374

• 적용 피삭재

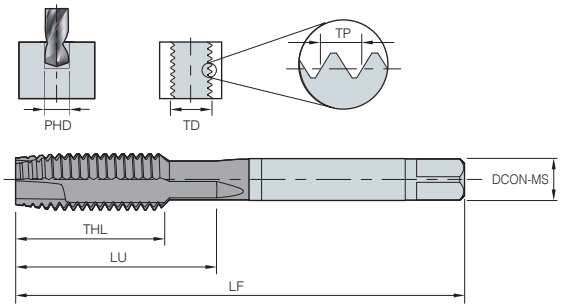
◎ : 매우적합 ○ : 적합

구분	탄소강			합금강	조질강			스테인리스강	공구강	주강	주철	강인주철	동	황동	황동주물	청동	알루미늄 압연재	알루미늄 합금주물	마그네슘 합금주물	아연 합금주물	티타늄 합금		열경화성 플라스틱	열가소성 플라스틱
	C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	STS	SKD	SC	GC	GCD	Cu	Bs	BsC	PB	Al	AC ADC	MC	ZDC	Ti	Ni	-	-
	◎	◎	◎	◎	○					◎	○	○						◎						

SVDNM

스파이럴 포인트 탭





DIN | SPT | Nitride | M(H) | B form | M MF | 6H | HSSE

(mm)

형번		TDZ	TP	LU	CZCMS	DCON-MS	TD	LF	THL	NOF	PHD	BSG
SVDNM	0204050	M2	0.4	13.5	2.8 x 2.1	2.8	2	45	8	3	1.6	DIN371
	025045050	M2.5	0.45	15	2.8 x 2.1	2.8	3	50	9	3	2.1	DIN371
	0305050	M3	0.5	18	3.5 x 2.7	3.5	3	56	11	3	2.5	DIN371
	0407050	M4	0.7	21	4.5 x 3.4	4.5	4	63	13	3	3.3	DIN371
	0508050	M5	0.8	25	6 x 4.9	6	5	70	16	3	4.2	DIN371
	0610050	M6	1	30	6 x 4.9	6	6	80	19	3	5	DIN371
	0812550	M8	1.25	35	8 x 6.2	8	8	90	22	3	6.8	DIN371
	1015050	M10	1.5	39	10 x 8	10	10	100	24	3	8.5	DIN371
	1217550	M12	1.75	40	9 x 7	9	12	110	29	3	10.2	DIN376
	1420050	M14	2	45	11 x 9	11	14	110	30	3	12	DIN376
	1620050	M16	2	52	12 x 9	12	16	110	32	3	14	DIN376
	1825050	M18	2.5	55	14 x 11	14	18	125	34	3	15.5	DIN376
	2025050	M20	2.5	58	16 x 12	16	20	140	34	4	17.5	DIN376
	2225050	M22	2.5	63	18 x 14.5	18	22	140	34	4	19.5	DIN376
	2430050	M24	3	66	18 x 14.5	18	24	160	38	4	21	DIN376
	0405050	MF4	0.5	18	2.8 x 2.1	2.8	4	63	10	3	3.5	DIN374
	0505050	MF5	0.5	25	3.5 x 2.7	3.5	5	70	12	3	4.5	DIN374
	0607550	MF6	0.75	25	4.5 x 3.4	4.5	6	80	14	3	5.3	DIN374
	0807550	MF8	0.75	35	6 x 4.9	6	8	80	19	3	7.3	DIN374
	0810050	MF8	1	35	6 x 4.9	6	8	90	22	3	7	DIN374
	1007550	MF10	0.75	39	7 x 5.5	7	10	90	20	3	9.3	DIN374
	1010050	MF10	1	39	7 x 5.5	7	10	90	20	3	9	DIN374
	1012550	MF10	1.25	39	7 x 5.5	7	10	100	24	3	8.8	DIN374
	1210050	MF12	1	48	9 x 7	9	12	100	22	3	11	DIN374
	1212550	MF12	1.25	48	9 x 7	9	12	100	22	3	10.8	DIN374
	1215050	MF12	1.5	48	9 x 7	9	12	100	22	3	10.5	DIN374
	1410050	MF14	1	48	11 x 9	11	14	100	22	3	13	DIN374
	1415050	MF14	1.5	48	11 x 9	11	14	100	22	3	12.5	DIN374
	1610050	MF16	1	52	12 x 9	12	16	100	22	3	15	DIN374
	1615050	MF16	1.5	52	12 x 9	12	16	100	22	3	14.5	DIN374
	1815050	MF18	1.5	55	14 x 11	14	18	110	25	4	16.5	DIN374
	1820050	MF18	2	55	14 x 11	14	18	125	34	4	16	DIN374
	2015050	MF20	1.5	58	16 x 12	16	20	125	25	4	18.5	DIN374
	2215050	MF22	1.5	63	18 x 14.5	18	22	125	25	4	20.5	DIN374
	2415050	MF24	1.5	66	18 x 14.5	18	24	140	28	4	22.5	DIN374
	2420050	MF24	2	66	18 x 14.5	18	24	140	28	4	22	DIN374

• 적용 피삭재

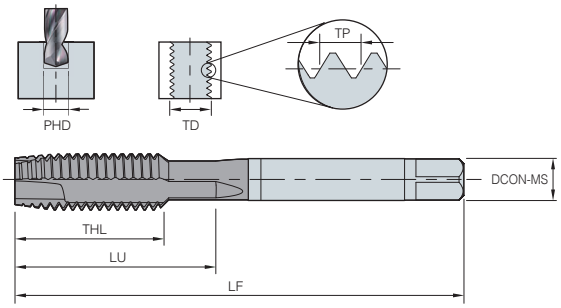
◎ : 매우적합 ○ : 적합

구분	탄소강			합금강	조질강			스테인리스강	공구강	주강	주철	강인주철	동	황동	황동주물	청동	알루미늄 압연재	알루미늄 합금주물	마그네슘 합금주물	아연 합금주물	티타늄 합금		열경화성 플라스틱	열가소성 플라스틱
	C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	STS	SKD	SC	GC	GCD	Cu	Bs	BsC	PB	Al	AC ADC	MC	ZDC	Ti	Ni	-	-
	○	○	○	○	○			◎	○	○	○	◎						○			○	○	○	

SVDOM

스파이럴 포인트 탭





DIN | SPT | Bright | N | B form | M MF | 6H | HSSE

(mm)

형 번		TDZ	TP	LU	CZCMS	DCON-MS	TD	LF	THL	NOF	PHD	BSG
SVDOM	0204050	M2	0.4	13.5	2.8 x 2.1	2.8	2	45	8	3	1.6	DIN371
	025045050	M2.5	0.45	15	2.8 x 2.1	2.8	3	50	9	3	2.1	DIN371
	0305050	M3	0.5	18	3.5 x 2.7	3.5	3	56	11	3	2.5	DIN371
	0407050	M4	0.7	21	4.5 x 3.4	4.5	4	63	13	3	3.3	DIN371
	0508050	M5	0.8	25	6 x 4.9	6	5	70	16	3	4.2	DIN371
	0610050	M6	1	30	6 x 4.9	6	6	80	19	3	5	DIN371
	0812550	M8	1.25	35	8 x 6.2	8	8	90	22	3	6.8	DIN371
	1015050	M10	1.5	39	10 x 8	10	10	100	24	3	8.5	DIN371
	1217550	M12	1.75	40	9 x 7	9	12	110	29	3	10.2	DIN376
	1420050	M14	2	45	11 x 9	11	14	110	30	3	12	DIN376
	1620050	M16	2	52	12 x 9	12	16	110	32	3	14	DIN376
	1825050	M18	2.5	55	14 x 11	14	18	125	34	3	15.5	DIN376
	2025050	M20	2.5	58	16 x 12	16	20	140	34	4	17.5	DIN376
	2225050	M22	2.5	63	18 x 14.5	18	22	140	34	4	19.5	DIN376
	2430050	M24	3	66	18 x 14.5	18	24	160	38	4	21	DIN376
	0405050	MF4	0.5	18	2.8 x 2.1	2.8	4	63	10	3	3.5	DIN374
	0505050	MF5	0.5	25	3.5 x 2.7	3.5	5	70	12	3	4.5	DIN374
	0607550	MF6	0.75	25	4.5 x 3.4	4.5	6	80	14	3	5.3	DIN374
	0807550	MF8	0.75	35	6 x 4.9	6	8	80	19	3	7.3	DIN374
	0810050	MF8	1	35	6 x 4.9	6	8	90	22	3	7	DIN374
	1007550	MF10	0.75	39	7 x 5.5	7	10	90	20	3	9.3	DIN374
	1010050	MF10	1	39	7 x 5.5	7	10	90	20	3	9	DIN374
	1012550	MF10	1.25	39	7 x 5.5	7	10	100	24	3	8.8	DIN374
	1210050	MF12	1	48	9 x 7	9	12	100	22	3	11	DIN374
	1212550	MF12	1.25	48	9 x 7	9	12	100	22	3	10.8	DIN374
	1215050	MF12	1.5	48	9 x 7	9	12	100	22	3	10.5	DIN374
	1410050	MF14	1	48	11 x 9	11	14	100	22	3	13	DIN374
	1415050	MF14	1.5	48	11 x 9	11	14	100	22	3	12.5	DIN374
	1610050	MF16	1	52	12 x 9	12	16	100	22	3	15	DIN374
	1615050	MF16	1.5	52	12 x 9	12	16	100	22	3	14.5	DIN374
	1815050	MF18	1.5	55	14 x 11	14	18	110	25	4	16.5	DIN374
	1820050	MF18	2	55	14 x 11	14	18	125	34	4	16	DIN374
	2015050	MF20	1.5	58	16 x 12	16	20	125	25	4	18.5	DIN374
	2215050	MF22	1.5	63	18 x 14.5	18	22	125	25	4	20.5	DIN374
	2415050	MF24	1.5	66	18 x 14.5	18	24	140	28	4	22.5	DIN374
	2420050	MF24	2	66	18 x 14.5	18	24	140	28	4	22	DIN374

• 적용 피삭재

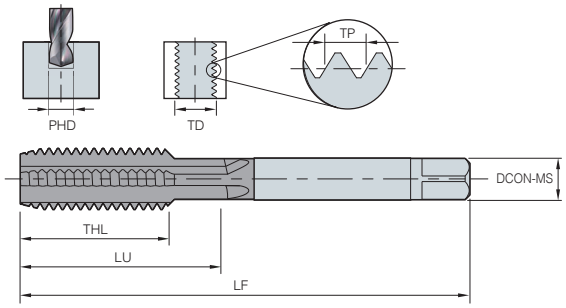
◎ : 매우적합 ○ : 적합

구분	탄소강			합금강	조질강			스테인리스강	공구강	주강	주철	강인주철	동	황동	황동주물	청동	알루미늄 압연재	알루미늄 합금주물	마그네슘 합금주물	아연 합금주물	티타늄 합금		열경화성 플라스틱	열가소성 플라스틱
	C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	STS	SKD	SC	GC	GCD	Cu	Bs	BsC	PB	Al	AC ADC	MC	ZDC	Ti	Ni	-	-
													◎	◎	◎	◎	◎	◎	○	○			◎	

SVGAM

스트레이트 플루트 탭





DIN | STT | TiAlN | K | B/E form | M MF | 6H | HSSE

(mm)

형	번	TDZ	TP	LU	CZCMS	DCON-MS	TD	LF	THL	NOF	PHD	BSG	THCHT
SVGAM	0305015	M3	0.5	18	3.5 x 2.7	3.5	3	56	11	3	2.5	DIN371	E
	0407015	M4	0.7	21	4.5 x 3.4	4.5	4	63	13	3	3.3	DIN371	E
	0508015	M5	0.8	25	6 x 4.9	6	5	70	15	3	4.2	DIN371	E
	0610015	M6	1	30	6 x 4.9	6	6	80	17	4	5	DIN371	E
	0812515	M8	1.25	35	8 x 6.2	8	8	90	20	4	6.8	DIN371	E
	1015015	M10	1.5	39	10 x 8	10	10	100	22	4	8.5	DIN371	E
	1217515	M12	1.75	40	9 x 7	9	12	110	24	4	10.2	DIN376	E
	1420015	M14	2	45	11 x 9	11	14	110	26	4	12	DIN376	E
	1620015	M16	2	52	12 x 9	12	16	110	27	4	14	DIN376	E
	1825015	M18	2.5	55	14 x 11	14	18	125	30	4	15.5	DIN376	E
	2025015	M20	2.5	58	16 x 12	16	20	140	32	4	17.5	DIN376	E
	2225015	M22	2.5	63	18 x 14.5	18	22	140	32	4	19.5	DIN376	E
	2430015	M24	3	66	18 x 14.5	18	24	160	34	4	21	DIN376	E
	0810015	MF8	1	35	6 x 4.9	6	8	90	17	4	7	DIN374	E
	1010015	MF10	1	39	7 x 5.5	7	10	90	18	4	9	DIN374	E
	1012515	MF10	1.25	39	7 x 5.5	7	10	100	22	4	8.8	DIN374	E
	1210015	MF12	1	48	9 x 7	9	12	100	18	4	11	DIN374	E
	1212515	MF12	1.25	48	9 x 7	9	12	100	22	4	10.8	DIN374	E
	1215015	MF12	1.5	48	9 x 7	9	12	100	22	4	10.5	DIN374	E
	1415015	MF14	1.5	48	11 x 9	11	14	100	22	4	12.5	DIN374	E
	1615015	MF16	1.5	52	12 x 9	12	16	100	22	4	14.5	DIN374	E
	1815015	MF18	1.5	55	14 x 11	14	18	110	25	4	16.5	DIN374	E
	2015015	MF20	1.5	58	16 x 12	16	20	125	25	4	18.5	DIN374	E
	2215015	MF22	1.5	63	18 x 14.5	18	22	125	25	4	20.5	DIN374	E
	2415015	MF24	1.5	66	18 x 14.5	18	24	140	27	4	22.5	DIN374	E
	2420015	MF24	2	66	18 x 14.5	18	24	140	27	4	22	DIN374	E
	0305050	M3	0.5	18	3.5 x 2.7	3.5	3	56	11	3	2.5	DIN371	B
	0407050	M4	0.7	21	4.5 x 3.4	4.5	4	63	13	3	3.3	DIN371	B
	0508050	M5	0.8	25	6 x 4.9	6	5	70	15	3	4.2	DIN371	B
	0610050	M6	1	30	6 x 4.9	6	6	80	17	4	5	DIN371	B
	0812550	M8	1.25	35	8 x 6.2	8	8	90	20	4	6.8	DIN371	B
	1015050	M10	1.5	39	10 x 8	10	10	100	22	4	8.5	DIN371	B
	1217550	M12	1.75	40	9 x 7	9	12	110	24	4	10.2	DIN376	B
	1420050	M14	2	45	11 x 9	11	14	110	26	4	12	DIN376	B
	1620050	M16	2	52	12 x 9	12	16	110	27	4	14	DIN376	B
	1825050	M18	2.5	55	14 x 11	14	18	125	30	4	15.5	DIN376	B
	2025050	M20	2.5	58	16 x 12	16	20	140	32	4	17.5	DIN376	B
	2225050	M22	2.5	63	18 x 14.5	18	22	140	32	4	19.5	DIN376	B
	2430050	M24	3	66	18 x 14.5	18	24	160	34	4	21	DIN376	B
	0810050	MF8	1	35	6 x 4.9	6	8	90	17	4	7	DIN374	B
	1010050	MF10	1	39	7 x 5.5	7	10	90	18	4	9	DIN374	B
	1012550	MF10	1.25	39	7 x 5.5	7	10	100	22	4	8.8	DIN374	B
	1210050	MF12	1	48	9 x 7	9	12	100	18	4	11	DIN374	B
	1212550	MF12	1.25	48	9 x 7	9	12	100	22	4	10.8	DIN374	B
	1215050	MF12	1.5	48	9 x 7	9	12	100	22	4	10.5	DIN374	B
	1415050	MF14	1.5	48	11 x 9	11	14	100	22	4	12.5	DIN374	B
	1615050	MF16	1.5	52	12 x 9	12	16	100	22	4	14.5	DIN374	B
	1815050	MF18	1.5	55	14 x 11	14	18	110	25	4	16.5	DIN374	B
	2015050	MF20	1.5	58	16 x 12	16	20	125	25	4	18.5	DIN374	B
	2215050	MF22	1.5	63	18 x 14.5	18	22	125	25	4	20.5	DIN374	B
	2415050	MF24	1.5	66	18 x 14.5	18	24	140	27	4	22.5	DIN374	B
	2420050	MF24	2	66	18 x 14.5	18	24	140	27	4	22	DIN374	B

• 적용 피삭재

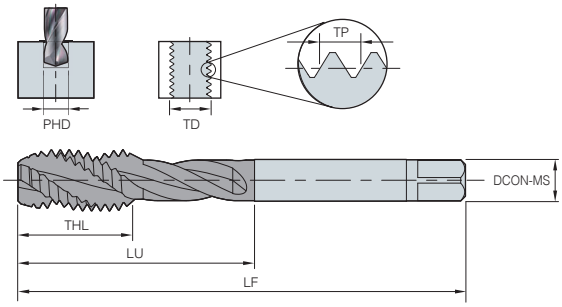
◎ : 매우적합 ○ : 적합

구분	탄소강			합금강	조질강			스테인리스강	공구강	주강	주철	강인주철	동	황동	황동주물	청동	알루미늄 압연재	알루미늄 합금주물	마그네슘 합금주물	아연 합금주물	티타늄 합금		열경화성 플라스틱	열가소성 플라스틱
	C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	STS	SKD	SC	GC	GCD	Cu	Bs	BsC	PB	Al	AC ADC	MC	ZDC	Ti	Ni	-	-
						○					◎													

SVPAM

스파이럴 플루트 탭





JIS | SFT | TiAlN | P(K) | C form | M MF | H2/3/4 | HSSE

(mm)

형 번		TDZ	TP	LU	CZCMS	DCON-MS	TD	LF	THL	NOF	PHD	BSG	TCTR
SVPAM	0204025	M2	0.4	13.5	3 x 2.5	3	2	40	8	3	1.6	JIS	H2
	025045025	M2.5	0.45	14.5	3 x 2.5	3	3	44	9	3	2.1	JIS	H2
	0305025	M3	0.5	17	4 x 3.2	4	3	46	6	3	2.5	JIS	H2
	0407025	M4	0.7	20.5	5 x 4	5	4	52	7.5	3	3.3	JIS	H2
	04507525	M4.5	0.75	20.5	5 x 4	5	5	55	13	3	3.8	JIS	H2
	0508025	M5	0.8	25	5.5 x 4.5	5.5	5	60	9	3	4.2	JIS	H2
	0610025	M6	1	29	6 x 4.5	6	6	62	11	3	5	JIS	H2
	0812525	M8	1.25	34	6.2 x 5	6.2	8	70	13	3	6.8	JIS	H3
	1015025	M10	1.5	38	7 x 5.5	7	10	75	16	3	8.5	JIS	H3
	1217525	M12	1.75	48	8.5 x 6.5	8.5	12	82	18	3	10.2	JIS	H4
	1420025	M14	2	45	10.5 x 8	10.5	14	88	20	4	12	JIS	H4
	1620025	M16	2	52	12.5 x 10	12.5	16	95	20	4	14	JIS	H4
	1825025	M18	2.5	55	14 x 11	14	18	100	22	4	15.5	JIS	H4
	2025025	M20	2.5	58	15 x 12	15	20	105	25	4	17.5	JIS	H4
	2225025	M22	2.5	63	17 x 13	17	22	115	25	4	19.5	JIS	H4
	2430025	M24	3	66	19 x 15	19	24	120	29	4	21	JIS	H4
	0405025	MF4	0.5	20.5	5 x 4	5	4	52	7.5	3	3.5	JIS	H2
	0505025	MF5	0.5	25	5.5 x 4.5	5.5	5	60	8	3	4.5	JIS	H2
	0607525	MF6	0.75	29	6 x 4.5	6	6	62	8	3	5.3	JIS	H2
	0807525	MF8	0.75	34	6.2 x 5	6.2	8	70	10	3	7.3	JIS	H3
	0810025	MF8	1	34	6.2 x 5	6.2	8	70	10	3	7	JIS	H3
	1007525	MF10	0.75	38	7 x 5.5	7	10	75	14	3	9.3	JIS	H3
	1010025	MF10	1	38	7 x 5.5	7	10	75	14	3	9	JIS	H3
	1012525	MF10	1.25	38	7 x 5.5	7	10	75	14	3	8.8	JIS	H3
	1210025	MF12	1	48	8.5 x 6.5	8.5	12	82	14	3	11	JIS	H3
	1212525	MF12	1.25	48	8.5 x 6.5	8.5	12	82	14	3	10.8	JIS	H3
	1215025	MF12	1.5	48	8.5 x 6.5	8.5	12	82	14	3	10.5	JIS	H3
	1410025	MF14	1	48	10.5 x 8	10.5	14	88	18	3	13	JIS	H3
	1415025	MF14	1.5	48	10.5 x 8	10.5	14	88	18	3	12.5	JIS	H3
	1615025	MF16	1.5	52	12.5 x 10	12.5	16	95	32	3	14.5	JIS	H3
	1815025	MF18	1.5	55	14 x 11	14	18	100	37	3	16.5	JIS	H4
	2015025	MF20	1.5	58	15 x 12	15	20	105	37	3	18.5	JIS	H4
	2215025	MF22	1.5	63	17 x 13	17	22	115	38	3	20.5	JIS	H4
	2415025	MF24	1.5	66	19 x 15	19	24	120	45	3	22.5	JIS	H4
	2420025	MF24	2	68	19 x 15	19	24	120	45	3	22	JIS	H4

• 적용 피삭재

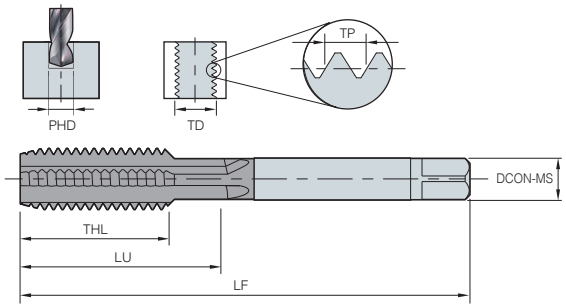
◎ : 매우적합 ○ : 적합

구분	탄소강			합금강	조질강			스테인리스강	공구강	주강	주철	강인주철	동	황동	황동주물	청동	알루미늄 압연재	알루미늄 합금주물	마그네슘 합금주물	아연 합금주물	티타늄 합금		열경화성 플라스틱	열가소성 플라스틱
	C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	STS	SKD	SC	GC	GCD	Cu	Bs	BsC	PB	Al	AC ADC	MC	ZDC	Ti	Ni	-	-
	◎	◎	◎	◎	○					◎	○	○						◎						

SVPNM

스트레이트 플루트 탭





JIS | SFT | Nitride | M(H) | C form | M MF | H2/3/4 | HSSE

(mm)

형번		TDZ	TP	LU	CZCMS	DCON-MS	TD	LF	THL	NOF	PHD	BSG	TCTR
SVPNM	0204025	M2	0.4	13.5	3 x 2.5	3	2	40	8	3	1.6	JIS	H2
	025045025	M2.5	0.45	14.5	3 x 2.5	3	3	44	9	3	2.1	JIS	H2
	0305025	M3	0.5	17	4 x 3.2	4	3	46	6	3	2.5	JIS	H2
	0407025	M4	0.7	20.5	5 x 4	5	4	52	7.5	3	3.3	JIS	H2
	04507525	M4.5	0.75	20.5	5 x 4	5	5	55	13	3	3.8	JIS	H2
	0508025	M5	0.8	25	5.5 x 4.5	5.5	5	60	9	3	4.2	JIS	H2
	0610025	M6	1	29	6 x 4.5	6	6	62	11	3	5	JIS	H2
	0812525	M8	1.25	34	6.2 x 5	6.2	8	70	13	3	6.8	JIS	H3
	1015025	M10	1.5	38	7 x 5.5	7	10	75	16	3	8.5	JIS	H3
	1217525	M12	1.75	48	8.5 x 6.5	8.5	12	82	18	3	10.2	JIS	H4
	1420025	M14	2	45	10.5 x 8	10.5	14	88	20	4	12	JIS	H4
	1620025	M16	2	52	12.5 x 10	12.5	16	95	20	4	14	JIS	H4
	1825025	M18	2.5	55	14 x 11	14	18	100	22	4	15.5	JIS	H4
	2025025	M20	2.5	58	15 x 12	15	20	105	25	4	17.5	JIS	H4
	2225025	M22	2.5	63	17 x 13	17	22	115	25	4	19.5	JIS	H4
	2430025	M24	3	66	19 x 15	19	24	120	29	4	21	JIS	H4
	0405025	MF4	0.5	20.5	5 x 4	5	4	52	7.5	3	3.5	JIS	H2
	0505025	MF5	0.5	25	5.5 x 4.5	5.5	5	60	8	3	4.5	JIS	H2
	0607525	MF6	0.75	29	6 x 4.5	6	6	62	8	3	5.3	JIS	H2
	0807525	MF8	0.75	34	6.2 x 5	6.2	8	70	10	3	7.3	JIS	H3
	0810025	MF8	1	34	6.2 x 5	6.2	8	70	10	3	7	JIS	H3
	1007525	MF10	0.75	38	7 x 5.5	7	10	75	14	3	9.3	JIS	H3
	1010025	MF10	1	38	7 x 5.5	7	10	75	14	3	9	JIS	H3
	1012525	MF10	1.25	38	7 x 5.5	7	10	75	14	3	8.8	JIS	H3
	1210025	MF12	1	48	8.5 x 6.5	8.5	12	82	14	3	11	JIS	H3
	1212525	MF12	1.25	48	8.5 x 6.5	8.5	12	82	14	3	10.8	JIS	H3
	1215025	MF12	1.5	48	8.5 x 6.5	8.5	12	82	14	3	10.5	JIS	H3
	1410025	MF14	1	48	10.5 x 8	10.5	14	88	18	3	13	JIS	H3
	1415025	MF14	1.5	48	10.5 x 8	10.5	14	88	18	3	12.5	JIS	H3
	1615025	MF16	1.5	52	12.5 x 10	12.5	16	95	32	3	14.5	JIS	H3
	1815025	MF18	1.5	55	14 x 11	14	18	100	37	3	16.5	JIS	H4
	2015025	MF20	1.5	58	15 x 12	15	20	105	37	3	18.5	JIS	H4
	2215025	MF22	1.5	63	17 x 13	17	22	115	38	3	20.5	JIS	H4
	2415025	MF24	1.5	66	19 x 15	19	24	120	45	3	22.5	JIS	H4
	2420025	MF24	2	68	19 x 15	19	24	120	45	3	22	JIS	H4

• 적용 피삭재

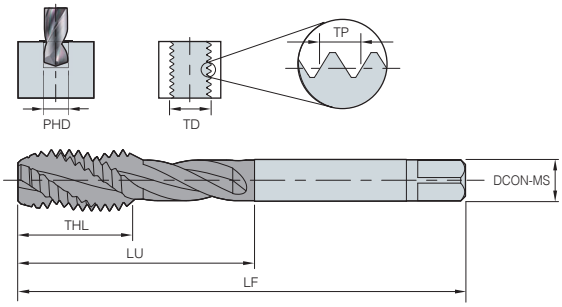
◎ : 매우적합 ○ : 적합

구분	탄소강			합금강	조질강			스테인리스강	공구강	주강	주철	강인주철	동	황동	황동주물	청동	알루미늄 압연재	알루미늄 합금주물	마그네슘 합금주물	아연 합금주물	티타늄 합금		열경화성 플라스틱	열가소성 플라스틱
	C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	STS	SKD	SC	GC	GCD	Cu	Bs	BsC	PB	Al	AC ADC	MC	ZDC	Ti	Ni	-	-
	○	○	○	○	○			◎	○	○	○	◎						○			○	○	○	

SVPOM

스파이럴 플루트 탭





JIS | SFT | Bright | N | C form | M MF | H2/3/4 | HSSE

(mm)

형	번	TDZ	TP	LU	CZCMS	DCON-MS	TD	LF	THL	NOF	PHD	BSG	TCTR
SVPOM	0204025	M2	0.4	13.5	3 x 2.5	3	2	40	8	3	1.6	JIS	H2
	025045025	M2.5	0.45	14.5	3 x 2.5	3	3	44	9	3	2.1	JIS	H2
	0305025	M3	0.5	17	4 x 3.2	4	3	46	6	3	2.5	JIS	H2
	0407025	M4	0.7	20.5	5 x 4	5	4	52	7.5	3	3.3	JIS	H2
	04507525	M4.5	0.75	20.5	5 x 4	5	5	55	13	3	3.8	JIS	H2
	0508025	M5	0.8	25	5.5 x 4.5	5.5	5	60	9	3	4.2	JIS	H2
	0610025	M6	1	29	6 x 4.5	6	6	62	11	3	5	JIS	H2
	0812525	M8	1.25	34	6.2 x 5	6.2	8	70	13	3	6.8	JIS	H3
	1015025	M10	1.5	38	7 x 5.5	7	10	75	16	3	8.5	JIS	H3
	1217525	M12	1.75	48	8.5 x 6.5	8.5	12	82	18	3	10.2	JIS	H4
	1420025	M14	2	45	10.5 x 8	10.5	14	88	20	4	12	JIS	H4
	1620025	M16	2	52	12.5 x 10	12.5	16	95	20	4	14	JIS	H4
	1825025	M18	2.5	55	14 x 11	14	18	100	22	4	15.5	JIS	H4
	2025025	M20	2.5	58	15 x 12	15	20	105	25	4	17.5	JIS	H4
	2225025	M22	2.5	63	17 x 13	17	22	115	25	4	19.5	JIS	H4
	2430025	M24	3	66	19 x 15	19	24	120	29	4	21	JIS	H4
	0405025	MF4	0.5	20.5	5 x 4	5	4	52	7.5	3	3.5	JIS	H2
	0505025	MF5	0.5	25	5.5 x 4.5	5.5	5	60	8	3	4.5	JIS	H2
	0607525	MF6	0.75	29	6 x 4.5	6	6	62	8	3	5.3	JIS	H2
	0807525	MF8	0.75	34	6.2 x 5	6.2	8	70	10	3	7.3	JIS	H3
	0810025	MF8	1	34	6.2 x 5	6.2	8	70	10	3	7	JIS	H3
	1007525	MF10	0.75	38	7 x 5.5	7	10	75	14	3	9.3	JIS	H3
	1010025	MF10	1	38	7 x 5.5	7	10	75	14	3	9	JIS	H3
	1012525	MF10	1.25	38	7 x 5.5	7	10	75	14	3	8.8	JIS	H3
	1210025	MF12	1	48	8.5 x 6.5	8.5	12	82	14	3	11	JIS	H3
	1212525	MF12	1.25	48	8.5 x 6.5	8.5	12	82	14	3	10.8	JIS	H3
	1215025	MF12	1.5	48	8.5 x 6.5	8.5	12	82	14	3	10.5	JIS	H3
	1410025	MF14	1	48	10.5 x 8	10.5	14	88	18	3	13	JIS	H3
	1415025	MF14	1.5	48	10.5 x 8	10.5	14	88	18	3	12.5	JIS	H3
	1615025	MF16	1.5	52	12.5 x 10	12.5	16	95	32	3	14.5	JIS	H3
	1815025	MF18	1.5	55	14 x 11	14	18	100	37	3	16.5	JIS	H4
	2015025	MF20	1.5	58	15 x 12	15	20	105	37	3	18.5	JIS	H4
	2215025	MF22	1.5	63	17 x 13	17	22	115	38	3	20.5	JIS	H4
	2415025	MF24	1.5	66	19 x 15	19	24	120	45	3	22.5	JIS	H4
	2420025	MF24	2	68	19 x 15	19	24	120	45	3	22	JIS	H4

• 적용 피삭재

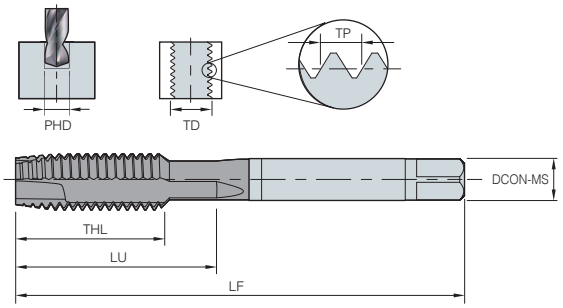
◎ : 매우적합 ○ : 적합

구분	탄소강			합금강	조질강			스테인리스강	공구강	주강	주철	강인주철	동	황동	황동주물	청동	알루미늄 압연재	알루미늄 합금주물	마그네슘 합금주물	아연 합금주물	티타늄 합금		열경화성 플라스틱	열가소성 플라스틱
	C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	STS	SKD	SC	GC	GCD	Cu	Bs	BsC	PB	Al	AC ADC	MC	ZDC	Ti	Ni	-	-
													◎	◎	◎	◎	◎	◎	○	○			◎	

SVNAM

스파이럴 포인트 탭





JIS | SPT | TiAlN | P(K) | B form | M MF | H2/3/4 | HSSE

(mm)

형 번		TDZ	TP	LU	CZCMS	DCON-MS	TD	LF	THL	NOF	PHD	BSG	TCTR
SVNAM	0204050	M2	0.4	14	3 x 2.5	3	2	40	8	3	1.6	JIS	H2
	025045050	M2.5	0.45	15	3 x 2.5	3	3	44	9	3	2.1	JIS	H2
	0305050	M3	0.5	18	4 x 3.2	4	3	46	11	3	2.5	JIS	H2
	0407050	M4	0.7	21	5 x 4	5	4	52	13	3	3.3	JIS	H2
	04507550	M4.5	0.75	21	5 x 4	5	5	55	13	3	3.8	JIS	H2
	0508050	M5	0.8	25	5.5 x 4.5	5.5	5	60	16	3	4.2	JIS	H2
	0610050	M6	1	30	6 x 4.5	6	6	62	19	3	5	JIS	H2
	0812550	M8	1.25	35	6.2 x 5	6.2	8	70	22	3	6.8	JIS	H3
	1015050	M10	1.5	39	7 x 5.5	7	10	75	24	3	8.5	JIS	H3
	1217550	M12	1.75	48	8.5 x 6.5	8.5	12	82	29	3	10.2	JIS	H4
	1420050	M14	2	48	10.5 x 8	10.5	14	88	30	3	12	JIS	H4
	1620050	M16	2	52	12.5 x 10	12.5	16	95	32	3	14	JIS	H4
	1825050	M18	2.5	55	14 x 11	14	18	100	34	3	15.5	JIS	H4
	2025050	M20	2.5	58	15 x 12	15	20	105	34	4	17.5	JIS	H4
	2225050	M22	2.5	63	17 x 13	17	22	115	34	4	19.5	JIS	H4
	2430050	M24	3	66	19 x 15	19	24	120	38	4	21	JIS	H4
	0405050	MF4	0.5	21	5 x 4	5	4	52	10	3	3.5	JIS	H2
	0505050	MF5	0.5	25	5.5 x 4.5	5.5	5	60	12	3	4.5	JIS	H2
	0607550	MF6	0.75	30	6 x 4.5	6	6	62	14	3	5.3	JIS	H2
	0807550	MF8	0.75	35	6.2 x 5	6.2	8	70	19	3	7.3	JIS	H3
	0810050	MF8	1	35	6.2 x 5	6.2	8	70	19	3	7	JIS	H3
	1007550	MF10	0.75	39	7 x 5.5	7	10	75	20	3	9.3	JIS	H3
	1010050	MF10	1	39	7 x 5.5	7	10	75	20	3	9	JIS	H3
	1012550	MF10	1.25	39	7 x 5.5	7	10	75	20	3	8.8	JIS	H3
	1210050	MF12	1	48	8.5 x 6.5	8.5	12	82	22	3	11	JIS	H3
	1212550	MF12	1.25	48	8.5 x 6.5	8.5	12	82	22	3	10.8	JIS	H3
	1215050	MF12	1.5	48	8.5 x 6.5	8.5	12	82	22	3	10.5	JIS	H3
	1410050	MF14	1	48	10.5 x 8	10.5	14	88	22	3	13	JIS	H3
	1415050	MF14	1.5	48	10.5 x 8	10.5	14	88	22	3	12.5	JIS	H3
	1615050	MF16	1.5	52	12.5 x 10	12.5	16	95	32	3	14.5	JIS	H3
	1815050	MF18	1.5	55	14 x 11	14	18	100	37	3	16.5	JIS	H4
	2015050	MF20	1.5	58	15 x 12	15	20	105	37	3	18.5	JIS	H4
	2215050	MF22	1.5	63	17 x 13	17	22	115	38	3	20.5	JIS	H4
	2415050	MF24	1.5	66	19 x 15	19	24	120	45	3	22.5	JIS	H4
	2420050	MF24	2	66	19 x 15	19	24	120	45	3	22	JIS	H4

• 적용 피삭재

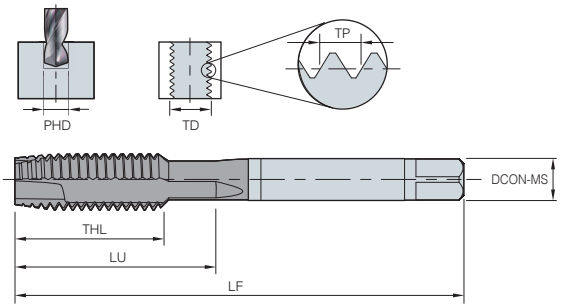
◎ : 매우적합 ○ : 적합

구분	탄소강			합금강	조질강			스테인리스강	공구강	주강	주철	강인주철	동	황동	황동주물	청동	알루미늄 압연재	알루미늄 합금주물	마그네슘 합금주물	아연 합금주물	티타늄 합금		열경화성 플라스틱	열가소성 플라스틱
	C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	STS	SKD	SC	GC	GCD	Cu	Bs	BsC	PB	Al	AC ADC	MC	ZDC	Ti	Ni	-	-
	◎	◎	◎	◎	○					◎	○	○						◎						

SVNNM

스파이럴 포인트 탭





JIS | SPT | Nitride | M(H) | B form | M MF | H2/3/4 | HSSE

(mm)

형 번		TDZ	TP	LU	CZCMS	DCON-MS	TD	LF	THL	NOF	PHD	BSG	TCTR
SVNNM	0204050	M2	0.4	14	3 x 2.5	3	2	40	8	3	1.6	JIS	H2
	025045050	M2.5	0.45	15	3 x 2.5	3	3	44	9	3	2.1	JIS	H2
	0305050	M3	0.5	18	4 x 3.2	4	3	46	11	3	2.5	JIS	H2
	0407050	M4	0.7	21	5 x 4	5	4	52	13	3	3.3	JIS	H2
	04507550	M4.5	0.75	21	5 x 4	5	5	55	13	3	3.8	JIS	H2
	0508050	M5	0.8	25	5.5 x 4.5	5.5	5	60	16	3	4.2	JIS	H2
	0610050	M6	1	30	6 x 4.5	6	6	62	19	3	5	JIS	H2
	0812550	M8	1.25	35	6.2 x 5	6.2	8	70	22	3	6.8	JIS	H3
	1015050	M10	1.5	39	7 x 5.5	7	10	75	24	3	8.5	JIS	H3
	1217550	M12	1.75	48	8.5 x 6.5	8.5	12	82	29	3	10.2	JIS	H4
	1420050	M14	2	48	10.5 x 8	10.5	14	88	30	3	12	JIS	H4
	1620050	M16	2	52	12.5 x 10	12.5	16	95	32	3	14	JIS	H4
	1825050	M18	2.5	55	14 x 11	14	18	100	34	3	15.5	JIS	H4
	2025050	M20	2.5	58	15 x 12	15	20	105	34	4	17.5	JIS	H4
	2225050	M22	2.5	63	17 x 13	17	22	115	34	4	19.5	JIS	H4
	2430050	M24	3	66	19 x 15	19	24	120	38	4	21	JIS	H4
	0405050	MF4	0.5	21	5 x 4	5	4	52	10	3	3.5	JIS	H2
	0505050	MF5	0.5	25	5.5 x 4.5	5.5	5	60	12	3	4.5	JIS	H2
	0607550	MF6	0.75	30	6 x 4.5	6	6	62	14	3	5.3	JIS	H2
	0807550	MF8	0.75	35	6.2 x 5	6.2	8	70	19	3	7.3	JIS	H3
	0810050	MF8	1	35	6.2 x 5	6.2	8	70	19	3	7	JIS	H3
	1007550	MF10	0.75	39	7 x 5.5	7	10	75	20	3	9.3	JIS	H3
	1010050	MF10	1	39	7 x 5.5	7	10	75	20	3	9	JIS	H3
	1012550	MF10	1.25	39	7 x 5.5	7	10	75	20	3	8.8	JIS	H3
	1210050	MF12	1	48	8.5 x 6.5	8.5	12	82	22	3	11	JIS	H3
	1212550	MF12	1.25	48	8.5 x 6.5	8.5	12	82	22	3	10.8	JIS	H3
	1215050	MF12	1.5	48	8.5 x 6.5	8.5	12	82	22	3	10.5	JIS	H3
	1410050	MF14	1	48	10.5 x 8	10.5	14	88	22	3	13	JIS	H3
	1415050	MF14	1.5	48	10.5 x 8	10.5	14	88	22	3	12.5	JIS	H3
	1615050	MF16	1.5	52	12.5 x 10	12.5	16	95	32	3	14.5	JIS	H3
	1815050	MF18	1.5	55	14 x 11	14	18	100	37	3	16.5	JIS	H4
	2015050	MF20	1.5	58	15 x 12	15	20	105	37	3	18.5	JIS	H4
	2215050	MF22	1.5	63	17 x 13	17	22	115	38	3	20.5	JIS	H4
	2415050	MF24	1.5	66	19 x 15	19	24	120	45	3	22.5	JIS	H4
	2420050	MF24	2	66	19 x 15	19	24	120	45	3	22	JIS	H4

• 적용 피삭재

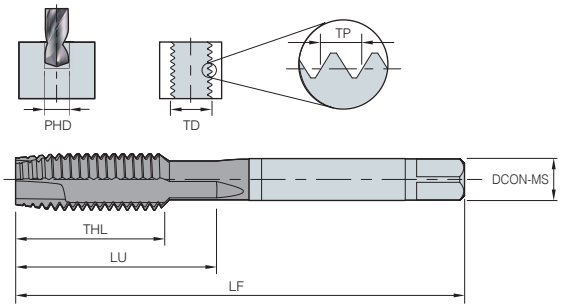
◎ : 매우적합 ○ : 적합

구분	탄소강			합금강	조질강			스테인리스강	공구강	주강	주철	강인주철	동	황동	황동주물	청동	알루미늄 압연재	알루미늄 합금주물	마그네슘 합금주물	아연 합금주물	티타늄 합금		열경화성 플라스틱	열가소성 플라스틱
	C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	STS	SKD	SC	GC	GCD	Cu	Bs	BsC	PB	Al	AC ADC	MC	ZDC	Ti	Ni	-	-
	○	○	○	○	○			◎	○	○	○	◎						○			○	○	○	

SVNOM

스파이럴 포인트 탭





JIS | SPT | Bright | N | B form | M MF | H2/3/4 | HSSE

(mm)

형 번		TDZ	TP	LU	CZCMS	DCON-MS	TD	LF	THL	NOF	PHD	BSG	TCTR
SVNOM	0204050	M2	0.4	14	3 x 2.5	3	2	40	8	3	1.6	JIS	H2
	025045050	M2.5	0.45	15	3 x 2.5	3	3	44	9	3	2.1	JIS	H2
	0305050	M3	0.5	18	4 x 3.2	4	3	46	11	3	2.5	JIS	H2
	0407050	M4	0.7	21	5 x 4	5	4	52	13	3	3.3	JIS	H2
	04507550	M4.5	0.75	21	5 x 4	5	5	55	13	3	3.8	JIS	H2
	0508050	M5	0.8	25	5.5 x 4.5	5.5	5	60	16	3	4.2	JIS	H2
	0610050	M6	1	30	6 x 4.5	6	6	62	19	3	5	JIS	H2
	0812550	M8	1.25	35	6.2 x 5	6.2	8	70	22	3	6.8	JIS	H3
	1015050	M10	1.5	39	7 x 5.5	7	10	75	24	3	8.5	JIS	H3
	1217550	M12	1.75	48	8.5 x 6.5	8.5	12	82	29	3	10.2	JIS	H4
	1420050	M14	2	48	10.5 x 8	10.5	14	88	30	3	12	JIS	H4
	1620050	M16	2	52	12.5 x 10	12.5	16	95	32	3	14	JIS	H4
	1825050	M18	2.5	55	14 x 11	14	18	100	34	3	15.5	JIS	H4
	2025050	M20	2.5	58	15 x 12	15	20	105	34	4	17.5	JIS	H4
	2225050	M22	2.5	63	17 x 13	17	22	115	34	4	19.5	JIS	H4
	2430050	M24	3	66	19 x 15	19	24	120	38	4	21	JIS	H4
	0405050	MF4	0.5	21	5 x 4	5	4	52	10	3	3.5	JIS	H2
	0505050	MF5	0.5	25	5.5 x 4.5	5.5	5	60	12	3	4.5	JIS	H2
	0607550	MF6	0.75	30	6 x 4.5	6	6	62	14	3	5.3	JIS	H2
	0807550	MF8	0.75	35	6.2 x 5	6.2	8	70	19	3	7.3	JIS	H3
	0810050	MF8	1	35	6.2 x 5	6.2	8	70	19	3	7	JIS	H3
	1007550	MF10	0.75	39	7 x 5.5	7	10	75	20	3	9.3	JIS	H3
	1010050	MF10	1	39	7 x 5.5	7	10	75	20	3	9	JIS	H3
	1012550	MF10	1.25	39	7 x 5.5	7	10	75	20	3	8.8	JIS	H3
	1210050	MF12	1	48	8.5 x 6.5	8.5	12	82	22	3	11	JIS	H3
	1212550	MF12	1.25	48	8.5 x 6.5	8.5	12	82	22	3	10.8	JIS	H3
	1215050	MF12	1.5	48	8.5 x 6.5	8.5	12	82	22	3	10.5	JIS	H3
	1410050	MF14	1	48	10.5 x 8	10.5	14	88	22	3	13	JIS	H3
	1415050	MF14	1.5	48	10.5 x 8	10.5	14	88	22	3	12.5	JIS	H3
	1615050	MF16	1.5	52	12.5 x 10	12.5	16	95	32	3	14.5	JIS	H3
	1815050	MF18	1.5	55	14 x 11	14	18	100	37	3	16.5	JIS	H4
	2015050	MF20	1.5	58	15 x 12	15	20	105	37	3	18.5	JIS	H4
	2215050	MF22	1.5	63	17 x 13	17	22	115	38	3	20.5	JIS	H4
	2415050	MF24	1.5	66	19 x 15	19	24	120	45	3	22.5	JIS	H4
	2420050	MF24	2	66	19 x 15	19	24	120	45	3	22	JIS	H4

• 적용 피삭재

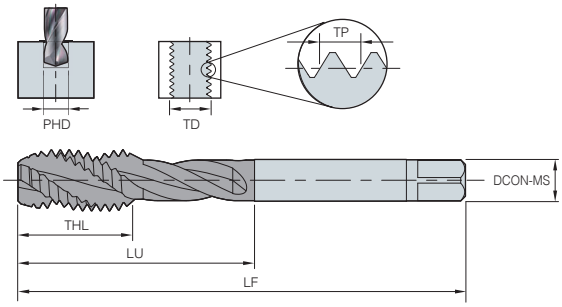
◎ : 매우적합 ○ : 적합

구분	탄소강			합금강	조질강			스테인리스강	공구강	주강	주철	강인주철	동	황동	황동주물	청동	알루미늄 압연재	알루미늄 합금주물	마그네슘 합금주물	아연 합금주물	티타늄 합금		열경화성 플라스틱	열가소성 플라스틱
	C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	STS	SKD	SC	GC	GCD	Cu	Bs	BsC	PB	Al	AC ADC	MC	ZDC	Ti	Ni	-	-
													◎	◎	◎	◎	◎	◎	○	○			◎	

SVSAM

스파이럴 플루트 탭





JIS | SFT | TiAlN | K | B form | M MF | H2/3/4 | HSSE

(mm)

형	번	TDZ	TP	LU	CZCMS	DCON-MS	TD	LF	THL	NOF	PHD	BSG	THCHT	TCTR
SVSAM	0305015	M3	0.5	18	4 x 3.2	4	3	46	11	3	2.5	JIS	E	H2
	0407015	M4	0.7	21	5 x 4	5	4	52	13	3	3.3	JIS	E	H2
	04507515	M4.5	0.75	21	5 x 4	5	5	55	13	3	3.8	JIS	E	H2
	0508015	M5	0.8	25	5.5 x 4.5	5.5	5	60	16	3	4.2	JIS	E	H2
	0610015	M6	1	30	6 x 4.5	6	6	62	19	4	5	JIS	E	H2
	0812515	M8	1.25	35	6.2 x 5	6.2	8	70	22	4	6.8	JIS	E	H3
	1015015	M10	1.5	39	7 x 5.5	7	10	75	24	4	8.5	JIS	E	H3
	1217515	M12	1.75	48	8.5 x 6.5	8.5	12	82	29	4	10.2	JIS	E	H4
	1420015	M14	2	48	10.5 x 8	10.5	14	88	30	4	12	JIS	E	H4
	1620015	M16	2	52	12.5 x 10	12.5	16	95	32	4	14	JIS	E	H4
	1825015	M18	2.5	55	14 x 11	14	18	100	37	4	15.5	JIS	E	H4
	2025015	M20	2.5	58	15 x 12	15	20	105	37	4	17.5	JIS	E	H4
	2225015	M22	2.5	63	17 x 13	17	22	115	38	4	19.5	JIS	E	H4
	2430015	M24	3	66	19 x 15	19	24	120	45	4	21	JIS	E	H4
	0810015	MF8	1	35	6.2 x 5	6.2	8	70	22	4	7	JIS	E	H3
	1012515	MF10	1.25	39	7 x 5.5	7	10	75	24	4	8.8	JIS	E	H3
	1210015	MF12	1	48	8.5 x 6.5	8.5	12	82	29	4	11	JIS	E	H3
	1212515	MF12	1.25	48	8.5 x 6.5	8.5	12	82	29	4	10.8	JIS	E	H3
	1215015	MF12	1.5	48	8.5 x 6.5	8.5	12	82	29	4	10.5	JIS	E	H3
	1415015	MF14	1.5	48	10.5 x 8	10.5	14	88	30	4	12.5	JIS	E	H3
	1615015	MF16	1.5	52	12.5 x 10	12.5	16	95	32	4	14.5	JIS	E	H3
	1815015	MF18	1.5	55	14 x 11	14	18	100	37	4	16.5	JIS	E	H4
	2015015	MF20	1.5	58	15 x 12	15	20	105	37	4	18.5	JIS	E	H4
	2215015	MF22	1.5	63	17 x 13	17	22	115	38	4	20.5	JIS	E	H4
	2415015	MF24	1.5	66	19 x 15	19	24	120	45	4	22.5	JIS	E	H4
	2420015	MF24	2	66	19 x 15	19	24	120	45	4	22	JIS	E	H4
	0305050	M3	0.5	18	4 x 3.2	4	3	46	11	3	2.5	JIS	B	H2
	0407050	M4	0.7	21	5 x 4	5	4	52	13	3	3.3	JIS	B	H2
	04507550	M4.5	0.75	21	5 x 4	5	5	55	13	3	3.8	JIS	B	H2
	0508050	M5	0.8	25	5.5 x 4.5	5.5	5	60	16	3	4.2	JIS	B	H2
	0610050	M6	1	30	6 x 4.5	6	6	62	19	4	5	JIS	B	H2
	0812550	M8	1.25	35	6.2 x 5	6.2	8	70	22	4	6.8	JIS	B	H3
	1015050	M10	1.5	39	7 x 5.5	7	10	75	24	4	8.5	JIS	B	H3
	1217550	M12	1.75	48	8.5 x 6.5	8.5	12	82	29	4	10.2	JIS	B	H4
	1420050	M14	2	48	10.5 x 8	10.5	14	88	30	4	12	JIS	B	H4
	1620050	M16	2	52	12.5 x 10	12.5	16	95	32	4	14	JIS	B	H4
	1825050	M18	2.5	55	14 x 11	14	18	100	37	4	15.5	JIS	B	H4
	2025050	M20	2.5	58	15 x 12	15	20	105	37	4	17.5	JIS	B	H4
	2225050	M22	2.5	63	17 x 13	17	22	115	38	4	19.5	JIS	B	H4
	2430050	M24	3	66	19 x 15	19	24	120	45	4	21	JIS	B	H4
	0810050	MF8	1	35	6.2 x 5	6.2	8	70	22	4	7	JIS	B	H3
	1012550	MF10	1.25	39	7 x 5.5	7	10	75	24	4	8.8	JIS	B	H3
	1210050	MF12	1	48	8.5 x 6.5	8.5	12	82	29	4	11	JIS	B	H3
	1212550	MF12	1.25	48	8.5 x 6.5	8.5	12	82	29	4	10.8	JIS	B	H3
	1215050	MF12	1.5	48	8.5 x 6.5	8.5	12	82	29	4	10.5	JIS	B	H3
	1415050	MF14	1.5	48	10.5 x 8	10.5	14	88	30	4	12.5	JIS	B	H3
	1615050	MF16	1.5	52	12.5 x 10	12.5	16	95	32	4	14.5	JIS	B	H3
	1815050	MF18	1.5	55	14 x 11	14	18	100	37	4	16.5	JIS	B	H4
	2015050	MF20	1.5	58	15 x 12	15	20	105	37	4	18.5	JIS	B	H4
	2215050	MF22	1.5	63	17 x 13	17	22	115	38	4	20.5	JIS	B	H4
	2415050	MF24	1.5	66	19 x 15	19	24	120	45	4	22.5	JIS	B	H4
	2420050	MF24	2	66	19 x 15	19	24	120	45	4	22	JIS	B	H4

• 적용 피삭재

◎ : 매우적합 ○ : 적합

구분	탄소강			합금강	조질강			스테인리스강	공구강	주강	주철	강인주철	동	황동	황동주물	청동	알루미늄 압연재	알루미늄 합금주물	마그네슘 합금주물	아연 합금주물	티타늄 합금		열경화성 플라스틱	열가소성 플라스틱
	C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 HRC	45~55 HRC	50~60 HRC	STS	SKD	SC	GC	GCD	Cu	Bs	BsC	PB	Al	AC ADC	MC	ZDC	Ti	Ni	-	-
						○					◎													

PART

TOOLING SYSTEM

툴링시스템

우수한 품질의 제품을 고객들에게 공급하여 자동차, 항공,
전자, 기계, 플랜트 산업의 발전에 이바지하고
해외 각국에 수출을 통해 한국공구의 우수성을 세계에
알리고자 최선을 다해 노력하겠습니다.



Technical information for Tooling System

E3 툴링시스템 일람표
E5 **DHE** [Hydraulic expansion chuck_유압척]
E12 **DHE/S** [Hydraulic expansion chuck_유압척]
E15 **DHE/G** [Hydraulic expansion chuck for tool grinding_연삭기용 유압척]
E19 **DZC** [Zero fit collet_제로핏 콜렛]
E21 **DSC** [Shrinking Chuck_밀링척]
E30 **NPM** [New power milling chuck_뉴파워 밀링척]
E36 **DCL** [Lock collet for milling chuck_ 논슬립 밀링척 콜렛]
E37 **DCJ** [etcoolant collet_제트쿨런트 콜렛]
E41 **SDC/P** [Precision collet chuck for multi purpose machining_ER 콜렛척]
E50 **SDC/PL** [Precision collet chuck(Length adjustment type)_외부길이 조절형 콜렛척]
E53 **GERC** [GER Collet_GER 코팅콜렛]
E62 **ER/L** [Lock collet for ER collet chuck_논슬립 콜렛척 콜렛]
E63 **RTJW** [Jet coolant disk_제트쿨런트 디스크]
E64 **DSK** [Slim type collet chuck_슬림 콜렛척]
E68 **GSK** [Great speed slim collet chuck_고속 슬림 콜렛척]
E77 **DTN** [Tapping holder_탭핑척]
E81 **DST** [High speed synchro tapping chuck_고속 탭핑척]
E85 **TEH** [Tap Extension Holder_탭 익스텐션 홀더]
E87 **STER PAT.** [DINE Synchro Tapping ER Collet_탭핑 ER 콜렛]
E88 **OFH** [Floating holder for brush_플로팅 홀더]
E100 **ANGULAR HEAD**
E102 **BT-KAH** [KAH(90° type)_각도 고정타입]
E104 **BT-KHU** [KHU(Free angle)_각도 조절 타입(0°–90°)]
E106 **BT-KAG** [Attachmaent type KAG_어테치먼트 타입]
E108 **BT-HRAG** [Attachment type HRAG(Reinforced)_어테치먼트 타입]
E110 **BT-MAH** [강성 보강형 MAH(Reinforced series)_ 각도 조절 타입(0°–90°)]
E112 **BT-KAC** [KAC(45° type)_각도 고정타입]
E114 **BT-SAH** [Slim Angular head_슬림 앵귤러헤드]
E115 **POSITIONING BLOCK** [위치 결정블록 (BT40용)]
E116 **POSITIONING BLOCK** [위치 결정블록 (BT50용)]
E118 **ATM** [Air Turbine Machine_에어 스핀들]
E121 **ATM(U) SPARE PART** [에어 스핀들 관련 부품]
E122 **ATU** [Universal Type_각도조절형 에어 스핀들]

E 툴링시스템 일람표

유압척 DHE

E3

유압척 DHE/S

E12

연삭기용 유압척 DHE/G

E15

제로핏 콜렛 DZC

E19

열박음척 DSC

E21

밀링척 NPM

E30

논슬립 밀링척 콜렛 DCL

E36

제트쿨런트 콜렛 DCJ

E37

콜렛척 SDC/P

E41

조절형 콜렛척 SDC/PL

E50

코팅 콜렛 GERC

E53

ER콜렛 ER COLLET

E57

ER콜렛 ER/L

E62

제트쿨런트 디스크 RTJW

E63

슬림 콜렛척 DSK

E66

고속 슬림 콜렛척 GSK

E68

HC 콜렛

E73

탭핑척 DTN

E77

탭 어댑터 TCA

E80

고속 탭핑척 DST

E81

탭콜렛 TER

E84

탭 익스텐션 홀더 TEH

E85

탭핑 ER 콜렛 STER PAT.

E87

플로팅 홀더 OFH

E88

사이드락 아버 SLA

E89

모듈러 시스템 아버 MD

E93

모듈러 시스템 익스텐션 바

E99

모듈러 시스템 레듀서 바

E99

앵귤러 헤드 KAH

E102

앵귤러 헤드 KHU

E104

앵귤러 헤드 KAG

E106

앵귤러 헤드 HRAG

E108

앵귤러 헤드 MAH

E110

앵귤러 헤드 KAC

E112

앵귤러 헤드 SAH

E114

앵귤러 헤드 ATM

E118

앵귤러 헤드 ATU

E122

Hydraulic expansion chuck_유압척

DHE

- 높은 정밀도 가공으로 금형가공, 자동차부품, 정밀부품 가공에 최적
- 유압실에 의한 방진효과로 가공면 조도 향상
- T-렌치를 이용한 공구착탈 방식으로 교체시간 감소 및 작업자 피로도 감소
- 적용 샹크경 : Ø6-32



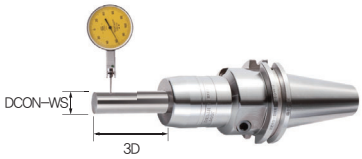
형번표기법

BT40	-	DHE	20	-	140
스핀들		Hydraulic expansion chuck	최대척킹경		길이

특징

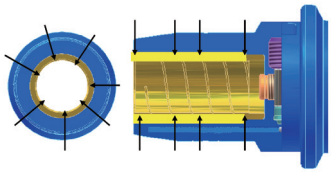
높은 정밀도는 절삭공구의 마모를 적게 하여 툴의 수명을 증대시킬 뿐만 아니라 유압실은 진동을 감쇄시키는 효과가 있어 가공면의 조도가 향상됨

- Run out : 5㎛ 이하
- L = 3 x DCON-WS
- Shank : DC의 공차 : h6



내부의 완전 밀폐 구조(내구성)

- 내경부의 완전 밀폐 시스템으로 먼지, 절삭유, 윤활유, 칩 등이 침투할 가능성을 완전 차단
  - 파지력, 정밀도 장기간 유지

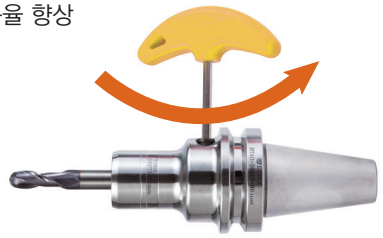


샹크	Grade	RPMX
BT50, HSK100A	G6.3	8,000
BT40, HSK63A		10,000
BT30, HSK50A		15,000



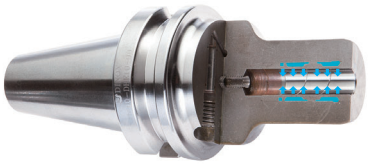
간편한 T-렌치로 공구의 탈, 착 가능

- 간단한 조작에 의한 클램핑/언클램핑 구조(편리성)
  - 작업자의 피로도 감소
  - 장비의 가동율 향상



안정적인 파지력

홀더와 공구의 공간을 유압력으로 고정하여 안정적인 파지력을 제공함



DBT-DHE



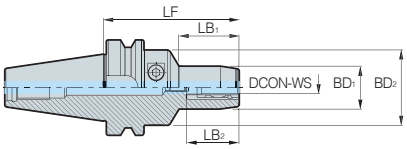


그림 1

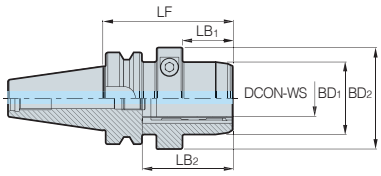


그림 2

(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LB_1	LB_2	ADJ	RPMX	그림	kg
DBT30-	DHE6-65	6	65	29	46	33	30~40	M5	25,000	1	0.7
	DHE8-65	8	65	31	46	33	30~40	M5	25,000	1	0.7
	DHE10-65	10	65	32	46	34	35~45	M5	25,000	1	0.7
	DHE12-70	12	70	35	46	34	41~51	M5	25,000	1	0.8
	DHE14-90	14	90	36	46	40	43~53	M5	25,000	1	1
	DHE16-90	16	90	40	46	45	46~56	M5	25,000	1	1
	DHE18-90	18	90	42	46	40	49~59	M5	25,000	1	1.1
	DHE20-90	20	90	44	46	45	49~59	M5	25,000	1	1.1
DBT40-	DHE6-90	6	90	29	50	40	30~40	M5	20,000	1	1.4
	DHE6-140	6	140	29	50	40	30~40	M5	20,000	1	2.2
	DHE8-90	8	90	31	50	40	30~40	M5	20,000	1	1.4
	DHE8-140	8	140	31	50	40	30~40	M5	20,000	1	2.2
	DHE10-90	10	90	33	50	40	35~45	M5	20,000	1	1.5
	DHE10-140	10	140	33	50	40	35~45	M5	20,000	1	2.2
	DHE12-90	12	90	35	50	40	41~51	M10	20,000	1	1.5
	DHE12-140	12	140	35	50	40	41~51	M10	20,000	1	2.3
	DHE14-90	14	90	36	50	40	43~53	M10	20,000	1	1.5
	DHE14-140	14	140	36	50	40	43~53	M10	20,000	1	2.2
	DHE16-90	16	90	40	50	45	46~56	M10	20,000	1	1.5
	DHE16-140	16	140	40	50	45	46~56	M10	20,000	1	2.2
	DHE18-90	18	90	42	50	45	49~59	M10	20,000	1	1.5
	DHE18-140	18	140	42	50	45	49~59	M10	20,000	1	2.2
	DHE20-90	20	90	44	50	47	49~59	M10	20,000	1	1.5
	DHE20-140	20	140	44	50	50	49~59	M10	20,000	1	2.3
	DHE25-90	25	90	50	50	35	58~68	M16	20,000	2	2
	DHE32-90	32	90	63	50	35	58~68	M16	20,000	2	2.3
DBT50-	DHE6-90	6	90	29	50	34	30~40	M5	15,000	1	3.9
	DHE6-140	6	140	29	50	40	30~40	M5	15,000	1	4.5
	DHE8-90	8	90	31	50	34	30~40	M5	15,000	1	4.2
	DHE8-140	8	140	31	50	40	30~40	M5	15,000	1	4.6
	DHE10-90	10	90	33	50	34	35~45	M5	15,000	1	3.9
	DHE10-140	10	140	33	50	34	35~45	M5	15,000	1	4.5
	DHE12-90	12	90	35	50	34	41~51	M10	15,000	1	4
	DHE12-140	12	140	35	50	34	41~51	M10	15,000	1	4.6
	DHE14-90	14	90	36	50	34	43~53	M10	15,000	1	3.9
	DHE14-140	14	140	36	50	34	43~53	M10	15,000	1	4.5
	DHE16-90	16	90	40	50	34	46~56	M10	15,000	1	4.1
	DHE16-140	16	140	40	50	34	46~56	M10	15,000	1	4.7
	DHE18-90	18	90	42	50	40	49~59	M10	15,000	1	4
	DHE18-140	18	140	42	50	45	49~59	M10	15,000	1	4.5
	DHE20-90	20	90	44	50	34	49~59	M10	15,000	1	4.2
	DHE20-140	20	140	44	50	47	49~59	M10	15,000	1	4.5
	DHE25-90	25	90	66	-	52	58~68	M16	15,000	2	4.7
	DHE32-90	32	90	72	-	52	58~68	M16	15,000	2	4.8

적용부품 E10

• H : 공구 삽입 깊이(최소~최대) • 내부 쿨런트 시스템 탑재

BT-DHE



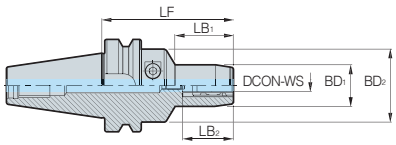


그림 1

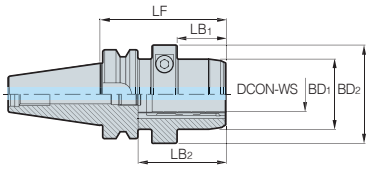


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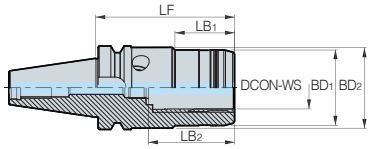


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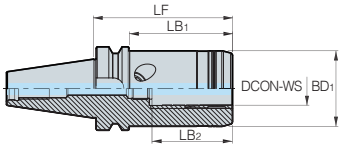


그림 4

(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LB_1	LB_2	ADJ	RPMX	그림	kg
BT30-	DHE4-65	4	65	29	46	33	40	-	25,000	1	0.7
	DHE5-65	5	65	29	46	33	40	-	25,000	1	0.7
	DHE6-65	6	65	29	46	33	30~40	M5	25,000	1	0.7
	DHE8-65	8	65	31	46	33	30~40	M5	25,000	1	0.7
	DHE10-65	10	65	32	46	34	35~45	M5	25,000	1	0.7
	DHE12-70	12	70	35	46	34	36~46	M5	25,000	1	0.8
	DHE14-90	14	90	36	46	40	43~53	M5	25,000	1	1
	DHE16-90	16	90	40	46	45	46~56	M5	25,000	1	1
	DHE18-90	18	90	42	46	40	49~59	M5	25,000	1	1.1
	DHE20-90	20	90	44	46	45	49~59	M5	25,000	1	1.1
BT40-	DHE4-90	4	90	29	50	40	40	-	20,000	1	1.4
	DHE5-90	5	90	29	50	40	40	-	20,000	1	1.4
	DHE6-90	6	90	29	50	40	30~40	M5	20,000	1	1.4
	DHE6-140	6	140	29	50	40	30~40	M5	20,000	1	2.2
	DHE8-90	8	90	31	50	40	30~40	M5	20,000	1	1.4
	DHE8-140	8	140	31	50	40	30~40	M5	20,000	1	2.2
	DHE10-90	10	90	33	50	40	35~45	M5	20,000	1	1.5
	DHE10-140	10	140	33	50	40	35~45	M5	20,000	1	2.2
	DHE12-90	12	90	35	50	40	41~51	M10	20,000	1	1.5
	DHE12-140	12	140	35	50	40	41~51	M10	20,000	1	2.3
	DHE14-90	14	90	36	50	40	43~53	M10	20,000	1	1.5
	DHE14-140	14	140	36	50	40	43~53	M10	20,000	1	2.2
	DHE16-90	16	90	40	50	45	46~56	M10	20,000	1	1.5
	DHE16-140	16	140	40	50	45	46~56	M10	20,000	1	2.2
	DHE18-90	18	90	42	50	45	49~59	M10	20,000	1	1.5
	DHE18-140	18	140	42	50	45	49~59	M10	20,000	1	2.2
	DHE20-90	20	90	44	50	47	49~59	M10	20,000	1	1.5
	DHE20-140	20	140	44	50	50	49~59	M10	20,000	1	2.3
	DHE25-90	25	90	50	70	35	58~68	M16	20,000	2	2
	DHE25-105	25	105	57	-	78	51~61	M16	20,000	4	2
	DHE25-140	25	140	57	-	113	51~61	M16	20,000	4	2.6
	DHE32-90	32	90	63	75	35	58~68	M16	20,000	2	2.3
	DHE32-105	32	105	57	61	45	55~65	M16	20,000	3	2.4
	DHE32-140	32	140	57	61	45	55~65	M16	20,000	3	3

적용부품 **E10**

• H : 공구 삽입 깊이(최소~최대) • 내부 쿨런트 시스템 탑재

BT-DHE



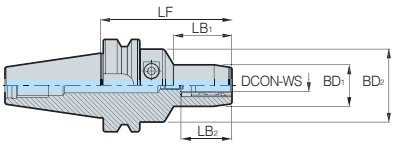


그림 1

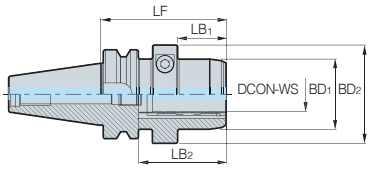


그림 2

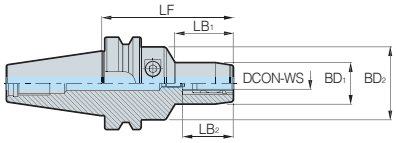


그림 3

(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LB_1	LB_2	ADJ	RPMX	그림	kg
BT50-	DHE4-90	4	90	29	50	34	40	-	15,000	1	3.9
	DHE5-90	5	90	29	50	34	40	-	15,000	1	3.9
	DHE6-90	6	90	29	50	34	30~40	M5	15,000	1	3.9
	DHE6-140	6	140	29	50	40	30~40	M5	15,000	1	4.4
	DHE8-90	8	90	31	50	34	30~40	M5	15,000	1	4.2
	DHE8-140	8	140	31	50	40	30~40	M5	15,000	1	4.6
	DHE10-90	10	90	33	50	34	35~45	M5	15,000	1	3.9
	DHE10-140	10	140	33	50	34	35~45	M5	15,000	1	4.5
	DHE12-90	12	90	35	50	34	41~51	M10	15,000	1	4
	DHE12-140	12	140	35	50	34	41~51	M10	15,000	1	4.6
	DHE14-90	14	90	36	50	34	43~53	M10	15,000	1	3.9
	DHE14-140	14	140	36	50	34	43~53	M10	15,000	1	4.5
	DHE16-90	16	90	40	50	34	46~56	M10	15,000	1	4.1
	DHE16-140	16	140	40	50	34	46~56	M10	15,000	1	4.7
	DHE18-90	18	90	42	50	40	49~59	M10	15,000	1	4
	DHE18-140	18	140	42	50	45	49~59	M10	15,000	1	4.5
	DHE20-90	20	90	44	50	34	49~59	M10	15,000	1	4
	DHE20-140	20	140	44	50	47	49~59	M10	15,000	1	4.5
	DHE25-90	25	90	66	-	52	58~68	M16	15,000	2	4.7
	DHE25-150	25	150	57	-	112	51~61	M16	15,000	3	4.5
	DHE32-90	32	90	72	-	52	58~68	M16	15,000	2	5.8

적용부품 E10

• H : 공구 삽입 깊이(최소~최대) • 내부 쿨런트 시스템 탑재

HSK-DHE



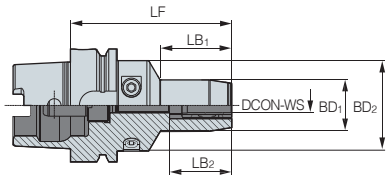


그림 1

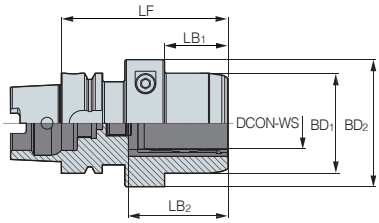


그림 2

(mm)

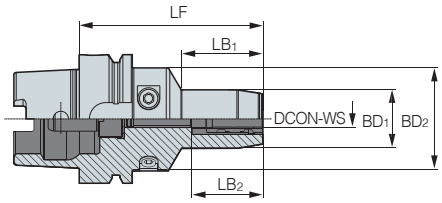
형 번		DCON-WS	LF	BD_1	BD_2	LB_1	LB_2	ADJ	RPMX	그림	kg
HSK50A-	DHE6-70	6	70	29	40	28	30~40	M5	20,000	1	0.7
	DHE8-70	8	70	31	40	28	30~40	M5	20,000	1	0.7
	DHE10-80	10	80	33	40	35	35~45	M5	20,000	1	0.8
	DHE12-90	12	90	35	40	40	41~51	M5	20,000	1	0.8
	DHE14-95	14	95	36	53	28	43~53	M10	20,000	2	0.8
	DHE16-95	16	95	40	53	28	46~56	M10	20,000	2	0.9
	DHE18-100	18	100	42	60	28	49~59	M10	20,000	2	0.9
	DHE20-100	20	100	44	60	28	49~59	M10	20,000	2	0.9
HSK63A-	DHE4-75	4	75	29	50	34	40	-	20,000	1	1
	DHE5-75	5	75	29	50	34	40	-	20,000	1	1
	DHE6-75	6	75	29	50	34	30~40	M5	20,000	1	1
	DHE6-150	6	150	29	50	34	30~40	M5	20,000	1	2.2
	DHE8-75	8	75	31	50	34	30~40	M5	20,000	1	1
	DHE8-150	8	150	31	50	34	30~40	M5	20,000	1	2.2
	DHE10-85	10	85	33	50	34	35~45	M5	20,000	1	1.2
	DHE10-150	10	150	33	51	34	35~45	M5	20,000	1	2.2
	DHE12-90	12	90	35	51	40	41~51	M10	20,000	1	1.2
	DHE12-150	12	150	35	51	40	41~51	M10	20,000	1	2.2
	DHE14-95	14	95	36	52	40	42~53	M10	20,000	1	1.3
	DHE14-150	14	150	36	52	40	43~53	M10	20,000	1	2.2
	DHE16-95	16	95	40	52	45	46~56	M10	20,000	1	1.3
	DHE16-150	16	150	40	53	45	46~56	M10	20,000	1	2.2
	DHE18-100	18	100	42	53	45	49~59	M10	20,000	1	1.4
	DHE18-150	18	150	42	53	45	49~59	M10	20,000	1	2.2
	DHE20-100	20	100	44	50	50	49~59	M10	20,000	1	1.4
	DHE20-150	20	150	44	50	50	49~59	M10	20,000	1	2.2
	DHE25-110	25	110	50	70	48	56~68	M16	20,000	2	1.9
	DHE32-110	32	110	63	80	48	56~68	M16	20,000	2	2.3

적용부품 E10

• H : 공구 삽입 깊이(최소~최대) • 내부 쿨런트 시스템 탑재

HSK-DHE





(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LB_1	LB_2	ADJ	RPMX	kg
HSK100A-	DHE6-80	6	80	29	50	34	30~40	M5	15,000	2.4
	DHE6-150	6	150	29	50	34	30~40	M5	15,000	2.8
	DHE8-80	8	80	31	50	34	30~40	M5	15,000	2.4
	DHE8-150	8	150	31	50	34	30~40	M5	15,000	2.8
	DHE10-90	10	90	33	50	34	35~45	M5	15,000	2.5
	DHE10-150	10	150	33	50	34	35~45	M5	15,000	3
	DHE12-95	12	95	35	50	34	41~51	M10	15,000	2.5
	DHE12-150	12	150	35	50	34	41~52	M10	15,000	3
	DHE14-100	14	100	36	50	40	43~53	M10	15,000	2.6
	DHE14-150	14	150	36	50	40	43~54	M10	15,000	3.1
	DHE16-100	16	100	40	50	45	46~56	M10	15,000	2.6
	DHE16-150	16	150	40	50	45	46~56	M10	15,000	3.1
	DHE18-100	18	100	42	50	45	49~59	M10	15,000	2.7
	DHE18-150	18	150	42	50	45	49~59	M10	15,000	3.2
	DHE20-105	20	105	44	50	50	49~59	M10	15,000	2.8
	DHE20-150	20	150	44	50	50	49~59	M10	15,000	3.4
	DHE25-115	25	115	50	63	62	58~68	M16	15,000	3.3
	DHE32-115	32	115	63	75	62	58~68	M16	15,000	3.8

적용부품 E10

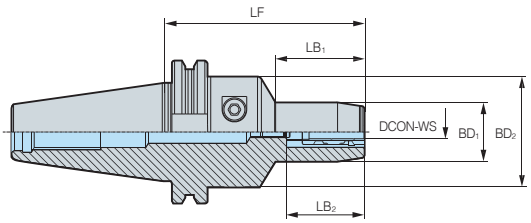
• H : 공구 삽입 깊이(최소~최대) • 내부 쿨런트 시스템 탑재

부품

기본 구성					
구 분		클램프 볼트	렌치	구 분	조정 스크류
형번 \ 부품				형번 \ 부품	
BT30/SK30/HSK50A	DHE4.5, 6, 8, 10, 12, 14, 16, 18, 20	BTF1010	DHETW-5	DHE 6, 8, 10	DHE-M5 (ADJ)
BT40/BT50/SK40/ SK50/HSK63A/ HSK100A	DHE4.5, 6, 8, 10, 12, 14, 16, 18, 20	BTF1010	DHETW-5	DHE 12, 14, 16, 18, 20	DHE-M10 (ADJ)
	DHE 25, 32	BTF1212-1.5	DHETW-6	DHE 25, 32	DHE-M16 (ADJ)

SK-DHE





(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LB_1	LB_2	ADJ	RPMX	kg
SK40-	DHE6-90	6	90	29	50	40	30-40	M5	20,000	1.4
	DHE8-90	8	90	31	50	40	30-40	M5	20,000	1.4
	DHE10-90	10	90	33	50	40	35-45	M5	20,000	1.5
	DHE12-90	12	90	35	50	40	41~51	M10	20,000	1.5
	DHE12-140	12	140	35	50	40	41~51	M10	20,000	2.1
	DHE14-90	14	90	36	50	40	43~53	M10	20,000	1.4
	DHE16-90	16	90	40	50	45	46~56	M5	20,000	1.5
	DHE18-90	18	90	42	50	45	49~59	M5	20,000	1.5
	DHE20-90	20	90	44	50	50	49~59	M10	20,000	1.5
	DHE20-140	20	140	44	50	50	49~59	M10	20,000	2.1
SK50-	DHE12-90	12	90	35	50	40	41~51	M10	15,000	3.2
	DHE14-90	14	90	36	50	40	43~53	M10	15,000	3.2
	DHE16-90	16	90	40	50	45	46~56	M10	15,000	3.3
	DHE18-90	18	90	42	50	40	49~59	M10	15,000	3.2
	DHE20-90	20	90	44	50	47	49~59	M10	15,000	3.2

적용부품 E11

• H : 공구 삽입 깊이(최소~최대) • 내부 쿨런트 시스템 탑재

부품

기본 구성					
구 분		클램프 볼트	렌치	구 분	조정 스크류
형번 \ 부품				형번 \ 부품	
BT30/SK30/HSK50A	DHE4.5, 6, 8, 10, 12, 14, 16, 18, 20	BTF1010	DHETW-5	DHE 6, 8, 10	DHE-M5 (ADJ)
BT40/BT50/SK40/ SK50/HSK63A/ HSK100A	DHE4.5, 6, 8, 10, 12, 14, 16, 18, 20	BTF1010	DHETW-5	DHE 12, 14, 16, 18, 20	DHE-M10 (ADJ)
	DHE 25, 32	BTF1212-1.5	DHETW-6	DHE 25, 32	DHE-M16 (ADJ)

※ DBT30, BT30, HSK50A 예외

Hydraulic expansion chuck_유압척

DHE/S

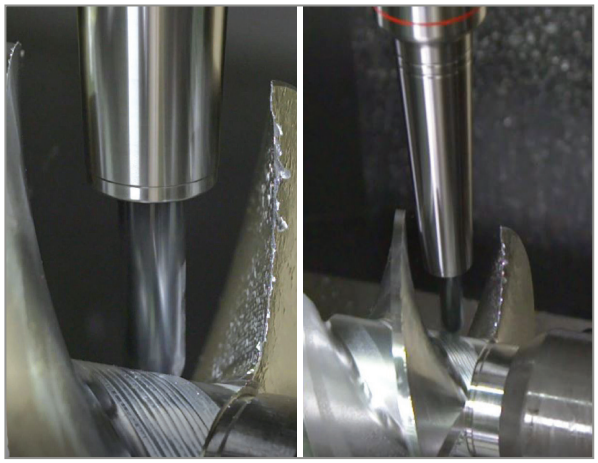


- 고품질 면조도 및 정밀도가 요구되는 가공에 최적화된 제품
- 금형 및 자동차 부품 등 형상이 복잡하고 간섭이 많아 어려운 가공에 적합
- 공구가 깊숙히 들어가야 하는 금속 Impeller 가공에 최적
- 별도의 체결 장비가 필요하지 않아 손쉽게 공구체결이 가능
- 정삭(0.02~0.2mm) 가공에 용이
- 가공영역 : 밀링, 드릴링, 리밍

형번표기법

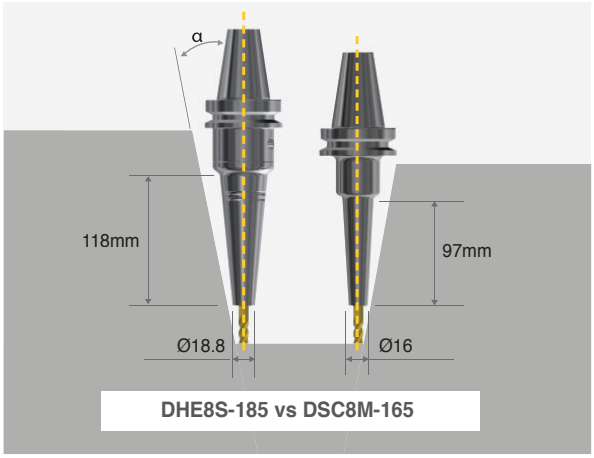
BT30	-	DHE	8	S	-	115
스핀들		Hydraulic expansion chuck	Tool Dia.	타입 S : Slim		길이

추천가공



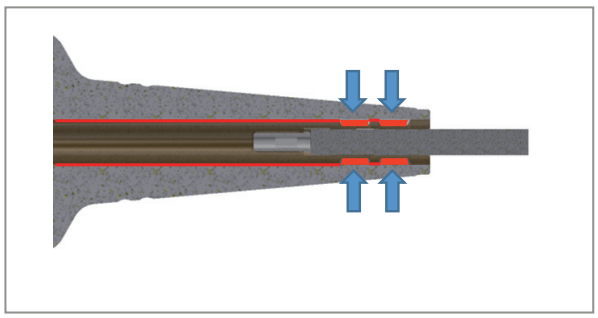
- 고 정밀도가 요구되는 가공에 최적
- 가공하기 힘든 좁고 깊은 가공 가능
- 정삭 가공이 필요한 제작물

제품비교



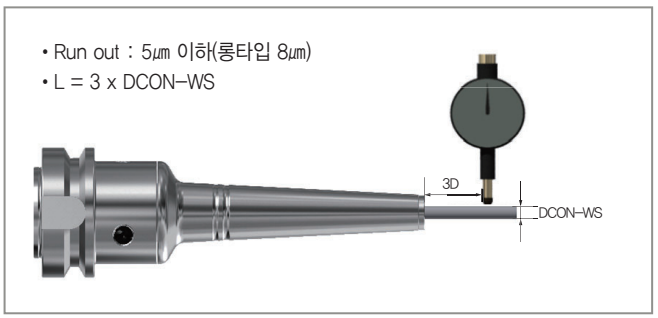
- 길이와 슬림함에서 DSC/M 타입과 유사
  (공구 돌출량 40mm 기준 α = 약 2° 차이)
- DSC/M 타입 대비 길어진 게이지라인과 높아진 강성
- 3° 테이퍼 형상으로 금형 가공에 최적

안정적인 파지력



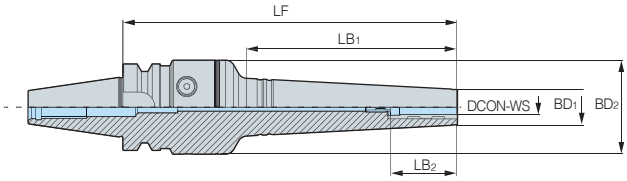
- 두 포인트에서 툴을 잡아주어 높은 파지력과 정도가 좋음

고정도



BT-DHE/S





(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LB_1	LB_2	RPMX	Run-out	kg
BT30-	DHE4S-115	4	115	16.8	50	50	19	25,000	5㎛	1.1
	DHE5S-115	5	115	16.8	50	50	19	25,000	5㎛	1.1
	DHE6S-115	6	115	17	50	50	23	25,000	5㎛	1.1
	DHE6S-180	6	180	17	50	115	23	25,000	8㎛	1.4
	DHE8S-115	8	115	19	50	50	31	25,000	5㎛	1.1
	DHE8S-180	8	180	19	50	115	31	25,000	8㎛	1.4
	DHE10S-120	10	120	21	50	55	36	25,000	5㎛	1.4
	DHE10S-180	10	180	21	50	115	36	25,000	8㎛	1.9
	DHE12S-130	12	130	23	50	65	38	25,000	5㎛	1.2
	DHE12S-180	12	180	23	50	115	38	25,000	8㎛	1.6
BT40-	DHE4S-120	4	120	16.8	50	50	19	20,000	5㎛	1.7
	DHE5S-120	5	120	16.8	50	50	19	20,000	5㎛	1.7
	DHE6S-120	6	120	17	50	50	23	20,000	5㎛	1.7
	DHE6S-185	6	185	17	50	115	23	20,000	8㎛	2.0
	DHE8S-120	8	120	19	50	50	31	20,000	5㎛	2.0
	DHE8S-185	8	185	19	50	115	31	20,000	8㎛	2.0
	DHE10S-125	10	125	21	50	55	36	20,000	5㎛	1.6
	DHE10S-185	10	185	21	50	115	36	20,000	8㎛	2.0
	DHE12S-135	12	135	23	50	65	38	20,000	5㎛	1.8
	DHE12S-185	12	185	23	50	115	38	20,000	8㎛	2.2
	DHE16S-190	16	190	26.8	50	115	41	20,000	8㎛	2.3
	DHE20S-190	20	190	30.8	50	115	44	20,000	8㎛	2.4
BT50-	DHE6S-200	6	200	16.8	50	115	22	15,000	8㎛	4.6
	DHE8S-200	8	200	18.8	50	115	30	15,000	8㎛	4.6
	DHE10S-200	10	200	20.8	50	115	35	15,000	8㎛	4.8
	DHE12S-200	12	200	22.8	50	115	37	15,000	8㎛	4.9
	DHE16S-200	16	200	26.8	50	115	41	15,000	8㎛	5.0
	DHE20S-200	20	200	30.8	50	115	44	15,000	8㎛	5.0

적용부품 E14

• H : 공구 삽입 깊이(최소~최대) • 내부 쿨런트 시스템 탑재

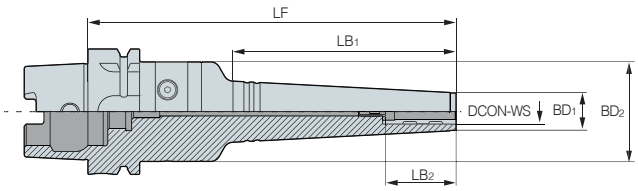
부품

구 분	별도 구매
내부 쿨런트 튜브	

샹크별 구분	
HSK63A	HSK63A-CNS
HSK100A	HSK100A-CNS

HSK-DHE/S





(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LB_1	LB_2	RPMX	Run-out	kg
HSK63A-	DHE4S-120	4	120	16.8	50	50	19	20,000	5㎛	1.4
	DHE5S-120	5	120	16.8	50	50	19	20,000	5㎛	1.4
	DHE6S-120	6	120	17	50	50	23	20,000	5㎛	1.4
	DHE6S-185	6	185	17	50	115	23	20,000	8㎛	1.7
	DHE8S-120	8	120	19	50	50	31	20,000	5㎛	1.4
	DHE8S-185	8	185	19	50	115	31	20,000	8㎛	1.8
	DHE10S-125	10	125	21	50	55	36	20,000	5㎛	1.5
	DHE10S-185	10	185	21	50	115	36	20,000	8㎛	1.8
	DHE12S-135	12	135	23	50	65	38	20,000	5㎛	1.8
	DHE12S-185	12	185	23	50	115	38	20,000	8㎛	1.8
	DHE16S-190	16	190	26.8	50	115	41	20,000	8㎛	2.2
	DHE20S-190	20	190	30.8	50	115	44	20,000	8㎛	2.3
HSK100A-	DHE16S-190	16	190	26.8	50	115	41	15,000	8㎛	3.1
	DHE20S-190	20	190	30.8	50	115	44	15,000	8㎛	3.3

적용부품 E14

• H : 공구 삽입 깊이(최소~최대) • 내부 쿨런트 시스템 탑재

부품

기본 구성					
구 분		클램프 볼트	렌치	구 분	조정 스크류
형번 \ 부품				형번 \ 부품	
BT30	DHE/S 4, 5, 6, 8, 10, 12	BTF1010	DHETW-5	DHE/S 6, 8, 10, 12	DHE-M5 (ADJ)
BT40	DHE/S 4, 5, 6, 8, 10, 12, 16, 20	BTF1010	DHETW-5	DHE/S 16, 20	DHE-M10 (ADJ)
BT50	DHE/S 6, 8, 10, 12, 16, 20	BTF1010	DHETW-5		
HSK63A	DHE/S 4, 5, 6, 8, 10, 12, 16, 20	BTF1010	DHETW-5		
HSK100A	DHE/S 16, 20	BTF1010	DHETW-5		

Hydraulic expansion chuck for tool grinding_연삭기용 유압척

DHE/G

- 입구부 25도 적용으로 휠 간섭 최소화
- 3D 3㎛ 이내의 안정적 런아웃
- 2 포인트 클램핑의 안정적 파지력

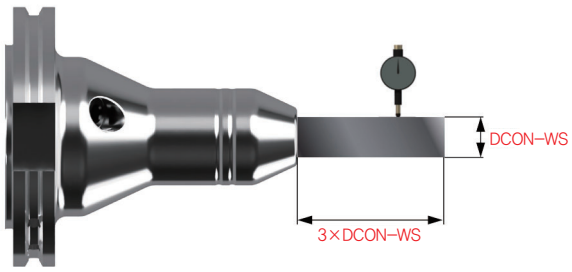


형번표기법

SK50	DHE	12	G	110
Spindle	Hydraulic Expansion Chuck	Tool Dia.	Grinding	Length

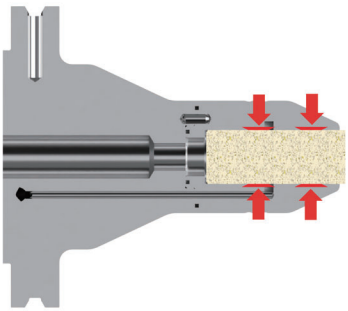
고정도

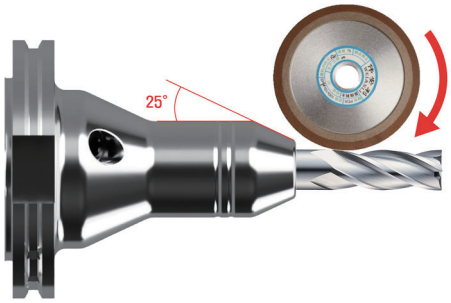
- 고정도 적용으로 3xDCON-WS에서 런아웃 3㎛ 이내



안정적 클램핑

- 상하 2 포인트의 안정적 클램핑으로 고정도 구현





휠 간섭 최소화

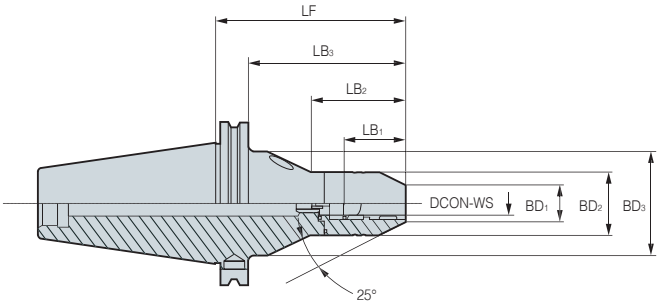
- 선단부에 25° 각도를 적용하여 가공시 휠 간섭 최소화

공구 연삭용 유압척

- 공구 연삭시 엔드툴을 고정해 주기 위한 지그 용도로 사용

DHE/G





(mm)

형 번		DCON-WS	LF	BD_1	BD_2	BD_3	LB_1	LB_2	LB_3	ADJ	kg
SK50-	DHE6G-110	6	110	15	15	32	25	55	90.9	M5	3.2
	DHE8G-110	8	110	17	17	33.5	25	55	90.9	M5	3.4
	DHE10G-110	10	110	19	19	35	30	55	90.9	M5	3.4
	DHE12G-110	12	110	21.5	21.5	36.5	36	55	90.9	M10	3.6
	DHE14G-110	14	110	23.5	23.5	38	38	60	90.9	M10	3.6
	DHE16G-110	16	110	25.5	25.5	39.5	41	60	90.9	M10	3.7
	DHE18G-110	18	110	27.5	27.5	41	44	60	90.9	M10	3.8
	DHE20G-110	20	110	28	28	42	44	47	90.9	M10	3.8
	DHE25G-110	25	110	33	33	47	53	49	90.9	M16	4
	DHE32G-110	32	110	40	40	54	53	63	90.9	M16	4.2

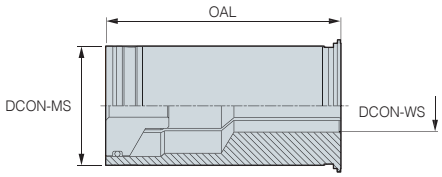
부품

기본 구성					
구 분		클램프 볼트	렌치	구 분	조정 스크류
형번 / 부품				형번 / 부품	
SK50	DHE6,8,10,12,14,16,18,20	BTF1010	DHETW-5	DHE 6,8,10	DHE-M5 (ADJ)
	DHE25,32	BTF1212-1.5	DHETW-6	DHE 12,14,16,18,20	DHE-M10 (ADJ)
				DHE 25,32	DHE-M16 (ADJ)

DHC 콜렛

일반형





(mm)

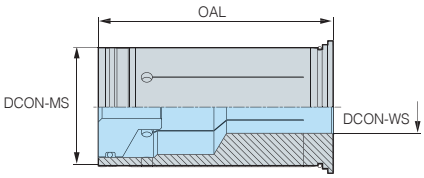
형 번		DCON-WS	OAL	DCON-MS	kg
DHC12-	3	3	47	12	0.06~0.08
	4	4	47	12	0.06~0.08
	5	5	47	12	0.06~0.08
	6	6	47	12	0.06~0.08
	8	8	47	12	0.06~0.08
DHC20-	3	3	52	20	0.04~0.06
	4	4	52	20	0.04~0.06
	5	5	52	20	0.04~0.06
	6	6	52	20	0.04~0.06
	7	7	52	20	0.04~0.06
	8	8	52	20	0.04~0.06
	9	9	52	20	0.04~0.06
	10	10	52	20	0.04~0.06
	11	11	52	20	0.04~0.06
	12	12	52	20	0.04~0.06
	14	14	52	20	0.04~0.06
	16	16	52	20	0.04~0.06
DHC32-	6	6	63	32	0.2~0.5
	8	8	63	32	0.2~0.5
	10	10	63	32	0.2~0.5
	12	12	63	32	0.2~0.5
	14	14	63	32	0.2~0.5
	16	16	63	32	0.2~0.5
	18	18	63	32	0.2~0.5
	19	19	63	32	0.2~0.5
	20	20	63	32	0.2~0.5
	25	25	63	32	0.2~0.5

• 내부 쿨런트 시스템 불가

DHC-(P) 콜렛

방수형





(mm)

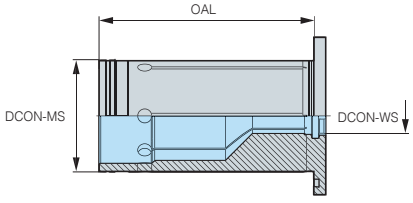
형 번		DCON-WS	OAL	DCON-MS	kg
DHC12-	3(P)	3	47	12	0.04
	4(P)	4	47	12	0.04
	5(P)	5	47	12	0.04
	6(P)	6	47	12	0.04
	8(P)	8	47	12	0.04
DHC20-	3(P)	3	52	20	0.06~0.1
	4(P)	4	52	20	0.06~0.1
	5(P)	5	52	20	0.06~0.1
	6(P)	6	52	20	0.06~0.1
	7(P)	7	52	20	0.06~0.1
	8(P)	8	52	20	0.06~0.1
	9(P)	9	52	20	0.06~0.1
	10(P)	10	52	20	0.06~0.1
	11(P)	11	52	20	0.06~0.1
	12(P)	12	52	20	0.06~0.1
	14(P)	14	52	20	0.06~0.1
	16(P)	16	52	20	0.06~0.1
DHC32-	6(P)	6	63	32	0.2~0.3
	8(P)	8	63	32	0.2~0.3
	10(P)	10	63	32	0.2~0.3
	12(P)	12	63	32	0.2~0.3
	14(P)	14	63	32	0.2~0.3
	16(P)	16	63	32	0.2~0.3
	18(P)	18	63	32	0.2~0.3
	19(P)	19	63	32	0.2~0.3
	20(P)	20	63	32	0.2~0.3
	25(P)	25	63	32	0.2~0.3

• 내부 쿨런트 시스템 탑재

DHJ 콜렛

제트쿨런트





(mm)

형 번		DCON-WS	OAL	DCON-MS	kg
DHJ20-	6	6	50	20	0.1
	8	8	50	20	0.1
	10	10	50	20	0.1
	12	12	50	20	0.1
	14	14	50	20	0.08
	16	16	50	20	0.08

• 내부 쿨런트 시스템 탑재

Zero fit collet_제로핏 콜렛

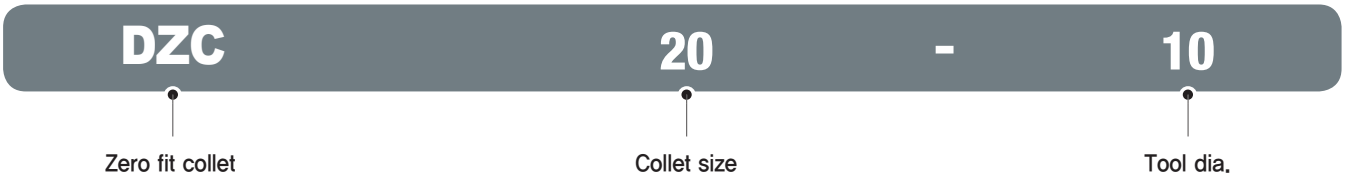
DZC

공구 끝단에서 발생되는 10~20㎛의 런아웃을 0~2㎛로 보정

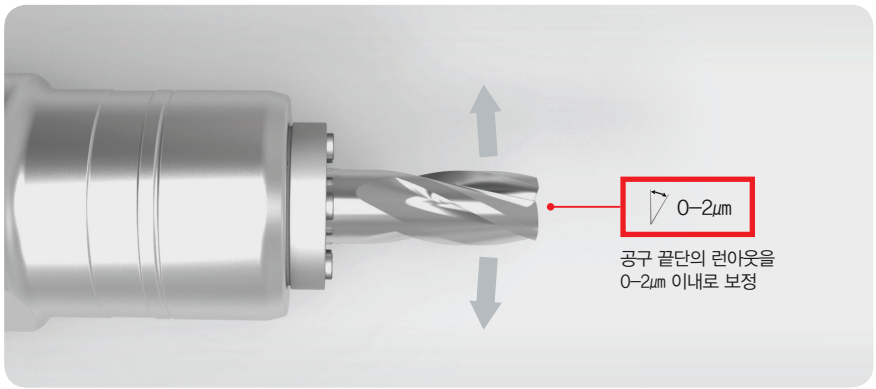
- 엔드툴의 런아웃, 진직도를 향상
- 가공면의 면조도, 품질 향상
- 가공 구멍 치수의 정도 향상
- 엔드툴의 수명 향상

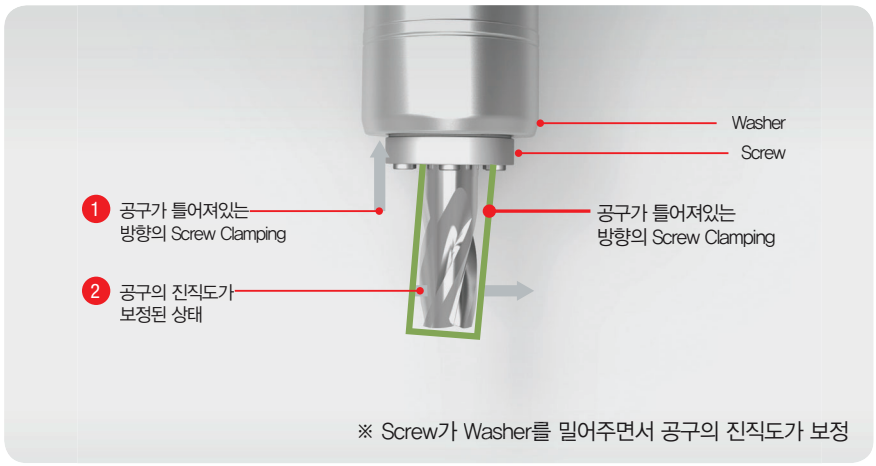


형번표기법



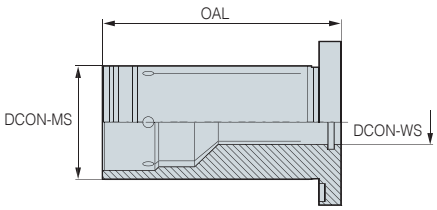
제품특징





DZC





(mm)

형 번		DCON-WS	OAL	DCON-MS
DZC20-	6	6	57	20
	8	8	57	20
	10	10	57	20
	12	12	57	20
	14	14	57	20
	16	16	57	20
DZC32-	6	6	68	32
	8	8	68	32
	10	10	68	32
	12	12	68	32
	16	16	68	32
	20	20	68	32
	25	25	68	32

• 내부 쿨런트 시스템불가

사용방법

• 작은 힘으로 런아웃 조절 볼트를 클램핑 하여도 런아웃은 조절됩니다.
• 런아웃 조절 스크류를 무리하게 클램핑하면, 내부 부품의 변형이 일어날 수 있습니다.
(무리한 힘으로 클램핑하지 마시기 바랍니다. Torque: 600cN · m 이하 권장)
• 런아웃 조절 스크류 클램핑에 무리한 힘이 가해진다면, 반드시 모든 스크류(6EA)를 완전히 언클램프하여 다시 조정하시기 바랍니다.

Shrinking Chuck_밀링척

DSC

- 특수 열처리된 특수강 사용
- 누구나 높은 정밀도의 체결 및 가공이 가능
- 깊은 홈 가공 시 간섭 및 공구 돌출길이 최소화로 공구 수명연장, 가공정도 향상
- 적용샹크경 : Ø3~Ø32

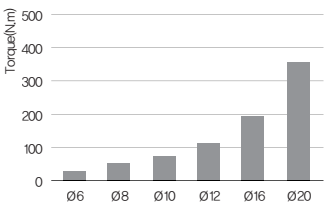


형번표기법

BT50	-	DSC	6	-	S	-	16S	-	S
스핀들		Hydraulic expansion chuck	Tool Dia.		타입 S : Slim		길이		타입 S : Slim

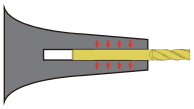
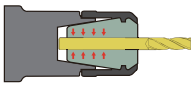
높은 파지력

- 유압척 대비 30% 파지력 증가
- 확실한 동력 전달
- Run-Out(≤0.003mm)



대칭적인 디자인



열박음척	콜렛척
홀더와 공구의 공간을 열수축으로 고정	콜렛의 탄성을 이용하여 공구 고정
	
열팽창 ▶ 열수축	탄성변환
매우 높은 파지력	높은 파지력

Slim Type 시리즈 구성

Straight Type

유압척, 밀링척, 콜렛척 등 다양한 홀더에 결합하여 사용



Mono Type

일체형으로 고정밀도 사용



공구 체결 공차

(mm)

Tool Shank	Tool Shank Tolerance(h6)	Tool Shank	Tool Shank Tolerance(h6)	Tool Shank	Tool Shank Tolerance(h6)	Tool Shank	Tool Shank Tolerance(h6)
Ø3	0~-0.008	Ø6	0~-0.008	Ø12	0~-0.011	Ø25	0~-0.013
Ø4	0~-0.009	Ø8	0~-0.009	Ø16	0~-0.011	Ø32	0~-0.016
Ø5	0~-0.011	Ø10	0~-0.011	Ø20	0~-0.013		

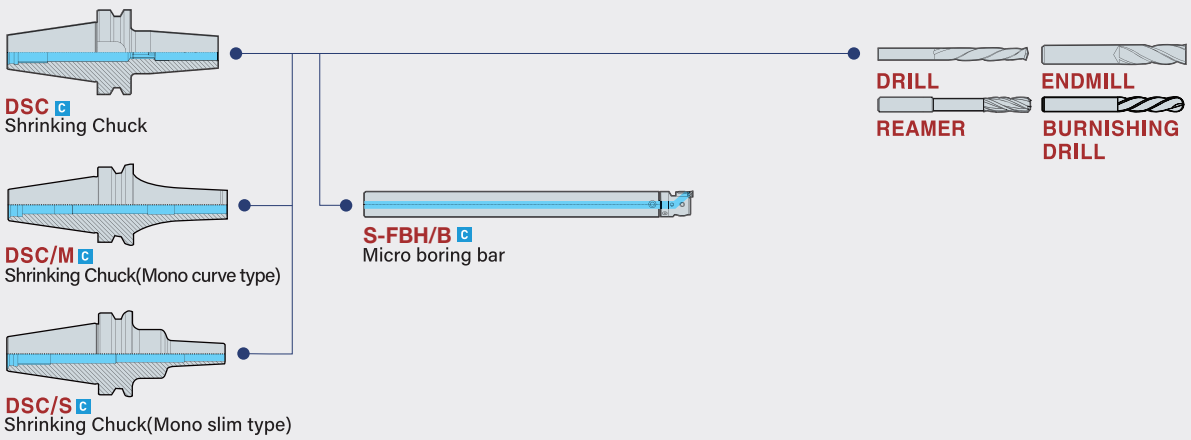
공구의 최소 삽입 깊이

(mm)

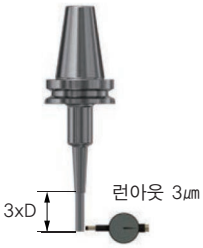
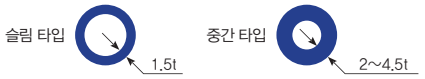
내경	Type	Ø6	Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
공구의 최소 삽입 깊이	슬림	18	24	30	30	-	-	-	-
	중간	18	24	30	30	32	40	-	-
	일반	26	26	32	37	37	40	42	52

DSC MAP

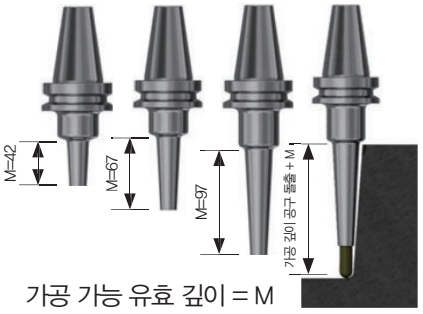
Shrinking Chuck



Mono 타입

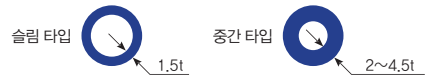
형상	정밀도	TYPE
		

- 최적화된 특수강을 사용하여 강성이 좋고 내열성이 좋아 5,000회 이상 사용해도 고정밀도를 유지합니다.
- 고강성 제품으로 안정된 절삭이 가능하여 좋은 가공 면조도를 얻을 수 있습니다.
- 고정밀도 제품으로 공구의 수명이 연장됩니다.



가공 가능 유효 깊이 = M

Straight 타입

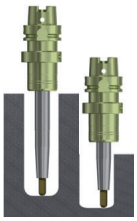
형상	정밀도	TYPE
 콜렛척 유압척 밀링척		 유압척, 밀링척, 콜렛척 등 다양한 홀더에 결합하여 사용

- 유압척, 콜렛척 등 다양한 홀더에 결합하여 사용되는 Straight 타입은 높은 정밀도를 유지하며, 저렴한 가격으로 다양한 가공이 가능하도록 도와줍니다.
- 20여종의 다양한 샹크가 준비되어 있어 작업상황에 맞게 사용이 가능합니다.

적용예시



Ø6~Ø12 공구 체결 가능
다양한 길이와 샹크 사이즈



가공 상황에 따라
길이를 조정하여 사용 가능

사용 시 주의사항

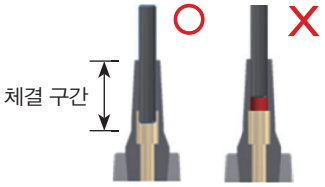
적용예시

- 초경 공구를 사용하여 주십시오.
- 하이스공구 사용 시 분해가 불가능할 수 있습니다.
- 공차 외 공구 사용은 파지력에 영향을 주며, 사고의 원인이 됩니다.



공구 체결 시 주의사항

- 공구 체결 전 척 내경의 부식으로 발행된 녹, 먼지, 절삭유 등을 제거하여 청결 상태를 유지 하십시오.
- 공구 체결 시 체결구간 밑으로 체결하여 주십시오.
- 체결구간 중간에 공구 체결 시 정도 및 내구성에 영향을 미칩니다.
- 공구 체결 시 바닥 면에 닿으면 정도에 영향을 미칩니다.



고주파 가열 주의사항

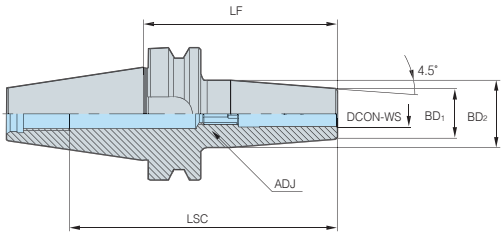
- 공구 체결 · 분해 시 Shrink fit device는 Slim형 프로그램이 되어있는 장비 사용을 권장합니다.
- Slim형 프로그램이 없는 device 사용 시 Overheating이 발생할 수 있습니다. (Overheating은 제품의 내구성과 수명, 정도에 영향을 줄 수 있습니다.)

보관 방법

- Shrink fit chuck을 사용하지 않을 때는 가능한 척에서 공구를 분리하여 주십시오. (장기간 체결 시 제품 수명에 영향을 미칠 수 있습니다.)
- Shrink fit chuck을 사용한 후에는 반드시 물기를 제거하여 주시고, 방청유 및 방청 스프레이를 사용하여 녹이 발생하는 것을 막아 주십시오. (특수 스틸 사용으로 일반 스틸에 비해 녹발생이 적으나 오랜 기간 미사용 시 녹이 발생할 수 있습니다.)

BT-DSC





(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LSC	ADJ	RPMX	kg
BT30 -	DSC3-60	3	60	11	18.5	82	-	25,000	0.4
	DSC4-60	4	60	13	20.5	82	-	25,000	0.4
BT40 -	DSC6-90	6	90	21	27	36	M5	20,000	1.1
	DSC6-120	6	120	21	27	36	M5	20,000	1.2
	DSC6-160	6	160	21	27	36	M5	20,000	1.4
	DSC8-90	8	90	21	27	36	M5	20,000	1.1
	DSC8-120	8	120	21	27	36	M5	20,000	1.2
	DSC8-160	8	160	21	27	36	M5	20,000	1.4
	DSC10-90	10	90	24	32	42	M8	20,000	1.1
	DSC10-120	10	120	24	32	42	M8	20,000	1.3
	DSC10-160	10	160	24	32	42	M8	20,000	1.6
	DSC12-90	12	90	24	32	47	M8	20,000	1.1
	DSC12-120	12	120	24	32	47	M8	20,000	1.3
	DSC12-160	12	160	24	32	47	M8	20,000	1.6
	DSC16-90	16	90	27	34	50	M12	20,000	1.2
	DSC16-120	16	120	27	34	50	M12	20,000	1.3
	DSC16-160	16	160	27	34	50	M12	20,000	1.7
	DSC20-90	20	90	33	42	52	M12	20,000	1.3
	DSC20-120	20	120	33	42	52	M12	20,000	1.5
	DSC20-160	20	160	33	42	52	M12	20,000	2.0

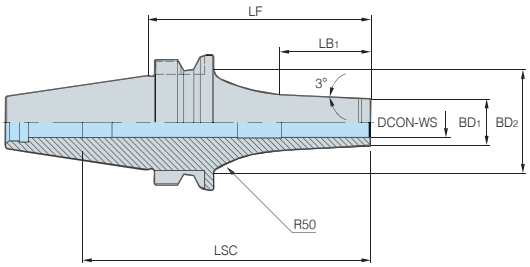
적용부품 **E25**

• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 탑재

BT-DSC/M

Mono Curve 타입





(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LB_1	LSC	RPMX	kg
BT30 -	DSC3M-75S	3	75	8	25	30	97	25,000	0.4
	DSC4M-75S	4	75	10	25	32	97	25,000	0.4
	DSC6M-75S	6	75	12	30	29	97	25,000	0.5
	DSC8M-75S	8	75	14	32	29	97	25,000	0.5
	DSC10M-75S	10	75	16	32	31	45	25,000	0.5
	DSC12M-75S	12	75	19	32	34	45	25,000	0.5

적용부품 **E25**

• H : 공구 삽입 깊이 • 조정 스크류 사용 불가 • 내부 쿨런트 시스템 탑재

BT-DSC/M

Mono 타입



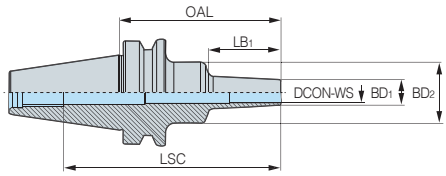


그림 1

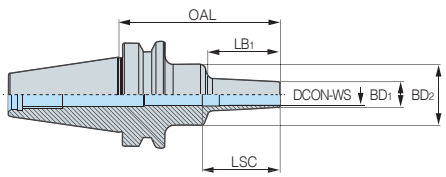


그림 2

(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LB_1	LSC	RPMX	그림	kg
BT40 -	DSC3M-95	3	95	8	26	42	128	20,000	1	1.1
	DSC4M-95	4	95	8	26	42	128	20,000	1	1.1
	DSC6M-95	6	95	10	26	42	128	20,000	1	1.0
	DSC6M-120	6	120	10	26	67	153	20,000	1	1.0
	DSC6M-160	6	160	10	36	97	193	20,000	1	1.2
	DSC8M-95	8	95	13	36	42	128	20,000	1	1.3
	DSC8M-120	8	120	13	36	67	153	20,000	1	1.3
	DSC8M-160	8	160	13	36	97	193	20,000	1	1.3
	DSC10M-95	10	95	16	36	42	128	20,000	1	1.1
	DSC10M-120	10	120	16	36	67	153	20,000	1	1.1
	DSC10M-160	10	160	16	36	97	193	20,000	1	1.3
	DSC12M-95	12	95	19	36	42	128	20,000	1	1.1
	DSC12M-120	12	120	19	36	67	153	20,000	1	1.2
	DSC12M-160	12	160	19	36	97	193	20,000	1	1.4
	DSC16M-95	16	95	24	50	42	47	20,000	2	1.3
	DSC16M-120	16	120	24	50	67	47	20,000	2	1.4
	DSC16M-160	16	160	24	50	97	47	20,000	2	1.7
	DSC20M-95	20	95	29	50	42	55	20,000	2	1.3
	DSC20M-120	20	120	29	50	67	55	20,000	2	1.5
	DSC20M-160	20	160	29	50	97	55	20,000	2	1.9
BT50 -	DSC6M-110	6	110	10	26	42	163	15,000	1	3.5
	DSC6M-160	6	160	10	36	97	213	15,000	1	3.6
	DSC8M-110	8	110	13	36	42	163	15,000	1	3.7
	DSC8M-160	8	160	13	36	97	213	15,000	1	3.7
	DSC10M-110	10	110	16	36	42	163	15,000	1	3.7
	DSC10M-160	10	160	16	36	97	213	15,000	1	3.7
	DSC12M-110	12	110	19	36	42	163	15,000	1	3.7
	DSC12M-160	12	160	19	50	97	213	15,000	1	4.0
	DSC16M-110	16	110	24	50	42	163	15,000	1	3.9
	DSC16M-160	16	160	24	50	97	213	15,000	1	4.1
	DSC20M-110	20	110	29	50	42	55	15,000	2	3.9
	DSC20M-160	20	160	29	50	97	55	15,000	2	4.2

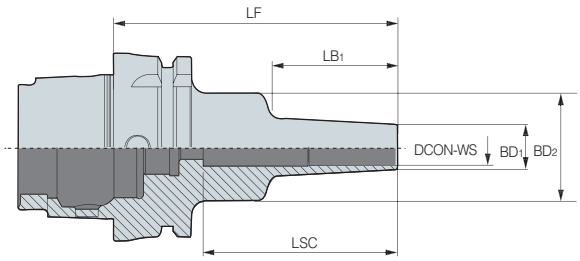
적용부품 E25

• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 탑재

HSK-DSC/M

Mono 타입





(mm)

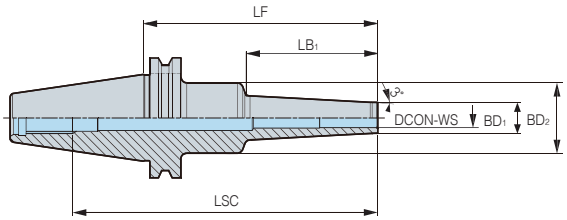
형 번		DCON-WS	LF	BD_1	BD_2	LB_1	LSC	RPMX	kg
HSK63A -	DSC6M-95	6	95	10	26	42	73	20,000	0.7
	DSC8M-95	8	95	13	36	42	39	20,000	0.8
	DSC10M-120	10	120	16	36	67	45	20,000	0.8
	DSC12M-120	12	120	19	36	67	45	20,000	0.9
	DSC16M-120	16	120	24	50	67	47	20,000	1.1

적용부품 **E25**

• H : 공구 삽입 깊이 • 조정 스크류 사용 불가 • 내부 쿨런트 시스템 옵션 탑재 가능

SK-DSC/M





(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LB_1	LSC	RPMX	kg
SK40-	DSC6M-95	6	95	10	26	42	131	20,000	0.8
	DSC6M-120	6	120	10	26	67	156	20,000	1.0
	DSC8M-95	8	95	13	36	42	131	20,000	1.4
	DSC8M-120	8	120	13	36	67	156	20,000	1.0
	DSC10M-95	10	95	16	36	42	131	20,000	1.0
	DSC10M-120	10	120	16	36	67	156	20,000	1.0
	DSC12M-95	12	95	19	36	42	131	20,000	1.0
	DSC12M-120	12	120	19	36	67	156	20,000	1.1
	DSC16M-95	16	95	24	50	42	47	20,000	1.3
	DSC16M-120	16	120	24	50	67	47	20,000	1.4
	DSC20M-95	20	95	29	50	42	55	20,000	1.3
	DSC20M-120	20	120	29	50	67	55	20,000	1.4

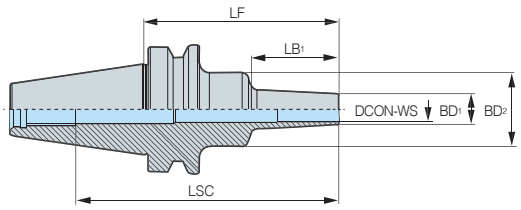
적용부품 **E25**

• H : 공구 삽입 깊이 • 조정 스크류 사용 불가 • 내부 쿨런트 시스템 탑재

BT-DSC/S

Mono 슬림 타입





(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LB_1	LSC	RPMX	kg
BT30 -	DSC6S-60	6	60	9	20	22	82	25,000	0.4
	DSC6S-80	6	80	9	20	42	102	25,000	0.5
	DSC6S-120	6	120	9	25	67	142	25,000	0.5
BT40 -	DSC6S-95	6	95	9	26	42	128	20,000	1.0
	DSC6S-120	6	120	9	26	67	153	20,000	1.0
	DSC6S-160	6	160	9	36	97	193	20,000	1.2
	DSC8S-95	8	95	11	36	42	128	20,000	1.1
	DSC8S-120	8	120	11	36	67	153	20,000	1.1
	DSC8S-160	8	160	11	36	97	193	20,000	1.2
	DSC10S-95	10	95	13	36	42	128	20,000	1.0
	DSC10S-120	10	120	13	36	67	153	20,000	1.1
	DSC10S-160	10	160	13	36	97	193	20,000	1.2
	DSC12S-95	12	95	15	36	42	128	20,000	1.1
	DSC12S-120	12	120	15	36	67	153	20,000	1.1
	DSC12S-160	12	160	15	36	97	193	20,000	1.2
BT50 -	DSC6S-110	6	110	9	26	42	166	15,000	3.5
	DSC6S-160	6	160	9	36	97	216	15,000	3.6
	DSC8S-110	8	110	11	36	42	166	15,000	3.6
	DSC8S-160	8	160	11	36	97	216	15,000	3.6
	DSC10S-110	10	110	13	36	42	166	15,000	3.6
	DSC10S-160	10	160	13	36	97	216	15,000	3.6
	DSC12S-110	12	110	15	36	42	166	15,000	3.6
	DSC12S-160	12	160	15	36	97	216	15,000	3.7

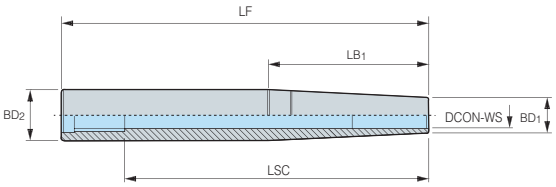
적용부품 **E25**

• H : 공구 삽입 깊이 • 조정 스크류 사용 불가 • 내부 쿨런트 시스템 탑재

ST-DSC/M

열박음척 미들 타입





(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LB_1	LSC	kg
ST16 -	DSC6M-115	6	115	10	16	50	95	0.1
	DSC6M-140	6	140	10	16	60	120	0.1
ST20 -	DSC6M-175	6	175	10	20	95	155	0.2
	DSC8M-145	8	145	13	20	70	125	0.2
	DSC10M-120	10	120	16	20	50	45	0.2
ST25 -	DSC8M-175	8	175	13	25	105	155	0.4
	DSC10M-145	10	145	16	25	75	45	0.4
	DSC10M-175	10	175	16	25	105	45	0.4
	DSC12M-120	12	120	19	25	50	45	0.3
	DSC12M-150	12	150	19	25	80	45	0.4
	DSC16M-175	16	175	24	25	50	47	0.5
ST32 -	DSC20M-175	20	175	29	32	50	55	0.8

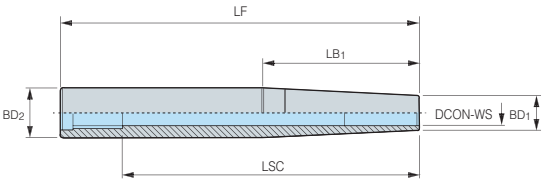
적용부품 **E25**

• H : 공구 삽입 깊이 • 조정 스크류 사용 불가 • 내부 쿨런트 시스템 옵션 탑재

ST-DSC/S

열박음척 슬림 타입





(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LB_1	LSC	kg
ST16 -	DSC6S-115	6	115	9	16	55	95	0.1
	DSC6S-140	6	140	9	16	70	120	0.1
	DSC8S-115	8	115	11	16	50	95	0.1
ST20 -	DSC6S-175	6	175	9	20	105	155	0.2
	DSC8S-175	8	175	11	20	85	155	0.2
	DSC10S-145	10	145	13	20	75	77	0.2
	DSC12S-120	12	120	15	20	50	52	0.2
ST32 -	DSC12S-315	12	315	15	32	185	295	1.2

적용부품 **E25**

• H : 공구 삽입 깊이 • 조정 스크류 사용 불가 • 내부 쿨런트 시스템 옵션 탑재 가능

부품

기본 구성											
타 입		DSC6	DSC8	DSC10	DSC12	DSC14	DSC16	DSC18	DSC20	DSC25	DSC32
조정 스크류		M520C		M820C		M1230C					

New power milling chuck_뉴파워 밀링척

NPM

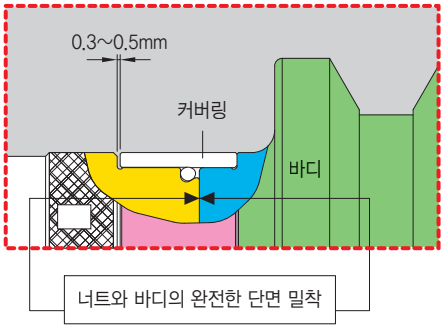
- 500kgf·m 이상의 강력한 파지력(NPM42 기준)
- Dust Block 기능으로 외부이물질 외벽 차단
- 제트쿨런트 작업가능
- L/D = 3 에서 15㎛ 이내의 높은 정밀도 구현
- 가공범위 : Ø20-Ø42



형번표기법

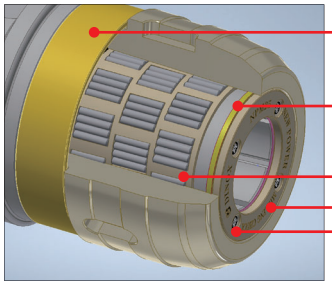
BT40	-	NPM	32	-	110
스핀들		New Power Milling Chuck	Tool Dia.		Length

이물질 혼입 방지 시스템 채택으로 내구성 향상

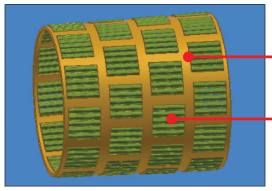


전면부 스톱링 채택
– 심링과 O-Ring으로 혼입방지

NPM 구조적 특징



· Needle Roller Bearing 〈NPM20〉



· 특수 steel bearing 채택으로 파손 방지
· 클램핑시 하중 분산으로 강한 체결

황삭에서 중삭까지 안정적인 작업이 가능

완전한 단면밀착과 강력한 파지력으로 절삭시 진동흡수가 탁월하고 절삭력을 강화시킴

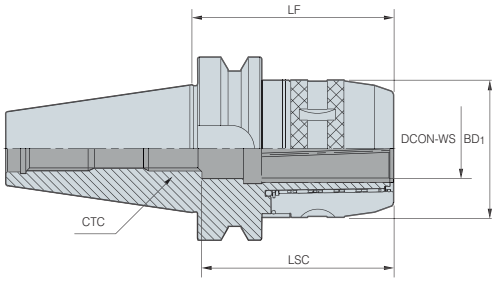


황삭에서 중삭까지 안정적인 작업이 가능



DBT-NPM





(mm)

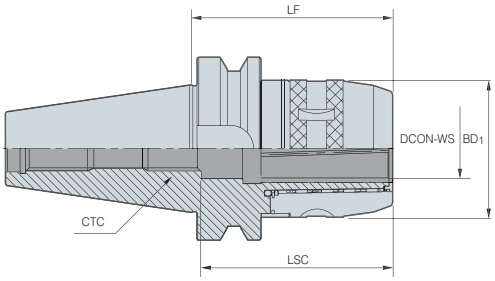
형 번		DCON-WS	LF	BD1	LSC	CTC	COLLET	kg
DBT30 -	NPM20-85	20	85	54	85	M16	DC20, DSC20, DCJ20	1.1
DBT40 -	NPM20-85	20	85	54	85	M16	DC20, DSC20, DCJ20	2.3
	NPM20-100	20	100	54	85	M16	DC20, DSC20, DCJ20	2.4
	NPM20-135	20	135	54	85	M16	DC20, DSC20, DCJ20	2.5
	NPM25-85	25	85	61	83	M16	DC25,DCS25	1.8
	NPM32-90	32	90	75	85	M16	DC32, DCS32, DCJ32	2.4
	NPM32-110	32	110	75	95	M16	DC32, DCS32, DCJ32	2.9
	NPM32-120	32	120	75	95	M16	DC32, DCS32, DCJ32	3.1
	NPM32-135	32	135	75	95	M16	DC32, DCS32, DCJ32	3.4
DBT50 -	NPM20-95	20	95	54	85	M16	DC20, DCS20, DCJ20	4.3
	NPM20-105	20	105	54	85	M16	DC20, DCS20, DCJ20	4.5
	NPM20-125	20	125	54	85	M16	DC20, DCS20, DCJ20	4.8
	NPM20-165	20	165	54	85	M16	DC20, DCS20, DCJ20	5.3
	NPM25-95	25	95	61	83	M16	DC25,DCS25	4.6
	NPM32-90	32	90	75	93	M24	DC32, DCS32, DCJ32	4.9
	NPM32-110	32	110	75	93	M24	DC32, DCS32, DCJ32	5
	NPM32-135	32	135	75	105	M24	DC32, DCS32, DCJ32	5.8
	NPM32-165	32	165	75	105	M24	DC32, DCS32, DCJ32	6.9
	NPM42-110	42	110	90	125	M24	DC42, DCS42	5.6
	NPM42-135	42	135	90	125	M24	DC42, DCS42	6.6
	NPM42-165	42	165	90	125	M24	DC42, DCS42	8

적용부품 E28

• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 옵션 탑재 가능 • L ≤ 90인 경우, 길이가 짧은 캡으로 중절삭에는 90 이상 기장의 제품 권장

BT-NPM





(mm)

형 번		DCON-WS	LF	BD1	LSC	CTC	COLLET	kg
BT30 -	NPM20-85	20	85	54	85	M16	DC20, DSC20, DCJ20	1.2
BT40 -	NPM20-85	20	85	54	85	M16	DC20, DSC20, DCJ20	2.3
	NPM20-100	20	100	54	85	M16	DC20, DSC20, DCJ20	2.3
	NPM20-135	20	135	54	83	M16	DC20, DSC20, DCJ20	2.4
	NPM25-85	25	85	61	85	M16	DC25, DCS25	1.7
	NPM32-90	32	90	75	87	M16	DC32, DCS32, DCJ32	2.3
	NPM32-110	32	110	75	95	M16	DC32, DCS32, DCJ32	2.8
	NPM32-120	32	120	75	95	M16	DC32, DCS32, DCJ32	3
	NPM32-135	32	135	75	95	M16	DC32, DCS32, DCJ32	3.5
BT50 -	NPM20-95	20	95	54	85	M16	DC20, DCS20, DCJ20	4.3
	NPM20-125	20	125	54	85	M16	DC20, DCS20, DCJ20	4.7
	NPM20-165	20	165	54	85	M16	DC20, DCS20, DCJ20	5.2
	NPM25-95	25	95	61	83	M16	DC25,DCS25	4.6
	NPM32-90	32	90	75	93	M24	DC32, DCS32, DCJ32	4.9
	NPM32-110	32	110	75	105	M24	DC32, DCS32, DCJ32	5.0
	NPM32-135	32	135	75	105	M24	DC32, DCS32, DCJ32	5.7
	NPM32-165	32	165	75	105	M24	DC32, DCS32, DCJ32	6.9
	NPM42-110	42	110	90	125	M24	DC42, DCS42	5.4
	NPM42-135	42	135	90	125	M24	DC42, DCS42	6.5
	NPM42-165	42	165	90	125	M24	DC42, DCS42	7.9

적용부품 E28

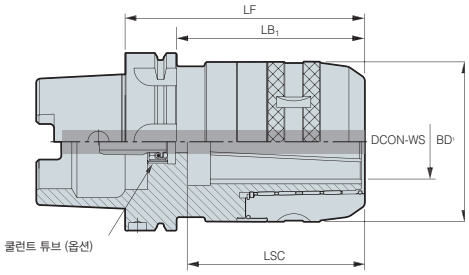
• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 옵션 탑재 가능 • L ≤ 90인 경우, 길이가 짧은 캡으로 중절삭에는 90 이상 기장의 제품 권장

별도 구매품

별도 구매			
구 분	콜렛	스패너	쿨런트시스템
부품 / 형번			
NPM20	DC20, DCS20, DCJ20	57-60	CTC20-□□
NPM32	DC32, DCS32, DCJ32	75-79	CTC32-□□
NPM42	DC42, DCS42	92-96	CTC42-□□

HSK-NPM





(mm)

형 번		DCON-WS	LF	BD_1	LB_1	LSC	COLLET	kg
HSK63A-	NPM20-100	20	100	54	74	75	DC20, DCS20, DCJ20	1.0
	NPM20-100	20	100	54	74	75	DC20, DCS20, DCJ20	1.6
	NPM25-100	25	100	61	74	75	DC25,DCS25	1.9
	NPM32-110	32	110	75	84	82	DC32, DCS32, DCJ32	2.5
	NPM32-120	32	120	75	84	90	DC32, DCS32, DCJ32	2.9
HSK100A-	NPM20-110	20	110	54	81	75	DC20,DCS20,DCJ20	3.0
	NPM25-110	25	110	61	81	75	DC25,DCS25,DCJ25	3.2
	NPM32-115	32	115	75	86	82	DC32,DCS32,DCJ32	4.1
	NPM32-130	32	130	75	101	90	DC32,DCS32,DCJ32	4.0
	NPM42-135	42	135	90	106	100	DC42,DCS42	5.7

적용부품 E29

• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 옵션 탑재 가능

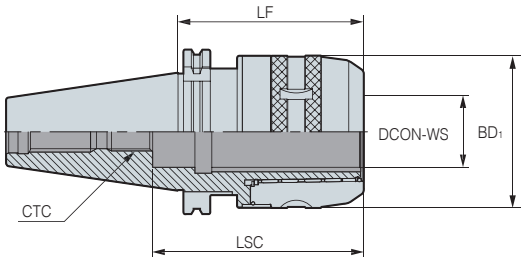
별도 구매품

구 분	별도 구매
쿨런트 튜브	

샹크별 구분	
HSK50A	HSK50A-CNS
HSK63A	HSK63A-CNS
HSK100A	HSK100A-CNS

SK-NPM





(mm)

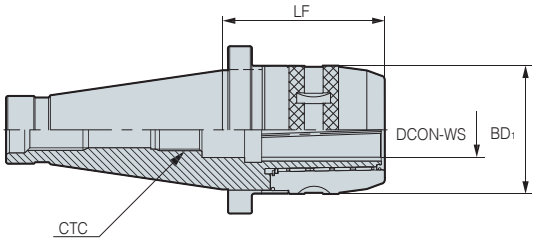
형 번		DCON-WS	LF	BD1	LSC	CTC	COLLET	kg
SK40-	NPM20-95	20	95	54	85	M16	DC20, DCS20, DCJ20	2.4
	NPM32-95	32	95	75	85	M16	DC32, DCS32, DCJ32	2.4
	NPM32-110	32	110	75	95	M16	DC32, DCS32, DCJ32	2.8
	NPM32-135	32	135	75	95	M16	DC32, DCS32, DCJ32	3.2
SK50-	NPM20-100	20	100	54	85	M16	DC20, DCS20, DCJ20	3.6
	NPM32-100	32	100	75	105	M24	DC32, DCS32, DCJ32	4.3
	NPM32-130	32	130	75	105	M24	DC32, DCS32, DCJ32	5.2
	NPM42-110	42	110	90	125	M24	DC42, DCS42	5.2
	NPM42-135	42	135	90	125	M24	DC42, DCS42	6.1

적용부품 E28

• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 옵션 탑재 가능

NT-NPM





(mm)

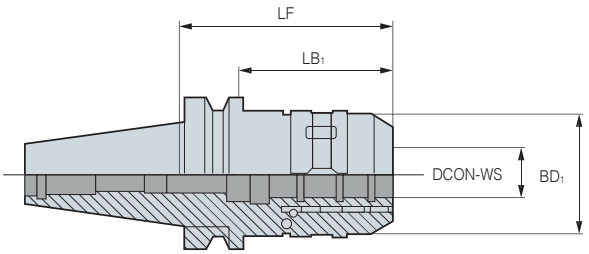
형 번		DCON-WS	LF	BD1	CTC	COLLET	kg
NT40-	NPM32-95	32	95	75	M16	DC32, DCS32, DCJ32	2.7
NT50-	NPM32-95	32	95	75	M24	DC32, DCS32, DCJ32	4.3
	NPM42-95	42	95	90	M24	DC42, DCS42	4.8
NT50M-	NPM32-95	32	95	75	M24	DC32, DCS32, DCJ32	4.4
	NPM42-95	42	95	90	M24	DC42, DCS42	4.9

적용부품 E28

• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 옵션 탑재 가능

BT-DMC





(mm)

형 번		DCON-WS	LF	BD1	LB1	COLLET	kg
BT30-	DMC20-80	20	80	54	80	DC20, DCS20	1
BT30-	DMC20-90	20	90	54	80	DC20, DCS20	2.3
	DMC32-105	32	105	75	95	DC32, DCS32	2.9
BT30-	DMC32-105	32	105	75	95	DC32, DCS32	4.9
	DMC32-165	32	165	75	95	DC32, DCS32	6.7
	DMC42-105	42	105	90	125	DC42, DCS42	5.2
	DMC42-165	42	165	90	125	DC42, DCS42	8

적용부품 E28

• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 불가 제품

별도 구매품

구 분	별도 구매
스패너	

샹크별 구분	
DMC 20	57-60
DMC 32	75-79
DMC 42	92-96

Lock collet for milling chuck_ 논슬립 밀링척 콜렛

DCL

- 기계적 체결 방식으로 최상의 공구빠짐 방지 기능
- 극한의 가공조건에도 안정적 공구 체결력 발휘

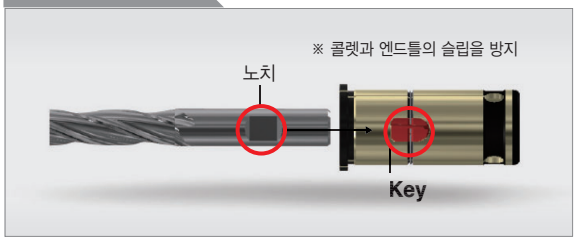


형번표기법

DCL	32	-	20
DINE lock-collet	Collet size		Tool dia.

구조적 특징

빠질 수 없는 구조



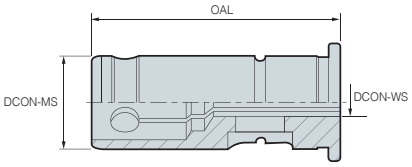
- 기계작용이 많은 극한 가공에도 툴이 헛돌거나 빠지는 현상방지
- Weldon flat (DIN 6535HB) 엔드밀 사용

슬립 없는 구조



- 밀링척의 그루브에 밀착이 되어 높은 토크의 작용에도 슬립이 없음

상세규격



형 번	DCON-WS	OAL	DCON-MS
DCL20-6	6	53	20
DCL20-8	8	53	20
DCL20-10	10	53	20
DCL20-12	12	53	20
DCL20-14	14	53	20
DCL20-16	16	53	20
DCL32-6	6	65	32
DCL32-8	8	65	32

형 번	DCON-WS	OAL	DCON-MS
DCL32-10	10	65	32
DCL32-12	12	65	32
DCL32-14	14	65	32
DCL32-16	16	65	32
DCL32-18	18	65	32
DCL32-20	20	65	32
DCL32-25	25	65	32

부품

기본 구성		
구 분	Key	C-Grip
부품 / 형번		
DCL20-6	DCL20-6K	DCL-CG20
DCL20-8	DCL20-8K	DCL-CG20
DCL20-10	DCL20-10K	DCL-CG20
DCL20-12	DCL20-12K	DCL-CG20
DCL20-14	DCL20-14K	DCL-CG20
DCL20-16	DCL20-16K	DCL-CG20
DCL32-6	DCL32-6K	DCL-CG32
DCL32-8	DCL32-8K	DCL-CG32

기본구성		
구 분	Key	C-Grip
부품 / 형번		
DCL32-10	DCL32-10K	DCL-CG32
DCL32-12	DCL32-12K	DCL-CG32
DCL32-14	DCL32-14K	DCL-CG32
DCL32-16	DCL32-16K	DCL-CG32
DCL32-18	DCL32-18K	DCL-CG32
DCL32-20	DCL32-20K	DCL-CG32
DCL32-25	DCL32-25K	DCL-CG32

Jetcoolant collet_제트쿨런트 콜렛(밀링척용)

DCJ

- 칩이 공구에 붙는 것을 방지하여 절삭 공구 수명 연장
- 강력한 Jet 분사로 칩 처리 능력 향상
- 기존 밀링척의 성능은 유지
- Collet 교체로 Inside, Jet coolant 빠른 교환 가능
- 초고압 내부쿨런트에서도 사용 가능



형 번		Ø6	Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
NPM	20	●	●	●	●	●			
	32	●	●	●	●	●	●	●	
	42	●	●	●	●	●	●	●	●

• 초고압 내부쿨런트에서도 사용 가능

NPM + Jet coolant Colle



간편한 조립



※ 기존 밀링척(NPM)에 Collet만 결합하여 사용 가능

쿨런트 타입

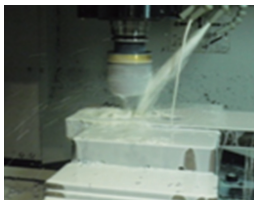
• Jet coolant

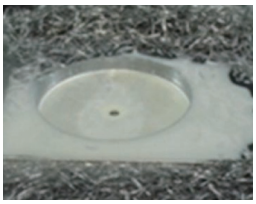


• Inside coolant



칩 배출 능력





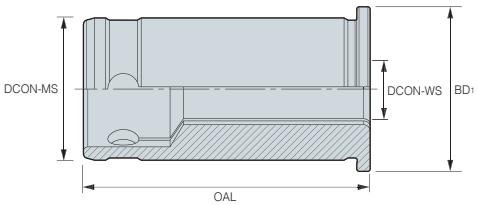
쿨런트 타입

형 번	
NPM20	DCJ20-6
	DCJ20-8
	DCJ20-10
	DCJ20-12
	DCJ20-16
NPM32	DCJ32-6
	DCJ32-8
	DCJ32-10
	DCJ32-12
	DCJ32-16
	DCJ32-20
	DCJ32-25

DC 콜렛

스트레이트 콜렛





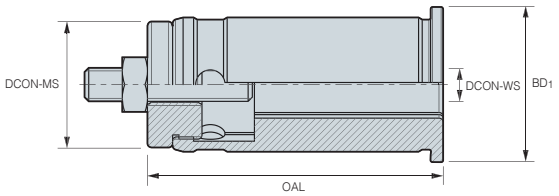
(mm)

형 번		DCON-WS	OAL	DCON-MS	BD_1	WT
DC	20-6	6	53	20	25	0.1
	20-8	8	53	20	25	0.1
	20-10	10	53	20	25	0.1
	20-12	12	53	20	25	0.1
	20-14	14	53	20	25	0.1
	20-16	16	53	20	25	0.1
	25-6	6	62	25	29	0.2
	25-8	8	62	25	29	0.2
	25-10	10	62	25	29	0.2
	25-12	12	62	25	29	0.2
	25-16	16	62	25	29	0.2
	32-6	6	65	32	37	0.2
	32-8	8	65	32	37	0.2
	32-10	10	65	32	37	0.2
	32-12	12	65	32	37	0.2
	32-14	14	65	32	37	0.2
	32-16	16	65	32	37	0.2
	32-19	19	65	32	37	0.2
	32-20	20	65	32	37	0.2
	32-25	25	65	32	37	0.2
	42-6	6	73	42	47	0.5
	42-8	8	73	42	47	0.5
	42-10	10	73	42	47	0.5
	42-12	12	73	42	47	0.5
	42-16	16	73	42	47	0.5
	42-20	20	73	42	47	0.5
	42-25	25	73	42	47	0.5
	42-32	32	73	42	47	0.5

DCS 콜렛

스트레이트 콜렛





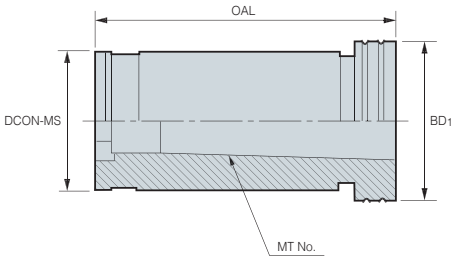
(mm)

형 번		DCON-WS	OAL	DCON-MS	BD_1	WT
DCS	20-6	6	57	20	25	0.1
	20-8	8	57	20	25	0.1
	20-10	10	57	20	25	0.1
	20-12	12	57	20	25	0.1
	20-16	16	57	20	25	0.1
	32-6	6	70.5	32	37	0.2
	32-8	8	70.5	32	37	0.2
	32-10	10	70.5	32	37	0.2
	32-12	12	70.5	32	37	0.2
	32-14	14	70.5	32	37	0.2
	32-16	16	70.5	32	37	0.2
	32-19	19	70.5	32	37	0.2
	32-20	20	70.5	32	37	0.2
	32-25	25	70.5	32	37	0.2
	42-6	6	80	42	47	0.5
	42-8	8	80	42	47	0.5
	42-10	10	80	42	47	0.5
	42-12	12	80	42	47	0.5
	42-16	16	80	42	47	0.5
	42-20	20	80	42	47	0.5
	42-25	25	80	42	47	0.5
	42-32	32	80	42	47	0.5

TC 콜렛

테이퍼 콜렛





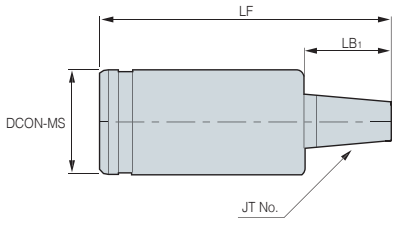
(mm)

형 번		MT No.	OAL	BD_1	DCON-MS	kg
TC	20-1	MT1	60	26	20	0.1
	20-2	MT2	72	26	20	0.1
	25-1	MT1	60	32	25	0.2
	25-2	MT2	72	32	25	0.2
	32-1	MT1	60	38	32	0.4
	32-2	MT2	72	38	32	0.4
	32-3	MT3	90	38	32	0.4
	42-1	MT1	60	48	42	0.6
	42-2	MT2	72	48	42	0.7
	42-3	MT3	90	48	42	0.8
	42-4	MT4	113	48	42	0.9

DJT

드릴척 아버





(mm)

형 번		JT No.	LF	DCON-MS	LB_1	kg
DJT	20-6	JT6	83	20	28	0.2
	32-6	JT6	93	32	28	0.5
	42-6	JT6	103	42	28	0.9

Precision collet chuck for multi purpose machining_ER 콜렛척

SDC/P



- 합리적인 가격과 안정적인 가공성으로 일반가공에 최상의 효율성
- 슬리브너트 채용으로 타사대비 안정적 런아웃 구현
- 폭넓은 체결범위 적용 가능
- 콜렛교체만으로 다양한 가공 가능
- 가공범위 : Ø1~Ø26

형번표기법

BT30	-	SDC	10	-	P	100
Spindle		Collet chuck	Tool Dia.		Precision	Length

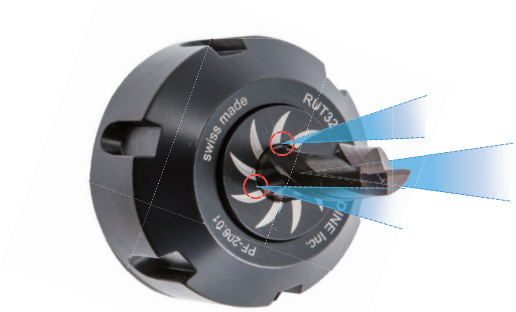
최고급 너트 사용 (SWISS Made)

- 부드러운 슬리브 베어링 RN 너트 (변경 후)

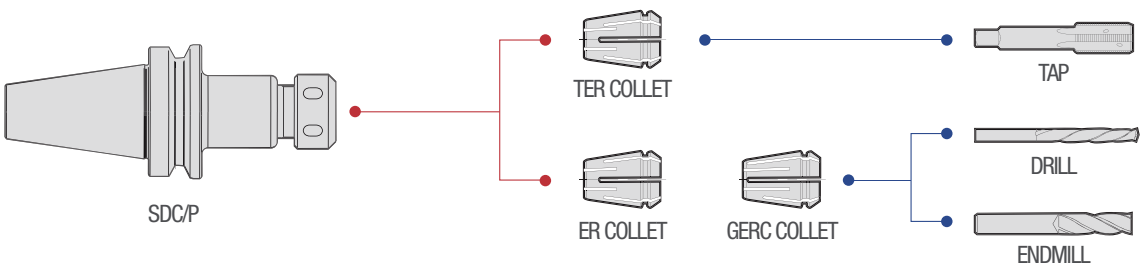


Jet coolant disk 호환 가능

- 일반 RT/RUT 너트로 교환 후 RTJW를 체결하여 Jet coolant – Inside coolant 사용 가능



SDC/P Application



DBT-SDC/P



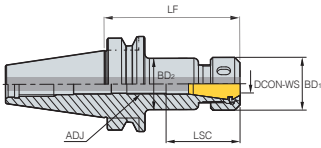


그림 1

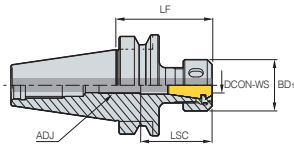


그림 2

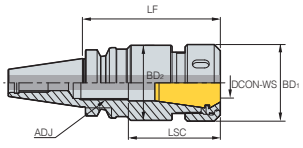


그림 3

(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LSC	Collet/ STEP	ADJ	그림	kg
DBT30 -	SDC7P-70	1.0~7.0	70	18	17	33	GERC11/0.5	M7	1	0.5
	SDC7P-100	1.0~7.0	100	18	17	33	GERC11/0.5	M7	1	0.5
	SDC10P-50	1.0~10.0	50	32	-	44.5	GERC16/1.0	M10	2	0.5
	SDC10P-70	1.0~10.0	70	32	31	44.5	GERC16/1.0	M10	1	0.6
	SDC10P-100	1.0~10.0	100	32	31	44.5	GERC16/1.0	M10	1	0.7
	SDC13P-50	1.0~13.0	50	35	-	49	GERC20/1.0	M13	2	0.5
	SDC13P-70	1.0~13.0	70	35	34	49	GERC20/1.0	M13	1	0.6
	SDC13P-100	1.0~13.0	100	35	34	49	GERC20/1.0	M13	1	0.8
	SDC16P-50	2.0~16.0	50	42	-	50	GERC25/1.0	M18	2	0.5
	SDC16P-70	2.0~16.0	70	42	41	50	GERC25/1.0	M18	1	0.7
	SDC16P-100	2.0~16.0	100	42	41	50	GERC25/1.0	M18	1	1.0
	SDC20P-60	2.0~20.0	60	50	-	60	GERC32/1.0	M22	2	0.6
	SDC20P-90	2.0~20.0	90	50	49	60	GERC32/1.0	M22	3	1.0
	SDC20P-120	2.0~20.0	120	50	49	60	GERC32/1.0	M22	3	1.4
DBT40 -	SDC7P-70	1.0~7.0	70	18	17	33	GERC11/0.5	M7	1	0.9
	SDC7P-90	1.0~7.0	90	18	17	33	GERC11/0.5	M7	1	0.9
	SDC7P-130	1.0~7.0	130	18	17	33	GERC11/0.5	M7	1	1.0
	SDC10P-70	1.0~10.0	70	32	31	44.5	GERC16/1.0	M10	1	1.0
	SDC10P-90	1.0~10.0	90	32	31	44.5	GERC16/1.0	M10	1	1.2
	SDC10P-130	1.0~10.0	130	32	31	44.5	GERC16/1.0	M10	2	1.4
	SDC13P-70	1.0~13.0	70	35	34	49	GERC20/1.0	M13	1	1.1
	SDC13P-90	1.0~13.0	90	35	34	49	GERC20/1.0	M13	1	1.2
	SDC13P-130	1.0~13.0	130	35	34	49	GERC20/1.0	M13	1	1.4
	SDC13P-150	1.0~13.0	150	35	34	49	GERC20/1.0	M13	1	1.6
	SDC16P-70	2.0~16.0	70	42	41	50	GERC25/1.0	M18	1	1.1
	SDC16P-90	2.0~16.0	90	42	41	50	GERC25/1.0	M18	1	1.3
	SDC16P-130	2.0~16.0	130	42	41	50	GERC25/1.0	M18	1	1.7
	SDC20P-70	2.0~20.0	70	50	-	60	GERC32/1.0	M22	2	1.1
	SDC20P-90	2.0~20.0	90	50	49	60	GERC32/1.0	M22	1	1.4
	SDC20P-130	2.0~20.0	130	50	49	60	GERC32/1.0	M22	1	1.9
	SDC20P-150	2.0~20.0	150	50	49	60	GERC32/1.0	M22	1	2.2
	SDC26P-90	4.0~26.0	90	63	62	71	GERC40/1.0	M28	1	1.7

적용부품 E43 적용콜렛 E54

• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 옵션 탑재 가능 • 오일홀 타입 사용 시 콜렛은 정치수 사용

DBT-SDC/P



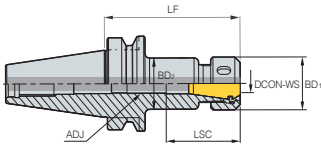


그림 1

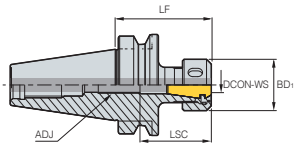


그림 2

(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LSC	Collet/ STEP	ADJ	그림	kg
DBT50 -	SDC10P-100	1.0~10.0	100	32	31	44.5	GERC16/1.0	M10	1	3.7
	SDC10P-120	1.0~10.0	120	32	31	44.5	GERC16/1.0	M10	1	3.7
	SDC10P-160	1.0~10.0	160	32	31	44.5	GERC16/1.0	M10	1	3.8
	SDC13P-100	1.0~13.0	100	35	34	49	GERC20/1.0	M13	1	3.8
	SDC13P-130	1.0~13.0	130	35	34	49	GERC20/1.0	M13	1	3.8
	SDC13P-160	1.0~13.0	160	35	34	49	GERC20/1.0	M13	1	4.1
	SDC13P-180	1.0~13.0	180	35	34	49	GERC20/1.0	M13	1	4.2
	SDC16P-100	2.0~16.0	100	42	41	50	GERC25/1.0	M18	1	3.9
	SDC16P-160	2.0~16.0	160	42	41	50	GERC25/1.0	M18	1	4.3
	SDC20P-70	2.0~20.0	70	50	-	60	GERC32/1.0	M22	2	1.7
	SDC20P-100	2.0~20.0	100	50	49	60	GERC32/1.0	M22	1	4.0
	SDC20P-130	2.0~20.0	130	50	49	60	GERC32/1.0	M22	1	4.3
	SDC20P-160	2.0~20.0	160	50	49	60	GERC32/1.0	M22	1	4.7
	SDC20P-180	2.0~20.0	180	50	49	60	GERC32/1.0	M22	1	5.0
	SDC26P-160	4.0~26.0	160	63	62	71	GERC40/1.0	M28	1	5.5

적용부품 E43 적용콜렛 E54

• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 옵션 탑재 가능 • 오일홀 타입 사용 시 콜렛은 정치수 사용

부품

기본 구성			별도 구매	
구 분	슬리브 베어링 너트	조정 스크류	스패너	콜렛
부품 / 형번				
SDC7P	RN11	BN0716F	20-22	GERC/ER 11-ØD
SDC10P	RN16	BN1025F	32-35	GERC/ER 16-ØD
SDC13P	RN20	BN1325F	35-38	GERC/ER 20-ØD
SDC16P	RN25	BN1830F	42-46	GERC/ER 25-ØD
SDC20P	RN32	BN2230F	48-52	GERC/ER 32-ØD
SDC26P	RN40	BN2838F	62-65	GERC/ER 40-ØD

* BT30-SDC13P-50/HSK63A-SDC13P-100은 BN0716F 스크류를 사용합니다.

BT-SDC/P



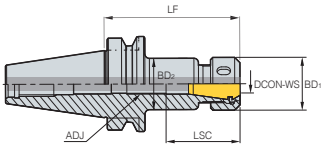


그림 1

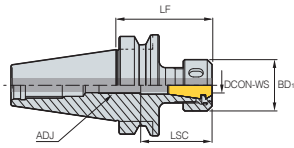


그림 2

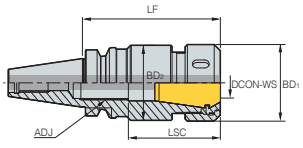


그림 3

(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LSC	Collet/ STEP	ADJ	그림	kg
BT30 -	SDC7P-70	1.0~7.0	70	18	17	33	GERC11/0.5	M7	1	0.5
	SDC7P-100	1.0~7.0	100	18	17	33	GERC11/0.5	M7	1	0.5
	SDC10P-50	1.0~10.0	50	32	-	44.5	GERC16/1.0	M10	2	0.5
	SDC10P-70	1.0~10.0	70	32	31	44.5	GERC16/1.0	M10	1	0.6
	SDC10P-100	1.0~10.0	100	32	31	44.5	GERC16/1.0	M10	1	0.7
	SDC13P-50	1.0~13.0	50	35	-	49	GERC20/1.0	M13	2	0.5
	SDC13P-70	1.0~13.0	70	35	34	49	GERC20/1.0	M13	1	0.6
	SDC13P-100	1.0~13.0	100	35	34	49	GERC20/1.0	M13	1	0.8
	SDC16P-50	2.0~16.0	50	42	-	50	GERC25/1.0	M18	2	0.5
	SDC16P-70	2.0~16.0	70	42	41	50	GERC25/1.0	M18	1	0.7
	SDC16P-100	2.0~16.0	100	42	41	50	GERC25/1.0	M18	1	1.0
	SDC20P-60	2.0~20.0	60	50	-	60	GERC32/1.0	M22	2	0.6
	SDC20P-90	2.0~20.0	90	50	49	60	GERC32/1.0	M22	3	1.0
	SDC20P-120	2.0~20.0	120	50	49	60	GERC32/1.0	M22	3	1.4
BT40 -	SDC7P-70	1.0~7.0	70	18	17	33	GERC11/0.5	M7	1	0.9
	SDC7P-90	1.0~7.0	90	18	17	33	GERC11/0.5	M7	1	0.9
	SDC7P-130	1.0~7.0	130	18	17	33	GERC11/0.5	M7	1	1.0
	SDC10P-70	1.0~10.0	70	32	31	44.5	GERC16/1.0	M10	1	1.0
	SDC10P-90	1.0~10.0	90	32	31	44.5	GERC16/1.0	M10	1	1.2
	SDC10P-130	1.0~10.0	130	32	31	44.5	GERC16/1.0	M10	2	1.4
	SDC13P-70	1.0~13.0	70	35	34	49	GERC20/1.0	M13	1	1.1
	SDC13P-90	1.0~13.0	90	35	34	49	GERC20/1.0	M13	1	1.2
	SDC13P-130	1.0~13.0	130	35	34	49	GERC20/1.0	M13	1	1.4
	SDC13P-150	1.0~13.0	150	35	34	49	GERC20/1.0	M13	1	1.6
	SDC16P-70	2.0~16.0	70	42	41	50	GERC25/1.0	M18	1	1.1
	SDC16P-90	2.0~16.0	90	42	41	50	GERC25/1.0	M18	1	1.3
	SDC16P-130	2.0~16.0	130	42	41	50	GERC25/1.0	M18	1	1.7
	SDC20P-70	2.0~20.0	70	50	-	60	GERC32/1.0	M22	2	1.1
	SDC20P-90	2.0~20.0	90	50	49	60	GERC32/1.0	M22	1	1.4
	SDC20P-130	2.0~20.0	130	50	49	60	GERC32/1.0	M22	1	1.9
	SDC20P-150	2.0~20.0	150	50	49	60	GERC32/1.0	M22	1	2.2
	SDC26P-90	4.0~26.0	90	63	62	71	GERC40/1.0	M28	1	1.7

적용부품 E45 적용콜렛 E54

• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 옵션 탑재 가능 • 오일홀 타입 사용 시 콜렛은 정치수 사용

BT-SDC/P



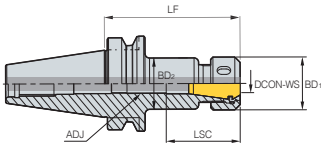


그림 1

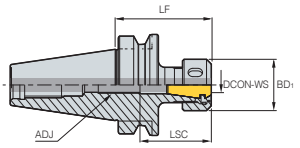


그림 2

(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LSC	Collet/ STEP	ADJ	그림	kg
BT50 -	SDC10P-100	1.0~10.0	100	32	31	44.5	GERC16/1.0	M10	1	3.7
	SDC10P-120	1.0~10.0	120	32	31	44.5	GERC16/1.0	M10	1	3.7
	SDC10P-160	1.0~10.0	160	32	31	44.5	GERC16/1.0	M10	1	3.8
	SDC13P-100	1.0~13.0	100	35	34	49	GERC20/1.0	M13	1	3.8
	SDC13P-130	1.0~13.0	130	35	34	49	GERC20/1.0	M13	1	3.8
	SDC13P-160	1.0~13.0	160	35	34	49	GERC20/1.0	M13	1	4.1
	SDC13P-180	1.0~13.0	180	35	34	49	GERC20/1.0	M13	1	4.2
	SDC16P-100	2.0~16.0	100	42	41	50	GERC25/1.0	M18	1	3.9
	SDC16P-160	2.0~16.0	160	42	41	50	GERC25/1.0	M18	1	4.3
	SDC20P-70	2.0~20.0	70	50	-	60	GERC32/1.0	M22	2	1.7
	SDC20P-100	2.0~20.0	100	50	49	60	GERC32/1.0	M22	1	4.0
	SDC20P-130	2.0~20.0	130	50	49	60	GERC32/1.0	M22	1	4.3
	SDC20P-160	2.0~20.0	160	50	49	60	GERC32/1.0	M22	1	4.7
	SDC20P-180	2.0~20.0	180	50	49	60	GERC32/1.0	M22	1	5.0
	SDC26P-160	4.0~26.0	160	63	62	71	GERC40/1.0	M28	1	5.5

적용부품 E45 적용콜렛 E54

• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 옵션 탑재 가능 • 오일홀 타입 사용 시 콜렛은 정치수 사용

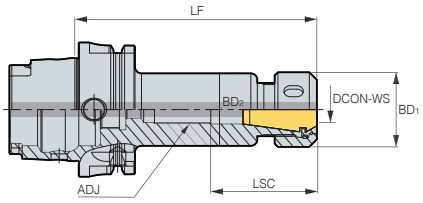
부품

기본 구성			별도 구매	
구 분	슬리브 베어링 너트	조정 스크류	스패너	콜렛
부품 / 형번				
SDC7P	RN11	BN0716F	20-22	GERC/ER 11-ØD
SDC10P	RN16	BN1025F	32-35	GERC/ER 16-ØD
SDC13P	RN20	BN1325F	35-38	GERC/ER 20-ØD
SDC16P	RN25	BN1830F	42-46	GERC/ER 25-ØD
SDC20P	RN32	BN2230F	48-52	GERC/ER 32-ØD
SDC26P	RN40	BN2838F	62-65	GERC/ER 40-ØD

* BT30-SDC13P-50/HSK63A-SDC13P-100은 BN0716F 스크류를 사용합니다.

HSK-SDC/P





(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LSC	ADJ	Collet/STEP	kg
HSK63A -	SDC7P-100	1.0~7.0	100	18	17	33	M7	GERC11/0.5	0.9
	SDC7P-120	1.0~7.0	120	18	17	34	M8	GERC11/0.5	0.9
	SDC10P-100	1.0~10.0	100	32	31	44.5	M10	GERC16/1.0	1
	SDC10P-120	1.0~10.0	120	32	31	44.5	M10	GERC16/1.0	1
	SDC13P-100	1.0~13.0	100	35	34	P	M7	GERC20/1.0	1.1
	SDC13P-120	1.0~13.0	120	35	34	49	M7	GERC20/1.0	1.2
	SDC13P-150	1.0~13.0	150	35	34	49	M7	GERC20/1.0	1.2
	SDC16P-100	1.0~16.0	100	42	41	50	M7	GERC25/1.0	1.2
	SDC20P-110	1.0~20.0	110	50	49	60	M7	GERC32/1.0	1.5
	SDC26P-130	4.0~26.0	130	63	62	71	M10	GERC40/1.0	1.6
HSK100A -	SDC7P-100	1.0~7.0	100	18	17	33	M7	GERC11/0.5	2
	SDC10P-100	1.0~10.0	100	32	31	44.5	M10	GERC16/1.0	2.2
	SDC13P-100	1.0~13.0	100	35	34	49	M7	GERC20/1.0	2.4
	SDC16P-110	2.0~16.0	100	42	41	50	M13	GERC25/1.0	2.6
	SDC20P-120	2.0~20.0	120	50	49	60	M10	GERC32/1.0	2.9
	SDC26P-130	4.0~26.0	130	63	62	71	M28	GERC40/1.0	3.8

적용부품 E47 적용콜렛 E54

• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 옵션 탑재 가능 • 오일홀 타입 사용 시 콜렛은 정치수 사용

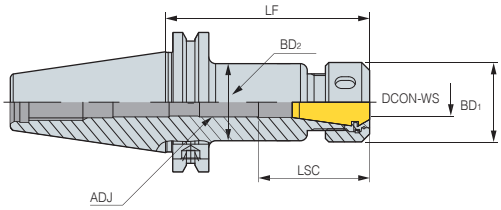
별도 구매품

구 분	별도 구매
쿨런트 튜브	

샹크별 구분	
HSK63A	HSK63A-CNS
HSK100A	HSK100A-CNS

SK-SDC/P





(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LSC	ADJ	Collet/STEP	kg
SK40-	SDC10P-90	1.0~10.0	90	32	31	44.5	GERC16/1.0	M10	1.1
	SDC13P-90	1.0~13.0	90	35	34	49	GERC20/1.0	M13	1.2
	SDC13P-120	1.0~13.0	120	35	34	49	GERC20/1.0	M13	1.3
	SDC16P-90	2.0~16.0	90	42	41	50	GERC25/1.0	M18	1.4
	SDC20P-90	2.0~20.0	90	50	49	60	GERC32/1.0	M13	1.5

적용부품 E47 적용콜렛 E54

• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 옵션 탑재 가능 • 오일홀 타입 사용 시 콜렛은 정치수 사용

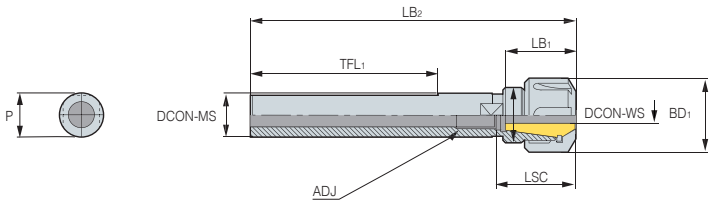
부품

기본 구성			별도 구매	
구 분	슬리브 베어링 너트	조정 스크류	스패너	콜렛
부품 / 형번				
SDC7P	RN11	BN0716F	20-22	GERC/ER 11-ØD
SDC10P	RN16	BN1025F	32-35	GERC/ER 16-ØD
SDC13P	RN20	BN1325F	35-38	GERC/ER 20-ØD
SDC16P	RN25	BN1830F	42-46	GERC/ER 25-ØD
SDC20P	RN32	BN2230F	48-52	GERC/ER 32-ØD
SDC26P	RN40	BN2838F	62-65	GERC/ER 40-ØD

* BT30-SDC13P-50/HSK63A-SDC13P-100은 BN0716F 스크류를 사용합니다.

S-SDC





(mm)

	형 번	DCON-WS	LB2	BD1	DCON-MS	LB1	TFL1	LSC	Collet/STEP	ADJ	kg
S16 -	SDC7-120M	1.0~7.0	120	19	16	-	-	33	GERC11/0.5	M7	0.1
	SDC7-120T	1.0~7.0	120	19	16	-	73	33	GERC11/0.5	M7	0.1
	SDC10-150T	1.0~10.0	150	28	16	46.5	83	34.5	GERC16/1.0	M10	0.2
S20 -	SDC10-150M	1.0~10.0	150	28	20	26.5	-	34.5	GERC16/1.0	M10	0.3
	SDC10-150T	1.0~10.0	150	28	20	26.5	83	34.5	GERC16/1.0	M10	0.3
	SDC13-150M	1.0~13.0	150	35	20	50	-	49	GERC20/1.0	M13	0.3
	SDC13-150T	1.0~13.0	150	35	20	50	83	49	GERC20/1.0	M13	0.3
S25 -	SDC10-150M	1.0~10.0	150	28	25	-	-	34.5	GERC16/1.0	M10	0.4
	SDC10-150T	1.0~10.0	150	28	25	-	83	34.5	GERC16/1.0	M10	0.4
	SDC13-150M	1.0~13.0	150	35	25	-	-	49	GERC20/1.0	M13	0.4
	SDC13-150T	1.0~13.0	150	35	25	-	83	49	GERC20/1.0	M13	0.4
S32 -	SDC13-150M	1.0~13.0	150	35	32	-	-	49	GERC20/1.0	M13	0.7
	SDC13-150T	1.0~13.0	150	35	32	-	83	49	GERC20/1.0	M13	0.7
	SDC20-165M	2.0~20.0	165	50	32	-	-	60	GERC32/1.0	M22	0.9
	SDC20-165T	2.0~20.0	165	50	32	-	83	60	GERC32/1.0	M22	0.9

적용부품 E49 적용콜렛 E54

• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 옵션 탑재 가능

S-SDC/S



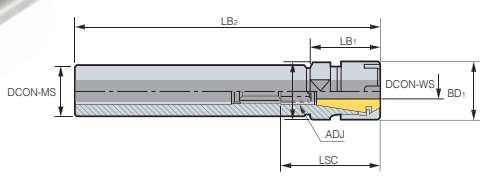


그림 1

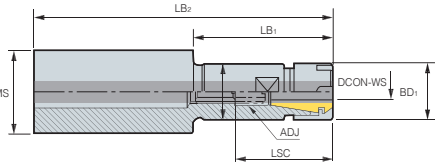


그림 2

(mm)

형 번		DCON-WS	LB2	BD1	DCON-MS	LB1	LSC	Collet/STEP	ADJ	그림	kg
S16 -	SDC7S-100M	1.0~7.0	100	16	16	21	33	GERC11/0.5	M7	1	0.1
	SDC7S-150M	1.0~7.0	150	16	16	21	33	GERC11/0.5	M7	1	0.1
	SDC10S-100M	1.0~10.0	100	22	16	50	44.5	GERC16/1.0	M10	1	0.1
	SDC10S-150M	1.0~10.0	150	22	16	50	44.5	GERC16/1.0	M10	1	0.1
S20 -	SDC7S-100M	1.0~7.0	100	16	20	30	35	GERC11/0.5	M7	2	0.1
	SDC7S-150M	1.0~7.0	150	16	20	80	35	GERC11/0.5	M7	2	0.2
	SDC10S-100M	1.0~10.0	100	22	20	50	44.5	GERC16/1.0	M10	1	0.1
	SDC10S-150M	1.0~10.0	150	22	20	50	44.5	GERC16/1.0	M10	1	0.2
	SDC10S-200M	1.0~10.0	200	22	20	50	44.5	GERC16/1.0	M10	1	0.3
	SDC13S-100M	1.0~13.0	100	28	20	50	49	GERC20/1.0	M13	1	0.1
	SDC13S-150M	1.0~13.0	150	28	20	50	49	GERC20/1.0	M13	1	0.2
S25 -	SDC7S-100M	1.0~7.0	100	16	25	30	33	GERC11/0.5	M7	2	0.2
	SDC7S-150M	1.0~7.0	150	16	25	80	33	GERC11/0.5	M7	2	0.2
	SDC10S-100M	1.0~10.0	100	22	25	30	44.5	GERC16/1.0	M10	2	0.2
	SDC10S-150M	1.0~10.0	150	22	25	80	44.5	GERC16/1.0	M10	2	0.3
	SDC13S-100M	1.0~13.0	100	28	25	50	49	GERC20/1.0	M13	1	0.2
	SDC13S-150M	1.0~13.0	150	28	25	50	49	GERC20/1.0	M13	1	0.4
	SDC16S-100M	2.0~16.0	100	35	25	50	50	GERC25/1.0	M18	1	0.3
	SDC16S-150M	2.0~16.0	150	35	25	50	50	GERC25/1.0	M18	1	0.4
	SDC16S-200M	2.0~16.0	200	35	25	50	50	GERC25/1.0	M18	1	0.6
S32 -	SDC16S-120M	2.0~16.0	120	35	32	50	50	GERC25/1.0	M18	1	0.5
	SDC16S-150M	2.0~16.0	150	35	32	50	50	GERC25/1.0	M18	1	0.6

적용부품 E49 적용콜렛 E54

• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 옵션 탑재 가능

부품

기본 구성		별도 구매	
구 분	너트	스패너	콜렛
부품 / 형번			
SDC7S	R11M	M11M	GERC/ER 11-ØD
SDC10S	R16M	M16M	GERC/ER 16-ØD
SDC13S	R20M	M20M	GERC/ER 20-ØD
SDC16S	R25M	M25M	GERC/ER 25-ØD

* BT30-SDC13P-50/HSK63A-SDC13P-100은 BN0716F 스크류를 사용합니다.

Precision collet chuck(Length adjustment type)_외부길이 조절형 콜렛척

SDC/PL

- 정밀한 공구길이 조정.
- 공구세팅 시간 단축으로 생산가동성 향상.



형번표기법

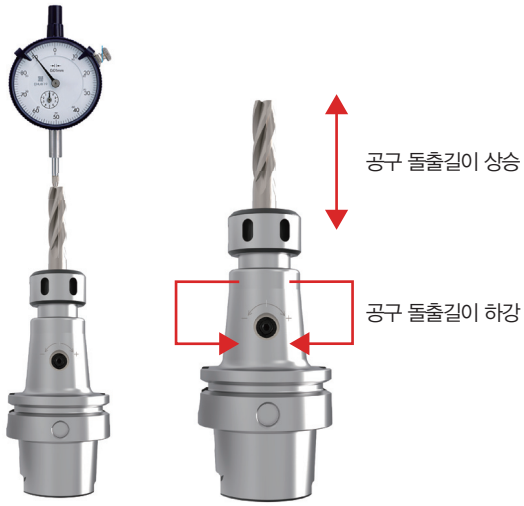
BT30	-	SDC	16	P	L	-	130
Spindle		Collet chuck	Tool Dia.	Precision	Length adjustment		Length

SDC/PL이란?

콜렛척 방식에 해당되는 홀더에 공구 길이 조절 기능을 추가하여 고객의 공구 세팅 시간을 단축시키는 편의성 증대

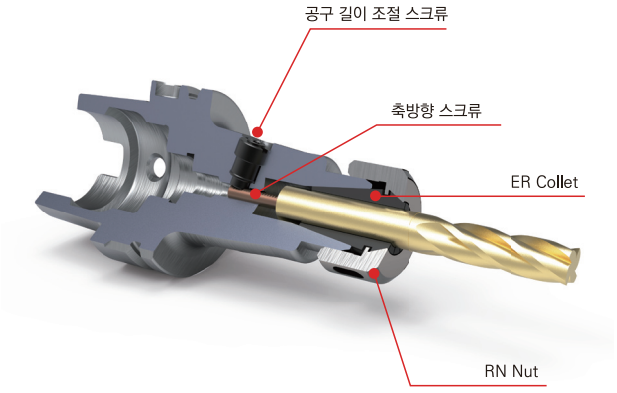
길이 조절 방법

- 공구 길이 조절 스크류를 회전시켜 공구 길이 조절



명칭 소개

- 내부쿨런트 가능



BT-SDC/PL



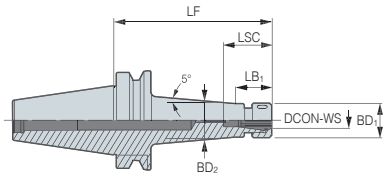


그림 1

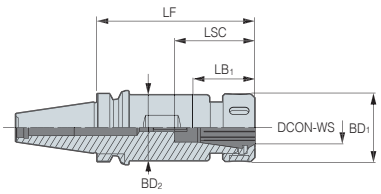


그림 2

(mm)

형 번		DCON-WS	LF	BD1	BD2	LSC		LB1	Collet/STEP	그림
BT30 -	SDC13PL-100	1.0~13.0	100	35	34	49	39~49	37	GERC20/1.0	1
	SDC16PL-100	2.0~16.0	100	42	41	50	40~50	45	GERC25/1.0	2
	SDC20PL-100	2.0~20.0	120	50	49	60	50~60	55	GERC32/1.0	2
BT40 -	SDC13PL-90	1.0~13.0	90	35	34	49	39~49	37	GERC20/1.0	1
	SDC13PL-130	1.0~13.0	130	35	34	49	39~49	37	GERC20/1.0	1
	SDC13PL-150	1.0~13.0	150	35	34	49	39~49	37	GERC20/1.0	1
	SDC16PL-90	2.0~16.0	90	42	41	50	40~50	37	GERC25/1.0	1
	SDC16PL-130	2.0~16.0	130	42	41	50	40~50	57	GERC25/1.0	1
	SDC20PL-130	2.0~20.0	130	50	49	60	50~60	58	GERC32/1.0	1
	SDC20PL-150	2.0~20.0	150	50	49	60	50~60	68	GERC32/1.0	1
BT50 -	SDC13PL-100	1.0~13.0	100	35	34	49	39~49	37	GERC20/1.0	1
	SDC13PL-130	1.0~13.0	130	35	34	49	39~49	37	GERC20/1.0	1
	SDC13PL-160	1.0~13.0	160	35	34	49	39~49	37	GERC20/1.0	1
	SDC13PL-180	1.0~13.0	180	35	34	49	39~49	37	GERC20/1.0	1
	SDC16PL-100	2.0~16.0	100	42	41	50	40~50	37	GERC25/1.0	1
	SDC16PL-160	2.0~16.0	160	42	41	50	40~50	67	GERC25/1.0	1
	SDC20PL-130	2.0~20.0	130	50	49	60	50~60	52	GERC32/1.0	1
	SDC20PL-160	2.0~20.0	160	50	49	60	50~60	67	GERC32/1.0	1
	SDC20PL-180	2.0~20.0	180	50	49	60	50~60	77	GERC32/1.0	1
	SDC20PL-160	4.0~26.0	160	63	62	71	61~71	68	GERC40/1.0	1

적용부품 E52 적용콜렛 E54

• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 옵션 탑재 가능 • 쿨런트 시스템 사용 시 쿨런트 콜렛 사용

HSK-SDC/PL



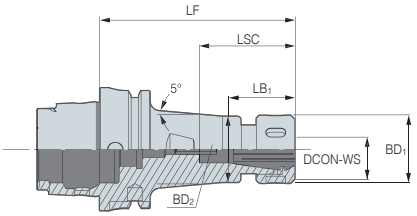


그림 1

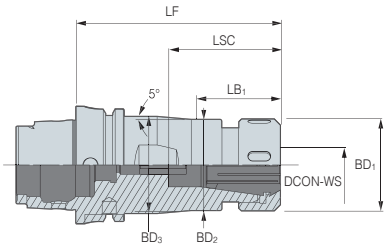


그림 2

(mm)

형 번		DCON-WS	LF	BD1	BD2	BD3	LSC		LB1	Collet/STEP	그림
HSK63A -	SDC13PL-100	1.0~13.0	100	35	34		49	39~49	37	GERC20/1.0	1
	SDC16PL-100	2.0~16.0	100	42	41		50	40~50	43	GERC25/1.0	1
	SDC20PL-110	2.0~20.0	110	50	49	52	60	50~60	48	GERC32/1.0	2
HSK100A -	SDC16PL-110	2.0~16.0	110	42	41		50	40~50	46	GERC25/1.0	1
	SDC20PL-120	2.0~20.0	120	50	49		60	50~60	52	GERC32/1.0	1

적용부품 E47 적용콜렛 E49

• H : 공구 삽입 깊이 • 내부 쿨런트 시스템 옵션 탑재 가능 • 쿨런트 시스템 사용 시 쿨런트 콜렛 사용

부품

구 분	별도 구매
쿨런트 튜브	

샹크별 구분	
HSK63A	HSK63A-CNS
HSK100A	HSK100A-CNS

GER Collet_GER 코팅콜렛

GERC

- 고정도 정밀도와 부식방지 코팅을 적용한 최상위급 ER 콜렛
- FAHRION 만의 타사대비 적은 절개로 동일한 체결력을 발휘
- 모든 코너의 호닝처리로 너트와 콜렛척의 데미지 최소화

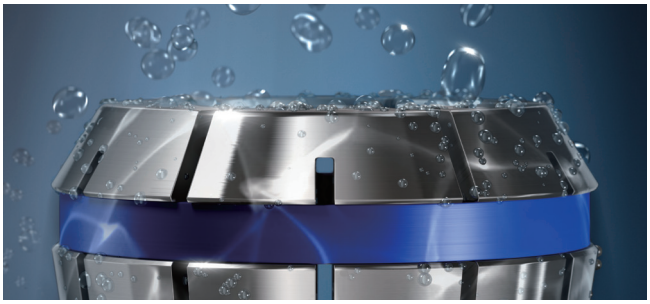


형번표기법

GREC	-	14	4	-	HP
GERC 콜렛		콜렛 사이즈	Tool Dia		HP : Precision 무기호 : General

특수코팅기술

GERC 콜렛과 달리 기존의 보호되지 않는 콜렛은 다음과 같은 특징이 있음
코팅되지 않은 기존의 콜렛은 습도, 절삭유, 세정액, 염분, 가스와 같은 다양한 원인으로 단시간 내에 부식의 영향을 받음
이는 콜렛뿐만 아니라 가공 전체에 영향을 미침



콜렛이 녹슬면 툴 사용 수명이 단축되고 정밀도가 크게 떨어지므로 마이크로
단위로 표면코팅하여 콜렛을 효과적으로 보호하고 장기적으로 콜렛의
부식진행을 막아 정밀도를 장기간 유지

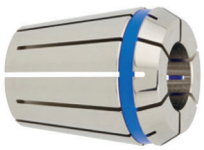


GERC 타사

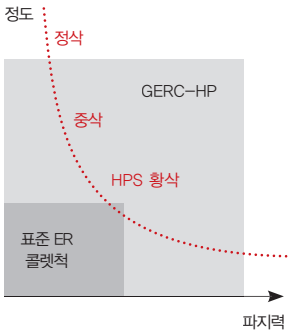
사용한 지 4개월 후 두 콜렛의 모습 :
오른쪽은 코팅되지 않은 콜렛, 왼쪽은 GERC를 사용한 콜렛

GERC-HP(정밀형)

정밀급 콜렛척은 일반 콜렛척보다 가격이 비싸지만,
장기적인 비용 효율성 면에서는 이점이 훨씬 더 큼
최대 정밀도로 제조 공차가 적어 더 우수한 가공물을
얻을 수 있으므로, 비용이 많이 드는 재작업을
최소화할 수 있음

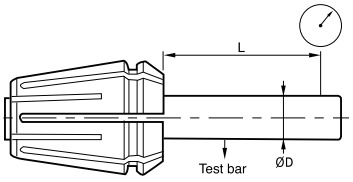


정밀급 콜렛 2㎛



정밀도(L/D = 3)

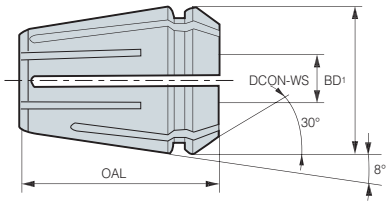
일반급 = 5㎛
정밀급 = 2㎛



GERC 콜렛

일반급





(mm)

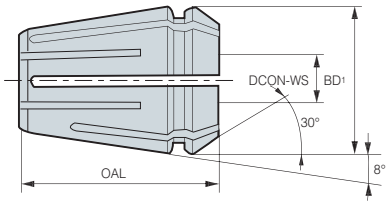
형	번	ER사이즈	DCON-WS	OAL	BD1	정밀도
GERC11-	1.0	11	1.0	18.0	11.5	5㎛
	1.5	11	1.5	18.0	11.5	5㎛
	2.0	11	2.0	18.0	11.5	5㎛
	2.5	11	2.5	18.0	11.5	5㎛
	3.0	11	3.0	18.0	11.5	5㎛
	3.5	11	3.5	18.0	11.5	5㎛
	4.0	11	4.0	18.0	11.5	5㎛
	4.5	11	4.5	18.0	11.5	5㎛
	5.0	11	5.0	18.0	11.5	5㎛
	5.5	11	5.5	18.0	11.5	5㎛
	6.0	11	6.0	18.0	11.5	5㎛
	6.5	11	6.5	18.0	11.5	5㎛
	7.0	11	7.0	18.0	11.5	5㎛
GERC16-	1.0	16	1.0	27.5	17.0	5㎛
	2.0	16	2.0	27.5	17.0	5㎛
	3.0	16	3.0	27.5	17.0	5㎛
	4.0	16	4.0	27.5	17.0	5㎛
	4.5	16	4.5	27.5	17.0	5㎛
	5.0	16	5.0	27.5	17.0	5㎛
	6.0	16	6.0	27.5	17.0	5㎛
	7.0	16	7.0	27.5	17.0	5㎛
	8.0	16	8.0	27.5	17.0	5㎛
	9.0	16	9.0	27.5	17.0	5㎛
	10.0	16	10.0	27.5	17.0	5㎛
GERC20-	1.0	20	1.0	31.5	21.0	5㎛
	2.0	20	2.0	31.5	21.0	5㎛
	3.0	20	3.0	31.5	21.0	5㎛
	4.0	20	4.0	31.5	21.0	5㎛
	5.0	20	5.0	31.5	21.0	5㎛
	6.0	20	6.0	31.5	21.0	5㎛
	7.0	20	7.0	31.5	21.0	5㎛
	8.0	20	8.0	31.5	21.0	5㎛
	9.0	20	9.0	31.5	21.0	5㎛
	10.0	20	10.0	31.5	21.0	5㎛
	11.0	20	11.0	31.5	21.0	5㎛
	12.0	20	12.0	31.5	21.0	5㎛
	13.0	20	13.0	31.5	21.0	5㎛

형	번	ER사이즈	DCON-WS	OAL	BD1	정밀도
GERC25-	2.0	25	2.0	34.0	26.0	5㎛
	3.0	25	3.0	34.0	26.0	5㎛
	4.0	25	4.0	34.0	26.0	5㎛
	5.0	25	5.0	34.0	26.0	5㎛
	6.0	25	6.0	34.0	26.0	5㎛
	7.0	25	7.0	34.0	26.0	5㎛
	8.0	25	8.0	34.0	26.0	5㎛
	9.0	25	9.0	34.0	26.0	5㎛
	10.0	25	10.0	34.0	26.0	5㎛
	11.0	25	11.0	34.0	26.0	5㎛
	12.0	25	12.0	34.0	26.0	5㎛
	13.0	25	13.0	34.0	26.0	5㎛
	14.0	25	14.0	34.0	26.0	5㎛
	15.0	25	15.0	34.0	26.0	5㎛
	16.0	25	16.0	34.0	26.0	5㎛
GERC32-	2.0	32	2.0	40.0	33.0	5㎛
	3.0	32	3.0	40.0	33.0	5㎛
	4.0	32	4.0	40.0	33.0	5㎛
	5.0	32	5.0	40.0	33.0	5㎛
	6.0	32	6.0	40.0	33.0	5㎛
	7.0	32	7.0	40.0	33.0	5㎛
	8.0	32	8.0	40.0	33.0	5㎛
	9.0	32	9.0	40.0	33.0	5㎛
	10.0	32	10.0	40.0	33.0	5㎛
	11.0	32	11.0	40.0	33.0	5㎛
	12.0	32	12.0	40.0	33.0	5㎛
	13.0	32	13.0	40.0	33.0	5㎛
	14.0	32	14.0	40.0	33.0	5㎛
	15.0	32	15.0	40.0	33.0	5㎛
	16.0	32	16.0	40.0	33.0	5㎛
	17.0	32	17.0	40.0	33.0	5㎛
	18.0	32	18.0	40.0	33.0	5㎛
	19.0	32	19.0	40.0	33.0	5㎛
	20.0	32	20.0	40.0	33.0	5㎛
GERC40-	16.0	40	16.0	46.0	41.0	5㎛
	20.0	40	20.0	46.0	41.0	5㎛
	25.0	40	25.0	46.0	41.0	5㎛

GERC 콜렛

정밀급





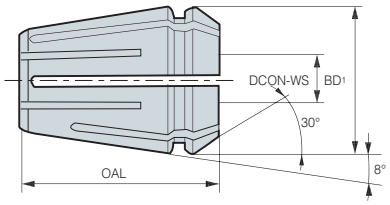
(mm)

형 번		ER사이즈	DCON-WS	OAL	BD1	정밀도
GERC11-	3.0HP	11.0	3.0	18.0	11.5	2㎛
	4.0HP	11.0	4.0	18.0	11.5	2㎛
	5.0HP	11.0	5.0	18.0	11.5	2㎛
	6.0HP	11.0	6.0	18.0	11.5	2㎛
GERC16-	3.0HP	16.0	3.0	27.5	17.0	2㎛
	4.0HP	16.0	4.0	27.5	17.0	2㎛
	5.0HP	16.0	5.0	27.5	17.0	2㎛
	6.0HP	16.0	6.0	27.5	17.0	2㎛
	7.0HP	16.0	7.0	27.5	17.0	2㎛
	8.0HP	16.0	8.0	27.5	17.0	2㎛
	9.0HP	16.0	9.0	27.5	17.0	2㎛
	10.0HP	16.0	10.0	27.5	17.0	2㎛
GERC20-	3.0HP	20.0	3.0	31.5	21.0	2㎛
	4.0HP	20.0	4.0	31.5	21.0	2㎛
	5.0HP	20.0	5.0	31.5	21.0	2㎛
	6.0HP	20.0	6.0	31.5	21.0	2㎛
	8.0HP	20.0	8.0	31.5	21.0	2㎛
	9.0HP	20.0	9.0	31.5	21.0	2㎛
	10.0HP	20.0	10.0	31.5	21.0	2㎛
	11.0HP	20.0	11.0	31.5	21.0	2㎛
	12.0HP	20.0	12.0	31.5	21.0	2㎛
	13.0HP	20.0	13.0	31.5	21.0	2㎛
GERC25-	6.0HP	25.0	6.0	34.0	26.0	2㎛
	10.0HP	25.0	10.0	34.0	26.0	2㎛
	12.0HP	25.0	12.0	34.0	26.0	2㎛
	14.0HP	25.0	14.0	34.0	26.0	2㎛
	16.0HP	25.0	16.0	34.0	26.0	2㎛
GERC32-	6.0HP	32.0	6.0	40.0	33.0	2㎛
	10.0HP	32.0	10.0	40.0	33.0	2㎛
	12.0HP	32.0	12.0	40.0	33.0	2㎛
	16.0HP	32.0	16.0	40.0	33.0	2㎛
	18.0HP	32.0	18.0	40.0	33.0	2㎛
	20.0HP	32.0	20.0	40.0	33.0	2㎛

GERC 콜렛

방수형 일반급





(mm)

형 번		ER사이즈	DCON-WS	OAL	BD1	정밀도
GERC16-	5.0C	16	5.0	27.5	17.0	5㎛
	6.0C	16	6.0	27.5	17.0	5㎛
	8.0C	16	8.0	27.5	17.0	5㎛
	10.0C	16	10.0	27.5	17.0	5㎛
GERC20-	6.0C	20	6.0	31.5	21.0	5㎛
	8.0C	20	8.0	31.5	21.0	5㎛
	10.0C	20	10.0	31.5	21.0	5㎛
	12.0C	20	12.0	31.5	21.0	5㎛
GERC25-	6.0C	25	6.0	34.0	26.0	5㎛
	8.0C	25	8.0	34.0	26.0	5㎛
	10.0C	25	10.0	34.0	26.0	5㎛
	12.0C	25	12.0	34.0	26.0	5㎛
	14.0C	25	14.0	34.0	26.0	5㎛
	16.0C	25	16.0	34.0	26.0	5㎛

형 번		ER사이즈	DCON-WS	OAL	BD1	정밀도
GERC32-	8.0C	32	8.0	40.0	33.0	5㎛
	9.0C	32	9.0	40.0	33.0	5㎛
	10.0C	32	10.0	40.0	33.0	5㎛
	11.0C	32	11.0	40.0	33.0	5㎛
	12.0C	32	12.0	40.0	33.0	5㎛
	13.0C	32	13.0	40.0	33.0	5㎛
	14.0C	32	14.0	40.0	33.0	5㎛
	15.0C	32	15.0	40.0	33.0	5㎛
	16.0C	32	16.0	40.0	33.0	5㎛
	18.0C	32	18.0	40.0	33.0	5㎛
	20.0C	32	20.0	40.0	33.0	5㎛

GERC 콜렛 세트

일반급



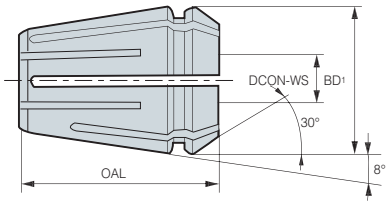
(mm)

형 번		DCON-WS	간격	콜렛수량	정밀도	kg
GERC	11 (SET)	1.0-7.0	0.5	13pcs	5㎛	0.1
	16 (SET)	1.0-10.0	1.0	10pcs	5㎛	0.2
	20 (SET)	2.0-13.0	1.0	12pcs	5㎛	0.5
	25 (SET)	2.0-16.0	1.0	15pcs	5㎛	1.1
	32 (SET)	3.0-20.0	1.0	18pcs	5㎛	2.6
	40 (SET)	4.0-26.0	1.0	23pcs	5㎛	5.8

ER 콜렛

일반급





(mm)

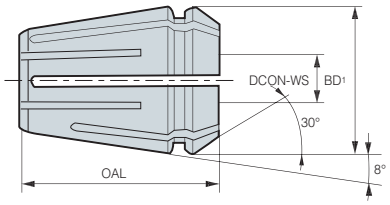
형	번	ER사이즈	DCON-WS	OAL	BD1	정밀도
ER11-	1.0	11	1.0	18.0	11.5	10㎛
	1.5	11	1.5	18.0	11.5	10㎛
	2.0	11	2.0	18.0	11.5	10㎛
	2.5	11	2.5	18.0	11.5	10㎛
	3.0	11	3.0	18.0	11.5	10㎛
	3.5	11	3.5	18.0	11.5	10㎛
	4.0	11	4.0	18.0	11.5	10㎛
	4.5	11	4.5	18.0	11.5	10㎛
	5.0	11	5.0	18.0	11.5	10㎛
	5.5	11	5.5	18.0	11.5	10㎛
	6.0	11	6.0	18.0	11.5	10㎛
	6.5	11	6.5	18.0	11.5	10㎛
	7.0	11	7.0	18.0	11.5	10㎛
ER16-	1.0	16	1.0	27.5	17.0	10㎛
	2.0	16	2.0	27.5	17.0	10㎛
	3.0	16	3.0	27.5	17.0	10㎛
	4.0	16	4.0	27.5	17.0	10㎛
	5.0	16	5.0	27.5	17.0	10㎛
	6.0	16	6.0	27.5	17.0	10㎛
	7.0	16	7.0	27.5	17.0	10㎛
	8.0	16	8.0	27.5	17.0	10㎛
	9.0	16	9.0	27.5	17.0	10㎛
	10.0	16	10.0	27.5	17.0	10㎛
ER20-	1.0	20	1.0	31.5	21.0	10㎛
	2.0	20	2.0	31.5	21.0	10㎛
	3.0	20	3.0	31.5	21.0	10㎛
	4.0	20	4.0	31.5	21.0	10㎛
	5.0	20	5.0	31.5	21.0	10㎛
	6.0	20	6.0	31.5	21.0	10㎛
	7.0	20	7.0	31.5	21.0	10㎛
	8.0	20	8.0	31.5	21.0	10㎛
	9.0	20	9.0	31.5	21.0	10㎛
	10.0	20	10.0	31.5	21.0	10㎛
	11.0	20	11.0	31.5	21.0	10㎛
	12.0	20	12.0	31.5	21.0	10㎛
	13.0	20	13.0	31.5	21.0	10㎛

형	번	ER사이즈	DCON-WS	OAL	BD1	정밀도
ER25-	2.0	25	2.0	34.0	26.0	10㎛
	3.0	25	3.0	34.0	26.0	10㎛
	4.0	25	4.0	34.0	26.0	10㎛
	5.0	25	5.0	34.0	26.0	10㎛
	6.0	25	6.0	34.0	26.0	10㎛
	7.0	25	7.0	34.0	26.0	10㎛
	8.0	25	8.0	34.0	26.0	10㎛
	9.0	25	9.0	34.0	26.0	10㎛
	10.0	25	10.0	34.0	26.0	10㎛
	11.0	25	11.0	34.0	26.0	10㎛
	12.0	25	12.0	34.0	26.0	10㎛
	13.0	25	13.0	34.0	26.0	10㎛
	14.0	25	14.0	34.0	26.0	10㎛
	15.0	25	15.0	34.0	26.0	10㎛
	16.0	25	16.0	34.0	26.0	10㎛
ER32-	2.0	32	2.0	40.0	33.0	10㎛
	3.0	32	3.0	40.0	33.0	10㎛
	4.0	32	4.0	40.0	33.0	10㎛
	5.0	32	5.0	40.0	33.0	10㎛
	6.0	32	6.0	40.0	33.0	10㎛
	7.0	32	7.0	40.0	33.0	10㎛
	8.0	32	8.0	40.0	33.0	10㎛
	9.0	32	9.0	40.0	33.0	10㎛
	10.0	32	10.0	40.0	33.0	10㎛
	11.0	32	11.0	40.0	33.0	10㎛
	12.0	32	12.0	40.0	33.0	10㎛
	13.0	32	13.0	40.0	33.0	10㎛
	14.0	32	14.0	40.0	33.0	10㎛
	15.0	32	15.0	40.0	33.0	10㎛
	16.0	32	16.0	40.0	33.0	10㎛
	17.0	32	17.0	40.0	33.0	10㎛
	18.0	32	18.0	40.0	33.0	10㎛
	19.0	32	19.0	40.0	33.0	10㎛
	20.0	32	20.0	40.0	33.0	10㎛

ER 콜렛

정밀급





(mm)

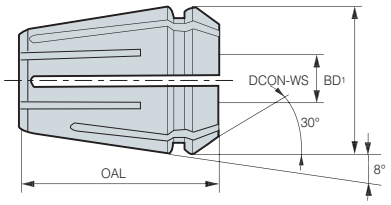
형 번		ER사이즈	DCON-WS	OAL	BD1	정밀도
ER11-	2.0P	11	2.0	18.0	11.3	5㎛
	3.0P	11	3.0	18.0	11.3	5㎛
	4.0P	11	4.0	18.0	11.3	5㎛
	5.0P	11	5.0	18.0	11.3	5㎛
	6.0P	11	6.0	18.0	11.3	5㎛
	7.0P	11	7.0	18.0	11.3	5㎛
ER16-	2.0P	16	2.0	27.5	16.7	5㎛
	3.0P	16	3.0	27.5	16.7	5㎛
	4.0P	16	4.0	27.5	16.7	5㎛
	5.0P	16	5.0	27.5	16.7	5㎛
	6.0P	16	6.0	27.5	16.7	5㎛
	7.0P	16	7.0	27.5	16.7	5㎛
	8.0P	16	8.0	27.5	16.7	5㎛
	9.0P	16	9.0	27.5	16.7	5㎛
	10.0P	16	10.0	27.5	16.7	5㎛
ER20-	2.0P	20	2.0	31.5	20.7	5㎛
	3.0P	20	3.0	31.5	20.7	5㎛
	4.0P	20	4.0	31.5	20.7	5㎛
	5.0P	20	5.0	31.5	20.7	5㎛
	6.0P	20	6.0	31.5	20.7	5㎛
	7.0P	20	7.0	31.5	20.7	5㎛
	8.0P	20	8.0	31.5	20.7	5㎛
	9.0P	20	9.0	31.5	20.7	5㎛
	10.0P	20	10.0	31.5	20.7	5㎛
	11.0P	20	11.0	31.5	20.7	5㎛
	12.0P	20	12.0	31.5	20.7	5㎛
	13.0P	20	13.0	31.5	20.7	5㎛

형 번		ER사이즈	DCON-WS	OAL	BD1	정밀도
ER25-	2.0P	25	2.0	34.0	25.8	5㎛
	3.0P	25	3.0	34.0	25.8	5㎛
	4.0P	25	4.0	34.0	25.8	5㎛
	5.0P	25	5.0	34.0	25.8	5㎛
	6.0P	25	6.0	34.0	25.8	5㎛
	7.0P	25	7.0	34.0	25.8	5㎛
	8.0P	25	8.0	34.0	25.8	5㎛
	9.0P	25	9.0	34.0	25.8	5㎛
	10.0P	25	10.0	34.0	25.8	5㎛
	11.0P	25	11.0	34.0	25.8	5㎛
	12.0P	25	12.0	34.0	25.8	5㎛
	13.0P	25	13.0	34.0	25.8	5㎛
	14.0P	25	14.0	34.0	25.8	5㎛
	15.0P	25	15.0	34.0	25.8	5㎛
	16.0P	25	16.0	34.0	25.8	5㎛
ER32-	2.0P	32	2.0	40.0	32.8	5㎛
	3.0P	32	3.0	40.0	32.8	5㎛
	4.0P	32	4.0	40.0	32.8	5㎛
	5.0P	32	5.0	40.0	32.8	5㎛
	6.0P	32	6.0	40.0	32.8	5㎛
	7.0P	32	7.0	40.0	32.8	5㎛
	8.0P	32	8.0	40.0	32.8	5㎛
	9.0P	32	9.0	40.0	32.8	5㎛
	10.0P	32	10.0	40.0	32.8	5㎛
	11.0P	32	11.0	40.0	32.8	5㎛
	12.0P	32	12.0	40.0	32.8	5㎛
	13.0P	32	13.0	40.0	32.8	5㎛
	14.0P	32	14.0	40.0	32.8	5㎛
	15.0P	32	15.0	40.0	32.8	5㎛
	16.0P	32	16.0	40.0	32.8	5㎛
	17.0P	32	17.0	40.0	32.8	5㎛
	18.0P	32	18.0	40.0	32.8	5㎛
	19.0P	32	19.0	40.0	32.8	5㎛
	20.0P	32	20.0	40.0	32.8	5㎛

ER 콜렛

방수형 일반급





(mm)

형 번		ER사이즈	DCON-WS	OAL	BD1	정밀도
ER16-	5.0C	16	5.0	27.5	17.0	10㎛
	6.0C	16	6.0	27.5	17.0	10㎛
	8.0C	16	8.0	27.5	17.0	10㎛
	10.0C	16	10.0	27.5	17.0	10㎛
ER20-	6.0C	20	6.0	31.5	21.0	10㎛
	8.0C	20	8.0	31.5	21.0	10㎛
	10.0C	20	10.0	31.5	21.0	10㎛
	12.0C	20	12.0	31.5	21.0	10㎛
ER25-	6.0C	25	6.0	34.0	26.0	10㎛
	8.0C	25	8.0	34.0	26.0	10㎛
	10.0C	25	10.0	34.0	26.0	10㎛
	12.0C	25	12.0	34.0	26.0	10㎛
	14.0C	25	14.0	34.0	26.0	10㎛
	16.0C	25	16.0	34.0	26.0	10㎛
ER32-	8.0C	32	8.0	40.0	33.0	10㎛
	9.0C	32	9.0	40.0	33.0	10㎛
	10.0C	32	10.0	40.0	33.0	10㎛
	11.0C	32	11.0	40.0	33.0	10㎛
	12.0C	32	12.0	40.0	33.0	10㎛
	13.0C	32	13.0	40.0	33.0	10㎛
	14.0C	32	14.0	40.0	33.0	10㎛
	15.0C	32	15.0	40.0	33.0	10㎛
	16.0C	32	16.0	40.0	33.0	10㎛
	18.0C	32	18.0	40.0	33.0	10㎛
	20.0C	32	20.0	40.0	33.0	10㎛

ER 콜렛 세트

일반급



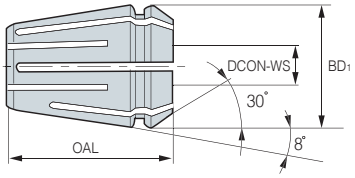
(mm)

형 번		DCON-WS	간격	콜렛수량	정밀도	kg
ER	11 (SET)	1.0-7.0	0.5	13pcs	10㎛	0.1
	16 (SET)	1.0-10.0	1.0	10pcs	10㎛	0.1
	20 (SET)	2.0-13.0	1.0	12pcs	10㎛	0.4
	25 (SET)	2.0-16.0	1.0	15pcs	10㎛	1.1
	32 (SET)	3.0-20.0	1.0	18pcs	10㎛	2.6

ER-T 콜렛

일반급





(mm)

형 번		ER사이즈	DCON-WS	OAL	BD1	정밀도
ER11-	2.0-T	11	2.0	18.0	11.5	10㎛
	3.0-T	11	3.0	18.0	11.5	10㎛
	4.0-T	11	4.0	18.0	11.5	10㎛
	5.0-T	11	5.0	18.0	11.5	10㎛
	6.0-T	11	6.0	18.0	11.5	10㎛
	7.0-T	11	7.0	18.0	11.5	10㎛
ER16-	2.0-T	16	2.0	27.5	17.0	10㎛
	3.0-T	16	3.0	27.5	17.0	10㎛
	4.0-T	16	4.0	27.5	17.0	10㎛
	5.0-T	16	5.0	27.5	17.0	10㎛
	6.0-T	16	6.0	27.5	17.0	10㎛
	7.0-T	16	7.0	27.5	17.0	10㎛
	8.0-T	16	8.0	27.5	17.0	10㎛
	9.0-T	16	9.0	27.5	17.0	10㎛
	10.0-T	16	10.0	27.5	17.0	10㎛
ER20-	2.0-T	20	2.0	31.5	21.0	10㎛
	3.0-T	20	3.0	31.5	21.0	10㎛
	4.0-T	20	4.0	31.5	21.0	10㎛
	5.0-T	20	5.0	31.5	21.0	10㎛
	6.0-T	20	6.0	31.5	21.0	10㎛
	7.0-T	20	7.0	31.5	21.0	10㎛
	8.0-T	20	8.0	31.5	21.0	10㎛
	9.0-T	20	9.0	31.5	21.0	10㎛
	10.0-T	20	10.0	31.5	21.0	10㎛
	11.0-T	20	11.0	31.5	21.0	10㎛
	12.0-T	20	12.0	31.5	21.0	10㎛
	13.0-T	20	13.0	31.5	21.0	10㎛

형 번		ER사이즈	DCON-WS	OAL	BD1	정밀도
ER25-	2.0-T	25	2.0	34.0	26.0	10㎛
	3.0-T	25	3.0	34.0	26.0	10㎛
	4.0-T	25	4.0	34.0	26.0	10㎛
	5.0-T	25	5.0	34.0	26.0	10㎛
	6.0-T	25	6.0	34.0	26.0	10㎛
	7.0-T	25	7.0	34.0	26.0	10㎛
	8.0-T	25	8.0	34.0	26.0	10㎛
	9.0-T	25	9.0	34.0	26.0	10㎛
	10.0-T	25	10.0	34.0	26.0	10㎛
	11.0-T	25	11.0	34.0	26.0	10㎛
	12.0-T	25	12.0	34.0	26.0	10㎛
	13.0-T	25	13.0	34.0	26.0	10㎛
	14.0-T	25	14.0	34.0	26.0	10㎛
	15.0-T	25	15.0	34.0	26.0	10㎛
	16.0-T	25	16.0	34.0	26.0	10㎛
ER32-	2.0-T	32	2.0	40.0	33.0	10㎛
	3.0-T	32	3.0	40.0	33.0	10㎛
	4.0-T	32	4.0	40.0	33.0	10㎛
	5.0-T	32	5.0	40.0	33.0	10㎛
	6.0-T	32	6.0	40.0	33.0	10㎛
	7.0-T	32	7.0	40.0	33.0	10㎛
	8.0-T	32	8.0	40.0	33.0	10㎛
	9.0-T	32	9.0	40.0	33.0	10㎛
	10.0-T	32	10.0	40.0	33.0	10㎛
	11.0-T	32	11.0	40.0	33.0	10㎛
	12.0-T	32	12.0	40.0	33.0	10㎛
	13.0-T	32	13.0	40.0	33.0	10㎛
	14.0-T	32	14.0	40.0	33.0	10㎛
	15.0-T	32	15.0	40.0	33.0	10㎛
	16.0-T	32	16.0	40.0	33.0	10㎛
	17.0-T	32	17.0	40.0	33.0	10㎛
	18.0-T	32	18.0	40.0	33.0	10㎛
	19.0-T	32	19.0	40.0	33.0	10㎛
	20.0-T	32	20.0	40.0	33.0	10㎛

Lock collet for ER collet chuck_논슬립 콜렛척 콜렛

ER/L

- 엔드밀이 절대 빠지지 않는 설계구조
- 공구 빠짐이나 밀림, 헛 돌아가는 현상 방지
- 스페셜 엔드밀 없이 Weldon flat(DIN 6535HB) 엔드밀 사용
- 대형금형이나 난삭재 가공의 사용



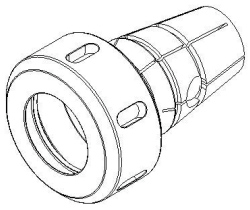
형번표기법

ER	-	20	12	-	L
ER 콜렛		콜렛 사이즈	Tool Dia		Lock

사용방법

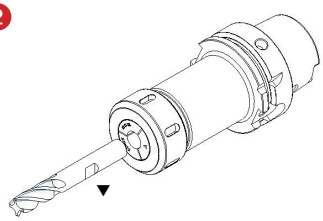
- 너트와 콜렛을 조립(일반ER콜렛 사용과 동일)
- End Tool 조립(노치와 키가 조립될 수 있는 방향으로 조립)
- 너트와 바디를 체결

❶



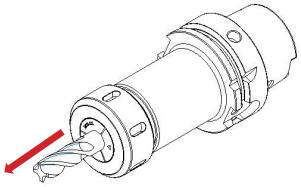
논슬립 ER 콜렛을 너트와 결합한다.

❷



❶번을 콜렛척에 삽입한 후 너트를 클램핑 한다. 이후 엔드밀의 노치를 콜렛의 ▼부분 (스틸볼자리)에 맞춰 삽입한다.

❸



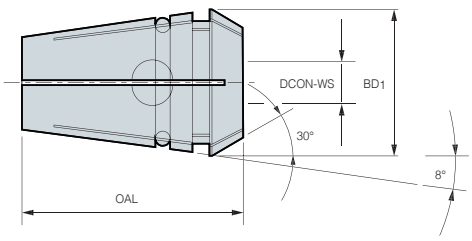
콜렛에 있는 스틸볼이 엔드밀의 노치부에 걸린 것을 확인 후 축 방향(화살표 방향)으로 엔드밀을 잡아당기면서 너트를 완전 클램핑 한다.

주의사항 오토클램프 장비를 사용할 경우 ❸ 번 과정은 진행하지 않습니다. (엔드밀의 회전으로 부상의 위험이 있습니다.)

ER/L 콜렛

논슬립 콜렛척 콜렛





(mm)

형번		ER사이즈	DCON-WS	OAL	BD_1	BD_2
ER	20-6L	20	6	31.5	20.7	20
	20-8L	20	8	31.5	20.7	20
	20-10L	20	10	31.5	20.7	20
	20-12L	20	12	31.5	20.7	20
	32-12L	32	12	40.0	32.7	32
	32-16L	32	16	40.0	32.7	32
	32-20L	32	20	40.0	32.7	32

Jet coolant disk_제트쿨런트 디스크

RTJW

- 칩이 공구에 붙는 것을 방지하여 절삭 공구 수명 연장
- 강력한 JET 분사로 칩 처리 능력 향상
- 노즐의 위치 변화가 필요없어 장비 비가동 시간 감소

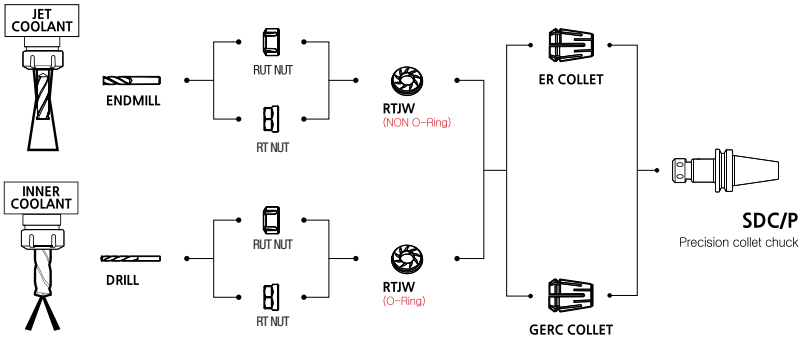


형번표기법

RTJW	16	-	6
Jet Coolant Disk	ER 콜렛척		최대 척킹경

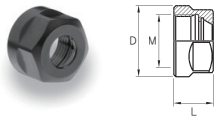
적용 방법

- 방수형(RT, RUT) NUT 하나로 Inside, Jet coolant 동시 사용
- Disk 교체 만으로 Inside, Jet coolant 빠른 교환 가능
- 고속 회전에서도 비산이 없는 강력한 Jet 분사



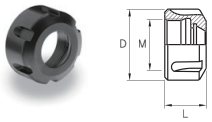
RT 너트

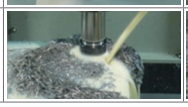
Type	M	D	L
RT16	M22x1.50	28.0	22.5

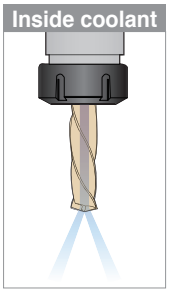


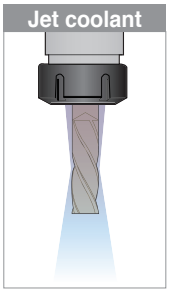
RUT 너트

Type	M	D	L
RUT20	M25x1.50	35.0	24.0
RUT25	M32x1.50	42.0	25.0
RUT32	M40x1.50	50.0	27.5
RUT40	M50x1.50	63.0	30.5



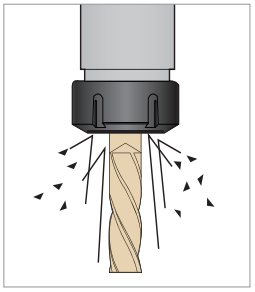
	포켓 가공	가공 후	비고
Jet coolant			▶ 강력한 Jet 분사로 포켓 안의 칩이 완벽히 제거
Outside coolant			▶ 포켓 안의 칩이 제거 되지 못함 ▶ 콜렛과 너트 안에 칩이 쌓여있음





쿨런트 방식

용도에 따라
Inside coolant, Jet coolant
급유를 사용할수 있음



혼입 방지

RTJW로 절삭 칩 혼입을
방지하여
방진에 효과적

RTJW





(mm)

형 번		ER 사이즈	DMt
RTJW16 -	6	16	6
	7	16	7
	8	16	8
RTJW20 -	6	20	6
	7	20	7
	8	20	8
	9	20	9
	10	20	10
RTJW25 -	6	25	6
	7	25	7
	8	25	8
	9	25	9
	10	25	10
	11	25	11
	12	25	12
	13	25	13
	14	25	14
	15	25	15
	16	25	16

형 번		ER 사이즈	DMt
RTJW32 -	6	32	6
	7	32	7
	8	32	8
	9	32	9
	10	32	10
	11	32	11
	12	32	12
	13	32	13
	14	32	14
	15	32	15
	16	32	16
	17	32	17
	18	32	18
	20	32	20
RTJW40 -	18	40	18
	19	40	19
	20	40	20
	21	40	21
	22	40	22
	24	40	24

체결가능제품 **E42~47**

• Ø5 이하 제작 불가

Slim type collet chuck_슬림 콜렛척

DSK

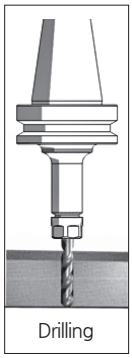
- 발란싱 G6.3 최고 15,000RPMX 가공 가능
- 8° 콜렛 채용으로 가공중 공구 떨림 최소화
- 최고급 너트 적용으로 가공 안정성 최적화
- 공구체결범위 : Ø2~Ø25

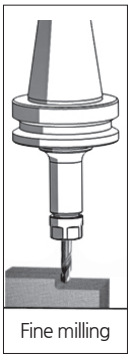


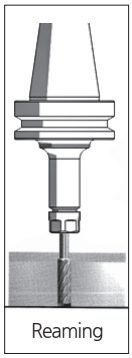
형번표기법

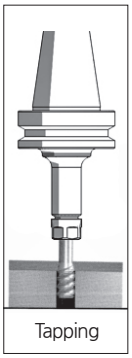
BT30	-	DSK	10	-	90
스핀들		탭핑 홀더	최대 척킹경		길이

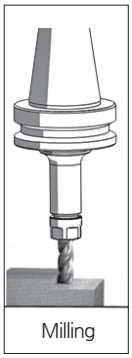
다용도 작업

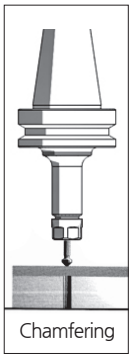

Drilling


Fine milling


Reaming

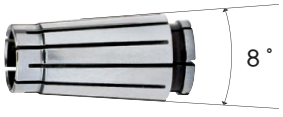

Tapping


Milling


Chamfering

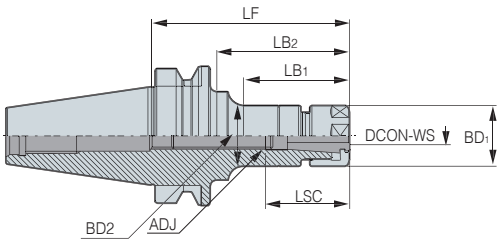
콜렛

일반형 타입 & 정밀형 타입	형번	Max Chacking	Run-out
	HC6 - ØD	6.0	일반형 5μm 정밀형 3μm
	HC10 - ØD	10.0	
	HC13 - ØD	13.0	
	HC16 - ØD	16.0	
	HC20 - ØD	20.0	
	HC25 - ØD	25.0	

8° HC 콜렛
 8°
가공중 공구 떨림 최소화

BT-DSK





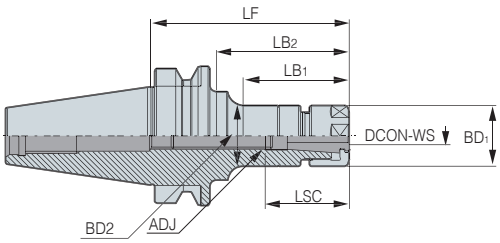
(mm)

형 번		DCON-WS	LF	BD1	BD2	LB1	LB2	LSC	COLLET	ADJ	RPMX	kg
BT30 -	DSK6-60	3.0~6.0	60	20	20	33	33	31	HC6	M8	15,000	0.4
	DSK6-90	3.0~6.0	90	20	32	56	65	31	HC6	M8	15,000	0.5
	DSK10-60	2.0~10.0	60	28	28	35	35	38	HC10	M12	15,000	0.5
	DSK10-90	2.0~10.0	90	28	28	65	65	38	HC10	M12	15,000	0.6
	DSK10-120	2.0~10.0	120	28	28	95	95	38	HC10	M12	15,000	1.1
	DSK13-60	3.0~13.0	60	33	33	36	36	43	HC13	M12	15,000	0.5
	DSK16-60	3.0~16.0	60	40	40	37	37	52	HC16	M12	15,000	0.6
	DSK16-90	3.0~16.0	90	40	40	67	67	52	HC16	M18	15,000	0.8
	DSK16-120	3.0~16.0	120	40	40	97	97	60	HC16	M18	15,000	1.1
	DSK20-75	4.0~20.0	75	48	48	52	52	70	HC20	M12	15,000	1.1
	DSK20-90	4.0~20.0	90	48	48	52	52	70	HC20	M18	15,000	1.2
	DSK25-90	16.0~25.0	90	55	55	67.5	67.5	63.5	HC25	M12	15,000	0.9
BT40 -	DSK6-60	3.0~6.0	60	20	20	30	30	35	HC6	M8	10,000	1.0
	DSK6-90	3.0~6.0	90	19.5	32	51	61	31	HC6	M8	10,000	1.1
	DSK6-120	3.0~6.0	120	19.5	32	60	90	31	HC6	M8	10,000	1.1
	DSK6-150	3.0~6.0	150	19.5	25	60	120	31	HC6	M8	10,000	1.1
	DSK10-60	2.0~10.0	60	28	28	32	32	50	HC10	M12	10,000	1.1
	DSK10-90	2.0~10.0	90	27.5	40	48	60	38	HC10	M12	10,000	1.2
	DSK10-120	2.0~10.0	120	27.5	40	73	90	38	HC10	M12	10,000	1.2
	DSK10-150	2.0~10.0	150	27.5	34.5	73	118	38	HC10	M12	10,000	1.4
	DSK10-180	2.0~10.0	180	28	39	73	148	50	HC10	M12	10,000	1.4
	DSK13-90	3.0~13.0	90	33	33	59	59	43	HC13	M15	10,000	1.3
	DSK16-60	3.0~16.0	90	40	40	58	58	52	HC16	M18	10,000	1.3
	DSK16-90	3.0~16.0	90	40	40	58	58	52	HC16	M18	10,000	1.3
	DSK16-120	3.0~16.0	120	40	40	88	88	52	HC16	M18	10,000	1.5
	DSK16-150	3.0~16.0	150	40	40	118	118	52	HC16	M18	10,000	1.9
	DSK16-180	3.0~16.0	180	40	40	148	148	60	HC16	M18	10,000	1.9
	DSK20-60	4.0~20.0	60	48	48	32	32	70	HC20	M22	10,000	1.5
	DSK20-90	4.0~20.0	90	48.5	48.5	60	60	60	HC20	M22	10,000	1.5
	DSK20-120	4.0~20.0	120	48.5	48.5	90	90	60	HC20	M22	10,000	1.8
	DSK25-90	16.0~25.0	90	55	55	61	61	63.5	HC25	M28	10,000	1.6
	DSK25-120	16.0~25.0	120	55	55	91	91	85	HC25	M28	10,000	2.0

적용부품 E67 적용콜렛 E73

BT-DSK





(mm)

형 번		DCON-WS	LF	BD1	BD2	LB1	LB2	LSC	COLLET	ADJ	RPMX	kg
BT50 -	DSK6-105	3.0~6.0	105	19.5	32	55	64	31	HC6	M8	8,000	3.6
	DSK6-135	3.0~6.0	135	19.5	32	60	92	31	HC6	M8	8,000	3.7
	DSK6-165	3.0~6.0	165	19.5	32	60	114	31	HC6	M8	8,000	4.1
	DSK10-105	2.0~10.0	105	27.5	27.5	57	57	38	HC10	M12	8,000	3.8
	DSK10-135	2.0~10.0	135	27.5	32	70	92	38	HC10	M12	8,000	3.9
	DSK10-165	2.0~10.0	165	27.5	36	75	114	38	HC10	M12	8,000	4.1
	DSK10-195	2.0~10.0	195	28	36	75	146	38	HC10	M12	8,000	4.5
	DSK13-135	3.0~13.0	135	33	33	92	92	43	HC13	M15	8,000	3.8
	DSK16-105	3.0~16.0	105	40	40	62	62	52	HC16	M18	8,000	4.0
	DSK16-135	3.0~16.0	135	40	40	92	92	52	HC16	M18	8,000	4.2
	DSK16-165	3.0~16.0	165	40	50	40	122	52	HC16	M18	8,000	4.6
	DSK16-195	3.0~16.0	195	40	52	40	152	60	HC16	M18	8,000	4.6
	DSK20-105	4.0~20.0	105	48	40	62	62	60	HC20	M22	8,000	4.2
	DSK20-135	4.0~20.0	135	48	40	92	92	60	HC20	M22	8,000	4.5
	DSK20-165	4.0~20.0	165	48	40	122	122	60	HC20	M22	8,000	4.9
	DSK25-105	16.0~25.0	105	55	55	62	62	63.5	HC25	M28	8,000	4.4
	DSK25-135	16.0~25.0	135	55	55	92	92	63.5	HC25	M28	8,000	4.5
	DSK25-165	16.0~25.0	165	55	55	122	122	63.5	HC25	M28	8,000	5.2

적용부품 E67 적용콜렛 E73

부품

기본 구성				별도 구매
구 분	너트	조정 스크류	추출 도구	스패너
부품 / 형번				
DSK6	DN6	BN0825F	DSK-6CE	DSS-6
DSK10	DN10	BN1225F	DSK-10CE	DSS-10
DSK13	DN13	BN1230(BT30)/BN1524F(그외)	DSK-13CE	DSS-13
DSK16	DN16	BN1830F	DSK-16CE	DSS-16
DSK20	DN20	BN2230F	DSK-20CE	DSS-20
DSK25	DN25	BN2838F	DSK-25CE	DSS-25

Great speed slim collet chuck_고속 슬림 콜렛척

GSK

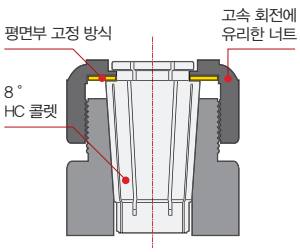
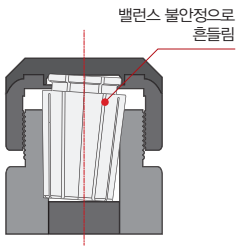
- 발란싱 G2.5 최고 25,000RPMX 가공 가능
- 고속가공으로 가공생산성 향상
- 8° 콜렛 채용으로 가공중 공구 떨림 최소화
- 최고급 고정도 너트가 콜렛을 일정하게 눌러주어, 가공안정성 최적
- 공구체결범위 : Ø2~Ø25



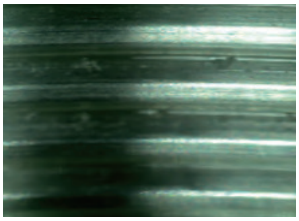
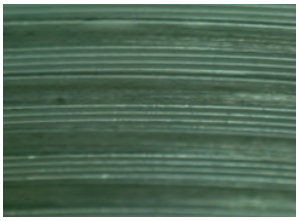
형번표기법

BT40	-	GSK	10	-	90
스핀들		탭핑 홀더	최대 척킹경		길이

독창적인 설계

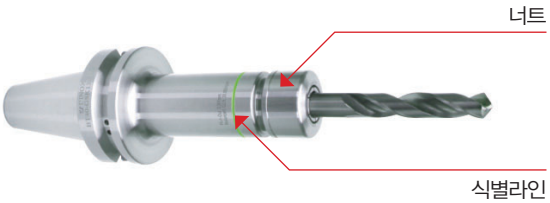
GSK	타사
	
8° 콜렛으로 강력한 체결력과 평면부 고정 방식으로 고정도가 좋음	고속회전 시 회전하는 원심력에 의해 밸런스가 불안정

너트 체결부 나사연마 비교

GSK	타사
	
나사 연마를 통해 재현 정밀도 우수	선삭 작업으로 정밀도 불안정

특별한 디자인

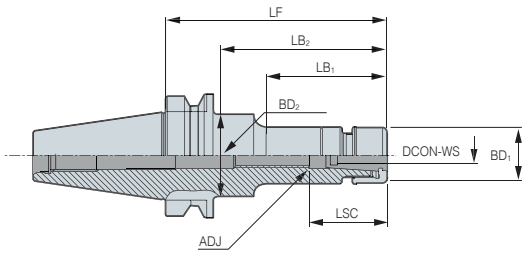
고속 콜렛척에 최적화된 제품으로 테스트바 영역을 제품에 지정하여 손쉬운 런아웃 측정이 가능하도록 독특한 디자인으로 설계 디자인됨



C 내부 쿨런트 시스템은 옵션 탑재 가능합니다.

BT-GSK



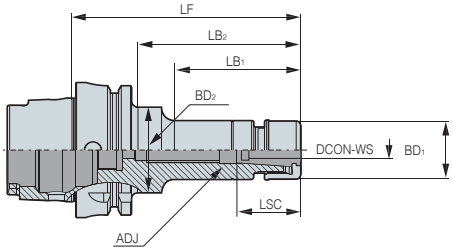


(mm)

형 번		DCON-WS	LF	BD1	BD2	LB1	LB2	LSC	COLLET	ADJ	RPMX	kg
BT30 -	GSK6-60	3.0~6.0	60	19.5	19.5	33	33	31	HC6	M8	25,000	0.4
	GSK6-90	3.0~6.0	90	19.5	32	56	65	31	HC6	M8	25,000	0.5
	GSK10-60	2.0~10.0	60	27	27	35	35	38	HC10	M12	25,000	0.5
	GSK10-90	2.0~10.0	90	27	27	65	65	38	HC10	M12	25,000	0.6
	GSK13-60	3.0~13.0	60	35	35	36	36	43	HC13	M12	25,000	0.6
	GSK16-60	3.0~16.0	60	40	40	37	37	52	HC16	M12	25,000	0.6
	GSK16-90	3.0~16.0	90	40	40	67	67	52	HC16	M18	25,000	0.8
	GSK25-90	16.0~25.0	90	55	55	67.5	67.5	64	HC25	M12	25,000	1.0
BT40 -	GSK6-90	3.0~6.0	90	20	32	51	61	31	HC6	M8	20,000	1.0
	GSK6-120	3.0~6.0	120	20	32	60	90	31	HC6	M8	20,000	1.2
	GSK6-150	3.0~6.0	150	20	25	60	120	31	HC6	M8	20,000	1.2
	GSK10-90	2.0~10.0	90	27	40	48	60	38	HC10	M12	20,000	1.1
	GSK10-120	2.0~10.0	120	27	40	73	90	38	HC10	M12	20,000	1.3
	GSK10-150	2.0~10.0	150	27	35	73	118	38	HC10	M12	20,000	1.4
	GSK13-90	3.0~13.0	90	35	35	59	59	43	HC13	M15	20,000	1.2
	GSK16-90	3.0~16.0	90	40	40	58	58	52	HC16	M18	20,000	1.3
	GSK16-120	3.0~16.0	120	40	40	88	88	52	HC16	M18	20,000	1.5
	GSK16-150	3.0~16.0	150	40	40	118	118	52	HC16	M18	20,000	1.8
	GSK20-90	4.0~20.0	90	48	48	60	60	60	HC20	M22	20,000	1.4
	GSK20-120	4.0~20.0	120	48	48	90	90	60	HC20	M22	20,000	1.8
	GSK25-90	16.0~25.0	90	55	55	61	61	64	HC25	M28	20,000	1.6
	GSK25-120	16.0~25.0	120	55	55	91	91	64	HC25	M28	20,000	2.0
BT50 -	GSK6-105	3.0~6.0	105	20	32	55	64	31	HC6	M8	15,000	3.6
	GSK6-135	3.0~6.0	135	20	32	60	92	31	HC6	M8	15,000	3.6
	GSK6-165	3.0~6.0	165	20	32	60	114	31	HC6	M8	15,000	3.9
	GSK10-105	2.0~10.0	105	27	27	57	57	38	HC10	M12	15,000	3.7
	GSK10-135	2.0~10.0	135	27	32	70	92	38	HC10	M12	15,000	3.7
	GSK10-165	2.0~10.0	165	27	36	75	114	38	HC10	M12	15,000	4.0
	GSK13-135	3.0~13.0	135	35	35	92	92	43	HC13	M15	15,000	3.9
	GSK16-105	3.0~16.0	105	40	40	62	62	52	HC16	M18	15,000	3.9
	GSK16-135	3.0~16.0	135	40	40	92	92	52	HC16	M18	15,000	4.1
	GSK16-165	3.0~16.0	165	40	50	40	122	52	HC16	M18	15,000	4.3
	GSK20-105	4.0~20.0	105	48	-	-	62	60	HC20	M22	15,000	4.1
	GSK20-135	4.0~20.0	135	48	-	-	92	60	HC20	M22	15,000	4.4
	GSK20-165	4.0~20.0	165	48	-	-	122	60	HC20	M22	15,000	4.9
	GSK25-105	16.0~25.0	105	55	55	62	62	64	HC25	M28	15,000	4.2
	GSK25-135	16.0~25.0	135	55	55	92	92	64	HC25	M28	15,000	4.6
	GSK25-165	16.0~25.0	165	55	55	122	122	64	HC25	M28	15,000	5.1

HSK-GSK





(mm)

형 번		DCON-WS	LF	BD1	BD2	LB1	LB2	LSC	COLLET	ADJ	RPMX	kg
HSK63A -	GSK6-100	3.0~6.0	100	20	32	51	71	31	HC6	M8	20,000	0.8
	GSK10-105	2.0~10.0	105	27	35	60	76	38	HC10	M12	20,000	0.9
	GSK16-120	3.0~16.0	120	40	40	90	-	52	HC16	M18	20,000	1.3
	GSK20-120	4.0~20.0	120	48	48	92	-	60	HC20	M22	20,000	1.6
HSK100A -	GSK6-120	3.0~6.0	120	19.5	32	70	88	31	HC6	M8	15,000	2.2
	GSK10-120	2.0~10.0	120	27	27	70	88	38	HC10	M12	15,000	2.3
	GSK16-140	3.0~16.0	140	40	40	105	-	52	HC16	M18	15,000	2.8
	GSK25-155	16.0~25.0	155	55	55	120	-	64	HC25	M28	15,000	3.6

SK-GSK



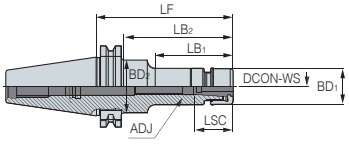


그림 1

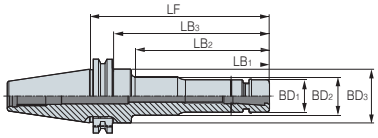


그림 2

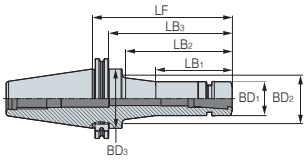


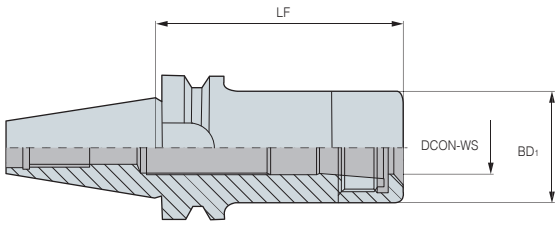
그림 3

(mm)

형 번		DCON-WS	LF	BD_1	BD_2	BD_3	LB_1	LB_2	LB_3	LSC	COLLET	ADJ	RPMX	그림	kg
SK40 -	GSK6-60	3.0~6.0	60	20	-	-	41	-	-	31	HC6	M8	20,000	1	0.8
	GSK6-90	3.0~6.0	90	20	45	-	48	71	-	31	HC6	M8	20,000	1	1.0
	GSK10-90	2.0~10.0	90	27	45	-	50	71	-	38	HC10	M12	20,000	1	1.1
	GSK10-150	2.0~10.0	150	27	32	45	70	112	131	38	HC10	M12	20,000	2	1.3
	GSK16-90	3.0~16.0	90	40	-	-	68	-	-	52	HC16	M18	20,000	1	1.2
	GSK16-150	3.0~16.0	150	40	45	-	114	118	-	52	HC16	M18	20,000	1	1.7
	GSK20-90	4.0~20.0	90	48	-	-	71	-	-	60	HC20	M22	20,000	1	1.3
	GSK25-90	16.0~25.0	90	55	-	-	71	-	-	64	HC25	M28	20,000	1	1.3
SK50 -	GSK6-105	3.0~6.0	105	20	70	-	60	86	-	31	HC6	M8	15,000	1	3.1
	GSK6-165	3.0~6.0	165	20	32	70	60	120	15	31	HC6	M8	15,000	2	3.3
	GSK10-105	2.0~10.0	105	27	70	-	65	86	-	38	HC10	M12	15,000	1	3.2
	GSK10-165	2.0~10.0	165	27	32	70	75	120	15	38	HC10	M12	15,000	2	3.4
	GSK16-105	3.0~16.0	105	40	70	-	65	86	-	52	HC16	M18	15,000	1	3.4
	GSK16-165	3.0~16.0	165	40	50	70	90	126	15	52	HC16	M18	15,000	3	3.9
	GSK20-105	4.0~20.0	105	48	70	-	65	86	-	60	HC20	M22	15,000	1	3.6
	GSK20-165	4.0~20.0	165	48	70	-	125	146	-	60	HC20	M22	15,000	1	4.3
	GSK25-105	16.0~25.0	105	55	70	-	65	86	-	64	HC25	M28	15,000	1	3.7
	GSK25-165	16.0~25.0	165	55	70	-	125	146	-	64	HC25	M28	15,000	1	4.6

BT-TSK





(mm)

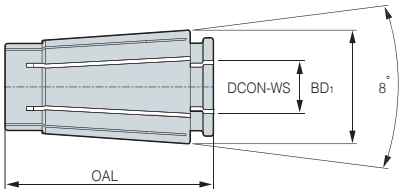
형 번		LF	LB1	BD1	COLLET
BT30 -	TSK10-60	2.0~10.0	60	27.5	HC10
	TSK10-90	2.0~10.0	90	27.5	HC10
	TSK10-120	2.0~10.0	120	27.5	HC10
	TSK16-60	3.0~16.0	60	40	HC16
	TSK16-90	3.0~16.0	90	40	HC16
	TSK16-120	3.0~16.0	120	40	HC16
BT40 -	TSK10-90	2.0~10.0	90	27.5	HC10
	TSK16-90	2.0~10.0	90	40	HC10

• 내부 쿨런트 시스템 옵션 탑재 가능

HC 콜렛

일반급





(mm)

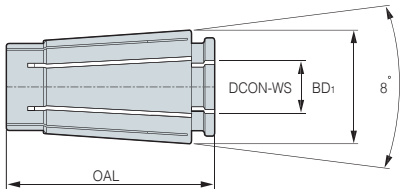
형	번	DCON-WS	OAL	BD1	간격	정밀도
HC6 -	3.0	3.0	25.0	10.5	1.0	5μm
	4.0	4.0	25.0	10.5	1.0	5μm
	5.0	5.0	25.0	10.5	1.0	5μm
	6.0	6.0	25.0	10.5	1.0	5μm
HC10 -	2.0	2.0	30.5	15.6	1.0	5μm
	3.0	3.0	30.5	15.6	1.0	5μm
	4.0	4.0	30.5	15.6	1.0	5μm
	5.0	5.0	30.5	15.6	1.0	5μm
	6.0	6.0	30.5	15.6	1.0	5μm
	7.0	7.0	30.5	15.6	1.0	5μm
	8.0	8.0	30.5	15.6	1.0	5μm
	9.0	9.0	30.5	15.6	1.0	5μm
	10.0	10.0	30.5	15.6	1.0	5μm
HC13 -	3.0	3.0	39.0	20.1	1.0	5μm
	4.0	4.0	39.0	20.1	1.0	5μm
	5.0	5.0	39.0	20.1	1.0	5μm
	6.0	6.0	39.0	20.1	1.0	5μm
	7.0	7.0	39.0	20.1	1.0	5μm
	8.0	8.0	39.0	20.1	1.0	5μm
	9.0	9.0	39.0	20.1	1.0	5μm
	10.0	10.0	39.0	20.1	1.0	5μm
	11.0	11.0	39.0	20.1	1.0	5μm
	12.0	12.0	39.0	20.1	1.0	5μm
	13.0	13.0	39.0	20.1	1.0	5μm
HC16 -	3.0	3.0	45.0	24.6	1.0	5μm
	4.0	4.0	45.0	24.6	1.0	5μm
	5.0	5.0	45.0	24.6	1.0	5μm
	6.0	6.0	45.0	24.6	1.0	5μm
	7.0	7.0	45.0	24.6	1.0	5μm
	8.0	8.0	45.0	24.6	1.0	5μm
	9.0	9.0	45.0	24.6	1.0	5μm
	10.0	10.0	45.0	24.6	1.0	5μm
	11.0	11.0	45.0	24.6	1.0	5μm
	12.0	12.0	45.0	24.6	1.0	5μm
	13.0	13.0	45.0	24.6	1.0	5μm
	14.0	14.0	45.0	24.6	1.0	5μm
	15.0	15.0	45.0	24.6	1.0	5μm
	16.0	16.0	45.0	24.6	1.0	5μm

형	번	DCON-WS	OAL	BD1	간격	정밀도
HC20 -	4.0	4.0	54.3	29.2	2.0	5μm
	6.0	6.0	54.3	29.2	2.0	5μm
	8.0	8.0	54.3	29.2	2.0	5μm
	10.0	10.0	54.3	29.2	2.0	5μm
	12.0	12.0	54.3	29.2	2.0	5μm
	14.0	14.0	54.3	29.2	2.0	5μm
	16.0	16.0	54.3	29.2	2.0	5μm
	18.0	18.0	54.3	29.2	2.0	5μm
	20.0	20.0	54.3	29.2	2.0	5μm
HC25 -	16.0	16.0	57.0	35.7	1.0	5μm
	17.0	17.0	57.0	35.7	1.0	5μm
	18.0	18.0	57.0	35.7	1.0	5μm
	19.0	19.0	57.0	35.7	1.0	5μm
	20.0	20.0	57.0	35.7	1.0	5μm
	21.0	21.0	57.0	35.7	1.0	5μm
	22.0	22.0	57.0	35.7	1.0	5μm
	23.0	23.0	57.0	35.7	1.0	5μm
	24.0	24.0	57.0	35.7	1.0	5μm
	25.0	25.0	57.0	35.7	1.0	5μm

HC 콜렛

정밀급





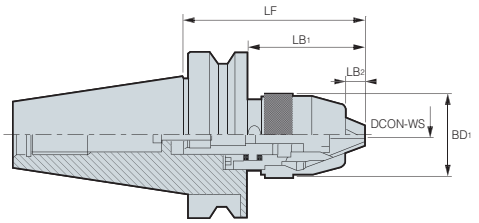
(mm)

형	번	DCON-WS	OAL	BD1	간격	정밀도
HC6 -	3.0P	3.0	25.0	10.5	1.0	3㎛
	4.0P	4.0	25.0	10.5	1.0	3㎛
	5.0P	5.0	25.0	10.5	1.0	3㎛
	6.0P	6.0	25.0	10.5	1.0	3㎛
HC10 -	2.0P	2.0	30.5	15.6	1.0	3㎛
	3.0P	3.0	30.5	15.6	1.0	3㎛
	4.0P	4.0	30.5	15.6	1.0	3㎛
	5.0P	5.0	30.5	15.6	1.0	3㎛
	6.0P	6.0	30.5	15.6	1.0	3㎛
	7.0P	7.0	30.5	15.6	1.0	3㎛
	8.0P	8.0	30.5	15.6	1.0	3㎛
	9.0P	9.0	30.5	15.6	1.0	3㎛
	10.0P	10.0	30.5	15.6	1.0	3㎛
HC13 -	3.0P	3.0	39.0	20.1	1.0	3㎛
	4.0P	4.0	39.0	20.1	1.0	3㎛
	5.0P	5.0	39.0	20.1	1.0	3㎛
	6.0P	6.0	39.0	20.1	1.0	3㎛
	7.0P	7.0	39.0	20.1	1.0	3㎛
	8.0P	8.0	39.0	20.1	1.0	3㎛
	9.0P	9.0	39.0	20.1	1.0	3㎛
	10.0P	10.0	39.0	20.1	1.0	3㎛
	11.0P	11.0	39.0	20.1	1.0	3㎛
	12.0P	12.0	39.0	20.1	1.0	3㎛
	13.0P	13.0	39.0	20.1	1.0	3㎛
HC16 -	3.0P	3.0	45.0	24.6	1.0	3㎛
	4.0P	4.0	45.0	24.6	1.0	3㎛
	5.0P	5.0	45.0	24.6	1.0	3㎛
	6.0P	6.0	45.0	24.6	1.0	3㎛
	7.0P	7.0	45.0	24.6	1.0	3㎛
	8.0P	8.0	45.0	24.6	1.0	3㎛
	9.0P	9.0	45.0	24.6	1.0	3㎛
	10.0P	10.0	45.0	24.6	1.0	3㎛
	11.0P	11.0	45.0	24.6	1.0	3㎛
	12.0P	12.0	45.0	24.6	1.0	3㎛
	13.0P	13.0	45.0	24.6	1.0	3㎛
	14.0P	14.0	45.0	24.6	1.0	3㎛
	15.0P	15.0	45.0	24.6	1.0	3㎛
	16.0P	16.0	45.0	24.6	1.0	3㎛

형	번	DCON-WS	OAL	BD1	간격	정밀도
HC20 -	4.0P	4.0	54.3	29.2	2.0	3㎛
	6.0P	6.0	54.3	29.2	2.0	3㎛
	8.0P	8.0	54.3	29.2	2.0	3㎛
	10.0P	10.0	54.3	29.2	2.0	3㎛
	12.0P	12.0	54.3	29.2	2.0	3㎛
	14.0P	14.0	54.3	29.2	2.0	3㎛
	16.0P	16.0	54.3	29.2	2.0	3㎛
	18.0P	18.0	54.3	29.2	2.0	3㎛
	20.0P	20.0	54.3	29.2	2.0	3㎛
HC25 -	16.0P	16.0	57.0	35.7	1.0	3㎛
	17.0P	17.0	57.0	35.7	1.0	3㎛
	18.0P	18.0	57.0	35.7	1.0	3㎛
	19.0P	19.0	57.0	35.7	1.0	3㎛
	20.0P	20.0	57.0	35.7	1.0	3㎛
	21.0P	21.0	57.0	35.7	1.0	3㎛
	22.0P	22.0	57.0	35.7	1.0	3㎛
	23.0P	23.0	57.0	35.7	1.0	3㎛
	24.0P	24.0	57.0	35.7	1.0	3㎛
	25.0P	25.0	57.0	35.7	1.0	3㎛

BT-NPU





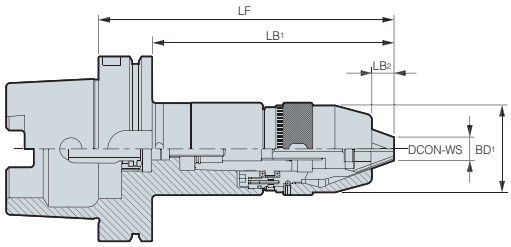
(mm)

형 번		DCON-WS	LF	BD1	LB1	LB2	kg
BT30 -	NPU8-97	1~8	97	38	75	8.0	0.8
	NPU13-125	1~13	125	50	103	12.0	1.4
BT40 -	NPU8-87	1~8	87	38	60	8.0	1.2
	NPU13-105	1~13	105	50	78	12.0	1.6
	NPU13-130	1~13	130	50	103	12.0	1.9
BT50 -	NPU13-130	1~13	130	50	92	12.0	4.5
	NPU13-190	1~13	190	50	152	12.0	5.3

• 내부 쿨런트 시스템 불가

HSK-NPU





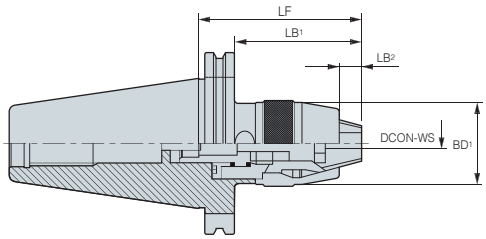
(mm)

형 번		DCON-WS	LF	BD1	LB1	LB2	kg
HSK63A -	NPU13-175	1~13	175	50	149	12.0	2.4
HSK100A -	NPU13-180	1~13	180	50	151	12.0	3.6

• 내부 쿨런트 시스템 불가

SK-NPU





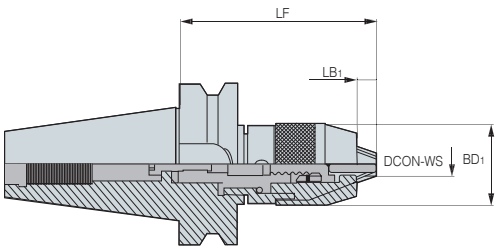
(mm)

형 번		DCON-WS	LF	BD_1	LB_1	LB_2	kg
SK40 -	NPU13-105	1~13	105	50	78	12.5	1.6
SK50 -	NPU13-111	1~13	111	50	84	12.5	3.6

• 내부 쿨런트 시스템 불가

BT-TNPU





(mm)

형 번		DCON-WS	BD_1	LF	LB_1
BT30 -	TNPU08-75	0.3-8	38	84.5	7.5
BT40 -	TNPU08-80	0.3-8	38	87.5	7.5
	TNPU13-90	0.3-13	50	102.5	12.5
	TNPU13-130	0.3-13	50	142.5	12.5
BT50 -	TNPU13-110	0.3-13	50	122.5	12.5
	TNPU13-130	0.3-13	50	142.5	12.5
	TNPU13-190	0.3-13	50	202.5	12.5

• 내부 쿨런트 시스템 불가

부품

기본 구성			별도 구매
구 분	척	볼트	스패너
부품 / 형번			
NPU8	NPU08	BX0620	NPU0836
NPU13	NPU13	BX0825	NPU1348

Tapping holder_탭핑척

DTN

- 전용 어댑터 사용으로 빠르고 편리한 모듈형 공구교체
- 탠션 기능으로 일반 머시닝센터에서 TAP 수명 증가
- 가공범위 : M3~M38

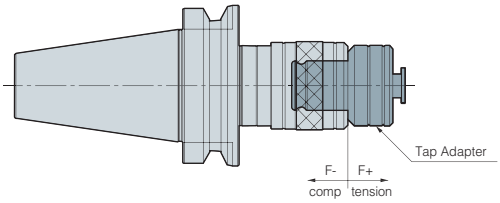


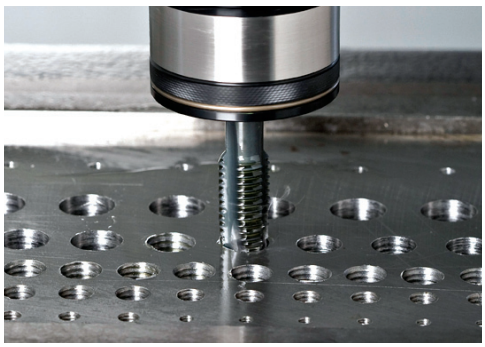
형번표기법

BT40	-	DTN	22	-	130
스핀들		탭핑 홀더	최대 척킹경		길이

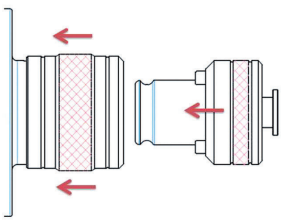
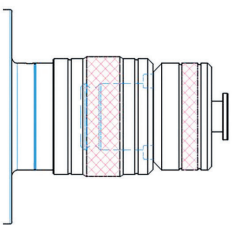
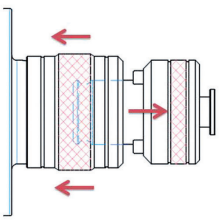
쉬운 TCA(Tap adapter) 교환

- 고정도, 긴수명이 가능한 원터치 교환방식의 어댑터
- 파이별 탭의 교환이 빠르며 다양한 가공에 용이함
- 축방향 플로팅 방식으로 인장 수축이 가능함



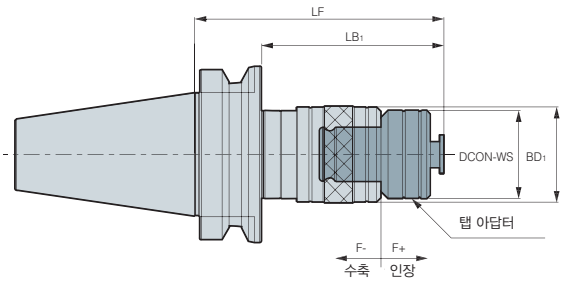


체결방법

TCA 삽입 Before installation	TCA 장착 After installation	TCA 분리 Disassembly
		
1. 탭홀더의 커버를 아래로 누른 후 TCA를 삽입한다. 2. TCA를 Key홈에 맞추어 체결하고 철컥 소리가 날 때까지 누른다.	1. 탭홀더의 커버가 정상위치로 올라와 있음	1. 탭홀더의 커버를 누른 후 TCA를 분리한다.

BT-DTN





(mm)

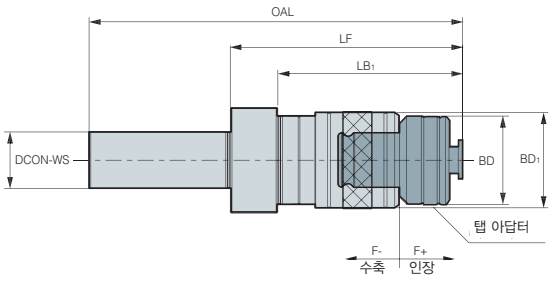
형 번		탭 사이즈	LF	LB1	DCON-WS	BD1	사용어뎁터	F-	F +	kg
BT30 -	DTN12-85	M3~M12	85	63	32	39	TCA1-M	4	10	0.5
BT40 -	DTN12-90	M3~M12	90	63	32	39	TCA1-M	4	10	1.2
	DTN12-120	M3~M12	120	93	32	39	TCA1-M	4	10	1.5
	DTN22-130	M8~M24	130	103	50	56	TCA2-M	12.5	12.5	1.7
	DTN22-160	M8~M24	160	133	50	56	TCA2-M	12.5	12.5	2.2
BT50 -	DTN12-100	M3~M12	100	62	32	39	TCA1-M	4	10	3.9
	DTN12-130	M3~M12	130	92	32	39	TCA1-M	4	10	3.9
	DTN22-140	M8~M24	140	102	50	56	TCA2-M	12.5	12.5	4.3
	DTN22-170	M8~M24	170	132	50	56	TCA2-M	12.5	12.5	4.7
	DTN38-185	M16~M38	185	147	72	81	TCA3-M	20	20	5.7
	DTN38-215	M16~M38	215	177	72	81	TCA3-M	20	20	6.7

탭 아답터(TCA) **E80**

• 내부 쿨런트 시스템 불가

S-DTN





(mm)

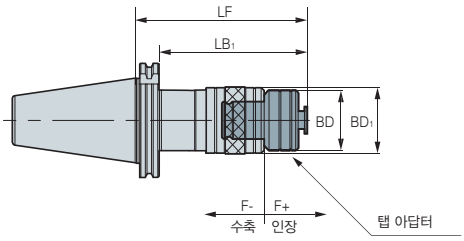
형 번		탭사이즈	BD	DCON-WS	OAL	BD1	LF	LB1	사용어뎁터	F-	F+	kg
S32 -	DTN12-90	M3-M12	32	32	170	39	90	63	TCA1	4	10	1.0
	DTN22-130	M8-M24	50	32	210	56	130	103	TCA2	12.5	12.5	1.8

탭 아답터(TCA) **E80**

• 내부 쿨런트 시스템 불가

SK-DTN





(mm)

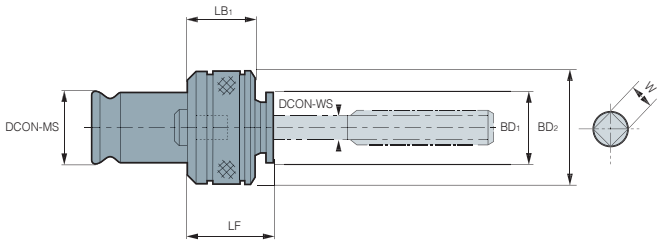
형 번		탭사이즈	BD	LF	BD1	LB1	사용어댑터	F−	F+	kg
SK40 -	DTN12-90	M3~M12	32	90	39	70.9	TCA1-M	4	10	1.0
	DTN22-130	M8~M22	50	130	56	110.9	TCA2-M	12.5	12.5	1.6
SK50 -	DTN12-100	M3~M12	32	100	39	80.9	TCA1-M	4	10	2.9
	DTN22-140	M8~M22	50	140	56	120.9	TCA2-M	12.5	12.5	3.5

탭 아답터(TCA) **E80**

• 내부 쿨런트 시스템 불가

TCA 탭 아답터





(mm)

형 번		DCON-WS	LF	DCON-MS	LB1	BD1	BD2	W	kg
TCA1 -	M3	4	27	19	25	19	32	3	0.2
	M4	5	27	19	25	19	32	4	0.2
	M5	6	27	19	25	19	32	4	0.2
	M6	6	27	19	25	19	32	4	0.2
	M8	6.2	27	19	25	19	32	5	0.2
	M10	7	27	19	25	19	32	6	0.2
	M11	8	27	19	25	19	32	6	0.2
	M12	9	27	19	25	19	32	7	0.2
TCA2 -	M8	6.2	34	31	31	29	50	5	0.5
	M10	7	34	31	31	29	50	6	0.5
	M12	8.5	34	31	31	29	50	7	0.5
	M14	11	34	31	31	29	50	8	0.5
	P1/4	11	34	31	31	29	50	9	0.5
	M16	13	34	31	31	29	50	10	0.5
	M18	14	34	31	31	29	50	11	0.5
	M20	15	34	31	31	29	50	12	0.5
	M22	17	34	31	31	29	50	13	0.5
	P1/2	18	34	31	31	29	50	14	0.5
	M24	19	34	31	31	29	50	15	0.5
TCA3 -	M16	13	45	48	41	44	72	10	1.4
	M18	14	45	48	41	44	72	11	1.4
	M20	15	45	48	41	44	72	12	1.4
	M22	17	45	48	41	44	72	13	1.4
	M24	19	45	48	41	44	72	15	1.4
	M27	20	45	48	41	44	72	15	1.4
	M30	23	45	48	41	44	72	17	1.4
	M33	25	45	48	41	44	72	19	1.4
	M36	28	45	48	41	44	72	21	1.4

• 내부 쿨런트 시스템 불가

High speed synchro tapping chuck_고속 탭핑척

DST

- 고속가공용 탭핑척
- 특수설계 구조로 Thrust load 흡수로 탭 파손 방지 및 공구수명 증대
- 내부쿨런트 적용 가능
- 적용가능범위 : M1-M22

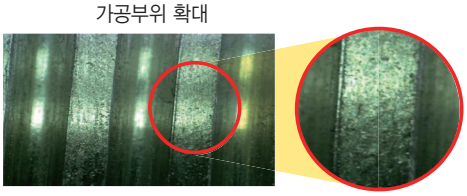


형번표기법

BT40	-	DST	22	-	110
스핀들		탭핑 홀더	최대 척킹경		길이

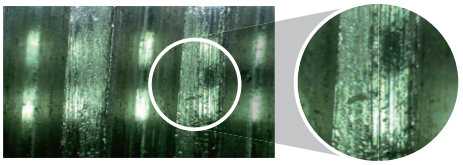
정밀한 가공

가공부위 확대



DST22
(vc = 100 m/min)

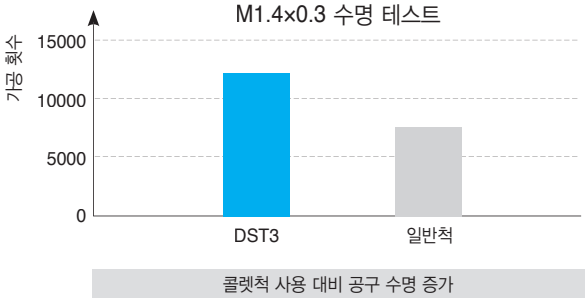
면조도 향상



기존 제품

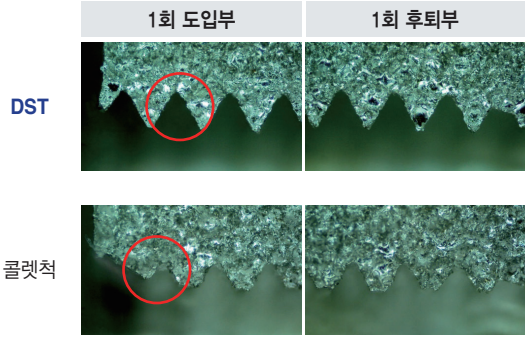


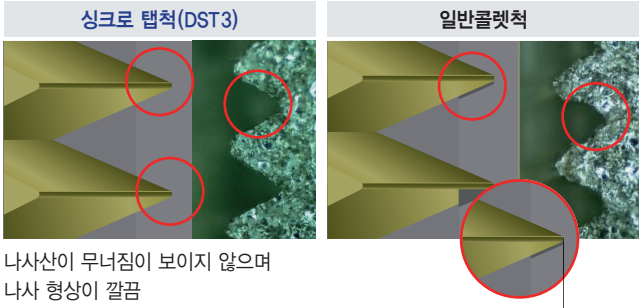
탭핑전용 콜렛
- 탭 작업 시 TER 콜렛 사용
- DST3 : ER11콜렛 사용



콜렛척 사용 대비 공구 수명 증가

나사산 형상 비교



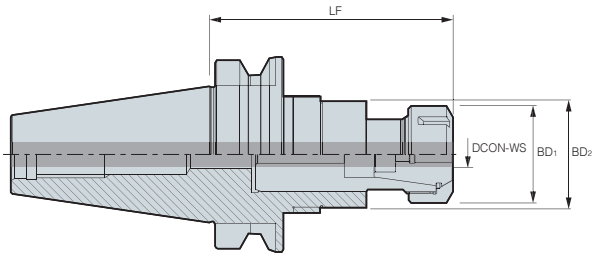


나사산이 무너짐이 보이지 않으며
나사 형상이 깔끔

동기오차가 보상되지 못하여
산의 무너진 형상

BT-DST





(mm)

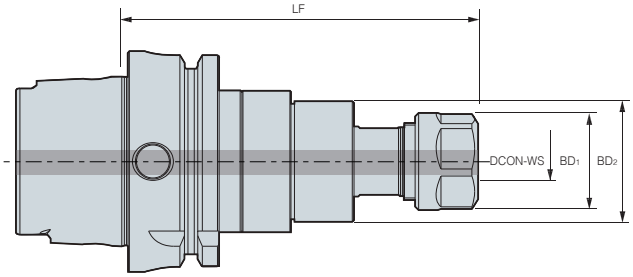
형 번		DCON-WS	LF	BD1	BD2	사용콜렛	F-	F+	kg
BT30 -	DST3-70	M1~M3	70	20	19	ER11	0.5	0.5	0.5
	DST10-100	M3~M10	100	40.4	28	TER16	0.5	0.5	0.8
BT40 -	DST3-70	M1~M3	70	20	19	ER11	0.5	0.5	1.0
	DST10-100	M3~M10	100	40.4	28	TER16	0.5	0.5	1.3
	DST22-110	M6~M22	110	60	50	TER32	0.7	0.7	1.7
BT50 -	DST10-110	M3~M10	110	60	50	TER16	0.5	0.5	3.8
	DST22-130	M6~M22	130	60	50	TER32	0.7	0.7	4.5

적용콜렛 **E57, E84**

• 내부 쿨런트 시스템 옵션 탑재 가능

HSK-DST





(mm)

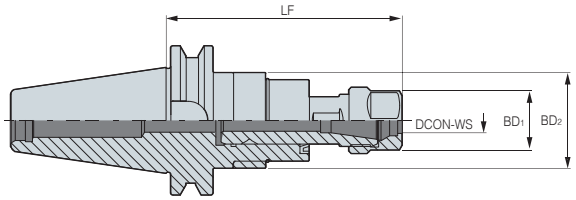
형 번		DCON-WS	LF	BD1	BD2	사용콜렛	F-	F+	kg
HSK63A -	DST3-80	M1~M3	80	19	20	ER11	0.5	0.5	0.7
	DST10-100	M3~M10	100	28	40.4	TER16	0.5	0.5	0.9
	DST22-130	M6~M22	130	49.5	60	TER32	0.7	0.7	1.8

적용콜렛 **E57, E84**

• 내부 쿨런트 시스템 옵션 탑재 가능

SK-DST





(mm)

형 번		DCON-WS	LF	BD1	BD2	사용콜렛	F-	F+	kg
SK30 -	DST3-70	M1~M3	70	19	20	ER11	0.2	0.2	0.4
SK40 -	DST3-70	M1~M3	70	19	20	ER11	0.2	0.2	0.9
	DST10-110	M3~M10	110	28	35	TER16	0.5	0.5	1.2
	DST22-120	M6~M22	120	50	54	TER32	0.7	0.7	1.8
SK50 -	DST10-110	M3~M10	110	28	35	TER16	0.5	0.5	3.0
	DST22-120	M6~M22	120	50	54	TER32	0.7	0.7	3.7

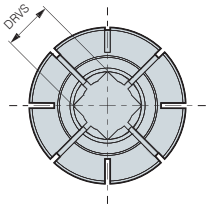
적용콜렛 **E57, E84**

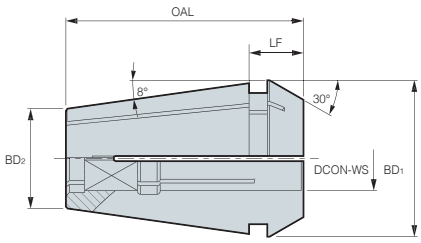
• 내부 쿨런트 시스템 옵션 탑재 가능

TER

탭 콜렛







(mm)

형 번		적용탭	DCON-WS	OAL	DRVS	BD_1	BD_2	LF	kg
TER16 -	**4x3.2**	M3	4	27.5	3.2	16.74	10.1	6.3	0.03
	5x4	M4	5	27.5	4	16.74	10.1	6.3	0.03
	5.5x4.5	M5	5.5	27.5	4.5	16.74	10.1	6.3	0.02
	6x4.5	M6,U1/4	6	27.5	4.5	16.74	10.1	6.3	0.02
	6.2x5	M7, M8	6.2	27.5	5	16.74	10.1	6.3	0.02
	7x5.5	M9, M10, U3/8	7	27.5	5.5	16.74	10.1	6.3	0.02
TER20 -	**5x4**	M4	5	31.5	4	20.74	13.2	7.2	0.05
	5.5x4.5	M5	5.5	31.5	4.5	20.74	13.2	7.2	0.05
	6x4.5	M6,U1/4	6	31.5	4.5	20.74	13.2	7.2	0.05
	6.2x5	M7, M8	6.2	31.5	5	20.74	13.2	7.2	0.04
	7x5.5	M9, M10, U3/8	7	31.5	5.5	20.74	13.2	7.2	0.05
	8x6	M11, U7/16, P1/8	8	31.5	6	20.74	13.2	7.2	0.04
	8.5x6.5	M12	8.5	31.5	6.5	20.74	13.2	7.2	0.04
TER25 -	**5x4**	M4	5	34	4	25.74	17.6	7.5	0.9
	5.5x4.5	M5	5.5	34	4.5	25.74	17.6	7.5	0.8
	6x4.5	M6	6	34	4.5	25.74	17.6	7.5	0.8
	6.2x5	M7, M8	6.2	34	5	25.74	17.6	7.5	0.1
	7x5.5	M9, M10, U3/8	7	34	5.5	25.74	17.6	7.5	0.8
	8.5x6.5	M12	8.5	34	6.5	25.74	17.6	7.5	0.8
TER32 -	**6x4.5**	M6,U1/4	6.2	40	4.5	32.74	23.1	8.2	0.2
	6.2x5	M7, M8	M8	40	5	32.74	23.1	8.2	0.2
	7x5.5	M9, M10, U3/8	7	40	5.5	32.74	23.1	8.2	0.2
	8X6	M11, U7/16, P1/8	8	40	6	32.74	23.1	8.2	0.2
	8.5x6.5	M12	8.5	40	6.5	32.74	23.1	8.2	0.2
	10.5x8	M14, U9/16	10.5	40	8	32.74	23.1	8.2	0.2
	12.5x10	M16	12.5	40	10	32.74	23.1	8.2	0.2
	14x11	M18, P3/8	14	40	11	32.74	23.1	8.2	0.1
	15x12	M20	15	40	12	32.74	23.1	8.2	0.1
	17x13	M22, U7/8	17	40	13	32.74	23.1	8.2	0.1
	11x9	P1/4	11	40	9	32.74	23.1	8.2	0.2
	12x9	U5/8	12	40	9	32.74	23.1	8.2	0.2
	9x7	U1/2	9	40	7	32.74	23.1	8.2	0.2

• RTJW와 너트를 사용하여 방수형 탭가공 가능(정치수에 한함)

Tap Extension Holder_탭 익스텐션 홀더

TEH

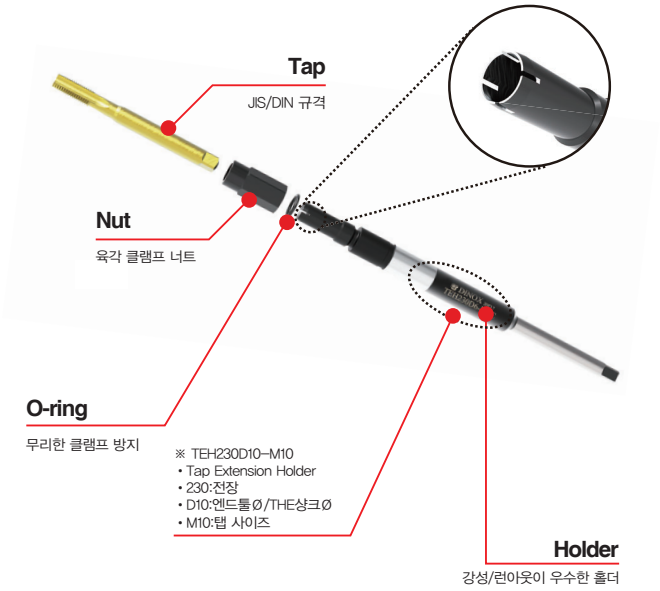
- 간섭 구간 적용을 위한 탭 전용 길이 연장 홀더
- 롱탭 사용 대비 공구비 절감 및 가공성능 향상



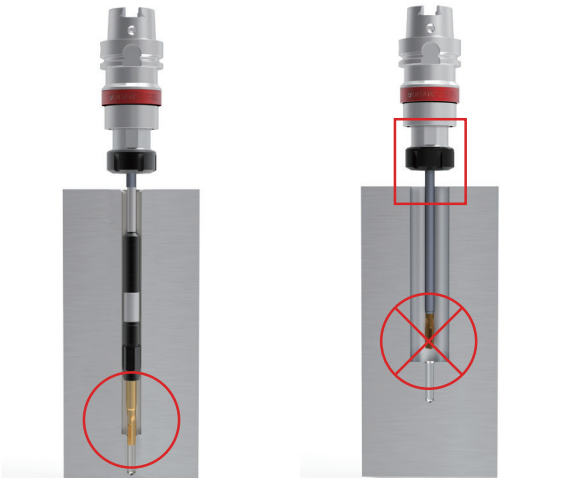
형번표기법

THE	230	D6	J	M6	-	C
홀더	길이	Shank dia.	J : JIS NON : DIN	Tap size		C : Coolant NON : General

명칭 소개



깊은 홀 가공



TEH	일반 롱탭
가공 O	가공 X

전장 비교	롱 탭	THE
M10	150mm	230mm
M22	200mm	330mm

※ 일반 롱 탭에 비해 전장이 더 길기 때문에 좁고 깊은 홀 가공에 유리하다.

TEH 세팅 방법



DST
High speed synchro tapping chuck

TER Collet

TEH
Tap Extension Holder

Tap
(M4~M22)

TEH (JIS)



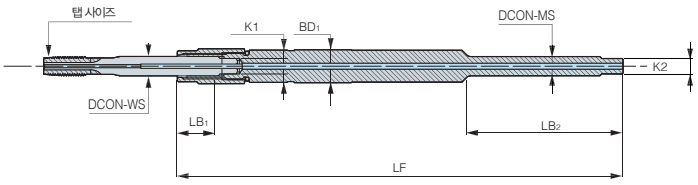


그림 1

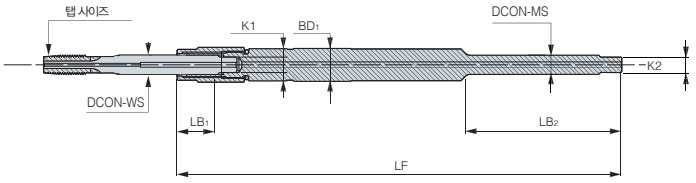


그림 2

(mm)

형 번		탭 사이즈	LB1	LB2	LF	BD1	DCON-WS	DCON-MS	K1	K2	너트외경Ø	그림
TEH230	D5J-M4	M4	18	50	230	11	5	6	4	45	12.1	2
	D6J-M6C	M6	18	50	230	12	6	6	4.5	4.5	13.3	1
	D6.2J-M8C	M8	18	65	230	12	6.2	6.2	5	5	13.3	1
	D7J-M10C	M10	18	65	230	13	7	7	5.5	5.5	14.4	1
	D8.5J-M12C	M12	22	65	230	14	8.5	8.5	6.5	65	15.6	1
TEH330	D10.5J-M14C	M14	25	70	330	16	10.5	10.5	8	8	17.9	1
	D12.5J-M16C	M16	25	70	330	18	12.5	12.5	10	10	19.9	1
	D14J-M18C	M18	25	70	330	20	14	14	11	11	21.9	1
	D15J-M20C	M20	25	75	330	21	15	15	12	12	22.9	1
	D17J-M22C	M22	25	75	330	23	17	17	13	13	25.9	1

• 내부 쿨런트 시스템이 탑재되어 있습니다. (그림. 2 형번은 논쿨런트 타입임.)

TEH (DIN)



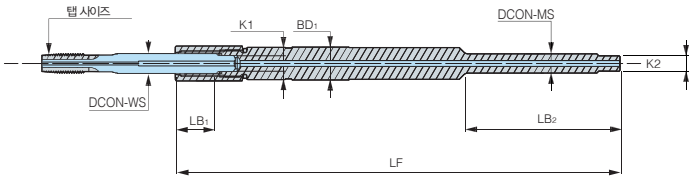


그림 1

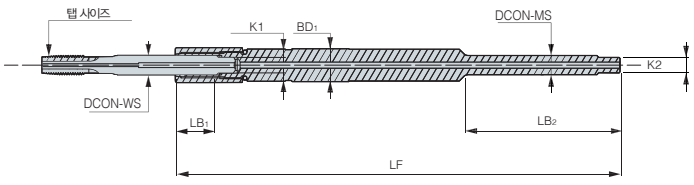


그림 2

(mm)

형 번		탭 사이즈	LB1	LB2	LF	BD1	DCON-WS	DCON-MS	K1	K2	너트외경Ø	그림
TEH230	D4.5-M4	M4	18	50	230	10	4.5	6	3.4	4.5	11.1	2
	D6-M6C	M6	20	50	230	12	6	7	4.9	5.5	13.3	1
	D8-M8C	M8	23	65	230	14	8	8	6.3	6.2	15.6	1
	D10-M10C	M10	24	65	230	16	10	10	8	8	17.9	1
	D9-M12C	M12	23	65	230	15	9	9	7	7	16.8	1
TEH330	D11-M14C	M14	26	70	330	17	11	11	9	9	19.1	1
	D12-M16C	M16	26	70	330	18	12	12	9	9	19.9	1
	D14-M18C	M18	28	70	330	20	14	14	11	11	21.9	1
	D16-M20C	M20	28	75	330	22	16	16	12	12	23.9	1
	D18-M22C	M22	28	75	330	24	18	18	14.5	14.5	25.9	1

• 내부 쿨런트 시스템이 탑재되어 있습니다. (그림. 2 형번은 논쿨런트 타입임.)

DINE Synchro Tapping ER Collet_탭핑 ER 콜렛

STER PAT.



일반 콜렛척으로 고속 탭핑 가공 시 동기 오차범위를 최소화 할 수 있는 콜렛

- 동기 오차 최소화, 정밀도 향상
- TAP 파손 방지, 공구 수명 증대
- TAP 구멍의 확대 및 나사산이 가늘어지는 문제 해결
- 고속가공 전용 탭 사용 추천

형번표기법

ST	ER	16	3
Synchronizing Tapping Collet	Collet	Collet size	Tool dia.

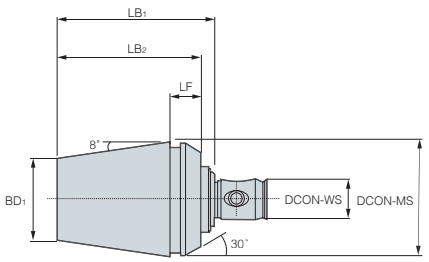
상세내용

STER32



상세규격

COLLET



CONNECTOR

그림 1

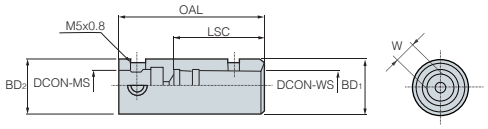
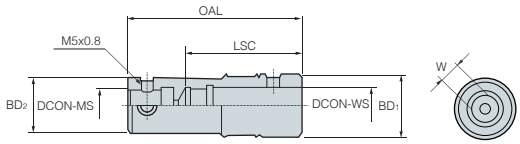


그림 2



※COLLET

형 번	DCON-MS	BD1	DCON-WS	LB1	LB2	LF	그림
STER32	32	23.1	11	44	40	8.2	1

※CONNECTOR

형 번	BD1	BD2	DCON-WS	DCON-MS	OAL	LSC	W	그림
STER32C-M6	19	21	6	11	50	29.5	4.5	2
STER32C-M8	19	21	6.2	11	50	30	5	2
STER32C-M10	19	21	7	11	50	29	5.5	2
STER32C-M12	19	21	8.5	11	50	30.5	6.5	2
STER32C-M14	19	21	10.5	11	50	31	8	2
STER32C-M16	19	21	12.5	11	50	40.5	10	2

PART(스크류)

BTT0506F



BT0504



PART(스크류)

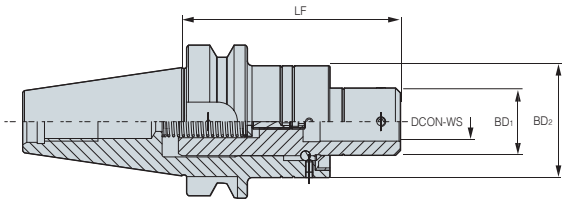
LW-2.5



BT-OFH

플로팅 홀더





(mm)

형 번	DCON-WS	LF	BD_1	BD_2	Sleeve stroke(F)	RPMX
BT30-OFH6-75	6	75	19.7	38	6	15,000

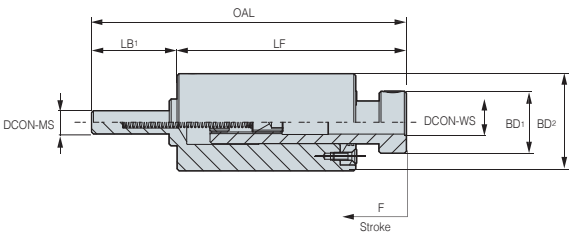
적용콜렛 **E57, E84**

• 내부 쿨런트 시스템 불가

ST-OFH

플로팅 홀더





(mm)

형 번	DCON-WS	OAL	BD_1	BD_2	DCON–MS	LB_1	LF	Sleeve stroke(F)	RPMX
ST06-OFH6-60	6	81	16	25	6	59	22	6	15,000

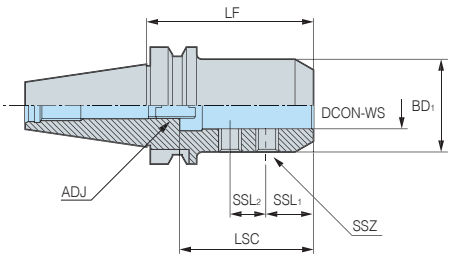
적용콜렛 **E57, E84**

• 내부 쿨런트 시스템 불가

BT-SLA

사이드 락 아버





(mm)

형 번		DCON-WS	LF	BD1	LSC	SSL1	SSL2	SSZ	ADJ	kg
BT30-	SLA16-90	16	90	40	72	25	20	M10	M12	0.9
	SLA20-90	20	90	50	72	25	20	M12	M12	1.2
	SLA25-90	25	90	50	72	25	20	M12	M12	1.1
BT40-	SLA16-90	16	90	40	72	25	20	M10	M12	1.4
	SLA20-90	20	90	50	72	25	20	M12	M12	1.8
	SLA25-90	25	90	50	72	25	20	M12	M12	1.6
	SLA32-90	32	90	60	82	25	25	M14	M12	1.8
	SLA32-105	32	105	60	82	25	25	M14	M12	2.0
	SLA40-105	40	105	80	82	25	25	M16	M12	2.9
BT50-	SLA16-90	16	90	40	72	25	20	M10	M12	4
	SLA20-105	20	105	50	72	25	20	M12	M12	4.4
	SLA25-105	25	105	50	72	25	20	M12	M12	4.3
	SLA25-135	25	135	50	72	25	20	M12	M12	4.6
	SLA25-165	25	165	50	82	25	20	M12	M12	5.2
	SLA32-105	32	105	60	82	25	25	M14	M12	4.5
	SLA32-135	32	135	60	82	25	25	M14	M12	5.1
	SLA32-165	32	165	60	82	25	25	M14	M12	5.7
	SLA40-105	40	105	90	82	25	20	M16	M12	6.1
	SLA40-150	40	150	90	82	25	25	M16	M12	8.1
	SLA42-105	42	105	90	82	25	25	M16	M12	5.9

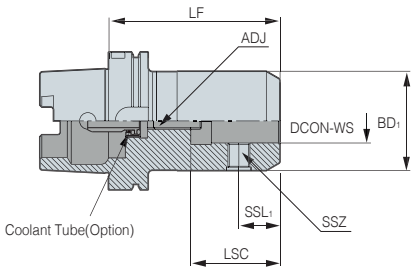
적용콜렛 **E57, E84**

• 내부 쿨런트 시스템이 탑재되어 있습니다.

HSK-SLA

사이드 락 아버





(mm)

형 번		DCON-WS	LF	BD_1	LSC	SSL_1	SSZ	ADJ	kg
HSK30A-	SLA20-100	20	100	52	51	25	M8	M12	1.6
	SLA25-105	25	105	65	59	25	M8	M12	2.1
	SLA32-105	32	105	72	63	30	M5	M12	2.3
HSK100A-	SLA20-105	20	105	52	51	25	M16	M12	3.1
	SLA25-110	25	110	65	59	25	M18	M12	3.8
	SLA32-125	32	125	72	63	30	M20	M12	4.4
	SLA40-135	40	135	80	73	32	M20	M12	5.2

적용콜렛 **E57, E84**

• 내부 쿨런트 시스템이 탑재되어 있습니다.

부품

구 분	별도 구매
쿨런트 튜브	

샹크별 구분	
HSK63A	HSK63A-CNS
HSK100A	HSK100A-CNS

SK-SLA

사이드 락 아버



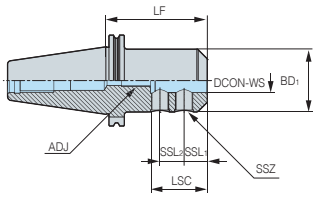


그림 1

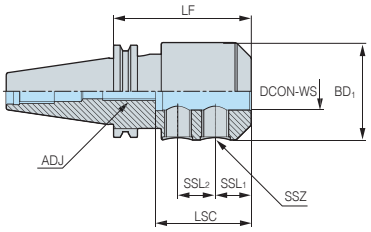


그림 2

(mm)

형 번		DCON-WS	LF	BD_1	LSC	SSL_1	SSL_2	SSZ	ADJ	그림	kg
SK40-	SLA16-75	16	75	48	49	24	-	M14	M12	1	1.4
	SLA20-75	20	75	52	51	25	-	M16	M12	1	1.5
	SLA25-95	25	95	65	59	24	25	M18	M12	2	2.1
	SLA32-105	32	105	72	63	24	28	M20	M12	2	2.8
SK50-	SLA16-90	16	90	48	49	24	-	M14	M12	1	3.5
	SLA20-90	20	90	52	51	25	-	M16	M12	1	3.6
	SLA25-105	25	105	65	59	24	25	M18	M12	1	4.5
	SLA32-120	32	120	72	63	24	28	M20	M12	1	5.2
	SLA40-120	40	120	80	73	30	32	M20	M12	1	5.6

적용콜렛 **E57, E84**

• 내부 쿨런트 시스템 불가

부품

기본 구성				별도 구매	
구 분	세트 스크류		조정 스크류	렌치	
부품 / 형번					
	BT 타입	HSK 타입		BT 타입	HSK 타입
SLA16	BTF1010	BTF1414-1.5	M1230C	LW-5	LW-6
SLA20	BTF1212-1.5	BTF1616-1.5		LW-6	LW-8
SLA25	BTF1212-1.5	BTF1818-1.5		LW-6	LW-8
SLA32	BTF1414-1.5	BTF2020-1.5		LW-6	LW-10
SLA40	BTF1624-1.5	BTF2020-1.5		LW-8	LW-10
SLA42	BTF1624-1.5	BTF2020-1.5		LW-8	LW-10

SK-MTA

모르스 테이퍼 아버



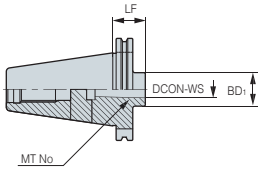


그림 1

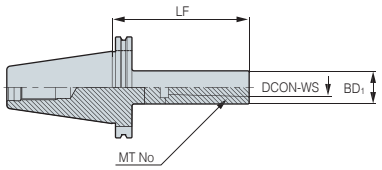


그림 2

(mm)

형 번		MT No.	LF	DCON-WS	BD_1	그림	kg
SK50-	MTA3-45	3	45	23.825	40	1	2.7
	MTA3-150	3	150	23.825	40	2	3.6
	MTA4-75	4	75	31.267	50	1	2.9

적용콜렛 **E57, E84**

• 내부 쿨런트 시스템 불가

DBT-MD

모듈러 아버

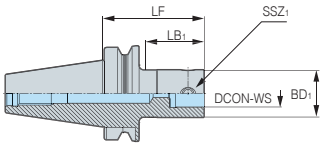


그림 1

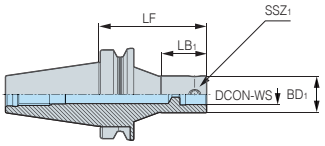


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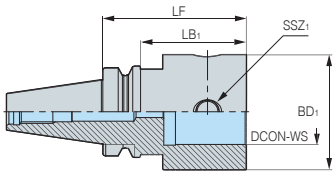


그림 3

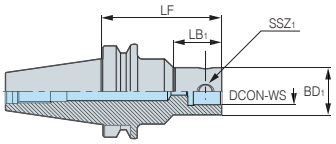


그림 4

(mm)

형 번		DCON-WS	LF	BD1	LB1	SSZ1	그림	kg
DBT30-	MD19F-70R	11	70	19	27	M5	4	0.5
	MD25F-90R	14	90	25	43	M6	4	0.6
	MD32F-80R	18	80	32	39	M8	4	0.7
	MD40F-45	22	45	40	23	M10	1	0.5
	MD40F-80R	22	80	40	49	M10	4	0.8
	MD50F-70	28	70	50	40	M12	3	0.9
DBT40-	MD19F-70	11	70	19	43	M5	1	1.0
	MD25F-95	14	95	25	68	M6	1	1.1
	MD25F-105R	14	105	25	40	M6	2	1.2
	MD32F-100	18	100	32	73	M8	1	1.2
	MD32F-115R	18	115	32	45	M8	2	1.5
	MD40F-50	22	50	40	23	M10	1	1.2
	MD40F-110R	22	110	40	60	M10	2	1.6
	MD40F-115	22	115	40	88	M10	1	1.6
	MD50F-100R	28	100	50	60	M12	2	1.8
	MD50F-105	28	105	50	78	M12	1	1.9
	MD63F-64	36	64	63	37	M16	3	1.5
	MD63F-90	36	90	63	63	M16	3	2.1
	MD63F-110	36	110	63	83	M16	3	2.5
	MD80F-100	45	100	80	73	M16	3	2.9

적용콜렛 **E54, E84**

• 내부 쿨런트 시스템이 탑재되어 있습니다.

DBT-MD

모듈러 아버

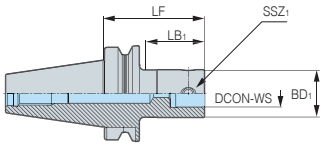


그림 1

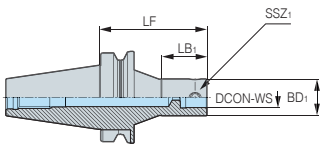


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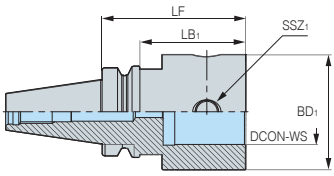


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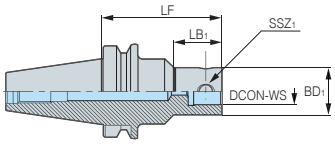


그림 4

(mm)

형 번		DCON-WS	LF	BD1	LB1	SSZ1	그림	kg
DBT50-	MD19F-85	11	85	19	45	M5	1	3.7
	MD19F-100	11	100	19	60	M5	1	3.8
	MD25F-105	14	105	25	64	M6	1	3.9
	MD25F-120R	14	120	25	40	M6	2	4.0
	MD32F-110	18	110	32	67	M8	1	4.1
	MD32F-115R	18	115	32	45	M8	2	4.2
	MD32F-235R	18	235	32	115	M8	2	5.5
	MD40F-60	22	60	40	22	M10	1	3.7
	MD40F-125R	22	125	40	59	M10	2	4.3
	MD40F-145	22	145	40	102	M10	1	4.5
	MD40F-195R	22	195	40	83	M10	4	4.8
	MD40F-230R	22	230	40	180	M10	2	5.0
	MD50F-125	28	125	50	82	M12	1	4.6
	MD50F-160R	28	160	50	61	M12	2	5.8
	MD50F-225R	28	225	50	125	M12	4	6.0
	MD50F-250R	28	250	50	81	M12	2	7.0
	MD63F-75	36	75	63	35	M16	1	4.2
	MD63F-130	36	130	63	87	M16	1	5.3
	MD63F-140	36	140	63	97	M16	1	5.5
	MD63F-140R	36	140	63	70	M16	2	5.7
	MD63F-195R	36	195	63	120	M16	4	6.8
	MD63F-230R	36	230	63	149	M16	4	7.5
	MD63F-240R	36	240	63	190	M16	2	7.8
	MD80F-75	45	75	80	36	M16	1	4.4
	MD80F-110	45	110	80	69	M16	1	5.8
	MD80F-160	45	160	80	119	M16	1	8.0
	MD90F-75	45	75	90	37	M16	1	4.8
	MD90F-145	45	145	90	107	M16	1	7.4

적용콜렛 **E54, E84**

• 내부 쿨런트 시스템이 탑재되어 있습니다.

BT-MD

모듈러 아버



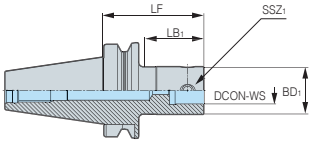


그림 1

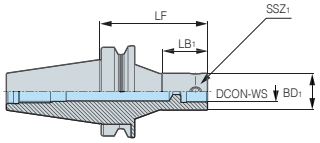


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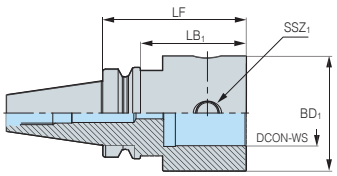


그림 3

(mm)

형 번		DCON-WS	LF	BD1	LB1	SSZ1	그림	kg
BT30-	MD19F-70	11	70	19	45	M5	1	0.5
	MD25F-90	14	90	25	63	M6	1	0.6
	MD32F-80	18	80	32	55	M8	1	0.7
	MD40F-45	22	45	40	22	M10	1	0.5
	MD40F-60	22	60	40	36	M10	1	0.7
	MD40F-80	22	80	40	56	M10	1	0.9
	MD50F-70	28	70	50	48	M12	3	0.9
BT40-	MD19F-70	11	70	19	40	M5	1	1.0
	MD25F-95	14	95	25	63	M6	1	1.1
	MD25F-105R	14	105	25	40	M6	2	1.2
	MD32F-100	18	100	32	70	M8	1	1.2
	MD32F-115R	18	115	32	45	M8	2	1.5
	MD40F-60	22	60	40	31	M10	1	1.1
	MD40F-110R	22	110	40	60	M10	2	1.6
	MD40F-115	22	115	40	83	M10	1	1.6
	MD50F-60	28	60	50	33	M12	1	1.3
	MD50F-100R	28	100	50	50	M12	2	1.8
	MD50F-105	28	105	50	73	M12	1	1.8
	MD63F-64	36	64	63	37	M16	3	1.5
	MD63F-90	36	90	63	63	M16	3	2.0
	MD63F-110	36	110	63	83	M16	3	2.4
	MD63F-135	36	135	63	108	M16	3	3.0
	MD80F-100	45	100	80	73	M16	3	2.9

적용콜렛 **E57, E84**

• 내부 쿨런트 시스템이 탑재되어 있습니다.

BT-MD

모듈러 아버



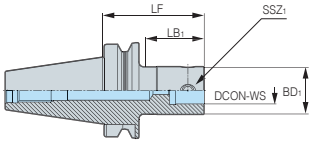


그림 1

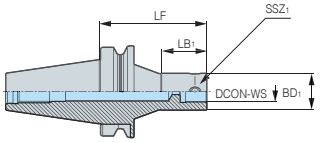


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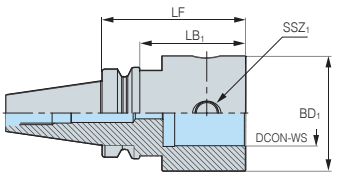


그림 3

(mm)

형 번		DCON-WS	LF	BD_1	LB_1	SSZ_1	그림	kg
BT50-	MD19F-85	11	85	19	44	M5	1	3.7
	MD19F-100	11	100	19	62	M5	1	3.7
	MD25F-105	14	105	25	62	M6	1	3.8
	MD25F-120R	14	120	25	40	M6	2	3.8
	MD32F-110	18	110	32	67	M8	1	4.0
	MD32F-115R	18	115	32	45	M8	2	4.1
	MD32F-235R	18	235	32	115	M8	2	5.5
	MD40F-60	22	60	40	22	M10	1	3.7
	MD40F-125R	22	125	40	59	M10	2	3.8
	MD40F-145	22	145	40	107	M10	1	4.3
	MD40F-195	22	195	40	152	M10	1	4.8
	MD40F-230R	22	230	40	180	M10	2	5.0
	MD50F-125	28	125	50	82	M12	1	4.6
	MD50F-160R	28	160	50	61	M12	2	5.7
	MD50F-225	28	225	50	182	M12	1	6.0
	MD50F-250R	28	250	50	81	M12	2	7.0
	MD63F-75	36	75	63	35	M16	1	4.2
	MD63F-130	36	130	63	87	M16	1	5.3
	MD63F-140	36	140	63	92	M16	1	5.5
	MD63F-140R	36	140	63	80	M16	2	5.7
	MD63F-195	36	195	63	152	M16	1	6.8
	MD63F-230	36	230	63	187	M16	1	7.5
	MD63F-240R	36	240	63	190	M16	2	7.8
	MD80F-75	45	75	80	36	M16	1	4.3
	MD80F-110	45	110	80	69	M16	1	5.7
	MD80F-175	45	175	80	134	M16	1	8.0
	MD90F-75	45	75	90	36	M16	1	4.8
	MD90F-145	45	145	90	104	M16	1	7.4
	MD90F-195	45	195	90	154	M16	1	9.4

적용콜렛 **E57, E84**

• 내부 쿨런트 시스템이 탑재되어 있습니다.

HSK-MD

모듈러 아버



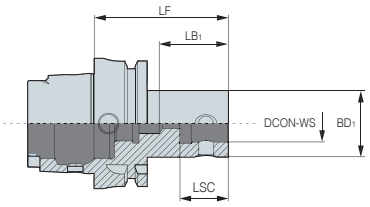


그림 1

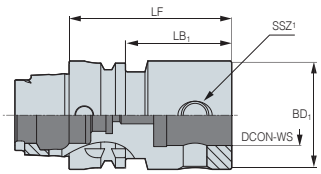


그림 2

(mm)

형 번		DCON-WS	LF	BD1	LB1	LSC	SSZ1	그림	kg
HSK63A-	MD19F-60	11	60	19	31	15.5	M5	1	0.7
	MD25F-60	14	60	25	31	18.5	M6	1	0.7
	MD32F-65	18	65	32	36	23.5	M8	1	0.8
	MD40F-70	22	70	40	41	29	M10	1	0.9
	MD50F-85	28	85	50	58	36	M12	1	1.3
	MD63F-95	36	95	63	69	46	M16	2	1.7
HSK100A-	MD19F-60	11	60	19	19	15.5	M5	1	2.1
	MD25F-60	14	60	25	20	18.5	M6	1	2.1
	MD32F-65	18	65	32	26	23.5	M8	1	2.1
	MD40F-70	22	70	40	38	29	M10	1	2.3
	MD50F-80	28	80	50	48	36	M12	1	2.6
	MD63F-90	36	90	63	58	46	M16	1	3
	MD80F-105	45	105	80	73	57	M16	1	4.2
	MD90F-105	45	105	90	76	57	M16	1	4.7

적용콜렛 E57, E84

• 내부 쿨런트 시스템은 옵션 탑재가 가능합니다.

부품

별도 구매품		
구 분	내부 클램프 볼트	렌치
부품 / 형번		
HSK63A	HSK63A-CNS	HSK63-WRENCHI(C)
HSK100A	HSK100A-CNS	HSK100-WRENCHI(C)

SK-MD

모듈러 아버



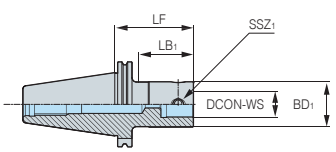


그림 1

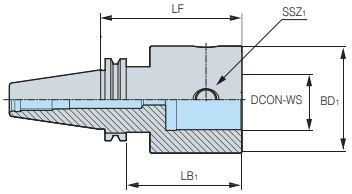


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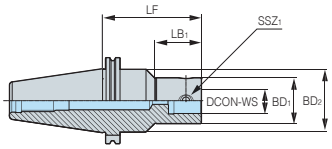


그림 3

(mm)

형 번		DCON-WS	LF	BD_1	BD_2	LB_1	SSZ_1	그림	kg
SK40-	MD19F-80R	11	80	19	30	12	M5	3	1.0
	MD25F-80R	14	80	25	35	22	M6	3	1.1
	MD32F-115R	18	115	32	42	36	M8	3	1.5
	MD40F-60	22	60	40	-	40	M10	1	1.1
	MD40F-100	22	100	40	-	79	M10	1	1.4
	MD50F-75	28	75	50	-	55	M10	1	1.5
	MD50F-100	28	100	50	-	80	M12	1	1.8
	MD63F-70	36	70	63	-	50	M16	2	1.4
SK50-	MD19F-85R	11	85	19	40	12	M5	3	3.0
	MD25F-80R	14	80	25	44	22	M6	3	3.1
	MD25F-105R	14	105	25	44	22	M6	3	3.3
	MD32F-110	18	110	32	-	87	M8	1	3
	MD32F-110R	18	110	32	50	36	M8	3	3.5
	MD40F-100	22	100	40	-	75	M10	1	3.2
	MD40F-145	22	145	40	-	120	M10	1	3.5
	MD40F-220R	22	220	40	60	83	M10	3	5.6
	MD50F-125R	28	125	50	65	60	M12	3	4.3
	MD50F-240R	28	240	50	65	125	M12	3	6.6
	MD63F-75	36	75	63	-	52	M16	1	3.6
	MD63F-130	36	130	63	-	107	M16	1	4.7
	MD63F-230R	36	230	63	80	149	M16	3	7.9
	MD80F-95	45	95	80	-	75	M16	1	4.8
	MD80F-150	45	150	80	-	130	M16	1	6.8
	MD90F-115	45	115	90	-	95	M16	2	6.3
	MD90F-165	45	165	90	-	145	M16	2	8.1

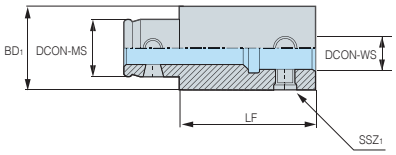
적용콜렛 **E57, E84**

• 내부 쿨런트 시스템이 탑재되어 있습니다.

EXT

익스텐션 바





(mm)

형 번		DCON-MS	LF	BD1	DCON-WS	SSZ1	kg
EXT	1930F	11	30	19	11	M5	0.1
	1950F	11	50	19	11	M5	0.1
	2530F	14	30	25	14	M6	0.1
	2550F	14	50	25	14	M6	0.2
	3235F	18	35	32	18	M8	0.2
	3260F	18	60	32	18	M8	0.4
	4040F	22	40	40	22	M10	0.4
	4090F	22	90	40	22	M10	0.9
	5050F	28	50	50	28	M12	0.7
	50100F	28	100	50	28	M12	1.4
	6360F	36	60	63	36	M16	1.4
	63120F	36	120	63	36	M16	2.9
	8070F	45	70	80	45	M16	2.5
	80120F	45	120	80	45	M16	4.5
	9080F	45	80	90	45	M16	3.8
	90130F	45	130	90	45	M16	6.4

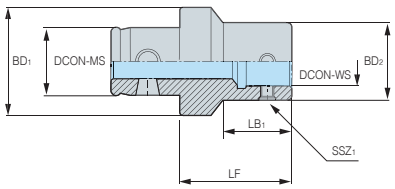
적용콜렛 E57, E84

• 내부 쿨런트 시스템이 탑재되어 있습니다.

RDC

레듀서 바





(mm)

형 번		DCON-MS	LF	BD1	DCON-WS	BD2	LB1	SSZ1	kg
RDC	3225F	18	30	32	14	25	17.25	M6	0.1
	4025F	22	30	40	14	25	16.53	M6	0.3
	4032F	22	30	40	18	32	18.55	M8	0.2
	5025F	28	30	50	14	25	16.36	M6	0.3
	5032F	28	40	50	18	32	21.75	M8	0.3
	5040F	28	40	50	22	40	24.75	M10	0.5
	6325F	36	30	63	14	25	15.84	M6	0.6
	6332F	36	40	63	18	32	29.62	M8	0.6
	6340F	36	40	63	22	40	26.85	M10	0.7
	6350F	36	45	63	28	50	33.19	M12	0.9
	8040F	45	40	80	22	40	24.57	M10	1.2
	8050F	45	45	80	28	50	30.91	M12	1.3
	8063F	45	50	80	36	63	34.66	M16	1.6

적용콜렛 E57, E84

• 내부 쿨런트 시스템이 탑재되어 있습니다.

ANGULAR HEAD_앵귤러헤드

ANGULAR HEAD

솔리드타입의 강점

1대의 장비로 2대의 효과, 다양한 각도 가공가능, 알루미늄 바디 적용으로 경량화



형번표기법

BT50	-	KHU	10	-	195
스핀들		Angular Head	최대 척킹경		길이

각부 명칭

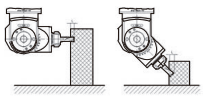
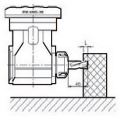
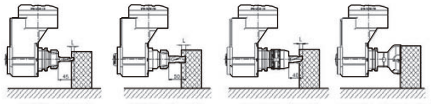




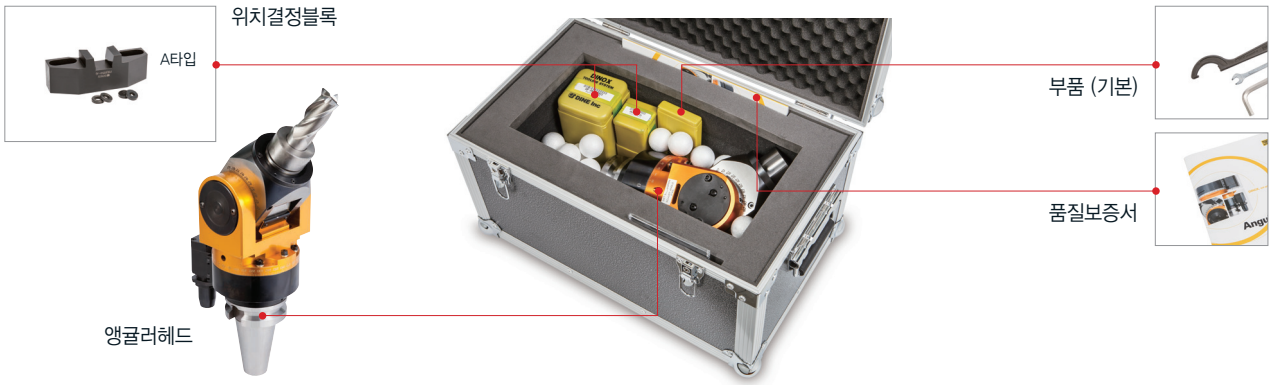
포지셔닝 핀 세부사항



다양한 가공

			
0~90° 경사각 조절 앵귤러헤드 (MAH, KHU)	경사각 고정 90° 타입 앵귤러헤드 (KAH)	경사각 고정 45° 타입 앵귤러헤드 (KAC)	어테치먼트 타입 앵귤러헤드 (HRAG, KAG)

구성품



MAH

Universal type MAH (Reinforced series)
각도 조절타입 앵귤러헤드

• 유니버셜 타입 기존 제품의 성능을 개선하여 금형가공에 탁월한 MAH

- 대형 금형 가공의 안정적인 작업
- 공구 지름(D) 32mm Ball Endmill 사용 가능



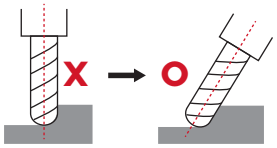
KHU

Universal type KHU (Free angle)
각도 조절타입 앵귤러헤드

• 자유로운 가공이 가능한 각도 조절 타입 앵귤러헤드

- 상하 0° ~90° , 좌우 360° 로 가공각도 조정이 자유로움.
- Tap전용 Collet 사용 시 사전에 문의 요망
- HSK, SK타입은 주문제작 가능





볼 엔드밀 날의 마모 및 공작물의 면조도 불량이 발생하므로 볼 엔드밀의 인선을 경사지게 가공

HRAG

Attachment type HRAG (Reinforced type)
어테치먼트 타입 앵귤러헤드

• 어테치먼트 타입 bracket의 강성이 200% 향상된 HRAG

- Face mill cutter의 안정적인 작업
- BT50의 shank에서도 bracket의 분해 조립이 쉬워 가공기계와의 호환성 향상
- 제품의 life cycle 향상



KAG

Attachment type KAG
어테치먼트 타입 앵귤러헤드

• 좌우 360°로 가공각도 조정이 자유로움

- BT40, BT30의 다양한 공구를 장착하여 사용이 가능
- HSK, SK타입은 주문제작
- Coolant type 별도 주문



KAH

Modular type KAH (90° type)
각도 고정타입 앵귤러헤드

• 자유로운 가공이 가능한 각도 조절 타입 앵귤러헤드

- 좌우 360° 로 가공각도를 임의대로 조정하여 사용이 가능
- Tap 전용 Collet 사용 시 사전에 문의 요망
- HSK, SK type은 주문 제작



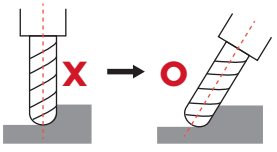
KAC

Modular type KAC (45° type)
각도 고정타입 앵귤러헤드

• 자유로운 가공이 가능한 각도 고정 타입 앵귤러헤드

- 좌우 360° 로 가공각도를 임의대로 조정하여 사용이 가능
- Tap 전용 Collet 사용 시 사전에 문의 요망
- 45° 각도 고정타입 앵귤러 헤드
- BT40 타입은 별도 문의





볼 엔드밀 날의 마모 및 공작물의 면조도 불량이 발생하므로 볼 엔드밀의 인선을 경사지게 가공

KAH(90° type)_각도 고정타입

BT-KAH



특징

자유로운 가공이 가능한 각도 조절 타입 앵귤러헤드

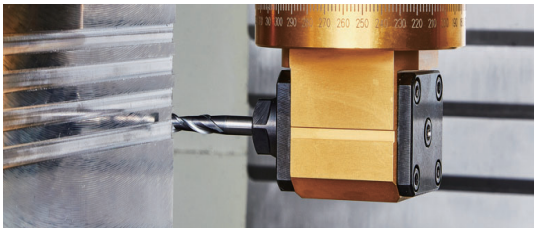
- 좌우 360°로 가공 각도를 임의대로 조정하여 사용이 가능
- HSK, SK타입은 주문 제작 합니다.
- ATC(자동 공구 교환) 가능
- Spindle과 반대 방향으로 공구 회전

소형 KAH 특징

- 소형장비 (BT30)에서 사용 가능한 소형 앵귤러 헤드
- 무게 2.6kg 가벼운 무게로 장비에 설치가 용이함
- 다면가공을 시스템화한 앵귤러헤드
- 좌우 360°로 가공 각도 조정이 자유로움
- 사용콜렛 : ER11

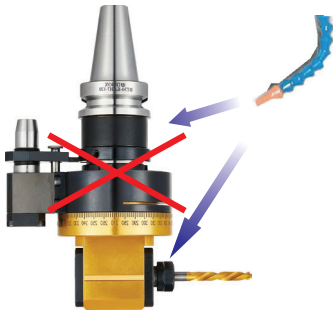
BT-KAH 구조(회전 방식)

- 스파이럴 베벨기어 사용 (축각 90°)
- 진동 및 소음 감소
- 백래쉬가 작음
- 1:1 기어비 사용으로 복잡한 계산 없이 사용 가능
- 스핀들 대비 역회전 방향 (CW:CCW)



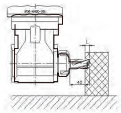
주의사항

- Angular head 본체에 직접적인 절삭유 분사하지 말 것



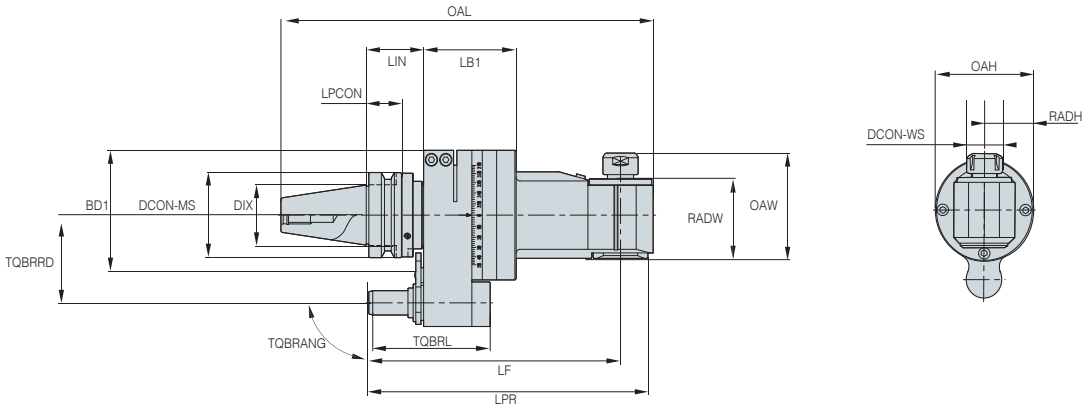
가공사례

Model : BT50-KAH20-200

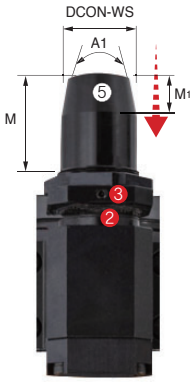
Cutting tool	가공물	가공깊이	회전수(RPMX)	Feed (mm/min)	Feed (mm/rev)	BT50-KAH20-200
Ø16-2 Flute Endmill(HSS), Over length-40mm	S45C	3	700	98	0.14	
	S45C	4	500	60	0.12	
	Al	7	900	72	0.08	
	Al	4	1800	144	0.08	

부품

Angular head	기본 구성품		별도 구매품	포지셔닝 블록
	Nut	Spanner	GERC Collet	Positioning Block
KAH7	R11-AH	S-17	GERC11-ØD	
KHU10	R16-AH(M20)	S-25	GERC16-ØD	
KAH13	RU20-AH	35-38	GERC20-ØD	
KHU20	RU32-AH	48-52	GERC32-ØD	



포지셔닝 핀



샹크사이즈	M	M1	A1	DCON-WS
BT30	Max : 23 Min : 17	8	20°	Ø15
BT40	Max : 32 Min : 26	10	20°	Ø19.6
BT50	Max : 35 Min : 29	15	20°	Ø28

NO	명 칭
①	헤드
②	회전각도 분할 눈금(360° 자유롭게 선택 가능)
③	포지셔닝 핀 부분
④	조우키
⑤	높이 조절 렌치 홀

NO	부품명	형 번
1	헤드 고정 볼트	BX0618
2	세트 나사	BT0404
3	고정 볼트	BX50630

형 번		DCON-MS	DIX	BD1	TQBRRD	OAH	DCON-WS	RADH	LF	LPR	TQBRL	TQBRANG	LPCON	LIN	LB1	OAL	RADW	OAW	기어비	RPMX	적용콜렛	kg
BT30-	KAH7-120	46	42	72	55	40	11	20	120	140	61	90	22	56	39	188.4	24.5	61.5	1:1	5,000	GERC11	2.6
BT40-	KAH7-170	63	50	96	65	40	11	20	170	190	94	90	27	44	71	255.4	24.5	61.5	1:1	5,000	GERC11	5.8
	KAH10-195	63	50	96	65	58	16	29	195	220	94	90	27	44	71	285.4	32	78	1:1	5,000	GERC16	6.2
	KAH13-165	63	50	96	65	60	20	30	165	193	94	90	27	44	71	258.4	35	88	1:1	5,000	GERC20	6.0
	KAH20-180	63	50	96	65	76	32	38	180	218	94	90	27	44	71	283.4	49	120	1:1	3,500	GERC32	7.5
BT50-	KAH07-220	100	87	114	80	40	11	20	220	240	104	90	38	57	54	341.8	24.5	61.5	1:1	3,500	GERC11	10.7
	KAH10-215	100	87	114	80	58	16	29	215	240	104	90	38	57	54	341.8	32	78	1:1	3,500	GERC16	11.0
	KAH10-260	100	87	114	80	58	16	29	260	285	104	90	38	57	54	386.8	32	78	1:1	3,500	GERC16	11.4
	KAH13-260	100	87	114	80	60	20	30	260	288	104	90	38	57	54	389.8	35	88	1:1	3,500	GERC20	12.0
	KAH20-200	100	87	114	80	76	32	38	200	238	104	90	38	57	54	339.8	49	120	1:1	3,500	GERC32	11.6
	KAH20-240	100	87	114	80	76	32	38	240	278	140	90	38	57	54	379.8	49	120	1:1	3,500	GERC32	13.5

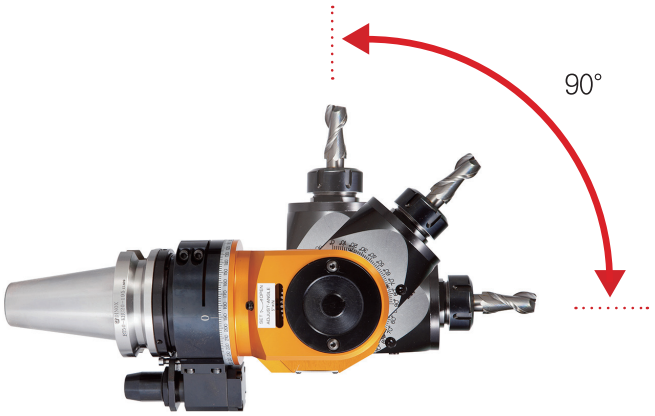
KHU(Free angle)_각도 조절 타입(0°–90°)

BT-KHU

특징

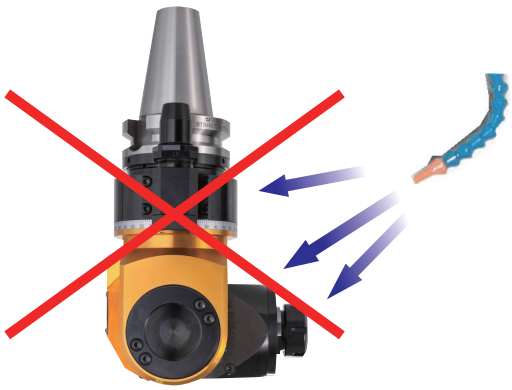
자유로운 가공이 가능한 각도 조절 타입 앵귤러헤드

- 상하 0°~ 90°, 좌우 360°로 가공 각도 조정이 자유로움
- HSK, SK타입은 주문 제작 합니다

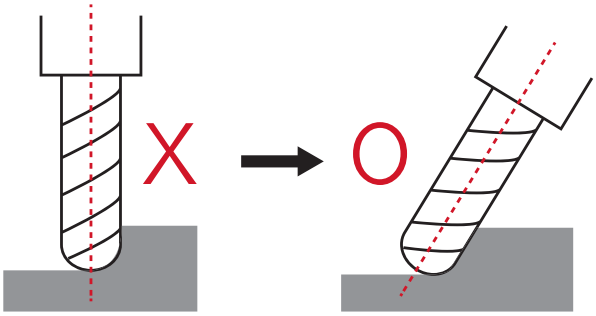


주의사항

Angular head 본체에 직접적인 절삭유 분사하지 마십시오.



볼 엔드밀 날의 마모 및 공작물의 면조도 불량이 발생하므로
볼 엔드밀의 인선을 경사지게 가공 하십시오.



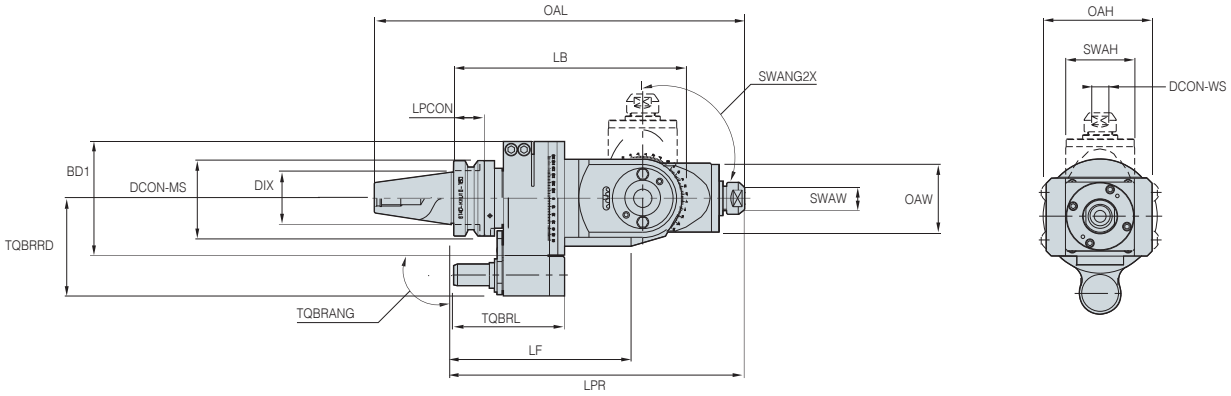
가공사례

Model : BT50-KHU20-195

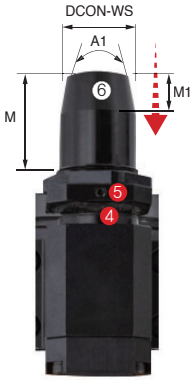
Cutting tool	가공물	절입깊이	회전수(RPMX)	Feed (mm/min)	Feed (mm/rev)	Cutting angle
Ø16-2 Flute Endmill(HSS), Over length-40mm	S45C	2	600	48	0.08	90°
	AL	3	1200	168	0.14	90°
	S45C	3	600	48	0.08	45°
	AL	5	1200	144	0.12	45°

부품

Angular head	기본 구성품		별도 구매품
	Nut	Spanner	GERC Collet
KHU10	R16-AH	S-25	GERC16-ØD
KHU20	RU32-AH	48-52	GERC32-ØD



포지셔닝 핀



샹크사이즈	M	M1	A	DCON-WS
BT40	Max : 32 Min : 26	10	20°	Ø19.6
BT50	Max : 35 Min : 29	15	20°	Ø28

NO	명 칭
①	경사각도 분할 눈금(상하 0~90° 각도 분할 가능)
②	회전각도 분할 눈금(360° 자유롭게 선택 가능)
③	헤드
④	포지셔닝 핀 부분
⑤	조우키
⑥	높이 조절 렌치 홀

NO	부품명	형 번
1	Tilt Axies 고정 볼트	BH0630
2	브라켓 각도 고정 볼트	BX0630
3	포지션 블록, 고정 볼트	BX0512
4	세트 나사	BT0404
5	고정 볼트	BX05630

형 번		DCON-MS	DIX	BD1	TABBRD	LF	LPR	TQBRL	TQBRANG	LB	OAL	LPCON	SWANG2X	SWAW	OAW	OAH	SWAH	DCON-WS	기어비	스핀들 대비 회전방향	RPMX	적용콜렛	
BT40-	KHU10-160	63	54	96	65	160	247	94	90	193	312.4	27	90	58	66	90	58	16	1:2	정회전	6,000	GERC16	8.3
BT50-	KHU10-180	100	87	114	80	180	267	104	90	213	368.8	38	90	58	66	90	58	16	1:2	정회전	6,000	GERC16	11.5
	KHU20-195	100	90	114	80	195	316	104	90	242	417.8	38	90	84	94	128	84	32	1:1	정회전	3,000	GERC32	17.9

Attachmaent type KAG_어테치먼트 타입

BT-KAG

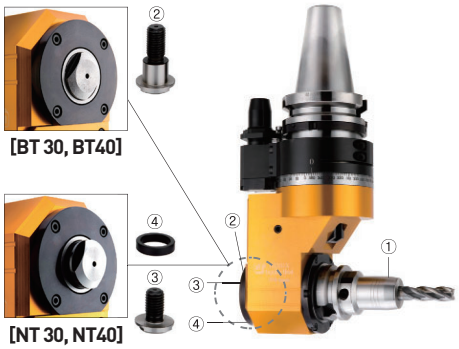


특징

- 좌우 360°로 가공 각도 조정이 자유로움
- BT40, BT50의 다양한 공구를 장착하여 사용이 가능
- HSK, SK타입은 주문 제작 합니다
- Coolant type 별도 주문

공구 체결 방법

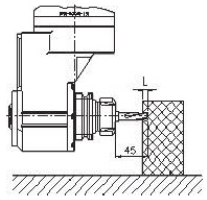
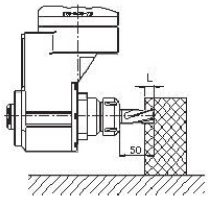
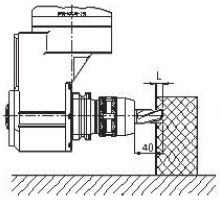
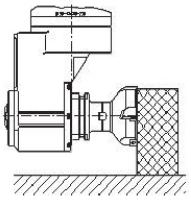
1. 공구 체결은 공구 ①을 Angular Head 스핀들에 삽입합니다.
2. 고정볼트 ②를 이용하여 공구 ①을 견고하게 고정시킵니다.(BT타입)
3. 볼트 ③에 링 ④을 끼워 공구 ①을 견고하게 고정시킵니다.(NT타입)

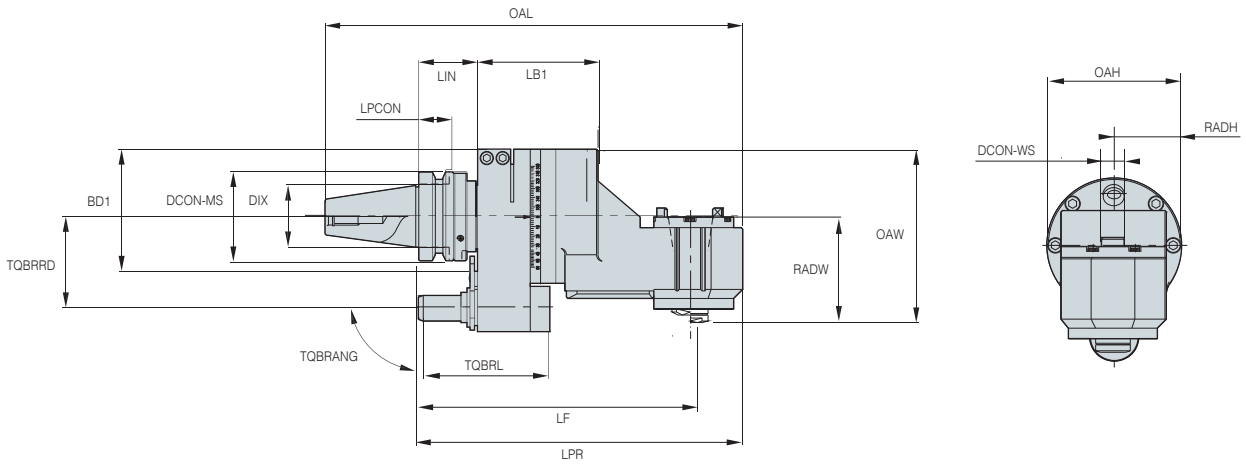


가공사례

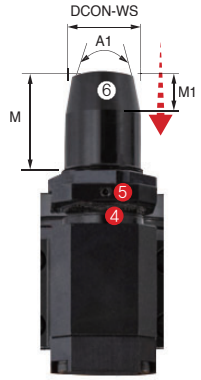
Model : BT50-KAG40-230

Cutting tool	가공물	절입깊이	회전수(RPMX)	Feed (mm/min)	Feed (mm/rev)
BT40-SDC20-60 Ø12-2 Flute Endmill (HSS)	S45C	3	400	72	0.09
	S45C	3	200	36	0.09
NT40-SDC20-60 Ø20-2 Flute Endmill (HSS)	S45C	4	500	50	0.05
	AL	10	1,000	100	0.05
BT40-NPM20-85 Ø20-2 Flute Endmill (HSS) over hang 40mm	S45C	3	400	72	0.09
	S45C	3	400	36	0.09
	AL	5	400	72	0.09
	AL	5	480	86	0.09
	AL	10	400	72	0.09
	AL	10	320	58	0.09
BT40-FMA25.4-45 Ø80 Shoulder mill (5 Flute-50L)	S45C	2	400	120	-
	S45C	1	200	60	-
	AL	2	600	150	-
	AL	1	600	150	-

BT40-SDC20-60 (Ø12 E/M)	NT40-SDC20-60 (Ø20 E/M)	BT40-NPM20-85 (Ø20 E/M)	BT40-FMA25.4-45 (Ø80 Shoulder Mill)
			



포지셔닝 핀



샹크사이즈	M	M1	A	DCON-WS
BT40	Max : 32 Min : 26	10	20°	Ø19.6
BT50	Max : 35 Min : 29	15	20°	Ø28

NO	명 칭
①	회전각도 분할 눈금(360° 자유롭게 선택 가능)
②	헤드
③	포지셔닝 핀 부분
④	조우키
⑤	높이 조절 렌치 홀

NO	부품명	형 번
1	Set 나사	BT0404
2	고정 볼트	BX50630
3	BT/NT 볼트	

형 번	DCON-MS	DIX	BD1	TQBRRD	LF	LPR	TQBRL	TQBRANG	OAL	LIN	LB1	LPCON
BT40- KAG30-195	63	50	96	65	195	232.5	94	90	297.9	44	86	27
	RADW		OAW		OAH	DCNWS	RADH	기어비	스핀들 대비 회전방향	RPMX	장착홀더 샹크	kg
	BT	NT	BT	NT								
	70	76.4	118	124.4	75	31.75	37.5	1:1	정회전	4,000	BT/NT30	7.2

형 번	DCON-MS	DIX	BD1	TQBRRD	LF	LPR	TQBRL	TQBRANG	OAL	LIN	LB1	LPCON
BT50- KAG40-230	100	87	114	80	230	276.5	104	90	378.3	57	88	38
	RADW		OAW		OAH	DCNWS	RADH	기어비	스핀들 대비 회전방향	RPMX	장착홀더 샹크	kg
	BT	NT	BT	NT								
	95	102	152	159	93	44.45	46.5	1:1	정회전	3,000	BT/NT30	15.7

Attachment type HRAG(Reinforced)_어테치먼트 타입

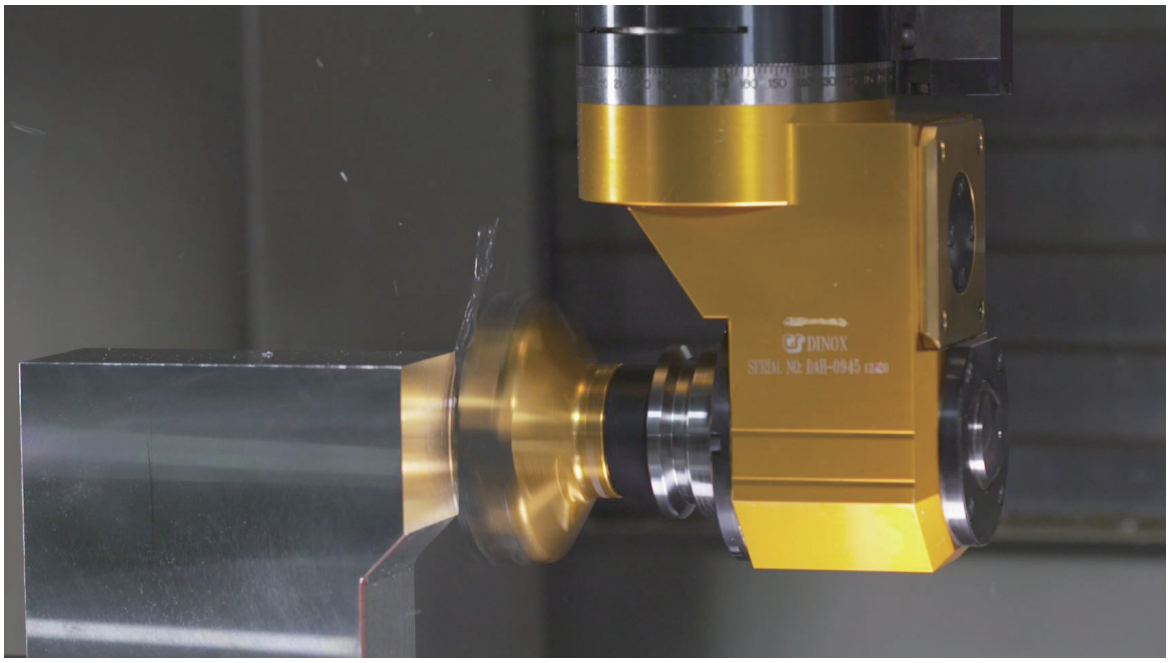
BT-HRAG

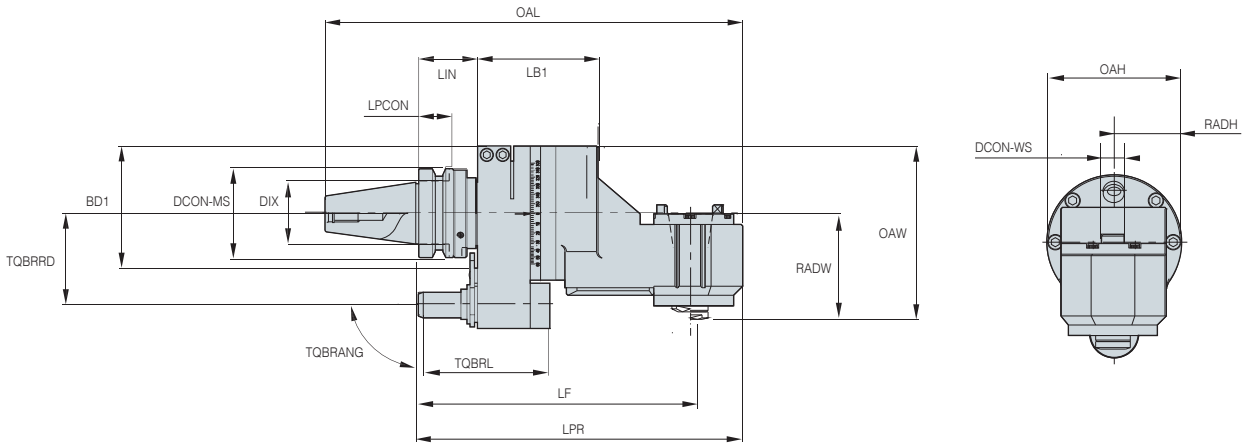


특징

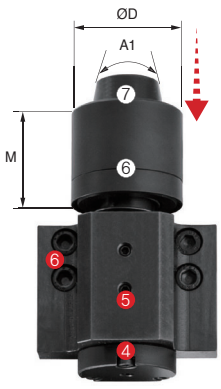
어테치먼트 타입 braket의 강성이 200% 향상된 HRAG

- Face mill cutter의 안정적인 작업
- BT50의 shank에서도 braket의 분해 조립이 쉬워 가공기계와의 호환성 향상
- 제품 수명 향상





포지셔닝 핀



샹크사이즈	M	A	DCON-WS
BT50	56.5	20°	Ø40

NO	명 칭
①	회전각도 분할 눈금(360° 조정)
②	헤드
③	포지셔닝 핀 부분
④	조우키
⑤	포지셔닝 링
⑥	포지셔닝 커버
⑦	포지셔닝 핀

NO	부품명	형 번
1	헤드 고정 볼트	BX0660
2	포지셔닝링 Set 나사	MSST5-12
3	회전 각도 분할눈금 나사	BT0648
4	포지셔닝핀 높이 조절 나사	BT0516
5	포지셔닝 핀 Set 나사	BT0512
6	바디 포지션 블록 Set 나사	BT0516
7	BT / NT 볼트	

형 번	DCON-MS	DIX	BD1	TQBRRD	LF	LPR	TQBRL	TQBRANG	OAL	LIN	LB1	LPCON
BT50- HRAG40-230	100	88	136	80	230	276.5	103	90	378.3	57	88	38

RADW		OAW		OAH	DCNWS	RADH	RPMX	장착툴 샹크	kg
BT	NT	BT	NT						
95	102	163	170	93	44.45	46.5	3000	BT/NT30	18.2

강성 보강형 MAH(Reinforced series)_ 각도 조절 타입(0°–90°)

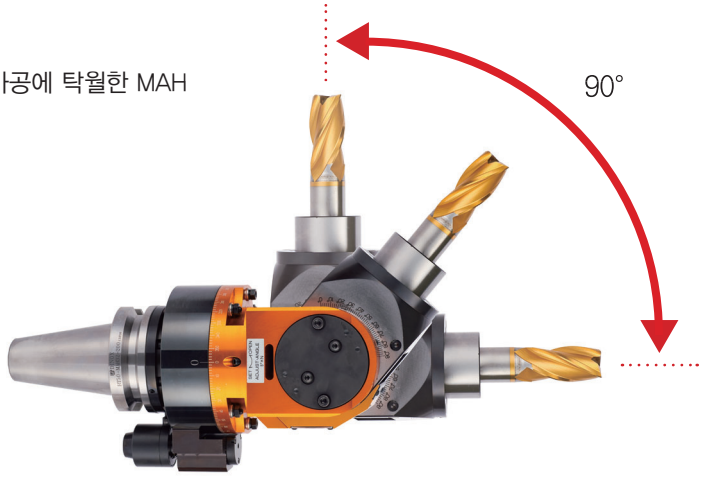
BT-MAH

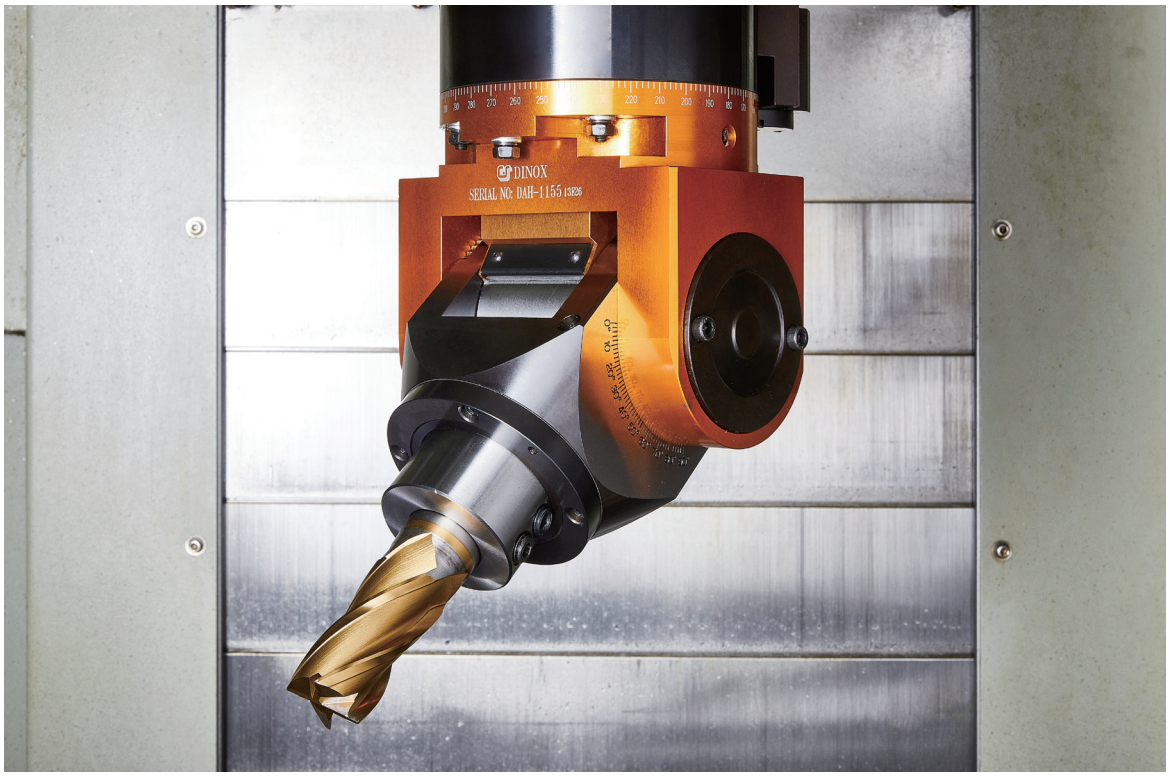
특징

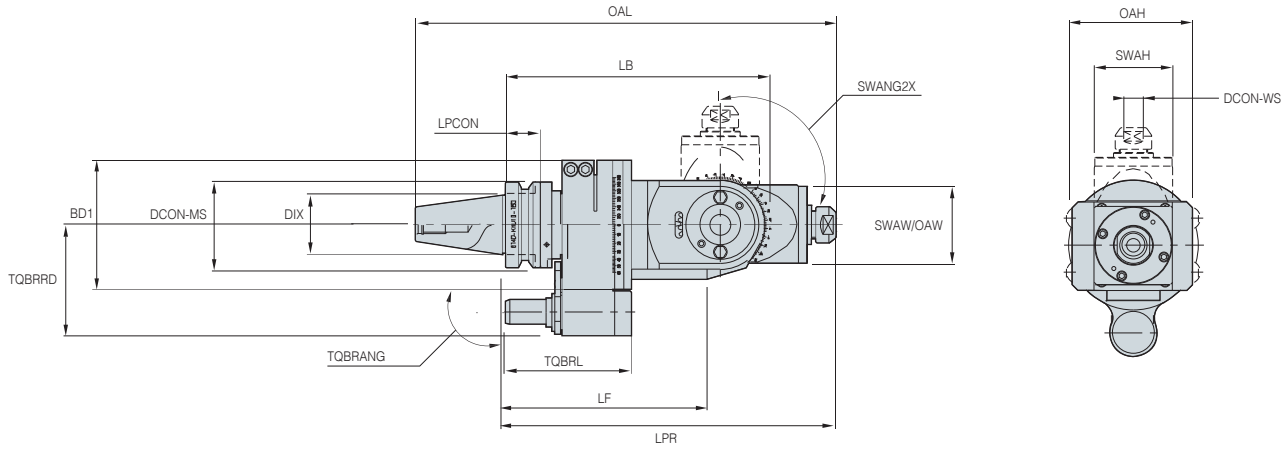
금형가공용 MAH

유니버셜 타입 기존 제품의 성능을 개선하여 금형가공에 탁월한 MAH

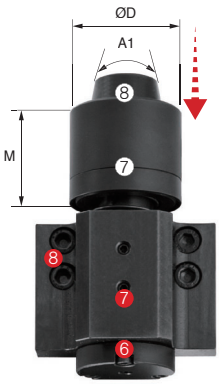
- 대형 금형 가공의 안정적인 작업
- 공구 지름(D) D32 Ball Endmill 사용 가능







포지셔닝 핀



샹크사이즈	M	A1	ØD
BT50	56.5	20°	Ø40

NO	명 칭
①	경사각도 분할 눈금(상하 0~90° 각도 분할 가능)
②	회전각도 분할 눈금(360° 조정)
③	헤드
④	포지셔닝 핀 부분
⑤	조우키
⑥	포지셔닝 링
⑦	포지셔닝 커버
⑧	포지셔닝 핀

NO	부품명	형 번
1	경사각도 분할눈금 나사	BT1216
2	헤드 고정 볼트	BT0645
3	회전각도 분할눈금 나사	BT0640
4	포지셔닝링 세트 나사	MSST5-12
5	Tilt Axies 고정 볼트	BH0616
6	포지셔닝 핀 높이 조절 나사	BT0516
7	포지셔닝 핀 세트 나사	BT0512
8	바디 포지션 블록 세트 볼트	BX0516

형 번	DCON-MS	DIX	BD1	TQBRRD	LF	LPR	TQBRL	TQBRANG	OAL	LB	LPCON
BT50- MAH32-200	100	55	136	80	200	325	103	90	426.8	247	38
	SWANG2X		SWAW / OAW		OAH	SWAH	DCON-WS	RPMX	공구장착		kg
	90		95		154	95	32	3,000	SIDE LOCK		19.6

KAC(45° type)_각도 고정타입

BT-KAC



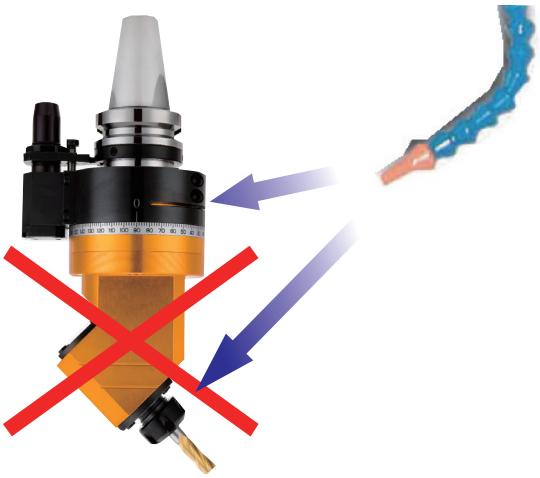
특징

자유로운 가공이 가능한 각도 고정 타입 앵귤러헤드

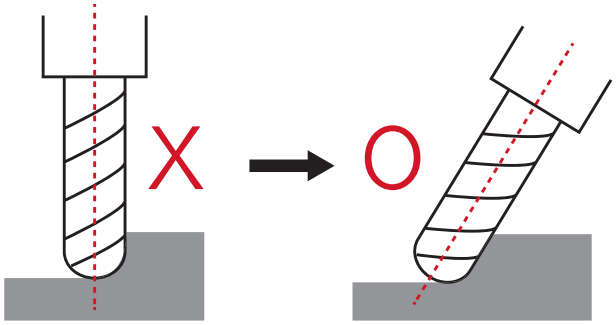
- 좌우 360°로 가공 각도를 임의대로 조정하여 사용이 가능
- 45°각도 고정타입 앵귤러 헤드
- BT40 타입은 별도 문의

주의사항

Angular head 본체에 직접적인 절삭유 분사하지 마십시오.



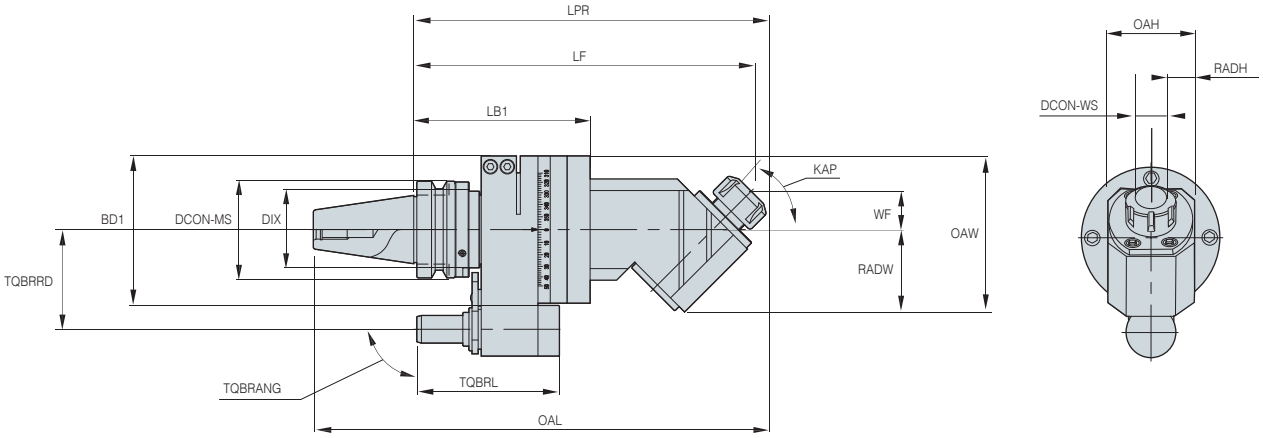
볼 엔드밀 날의 마모 및 공작물의 면조도 불량이 발생하므로
볼 엔드밀의 인선을 경사지게 가공하십시오.



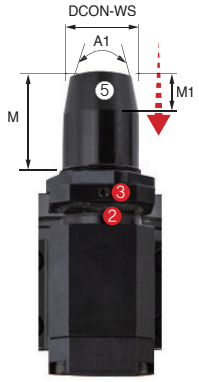
부품

Angular head	기본 구성품		별도 구매품
	Nut	Spanner	GERC Collet
KAC10	R16-AH (M20)	S-25	GERC16-ØD
KAC10	RU20-AH	35-38	GERC20-ØD
KAC20	RU32-AH	48-52	GERC32-ØD

※ Nut 주문 시 사전에 문의하여 주십시오.



포지셔닝 핀



샹크사이즈	M	M1	A	DCON-WS
BT40	Max : 32 Min : 26	10	20°	Ø19.6
BT50	Max : 35 Min : 29	15	20°	Ø28

NO	명 칭
①	헤드
②	회전각도 분할 눈금(360° 자유롭게 선택 가능)
③	포지셔닝 핀 부분
④	조우키
⑤	높이 조절 렌치 홀

NO	부품명	형 번
1	헤드 고정 볼트	**BX0618**
2	Set 나사	**BT0404**
3	고정 볼트	**BX0630**

형 번		DCON-MS	DIX	BD1	TQBRRD	OAL	TQBRL	TQBRANG	LPR	LF	LB1	OAW	WF	RADW	KAP	OAH	DCON-WS	RADH	RPMXX	적용콜렛	kg
BT50-	KAC10-240	100	87	114	80	350.8	104	90	249	240	111	102	25	54	45	60	16	30	5,000	GERC16	9.7
	KAC13-240	100	87	114	80	352.8	104	90	251	240	111	102	25	54	45	60	20	30	5,000	GERC20	10.7
	KAC20-250	100	87	114	80	367.8	104	90	266	250	111	108	30	60	45	72	32	36	3,500	GERC32	11.7

Slim Angular head_슬림 앵귤러헤드

BT-SAH



형번표기법

B50	-	SAH	6	-	277
Spindle		Slim Angular head	Tool Dia.		Length

- 좁은 폭 내부 가공용 앵귤러헤드 (최소 피삭재 내경 : Ø40, 최소가공폭 32mm)
- MAX 3,500RPMX, 스핀들 : 적용비율 1:1.37
- 가공범위 : Ø3, Ø4, Ø6

가공 특징

Min. Ø40 홀 (공구 돌출량 제외)	Min.32mm 틈새 (공구 돌출량 제외)
	

파지력

	측정	측정값(N-m)			
클램프 토크	2	2.5	3	3.5	4
파지력	측정불가	5.5	6.5	7	7

※ 콜렛의 적정 클램프 토크는 3.5N-m

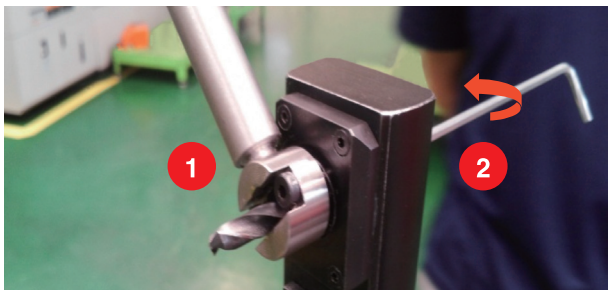
전용 콜렛



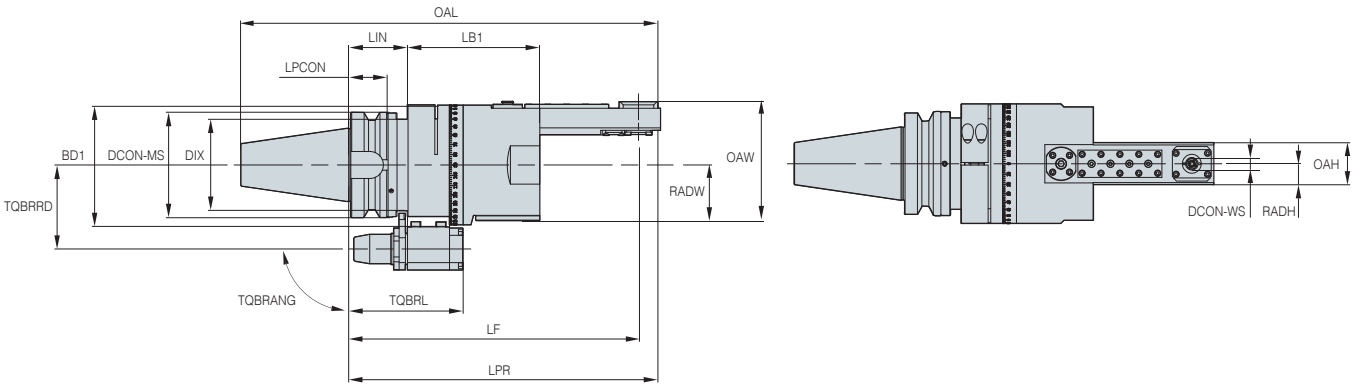
● 표시 : 재고관리품

형 번	체결범위	Stock
SAH6-C3	3	●
SAH6-C4	4	●
SAH-C6	6	●

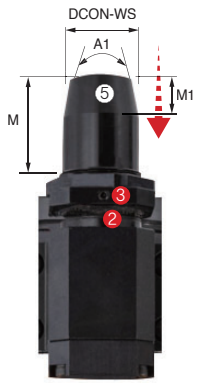
체결 방법



1. 툴을 SAH 전용 콜렛과 결합
2. 결합한 툴을 SAH에 삽입 후 체결 전용 치구로 고정
3. 육모렌치로 볼트를 회전하여 클램핑



포지셔닝 핀



NO	명 칭
①	헤드
②	회전각도 분할 눈금(360° 자유롭게 선택 가능)
③	포지셔닝 핀 부분
④	조우키
⑤	높이 조절 렌치 홀

샹크사이즈	M	M1	A	DCON-WS
BT50	Max : 35 Min : 29	15	20°	Ø28

NO	부품명	형 번
1	헤드 고정 볼트	BX0618
2	Set 나사	BT0404
3	고정 볼트	BX0630

형 번	DCON-MS	DIX	BD1	TQBRRD	LF	LPR	TQBRL	TQBRANG	OAL	LIN	LB1	LPCON	OAW	RADW	OAH	DCON-WS	RADH	회전비율 (IN:OUT)	회전방향	RPMXX	kg
BT50- SAH6-277	100	87	114	80	277	298	104	90	399.8	57	126	38	113	53	40	10	20	1:1.37	CW:CW	3,500	15.2

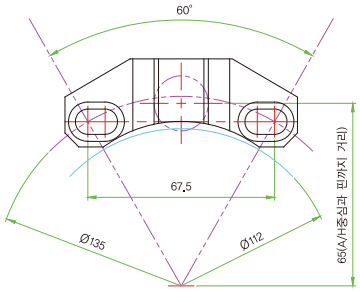
위치 결정블록 (BT40용)

POSITIONING BLOCK

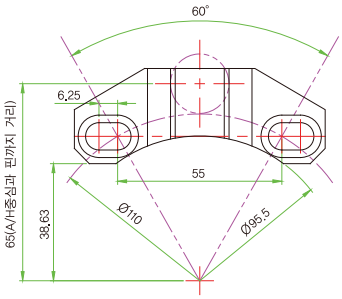
기계에 위치결정블록 설치방법

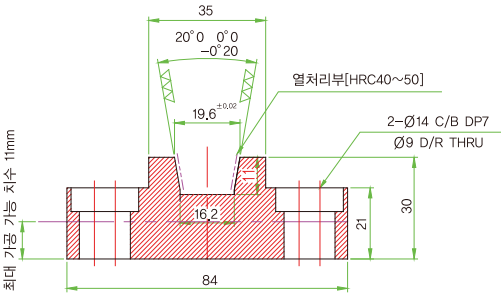
BT40용 고객표준타입-A그룹(60도) Standard type-A(60°)

- 최소 PCD 110일때
- 스핀들 직경 Ø94이하 가능
- 볼트간 거리 55mm



- 최대 PCD 135일때
- 스핀들 직경 Ø112이하 가능
- 볼트간 거리 67.5mm



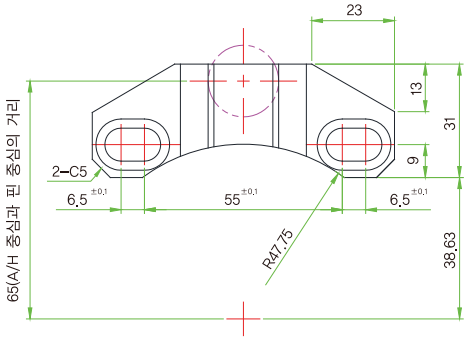


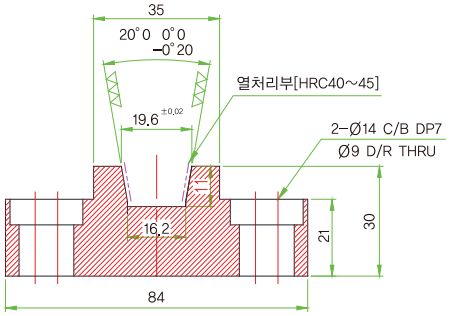
Semi-finishing : 블록의 높이 가공 필요

- 간섭이 되지 않도록 블록 높이를 직접 블록 바닥을 가공하여 사용

※ 최소 블럭높이 : 19mm (상면 기준)

- 테이퍼부만 열처리
- 기본 M10로 하고 M8이하는 와셔 공급





※(주)다인정공에서는 위치결정 블록 타입을 기본으로 제공합니다. (BT30 Angular Head 제외)

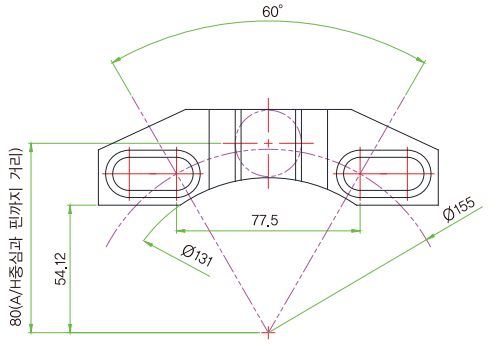
위치 결정블록 (BT50용)

POSITIONING BLOCK

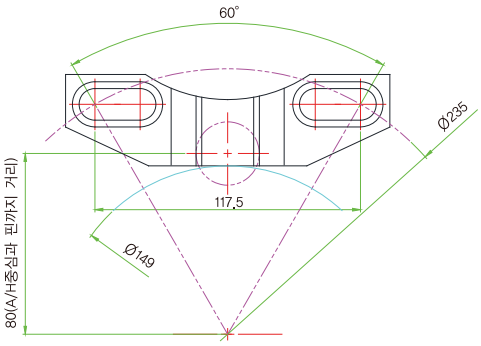
기계에 위치결정블록 설치방법

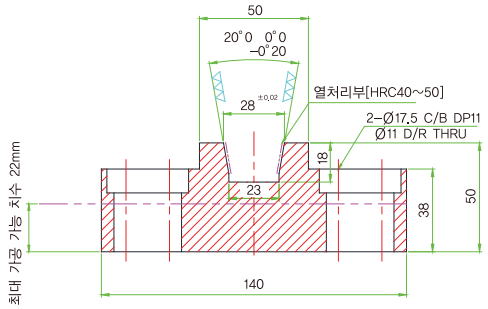
BT50용 고객표준타입-A그룹(60도) Standard type-A(60°)

- 최소 PCD 155일때
- 스핀들 직경 Ø130이하 가능
- 볼트간 거리 77.5mm



- 최대 PCD 235일때
- 스핀들 직경 Ø148이하 가능
- 볼트간 거리 117.5mm

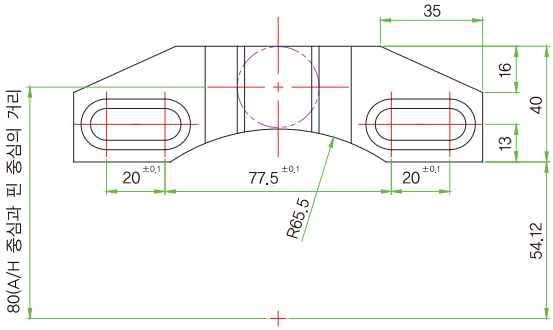


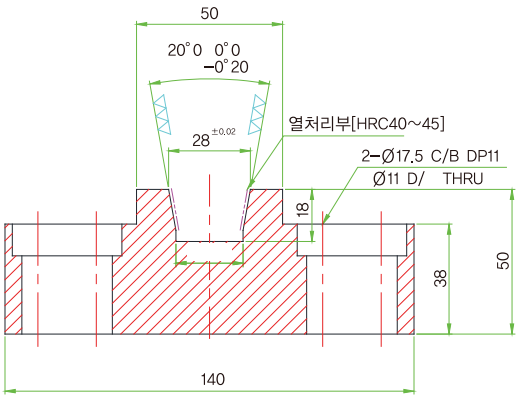


- Semi-finishing : 블록의 높이 가공 필요
- 간섭이 되지 않도록 블록 높이를 결정 후 고객이 직접 블록 바닥을 가공하여 사용

※ 최소 블럭높이 : 28mm (상면 기준)

- 테이퍼부만 열처리
- 기본 M10으로 하고 M8이하는 와셔 공급





※(주)다인정공에서는 위치결정 블록 타입을 기본으로 제공합니다. (BT30 Angular Head 제외)

Air Turbine Machine_에어 스핀들

ATM



형번표기법

BT50	-	ATM	6	228	-	(ATC)
Spindle		Air Turbine Machine	Tool Dia.	Length		ATC : Auto Tool Change Type NON : General

특징

- 증속기와 달리 압축공기 이용한 내부 터빈 고속 회전 (50,000 RPMX) 가공
- 고압의 압축공기 / 절삭유 공급만으로 기존 MCT 호환 사용
- 장비 노후여부에 제한없이 고속/정밀 가공 가능
- 빠른 열 배출로 장시간 연속 가공 가능

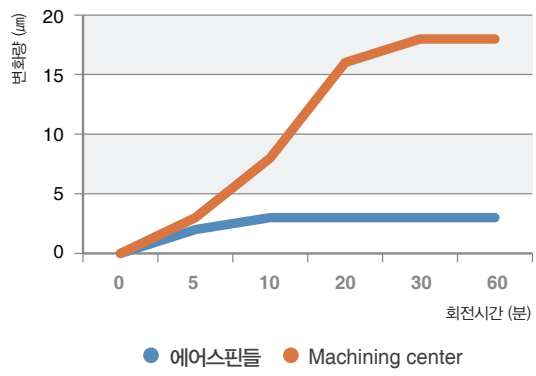
Air Spindle이란?

에어 스핀들은 압축공기를 이용한 고속회전(50,000RPMX)이 가능하여 표준(구형) 머시닝 센터에서도 고속 가공기와 같은 성능 구현이 가능 합니다.

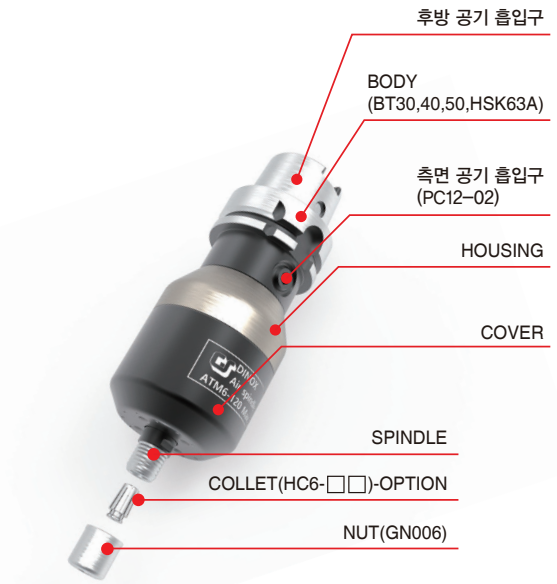
열변형 방지

- 에어 블레이드 회전 방식으로 스핀들의 온도 상승 방지 가능
- 스핀들의 열변형에 의한 Z 축 변형 방지

회전 시간에 따른 Z축 변화



명칭 소개



AIR SPINDLE

General Type



사용방법

- 주축 에어분사가 가능한 장비에서 사용
- 외부 에어호스 연결없이 ATC 가능

주의사항

- 주축 에어 분사 시 오일 등 이물질 유입에 주의



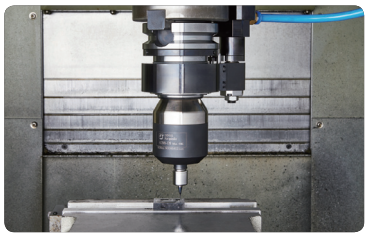
사용방법

- 외부에서 에어호스를 연결하여 사용
- 레귤레이터와 직접 연결되어 이물질 유입을 최소화

주의사항

- ATC 시 제품에서 호스를 분리해야함
- 주축 회전 시 주의

Auto Tool Change Type

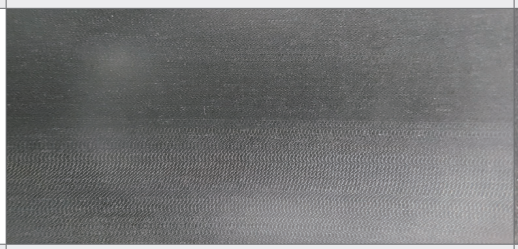


사용방법

- 에어 주축 관통이 안 되는 장비에서도 ATC 및 장비 회전이 가능하여 자동화 가능
- Positioning Block에서 에어 공급이 되어 ATC 및 장비 스핀들 회전 가능
- 공구 길이 보정 등 주축의 저속 회전에서도 사용 가능

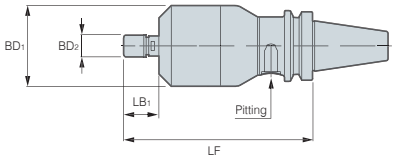
가공 테스트

에어 스핀들은 샹크와 바디가 조립형으로 되어있어 샹크(BT30,BT40,BT50,HSK63A)가 다른 장비에도 쉽게 적용이 가능합니다.

장 비	에어 스핀들 〈HSK63A-ATM6-170〉	Machining center 〈유압척〉
가공소재	SCM440 (HrC 40)	SCM440 (HrC 40)
회전속도	50,000 RPMX	20,000 RPMX
가공시간	146분	276분
축방향 변위	5㎛	21㎛
가공 표면		
비 고	가공속도 및 면조도 향상	면조도 및 공구 수명 저하

BT-ATM

Air Spindle General Type

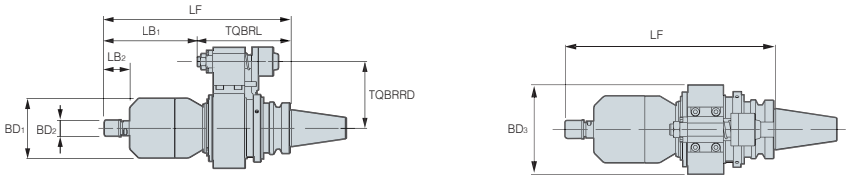


(mm)

형 번		BD1	BD2	LF	LB1	RPM(레귤레이터 기준)	Pitting
BT30	ATM6-176	72	19.5	176	31.5	MAX 50,000	PC12-02
BT40	ATM6-171	72	19.5	171	31.5	MAX 50,000	PC12-02
BT50	ATM6-182	72	19.5	182	31.5	MAX 50,000	PC12-02

• 내부 쿨런트 시스템 불가 제품입니다.

Air Spindle ATC Type



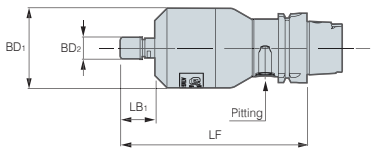
(mm)

형 번		BD1	BD2	BD3	LF	TQBRL	LB1	LB2	TQBRRD	RPM(레귤레이터 기준)
BT40	ATM6-227(ATC)	72	19.5	96	227	114	113	32	80	MAX.50,000
BT50	ATM6-228(ATC)	72	19.5	96	228	115	113	32	80	MAX.50,000

• 내부 쿨런트 시스템 불가 제품입니다.

HSK-ATM

Air Spindle General Type

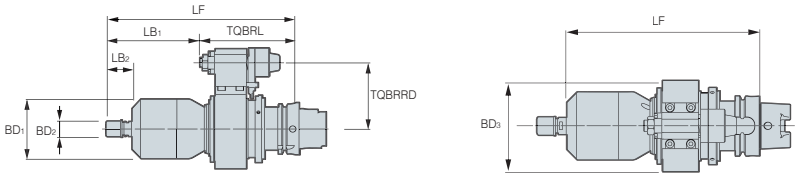


(mm)

형 번		BD1	BD2	LF	LB1	RPM(레귤레이터 기준)	Pitting
HSK63A	ATM6-170	72	19.5	170	31.5	MAX 50,000	PC12-02

• 내부 쿨런트 시스템 불가 제품입니다.

Air Spindle ATC Type



(mm)

형 번		BD1	BD2	BD3	LF	TQBRL	LB1	LB2	TQBRRD	RPM(레귤레이터 기준)
HSK63A	ATM6-235(ATC)	72	19.5	96	235	122	113	32	80	MAX.50,000

• 내부 쿨런트 시스템 불가 제품입니다.

에어 스핀들 관련 부품

ATM(U) SPARE PART

기본 구성품



(ATM)



(ATU)

부품

기본 구성품					
이미지					
	AIR SPINDLE	에어 레귤레이터	BX0310	SPANNER	너트
수량	1	1	2	1	1

Type	AIR SPINDLE					
Spec	ATM(U)6 (BT30,40,50,HSK63A)				ATM	ATM
	No	제품 구분	품 명	규 격	수 량	수 량
ATM components.	1	BASIC	ATM(U)6	□□□-ATM(U)6-□□□	1	1
	2		NUT	GN-06	1	1
	3		REGULATOR	TPC PP3-03BG	1	1
	4		PITTING	PC12-02	1	-
	5			PC12-03	1	2
	6		SPANNER	GSK6-SPANNER	1	1
	7			S16 SPANNER	1	1
	8			S17 SPANNER	-	1
	9		Wrench	LW-1.5	-	1
	10			LW-2.5	-	1
	11			LW-3.0	-	1
	12			LW-6.0	-	1

부품 (별도 구매품)

형 번	이미지	ØD1	L	MAX ØD	간격
HC6ØD(P)		10.5	25	6	1

포지셔닝 블록


각도조절형 에어 스핀들_(Universal Type)

ATU



형번표기법

B50	-	ATU	6	-	155
Spindle		Air Turbine Universal	Tool Dia.		Length

특징

- 각도조절로 다축 가공이 가능한 Air Spindle
- 공기주입 방식 선택 가능 (포지션 핀 또는 장비 주축)
- Auto Tool Change 사용 가능

제품 구조 및 특징

1) 각도조절

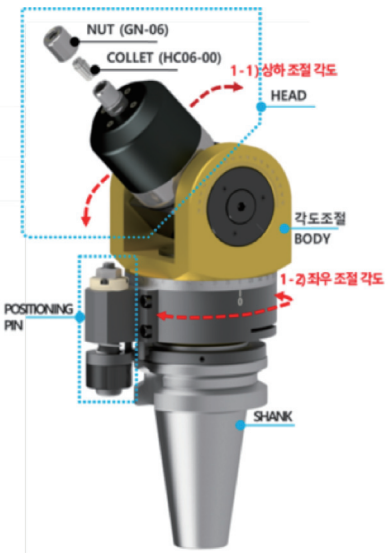
1–1) 상하 조절 각도 : –90˚ ~ +90˚

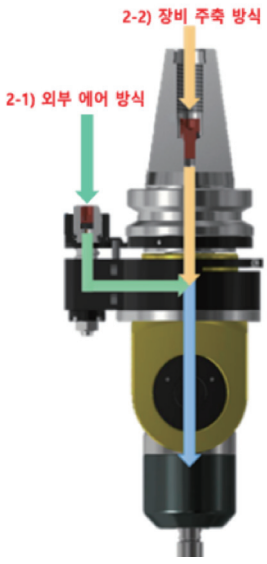
1–2) 좌우 조절 각도 : 0˚ ~ 360˚

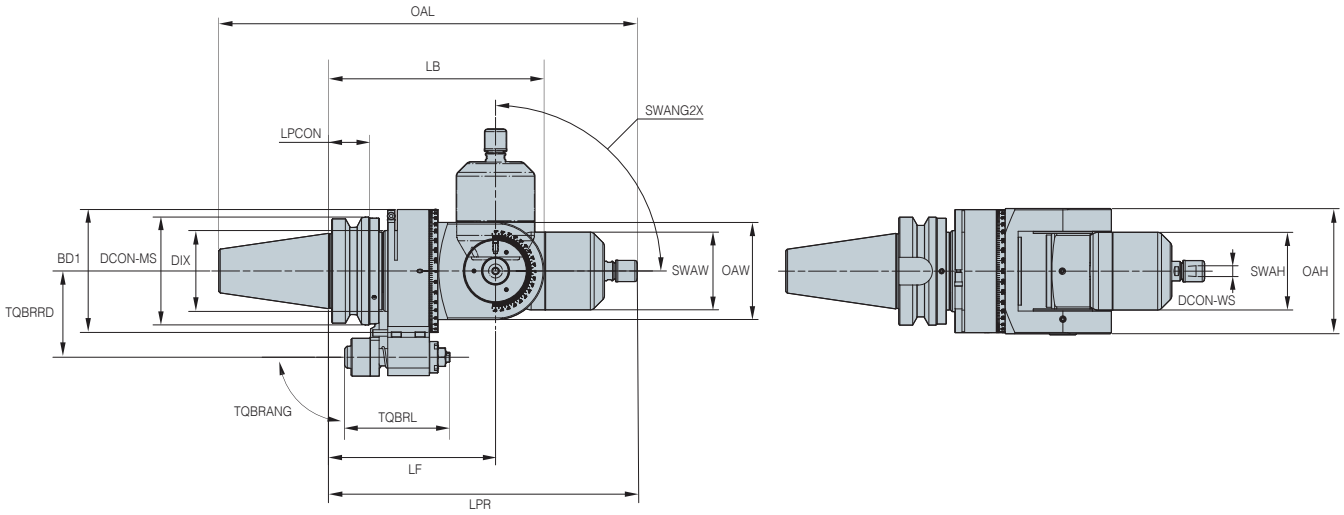
2) 공기주입 방식

2–1) 외부 에어 방식

2–2) 장비 주축 방식







스펙

형 번	DCON-MS	DIX	BD1	TQBBRD	LF	LPR	TQBRL	TQBRANG
BT50- ATU6-155	100	75	114	80	155	286.5	97.5	90

LB	OAL	LPCON	SWANG2X	SWAW	OAW	OAH	SWAH	DCON-WS
200	388.3	38	90	Ø72	90	116	Ø72	10

1. 사용 시 주축 회전 금지
2. 적정 공기압은 MAX RPMX 기준이며 외부에어, 장비주축방식 모두 약 3bar의 공기압으로 50,000 RPMX 사용 가능
3. Auto Tool Change 가능



PART 3

Recommended Cutting Conditions
추천절삭조건

F3	Super Endmill for HRSA
F4	Super Endmill for Ti/STS
F6	The Mirror Endmill
F7	H-Star Endmill
F65	U-Star Endmill
F92	I^+ Endmill
F93	R^+ Endmill
F97	S-Star Endmill
F101	A-Star Endmill
F102	D Endmill
F103	Composite Router Endmill
F105	T Endmill
F105	C-Max
F106	M^+ Endmill
F106	PCD Endmill
F107	MSD Plus
F107	MSD Plus-S
F108	MSD Plus for CFRP
F108	MSFD
F108	MLD Plus
F109	W-Star Drill
F109	SSD-N
F110	Burnishing Drill
F110	PCD Drill
F110	Gun Drill
F111	Chucking/Machine Reamer
F111	PCD Reamer
F111	Cermet Reamer
F112	Chamfer Tool
F112	Counter Sink
F114	Tap-Star

Super Endmill for HRSA

SFES4000(플랫), SRES4000(레디우스)

피삭재				브리넬 경도 (HB)	비절삭 저항 (N/mm^2)	고온 인장강도 (N/mm^2)	ap (mm)	ae (mm)	가공 방법	공구 직경 (mm)	3	4	5	6	8	10	12	16	20
ISO	피삭재 소재	KS	ISO							날장 (mm)	8	10	15	15	20	25	30	42	48
S	내열합금 (니켈계)	Inconel718 Inconel625	Inconel718 Inconel625	250 ~ 320	690 ~ 965	650	1.5D	0.05D	측면가공 	vc	36	38	38	40	40	39	40	38	40
										fz	0.014	0.020	0.025	0.030	0.035	0.043	0.050	0.069	0.079
										rpm	3,800	3,000	2,450	2,100	1,600	1,250	1,050	765	635
										feed	220	240	245	250	225	215	210	210	200
		Waspaloy	Waspaloy	210 ~ 290	1100 ~ 1400	900				vc	24	24	24	24	24	24	24	24	24
										fz	0.013	0.018	0.024	0.029	0.041	0.048	0.058	0.058	0.072
		Hastelloy	Hastelloy	170 ~ 240	520 ~ 800	530	0.3D	1D	슬로팅 	rpm	2,500	1,900	1,500	1,250	945	760	630	475	380
										feed	125	135	145	145	155	145	145	110	110

Super Endmill for Ti/STS

SFET4000(플랫), SRET4000(레디우스)

피삭재				브리넬 경도 (HB)	비절삭 저항 (N/mm²)	ap (mm)	ae (mm)	가공 방법	공구 직경 (mm)	3	4	5	6	8	10	12	16	20
ISO	피삭재 소재	KS	ISO (DIN)						날장 (mm)	8	10	15	15	20	25	30	42	48
P	탄소강	SM20C SM40C SM45C	(C22) C40 C45	230	400 ~ 600	1.5D	0.1D	측면가공	vc	100	108	114	114	114	114	114	114	114
									fz	0.020	0.030	0.040	0.050	0.065	0.070	0.080	0.085	0.100
									rpm	10610	8594	7257	6048	4536	3629	3024	2268	1814
									feed	849	1031	1161	1210	1179	1016	968	771	726
						0.5D	1D	슬로팅	vc	64	65	68	70	70	70	70	70	70
									fz	0.016	0.022	0.030	0.038	0.046	0.050	0.056	0.060	0.070
									rpm	6791	5173	4329	3714	2785	2228	1857	1393	1114
									feed	435	455	519	564	512	446	416	334	312
	합금강	SNCM220 SNCM420 SCM430 SCM440	20NiCrMo2 - - 42CrMo4	280	800 ~ 1000	1.5D	0.1D	측면가공	vc	141	138	151	151	151	151	151	151	151
									fz	0.021	0.032	0.049	0.069	0.067	0.075	0.078	0.095	0.090
									rpm	15000	11000	9600	8000	6000	4800	4000	3000	2400
									feed	1250	1400	1900	2200	1600	1440	1250	1140	860
						0.5D	1D	슬로팅	vc	65	70	71	70	70	69	72	70	69
									fz	0.015	0.022	0.035	0.050	0.060	0.060	0.070	0.070	0.080
									rpm	6900	5600	4500	3700	2800	2200	1900	1400	1100
									feed	410	490	630	740	670	530	530	390	350
M	페라이트/ 마르텐 사이트계	STS405 STS430 STS416 STS434 STS403 STS410	X6CrAl13 X6Cr17 X12CrS13 X6CrMo17-1 (X6Cr13) X12Cr13	240	450 540 450	1.5D	0.1D	측면가공	vc	100	108	114	114	114	114	114	114	114
									fz	0.020	0.030	0.040	0.050	0.065	0.070	0.080	0.085	0.100
									rpm	10610	8594	7257	6048	4536	3629	3024	2268	1814
									feed	849	1031	1161	1210	1179	1016	968	771	726
						0.5D	1D	슬로팅	vc	64	65	68	70	70	70	70	70	70
									fz	0.016	0.022	0.030	0.038	0.046	0.050	0.056	0.060	0.070
									rpm	6791	5173	4329	3714	2785	2228	1857	1393	1114
									feed	435	455	519	564	512	446	416	334	312
	오스테 나이트계	STS303 STS304 STS316	X10CrNiS18-9 X5CrNi18-9 X5CrNiMo17-12-2	200	520	1.5D	0.1D	측면가공	vc	72	76	78	80	80	80	80	80	80
									fz	0.020	0.030	0.040	0.050	0.065	0.070	0.080	0.085	0.100
									rpm	7639	6048	4966	4244	3183	2546	2122	1592	1273
									feed	611	726	795	849	828	713	679	541	509
						0.5D	1D	슬로팅	vc	45	46	48	50	50	50	50	50	50
									fz	0.016	0.022	0.030	0.038	0.046	0.050	0.056	0.060	0.070
									rpm	4775	3660	3056	2653	1990	1592	1326	955	796
									feed	306	322	367	403	366	318	297	229	223
S	Ti/ Ti 합금	Ti6Al4V Ti5Al5V5Mo Ti7Al4Mo	Ti6Al4V Ti5Al5V5Mo Ti7Al4Mo	320	600 ~ 1800	1.5D	0.1D	측면가공	vc	70	74	75	76	78	78	78	78	78
									fz	0.018	0.027	0.035	0.043	0.054	0.064	0.073	0.080	0.092
									rpm	7427	5889	4775	4032	3104	2483	2069	1552	1241
									feed	535	636	668	693	670	636	604	497	457
						0.5D	1D	슬로팅	vc	40	41	43	45	45	45	45	45	45
									fz	0.014	0.020	0.027	0.034	0.040	0.045	0.050	0.054	0.063
									rpm	4244	3263	2737	2387	1790	1432	1194	895	716
									feed	238	261	296	327	286	258	239	193	180

Super Endmill for Ti/STS

SBET2000 (볼)

피삭재				브리넬 경도 (HB)	비절삭 저항 (N/mm²)	ap (mm)	ae (mm)	가공 방법	공구 직경 (mm)	1	2	3	4	5	6	8	10	12
ISO	피삭재 소재	KS	ISO (DIN)						날장 (mm)	1	2	3	8	12	12	16	20	25
P	탄소강	SM20C SM40C SM45C	(C22) C40 C45	230	400 ~ 600	≤0.1D	≤0.1D	모방가공	vc	130	130	123	200	200	200	200	200	200
									fz	0.039	0.056	0.080	0.044	0.051	0.050	0.059	0.070	0.085
									rpm	41600	20800	13000	16000	12700	10600	8000	6400	5300
	합금강	SNCM220 SNCM420 SCM430 SCM440	20NiCrMo2 - - 42CrMo4	280	800 ~ 1000	≤0.1D	≤0.1D		feed	1625	1170	1040	1400	1300	1050	950	900	900
M	페라이트/ 마르텐 사이트계	STS405 STS430 STS416 STS434 STS403 STS410	X6CrAl13 X6Cr17 X12CrS13 X6CrMo17-1 (X6Cr13) X12Cr13	240	450 540 450	≤0.1D	≤0.1D	모방가공	vc	120	120	113	180	180	180	180	180	180
									fz	0.039	0.056	0.080	0.035	0.039	0.044	0.058	0.068	0.081
									rpm	38400	19200	12000	14400	11520	9600	7200	5760	4800
						≤0.1D	≤0.1D		feed	3000	2160	1920	1008	897	845	835	783	778
	오스테 나이트계	STS303 STS304 STS316	X10CrNiS18-9 X5CrNi18-9 X5CrNiMo17-12-2	200	520	≤0.1D	≤0.1D	모방가공	vc	100	100	94	150	150	150	150	150	150
									fz	0.039	0.056	0.080	0.035	0.039	0.044	0.058	0.068	0.081
									rpm	32000	16000	10000	12000	9600	8000	6000	4800	4000
									feed	2500	1800	1600	850	750	700	700	650	650
S	Ti/ Ti 합금	Ti6Al4V Ti5Al5V5Mo Ti7Al4Mo	Ti6Al4V Ti5Al5V5Mo Ti7Al4Mo	320	600 ~ 1800	≤0.1D	≤0.1D	모방가공	vc	100	100	94	150	150	150	150	150	150
									fz	0.039	0.056	0.080	0.035	0.039	0.044	0.058	0.068	0.081
									rpm	32000	16000	10000	12000	9600	8000	6000	4800	4000
									feed	2500	1800	1600	850	750	700	700	650	650

SBET4000 (볼)

피삭재				브리넬 경도 (HB)	비절삭 저항 (N/mm²)	ap (mm)	ae (mm)	가공 방법	공구 직경 (mm)	4	5	6	8	10	12
ISO	피삭재 소재	KS	ISO (DIN)						날장 (mm)	8	12	12	16	20	25
P	탄소강	SM20C SM40C SM45C	(C22) C40 C45	230	400 ~ 600	≤0.1D	≤0.1D	모방가공	vc	200	200	200	200	200	200
									fz	0.044	0.051	0.050	0.059	0.070	0.085
									rpm	16000	12700	10600	8000	6400	5300
	합금강	SNCM220 SNCM420 SCM430 SCM440	20NiCrMo2 - - 42CrMo4	280	800 ~ 1000	≤0.1D	≤0.1D		feed	2800	2600	2100	1900	1800	1800
M	페라이트/ 마르텐 사이트계	STS405 STS430 STS416 STS434 STS403 STS410	X6CrAl13 X6Cr17 X12CrS13 X6CrMo17-1 (X6Cr13) X12Cr13	240	450 540 450	≤0.1D	≤0.1D	모방가공	vc	180	180	180	180	180	180
									fz	0.035	0.039	0.044	0.058	0.068	0.081
									rpm	14400	11520	9600	7200	5760	4800
						≤0.1D	≤0.1D		feed	2040	1800	1680	1680	1560	1560
	오스테 나이트계	STS303 STS304 STS316	X10CrNiS18-9 X5CrNi18-9 X5CrNiMo17-12-2	200	520	≤0.1D	≤0.1D	모방가공	vc	150	150	150	150	150	150
									fz	0.035	0.039	0.044	0.058	0.068	0.081
									rpm	12000	9600	8000	6000	4800	4000
									feed	1700	1500	1400	1400	1300	1300
S	Ti/ Ti 합금	Ti6Al4V Ti5Al5V5Mo Ti7Al4Mo	Ti6Al4V Ti5Al5V5Mo Ti7Al4Mo	320	600 ~ 1800	≤0.1D	≤0.1D	모방가공	vc	150	150	150	150	150	150
									fz	0.035	0.039	0.044	0.058	0.068	0.081
									rpm	12000	9600	8000	6000	4800	4000
									feed	1700	1500	1400	1400	1300	1300

The Mirror Endmill

PCD Endmill

공구직경 (DC, Ø)	R	고속도강, 프리하든강, 열처리강 (~HRC65)			
		n (min-1)	vf (mm/min)	ap (mm)	ae (mm)
0.3~0.4	0.15~0.2	40,000	200	0.002	0.002
0.6	0.3	40,000	400	0.003	0.003
1	0.5	40,000	500	0.005	0.005
1.5~2	0.75~1	40,000	600	0.005	0.005

cBN Endmill

공구직경 (DC, Ø)	넥장 (LU)	HRC~55				HRC55~65				HRC65~68			
		n (min-1)	vf (mm/min)	ap (mm)	ae (mm)	n (min-1)	vf (mm/min)	ap (mm)	ae (mm)	n (min-1)	vf (mm/min)	ap (mm)	ae (mm)
0.4	0.5	40,000	1,500	0.005	0.010	40,000	1,200	0.005	0.010	40,000	750	0.005	0.005
0.4	1	40,000	1,200	0.005	0.010	40,000	900	0.005	0.010	40,000	600	0.005	0.005
0.5	1	40,000	1,500	0.010	0.010	40,000	1,400	0.010	0.010	40,000	900	0.010	0.010
0.6	1.5	35,000	2,000	0.020	0.030	35,000	2,000	0.020	0.030	35,000	1,000	0.010	0.020
0.8	2	35,000	2,000	0.030	0.040	35,000	2,000	0.020	0.030	35,000	1,500	0.010	0.020
1	2.5	35,000	3,000	0.040	0.050	35,000	3,000	0.030	0.040	35,000	2,000	0.020	0.030
1.2	3	35,000	3,000	0.050	0.050	35,000	2,500	0.035	0.035	35,000	2,000	0.020	0.025
1.5	4	30,000	3,000	0.060	0.060	30,000	2,500	0.040	0.040	30,000	2,000	0.020	0.025
2	5	30,000	3,000	0.080	0.080	30,000	2,500	0.050	0.050	30,000	2,000	0.020	0.050

* 상기 추천절삭조건은 외부 급유 적용, 가공 깊이 5D 이하일 때의 절삭조건입니다.

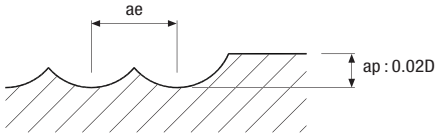
H-Star Endmill

ESB702, ESB712 series

피삭재	열처리강, 내열합금강		열처리강									
절삭조건	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
~0.2	50,000	1,200	50,000	1,050	45,000	960	40,000	770	35,000	674	31,500	570
0.3	50,000	1,500	50,000	1,350	45,000	1,200	40,000	765	35,000	840	31,500	700
0.4	50,000	1,900	50,000	1,700	45,000	1,500	40,000	1,200	35,000	1,050	31,500	1,100
0.5	50,000	2,400	50,000	2,100	45,000	1,900	40,000	1,500	35,000	1,300	31,500	1,100
0.6	50,000	2,900	50,000	2,500	45,000	2,200	40,000	1,800	35,000	1,600	31,500	1,400
0.8	50,000	3,900	50,000	3,300	45,000	3,000	40,000	2,400	35,000	1,600	31,500	1,800
1	50,000	4,800	50,000	4,200	45,000	3,800	40,000	3,000	35,000	2,600	35,000	2,300
1.5	50,000	5,400	48,000	4,500	43,000	4,000	23,000	3,100	33,000	2,700	29,700	2,300
2	49,700	5,700	47,800	4,800	40,000	4,000	35,000	3,150	32,000	2,800	28,500	2,300
3	33,100	6,000	31,800	5,300	26,500	4,000	23,500	3,150	21,000	28,00	19,000	2,300
4	24,900	6,000	23,900	5,300	20,000	4,000	17,500	3,150	16,000	2,800	14,500	2,300
5	18.6	5,800	17,800	4,900	15,000	3,750	13,500	3,050	11,500	2,550	10,500	2,100
6	13,900	4,850	13,400	4,100	11,000	3,100	10,000	2,500	8,800	2,150	8,000	1,750
8	11,100	4,200	10,700	3,500	9,000	2,700	8,000	2,150	7,000	1,850	6,500	1,550
10	9,300	3,700	8,900	3,100	7,500	2,400	6,600	1,900	5,800	1,650	5,300	1,380
12	6,950	2,950	6,680	2,500	5,600	1,900	5,000	1,550	4,400	1,250	4,000	1,050

절입기준

*ae : D1 ~ D4 = 0.05 × D
D5 ~ D8 = 0.025mm
D10 ~ D20 = 0.30mm

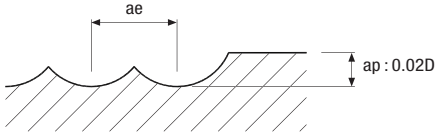


ESB703 series

피삭재	열처리강											
절삭조건	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
2	57,000	7,100	55,000	6,000	46,000	5,000	40,300	3,900	36,800	3,500	32,800	2,900
2.5	57,000	7,100	55,000	6,000	46,000	5,000	40,300	3,900	36,800	3,500	32,800	2,900
3	38,000	7,500	36,600	6,600	30,500	5,000	27,000	3,900	24,200	3,500	21,900	2,900
4	28,500	7,500	27,500	6,600	23,000	5,000	20,100	3,900	18,400	3,500	16,700	2,900
5	21,500	7,300	20,500	6,100	17,300	4,700	15,500	3,800	13,200	3,200	12,100	2,600
6	16,000	6,100	15,400	5,100	12,700	3,900	11,500	3,100	10,100	2,700	9,200	2,200
8	12,700	5,300	12,300	4,400	10,400	3,400	9,200	2,700	8,100	2,300	7,500	1,900
10	10,700	4,600	10,200	3,900	8,600	3,000	7,600	2,400	6,700	2,100	6,100	1,700
12	8,000	3,700	7,700	3,100	6,400	2,400	5,800	1,900	5,100	1,600	4,600	1,300

절입기준

*ae : D1 ~ D4 = 0.05 × D
D5 ~ D8 = 0.025mm
D10 ~ D20 = 0.30mm



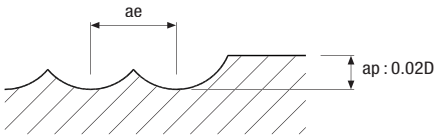
H-Star Endmill

ESB734 series

피삭재 / 절삭조건 / 공구직경(Ø)	열처리강											
	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
2	62,100	8,600	59,800	7,200	50,000	6,000	43,800	4,700	40,000	4,200	35,600	3,500
2.5	62,100	8,600	59,800	7,200	50,000	6,000	43,800	4,700	40,000	4,200	35,600	3,500
3	41,400	9,000	39,800	8,000	33,100	6,000	29,400	4,700	26,300	4,200	23,800	3,500
4	31,100	9,000	29,900	8,000	25,000	6,000	21,900	4,700	20,000	4,200	18,100	3,500
5	23,300	8,700	22,300	7,400	18,800	5,600	16,900	4,600	14,400	3,800	13,100	3,200
6	17,400	7,300	16,800	6,200	13,800	4,700	12,500	3,800	11,000	3,200	10,000	2,600
8	13,900	6,300	13,400	5,300	11,300	4,100	10,000	3,200	8,800	2,800	8,100	2,300
10	11,600	5,600	11,100	4,700	9,400	3,600	8,300	2,900	7,300	2,500	6,600	2,100

절입기준

*ae : D1 ~ D4 = 0.05 × D
D5 ~ D8 = 0.025mm
D10 ~ D20 = 0.30mm

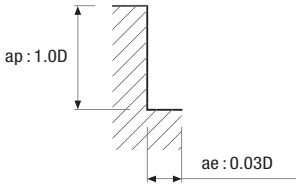


ESE702 series

측면 절삭 가공

피삭재 / 절삭조건 / 공구직경(Ø)	열처리강, 내열합금강		열처리강									
	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1	48,000	1,050	38,000	820	25,500	510	20,500	310	16,000	190	12,500	125
2	33,300	1,200	26,000	970	17,500	600	14,500	370	11,000	230	9,500	165
3	21,800	1,200	17,300	970	11,500	600	9,500	370	7,500	230	6,400	165
4	16,700	1,250	13,200	1,000	8,800	625	7,200	385	5,600	240	4,750	170
5	15,700	1,450	12,500	1,150	8,300	710	6,400	410	5,100	260	4,450	190
6	13,100	1,350	10,350	1,100	6,900	690	5,300	400	4,200	255	3,700	185
8	9,880	1,320	7,800	1,030	5,200	635	4,000	365	3,200	235	2,800	170
10	7,800	1,200	6,150	970	4,100	590	3,200	340	2,550	220	2,200	160
12	6,650	1,200	5,250	970	3,500	590	2,650	340	2,100	220	1,860	160
16	4,900	1,050	3,900	840	2,600	520	2,000	300	1,600	190	1,400	140
20	3,900	950	3,100	750	2,050	475	1,600	275	1,300	175	1,100	125

절입기준



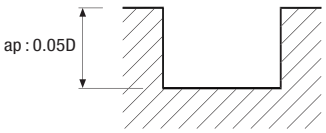
H-Star Endmill

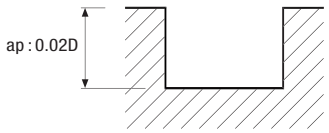
ESE702 series

슬로팅 가공

피삭재	열처리강, 내열합금강		열처리강									
절삭조건	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
~0.2	50,000	130	45,000	115	40,000	95	33,000	60	33,000	45	26,400	30
0.3	50,000	190	45,000	140	40,000	115	33,000	70	25,000	50	20,000	35
0.4	50,000	235	45,000	180	40,000	140	33,000	90	25,000	55	20,000	40
0.5	50,000	370	45,000	280	40,000	220	33,000	140	25,000	85	20,000	60
0.6	50,000	470	45,000	360	40,000	285	33,000	160	25,000	105	20,000	75
0.8	50,000	600	40,000	440	30,000	295	25,000	185	19,000	110	15,200	80
0.9	49,000	655	39,000	520	27,800	330	22,700	205	17,500	125	14,000	90
1	48,000	750	38,000	570	25,500	360	20,500	215	16,000	135	12,500	85
2	33,300	850	26,000	680	17,500	420	14,500	260	11,000	160	9,500	115
3	21,800	850	17,300	680	11,500	420	9,500	260	7,500	160	6,400	115
4	16,700	880	13,200	700	8,800	440	7,200	270	5,600	170	4,750	118
5	15,700	1,000	12,500	805	8,300	500	6,400	285	5,100	180	4,450	132
6	13,100	950	10,350	770	6,900	480	5,300	280	4,200	180	3,700	130
8	9,880	930	7,800	720	5,200	445	4,000	255	3,200	165	2,800	120
10	7,800	850	6,150	680	4,100	415	3,200	240	2,550	155	2,200	122
12	6,650	850	5,250	680	3,500	415	2,650	240	2,100	155	1,860	112
16	4,900	730	3,900	580	2,600	365	2,000	210	1,600	135	1,400	95
20	3,900	660	3,100	525	2,050	335	1,600	195	1,300	125	1,100	85

절입기준



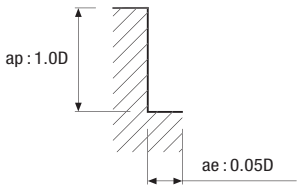


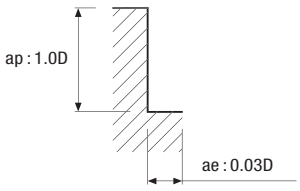
ESE704, ESE714, ESE744 series

측면 절삭 가공

피삭재	열처리강, 내열합금강		열처리강									
절삭조건	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1	48,000	1,480	38,000	1,050	25,500	710	20,500	430	16,000	270	12,500	175
2	33,300	1,750	26,000	1,250	17,500	840	14,500	520	11,000	320	9,500	230
3	21,800	1,750	17,300	1,250	11,500	840	9,500	520	7,500	320	6,400	230
4	16,700	1,800	13,200	1,300	8,800	880	7,200	540	5,600	335	4,750	240
5	15,700	2,000	12,500	1,500	8,300	1,000	6,400	580	5,100	370	4,450	270
6	13,100	1,950	10,350	1,400	6,900	950	5,300	560	4,200	350	3,700	260
8	9,880	1,880	7,800	1,350	5,200	900	4,000	520	3,200	330	2,800	240
10	7,800	1,750	6,150	1,260	4,100	840	3,200	480	2,550	310	2,200	220
12	6,650	1,750	5,250	1,260	3,500	840	2,650	480	2,100	300	1,860	220
16	4,900	1,500	3,900	1,100	2,600	730	2,000	420	1,600	270	1,400	200
20	3,900	1,300	3,100	970	2,050	650	1,600	380	1,300	250	1,100	180

절입기준





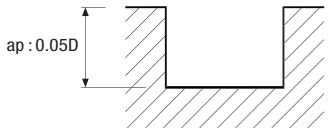
H-Star Endmill

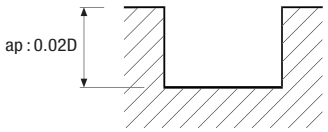
ESE712 series

슬로팅 가공

피삭재	열처리강, 내열합금강		열처리강									
절삭조건	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
0.2	50,000	130	45,000	115	40,000	95	33,000	60	33,000	45	26,400	30
0.3	50,000	190	45,000	140	40,000	115	33,000	70	25,000	50	20,000	35
0.4	50,000	235	45,000	180	40,000	140	33,000	90	25,000	55	20,000	40
0.5	50,000	370	45,000	280	40,000	220	33,000	140	25,000	85	20,000	60
0.6	50,000	470	45,000	360	40,000	285	30,000	160	25,000	105	20,000	75
0.8	50,000	600	40,000	440	30,000	295	25,000	185	19,000	110	15,200	80
0.9	49,000	655	39,000	520	27,800	330	22,700	205	17,500	125	14,000	90
1	48,000	750	38,000	570	25,500	360	20,500	215	16,000	135	12,500	85
2	33,300	850	26,000	680	17,500	420	14,500	260	11,000	160	9,500	115
3	21,800	850	17,300	680	11,500	420	9,500	260	7,500	160	6,400	115
4	16,700	880	13,200	700	8,800	440	7,200	270	5,600	170	4,750	118
5	15,700	1,000	12,500	805	8,300	500	6,400	285	5,100	180	4,450	132
6	13,100	950	10,350	770	6,900	480	5,300	280	4,200	180	3,700	130
8	9,880	930	7,800	720	5,200	445	4,000	255	3,200	165	2,800	120
10	7,800	850	6,150	680	4,100	415	3,200	240	2,550	155	2,200	112
12	6,650	850	5,250	680	3,500	415	2,650	240	2,100	155	1,860	112
16	4,900	730	3,900	580	2,600	365	2,000	210	1,600	135	1,400	95
20	3,900	660	3,100	525	2,050	335	1,600	195	1,300	125	1,100	85

절입기준



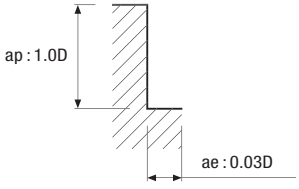


ESE712 series

측면 절삭 가공

피삭재	열처리강, 내열합금강		열처리강									
절삭조건	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1	48,000	1,050	38,000	820	25,500	510	20,500	310	16,000	190	12,500	125
2	33,300	1,200	26,000	970	17,500	600	14,500	370	11,000	230	9,500	165
3	21,800	1,200	17,300	970	11,500	600	9,500	370	7,500	230	6,400	165
4	16,700	1,250	13,200	1,000	8,800	625	7,200	385	5,600	240	4,750	170
5	15,700	1,450	12,500	1,150	8,300	710	6,400	410	5,100	260	4,450	190
6	13,100	1,350	10,350	1,100	6,900	690	5,300	400	4,200	255	3,700	185
8	9,880	1,320	7,800	1,030	5,200	635	4,000	365	3,200	235	2,800	170
10	7,800	1,200	6,150	970	4,100	590	3,200	340	2,550	220	2,200	160
12	6,650	1,200	5,250	970	3,500	590	2,650	340	2,100	220	1,860	160
16	4,900	1,050	3,900	840	2,600	520	2,000	300	1,600	190	1,400	140
20	3,900	950	3,100	750	2,050	475	1,600	275	1,300	175	1,100	125

절입기준



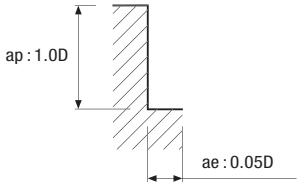
H-Star Endmill

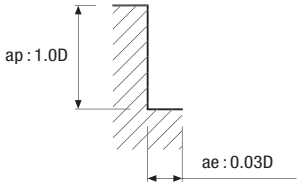
ESE716 series

측면 절삭 가공

피삭재	열처리강, 내열합금강		열처리강									
절삭조건	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6	24,800	5,350	23,500	4,900	16,000	4,900	13,500	3,300	10,500	2,100	8,000	1,450
8	20,000	5,500	19,000	5,000	12,000	4,600	10,000	3,100	8,000	2,000	6,000	1,400
10	16,000	4,900	15,500	4,500	9,500	4,100	8,000	2,900	6,400	1,800	4,800	1,300
12	13,000	4,500	12,500	4,100	8,000	3,800	6,600	2,500	5,300	1,600	4,000	1,150
16	10,000	4,000	9,700	3,700	6,000	3,400	5,000	2,300	4,000	1,250	3,000	870
20	8,000	3,350	7,800	3,400	4,800	3,200	4,000	2,100	3,200	1,020	2,400	690

절입기준



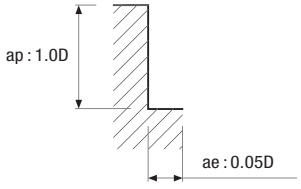


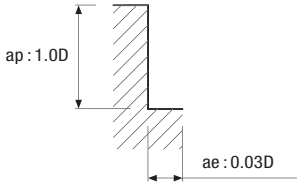
ESE724 series

측면 절삭 가공

피삭재	열처리강, 내열합금강		열처리강									
절삭조건	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1	48,000	1,480	38,000	1,050	25,500	710	20,500	430	16,000	270	12,500	175
2	33,300	1,750	26,000	1,250	17,500	840	14,500	520	11,000	320	9,500	230
3	21,800	1,750	17,300	1,250	11,500	840	9,500	520	7,500	320	6,400	230
4	16,700	1,800	13,200	1,300	8,800	880	7,200	540	5,600	335	4,750	240
5	15,700	2,000	12,500	1,500	8,300	1,000	6,400	580	5,100	370	4,450	270
6	13,100	1,950	10,350	1,400	6,900	950	5,300	560	4,200	350	3,700	260
8	9,880	1,880	7,800	1,350	5,200	900	4,000	520	3,200	330	2,800	240
10	7,800	1,750	6,150	1,260	4,100	840	3,200	480	2,550	310	2,200	220
12	6,650	1,750	5,250	1,260	3,500	840	2,650	480	2,100	300	1,860	220
16	4,900	1,500	3,900	1,100	2,600	730	2,000	420	1,600	270	1,400	200
20	3,900	1,300	3,100	970	2,050	650	1,600	380	1,300	250	1,100	180

절입기준



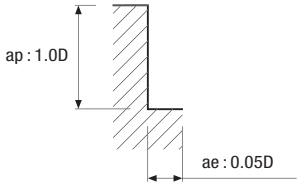


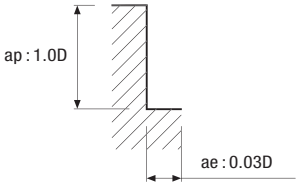
H-Star Endmill

ESE726, ESR736 series

피삭재 / 절삭조건 / 공구직경(Ø)	열처리강, 내열합금강		열처리강									
	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6	24,800	5,350	23,500	4,900	16,000	4,900	13,500	3,300	10,500	2,100	8,000	1,450
8	20,000	5,500	19,000	5,000	12,000	4,600	10,000	3,100	8,000	2,000	6,000	1,400
10	16,000	4,900	15,500	4,500	9,500	4,100	8,000	2,900	6,400	1,800	4,800	1,300
12	13,000	4,500	12,500	4,100	8,000	3,800	6,600	2,500	5,300	1,600	4,000	1,150
16	10,000	4,000	9,700	3,700	6,000	3,400	5,000	2,300	4,000	1,250	3,000	870
20	8,000	3,350	7,800	3,400	4,800	3,200	4,000	2,100	3,200	1,020	2,400	690

절입기준



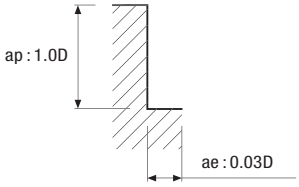


ESR702 series

측면 절삭 가공

피삭재 / 절삭조건 / 공구직경(Ø)	열처리강, 내열합금강		열처리강									
	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
2	33,300	960	26,000	776	17,500	480	14,500	296	11,000	184	9,500	132
3	21,800	960	17,300	776	11,500	480	9,500	296	7,500	184	6,400	132
4	16,700	1,000	13,200	800	8,800	500	7,200	308	5,600	192	4,750	136
5	15,700	1,160	12,500	920	8,300	568	6,400	328	5,100	208	4,450	152
6	13,100	1,080	10,350	880	6,900	552	5,300	320	4,200	204	3,700	148
8	9,880	1,056	7,800	824	5,200	508	4,000	292	3,200	188	2,800	136
10	7,800	960	6,150	776	4,100	472	3,200	272	2,550	176	2,200	128
12	6,650	960	5,250	776	3,500	472	2,650	272	2,100	176	1,860	128
16	4,900	840	3,900	672	2,600	416	2,000	240	1,600	152	1,400	112
20	3,900	760	3,100	600	2,050	380	1,600	220	1,300	140	1,100	100

절입기준



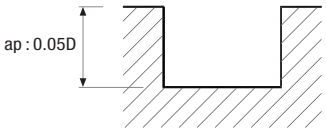
H-Star Endmill

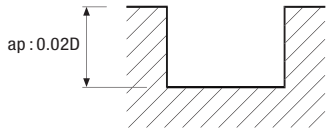
ESR702, ESR732 series

슬로팅 가공

피삭재	열처리강, 내열합금강		열처리강									
절삭조건	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
2	33,300	680	26,000	544	17,500	336	14,500	208	11,000	128	9,500	92
3	21,800	680	17,300	544	11,500	336	9,500	208	7,500	128	6,400	92
4	16,700	704	13,200	560	8,800	352	7,200	216	5,600	136	4,750	94
5	15,700	800	12,500	644	8,300	400	6,400	228	5,100	144	4,450	106
6	13,100	760	10,350	616	6,900	384	5,300	224	4,200	144	3,700	104
8	9,880	744	7,800	576	5,200	356	4,000	204	3,200	132	2,800	96
10	7,800	680	6,150	544	4,100	332	3,200	192	2,550	124	2,200	90
12	6,650	680	5,250	544	3,500	332	2,650	192	2,100	124	1,860	90
16	4,900	584	3,900	464	2,600	292	2,000	168	1,600	108	1,400	78
20	3,900	528	3,100	420	2,050	268	1,600	168	1,300	100	1,100	70

절입기준



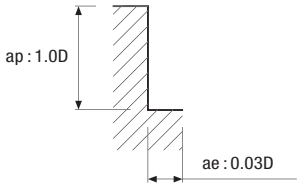


ESR724, ESR714, ESR734, ESR704 series

측면 절삭 가공

피삭재	열처리강, 내열합금강		열처리강									
절삭조건	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
3	21,800	1,400	17,300	1,000	11,500	672	9,500	416	7,500	256	6,400	184
4	16,700	1,440	13,200	1,040	8,800	704	7,200	432	5,600	268	4,750	192
5	15,700	1,600	12,500	1,200	8,300	800	6,400	464	5,100	296	4,450	216
6	13,100	1,560	10,350	1,120	6,900	760	5,300	448	4,200	280	3,700	208
8	9,880	1,504	7,800	1,080	5,200	720	4,000	416	3,200	264	2,800	192
10	7,800	1,400	6,150	1,008	4,100	672	3,200	384	2,550	248	2,200	176
12	6,650	1,400	5,250	1,008	3,500	672	2,650	384	2,100	240	1,860	176
16	4,900	1,200	3,900	880	2,600	584	2,000	336	1,600	216	1,400	160
20	3,900	1,040	3,100	776	2,050	520	1,600	304	1,300	200	1,100	144

절입기준

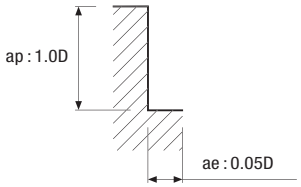


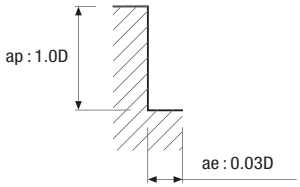
H-Star Endmill

ESR706 series

피삭재	열처리강, 내열합금강		열처리강									
절삭조건	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6	24,800	5,350	23,500	4,900	16,000	4,900	13,500	3,300	10,500	2,100	8,000	1,450
8	20,000	5,500	19,000	5,000	12,000	4,600	10,000	3,100	8,000	2,000	6,000	1,400
10	16,000	4,900	15,500	4,500	9,500	4,100	8,000	2,900	6,400	1,800	4,800	1,300
12	13,000	4,500	12,500	4,100	8,000	3,800	6,600	2,500	5,300	1,600	4,000	1,150
16	10,000	4,000	9,700	3,700	6,000	3,400	5,000	2,300	4,000	1,250	3,000	870
20	8,000	3,350	7,800	3,400	4,800	3,200	4,000	2,100	3,200	1,020	2,400	690

절입기준





H-Star Endmill

ESRB712

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			열처리강 (SKD, SKT, STAVAX)		
인장강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경(Ø)	유효장	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)
0.1	**0.3**	50,000	240	0.009	50,000	215	0.007	50,000	190	0.005
0.1	**0.5**	50,000	240	0.006	50,000	215	0.005	50,000	190	0.004
0.1	**1**	45,000	195	0.002	45,000	175	0.002	45,000	155	0.001
0.2	**0.5**	50,000	335	0.018	50,000	310	0.014	43,200	260	0.010
0.2	**1**	50,000	335	0.013	50,000	310	0.010	43,200	260	0.007
0.2	**1.5**	45,000	270	0.007	45,000	250	0.006	38,880	210	0.004
0.2	**2**	45,000	270	0.005	45,000	250	0.004	38,880	210	0.003
0.2	3	45,000	270	0.003	45,000	250	0.003	38,880	210	0.002
0.3	1	50,000	475	0.019	50,000	430	0.015	42,800	365	0.011
0.3	1.5	50,000	475	0.019	50,000	430	0.015	42,800	365	0.011
0.3	2	45,000	385	0.011	45,000	350	0.008	38,520	295	0.006
0.3	2.5	45,000	385	0.007	45,000	350	0.005	38,520	295	0.004
0.3	3	45,000	385	0.007	45,000	350	0.005	38,520	295	0.004
0.3	4	40,000	305	0.004	40,000	275	0.003	34,240	235	0.002
0.3	5	30,000	200	0.003	30,000	180	0.002	25,680	155	0.002
0.4	1	41,000	490	0.036	38,800	425	0.028	34,200	340	0.020
0.4	1.5	41,000	490	0.025	38,800	425	0.020	34,200	340	0.014
0.4	2	41,000	490	0.025	38,800	425	0.020	34,200	340	0.014
0.4	2.5	36,900	395	0.014	34,920	345	0.011	30,780	275	0.008
0.4	3	36,900	395	0.014	34,920	345	0.011	30,780	275	0.008
0.4	4	36,900	395	0.009	34,920	345	0.007	30,780	275	0.005
0.4	5	32,800	315	0.009	31,040	270	0.007	27,360	220	0.005
0.4	6	32,800	315	0.005	31,040	270	0.004	27,360	220	0.003
0.4	8	24,600	205	0.004	23,280	180	0.003	20,520	145	0.002
0.4	10	12,300	90	0.004	11,640	75	0.003	10,260	60	0.002
0.5	1	34,200	685	0.045	32,300	580	0.035	28,500	515	0.025
0.5	1.5	34,200	685	0.045	32,300	580	0.035	28,500	515	0.025
0.5	2	34,200	685	0.032	32,300	580	0.025	28,500	515	0.018
0.5	2.5	34,200	685	0.032	32,300	580	0.025	28,500	515	0.018
0.5	3	30,780	555	0.018	29,070	470	0.014	25,650	415	0.010
0.5	4	30,780	555	0.018	29,070	470	0.014	25,650	415	0.010
0.5	5	30,780	555	0.011	29,070	470	0.009	25,650	415	0.006
0.5	6	27,360	440	0.011	25,840	370	0.009	22,800	330	0.006
0.5	8	20,520	290	0.007	19,380	245	0.005	17,100	215	0.004
0.5	10	20,520	290	0.005	19,380	245	0.004	17,100	215	0.003
0.5	12	10,260	125	0.005	9,690	105	0.004	8,550	95	0.003
0.5	14	10,260	125	0.005	9,690	105	0.004	8,550	95	0.003
0.5	16	3,420	35	0.005	3,230	30	0.004	2,850	25	0.003
0.6	1	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
0.6	2	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
0.6	3	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
0.6	4	30,780	830	0.022	29,070	680	0.017	25,650	555	0.012
0.6	5	30,780	830	0.014	29,070	680	0.011	25,650	555	0.008
0.6	6	30,780	830	0.014	29,070	680	0.011	25,650	555	0.008

H-Star Endmill

ESRB712

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			열처리강 (SKD, SKT, STAVAX)		
인장강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경(Ø)	유효장	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)
0.6	8	27,360	655	0.008	25,840	540	0.006	22,800	440	0.005
0.6	10	20,520	430	0.005	19,380	355	0.004	17,100	290	0.003
0.6	12	20,520	430	0.005	19,380	355	0.004	17,100	290	0.003
0.6	14	10,260	185	0.005	9,690	150	0.004	8,550	125	0.003
0.6	16	10,260	185	0.005	9,690	150	0.004	8,550	125	0.003
0.7	2	34,200	1,130	0.063	32,300	930	0.049	28,500	765	0.035
0.7	4	30,780	915	0.025	29,070	755	0.020	25,650	620	0.014
0.7	6	30,780	915	0.016	29,070	755	0.012	25,650	620	0.009
0.7	8	27,360	725	0.016	25,840	595	0.012	22,800	490	0.009
0.7	10	27,360	725	0.009	25,840	595	0.007	22,800	490	0.005
0.7	12	20,520	475	0.006	19,380	390	0.005	17,100	320	0.004
0.8	2	34,200	1,230	0.072	32,300	1,035	0.056	28,500	855	0.040
0.8	3	34,200	1,230	0.050	32,300	1,035	0.039	28,500	855	0.028
0.8	4	34,200	1,230	0.050	32,300	1,035	0.039	28,500	855	0.028
0.8	5	30,780	995	0.029	29,070	840	0.022	25,650	695	0.016
0.8	6	30,780	995	0.029	29,070	840	0.022	25,650	695	0.016
0.8	8	30,780	995	0.018	29,070	840	0.014	25,650	695	0.010
0.8	10	27,360	785	0.018	25,840	660	0.014	22,800	545	0.010
0.8	12	27,360	785	0.011	25,840	660	0.008	22,800	545	0.006
0.8	14	20,520	515	0.007	19,380	435	0.006	17,100	360	0.004
0.8	16	20,520	515	0.007	19,380	435	0.006	17,100	360	0.004
0.8	20	10,260	220	0.007	9,690	185	0.006	8,550	155	0.004
0.9	4	29,250	1,120	0.032	27,630	935	0.025	24,390	775	0.018
0.9	6	29,250	1,120	0.032	27,630	935	0.025	24,390	775	0.018
0.9	8	29,250	1,120	0.020	27,630	935	0.016	24,390	775	0.011
0.9	10	26,000	885	0.020	24,560	740	0.016	21,680	610	0.011
1.0	2	30,800	1,540	0.090	29,100	1,310	0.070	25,700	1,075	0.050
1.0	3	30,800	1,540	0.090	29,100	1,310	0.070	25,700	1,075	0.050
1.0	4	30,800	1,540	0.063	29,100	1,310	0.049	25,700	1,075	0.035
1.0	5	30,800	1,540	0.063	29,100	1,310	0.049	25,700	1,075	0.035
1.0	6	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
1.0	7	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
1.0	8	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
1.0	10	27,720	1,245	0.023	26,190	1,060	0.018	23,130	870	0.013
1.0	12	24,640	985	0.023	23,280	840	0.018	20,560	690	0.013
1.0	14	24,640	985	0.014	23,280	840	0.011	20,560	690	0.008
1.0	16	18,480	645	0.014	17,460	550	0.011	15,420	450	0.008
1.0	18	18,480	645	0.009	17,460	550	0.007	15,420	450	0.005
1.0	20	18,480	645	0.009	17,460	550	0.007	15,420	450	0.005
1.0	22	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
1.0	26	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
1.0	30	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
1.0	40	3,080	75	0.009	2,910	65	0.007	2,570	55	0.005
1.0	50	3,080	75	0.006	2,910	65	0.005	2,570	55	0.003

H-Star Endmill

ESRB712

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			열처리강 (SKD, SKT, STAVAX)		
인장강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경(Ø)	유효장	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)
1.2	4	26,300	1,375	0.076	24,800	1,150	0.059	21,900	950	0.042
1.2	6	26,300	1,375	0.076	24,800	1,150	0.059	21,900	950	0.042
1.2	8	23,670	1,115	0.043	22,320	930	0.034	19,710	770	0.024
1.2	10	23,670	1,115	0.027	22,320	930	0.021	19,710	770	0.015
1.2	12	23,670	1,115	0.027	22,320	930	0.021	19,710	770	0.015
1.2	16	21,040	880	0.016	19,840	735	0.013	17,520	610	0.009
1.2	20	15,780	580	0.011	14,880	485	0.008	13,140	400	0.006
1.2	26	7,890	245	0.011	7,440	205	0.008	6,570	170	0.006
1.4	6	21,500	1,295	0.088	20,300	1,100	0.069	18,000	935	0.049
1.4	8	19,350	1,050	0.050	18,270	890	0.039	16,200	755	0.028
1.4	10	19,350	1,050	0.050	18,270	890	0.039	16,200	755	0.028
1.4	16	17,200	830	0.032	16,240	705	0.025	14,400	600	0.018
1.5	4	23,900	1,580	0.135	22,600	1,355	0.105	20,000	1,075	0.075
1.5	5	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
1.5	6	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
1.5	7	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
1.5	8	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.030
1.5	10	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.030
1.5	12	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.030
1.5	14	21,510	1,280	0.034	20,340	1,100	0.026	18,000	870	0.019
1.5	16	19,120	1,010	0.034	18,080	865	0.026	16,000	690	0.019
1.5	18	19,120	1,010	0.034	18,080	865	0.026	16,000	690	0.019
1.5	20	19,120	1,010	0.020	18,080	865	0.016	16,000	690	0.011
1.5	22	19,120	1,010	0.020	18,080	865	0.016	16,000	690	0.011
1.5	26	14,340	665	0.014	13,560	570	0.011	12,000	450	0.008
1.5	30	14,340	665	0.014	13,560	570	0.011	12,000	450	0.008
1.5	35	7,170	285	0.010	6,780	245	0.008	6,000	195	0.005
1.5	40	7,170	285	0.010	6,780	245	0.008	6,000	195	0.005
1.6	4	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
1.6	6	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
1.6	8	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
1.6	10	19,980	1,260	0.058	18,900	1,055	0.045	16,650	900	0.032
1.6	12	19,980	1,260	0.058	18,900	1,055	0.045	16,650	900	0.032
1.6	16	19,980	1,260	0.036	18,900	1,055	0.028	16,650	900	0.020
1.6	20	17,760	995	0.036	16,800	830	0.028	14,800	710	0.020
1.8	4	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
1.8	6	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
1.8	8	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
1.8	10	19,980	1,440	0.065	18,900	1,190	0.050	16,650	990	0.036
1.8	12	19,980	1,440	0.065	18,900	1,190	0.050	16,650	990	0.036
1.8	16	19,980	1,440	0.041	18,900	1,190	0.032	16,650	990	0.023
1.8	20	17,760	1,140	0.041	16,800	940	0.032	14,800	785	0.023
2.0	6	18,000	1,795	0.180	17,000	1,525	0.140	15,000	1,285	0.100
2.0	8	18,000	1,795	0.126	17,000	1,525	0.098	15,000	1,285	0.070

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피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			열처리강 (SKD, SKT, STAVAX)		
인장강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경(Ø)	유효장	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)
2.0	10	18,000	1,795	0.126	17,000	1,525	0.098	15,000	1,285	0.070
2.0	12	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
2.0	14	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
2.0	16	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
2.0	18	16,200	1,455	0.045	15,300	1,235	0.035	13,500	1,040	0.025
2.0	20	16,200	1,455	0.045	15,300	1,235	0.035	13,500	1,040	0.025
2.0	22	14,400	1,150	0.045	13,600	975	0.035	12,000	820	0.025
2.0	26	14,400	1,150	0.045	13,600	975	0.035	12,000	820	0.025
2.0	30	14,400	1,150	0.027	13,600	975	0.021	12,000	820	0.015
2.0	35	10,800	755	0.018	10,200	640	0.014	9,000	540	0.010
2.0	40	10,800	755	0.018	10,200	640	0.014	9,000	540	0.010
2.0	45	5,400	325	0.018	5,100	275	0.014	4,500	230	0.010
2.0	50	5,400	325	0.018	5,100	275	0.014	4,500	230	0.010
2.0	60	5,400	325	0.018	5,100	275	0.014	4,500	230	0.010
2.5	8	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
2.5	10	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
2.5	12	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
2.5	16	14,220	1,560	0.090	13,410	1,300	0.070	11,880	1,055	0.050
2.5	20	14,220	1,560	0.090	13,410	1,300	0.070	11,880	1,055	0.050
2.5	22	14,220	1,560	0.056	13,410	1,300	0.044	11,880	1,055	0.031
2.5	26	12,640	1,230	0.056	11,920	1,025	0.044	10,560	835	0.031
2.5	30	12,640	1,230	0.056	11,920	1,025	0.044	10,560	835	0.031
2.5	35	12,640	1,230	0.034	11,920	1,025	0.026	10,560	835	0.019
2.5	40	9,480	810	0.034	8,940	675	0.026	7,920	550	0.019
2.5	45	9,480	810	0.023	8,940	675	0.018	7,920	550	0.013
2.5	50	9,480	810	0.023	8,940	675	0.018	7,920	550	0.013
3.0	6	13,700	2,050	0.270	12,900	1,730	0.210	11,400	1,435	0.150
3.0	8	13,700	2,050	0.270	12,900	1,730	0.210	11,400	1,435	0.150
3.0	10	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
3.0	12	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
3.0	14	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
3.0	16	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.06
3.0	18	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.06
3.0	20	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.06
3.0	22	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.06
3.0	26	12,330	1,660	0.068	11,610	1,400	0.053	10,260	1,160	0.038
3.0	30	12,330	1,660	0.068	11,610	1,400	0.053	10,260	1,160	0.038
3.0	35	10,960	1,310	0.068	10,320	1,105	0.053	9,120	920	0.038
3.0	40	10,960	1,310	0.041	10,320	1,105	0.032	9,120	920	0.023
3.0	45	10,960	1,310	0.041	10,320	1,105	0.032	9,120	920	0.023
3.0	50	8,220	860	0.027	7,740	725	0.021	6,840	605	0.015
3.0	60	8,220	860	0.027	7,740	725	0.021	6,840	605	0.015
4.0	8	9,800	1,965	0.360	9,300	1,670	0.280	8,200	1,395	0.200
4.0	10	9,800	1,965	0.360	9,300	1,670	0.280	8,200	1,395	0.200

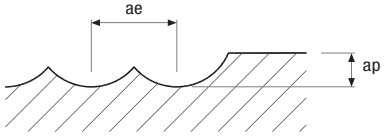
H-Star Endmill

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피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			열처리강 (SKD, SKT, STAVAX)		
인장강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경(Ø)	유효장	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)
4.0	12	9,800	1,965	0.360	9,300	1,670	0.280	8,200	1,395	0.200
4.0	14	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
4.0	16	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
4.0	18	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
4.0	20	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
4.0	22	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080
4.0	26	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080
4.0	30	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080
4.0	35	8,820	1,590	0.090	8,370	1,355	0.070	7,380	1,130	0.050
4.0	40	8,820	1,590	0.090	8,370	1,355	0.070	7,380	1,130	0.050
4.0	45	7,840	1,260	0.090	7,440	1,070	0.070	6,560	895	0.050
4.0	50	7,840	1,260	0.090	7,440	1,070	0.070	6,560	895	0.050
4.0	60	7,840	1,260	0.054	7,440	1,070	0.042	6,560	895	0.030
5.0	15	7,700	1,845	0.315	7,300	1,455	0.245	6,400	1,285	0.175
5.0	20	7,700	1,845	0.315	7,300	1,455	0.245	6,400	1,285	0.175
5.0	26	6,930	1,495	0.180	6,570	1,180	0.140	5,760	1,040	0.100
5.0	30	6,930	1,495	0.180	6,570	1,180	0.140	5,760	1,040	0.100
5.0	35	6,930	1,495	0.180	6,570	1,180	0.140	5,760	1,040	0.100
5.0	40	6,930	1,495	0.180	6,570	1,180	0.140	5,760	1,040	0.100
5.0	50	6,930	1,495	0.113	6,570	1,180	0.088	5,760	1,040	0.063
5.0	60	6,160	1,180	0.113	5,840	930	0.088	5,120	820	0.063
6.0	20	6,500	1,900	0.378	6,200	1,600	0.294	5,500	1,330	0.210
6.0	30	6,500	1,900	0.378	6,200	1,600	0.294	5,500	1,330	0.210
8.0	25	4,850	1,800	0.504	4,600	1,500	0.392	4,000	1,280	0.280
8.0	30	4,850	1,800	0.504	4,600	1,500	0.392	4,000	1,280	0.280
10.0	30	3,850	1,650	0.900	3,680	1,400	0.700	3,200	1,200	0.500
10.0	40	3,850	1,650	0.630	3,680	1,400	0.490	3,200	1,200	0.350
12.0	32	3,200	1,520	1.080	3,050	1,300	0.840	2,650	1,100	0.600
12.0	45	3,200	1,520	0.756	3,050	1,300	0.588	2,650	1,100	0.420

절입기준

*ae : D1 ~ D4 = 0.05 × D
D5 ~ D8 = 0.025mm
D10 ~ D20 = 0.30mm



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측면 절삭 가공

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			열처리강 (SKD, SKT, STAVAX)		
인장강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경(Ø)	유효장	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)
0.1	0.3	50,000	315	0.009	46,200	230	0.007	40,600	170	0.005
0.1	0.5	50,000	315	0.006	46,200	230	0.005	40,600	170	0.004
0.1	1	45,000	255	0.002	41,580	185	0.002	36,540	140	0.001
0.2	0.5	38,500	380	0.018	36,300	270	0.014	32,100	200	0.010
0.2	1	38,500	380	0.013	36,300	270	0.010	32,100	200	0.007
0.2	1.5	34,650	310	0.007	32,670	220	0.006	28,890	160	0.004
0.2	2	34,650	310	0.005	32,670	220	0.004	28,890	160	0.003
0.3	1	34,200	390	0.019	32,300	270	0.015	28,500	230	0.011
0.3	1.5	34,200	390	0.019	32,300	270	0.015	25,800	230	0.011
0.3	2	30,780	315	0.011	29,070	220	0.008	25,650	185	0.006
0.3	2.5	30,780	315	0.007	29,070	220	0.005	25,650	185	0.004
0.3	3	30,780	315	0.007	29,070	220	0.005	25,650	185	0.004
0.3	4	27,360	250	0.004	25,840	175	0.003	22,800	145	0.002
0.3	5	20,520	165	0.003	19,380	115	0.002	17,100	95	0.002
0.4	1	27,400	540	0.036	25,800	380	0.028	22,800	280	0.020
0.4	1.5	27,400	540	0.025	25,800	380	0.020	22,800	280	0.014
0.4	2	27,400	540	0.025	25,800	380	0.020	22,800	280	0.014
0.4	2.5	24,660	435	0.014	23,220	310	0.011	20,520	225	0.008
0.4	3	24,660	435	0.014	23,220	310	0.011	20,520	225	0.008
0.4	4	24,660	435	0.009	23,220	310	0.007	20,520	225	0.005
0.4	5	21,920	345	0.009	20,640	245	0.007	18,240	180	0.005
0.4	6	21,920	345	0.005	20,640	245	0.004	18,240	180	0.003
0.4	8	16,440	225	0.004	15,480	160	0.003	13,680	120	0.002
0.4	10	8,220	95	0.004	7,740	70	0.003	6,840	50	0.002
0.5	1	27,400	540	0.045	25,800	425	0.035	22,800	285	0.025
0.5	1.5	27,400	540	0.045	25,800	425	0.035	22,800	285	0.025
0.5	2	27,400	540	0.032	25,800	425	0.025	22,800	285	0.018
0.5	2.5	27,400	540	0.032	25,800	425	0.025	22,800	285	0.018
0.5	3	24,660	435	0.018	23,220	345	0.014	20,520	230	0.010
0.5	4	24,660	435	0.018	23,220	345	0.014	20,520	230	0.010
0.5	5	24,660	435	0.011	23,220	345	0.009	20,520	230	0.006
0.5	6	21,920	345	0.011	20,640	270	0.009	18,240	180	0.006
0.5	8	16,440	225	0.007	15,480	180	0.005	13,680	120	0.004
0.5	10	16,440	225	0.005	15,480	180	0.004	13,680	120	0.003
0.5	12	8,220	95	0.005	7,740	75	0.004	6,840	50	0.003
0.5	14	8,220	95	0.005	7,740	75	0.004	6,840	50	0.003
0.5	16	2,740	25	0.005	2,580	20	0.004	2,280	15	0.003
0.6	2	27,400	775	0.038	25,800	545	0.029	22,800	405	0.021
0.6	3	27,400	775	0.038	25,800	545	0.029	22,800	405	0.021
0.6	4	24,660	630	0.022	23,220	440	0.017	20,520	330	0.012
0.6	5	24,660	630	0.014	23,220	440	0.011	20,520	330	0.008
0.6	6	24,660	630	0.014	23,220	440	0.011	20,520	330	0.008
0.6	8	21,920	495	0.008	20,640	350	0.006	18,240	260	0.005
0.6	10	16,440	325	0.005	15,480	230	0.004	13,680	170	0.003

H-Star Endmill

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측면 절삭 가공

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			열처리강 (SKD, SKT, STAVAX)		
인장강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경(Ø)	유효장	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)
0.6	12	16,440	325	0.005	15,480	230	0.004	13,680	170	0.003
0.6	14	8,220	140	0.005	7,740	100	0.004	6,840	75	0.003
0.6	16	8,220	140	0.005	7,740	100	0.004	6,840	75	0.003
0.7	2	27,400	775	0.063	25,800	545	0.049	22,800	405	0.035
0.7	4	24,660	630	0.025	23,220	440	0.020	20,520	330	0.014
0.7	6	24,660	630	0.016	23,220	440	0.012	20,520	330	0.009
0.7	8	21,920	495	0.016	20,640	350	0.012	18,240	260	0.009
0.7	10	21,920	495	0.009	20,640	350	0.007	18,240	260	0.005
0.7	12	16,440	325	0.009	15,480	230	0.005	13,680	170	0.004
0.8	2	27,400	775	0.072	25,800	605	0.056	22,800	450	0.040
0.8	3	27,400	775	0.050	25,800	605	0.039	22,800	450	0.028
0.8	4	27,400	775	0.050	25,800	605	0.039	22,800	450	0.028
0.8	5	24,660	630	0.029	23,220	490	0.022	20,520	365	0.016
0.8	6	24,660	630	0.029	23,220	490	0.022	20,520	365	0.016
0.8	8	24,660	630	0.018	23,220	490	0.014	20,520	365	0.010
0.8	10	21,920	495	0.018	20,640	385	0.014	18,240	290	0.010
0.8	12	21,920	495	0.011	20,640	385	0.008	18,240	290	0.006
0.8	14	16,440	325	0.007	15,480	255	0.006	13,680	190	0.004
0.8	16	16,440	325	0.007	15,480	255	0.006	13,680	190	0.004
0.8	20	8,220	140	0.007	7,740	110	0.006	6,840	80	0.004
0.9	6	22,140	575	0.032	20,970	440	0.025	18,450	330	0.018
0.9	8	22,140	575	0.020	20,970	440	0.016	18,450	330	0.011
0.9	10	19,680	455	0.020	18,640	350	0.016	16,400	260	0.011
1.0	2	24,600	1,045	0.090	23,300	890	0.070	20,500	665	0.050
1.0	3	24,600	1,045	0.090	23,300	890	0.070	20,500	665	0.050
1.0	4	24,600	1,045	0.063	23,300	890	0.049	20,500	665	0.035
1.0	5	24,600	1,045	0.063	23,300	890	0.049	20,500	665	0.035
1.0	6	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
1.0	7	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
1.0	8	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
1.0	10	22,140	845	0.023	20,970	720	0.018	18,450	540	0.013
1.0	12	19,680	670	0.023	18,640	570	0.018	16,400	425	0.013
1.0	14	19,680	670	0.014	18,640	570	0.011	16,400	425	0.008
1.0	16	14,760	440	0.014	13,980	375	0.011	12,300	280	0.008
1.0	18	14,760	440	0.009	13,980	375	0.007	12,300	280	0.005
1.0	20	14,760	440	0.009	13,980	375	0.007	12,300	280	0.005
1.0	22	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
1.0	26	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
1.0	30	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
1.0	40	2,460	50	0.009	2,330	45	0.007	2,050	35	0.005
1.0	50	2,460	50	0.006	2,330	45	0.005	2,050	35	0.003
1.2	4	21,900	930	0.076	20,700	720	0.059	18,200	485	0.042
1.2	6	21,900	930	0.076	20,700	720	0.059	18,200	485	0.042
1.2	8	19,710	755	0.043	18,630	585	0.034	16,380	395	0.024

H-Star Endmill

ESRE712

측면 절삭 가공

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			열처리강 (SKD, SKT, STAVAX)		
인장강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경(Ø)	유효장	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)
1.2	10	19,710	755	0.027	18,630	585	0.021	16,380	395	0.015
1.2	12	19,710	755	0.027	18,630	585	0.021	16,380	395	0.015
1.2	14	17,520	595	0.027	16,560	460	0.021	14,560	310	0.015
1.2	16	17,520	595	0.016	16,560	460	0.013	14,560	310	0.009
1.2	20	13,140	390	0.011	12,420	300	0.008	10,920	205	0.006
1.2	26	6,570	165	0.011	6,210	130	0.008	5,460	85	0.006
1.2	30	6,570	165	0.011	6,210	130	0.008	5,460	85	0.006
1.4	6	19,200	815	0.088	18,100	570	0.069	16,000	425	0.049
1.4	8	17,280	660	0.050	16,290	460	0.039	14,400	345	0.028
1.4	10	17,280	660	0.050	16,290	460	0.039	14,400	345	0.028
1.4	14	17,280	660	0.032	16,290	460	0.025	14,400	345	0.018
1.4	16	15,360	520	0.032	14,480	365	0.025	12,800	270	0.018
1.4	20	15,360	520	0.019	14,480	365	0.015	12,800	270	0.011
1.5	4	19,200	905	0.135	18,100	635	0.105	16,000	475	0.075
1.5	5	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
1.5	6	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
1.5	7	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
1.5	8	17,280	735	0.054	16,290	515	0.042	14,400	385	0.030
1.5	10	17,280	735	0.054	16,290	515	0.042	14,400	385	0.030
1.5	12	17,280	735	0.054	16,290	515	0.042	14,400	385	0.030
1.5	14	17,280	735	0.034	16,290	515	0.026	14,400	385	0.019
1.5	16	15,360	580	0.034	14,480	405	0.026	12,800	305	0.019
1.5	18	15,360	580	0.034	14,480	405	0.026	12,800	305	0.019
1.5	20	15,360	580	0.020	14,480	405	0.016	12,800	305	0.011
1.5	22	15,360	580	0.020	14,480	405	0.016	12,800	305	0.011
1.5	26	11,520	380	0.014	10,860	265	0.011	9,600	200	0.008
1.5	30	11,520	380	0.014	10,860	265	0.011	9,600	200	0.008
1.6	8	17,800	840	0.101	16,800	655	0.078	14,800	490	0.056
1.6	10	16,020	680	0.058	15,120	530	0.045	13,320	395	0.032
1.6	12	16,020	680	0.058	15,120	530	0.045	13,320	395	0.032
1.6	16	16,020	680	0.036	15,120	530	0.028	13,320	395	0.020
1.6	20	14,240	540	0.036	13,440	420	0.028	11,840	315	0.020
1.8	8	17,800	840	0.113	16,800	655	0.088	14,800	490	0.063
1.8	10	16,020	680	0.065	15,120	530	0.050	13,320	395	0.036
1.8	12	16,020	680	0.065	15,120	530	0.050	13,320	395	0.036
1.8	16	16,020	680	0.041	15,120	530	0.032	13,320	395	0.023
1.8	20	14,240	540	0.041	13,440	420	0.032	11,840	315	0.023
2.0	6	14,400	820	0.180	13,600	620	0.140	12,000	475	0.100
2.0	8	14,400	820	0.126	13,600	620	0.098	12,000	475	0.070
2.0	10	14,400	820	0.126	13,600	620	0.098	12,000	475	0.070
2.0	12	12,960	665	0.072	12,240	500	0.056	10,800	385	0.040
2.0	14	12,960	665	0.072	12,240	500	0.056	10,800	385	0.040
2.0	16	12,960	665	0.072	12,240	500	0.056	10,800	385	0.040
2.0	18	12,960	665	0.045	12,240	500	0.035	10,800	385	0.025

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ESRE712

측면 절삭 가공

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			열처리강 (SKD, SKT, STAVAX)		
인장강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경(Ø)	유효장	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)
2.0	20	12,960	665	0.045	12,240	500	0.035	10,800	385	0.025
2.0	22	11,520	525	0.045	10,880	395	0.035	9,600	305	0.025
2.0	26	11,520	525	0.045	10,880	395	0.035	9,600	305	0.025
2.0	30	11,520	525	0.027	10,880	395	0.021	9,600	305	0.015
2.0	35	8,640	345	0.018	8,160	260	0.014	7,200	200	0.010
2.0	40	8,640	345	0.018	8,160	260	0.014	7,200	200	0.010
2.0	45	4,320	150	0.018	4,080	110	0.014	3,600	85	0.010
2.0	50	4,320	150	0.018	4,080	110	0.014	3,600	85	0.010
2.0	60	4,320	150	0.018	4,080	110	0.014	3,600	85	0.010
2.5	8	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
2.5	10	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
2.5	12	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
2.5	14	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
2.5	16	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
2.5	18	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
2.5	20	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
2.5	22	11,070	785	0.056	10,440	550	0.044	9,270	415	0.031
2.5	26	9,840	620	0.056	9,280	435	0.044	8,240	325	0.031
2.5	30	9,840	620	0.056	9,280	435	0.044	8,240	325	0.031
2.5	35	9,840	620	0.034	9,280	435	0.026	8,240	325	0.019
2.5	40	7,380	405	0.034	6,960	285	0.026	6,180	215	0.019
2.5	45	7,380	405	0.023	6,960	285	0.018	6,180	215	0.013
2.5	50	7,380	405	0.023	6,960	285	0.018	6,180	215	0.013
3.0	6	10,900	860	0.270	10,300	605	0.210	6,600	450	0.150
3.0	8	10,900	860	0.270	10,300	605	0.210	6,600	450	0.150
3.0	10	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
3.0	12	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
3.0	14	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
3.0	16	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
3.0	18	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
3.0	20	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
3.0	22	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
3.0	26	9,810	695	0.068	9,270	490	0.053	5,940	365	0.038
3.0	30	9,810	695	0.068	9,270	490	0.053	5,940	365	0.038
3.0	35	8,720	550	0.068	8,240	385	0.053	5,280	290	0.038
3.0	40	8,720	550	0.041	8,240	385	0.032	5,280	290	0.023
3.0	45	8,720	550	0.041	8,240	385	0.032	5,280	290	0.023
3.0	50	6,540	360	0.027	6,180	255	0.021	3,960	190	0.015
3.0	60	6,540	360	0.027	6,180	255	0.021	3,960	190	0.015
4.0	8	8,000	1,300	0.360	7,600	1,160	0.280	6,700	770	0.200
4.0	10	8,000	1,300	0.360	7,600	1,160	0.280	6,700	770	0.200
4.0	12	8,000	1,300	0.360	7,600	1,160	0.280	6,700	770	0.200
4.0	14	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
4.0	16	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140

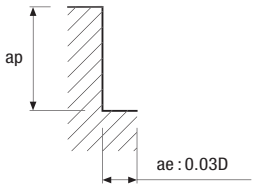
H-Star Endmill

ESRE712

측면 절삭 가공

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			열처리강 (SKD, SKT, STAVAX)		
인장강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경(Ø)	유효장	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)
4.0	18	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
4.0	20	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
4.0	22	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
4.0	26	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
4.0	30	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
4.0	35	7,200	1,055	0.090	6,840	940	0.070	6,030	625	0.050
4.0	40	7,200	1,055	0.090	6,840	940	0.070	6,030	625	0.050
4.0	45	6,400	830	0.090	6,080	740	0.070	5,360	495	0.050
4.0	50	6,400	830	0.090	6,080	740	0.070	5,360	495	0.050
4.0	60	6,400	830	0.054	6,080	740	0.042	5,360	495	0.030
5.0	16	6,400	1,155	0.315	6,100	900	0.245	5,400	605	0.175
5.0	20	6,400	1,155	0.315	6,100	900	0.245	5,400	605	0.175
5.0	26	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
5.0	30	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
5.0	35	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
5.0	40	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
5.0	50	5,760	935	0.113	5,490	730	0.088	4,860	490	0.063
5.0	60	5,120	740	0.113	4,880	575	0.088	4,320	385	0.063
6.0	15	5,300	1,055	0.540	5,000	820	0.420	4,400	550	0.300
6.0	20	5,300	1,055	0.378	5,000	820	0.294	4,400	550	0.210
6.0	30	5,300	1,055	0.378	5,000	820	0.294	4,400	550	0.210
6.0	32	4,770	855	0.216	4,500	665	0.168	3,960	445	0.120
8.0	25	4,000	950	0.504	3,800	750	0.392	3,300	500	0.280
8.0	30	4,000	950	0.504	3,800	750	0.392	3,300	500	0.280
8.0	42	3,600	770	0.288	3,400	605	0.224	2,950	405	0.160
10.0	30	3,200	900	0.900	3,050	680	0.700	2,630	400	0.500
10.0	35	3,200	900	0.630	3,050	680	0.490	2,630	400	0.350
10.0	45	3,200	900	0.630	3,050	680	0.490	2,630	400	0.350
12.0	35	2,650	800	1.080	2,520	600	0.840	2,180	350	0.600
12.0	40	2,650	800	0.756	2,520	600	0.588	2,180	350	0.420
12.0	50	2,650	800	0.756	2,520	600	0.588	2,180	350	0.420

절입기준



H-Star Endmill

ESRE714

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			열처리강 (SKD, SKT, STAVAX)		
인장강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경(Ø)	유효장	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)
0.5	1	27,400	756	0.045	25,800	595	0.035	22,800	399	0.025
0.5	2	27,400	756	0.032	25,800	595	0.025	22,800	399	0.018
0.5	3	24,660	609	0.018	23,220	483	0.014	20,520	322	0.01
0.5	4	24,660	609	0.018	23,220	483	0.014	20,520	322	0.01
0.5	5	24,660	609	0.011	23,220	483	0.009	20,520	322	0.006
0.5	6	21,920	483	0.011	20,640	378	0.009	18,240	252	0.006
0.5	8	16,440	315	0.007	15,480	252	0.005	13,680	168	0.004
0.5	10	16,440	315	0.005	15,480	252	0.004	13,680	168	0.003
0.6	1	27,400	1,085	0.038	25,800	763	0.029	22,800	567	0.021
0.6	2	27,400	1,085	0.038	25,800	763	0.029	22,800	567	0.021
0.6	3	27,400	1,085	0.038	25,800	763	0.029	22,800	567	0.021
0.6	4	24,660	882	0.022	23,220	616	0.017	20,520	462	0.012
0.6	5	24,660	882	0.014	23,220	616	0.011	20,520	462	0.008
0.6	6	24,660	882	0.014	23,220	616	0.011	20,520	462	0.008
0.6	8	21,920	693	0.008	20,640	490	0.006	18,240	364	0.005
0.6	10	16,440	455	0.005	15,480	322	0.004	13,680	238	0.003
0.6	12	16,440	455	0.005	15,480	322	0.004	13,680	238	0.003
0.7	2	27,400	1,085	0.063	25,800	763	0.049	22,800	567	0.035
0.7	4	24,660	882	0.025	23,220	616	0.02	20,520	462	0.014
0.7	6	24,660	693	0.016	23,220	616	0.012	20,520	462	0.009
0.7	8	21,920	693	0.016	20,640	490	0.012	18,240	364	0.009
0.7	10	21,920	693	0.009	20,640	490	0.007	18,240	364	0.005
0.8	1	27,400	1,085	0.072	25,800	847	0.056	22,800	630	0.04
0.8	2	27,400	1,085	0.072	25,800	847	0.056	22,800	630	0.04
0.8	3	27,400	1,085	0.05	25,800	847	0.039	22,800	630	0.028
0.8	4	27,400	1,085	0.05	25,800	847	0.039	22,800	630	0.028
0.8	5	24,660	882	0.029	23,220	686	0.022	20,520	511	0.016
0.8	6	24,660	882	0.029	23,220	686	0.022	20,520	511	0.016
0.8	8	24,660	882	0.018	23,220	686	0.014	20,520	511	0.01
0.8	10	21,920	693	0.018	20,640	539	0.014	18,240	406	0.01
0.8	12	21,920	693	0.011	20,640	539	0.008	18,240	406	0.006
0.8	16	16,440	455	0.007	15,480	357	0.006	13,680	266	0.004
1	2	24,600	1,463	0.09	23,300	1,246	0.07	20,500	931	0.05
1	3	24,600	1,463	0.09	23,300	1,246	0.07	20,500	931	0.05
1	4	24,600	1,463	0.063	23,300	1,246	0.049	20,500	931	0.035
1	6	22,140	1,183	0.036	20,970	1,008	0.028	18,450	756	0.02
1	8	22,140	1,183	0.036	20,970	1,008	0.028	18,450	756	0.02
1	10	22,140	1,183	0.023	20,970	1,008	0.018	18,450	756	0.013
1	12	19,680	938	0.023	18,640	798	0.018	16,400	595	0.013
1	14	19,680	938	0.014	18,640	798	0.011	16,400	595	0.008
1	16	14,760	616	0.014	13,980	525	0.011	12,300	392	0.008
1	18	14,760	616	0.009	13,980	525	0.007	12,300	392	0.005
1	20	14,760	616	0.009	13,980	525	0.007	12,300	392	0.005
1.2	4	21,900	1,302	0.076	20,700	1,008	0.059	18,200	679	0.042
1.2	6	21,900	1,302	0.076	20,700	1,008	0.059	18,200	679	0.042
1.2	8	19,710	1,057	0.043	18,630	819	0.034	16,380	553	0.024
1.2	10	19,710	1,057	0.027	18,630	819	0.021	16,380	553	0.015
1.2	12	19,710	1,057	0.027	18,630	819	0.021	16,380	553	0.015

H-Star Endmill

ESRE714

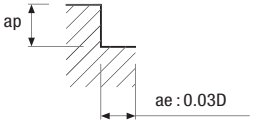
피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			열처리강 (SKD, SKT, STAVAX)		
인장강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경(Ø)	유효장	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)
1.2	16	17,520	833	0.016	16,560	644	0.013	14,560	434	0.009
1.2	18	17,520	833	0.016	16,560	644	0.013	14,560	434	0.009
1.2	20	13,140	546	0.011	12,420	420	0.008	10,920	287	0.006
1.4	6	19,200	1,141	0.088	18,100	798	0.069	16,000	595	0.049
1.4	8	17,280	924	0.05	16,290	644	0.039	14,400	483	0.028
1.4	10	17,280	924	0.05	16,290	644	0.039	14,400	483	0.028
1.4	12	17,280	924	0.05	16,290	644	0.039	14,400	483	0.028
1.4	14	17,280	924	0.032	16,290	644	0.025	14,400	483	0.018
1.4	16	15,360	728	0.032	14,480	511	0.025	12,800	378	0.018
1.5	4	19,200	1,267	0.135	18,100	889	0.105	16,000	665	0.075
1.5	6	19,200	1,267	0.095	18,100	889	0.074	16,000	665	0.053
1.5	8	17,280	1,029	0.054	16,290	721	0.042	14,400	539	0.03
1.5	10	17,280	1,029	0.054	16,290	721	0.042	14,400	539	0.03
1.5	12	17,280	1,029	0.054	16,290	721	0.042	14,400	539	0.03
1.5	16	15,360	812	0.034	14,480	567	0.026	12,800	427	0.019
1.5	18	15,360	812	0.034	14,480	567	0.026	12,800	427	0.019
1.5	20	15,360	812	0.02	14,480	567	0.016	12,800	427	0.011
1.5	25	11,520	532	0.014	10,860	371	0.011	9,600	280	0.008
1.5	30	11,520	532	0.014	10,860	371	0.011	9,600	280	0.008
1.6	6	17,800	1,176	0.101	16,800	917	0.078	14,800	686	0.056
1.6	8	17,800	1,176	0.101	16,800	917	0.078	14,800	686	0.056
1.6	10	16,020	952	0.058	15,120	742	0.045	13,320	553	0.032
1.6	12	16,020	952	0.058	15,120	742	0.045	13,320	553	0.032
1.6	14	16,020	952	0.058	15,120	742	0.045	13,320	553	0.032
1.6	16	16,020	952	0.036	15,120	752	0.028	13,320	553	0.02
1.6	18	16,020	952	0.036	15,120	752	0.028	13,320	553	0.02
1.6	20	14,240	756	0.036	13,440	588	0.028	11,840	441	0.02
1.6	25	14,240	756	0.036	13,440	588	0.028	11,840	441	0.02
1.8	6	17,800	1,176	0.113	16,800	917	0.088	14,800	686	0.063
1.8	8	17,800	1,176	0.113	16,800	917	0.088	14,800	686	0.063
1.8	10	16,020	952	0.065	15,120	742	0.05	13,320	553	0.036
1.8	12	16,020	952	0.065	15,120	742	0.05	13,320	553	0.036
1.8	16	16,020	952	0.041	15,120	742	0.032	13,320	553	0.023
1.8	20	14,240	756	0.041	13,440	588	0.032	11,840	441	0.023
1.8	25	14,240	756	0.041	13,440	588	0.032	11,840	441	0.023
2	4	14,400	1,148	0.18	13,600	868	0.14	12,000	665	0.1
2	6	14,400	1,148	0.18	13,600	868	0.14	12,000	665	0.1
2	8	14,400	1,148	0.126	13,600	868	0.098	12,000	665	0.07
2	10	14,400	1,148	0.126	13,600	868	0.098	12,000	665	0.07
2	12	12,960	931	0.072	12,240	700	0.056	10,800	539	0.04
2	14	12,960	931	0.072	12,240	700	0.056	10,800	539	0.04
2	16	12,960	931	0.072	12,240	700	0.056	10,800	539	0.04
2	18	12,960	931	0.045	12,240	700	0.035	10,800	539	0.025
2	20	12,960	931	0.045	12,240	700	0.035	10,800	539	0.025
2	22	11,520	735	0.045	10,880	553	0.035	9,600	427	0.025
2	25	11,520	735	0.045	10,880	553	0.035	9,600	427	0.025
2	30	11,520	735	0.027	10,880	553	0.021	9,600	427	0.015
2.5	10	12,300	1,358	0.158	11,600	952	0.123	10,300	714	0.088

H-Star Endmill

ESRE714

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			열처리강 (SKD, SKT, STAVAX)		
인장강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경(Ø)	유효장	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)
2.5	12	12,300	1,358	0.158	11,600	952	0.123	10,300	714	0.088
2.5	16	11,070	1,099	0.09	10,440	770	0.07	9,270	581	0.05
2.5	20	11,070	1,099	0.09	10,440	770	0.07	9,270	581	0.05
2.5	25	9,840	868	0.056	9,280	609	0.044	8,240	455	0.031
2.5	30	9,840	868	0.056	9,280	609	0.044	8,240	455	0.031
3	6	10,900	1,204	0.27	10,300	847	0.21	6,600	630	0.15
3	8	10,900	1,204	0.27	10,300	847	0.21	6,600	630	0.15
3	10	10,900	1,204	0.189	10,300	847	0.147	6,600	630	0.105
3	12	10,900	1,204	0.189	10,300	847	0.147	6,600	630	0.105
3	16	9,810	973	0.108	9,270	686	0.084	5,940	511	0.06
3	20	9,810	973	0.108	9,270	686	0.084	5,940	511	0.06
3	25	9,810	973	0.068	9,270	686	0.053	5,940	511	0.038
3	30	9,810	973	0.068	9,270	686	0.053	5,940	511	0.038
3	35	8,720	770	0.068	8,240	539	0.053	5,280	406	0.038
3	40	8,720	770	0.041	8,240	539	0.032	5,280	406	0.023
3	45	8,720	770	0.041	8,240	539	0.032	5,280	406	0.023
3	50	6,540	504	0.027	6,180	357	0.021	3,960	266	0.015
3	60	6,540	504	0.027	6,180	357	0.021	3,960	266	0.015
3.5	12	9,310	1,430	0.236	8,800	1,008	0.183	5,640	750	0.131
3.5	16	8,380	1,158	0.135	7,920	816	0.105	5,070	608	0.075
3.5	20	8,380	1,158	0.135	7,920	816	0.105	5,070	608	0.047
3.5	25	8,380	1,158	0.085	7,920	816	0.066	5,070	608	0.047
3.5	30	8,380	1,158	0.085	7,920	816	0.066	5,070	608	0.047
3.5	35	7,450	916	0.085	7,040	641	0.066	4,510	483	0.047
3.5	40	7,450	916	0.051	7,040	641	0.04	4,510	483	0.028
4	6	8,000	1,820	0.36	7,600	1,624	0.28	6,700	1,078	0.2
4	8	8,000	1,820	0.36	7,600	1,624	0.28	6,700	1,078	0.2
4	10	8,000	1,820	0.36	7,600	1,624	0.28	6,700	1,078	0.2
4	12	8,000	1,820	0.36	7,600	1,624	0.28	6,700	1,078	0.2
4	16	8,000	1,820	0.252	7,600	1,624	0.196	6,700	1,078	0.14
4	20	8,000	1,820	0.252	7,600	1,624	0.196	6,700	1,078	0.14
4	25	7,200	1,477	0.144	6,840	1,316	0.112	6,030	875	0.08
4	30	7,200	1,477	0.144	6,840	1,316	0.112	6,030	875	0.08
4	40	7,200	1,477	0.09	6,840	1,316	0.07	6,030	875	0.05
4	45	6,400	1,162	0.09	6,080	1,036	0.07	5,360	693	0.05
4	50	6,400	1,162	0.09	6,080	1,036	0.07	5,360	693	0.05
4	60	6,400	1,162	0.054	6,080	1,036	0.042	5,360	693	0.03
4.5	12	6,830	2,166	0.45	6,490	1,933	0.35	5,720	1,283	0.25
4.5	16	6,830	2,166	0.315	6,490	1,933	0.245	5,720	1,283	0.175
4.5	20	6,830	2,166	0.315	6,490	1,933	0.245	5,720	1,283	0.175
4.5	25	6,150	1,758	0.18	5,840	1,566	0.14	5,150	1,041	0.1
4.5	30	6,150	1,758	0.18	5,840	1,566	0.14	5,150	1,041	0.1

절입기준

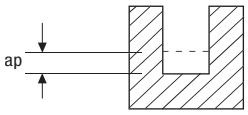


H-Star Endmill

ESRE714

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			열처리강 (SKD, SKT, STAVAX)		
인장강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경(Ø)	유효장	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	절입 (mm)
4.5	40	6,150	1,758	0.112	5,840	1,566	0.087	5,150	1,041	0.062
5	16	6,400	1,617	0.315	6,100	1,260	0.245	5,400	847	0.175
5	20	6,400	1,617	0.315	6,100	1,260	0.245	5,400	847	0.175
5	25	5,760	1,309	0.18	5,490	1,022	0.14	4,860	686	0.1
5	30	5,760	1,309	0.18	5,490	1,022	0.14	4,860	686	0.1
5	40	5,760	1,309	0.18	5,490	1,022	0.14	4,860	686	0.1
5	50	5,760	1,309	0.113	5,490	1,022	0.088	4,860	686	0.063
5	60	5,120	1,036	0.113	4,880	805	0.088	4,320	539	0.063
6	20	5,300	1,477	0.378	5,000	1,148	0.294	4,400	770	0.21
6	30	5,300	1,477	0.378	5,000	1,148	0.294	4,400	770	0.21
6	40	4,770	1,197	0.216	4,500	931	0.168	3,960	623	0.12
6	50	4,770	1,197	0.216	4,500	931	0.168	3,960	623	0.12
6	60	4,370	958	0.141	4,171	931	0.11	3,690	623	0.078
8	25	4,000	1,330	0.504	3,800	1,050	0.392	3,300	700	0.28
8	40	3,600	1,078	0.288	3,400	847	0.224	2,950	567	0.16
8	50	3,600	1,078	0.288	3,400	847	0.224	2,950	567	0.16
10	30	3,200	1,260	0.9	3,050	952	0.7	2,630	560	0.5
10	50	3,200	1,260	0.63	3,050	952	0.49	2,630	560	0.35
10	60	3,200	1,260	0.63	3,050	952	0.49	2,630	560	0.35
12	40	2,650	1,120	0.756	2,520	840	0.588	2,180	490	0.42
12	60	2,360	896	0.472	2,250	672	0.367	1,940	392	0.262
12	70	2,360	896	0.472	2,250	672	0.367	1,940	392	0.262

절입기준



H-Star Endmill

ESRR712 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
0.2	0.02	0.5	0.016	50,000	258	50,000	205	50,000	180	50,000	160
		1	0.011	50,000	258	50,000	205	50,000	180	50,000	160
		1.5	0.007	42,000	202	36,700	176	36,700	162	36,700	147
	0.05	0.5	0.02	50,000	258	50,000	205	50,000	180	50,000	160
		1	0.014	50,000	258	50,000	205	50,000	180	50,000	160
		1.5	0.008	50,000	240	45,900	202	45,900	170	45,900	153
0.3	0.02	1	0.016	50,000	585	50,000	456	50,000	336	50,000	320
		2	0.011	45,000	530	45,000	420	45,000	300	45,000	290
		3	0.007	35,000	412	35,000	326	30,000	200	30,000	194
	0.05	1	0.021	50,000	585	50,000	456	50,000	336	50,000	320
		2	0.012	45,000	530	45,000	420	45,000	300	45,000	290
		3	0.008	35,000	412	35,000	326	30,000	200	30,000	194
0.4	0.02	1	0.016	50,000	580	50,000	461	40,000	320	36,000	270
		2	0.013	45,000	520	45,000	410	36,000	290	34,000	240
		3	0.01	40,000	410	40,000	330	32,800	240	25,600	200
		4	0.007	30,000	320	30,000	250	21,600	160	19,200	150
	0.05	1	0.025	50,000	580	50,000	461	40,000	320	36,000	270
		2	0.016	45,000	520	45,000	410	36,000	290	34,000	240
		3	0.014	40,000	410	40,000	330	32,800	240	25,600	200
		4	0.008	30,000	320	30,000	250	21,600	160	19,200	150
	0.1	1	0.033	50,000	580	50,000	461	40,000	320	36,000	270
		1.5	0.03	50,000	580	50,000	461	40,000	320	36,000	270
		2	0.028	45,000	520	45,000	410	36,000	290	34,000	240
		3	0.016	40,000	410	40,000	330	32,800	240	25,600	200
		4	0.01	30,000	320	30,000	250	21,600	160	19,200	150
0.5	0.02	1	0.016	50,000	898	40,000	464	30,000	378	28,000	315
		1.5	0.014	50,000	898	40,000	464	30,000	378	28,000	315
		2	0.013	50,000	898	40,000	464	30,000	378	28,000	315
		2.5	0.011	45,000	810	36,000	414	27,000	315	24,500	261
		3	0.01	45,000	810	36,000	414	27,000	315	24,500	261
		4	0.008	40,000	720	32,000	378	24,000	279	20,000	234
		5	0.007	40,000	720	32,000	378	24,000	279	20,000	234
		6	0.006	28,800	480	19,400	260	18,000	250	15,000	200
		8	0.005	28,800	480	19,400	260	18,000	250	15,000	200
		10	0.004	28,800	480	19,400	260	18,000	250	15,000	200
	0.05	1	0.03	50,000	898	40,000	464	30,000	378	28,000	315
		1.5	0.026	50,000	898	40,000	464	30,000	378	28,000	315
		2	0.023	50,000	898	40,000	464	30,000	378	28,000	315
		2.5	0.02	45,000	810	36,000	414	27,000	315	24,500	261
		3	0.017	45,000	810	36,000	414	27,000	315	24,500	261
		4	0.017	40,000	720	32,000	378	24,000	279	20,000	234
		5	0.011	28,800	540	19,400	280	18,000	250	15,000	200
		6	0.008	28,800	480	19,400	260	18,000	250	15,000	200
		8	0.007	28,800	480	19,400	260	18,000	250	15,000	200
		10	0.006	28,800	480	19,400	260	18,000	250	15,000	200

H-Star Endmill

ESRR712 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
0.5	0.1	1	0.035	50,000	898	40,000	464	30,000	378	28,000	315
		1.5	0.032	50,000	898	40,000	464	30,000	378	28,000	315
		2	0.03	50,000	898	40,000	464	30,000	378	28,000	315
		2.5	0.025	45,000	810	36,000	414	27,000	315	24,500	261
		3	0.02	45,000	810	36,000	414	27,000	315	24,500	261
		4	0.02	40,000	720	32,000	378	24,000	279	20,000	234
		5	0.013	28,800	540	19,400	280	18,000	250	15,000	200
		6	0.013	28,800	480	19,400	260	18,000	250	15,000	200
		8	0.01	28,800	480	19,400	260	18,000	250	15,000	200
		10	0.08	28,800	480	19,400	260	18,000	250	15,000	200
0.6	0.02	2	0.016	50,000	1,159	37,830	600	28,200	390	23,000	320
		3	0.014	40,000	830	27,800	440	23,600	280	21,000	230
		4	0.013	40,000	830	27,800	440	23,600	280	21,000	230
		6	0.01	24,000	490	18,000	300	17,800	240	15,000	210
		8	0.008	24,000	466	18,000	285	17,800	228	15,000	200
		10	0.007	24,000	451	18,000	276	17,800	221	15,000	193
		12	0.006	24,000	451	18,000	276	17,800	221	15,000	193
	0.05	2	0.028	50,000	1,159	37,830	600	28,200	390	23,000	320
		3	0.023	40,000	830	27,800	440	23,600	280	21,000	230
		4	0.019	40,000	830	27,800	440	23,600	280	21,000	230
		6	0.012	24,000	490	18,000	300	17,800	240	15,000	210
		8	0.01	24,000	466	18,000	285	17,800	228	15,000	200
		10	0.007	24,000	451	18,000	276	17,800	221	15,000	193
		12	0.006	24,000	451	18,000	276	17,800	221	15,000	193
	0.1	2	0.035	50,000	1,159	37,830	600	28,200	390	23,000	320
		3	0.03	40,000	830	27,800	440	23,600	280	21,000	230
		4	0.024	40,000	830	27,800	440	23,600	280	21,000	230
		6	0.015	24,000	490	18,000	300	17,800	240	15,000	210
		8	0.013	24,000	466	18,000	285	17,800	228	15,000	200
		10	0.009	24,000	451	18,000	276	17,800	221	15,000	193
		12	0.007	24,000	451	18,000	276	17,800	221	15,000	193
0.7	0.1	2	0.042	49,200	1,054	34,190	558	29,030	355	25,830	292
		4	0.029	40,000	830	27,800	440	23,600	280	21,000	230
		6	0.018	24,000	490	18,000	300	17,800	240	15,000	210
		8	0.015	24,000	490	18,000	300	17,800	240	15,000	210
		10	0.012	24,000	490	18,000	300	17,800	240	15,000	210
0.8	0.02	2	0.016	48,000	1,378	28,000	647	20,000	400	20,000	360
		4	0.016	48,000	1,102	28,000	518	20,000	320	20,000	288
		6	0.013	38,700	800	25,000	461	18,000	288	18,000	256
		8	0.011	29,025	600	20,000	369	16,200	259	16,200	230
		10	0.01	29,025	570	20,000	350	16,200	246	16,200	219
		12	0.09	29,025	570	20,000	350	16,200	246	16,200	219
	0.05	2	0.038	48,000	1,378	28,000	647	20,000	400	20,000	360
		4	0.026	48,000	1,102	28,000	518	20,000	320	20,000	288

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피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
0.8	0.05	6	0.015	38,700	800	25,000	461	18,000	288	18,000	256
		8	0.012	29,025	600	20,000	369	16,200	259	16,200	230
		10	0.011	29,025	570	20,000	350	16,200	246	16,200	219
		12	0.01	29,025	570	20,000	350	16,200	246	16,200	219
	0.1	2	0.047	48,000	1,378	28,000	647	20,000	400	20,000	360
		4	0.032	48,000	1,102	28,000	518	20,000	320	20,000	288
		6	0.019	38,700	800	25,000	461	18,000	288	18,000	256
		8	0.015	29,025	600	20,000	369	16,200	259	16,200	230
		10	0.013	29,025	570	20,000	350	16,200	246	16,200	219
		12	0.012	29,025	570	20,000	350	16,200	246	16,200	219
	0.2	2	0.081	48,000	1,378	28,000	647	20,000	400	20,000	360
		4	0.056	48,000	1,102	28,000	518	20,000	320	20,000	288
		6	0.032	38,700	800	25,000	461	18,000	288	18,000	256
		8	0.018	29,025	600	20,000	369	16,200	259	16,200	230
		10	0.016	29,025	570	20,000	350	16,200	246	16,200	219
		12	0.015	29,025	570	20,000	350	16,200	246	16,200	219
1	0.02	4	0.013	32,400	1,359	27,540	1,039	24,300	815	22,680	666
		6	0.01	26,244	990	22,307	842	19,683	660	18,371	539
		8	0.008	23,328	880	19,829	748	17,496	587	16,330	479
		10	0.006	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.005	18,144	609	15,422	453	13,608	399	12,701	320
		14	0.004	18,144	533	15,422	420	13,608	342	12,701	266
		16	0.004	18,144	533	15,422	420	13,608	342	12,701	266
		20	0.003	13,608	399	11,567	315	10,206	257	9,526	200
	0.05	4	0.027	32,400	1,359	28,917	1,128	24,300	815	22,680	666
		6	0.017	26,244	990	24,538	928	19,683	660	18,371	539
		8	0.016	23,328	880	19,829	748	17,496	587	16,330	479
		10	0.011	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.01	18,144	609	15,422	453	13,608	399	12,701	320
		14	0.008	18,144	533	15,422	420	13,608	342	12,701	266
		16	0.006	18,144	533	15,422	420	13,608	342	12,701	266
		20	0.004	13,608	399	11,567	315	10,206	257	9,526	200
	0.1	4	0.038	32,400	1,359	27,540	1,039	24,300	815	22,680	666
		6	0.024	26,244	990	22,307	842	19,683	660	18,371	539
		8	0.024	23,328	880	19,829	748	17,496	587	16,330	479
		10	0.015	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.015	18,144	609	15,422	453	13,608	399	12,701	320
		14	0.012	18,144	533	15,422	420	13,608	342	12,701	266
		16	0.009	18,144	533	15,422	420	13,608	342	12,701	266
		20	0.006	13,608	399	11,567	315	10,206	257	9,526	200
	0.2	4	0.07	32,400	1,359	27,540	1,039	24,300	815	22,680	666
		6	0.04	26,244	990	22,307	842	19,683	660	18,371	539
		8	0.04	23,328	880	19,829	748	17,496	587	16,330	479
		10	0.025	20,412	770	17,350	655	15,309	514	14,288	419

H-Star Endmill

ESRR712 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1	0.2	12	0.025	18,144	609	15,422	453	13,608	399	12,701	320
		14	0.02	18,144	533	15,422	420	13,608	342	12,701	266
		16	0.015	18,144	533	15,422	420	13,608	342	12,701	266
		20	0.01	13,608	399	11,567	315	10,206	257	9,526	200
	0.3	4	0.07	32,400	1,359	27,540	1,039	24,300	815	22,680	666
		6	0.04	26,244	990	22,307	842	19,683	660	18,371	539
		8	0.04	23,328	880	19,829	748	17,496	587	16,330	479
		10	0.025	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.025	18,144	609	15,422	453	13,608	399	12,701	320
		14	0.02	18,144	533	15,422	420	13,608	342	12,701	266
		16	0.015	18,144	533	15,422	420	13,608	342	12,701	266
		20	0.01	13,608	399	11,567	315	10,206	257	9,526	200
1.2	0.02	4	0.013	28,868	1,154	24,538	928	21,651	727	20,208	594
		6	0.01	28,868	1,154	24,538	928	21,651	727	20,208	594
		8	0.008	24,640	962	20,944	791	18,480	620	17,248	506
		10	0.006	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.005	19,278	652	16,386	554	14,458	428	13,494	342
		14	0.004	18,144	533	15,422	453	13,608	342	12,701	266
		16	0.004	18,144	533	15,422	453	13,608	342	12,701	266
		20	0.003	13,608	399	11,567	315	10,206	257	9,526	200
	0.05	4	0.027	28,868	1,154	24,538	928	21,651	727	20,208	594
		6	0.017	28,868	1,154	24,538	928	21,651	727	20,208	594
		8	0.016	24,640	962	20,944	791	18,480	620	17,248	506
		10	0.011	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.01	19,278	652	16,386	554	14,458	428	13,494	342
		14	0.008	18,144	533	15,422	453	13,608	342	12,701	266
		16	0.006	18,144	533	15,422	453	13,608	342	12,701	266
		20	0.004	13,608	399	11,567	315	10,206	257	9,526	200
	0.1	4	0.03	28,868	1,154	24,538	928	21,651	727	20,208	594
		6	0.03	28,868	1,154	24,538	928	21,651	727	20,208	594
		8	0.022	24,640	962	20,944	791	18,480	620	17,248	506
		10	0.015	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.012	19,278	652	16,386	554	14,458	428	13,494	342
		14	0.01	18,144	533	15,422	453	13,608	342	12,701	266
		16	0.01	18,144	533	15,422	453	13,608	342	12,701	266
		20	0.006	13,608	399	11,567	315	10,206	257	9,526	200
	0.2	4	0.05	28,868	1,154	24,538	928	21,651	727	20,208	594
		6	0.05	28,868	1,154	24,538	928	21,651	727	20,208	594
		8	0.037	24,640	962	20,944	791	18,480	620	17,248	506
		10	0.025	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.02	19,278	651	16,386	554	14,458	428	13,494	342
		14	0.016	18,144	533	15,422	453	13,608	342	12,701	266
		16	0.016	18,144	533	15,422	453	13,608	342	12,701	266
		20	0.01	13,608	399	11,567	315	10,206	257	9,526	200

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ESRR712 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1.2	0.3	4	0.05	28,868	1,154	24,538	928	21,651	727	20,208	594
		6	0.05	28,868	1,154	24,538	928	21,651	727	20,208	594
		8	0.037	24,640	962	20,944	791	18,480	620	17,248	506
		10	0.025	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.02	19,278	651	16,386	554	14,458	428	13,494	342
		14	0.016	18,144	533	15,422	453	13,608	342	12,701	266
		16	0.016	18,144	533	15,422	453	13,608	342	12,701	266
		20	0.01	13,608	399	11,567	315	10,206	257	9,526	200
1.5	0.02	4	0.013	24,930	1,130	20,956	947	18,711	752	17,364	611
		6	0.01	23,779	1,074	20,382	921	17,834	716	16,560	582
		8	0.008	22,680	1,027	19,278	873	17,010	685	15,876	559
		10	0.006	20,412	924	17,350	785	15,309	616	14,288	503
		12	0.005	18,144	822	15,422	698	13,608	548	12,701	447
		14	0.004	14,112	568	11,995	423	10,584	373	9,878	298
		16	0.004	14,112	568	11,995	423	10,584	373	9,878	298
		20	0.003	14,112	568	11,995	423	10,584	373	9,878	298
	0.05	4	0.027	24,930	1,130	20,956	947	18,711	752	17,364	611
		6	0.017	23,779	1,074	20,382	921	17,834	716	16,560	582
		8	0.016	22,680	1,027	19,278	873	17,010	685	15,876	559
		10	0.011	20,412	924	17,350	785	15,309	616	14,288	503
		12	0.01	18,144	822	15,422	698	13,608	548	12,701	447
		14	0.008	14,112	568	11,995	423	10,584	373	9,878	298
		16	0.006	14,112	568	11,995	423	10,584	373	9,878	298
		20	0.004	14,112	568	11,995	423	10,584	373	9,878	298
	0.1	4	0.042	24,930	1,130	20,956	947	18,711	752	17,364	611
		6	0.04	23,779	1,074	20,382	921	17,834	716	16,560	582
		8	0.036	22,680	1,027	19,278	873	17,010	685	15,876	559
		10	0.036	20,412	924	17,350	785	15,309	616	14,288	503
		12	0.036	18,144	822	15,422	698	13,608	548	12,701	447
		14	0.023	14,112	568	11,995	423	10,584	373	9,878	298
		16	0.023	14,112	568	11,995	423	10,584	373	9,878	298
		20	0.018	14,112	568	11,995	423	10,584	373	9,878	298
	0.2	4	0.07	24,930	1,130	20,956	868	18,711	678	17,364	556
		6	0.065	23,779	1,074	20,382	921	17,834	716	16,560	582
		8	0.06	22,680	1,027	19,278	873	17,010	685	15,876	559
		10	0.06	20,412	924	17,350	785	15,309	616	14,288	503
		12	0.06	18,144	822	15,422	698	13,608	548	12,701	447
		14	0.038	14,112	568	11,995	423	10,584	373	9,878	298
		16	0.038	14,112	568	11,995	423	10,584	373	9,878	298
		20	0.03	14,112	568	11,995	423	10,584	373	9,878	298
	0.3	4	0.07	24,930	1,130	20,956	868	18,711	678	17,364	556
		6	0.065	23,779	1,074	20,382	921	17,834	716	16,560	582
		8	0.06	22,680	1,027	19,278	873	17,010	685	15,876	559
		10	0.06	20,412	924	17,350	785	15,309	616	14,288	503

H-Star Endmill

ESRR712 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1.5	0.3	12	0.06	18,144	822	15,422	698	13,608	548	12,701	447
		14	0.038	14,112	568	11,995	423	10,584	373	9,878	298
		16	0.038	14,112	568	11,995	423	10,584	373	9,878	298
		20	0.03	14,112	568	11,995	423	10,584	373	9,878	298
	0.5	4	0.085	24,930	1,130	20,956	868	18,711	678	17,364	556
		6	0.08	23,779	1,074	20,382	921	17,834	716	16,560	582
		8	0.07	22,680	1,027	19,278	873	17,010	685	15,876	559
		10	0.067	20,412	924	17,350	785	15,309	616	14,288	503
		12	0.065	18,144	822	15,422	698	13,608	548	12,701	447
		14	0.045	14,112	568	11,995	423	10,584	373	9,878	298
		16	0.045	14,112	568	11,995	423	10,584	373	9,878	298
		20	0.035	14,112	568	11,995	423	10,584	373	9,878	298
2	0.02	6	0.013	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.01	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		10	0.008	17,104	1,284	14,539	1,092	1,2828	807	11,973	659
		12	0.006	15,309	1,083	13,013	921	11,482	722	10,716	590
		14	0.005	14,458	1,023	12,290	869	10,844	682	10,121	557
		16	0.004	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.004	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.003	11,907	757	10,121	643	8,930	505	8,335	411
	0.05	6	0.027	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.017	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		10	0.016	17104	1,284	14539	1,092	12828	807	11973	659
		12	0.011	15,309	1,083	13,013	921	11,482	722	10,716	590
		14	0.01	14,458	1,023	12,290	869	10,844	682	10,121	557
		16	0.008	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.006	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.004	11,907	757	10,121	643	8,930	505	8,335	411
	0.1	6	0.07	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.055	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		10	0.042	17104	1,284	14539	1,092	12828	807	11973	659
		12	0.03	15,309	1,083	13,013	921	11,482	722	10,716	590
		14	0.03	14,458	1,023	12,290	869	10,844	682	10,121	557
		16	0.03	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.025	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.015	11,907	757	10,121	643	8,930	505	8,335	411
		30	0.01	11,312	719	9,615	611	8,484	480	7,918	391
	0.2	6	0.08	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.07	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		10	0.055	17,104	1,284	14,539	1,092	12,828	807	11,973	659
		12	0.04	15,309	1,083	13,013	921	11,482	722	10,716	590
		14	0.04	14,458	1,023	12,290	869	10,844	682	10,121	557
		16	0.04	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.035	11,907	843	10,121	716	8,930	562	8,335	459

H-Star Endmill

ESRR712 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
2	0.2	25	0.025	11,907	757	10,121	643	8,930	505	8,335	411
		30	0.017	11,312	719	9,615	611	8,484	480	7,918	391
	0.3	6	0.11	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.09	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		10	0.075	17,104	1,284	14,539	1,092	12,828	807	11,973	659
		12	0.06	15,309	1,083	13,013	921	11,482	722	10,716	590
		14	0.06	14,458	1,023	12,290	869	10,844	682	10,121	557
		16	0.06	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.037	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.03	11,907	757	10,121	643	8,930	505	8,335	411
		30	0.021	11,312	719	9,615	611	8,484	480	7,918	391
	0.5	6	0.17	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.14	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		10	0.11	17,104	1,284	14,539	1143	12,828	807	11,973	659
		12	0.08	15,309	1,083	13,013	1,023	11,482	722	10,716	590
		14	0.08	14,458	1,023	12,290	920	1,084	682	10,121	557
		16	0.08	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.05	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.05	11,907	757	10,121	643	8,930	505	8,335	411
		30	0.03	11,312	719	9,615	611	8,484	480	7,918	391
2.5	0.1	10	0.055	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		16	0.042	16,254	1,224	13,816	1040	12,190	767	11,378	626
		20	0.03	13,608	963	11,567	818	10,206	642	9,526	524
		25	0.022	12,757	860	10,844	730	9,568	573	8,930	467
		30	0.015	11,907	757	10,121	643	8,930	505	8,335	411
	0.2	10	0.07	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		16	0.055	16,254	1,224	1,386	1040	12,190	767	11,378	626
		20	0.04	13,608	963	11,567	818	10,206	642	9,526	524
	0.3	10	0.09	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		16	0.075	16,254	1,224	1,386	1040	12,190	767	11,378	626
		20	0.06	13,608	963	11,567	818	10,206	642	9,526	524
	0.5	10	0.14	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		16	0.11	16,254	1,224	1,386	1040	12,190	767	11,378	626
		20	0.08	13,608	963	11,567	818	10,206	642	9,526	524
3	0.1	10	0.06	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		12	0.05	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		16	0.035	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		20	0.035	11,664	1,146	9,914	974	8,748	687	8,165	561
		25	0.031	10,368	973	8,812	827	7,776	583	7,257	477
		30	0.027	9,072	801	7,711	681	6,804	480	6,350	393
		35	0.02	9,072	801	7,711	681	6,804	480	6,350	393
		40	0.015	9,072	801	7,711	681	6,804	480	6,350	393
	0.2	10	0.08	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		12	0.07	14,400	1,415	12,240	1,203	10,800	849	10,080	693

H-Star Endmill

ESRR712 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
3	0.2	16	0.05	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		20	0.05	11,664	1,146	9,914	974	8,748	687	8,165	561
		25	0.045	10,368	973	8,812	827	7,776	583	7,257	477
		30	0.04	9,072	801	7,711	681	6,804	480	6,350	393
		35	0.035	9,072	801	7,711	681	6,804	480	6,350	393
		40	0.03	9,072	801	7,711	681	6,804	480	6,350	393
	0.3	10	0.115	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		12	0.1	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		16	0.075	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		20	0.075	11,664	1,146	9,914	974	8,748	687	8,165	561
		25	0.067	10,368	973	8,812	827	7,776	583	7,257	477
		30	0.06	9,072	801	7,711	681	6,804	480	6,350	393
		35	0.05	9,072	801	7,711	681	6,804	480	6,350	393
		40	0.04	9,072	801	7,711	681	6,804	480	6,350	393
	0.5	10	0.155	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		12	0.13	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		16	0.1	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		20	0.1	11,664	1,146	9,914	974	8,748	687	8,165	561
		25	0.09	10,368	973	8,812	827	7,776	583	7,257	477
		30	0.08	9,072	801	7,711	681	6,804	480	6,350	393
		35	0.065	9,072	801	7,711	681	6,804	480	6,350	393
		40	0.05	9,072	801	7,711	681	6,804	480	6,350	393
	1	10	0.175	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		12	0.15	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		16	0.12	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		20	0.11	11,664	1,146	9,914	974	8,748	687	8,165	561
		25	0.1	10,368	973	8,812	827	7,776	583	7,257	477
		30	0.09	9,072	801	7,711	681	6,804	480	6,350	393
		35	0.075	9,072	801	7,711	681	6,804	480	6,350	393
		40	0.06	9,072	801	7,711	681	6,804	480	6,350	393
4	0.1	12	0.065	11,213	1,950	9,531	1,658	8,410	1,170	7,849	956
		16	0.06	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		20	0.055	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		25	0.05	10,255	1,783	7,782	1293	6,545	872	5,904	687
		30	0.045	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		35	0.04	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		40	0.035	10,255	1,783	6,867	1,075	5,491	688	5,124	561
	0.2	12	0.14	11,213	1,950	9,531	1,658	8,410	1,170	7,849	956
		16	0.13	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		20	0.11	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		25	0.105	10,255	1,783	7,782	1293	6,545	872	5,904	687
		30	0.1	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		35	0.08	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		40	0.07	9,247	1,429	6,225	901	5,217	602	4,621	459

H-Star Endmill

ESRR712 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
4	0.3	12	0.22	11,213	1,950	9,531	1,658	8,410	1,170	7,849	956
		16	0.2	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		20	0.18	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		25	0.17	10,255	1,783	7,782	1293	6,545	872	5,904	687
		30	0.16	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		35	0.14	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		40	0.13	9,247	1,429	6,225	901	5,217	602	4,621	459
	0.5	12	0.35	11,213	1,950	9,531	1,658	8,410	1,170	7,849	956
		16	0.25	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		20	0.2	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		25	0.175	10,255	1,783	7,782	1,293	6,545	872	5,904	687
		30	0.15	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		35	0.1	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		40	0.075	9,247	1,429	6,225	901	5,217	602	4,621	459
	1	12	0.4	11,213	1,950	9,531	1,658	8,410	1,170	7,849	956
		16	0.29	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		20	0.23	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		25	0.2	10,255	1,783	7,782	1,293	6,545	872	5,904	687
		30	0.17	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		35	0.12	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		40	0.09	9,247	1,429	6,225	901	5,217	602	4,621	459
5	0.2	15	0.16	9,154	1,990	7,781	1,692	6,866	1,194	6,408	975
		25	0.152	8,513	1,813	7,236	1,541	6,385	1,088	5,959	888
		30	0.145	7,872	1,637	6,691	1,391	5,904	982	5,510	802
		40	0.13	6,590	1,284	5,602	1,091	4,943	770	4,613	629
	0.5	15	0.35	9,154	1,990	7,781	1,692	6,866	1,194	6,408	975
		25	0.296	8,513	1,813	7,236	1541	6,385	1,088	5,959	888
		30	0.24	7,872	1,637	6,691	1,391	5,904	982	5,510	802
		40	0.135	6,590	1,284	5,602	1,091	4,943	770	4,613	629
	1	15	0.4	9,154	1,990	7,781	1,692	6,866	1,194	6,408	975
		25	0.337	8,513	1,813	7,236	1,541	6,385	1,088	5,959	888
		30	0.275	7,872	1,637	6,691	1,391	5,904	982	5,510	802
		40	0.15	6,590	1,284	5,602	1,091	4,943	770	4,613	629
6	0.1	20	0.065	7,630	1,991	6,486	1,692	5,722	1,194	5,342	975
		40	0.05	6,486	1,523	5,513	1,294	4,865	914	4,540	746
	0.2	20	0.14	7,630	1,991	6,486	1,692	5,722	1,194	5,342	975
		40	0.11	6,486	1,523	5,513	1,294	4,865	914	4,540	746
	0.3	20	0.22	7,630	1,991	6,486	1,692	5,722	1,194	5,342	975
		40	0.18	6,486	1,523	5,513	1,294	4,865	914	4,540	746
	0.5	20	0.35	7,630	1,991	6,486	1,692	5,722	1,194	5,342	975
		40	0.24	6,486	1,523	5,513	1,294	4,865	914	4,540	746
	1	20	0.4	7,630	1,991	6,486	1,692	5,722	1,194	5,342	975
		40	0.28	6,486	1,523	5,513	1,294	4,865	914	4,540	746
	1.5	20	0.45	7,630	1,991	6,486	1,692	5,722	1,194	5,342	975
		40	0.3	6,486	1,523	5,513	1,294	4,865	914	4,540	746

H-Star Endmill

ESRR712 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
8	0.2	22	0.35	5,730	1,900	4,524	1,483	3,016	914	2,320	584
	0.3	22	0.5	5,730	1,900	4,524	1,483	3,016	914	2,320	584
	0.5	22	0.6	5,730	1,900	4,524	1,483	3,016	914	2,320	584
	1	22	0.7	5,730	1,900	4,524	1,483	3,016	914	2,320	584
	1.5	22	0.8	5,730	1,900	4,524	1,483	3,016	914	2,320	584
10	0.2	24	0.4	4,524	1,728	3,567	1,396	2,378	849	1,856	544
	0.3	24	0.5	4,524	1,728	3,567	1,396	2,378	849	1,856	544
	0.5	24	0.6	4,524	1,728	3,567	1,396	2,378	849	1,856	544
	1	24	0.7	4,524	1,728	3,567	1,396	2,378	849	1,856	544
	1.5	24	0.8	4,524	1,728	3,567	1,396	2,378	849	1,856	544
	2	24	0.9	4,524	1,728	3,567	1,396	2,378	849	1,856	544
12	0.2	26	0.5	3,857	1,728	3,045	1,396	2,030	849	1,537	544
	0.3	26	0.6	3,857	1,728	3,045	1,396	2,030	849	1,537	544
	0.5	26	0.7	3,857	1,728	3,045	1,396	2,030	849	1,537	544
	1	26	0.8	3,857	1,728	3,045	1,396	2,030	849	1,537	544
	1.5	26	0.9	3,857	1,728	3,045	1,396	2,030	849	1,537	544
	2	26	1	3,857	1,728	3,045	1,396	2,030	849	1,537	544
	3	26	1	3,857	1,728	3,045	1,396	2,030	849	1,537	544
16	0.5	35	2	2,842	1,512	2,262	1209	1,508	748	1,160	480
	1	35	2	2,842	453	2,262	362	1,508	224	1,160	480

- 절삭 깊이(Depth of Cut)는 위 표에서 해당되는 경도 아래 표시된 비율대로 줄여 사용하십시오.
- 상기의 절삭 조건표는 실제 상황과 다를 수 있으니, 기계의 상태, 가공형태 및 목적에 알맞게 조정하여 사용하십시오.
- RPM이 낮은 기계일 경우에는 Feed도 같은 비율로 낮추어 사용하십시오.

H-Star Endmill

ESRR714 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
0.5	0.05	2	0.023	50,000	1,257	40,000	649	30,000	529	28,000	441
		4	0.017	40,000	1,008	32,000	529	24,000	390	20,000	327
		6	0.008	28,800	672	19,400	364	18,000	350	15,000	280
		8	0.007	28,800	672	19,400	364	18,000	350	15,000	280
	0.1	2	0.03	50,000	1,257	40,000	649	30,000	529	28,000	441
		4	0.02	40,000	1,008	32,000	529	24,000	390	20,000	327
		6	0.013	28,800	672	19,400	364	18,000	350	15,000	280
		8	0.01	28,800	672	19,400	364	18,000	350	15,000	280
0.6	0.05	2	0.028	50,000	1,622	37,830	840	28,200	546	23,000	448
		4	0.019	40,000	1,162	27,800	616	23,600	392	21,000	322
		6	0.012	24,000	686	18,000	420	17,800	336	15,000	294
		8	0.01	24,000	652	18,000	399	17,800	319	15,000	280
	0.1	2	0.035	50,000	1,622	37,830	840	28,200	546	23,000	448
		4	0.024	40,000	1,162	27,800	616	23,600	392	21,000	322
		6	0.015	24,000	686	18,000	420	17,800	336	15,000	294
		8	0.013	24,000	652	18,000	399	17,800	319	15,000	280
0.7	0.05	2	0.028	49,200	1,475	34,190	781	29,030	497	25,830	408
		4	0.019	40,000	1,162	27,800	616	23,600	392	21,000	322
		6	0.012	24,000	686	18,000	420	17,800	336	15,000	294
		8	0.01	24,000	686	18,000	420	17,800	336	15,000	294
	0.1	2	0.042	49,200	1,475	34,190	781	29,030	497	25,830	408
		4	0.029	40,000	1,162	27,800	616	23,600	392	21,000	322
		6	0.018	24,000	686	18,000	420	17,800	336	15,000	294
		8	0.015	24,000	686	18,000	420	17,800	336	15,000	294
0.8	0.02	2	0.016	48,000	1,929	28,000	905	20,000	560	360	504
		4	0.016	48,000	1,542	28,000	725	20,000	448	288	403
		6	0.013	38,700	1,120	25,000	645	18,000	403	256	358
		8	0.011	29,025	840	20,000	516	16,200	362	230	322
		10	0.01	29,025	798	20,000	490	16,200	344	219	306
		12	0.09	29,025	798	20,000	490	16,200	344	219	306
	0.05	2	0.038	48,000	1,929	28,000	905	20,000	560	360	504
		4	0.026	48,000	1,542	28,000	725	20,000	448	288	403
		6	0.015	38,700	1,120	25,000	645	18,000	403	256	358
		8	0.012	29,025	840	20,000	516	16,200	362	230	322
		10	0.011	29,025	798	20,000	490	16,200	344	219	306
		12	0.01	29,025	798	20,000	490	16,200	344	219	306
	0.1	2	0.047	48,000	1,929	28,000	905	20,000	560	360	504
		4	0.032	48,000	1,542	28,000	725	20,000	448	288	403
		6	0.019	38,700	1,120	25,000	645	18,000	403	256	358
		8	0.015	29,025	840	20,000	516	16,200	362	230	322
		10	0.013	29,025	798	20,000	490	16,200	344	219	306
		12	0.012	29,025	798	20,000	490	16,200	344	219	306
1	0.02	4	0.013	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		6	0.01	26,244	1,386	22,307	1,178	19,683	924	18,371	754

H-Star Endmill

ESRR714 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1	0.02	8	0.008	23,328	1,232	19,829	1,047	17,496	821	16,330	670
		10	0.006	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.005	18,144	852	15,422	634	13,608	558	12,701	448
		14	0.004	18,144	746	15,422	588	13,608	478	12,701	372
		16	0.004	18,144	746	15,422	588	13,608	478	12,701	372
		20	0.003	13,608	558	11,567	441	10,206	359	9,526	280
	0.05	3	0.027	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		4	0.027	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		6	0.017	26,244	1,386	22,307	1,178	19,683	924	18,371	754
		8	0.016	23,328	1,232	19,829	1,047	17,496	821	16,330	670
		10	0.011	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.01	18,144	852	15,422	634	13,608	558	12,701	448
		14	0.008	18,144	746	15,422	588	13,608	478	12,701	372
		16	0.006	18,144	746	15,422	588	13,608	478	12,701	372
		20	0.004	13,608	558	11,567	441	10,206	359	9,526	280
	0.1	3	0.038	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		4	0.038	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		6	0.024	26,244	1,386	22,307	1,178	19,683	924	18,371	754
		8	0.024	23,328	1,232	19,829	1,047	17,496	821	16,330	670
		10	0.015	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.015	18,144	852	15,422	634	13,608	558	12,701	448
		14	0.012	18,144	746	15,422	588	13,608	478	12,701	372
		16	0.009	18,144	746	15,422	588	13,608	478	12,701	372
		20	0.006	13,608	558	11,567	441	10,206	359	9,526	280
	0.2	3	0.07	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		4	0.07	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		6	0.04	26,244	1,386	22,307	1,178	19,683	924	18,371	754
		8	0.04	23,328	1,232	19,829	1,047	17,496	821	16,330	670
		10	0.025	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.025	18,144	852	15,422	634	13,608	558	12,701	448
		14	0.02	18,144	746	15,422	588	13,608	478	12,701	372
		16	0.015	18,144	746	15,422	588	13,608	478	12,701	372
		20	0.01	13,608	558	11,567	441	10,206	359	9,526	280
	0.3	3	0.07	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		4	0.07	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		6	0.04	26,244	1,386	22,307	1,178	19,683	924	18,371	754
		8	0.04	23,328	1,232	19,829	1,047	17,496	821	16,330	670
		10	0.025	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.025	18,144	852	15,422	634	13,608	558	12,701	448
		14	0.02	18,144	746	15,422	588	13,608	478	12,701	372
		16	0.015	18,144	746	15,422	588	13,608	478	12,701	372
		20	0.01	13,608	558	11,567	441	10,206	359	9,526	280
1.2	0.02	4	0.013	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		6	0.01	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831

H-Star Endmill

ESRR714 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1.2	0.02	8	0.008	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.006	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.005	19,278	912	16,386	775	14,458	599	13,494	478
		14	0.004	18,144	746	15,422	634	13,608	478	12,701	372
		16	0.004	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.003	13,608	558	11,567	441	10,206	359	9,526	280
	0.05	3	0.027	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		4	0.027	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		6	0.017	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		8	0.016	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.011	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.01	19,278	912	16,386	775	14,458	599	13,494	478
		14	0.008	18,144	746	15,422	634	13,608	478	12,701	372
		16	0.006	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.004	13,608	558	11,567	441	10,206	359	9,526	280
	0.1	3	0.03	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		4	0.03	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		6	0.03	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		8	0.022	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.015	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.012	19,278	912	16,386	775	14,458	599	13,494	478
		14	0.01	18,144	746	15,422	634	13,608	478	12,701	372
		16	0.01	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.006	13,608	558	11,567	441	10,206	359	9,526	280
	0.2	3	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		4	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		6	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		8	0.037	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.025	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.02	19,278	912	16,386	775	14,458	599	13,494	478
		14	0.016	18,144	746	15,422	634	13,608	478	12,701	372
		16	0.016	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.01	13,608	558	11,567	441	10,206	359	9,526	280
	0.3	3	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		4	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		6	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		8	0.037	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.025	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.02	19,278	912	16,386	775	14,458	599	13,494	478
		16	0.016	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.01	13,608	558	11,567	441	10,206	359	9,526	280
1.5	0.02	6	0.01	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.008	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.006	20,412	1,293	17,350	1,222	15,309	959	14,288	782

H-Star Endmill

ESRR714 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1.5	0.02	12	0.005	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.004	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.004	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.003	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.003	14,112	795	11,995	592	10,584	522	9,878	417
	0.05	4	0.027	24,930	1,582	20,956	1,325	18,711	1,052	17,364	855
		6	0.017	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.016	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.011	20,412	1,293	17,350	1,222	15,309	959	14,288	782
		12	0.01	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.008	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.006	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.004	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.004	14,112	795	11,995	592	10,584	522	9,878	417
		26	0.003	14,112	795	11,995	592	10,584	522	9,878	417
	0.1	4	0.042	24,930	1,582	20,956	1,325	18,711	1,052	17,364	855
		6	0.04	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.036	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.036	20,412	1,293	17,350	1,222	15,309	959	14,288	782
		12	0.036	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.023	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.023	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.018	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.015	14,112	795	11,995	592	10,584	522	9,878	417
		26	0.01	14,112	795	11,995	592	10,584	522	9,878	417
	0.2	4	0.07	24,930	1,582	20,956	1,325	18,711	1,052	17,364	855
		6	0.065	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.06	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.06	20,412	1,293	17,350	1,222	15,309	959	14,288	782
		12	0.06	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.038	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.038	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.03	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.025	14,112	795	11,995	592	10,584	522	9,878	417
		25	0.02	14,112	795	11,995	592	10,584	522	9,878	417
	0.3	4	0.07	24,930	1,582	20,956	1,325	18,711	1,052	17,364	855
		6	0.065	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.06	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.06	20,412	1,293	17,350	1,222	15,309	959	14,288	782
		12	0.06	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.038	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.038	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.03	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.025	14,112	795	11,995	592	10,584	522	9,878	417
		25	0.02	14,112	795	11,995	592	10,584	522	9,878	417

H-Star Endmill

ESRR714 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1.5	0.5	4	0.085	24,930	1,582	20,956	1,325	18,711	1,052	17,364	855
		6	0.08	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.07	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.067	20,412	1,293	17,350	1,222	15,309	959	14,288	782
		12	0.065	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.045	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.045	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.035	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.03	14,112	795	11,995	592	10,584	522	9,878	417
		25	0.025	14,112	795	11,995	592	10,584	522	9,878	417
2	0.02	6	0.013	20,790	2,289	17,672	1,944	15,593	1,373	14,553	1,121
		8	0.01	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.008	17104	1,797	14539	1,528	12828	1,129	11973	922
		12	0.006	15,309	1,516	13,013	1,289	11,482	1,010	10,716	826
		14	0.005	14,458	1,432	12,290	1,216	10,844	954	10,121	779
		16	0.004	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		20	0.004	11,907	1,180	10,121	1,002	8,930	786	8,335	642
		25	0.003	11,907	1,059	10,121	900	8,930	707	8,335	575
		30	0.003	11,312	1,006	9,615	855	8,484	672	7,918	547
	0.05	6	0.027	20,790	2,289	17,672	1,944	15,593	1,373	14,553	1,121
		8	0.017	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.016	17104	1,797	14539	1,528	12828	1,129	11973	922
		12	0.011	15,309	1,516	13,013	1,289	11,482	1,010	10,716	826
		14	0.01	14,458	1,432	12,290	1,216	10,844	954	10,121	779
		16	0.008	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		20	0.006	11,907	1,180	10,121	1,002	8,930	786	8,335	642
		25	0.004	11,907	1,059	10,121	900	8,930	707	8,335	575
		30	0.003	11,312	1,006	9,615	855	8,484	672	7,918	547
	0.1	6	0.07	20,790	2,289	17,672	1,944	15,593	1,373	14,553	1,121
		8	0.055	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.042	17104	1,797	14539	1,528	12828	1,129	11973	922
		12	0.03	15,309	1,516	13,013	1,289	11,482	1,010	10,716	826
		14	0.03	14,458	1,432	12,290	1,216	10,844	954	10,121	779
		16	0.03	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		20	0.025	11,907	1,180	10,121	1,002	8,930	786	8,335	642
		22	0.02	11,907	1,059	10,121	900	8,930	707	8,335	575
		25	0.015	11,907	1,059	10,121	900	8,930	707	8,335	575
		30	0.01	11,312	1,006	9,615	855	8,484	672	7,918	547
	0.2	6	0.08	20,790	2,289	17,672	1,944	15,593	1,373	14,553	1,121
		8	0.07	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.055	17104	1,797	14539	1,528	12828	1,129	11973	922
		12	0.04	15,309	1,516	13,013	1,289	11,482	1,010	10,716	826
		14	0.04	14,458	1,432	12,290	1,216	10,844	954	10,121	779
		16	0.04	13,608	1,348	11,567	1,145	10,206	898	9,526	733

H-Star Endmill

ESRR714 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
2	0.2	20	0.035	11,907	1,180	10,121	1,002	8,930	786	8,335	642
		22	0.03	11,907	1,059	10,121	900	8,930	707	8,335	575
		25	0.025	11,907	1,059	10,121	900	8,930	707	8,335	575
		30	0.017	11,312	1,006	9,615	855	8,484	672	7,918	547
	0.3	6	0.11	20,790	2,289	17,672	1,944	15,593	1,373	14,553	1,121
		8	0.09	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.075	17104	1,797	14539	1,528	12828	1,129	11973	922
		12	0.06	15,309	1,516	13,013	1,289	11,482	1,010	10,716	826
		14	0.06	14,458	1,432	12,290	1,216	10,844	954	10,121	779
		16	0.06	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		20	0.037	11,907	1,180	10,121	1,002	8,930	786	8,335	642
		22	0.033	11,907	1,059	10,121	900	8,930	707	8,335	575
		25	0.03	11,907	1,059	10,121	900	8,930	707	8,335	575
		30	0.021	11,312	1,006	9,615	855	8,484	672	7,918	547
	0.5	6	0.17	20,790	2,289	17,672	1,944	15,593	1,373	14,553	1,121
		8	0.14	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.11	17104	1,797	14539	1,528	12828	1,129	11973	922
		12	0.08	15,309	1,516	13,013	1,289	11,482	1,010	10,716	826
		14	0.08	14,458	1,432	12,290	1,216	10,844	954	10,121	779
		16	0.08	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		20	0.05	11,907	1,180	10,121	1,002	8,930	786	8,335	642
		22	0.05	11,907	1,059	10,121	900	8,930	707	8,335	575
		25	0.05	11,907	1,059	10,121	900	8,930	707	8,335	575
		30	0.03	11,312	1,006	9,615	855	8,484	672	7,918	547
2.5	0.1	8	0.06	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.055	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		12	0.051	18,018	1,958	15,315	1,664	13,513	1,190	12,613	1,019
		14	0.046	17,136	1,835	14,566	1,560	12,852	1,132	11,995	971
		16	0.042	16,254	1,713	13,816	1,456	12,190	1,073	11,378	876
		20	0.03	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		25	0.022	12,757	1,204	10,844	1,022	9,568	802	8,930	653
		30	0.015	11,907	1,059	10,121	900	8,930	707	8,335	575
	0.2	8	0.08	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.07	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		12	0.06	18,018	1,958	15,315	1,664	13,513	1,190	12,613	1,019
		14	0.05	17,136	1,835	14,566	1,560	12,852	1,132	11,995	971
		16	0.055	16,254	1,713	13,816	1,456	12,190	1,073	11,378	876
		20	0.04	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		25	0.03	12,757	1,204	10,844	1,022	9,568	802	8,930	653
		30	0.02	11,907	1,059	10,121	900	8,930	707	8,335	575
	0.3	8	0.1	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.09	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		12	0.085	18,018	1,958	15,315	1,664	13,513	1,190	12,613	1,019
		14	0.08	17,136	1,835	14,566	1,560	12,852	1,132	11,995	971

H-Star Endmill

ESRR714 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
2.5	0.3	16	0.075	16,254	1,713	13,816	1,456	12,190	1,073	11,378	876
		20	0.06	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		25	0.065	12,757	1,204	10,844	1,022	9,568	802	8,930	653
		30	0.06	11,907	1,059	10,121	900	8,930	707	8,335	575
	0.5	8	0.15	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.14	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		12	0.13	18,018	1,958	15,315	1,664	13,513	1,190	12,613	1,019
		14	0.12	17,136	1,835	14,566	1,560	12,852	1,132	11,995	971
		16	0.11	16,254	1,713	13,816	1,456	12,190	1,073	11,378	876
		20	0.08	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		25	0.07	12,757	1,204	10,844	1,022	9,568	802	8,930	653
		30	0.05	11,907	1,059	10,121	900	8,930	707	8,335	575
3	0.1	8	0.07	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		10	0.06	14400	1,981	12240	1,684	10800	1,188	10080	970
		12	0.05	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		14	0.047	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		16	0.035	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		20	0.035	11,664	1,604	9,914	1,363	8,748	961	8,165	785
		25	0.031	10368	1,362	8812.5	1,158	7776	816	7257.5	667
		30	0.027	9,072	1,121	7,711	953	6,804	672	6,350	550
		35	0.02	9,072	1,121	7,711	953	6,804	672	6,350	550
		40	0.015	8,164	897	6,939	762	6,123	537	5,715	440
		45	0.01	7,258	672	6,169	572	5,443	403	5,080	330
	0.2	8	0.09	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		10	0.08	14400	1,981	12240	1,684	10800	1,188	10080	970
		12	0.07	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		14	0.06	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		16	0.05	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		20	0.05	11,664	1,604	9,914	1,363	8,748	961	8,165	785
		25	0.045	10368	1,362	8812.5	1,158	7776	816	7257.5	667
		30	0.04	9,072	1,121	7,711	953	6,804	672	6,350	550
		35	0.035	9,072	1,121	7,711	953	6,804	672	6,350	550
		40	0.03	8,164	897	6,939	762	6,123	537	5,715	440
		45	0.025	7,258	672	6,169	572	5,443	403	5,080	330
	0.3	8	0.13	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		10	0.115	14400	1,981	12240	1,684	10800	1,188	10080	970
		12	0.1	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		14	0.085	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		16	0.075	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		20	0.075	11,664	1,604	9,914	1,363	8,748	961	8,165	785
		25	0.0675	10368	1,362	8812.5	1,158	7776	816	7257.5	667
		30	0.06	9,072	1,121	7,711	953	6,804	672	6,350	550
		35	0.05	9,072	1,121	7,711	953	6,804	672	6,350	550
		40	0.04	8,164	897	6,939	762	6,123	537	5,715	440
		45	0.03	7,258	672	6,169	572	5,443	403	5,080	330

H-Star Endmill

ESRR714 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
3	0.5	8	0.18	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		10	0.155	14400	1,981	12240	1,684	10800	1,188	10080	970
		12	0.13	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		14	0.12	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		16	0.1	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		20	0.1	11,664	1,604	9,914	1,363	8,748	961	8,165	785
		25	0.09	10368	1,362	8812.5	1,158	7776	816	7257.5	667
		30	0.08	9,072	1,121	7,711	953	6,804	672	6,350	550
		35	0.065	9,072	1,121	7,711	953	6,804	672	6,350	550
		40	0.05	8,164	897	6,939	762	6,123	537	5,715	440
		45	0.04	7,258	672	6,169	572	5,443	403	5,080	330
		50	0.03	6,532	538	5,552	457	4,899	322	4,572	264
	1	8	0.2	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		10	0.175	14400	1,981	12240	1,684	10800	1,188	10080	970
		12	0.15	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		14	0.13	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		16	0.12	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		20	0.11	11,664	1,604	9,914	1,363	8,748	961	8,165	785
		25	0.1	10368	1,362	8812.5	1,158	7776	816	7257.5	667
		30	0.09	9,072	1,121	7,711	953	6,804	672	6,350	550
		35	0.075	9,072	1,121	7,711	953	6,804	672	6,350	550
		40	0.06	8,164	897	6,939	762	6,123	537	5,715	440
		45	0.045	7,258	672	6,169	572	5,443	403	5,080	330
		50	0.03	6,532	538	5,552	457	4,899	322	4,572	264
4	0.1	10	0.072	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		12	0.065	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		13	0.062	10,734	2,613	9,114	2,219	8,004	1,558	7,266	1,239
		16	0.06	10,255	2,496	8,697	2116	7,599	1,479	6,684	1,139
		20	0.055	10,255	2496	8,697	2,116	7,599	1,479	6,884	1,139
		25	0.05	10,255	2,496	7,782	1,810	6,545	1,221	5,904	962
		30	0.045	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		35	0.04	10,255	2,496	6,867	1505	5,491	963	5,124	785
		40	0.035	9,247	2,000	6,225	1,262	5,217	842	4,621	643
		45	0.03	8,240	1,505	5,584	1,019	4,944	722	4,119	501
		50	0.02	7,398	1,200	4,980	757	4,174	505	3,697	385
	0.2	10	0.15	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		12	0.14	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		13	0.135	10,734	2,613	9,114	2,219	8,004	1,558	7,266	1,239
		16	0.13	10,255	2,496	8,697	2116	7,599	1,479	6,684	1,139
		20	0.11	10,255	2496	8,697	2,116	7,599	1,479	6,884	1,139
		25	0.105	10,255	2,496	7,782	1,810	6,545	1,221	5,904	962
		30	0.1	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		35	0.08	10,255	2,496	6,867	1505	5,491	963	5,124	785
		40	0.07	9,247	2,000	6,225	1,262	5,217	842	4,621	643

H-Star Endmill

ESRR714 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
4	0.2	45	0.06	8,240	1,505	5,584	1,019	4,944	722	4,119	501
		50	0.05	7,398	1,200	4,980	757	4,174	505	3,697	385
	0.3	10	0.23	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		12	0.22	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		13	0.21	10,734	2,613	9,114	2,219	8,004	1,558	7,266	1,239
		16	0.2	10,255	2,496	8,697	2,116	7,599	1,479	6,684	1,139
		20	0.18	10,255	2496	8,697	2,116	7,599	1,479	6,884	1,139
		25	0.17	10,255	2,496	7,782	1,810	6,545	1,221	5,904	962
		30	0.16	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		35	0.14	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		40	0.13	9,247	2,000	6,225	1,262	5,217	842	4,621	643
		45	0.12	8,240	1,505	5,584	1,019	4,944	722	4,119	501
		50	0.11	7,398	1,200	4,980	757	4,174	505	3,697	385
	0.5	10	0.4	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		12	0.35	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		13	0.3	10,734	2,613	9,114	2,219	8,004	1,558	7,266	1,239
		16	0.25	10,255	2,496	8,697	2,116	7,599	1,479	6,684	1,139
		20	0.2	10,255	2496	8,697	2,116	7,599	1,479	6,884	1,139
		25	0.175	10,255	2,496	7,782	1,810	6,545	1,221	5,904	962
		30	0.15	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		35	0.1	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		40	0.075	9,247	2,000	6,225	1,262	5,217	842	4,621	643
		45	0.05	8,240	1,505	5,584	1,019	4,944	722	4,119	501
		50	0.04	7,398	1,200	4,980	757	4,174	505	3,697	385
		55	0.03	6,592	9,903	4,467	611	3,955	433	3,295	300
	1	10	0.5	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		12	0.4	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		13	0.35	10,734	2,613	9,114	2,219	8,004	1,558	7,266	1,239
		16	0.29	10,255	2,496	8,697	2,116	7,599	1,479	6,684	1,139
		20	0.23	10,255	2,496	8,697	2,116	7,599	1,479	6,884	1,139
		25	0.2	10,255	2,496	7,782	1,810	6,545	1,221	5,904	962
		30	0.17	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		35	0.12	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		40	0.09	9,247	2,000	6,225	1,262	5,217	842	4,621	643
		45	0.06	8,240	1,505	5,584	1,019	4,944	722	4,119	501
		50	0.05	7,398	1,200	4,980	757	4,174	505	3,697	385
		55	0.04	6,592	9,903	4,467	611	3,955	433	3,295	300
5	0.1	16	0.08	9,154	2,786	7,781	2,368	6,866	1,671	6,408	1,365
		30	0.07	7,872	2,291	6,691	1,948	5,904	1,374	5,510	1,122
		40	0.06	6,590	1,797	5,602	1,527	4,943	1,078	4,613	880
	0.2	16	0.16	9,154	2,786	7,781	2,368	6,866	1,671	6,408	1,365
		30	0.145	7,872	2,291	6,691	1,948	5,904	1,374	5,510	1,122
		40	0.13	6,590	1,797	5,602	1,527	4,943	1,078	4,613	880

H-Star Endmill

ESRR714 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
5	0.3	16	0.24	9,154	2,786	7,781	23,68	6,866	1,671	6,408	1,365
		30	0.22	7,872	2,291	6,691	1,948	5,904	1,374	5,510	1,122
		40	0.2	6,590	1,797	5,602	1,527	4,943	1,078	4,613	880
	0.5	16	0.35	9,154	2,786	7,781	2,368	6,866	1,671	6,408	1,365
		30	0.296	7,872	2,291	6,691	1,948	5,904	1,374	5,510	1,122
		40	0.135	6,590	1,797	5,602	1,527	4,943	1,078	4,613	880
		50	0.12	5,272	1,078	4,482	916	3,954	646	3,690	528
		60	0.1	4,218	647	3,585	549	3,164	388	2,952	317
	1	16	0.4	9,154	2,786	7,781	2,368	6,866	1,671	6,408	1,365
		30	0.275	7,872	2,291	6,691	1,948	5,904	1,374	5,510	1,122
		40	0.15	6,590	1,797	5,602	1,527	4,943	1,078	4,613	880
		50	0.13	5,272	1,078	4,482	916	3,954	646	3,690	528
		60	0.11	4,218	647	3,585	549	3,164	388	2,952	317
	1.5	15	0.45	9,154	2,786	7,781	2,368	6,866	1,671	6,408	1,365
	2	15	0.5	9,154	2,786	7,781	2,368	6,866	1,671	6,408	1,365
6	0.1	20	0.065	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		40	0.05	6,486	2,132	5,513	1,811	4,865	1,279	4,540	1,044
		50	0.04	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	0.2	20	0.14	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		40	0.11	6,486	2,132	5,513	1,811	4,865	1,279	4,540	1,044
		50	0.08	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	0.3	20	0.22	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		30	0.2	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		40	0.18	6,486	2,132	5,513	1,811	4,865	1,279	4,540	1,044
		50	0.14	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	0.5	20	0.35	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		30	0.29	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		40	0.24	6,486	2,132	5,513	1,811	4,865	1,279	4,540	1,044
		50	0.165	5,491	1,470	4,668	1,248	4,118	872	3,844	711
		60	0.1	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	1	20	0.4	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		30	0.35	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		40	0.28	6,486	2,132	5,513	1,811	4,865	1,279	4,540	1,044
		50	0.2	5,491	1,470	4,668	1,248	4,118	872	3,844	711
		60	0.15	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	1.5	20	0.45	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		40	0.4	6,486	2,132	5,513	1,811	4,865	1,279	4,540	1,044
		50	0.3	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	2	20	0.5	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		30	0.4	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		40	0.3	6,486	2,132	5,513	1,811	4,865	1,279	4,540	1,044
		50	0.2	5,491	1,470	4,668	1,248	4,118	872	3,844	711

H-Star Endmill

ESRR714 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
8	0.1	25	0.35	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
	0.2	22	0.5	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		40	0.25	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
	0.3	22	0.6	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		40	0.3	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
	0.5	22	0.7	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		35	0.5	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		40	0.35	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		50	0.3	4,584	1,596	3,619	1,245	2,413	767	1,856	490
		60	0.25	4,584	1,596	3,619	1,245	2,413	767	1,856	490
	1	22	0.8	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		35	0.6	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		40	0.4	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		50	0.4	4,584	1,596	3,619	1,245	2,413	767	1,856	490
		60	0.3	4,584	1,596	3,619	1,245	2,413	767	1,856	490
	1.2	22	0.9	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		40	0.45	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
	2	22	1	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		40	0.5	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		50	0.4	4,584	1,596	3,619	1,245	2,413	767	1,856	490
10	0.1	30	0.4	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
	0.2	24	0.5	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
		40	0.25	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
	0.3	24	0.6	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
		40	0.3	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
	0.5	24	0.7	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
		40	0.4	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
		50	0.3	3,619	1,451	2,854	1,172	1,902	713	1,485	456
		60	0.2	3,619	1,451	2,854	1,172	1,902	713	1,485	456
	1	24	0.8	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
		40	0.5	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
		50	0.4	3,619	1,451	2,854	1,172	1,902	713	1,485	456
		60	0.3	3,619	1,451	2,854	1,172	1,902	713	1,485	456
	1.5	24	0.9	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
		40	0.55	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
	2	24	1	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
		40	0.5	3,619	1,451	2,854	1,172	1,902	713	1,485	456
		50	0.4	2,895	870	2,283	703	1,522	427	1,188	274
	2.5	24	1.1	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
12	0.2	32	0.5	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
	0.3	26	0.6	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		45	0.3	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
	0.5	26	0.7	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		40	0.4	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761

H-Star Endmill

ESRR714 series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
12	0.5	60	0.3	3,086	1,451	2,436	1,172	1,624	713	1,230	456
	1	26	0.8	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		40	0.5	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		60	0.3	3,086	1,451	2,436	1,172	1,624	713	1,230	456
	1.5	26	0.9	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
	2	26	1	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		40	0.5	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
	3	26	1	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
16	0.5	35	2	2,842	2,116	2,262	1,692	1,508	1,047	1,160	672
		50	1	2,842	2,116	2,262	1,692	1,508	1,047	1,160	672
	1	35	2	2,842	2,116	2,262	1,692	1,508	1,047	1,160	672
		50	1	2,842	2,116	2,262	1,692	1,508	1,047	1,160	672
20	0.5	40	2	2,262	1,915	1,798	1,512	1,189	957	928	616
		55	1	2,262	1,915	1,798	1,512	1,189	957	928	616
	1	40	2	2,262	1,915	1,798	1,512	1,189	957	928	616
		55	1	2,262	1,915	1,798	1,512	1,189	957	928	616

- 절삭 깊이(Depth of Cut)는 위 표에서 해당되는 경도 아래 표시된 비율대로 줄여 사용하십시오.
- 상기의 절삭 조건표는 실제 상황과 다를 수 있으니, 기계의 상태, 가공형태 및 목적에 알맞게 조정하여 사용하십시오.
- RPM이 낮은 기계일 경우에는 Feed도 같은 비율로 낮추어 사용하십시오.

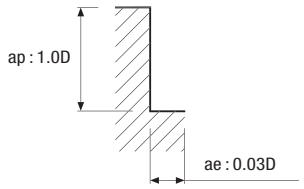
H-Star Endmill

ESXR704, ESXE704, ESXE714 series

측면 절삭 가공

피삭재	열처리강, 내열합금강		열처리강							
절삭조건	HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
4	17,200	1,690	11,440	1,140	9,360	700	7,280	430	6,170	310
6	13,450	1,820	8,970	1,230	6,890	720	5,460	450	4,810	330
8	9,100	1,750	6,760	1,170	5,200	670	4,160	420	3,640	310
10	8,000	1,630	5,330	1,090	4,160	620	3,320	400	2,860	280
12	6,830	1,630	4,550	1,010	3,450	580	2,730	370	2,420	260

절입기준

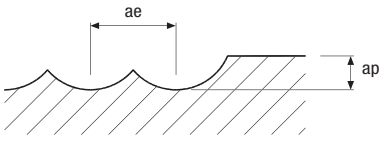


ESLNB20 series

피삭재	합금강, 내열합금강 HRC30~45			열처리강 HRC45~55			열처리강 HRC55~65			동, 동합금		
절삭조건												
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ae (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ae (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ae (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ae (mm)
0.5	34,100~49,500	600~870	0.007~0.028	31,900~35,200	490~540	0.005~0.023	31,900~35,200	440~480	0.005~0.021	49,000~50,000	1,100~1,400	0.010~0.042
0.6	28,600~40,700	590~850	0.007~0.034	26,400~29,700	480~540	0.006~0.028	26,400~29,700	400~480	0.006~0.025	42,000~50,000	1,100~1,700	0.011~0.050
0.8	22,000~30,800	640~890	0.016~0.064	19,800~22,000	490~550	0.013~0.052	19,800~22,000	440~500	0.012~0.048	31,000~50,000	1,100~2,250	0.024~0.096
1.0	17,600~24,200	600~850	0.008~0.080	15,400~17,600	470~540	0.007~0.065	15,400~17,600	440~500	0.006~0.060	24,000~49,500	1,100~2,200	0.012~0.120
1.2	14,300~18,700	590~780	0.024~0.032	12,000~14,000	480~540	0.020~0.026	12,000~14,000	420~480	0.018~0.024	28,500~38,500	1,480~1,950	0.036~0.048
1.5	11,000~14,300	580~760	0.031~0.048	10,000~11,500	480~540	0.025~0.039	10,000~11,500	420~480	0.023~0.036	17,000~28,500	1,100~1,950	0.046~0.072
2.0	8,500~11,000	590~800	0.024~0.160	7,900~8,800	470~530	0.020~0.130	7,900~8,800	440~480	0.018~0.120	12,600~24,000	1,100~2,150	0.036~0.240
3.0	5,700~8,200	730~1,000	0.064~0.24	5,300~5,800	590~650	0.052~0.195	5,300~5,800	550~620	0.048~0.120	11,900~17,000	1,850~2,700	0.096~0.360
4.0	4,300~6,200	680~990	0.080~0.320	3,950~4,400	550~620	0.065~0.260	3,850~4,400	530~570	0.060~0.240	6,600~12,500	1,260~2,500	0.120~0.480

절입기준

*ae : D1 ~ D4 = 0.05 × D
D5 ~ D8 = 0.025mm
D10 ~ D20 = 0.30mm



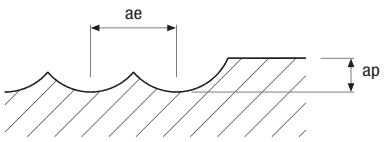
H-Star Endmill

ESTNB20 series

피삭재					탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율					절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
반경 (mm)	공구직경 (Ø)	목부길이 (mm)	Neck Angle (°)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
0.4	0.8	4	0.4	0.062	32,000	2,560	22,400	1,613	20,800	1,331	20,800	1,165
		6	0.4	0.045	32,000	2,560	22,400	1,613	20,800	1,331	20,800	1,165
		8	0.9	0.026	25,600	1,475	17,920	1,032	16,640	852	16,640	745
		12	0.9	0.020	20,800	1,065	14,560	699	13,520	606	13,520	519
		16	0.9	0.018	20,800	932	14,560	612	13,520	530	13,520	454
0.45	0.9	4	0.4	0.063	28,300	2,547	19,810	1,605	18,395	1,324	18,395	1,159
		8	0.4	0.050	28,300	2,547	19,810	1,605	18,395	1,324	18,395	1,159
		12	0.4	0.037	18,400	1,325	12,880	811	11,960	753	11,960	646
		16	0.4	0.024	18,400	1,325	12,880	811	11,960	753	11,960	646
		18	0.4	0.018	18,400	1,325	12,880	811	11,960	753	11,960	646
		20	0.4	0.015	15,850	1,141	11,095	699	10,303	649	10,303	556
		22	0.4	0.012	15,850	1,141	11,095	699	10,303	649	10,303	556
		24	0.4	0.009	14,150	1,019	9,905	624	9,198	579	9,198	497
0.5	1	6	0.4	0.055	25,600	2,560	17,920	1,613	16,640	1,331	16,640	1,165
		8	0.4	0.055	25,600	2,560	17,920	1,613	16,640	1,331	16,640	1,165
		10	0.4	0.032	20,800	1,872	14,560	1,310	13,520	1,082	13,520	946
		10	0.9	0.035	20,800	1,872	14,560	1,310	13,520	1,082	13,520	946
		15	0.9	0.028	16,640	1,331	11,648	874	10,816	757	10,816	649
		20	0.4	0.018	16,640	1,331	11,648	874	10,816	757	10,816	649
		20	0.9	0.020	16,640	1,331	11,648	874	10,816	757	10,816	649
		25	0.9	0.017	14,560	1,165	10,192	764	9,464	662	9,464	568
		30	0.4	0.015	12,480	874	8,736	568	8,112	487	8,112	406
		30	0.9	0.017	12,480	874	8,736	568	8,112	487	8,112	406
		35	0.9	0.010	10,400	728	7,280	473	6,760	406	6,760	338
		40	0.9	0.009	10,000	700	7,000	455	6,500	390	6,500	325
		50	0.9	0.007	9,500	665	6,650	432	6,175	371	6,175	309
		60	0.9	0.005	9,000	630	6,300	410	5,850	351	5,850	293
		70	0.9	0.003	8,500	595	5,950	387	5,525	332	5,525	276
0.75	1.5	8	0.4	0.070	16,960	2,544	11,872	1,603	11,024	1,323	11,024	1,158
		10	0.4	0.070	16,960	2,544	11,872	1,603	11,024	1,323	11,024	1,158
		12	0.4	0.070	16,960	2,544	11,872	1,603	11,024	1,323	11,024	1,158
		15	0.9	0.045	13,568	1,832	9,498	1,282	8,819	1,058	8,819	926
		20	0.9	0.040	11,024	1,323	7,717	810	7,166	752	7,166	645
		30	0.9	0.028	11,024	1,323	7,717	810	7,166	752	7,166	645

절입기준

*ae : D1 ~ D4 = 0.05 × D
D5 ~ D8 = 0.025mm
D10 ~ D20 = 0.30mm



- 절삭 깊이(Depth of Cut)는 위 표에서 해당되는 경도 아래 표시된 비율대로 줄여 사용하십시오.
- 리브가공이나 슬로팅 가공 등 칩 배출이 원활하지 않은 가공에서는 위의 절삭 조건에서 절삭 깊이를 20~30% 줄여 사용하십시오.
  예) ESTNB2040-20-10, HRC 55, 리브 가공
  예) 절삭 깊이 : 0.32(표준절삭깊이) × 0.65 × 0.8 = 0.17mm
- 상기의 절삭 조건표는 실제 상황과 다를 수 있으니, 기계의 상태, 가공형태 및 목적에 알맞게 조정하여 사용하십시오.
- RPM이 낮은 기계일 경우에는 Feed도 같은 비율로 낮추어 사용하십시오.

H-Star Endmill

ESTNB20 series

피삭재					탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율					절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
반경 (mm)	공구직경 (Ø)	목부길이 (mm)	Neck Angle (°)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
0.9	1.8	4	0.4	0.120	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		8	0.4	0.100	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		12	0.4	0.080	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		16	0.4	0.071	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		20	0.4	0.062	9,230	1,329	6,461	814	6,000	756	6,000	648
		24	0.4	0.053	9,230	1,329	6,461	814	6,000	756	6,000	648
		28	0.4	0.044	9,230	1,329	6,461	814	6,000	756	6,000	648
		32	0.4	0.036	9,230	1,329	6,461	814	6,000	756	6,000	648
		36	0.4	0.028	9,230	1,329	6,461	814	6,000	756	6,000	648
		38	0.4	0.020	8,000	1,152	5,600	706	5,200	655	5,200	562
		40	0.4	0.015	8,000	1,152	5,600	706	5,200	655	5,200	562
1	2	8	0.4	0.150	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		12	0.4	0.090	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		16	0.4	0.090	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		20	0.4	0.060	12,160	2,189	8,512	1,532	7,904	1,265	7,904	1,107
		20	0.9	0.070	12,160	2,189	8,512	1,532	7,904	1,265	7,904	1,107
		25	0.9	0.070	9,880	1,581	6,916	968	6,442	899	6,422	771
		30	0.4	0.040	9,880	1,581	6,916	968	6,442	899	6,422	771
		30	0.9	0.045	9,880	1,581	6,916	968	6,442	899	6,422	771
		35	0.9	0.045	9,880	1,581	6,916	968	6,442	899	6,422	771
		40	0.4	0.030	9,880	1,581	6,916	968	6,442	899	6,422	771
		40	0.9	0.035	9,880	1,581	6,916	968	6,442	899	6,422	771
		50	0.9	0.170	8,512	1,192	5,958	775	5,533	664	5,533	553
		60	0.9	0.009	7,235	1,013	5,065	658	4,703	564	4,703	470
		70	0.9	0.005	6,150	861	4,305	560	3,997	480	3,997	400
1.5	3	8	0.4	0.320	12,720	3,816	8,904	2,404	8,268	1,984	8,268	1,736
		16	0.4	0.220	12,720	3,816	8,904	2,404	8,268	1,984	8,268	1,736
		20	0.4	0.150	12,720	3,434	8,904	2,137	8,268	1,736	8,268	1,488
		30	0.4	0.080	10,176	2,748	7,123	1,496	6,614	1,389	6,614	1,191
		30	0.9	0.090	10,176	2,748	7,123	1,496	6,614	1,389	6,614	1,191
		40	0.4	0.060	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		40	0.9	0.070	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		50	0.9	0.050	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		60	0.9	0.030	7,123	1,710	4,986	1,047	4,630	972	4,630	833
		70	0.9	0.020	6,233	1,496	4,363	916	4,051	851	4,051	729
2	4	20	1	0.32	11,900	2,860	9,000	2,050	7,800	1,680	7,800	1,590
		30	1	0.23	11,900	2,570	9,000	1,850	7,800	1,520	7,800	1,430
		40	1	0.14	9,500	1,940	7,200	1,400	6,200	1,140	6,200	1,080
		50	1	0.11	7,800	1,590	5,800	1,120	5,000	920	5,000	870
		60	1	0.07	7,800	1,590	5,800	1,120	5,000	920	5,000	870
2.5	5	30	1	0.34	9,500	2,140	7,200	1,540	6,200	1,260	6,200	1,190
		40	1	0.25	9,500	2,140	7,200	1,540	6,200	1,260	6,200	1,190
		60	1	0.15	6,200	1,320	4,700	950	4,000	770	4,000	720

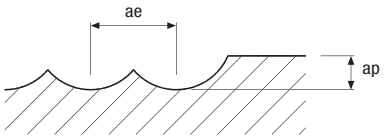
H-Star Endmill

ESTNB20 series

피삭재					탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율					절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
반경 (mm)	공구직경 (Ø)	목부길이 (mm)	Neck Angle (°)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
3	6	30	1	0.45	8,000	2,000	6,000	1,430	5,200	1,170	5,200	1,110
		40	1	0.40	8,000	1,800	6,000	1,280	5,200	1,050	5,200	990
		50	1	0.32	8,000	1,800	6,000	1,280	5,200	1,050	5,200	990
		60	1	0.22	6,400	1,360	4,800	970	4,100	780	4,100	740
		70	1	0.18	5,200	1,110	3,900	790	3,400	650	3,400	610
		80	1	0.14	5,200	1,110	3,900	790	3,400	650	3,400	610
4	8	50	1	0.50	6,000	1,460	4,500	1,040	3,900	850	3,900	810
		60	1	0.43	6,000	1,460	4,500	1,040	3,900	850	3,900	810
		70	1	0.33	6,000	1,460	4,500	1,040	3,900	850	3,900	810
		80	1	0.25	4,800	1,100	3,600	780	3,100	640	3,100	600
5	10	60	1	0.70	4,800	1,300	3,600	920	3,100	750	3,100	710
		75	1	0.50	4,800	1,300	3,600	920	3,100	750	3,100	710

절입기준

*ae : D1 ~ D4 = 0.05 × D
D5 ~ D8 = 0.025mm
D10 ~ D20 = 0.30mm



- 절삭 깊이(Depth of Cut)는 위 표에서 해당되는 경도 아래 표시된 비율대로 줄여 사용하십시오.
- 리브가공이나 슬로팅 가공 등 칩 배출이 원활하지 않은 가공에서는 위의 절삭 조건에서 절삭 깊이를 20~30% 줄여 사용하십시오.
  예) ESTNB2040-20-10, HRC 55, 리브 가공
  예) 절삭 깊이 : 0.32(표준절삭깊이) × 0.65 × 0.8 = 0.17mm
- 상기의 절삭 조건표는 실제 상황과 다를 수 있으니, 기계의 상태, 가공형태 및 목적에 알맞게 조정하여 사용하십시오.
- RPM이 낮은 기계일 경우에는 Feed도 같은 비율로 낮추어 사용하십시오.

H-Star Endmill

ESTNB30 series

피삭재					탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율					절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
반경 (mm)	공구직경 (Ø)	목부길이 (mm)	Neck Angle (°)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
0.1	0.2	1	0.4	0.017	40,000	800	28,000	504	26,000	416	26,000	364
		1.5	0.4	0.009	40,000	800	28,000	504	26,000	416	26,000	364
		2	0.9	0.007	32,000	461	22,400	323	20,800	266	20,800	233
		2.5	0.9	0.004	26,000	333	18,200	204	16,900	189	16,900	162
0.15	0.3	2	0.4	0.025	40,000	1,200	28,000	756	26,000	624	26,000	546
		3	0.9	0.013	32,000	691	22,400	484	20,800	399	20,800	349
		4	0.9	0.010	26,000	499	18,200	306	16,900	284	16,900	243
0.2	0.4	2	0.4	0.035	40,000	1,600	28,000	1,008	26,000	832	26,000	728
		3	0.4	0.020	40,000	1,600	28,000	1,008	26,000	832	26,000	728
		4	0.4	0.007	32,000	922	22,400	645	20,800	532	20,800	466
		4	0.9	0.009	32,000	922	22,400	645	20,800	532	20,800	466
		5	0.4	0.006	26,000	666	18,200	408	16,900	379	16,900	324
		5	0.9	0.007	26,000	666	18,200	408	16,900	379	16,900	324
0.25	0.5	4	0.4	0.040	40,000	2,000	28,000	1,260	26,000	1,040	26,000	910
		8	0.9	0.010	26,000	728	18,200	446	16,900	414	16,900	355
		12	0.9	0.005	22,400	627	15,680	384	14,560	357	14,560	306
0.27	0.54	2	0.4	0.050	40,000	2,160	28,000	1,361	26,000	1,123	26,000	983
		4	0.4	0.037	40,000	2,160	28,000	1,361	26,000	1,123	26,000	983
		5	0.4	0.031	40,000	1,512	28,000	1,176	26,000	1,040	26,000	832
		6	0.4	0.025	26,000	1,244	18,200	871	16,900	676	16,900	629
		6.5	0.4	0.020	26,000	1,011	18,200	619	16,900	575	16,900	493
		7	0.4	0.015	26,000	899	18,200	585	16,900	543	16,900	465
0.3	0.6	2	0.4	0.055	40,000	2,400	28,000	1,512	26,000	1,248	26,000	1,092
		4	0.4	0.035	40,000	2,400	28,000	1,512	26,000	1,248	26,000	1,092
		6	0.4	0.018	32,000	1,382	22,400	968	20,800	799	20,800	699
		6	0.9	0.020	32,000	1,382	22,400	968	20,800	799	20,800	699
		8	0.9	0.020	26,000	998	18,200	612	16,900	568	16,900	487
		10	0.4	0.013	26,000	874	18,200	535	16,900	497	16,900	426
		10	0.9	0.015	26,000	874	18,200	535	16,900	497	16,900	426
		12	0.9	0.010	26,000	874	18,200	535	16,900	497	16,900	426
		15	0.4	0.005	22,400	753	15,680	461	14,560	367	14,560	367
		15	0.9	0.006	22,400	753	15,680	461	14,560	367	14,560	367
0.4	0.8	4	0.4	0.062	32,000	2,560	22,400	1,613	20,800	1,331	20,800	1,165
		6	0.4	0.045	32,000	2,560	22,400	1,613	20,800	1,331	20,800	1,165
		8	0.9	0.026	25,600	1,475	17,920	1,032	16,640	852	16,640	745
		12	0.9	0.020	20,800	1,065	14,560	699	13,520	606	13,520	519
		16	0.9	0.018	20,800	932	14,560	612	13,520	530	13,520	454
0.45	0.9	4	0.4	0.063	28,300	2,547	19,810	1,605	18,395	1,324	18,395	1,159
		8	0.4	0.050	28,300	2,547	19,810	1,605	18,395	1,324	18,395	1,159
		12	0.4	0.037	18,400	1,325	12,880	811	11,960	753	11,960	646
		16	0.4	0.024	18,400	1,325	12,880	811	11,960	753	11,960	646
		18	0.4	0.018	18,400	1,325	12,880	811	11,960	753	11,960	646
		20	0.4	0.015	15,850	1,141	11,095	699	10,303	649	10,303	556
		22	0.4	0.012	15,850	1,141	11,095	699	10,303	649	10,303	556
		24	0.4	0.009	14,150	1,019	9,905	624	9,198	579	9,198	497

H-Star Endmill

ESTNB30 series

피삭재					탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율					절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
반경 (mm)	공구직경 (Ø)	목부길이 (mm)	Neck Angle (°)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
0.5	1	6	0.4	0.055	25,600	2,560	17,920	1,613	16,640	1,331	16,640	1,165
		8	0.4	0.055	25,600	2,560	17,920	1,613	16,640	1,331	16,640	1,165
		10	0.4	0.032	20,800	1,872	14,560	1,310	13,520	1,082	13,520	946
		10	0.9	0.035	20,800	1,872	14,560	1,310	13,520	1,082	13,520	946
		15	0.9	0.028	16,640	1,331	11,648	874	10,816	757	10,816	649
		20	0.4	0.018	16,640	1,331	11,648	874	10,816	757	10,816	649
		20	0.9	0.020	16,640	1,331	11,648	874	10,816	757	10,816	649
		25	0.9	0.017	14,560	1,165	10,192	764	9,464	662	9,464	568
		30	0.4	0.015	12,480	874	8,736	568	8,112	487	8,112	406
		30	0.9	0.017	12,480	874	8,736	568	8,112	487	8,112	406
		35	0.9	0.010	10,400	728	7,280	473	6,760	406	6,760	338
		40	0.9	0.009	10,000	700	7,000	455	6,500	390	6,500	325
		50	0.9	0.007	9,500	665	6,650	432	6,175	371	6,175	309
		60	0.9	0.005	9,000	630	6,300	410	5,850	351	5,850	293
		70	0.9	0.003	8,500	595	5,950	387	5,525	332	5,525	276
0.75	1.5	8	0.4	0.070	16,960	2,544	11,872	1,603	11,024	1,323	11,024	1,158
		10	0.4	0.070	16,960	2,544	11,872	1,603	11,024	1,323	11,024	1,158
		12	0.4	0.070	16,960	2,544	11,872	1,603	11,024	1,323	11,024	1,158
		15	0.9	0.045	13,568	1,832	9,498	1,282	8,819	1,058	8,819	926
		20	0.9	0.040	11,024	1,323	7,717	810	7,166	752	7,166	645
		30	0.9	0.028	11,024	1,323	7,717	810	7,166	752	7,166	645
0.9	1.8	4	0.4	0.120	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		8	0.4	0.100	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		12	0.4	0.080	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		16	0.4	0.071	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		20	0.4	0.062	9,230	1,329	6,461	814	6,000	756	6,000	648
		24	0.4	0.053	9,230	1,329	6,461	814	6,000	756	6,000	648
		28	0.4	0.044	9,230	1,329	6,461	814	6,000	756	6,000	648
		32	0.4	0.036	9,230	1,329	6,461	814	6,000	756	6,000	648
		36	0.4	0.028	9,230	1,329	6,461	814	6,000	756	6,000	648
		38	0.4	0.020	8,000	1,152	5,600	706	5,200	655	5,200	562
		40	0.4	0.015	8,000	1,152	5,600	706	5,200	655	5,200	562
1	2	8	0.4	0.150	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		12	0.4	0.090	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		16	0.4	0.090	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		20	0.4	0.060	12,160	2,189	8,512	1,532	7,904	1,265	7,904	1,107
		20	0.9	0.070	12,160	2,189	8,512	1,532	7,904	1,265	7,904	1,107
		25	0.9	0.070	9,880	1,581	6,916	968	6,442	899	6,422	771
		30	0.4	0.040	9,880	1,581	6,916	968	6,442	899	6,422	771
		30	0.9	0.045	9,880	1,581	6,916	968	6,442	899	6,422	771
		35	0.9	0.045	9,880	1,581	6,916	968	6,442	899	6,422	771
		40	0.4	0.030	9,880	1,581	6,916	968	6,442	899	6,422	771
		40	0.9	0.035	9,880	1,581	6,916	968	6,442	899	6,422	771
		50	0.9	0.170	8,512	1,192	5,958	775	5,533	664	5,533	553
		60	0.9	0.009	7,235	1,013	5,065	658	4,703	564	4,703	470
		70	0.9	0.005	6,150	861	4,305	560	3,997	480	3,997	400

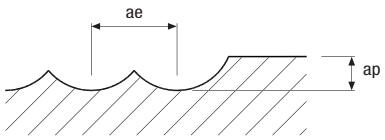
H-Star Endmill

ESTNB30 series

피삭재					탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율					절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
반경 (mm)	공구직경 (Ø)	목부길이 (mm)	Neck Angle (°)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1.5	3	8	0.4	0.320	12,720	3,816	8,904	2,404	8,268	1,984	8,268	1,736
		16	0.4	0.220	12,720	3,816	8,904	2,404	8,268	1,984	8,268	1,736
		20	0.4	0.150	12,720	3,434	8,904	2,137	8,268	1,736	8,268	1,488
		30	0.4	0.080	10,176	2,748	7,123	1,496	6,614	1,389	6,614	1,191
		30	0.9	0.090	10,176	2,748	7,123	1,496	6,614	1,389	6,614	1,191
		40	0.4	0.060	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		40	0.9	0.070	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		50	0.9	0.050	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		60	0.9	0.030	7,123	1,710	4,986	1,047	4,630	972	4,630	833
		70	0.9	0.020	6,233	1,496	4,363	916	4,051	851	4,051	729
2	4	20	1	0.32	11,900	2,860	9,000	2,050	7,800	1,680	7,800	1,590
		30	1	0.23	11,900	2,570	9,000	1,850	7,800	1,520	7,800	1,430
		40	1	0.14	9,500	1,940	7,200	1,400	6,200	1,140	6,200	1,080
		50	1	0.11	7,800	1,590	5,800	1,120	5,000	920	5,000	870
		60	1	0.07	7,800	1,590	5,800	1,120	5,000	920	5,000	870
2.5	5	30	1	0.34	9,500	2,140	7,200	1,540	6,200	1,260	6,200	1,190
		40	1	0.25	9,500	2,140	7,200	1,540	6,200	1,260	6,200	1,190
		60	1	0.15	6,200	1,320	4,700	950	4,000	770	4,000	720
3	6	30	1	0.45	8,000	2,000	6,000	1,430	5,200	1,170	5,200	1,110
		40	1	0.40	8,000	1,800	6,000	1,280	5,200	1,050	5,200	990
		50	1	0.32	8,000	1,800	6,000	1,280	5,200	1,050	5,200	990
		60	1	0.22	6,400	1,360	4,800	970	4,100	780	4,100	740
		70	1	0.18	5,200	1,110	3,900	790	3,400	650	3,400	610
		80	1	0.14	5,200	1,110	3,900	790	3,400	650	3,400	610
4	8	50	1	0.50	6,000	1,460	4,500	1,040	3,900	850	3,900	810
		60	1	0.43	6,000	1,460	4,500	1,040	3,900	850	3,900	810
		70	1	0.33	6,000	1,460	4,500	1,040	3,900	850	3,900	810
		80	1	0.25	4,800	1,100	3,600	780	3,100	640	3,100	600
5	10	60	1	0.70	4,800	1,300	3,600	920	3,100	750	3,100	710
		75	1	0.50	4,800	1,300	3,600	920	3,100	750	3,100	710

절입기준

*ae : D1 ~ D4 = 0.05 × D
D5 ~ D8 = 0.025mm
D10 ~ D20 = 0.30mm



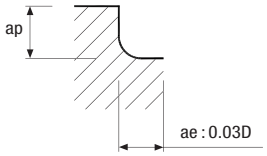
- 절삭 깊이(Depth of Cut)는 위 표에서 해당되는 경도 아래 표시된 비율대로 줄여 사용하십시오.
- 리브가공이나 슬로팅 가공 등 칩 배출이 원활하지 않은 가공에서는 위의 절삭 조건에서 절삭 깊이를 20~30% 줄여 사용하십시오.
  예) ESTNB2040-20-10, HRC 55, 리브 가공
  예) 절삭 깊이 : 0.32(표준절삭깊이) × 0.65 × 0.8 = 0.17mm
- 상기의 절삭 조건표는 실제 상황과 다를 수 있으니, 기계의 상태, 가공형태 및 목적에 알맞게 조정하여 사용하십시오.
- RPM이 낮은 기계일 경우에는 Feed도 같은 비율로 낮추어 사용하십시오.

H-Star Endmill

ESLNS20, ESLNS40 series

피삭재 / 절삭조건 / 공구직경(Ø)	합금강, 내열합금강 HRC30~45			열처리강 HRC45~55			고경도강 HRC55~65			동, 동합금		
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ae (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ae (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ae (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ae (mm)
0.4	34,100~50,000	350~590	0.005~0.028	30,500~35,200	295~340	0.003~0.020	18,300~24,600	120~200	0.002~0.012	48,000~50,000	790~920	0.008~0.048
0.5	25,650~33,000	370~470	0.006~0.035	23,750~26,000	285~315	0.004~0.025	14,200~18,000	115~130	0.003~0.015	44,000~50,000	800~1,150	0.010~0.060
0.6	20,900~35,200	330~560	0.007~0.030	19,900~22,000	260~290	0.005~0.021	11,900~15,500	100~120	0.003~0.013	37,500~50,000	770~1,250	0.011~0.051
0.8	16,150~26,400	360~590	0.009~0.040	15,200~16,700	280~310	0.006~0.028	9,000~11,700	110~125	0.004~0.017	28,500~47,000	770~1,300	0.015~0.068
1.0	12,300~18,700	350~540	0.011~0.028	10,500~11,500	250~280	0.008~0.020	6,300~8,050	100~115	0.005~0.012	22,500~34,000	810~1,300	0.018~0.048
1.2	10,450~17,600	350~590	0.025~0.070	9,100~10,000	250~280	0.015~0.042	5,400~7,000	100~115	0.009~0.026	22,500~31,500	950~1,350	0.036~0.101
1.5	9,100~17,600	430~830	0.017~0.077	7,000~8,000	250~280	0.012~0.055	4,300~5,500	100~115	0.007~0.033	14,500~25,000	770~1,320	0.028~0.132
2.0	6,350~10,550	340~570	0.021~0.140	6,100~6,700	270~300	0.015~0.100	3,600~4,700	100~120	0.009~0.060	11,500~18,500	770~1,250	0.036~0.240
3.0	4,300~7,050	550~900	0.056~0.210	3,990~4,600	445~515	0.040~0.150	2,400~3,200	105~310	0.024~0.090	9,000~13,000	1,400~2,110	0.096~0.360
4.0	3,200~5,300	400~675	0.074~0.280	3,000~3,400	335~380	0.053~0.200	1,800~2,400	75~230	0.032~0.120	6,750~9,750	1,050~1,575	0.128~0.480

절입기준



H-Star Endmill

ESLNR series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
0.2	0.05	0.5	0.020	50,000	258	50,000	205	50,000	180	50,000	160
		1	0.014	50,000	258	50,000	205	50,000	180	50,000	160
		1.5	0.008	50,000	240	45,900	202	45,900	170	45,900	153
		2	0.008	42,000	202	36,700	176	36,700	162	36,700	147
0.3	0.05	1	0.021	50,000	585	50,000	456	50,000	336	50,000	320
		1.5	0.016	50,000	585	45,000	456	45,000	336	45,000	320
		2	0.012	45,000	530	45,000	420	45,000	300	45,000	290
		2.5	0.010	40,000	471	40,000	373	40,000	267	40,000	258
		3	0.008	35,000	412	35,000	326	30,000	200	30,000	194
0.4	0.05	1	0.025	50,000	580	50,000	461	40,000	320	36,000	270
		1.5	0.020	50,000	580	50,000	461	40,000	320	36,000	270
		2	0.016	45,000	520	45,000	410	36,000	290	34,000	240
		2.5	0.015	40,500	480	40,500	370	33,400	270	30,600	220
		3	0.014	40,000	410	40,000	330	32,800	240	25,600	200
		3.5	0.012	36,000	380	36,000	300	29,400	200	22,920	180
		4	0.008	30,000	320	30,000	250	21,600	160	19,200	150
	0.1	2	0.028	45,000	520	45,000	410	36,000	290	34,000	240
		3	0.016	40,000	410	40,000	330	32,800	240	25,600	200
		4	0.010	30,000	320	30,000	250	21,600	160	19,200	150
0.5	0.05	1	0.030	50,000	898	40,000	464	30,000	378	28,000	315
		2	0.023	50,000	898	40,000	464	30,000	378	28,000	315
		3	0.017	45,000	810	36,000	414	27,000	315	24,500	261
		4	0.017	40,000	820	32,000	378	24,000	279	20,000	234
		5	0.011	28,800	540	19,400	280	18,000	250	15,000	200
		6	0.008	28,800	480	19,400	260	18,000	250	15,000	200
	0.1	1	0.035	50,000	898	40,000	464	30,000	378	28,000	315
		2	0.030	50,000	898	40,000	464	30,000	378	28,000	315
		3	0.020	45,000	810	36,000	414	27,000	315	24,500	261
		4	0.020	40,000	720	32,000	378	24,000	279	20,000	234
		5	0.013	28,800	540	19,400	280	18,000	250	15,000	200
		6	0.013	28,800	480	19,400	260	18,000	250	15,000	200
0.6	0.1	2	0.035	50,000	1,159	37,830	600	28,200	390	23,000	320
		4	0.024	40,000	830	27,800	440	23,600	280	21,000	230
		6	0.015	24,000	490	18,000	300	17,800	240	15,000	210
		8	0.013	24,000	466	18,000	285	17,800	228	15,000	200
		10	0.009	24,000	451	18,000	276	17,800	221	15,000	193
2	0.2	6	0.08	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.07	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		12	0.04	15,309	1,083	13,013	921	11,482	722	10,716	590
		16	0.04	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.035	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.025	11,907	843	10,121	716	8,930	562	8,335	459
		30	0.017	11,312	800	9,615	680	8,484	534	7,918	436
	0.3	8	0.09	18,900	1,651	16,065	1,403	14,175	991	13,230	809
		16	0.06	13,608	1,070	11,567	909	10,206	713	9,526	583
		20	0.037	11,907	936	10,121	796	8,930	624	8,335	510

H-Star Endmill

ESLNR series

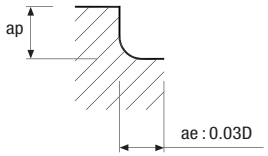
피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
2	0.5	6	0.017	20,709	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.014	18,900	1,651	16,065	1,403	14,175	991	13,230	809
		12	0.08	15,309	1,204	13,013	1,023	11,482	802	10,716	655
		16	0.08	13,608	1,070	11,567	909	10,206	713	9,526	583
		20	0.05	11,907	936	10,121	796	8,930	624	8,335	510
		25	0.05	11,907	936	10,121	796	8,930	624	8,335	510
		30	0.03	11,312	889	9,615	756	8,484	593	7,918	484
	0.8	8	0.2	18,900	1,651	16,065	1,403	14,175	991	13,230	809
		16	0.1	13,608	1,070	11,567	909	10,206	713	9,526	583
		20	0.06	11,907	936	10,121	796	8,930	624	8,335	510
3	0.2	8	0.09	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		12	0.07	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		16	0.05	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		20	0.05	11,664	1,146	9,914	974	8,748	764	8,165	624
		30	0.04	9,072	1,146	7,711	974	6,804	764	6,350	624
		35	0.035	9,072	1,146	7,711	974	6,804	764	6,350	624
	0.3	8	0.13	14,400	1,572	12,240	1,337	10,800	943	10,080	771
		16	0.075	14,400	1,572	12,240	1,337	10,800	943	10,080	771
		20	0.075	11,664	1,274	9,914	1,083	8,748	849	8,165	693
		30	0.06	9,072	1,274	7,711	1,083	6,804	849	6,350	693
	0.5	8	0.18	14,400	1,572	12,240	1,337	10,800	943	10,080	771
		12	0.13	14,400	1,572	12,240	1,337	10,800	943	10,080	771
		16	0.1	14,400	1,572	12,240	1,337	10,800	943	10,080	771
		20	0.1	11,664	1,274	9,914	1,083	8,748	849	8,165	693
		30	0.08	9,072	1,274	7,711	1,083	6,804	849	6,350	693
		35	0.065	9,072	1,274	7,711	1,083	6,804	849	6,350	693
0.8	0.1	4	0.032	48,000	1,102	28,000	518	20,000	320	20,000	288
		6	0.019	38,700	800	25,000	461	18,000	288	18,000	256
		8	0.015	29,025	600	20,000	369	16,200	259	16,200	230
		12	0.012	29,025	570	20,000	350	16,200	246	16,200	219
	0.2	4	0.056	48,000	1,102	28,000	518	20,000	320	20,000	288
		6	0.032	38,700	800	25,000	461	18,000	288	18,000	256
1	0.1	4	0.038	32,400	1,359	27,540	1,039	24,300	815	22,680	666
		6	0.024	26,244	990	22,307	842	19,683	660	18,371	539
		8	0.024	23,328	880	19,829	748	17,496	587	16,330	479
		10	0.015	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.015	18,144	609	15,422	453	13,608	399	12,701	320
		16	0.009	18,144	533	15,422	420	13,608	342	12,701	266
		20	0.006	13,608	399	11,567	315	10,206	257	9,526	200
	0.2	4	0.07	32,400	1,359	27,540	1,039	24,300	815	22,680	666
		6	0.040	26,244	990	22,307	842	19,683	660	18,371	539
		8	0.040	23,328	880	19,829	748	17,496	587	16,330	479
		10	0.025	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.025	18,144	609	15,422	453	13,608	399	12,701	320
		16	0.015	18,144	533	15,422	420	13,608	342	12,701	266
		20	0.010	13,608	399	11,567	315	10,206	257	9,526	200

H-Star Endmill

ESLNR series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1	0.3	6	0.040	26,244	990	22,307	842	19,683	660	18,371	539
		10	0.025	20,412	770	17,350	655	15,309	514	14,288	419
		16	0.015	18,144	533	15,422	420	13,608	342	12,701	266
		20	0.010	13,608	399	11,567	315	10,206	257	9,526	200
1.5	0.1	4	0.042	24,930	1,130	20,956	868	18,711	678	17,364	556
		8	0.036	22,680	1,027	19,278	873	17,010	685	15,876	559
		12	0.036	18,144	822	15,422	698	13,608	548	12,701	447
		15	0.023	14,112	568	11,995	423	10,584	373	9,878	298
		20	0.018	14,112	568	11,995	423	10,584	373	9,878	298
	0.2	4	0.070	24,930	1,130	20,956	868	18,711	678	17,364	556
		8	0.060	22,680	1,027	19,278	873	17,010	685	15,876	559
		12	0.060	18,144	822	15,422	698	13,608	548	12,701	447
		15	0.038	14,112	568	11,995	423	10,584	373	9,878	298
		20	0.030	14,112	568	11,995	423	10,584	373	9,878	298
	0.3	8	0.060	22,680	1,027	19,278	873	17,010	685	15,876	559
		15	0.038	14,112	568	11,995	423	10,584	373	9,878	298
		20	0.030	14,112	568	11,995	423	10,584	373	9,878	298

절입기준



- 절삭 깊이(Depth of Cut)는 위 표에서 해당되는 경도 아래 표시된 비율대로 줄여 사용하십시오.
- 상기의 절삭 조건표는 실제 상황과 다를 수 있으니, 기계의 상태, 가공형태 및 목적에 알맞게 조정하여 사용하십시오.
- RPM이 낮은 기계일 경우에는 Feed도 같은 비율로 낮추어 사용하십시오.

H-Star Endmill

ESTNR series

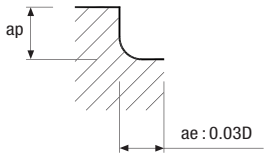
피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
0.2	0.05	2	0.007	39,660	887	33,660	754	29,700	591	27,720	483
0.4	0.05	4	0.009	30,096	899	25,582	764	22,572	599	21,067	489
		5	0.007	26,752	710	22,739	528	20,064	466	18,726	373
	0.1	4	0.009	31,680	946	26,928	804	23,760	631	22,176	515
		5	0.007	28,160	747	23,936	556	21,120	490	19,712	392
0.5	0.1	5	0.013	30,413	1,090	25,851	753	22,810	562	21,289	453
		8	0.008	24,330	678	20,681	468	18,248	350	17,031	282
		10	0.007	18,248	509	15,511	351	13,686	262	12,773	211
0.6	0.1	12	0.01	20,377	791	17,320	546	15,282	408	14,264	329
		15	0.006	16,727	649	14,218	448	12,545	335	11,709	270
0.8	0.2	6	0.045	31,680	1,084	26,928	921	23,760	723	22,176	590
		12	0.02	28,160	943	23,936	695	21,120	613	19,712	490
1	0.2	8	0.04	28,512	1,463	24,235	1,244	21,384	976	19,958	797
		10	0.035	28,512	1,596	24,235	1,357	21,384	1,064	19,958	869
		15	0.028	25,344	1,261	21,542	938	19,008	828	17,741	662
		20	0.02	19,008	828	16,157	653	14,256	532	13,306	414
		25	0.017	15,840	690	13,464	544	11,880	443	11,088	345
		30	0.017	15,840	690	13,464	544	11,880	443	11,088	345
		35	0.01	15,840	690	13,464	544	11,880	443	11,088	345
	0.3	8	0.04	28,512	1,463	24,235	1,244	21,384	976	19,958	797
		15	0.028	25,344	1,261	21,542	938	19,008	828	17,741	662
		25	0.017	15,840	690	13,464	544	11,880	443	11,088	345
		30	0.017	15,840	690	13,464	544	11,880	443	11,088	345
1.5	0.2	10	0.05	21,683	1,079	18,431	803	16,262	708	15,178	567
		15	0.045	19,712	981	16,755	730	14,784	644	13,798	515
		20	0.042	17,347	863	14,745	642	13,010	567	12,143	453
		25	0.032	14,784	644	12,566	508	11,088	414	10,349	322
		30	0.028	12,320	536	10,472	423	9,240	345	8,624	268
	0.3	10	0.05	21,683	1,079	18,431	803	16,262	708	15,178	567
		20	0.042	17,347	863	14,745	642	13,010	567	12,143	453
		25	0.032	14,784	644	12,566	508	11,088	414	10,349	322
		30	0.028	12,320	536	10,472	423	9,240	345	8,624	268
2	0.2	30	0.045	13,440	1,254	11,424	933	10,080	823	9,408	658
		40	0.035	10,080	823	8,568	650	7,560	529	7,056	412
		50	0.017	8,400	686	7,140	541	6,300	441	5,880	343
	0.3	12	0.088	22,680	1,814	19,278	1,427	17,010	1,191	15,876	1,048
		20	0.054	18,144	1,452	15,422	1,141	13,608	953	12,701	838
		30	0.045	13,440	1,393	11,424	1,036	10,080	914	9,408	732
		40	0.035	10,080	914	8,568	722	7,560	588	7,056	457
		50	0.017	8,400	762	7,140	601	6,300	490	5,880	381

H-Star Endmill

ESTNR series

피삭재				탄소강, 합금강 180~250HB		프리하든강 HRC35~45		열처리강 HRC45~55		고경도강 HRC55~65	
표준절삭깊이비율				절삭깊이 × 100%		절삭깊이 × 80%		절삭깊이 × 65%		절삭깊이 × 60%	
공구직경 (Ø)	코너 R (mm)	목부길이 (mm)	절삭깊이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
2	0.5	8	0.170	22,680	1,814	19,278	1,427	17,010	1,191	15,876	1,048
		12	0.088	22,680	1,814	19,278	1,427	17,010	1,191	15,876	1,048
		16	0.088	19,278	1,542	16,386	1,213	14,459	1,012	13,495	891
		20	0.054	18,114	1,452	15,422	1,141	13,608	953	12,701	838
		25	0.054	15,876	1,270	13,495	999	11,907	833	11,113	733
		30	0.045	13,440	1,393	11,424	1,036	10,080	914	9,408	732
		40	0.035	10,080	914	8,568	722	7,560	588	7,056	457
		50	0.017	8,400	762	7,140	601	6,300	490	5,880	381
3	0.2	40	0.070	10,240	956	8,704	711	7,680	627	7,168	502
		50	0.050	7,680	627	6,528	495	5,760	403	5,376	314
		60	0.030	6,400	523	5,440	412	4,800	336	4,480	261
	0.3	40	0.070	10,240	1,062	8,704	790	7,680	697	7,168	557
		50	0.050	7,680	697	6,528	550	5,760	448	5,376	348
		60	0.030	6,400	581	5,440	458	4,800	373	4,480	290
	0.5	40	0.070	10,240	1,062	8,704	790	7,680	697	7,168	557
		50	0.050	7,680	697	6,528	550	5,760	448	5,376	348
		60	0.030	6,400	581	5,440	458	4,800	373	4,480	290

절입기준



- 절삭 깊이(Depth of Cut)는 위 표에서 해당되는 경도 아래 표시된 비율대로 줄여 사용하십시오.
- 상기의 절삭 조건표는 실제 상황과 다를 수 있으니, 기계의 상태, 가공형태 및 목적에 알맞게 조정하여 사용하십시오.
- RPM이 낮은 기계일 경우에는 Feed도 같은 비율로 낮추어 사용하십시오.

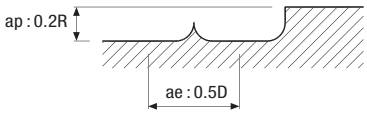
H-Star Endmill

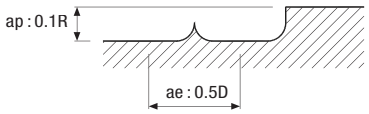
ESPM4 series

측면 절삭 가공

피삭재	열처리강, 내열합금강		열처리강							
절삭조건	~HRC40		HRC40~50		HRC50~55		HRC55~60		HRC60~65	
공구직경(Ø)×코너 R(mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
3 × R0.5	9,550	6,500	6,900	4,150	4,550	2,750	2,850	1,150	1,900	610
4 × R0.5	7,950	7,000	5,750	4,600	4,000	3,200	2,550	1,350	1,750	700
6 × R0.5	5,800	7,650	4,100	4,900	2,900	3,500	1,850	1,850	1,350	795
6 × R1.0	5,800	7,650	4,100	4,900	2,900	3,500	1,850	1,850	1,350	795
8 × R1.0	4,350	7,650	3,050	4,900	2,200	3,500	1,400	1,850	995	795
8 × R2.0	4,350	7,650	3,050	4,900	2,200	3,500	1,400	1,850	995	795
10 × R1.0	3,500	7,650	2,450	4,900	1,750	3,500	1,100	1,850	795	795
10 × R2.0	3,500	7,650	2,450	4,900	1,750	3,500	1,100	1,850	795	795
12 × R2.0	2,900	7,650	2,050	4,900	1,450	3,500	925	1,850	665	795
12 × R3.0	2,900	7,650	2,050	4,900	1,450	3,500	925	1,850	665	795

절입기준



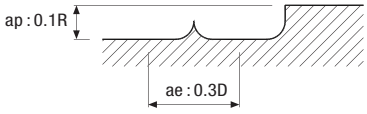


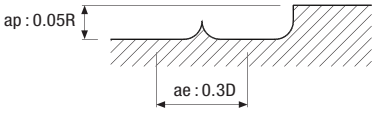
ESPM4 series

고속 가공

피삭재	열처리강, 내열합금강		열처리강							
절삭조건	~HRC40		HRC40~50		HRC50~55		HRC55~60		HRC60~65	
공구직경(Ø)×코너 R(mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
3 × R0.5	22,000	16,000	17,000	10,000	12,500	8,000	9,500	4,600	6,900	2,500
4 × R0.5	17,000	17,500	13,000	12,000	11,000	9,200	8,000	5,500	5,600	2,900
6 × R0.5	13,500	18,500	10,500	13,800	9,000	11,000	6,400	6,400	4,500	3,600
6 × R1.0	13,500	18,500	10,500	13,800	9,000	11,000	6,400	6,400	4,500	3,600
8 × R1.0	10,000	18,500	8,000	14,000	6,800	11,000	4,800	6,700	3,400	4,100
8 × R2.0	10,000	18,500	8,000	14,000	6,800	11,000	4,800	6,700	3,400	4,100
10 × R1.0	8,000	18,500	6,400	14,000	5,400	11,000	3,800	6,800	2,700	3,800
10 × R2.0	8,000	18,500	6,400	14,000	5,400	11,000	3,800	6,800	2,700	3,800
12 × R2.0	6,600	18,500	5,300	14,000	4,500	11,000	3,200	7,000	2,250	3,600
12 × R3.0	6,600	18,500	5,300	14,000	4,500	11,000	3,200	7,000	2,250	3,600

절입기준



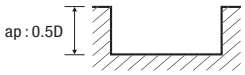


U-Star Endmill

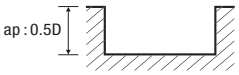
UE502, UXE502 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		스테인리스강 (SUS)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45				HRC45~55	
절삭조건	~1100N/mm²		1100~1500N/mm²				1500~2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
2.0	11,560	190	7,560	120	6,300	90	5,040	35
3.0	8,920	210	5,560	140	4,620	120	3,360	40
4.0	7,560	300	4,620	180	3,880	150	2,940	40
5.0	6,300	320	3,780	190	3,160	160	2,320	50
6.0	5,560	350	3,360	220	2,840	180	2,000	55
8.0	4,200	380	2,520	200	2,100	180	1,680	75
10.0	3,260	330	2,000	160	1,680	160	1,360	60
12.0	2,740	280	1,680	130	1,360	130	1,160	55
16.0	2,200	220	1,360	110	1,060	110	900	40
20.0	1,680	170	1,060	80	840	80	680	30
25.0	1,360	130	840	70	680	60	540	20

절입기준



(ap : UP to Ø3 : 0.2D)



U-Star Endmill

UE512

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			고경도강 (SKD, SKT, STAVAX)		
강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경 (Ø)	유효길이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	테이블이송 vf (mm/min)	Feed vf (mm/min)	ap (mm)
0.1	0.3	50,000	315	0.009	46,200	230	0.007	40,600	170	0.005
0.1	0.5	50,000	315	0.006	46,200	230	0.005	40,600	170	0.004
0.1	1	45,000	255	0.002	41,580	185	0.002	36,540	140	0.001
0.2	0.5	38,500	380	0.018	36,300	270	0.014	32,100	200	0.01
0.2	1	38,500	380	0.013	36,300	270	0.010	32,100	200	0.007
0.2	1.5	34,650	310	0.007	32,670	220	0.006	28,890	160	0.004
0.2	2	34,650	310	0.005	32,670	220	0.004	28,890	160	0.003
0.3	1	34,200	390	0.019	32,300	270	0.015	28,500	230	0.011
0.3	1.5	34,200	390	0.019	32,300	270	0.015	25,800	230	0.011
0.3	2	30,780	315	0.011	29,070	220	0.008	25,650	185	0.006
0.3	2.5	30,780	315	0.007	29,070	220	0.005	25,650	185	0.004
0.3	3	30,780	315	0.007	29,070	220	0.005	25,650	185	0.004
0.3	4	27,360	250	0.004	25,840	175	0.003	22,800	145	0.002
0.3	5	20,520	165	0.003	19,380	115	0.002	17,100	95	0.002
0.4	1	27,400	540	0.036	25,800	380	0.028	22,800	280	0.02
0.4	1.5	27,400	540	0.025	25,800	380	0.020	22,800	280	0.014
0.4	2	27,400	540	0.025	25,800	380	0.020	22,800	280	0.014
0.4	2.5	24,660	435	0.014	23,220	310	0.011	20,520	225	0.008
0.4	3	24,660	435	0.014	23,220	310	0.011	20,520	225	0.008
0.4	4	24,660	435	0.009	23,220	310	0.007	20,520	225	0.005
0.4	5	21,920	345	0.009	20,640	245	0.007	18,240	180	0.005
0.4	6	21,920	345	0.005	20,640	245	0.004	18,240	180	0.003
0.4	8	16,440	225	0.004	15,480	160	0.003	13,680	120	0.002
0.4	10	8,220	95	0.004	7,740	70	0.003	6,840	50	0.002
0.5	1	27,400	540	0.045	25,800	425	0.035	22,800	285	0.025
0.5	1.5	27,400	540	0.045	25,800	425	0.035	22,800	285	0.025
0.5	2	27,400	540	0.032	25,800	425	0.025	22,800	285	0.018
0.5	2.5	27,400	540	0.032	25,800	425	0.025	22,800	285	0.018
0.5	3	24,660	435	0.018	23,220	345	0.014	20,520	230	0.01
0.5	4	24,660	435	0.018	23,220	345	0.014	20,520	230	0.01
0.5	5	24,660	435	0.011	23,220	345	0.009	20,520	230	0.006
0.5	6	21,920	345	0.011	20,640	270	0.009	18,240	180	0.006
0.5	8	16,440	225	0.007	15,480	180	0.005	13,680	120	0.004
0.5	10	16,440	225	0.005	15,480	180	0.004	13,680	120	0.003
0.5	12	8,220	95	0.005	7,740	75	0.004	6,840	50	0.003
0.5	14	8,220	95	0.005	7,740	75	0.004	6,840	50	0.003
0.5	16	2,740	25	0.005	2,580	20	0.004	2,280	15	0.003
0.6	2	27,400	775	0.038	25,800	545	0.029	22,800	405	0.021
0.6	3	27,400	775	0.038	25,800	545	0.029	22,800	405	0.021
0.6	4	24,660	630	0.022	23,220	440	0.017	20,520	330	0.012
0.6	5	24,660	630	0.014	23,220	440	0.011	20520	330	0.008
0.6	6	24,660	630	0.014	23,220	440	0.011	20520	330	0.008
0.6	8	21,920	495	0.008	20640	350	0.006	18240	260	0.005

U-Star Endmill

UE512

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			고경도강 (SKD, SKT, STAVAX)		
강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경 (Ø)	유효길이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	테이블이송 vf (mm/min)	Feed vf (mm/min)	ap (mm)
0.6	10	16,440	325	0.005	15,480	230	0.004	13,680	170	0.003
0.6	12	16,440	325	0.005	15,480	230	0.004	13,680	170	0.003
0.6	14	8,220	140	0.005	7,740	100	0.004	6,840	75	0.003
0.6	16	8,220	140	0.005	7,740	100	0.004	6,840	75	0.003
0.7	2	27,400	775	0.063	25,800	545	0.049	22,800	405	0.035
0.7	4	24,660	630	0.025	23,220	440	0.020	20,520	330	0.014
0.7	6	24,660	630	0.016	23,220	440	0.012	20,520	330	0.009
0.7	8	21,920	495	0.016	20,640	350	0.012	18,240	260	0.009
0.7	10	21,920	495	0.009	20,640	350	0.007	18,240	260	0.005
0.7	12	16,440	325	0.009	15,480	230	0.005	13,680	170	0.004
0.8	2	27,400	775	0.072	25,800	605	0.056	22,800	450	0.040
0.8	3	27,400	775	0.050	25,800	605	0.039	22,800	450	0.028
0.8	4	27,400	775	0.050	25,800	605	0.039	22,800	450	0.028
0.8	5	24,660	630	0.029	23,220	490	0.022	20,520	365	0.016
0.8	6	24,660	630	0.029	23,220	490	0.022	20,520	365	0.016
0.8	8	24,660	630	0.018	23,220	490	0.014	20,520	365	0.010
0.8	10	21,920	495	0.018	20,640	385	0.014	18,240	290	0.01
0.8	12	21,920	495	0.011	20,640	385	0.008	18,240	290	0.006
0.8	14	16,440	325	0.007	15,480	255	0.006	13,680	190	0.004
0.8	16	16,440	325	0.007	15,480	255	0.006	13,680	190	0.004
0.8	20	8,220	140	0.007	7,740	110	0.006	6,840	80	0.004
0.9	6	22,140	575	0.032	20,970	440	0.025	18,450	330	0.018
0.9	8	22,140	575	0.020	20,970	440	0.016	18,450	330	0.011
0.9	10	19,680	455	0.020	18,640	350	0.016	16,400	260	0.011
1.0	2	24,600	1045	0.090	23,300	890	0.070	20,500	665	0.050
1.0	3	24,600	1045	0.090	23,300	890	0.070	20,500	665	0.050
1.0	4	24,600	1045	0.063	23,300	890	0.049	20,500	665	0.035
1.0	5	24,600	1045	0.063	23,300	890	0.049	20,500	665	0.035
1.0	6	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
1.0	7	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
1.0	8	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
1.0	10	22,140	845	0.023	20,970	720	0.018	18,450	540	0.013
1.0	12	19,680	670	0.023	18,640	570	0.018	16,400	425	0.013
1.0	14	19,680	670	0.014	18,640	570	0.011	16,400	425	0.008
1.0	16	14,760	440	0.014	13,980	375	0.011	12,300	280	0.008
1.0	18	14,760	440	0.009	13,980	375	0.007	12,300	280	0.005
1.0	20	14,760	440	0.009	13,980	375	0.007	12,300	280	0.005
1.0	22	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
1.0	26	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
1.0	30	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
1.0	40	2460	50	0.009	2,330	45	0.007	2,050	35	0.005
1.0	50	2460	50	0.006	2,330	45	0.005	2050	35	0.003
1.2	4	21900	930	0.076	20700	720	0.059	18200	485	0.042

U-Star Endmill

UE512

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			고경도강 (SKD, SKT, STAVAX)		
강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경 (Ø)	유효길이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	테이블이송 vf (mm/min)	Feed vf (mm/min)	ap (mm)
1.2	6	21,900	930	0.076	20,700	720	0.059	18,200	485	0.042
1.2	8	19,710	755	0.043	18,630	585	0.034	16,380	395	0.024
1.2	10	19,710	755	0.027	18,630	585	0.021	16,380	395	0.015
1.2	12	19,710	755	0.027	18,630	585	0.021	16,380	395	0.015
1.2	14	17,520	595	0.027	16,560	460	0.021	14,560	310	0.015
1.2	16	17,520	595	0.016	16,560	460	0.013	14,560	310	0.009
1.2	20	13,140	390	0.011	12,420	300	0.008	10,920	205	0.006
1.2	26	6,570	165	0.011	6,210	130	0.008	5,460	85	0.006
1.2	30	6,570	165	0.011	6,210	130	0.008	5,460	85	0.006
1.4	6	19,200	815	0.088	18,100	570	0.069	16,000	425	0.049
1.4	8	17,280	660	0.050	16,290	460	0.039	14,400	345	0.028
1.4	10	17,280	660	0.050	16,290	460	0.039	14,400	345	0.028
1.4	14	17,280	660	0.032	16,290	460	0.025	14,400	345	0.018
1.4	16	15,360	520	0.032	14,480	365	0.025	12,800	270	0.018
1.4	20	15,360	520	0.019	14,480	365	0.015	12,800	270	0.011
1.5	4	19,200	905	0.135	18,100	635	0.105	16,000	475	0.075
1.5	5	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
1.5	6	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
1.5	7	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
1.5	8	17,280	735	0.054	16,290	515	0.042	14,400	385	0.030
1.5	10	17,280	735	0.054	16,290	515	0.042	14,400	385	0.03
1.5	12	17,280	735	0.054	16,290	515	0.042	14,400	385	0.030
1.5	14	17,280	735	0.034	16,290	515	0.026	14,400	385	0.019
1.5	16	15,360	580	0.034	14,480	405	0.026	12,800	305	0.019
1.5	18	15,360	580	0.034	14,480	405	0.026	12,800	305	0.019
1.5	20	15,360	580	0.020	14,480	405	0.016	12,800	305	0.011
1.5	22	15,360	580	0.020	14,480	405	0.016	12,800	305	0.011
1.5	26	11,520	380	0.014	10,860	265	0.011	9,600	200	0.008
1.5	30	11,520	380	0.014	10,860	265	0.011	9,600	200	0.008
1.6	8	17,800	840	0.101	16,800	655	0.078	14,800	490	0.056
1.6	10	16,020	680	0.058	15,120	530	0.045	13,320	395	0.032
1.6	12	16,020	680	0.058	15,120	530	0.045	13,320	395	0.032
1.6	16	16,020	680	0.036	15,120	530	0.028	13,320	395	0.020
1.6	20	14,240	540	0.036	13,440	420	0.028	11,840	315	0.020
1.8	8	17,800	840	0.113	16,800	655	0.088	14,800	490	0.063
1.8	10	16,020	680	0.065	15,120	530	0.050	13,320	395	0.036
1.8	12	16,020	680	0.065	15,120	530	0.050	13,320	395	0.036
1.8	16	16,020	680	0.041	15,120	530	0.032	13,320	395	0.023
1.8	20	14,240	540	0.041	13,440	420	0.032	11,840	315	0.023
2.0	6	14,400	820	0.180	13,600	620	0.140	12,000	475	0.100
2.0	8	14,400	820	0.126	13,600	620	0.098	12,000	475	0.070
2.0	10	14400	820	0.126	13600	620	0.098	12,000	475	0.070
2.0	12	12960	665	0.072	12240	500	0.056	10,800	385	0.040

U-Star Endmill

UE512

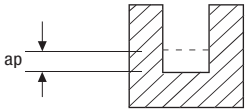
피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			고경도강 (SKD, SKT, STAVAX)		
강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경 (Ø)	유효길이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	테이블이송 vf (mm/min)	Feed vf (mm/min)	ap (mm)
2.0	14	12,960	665	0.072	12,240	500	0.056	10,800	385	0.040
2.0	16	12,960	665	0.072	12,240	500	0.056	10,800	385	0.040
2.0	18	12,960	665	0.045	12,240	500	0.035	10,800	385	0.025
2.0	20	12,960	665	0.045	12,240	500	0.035	10,800	385	0.025
2.0	22	11,520	525	0.045	10,880	395	0.035	9,600	305	0.025
2.0	26	11,520	525	0.045	10,880	395	0.035	9,600	305	0.025
2.0	30	11,520	525	0.027	10,880	395	0.021	9,600	305	0.015
2.0	35	8,640	345	0.018	8,160	260	0.014	7,200	200	0.010
2.0	40	8,640	345	0.018	8,160	260	0.014	7,200	200	0.010
2.0	45	4,320	150	0.018	4,080	110	0.014	3,600	85	0.010
2.0	50	4,320	150	0.018	4,080	110	0.014	3,600	85	0.010
2.0	60	4,320	150	0.018	4,080	110	0.014	3,600	85	0.010
2.5	8	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
2.5	10	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
2.5	12	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
2.5	14	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
2.5	16	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
2.5	18	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
2.5	20	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
2.5	22	11,070	785	0.056	10,440	550	0.044	9,270	415	0.031
2.5	26	9,840	620	0.056	9,280	435	0.044	8,240	325	0.031
2.5	30	9,840	620	0.056	9,280	435	0.044	8,240	325	0.031
2.5	35	9,840	620	0.034	9,280	435	0.026	8,240	325	0.019
2.5	40	7,380	405	0.034	6,960	285	0.026	6,180	215	0.019
2.5	45	7,380	405	0.023	6,960	285	0.018	6,180	215	0.013
2.5	50	7,380	405	0.023	6,960	285	0.018	6,180	215	0.013
3.0	6	10,900	860	0.270	10,300	605	0.210	6,600	450	0.150
3.0	8	10,900	860	0.270	10,300	605	0.210	6,600	450	0.150
3.0	10	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
3.0	12	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
3.0	14	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
3.0	16	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
3.0	18	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
3.0	20	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
3.0	22	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
3.0	26	9,810	695	0.068	9,270	490	0.053	5,940	365	0.038
3.0	30	9,810	695	0.068	9,270	490	0.053	5,940	365	0.038
3.0	35	8,720	550	0.068	8,240	385	0.053	5,280	290	0.038
3.0	40	8,720	550	0.041	8,240	385	0.032	5,280	290	0.023
3.0	45	8,720	550	0.041	8,240	385	0.032	5,280	290	0.023
3.0	50	6,540	360	0.027	6,180	255	0.021	3,960	190	0.015
3.0	60	6,540	360	0.027	6,180	255	0.021	3,960	190	0.015

U-Star Endmill

UE512

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			고경도강 (SKD, SKT, STAVAX)		
강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경 (Ø)	유효길이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	테이블이송 vf (mm/min)	Feed vf (mm/min)	ap (mm)
4.0	8	8,000	1,300	0.360	7,600	1,160	0.280	6,700	770	0.200
4.0	10	8,000	1,300	0.360	7,600	1,160	0.280	6,700	770	0.200
4.0	12	8,000	1,300	0.360	7,600	1,160	0.280	6,700	770	0.200
4.0	14	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
4.0	16	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
4.0	18	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
4.0	20	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
4.0	22	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
4.0	26	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
4.0	30	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
4.0	35	7,200	1,055	0.090	6,840	940	0.070	6,030	625	0.050
4.0	40	7,200	1,055	0.090	6,840	940	0.070	6,030	625	0.050
4.0	45	6,400	830	0.090	6,080	740	0.070	5,360	495	0.050
4.0	50	6,400	830	0.090	6,080	740	0.070	5,360	495	0.050
4.0	60	6,400	830	0.054	6,080	740	0.042	5,360	495	0.030
5.0	16	6,400	1,155	0.315	6,100	900	0.245	5,400	605	0.175
5.0	20	6,400	1,155	0.315	6,100	900	0.245	5,400	605	0.175
5.0	26	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
5.0	30	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
5.0	35	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
5.0	40	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
5.0	50	5,760	935	0.113	5,490	730	0.088	4,860	490	0.063
5.0	60	5,120	740	0.113	4,880	575	0.088	4,320	385	0.063
6.0	15	5,300	1,055	0.540	5,000	820	0.420	4,400	550	0.300
6.0	20	5,300	1,055	0.378	5,000	820	0.294	4,400	550	0.210
6.0	30	5,300	1,055	0.378	5,000	820	0.294	4,400	550	0.210
6.0	32	4,770	855	0.216	4,500	665	0.168	3,960	445	0.120
8.0	25	4,000	950	0.504	3,800	750	0.392	3,300	500	0.280
8.0	30	4,000	950	0.504	3,800	750	0.392	3,300	500	0.280
8.0	42	3,600	770	0.288	3,400	605	0.224	2,950	405	0.160
10	30	3,200	900	0.900	3,050	680	0.700	2,630	400	0.500
10	35	3,200	900	0.630	3,050	680	0.490	2,630	400	0.350
10	45	3,200	900	0.630	3,050	680	0.490	2,630	400	0.350
12	35	2,650	800	1.080	2,520	600	0.840	2,180	350	0.600
12	40	2,650	800	0.756	2,520	600	0.588	2,180	350	0.420
12	50	2,650	800	0.756	2,520	600	0.588	2,180	350	0.420

절입기준

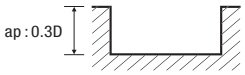


U-Star Endmill

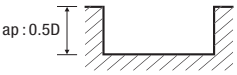
UE522 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100~1500N/mm²		1500~2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
2.0	6,300	60	5,040	50	3,150	25
3.0	4,410	70	3,570	60	2,200	30
4.0	3,570	85	2,840	70	1,790	35
5.0	3,050	105	2,420	85	1,580	40
6.0	2,630	125	2,100	105	1,370	50
8.0	2,000	135	1,580	105	1,050	50
10.0	1,680	135	1,370	105	840	50
12.0	1,370	105	1,160	95	700	40
16.0	1,160	95	890	75	560	35
20.0	840	70	680	50	420	25

절입기준



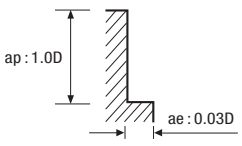
(ap : UP to Ø3.0 : 0.4mm)



UE504H series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100~1500N/mm²		1500~2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1.0	45,000	750	37,000	560	23,000	300
2.0	23,500	800	18,000	540	12,000	360
3.0	15,750	810	12,600	580	8,280	380
4.0	12,150	830	9,540	600	6,345	400
6.0	9,450	900	7,470	640	4,950	440
8.0	7,110	860	5,625	620	3,780	410
10.0	5,580	800	4,410	570	2,925	380
12.0	4,770	800	3,780	570	2,520	380
16.0	3,600	810	2,900	570	2,000	400
20.0	3,000	810	2,300	570	1,600	400

절입기준

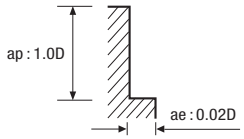


U-Star Endmill

UE514 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		스테인리스강 (SUS)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45				HRC45~55	
절삭조건	~1100N/mm²		1100~1500N/mm²				1500~2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1.0	22,000	310	13,500	180	10,750	140	8,500	50
1.5	17,000	320	10,700	190	8,500	150	6,500	50
2.0	13,900	330	9,070	200	7,560	165	6,000	60
2.5	12,000	350	7,600	220	6,000	180	4,500	60
3.0	10,700	380	6,670	240	5,110	200	4,030	70
4.0	9,070	680	5,540	420	4,650	330	3,530	70
5.0	7,560	720	4,530	430	3,800	360	2,780	85
6.0	6,670	790	4,030	490	3,400	390	2,400	95
8.0	5,040	850	3,020	450	2,520	420	2,010	130
10.0	3,910	730	2,400	360	2,010	360	1,630	105
12.0	3,300	620	2,010	300	1,630	280	1,400	95

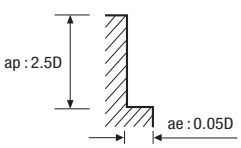
절입기준

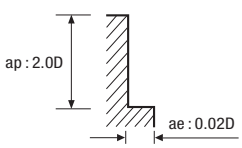


UE524 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100~1500N/mm²		1500~2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
2.0	6,300	100	5,040	80	3,150	45
3.0	4,410	115	3,570	100	2,200	55
4.0	3,570	140	2,840	115	1,790	60
5.0	3,050	180	2,420	140	1,580	70
6.0	2,630	215	2,100	180	1,370	90
8.0	2,000	230	1,580	180	1,050	90
10.0	1,680	230	1,370	180	840	90
12.0	1,370	180	1,160	160	700	70
16.0	1,160	160	890	125	560	60
20.0	840	115	680	90	420	45

절입기준





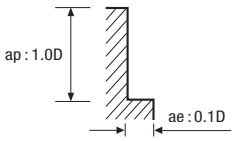
U-Star Endmill

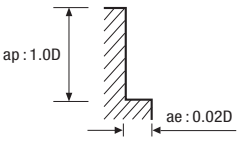
ULE504 series

일반 가공

피삭재	비합금강, 합금강, 주철		열처리강				스테인리스강	
강도	~HRC30		HRC35~45		HRC45~55			
절삭조건	~1000N/mm²		1000~1500N/mm²		1500~2000N/mm²		-	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
2.0	12,100	320	7,900	195	2,700	47	6,600	160
3.0	9,400	370	5,840	230	2,000	58	4,850	195
4.0	7,900	655	4,850	405	1,500	58	4,070	320
5.0	6,600	690	3,970	415	1,300	58	3,320	345
6.0	5,830	760	3,530	470	1,150	58	2,980	380
8.0	4,410	815	2,650	435	880	58	2,200	405
10.0	3,420	700	2,100	345	720	46	1,760	345
12.0	2,880	600	1,760	290	590	46	1,430	275
16.0	2,310	470	1,430	230	460	29	1,150	230
20.0	1,760	370	1,110	185	340	29	880	175
25.0	1,430	290	880	150	270	23	715	140

절입기준

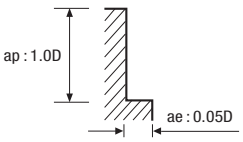




UE504, UXE504 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		스테인리스강 (SUS)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45				HRC45~55	
절삭조건	~1100N/mm²		1100~1500N/mm²		-		1500~2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
2.0	11,560	280	7,560	170	6,300	140	6,300	5,040
3.0	8,920	320	5,560	200	4,620	170	4,620	3,360
4.0	7,560	570	4,620	350	3,880	280	3,880	2,940
5.0	6,300	600	3,780	360	3,160	300	3,160	2,320
6.0	5,560	660	3,360	410	2,840	330	2,840	2,000
8.0	4,200	710	2,520	380	2,100	350	2,100	1,680
10.0	3,260	610	2,000	300	1,680	300	1,680	1,360
12.0	2,740	520	1,680	250	1,360	240	1,360	1,160
16.0	2,200	410	1,360	200	1,100	300	1,100	900
20.0	1,680	320	1,060	160	840	150	840	680
25.0	1,360	250	840	130	680	120	680	540

절입기준



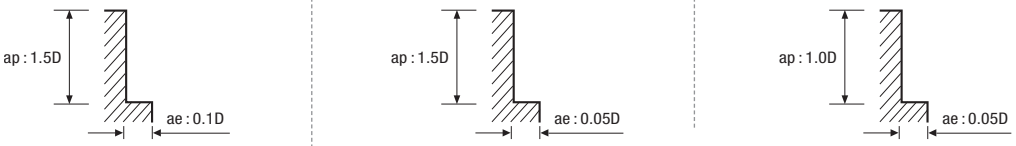
U-Star Endmill

UE506 series

일반 가공

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100 ~ 1500N/mm²		1500 ~ 2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6.0	5,560	2,000	3,880	1,370	1,580	210
8.0	4,200	2,000	2,940	1,370	1,160	210
10.0	3,360	2,000	2,320	1,370	1,000	210
12.0	2,840	1,680	2,000	1,160	840	180
16.0	2,100	1,260	1,480	880	640	130
20.0	1,680	1,010	1,160	690	500	110
25.0	1,500	900	1,100	600	430	90

절입기준

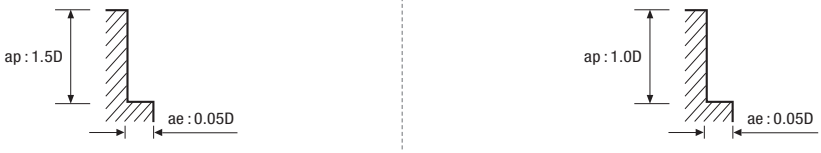


UE506 series

고속 가공

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC45~55	
절삭조건	~ 1100N/mm²		1500 ~ 2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6.0	16,800	6,090	8,400	3,050
8.0	12,600	6,090	6,300	3,050
10.0	9,980	5,990	5,040	3,050
12.0	8,400	5,040	4,200	2,520
16.0	6,300	3,780	3,160	1,890
20.0	5,040	3,050	2,520	1,470
25.0	4,500	2,700	2,200	1,300

절입기준

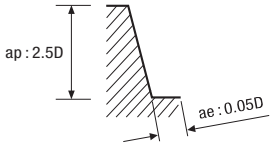


U-Star Endmill

UTE502 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)	
강도	~HRC35		HRC35~45	
절삭조건	~ 1100N/mm²		1100 ~ 1500N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
0.3	45,000	135	35,000	105
0.4	36,000	144	27,900	113
0.6	25,200	144	18,900	113
0.8	18,000	144	13,950	108
1.0	14,850	149	11,250	113
2.0	7,560	153	5,670	113
3.0	3,969	108	3,213	90
4.0	3,213	126	2,556	104
6.0	2,367	189	1,890	153
8.0	1,800	225	1,422	162
10.0	1,440	225	1,170	167

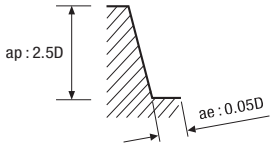
절입기준



UTE504 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)	
강도	~HRC35		HRC35~45	
절삭조건	~ 1100N/mm²		1100 ~ 1500N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
3.0	3,969	216	3,213	180
4.0	3,213	252	2,556	207
6.0	2,367	378	1,890	306
8.0	1,800	450	1,422	324
10.0	1,440	450	1,170	333

절입기준

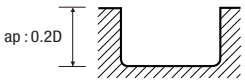


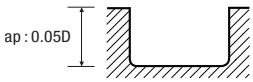
U-Star Endmill

UR502 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100 ~ 1500N/mm²		1500 ~ 2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
0.2	44,000	145	28,800	60	17,600	40
0.3	41,000	170	27,000	70	16,500	45
0.4	41,000	170	27,000	70	16,500	45
0.5	36,000	190	23,400	80	14,300	50
0.6	30,000	210	19,800	90	12,100	55
0.8	30,000	210	19,800	90	12,100	55
1.0	27,600	240	18,000	100	11,000	60
1.5	22,000	250	13,500	110	8,500	60
2.0	18,000	260	11,560	120	7,200	70
2.5	15,000	270	9,500	130	6,100	70
3.0	13,240	280	8,560	140	5,280	70
4.0	10,720	340	6,820	170	4,300	80
5.0	9,160	420	5,800	200	3,800	100
6.0	7,900	500	5,040	250	3,280	120
8.0	6,000	540	3,800	250	2,520	120
10.0	5,040	540	3,280	250	2,020	120
12.0	4,120	420	2,780	230	1,680	100
16.0	3,100	360	2,100	170	1,280	80
20.0	2,520	280	1,640	120	1,000	60

절입기준



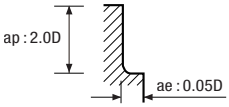


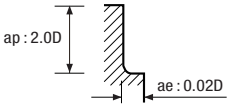
U-Star Endmill

UR504, UR512 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100 ~ 1500N/mm²		1500 ~ 2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
3.0	4,410	115	3,570	100	2,200	55
4.0	3,570	140	2,840	115	1,790	60
5.0	3,050	180	2,420	140	1,580	70
6.0	2,630	215	2,100	180	1,370	85
8.0	2,000	230	1,580	180	1,050	85
10.0	1,680	230	1,370	180	840	85
12.0	1,370	180	1,160	160	700	70
16.0	1,160	160	890	125	560	60
20.0	840	115	680	90	420	45

절입기준

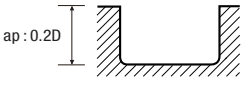


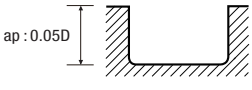


UR542 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100 ~ 1500N/mm²		1500 ~ 2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
0.2	50,000	170	34,500	75	21,150	45
0.3	50,000	200	32,000	85	20,000	50
0.4	50,000	200	32,000	85	20,000	50
0.5	43,000	220	28,000	95	17,100	60
0.6	36,400	250	24,000	110	14,500	65
0.8	36,400	250	24,000	110	14,500	65
1.0	33,100	280	21,600	120	13,200	70
1.5	26,400	300	16,200	130	10,200	70
2.0	21,600	310	13,800	140	8,640	80
2.5	18,000	320	11,400	150	7,320	80
3.0	15,900	330	10,300	160	6,300	80
4.0	12,800	400	8,200	200	5,150	95
5.0	11,000	500	7,000	240	4,560	120
6.0	9,500	600	6,000	300	3,930	140
8.0	7,200	640	4,550	300	3,020	140
10.0	6,000	640	4,000	300	2,420	140
12.0	5,000	500	3,340	270	2,000	120
16.0	3,720	450	2,520	210	1,540	95
20.0	3,000	330	1,950	140	1,200	70

절입기준



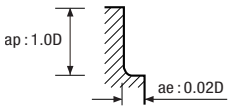


U-Star Endmill

UR544, UXR514 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100 ~ 1500N/mm²		1500 ~ 2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1.0	33,100	360	21,600	260	13,200	140
1.5	26,400	370	16,200	270	10,200	140
2.0	21,600	380	13,800	280	8,640	150
2.5	18,000	390	11,400	300	7,320	150
3.0	15,900	400	10,300	310	6,300	150
4.0	12,800	500	8,200	360	5,150	160
5.0	11,000	510	7,000	430	4,560	200
6.0	9,500	510	6,000	430	3,930	200
8.0	7,200	550	4,550	430	3,020	200
10.0	6,000	550	4,000	430	2,420	200
12.0	5,000	430	3,340	380	2,000	160
16.0	3,720	330	2,520	280	1,540	135
20.0	3,000	270	1,950	210	1,200	100

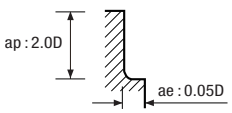
절입기준

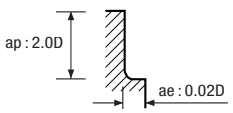


UXR504 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC25		HRC35~45		HRC25~35	
절삭조건	~1100N/mm²		1100 ~ 1500N/mm²		1500 ~ 2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1.0	27,600	300	18,000	220	11,000	120
1.5	22,000	310	13,500	230	8,500	120
2.0	18,000	320	11,560	240	7,200	130
2.5	15,000	330	9,500	250	6,100	130
3.0	13,240	340	8,560	260	5,280	130
4.0	10,720	420	6,820	300	4,300	140
5.0	9,160	430	5,800	360	3,800	170
6.0	7,900	430	5,040	360	3,280	170
8.0	6,000	460	3,800	360	2,520	170
10.0	5,040	460	3,280	360	2,020	170
12.0	4,120	360	2,780	320	1,680	140
16.0	3,100	280	2,100	230	1,280	115
20.0	2,520	230	1,640	180	1,000	90

절입기준



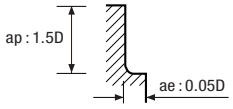


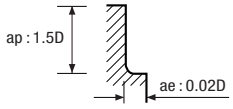
U-Star Endmill

UR506 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC25		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100~1500N/mm²		1500~2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6.0	14,880	3,210	14,100	2,940	9,600	2,940
8.0	12,000	3,300	11,400	3,000	7,200	2,760
10.0	9,600	2,940	9,300	2,700	5,700	2,460
12.0	7,800	2,700	7,500	2,460	4,800	2,280
16.0	6,000	2,400	5,820	2,220	3,600	2,040
20.0	4,800	2,010	4,680	2,040	2,880	1,920

절입기준



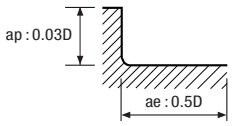


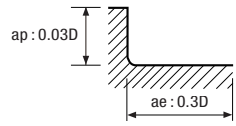
UDR503 series

일반 가공

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100~1500N/mm²		1500~2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6.0	5,100	3,500	5,500	3,750	3,850	2,700
8.0	3,800	3,400	4,150	3,700	2,850	2,550
10.0	3,800	3,750	3,600	3,500	2,700	2,700
12.0	3,200	4,200	3,250	4,250	2,250	2,300
16.0	2,400	3,100	2,250	2,900	1,700	1,750
20.0	1,900	2,500	1,800	2,350	1,350	1,400

절입기준





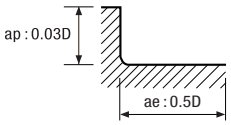
U-Star Endmill

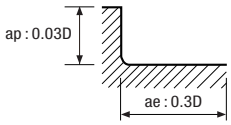
UDR503 series

고속 가공

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100 ~ 1500N/mm²		1500 ~ 2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6.0	8,300	5,700	7,650	5,250	6,400	4,550
8.0	6,200	5,550	5,750	5,100	5,250	4,700
10.0	5,750	5,650	5,000	4,900	4,200	4,250
12.0	4,800	6,300	4,150	5,450	3,500	3,650
16.0	3,600	4,700	3,100	4,050	2,650	2,700
20.0	2,900	3,750	2,500	3,250	2,100	2,150

절입기준

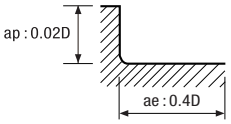


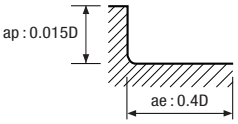


USPM4 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100 ~ 1500N/mm²		1500 ~ 2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1.0	49,000	7,650	40,000	6,500	35,000	5,750
1.5	37,000	8,550	30,000	7,200	27,000	6,400
2.0	29,700	9,000	24,300	7,560	21,600	6,750
3.0	19,800	9,900	16,200	8,100	14,400	7,650
4.0	15,300	10,800	12,600	8,550	10,800	7,920
6.0	9,900	11,700	8,100	9,900	7,200	8,640
8.0	7,380	11,700	6,300	9,900	5,400	8,640
10.0	5,850	10,800	4,950	9,000	4,320	8,550
12.0	4,950	10,800	4,140	9,000	3,690	8,100
16.0	3,690	9,000	3,060	7,920	2,700	7,020
20.0	2,970	7,200	2,430	6,300	2,160	5,670

절입기준



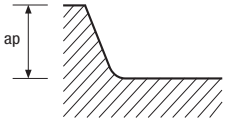


U-Star Endmill

UTR504 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			고경도강 (SKD, SKT, STAVAX)		
강도	~HRC35			HRC35~45			HRC45~55		
절삭조건	~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)
0.4	40,000	630	0.008~0.016	32,000	450	0.008~0.012	22,000	270	0.004~0.008
0.6	30,000	630	0.012~0.024	23,000	450	0.012~0.018	15,000	270	0.006~0.012
0.8	22,500	630	0.016~0.032	17,000	450	0.016~0.024	11,500	270	0.008~0.016
1.0	18,000	630	0.020~0.040	13,500	450	0.020~0.030	9,000	270	0.010~0.020
1.2	14,400	630	0.025~0.050	11,700	450	0.025~0.040	7,200	270	0.012~0.025
1.5	11,700	630	0.030~0.060	9,000	450	0.030~0.050	5,850	270	0.015~0.030
2.0	9,000	630	0.040~0.080	7,200	450	0.040~0.060	4,500	270	0.020~0.040

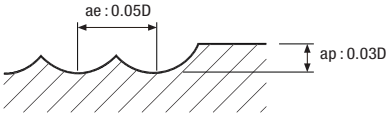
절입기준



UB502---P series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100~1500N/mm²		1500~2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
0.1	40,000	550	40,000	500	33,000	400
0.2	30,000	720	30,000	630	27,000	575
0.3	30,000	900	30,000	810	27,000	720
0.4	30,000	1,140	30,000	1,020	27,000	900
0.5	30,000	1,440	30,000	1,260	27,000	1,140
0.6	30,000	1,740	30,000	1,500	27,000	1,320
0.8	30,000	2,340	30,000	1,980	27,000	1,800
1.0	30,000	2,880	30,000	2,520	27,000	2,280
1.2	30,000	3,060	28,800	2,580	25,800	2,310
1.5	30,000	3,240	28,800	2,700	25,800	2,400
2.0	29,820	3,420	28,680	2,880	24,000	2,400
3.0	19,860	3,600	19,080	3,180	15,900	2,400
4.0	14,940	3,600	14,340	3,180	12,000	2,400
5.0	11,160	3,480	10,680	2,940	9,000	2,250
6.0	8,340	2,910	8,040	2,460	6,600	1,860
8.0	6,660	2,520	6,420	2,100	5,400	1,620
10.0	5,580	2,220	5,340	1,860	4,500	1,440
12.0	4,170	1,770	4,008	1,500	3,360	1,140
16.0	3,340	1,590	3,210	1,320	2,700	1,020
20.0	2,670	1,410	2,580	1,170	2,160	900
25.0	2,130	1,150	2,060	950	1,730	730

절입기준



U-Star Endmill

UB512, UB512...S6 series

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			고경도강 (SKD, SKT, STAVAX)		
강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경 (Ø)	유효길이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	테이블이송 vf (mm/min)	Feed vf (mm/min)	ap (mm)
0.1	0.2	50,000	240	0.009	50,000	215	0.007	50,000	190	0.005
0.1	0.3	50,000	240	0.009	50,000	215	0.007	50,000	190	0.005
0.1	0.5	50,000	240	0.006	50,000	215	0.005	50,000	190	0.004
0.1	1	45,000	195	0.002	45,000	175	0.002	45,000	155	0.001
0.2	0.5	50,000	335	0.018	50,000	310	0.014	43,200	260	0.010
0.2	1	50,000	335	0.013	50,000	310	0.010	43,200	260	0.007
0.2	1.5	45,000	270	0.007	45,000	250	0.006	38,880	210	0.004
0.2	2	45,000	270	0.005	45,000	250	0.004	38,880	210	0.003
0.2	3	45,000	270	0.003	45,000	250	0.003	38,880	210	0.002
0.3	1	50,000	475	0.019	50,000	430	0.015	42,800	365	0.011
0.3	1.5	50,000	475	0.019	50,000	430	0.015	42,800	365	0.011
0.3	2	45,000	385	0.011	45,000	350	0.008	38,520	295	0.006
0.3	2.5	45,000	385	0.007	45,000	350	0.005	38,520	295	0.004
0.3	3	45,000	385	0.007	45,000	350	0.005	38,520	295	0.004
0.3	4	40,000	305	0.004	40,000	275	0.003	34,240	235	0.002
0.3	5	30,000	200	0.003	30,000	180	0.002	25,680	155	0.002
0.4	1	41,000	490	0.036	38,800	425	0.028	34,200	340	0.020
0.4	1.5	41,000	490	0.025	38,800	425	0.020	34,200	340	0.014
0.4	2	41,000	490	0.025	38,800	425	0.020	34,200	340	0.014
0.4	2.5	36,900	395	0.014	34,920	345	0.011	30,780	275	0.008
0.4	3	36,900	395	0.014	34,920	345	0.011	30,780	275	0.008
0.4	4	36,900	395	0.009	34,920	345	0.007	30,780	275	0.005
0.4	5	32,800	315	0.009	31,040	270	0.007	27,360	220	0.005
0.4	6	32,800	315	0.005	31,040	270	0.004	27,360	220	0.003
0.4	8	24,600	205	0.004	23,280	180	0.003	20,520	145	0.002
0.4	10	12,300	90	0.004	11,640	75	0.003	10,260	60	0.002
0.5	1	34,200	685	0.045	32,300	580	0.035	28,500	515	0.025
0.5	1.5	34,200	685	0.045	32,300	580	0.035	28,500	515	0.025
0.5	2	34,200	685	0.032	32,300	580	0.025	28,500	515	0.018
0.5	2.5	34,200	685	0.032	32,300	580	0.025	28,500	515	0.018
0.5	3	30,780	555	0.018	29,070	470	0.014	25,650	415	0.010
0.5	4	30,780	555	0.018	29,070	470	0.014	25,650	415	0.010
0.5	5	30,780	555	0.011	29,070	470	0.009	25,650	415	0.006
0.5	6	27,360	440	0.011	25,840	370	0.009	22,800	330	0.006
0.5	8	20,520	290	0.007	19,380	245	0.005	17,100	215	0.004
0.5	10	20,520	290	0.005	19,380	245	0.004	17,100	215	0.003
0.5	12	10,260	125	0.005	9,690	105	0.004	8,550	95	0.003
0.5	14	10,260	125	0.005	9,690	105	0.004	8,550	95	0.003
0.5	16	3,420	35	0.005	3,230	30	0.004	2,850	25	0.003
0.6	1	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
0.6	2	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
0.6	3	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
0.6	4	30,780	830	0.022	29,070	680	0.017	25,650	555	0.012

U-Star Endmill

UB512, UB512...S6 series

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			고경도강 (SKD, SKT, STAVAX)		
강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경 (Ø)	유효길이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	테이블이송 vf (mm/min)	Feed vf (mm/min)	ap (mm)
0.6	5	30,780	830	0.014	29,070	680	0.011	25,650	555	0.008
0.6	6	30,780	830	0.014	29,070	680	0.011	25,650	555	0.008
0.6	8	27,360	655	0.008	25,840	540	0.006	22,800	440	0.005
0.6	10	20,520	430	0.005	19,380	355	0.004	17,100	290	0.003
0.6	12	20,520	430	0.005	19,380	355	0.004	17,100	290	0.003
0.6	14	10,260	185	0.005	9,690	150	0.004	8,550	125	0.003
0.6	16	10,260	185	0.005	9,690	150	0.004	8,550	125	0.003
0.7	2	34,200	1,130	0.063	32,300	930	0.049	28,500	765	0.035
0.7	4	30,780	915	0.025	29,070	755	0.020	25,650	620	0.014
0.7	6	30,780	915	0.016	29,070	755	0.012	25,650	620	0.009
0.7	8	27,360	725	0.016	25,840	595	0.012	22,800	490	0.009
0.7	10	27,360	725	0.009	25,840	595	0.007	22,800	490	0.005
0.7	12	20,520	475	0.006	19,380	390	0.005	17,100	320	0.004
0.8	2	34,200	1,230	0.072	32,300	1,035	0.056	28,500	855	0.040
0.8	3	34,200	1,230	0.050	32,300	1,035	0.039	28,500	855	0.028
0.8	4	34,200	1,230	0.050	32,300	1,035	0.039	28,500	855	0.028
0.8	5	30,780	995	0.029	29,070	840	0.022	25,650	695	0.016
0.8	6	30,780	995	0.029	29,070	840	0.022	25,650	695	0.016
0.8	8	30,780	995	0.018	29,070	840	0.014	25,650	695	0.010
0.8	10	27,360	785	0.018	25,840	660	0.014	22,800	545	0.010
0.8	12	27,360	785	0.011	25,840	660	0.008	22,800	545	0.006
0.8	14	20,520	515	0.007	19,380	435	0.006	17,100	360	0.004
0.8	16	20,520	515	0.007	19,380	435	0.006	17,100	360	0.004
0.8	20	10,260	220	0.007	9,690	185	0.006	8,550	155	0.004
0.9	4	29,250	1,120	0.032	27,630	935	0.025	24,390	775	0.018
0.9	6	29,250	1,120	0.032	27,630	935	0.025	24,390	775	0.018
0.9	8	29,250	1,120	0.020	27,630	935	0.016	24,390	775	0.011
0.9	10	26,000	885	0.020	24,560	740	0.016	21,680	610	0.011
1.0	2	30,800	1,540	0.090	29,100	1,310	0.070	25,700	1,075	0.050
1.0	3	30,800	1,540	0.090	29,100	1,310	0.070	25,700	1,075	0.050
1.0	4	30,800	1,540	0.063	29,100	1,310	0.049	25,700	1,075	0.035
1.0	5	30,800	1,540	0.063	29,100	1,310	0.049	25,700	1,075	0.035
1.0	6	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
1.0	7	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
1.0	8	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
1.0	10	27,720	1,245	0.023	26,190	1,060	0.018	23,130	870	0.013
1.0	12	24,640	985	0.023	23,280	840	0.018	20,560	690	0.013
1.0	14	24,640	985	0.014	23,280	840	0.011	20,560	690	0.008
1.0	16	18,480	645	0.014	17,460	550	0.011	15,420	450	0.008
1.0	18	18,480	645	0.009	17,460	550	0.007	15,420	450	0.005
1.0	20	18,480	645	0.009	17,460	550	0.007	15,420	450	0.005
1.0	22	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
1.0	26	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005

U-Star Endmill

UB512, UB512...S6 series

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			고경도강 (SKD, SKT, STAVAX)		
강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경 (Ø)	유효길이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	테이블이송 vf (mm/min)	Feed vf (mm/min)	ap (mm)
1.0	30	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
1.0	40	3,080	75	0.009	2,910	65	0.007	2,570	55	0.005
1.0	50	3,080	75	0.006	2,910	65	0.005	2,570	55	0.003
1.2	4	26,300	1,375	0.076	24,800	1,150	0.059	21,900	950	0.042
1.2	6	26,300	1,375	0.076	24,800	1,150	0.059	21,900	950	0.042
1.2	8	23,670	1,115	0.043	22,320	930	0.034	19,710	770	0.024
1.2	10	23,670	1,115	0.027	22,320	930	0.021	19,710	770	0.015
1.2	12	23,670	1,115	0.027	22,320	930	0.021	19,710	770	0.015
1.2	16	21,040	880	0.016	19,840	735	0.013	17,520	610	0.009
1.2	20	15,780	580	0.011	14,880	485	0.008	13,140	400	0.006
1.2	26	7,890	245	0.011	7,440	205	0.008	6,570	170	0.006
1.4	6	21,500	1,295	0.088	20,300	1,100	0.069	18,000	935	0.049
1.4	8	19,350	1,050	0.050	18,270	890	0.039	16,200	755	0.028
1.4	10	19,350	1,050	0.050	18,270	890	0.039	16,200	755	0.028
1.4	16	17,200	830	0.032	16,240	705	0.025	14,400	600	0.018
1.5	4	23,900	1,580	0.135	22,600	1,355	0.105	20,000	1,075	0.075
1.5	5	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
1.5	6	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
1.5	7	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
1.5	8	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.030
1.5	10	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.03
1.5	12	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.030
1.5	14	21,510	1,280	0.034	20,340	1,100	0.026	18,000	870	0.019
1.5	16	19,120	1,010	0.034	18,080	865	0.026	16,000	690	0.019
1.5	18	19,120	1,010	0.034	18,080	865	0.026	16,000	690	0.019
1.5	20	19,120	1,010	0.020	18,080	865	0.016	16,000	690	0.011
1.5	22	19,120	1,010	0.020	18,080	865	0.016	16,000	690	0.011
1.5	26	14,340	665	0.014	13,560	570	0.011	12,000	450	0.008
1.5	30	14,340	665	0.014	13,560	570	0.011	12,000	450	0.008
1.5	35	7,170	285	0.010	6,780	245	0.008	6,000	195	0.005
1.5	40	7,170	285	0.010	6,780	245	0.008	6,000	195	0.005
1.6	4	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
1.6	6	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
1.6	8	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
1.6	10	19,980	1,260	0.058	18,900	1,055	0.045	16,650	900	0.032
1.6	12	19,980	1,260	0.058	18,900	1,055	0.045	16,650	900	0.032
1.6	16	19,980	1,260	0.036	18,900	1,055	0.028	16,650	900	0.020
1.6	20	17,760	995	0.036	16,800	830	0.028	14,800	710	0.020
1.8	4	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
1.8	6	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
1.8	8	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
1.8	10	19,980	1,440	0.065	18,900	1,190	0.050	16,650	990	0.036
1.8	12	19,980	1,440	0.065	18,900	1,190	0.050	16,650	990	0.036

U-Star Endmill

UB512, UB512...S6 series

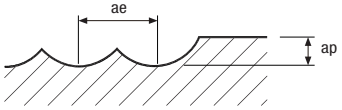
피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			고경도강 (SKD, SKT, STAVAX)		
강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경 (Ø)	유효길이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	테이블이송 vf (mm/min)	Feed vf (mm/min)	ap (mm)
1.8	16	19,980	1,440	0.041	18,900	1,190	0.032	16,650	990	0.023
1.8	20	17,760	1,140	0.041	16,800	940	0.032	14,800	785	0.023
2.0	6	18,000	1,795	0.18	17,000	1,525	0.140	15,000	1,285	0.100
2.0	8	18,000	1,795	0.126	17,000	1,525	0.098	15,000	1,285	0.070
2.0	10	18,000	1,795	0.126	17,000	1,525	0.098	15,000	1,285	0.070
2.0	12	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
2.0	14	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
2.0	16	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
2.0	18	16,200	1,455	0.045	15,300	1,235	0.035	13,500	1,040	0.025
2.0	20	16,200	1,455	0.045	15,300	1,235	0.035	13,500	1,040	0.025
2.0	22	14,400	1,150	0.045	13,600	975	0.035	12,000	820	0.025
2.0	26	14,400	1,150	0.045	13,600	975	0.035	12,000	820	0.025
2.0	30	14,400	1,150	0.027	13,600	975	0.021	12,000	820	0.015
2.0	35	10,800	755	0.018	10,200	640	0.014	9,000	540	0.010
2.0	40	10,800	755	0.018	10,200	640	0.014	9,000	540	0.010
2.0	45	5,400	325	0.018	5,100	275	0.014	4,500	230	0.010
2.0	50	5,400	325	0.018	5,100	275	0.014	4,500	230	0.010
2.0	60	5,400	325	0.018	5,100	275	0.014	4,500	230	0.010
2.5	8	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
2.5	10	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
2.5	12	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
2.5	16	14,220	1,560	0.090	13,410	1,300	0.070	11,880	1,055	0.050
2.5	20	14,220	1,560	0.090	13,410	1,300	0.070	11,880	1,055	0.050
2.5	22	14,220	1,560	0.056	13,410	1,300	0.044	11,880	1,055	0.031
2.5	26	12,640	1,230	0.056	11,920	1,025	0.044	10,560	835	0.031
2.5	30	12,640	1,230	0.056	11,920	1,025	0.044	10,560	835	0.031
2.5	35	12,640	1,230	0.034	11,920	1,025	0.026	10,560	835	0.019
2.5	40	9,480	810	0.034	8,940	675	0.026	7,920	550	0.019
2.5	45	9,480	810	0.023	8,940	675	0.018	7,920	550	0.013
2.5	50	9,480	810	0.023	8,940	675	0.018	7,920	550	0.013
3.0	6	13,700	2,050	0.270	12,900	1,730	0.21	11,400	1,435	0.150
3.0	8	13,700	2,050	0.270	12,900	1,730	0.21	11,400	1,435	0.150
3.0	10	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
3.0	12	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
3.0	14	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
3.0	16	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.060
3.0	18	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.060
3.0	20	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.060
3.0	22	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.060
3.0	26	12,330	1,660	0.068	11,610	1,400	0.053	10,260	1,160	0.038
3.0	30	12,330	1,660	0.068	11,610	1,400	0.053	10,260	1,160	0.038
3.0	35	10,960	1,310	0.068	10,320	1,105	0.053	9,120	920	0.038
3.0	40	10,960	1,310	0.041	10,320	1,105	0.032	9,120	920	0.023

U-Star Endmill

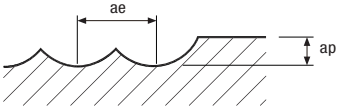
UB512, UB512...S6 series

피삭재		합금강,탄소강 (SCM, SNCM, S45C)			프리하든강 (NAK, CENA, KP4)			고경도강 (SKD, SKT, STAVAX)		
강도		~HRC35			HRC35~45			HRC45~55		
절삭조건		~1100N/mm²			1100~1500N/mm²			1500~2000N/mm²		
공구직경 (Ø)	유효길이 (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	ap (mm)	테이블이송 vf (mm/min)	Feed vf (mm/min)	ap (mm)
3.0	45	10,960	1,310	0.041	10,320	1,105	0.032	9,120	920	0.023
3.0	50	8,220	860	0.027	7,740	725	0.021	6,840	605	0.015
3.0	60	8,220	860	0.027	7,740	725	0.021	6,840	605	0.015
4.0	8	9,800	1,965	0.360	9,300	1,670	0.28	8,200	1,395	0.200
4.0	10	9,800	1,965	0.360	9,300	1,670	0.28	8,200	1,395	0.200
4.0	12	9,800	1,965	0.360	9,300	1,670	0.28	8,200	1,395	0.200
4.0	14	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
4.0	16	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
4.0	18	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
4.0	20	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
4.0	22	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080
4.0	26	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080
4.0	30	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080
4.0	35	8,820	1,590	0.090	8,370	1,355	0.07	7,380	1,130	0.050
4.0	40	8,820	1,590	0.090	8,370	1,355	0.07	7,380	1,130	0.050
4.0	45	7,840	1,260	0.090	7,440	1,070	0.07	6,560	895	0.050
4.0	50	7,840	1,260	0.090	7,440	1,070	0.07	6,560	895	0.050
4.0	60	7,840	1,260	0.054	7,440	1,070	0.042	6,560	895	0.030
5.0	15	7,700	1,845	0.315	7,300	1,455	0.245	6,400	1,285	0.175
5.0	20	7,700	1,845	0.315	7,300	1,455	0.245	6,400	1,285	0.175
5.0	26	6,930	1,495	0.180	6,570	1,180	0.14	5,760	1,040	0.100
5.0	30	6,930	1,495	0.180	6,570	1,180	0.14	5,760	1,040	0.100
5.0	35	6,930	1,495	0.180	6,570	1,180	0.14	5,760	1,040	0.100
5.0	40	6,930	1,495	0.180	6,570	1,180	0.14	5,760	1,040	0.100
5.0	50	6,930	1,495	0.113	6,570	1,180	0.088	5,760	1,040	0.063
5.0	60	6,160	1,180	0.113	5,840	930	0.088	5,120	820	0.063
6.0	20	6,500	1,900	0.378	6,200	1,600	0.294	5,500	1,330	0.210
6.0	30	6,500	1,900	0.378	6,200	1,600	0.294	5,500	1,330	0.210
8.0	25	4,850	1,800	0.504	4,600	1,500	0.392	4,000	1,280	0.280
8.0	30	4,850	1,800	0.504	4,600	1,500	0.392	4,000	1,280	0.280
10.0	30	3,850	1,650	0.900	3,680	1,400	0.7	3,200	1,200	0.500
10.0	40	3,850	1,650	0.630	3,680	1,400	0.49	3,200	1,200	0.350
12.0	32	3,200	1,520	1.080	3,050	1,300	0.84	2,650	1,100	0.600
12.0	45	3,200	1,520	0.756	3,050	1,300	0.588	2,650	1,100	0.420

절입기준



ap: D1~D6 = 0.2mm
D8~D12 = 0.3mm
ae: 0.2 × D



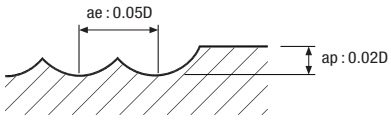
ap: D1~D4 = 0.05 × D
D5~D8 = 0.25mm
D10~D12 = 0.3mm
ae: 0.1 × D

U-Star Endmill

UB532 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100~1500N/mm²		1500~2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
3.0	35,000	2,800	33,000	2,600	12,000	900
4.0	26,000	2,300	25,000	2,200	9,000	800
5.0	21,000	2,100	20,000	2,000	7,000	700
6.0	17,000	1,900	16,000	1,800	6,000	650
8.0	13,000	1,700	12,000	1,600	4,500	550
10.0	10,500	1,450	10,000	1,400	3,500	500
12.0	9,000	1,400	8,000	1,300	3,000	450

절입기준

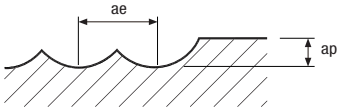


UB542 series

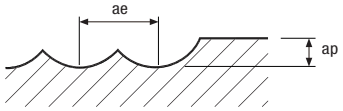
일반 가공

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100~1500N/mm²		1500~2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
0.1	16,500	80	25,500	185	25,500	160
0.2	16,500	90	25,500	220	25,500	200
0.3	15,300	112	24,000	260	24,000	220
0.4	15,300	112	24,000	260	24,000	220
0.5	13,300	128	20,800	300	20,800	250
0.6	11,200	144	17,600	330	17,600	280
0.8	11,200	144	17,600	330	17,600	280
1.0	10,180	160	16,000	370	16,000	320
1.5	9,500	220	13,000	500	12,800	400
2.0	9,250	260	11,500	640	11,300	590
3.0	8,000	370	10,200	880	9,800	850
4.0	6,720	420	8,500	880	8,200	850
5.0	5,840	460	7,500	880	7,200	850
6.0	5,500	660	6,900	920	6,500	880
8.0	4,600	740	5,600	840	5,300	800
10	4,070	820	4,850	800	4,650	770
12	3,700	890	4,350	800	4,150	770

절입기준



ap: D1~D6 = 0.2mm
D8~D12 = 0.3mm
ae: 0.2 × D



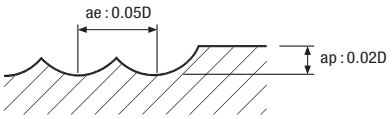
ap: D1~D4 = 0.05 × D
D5~D8 = 0.25mm
D10~D12 = 0.3mm
ae: 0.1 × D

U-Star Endmill

USB502 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100 ~ 1500N/mm²		1500 ~ 2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
3.0	13,500	1,700	13,200	1,620	12,500	860
4.0	10,600	1,700	10,300	1,620	9,800	860
5.0	9,400	1,650	9,050	1,570	8,600	860
6.0	8,600	1,750	8,250	1,670	7,850	865
8.0	7,000	1,550	6,700	1,460	6,350	890
10.0	6,050	1,450	5,800	1,360	5,450	870
12.0	5,450	1,420	5,200	1,330	4,900	785
16.0	4,300	1,200	4,000	1,100	3,700	650
20.0	3,600	1,050	3,200	900	3,000	550

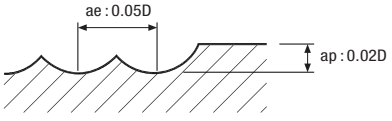
절입기준



UB503 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100 ~ 1500N/mm²		1500 ~ 2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1.0	50,000	4,150	44,000	3,000	33,000	2100
1.5	40,000	5,100	35,000	3,660	36,400	2600
2.0	33,000	5,890	29,000	4,150	21,700	3000
3.0	25,000	6,930	22,000	4,880	16,500	3490
4.0	21,670	6,930	18,120	4,880	13,400	3490
5.0	18,000	6,520	15,100	4,880	11,160	3320
6.0	16,200	7,710	13,680	5,590	10,980	4050
8.0	12,150	6,610	10,170	4,720	8,280	3580
10.0	9,720	5,870	8,190	4,130	6,620	3100
12.0	8,150	5,490	4,130	3,830	5,520	2870

절입기준

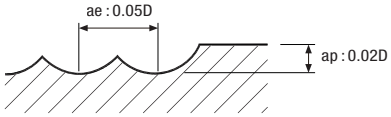


U-Star Endmill

UB504 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100 ~ 1500N/mm²		1500 ~ 2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1.0	48,000	3,300	35,000	2,350	32,000	2,200
1.5	38,400	4,100	28,000	2,900	25,600	2,700
2.0	31,680	4,600	23,100	3,300	21,000	3,100
3.0	24,000	5,430	17,500	3,880	16,000	3,650
4.0	20,130	5,430	14,880	3,880	14,220	3,650
5.0	16,780	5,430	12,400	3,690	11,670	3,470
6.0	15,200	6,220	12,200	4,500	11,100	3,830
8.0	11,300	5,250	9,200	3,980	8,320	3,350
10.0	9,100	4,590	7,350	3,450	6,660	2,870
12.0	7,590	4,260	6,130	3,190	5,530	2,400

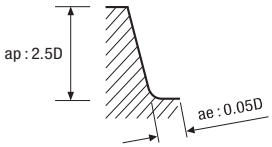
절입기준



UTB502 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)	
강도	~HRC35		HRC35~45	
절삭조건	~ 1100N/mm²		1100 ~ 1500N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
0.4	36,000	144	27,900	113
0.6	25,200	144	18,900	113
0.8	18,000	144	13,950	108
1.0	14,850	149	11,250	113
2.0	7,560	153	5,670	113
3.0	3,969	108	3,213	90
4.0	3,213	126	2,556	104

절입기준

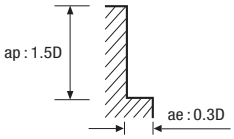


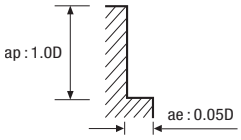
U-Star Endmill

UF50 series

피삭재	비합금강, 합금강, 주철		합금강, 내열합금강		스테인리스강		열처리강			
강도	~HRC30		HRC30~38		HRC38~45		HRC45~55		HRC55~65	
절삭조건	~1000N/mm²		1000~1200N/mm²		1200~1400N/mm²		1400~2000N/mm²		2000N/mm²~	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6.0	15,600	2,320	12,400	840	8,400	570	3,400	260	2,400	190
8.0	11,600	2,320	9,200	840	6,300	570	2,400	240	1,800	180
10.0	9,200	2,320	7,600	840	5,100	570	2,000	290	1,300	190
12.0	8,000	2,400	6,000	800	4,200	570	1,680	260	1,200	190
14.0	6,800	2,400	5,200	840	3,600	570	1,400	200	900	130
16.0	6,000	2,400	4,800	760	3,300	510	1,200	160	800	110
18.0	5,200	2,320	4,400	720	2,700	420	1,100	150	700	100
20.0	4,800	2,160	3,600	560	2,400	360	1,000	150	660	100
25.0	4,300	2,150	3,200	620	2,160	410	900	160	600	100

절입기준

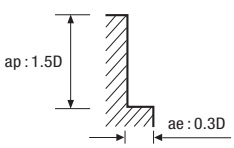


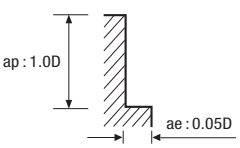


UF51 series

피삭재	합금강,탄소강 (SCM, SNCM, S45C)		프리하든강 (NAK, CENA, KP4)		고경도강 (SKD, SKT, STAVAX)	
강도	~HRC35		HRC35~45		HRC45~55	
절삭조건	~1100N/mm²		1100~1500N/mm²		1500~2000N/mm²	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6.0	12,400	840	8,400	570	3,400	260
8.0	9,200	840	6,300	570	2,400	240
10.0	7,600	840	5,100	570	2,000	290
12.0	6,000	800	4,200	570	1,680	260
14.0	5,200	840	3,600	570	1,400	200
16.0	4,800	760	3,300	510	1,200	160
18.0	4,400	720	2,700	420	1,100	150
20.0	3,600	560	2,400	360	1,000	150
25.0	3,200	620	2,160	410	900	160

절입기준



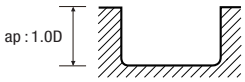


U-Star Endmill

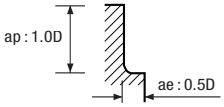
UF51---H series

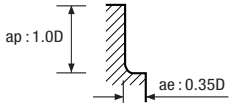
피삭재 / 절삭조건 / 공구직경(Ø)	합금강,탄소강 (SCM, S45C, S50C) ~HRC25		합금강, 탄소강, 프리하든강 (SCM, SKD, NAK, KP4) HRC25~40		합금강, 탄소강 (SCM, S45C, S50C) ~HRC25		합금강, 탄소강, 프리하든강 (SCM, SKD, NAK, KP4) HRC25~40	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6.0	12,000	1,550	10,600	1,100	15,800	2,570	14,300	1,850
8.0	9,000	1,650	8,100	1,180	11,900	2,700	10,700	1,950
10.0	7,200	1,650	6,400	1,180	9,500	2,700	8,500	1,950
12.0	6,000	1,540	5,400	1,140	8,000	2,570	7,100	1,850
16.0	4,500	1,500	4,100	1,050	6,000	2,450	5,400	1,750
20.0	3,600	1,330	3,200	900	4,800	2,140	4,300	1,500

절입기준







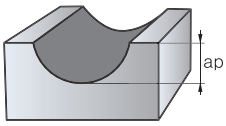


I+ Endmill

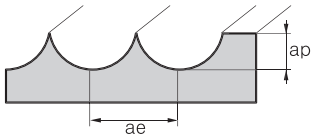
IPBE2000 (볼)

공구직경 (Ø)	탄소강 (SM50C)		합금강, 프리하든강 (SCM, STD, STS, KP4M, NAK)		금형강 HRC45이하 (STD61)		비철금속 (Aluminum)	
	회전속도 (min^{-1})	이송속도 (mm/min)	회전속도 (min^{-1})	이송속도 (mm/min)	회전속도 (min^{-1})	이송속도 (mm/min)	회전속도 (min^{-1})	이송속도 (mm/min)
1.0	40,000	1,200	38,000	1,200	29,000	900	40,000	1,000
1.5	30,000	1,270	25,500	1,100	19,000	700	40,000	1,360
2.0	24,000	1,160	19,000	800	14,300	600	40,000	2,000
2.5	19,000	1,000	15,300	670	11,500	510	38,000	2,400
3.0	16,000	930	13,000	600	9,600	460	32,000	2,400
3.5	13,700	930	11,400	580	8,200	450	27,300	2,400
4.0	12,000	930	10,000	570	7,200	450	24,000	2,400
5.0	9,600	930	8,000	560	5,700	450	19,000	2,400
6.0	8,000	930	6,400	540	4,800	450	16,000	2,400
8.0	6,000	900	4,800	540	3,600	450	12,000	2,400
10.0	4,800	900	3,800	540	2,900	450	9,600	2,300
12.0	4,000	900	3,200	540	2,400	450	8,000	2,100
14.0	3,400	900	2,750	540	2,050	450	6,800	2,000
16.0	3,000	900	2,400	540	1,800	450	6,000	2,000
20.0	2,400	900	1,900	520	1,450	450	4,800	2,000

절입기준



■ 홈가공
- ap : 0.1×R (~45HRC)
  0.08×R (~50HRC)



(R0.1~0.5=0.2×R)
0.3×R

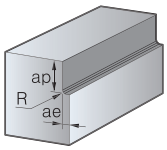
■ 측면가공
~0.16×R R≦0.3 (~45HRC)
~0.25×R R≦3 (~45HRC)
~0.17×R R≦4 (~45HRC)
~0.05×R (~50HRC)

*가공물 장착 시 강성을 필요로하며 떨림이 발생할 경우에는 상기 표의 회전속도와 이송을 같은 비율로 내려서 사용

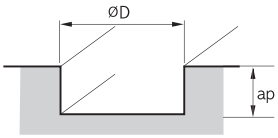
IPRE2000 (레디우스)

공구직경 (Ø)	탄소강 및 합금강 HRC30이하 (AISI 1049, Cast iron, SM50C, SCM)			합금강 및 공구강 HRC30~45 (Prehardened steels, STD61, NAK 등)			스테인리스강 (STS304, STS316 등)		
	회전속도 (min^{-1})	이송속도(mm/min)		회전속도 (min^{-1})	이송속도(mm/min)		회전속도 (min^{-1})	이송속도(mm/min)	
		측면가공	홈가공		측면가공	홈가공		측면가공	홈가공
2.0	11,000	180	180	7,200	110	110	6,000	90	90
3.0	8,500	200	160	5,300	130	100	4,400	110	66
4.0	7,200	360	290	4,400	220	180	3,000	180	110
5.0	6,000	380	300	3,600	230	180	2,400	190	110
6.0	5,300	420	340	3,200	240	190	2,200	210	130
8.0	4,000	450	360	2,400	240	190	1,600	220	130
10.0	3,200	390	310	1,900	190	150	1,300	190	110
12.0	2,700	330	260	1,600	160	130	1,000	150	90

절입기준



■ 측면가공
- ap : ≤ 1.5D
- ae : ≤ 0.1D



■ 홈가공
- ap : ≤ 0.3D

*가공물 장착 시 강성을 필요로하며 떨림이 발생할 경우에는 상기 표의 회전속도와 이송을 같은 비율로 내려서 사용

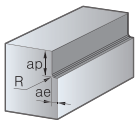
R+ Endmill

RPAE

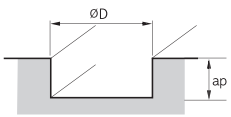
*For Carbide

피삭재 / 절삭조건 / 공구직경(Ø)	알루미늄, 비철금속		알루미늄, 비철금속	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6.0	13,000	1,125	13,000	1,400
8.0	10,400	1,300	10,400	1,600
10.0	10,400	1,585	10,400	2,000
12.0	10,400	1,950	10,400	1,650
14.0	7,800	1,675	7,800	2,050
16.0	7,800	1,755	7,800	2,250
18.0	5,200	1,300	5,200	1,700
20.0	5,200	1,495	5,200	1,800
25.0	5,000	1,495	5,000	1,800

절입기준



■ 측면가공
- ap : ≤ 1.5D
- ae : ≤ 0.15D



■ 홈가공
- ap : ≤ 0.2D

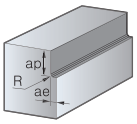
* 가공물 장착 시 강성을 필요로 하며 떨림이 발생할 경우에는 상기 표의 회전속도와 이송을 같은 비율로 내려서 사용

RP(L)E-FP-H

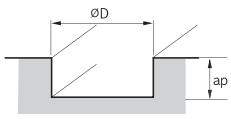
*For Carbide

피삭재 / 절삭조건 / 공구직경(Ø)	합금강, 탄소강 ≤HRC25 이하		합금강, 탄소강, 프리하든강 HRC25~40		합금강, 탄소강 ≤HRC25 이하		합금강, 탄소강, 프리하든강 HRC25~40	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6.0	12,000	1,550	10,600	1,100	15,800	2,570	14,300	1,850
8.0	9,000	1,650	8,100	1,180	11,900	2,700	10,700	1,950
10.0	7,200	1,650	6,400	1,180	9,500	2,700	8,500	1,950
12.0	6,000	1,540	5,400	1,140	8,000	2,570	7,100	1,850
14.0	5,200	1,540	4,750	1,095	7,000	2,510	6,250	1,800
16.0	4,500	1,540	4,100	1,050	6,000	2,450	5,400	1,750
18.0	4,400	1,435	3,650	975	5,400	2,295	4,850	1,625
20.0	3,600	1,330	3,200	900	4,800	2,140	4,300	1,500
25.0	3,200	1,200	2,800	850	4,400	2,000	3,800	1,400

절입기준



■ 측면가공
- ap : ≤ 1.0D
- ae : ≤ 0.5D (≤HRC25 이하)
  ≤ 0.35D (HRC25~40)



■ 홈가공
- ap : ≤ 1.0D (≤HRC25 이하)
  ≤ 0.8D (HRC25~40)

* 가공물 장착 시 강성을 필요로 하며 떨림이 발생할 경우에는 상기 표의 회전속도와 이송을 같은 비율로 내려서 사용

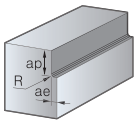
R+ Endmill

RPE-XG

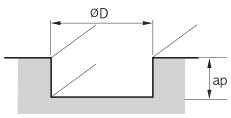
*For Carbide

피삭재 / 절삭조건 / 공구직경(Ø)	합금강, 탄소강 ≤HRC25 이하		합금강, 탄소강, 프리하든강 HRC25~40		합금강, 탄소강 ≤HRC25 이하		합금강, 탄소강, 프리하든강 HRC25~40	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6.0	12,000	1,090	10,600	770	15,800	1,800	14,300	1,300
8.0	9,000	1,160	8,100	830	11,900	1,890	10,700	1,370
10.0	7,200	1,160	6,400	830	9,500	1,890	8,500	1,370
12.0	6,000	1,080	5,400	800	8,000	1,800	7,100	1,300
14.0	5,200	1,080	4,750	770	7,000	1,760	6,250	1,260
16.0	4,500	1,080	4,100	740	6,000	1,720	5,400	1,230
18.0	4,400	1,000	3,650	680	5,400	1,610	4,850	1,140
20.0	3,600	930	3,200	630	4,800	1,500	4,300	1,050
25.0	3,200	840	2,800	600	4,400	1,400	3,800	980

절입기준



■ 측면가공
- ap : ≤ 1.0D
- ae : ≤ 0.5D (≤HRC25 이하)
  ≤ 0.35D (HRC25~40)



■ 홈가공
- ap : ≤ 1.0D (≤HRC25 이하)
  ≤ 0.8D (HRC25~40)

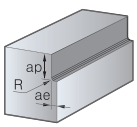
* 가공물 장착 시 강성을 필요로 하며 떨림이 발생할 경우에는 상기 표의 회전속도와 이송을 같은 비율로 내려서 사용

RPE-FP-L

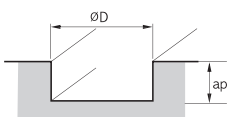
*For Carbide

피삭재 / 절삭조건 / 공구직경(Ø)	합금강, 탄소강 ≤HRC35 이하		프리하든강 HRC35~45		고경도강 HRC45~55	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6.0	12,400	840	8,400	570	3,400	260
8.0	9,200	840	6,300	570	2,400	240
10.0	7,600	840	5,100	570	2,000	290
12.0	6,000	840	4,200	570	1,680	260
14.0	5,200	840	3,600	570	1,400	200
16.0	4,800	760	3,300	510	1,200	160
18.0	4,400	720	2,700	420	1,100	150
20.0	3,600	560	2,400	360	1,000	150
25.0	3,200	620	2,160	410	900	160

절입기준



■ 측면가공
- ap : ≤ 1.0D
- ae : ≤ 0.3D (≤HRC45 이하)
  ≤ 0.05D (HRC45~55)



■ 홈가공
- ap : ≤ 0.3D (≤HRC45 이하)
  ≤ 0.05D (HRC45~55)

* 가공물 장착 시 강성을 필요로 하며 떨림이 발생할 경우에는 상기 표의 회전속도와 이송을 같은 비율로 내려서 사용

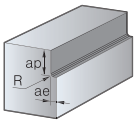
R+ Endmill

RPE-RG

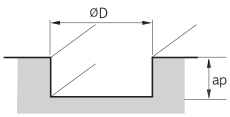
*For Carbide

피삭재 / 절삭조건 / 공구직경(Ø)	합금강, 탄소강 ≤HRC25 이하		합금강, 탄소강, 프리하든강 HRC25~40		합금강, 탄소강 ≤HRC25 이하		합금강, 탄소강, 프리하든강 HRC25~40	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6.0	12,000	1,240	10,600	800	15,800	2,060	14,300	1,480
8.0	9,000	1,320	8,100	940	11,900	2,160	10,700	1,560
10.0	7,200	1,320	6,400	940	9,500	2,160	8,500	1,560
12.0	6,000	1,230	5,400	910	8,000	2,060	7,100	1,480
14.0	5,200	1,230	4,750	880	7,000	2,010	6,250	1,440
16.0	4,500	1,230	4,100	840	6,000	1,960	5,400	1,400
18.0	4,400	1,150	3,650	780	5,400	1,840	4,850	1,300
20.0	3,600	1,060	3,200	720	4,800	1,710	4,300	1,200
25.0	3,200	960	2,800	680	4,400	1,600	3,800	1,120

절입기준



■ 측면가공
- ap : ≤ 1.0D
- ae : ≤ 0.5D (≤HRC25 이하)
  ≤ 0.35D (HRC25~40)



■ 홈가공
- ap : ≤ 1.0D (≤HRC25 이하)
  ≤ 0.8D (HRC25~40)

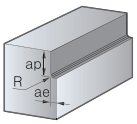
* 가공물 장착 시 강성을 필요로 하며 떨림이 발생할 경우에는 상기 표의 회전속도와 이송을 같은 비율로 내려서 사용

RPE-FF, FP, RG

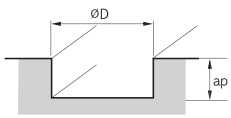
*For HSS PM

피삭재 / 절삭조건 / 공구직경(Ø)	합금강, 탄소강, 공구강		합금강, 탄소강, 공구강 ≤HRC20 이하		합금강, 탄소강, 공구강 HRC20~30		합금강, 탄소강, 공구강 HRC30~40	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6.0	2,700	200	2,100	155	1,500	100	1,250	90
8.0	2,300	250	1,800	200	1,300	140	1,000	110
10.0	1,800	360	1,400	275	1,000	170	850	140
12.0	1,500	360	1,150	290	850	200	700	155
14.0	1,300	360	1,000	290	720	200	600	155
16.0	1,150	360	900	290	625	200	520	155
18.0	1,000	360	850	290	580	200	470	155
20.0	920	370	720	290	500	200	420	155
22.0	850	370	620	290	450	200	380	155
25.0	750	360	570	275	400	190	340	155

절입기준



■ 측면가공
- ap : ≤ 1.5D (모든직경)
- ae : ≤ 0.5D (모든직경)



■ 홈가공
- ap : ≤ 0.15D

* 가공물 장착 시 강성을 필요로 하며 떨림이 발생할 경우에는 상기 표의 회전속도와 이송을 같은 비율로 내려서 사용

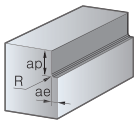
R+ Endmill

RPE-RG

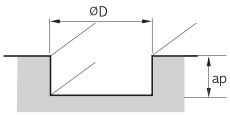
*For HSS PM

피삭재 / 절삭조건 / 공구직경(Ø)	합금강, 탄소강, 공구강		합금강, 탄소강, 공구강 ≤HRC20 이하		합금강, 탄소강, 공구강 HRC20~30		합금강, 탄소강, 공구강 HRC30~40	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6.0	1,800	80	1,600	60	1,200	55	800	30
8.0	1,400	105	1,100	75	900	65	560	45
10.0	1,100	150	900	120	800	110	450	60
12.0	900	180	800	140	630	110	400	70
14.0	800	180	700	140	560	110	350	70
16.0	700	180	560	140	450	110	280	70
18.0	630	180	500	140	400	110	250	70
20.0	560	180	450	140	400	110	220	70
22.0	500	220	450	170	350	140	220	70
25.0	450	220	400	170	310	140	180	85
28.0	400	210	350	160	280	130	160	85
30.0	350	210	310	160	250	130	160	85
32.0	350	210	280	160	220	130	140	85
36.0	310	210	250	160	200	130	120	85
40.0	280	200	220	150	180	120	110	80
50.0	220	200	180	170	160	140	90	80

절입기준



■ 측면가공
- ap : ≤ 1.5D
- ae : ≤ 0.1D



■ 홈가공
- ap : ≤ 0.15D

* 가공물 장착 시 강성을 필요로 하며 떨림이 발생할 경우에는 상기 표의 회전속도와 이송을 같은 비율로 내려서 사용

S-Star Endmill

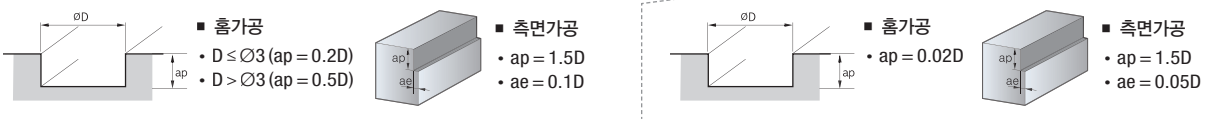
SPFE2000 (플랫)

피삭재 / 절삭조건 / 공구직경(Ø)	탄소강, 합금강, 공구강						스테인리스강				티타늄 합금		인코넬 합금	
	~HRC20		~HRC30		HRC30~45		300 Series		400 Series					
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1	31,800	570	30,100	570	28,700	570	22,300	450	31,800	640	22,300	520	9,600	190
1.2	26,500	480	25,100	480	23,900	480	18,600	370	26,500	530	18,600	430	8,000	160
1.5	21,200	380	20,100	380	19,100	380	14,900	300	21,200	420	14,900	340	6,400	130
2	15,900	430	15,000	430	14,300	430	11,100	270	15,900	380	11,100	260	4,800	100
2.5	12,700	410	12,000	410	11,500	410	8,900	250	12,700	360	8,900	310	3,800	110
3	11,700	420	11,100	420	10,600	420	8,500	340	11,700	470	8,500	290	4,200	130
4	8,800	480	8,400	480	8,000	480	6,400	380	8,800	530	6,400	300	3,200	130
5	7,000	510	6,700	510	6,400	510	5,100	410	7,000	560	5,100	290	2,500	130
6	5,800	520	5,600	530	5,300	530	4,200	420	5,800	580	4,200	290	2,100	130
8	4,400	520	4,200	520	4,000	520	3,200	420	4,400	570	3,200	260	1,600	110
10	3,500	440	3,300	440	3,200	450	2,500	350	3,500	490	2,500	250	1,300	110
12	2,900	420	2,800	430	2,700	430	2,100	340	2,900	460	2,100	240	1,100	110
14	2,500	370	2,400	380	2,300	380	1,800	200	2,500	280	1,800	250	900	110
16	2,200	340	2,100	340	2,000	340	1,600	270	2,200	370	1,600	260	800	110
18	1,900	310	1,900	320	1,800	320	1,400	270	1,900	360	1,400	240	700	110
20	1,800	320	1,700	320	1,600	320	1,300	260	1,800	360	1,300	240	600	100

SPFE3000 (플랫)

피삭재 / 절삭조건 / 공구직경(Ø)	탄소강, 합금강, 공구강						스테인리스강				티타늄 합금		인코넬 합금	
	~HRC20		~HRC30		HRC30~45		300 Series		400 Series					
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1	35,000	950	33,400	950	31,800	950	22,300	670	31,800	950	22,300	770	9,600	290
1.2	29,200	790	27,900	800	26,500	800	18,600	560	26,500	800	18,600	640	8,000	240
1.5	23,400	630	22,300	640	21,200	640	14,900	450	21,200	640	14,900	520	6,400	190
2	17,500	710	16,700	710	15,900	720	11,100	400	15,900	570	11,100	380	4,800	140
2.5	14,000	680	13,400	690	12,700	690	8,900	370	12,700	530	8,900	460	3,800	170
3	12,700	690	12,300	700	11,700	700	8,500	510	11,700	700	8,500	440	4,200	190
4	9,600	780	9,200	790	8,800	790	6,400	580	8,800	790	6,400	440	3,200	190
5	7,600	820	7,400	840	7,000	840	5,100	610	7,000	840	5,100	440	2,500	190
6	6,400	870	6,100	870	5,800	870	4,200	630	5,800	870	4,200	440	2,100	190
8	4,800	840	4,600	850	4,400	860	3,200	620	4,400	860	3,200	390	1,600	170
10	3,800	720	3,700	740	3,500	740	2,500	530	3,500	740	2,500	370	1,300	170
12	3,200	690	3,100	710	2,900	700	2,100	500	2,900	700	2,100	360	1,100	170
14	2,700	610	2,600	620	2,500	620	1,800	300	2,500	410	1,800	370	900	160
16	2,400	550	2,300	560	2,200	560	1,600	410	2,200	560	1,600	390	800	170
18	2,100	510	2,000	510	1,900	510	1,400	400	1,900	540	1,400	360	700	160
20	1,900	510	1,800	510	1,800	540	1,300	390	1,800	540	1,300	360	600	140

절입기준



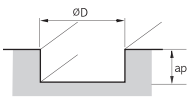
※ 상기표는 측면가공 조건으로, 홈가공 시 회전속도와 이송을 70% 비율로 내려서 가공

S-Star Endmill

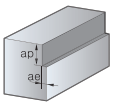
SPFE4000 (플랫)/SPRE4000 (레디우스)

피삭재 / 절삭조건 / 공구직경(Ø)	탄소강, 합금강, 공구강						스테인리스강				티타늄 합금		인코넬 합금	
	~HRC20		~HRC30		HRC30~45		300 Series		400 Series					
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1	35,000	1,260	33,400	1,270	31,800	1,270	22,300	890	31,800	1,270	22,300	1,030	9,600	380
1.2	29,200	1,050	27,900	1,060	26,500	1,060	18,600	740	26,500	1,060	18,600	860	8,000	320
1.5	23,400	840	22,300	850	21,200	850	14,900	600	21,200	850	14,900	690	6,400	260
2	17,500	950	16,700	950	15,900	950	11,100	530	15,900	760	11,100	510	4,800	190
2.5	14,000	910	13,400	920	12,700	910	8,900	500	12,700	710	8,900	620	3,800	230
3	12,700	920	12,300	930	11,700	940	8,500	680	11,700	940	8,500	590	4,200	250
4	9,600	1,040	9,200	1,050	8,800	1,060	6,400	770	8,800	1,060	6,400	590	3,200	260
5	7,600	1,100	7,400	1,120	7,000	1,120	5,100	820	7,000	1,120	5,100	590	2,500	250
6	6,400	1,160	6,100	1,160	5,800	1,160	4,200	840	5,800	1,160	4,200	580	2,100	250
8	4,800	1,130	4,600	1,140	4,400	1,140	3,200	830	4,400	1,140	3,200	520	1,600	220
10	3,800	960	3,700	980	3,500	980	2,500	700	3,500	980	2,500	500	1,300	220
12	3,200	920	3,100	940	2,900	930	2,100	670	2,900	930	2,100	490	1,100	220
14	2,700	810	2,600	820	2,500	830	1,800	400	2,500	550	1,800	500	900	220
16	2,400	740	2,300	740	2,200	750	1,600	540	2,200	750	1,600	520	800	220
18	2,100	680	2,000	680	1,900	680	1,400	530	1,900	720	1,400	490	700	210
20	1,900	690	1,800	680	1,800	720	1,300	520	1,800	720	1,300	480	600	190

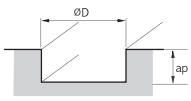
절입기준



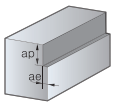
■ 홈가공
- D ≤ Ø3 (ap = 0.2D)
- D > Ø3 (ap = 0.5D)



■ 측면가공
- ap = 1.5D
- ae = 0.1D



■ 홈가공
- ap = 0.2D



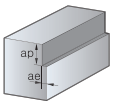
■ 측면가공
- ap = 1.5D
- ae = 0.05D

※ 상기표는 측면가공 조건으로, 홈가공 시 회전속도와 이송을 70% 비율로 내려서 가공

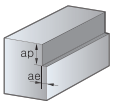
SPFE6000 (플랫)

피삭재 / 절삭조건 / 공구직경(Ø)	탄소강, 합금강, 공구강						스테인리스강				티타늄 합금		인코넬 합금	
	~HRC20		~HRC30		HRC30~45		300 Series		400 Series					
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6	6,400	1,730	6,100	1,740	5,800	1,160	4,200	840	5,800	1,160	4,200	580	2,100	250
8	4,800	1,690	4,600	1,700	4,400	1,140	3,200	830	4,400	1,140	3,200	520	1,600	220
10	3,800	1,440	3,700	1,480	3,500	980	2,500	700	3,500	980	2,500	500	1,300	220
12	3,200	1,390	3,100	1,410	2,900	930	2,100	670	2,900	930	2,100	490	1,100	220
16	2,400	1,100	2,300	1,110	2,200	750	1,600	540	2,200	750	1,600	520	800	220
20	1,900	1,030	1,800	1,030	1,800	720	1,300	520	1,800	720	1,300	480	600	190

절입기준



■ 측면가공
- ap = 1.5D
- ae = 0.1D



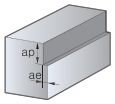
■ 측면가공
- ap = 1.5D
- ae = 0.05D

S-Star Endmill

SPRE5000/SPRE7000 (레디우스)

피삭재 / 절삭조건 / 공구직경(Ø)	탄소강, 합금강, 공구강						스테인리스강				티타늄 합금		인코넬 합금	
	~HRC20		~HRC30		HRC30~45		300 Series		400 Series					
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6	6,400	1,370	6,100	1,450	5,800	1,450	4,200	1,050	5,800	1,450	4,200	730	2,100	320
8	4,800	1,330	4,600	1,420	4,400	1,430	3,200	1,040	4,400	1,430	3,200	650	1,600	280
10	3,800	1,140	3,700	1,230	3,500	1,230	2,500	880	3,500	1,230	2,500	620	1,300	280
12	3,200	1,090	3,100	1,180	2,900	1,160	2,100	840	2,900	1,160	2,100	610	1,100	280
16	2,400	870	2,300	930	2,200	940	1,600	680	2,200	940	1,600	650	800	280
20	1,900	810	1,800	860	1,800	900	1,300	650	1,800	900	1,300	600	600	240

절입기준

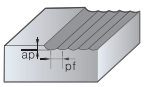


■ 측면가공
- ap = 1.0D
- ae = 0.05D

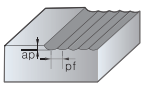
SPBE2000 (볼)

피삭재 / 절삭조건 / 공구직경(Ø)	탄소강, 합금강, 공구강						스테인리스강				티타늄 합금		인코넬 합금	
	~HRC20		~HRC30		HRC30~45		300 Series		400 Series					
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
2	27,100	1,850	25,500	1,940	23,900	1,910	15,900	950	23,900	1,430	20,700	480	9,600	190
4	17,500	1,200	16,700	1,270	15,900	1,270	11,900	830	14,300	1,000	11,900	550	6,400	260
6	11,700	1,000	11,100	1,050	10,600	1,060	8,000	700	9,600	840	8,000	550	4,200	250
8	8,800	900	8,400	960	8,000	960	6,000	700	7,200	840	6,000	490	3,200	220
10	7,000	840	6,700	890	6,400	900	4,800	650	5,700	780	4,800	480	2,500	220
12	5,800	790	5,600	850	5,300	850	4,000	650	4,800	780	4,000	460	2,100	210

절입기준



■ 측면가공
- ap = 0.1D
- pf = 0.2D



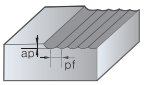
■ 측면가공
- ap = 0.05D
- pf = 0.1D

S-Star Endmill

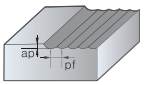
SPBE4000 (볼)

피삭재 / 절삭조건 / 공구직경(Ø)	탄소강, 합금강, 공구강						스테인리스강				티타늄 합금		인코넬 합금	
	~HRC20		~HRC30		HRC30~45		300 Series		400 Series					
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
3	21,200	2,900	20,200	3,070	19,100	3,060	15,900	1,910	19,100	2,290	15,900	1,100	8,500	510
4	17,500	2,630	16,700	2,790	15,900	2,800	11,900	1,670	14,300	2,000	11,900	1,100	6,400	510
5	14,000	2,390	13,400	2,550	12,700	2,540	9,600	1,500	11,500	1,790	9,600	1,110	5,100	510
6	11,700	2,000	11,100	2,110	10,600	2,120	8,000	1,410	9,600	1,690	8,000	1,110	4,200	500
8	8,800	1,810	8,400	1,920	8,000	1,920	6,000	1,390	7,200	1,670	6,000	970	3,200	450
10	7,000	1,680	6,700	1,780	6,400	1,790	4,800	1,310	5,700	1,550	4,800	950	2,500	430
12	5,800	1,690	5,600	1,810	5,300	1,800	4,000	1,300	4,800	1,560	4,000	920	2,100	420
16	4,400	1,350	4,200	1,440	4,000	1,440	3,000	1,020	3,600	1,220	3,000	970	1,600	450
20	3,500	1,140	3,300	1,190	3,200	1,220	2,400	860	2,900	1,040	2,400	890	1,300	420

절입기준



■ 측면가공
- ap = 0.1D
- pf = 0.2D

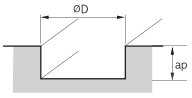


■ 측면가공
- ap = 0.05D
- pf = 0.1D

SPXE3000/4000/5000(러핑)

피삭재 / 절삭조건 / 공구직경(Ø)	스테인리스강			
	300 Series		400 Series	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
3	5,300	360	6,400	440
4	4,800	350	5,700	410
5	4,800	360	5,700	430
6	4,500	360	5,400	430
7	3,900	360	4,600	420
8	3,400	340	4,100	410
9	3,000	320	3,600	390
10	2,700	320	3,200	380
12	2,300	290	2,700	330
14	1,900	240	2,300	290
16	1,700	220	2,000	260
20	1,400	190	1,600	220

절입기준



■ 홈가공
- D3~D5 = 0.3D
- D6~D10 = 0.25D
- D12~D16 = 0.15D
- D18~D20 = 0.1D

* 가공물 장착 시 강성을 필요로하며 떨림이 발생할 경우에는 상기 표의 회전속도와 이송을 같은 비율로 내려서 사용

※ 주의사항

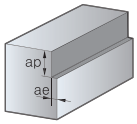
- 절삭조건은 기계의 상태, 가공형태 및 목적에 알맞게 조정하여 사용
- 가공기계는 강성이 충분한 기계로 선택하고, 가공품의 고정상태를 확인
- 절삭유는 가공물 재질에 적합한 절삭유를 선택하고, 고압 또는 충분한 양의 절삭유가공구 및 가공물에 공급될 수 있는지 확인
- 가공 시 떨림이 발생할 경우에는 회전속도와 이송을 같은 비율로 내려서 사용

A-Star Endmill

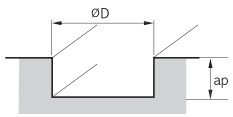
APFE/AFE

구 분	측면가공				홈가공			
피삭재 / 절삭조건	알루미늄합금 (A7075)		알루미늄합금주물 (AC4B)		알루미늄합금 (A7075)		알루미늄합금주물 (AC4B)	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1	40,000	480	40,000	368	40,000	368	40,000	280
2	40,000	880	38,000	680	38,000	680	32,000	440
3	32,000	1,120	25,000	760	25,000	760	21,000	480
4	24,000	1,200	19,000	800	19,000	800	13,000	520
5	19,000	1,280	15,000	880	15,000	800	13,000	560
6	16,000	1,520	13,000	960	13,000	880	11,000	600
8	12,000	1,520	9,500	960	9,500	960	8,000	640
10	9,500	1,520	7,600	960	7,600	960	6,400	640
12	8,000	1,520	6,400	960	6,400	960	5,300	640
16	6,000	1,520	4,800	960	4,800	800	4,000	576
20	4,800	1,200	3,800	800	3,800	776	3,200	528

절입기준



■ 측면가공
- ap : ≤ 2.0D
- ae : ≤ 0.2D (D < Ø3)
  ≤ 0.5D (D ≥ Ø3)



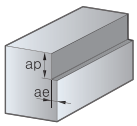
■ 홈가공
- ap : ≤ D (최대 : 12mm)

* 가공물 장착 시 강성을 필요로 하며 떨림이 발생할 경우에는 상기 표의 회전속도와 이송을 같은 비율로 내려서 사용

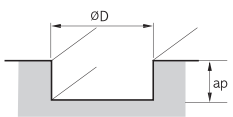
RPAE/APRE

구 분	측면가공				홈가공			
피삭재 / 절삭조건	알루미늄합금 (A7075)		알루미늄합금주물 (AC4B)		알루미늄합금 (A7075)		알루미늄합금주물 (AC4B)	
공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
4	20,000	8,000	16,000	6,400	15,000	5,000	12,000	4,000
5	16,000	6,500	12,800	5,200	12,000	4,000	9,600	3,200
6	13,500	6,000	10,800	4,800	10,500	3,800	8,400	3,100
8	10,500	4,700	8,400	3,800	8,000	3,000	6,400	2,400
10	8,500	3,800	6,800	3,100	6,500	2,500	5,200	2,000
12	6,800	3,050	5,500	2,500	5,250	2,000	4,200	1,600
14	5,800	2,600	4,700	2,100	4,500	1,700	3,600	1,400
16	5,200	2,350	4,200	1,900	4,000	1,500	3,200	1,200
18	4,700	2,100	3,800	1,700	3,550	1,300	2,900	1,100
20	4,200	1,900	3,400	1,600	3,200	1,200	2,600	1,000
25	3,400	1,500	2,800	1,200	2,550	1,000	2,100	800

절입기준



■ 측면가공
- ap : ≤ 1.5D
- ae : ≤ 0.5D



■ 홈가공
- ap : ≤ 1.5D

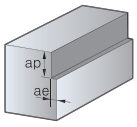
* 가공물 장착 시 강성을 필요로 하며 떨림이 발생할 경우에는 상기 표의 회전속도와 이송을 같은 비율로 내려서 사용

D Endmill

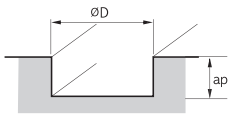
Flat type

구 분	DFE2000 (홈가공용)		DFE2000 (측면가공용)		DFE4000 (측면가공용)	
피삭재	흑연(그라파이트)					
절삭조건 / 공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1.0	40,000	500	40,000	700	-	-
2.0	25,000	570	25,000	800	25,000	1,600
3.0	20,000	570	20,000	800	20,000	1,600
4.0	18,000	680	18,000	950	18,000	1,900
5.0	14,000	960	14,000	1,200	14,000	2,400
6.0	11,000	1,000	11,000	1,400	11,000	2,800
8.0	8,000	930	8,000	1,300	8,000	2,600
10.0	6,500	860	6,500	1,200	6,500	2,400
12.0	5,500	860	5,500	1,200	5,500	2,400

절입기준



■ 측면가공
- D ≤ Ø2.5, ap = 1.5D, ae = 0.05D
- D > Ø2.5, ap = 1.5D, ae = 0.1D



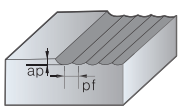
■ 홈가공
- D ≤ Ø2.5, ap = 0.3D
- D > Ø2.5, ap = 0.5D

* 가공물 장착 시 강성을 필요로 하며 떨림이 발생할 경우에는 상기 표의 회전속도와 이송을 같은 비율로 내려서 사용

Ball type

구 분	DBE2000		DBE4000	
피삭재	흑연(그라파이트)			
절삭조건 / 공구직경(Ø)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
1.0	16,000	400	-	-
2.0	16,000	800	16,000	1,200
3.0	16,000	1,450	16,000	2,000
4.0	16,000	2,100	16,000	3,100
5.0	15,500	2,550	15,000	3,800
6.0	15,000	2,950	15,000	4,400
8.0	13,000	3,000	13,000	4,500
10.0	11,500	3,000	12,000	4,600
12.0	10,700	3,200	10,000	4,700

절입기준



■ 홈가공
- ap = 0.2D
- pf = 0.2D

* 가공물 장착 시 강성을 필요로 하며 떨림이 발생할 경우에는 상기 표의 회전속도와 이송을 같은 비율로 내려서 사용

※ 주의사항

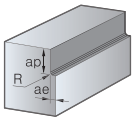
- 절삭조건은 기계의 상태, 가공형태 및 목적에 알맞게 조정하여 사용
- 가공물 장착 시 강성을 필요로 하며 떨림이 발생할 경우 회전속도와 이송을 같은 비율로 낮추어 사용
- 공구 오버행에 따라 돌출길이 3D 이상의 경우 회전속도와 이송을 낮추어 적용

Composite Router Endmill

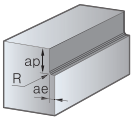
CCDR

구 분	CCDR (측면 황삭가공용)				CCDR (측면 황삭가공용)			
피삭재 / 절삭조건 / 공구직경(Ø)	CFRP		GFRP		CFRP		GFRP	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6	7,960	1,114	3,980	557	10,610	1,910	5,310	743
8	5,970	1,075	2,980	536	7,960	1,910	3,980	716
10	4,770	1,717	2,390	860	6,370	3,058	3,180	1,145
12	3,980	1,672	1,990	836	5,310	3,027	2,650	1,113

절입기준



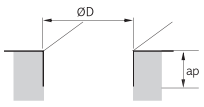
■ 측면 황삭가공용
- ap : = 1D
- ae : = 0.4D



■ 측면 정삭가공용
- ap : = 1D
- ae : = 0.02D

구 분	CCDR (홈가공용)			
피삭재 / 절삭조건 / 공구직경(Ø)	CFRP		GFRP	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6	5,310	531	3,710	371
8	3,980	478	2,790	335
10	3,180	763	2,230	535
12	2,650	716	1,860	502

절입기준



■ 홈가공용
- CFRP, ap : = 1D
- GFRP, ap : = 0.8D

※ 주의사항

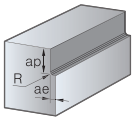
- 절삭조건의 경우 CFRP & GFRP 종류, 피삭재 형상 및 클램핑 상태, 기계강성에 따라 달라질 수 있습니다.
- 피삭재 뜯김, 버, 박리 등과 같은 가공결함 발생 시에는 테이블 이송을 줄여서 사용하시기 바랍니다.
- 가공 시 발생하는 고열은 가공결함을 유발하오니 고압 습식(정제수) 사용을 권장합니다.
- 가공 시 발생하는 분진에 사전 대비하시기 바랍니다

Composite Router Endmill

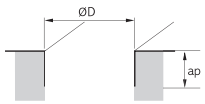
CCR

구 분	CCR (측면 황삭가공용)				CCR (홈가공용)			
피삭재 / 절삭조건 / 공구직경(Ø)	CFRP		GFRP		CFRP		GFRP	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
4	15,920	1,020	7,960	510	7,960	340	3,980	170
5	12,730	1,270	6,370	640	6,370	430	3,180	210
6	10,610	1,270	5,310	640	5,310	430	2,650	210
8	7,960	1,340	3,980	670	3,980	450	1,990	230
10	6,370	1,530	3,180	760	3,180	510	1,590	260
12	5,310	1,720	2,650	860	2,650	580	1,330	290

절입기준



■ 측면 황삭가공용
- ap : = 2D
- ae : = 0.35D

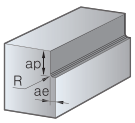


■ 홈가공용
- CFRP, ap : = 1D
- CFRP, ae : = 1D

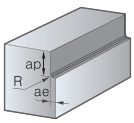
CCLR/CCRR

구 분	CCLR/CCRR (측면 황삭가공용)				CCLR/CCRR (측면 정삭가공용)			
피삭재 / 절삭조건 / 공구직경(Ø)	CFRP		GFRP		CFRP		GFRP	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
4	15,920	1,530	7,960	510	15,920	1,275	7,960	380
5	12,730	1,530	6,370	510	12,730	1,275	6,370	380
6	10,610	1,530	5,310	510	10,610	1,275	5,310	380
8	7,960	1,530	3,980	510	7,960	1,275	3,980	380
10	6,370	1,530	3,180	510	6,370	1,275	3,180	380
12	5,310	1,530	2,650	510	5,310	1,275	2,650	380

절입기준



■ 측면 황삭가공용
- CFRP, ap : = 2D, ae : = 0.4
- GFRP, ap : = 2D, ae : = 0.3



■ 측면 정삭가공용
- ap : = 2D
- ae : = 0.1D

* CCRR의 경우 테이블이송 vf (mm/min) 30% 상향 적용하여 사용하시기 바랍니다.

※ 주의사항

- 절삭조건의 경우 CFRP & GFRP 종류, 피삭재 형상 및 클램핑 상태, 기계강성에 따라 달라질 수 있습니다.
- 피삭재 뜯김, 버, 박리 등과 같은 가공결함 발생 시에는 테이블 이송을 줄여서 사용하시기 바랍니다.
- 가공 시 발생하는 고열은 가공결함을 유발하오니 고압 습식(정제수) 사용을 권장합니다.
- 가공 시 발생하는 분진에 사전 대비하시기 바랍니다.

T Endmill

Titanium/Co-Cr

공구직경(Ø)	가공 영역	절입 ap (mm)	절입 ae (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
3.0	황삭	0.12	0.7	10,500	1,150
2.5	중삭	0.08	0.53	11,500	850
2.0	중삭	0.08	0.42	14,500	850
1.5	정삭	0.04	0.32	19,000	850
1.0	정삭	0.02	0.07	28,500	850
0.6	정삭	0.02	0.07	28,500	850

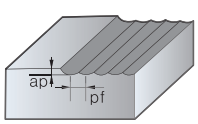
Zirconia

공구직경(Ø)	가공 영역	절입 ap (mm)	절입 ae (mm)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
3.0	황삭	0.5	1.5	23,500	1,600
2.5	중삭	0.3	1.25	28,000	1,200
2.0	정삭	0.3	1.0	35,000	1,200
1.0	정삭	0.1	0.2	38,500	1,050
0.6	정삭	0.1	0.2	63,500	630

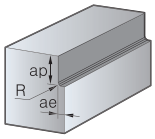
C-Max

구 분	CBE/CBNE		CFE/CFNE		CRE/CRNE	
피삭재	동, 동합금 (Copper Alloys)					
절삭조건 / 공구직경(Ø)	회전속도 n(min⁻¹)	테이블이송 vf(mm/min)	회전속도 n(min⁻¹)	테이블이송 vf(mm/min)	회전속도 n(min⁻¹)	테이블이송 vf(mm/min)
0.5	40,000	2,600	40,000	1,800	-	-
1	40,000	2,800	40,000	2,000	40,000	2,000
1.5	40,000	3,200	40,000	2,400	30,000	2,400
2	40,000	3,600	30,000	1,800	30,000	1,800
3	40,000	4,000	23,000	1,380	20,000	1,380
4	32,000	3,200	15,000	900	15,000	900
5	25,000	2,500	12,000	750	12,000	750
6	21,000	2,100	10,000	600	10,000	600
8	16,000	1,600	8,000	480	8,000	480
10	13,000	1,300	6,400	384	6,400	384
12	9,000	900	5,400	324	5,400	324

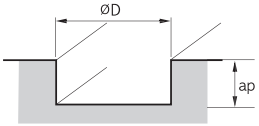
절입기준



■측면가공
• ap = 0.1D
• pf = 0.2D



■측면가공
• ap = 1.5D
• ae = 0.1D



■홈가공
• ap ≤ 1.5D

*가공물 장착 시 강성을 필요로하며 떨림이 발생할 경우에는 상기 표의 회전속도와 이송을 같은 비율로 내려서 사용

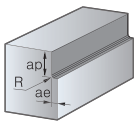
M+ Endmill

MPRE4000-B

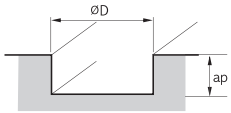
*For Carbide

피삭재 / 절삭조건 / 공구직경(Ø)	합금강, 탄소강 (AISI1049, Cast iron, S50C, SCM) HRC30 이하		스테인레스강 (Pre-hardened steels, STD61, NAK) HRC30~45		주철 (Grey cast iron, Spher, Graphite/malleable cast iron)	
	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)	회전속도 n (min⁻¹)	테이블이송 vf (mm/min)
6.0	12,400	840	8,400	570	3,400	260
8.0	9,200	840	6,300	570	2,400	240
10.0	7,600	840	5,100	570	2,000	290
12.0	6,000	840	4,200	570	1,680	260
14.0	5,200	840	3,600	570	1,400	200
16.0	4,800	760	3,300	510	1,200	160
18.0	4,400	720	2,700	420	1,100	150
20.0	3,600	560	2,400	360	1,000	150
25.0	3,200	620	2,160	410	900	160

절입기준



■ 측면가공
- ap : ≤ 1.5D
- ae : ≤ 0.1D



■ 홈가공
- ap : ≤ 0.05D (D ≤ Ø2)
  ≤ 0.1D (D > Ø2)

* 가공물 장착 시 강성을 필요로 하며 떨림이 발생할 경우에는 상기 표의 회전속도와 이송을 같은 비율로 내려서 사용

PCD Endmill

피삭재	vc (m/min)	n (min⁻¹)	fz (mm/t)
알루미늄합금, 동합금	30~300	2,000~12,000	0.02~0.07
강화플라스틱	35~300	2,800~16,000	0.04~0.12
카본, 흑연	10~100	5,300~16,000	0.04~0.2

MSD Plus

피삭재			브리넬 경도(HB)	재종	절삭속도 vc (m/min)	이송				
						드릴직경(mm)에 따른 이송(mm/rev)				
ISO	피삭재 소재					Ø1.0~Ø4.0	Ø4.1~Ø8.0	Ø8.1~Ø12.0	Ø12.1~Ø16.0	Ø16.1~Ø20.0
P	탄소강	저탄소강	80~120	PC325U	90 (80~150)	0.10~0.15	0.16~0.24	0.20~0.30	0.25~0.36	0.30~0.40
		고탄소강	250 이상	PC325U	50 (40~80)	0.08~0.20	0.08~0.20	0.10~0.25	0.15~0.25	0.15~0.30
	합금강	저합금강	140~260	PC325U	90 (80~150)	0.10~0.15	0.16~0.24	0.20~0.30	0.25~0.36	0.30~0.40
		저합금열처리강	200~400	PC325U	60 (50~100)	0.10~0.15	0.16~0.24	0.20~0.30	0.25~0.36	0.30~0.40
		고합금강	50~260	PC325U	50 (40~80)	0.08~0.20	0.08~0.20	0.10~0.25	0.15~0.25	0.15~0.30
		고합금열처리강	over 250	PC325U	50 (40~80)	0.08~0.20	0.08~0.20	0.10~0.25	0.15~0.25	0.15~0.30
M	스테인레스강	오스테 나이트계	135~275	PC325U	45 (25~80)	0.05~0.20	0.05~0.20	0.10~0.25	0.10~0.25	0.15~0.30
		페라이트계 마르텐사이트계	135~275	PC325U	50 (30~80)	0.05~0.20	0.05~0.20	0.10~0.25	0.10~0.25	0.15~0.30
K	주철	회주철	150~230	PC325U	100 (80~150)	0.10~0.15	0.16~0.24	0.20~0.30	0.25~0.36	0.30~0.40
		덕타일주철	160~260	PC325U	90 (70~140)	0.10~0.15	0.16~0.24	0.20~0.30	0.25~0.36	0.30~0.40
N	알루미늄	알루미늄합금	30~150	FG2	150 (125~220)	0.24~0.38	0.38~0.53	0.53~0.75	0.61~0.85	0.68~0.98
	동합금	동합금	150~160	FG2	150 (125~220)	0.10~0.15	0.16~0.24	0.20~0.30	0.25~0.36	0.30~0.40

• 상기 추천절삭조건은 내부 급유 적용, 가공 깊이 5D 이하일 때의 절삭조건입니다.
• 외부 급유 적용 시, 위의 조건의 절삭 속도를 20% 낮추어 주십시오.

MSD Plus-S

피삭재			브리넬 경도(HB)	재종	절삭속도 vc (m/min)	이송(절입 깊이 = 3D~5D)			
						드릴직경(mm)에 따른 이송(mm/rev)			
ISO	피삭재 소재					Ø2.5~Ø5.0	Ø5.1~Ø8.0	Ø8.1~Ø12.0	Ø12.1~Ø16.0
S	내열합금 (Inconel718 등)	Fe-base	25~35	PC325T	25~30	0.055~0.07	0.07~0.10	0.08~0.13	0.10~0.15
		Ni or Co base	35~45	PC325T	20~25	0.045~0.06	0.06~0.09	0.07~0.12	0.09~0.14
	티타늄 합금 (Ti-6Al-4V 등)	Pure titanium	10~15	PC325T	40~50	0.07~0.11	0.09~0.14	0.12~0.18	0.16~0.23
		α and β alloys	35~45	PC325T	30~40	0.05~0.09	0.07~0.12	0.10~0.16	0.14~0.21

• 상기 추천절삭조건은 내부 급유 적용, 가공 깊이 5D 이하일 때의 절삭조건입니다.

MSD Plus for CFRP

피삭재 재질	재종	절삭속도 vc (m/min)	이송(절입 깊이 = 5D) 드릴직경(mm)에 따른 이송(mm/rev)		
			Ø2.5~Ø4.0	Ø4.1~Ø8.0	Ø8.1~Ø12.0
CFRP	ND2100	100 (100~150)	0.03 ~ 0.07	0.03 ~ 0.07	0.03 ~ 0.07

MSFD

피삭재			브리넬 경도(HB)	재종	절삭속도 vc (m/min)	이송(절입 깊이 = 2D~3D) 드릴직경(mm)에 따른 이송(mm/rev)		
ISO	피삭재 소재			추천		Ø2.5~Ø4.0	Ø4.1~Ø8.0	Ø8.1~Ø12.0
P	탄소강	저탄소강	80~120	PC325U	75 (60~90)	0.03~0.10	0.05~0.15	0.10~0.20
		고탄소강	180~280	PC325U	75 (60~80)	0.03~0.10	0.05~0.15	0.10~0.20
	합금강	저합금강	140~260	PC325U	65 (50~80)	0.03~0.10	0.05~0.15	0.10~0.20
		고합금강	50~260	PC325U	65 (50~80)	0.03~0.10	0.05~0.15	0.10~0.20

MLD Plus

피삭재			브리넬 경도(HB)	재종	절삭속도 vc (m/min)	이송(절입 깊이 = 10D~25D) 드릴직경(mm)에 따른 이송(mm/rev)		
ISO	피삭재 소재			추천		Ø3.0~Ø5.0	Ø5.1~Ø8.0	Ø8.1~Ø10.0
P	탄소강	저탄소강	80~120	PC315G	80 (60~90)	0.10~0.15	0.15~0.20	0.20~0.25
		고탄소강	180~280	PC315G	70 (60~80)	0.10~0.15	0.15~0.20	0.20~0.25
	합금강	저합금강	140~260	PC215G	80 (60~90)	0.10~0.15	0.12~0.17	0.15~0.20
		고합금강	50-260	PC215G	70 (60~80)	0.08~0.15	0.10~0.15	0.15~0.20
K	주철	회주철	150-230	PC215G	80 (60~100)	0.10~0.20	0.15~0.20	0.15~0.20
		덕타일주철	160-260	PC215G	70 (60~80)	0.10~0.20	0.15~0.20	0.15~0.20
N	알루미늄	알루미늄합금	30-150	FG2	120 (100~150)	0.12~0.17	0.15~0.20	0.20~0.25
	동합금	동합금	150-160	FG2	120 (100~150)	0.12~0.17	0.15~0.20	0.20~0.25

W-Star Drill

피삭재 구분			브리넬 경도(HB)	재종	절삭속도 vc (m/min)	이송				
						드릴직경(mm)에 따른 이송(mm/rev)				
ISO	피삭재 소재					Ø2.5~Ø4.0	Ø4.1~Ø8.0	Ø8.1~Ø12.0	Ø12.1~Ø16.0	Ø16.1~Ø20.0
P	탄소강	저탄소강	80~120	PC320W	72(64~120)	0.08~0.12	0.13~0.19	0.16~0.24	0.20~0.29	0.24~0.32
		고탄소강	250 이상	PC320W	40(32~64)	0.06~0.16	0.06~0.16	0.08~0.20	0.12~0.20	0.12~0.24
	합금강	저합금강	140~260	PC320W	72(64~120)	0.08~0.12	0.13~0.19	0.16~0.24	0.20~0.29	0.24~0.32
		저합금열처리강	200~400	PC320W	48(40~80)	0.08~0.12	0.13~0.19	0.16~0.24	0.20~0.29	0.24~0.32
		고합금강	50~260	PC320W	40(32~64)	0.06~0.16	0.06~0.16	0.08~0.20	0.12~0.20	0.12~0.24
		고합금열처리강	250 이상	PC320W	40(32~64)	0.06~0.16	0.06~0.16	0.08~0.20	0.12~0.20	0.12~0.24
M	스테인레스강	오스테 나이트계	135~275	PC320W	36(20~64)	0.04~0.16	0.04~0.16	0.08~0.20	0.08~0.20	0.12~0.24
		페라이트계 마르텐사이트계	135~275	PC320W	40(24~64)	0.04~0.16	0.04~0.16	0.08~0.20	0.08~0.20	0.12~0.24
K	주철	회주철	150~230	PC320W	80(64~120)	0.08~0.12	0.13~0.19	0.16~0.24	0.20~0.29	0.24~0.32
		덕타일주철	160~260	PC320W	72(56~112)	0.08~0.12	0.13~0.19	0.16~0.24	0.20~0.29	0.24~0.32

• 상기 추천절삭조건은 내부 급유 적용, 가공 깊이 5D 이하일 때의 절삭조건입니다.

SSD-N

SSD-N

피삭재 / 절삭조건 / 공구직경(Ø)	공구강, 합금강		알루미늄, 알루미늄 합금		황동, 청동		엑포시, 레진	
	회전속도 n (min⁻¹)	이송 fn (mm/rev)	회전속도 n (min⁻¹)	이송 fn (mm/rev)	회전속도 n (min⁻¹)	이송 fn (mm/rev)	회전속도 n (min⁻¹)	이송 fn (mm/rev)
3	4,000~7,000	0.02	10,000~12,000	0.03	7,000~10,000	0.02	9,000~12,000	0.08
5	2,400~4,200	0.03	6,000~8,000	0.05	4,200~6,000	0.04	5,400~7,200	0.08
8	1,500~2,600	0.05	3,700~5,000	0.08	2,600~3,700	0.08	3,400~4,500	0.09
12	1,000~1,700	0.06	2,500~3,200	0.12	1,700~2,500	0.12	2,200~3,000	0.11

피삭재 구분			브리넬 경도(HB)	재종	절삭속도 vc (m/min)	드릴직경(mm)에 따른 이송(mm/rev)			
ISO	피삭재 소재					Ø2.5~Ø4.0	Ø4.1~Ø8.0	Ø8.1~Ø12.0	Ø12.1~Ø15.0
P	탄소강	저탄소강	80~120	Carbide	35 (20~65)	0.02~0.06	0.04~0.08	0.06~0.12	0.10~0.16
N	알루미늄	알루미늄합금	30-150		100 (94~120)	0.03~0.06	0.05~0.08	0.08~0.12	0.12~0.18
	동합금	동합금	150-160		80 (65~95)	0.03~0.06	0.05~0.08	0.08~0.12	0.12~0.18

Burnishing Drill

피삭재	절삭속도 vc (m/min)	드릴직경(mm)에 따른 이송(mm/rev)				
		Ø2.0~3.0	Ø3.5~5.0	Ø5.5~8.0	Ø8.5~12.0	Ø12.5~18.0
알루미늄합금, 동합금	30~60	0.02~0.05	0.03~0.10	0.04~0.15	0.05~0.20	0.05~0.30
알루미늄다이캐스팅합금	50~80	0.02~0.05	0.03~0.10	0.04~0.15	0.05~0.20	0.05~0.30
일반주철(GC)	25~60	0.01~0.04	0.02~0.08	0.05~0.12	0.05~0.20	0.05~0.30
덕타일주철(GCD)	20~50	0.01~0.03	0.02~0.05	0.03~0.08	0.04~0.12	0.05~0.15

PCD Drill

피삭재	vc (m/min)	fn (mm/rev)
CFRP	50~250	0.075 (0.05~0.25)
알루미늄합금		0.050 (0.03~0.20)
카운터싱크 가공		0.040 (0.02~0.15)

Gun Drill

피삭재	경도(HB)	절삭속도 vc (m/min)	드릴직경(mm)에 따른 이송(mm/rev)					
			~Ø4	~Ø6	~Ø10	~Ø14	~Ø24	Ø25~
탄소강 합금강	~150	100~150	0.005~0.015	0.010~0.025	0.015~0.035	0.020~0.050	0.030~0.070	0.040~0.080
	150~250	80~120	0.005~0.010	0.010~0.020	0.015~0.030	0.020~0.040	0.030~0.060	0.030~0.060
	250~350	50~100	0.005~0.010	0.005~0.010	0.010~0.020	0.015~0.030	0.020~0.040	0.020~0.040
	350~	~30	-	0.005~0.010	0.005~0.010	0.010~0.020	0.020~0.035	0.020~0.035
스테인레스강	~250	50~80	0.005~0.015	0.010~0.020	0.010~0.020	0.010~0.030	0.020~0.035	0.020~0.040
	250~350	40~50	-	0.005~0.015	0.010~0.015	0.010~0.020	0.010~0.020	0.010~0.020
주철	~220	80~100	0.010~0.0120	0.020~0.040	0.030~0.050	0.040~0.080	0.080~0.120	0.100~0.150
	220~	40~80	0.005~0.010	0.005~0.015	0.010~0.020	0.015~0.030	0.020~0.050	0.025~0.070
알루미늄합금	-	180~250	0.010~0.020	0.020~0.040	0.030~0.060	0.040~0.080	0.100~0.180	0.150~0.200
경합금	-	120~200	0.005~0.010	0.010~0.020	0.020~0.025	0.020~0.030	0.030~0.040	0.040~0.060

Chucking/Machine Reamer

피삭재	경도(HB)	절삭속도 vc (m/min)	리머 직경		
			~Ø9	Ø10~25	Ø26~60
강	~100kg/mm²	절삭속도(m/min)	8~12	8~12	8~12
		이송속도(mm/rev)	0.15~0.25	0.20~0.40	0.30~0.50
	100~140kg/mm²	절삭속도(m/min)	5~10	5~10	5~10
		이송속도(mm/rev)	0.10~0.20	0.15~0.25	0.20~0.40
주철	HB ~220	절삭속도(m/min)	6~12	6~12	8~15
		이송속도(mm/rev)	0.15~0.30	0.30~0.50	0.40~0.80
	HB 220~	절삭속도(m/min)	5~10	5~10	8~12
		이송속도(mm/rev)	0.10~0.20	0.20~0.35	0.30~0.50
황동	HB 50~120	절삭속도(m/min)	8~12	10~15	10~15
		이송속도(mm/rev)	0.10~0.15	0.15~0.25	0.25~0.40
청동	HB 60~100	절삭속도(m/min)	8~12	10~15	10~15
		이송속도(mm/rev)	0.10~0.15	0.15~0.25	0.25~0.40
알루미늄합금	HB 90~120	절삭속도(m/min)	15~25	15~25	20~30
		이송속도(mm/rev)	0.15~0.25	0.25~0.40	0.40~0.70
합성수지	-	절삭속도(m/min)	15~30	20~35	30~40
		이송속도(mm/rev)	0.15~0.25	0.25~0.40	0.40~0.50

PCD Reamer

고속, 고정밀 가공용

피삭재	vc (m/min)	fn (mm/rev)
알루미늄합금	50 ~ 250	0.05~0.20

Cermet Reamer

피삭재	경도 (HRC)	이송 fn (mm/rev)	절삭속도 vc (m/min)
일반탄소강	Under HRC30	0.1~0.4	50~80
고탄소강 합금강	HRC30 ~ 40	0.1~0.4	80~120
	HRC40 ~ 50	0.1~0.4	50~80
합금강	More than HRC50	0.05~0.2	30~60

Chamfer Tool

ISO	재 종	ØD(Ø5 ~Ø20)		ØD(Ø25 ~Ø35)	
		vc(m/min)	fz(mm/t)	vc(m/min)	fz(mm/t)
P	PC3700	160~270	0.05~0.25	160~270	0.05~0.25
	PC5300	190~310		190~310	
	ST30A	60~100		60~100	
M	PC5300	100~160	0.05~0.20	100~160	0.10~0.30
	PC5400	70~120		70~120	
K	PC5300	110~180	0.10~0.30	110~180	0.30~0.50
	G10	50~90		50~90	

Counter Sink

CSPC

공구직경 (Ø)	탄소강, 합금강 HRC30 이하		프리하든강 HRC30~45		스테인리스강 HRC30~50		고경도강 HRC45~55		알루미늄합금	
	회전속도 n (min⁻¹)	이송속도 (mm/min)	회전속도 n (min⁻¹)	이송속도 (mm/min)	회전속도 n (min⁻¹)	이송속도 (mm/min)	회전속도 n (min⁻¹)	이송속도 (mm/min)	회전속도 n (min⁻¹)	이송속도 (mm/min)
6.0	3,030	1,550	1,820	600	1,520	500	1,350	240	7,580	3,870
8.0	2,300	1,520	1,370	580	1,150	480	1,015	270	5,750	3,800
10.0	1,840	1,490	1,100	590	920	500	810	270	4,590	3,720
12.0	1,540	1,480	930	610	780	510	690	270	3,850	3,700
16.0	1,150	1,310	690	520	570	460	505	260	2,890	3,470

CSNC/CSHC

1F(홀) 타입

공구직경 (Ø)	탄소강, 합금강 HRC30 이하		프리하든강 HRC30~45		스테인리스강		알루미늄합금	
	절삭속도 (m/min)	이송속도 (mm/min)	절삭속도 (m/min)	이송속도 (mm/min)	절삭속도 (m/min)	이송속도 (mm/min)	절삭속도 (m/min)	이송속도 (mm/min)
~ 10.0	42~72	121	28~48	120	15~17	50	50~110	350
10.0 ~ 20.0		110		70		25		230
20.0 ~ 30.0		75		50		20		200

CSNC

3F 타입

공구직경 (Ø)	탄소강, 합금강 HRC30 이하		프리하든강 HRC30~45		스테인리스강		알루미늄합금	
	절삭속도 (m/min)	이송속도 (mm/min)	절삭속도 (m/min)	이송속도 (mm/min)	절삭속도 (m/min)	이송속도 (mm/min)	절삭속도 (m/min)	이송속도 (mm/min)
~ 10.0	30~60	170	20~40	100	10~12	30	40~100	350
10.0 ~ 20.0		85		60		16		230
20.0 ~ 30.0		60		40		10		200

Counter Sink

CSPH

공구직경 (Ø)	탄소강, 합금강 HRC30 이하		프리하든강 HRC30~45		스테인리스강 HRC30~50		고경도강 HRC45~55		알루미늄합금	
	회전속도 n (min⁻¹)	이송속도 (mm/min)	회전속도 n (min⁻¹)	이송속도 (mm/min)	회전속도 n (min⁻¹)	이송속도 (mm/min)	회전속도 n (min⁻¹)	이송속도 (mm/min)	회전속도 n (min⁻¹)	이송속도 (mm/min)
6.3	1,328	230	1,970	350	905	160	807	140	5,760	1,040
8.3	995	230	1,490	360	690	160	610	140	4,370	1,050
10.4	792	230	1,190	360	550	160	487	130	3,485	940
12.4	665	230	1,000	360	460	150	407	130	2,920	960
16.5	500	230	750	360	345	160	307	140	2,200	990
20.5	402	230	600	360	276	160	247	140	1,770	1,010

CSNH/CSHH

1F(홀) 타입

공구직경 (Ø)	탄소강, 합금강 HRC30 이하		프리하든강 HRC30~45		스테인리스강		알루미늄합금	
	절삭속도 (m/min)	이송속도 (mm/min)	절삭속도 (m/min)	이송속도 (mm/min)	절삭속도 (m/min)	이송속도 (mm/min)	절삭속도 (m/min)	이송속도 (mm/min)
~ 10.0	20~30	110	16~20	55	50~60	255	50~100	450
10.0 ~ 20.0		55		35		180		350
20.0 ~ 30.0		35		55		150		300

CSNH

3F 타입

공구직경 (Ø)	탄소강, 합금강 HRC30 이하		프리하든강 HRC30~45		스테인리스강		알루미늄합금		플라스틱	
	절삭속도 (m/min)	이송속도 (mm/min)	절삭속도 (m/min)	이송속도 (mm/min)	절삭속도 (m/min)	이송속도 (mm/min)	절삭속도 (m/min)	이송속도 (mm/min)	절삭속도 (m/min)	이송속도 (mm/min)
~ 10.0	10~15	60	8~12	35	4~6	30	50~60	255	35~70	400
10.0 ~ 20.0		30		25		16		180		300
20.0 ~ 30.0		20		15		10		150		250

Tap-Star

ISO	피삭재		절삭속도 vc(m/min)					절삭유제			
			스트레이트 탭	스파이럴 탭	포인트 탭	초경 탭	롤 탭	불수용성	수용성 (에멀전)	세미 드라이	드라이
P	저탄소강	≥ 0.25 %C	8~13	8~13	15~25	-	8~13	◎	○	△	△
	중탄소강	≥ 0.25~0.45 %C	7~12	7~12	10~15	-	7~10	◎	○	△	△
	고탄소강	≥ 0.45 %C	6~9	6~9	8~13	-	5~8	◎	○	△	△
	합금강	SCM	7~12	7~12	10~15	-	5~8	◎	△	△	△
	조질강	25~45HRC	3~5	3~5	4~6	-	-	◎	△	–	–
	공구강	SKD	6~9	6~9	7~10	-	-	◎	–	–	–
	주강	SCM	6~11	6~11	10~15	-	-	◎	○	–	–
M	스테인레스강	SUS	4~7	5~8	8~13	-	5~10	◎	○	–	–
	석출경화계 스테인레스강	SUS630 SUS631	3~5	3~5	4~6	-	-	◎	–	–	–
K	주철	GC	10~15	-	-	10~20	-	◎	○	○	○
	덕타일주철	GCD	7~12	7~12	10~20	10~20	-	◎	○	○	–
N	동	Cu	6~9	6~11	7~12	10~20	7~12	○	○	–	–
	황동·황동주물	Bs Bsc	10~15	10~20	15~25	15~25	7~12	○	○	○	○
	청동·청동주물	PB PBC	6~11	6~11	10~20	10~20	7~12	○	○	–	–
	알루미늄 압연재	Al	10~20	10~20	15~25	-	10~20	◎	○	△	–
	알루미늄 합금주물	AC ACD	10~15	10~15	15~20	10~20	10~25	◎	○	△	–
	마그네슘 합금주물	MC	7~12	7~12	10~15	10~20	-	◎	○	○	–
	아연합금 주물	ZDC	1~12	7~12	10~15	10~20	7~12	◎	○	△	–
	열경화성 플라스틱	베이클라이트 페놀 에폭시	10~20	-	-	15~25	-	–	○	○	○
	열가소성 플라스틱	염화비닐 나일론	10~20	10~15	10~20	10~20	-	–	○	○	○

◎: 매우적합 ○: 적합 △: 사용가능 – : 사용불가

- 냉간단조, 열간단조, 철계소결 부품의 고이송, 고절입 및 강단속 조건전용
- 우수한 내치핑성, 내결손성 및 내열균열성 확보
- 절삭날의 최적화를 통한 가공물의 면조도 향상

PART G

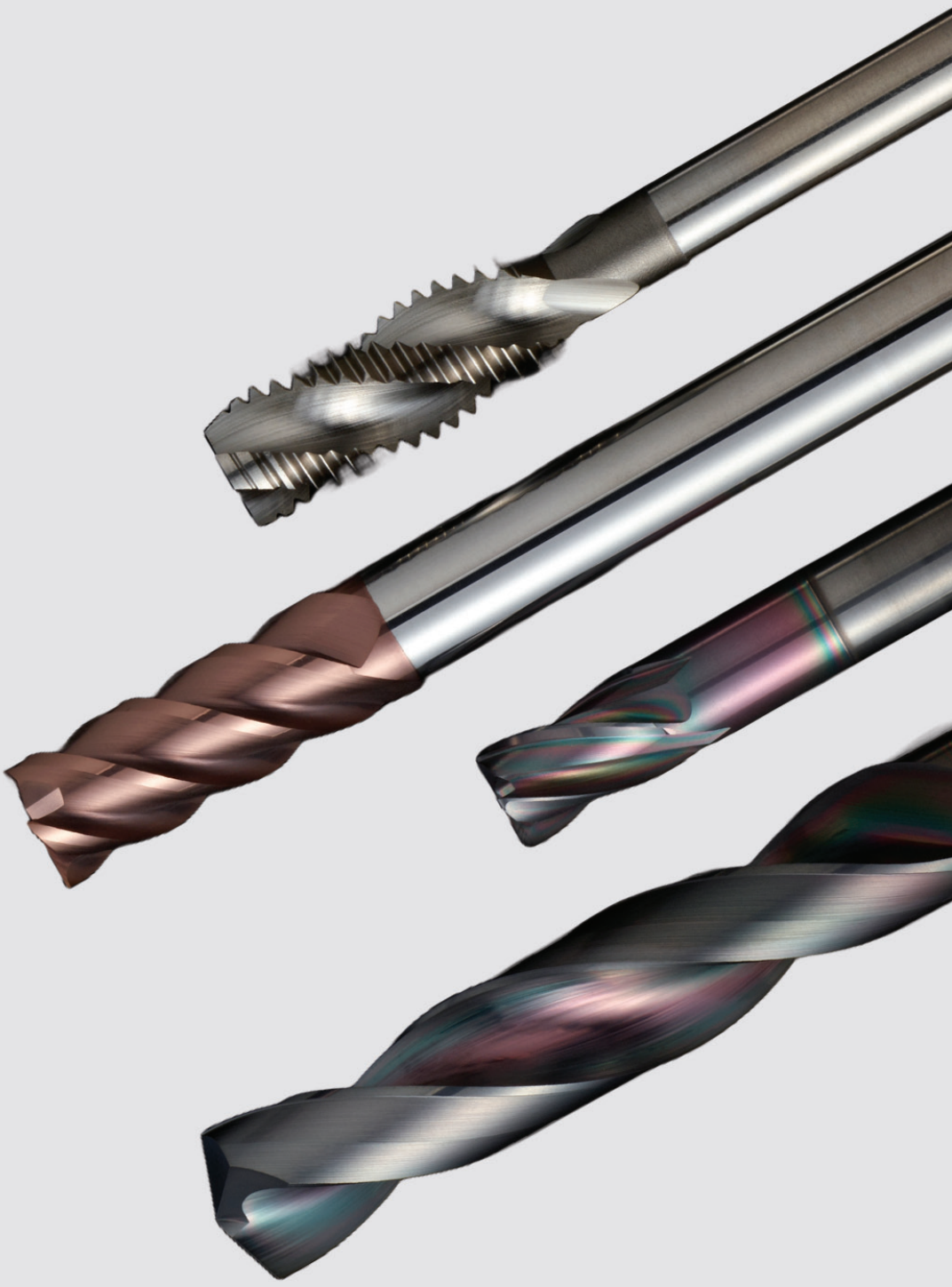
TECHNICAL INFORMATION
기술자료

기술자료 I

G2 피삭재 규격표
G6 철강, 비철금속기호 일람표
G7 SI단위 환산표
G8 경도 대조표

기술자료 II

G9 테이퍼 종류
G12 엔드밀 기술자료
G15 드릴 기술자료
G21 코오로이 솔리드 재종표



피삭재 규격표

구조용 탄소강과 합금강

Type		Korea	ISO	Japan	U.S.A	Great Britain	Germany	France	Russia
		KS	ISO	JIS	AISI SAE	BS BS/EN	DIN DIN/EN	NF NF/EN	GOCT
Carbon steel		SM10C	C10	S10C	1010	040A10 045A10 045M10	C10E C10R	XC10	-
		SM15C	C15E4 C15M2	S15C	1015	055M15	C15E C15R	-	-
		SM20C	-	S20C	1020	070M20 C22, C22E C22R	C22 C22E C22R	C22 C22E C22R	-
		SM25C	C25 C25E4 C25M2	S25C	1025	C25 C25E C25R	C25 C25E C25R	C25 C25E C25R	-
		SM30C	C30 C30E4 C30M2	S30C	1030	080A30 080M30 CC30 C30E C30R	C30 C30E C30R	C30 C30E C30R	30ㄱ
		SM35C	C35 C35E4 C35M2	S35C	1035	C35 C35E C35R	C35 C35E C35R	C35 C35E C35R	35ㄱ
		SM40C	C40 C40E4 C40M2	S40C	1039 1040	080M40 C40 C40E C40R	C40 C40E C40R	C40 C40E C40R	40ㄱ
		SM43C	-	S43C	1042 1043	080A42	-	-	40ㄱ
		SM45C	C45 C45E4 C45M2	S45C	1045 1046	C45 C45E C45R	C45 C45E C45R	C45 C45E C45R	45ㄱ
		SM48C	-	S48C	-	080A47	-	-	45ㄱ
		SM50C	C50 C50E4 C50M2	S50C	1049	080M50 C50 C50E C50R	C50 C50E C50R	C50 C50E C50R	50ㄱ
		SM53C	-	S53C	1050 1053	-	-	-	50ㄱ
		SM55C	C55 C55E4 C55M2	S55C	1055	070M55 C55 C55E C55R	C55 C55E C55R	C55 C55E C55R	-
		SM58C	C60 C60E4 C60M2	S58C	1059 1060	C60 C60E C60R	C60 C60E C60R	C60 C60E C60R	60ㄱ
Alloy steel	Nickel chromium steel	SNC236 SNC415(H) SNC631(H) SNC815(H) SNC836	- - - 15NiCr13 -	SNC236 SNC415(H) SNC631(H) SNC815(H) SNC836	- - - - -	- - - 655M13(655H13) -	- - - 15NiCr13 -	- - - - -	40XH - 30XH3A - -
	Nickel chromium molybdenum steel	SNCM220	20NiCrMo2 20NiCrMoS2	SNCM220	8615 8617(H) 8620(H) 8622(H)	805A20 805M20 805A22 805M22	20NiCrMo2 20NiCrMoS2	20NCD2	-
		SNCM240	41CrNiMo2 41CrNiMoS2	SNCM240	8637 8640	-	-	-	-
		SNCM415 SNCM420(H) SNCM431 SNCM439 SNCM447 SNCM616 SNCM625 SNCM630 SNCM815	- - - - - - - - -	SNCM415 SNCM420(H) SNCM431 SNCM439 SNCM447 SNCM616 SNCM625 SNCM630 SNCM815	- 4320(H) - 4340 - - - - -	- - - - - - - - -	- - - - - - - - -	- - - - - - - - -	- 20XH2M(20XHM) - - - - - - -
	Chromium steel	SCr415(H)	-	SCr415(H)	-	-	17Cr3 17CrS3	-	15X 15XA
		SCr420(H)	20Cr4(H) 20CrS4	SCr420(H)	5120(H)	-	-	-	20X
		SCr430(H)	34Cr4 34CrS4	SCr430(H)	5130(H) 5132(H)	34Cr4 34CrS4	34Cr4 34CrS4	34Cr4 34CrS4	30X
		SCr435(H)	34Cr4 34CrS4 37Cr4 37CrS4	SCr435(H)	5135(H)	37Cr4 37CrS4	37Cr4 37CrS4	37Cr4 37CrS4	35X
		SCr440(H)	37Cr4 37CrS4 41Cr4 41CrS4	SCr440(H)	5140(H)	530M40 41Cr4 41CrS4	41Cr4 41CrS4	41Cr4 41CrS4	40X
		SCr445(H)		SCr445(H)					45X

*상기 알로이 스틸은 국내제작공급이 가능 (주)KPC ☎ 053-852-4839

Type		Korea	ISO	Japan	U.S.A	Great Britain	Germany	France	Russia
		KS	ISO	JIS	AISI SAE	BS BS/EN	DIN DIN/EN	NF NF/EN	GOCT
Alloy steel	Chromium molybdenum steel	SCM415(H)	-	SCM415(H)	-	-	-	-	-
		SCM418(H)	18CrMo4 18CrMoS4	SCM418(H)	-	-	18CrMo4 18CrMoS4	-	20XM
		SCM420(H)	-	SCM420(H)	-	708M20(708H20)	-	-	20XM
		SCM430	-	SCM430	4130	-	-	-	30XM 30XMA
		SCM432	-	SCM432	-	-	-	-	-
		SCM435(H)	34CrMo4 34CrMoS4	SCM435(H)	(4135H) 4137(H)	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	35XM
		SCM440(H)	42CrMo4 42CrMoS4	SCM440(H)	4140(H) 4142(H)	708M70 709M40 42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	-
		SCM445(H)	-	SCM445(H)	4145(H) 4147(H)	-	-	-	-
	Manganese steel and Manganese chromium steel	SMn420(H)	22Mn6(H)	SMn420(H)	1522(H)	150M19	-	-	-
		SMn433(H)	-	SMn433(H)	1534	150M36	-	-	30 Г 2 35 Г 2
		SMn438(H)	36Mn6(H)	SMn438(H)	1541(H)	150M36			35 Г 2 40 Г 2
		SMn443(H)	42Mn6(H)	SMn443(H)	1541(H)	-	-	-	40 Г 2 45 Г 2
		SMnC420(H)	-	SMnC420(H)	-	-	-	-	-
		SMnC443(H)	-	SMnC443(H)	-	-	-	-	-
	Aluminum chromium molybdenum steel	SACM645	41CrAlMo74	SACM645	-	-	-	-	-

*상기 알로이 스틸은 국내제작공급이 가능 (주)KPC ☎ 053-852-4839

공구강

Type	Korea	ISO	Japan	U.S.A	Great Britain	Germany	France	Russia
	KS	ISO	JIS	AISI SAE	BS BS/EN	DIN DIN/EN	NF NF/EN	GOCT
High speed steel	SKH2	HS18-0-1	SKH2	T1				
	SKH3	-	SKH3	T4				
	SKH4	-	SKH4	T5				
	SKH10	-	SKH10	T15	BM 2	S6/5/2	Z 85 WDCV	
	SKH51	HS6-5-2	SKH51	M2				
	SKH52	HS6-6-2	SKH52	M3-1				
	SKH53	HS6-5-3	SKH53	M3-2				
	SKH54	HS6-5-4	SKH54	M4	BM 35	S6/5/2/5	6-5-2-5	
	SKH55	HS6-5-2-5	SKH55	M 35				
	SKH56	-	SKH56	M36				
	SKH57	HS10-4-3-10	SKH57	-		S2/9/2		
	SKH58	HS2-9-2	SKH58	M7				
	SKH59	HS2-9-1-8	SKH59	M42				
Alloy tool steel	STS11	-	SKS11	F2				
	STS2	-	SKS2	-				
	STS21	-	SKS21	-				
	STS5	-	SKS5	-				
	STS51	-	SKS51	L6				
	STS7	-	SKS7	-				
	STS8	-	SKS8	-				
	STS4	-	SKS4	-				
	STS41	-	SKS41	-				
	STS43	105V	SKS43	W2-9 1/				
	STS44	-	SKS44	W2-8 1-2				
	STS3	-	SKS3	-		105WCr6	105WC13	
	STS31	105WCr1	SKS31	-				
	STS93	-	SKS93	-				
	STS94	-	SKS94	-				
	STS95	-	SKS95	-	BD3	X210Cr12	Z200C12	
	STD1	210Cr12	SKD1	D3				
	STD11	-	SKD11	D2	BA2	X100CrMoV5 1	Z100CDV5	
	STD12	100CrMoV5	SKD12	A2				
	STD4	-	SKD4	-	BH21	X30WCrV9 3	Z30WCV9	
	STD5	X30WCrV9-3	SKD5	H21				
	STD6	X37CrMoV5-1	SKD6	H11	BH13	X40CrMoV5 1	Z40CDV5	
	STD61	X40CrMoV5-1	SKD61	H13				
	STD62	X35CrWMoV5	SKD62	H12				
	STD7	32CrMoV12-28	SKD7	H10				
	STD8	-	SKD8	H19				
	STF3	-	SKT3	-		55NiCrMoV6	55NCDV7	
	STF4	55NiCrMoV7	SKT4	L6				

*상기 하이스피드 스틸은 국내제작공급이 가능 (주)KPC ☎ 053-852-4839

Type	Korea	ISO	Japan	U.S.A	Great Britain	Germany	France	Russia
	KS	ISO	JIS	AISI SAE	BS BS/EN	DIN DIN/EN	NF NF/EN	GOCT
Free cutting carbon steel	SUM11	-	SUM11	1110				
	SUM12	-	SUM12	1109				
	SUM21	9S20	SUM21	1212				
	SUM22	11SMn28	SUM22	1213	230M07	9SMn28	S250	
	SUM22L	11SMnPb28	SUM22L	12L13		9SMnPb28	S250Pb	
	SUM23	-	SUM23	1215	240M07	9SMn36	S 300	
	SUM23L	-	SUM23L	-				
	SUM24L	11SMnPb28	SUM24L	12L14		9SMnPb36	S300Pb	
	SUM25	12SMn35	SUM25	-				
	SUM31	-	SUM31	1117				
	SUM31L	-	SUM31L	-				
	SUM32	-	SUM32	-				
	SUM41	-	SUM41	1137				
	SUM42	-	SUM42	1141				
	SUM43	44SMn28	SUM43	1144				
High carbon chromiom	STB1	-	SUJ1	-				
	STB2	B1	SUJ2	52100	534A99	100Cr6	100Cr6	
	STB3	B2	SUJ3	ASTM A 485 Grade 1				
	STB4	-	SUJ4	-				
	STB5	-	SUJ5	-				

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스테인리스강

Type		Korea	ISO	Japan	U.S.A		Great Britain	Germany	France	Russia
		KS	ISO	JIS	UNS	AISI SAE	BS BS/EN	DIN DIN/EN	NF NF/EN	GOCT
Stainless steel	Austenitic	STS201	X12CrMnNiN17-7-5	SUS201	S20100	201	284S16	X12CrNi17-7	Z12CMN17-07Az	12X17·9AH4
		STS202	X12CrMnNiN18-9-5	SUS202	S20200	202	301S21	X2CrNiN18-7		07X16H6
		STS301	X10CrNi18-8	SUS301	S30100	301		X12CrNi17-7	Z11CN17-08	
		STS301L	X2CrNiN18-7	SUS301L						
		STS301J1		SUS301J1			302S25			12X18H9
		STS302		SUS302	S30200	302		X10CrNiS18-9	Z12CN18-09	
		STS302B	X12CrNiSi18-9-3	SUS302B	S30215	302B	303S21			
		STS303	X10CrNiS18-9	SUS303	S30300	303	303S41		Z8CNF18-09	12X18H10E
		STS303Se		SUS303Se	S30323	303Se		X5CrNi18-10		
		STS303Cu		SUS303Cu			304S31			08X18H10
		STS304	X5CrNi18-9 X2CrNi18-9	SUS304	S30400	304	304S11	X2CrNi19-11	Z7CN18-09	03X18H11
		STS304L	X2CrNi19-11	SUS304L	S30403	304L		X2CrNiN18-10	Z3CN19-11	
		STS304N1	X5CrNiN18-8	SUS304N1	S30451	304N			Z6CN19-09Az	
		STS304LN	X2CrNiN18-8	SUS304LN	S30453	304LN		X5CrNi18-12	Z3CN18-10Az	
		STS304J1		SUS304J1			305S19			06X18H11
		STS305	X6CrNi18-12	SUS305	S30500	305			Z8CN18-12	
		STS309S		SUS309S	S30908	309S	310S31	X5CrNiMo27-12-2	Z10CN24-13	10X23H18
		STS310S	X6CrNi25-20	SUS310S	S31008	310S	316S31	X5CrNiMo27-13-3	Z8CN25-20	
		STS316	X5CrNiMo17-12-2 X3CrNiMo17-12-3	SUS316	S31600	316	316S11	X2CrNiMo17-13-2 X2CrNiMo17-14-3	Z7CND17-12-02 Z6CND18-12-03	03X17H14M3
		STS316L	X2CrNiMo17-12-2 X2CrNiMo17-12-3 X2CrNiMo18-14-3	SUS316L	S31603	316L			Z3CND17-12-02 Z3CND17-12-03	
		STS316N		SUS316N	S31651	316N	317S16	X6CrNiTi18-10		
		STS317		SUS317	S31700	317	321S31	X6CrNiNb18-10		08X18H10T
		STS321	X6CrNiTi18-10	SUS321	S32100	321	347S31		Z6CNT18-10	08X18H12
		STS347	X6CrNiNb18-10	SUS347	S34700	347		X6CrAl13	Z6CNNb18-10	
		STS384	X3NiCr18-16	SUS384	S38400	384	405S17		Z6CN18-16	
	Ferritic	STS405	X6CrAl13	SUS405	S40500	405			Z8CA12	
		STS410L		SUS410L				X6Cr17	Z3C14	
		STS429		SUS429	S42900	429	430S17	X7CrS18		12X17
		STS430	X6Cr17	SUS430	S43000	430		X6CrMo17-1	Z8C17	
		STS430F	X7CrS17	SUS430F	S43020	430F	434S17		Z8CF17	
		STS434	X6CrMo17-1	SUS434	S43400	434			Z8CD17-01	
		STS444	X2CrMoTi18-2	SUS444	S44400	444			Z3CDT18-02	
		STSXM27		SUSXM27	S44627			X10Cr13	Z1CD26-01	
	Martensitic	STS403		SUS403	S40300	403	410S21			
		STS410	X12Cr13	SUS410	S41000	410	416S21	X20Cr13	Z13C13	
		STS416	X12CrS13	SUS416	S41600	416	420S29	X20CrNi17-2	Z11CF13	20X13
		STS420J1	X20Cr13	SUS420J1	S42000	420	431S29		Z20C13	20X17H2
		STS431	X19CrNi16-2	SUS431	S43100	431			Z15CN16-02	
		STS440A	X70CrMo15	SUS440A	S44002	440A		X7CrNiAl17-7	Z70C15	
	Precipitation hardening type	STS630	X5CrNiCuNb16-4	SUS630	S17400	S17400			Z6CNU17-04	09X17H7IO
		STS631	X7CrNiAl17-7	SUS631	S17700	S17700			Z9CNA17-07	
		STS631J1		SUS631J1						

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주철

Type		Korea	ISO	Japan	U.S.A	Great Britain	Germany	France	Russia
		KS	ISO	JIS	AISI SAE	BS BS/EN	DIN DIN/EN	NF NF/EN	GOCT
Casting Iron	Grey iron casting	GC100 GC150 GC200 GC250 GC300 GC350	100,150, 200, 250, 300, 350	FC100 FC150 FC200 FC250 FC300 FC350	No 20 B No 25 B No 30 B No 35 B No 45 B No 50 B No 55 B	 Grade 150 Grade 220 Grade 260 Grade 300 Grade 350 Grade 400	GG 10 GG 15 GG 20 GG 25 GG 30 GG 35 GG 40	Ft 10 D Ft 15 D Ft 20 D Ft 25 D Ft 30 D Ft 35 D Ft 40 D	
	Spheroidal graphite iron casting	GCD400-15, GCD400-18 GCD450-10, GCD500-7 GCD600-3 GCD700-2	400-15, 400-18 450-10, 500-7 600-3 700-2	FCD400 FCD500 FCD600 FCD700	60-40-18 65-45-12 80-55-06 100-70-03	SNG 420/12 SNG 370/17 SNG 500/7 SNG 600/3 SNG 700/2	GGG 40 GGG 40.3 GGG 50 GGG 60 GGG 70	FCS 400-12 FGS 370-17 FGS 500-7 FGS 600-3 FGS 700-2	
	Austempered Spheroidal graphite iron casting	FCAD	-	FCAD	-	EN-GJS-	EN-GJS-	EN-GJS-	
	Austenitic iron casting	FCA- FCDA-	L-, S-	FCA- FCDA-	Type 1, 2, Type D-2, D-3A Class 1, 2	F1, F2, S2W, S5S	GGL-, GGG-	L-, S-	

비철금속

Type		Korea	ISO	Japan	U.S.A	Great Britain	Germany	France	Russia
		KS	ISO	JIS	AISI SAE	BS BS/EN	DIN DIN/EN	NF NF/EN	GOCT
Aluminum alloy	Aluminum alloy ingots for casting	AC1B	Al-Cu4MgTi	AC1B	204.0	-	-	A-U5GT	
		AC2A	-	AC2A	-	-	-	-	
		AC2B	-	AC2B	319.0	-	-	-	
		AC3A	-	AC3A	-	LM-6	-	-	
		AC4A	-	AC4A	-	-	G(GK)-AlSi9Cu3	-	
		AC4B	-	AC4B	-	-	-	-	
		AC4C	Al-Si7Mg(Fe)	AC4C	356.0	LM-25	G(GK)-AlSi7MG	A-S7G	
		AC4CH	Al-Si7Mg	AC4CH	A356.0	-	-	-	
		AC4D	Al-Si5Cu1Mg	AC4D	355.0	LM-16	-	-	
		AC5A	Al-Cu4Ni2Mg2	AC5A	242.0	-	G(GK)-AlMg5	A-U4NT	
		AC7A	-	AC7A	514.0	LM-5	-	-	
		AC8A	-	AC8A	-	LM-13	-	A-S12UNG	
		AC8B	-	AC8B	-	LM-26	-	A-S10UG	
		AC8C	-	AC8C	-	-	-	A-S10UG	
		AC9A	-	AC9A	-	LM-29	-	-	
		AC9B	-	AC9B	-	-	GD-AlSi12 (Cu)	A-S18UNG	
	Aluminum alloy die casting	ALDC1	Al-Si12CuFe	ADC1	A413.0	LM20	GD-AlSi10Mg	A-S13	
		ALDC2	-	ADC3	A360.0	-	GD-AlMg9	A-S9G	
		ALDC3	-	ADC5	518.0	-	-	A-G6	
		ALDC4	-	ADC6	-	-	GD-AlSi9Cu3	A-G3T	
		ALDC7	Al-Si8Cu3Fe	ADC10	A380.0	-	GD-AlSi9Cu3	-	
		ALDC7Z	Al-Si8Cu3Fe	ADC10Z	A380.0	LM24	-	-	
		ALDC8	-	ADC12	383.0	LM2	-	-	
		ALDC8Z	-	ADC12Z	383.0	LM2	-	-	
		ALDC9	-	ADC14	B390.0	LM30	EN AW-5052	-	
	Aluminum alloy extruded shapes	A5052S	-	A5052S	5052	EN AW-5052	EN AW-5454	EN AW-5052	
		A5454S	-	A5454S	5454	EN AW-5454	EN AW-5083	EN AW-5454	
		A5083S	AlMg4.5Mn0.7	A5083S	5083	EN AW-5083	EN AW-5086	EN AW-5083	
		A5086S	-	A5086S	5086	EN AW-5086	EN AW-6061	EN AW-5086	
		A6061S	AlMg1SiCu	A6061S	6061	EN AW-6061	EN AW-6063	EN AW-6061	
		A6063S	AlMg0.7Si	A6063S	6063	EN AW-6063	EN AW-7003	EN AW-6063	
		A7003S	-	A7003S	-	EN AW-7003	-	EN AW-7003	
		A7N01S	-	A7N01S	-	-	EN AW-7075	-	
		A7075S	AlZn5.5MgCu	A7075S	7075	EN AW-7075		EN AW-7075	

내열강

Type		Korea	ISO	Japan	U.S.A		Great Britain	Germany	France	Russia
		KS	ISO	JIS	UNS	AISI SAE	BS BS/EN	DIN DIN/EN	NF NF/EN	GOCT
Heat resistant steel	Austenitic	STR31		SUH31			331S42		Z35CNWS14-14	
		STR35		SUH35			349S52	X53CrMnNi21-9	Z52CMN21-09-Az	
		STR36		SUH36			349S54		Z55CMN21-09-Az	
		STR37		SUH37	S63008		381S34			
		STR38		SUH38	S63017					
		STR309		SUH309			309S24	CrNi2520	Z15CN24-13	
		STR310		SUH310	S30900		310S24		Z15CN25-20	
		STR330		SUH330	S31000	309			Z12NCS35-16	
		STR660		SUH660	N08330	310			Z6NCTV25-20	
		STR661		SUH661	S66286	N08330		CrAl1205		
	Ferritic	STR21		SUH21	R30155			X6CrTi12		
		STR409	X6CrTi12	SUH409			409S19		Z6CT12	
		STR409L	X2CrTi12	SUH409L	S40900				Z3CT12	
		STR446		SUH446		409		X45CrSi9-3	Z12C25	
	Martensitic	STR1		SUH1	S44600		401S45		Z45CS9	
		STR3		SUH3	S65007	446			Z40CSD10	
		STR4		SUH4			443S65		Z80CSN20-02	
		STR11		SUH11						
		STR600		SUH600						
		STR616		SUH616	S42200					

*상기 내열강(일부)은 국내제작공급이 가능 (주)KPC ☎ 053-852-4839

철강, 비철금속 기호 일람표

피삭재 규격 비교표

분 류		JIS 규격 명칭	기 호
구조용강		용접구조용 압연강재	SWS
		재생강재	SBR
		일반구조용 압연강재	SB
		일반구조용 경량형강	SBC
		자동차구조용 열간압연강판 및 강재	SAPH
박강판		냉간압연 연강판 및 강재	SBC
		열간압연 연강판 및 강재	SHP
강 관		배관용 탄소강 강관	SPP
		보일러 · 열교환기용 탄소강 강관	STH
		고압가스용 기용계목무 강관	STHG
		일반구조용 탄소강 강관	SPS
		기계구조용 스테인리스 강관	STST
		구조용 합금강 강관	STA
		기계구조용 스테인리스 강관	STS-TK
		일반구조용 각형 강관	SPSR
		배관용 합금강 강관	SPA
		압력배관용 탄소강 강관	SPPS
		고온배관용 탄소강 강관	SPSR
		고압배관용 탄소강 강관	SPPH
		배관용 스테인리스 강관	STSxT
기계구조용강		기계구조용 탄소강 강재	SMxxC, SMxxCK
		알루미늄크롬 몰리브덴강 강재	SACM
		크롬 몰리브덴강 강재	SCM
		크롬강 강재	SCr
		니켈크롬강 강재	SNC
		니켈크롬몰리브덴강 강재	SNCM
		기계구조용 망간강 및 망간크롬강 강재	SMn, SMnC
특수용도강	공구강	탄소공구강	STC
		중공강 강재	SKC
		합금공구강	STS, STD, STF
		고속도공구강 강재	SKH
	스테인레스강	스테인리스강 봉	STS
	내열강	내열강	STR
		내열강 봉	STR
		내열강판	STR
	황 및 유황복합쾌삭 강재		SUM
	고탄소크롬 특수 강재		STB
	스프링강 강재		SPS

분 류	JIS 규격 명칭	기 호
단 강	탄소강단강품	SF
	크롬몰리브덴강 단강품	SFCM
	니켈크롬 몰리브 덴강 단강품	SFNCM
주 철	회주철	GC
	구상흑연 주철품	GCD
	흑심가단 주철품	BMC
	백심가단 주철품	WMC
	펄라이트 가단주철품	PMC
주 강	탄소강주강품	SC
	구조용 고장력 탄소강 및 저합금강 주강품	HSC
	스테인리스강 주강품	SSC
	내열강 주강품	HRSC
	고망간강 주강품	HMnSC
	고온고압용 주강품	SCPH
주 물	황동주물	BsC
	고력황동주물	HBsC
	청동주물	BrC
	링청동주물	PCB
	알루미늄청동주물	AlBC
	알루미늄합금주물	ACxA
	마그네슘합금주물	MgC
	아연합금 다이캐스트	ZnDC
	알루미늄합금 다이캐스트	Aℓ DC
	마그네슘합금 다이캐스트	MgDC
	화이트메탈	WM
	베어링용 알루미늄합금주물	AM
	베어링강 · 아연합금주물	KM

SI 단위 환산표

주요 SI 단위의 환산표

■ 특성

N	kgf	dyn
1	1.01972×10^{-1}	1×10^{-5}
9.80665	1	9.80665×10^{5}
1×10^{-5}	1.01972×10^{-6}	1

■ 응력

Pa 또는 N/m²	MPa 또는 N/mm²	kgf/mm²	kgf/cm²	kgf/m²
1	1×10^{-6}	1.01972×10^{-7}	1.01972×10^{-5}	1.01972×10^{-1}
1×10^{6}	1	1.01972×10^{-1}	1.01972×10	1.01972×10^{5}
9.80665×10^{6}	9.80665	1	1×10^{2}	1×10^{6}
9.80665×10^{4}	9.80665×10^{-2}	1×10^{-2}	1	1×10^{4}
9.80665	9.80665×10^{-6}	1×10^{-6}	1×10^{-4}	1

■ 압력

Pa	kPa	MPa	bar	kgf/cm²
1	1×10^{-3}	1×10^{-6}	1×10^{-5}	1.01972×10^{-5}
1×10^{3}	1	1×10^{-3}	1×10^{-2}	1.01972×10^{-2}
1×10^{6}	1×10^{3}	1	1×10	1.01972×10
1×10^{5}	1×10^{2}	1×10^{-1}	1	1.01972
9.80665×10^{4}	9.80665×10	9.80665×10^{-2}	9.80665×10^{-1}	1

■ 일 · 에너지 · 열량

J	kW · h	kgf · m	kcal
1	2.77778×10^{-7}	1.01972×10^{-1}	2.38889×10^{-4}
3.60000×10^{6}	1	3.67098×10^{5}	8.60000×10^{2}
9.80665	2.72407×10^{-6}	1	2.34270×10^{-3}
4.18605×10^{3}	1.16279×10^{-3}	4.26858×10^{2}	1

■ 일률(공률 · 동력) 열률

W	kW	kgf · m/s	PS	kcal/h
1	1×10^{-3}	1.01972×10^{-1}	1.35962×10^{-3}	0.860
1×10^{3}	1	1.01972×10^{2}	1.359 62	8.60000×10^{2}
9.81 65	9.80665×10^{-3}	1	1.33333×10^{-2}	8.433 71
7.355×10^{2}	7.355×10^{-1}	7.5×10	1	6.32529×10^{2}
1.16279	1.16279×10^{-3}	1.18572×10^{-1}	1.58095×10^{-3}	1

■ 비열

J/(kg·K)	kcal/(kg·℃) cal/(g·℃)
1	2.38889×10^{-4}
4.18605×10^{3}	1

■ 열전도율

W/(m·k)	kcal/(h·m·℃)
1	8.6000×10^{-1}
1.16279	1

■ 회전수

min^{-1}	s^{-1}	r.p.m.
1	0.0167	1
60	1	60

경도 대조표

피삭재 경도 대조표

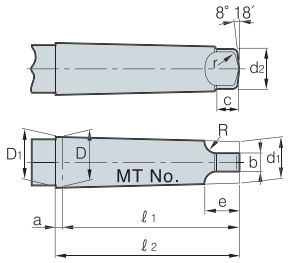
비커스 50kgf Hv	브리넬 3000kgf HB		로크웰				쇼어	인장강도 (근사값) MPa (1)
	표준구 10㎜	경구 10㎜	A스케일 60kgf 다이아몬드 입자 HRA	B스케일 100kgf 1/16in 볼 HRB	C스케일 150kgf 다이아몬드 입자 HRC	D스케일 100kgf 다이아몬드 입자 HRD	HS	
940	-	-	85.6	-	68.0	76.9	97	
920	-	-	85.3	-	67.5	76.5	96	
900	-	-	85.0	-	67.0	76.1	95	
880	-	(767)	84.7	-	66.4	75.7	93	
860	-	(757)	84.4	-	65.9	75.3	92	
840	-	(745)	84.1	-	65.3	74.8	91	
820	-	(733)	83.8	-	64.7	74.3	90	
800	-	(722)	83.4	-	64.0	74.8	88	
780	-	(710)	83.0	-	63.3	73.3	87	
760	-	(698)	82.6	-	62.5	72.6	86	
740	-	(684)	82.2	-	61.8	72.1	84	
720	-	(670)	81.8	-	61.0	71.5	83	
700	-	(656)	81.3	-	60.1	70.8	81	
690	-	(647)	81.1	-	59.7	70.5	-	
680	-	(638)	80.8	-	59.2	70.1	80	
670	-	630	80.6	-	58.8	69.8	-	
660	-	620	80.3	-	58.3	69.4	79	
650	-	611	80.0	-	57.8	69.0	-	
640	-	601	79.8	-	57.3	68.7	77	
630	-	591	79.5	-	56.8	68.3	-	
620	-	582	79.2	-	56.3	67.9	75	
610	-	573	78.9	-	55.7	67.5	-	
600	-	564	78.6	-	55.2	67.0	74	
590	-	554	78.4	-	54.7	66.7	-	2055
580	-	545	78.0	-	54.1	66.2	72	2020
570	-	535	77.8	-	53.6	65.8	-	1985
560	-	525	77.4	-	53.0	65.4	71	1950
550	(505)	517	77.0	-	52.3	64.8	-	1905
540	(496)	507	76.7	-	51.7	64.4	69	1860
530	(488)	497	76.4	-	51.1	63.9	-	1825
520	(480)	488	76.1	-	50.5	63.5	67	1795
510	(473)	479	75.7	-	49.8	62.9	-	1750
500	(465)	471	75.3	-	49.1	62.2	66	1705
490	(456)	460	74.9	-	48.4	61.6	-	1660
480	488	452	74.5	-	47.7	61.3	64	1620
470	441	442	74.1	-	46.9	60.7	-	1570
460	433	433	73.6	-	46.1	60.1	62	1530
450	425	425	73.3	-	45.3	59.4	-	1495
440	415	415	72.8	-	44.5	58.8	59	1460
430	405	405	72.3	-	43.6	58.2	-	1410
420	397	397	71.8	-	42.7	57.5	57	1370
410	388	388	71.4	-	41.8	56.8	-	1330
100	379	379	70.8	-	40.8	56.0	55	1290
390	369	369	70.3	-	39.8	55.2	-	1240
380	360	360	69.8	(100.0)	38.8	54.4	52	1205
370	350	350	69.2	-	39.9	53.6	-	1170
360	341	341	68.7	(109.0)	36.6	52.8	50	1130
350	331	331	68.1	-	35.5	51.9	-	1095
340	322	322	67.6	(108.0)	34.4	51.1	47	1070
330	313	313	67.0	-	33.3	50.2	-	1035

비커스 50kgf Hv	브리넬 3000kgf HB		로크웰				쇼어	인장강도 (근사값) MPa (1)
	표준구 10㎜	경구 10㎜	A스케일 60kgf 다이아몬드 입자 HRA	B스케일 100kgf 1/16in 볼 HRB	C스케일 150kgf 다이아몬드 입자 HRC	D스케일 100kgf 다이아몬드 입자 HRD	HS	
320	303	303	66.4	(107.0)	32.2	49.4	45	1005
310	294	294	65.8	-	31.0	48.4	-	980
300	284	284	65.2	(105.5)	29.8	47.5	42	950
295	280	280	64.8	-	29.2	47.1	-	935
290	275	275	64.5	(104.5)	28.5	46.5	41	915
285	270	270	64.2	-	27.8	46.0	-	905
280	265	265	63.8	(103.5)	27.1	45.3	40	890
275	261	261	63.5	-	26.4	44.9	-	875
270	256	256	63.1	(102.0)	25.6	44.3	38	855
265	252	252	62.7	-	24.8	43.7	-	840
260	247	247	62.4	(101.0)	24.0	43.1	37	825
255	243	243	62.0	-	23.1	42.2	-	805
250	238	238	61.6	99.5	22.2	41.7	36	795
245	233	233	61.2	-	21.3	41.1	-	780
240	228	228	60.7	98.1	20.3	40.3	34	765
230	219	219	-	96.7	(18.0)	-	33	730
220	209	209	-	95.0	(15.7)	-	32	695
210	200	200	-	93.4	(13.4)	-	30	670
200	190	190	-	91.5	(11.0)	-	29	635
190	181	181	-	89.5	(8.5)	-	28	605
180	171	171	-	87.1	(6.0)	-	26	580
170	162	162	-	85.0	(3.0)	-	25	545
160	152	152	-	81.7	(0.0)	-	24	515
150	143	143	-	78.7	-	-	22	490
140	133	133	-	75.0	-	-	21	455
130	124	124	-	71.2	-	-	20	425
120	114	114	-	66.7	-	-	-	390
110	105	105	-	62.3	-	-	-	-
100	95	95	-	56.2	-	-	-	-
95	90	90	-	52.0	-	-	-	-
90	86	86	-	48.0	-	-	-	-
85	81	81	-	41.0	-	-	-	-

주) 1. 1MPa=1N/㎟
2. 표 가운데 ( )안의 수치는 그다지 사용하지않는 범위의 것으로 참고로 나타낸 것

테이퍼 종류

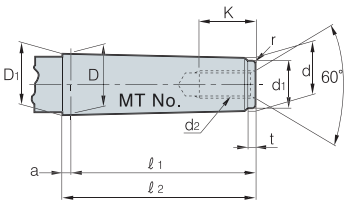
모르스 테이퍼(탱식)



(mm)

MT No.	테이퍼	테이퍼 각도(α)	D	a	D1	d1	ℓ1	ℓ2	d2	b	c	e	R	r
0	1/19.212	1°29′27″	9.045	3	9.201	6.104	56.5	59.5	6.0	3.9	6.5	10.5	4	1
1	1/20.047	1°25′43″	12.065	3.5	12.240	8.972	62.0	65.5	8.7	5.2	8.5	13.5	5	1.2
2	1/20.020	1°25′50″	17.780	5	18.030	14.034	75.0	80.0	13.5	6.3	10	16	6	1.6
3	1/19.922	1°26′16″	23.825	5	24.076	19.107	94.0	99.0	18.5	7.9	13	20	7	2
4	1/19.254	1°29′15″	31.267	6.5	31.605	25.164	117.5	124.0	24.5	11.9	16	24	8	2.5
5	1/19.002	1°30′26″	44.399	6.5	4.741	36.531	149.5	156.0	35.7	15.9	19	29	10	3
6	1/19.180	1°29′36″	63.348	8	63.765	52.399	210.0	218.0	51.0	19.0	27	40	13	4
7	1/19.231	1°29′22″	83.058	10	83.578	68.186	286.0	296.0	66.8	28.6	35	54	19	5

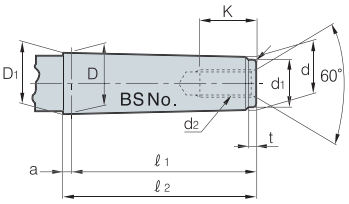
모르스 테이퍼(나사식)



(mm)

MT No.	테이퍼	테이퍼 각도(α)	D	a	D1	d	ℓ1	ℓ2	d1	d2	k	t	r
0	1/19.212	1°29′27″	9.045	3	9.201	6.442	50	53	6	-		4	0.2
1	1/20.047	1°25′43″	12.065	3.5	12.230	9.396	53.5	57	9	M6	16	5	0.2
2	1/20.020	1°25′50″	17.780	5	18.030	14.583	64	69	14	M10	24	5	0.2
3	1/19.922	1°26′16″	23.825	5	24.076	19.759	81	86	19	M12	28	7	0.6
4	1/19.254	1°29′15″	31.267	6.5	31.605	25.943	102.5	109	25	M16	32	9	1
5	1/19.002	1°30′26″	44.399	6.5	4.741	37.584	129.5	136	35.7	M20	40	9	2.5
6	1/19.180	1°29′36″	63.348	8	63.765	53.859	182	190	51	M24	50	12	4
7	1/19.231	1°29′22″	83.058	10	83.578	70.058	250	260	65	M33	80	18.5	5

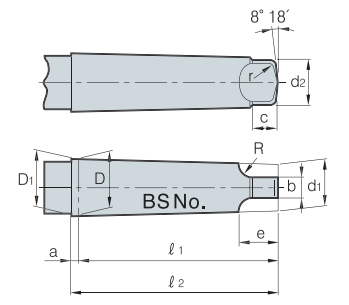
브라운·샤프 테이퍼(나사식)



(mm)

B&S No.	D	a	D1	d	d1	ℓ1	ℓ2	t	r	d2	K
4	10.221	2.4	10.321	8.890	8.0	31.0	34.2	2	0.2	-	-
5	13.286	2.4	13.386	11.430	10.0	44.4	46.8	3	0.2	-	-
6	15.229	2.4	15.330	12.700	11.0	60.0	62.7	3	0.2	M8(1/4)	20
7	18.424	2.4	18.524	15.240	14.0	76.2	78.6	4	0.2	M10(3/8)	24
8	22.828	3.2	22.962	19.090	17.0	90.5	93.7	4	0.6	M12(1/2)	28
9	27.104	3.2	27.238	22.863	21.0	101.6	104.8	4	0.6	M12(1/2)	28
10	32.749	3.2	32.887	26.534	24.0	144.5	147.7	5	1.0	M16(5/8)	32
11	38.905	3.2	39.039	31.749	29.0	171.4	174.6	5	1.0	M16(5/8)	32
12	45.641	3.2	45.774	38.103	35.0	181.0	184.2	6	2.5	M20(3/4)	40
13	52.654	3.2	52.787	44.451	41.0	196.8	200.0	6	3.0	M20(3/4)	40
14	59.533	3.2	59.666	50.800	47.0	209.6	212.8	7	4.0	M24(1)	40
15	66.408	3.2	66.541	57.150	53.0	222.2	225.4	7	4.0	M24(1)	50
16	73.292	3.2	73.425	63.500	59.0	35.0	238.2	8	5.0	M30(11/8)	60

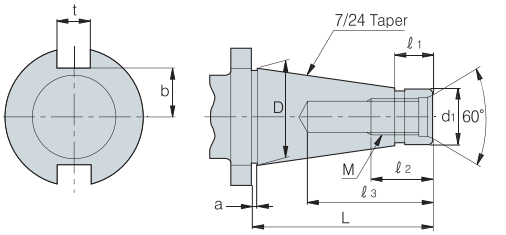
브라운·샤프 테이퍼(탱식)



(mm)

B&S No.	D	a	D1	d1	d2	ℓ1	ℓ2	b	c	e	R	r
4	10.221	2.4	10.321	8.458	8.1	42.1	44.5	5.5	8.7	14.4	7.9	1.3
5	13.286	2.4	13.386	10.962	10.7	55.6	58.0	6.3	9.5	16.2	7.9	1.5
6	15.229	2.4	15.330	12.167	11.7	73.0	75.4	7.1	11.1	18.0	7.9	1.5
7	18.424	2.4	18.524	14.675	14.2	89.7	92.1	7.9	11.9	20.3	9.5	1.8
8	22.828	3.2	22.962	18.453.	18.0	104.8	108.0	8.7	12.7	22.0	9.5	2.0
9	28.104	3.2	27.238	22.200	21.8	117.5	120.7	9.5	14.3	25.4	11.1	2.5
10	32.749	3.2	32.887	25.751	25.7	162.7	165.9	11.1	16.7	28.1	11.1	2.8
11	38.905	3.2	39.039	30.985	30.7	189.7	192.9	11.1	16.7	30.0	12.7	3.3
12	45.641	3.2	45.774	37.246	37.1	201.6	204.8	12.7	190	32.5	12.7	3.8
13	52.654	3.2	52.787	43.589	43.4	217.5	220.7	12.7	19.0	35.7	15.9	4.3
14	59.533	3.2	59.666	49.841	49.8	232.6	235.8	14.2	21.4	41.2	19.0	4.8
15	66.408	3.2	66.541	56.186	56.1	245.3	248.5	14.2	21.4	44.4	22.2	5.3
16	73.292	3.2	73.425	62.441	62.2	260.4	263.6	15.8	23.8	50.0	25.4	5.8

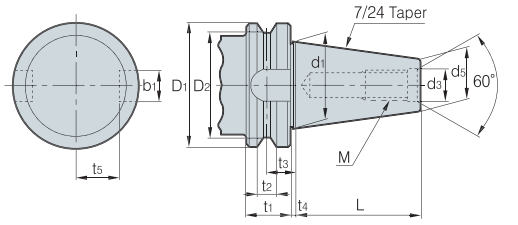
미국 밀링 머시인 표준테이퍼



(mm)

NT No.	호칭치수	D	D1	L	ℓ1	M	ℓ2	ℓ3	a	t	b
30	$1\frac{1}{4}$	31.750	$17.40^{-0.29}_{-0.36}$	70	20	UNC $\frac{1''}{2}$	24	50	1.6	15.9	6
40	$1\frac{3}{4}$	44.450	$25.32^{-0.30}_{-0.384}$	95	25	UNC $\frac{5''}{8}$	30	60	1.6	15.9	22.5
50	$2\frac{3}{4}$	69.850	$39.60^{-0.31}_{-0.41}$	130	25	UNC $1''$	45	90	3.2	25.4	35
60	$4\frac{1}{4}$	107.950	$60.20^{-0.34}_{-0.46}$	210	45	UNC $1\frac{1''}{4}$	56	110	3.2	25.4	60

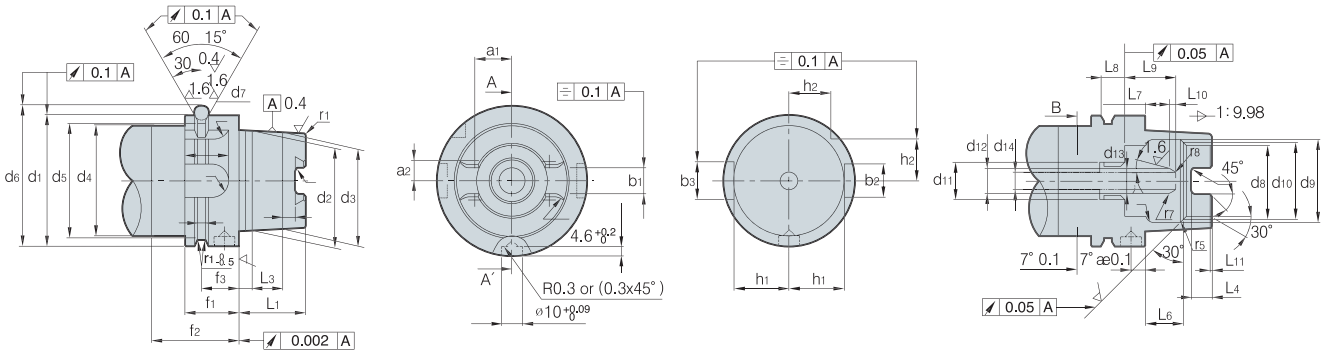
바틀그립 테이퍼



(mm)

BT No.	D1	D2	t1	t2	t3	t4	d1	d3	L	M	b1	t5	d5
35	53	43	22	10	14.6	2	38.1	13	56.5	M12×1.75	16.1	19.6	21.62
40	63	52	25	10	16.6	2	44.45	17	65.4	M16×2	16.1	22.6	25.3
45	85	73	30	12	21.2	3	57.15	21	82.8	M20×25	19.3	29.1	33.1
50	100	85	35	15	23.2	3	69.85	25	101.8	M24×3	25.7	35.4	40.1
60	155	135	45	20	28.2	3	107.95	31	161.8	M30×3.5	25.7	60.1	60.7

HSK 샹크(DIN 69893)



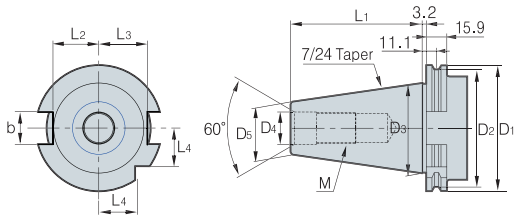
(mm)

HSK No.	b1	b2	b3	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12	d13	d14	a1	a2
50	10.54	12	14	50	38	36.90	42	43	59.3	7	26	32	29	M16X1	10	6.8	6.8	13.997	7.648
63	12.5	16	14	63	48	46.53	53	55	72.3	7	34	40	37	M18X1	12	8	8.4	17.862	9.25
100	20	20	14	100	75	72,80	85	92	109.75	7	53	63	58	M24X1.5	16	12	12	27.329	15.00

(mm)

HSK No.	f1	f2	f3	f4	b1	b2	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	r1	r2	r3	r4	r5	r6	r7	r8
50	26	42	18	3.75	2	15.5	25	5	11	7.5	4.5	14.13	10	10	23	3	1	19	1	1.5	2.38	6	0.5	1	2	6
63	26	42	18	3.75	28.5	20	32	6.3	14.7	10	6	18.13	10	12	24.5	3	1	21	1.2	1.5	3	8	0.6	1.5	3	8
100	29	45	20	3.75	44	31.5	50	10	24	15	10	28.56	12.5	16	28	3	1.5	24	2	2	3	12	1	1.5	3	10

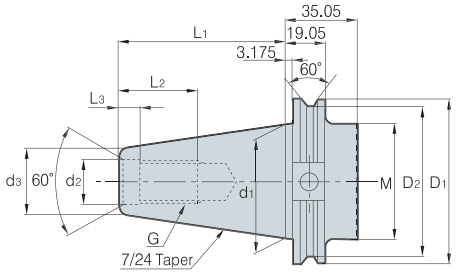
DIN 69871



(mm)

샹크 No	D1	D2	D3	D4	D5	L1	L2	L3	L	b	M
30	50.0	44.3	31.75	13	17.8	47.8	16.4	19.0	33.5	16.0	M12×1.75
40	63.5	56.2	44.45	17	24.5	68.4	22.8	25.0	42.5	16.1	M16×2
45	82.5	57.2	57.15	21	33.0	82.7	29.1	31.3	52.5	19.3	M20×2.5
50	97.5	91.2	68.85	25	40.1	101.7	35.5	37.7	61.5	25.7	M24×3

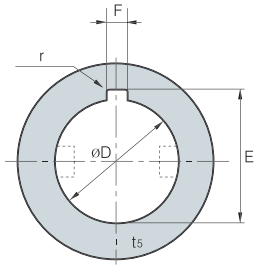
CAT 샹크



(mm)

샹크 No	D1	D2	M	d1	d2	d3	L1	L2	L3	G
CAT40	63.5	56.36	M16×2	44.45	16.28	21.84	68.25	28.45	4.78	5/8-11
CAT45	82.55	75.41	M20×25	57.15	19.46	27.69	82.55	38.1	4.78	3/4-10
CAT50	98.43	91.29	M24×3	69.85	26.19	35.05	101.6	44.45	6.35	1-8

밀링 커터의 구멍 규격(KSB3203)



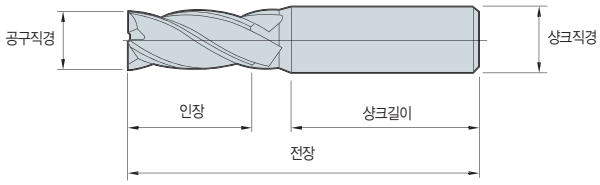
A형

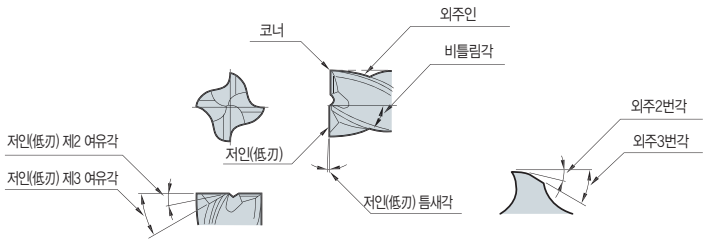
호칭지름	ø DH7	E	F	r
8	$8^{+0.015}_{0}$	$8.9^{+0.25}_{0}$	$2^{+0.16}_{+0.06}$	0.4
10	$10^{+0.015}_{0}$	$11.5^{+0.25}_{0}$	$3^{+0.16}_{+0.06}$	0.4
13	$13^{+0.018}_{0}$	$14.6^{+0.25}_{0}$	$3^{+0.16}_{+0.06}$	0.6
16	$16^{+0.018}_{0}$	$17.7^{+0.25}_{0}$	$4^{+0.19}_{+0.07}$	0.6
19	$19^{+0.021}_{0}$	$21.1^{+0.25}_{0}$	$5^{+0.19}_{+0.07}$	1
22	$22^{+0.021}_{0}$	$24.1^{+0.25}_{0}$	$6^{+0.19}_{+0.07}$	1
27	$27^{+0.021}_{0}$	$29.8^{+0.25}_{0}$	$7^{+0.23}_{+0.08}$	1.2
32	$32^{+0.025}_{0}$	$34.8^{+0.25}_{0}$	$8^{+0.23}_{+0.08}$	1.2
40	$40^{+0.025}_{0}$	$43.5^{+0.3}_{0}$	$10^{+0.23}_{+0.08}$	1.2
50	$50^{+0.025}_{0}$	$53.5^{+0.3}_{0}$	$12^{+0.23}_{+0.095}$	1.6
60	$60^{+0.030}_{0}$	$64.2^{+0.3}_{0}$	$14^{+0.275}_{+0.095}$	1.6
70	$70^{+0.030}_{0}$	$75.0^{+0.3}_{0}$	$16^{+0.275}_{+0.095}$	2
80	$80^{+0.030}_{0}$	$85.5^{+0.3}_{0}$	$18^{+0.275}_{+0.095}$	2
100	$100^{+0.035}_{0}$	$107.0^{+0.3}_{0}$	$24^{+0.32}_{+0.11}$	2.5

B형

호칭지름	ø DH7	E	F	r
$\frac{1}{2}$	$12.70^{+0.018}_{0}$	$14.17^{+0.25}_{0}$	$2.38^{+0.31}_{+0.13}$	0.5
$\frac{5}{8}$	$15.875^{+0.018}_{0}$	$17.74^{+0.25}_{0}$	$3.18^{+0.31}_{+0.13}$	0.8
$\frac{3}{4}$	$19.050^{+0.021}_{0}$	$20.89^{+0.25}_{0}$	$3.18^{+0.31}_{+0.13}$	0.8
$\frac{7}{8}$	$22.225^{+0.021}_{0}$	$24.07^{+0.25}_{0}$	$3.18^{+0.31}_{+0.13}$	0.8
1	$25.40^{+0.021}_{0}$	$28.04^{+0.25}_{0}$	$6.35^{+0.31}_{+0.13}$	1.2
$1\frac{1}{4}$	$31.750^{+0.025}_{0}$	$35.18^{+0.25}_{0}$	$7.94^{+0.32}_{+0.14}$	1.6
$1\frac{1}{2}$	$38.10^{+0.025}_{0}$	$42.32^{+0.25}_{0}$	$9.53^{+0.89}_{+0.25}$	1.6
$1\frac{3}{4}$	$44.450^{+0.025}_{0}$	$49.48^{+0.25}_{0}$	$11.11^{+0.89}_{+0.25}$	1.6
2	$50.80^{+0.03}_{0}$	$55.83^{+0.25}_{0}$	$12.7^{+0.89}_{+0.25}$	1.6
$2\frac{1}{2}$	$63.50^{+0.03}_{0}$	$69.42^{+0.25}_{0}$	$15.81^{+0.89}_{+0.25}$	1.6
3	$76.20^{+0.03}_{0}$	$82.93^{+0.25}_{0}$	$19.05^{+0.89}_{+0.25}$	2.4
$3\frac{1}{2}$	$88.90^{+0.035}_{0}$	$98.81^{+0.25}_{0}$	$22.23^{+0.89}_{+0.25}$	2.4
4	$101.60^{+0.035}_{0}$	$111.51^{+0.25}_{0}$	$25.4^{+0.89}_{+0.25}$	2.4
$4\frac{1}{2}$	$114.30^{+0.035}_{0}$	$125.81^{+0.25}_{0}$	$25.58^{+0.89}_{+0.25}$	3.2
5	$127.0^{+0.04}_{0}$	$140.08^{+0.25}_{0}$	$31.75^{+0.89}_{+0.25}$	3.2

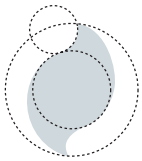
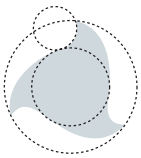
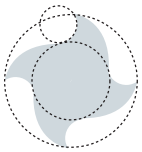
엔드밀의 형상 및 명칭





엔드밀 날수에 따른 비교

● 칩포켓 날수에 따른 특징 및 형상 비교

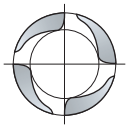
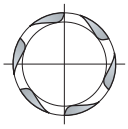
Ø10mm		2날	3날	4날
형 상				
날부단면적		44mm²	46mm²	48mm²
단면적율		56%	58%	61%
특징	장점	칩배출양호	칩배출성 양호	강성이 높음
	단점	강성이 저하	외경측정 어려움	칩배출성 저하
용 도		측면, 홈가공	측면, 홈가공	측면가공
		다용도로 쓰임	중, 정삭가공	정삭가공

● 날수에 따른 영향

항 목	주요특징	2 날	4 날
공구강성	비틀림강성	○	◎
	굽힘강성	○	◎
가공면조도	면조도	○	◎
	가공면정도	○	◎
칩처리성	칩막힘	◎	○
	칩배출성	◎	○
홈가공	칩배출성	◎	○
	키홈가공	◎	○
측면가공	가공면조도	○	◎
	진동	◎	○

◎우수 ○보통

일반 엔드밀과 고속가공용 엔드밀의 차이

일반 엔드밀		고속 가공용 엔드밀	
단면형식	특 징	단면형식	특 징
	– 저속, 고절입, 저이송 영역에 사용 – 저경도 피삭재용(일반강, 주철)		– 고속, 저절입, 고이송 영역에 사용 – 금형강 등의 고경도 피삭재 대응가능

절삭조건의 계산

● 절삭속도의 계산법

$$vc = \frac{\pi \times D \times n}{1000} \qquad n = \frac{1000 \times vc}{\pi \times D}$$

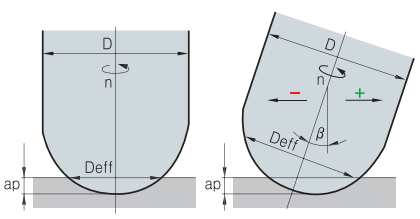
● 이송속도의 계산법

$vf = n \times fn \ \text{ or } \ n \times fz \times z$

$$fn = \frac{vf}{n} \qquad fz = \frac{fn}{z} \ \text{ or } \ \frac{vf}{n \times z}$$

vc : 절삭속도(m/min)
π : 원주율(3.14)
D : 엔드밀 외경(mm)
n : 회전속도(rpm,min⁻¹)
vf : 테이블이송(mm/min)
fn : 회전당 이송(mm/rev)
fz : 인(刃)당 이송량(mm/t)
z : 인(刃)수

볼엔드밀 절삭 속도 산출식

회전속도	$n = \frac{vc \times 1000}{D \times \pi}$
절삭속도	$vc = \frac{D \times \pi \times n}{1000}$
인(刃)당이송	$fz = \frac{vf}{z \times n}$
회전당이송	$fn = fz \times z$
테이블이송	$vf = fz \times z \times n$
칩제거율	$Q = ae \times ap \times vf$
유효직경	 $Deff = 2 \times \sqrt{D \times ap - ap^2}$ 계산Table 별첨참조 $Deff = D \times \sin\left[\beta \pm \arccos\left(\frac{D-2ap}{D}\right)\right]$

엔드밀 기술자료

날 길이의 영향

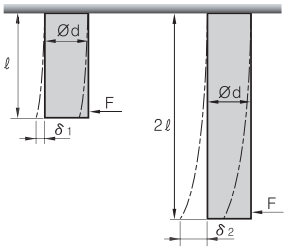
● 세장비의 표현

- 세장비(細長比 : 공구직경대비 인선 길이 비율)
- Aspect ratio
- ℓ/d
- 사용예 : 3d, 15d, 22d

● 길이에 따른 변형율

- 변형율이란 외부힘에 대한 반력
- 길이비의 3제곱에 비례
- 인,전장을 요한 범위 내 짧게 설정
- 엔드밀 날수가 많으면 강성이 큼
- 드릴은 구폭비가 좁을수록 강성이 큼

$$\delta = \frac{P\ell^3}{3EI}$$



- ℓ 이 2배 증가되면 δ2는 2ℓ³에 비례하므로 δ2 = 8δ1이됨 즉, 변형율은 8배 증가 됨

δ=변형량 P=절삭력 ℓ=인장 E=탄성계수 I=관성모멘트 ($I = \frac{\pi d^4}{64}$)

스핀들 회전수 환산표(rpm) - 외경기준

공구직경 \ vc	절삭속도(기호 : vc, 단위 : m/min)															
	20	30	40	50	60	70	80	90	100	120	140	150	180	200	250	300
0.2	31,831	47,746	63,662	79,577	95,493	111,408	127,324	143,239	159,155	190,986	222,817	238,720	286,479	318,310	397,887	477,465
0.3	21,221	31,831	42,441	53,052	63,662	74,272	84,883	95,493	106,103	127,324	148,545	159,155	190,986	212,207	265,258	318,310
0.4	15,915	23,873	31,831	39,789	47,746	55,704	63,662	71,620	79,577	95,493	111,408	119,366	143,239	159,155	198,944	238,732
0.5	12,732	19,099	25,465	31,831	38,197	44,563	50,930	57,296	63,662	76,394	89,127	95,493	114,592	127,324	159,155	190,986
0.6	10,610	15,915	21,221	26,526	31,831	37,136	42,441	47,746	53,052	63,662	74,272	79,577	95,493	106,103	132,629	159,155
0.7	9,095	13,642	18,189	22,736	27,284	31,831	36,378	40,926	45,473	54,567	63,662	68,209	81,851	90,946	113,682	136,419
0.8	7,958	11,937	15,915	19,894	23,873	27,852	31,831	35,810	39,789	47,746	55,704	59,683	71,620	79,577	99,472	119,366
0.9	7,074	10,610	14,147	17,684	21,221	24,757	28,294	31,831	35,368	42,441	49,515	53,052	63,662	70,736	88,419	106,103
1	6,366	9,549	12,732	15,915	19,009	22,282	25,465	28,648	31,831	38,197	44,563	47,746	57,296	63,662	79,577	95,793
1.5	4,244	6,366	8,488	10,610	12,732	14,854	16,977	19,099	21,221	25,465	29,709	31,831	38,197	42,441	53,052	63,662
2	3,183	4,775	6,366	7,958	9,549	11,141	12,732	14,324	15,915	19,099	22,282	23,873	28,648	31,831	39,789	47,746
2.5	2,546	3,820	5,093	6,366	7,639	8,913	10,186	11,459	12,732	15,279	17,825	19,099	22,918	25,465	31,831	38,197
3	2,122	3,183	4,244	5,305	6,366	7,427	8,488	9,549	10,610	12,732	14,854	15,915	19,099	21,221	26,526	31,831
3.5	1,819	2,728	3,638	4,547	5,457	6,366	7,276	8,185	9,095	10,913	12,732	13,642	16,370	18,189	22,736	27,284
4	1,592	2,387	3,183	3,979	4,775	5,570	6,366	7,162	7,958	9,549	11,141	11,937	14,324	15,915	19,894	23,873
4.5	1,415	2,122	2,829	3,537	4,244	4,951	5,659	6,366	7,074	8,488	9,903	10,610	12,732	14,147	17,684	21,221
5	1,273	1,910	2,546	3,183	3,820	4,456	5,093	5,730	6,366	7,639	8,913	9,549	11,459	12,732	15,915	19,099
5.5	1,157	1,736	2,315	2,894	3,472	4,051	4,630	5,209	5,787	6,945	8,102	8,681	10,417	11,575	14,469	17,362
6	1,061	1,592	2,122	2,653	3,183	3,714	4,244	4,775	5,305	6,366	7,427	7,958	9,549	10,610	13,263	15,915
6.5	979	1,469	1,959	2,449	2,938	3,428	3,918	4,407	4,897	5,876	6,856	7,346	8,815	9,794	12,243	14,691
7	909	1,364	1,819	2,274	2,728	3,183	3,638	4,093	4,547	5,457	6,366	6,821	8,185	9,095	11,368	13,642
7.5	849	1,273	1,698	2,122	2,546	2,971	3,395	3,820	4,244	5,093	5,942	6,366	7,639	8,488	10,610	12,732
8	796	1,194	1,592	1,989	2,387	2,785	3,183	3,581	3,979	4,775	5,570	5,968	7,162	7,958	9,947	11,937
8.5	749	1,123	1,498	1,872	2,247	2,621	2,996	3,370	3,745	4,494	5,243	5,617	6,741	7,490	9,362	11,234
9	707	1,061	1,415	1,768	2,122	2,476	2,829	3,183	3,537	4,244	4,951	5,305	6,366	7,074	8,842	10,610
9.5	670	1,005	1,340	1,675	2,010	2,345	2,681	3,016	3,351	4,021	4,691	5,026	6,031	6,701	9,377	10,052
10	637	955	1,273	1,592	1,910	2,228	2,546	2,865	3,183	3,820	4,456	4,775	5,730	6,366	7,958	9,549
11	579	868	1,157	1,447	1,736	2,026	2,315	2,604	2,894	3,472	4,051	4,341	5,209	5,787	7,234	8,681
12	531	796	1,061	1,326	1,592	1,857	2,122	2,387	2,653	3,183	3,714	3,979	4,775	5,305	6,631	7,958
13	490	735	979	1,224	1,469	1,714	1,959	2,204	2,449	2,938	3,428	3,673	4,407	4,897	6,121	7,346
14	455	682	909	1,137	1,364	1,592	1,819	2,046	2,274	2,728	3,183	3,410	4,093	4,547	5,684	6,821
15	424	637	849	1,061	1,273	1,485	1,698	1,910	2,122	2,546	2,971	3,183	3,820	4,244	5,305	6,366
16	398	597	796	995	1,194	1,393	1,592	1,790	1,989	2,387	2,785	2,984	3,581	3,979	4,974	5,968
17	374	562	749	969	1,123	1,311	1,498	1,685	1,872	2,247	2,621	2,809	3,370	3,745	4,681	5,617
18	354	531	707	884	1,061	1,238	1,415	1,592	1,768	2,122	2,476	2,653	3,183	3,537	4,421	5,305
19	335	503	670	838	1,005	1,173	1,340	1,508	1,675	2,010	2,345	2,513	3,016	3,351	4,188	5,026
20	318	477	637	796	955	1,114	1,273	1,432	1,592	1,910	2,228	2,387	2,865	3,183	3,979	4,775
21	303	455	606	758	909	1,061	1,213	1,364	1,516	1,819	2,122	2,274	2,728	3,032	9,789	4,547
22	289	434	579	723	868	1,013	1,157	1,302	1,447	1,736	2,026	2,170	2,604	2,894	3,617	4,341
23	277	415	554	692	830	969	1,107	1,246	1,384	1,661	1,938	2,076	2,491	2,768	3,460	4,152
24	265	398	531	663	796	928	1,061	1,194	1,326	1,592	1,857	1,989	2,387	2,653	3,316	3,979
25	255	382	509	637	764	891	1,019	1,146	1,273	1,528	1,783	1,910	2,292	2,546	3,183	3,820

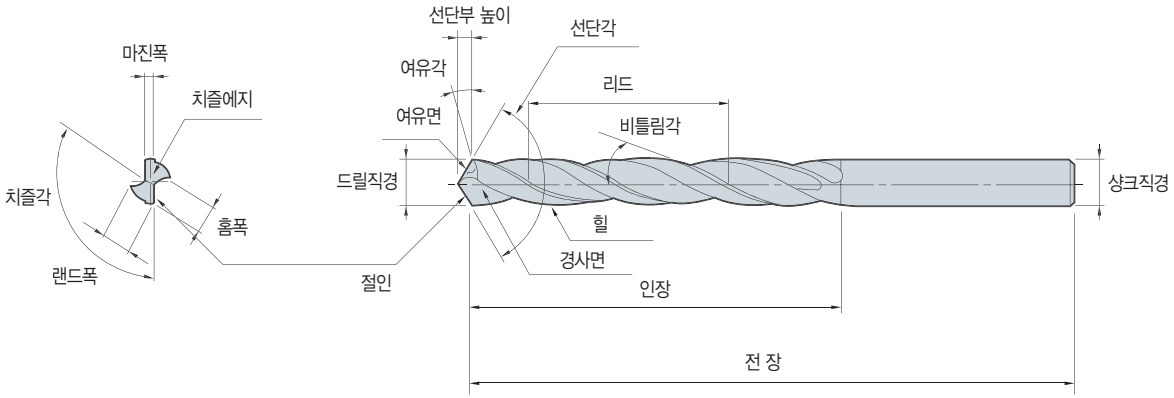
엔드밀 트러블의 원인과 대책

트러블 내용		원 인	대 책																
			절삭조건					공구 형상						재 종		기 타			
			절삭속도	이송량	절입량	절삭류	상·하향절삭	여유각	리드각	인 장	날 수	호 닝	칩포켓	인 성	경 도	기계강성	기계떨림	가공물고정	오버행
절인의 손상	외주인의 심한 마모	절삭조건 부적합	⬇	⬆		◉											⬆		
	치핑	절삭조건 부적합 구성인선 발생 공구강성 약화 공구재종 부적합		⬇			⬇	⬇				◉		⬆			⬇	⬆	⬇
	절삭중 파손	절삭조건 부적합 절삭부하 과대 오버행 과대		⬇	⬇					⬇			⬆			⬆		⬆	⬇
가공면 불량		구성인선 발생	⬆	⬆		◉			⬆			◉							
		떨림 발생	⬇				⬇			⬇						⬆	⬇	⬆	⬇
		진직도 불량		⬇	⬇		⬆		⬆	⬇									⬇
형상정밀도불량 (가공치수, 직각도)		절삭조건 부적합 공구형상 부적합	⬆	⬇			⬇			⬇	⬆					⬆	⬇		⬇
칩 배출 불량		절삭량 과다 칩포켓 부적합 절삭조건 부적합		⬇	⬇						⬇		⬆						

⬆ : 증가 ⬇ : 감소 ● : 사용 ◉ : 올바르게 사용

드릴 기술자료

스핀들 회전수 환산표(rpm) - 외경기준



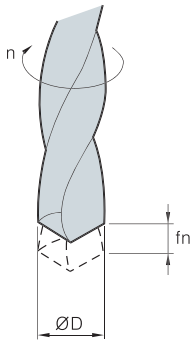
형상제원과 절삭특징

비틀림각	절삭날의 경사각역할을 수행. 비틀림각을 크게 하면 절삭저항이 작게 되는 경향이 있으나, 어느 정도 이상이 되면 드릴강성이 저하하는 원인으로 작용 절삭성 나쁘다 ◀작다 – 비틀림각 – 크다▶ 칩배출성 좋음 경질재(고경도강) ◀작다 – 비틀림각 – 크다▶ 연질재(알루미늄 등)
홈의길이	절삭으로 인해 생성된 칩을 배출시키는 통로이며, 절삭유제의 유입 통로임 너무 크면 드릴 강성을 저하시키고, 작으면 칩 배출성이 나빠져 파손의 원인
선단각	선단각은 절삭성능에 많은 영향을 주는 인자. 주로 피삭재에 의해 결정되며 표준품의경우 보통 118°로 되어있음 트러스트 저항감소 ◀작다 – 선단각 – 크다▶ 스러스트 저항증가 토크증가, 출구Burr증가 ◀작다 – 선단각 – 크다▶ 토크감소, 출구Burr감소 연질재(알루미늄 등) ◀작다 – 선단각 – 크다▶ 경질재(고경도강)
마진	가공시 피삭재 내경에 드릴의 외경이 닿는 부분으로 굽힘 방지 및 가이드 역할을 하는곳으로 주로 드릴의 크기에 따라 정해짐 절삭저항 감소 ◀작다 – 마진 – 크다▶ 절삭저항 증가 가이드성 부족 ◀작다 – 마진 – 크다▶ 가이드성 양호
심두께	드릴의 축심부를 형성하는 부분으로 강성을 부여. 드릴은 기 구멍이 없는 곳에 구멍뚫기를개시하기 위하여 선단에도 절삭날이 요하게 되며, 이 부분이 바로 치즐에지임. 심두께가 클 경우에는 저항을 감소시키기 위해 씨닝을 함 절삭저항 감소 ◀작다 – 심두께 – 크다▶ 절삭저항 증가 강성 감소 ◀작다 – 심두께 – 크다▶ 강성 증가 칩배출성 양호 ◀작다 – 심두께 – 크다▶ 칩배출성 저하 연질재(알루미늄 등) ◀작다 – 심두께 – 크다▶ 경질재(고경도강)
인경 백테이퍼	드릴직경은 선단부에서 샹크쪽 으로 갈수록 작게 되어있는데, 드릴링 중 드릴의 외주부가 피삭재에 마찰을 회피하는 역할을 함 일반적으로 홈의길이(인장) 100mm에 대한 직경의 감소량으로 나타내고, 0.04~0.1mm정도. 고능률 가공용 드릴이나 가공구멍의 조임이 발생하는 파삭재의 경우는 크게 설정됨
씨닝	일반 드릴의 트러스트 비율은 치즐부의 비율이 50%이상됨. 치즐에지의 길이는 드릴의 심두께와 치즐각에 의해 결정되나, 드릴 웨브의 두께를 얇게 하면 드릴 강도를 저하 시키게 됨. 그래서 웨브두께의 변화없이 씨닝을 실시하여 치즐에지를 짧게하든가 혹은 경사각을 부여. 즉, 씨닝을 통해 치즐부에 경사각을 부여해주고, 칩 배출성을 향상 시켜주고, 형상개선을 통한 트러스트 감소 등의 효과를 기대할 수 있음

종 류	형 태	특 징	당사적용
X형		진입성 양호, 중심두께가 높음 크랭크샤프트	마하드릴(MSD), 발칸드릴(VZD)
S형		범용, 일반용 재연삭이 용이	솔리드드릴(SSD)

드릴 트러블의 원인과 대책

절삭속도	이송속도	비틀림각	드릴가공 시간
$vc = \frac{\pi \cdot D \cdot n}{1000}$ (m/min)	$fn = \frac{vf}{n}$ (mm/rev)	$\delta = \tan^{-1}\left(\frac{\pi D}{L}\right)$	$tc = \frac{ld}{n \cdot fn}$ (min)
• vc : 절삭속도 (m/min) • D : 드릴직경 (mm) • n : 회전수 (min^{-1}) • π : 원주율 (3.14)	• fn : 이송 (mm/rev) • vf : 1분당가공깊이 (mm/min) • n : 회전수 (min^{-1})	• δ : 비틀림각 • D : 드릴직경 (mm) • L : 리이드 (mm) • π : 원주율 (3.14)	• tc : 가공시간 (min) • n : 회전수 (min^{-1}) • ld : 드릴가공길이 (mm) • fn : 이송 (mm/rev)



절삭토크 및 트러스트 (계산식)

$Md = KD^2 \times (0.0631 + 1.686 \times fn)(kg \cdot cm)$

$T = 57.95KDfn^{0.85}(kg)$

• Md : 절삭토크(kg · cm)
• T : 절삭트러스트(kg)
• D : 드릴직경(mm)
• fn : 이송(mm/rev)
• K : 재료계수

피 삭 재		인장강도(kgf/mm^2)	경도(HB)	재료계수 K
주철	주철(보통주철)	21	177	1.00
	주철	28	198	1.39
	주철(고급주철)	35	224	1.88
일반강	1020(탄소강 C 0.2%)	55	160	2.22
	1112(쾌삭강 C 0.12, S 0.2%)	62	183	1.42
	1335(망간강 Mn 1.75%)	63	197	1.45
니켈 크롬강	3115(Ni 1.25, Cr 0.6, Mn 0.5)	53	163	1.56
	3120(Ni 1.25, Cr 0.6, Mn 0.7)	69	174	2.02
	3140	88	241	2.32
크롬 몰리브덴강	4115(Cr 0.5, Mo 0.11, Mn 0.8)	63	167	1.62
	4130(Cr 0.95, Mo 0.2, Mn 0.5)	77	229	2.10
	4140(Cr 0.95, Mo 0.2, Mn 0.85)	94	269	2.41
니켈 몰리브덴강	4615(Ni 1.8, Mo 0.25, Mn 0.5)	75	212	2.12
	4820(Ni 3.5, Mo 0.25, Mn 0.6)	140	390	3.44
크롬강	5150(Cr 0.8, Mn 0.8)	95	277	2.46
크롬 바나듐강	6115(Cr 0.6, Mn 0.6, V 0.12)	58	174	2.08
	6120(Cr 0.8, Mn 0.8, V 0.1)	80	255	2.22

절삭토크 및 트러스트 (실험식)

$Md = K_1 \cdot d^2 \cdot fn^m$

$T = K_2 \cdot d \cdot fn^n$

• Md : 절삭토크(㎏ · ㎝)
• T : 트러스트(㎏)
• fn : 이송(mm/rev)
• K_1, K_2, m, n : 실험 Data 특성치
• d : 드릴반경(mm)

피 삭 재	K_1	m	K_2	n
연강	5.9	1.00	125.0	0.88
압연강	3.5	1.00	55.0	0.88
7-3 황 동	2.5	0.94	44.4	0.87
알루미늄	1.5	0.90	33.3	0.78
아연	1.4	0.88	27.0	0.74
포금	2.0	0.94	21.6	0.75
함석	0.3	0.57	6.4	0.55

드릴 트러블의 원인과 대책

트러블 내용		원 인	대 책															
			절삭조건					공구 형상						재 종		기 타			
			절삭속도	이송량	스텝이송	초기이송	절삭유	여유각	선단각	씨닝각	호닝	구폭비	씨닝	인성	경도	기계강성	기계떨림	가이드부쉬	가공물고정
치핑		• 인선이 너무 날카로움 (여유각 과대) (씨닝날이 너무 날카로움)						⬇		⬇	⬆			⬆					
		• 절삭속도 과대	⬇				●												
		• 구성인선 발생					●	⬇		⬇	⬆			⬆					
		• 진동과 떨림 발생	⬇													⬆	⬇		●
마모		• 절삭속도 과대 (마진부 이상마모)	⬇				●												
		• 절삭속도 부족 (중심부 이상마모)	⬆				●												
칩		• 롱칩 발생	⬆	⬆			●				⬇								
		• 접철 발생	⬆	⬆															
		• 칩이 탄다	⬆				●												
구멍정도 버 발생 가공면 불량		• 공구 장착 정도				⬇			⬇		⬇					⬆	⬇		●
		• 과대이송, 선단각의 날카로움		⬇					⬆		⬇								
		• 절삭속도 과대 (공구재종대비)	⬆				●	⬇	◉						⬆				
절 손	가공시작 시점에서 파손	• 가공물의 표면상태가 불량			●	⬇												●	
		• 기계 강성이 부족														⬆			●
		• 절삭조건 부적당	⬆	⬇															
	가공도중 파손	• 구멍이 굴곡짐	⬆						⬆				●				⬇	●	
		• 칩이 막힘		⬇	●							⬆							

⬆ : 증가 ⬇ : 감소 ● : 사용 ◉ : 올바르게 사용

나사 기초 구멍

● 미터 보통 나사

규 격	드릴직경
M1 X 0.25	0.75
M1.1 X 0.25	0.85
M1.2 X 0.25	0.95
M1.4 X 0.3	1.1
M1.6 X 0.35	1.25
M1.7 X 0.35	1.35
M1.8 X 0.35	1.45
M2 X 0.4	1.6
M2.2 X 0.45	1.75
M2.3 X 0.4	1.9
M2.5 X 0.45	2.1
M2.6 X 0.45	2.2
M3 X 0.6	2.4
M3 X 0.5	2.5
M3.5 X 0.6	2.9
M4 X 0.75	3.25
M4 X 0.7	3.3
M4.5 X 0.75	3.8
M5 X 0.9	4.1
M5 X 0.8	4.2
M5.5 X 0.9	4.6
M6 X 1	5
M7 X 1	6
M8 X 1.25	6.8
M9 X 1.25	7.8
M10 X 1.5	8.5
M11 X 1.5	9.5
M12 X 1.75	10.3
M14 X 2	12
M16 X 2	14
M18 X 2.5	15.5
M20 X 2.5	17.5
M22 X 2.5	19.5
M24 X 3	21
M27 X 3	24
M30 X 3.5	26.5
M33 X 3.5	29.5
M36 X 4	32
M39 X 4	35
M42 X 4.5	37.5
M45 X 4.5	40.5
M48 X 5	43

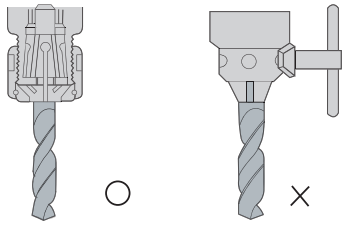
● 미터 가는 나사

규 격	드릴직경
M2.5 X 0.35	2.2
M3 X 0.35	2.7
M3.5 X 0.35	3.2
M4 X 0.5	3.5
M4.5 X 0.5	4
M5 X 0.5	4.5
M5.5 X 0.5	5
M6 X 0.75	5.3
M7 X 0.75	6.3
M8 X 1	7
M8 X 0.75	7.3
M9 X 1	8
M9 X 0.75	8.3
M10 X 1.25	8.8
M10 X 1	9
M10 X 0.75	9.3
M11 X 1	10
M11 X 0.75	10.3
M12 X 1.5	10.5
M12 X 1.25	10.8
M12 X 1	11
M14 X 1.5	12.5
M14 X 1	13
M15 X 1.5	13.5
M15 X 1	14
M16 X 1.5	14.5
M16 X 1	15
M17 X 1.5	15.5
M17 X 1	16
M18 X 2	16
M18 X 1.5	16.5
M18 X 1	17
M20 X 2	18
M20 X 1.5	18.5
M20 X 1	19
M22 X 2	20
M22 X 1.5	20.5
M22 X 1	21
M24 X 2	22
M24 X 1.5	22.5
M24 X 1	23
M25 X 2	23
M25 X 1.5	23.5
M25 X 1	24
M26 X 1.5	24.5
M27 X 2	25

사용시 주의사항

● 드릴척의 선정

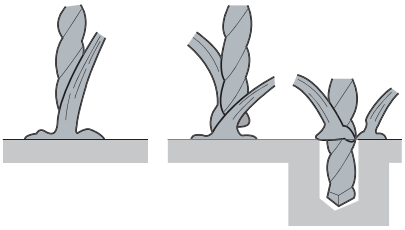
• 콜릿방식의 파지력이 강한 척이 좋음
(일반드릴척, 키레스척은 파지력이 약하여 강용 드릴에 부적합)



• 콜렛척 방식　　• 일반 드릴척 방식

● 절삭유 급유방법

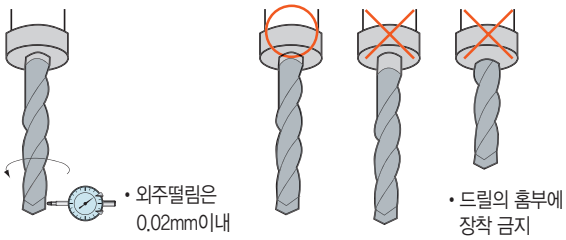
• 절삭유는 구멍의 입구부에 충분히 공급
• 표준절삭유압 : 3~5kg/㎠, 유량 : 2~5 ℓ /min



• 구멍의 입구부에 다량으로 공급

● 드릴의 장착

• 드릴 장착시 외주 떨림이 0.02㎜ 이내가 되도록 장착
• 드릴의 플루트부가 클램프 되지 않도록 유의

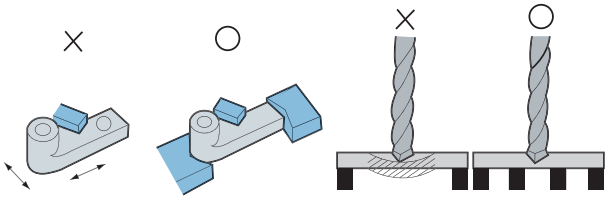


• 외주떨림은 0.02mm이내

• 드릴의 홈부에 장착 금지

● 가공물의 클램프 방법

• 고능률 구멍가공시에는 높은 트러스트, 토크와 동시에 수평 방향의 절삭력이 크게 작용하므로 진동이 발생치 않도록 견고히 클램프



수평부족으로 공작물이 움직여 드릴의 파손 유발

상하,좌우로 부터 확실한 클램프 필요

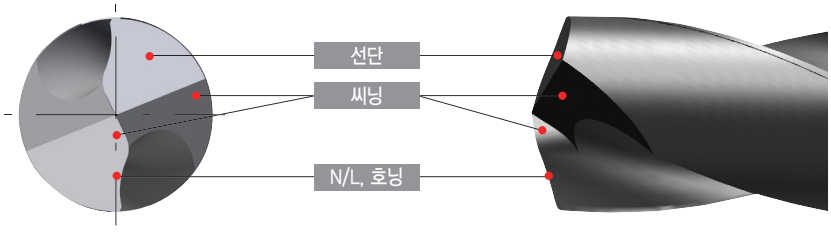
벤딩으로 치핑이 발생하므로 견고한 지지가 필요

재연삭시 주의사항

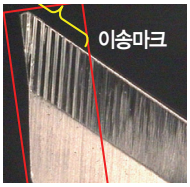
1) 드릴의 수명을 최대한 보장하기 위해서는 드릴의 손상이 재연삭 가능한 지점까지만 사용하여 재연삭 실시
2) 마모 및 손상부위가 1.5㎜이내 이어야만 재연삭이 가능
3) 드릴에 크랙이 발생할 경우는 재연삭이 불가능
4) 재연삭은 당사에 의뢰하시거나 재연삭 장치를 구입 사용하여 실시

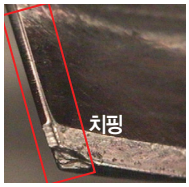
재연삭 설명서

● 재연삭방법(마하드릴)

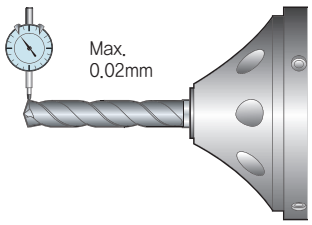


1) 준비작업 - 재연삭 범위 결정
이송 마크 또는 치핑, 마모구간을 확인하여 재연삭 범위를 결정
제거량이 많을 경우에는 거친 연삭을 실시





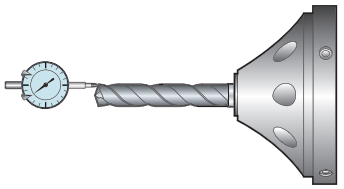
2) 연삭작업 - 드릴 셋팅
드릴을 콜렛척에 클램핑하고 흔들림은 0.02mm 이내 셋팅

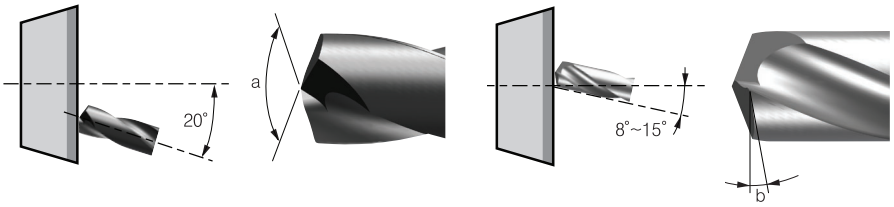


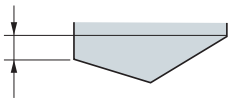
3) 연삭작업 - 선단연삭

– 선단부의 치핑 및 마모부위가 완벽히 제거 되도록 연삭
– 절입량을 0.02~0.03mm로 하며 립하이트차가 0.02mm 이내가 되도록 연삭을 실시

〈해당항목〉
선단각(a) : 140˚
선단여유각(b) : 8˚~15˚



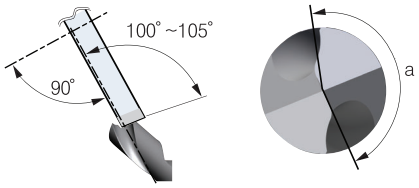


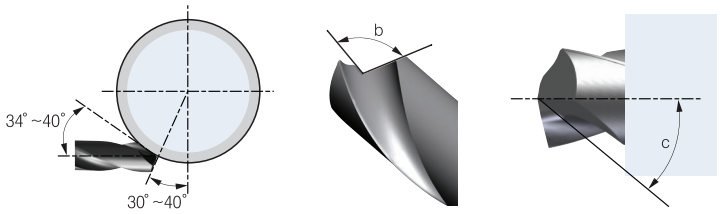


4) 연삭작업 - 씨닝연삭

– 네가랜드 폭을 감안하여 좌우 대칭이 되도록 드릴축심에서 인선높이를 0.03~0.08mm로 세팅
– 휠은 드릴 축에서 34˚~40˚가 되게 하여 절입

〈해당항목〉
씨닝각(a) : 155˚~160˚/씨닝열림각(b) : 100˚~105˚
씨닝여유각(c) : 34˚~40˚

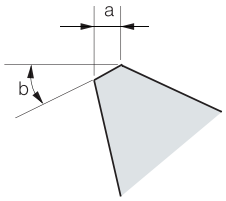




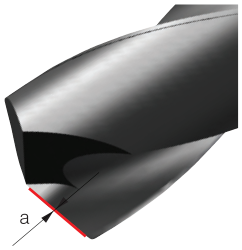
5) 연삭작업 - 네가랜드 연삭 및 호닝

– 선단 인선을 따라 다이아몬드 줄을 이용하여 균일한 폭으로 실시
– 네가랜드 작업후 부러쉬 또는 핸드스톤을 이용하여 마무리

〈해당항목〉
네가랜드폭(a) : 0.05mm~0.16mm/N/L각(b) : 24˚~26˚



• 네가랜드부 확대



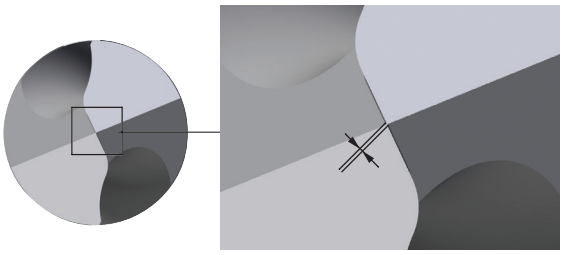
● TIP

• 포인트 만들기

– 별도의 센터드릴 없이 사용이 가능하도록 포인트의 폭을 0.10mm이하가 되도록 실시

• 추천연삭 조건

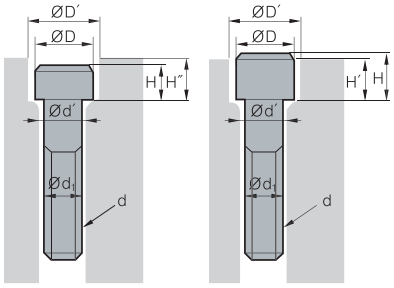
– 다이아몬드 휠 : 240~400 메쉬
– 다이아몬드 줄 : 400~600 메쉬
– 다이아몬드 핸드스톤 : 800~1500 메쉬



육각구멍 볼트구멍치수

● 육각구멍 볼트에 대한 카운터보링 및 볼트구멍의 치수

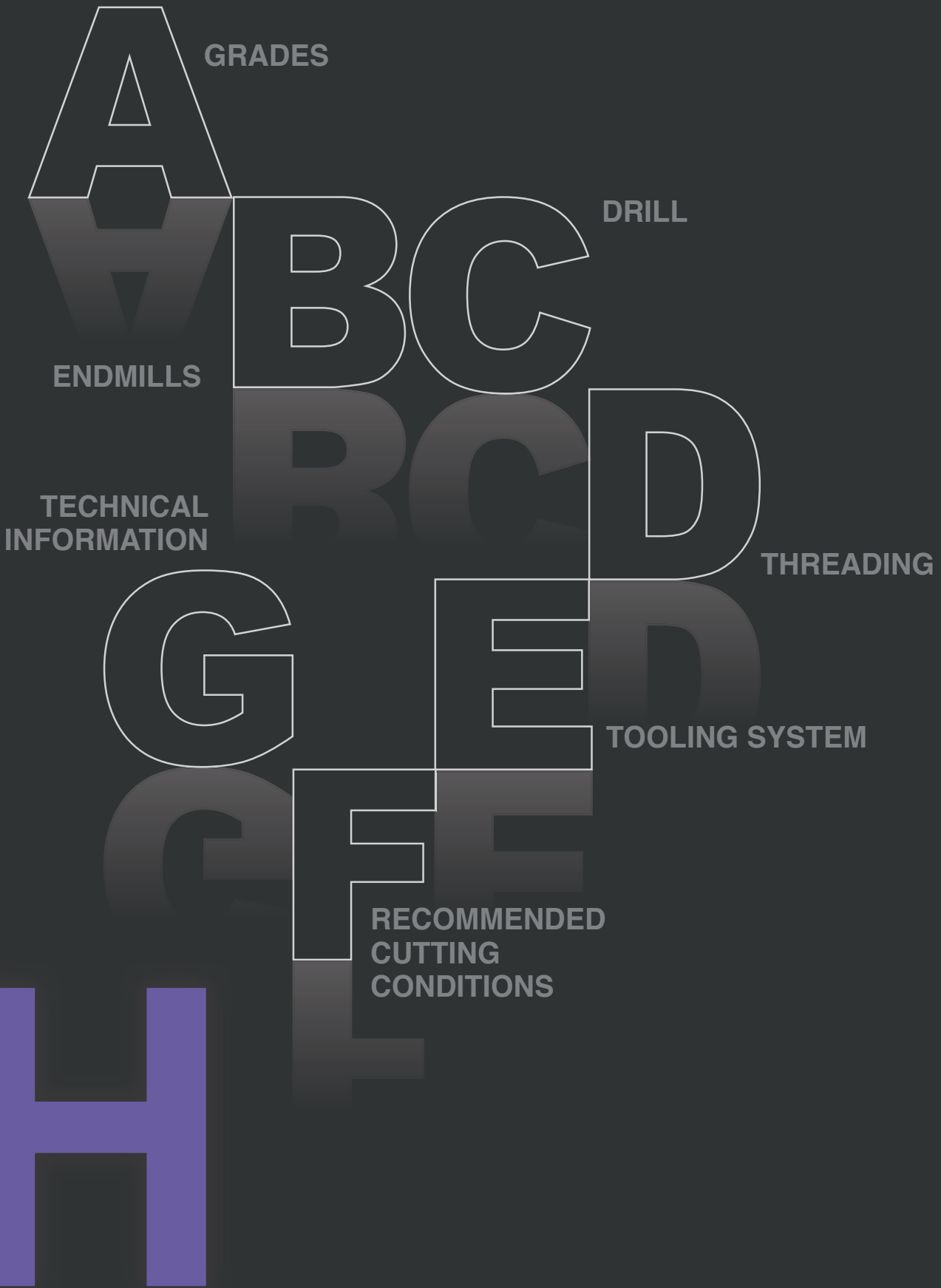
나사 호칭 (d)	M3	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30
Ød₁	3	4	5	6	8	10	12	14	16	18	20	22	24	27	30
Ød′	3.4	4.5	5.5	6.5	8.5	11	14	16	18	20	22	24	26	30	33
ØD	5.5	7	8.5	10	13	16	18	21	24	27	30	33	36	40	45
ØD′	5	8	9.5	11	14	17.5	20	23	26	29	32	35	39	43	48
H	3	4	5	6	8	10	12	14	16	18	20	22	24	27	30
H′	2.7	3.6	4.6	5.5	7.4	9.2	11.0	12.8	14.5	16.5	18.5	20.5	22.5	25	28
H″	3.3	4.4	5.4	6.5	8.6	10.8	13.0	15.2	17.5	19.5	21.5	23.5	25.5	29	32



코오로이 솔리드 재종표

Cat.		재종	ISO						엔드밀	솔리드 드릴	코 팅 층
			P	M	K	S	N	H			
코팅	PVD	PC2510				S05-S15			●		★ New TiAlN film (High hardness/ Oxidation resistance)
초경		H01			K05-K10	S01-S10	N10-N20	H05-H10	●		
코팅	PVD	PC203F						H05-H15	●		★ New TiAlN film (High hardness/ Oxidation resistance)
	PVD	PC210C					N10-N20		●		CrN
	PVD	PC215F	P20-P35						●		★ New TiAlN film (High hardness/ Oxidation resistance)
	PVD	PC215G	P15-P30		K15-K30					●	TiAlN
	PVD	PC221F	P35-P45		K35*K45				●		★ New TiAlN film (High hardness/ Oxidation resistance)
	PVD	PC230F	P05-P15	M05-M15	K05-K15						★ New TiAlN film (High hardness/ Oxidation resistance)
	PVD	PC303S	P05-P15		K05-K15			H05-H15	●		TiMeN TiAlN
	PVD	PC310U	P10-P20		K10-K20			H10-H20	●		TiMeN TiAlN
	PVD	PC315E	P20-P35		K20-K35				●		AlCrN
	PVD	PC315G	P15-P30		K15-K30					●	TiAlCrN
	PVD	PC320	P20-P35		K20-K35				●		TiAlN
	PVD	PC320S		M20-M30		S20-S30			●		TiMeN TiAlN
	PVD	PC320U	P01-P10		K05-K10				●		AlCrN
	PVD	SL				S25-S35			●		TiAlN
	PVD	PC325T				S20-S30				●	TiMeN TiAlN
	PVD	PC325U	P20-P35	M20-M30	K20-K35					●	TiAlCrN
초경		H01					N10-N20		●		
		H05S					N10-N20		●		
		FCC			N15-N35				●		
		FG2	P05-P25				N05-N25			●	
		FA1	P05-P25				N05-N25			●	
다이아코팅	CVD	ND2100					N2.5-N7.5		●	●	Dia Coating
	CVD	ND3000					N01-N05		●		Dia Coating
DLC	PVD	PD1005					N05-N10		●		DLC(ta-c)
	PVD	PD1010					N10-N15		●		DLC(ta-c)

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내셔널 파이프 나사 파인피치(NPTF)	나사	D19
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엔드밀 형번표기법	엔드밀	B3
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철강, 비철금속기호 일람표	기술자료 I	G6

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BT-DMC	툴링시스템(NPM)	E35
BT-DSC	툴링시스템(DSC)	E25
BT-DSC/M	툴링시스템(DSC)	E25
BT-DSC/S	툴링시스템(DSC)	E28
BT-DSK	툴링시스템(DSK)	E66
BT-DST	툴링시스템(DST)	E82
BT-DTN	툴링시스템(DTN)	E78
BT-GSK	툴링시스템(GSK)	E69
BT-HRAG	툴링시스템(HRAG)	E108
BT-KAC	툴링시스템(KAC)	E112
BT-KAG	툴링시스템(KAG)	E106
BT-KAH	툴링시스템(KAH)	E102
BT-KHU	툴링시스템(KAU)	E104
BT-MAH	툴링시스템(MAH)	E110
BT-MD	툴링시스템(MD)	E95
BT-NPM	툴링시스템(NPM)	E32
BT-NPU	툴링시스템(GSK)	E75
BT-OFH	툴링시스템(OFH)	E88
BT-SAH	툴링시스템(SAH)	E114
BT-SDC/P	툴링시스템(SDC/P)	E44
BT-SDC/PL	툴링시스템(SDC/PL)	E51
BT-SLA	툴링시스템(SLA)	E89
BT-TNPU	툴링시스템(GSK)	E76
BT-TSK	툴링시스템(GSK)	E72
CAMELEON CS Type	엔드밀(T Endmill)	B239
CAMELEON Type	엔드밀(T Endmill)	B240
CBE2000	엔드밀(C-Max 볼)	B249
CBNE2000	엔드밀(C-Max 롱 넥 볼)	B249
cBN-MBE2000	엔드밀(The Mirror Endmill 볼)	B23
cBN-MRE2000	엔드밀(The Mirror Endmill 레디우스)	B23
CCDR4000/6000	엔드밀(Composite Router Endmill 플랫)	B225
CCHR4000/6000	엔드밀(Composite Router Endmill 플랫)	B225
CCLR4000	엔드밀(Composite Router Endmill 플랫)	B226
CCR2000	엔드밀(Composite Router Endmill 플랫)	B226
CCRR6000/8000	엔드밀(Composite Router Endmill 플랫)	B227
CCT	드릴(챔퍼툴)	C57
CERACUBE/TRION-Z Type	엔드밀(T Endmill)	B243
CEREC Type	엔드밀(T Endmill)	B246
CET	드릴(챔퍼툴)	C56
CFE2000	엔드밀(C-Max 플랫)	B247
CFNE2000	엔드밀(C-Max 롱 넥 플랫)	B248
CHARLY Type	엔드밀(T Endmill)	B233
Composite Router Endmill 기술안내	엔드밀(Composite Router Endmill)	B224
CPD	드릴(PCD드릴 표준 콘)	C44
CPDL	드릴(PCD드릴 롱 콘)	C44
CRE2000	엔드밀(C-Max 레디우스)	B250
CRNE2000	엔드밀(C-Max 롱 넥 레디우스)	B250
CSHC1000	드릴(카운터싱크)	C60
CSHH1000	드릴(카운터싱크)	C62
CSNC1000	드릴(카운터싱크)	C60
CSNC3000	드릴(카운터싱크)	C59
CSNH1000	드릴(카운터싱크)	C62
CSNH3000	드릴(카운터싱크)	C61
CSPC3000	드릴(카운터싱크)	C59
CSPH3000	드릴(카운터싱크)	C61
D Endmill 기술안내	엔드밀(D Endmill)	B216
DBE2000	엔드밀(D Endmill 볼)	B221
DBE4000	엔드밀(D Endmill 볼)	B223
DBT-DHE	툴링시스템(DHE)	E6
DBT-MD	툴링시스템(MD)	E93

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DBT-SDC/P	툴링시스템(SDC/P)	E42
DC 콜렛	툴링시스템(DCJ)	E38
DCJ 기술안내	툴링시스템(DCJ)	E37
DCL 기술안내	툴링시스템(DCL)	E36
DCS 콜렛	툴링시스템(DCJ)	E39
DENTIUM Type	엔드밀(T Endmill)	B244
DFE2000	엔드밀(D Endmill 플랫)	B217
DFE4000	엔드밀(D Endmill 플랫)	B218
DHC 콜렛	툴링시스템(DHC 콜렛)	E17
DHC-(P) 콜렛	툴링시스템(DHC 콜렛)	E18
DHE 기술안내	툴링시스템(DHE)	E5
DHE/G	툴링시스템(DHE/G)	E16
DHE/G 기술안내	툴링시스템(DHE/G)	E15
DHE/S 기술안내	툴링시스템(DHE/S)	E12
DHJ 콜렛	툴링시스템(DHC 콜렛)	E18
DJT	툴링시스템(DCJ)	E40
DOF Type	엔드밀(T Endmill)	B245
DRE2000	엔드밀(D Endmill 레디우스)	B219
DRE4000	엔드밀(D Endmill 레디우스)	B220
DSC 기술안내	툴링시스템(DSC)	E21
DSK 기술안내	툴링시스템(DSK)	E65
DST 기술안내	툴링시스템(DST)	E81
DTN 기술안내	툴링시스템(DTN)	E77
DZC	툴링시스템(DZC)	E20
DZC 기술안내	툴링시스템(DZC)	E19
ELBEN Type	엔드밀(T Endmill)	B245
ER 콜렛	툴링시스템(GERC)	E57
ER 콜렛 세트	툴링시스템(GERC)	E60
ER/L 기술안내	툴링시스템(ER/L)	E62
ER/L 콜렛	툴링시스템(ER/L)	E62
ER-T 콜렛	툴링시스템(GERC)	E61
ESB702	엔드밀(H-Star Endmill 넥 볼)	B75
ESB703	엔드밀(H-Star Endmill 넥 볼)	B77
ESB712	엔드밀(H-Star Endmill 볼)	B76
ESB734	엔드밀(H-Star Endmill 15° 헬릭스볼)	B77
ESE702	엔드밀(H-Star Endmill 넥 플랫)	B26
ESE704	엔드밀(H-Star Endmill 넥 플랫)	B28
ESE712	엔드밀(H-Star Endmill 플랫)	B27
ESE714	엔드밀(H-Star Endmill 하이 헬릭스 플랫)	B29
ESE716	엔드밀(H-Star Endmill 하이 헬릭스 플랫)	B32
ESE724(6)	엔드밀(H-Star Endmill 하이 헬릭스 플랫)	B30
ESE744	엔드밀(H-Star Endmill 플랫)	B31
ESLNB20	엔드밀(H-Star Endmill 롱 넥 볼)	B83

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ESLNR20	엔드밀(H-Star Endmill 롱 넥 레디우스)	B68
ESLNS20	엔드밀(H-Star Endmill 롱 넥 플랫)	B39
ESLNS40	엔드밀(H-Star Endmill 롱 넥 플랫)	B43
ESPM4	엔드밀(H-Star Endmill 넥 레디우스)	B74
ESR702	엔드밀(H-Star Endmill 넥 레디우스)	B45
ESR704	엔드밀(H-Star Endmill 넥 레디우스)	B49
ESR706	엔드밀(H-Star Endmill 넥 레디우스)	B53
ESR714	엔드밀(H-Star Endmill 레디우스)	B51
ESR724	엔드밀(H-Star Endmill 넥 레디우스)	B51
ESR732	엔드밀(H-Star Endmill 롱 샹크 레디우스)	B48
ESR734	엔드밀(H-Star Endmill 롱 샹크 레디우스)	B52
ESR736	엔드밀(H-Star Endmill 레디우스)	B53
ESRB712	엔드밀(H-Star Endmill 리브 볼)	B78
ESRE712	엔드밀(H-Star Endmill 리브 플랫)	B33
ESRE714	엔드밀(H-Star Endmill 리브 플랫)	B36
ESRR712	엔드밀(H-Star Endmill 리브 레디우스)	B54
ESRR714	엔드밀(H-Star Endmill 리브 레디우스)	B60
ESTNB20	엔드밀(H-Star Endmill 테이퍼드 넥 볼)	B87
ESTNB30	엔드밀(H-Star Endmill 테이퍼드 넥 볼)	B91
ESTNR20	엔드밀(H-Star Endmill 테이퍼드 넥 레디우스)	B72
ESXE704	엔드밀(H-Star Endmill 넥 플랫)	B38
ESXE714	엔드밀(H-Star Endmill 플랫)	B38
ESXR704	엔드밀(H-Star Endmill 넥 레디우스)	B67
EXT	툴링시스템(EXT/RDC)	E99
GERC 기술안내	툴링시스템(GERC)	E53
GERC 콜렛	툴링시스템(GERC)	E54
GERC 콜렛 세트	툴링시스템(GERC)	E56
GSK 기술안내	툴링시스템(GSK)	E68
Gun Drill 기술안내	드릴(건 드릴)	C46
HBRE	드릴(브로치 리머)	C55
HC 콜렛	툴링시스템(GSK)	E73
HSK-ATM	툴링시스템(ATM)	E120
HSK-DHE	툴링시스템(DHE)	E9
HSK-DHE/S	툴링시스템(DHE/S)	E14
HSK-DSC/M	툴링시스템(DSC)	E27
HSK-DST	툴링시스템(DST)	E82
HSK-GSK	툴링시스템(GSK)	E70
HSK-MD	툴링시스템(MD)	E97
HSK-NPM	툴링시스템(NPM)	E33
HSK-NPU	툴링시스템(GSK)	E75
HSK-SDC/P	툴링시스템(SDC/P)	E46
HSK-SDC/PL	툴링시스템(SDC/PL)	E52
HSK-SLA	툴링시스템(SLA)	E90
H-Star Endmill 기술안내	엔드밀(H-Star End mill)	B24

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H-Star Endmill 추천절삭조건	추천절삭조건	F7
I+ Endmill 기술안내	엔드밀(I+ Endmill)	B174
I+ Endmill 추천절삭조건	추천절삭조건	F92
IMES-ICORE Type	엔드밀(T Endmill)	B230
IPBE2000	엔드밀(I+Endmill 볼)	B179
IPBE4000	엔드밀(I+Endmill 볼)	B181
IPFE2000	엔드밀(I+Endmill 플랫)	B175
IPFE4000	엔드밀(I+Endmill 플랫)	B177
IPLBE2000	엔드밀(I+Endmill 롱 볼)	B180
IPLFE2000	엔드밀(I+Endmill 롱 플랫)	B176
IPLFE4000	엔드밀(I+Endmill 롱 플랫)	B178
IPLRE2000	엔드밀(I+Endmil 롱 레디우스)	B183
IPLRE4000	엔드밀(I+Endmil 롱 레디우스)	B185
IPRE2000	엔드밀(I+Endmil 레디우스)	B182
IPRE4000	엔드밀(I+Endmil 레디우스)	B184
KCR	드릴(써메트 리머)	C55
KGDS	드릴(건 드릴 싱글 립)	C50
KGDT	드릴(건 드릴 트윈 립)	C51
LEZIRTH Type	엔드밀(T Endmill)	B236
M+ Endmill 기술안내	엔드밀(M+ Endmill)	B251
MANIX Type	엔드밀(T Endmill)	B241
MLD Plus 기술안내	드릴(마하 롱 드릴 플러스)	C29
MLD-□□(P/K/N)	드릴(마하 롱 드릴 플러스)	C30
MPRE4000-B	엔드밀(M+ Endmill 플랫)	B251
MSD Plus for CFRP 기술안내	드릴(마하 솔리드 드릴 for CFRP)	C20
MSD Plus 기술안내	드릴(마하 솔리드 드릴 플러스)	C6
MSD Plus-S 기술안내	드릴(마하 솔리드 드릴 플러스-S)	C11
MSDP-5C	드릴(마하 솔리드 드릴 플러스 for CFRP)	C21
MSDPH-□(P/M/K/N)	드릴(마하 솔리드 드릴 플러스)	C7
MSDPH-S	드릴(마하 솔리드 드릴 플러스-S)	C12
MSFD 기술안내	드릴(마하 솔리드 플랫 드릴)	C22
MSFD-2P	드릴(마하 솔리드 플랫 드릴)	C23
MSFDH-3P	드릴(마하 솔리드 플랫 드릴)	C26
NPM 기술안내	툴링시스템(NPM)	E30
NT-NPM	툴링시스템(NPM)	E34
PCD Endmill 기술안내	엔드밀(PCD Endmill)	B252
PDD	드릴(PCD드릴 브레이징)	C43
PDE1000/2000	엔드밀(PCD Endmill 플랫)	B252
PDR	드릴(PCD 리머)	C54
POSITIONING BLOCK	툴링시스템(POSITIONING BLOCK)	E116
PROTECH INNOTION Type	엔드밀(T Endmill)	B242
R+ Endmill 기술안내	엔드밀(R+ Endmill)	B186
RDC	툴링시스템(EXT/RDC)	E99
RND Type	엔드밀(T Endmill)	B240

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ROLAND Type	엔드밀(T Endmill)	B230
RPAE	엔드밀(R+Endmil AI용 웨이브 러핑)	B188
RPAE3000	엔드밀(A-Star Endmill 웨이브 러핑)	B215
RPE-FF	엔드밀(R+Endmil 파인피치 러핑)	B191
RPE-FP	엔드밀(R+Endmil 파인피치 러핑)	B192
RPE-FP-H	엔드밀(R+Endmil 파인피치 표준형 러핑)	B188
RPE-FP-L	엔드밀(R+Endmil 파인피치 러핑)	B190
RPE-RG	엔드밀(R+Endmil 4날 러핑)	B191
RPE-RG	엔드밀(R+Endmil 표준형 러핑)	B190
RPE-RG	엔드밀(R+Endmil 황삭용 러핑)	B192
RPE-XG	엔드밀(R+Endmil 정 · 황삭용 러핑)	B189
RPLE-FP-H	엔드밀(R+Endmil 파인피치 롱 러핑)	B189
RTJW	툴링시스템(RTJW)	E64
RTJW 기술안내	툴링시스템(RTJW)	E63
SBET2000	엔드밀(Super Endmill fot Ti 볼)	B20
SBET4000	엔드밀(Super Endmill for Ti 볼)	B21
SCRH	드릴(척킹/머신 리머)	C52
SCRS	드릴(척킹/머신 리머)	C52
SDC/P 기술안내	툴링시스템(SDC/P)	E41
SDC/PL 기술안내	툴링시스템(SDC/PL)	E50
S-DTN	툴링시스템(DTN)	E78
SFES4000	엔드밀(Super Endmill for HRSA 플랫)	B14
SFET4000	엔드밀(Super Endmill for Ti 플랫)	B18
SIRONA Type	엔드밀(T Endmill)	B235
SK-DHE	툴링시스템(DHE)	E11
SK-DSC/M	툴링시스템(DSC)	E27
SK-DST	툴링시스템(DST)	E83
SK-DTN	툴링시스템(DTN)	E79
SK-GSK	툴링시스템(GSK)	E71
SK-MD	툴링시스템(MD)	E98
SK-MTA	툴링시스템(MTA/TMTA)	E92
SK-NPM	툴링시스템(NPM)	E34
SK-NPU	툴링시스템(GSK)	E76
SK-SDC/P	툴링시스템(SDC/P)	E47
SK-SLA	툴링시스템(SLA)	E91
SPBE2000	엔드밀(S-Star Endmil 볼)	B202
SPBE4000	엔드밀(S-Star Endmil 볼)	B203
SPD	드릴(PCD드릴 표준 샌드위치)	C45
SPFE2000	엔드밀(S-Star Endmil 플랫)	B194
SPFE3000	엔드밀(S-Star Endmil 플랫)	B195
SPFE4000	엔드밀(S-Star Endmil 플랫)	B196
SPFE6000	엔드밀(S-Star Endmil 플랫)	B197
SPRE4000	엔드밀(S-Star Endmil 레디우스)	B198
SPRE5000	엔드밀(S-Star Endmil 니크 레디우스)	B200

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SPRE7000	엔드밀(S-Star Endmil 니크 레디우스)	B201
SPXE3000/4000/5000	엔드밀(S-Star Endmil 러핑)	B204
SRES4000	엔드밀(Super Endmill for HRSA 레디우스)	B15
SRET4000	엔드밀(Super Endmill for Ti 레디우스)	B19
S-SDC	툴링시스템(SDC/P)	E48
S-SDC/S	툴링시스템(SDC/P)	E49
SSD-N	드릴(SSD-N 솔리드 드릴)	C40
SSD-N 기술안내	드릴(SSD-N 솔리드 드릴)	C39
S-Star Endmill 기술안내	엔드밀(S-Star Endmill)	B193
ST-DSC/M	툴링시스템(DSC)	E29
ST-DSC/S	툴링시스템(DSC)	E29
STER PAT. 기술안내	툴링시스템(STER PAT.)	E87
ST-OFH	툴링시스템(OFH)	E88
Super Endmill for HRSA 기술안내	엔드밀(Super Endmill for HRSA)	B13
Super Endmill for Ti 기술안내	엔드밀(Super Endmill for Ti)	B17
SVDAM	나사(Tap-Star 스파이럴 포인트 탭)	D32
SVDNM	나사(Tap-Star 스파이럴 포인트 탭)	D33
SVDOM	나사(Tap-Star 스파이럴 포인트 탭)	D34
SVGAM	나사(Tap-Star 스트레이트 플루트 탭)	D35
SVNAM	나사(Tap-Star 스파이럴 포인트 탭)	D39
SVNNM	나사(Tap-Star 스파이럴 포인트 탭)	D40
SVNOM	나사(Tap-Star 스파이럴 포인트 탭)	D41
SVPAM	나사(Tap-Star 스파이럴 플루트 탭)	D36
SVPNM	나사(Tap-Star 스트레이트 플루트 탭)	D37
SVPOM	나사(Tap-Star 스파이럴 플루트 탭)	D38
SVQAM	나사(Tap-Star 스파이럴 플루트 탭)	D29
SVQNM	나사(Tap-Star 스파이럴 플루트 탭)	D30
SVQOM	나사(Tap-Star 스파이럴 플루트 탭)	D31
SVSAM	나사(Tap-Star 스파이럴 플루트 탭)	D42
T Endmill 기술안내	엔드밀(T Endmill)	B228
Tap-Star 기술안내	나사(Tap-Star)	D27
TC 콜렛	툴링시스템(DCJ)	E40
TCA 탭 아답터	툴링시스템(TCA)	E80
TCRS	드릴(척킹/머신 리머)	C53
TER	툴링시스템(TER)	E84
The Mirror Endmill 기술안내	엔드밀(The Mirror Endmill)	B22
THE 기술안내	툴링시스템(THE)	E85
THE(DIN)	툴링시스템(THE)	E86
THE(JIS)	툴링시스템(THE)	E86
TMRS	드릴(척킹/머신 리머)	C53
UB502	엔드밀(U-Star Endmill 볼)	B152
UB502P	엔드밀(U-Star Endmill 고정밀 볼)	B154
UB503	엔드밀(U-Star Endmill 볼)	B169
UB504	엔드밀(U-Star Endmill 볼)	B169

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UB512	엔드밀(U-Star Endmill 롱 넥 볼)	B155
UB512S6	엔드밀(U-Star Endmill 롱 넥 볼)	B159
UB532	엔드밀(U-Star Endmill 롤리팝 볼)	B160
UB542	엔드밀(U-Star Endmill 테이퍼드 넥 볼)	B161
UDR503	엔드밀(U-Star Endmill 더블 레디우스)	B146
UE502	엔드밀(U-Star Endmill 플랫)	B94
UE504	엔드밀(U-Star Endmill 플랫)	B109
UE504H	엔드밀(U-Star Endmill 45° 헬릭스 플랫)	B103
UE506	엔드밀(U-Star Endmill 플랫)	B111
UE512	엔드밀(U-Star Endmill 롱 넥 플랫)	B96
UE514	엔드밀(U-Star Endmill 롱 넥 플랫)	B104
UE522	엔드밀(U-Star Endmill 플랫)	B99
UE524	엔드밀(U-Star Endmill 플랫)	B106
UF50	엔드밀(U-Star Endmill 챔퍼 피치 러핑)	B171
UF51	엔드밀(U-Star Endmill 파인 피치 러핑)	B172
UF51H	엔드밀(U-Star Endmill 45° 헬릭스 파인 피치 러핑)	B173
UGINT Type	엔드밀(T Endmill)	B246
ULE504	엔드밀(U-Star Endmill 자동 선반용 플랫)	B108
UR502	엔드밀(U-Star Endmill 레디우스)	B117
UR504	엔드밀(U-Star Endmill 레디우스)	B132
UR506	엔드밀(U-Star Endmill 레디우스)	B145
UR512	엔드밀(U-Star Endmill 넥 레디우스)	B120
UR542	엔드밀(U-Star Endmill 테이퍼드 넥 레디우스)	B126
UR544	엔드밀(U-Star Endmill 테이퍼드 넥 레디우스)	B133
USB502	엔드밀(U-Star Endmill 스트레이트 볼)	B168
USPM4	엔드밀(U-Star Endmill 고이송 레디우스)	B147
UTB502	엔드밀(U-Star Endmill 테이퍼드 볼)	B170
UTE502	엔드밀(U-Star Endmill 테이퍼드 플랫)	B112
UTE504	엔드밀(U-Star Endmill 테이퍼드 플랫)	B114
UTR504	엔드밀(U-Star Endmill 테이퍼드 레디우스)	B148
UXE502	엔드밀(U-Star Endmill 강력 절삭용 플랫)	B101
UXE504	엔드밀(U-Star Endmill 강력 절삭용 플랫)	B110
UXR504	엔드밀(U-Star Endmill 멀티 헬릭스 레디우스)	B137
UXR514	엔드밀(U-Star Endmill 멀티 헬릭스 넥 레디우스)	B140
VHF-K4/CM Type	엔드밀(T Endmill)	B233
VHF-S1 Type	엔드밀(T Endmill)	B232
WIELAND MINI Type	엔드밀(T Endmill)	B231
WIELAND SELECT Type	엔드밀(T Endmill)	B231
WSDP-□D	드릴(W-Star Drill)	C35
W-Star Drill 기술안내	드릴(W-Star 드릴)	C34
YENA Type	엔드밀(T Endmill)	B235
ZIRKONZAHN M1/M4 Type	엔드밀(T Endmill)	B234
ZIRKONZAHN M5 Type	엔드밀(T Endmill)	B234
Z-MATCH/CAMELEON Type	엔드밀(T Endmill)	B239

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AFE3000	엔드밀(A-Star Endmil 숏 플랫)	B210
AFE3000	엔드밀(A-Star Endmil 플랫)	B211
AFE3000	엔드밀(A-Star Endmil 롱 플랫)	B212
AMANN GIRRBACH Type	엔드밀(T Endmill)	B232
ANGULAR HEAD	툴링시스템(앵귤러 헤드)	E100
APBE2000	엔드밀(A-Star Endmil 볼)	B209
APFE2000/3000	엔드밀(A-Star Endmil 플랫)	B206
APLFE2000/3000	엔드밀(A-Star Endmil 롱 플랫)	B208
APMFE2000/3000	엔드밀(A-Star Endmil 미들 플랫)	B207
APRE3000	엔드밀(A-Star Endmil 러핑)	B214
ARUM Type	엔드밀(T Endmill)	B236
A-Star Endmill 기술안내	엔드밀(A-Star Endmill)	B205
A-Star Endmill 추천절삭조건	추천절삭조건	F100
ATM	툴링시스템(ATM)	E118
ATM(U) SPARE PART	툴링시스템(ATM(U) SPARE PART)	E121
ATU	툴링시스템(ATU)	E122

B

BDS	드릴(버니싱 드릴)	C42
BDT	드릴(스텝버니싱 드릴)	C42
BT-ATM	툴링시스템(ATM)	E120
BT-DHE	툴링시스템(DHE)	E7
BT-DHE/S	툴링시스템(DHE/S)	E13
BT-DMC	툴링시스템(NPM)	E35
BT-DSC	툴링시스템(DSC)	E25
BT-DSC/M	툴링시스템(DSC)	E25
BT-DSC/S	툴링시스템(DSC)	E28
BT-DSK	툴링시스템(DSK)	E66
BT-DST	툴링시스템(DST)	E82
BT-DTN	툴링시스템(DTN)	E78
BT-GSK	툴링시스템(GSK)	E69
BT-HRAG	툴링시스템(HRAG)	E108
BT-KAC	툴링시스템(KAC)	E112
BT-KAG	툴링시스템(KAG)	E106
BT-KAH	툴링시스템(KAH)	E102
BT-KHU	툴링시스템(KAU)	E104
BT-MAH	툴링시스템(MAH)	E110
BT-MD	툴링시스템(MD)	E95
BT-NPM	툴링시스템(NPM)	E32
BT-NPU	툴링시스템(GSK)	E75
BT-OFH	툴링시스템(OFH)	E88
BT-SAH	툴링시스템(SAH)	E114

B

BT-SDC/P	툴링시스템(SDC/P)	E44
BT-SDC/PL	툴링시스템(SDC/PL)	E51
BT-SLA	툴링시스템(SLA)	E89
BT-TNPU	툴링시스템(GSK)	E76
BT-TSK	툴링시스템(GSK)	E72
Burnishing Drill 추천절삭조건	추천절삭조건	F110

C

CAMELEON CS Type	엔드밀(T Endmill)	B239
CAMELEON Type	엔드밀(T Endmill)	B240
CBE2000	엔드밀(C-Max 볼)	B249
CBNE2000	엔드밀(C-Max 롱 넥 볼)	B249
cBN-MBE2000	엔드밀(The Mirror Endmill 볼)	B23
cBN-MRE2000	엔드밀(The Mirror Endmill 레디우스)	B23
CCDR4000/6000	엔드밀(Composite Router Endmill 플랫)	B225
CCHR4000/6000	엔드밀(Composite Router Endmill 플랫)	B225
CCLR4000	엔드밀(Composite Router Endmill 플랫)	B226
CCR2000	엔드밀(Composite Router Endmill 플랫)	B226
CCRR6000/8000	엔드밀(Composite Router Endmill 플랫)	B227
CCT	드릴(챔퍼툴)	C57
CERACUBE/TRION-Z Type	엔드밀(T Endmill)	B243
CEREC Type	엔드밀(T Endmill)	B246
Cermet Reamer 추천절삭조건	추천절삭조건	F111
CET	드릴(챔퍼툴)	C56
CFE2000	엔드밀(C-Max 플랫)	B247
CFNE2000	엔드밀(C-Max 롱 넥 플랫)	B248
Chamfer Tool 추천절삭조건	추천절삭조건	F112
CHARLY Type	엔드밀(T Endmill)	B233
Chucking/Machine Reamer 추천절삭조건	추천절삭조건	F111
C-Max 추천절삭조건	추천절삭조건	F105
Composite Router Endmill 기술안내	엔드밀(Composite Router Endmill)	B224
Composite Router Endmill 추천절삭조건	추천절삭조건	F103
Counter Sink 추천절삭조건	추천절삭조건	F112
CPD	드릴(PCD드릴 표준 콘)	C44
CPDL	드릴(PCD드릴 롱 콘)	C44
CRE2000	엔드밀(C-Max 레디우스)	B250
CRNE2000	엔드밀(C-Max 롱 넥 레디우스)	B250
CSHC1000	드릴(카운터싱크)	C60
CSHH1000	드릴(카운터싱크)	C62
CSNC1000	드릴(카운터싱크)	C60
CSNC3000	드릴(카운터싱크)	C59
CSNH1000	드릴(카운터싱크)	C62

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CSNH3000	드릴(카운터싱크)	C61
CSPC3000	드릴(카운터싱크)	C59
CSPH3000	드릴(카운터싱크)	C61

D

D Endmill 기술안내	엔드밀(D Endmill)	B216
D Endmill 추천절삭조건	추천절삭조건	F102
DBE2000	엔드밀(D Endmill 볼)	B221
DBE4000	엔드밀(D Endmill 볼)	B223
DBT-DHE	툴링시스템(DHE)	E6
DBT-MD	툴링시스템(MD)	E93
DBT-NPM	툴링시스템(NPM)	E31
DBT-SDC/P	툴링시스템(SDC/P)	E42
DC 콜렛	툴링시스템(DCJ)	E38
DCJ 기술안내	툴링시스템(DCJ)	E37
DCL 기술안내	툴링시스템(DCL)	E36
DCS 콜렛	툴링시스템(DCJ)	E39
DENTIUM Type	엔드밀(T Endmill)	B244
DFE2000	엔드밀(D Endmill 플랫)	B217
DFE4000	엔드밀(D Endmill 플랫)	B218
DHC 콜렛	툴링시스템(DHC 콜렛)	E17
DHC-(P) 콜렛	툴링시스템(DHC 콜렛)	E18
DHE 기술안내	툴링시스템(DHE)	E5
DHE/G	툴링시스템(DHE/G)	E16
DHE/G 기술안내	툴링시스템(DHE/G)	E15
DHE/S 기술안내	툴링시스템(DHE/S)	E12
DHJ 콜렛	툴링시스템(DHC 콜렛)	E18
DJT	툴링시스템(DCJ)	E40
DOF Type	엔드밀(T Endmill)	B245
DRE2000	엔드밀(D Endmill 레디우스)	B219
DRE4000	엔드밀(D Endmill 레디우스)	B220
DSC 기술안내	툴링시스템(DSC)	E21
DSK 기술안내	툴링시스템(DSK)	E65
DST 기술안내	툴링시스템(DST)	E81
DTN 기술안내	툴링시스템(DTN)	E77
DZC	툴링시스템(DZC)	E20
DZC 기술안내	툴링시스템(DZC)	E19

E

ELBEN Type	엔드밀(T Endmill)	B245
ER 콜렛	툴링시스템(GERC)	E57
ER 콜렛 세트	툴링시스템(GERC)	E60

E

ER/L 기술안내	툴링시스템(ER/L)	E62
ER/L 콜렛	툴링시스템(ER/L)	E62
ER-T 콜렛	툴링시스템(GERC)	E61
ESB702	엔드밀(H-Star Endmill 넥 볼)	B75
ESB703	엔드밀(H-Star Endmill 넥 볼)	B77
ESB712	엔드밀(H-Star Endmill 볼)	B76
ESB734	엔드밀(H-Star Endmill 15° 헬릭스볼)	B77
ESE702	엔드밀(H-Star Endmill 넥 플랫)	B26
ESE704	엔드밀(H-Star Endmill 넥 플랫)	B28
ESE712	엔드밀(H-Star Endmill 플랫)	B27
ESE714	엔드밀(H-Star Endmill 하이 헬릭스 플랫)	B29
ESE716	엔드밀(H-Star Endmill 하이 헬릭스 플랫)	B32
ESE724(6)	엔드밀(H-Star Endmill 하이 헬릭스 플랫)	B30
ESE744	엔드밀(H-Star Endmill 플랫)	B31
ESLNB20	엔드밀(H-Star Endmill 롱 넥 볼)	B83
ESLNR20	엔드밀(H-Star Endmill 롱 넥 레디우스)	B68
ESLNS20	엔드밀(H-Star Endmill 롱 넥 플랫)	B39
ESLNS40	엔드밀(H-Star Endmill 롱 넥 플랫)	B43
ESPM4	엔드밀(H-Star Endmill 넥 레디우스)	B74
ESR702	엔드밀(H-Star Endmill 넥 레디우스)	B45
ESR704	엔드밀(H-Star Endmill 넥 레디우스)	B49
ESR706	엔드밀(H-Star Endmill 넥 레디우스)	B53
ESR714	엔드밀(H-Star Endmill 레디우스)	B51
ESR724	엔드밀(H-Star Endmill 넥 레디우스)	B51
ESR732	엔드밀(H-Star Endmill 롱 샹크 레디우스)	B48
ESR734	엔드밀(H-Star Endmill 롱 샹크 레디우스)	B52
ESR736	엔드밀(H-Star Endmill 레디우스)	B53
ESRB712	엔드밀(H-Star Endmill 리브 볼)	B78
ESRE712	엔드밀(H-Star Endmill 리브 플랫)	B33
ESRE714	엔드밀(H-Star Endmill 리브 플랫)	B36
ESRR712	엔드밀(H-Star Endmill 리브 레디우스)	B54
ESRR714	엔드밀(H-Star Endmill 리브 레디우스)	B60
ESTNB20	엔드밀(H-Star Endmill 테이퍼드 넥 볼)	B87
ESTNB30	엔드밀(H-Star Endmill 테이퍼드 넥 볼)	B91
ESTNR20	엔드밀(H-Star Endmill 테이퍼드 넥 레디우스)	B72
ESXE704	엔드밀(H-Star Endmill 넥 플랫)	B38
ESXE714	엔드밀(H-Star Endmill 플랫)	B38
ESXR704	엔드밀(H-Star Endmill 넥 레디우스)	B67
EXT	툴링시스템(EXT/RDC)	E99

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GERC 기술안내	툴링시스템(GERC)	E53
GERC 콜렛	툴링시스템(GERC)	E54

G

GERC 콜렛 세트	툴링시스템(GERC)	E56
GSK 기술안내	툴링시스템(GSK)	E68
Gun Drill 기술안내	드릴(건 드릴)	C46
Gun Drill 추천절삭조건	추천절삭조건	F110

H

HBRE	드릴(브로치 리머)	C55
HC 콜렛	툴링시스템(GSK)	E73
HSK-ATM	툴링시스템(ATM)	E120
HSK-DHE	툴링시스템(DHE)	E9
HSK-DHE/S	툴링시스템(DHE/S)	E14
HSK-DSC/M	툴링시스템(DSC)	E27
HSK-DST	툴링시스템(DST)	E82
HSK-GSK	툴링시스템(GSK)	E70
HSK-MD	툴링시스템(MD)	E97
HSK-NPM	툴링시스템(NPM)	E33
HSK-NPU	툴링시스템(GSK)	E75
HSK-SDC/P	툴링시스템(SDC/P)	E46
HSK-SDC/PL	툴링시스템(SDC/PL)	E52
HSK-SLA	툴링시스템(SLA)	E90
H-Star Endmill 기술안내	엔드밀(H-Star Endmill)	B24
H-Star Endmill 추천절삭조건	추천절삭조건	F7

H

I+ Endmill 기술안내	엔드밀(I+ Endmill)	B174
I+ Endmill 추천절삭조건	추천절삭조건	F92
IMES-ICORE Type	엔드밀(T Endmill)	B230
IPBE2000	엔드밀(I+Endmill 볼)	B179
IPBE4000	엔드밀(I+Endmill 볼)	B181
IPFE2000	엔드밀(I+Endmill 플랫)	B175
IPFE4000	엔드밀(I+Endmill 플랫)	B177
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P

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H 색인표 (A~Z)

P

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SVDOM	나사(Tap-Star 스파이럴 포인트 탭)	D34
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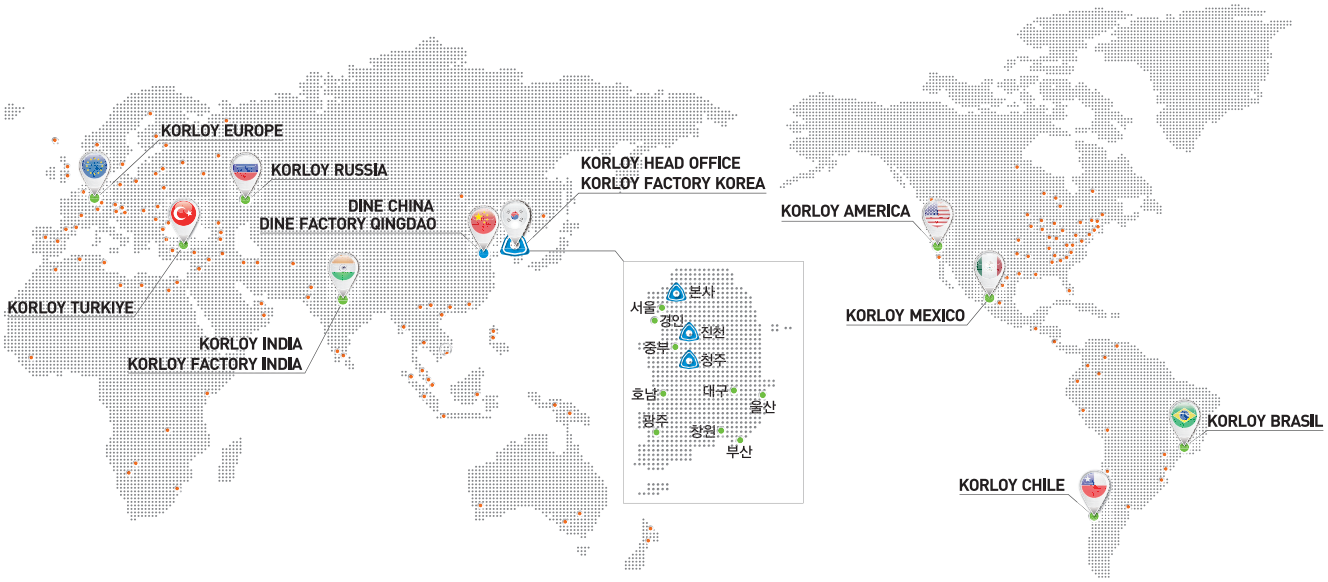
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