

H-STAR Endmill

Endmill for high hardness steel cutting



- Stable cutting from high hardness substrate and exclusive new coating layer with good wear resistance application
- Improved initial chipping resistance with optimized edge treatment for high hardness steel cutting

Contents

Features	004
Application examples	006
Line-up	008
H-Star Endmill	010
Recommended Cutting Conditions	116





- » **Good wear resistance and heat resistance**
 - Ultra-fine substrate and new coating layer
- » **Good chipping resistance**
 - Optimal cutting edge and special treatment on it
- » **High precise measurement**
 - Tight precision tolerance applied on tool diameter and radius
- » **Various line-ups**
 - Normal/rib type and neck type shape

Endmill for high hardness steel cutting

H-Star Endmill

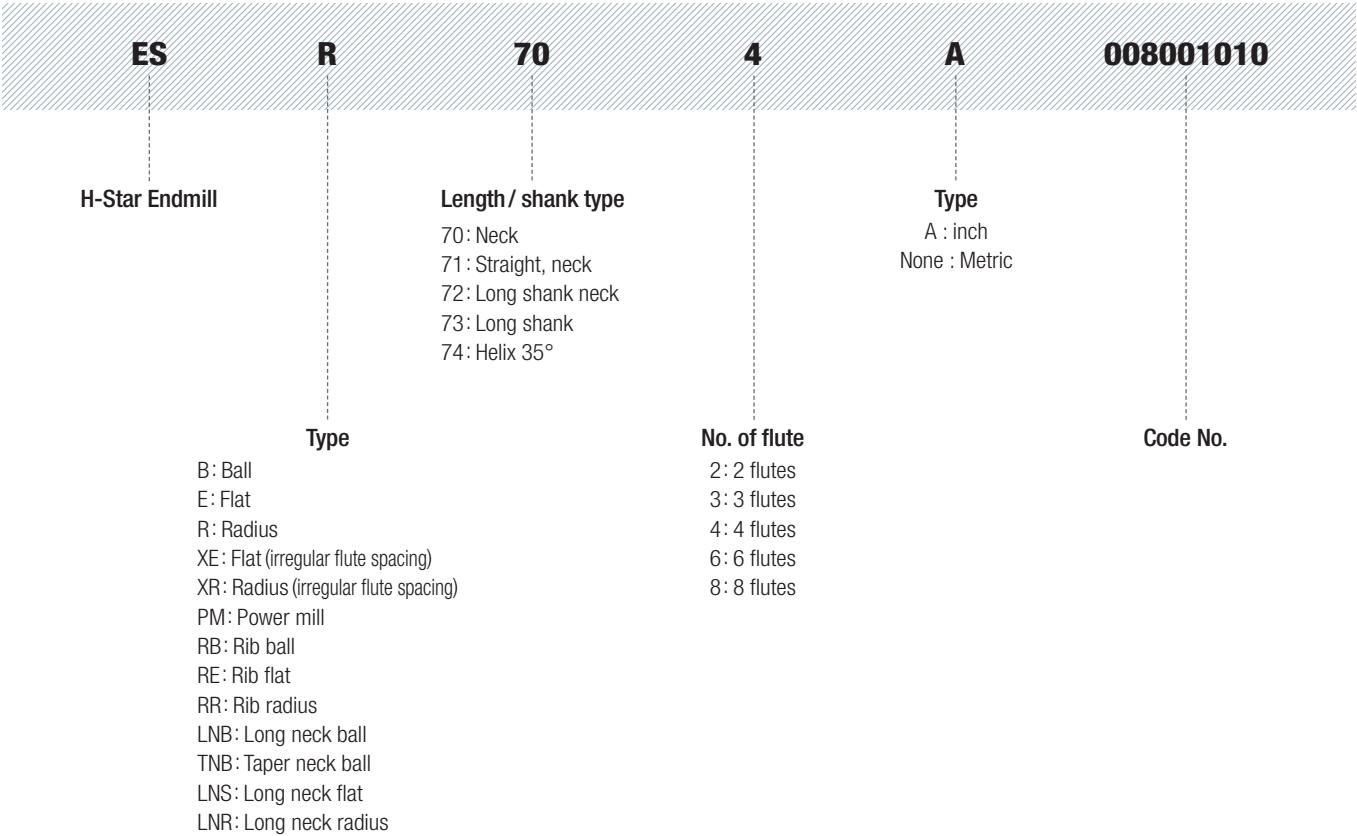
High hardness heat treated workpiece (HRC50~63) used for automobile, mold and general industries has features like high hardness, outstanding durability and excellent wear resistance.

Those features occur severe impact on the cutting edge so it makes hard to apply high speed cutting due to frequent chipping and fracture.

The **H-Star Endmill** improved wear resistance applying ultra-fine substrate and newly developed AlTiSiN coating layer which also ensures stability in cutting from frictional heat. In addition, the optimal cutting edge shape and special treatment on it improve chipping resistance in the beginning of cutting and realize stable cutting.

KORLOY recommends H-Star Endmill which is the optimal tool for high hardness heat treated workpiece machining to improve our customers' productivity.

↪ Code system



Features

- **High hardness coating layer** - Ensuring stable cutting from high Si content, increased wear resistance and frictional heat resistance due to applying a new AlTiSiN series coating layer
- **High hardness substrate** - Containing ultra-fine WC + Co 9% and expanded general application range by maximizing cutting edge feature
- **Edge treatment** - Increased chipping resistance in the beginning of high hardness steel cutting and enhanced wear resistance lead to stable cutting



High hardness substrate

- Ultra-fine WC+Co 9%
- Expanded general application range by maximizing cutting edge feature

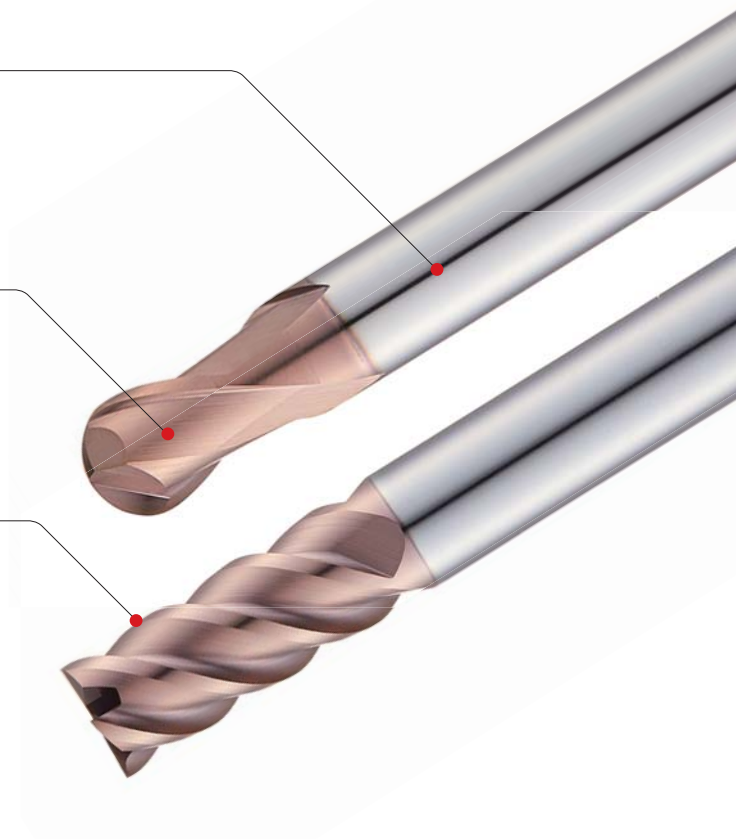
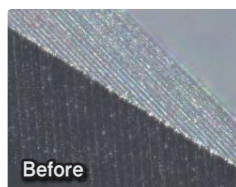


High hardness coating layer

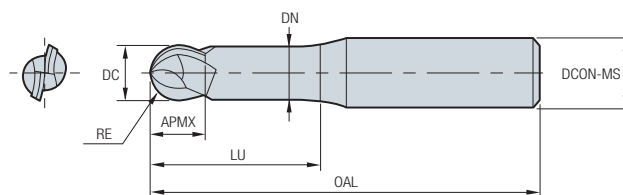
- High Si content
- Enhanced wear resistance
- Stable cutting through frictional heat resistance increase

Edge treatment

- Enhancing chipping resistance in the beginning of high hardness steel cutting
- Increased wear resistance and stable cutting performance



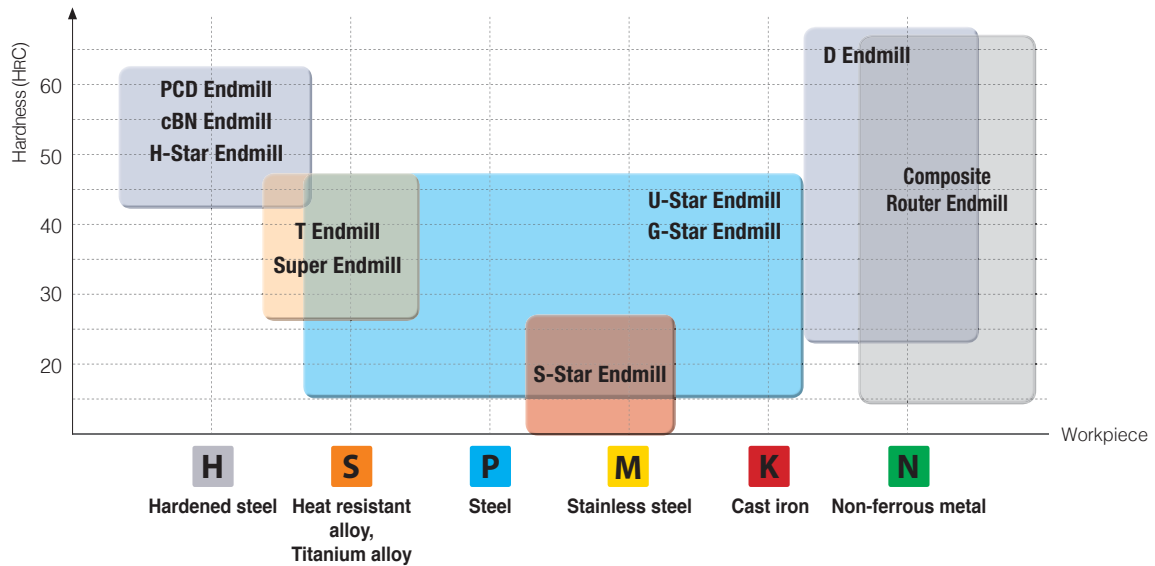
ISO13399 Glossary



ISO13399 Property Symbols	Property Name
AP	Axial depth
APMX	Depth of cut maximum
BHTA	Body half taper angle
CA	Collision Angle
CHW	Corner chamfer width
DC	Cutting diameter
DCON-MS	Connection diameter machine side
DCX	Cutting diameter maximum
DN	Neck diameter
FHA	Flute helix angle
KCH	Corner chamfer

ISO13399 Property Symbols	Property Name
L	Length
LF	Functional length
LS	Shank length
LU	Usable length / max. recommended
LUX	Usable length maximum
NOF	Flute count
OAL	Overall length
PSIR	Tool lead angle
RE	Corner radius
WT	Weight of item

Application range



Applicable Workpiece

◎: Excellent ○: Good

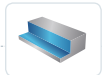
Carbon steel (~ HB225)	Alloy steel (HB225~325)	Pre-hardened steel (HRC30~50)	Hardened steel		Copper	Graphite	Cast iron ~FCD500	Aluminum	Stainless steel
			SKD61(~HRC55)	SKD11(HRC55~)					
		○	◎	◎	○				

Application examples

Hardened steel (STD61, HRC50~55)

Cutting condition $vc(sf/min) = 426$, $fz(inch/t) = 0.002$, $ap(inch) = 0.002$, $ae(inch) = 0.009$, dry

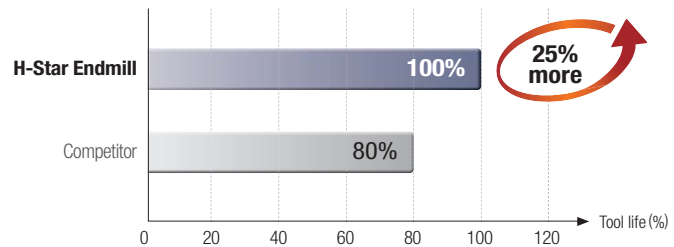
Tool ESB712A (Diameter = $\varnothing 0.472$ inch)



[H-Star Endmill]



[Competitor]



Hardened steel (STD11, HRC60~63)

Cutting condition $vc(sf/min) = 229$, $fz(inch/t) = 0.0015$, $ap(inch) = 0.472$, $ae(inch) = 0.0157$, dry

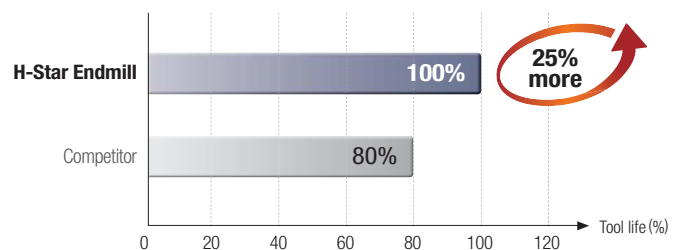
Tool ESE714A (Diameter = $\varnothing 0.472$ inch)



[H-Star Endmill]



[Competitor]



Application examples

Hardened steel (STD61, HRC50~55)

Cutting condition $vc(m/min) = 200$, $fz(mm/t) = 0.15$, $ap(mm) = 0.5$, $ae(mm) = 0.5$, dry

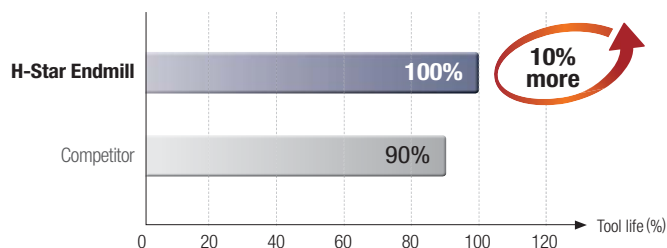
Tool ESB702101 (Diameter = $\varnothing 10$ mm)



[H-Star Endmill]



[Competitor]



Hardened steel (STD11, HRC55~60)

Cutting condition $vc(m/min) = 70$, $fz(mm/t) = 0.1$, $ap(mm) = 10$, $ae(mm) = 0.3$, dry

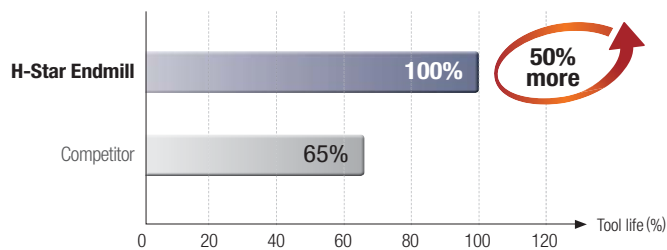
Tool ESXR7041001032 (Diameter = $\varnothing 10$ mm)



[H-Star Endmill]



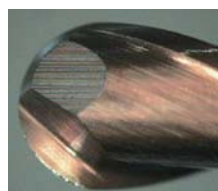
[Competitor]



Hardened steel (SKH51, HRC60~63)

Cutting condition $vc(m/min) = 73$, $fz(mm/t) = 0.08$, $ap(mm) = 0.083$, $ae(mm) = 0.083$, wet

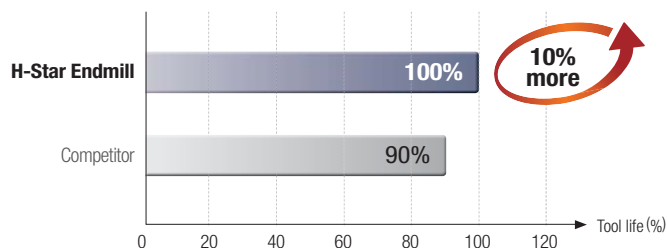
Tool ESB702015S4 (Diameter = $\varnothing 1.5$ mm)



[H-Star Endmill]



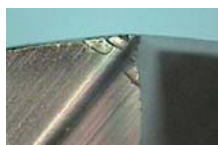
[Competitor]



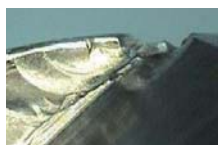
Hardened steel (STD61, HRC48~50)

Cutting condition $vc(m/min) = 250$, $fz(mm/t) = 0.15$, $ap(mm) = 0.15$, $ae(mm) = 0.15$, wet

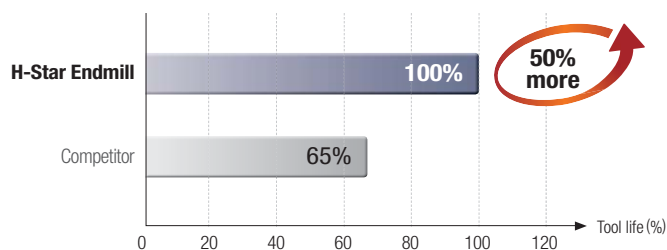
Tool ESB702100 (Diameter = $\varnothing 10$ mm)



[H-Star Endmill]



[Competitor]



↪ Line-up(Inch)

(inch)

Type	Designation	Grade	Picture	Product name	No. of flute	Range		Page
						Min.	Max.	
Flat	ESE702A	PC305H		2 flutes neck type flat	2	1/8	5/8	10
	ESE712A	PC305H		2 flutes flat	2	1/16	1/2	10
	ESE704A	PC305H		4 flutes neck type flat	4	1/4	1/2	11
	ESE714A	PC305H		4 flutes high helix flat	4	1/16	1	11
	ESE744A	PC305H		4 flutes 35° helix flat	4	1/8	3/4	12
	ESE716A	PC305H		6 flutes high helix flat	6	1/4	1	12
Radius	ESR704A	PC305H		4 flutes neck type radius	4	1/8	3/4	13
	ESR714A	PC305H		4 flutes radius	4	1/8	3/4	15
	ESR706A	PC305H		6 flutes neck type radius	6	3/16	1/2	16
	ESR716A	PC305H		6 flutes type radius	6	1/4	5/8	17
	ESR718A	PC305H		8 flutes radius	8	3/4	1	17
	ESPM4A	PC305H		4 flutes radius Endmill for high feed	4	1/8	1/2	18
Ball	ESB702A	PC305H		2 flutes neck type ball	2	1/32	3/4	19
	ESB703A	PC305H		3 flutes ball	3	1/16	1/2	20
	ESB714A	PC305H		4 flutes ball	4	1/8	1/2	20

↪ Line-up(Metric)

(mm)

Type	Designation	Grade	Picture	Product name	No. of flute	Range		Page
						Min.	Max.	
Flat	ESE702	PC305H		2 flutes neck type flat	2	0.1	20	21
	ESE712	PC305H		2 flutes flat	2	1	6	22
	ESE704	PC305H		4 flutes neck type flat	4	1	20	23
	ESE714	PC305H		4 flutes high helix flat	4	1	12	24
	ESE724(6)	PC305H		4&6 flutes neck type flat	4/6	1	12	25
	ESE744	PC305H		4 flutes high helix flat	4	1	12	26
	ESE716	PC305H		6 flutes high helix flat	6	6	20	27
	ESRE712	PC305H		2 flutes rib neck type flat	2	0.1	12	28
	ESRE714	PC305H		4 flutes rib flat	4	0.5	12	34

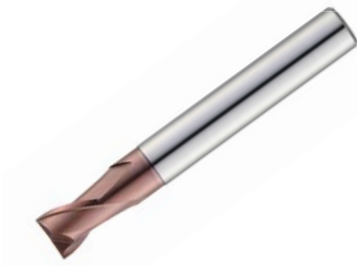
Line-up(Metric)

(mm)

Type	Designation	Grade	Picture	Product name	No. of flute	Range		Page
						Min.	Max.	
Flat	ESXE704	PC305H		4 flutes neck type flat	4	1	12	38
	ESXE714	PC305H		4 flutes flat	4	2	12	38
	ESLNS20	PC305H		2 flutes long neck type flat	2	0.1	5	39
	ESLNS40	PC305H		4 flutes long neck type flat	4	1	5	43
Radius	ESR702	PC305H		2 flutes neck type radius	2	1	12	45
	ESR732	PC305H		2 flutes long shank radius	2	1	12	50
	ESR704	PC305H		4 flutes neck type radius	4	1	12	52
	ESR714	PC305H		4 flutes radius	4	3	12	55
	ESR724	PC305H		4 flutes neck type radius	4	6	12	56
	ESR734	PC305H		4 flutes long shank radius	4	1	12	57
	ESR706	PC305H		6 flutes neck type radius	6	6	12	59
	ESR736	PC305H		6 flutes radius	6	6	12	59
	ESRR712	PC305H		2 flutes rib radius	2	0.2	16	60
	ESRR714	PC305H		4 flutes rib radius	4	0.5	20	71
	ESXR704	PC305H		4 flutes neck type radius	4	2	12	84
	ESLNR20	PC305H		2 flutes long radius	2	0.2	3	86
	ESTNR20	PC305H		2 flutes tapered neck type radius	2	0.2	3	90
	ESPM4	PC305H		4 flutes neck type radius	4	3	12	92
	ESB702	PC305H		2 flutes neck type ball	2	0.1	12	93
Ball	ESB712	PC305H		2 flutes ball	2	1	12	94
	ESB703	PC305H		3 flutes neck type ball	3	2	12	95
	ESB734	PC305H		4 flutes 15° helix ball	4	2	10	96
	ESRB712	PC305H		2 flutes rib ball	2	0.1	12	97
	ESLNB20	PC305H		2 flutes long neck type ball	2	0.1	5	105
	ESTNB20	PC305H		2 flutes tapered neck type ball	2	0.2	10	109
	ESTNB30	PC305H		3 flutes tapered neck type ball	3	2	5	113

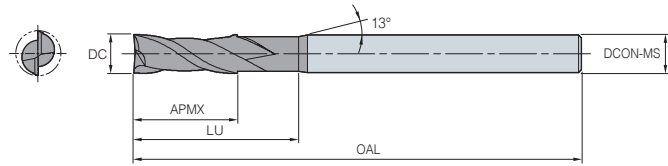
ESE702A

2 flutes neck type flat



p.116

DC	Tolerance
1/8 ~ 1/4	0.0000 ~ 0.0005
3/8 ~ 5/8	0.0000 ~ 0.0006

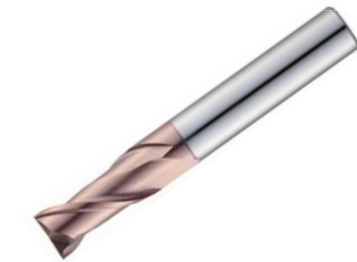


(inch)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-062982	ESE702A008016	1/8	1/8	1/4	5/8	3
1-04-062983	ESE702A012024	3/16	3/16	3/8	5/8	3 1/2
1-04-062984	ESE702A016032	1/4	1/4	1/2	3/4	3 1/2
1-04-062985	ESE702A024048	3/8	3/8	3/4	1 1/8	4
1-04-062986	ESE702A032064	1/2	1/2	1	1 3/4	4
1-04-062987	ESE702A040080	5/8	5/8	1 1/4	2	5

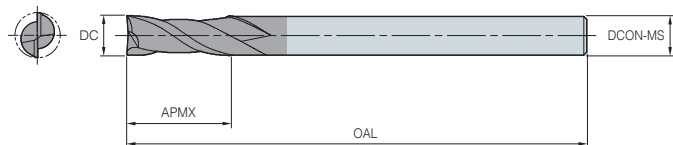
ESE712A

2 flutes flat



p.116

DC	Tolerance
1/16 ~ 1/4	0.0000 ~ 0.0005
5/16 ~ 1/2	0.0000 ~ 0.0006



(inch)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-063043	ESE712A004012	1/16	1/8	3/16	-	1 1/2
1-04-063044	ESE712A008032	1/8	1/8	1/2	-	1 1/2
1-04-063045	ESE712A012040	3/16	3/16	5/8	-	2
1-04-063050	ESE712A016048	1/4	1/4	3/4	-	2 1/2
1-04-063052	ESE712A020052	5/16	5/16	13/16	-	2 1/2
1-04-063054	ESE712A024064	3/8	3/8	1	-	2 1/2
1-04-063056	ESE712A032064	1/2	1/2	1	-	3

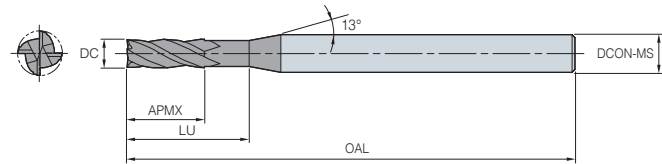
ESE704A

4 flutes neck type flat



p.117

DC	Tolerance
~ 1/4	0.0000 ~ 0.0005
3/8 ~ 1/2	0.0000 ~ 0.0006



(inch)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-062990	ESE704A016032	1/4	1/4	1/2	1 1/8	2 1/2
1-04-062991	ESE704A024056	3/8	3/8	7/8	15/16	2 1/2
1-04-062992	ESE704A032080	1/2	1/2	1 1/4	1 7/32	3 1/4

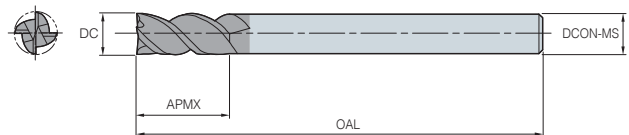
ESE714A

4 flutes high helix flat



p.117

DC	Tolerance
1/16 ~ 1/4	0.0000 ~ 0.0005
5/16 ~ 1	0.0000 ~ 0.0006



(inch)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-063046	ESE714A004012	1/16	1/8	3/16	-	1 1/2
1-04-062988	ESE714A008024	1/8	1/8	3/8	-	1 1/2
1-04-063047	ESE714A008032	1/8	1/8	1/2	-	1 1/2
1-04-062989	ESE714A012028	3/16	3/16	7/16	-	2
1-04-063048	ESE714A012040	3/16	3/16	5/8	-	2
1-04-063104	ESE714A012032	3/16	3/16	1/2	-	1 3/8
1-04-063105	ESE714A012028-2.3	3/16	3/8	7/16	-	2 5/16
1-04-063106	ESE714A012032-2.37	3/16	3/8	1/2	-	2 3/8
1-04-063051	ESE714A016048	1/4	1/4	3/4	-	2 1/2
1-04-063053	ESE714A020052	5/16	5/16	13/16	-	2 1/2
1-04-063055	ESE714A024064	3/8	3/8	1	-	2 1/2
1-04-062924	ESE714A024080	3/8	3/8	1 1/4	-	3
1-04-062925	ESE714A032080	1/2	1/2	1 1/4	-	3
1-04-062926	ESE714A040096	5/8	5/8	1 1/2	-	3 1/2
1-04-063107	ESE714A056120	7/8	7/8	1 7/8	-	4 1/8
1-04-063108	ESE714A064128	1	1	2	-	4 1/2

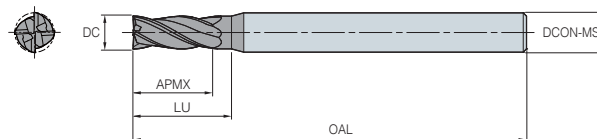
ESE744A

4 flutes high helix flat



p.117

DC	Tolerance
1/8 ~ 1/4	0.0000 ~ 0.0005
3/8 ~ 3/4	0.0000 ~ 0.0006



(inch)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-062975	ESE744A008024	1/8	1/8	3/8	-	1 1/2
1-04-062976	ESE744A012028	3/16	3/16	7/16	-	2
1-04-062977	ESE744A016032	1/4	1/4	1/2	1 1/8	2 1/2
1-04-062978	ESE744A024056	3/8	3/8	7/8	15/16	2 1/2
1-04-062979	ESE744A032080	1/2	1/2	1 1/4	1 7/32	3 1/4
1-04-062980	ESE744A040080	5/8	5/8	1 1/4	1 31/32	4
1-04-062981	ESE744A048096	3/4	3/4	1 1/2	1 23/32	4

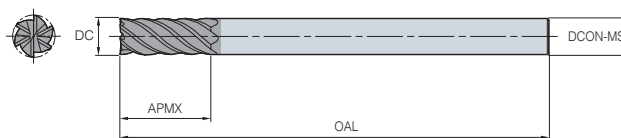
ESE716A

6 flutes high helix flat



p.117

DC	Tolerance
1/4	0.0000 ~ 0.0005
5/16 ~ 1	0.0000 ~ 0.0006

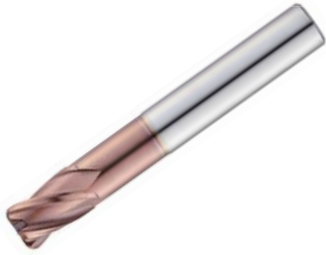


(inch)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-063049	ESE716A016032	1/4	1/4	1/2	-	2 1/4
1-04-062914	ESE716A016064	1/4	1/4	1	-	2 3/4
1-04-062854	ESE716A020048	5/16	5/16	3/4	-	2 1/2
1-04-062855	ESE716A020096	5/16	5/16	1 1/2	-	3 5/8
1-04-062856	ESE716A024056	3/8	3/8	7/8	-	2 7/8
1-04-062857	ESE716A024112	3/8	3/8	1 3/4	-	4
1-04-062915	ESE716A032064	1/2	1/2	1	-	3 1/4
1-04-062916	ESE716A032140	1/2	1/2	2 3/16	-	4 3/8
1-04-063057	ESE716A040080	5/8	5/8	1 1/4	-	3 5/8
1-04-063058	ESE716A040168	5/8	5/8	2 5/8	-	5 1/8
1-04-063059	ESE716A048096	3/4	3/4	1 1/2	-	4 1/8
1-04-063060	ESE716A048144	3/4	3/4	2 1/4	-	5
1-04-063061	ESE716A048208	3/4	3/4	3 1/4	-	6
1-04-063062	ESE716A064112	1	1	1 3/4	-	4 1/4

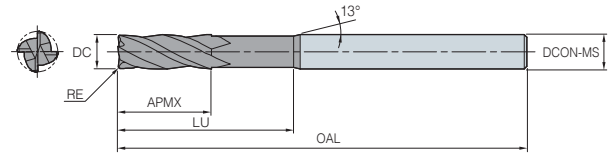
ESR704A

4 flutes neck type radius



p.118

DC	Tolerance
1/8 ~ 1/4	0.0000 ~ 0.0005
5/16 ~ 3/4	0.0000 ~ 0.0006



(inch)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-063063	ESR704A008001010	1/8	1/8	5/32	3/4	1 1/2	1/64
1-04-063064	ESR704A012001016	3/16	3/16	1/4	1	2	1/64
1-04-062996	ESR704A016001032	1/4	1/4	1/2	1 1/8	2 1/2	1/64
1-04-062997	ESR704A016002032	1/4	1/4	1/2	1 1/8	2 1/2	2/64
1-04-063014	ESR704A016001020	1/4	1/4	5/16	9/16	2	1/64
1-04-063069	ESR704A016001020-2.5	1/4	1/4	5/16	1	2 1/2	1/64
1-04-063070	ESR704A016004020	1/4	1/4	5/16	1	2 1/2	4/64
1-04-063071	ESR704A016004020-3	1/4	1/4	5/16	1 1/2	3	4/64
1-04-063015	ESR704A020001024	5/16	5/16	3/8	3/4	2 1/2	1/64
1-04-063072	ESR704A020001024-2.5	5/16	5/16	3/8	1	2 1/2	1/64
1-04-063073	ESR704A020004024	5/16	5/16	3/8	1	2 1/2	4/64
1-04-062998	ESR704A024001056	3/8	3/8	7/8	15/16	2 1/2	1/64
1-04-062999	ESR704A024002056	3/8	3/8	7/8	15/16	2 1/2	2/64
1-04-063000	ESR704A024004056	3/8	3/8	7/8	15/16	2 1/2	4/64
1-04-063016	ESR704A024001032	3/8	3/8	1/2	1	3	1/64
1-04-063074	ESR704A024002028	3/8	3/8	7/16	1	2 1/2	2/64
1-04-063075	ESR704A024005028	3/8	3/8	7/16	1	2 1/2	5/64
1-04-063076	ESR704A024005028-3.5	3/8	3/8	7/16	2	3 1/2	5/64

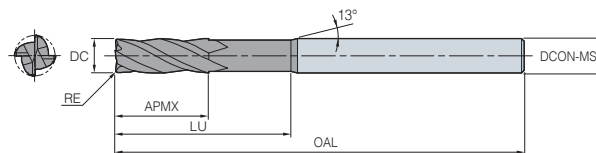
ESR704A

4 flutes neck type radius



p.118

DC	Tolerance
1/8 ~ 1/4	0.0000 ~ 0.0005
5/16 ~ 3/4	0.0000 ~ 0.0006



(inch)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-063077	ESR704A028002032	7/16	7/16	1/2	1 1/8	3	2/64
1-04-063078	ESR704A028005032	7/16	7/16	1/2	1 1/8	3	5/64
1-04-063001	ESR704A032001080	1/2	1/2	1 1/4	1 7/32	3 1/4	1/64
1-04-063002	ESR704A032002080	1/2	1/2	1 1/4	1 7/32	3 1/4	2/64
1-04-063003	ESR704A032004080	1/2	1/2	1 1/4	1 7/32	3 1/4	4/64
1-04-063017	ESR704A032001040	1/2	1/2	5/8	1 3/16	3	1/64
1-04-063079	ESR704A032002036	1/2	1/2	9/16	1 1/4	3	2/64
1-04-063080	ESR704A032004036	1/2	1/2	9/16	1 1/4	3	4/64
1-04-063081	ESR704A032006036	1/2	1/2	9/16	1 1/4	3	6/64
1-04-063082	ESR704A032006036-4	1/2	1/2	9/16	1 1/4	4	6/64
1-04-063004	ESR704A040002080	5/8	5/8	1 1/4	1 31/32	4	2/64
1-04-063005	ESR704A040003080	5/8	5/8	1 1/4	1 31/32	4	3/64
1-04-063006	ESR704A040004080	5/8	5/8	1 1/4	1 31/32	4	4/64
1-04-063018	ESR704A040001048	5/8	5/8	3/4	1 1/2	3 1/2	1/64
1-04-063007	ESR704A048002096	3/4	3/4	1 1/2	1 23/32	4	2/64
1-04-063008	ESR704A048003096	3/4	3/4	1 1/2	1 23/32	4	3/64
1-04-063009	ESR704A048004096	3/4	3/4	1 1/2	1 23/32	4	4/64
1-04-063019	ESR704A048001064	3/4	3/4	1	1 3/4	4	1/64

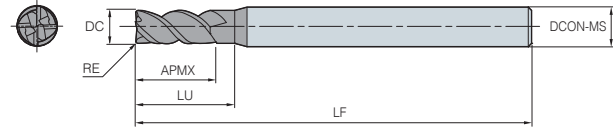
ESR714A

4 flutes radius



p.118

DC	Tolerance
1/8 ~ 1/4	0.0000 ~ 0.0005
1/4 ~ 3/4	0.0000 ~ 0.0006



(inch)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-062993	ESR714A008001024	1/8	1/8	1/64	3/8	1 1/2	1/64
1-04-063090	ESR714A008001010	1/8	1/4	1/64	5/32	2 1/2	1/64
1-04-062994	ESR714A012001028	3/16	3/16	1/64	7/16	2	1/64
1-04-062995	ESR714A012002028	3/16	3/16	2/64	7/16	2	2/64
1-04-063091	ESR714A012001014	3/16	1/4	1/64	7/32	2 1/2	1/64
1-04-063092	ESR714A016001018	1/4	1/4	1/64	9/32	2 1/2	1/64
1-04-063093	ESR714A020003026	5/16	5/16	3/64	13/32	2 1/2	3/64
1-04-063094	ESR714A024003030	3/8	3/8	3/64	15/32	2 1/2	3/64
1-04-062927	ESR714A024001080	3/8	3/8	1/64	1 1/4	3	1/64
1-04-063095	ESR714A028003036	7/16	7/16	3/64	9/16	2 1/2	3/64
1-04-063096	ESR714A032003040	1/2	1/2	3/64	5/8	3	3/64
1-04-063097	ESR714A032003040-4.5	1/2	1/2	3/64	5/8	4 1/2	3/64
1-04-062928	ESR714A032001080	1/2	1/2	1/64	1 1/4	3	1/64
1-04-063098	ESR714A040003048	5/8	5/8	3/64	3/4	3 1/2	3/64
1-04-063099	ESR714A040003048-4.5	5/8	5/8	3/64	3/4	4 1/2	3/64
1-04-063100	ESR714A040003048-5.5	5/8	5/8	3/64	3/4	5 1/2	3/64
1-04-062929	ESR714A040002096	5/8	5/8	2/64	1 1/2	3 1/2	2/64
1-04-063101	ESR714A048004060	3/4	3/4	4/64	15/16	4	4/64
1-04-063102	ESR714A048004060-4.5	3/4	3/4	4/64	15/16	4 1/2	4/64
1-04-063103	ESR714A048004060-5.5	3/4	3/4	4/64	15/16	5 1/2	4/64

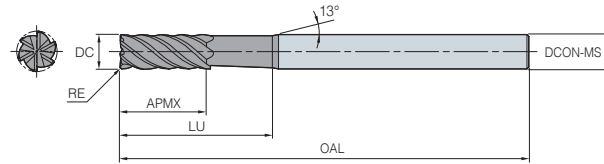
ESR706A

6 flutes neck type radius



p.118

DC	Tolerance
3/16 ~ 1/4	0.0000 ~ 0.0005
5/16 ~ 1/2	0.0000 ~ 0.0006

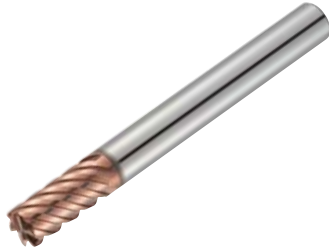


(inch)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-063065	ESR706A012001017	3/16	1/4	17/64	13/20	2	1/64
1-04-063066	ESR706A012002017	3/16	1/4	17/64	13/20	2	2/64
1-04-063067	ESR706A012001017-4	3/16	1/4	17/64	1 3/10	4	1/64
1-04-063068	ESR706A012002017-4	3/16	1/4	17/64	1 3/10	4	2/64
1-04-062917	ESR706A016001022	1/4	1/4	11/32	13/16	3	1/64
1-04-062918	ESR706A016002022	1/4	1/4	11/32	13/16	3	2/64
1-04-062919	ESR706A016001022-6	1/4	1/4	11/32	1 5/8	6	1/64
1-04-062920	ESR706A016002022-6	1/4	1/4	11/32	1 5/8	6	2/64
1-04-062864	ESR706A020001026	5/16	5/16	13/32	1 1/8	3	1/64
1-04-062865	ESR706A020002026	5/16	5/16	13/32	1 1/8	3	2/64
1-04-062866	ESR706A020002026-6	5/16	5/16	13/32	13/16	6	2/64
1-04-062867	ESR706A024001030	3/8	3/8	15/32	1 17/64	3	1/64
1-04-062868	ESR706A024002030	3/8	3/8	15/32	1 17/64	3	2/64
1-04-062869	ESR706A024001030-6	3/8	3/8	15/32	2 7/64	6	1/64
1-04-062870	ESR706A024002030-6	3/8	3/8	15/32	2 7/64	6	2/64
1-04-062871	ESR706A024001066	3/8	3/8	1 1/32	1 1/2	3	1/64
1-04-062921	ESR706A032002040	1/2	1/2	5/8	1 25/64	3	2/64

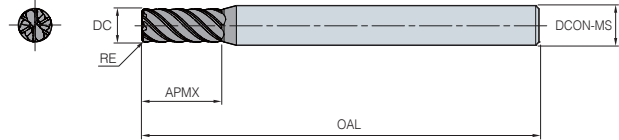
ESR716A

6 flutes type radius



p.118

DC	Tolerance
1/4	0.0000 ~ 0.0005
5/16 ~ 5/8	0.0000 ~ 0.0006

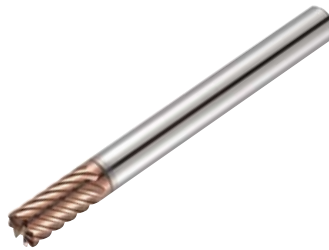


(inch)

K.P. Code	Designation	DC	DCON-MS	APMX	OAL	RE
1-04-062839	ESR716A016001032	1/4	1/4	1/2	2 1/4	1/64
1-04-062840	ESR716A020001048	5/16	5/16	3/4	2 1/2	1/64
1-04-062841	ESR716A024002056	3/8	3/8	7/8	2 7/8	2/64
1-04-062842	ESR716A032002064	1/2	1/2	1	3 1/4	2/64
1-04-063020	ESR716A040002096	5/8	5/8	1 1/2	3 5/8	2/64
1-04-063021	ESR716A040004096	5/8	5/8	1 1/2	3 5/8	4/64

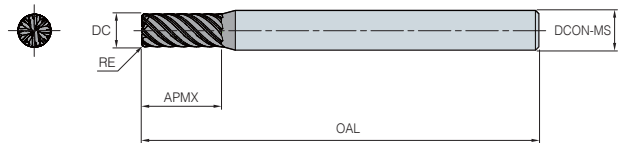
ESR718A

8 flutes type radius



p.119

DC	Tolerance
ALL	0.0000 ~ 0.0006



(inch)

K.P. Code	Designation	DC	DCON-MS	APMX	OAL	RE
1-04-063022	ESR718A048002096	3/4	3/4	1 1/2	4 1/8	2/64
1-04-063023	ESR718A048004096	3/4	3/4	1 1/2	4 1/8	4/64
1-04-063024	ESR718A064002096	1	1	1 1/2	4 1/4	2/64
1-04-063025	ESR718A064004096	1	1	1 1/2	4 1/4	4/64
1-04-063026	ESR718A064002288	1	1	4 1/2	7	2/64
1-04-063027	ESR718A064004288	1	1	4 1/2	7	4/64

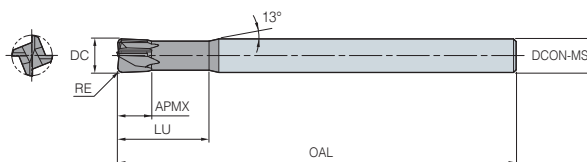
ESPM4A

4 flutes radius for high speed machining



p.119~120

DC	Tolerance
1/8 ~ 1/4	0.000 ~ -0.012
5/16 ~ 1/2	0.000 ~ -0.015



(inch)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-063010	ESPM4A008002003	1/8	1/4	1/20	3/8	2 1/4	2/64
1-04-063083	ESPM4A008002004	1/8	1/4	1/16	3/8	2 1/4	2/64
1-04-063011	ESPM4A012004005	3/16	1/4	3/40	3/8	2 1/4	4/64
1-04-063084	ESPM4A012004006	3/16	1/4	3/32	9/16	2 1/4	4/64
1-04-063012	ESPM4A016004006	1/4	1/4	1/10	1/2	2 1/2	4/64
1-04-063085	ESPM4A016004006-3	1/4	1/4	1/10	1	3	4/64
1-04-063086	ESPM4A020006008-3	5/16	5/16	3/23	1 1/4	3	6/64
1-04-063087	ESPM4A024006010-3	3/8	3/8	3/20	3/4	3	6/64
1-04-063088	ESPM4A024006010-4	3/8	3/8	3/20	1 1/2	4	6/64
1-04-063013	ESPM4A032006013	1/2	1/2	1/5	1	3 1/4	6/64
1-04-063089	ESPM4A032008013-5	1/2	1/2	1/5	2	5	8/64

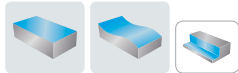
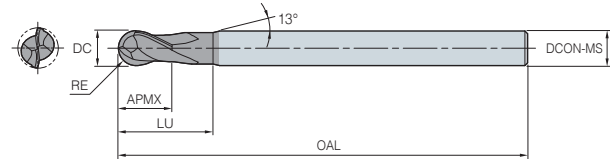
ESB702A

2 flutes neck type ball



p.120

DC	Tolerance
1/32 ~ 1/4	0.0000 ~ 0.0005
5/16 ~ 3/4	0.0000 ~ 0.0006



(inch)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-062831	ESB702A002002	1/32	1/4	1/32	1/16	2
1-04-062873	ESB702A002002-3	1/32	1/4	1/32	1/16	3
1-04-062832	ESB702A004004	1/16	1/4	1/16	1/8	2
1-04-062874	ESB702A004004-3	1/16	1/4	1/16	1/8	3
1-04-062833	ESB702A006006	3/32	1/4	3/32	3/16	2
1-04-062922	ESB702A006006-3	3/32	1/4	3/32	3/16	3
1-04-062876	ESB702A008008	1/8	1/4	1/8	1/4	3
1-04-062825	ESB702A008016	1/8	1/8	1/4	5/8	3
1-04-062834	ESB702A012012	3/16	1/4	3/16	3/8	3
1-04-062843	ESB702A012017	3/16	1/4	17/64	21/32	2
1-04-062844	ESB702A012017-4	3/16	3/16	17/64	1 5/16	4
1-04-062826	ESB702A012024	3/16	3/16	3/8	5/8	3 1/2
1-04-062912	ESB702A016016	1/4	1/4	1/4	1/2	3 1/2
1-04-062845	ESB702A016022	1/4	1/4	11/32	1 5/16	3
1-04-062846	ESB702A016022-6	1/4	1/4	11/32	1 39/64	6
1-04-062910	ESB702A016032	1/4	1/4	1/2	3/4	3 1/2
1-04-062836	ESB702A020020	5/16	5/16	5/16	5/8	4
1-04-062837	ESB702A024024	3/8	3/8	3/8	3/4	4
1-04-062847	ESB702A024030	3/8	3/8	15/32	1 17/64	3
1-04-062848	ESB702A024030-6	3/8	3/8	15/32	2 1/8	6
1-04-062828	ESB702A024048	3/8	3/8	3/4	1 1/8	4
1-04-062913	ESB702A032032	1/2	1/2	1/2	1	4 1/2
1-04-062849	ESB702A032040	1/2	1/2	5/8	1 25/64	4
1-04-062850	ESB702A032040-6	1/2	1/2	5/8	2 5/16	6
1-04-062911	ESB702A032064	1/2	1/2	1	1 3/4	4
1-04-062877	ESB702A040040	5/8	5/8	5/8	1 1/4	5 1/2
1-04-062851	ESB702A040048	5/8	5/8	3/4	1 21/32	4
1-04-062852	ESB702A040048-6	5/8	5/8	3/4	2 5/8	6
1-04-062830	ESB702A040080	5/8	5/8	1 1/4	2	5
1-04-062923	ESB702A048048	3/4	3/4	3/4	1 1/2	6 1/2

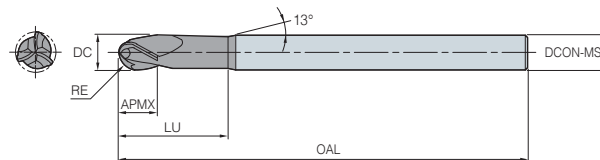
ESB703A

3 flutes neck type radius



p.121

DC	Tolerance
1/16 ~ 1/4	0.0000 ~ 0.0005
5/16 ~ 1/2	0.0000 ~ 0.0006



(inch)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-063028	ESB703A004004	1/16	1/4	1/16	1/8	2
1-04-063029	ESB703A006006	3/32	1/4	3/32	3/16	2
1-04-063030	ESB703A008008	1/8	1/4	1/8	1/4	2
1-04-063033	ESB703A012012	3/16	1/4	3/16	3/8	2
1-04-063035	ESB703A016016	1/4	1/4	1/4	1/2	2 1/4
1-04-063037	ESB703A020020	5/16	5/16	5/16	5/8	2 1/2
1-04-063039	ESB703A024024	3/8	3/8	3/8	3/4	3
1-04-063041	ESB703A032032	1/2	1/2	1/2	1	3

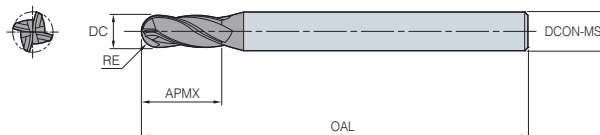
ESB714A

4 flutes type ball



p.121

DC	Tolerance
1/8 ~ 1/4	0.0000 ~ 0.0005
5/16 ~ 1/2	0.0000 ~ 0.0006



(inch)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-063031	ESB714A008008	1/8	1/4	1/8	-	3
1-04-063032	ESB714A010010	5/32	1/4	5/32	-	3
1-04-063034	ESB714A012012	3/16	1/4	3/16	-	3
1-04-063036	ESB714A016016	1/4	3/8	1/4	-	4
1-04-063038	ESB714A020020	5/16	3/8	5/16	-	4
1-04-063040	ESB714A024024	3/8	1/2	3/8	-	5
1-04-063042	ESB714A032032	1/2	1/2	1/2	-	5

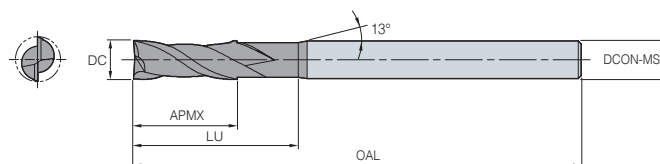
ESE702

2 flutes neck type flat



p.122

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-052305	ESE702001	0.1	4	0.2	-	40
1-04-052306	ESE702002	0.2	4	0.4	-	40
1-04-052307	ESE702003	0.3	4	0.5	-	40
1-04-052308	ESE702004	0.4	4	0.7	-	40
1-04-052309	ESE702005	0.5	4	1	-	40
1-04-052310	ESE702006	0.6	4	1.2	-	40
1-04-052311	ESE702007	0.7	4	1.4	-	40
1-04-052312	ESE702008	0.8	4	1.6	-	40
1-04-052313	ESE702009	0.9	4	2	-	40
1-04-052315	ESE702010	1	6	1.5	-	40
1-04-052314	ESE702010S4	1	4	1.5	-	40
1-04-052316	ESE702015	1.5	6	2.2	-	40
1-04-052318	ESE702020	2	6	3	6	40
1-04-052317	ESE702020S4	2	4	3	6	40
1-04-052319	ESE702025	2.5	6	4	6	40
1-04-052320	ESE702030	3	6	4	7	45
1-04-052321	ESE702035	3.5	6	6	9	45
1-04-052322	ESE702040	4	6	6	9	45
1-04-052323	ESE702045	4.5	6	6	10	45
1-04-052324	ESE702050	5	6	6	11	50
1-04-052325	ESE702060	6	6	7	14	50
1-04-052326	ESE702080	8	8	9	18	60
1-04-052327	ESE702100	10	10	12	25	75
1-04-052328	ESE702120	12	12	15	30	75
1-04-052329	ESE702160	16	16	18	38	90
1-04-052330	ESE702200	20	20	24	45	100

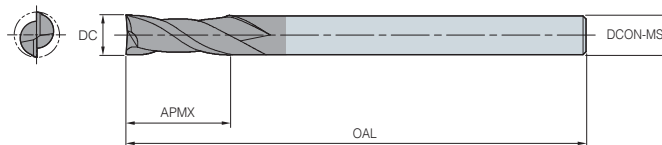
ESE712

2 flutes flat



p.123

DC	Tolerance
Ø1 ~ Ø6	0.000 ~ -0.012
Ø6.5 ~ Ø12	0.000 ~ -0.015



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	OAL
1-04-052349	ESE712010	1	6	3	40
1-04-052348	ESE712010-02	1	6	2	40
1-04-054150	ESE712010-02S4	1	4	2	40
1-04-052350	ESE712010-04	1	6	4	40
1-04-052351	ESE712012	1.2	6	3	40
1-04-052352	ESE712015	1.5	6	4	40
1-04-054151	ESE712015S4	1.5	4	4	40
1-04-052353	ESE712015-06	1.5	6	6	40
1-04-052354	ESE712015-08	1.5	6	8	40
1-04-052355	ESE712020	2	6	5	40
1-04-054152	ESE712020S4	2	4	5	40
1-04-052356	ESE712020-08	2	6	8	40
1-04-052357	ESE712020-10	2	6	10	50
1-04-052358	ESE712025	2.5	6	6	40
1-04-054153	ESE712025S4	2.5	4	6	40
1-04-052359	ESE712030	3	6	8	45
1-04-054154	ESE712030S4	3	4	8	45
1-04-052360	ESE712030-10	3	6	10	50
1-04-052361	ESE712030-12	3	6	12	50
1-04-052362	ESE712035	3.5	6	10	45
1-04-052363	ESE712040	4	6	10	45
1-04-054155	ESE712040S4	4	4	10	45
1-04-052364	ESE712040-12	4	6	12	50
1-04-052365	ESE712040-16	4	6	16	60
1-04-052366	ESE712045	4.5	6	11	45
1-04-052367	ESE712050	5	6	13	50
1-04-052368	ESE712055	5.5	6	13	50
1-04-052369	ESE712060	6	6	13	50
1-04-052370	ESE712060-15	6	6	15	60
1-04-052371	ESE712065	6.5	8	16	60
1-04-052372	ESE712070	7	8	18	60
1-04-052373	ESE712080	8	8	19	60
1-04-052374	ESE712100	10	10	22	70
1-04-054156	ESE712100-25	10	10	25	70
1-04-054158	ESE712120	12	12	26	75
1-04-054157	ESE712120-30	12	12	30	75

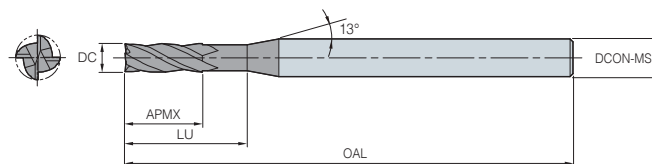
ESE704

4 flutes neck type flat



p.124

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-052332	ESE704010	1	6	1.5	-	40
1-04-052331	ESE704010S4	1	4	1.5	-	40
1-04-052333	ESE704015	1.5	6	2.2	-	40
1-04-054146	ESE704015S4	1.5	4	2.2	-	40
1-04-052335	ESE704020	2	6	3	6	40
1-04-052334	ESE704020S4	2	4	3	6	40
1-04-052336	ESE704025	2.5	6	4	6	40
1-04-054147	ESE704025S4	2.5	4	4	6	40
1-04-052337	ESE704030	3	6	4	7	45
1-04-054148	ESE704030S4	3	4	4	7	45
1-04-052338	ESE704035	3.5	6	5	9	45
1-04-052339	ESE704040	4	6	5	9	45
1-04-054149	ESE704040S4	4	4	5	9	45
1-04-052340	ESE704045	4.5	6	6	10	45
1-04-052341	ESE704050	5	6	6	11	50
1-04-052342	ESE704060	6	6	7	14	50
1-04-052343	ESE704080	8	8	9	18	60
1-04-052344	ESE704100	10	10	12	25	75
1-04-052345	ESE704120	12	12	15	30	75
1-04-052346	ESE704160	16	16	18	38	90
1-04-052347	ESE704200	20	20	24	45	100

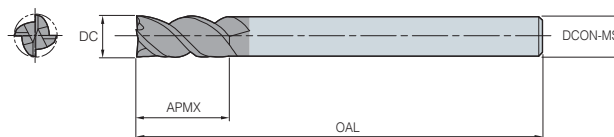
ESE714

4 flutes high helix flat



p.124

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

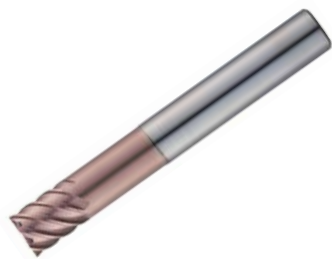


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	OAL
1-04-052375	ESE714010	1	6	2.5	40
1-04-054159	ESE714010S4	1	4	2.5	40
1-04-052376	ESE714012	1.2	6	3	40
1-04-052377	ESE714015	1.5	6	4	40
1-04-054160	ESE714015S4	1.5	4	4	40
1-04-052378	ESE714020	2	6	5	40
1-04-054161	ESE714020S4	2	4	5	40
1-04-052379	ESE714025	2.5	6	6	40
1-04-054162	ESE714025S4	2.5	4	6	40
1-04-052380	ESE714030	3	6	8	45
1-04-054163	ESE714030S4	3	4	8	45
1-04-052381	ESE714035	3.5	6	9	45
1-04-052382	ESE714040	4	6	10	45
1-04-054164	ESE714040S4	4	4	10	45
1-04-052383	ESE714050	5	6	13	50
1-04-052384	ESE714060	6	6	13	50
1-04-052385	ESE714060-15	6	6	15	60
1-04-054165	ESE714060-15L	6	6	15	90
1-04-052386	ESE714080	8	8	19	60
1-04-054166	ESE714080L	8	8	19	100
1-04-052387	ESE714100	10	10	22	70
1-04-052388	ESE714100-25	10	10	25	70
1-04-054167	ESE714100-25L	10	10	25	100
1-04-052389	ESE714120	12	12	26	75
1-04-052390	ESE714120-30	12	12	30	80
1-04-054168	ESE714120-30L	12	12	30	100

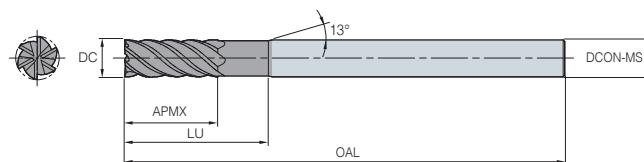
ESE724(6)

4&6 flutes neck type flat



p.124

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	NOF
1-04-052397	ESE724010	1	6	1.5	5	45	4
1-04-052398	ESE724015	1.5	6	2.2	6	45	4
1-04-052399	ESE724020	2	6	3	8	45	4
1-04-052400	ESE724030	3	6	4	9	50	4
1-04-052401	ESE724040	4	6	5	12	50	4
1-04-054169	ESE724040S4L	4	4	5	12	75	4
1-04-052402	ESE724050	5	6	6	15	50	4
1-04-052403	ESE726060	6	6	7	20	60	6
1-04-052404	ESE726080	8	8	9	25	70	6
1-04-052405	ESE726100	10	10	12	32	75	6
1-04-052406	ESE726120	12	12	15	38	80	6

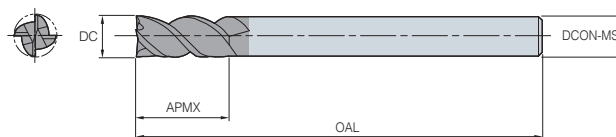
ESE744

4 flutes flat



p.124

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	OAL
1-04-054241	ESE744010S3	1	3	2.5	40
1-04-054242	ESE744010S4	1	4	2.5	40
1-04-054243	ESE744010	1	6	2.5	40
1-04-054244	ESE744012S3	1.2	3	3	40
1-04-054245	ESE744012S4	1.2	4	3	40
1-04-054246	ESE744015S3	1.5	3	4	40
1-04-054247	ESE744015S4	1.5	4	4	40
1-04-054248	ESE744015	1.5	6	4	40
1-04-054249	ESE744020S3	2	3	6	40
1-04-054250	ESE744020S4	2	4	6	40
1-04-054251	ESE744020	2	6	6	40
1-04-054252	ESE744025S3	2.5	3	8	45
1-04-054253	ESE744025S4	2.5	4	8	45
1-04-054254	ESE744025	2.5	6	8	45
1-04-054255	ESE744030S3	3	3	8	50
1-04-054256	ESE744030S4	3	4	8	45
1-04-054257	ESE744030	3	6	8	45
1-04-054258	ESE744035	3.5	6	10	45
1-04-054259	ESE744040S4	4	4	11	45
1-04-054260	ESE744040	4	6	11	45
1-04-054261	ESE744045	4.5	6	11	45
1-04-054262	ESE744050	5	6	13	50
1-04-054263	ESE744055	5.5	6	13	50
1-04-054264	ESE744060	6	6	13	50
1-04-054265	ESE744080	8	8	19	60
1-04-054266	ESE744100	10	10	22	70
1-04-054267	ESE744120	12	12	26	75

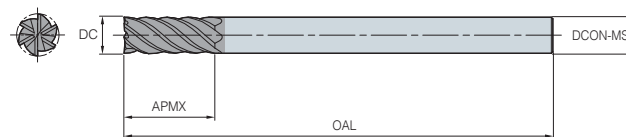
ESE716

6 flutes high helix flat



p.125

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	OAL
1-04-052391	ESE716060	6	6	13	50
1-04-052392	ESE716080	8	8	18	60
1-04-052393	ESE716100	10	10	22	70
1-04-052394	ESE716120	12	12	26	75
1-04-052395	ESE716160	16	16	35	90
1-04-052396	ESE716200	20	20	44	100

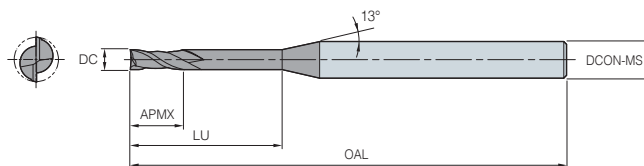
ESRE712

2 flutes rib neck type flat



p.126~130

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-053146	ESRE712001003	0.1	4	0.15	0.3	40
1-04-053147	ESRE712001005	0.1	4	0.15	0.5	40
1-04-053148	ESRE71200101	0.1	4	0.15	1	40
1-04-053149	ESRE712002005	0.2	4	0.3	0.5	40
1-04-053151	ESRE712002015	0.2	4	0.3	1.5	40
1-04-053150	ESRE71200201	0.2	4	0.3	1	40
1-04-053152	ESRE71200202	0.2	4	0.3	2	40
1-04-053154	ESRE712003015	0.3	4	0.5	1.5	40
1-04-053153	ESRE71200301	0.3	4	0.5	1	40
1-04-053156	ESRE712003025	0.3	4	0.5	2.5	40
1-04-053155	ESRE71200302	0.3	4	0.5	2	40
1-04-053157	ESRE71200303	0.3	4	0.5	3	40
1-04-053158	ESRE71200304	0.3	4	0.5	4	40
1-04-053159	ESRE71200305	0.3	4	0.5	5	40
1-04-053161	ESRE712004015	0.4	4	0.6	1.5	40
1-04-053160	ESRE71200401	0.4	4	0.6	1	40
1-04-053163	ESRE712004025	0.4	4	0.6	2.5	40
1-04-053162	ESRE71200402	0.4	4	0.6	2	40
1-04-053164	ESRE71200403	0.4	4	0.6	3	40
1-04-053165	ESRE71200404	0.4	4	0.6	4	40
1-04-053166	ESRE71200405	0.4	4	0.6	5	40
1-04-053167	ESRE71200406	0.4	4	0.6	6	40
1-04-053168	ESRE71200408	0.4	4	0.6	8	40
1-04-053169	ESRE71200410	0.5	4	0.6	10	40
1-04-053171	ESRE712005015	0.5	4	0.7	1.5	45
1-04-053170	ESRE71200501	0.5	4	0.7	1	45
1-04-053173	ESRE712005025	0.5	4	0.7	2.5	45
1-04-053172	ESRE71200502	0.5	4	0.7	2	45
1-04-053174	ESRE71200503	0.5	4	0.7	3	45
1-04-053175	ESRE71200504	0.5	4	0.7	4	45
1-04-053176	ESRE71200505	0.5	4	0.7	5	45
1-04-053177	ESRE71200506	0.5	4	0.7	6	45
1-04-053178	ESRE71200508	0.5	4	0.7	8	45
1-04-053179	ESRE71200510	0.5	4	0.7	10	45
1-04-053180	ESRE71200512	0.5	4	0.7	12	45
1-04-053181	ESRE71200514	0.5	4	0.7	14	45
1-04-053182	ESRE71200516	0.5	4	0.7	16	45
1-04-053183	ESRE71200602	0.6	4	0.9	2	45

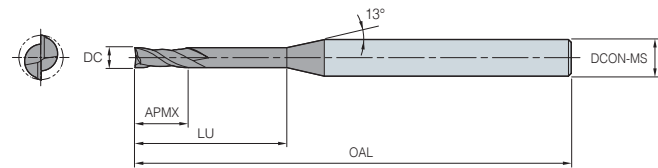
ESRE712

2 flutes rib neck type flat



p.126~130

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-053184	ESRE71200603	0.6	4	0.9	3	45
1-04-053185	ESRE71200604	0.6	4	0.9	4	45
1-04-053186	ESRE71200605	0.6	4	0.9	5	45
1-04-053187	ESRE71200606	0.6	4	0.9	6	45
1-04-053188	ESRE71200608	0.6	4	0.9	8	45
1-04-053189	ESRE71200610	0.6	4	0.9	10	45
1-04-053190	ESRE71200612	0.6	4	0.9	12	45
1-04-053191	ESRE71200614	0.6	4	0.9	14	45
1-04-053192	ESRE71200616	0.6	4	0.9	16	45
1-04-053193	ESRE71200702	0.7	4	1.2	2	45
1-04-053194	ESRE71200704	0.7	4	1.2	4	45
1-04-053195	ESRE71200706	0.7	4	1.2	6	45
1-04-053196	ESRE71200708	0.7	4	1.2	8	45
1-04-053197	ESRE71200710	0.7	4	1.2	10	45
1-04-053198	ESRE71200712	0.7	4	1.2	12	45
1-04-053199	ESRE71200802	0.8	4	1.2	2	45
1-04-053200	ESRE71200803	0.8	4	1.2	3	45
1-04-053201	ESRE71200804	0.8	4	1.2	4	45
1-04-053202	ESRE71200805	0.8	4	1.2	5	45
1-04-053203	ESRE71200806	0.8	4	1.2	6	45
1-04-053204	ESRE71200808	0.8	4	1.2	8	45
1-04-053205	ESRE71200810	0.8	4	1.2	10	45
1-04-053206	ESRE71200812	0.8	4	1.2	12	45
1-04-053207	ESRE71200814	0.8	4	1.2	14	45
1-04-053208	ESRE71200816	0.8	4	1.2	16	45
1-04-053209	ESRE71200820	0.8	4	1.2	20	50
1-04-053210	ESRE71200906	0.9	4	1.3	6	45
1-04-053211	ESRE71200908	0.9	4	1.3	8	45
1-04-053212	ESRE71200910	0.9	4	1.3	10	45
1-04-053213	ESRE71201002	1	4	1.5	2	50
1-04-053214	ESRE71201003	1	4	1.5	3	50
1-04-053215	ESRE71201004	1	4	1.5	4	50
1-04-053216	ESRE71201005	1	4	1.5	5	50
1-04-053217	ESRE71201006	1	4	1.5	6	50
1-04-053274	ESRE71201007	1	4	1.5	7	50
1-04-053275	ESRE71201008	1	4	1.5	8	50
1-04-053276	ESRE71201010	1	4	1.5	10	50
1-04-053277	ESRE71201012	1	4	1.5	12	50

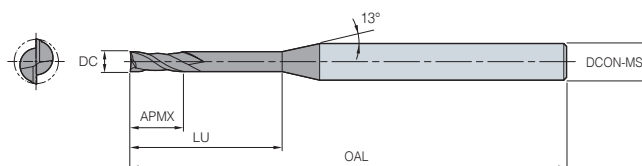
ESRE712

2 flutes rib neck type flat



p.126~130

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-053278	ESRE71201014	1	4	1.5	14	50
1-04-053279	ESRE71201016	1	4	1.5	16	50
1-04-053280	ESRE71201018	1	4	1.5	18	50
1-04-053281	ESRE71201020	1	4	1.5	20	50
1-04-053282	ESRE71201022	1	4	1.5	22	60
1-04-053283	ESRE71201026	1	4	1.5	26	60
1-04-053284	ESRE71201030	1	4	1.5	30	70
1-04-053285	ESRE71201040	1	4	1.5	40	80
1-04-053286	ESRE71201050	1	4	1.5	50	100
1-04-053287	ESRE71201204	1.2	4	1.8	4	50
1-04-053288	ESRE71201206	1.2	4	1.8	6	50
1-04-053289	ESRE71201208	1.2	4	1.8	8	50
1-04-053290	ESRE71201210	1.2	4	1.8	10	50
1-04-053291	ESRE71201212	1.2	4	1.8	12	50
1-04-053292	ESRE71201214	1.2	4	1.8	14	50
1-04-053293	ESRE71201216	1.2	4	1.8	16	50
1-04-053294	ESRE71201220	1.2	4	1.8	20	50
1-04-053295	ESRE71201226	1.2	4	1.8	26	60
1-04-053296	ESRE71201230	1.2	4	1.8	30	70
1-04-053297	ESRE71201406	1.4	4	2.1	6	50
1-04-053298	ESRE71201408	1.4	4	2.1	8	50
1-04-053299	ESRE71201410	1.4	4	2.1	10	50
1-04-053300	ESRE71201414	1.4	4	2.1	14	50
1-04-053301	ESRE71201416	1.4	4	2.1	16	50
1-04-053302	ESRE71201420	1.4	4	2.1	20	50
1-04-053303	ESRE71201504	1.5	4	2.3	4	50
1-04-053304	ESRE71201505	1.5	4	2.3	5	50
1-04-053305	ESRE71201506	1.5	4	2.3	6	50
1-04-053306	ESRE71201507	1.5	4	2.3	7	50
1-04-053307	ESRE71201508	1.5	4	2.3	8	50
1-04-053308	ESRE71201510	1.5	4	2.3	10	50
1-04-053309	ESRE71201512	1.5	4	2.3	12	50
1-04-053310	ESRE71201514	1.5	4	2.3	14	50
1-04-053311	ESRE71201516	1.5	4	2.3	16	50
1-04-053312	ESRE71201518	1.5	4	2.3	18	50
1-04-053313	ESRE71201520	1.5	4	2.3	20	50
1-04-053314	ESRE71201522	1.5	4	2.3	22	60
1-04-053315	ESRE71201526	1.5	4	2.3	26	60

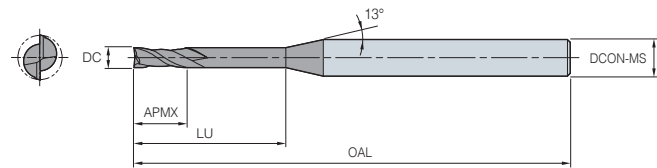
ESRE712

2 flutes rib neck type flat



p.126~130

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-053316	ESRE71201530	1.5	4	2.3	30	70
1-04-053317	ESRE71201608	1.6	4	2.3	8	50
1-04-053318	ESRE71201610	1.6	4	2.3	10	50
1-04-053319	ESRE71201612	1.6	4	2.3	12	50
1-04-053320	ESRE71201616	1.6	4	2.3	16	50
1-04-053321	ESRE71201620	1.6	4	2.3	20	50
1-04-053322	ESRE71201808	1.8	4	2.7	8	50
1-04-053323	ESRE71201810	1.8	4	2.7	10	50
1-04-053324	ESRE71201812	1.8	4	2.7	12	50
1-04-053325	ESRE71201816	1.8	4	2.7	16	50
1-04-053326	ESRE71201820	1.8	4	2.7	20	50
1-04-053327	ESRE71202006	2	4	3	6	50
1-04-053328	ESRE71202008	2	4	3	8	50
1-04-053329	ESRE71202010	2	4	3	10	50
1-04-053218	ESRE71202012	2	4	3	12	50
1-04-053219	ESRE71202014	2	4	3	14	50
1-04-053220	ESRE71202016	2	4	3	16	50
1-04-053221	ESRE71202018	2	4	3	18	50
1-04-053222	ESRE71202020	2	4	3	20	50
1-04-053223	ESRE71202022	2	4	3	22	60
1-04-053224	ESRE71202026	2	4	3	26	60
1-04-053225	ESRE71202030	2	4	3	30	70
1-04-053226	ESRE71202035	2	4	3	35	70
1-04-053227	ESRE71202040	2	4	3	40	80
1-04-053228	ESRE71202045	2	4	3	45	90
1-04-053229	ESRE71202050	2	4	3	50	100
1-04-053230	ESRE71202060	2	4	3	60	110
1-04-053231	ESRE71202508	2.5	4	4	8	50
1-04-053232	ESRE71202510	2.5	4	4	10	50
1-04-053233	ESRE71202512	2.5	4	4	12	50
1-04-053234	ESRE71202514	2.5	4	4	14	50
1-04-053235	ESRE71202516	2.5	4	4	16	50
1-04-053236	ESRE71202518	2.5	4	4	18	50
1-04-053237	ESRE71202520	2.5	4	4	20	50
1-04-053238	ESRE71202522	2.5	4	4	22	60
1-04-053239	ESRE71202526	2.5	4	4	26	60
1-04-053240	ESRE71202530	2.5	4	4	30	70
1-04-053241	ESRE71202535	2.5	4	4	35	70

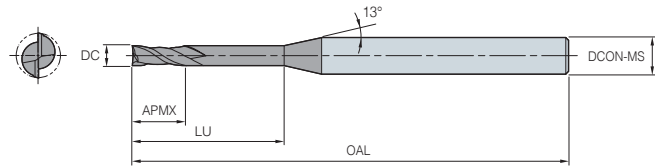
ESRE712

2 flutes rib neck type flat



p.126~130

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-053242	ESRE71202540	2.5	4	4	40	80
1-04-053243	ESRE71202545	2.5	4	4	45	90
1-04-053244	ESRE71202550	2.5	4	4	50	100
1-04-053245	ESRE71203006	3	6	4.5	6	50
1-04-053246	ESRE71203008	3	6	4.5	8	50
1-04-053247	ESRE71203010	3	6	4.5	10	50
1-04-053248	ESRE71203012	3	6	4.5	12	50
1-04-053249	ESRE71203014	3	6	4.5	14	60
1-04-053250	ESRE71203016	3	6	4.5	16	60
1-04-053251	ESRE71203018	3	6	4.5	18	60
1-04-053252	ESRE71203020	3	6	4.5	20	60
1-04-053253	ESRE71203022	3	6	4.5	22	65
1-04-053254	ESRE71203026	3	6	4.5	26	65
1-04-053255	ESRE71203030	3	6	4.5	30	70
1-04-053256	ESRE71203035	3	6	4.5	35	70
1-04-053257	ESRE71203040	3	6	4.5	40	80
1-04-053258	ESRE71203045	3	6	4.5	45	90
1-04-053259	ESRE71203050	3	6	4.5	50	100
1-04-053260	ESRE71203060	3	6	4.5	60	100
1-04-053261	ESRE71204008	4	6	6	8	50
1-04-053262	ESRE71204010	4	6	6	10	50
1-04-053263	ESRE71204012	4	6	6	12	50
1-04-053264	ESRE71204014	4	6	6	14	60
1-04-053265	ESRE71204016	4	6	6	16	60
1-04-053266	ESRE71204018	4	6	6	18	60
1-04-053267	ESRE71204020	4	6	6	20	60
1-04-053268	ESRE71204022	4	6	6	22	65
1-04-053269	ESRE71204026	4	6	6	26	65
1-04-053270	ESRE71204030	4	6	6	30	70
1-04-053271	ESRE71204035	4	6	6	35	70
1-04-053272	ESRE71204040	4	6	6	40	80
1-04-053273	ESRE71204045	4	6	6	45	90
1-04-053330	ESRE71204050	4	6	6	50	100
1-04-053331	ESRE71204060	4	6	6	60	100
1-04-053332	ESRE71205016	5	6	8	16	60
1-04-053333	ESRE71205020	5	6	8	20	60
1-04-053334	ESRE71205026	5	6	8	26	65
1-04-053335	ESRE71205030	5	6	8	30	70

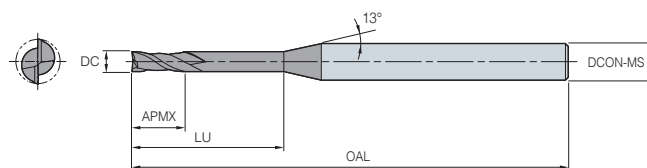
ESRE712

2 flutes rib neck type flat



p.126~130

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-053336	ESRE71205035	5	6	8	35	75
1-04-053337	ESRE71205040	5	6	8	40	80
1-04-053338	ESRE71205050	5	6	8	50	90
1-04-053339	ESRE71205060	5	6	8	60	100
1-04-053340	ESRE71206015	6	6	9	15	60
1-04-053341	ESRE71206020	6	6	9	20	60
1-04-053342	ESRE71206030	6	6	9	30	70
1-04-053343	ESRE71206032	6	6	9	32	90
1-04-053344	ESRE71208025	8	8	12	25	70
1-04-053345	ESRE71208030	8	8	12	30	80
1-04-053346	ESRE71208042	8	8	12	42	100
1-04-053347	ESRE71210030	10	10	15	30	75
1-04-053348	ESRE71210035	10	10	15	35	80
1-04-053349	ESRE71210045	10	10	15	45	100
1-04-053350	ESRE71212035	12	12	20	35	80
1-04-053351	ESRE71212040	12	12	20	40	90
1-04-053352	ESRE71212050	12	12	20	50	110

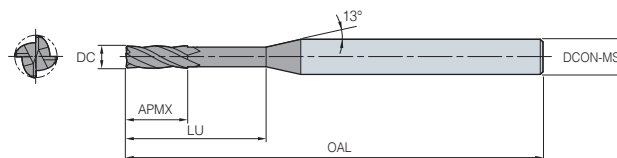
ESRE714

4 flutes rib flat



p.131~134

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-054644	ESRE71400501	0.5	4	0.5	1	40
1-04-054645	ESRE71400502	0.5	4	0.5	2	40
1-04-054646	ESRE71400503	0.5	4	0.5	3	45
1-04-054647	ESRE71400504	0.5	4	0.5	4	45
1-04-054648	ESRE71400505	0.5	4	0.5	5	45
1-04-054649	ESRE71400506	0.5	4	0.5	6	45
1-04-054650	ESRE71400508	0.5	4	0.5	8	45
1-04-054651	ESRE71400510	0.5	4	0.5	10	50
1-04-054652	ESRE71400601	0.6	4	0.6	1	45
1-04-054653	ESRE71400602	0.6	4	0.6	2	45
1-04-054654	ESRE71400603	0.6	4	0.6	3	45
1-04-054655	ESRE71400604	0.6	4	0.6	4	45
1-04-054656	ESRE71400605	0.6	4	0.6	5	45
1-04-054657	ESRE71400606	0.6	4	0.6	6	45
1-04-054658	ESRE71400608	0.6	4	0.6	8	45
1-04-054659	ESRE71400610	0.6	4	0.6	10	50
1-04-054660	ESRE71400612	0.6	4	0.6	12	50
1-04-054661	ESRE71400702	0.7	4	0.7	2	45
1-04-054662	ESRE71400704	0.7	4	0.7	4	45
1-04-054663	ESRE71400706	0.7	4	0.7	6	45
1-04-054664	ESRE71400708	0.7	4	0.7	8	45
1-04-054665	ESRE71400710	0.7	4	0.7	10	50
1-04-054666	ESRE71400801	0.8	4	0.8	1	40
1-04-054667	ESRE71400802	0.8	4	0.8	2	40
1-04-054668	ESRE71400803	0.8	4	0.8	3	40
1-04-054669	ESRE71400804	0.8	4	0.8	4	40
1-04-054670	ESRE71400805	0.8	4	0.8	5	40
1-04-054671	ESRE71400806	0.8	4	0.8	6	40
1-04-054672	ESRE71400808	0.8	4	0.8	8	40
1-04-054673	ESRE71400810	0.8	4	0.8	10	50
1-04-054674	ESRE71400812	0.8	4	0.8	12	50
1-04-054675	ESRE71400816	0.8	4	0.8	16	50
1-04-054676	ESRE71401002	1	4	1	2	45
1-04-054677	ESRE71401003	1	4	1	3	45
1-04-054678	ESRE71401004	1	4	1	4	45
1-04-054679	ESRE71401006	1	4	1	6	45
1-04-054680	ESRE71401008	1	4	1	8	45
1-04-054681	ESRE71401010	1	4	1	10	50
1-04-054682	ESRE71401012	1	4	1	12	50
1-04-054683	ESRE71401014	1	4	1	14	50

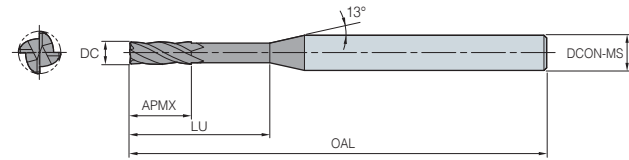
ESRE714

4 flutes rib flat



p.131~134

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-054684	ESRE71401016	1	4	1	16	50
1-04-054685	ESRE71401018	1	4	1	18	60
1-04-054686	ESRE71401020	1	4	1	20	60
1-04-054687	ESRE71401204	1.2	4	1.2	4	45
1-04-054688	ESRE71401206	1.2	4	1.2	6	45
1-04-054689	ESRE71401208	1.2	4	1.2	8	45
1-04-054690	ESRE71401210	1.2	4	1.2	10	50
1-04-054691	ESRE71401212	1.2	4	1.2	12	50
1-04-054692	ESRE71401216	1.2	4	1.2	16	50
1-04-054693	ESRE71401218	1.2	4	1.2	18	60
1-04-054694	ESRE71401220	1.2	4	1.2	20	60
1-04-054695	ESRE71401406	1.4	4	1.4	6	45
1-04-054696	ESRE71401408	1.4	4	1.4	8	45
1-04-054697	ESRE71401410	1.4	4	1.4	10	50
1-04-054698	ESRE71401412	1.4	4	1.4	12	50
1-04-054699	ESRE71401414	1.4	4	1.4	14	50
1-04-054700	ESRE71401416	1.4	4	1.4	16	50
1-04-054701	ESRE71401504	1.5	4	1.5	4	45
1-04-054702	ESRE71401506	1.5	4	1.5	6	45
1-04-054703	ESRE71401508	1.5	4	1.5	8	45
1-04-054704	ESRE71401510	1.5	4	1.5	10	50
1-04-054705	ESRE71401512	1.5	4	1.5	12	50
1-04-054706	ESRE71401516	1.5	4	1.5	16	50
1-04-054707	ESRE71401518	1.5	4	1.5	18	60
1-04-054708	ESRE71401520	1.5	4	1.5	20	60
1-04-054709	ESRE71401525	1.5	4	1.5	25	60
1-04-054710	ESRE71401530	1.5	4	1.5	30	70
1-04-054711	ESRE71401606	1.6	4	1.6	6	45
1-04-054712	ESRE71401608	1.6	4	1.6	8	45
1-04-054713	ESRE71401610	1.6	4	1.6	10	50
1-04-054714	ESRE71401612	1.6	4	1.6	12	50
1-04-054715	ESRE71401614	1.6	4	1.6	14	50
1-04-054716	ESRE71401616	1.6	4	1.6	16	50
1-04-054717	ESRE71401618	1.6	4	1.6	18	60
1-04-054718	ESRE71401620	1.6	4	1.6	20	60
1-04-054719	ESRE71401625	1.6	4	1.6	25	70
1-04-054720	ESRE71401806	1.8	4	1.8	6	45
1-04-054721	ESRE71401808	1.8	4	1.8	8	45
1-04-054722	ESRE71401810	1.8	4	1.8	10	50
1-04-054723	ESRE71401812	1.8	4	1.8	12	50

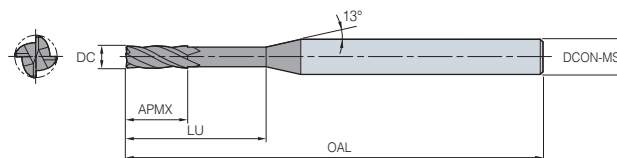
ESRE714

4 flutes rib flat



p.131~134

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-054724	ESRE71401816	1.8	4	1.8	16	50
1-04-054725	ESRE71401820	1.8	4	1.8	20	60
1-04-054726	ESRE71401825	1.8	4	1.8	25	70
1-04-054727	ESRE71402004	2	4	2	4	45
1-04-054728	ESRE71402006	2	4	2	6	45
1-04-054729	ESRE71402008	2	4	2	8	45
1-04-054730	ESRE71402010	2	4	2	10	50
1-04-054731	ESRE71402012	2	4	2	12	50
1-04-054732	ESRE71402014	2	4	2	14	50
1-04-054733	ESRE71402016	2	4	2	16	50
1-04-054734	ESRE71402018	2	4	2	18	50
1-04-054735	ESRE71402020	2	4	2	20	50
1-04-054736	ESRE71402022	2	4	2	22	60
1-04-054737	ESRE71402025	2	4	2	25	60
1-04-054738	ESRE71402030	2	4	2	30	70
1-04-054739	ESRE71402510	2.5	4	2.5	10	50
1-04-054740	ESRE71402512	2.5	4	2.5	12	50
1-04-054741	ESRE71402516	2.5	4	2.5	16	50
1-04-054742	ESRE71402520	2.5	4	2.5	20	50
1-04-054743	ESRE71402525	2.5	4	2.5	25	60
1-04-054744	ESRE71402530	2.5	4	2.5	30	70
1-04-054745	ESRE71403006	3	6	3	6	45
1-04-054746	ESRE71403008	3	6	3	8	45
1-04-054747	ESRE71403010	3	6	3	10	50
1-04-054748	ESRE71403012	3	6	3	12	50
1-04-054749	ESRE71403016	3	6	3	16	55
1-04-054750	ESRE71403020	3	6	3	20	60
1-04-054751	ESRE71403025	3	6	3	25	65
1-04-054752	ESRE71403030	3	6	3	30	70
1-04-054753	ESRE71403035	3	6	3	35	75
1-04-054754	ESRE71403040	3	6	3	40	80
1-04-054755	ESRE71403045	3	6	3	45	90
1-04-054756	ESRE71403050	3	6	3	50	100
1-04-054757	ESRE71403060	3	6	3	60	110
1-04-054758	ESRE71403512	3.5	6	3.5	12	50
1-04-054759	ESRE71403516	3.5	6	3.5	16	55
1-04-054760	ESRE71403520	3.5	6	3.5	20	60
1-04-054761	ESRE71403525	3.5	6	3.5	25	65
1-04-054762	ESRE71403530	3.5	6	3.5	30	70
1-04-054763	ESRE71403535	3.5	6	3.5	35	75

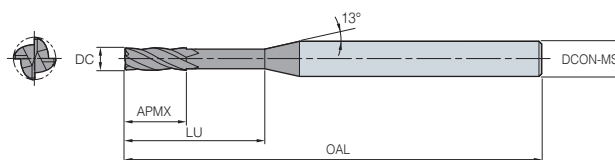
ESRE714

4 flutes rib flat



p.131~134

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-054764	ESRE71403540	3.5	6	3.5	40	80
1-04-054765	ESRE71404006	4	6	4	6	50
1-04-054766	ESRE71404008	4	6	4	8	50
1-04-054767	ESRE71404010	4	6	4	10	50
1-04-054768	ESRE71404012	4	6	4	12	50
1-04-054769	ESRE71404016	4	6	4	16	55
1-04-054770	ESRE71404020	4	6	4	20	60
1-04-054771	ESRE71404025	4	6	4	25	65
1-04-054772	ESRE71404030	4	6	4	30	70
1-04-054773	ESRE71404040	4	6	4	40	80
1-04-054774	ESRE71404045	4	6	4	45	90
1-04-054775	ESRE71404050	4	6	4	50	100
1-04-054776	ESRE71404060	4	6	4	60	110
1-04-054777	ESRE71404512	4.5	6	4.5	12	50
1-04-054778	ESRE71404516	4.5	6	4.5	16	55
1-04-054779	ESRE71404520	4.5	6	4.5	20	60
1-04-054780	ESRE71404525	4.5	6	4.5	25	65
1-04-054781	ESRE71404530	4.5	6	4.5	30	70
1-04-054782	ESRE71404540	4.5	6	4.5	40	80
1-04-054783	ESRE71405016	5	6	5	16	60
1-04-054784	ESRE71405020	5	6	5	20	60
1-04-054785	ESRE71405025	5	6	5	25	65
1-04-054786	ESRE71405030	5	6	5	30	70
1-04-054787	ESRE71405040	5	6	5	40	80
1-04-054788	ESRE71405050	5	6	5	50	100
1-04-054789	ESRE71405060	5	6	5	60	110
1-04-054790	ESRE71406020	6	6	6	20	60
1-04-054791	ESRE71406030	6	6	6	30	75
1-04-054792	ESRE71406040	6	6	6	40	80
1-04-054793	ESRE71406050	6	6	6	50	90
1-04-054794	ESRE71406060	6	6	6	60	100
1-04-054795	ESRE71408025	8	8	12	25	65
1-04-054796	ESRE71408040	8	8	12	40	100
1-04-054797	ESRE71408050	8	8	12	50	110
1-04-054798	ESRE71410030	10	10	15	30	70
1-04-054799	ESRE71410050	10	10	15	50	100
1-04-054800	ESRE71410060	10	10	15	60	120
1-04-054801	ESRE71412040	12	12	18	40	80
1-04-054802	ESRE71412060	12	12	18	60	110
1-04-054803	ESRE71412070	12	12	18	70	130

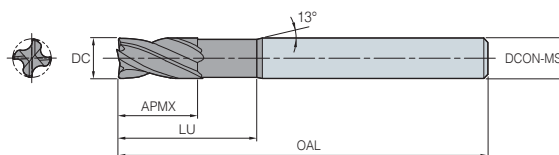
ESXE704

4 flutes neck type flat



p.135

DC	Tolerance
ALL	0.000 ~ -0.020



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL
1-04-053353	ESXE704010	1	4	1.5	4	45
1-04-053355	ESXE704020	2	4	3	6	45
1-04-053357	ESXE704030	3	6	4	7	45
1-04-053359	ESXE704040	4	6	5	9	45
1-04-053361	ESXE704060	6	6	7	14	50
1-04-053363	ESXE704080	8	8	9	18	60
1-04-053365	ESXE704100	10	10	12	25	75
1-04-053367	ESXE704120	12	12	15	30	75

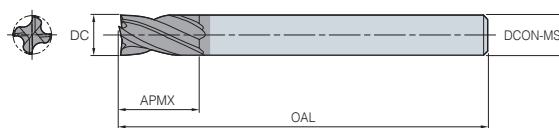
ESXE714

4 flutes flat



p.135

DC	Tolerance
ALL	0.000 ~ -0.020



K.P. Code	Designation	DC	DCON-MS	APMX	OAL
1-04-053369	ESXE714020	2	4	5	45
1-04-053370	ESXE714030	3	6	8	45
1-04-053371	ESXE714040	4	6	10	45
1-04-054176	ESXE714040S4	4	4	10	45
1-04-053372	ESXE714060	6	6	16	50
1-04-053373	ESXE714080	8	8	20	60
1-04-053374	ESXE714100	10	10	25	75
1-04-053375	ESXE714120	12	12	35	85

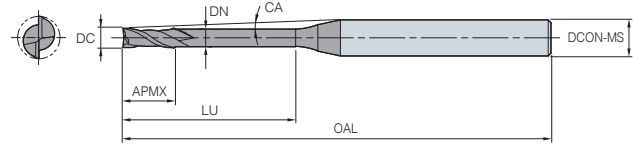
ESLNS20

2 flutes long neck type flat



p.135

DC	Tolerance
ALL	0.000 ~ -0.012



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	DN	CA	Effective length by inclination angle				
									0.5°	1°	1.5°	2°	3°
1-04-053695	ESLNS2001-0.3	0.1	4	0.15	0.3	45	0.08	11.6	0.4	0.4	0.5	0.5	0.5
1-04-053696	ESLNS2001-0.5	0.1	4	0.15	0.5	45	0.08	11.4	0.6	0.7	0.7	0.7	0.8
1-04-053697	ESLNS2001-1	0.1	4	0.15	1	45	0.08	10.9	1.2	1.2	1.2	1.3	1.4
1-04-053698	ESLNS2002-0.5	0.2	4	0.3	0.5	50	0.17	11.3	1.2	1.3	1.5	1.7	2
1-04-053699	ESLNS2002-1	0.2	4	0.3	1	50	0.17	10.8	1.7	1.9	2.2	2.4	2.7
1-04-053700	ESLNS2002-1.5	0.2	4	0.3	1.5	50	0.17	10.3	2.3	2.5	2.8	3	3.4
1-04-053701	ESLNS2003-1	0.3	4	0.45	1	50	0.27	10.8	1.7	1.9	2.2	2.4	2.7
1-04-053702	ESLNS2003-1.5	0.3	4	0.45	1.5	50	0.27	10.3	2.3	2.5	2.8	3	3.4
1-04-053703	ESLNS2003-2	0.3	4	0.45	2	50	0.27	9.8	2.8	3.1	3.4	3.6	4.1
1-04-053704	ESLNS2003-2.5	0.3	4	0.45	2.5	50	0.27	9.4	3.4	3.7	4	4.3	4.7
1-04-053705	ESLNS2003-3	0.3	4	0.45	3	50	0.27	9	3.9	4.3	4.6	4.9	5.4
1-04-053706	ESLNS2004-1	0.4	4	0.6	1	50	0.37	10.7	1.7	1.9	2.2	2.4	2.7
1-04-053707	ESLNS2004-1.5	0.4	4	0.6	1.5	50	0.37	10.2	2.3	2.5	2.8	3	3.4
1-04-053708	ESLNS2004-2	0.4	4	0.6	2	50	0.37	9.7	2.8	3.1	3.4	3.6	4.1
1-04-053709	ESLNS2004-2.5	0.4	4	0.6	2.5	50	0.37	9.3	3.4	3.7	4	4.3	4.7
1-04-053710	ESLNS2004-3	0.4	4	0.6	3	50	0.37	8.9	3.9	4.3	4.6	4.9	5.4
1-04-053711	ESLNS2004-3.5	0.4	4	0.6	3.5	50	0.37	8.6	4.5	4.9	5.2	5.5	6
1-04-053712	ESLNS2004-4	0.4	4	0.6	4	50	0.37	8.2	5	5.4	5.8	6.1	6.6
1-04-053713	ESLNS2004-5	0.4	4	0.6	5	50	0.37	7.6	6.1	6.6	6.9	7.3	7.8
1-04-053714	ESLNS2004-6	0.4	4	0.6	6	50	0.37	7.1	7.2	7.7	8.1	8.4	9
1-04-053715	ESLNS2005-1	0.5	4	0.75	1	50	0.47	10.7	1.7	1.9	2.2	2.4	2.7
1-04-053716	ESLNS2005-1.5	0.5	4	0.75	1.5	50	0.47	10.2	2.3	2.5	2.8	3	3.4
1-04-053717	ESLNS2005-2	0.5	4	0.75	2	50	0.47	9.7	2.8	3.1	3.4	3.6	4.1
1-04-053718	ESLNS2005-2.5	0.5	4	0.75	2.5	50	0.47	9.3	3.4	3.7	4	4.3	4.7
1-04-053719	ESLNS2005-3	0.5	4	0.75	3	50	0.47	8.9	3.9	4.3	4.6	4.9	5.4
1-04-053720	ESLNS2005-4	0.5	4	0.75	4	50	0.47	8.1	5	5.4	5.8	6.1	6.6
1-04-053721	ESLNS2005-5	0.5	4	0.75	5	50	0.47	7.5	6.1	6.6	6.9	7.3	7.8
1-04-053722	ESLNS2005-6	0.5	4	0.75	6	50	0.47	7	7.2	7.7	8.1	8.4	9
1-04-053723	ESLNS2005-8	0.5	4	0.75	8	50	0.47	6.2	9.3	9.9	10.3	10.7	11.4
1-04-053724	ESLNS2006-2	0.6	4	0.9	2	50	0.57	9.6	2.8	3.1	3.4	3.6	4.1
1-04-053725	ESLNS2006-4	0.6	4	0.9	4	50	0.57	6.9	7.2	7.7	8.1	8.4	9
1-04-053726	ESLNS2006-6	0.6	4	0.9	6	50	0.57	6.1	9.3	9.9	10.3	10.7	11.4
1-04-053727	ESLNS2006-8	0.6	4	0.9	8	50	0.57	5.4	11.5	12.1	12.6	13	13.7
1-04-053728	ESLNS2006-10	0.6	4	0.9	10	50	0.57	9.6	2.8	3.1	3.4	3.6	4.1
1-04-053729	ESLNS2007-2	0.7	4	1.05	2	50	0.67	8	5	5.4	5.8	6.1	6.6
1-04-053730	ESLNS2007-4	0.7	4	1.05	4	50	0.67	6.9	7.2	7.7	8.1	8.4	9
1-04-053731	ESLNS2007-6	0.7	4	1.05	6	50	0.67	6	9.3	9.9	10.3	10.7	11.4
1-04-053732	ESLNS2007-8	0.7	4	1.05	8	50	0.67	5.3	11.5	12.1	12.6	13	13.7
1-04-053733	ESLNS2007-10	0.7	4	1.2	10	50	0.77	7.9	5	5.4	5.8	6.1	6.6
1-04-053734	ESLNS2008-4	0.8	4	1.2	4	50	0.77	6.8	7.2	7.7	8.1	8.4	9

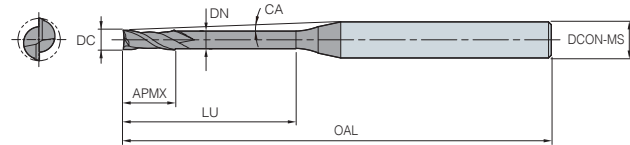
ESLNS20

2 flutes long neck type flat



p.135

DC	Tolerance
ALL	0.000 ~ -0.012



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	DN	CA	Effective length by inclination angle				
									0.5°	1°	1.5°	2°	3°
1-04-053735	ESLNS2008-6	0.8	4	1.2	6	50	0.77	5.9	9.3	9.9	10.3	10.7	11.4
1-04-053736	ESLNS2008-8	0.8	4	1.2	8	50	0.77	5.2	11.5	12.1	12.6	13	13.7
1-04-053737	ESLNS2008-10	0.8	4	1.2	10	50	0.77	4.7	13.6	14.2	14.8	15.2	16
1-04-053738	ESLNS2008-12	0.8	4	1.2	12	55	0.77	6.7	7.2	7.7	8.1	8.4	9.1
1-04-053739	ESLNS2009-6	0.9	4	1.35	6	50	0.86	5.8	9.4	9.9	10.4	10.7	11.4
1-04-053740	ESLNS2009-8	0.9	4	1.35	8	50	0.86	5.1	11.5	12.1	12.6	13	13.7
1-04-053741	ESLNS2009-10	0.9	4	1.35	10	55	0.86	4.6	13.6	14.3	14.8	15.2	16
1-04-053742	ESLNS2009-12	0.9	4	1.35	12	55	0.86	9.4	2.9	3.2	3.4	3.7	4.1
1-04-053743	ESLNS2010-2	1	4	1.5	2	50	0.96	7.7	5.1	5.5	5.8	6.1	6.6
1-04-053744	ESLNS2010-4	1	4	1.5	4	50	0.96	6.6	7.2	7.7	8.1	8.4	9.1
1-04-053745	ESLNS2010-6	1	4	1.5	6	50	0.96	5.7	9.4	9.9	10.4	10.7	11.4
1-04-053746	ESLNS2010-8	1	4	1.5	8	50	0.96	5	11.5	12.1	12.6	13	13.7
1-04-053747	ESLNS2010-10	1	4	1.5	10	55	0.96	4.5	13.6	14.3	14.8	15.2	16
1-04-053748	ESLNS2010-12	1	4	1.5	12	55	0.96	4.1	15.7	16.4	17	17.4	18.7
1-04-053749	ESLNS2010-14	1	4	1.5	14	60	0.96	3.8	17.8	18.6	19.1	19.6	21.3
1-04-053750	ESLNS2010-16	1	4	1.5	16	60	0.96	3.2	22	22.8	23.5	24	26.6
1-04-053751	ESLNS2010-20	1	4	1.5	20	60	0.96	6.3	7.3	7.7	8.1	8.5	9.1
1-04-053752	ESLNS2012-6	1.2	4	1.8	6	50	1.15	5.5	9.4	9.9	10.4	10.8	11.4
1-04-053753	ESLNS2012-8	1.2	4	1.8	8	50	1.15	4.8	11.5	12.1	12.6	13	13.7
1-04-053754	ESLNS2012-10	1.2	4	1.8	10	50	1.15	11.5	12.1	12.6	13	13.7	16
1-04-053755	ESLNS2012-12	1.2	4	1.8	12	55	1.15	4.3	13.6	14.3	14.8	15.2	16
1-04-053756	ESLNS2012-16	1.2	4	1.8	16	55	1.15	3.6	17.8	18.6	19.2	19.7	21.3
1-04-053757	ESLNS2014-6	1.4	4	2.1	6	50	1.34	6.1	7.3	7.8	8.1	8.5	9.1
1-04-053758	ESLNS2014-8	1.4	4	2.1	8	50	1.34	5.3	9.4	10	10.4	10.8	11.5
1-04-053759	ESLNS2014-10	1.4	4	2.1	10	50	1.34	4.6	11.6	12.1	12.6	13	13.8
1-04-053760	ESLNS2014-12	1.4	4	2.1	12	55	1.34	4.1	13.7	14.3	14.8	15.3	16.1
1-04-053761	ESLNS2014-14	1.4	4	2.1	14	55	1.34	3.7	15.8	16.5	17	17.5	18.7
1-04-053762	ESLNS2014-16	1.4	4	2.1	16	55	1.34	3.4	17.9	18.6	19.2	19.7	21.4
1-04-053763	ESLNS2015-4	1.5	4	2.25	4	50	1.44	7.2	5.2	5.5	5.9	6.2	6.7
1-04-053764	ESLNS2015-6	1.5	4	2.25	6	50	1.44	6	7.3	7.8	8.1	8.5	9.1
1-04-053765	ESLNS2015-8	1.5	4	2.25	8	50	1.44	5.1	9.4	10	10.4	10.8	11.5
1-04-053766	ESLNS2015-10	1.5	4	2.25	10	50	1.44	4.5	11.6	12.1	12.6	13	13.8
1-04-053767	ESLNS2015-12	1.5	4	2.25	12	55	1.44	4	13.7	14.3	14.8	15.3	16.1
1-04-053768	ESLNS2015-14	1.5	4	2.25	14	55	1.44	3.6	15.8	16.5	17	17.5	18.7
1-04-053769	ESLNS2015-16	1.5	4	2.25	16	55	1.44	3.3	17.9	18.6	19.2	19.7	-
1-04-053770	ESLNS2015-18	1.5	4	2.25	18	60	1.44	3	20	20.7	21.3	21.9	-
1-04-053771	ESLNS2015-20	1.5	4	2.25	20	60	1.44	2.8	22	22.9	23.5	24.1	-
1-04-053772	ESLNS2015-25	1.5	4	2.25	25	65	1.44	2.4	27.3	28.1	28.8	30	-
1-04-053773	ESLNS2016-6	1.6	4	2.4	6	50	1.54	5.9	7.3	7.8	8.1	8.5	9.1
1-04-053774	ESLNS2016-8	1.6	4	2.4	8	50	1.54	5	9.4	10	10.4	10.8	11.5

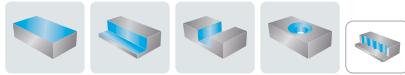
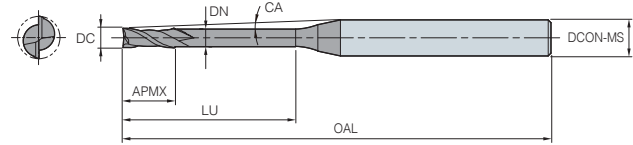
ESLNS20

2 flutes long neck type flat



p.135

DC	Tolerance
ALL	0.000 ~ -0.012



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	DN	CA	Effective length by inclination angle				
									0.5°	1°	1.5°	2°	3°
1-04-053775	ESLNS2016-10	1.6	4	2.4	10	50	1.54	4.4	11.6	12.1	12.6	13	13.8
1-04-053776	ESLNS2016-12	1.6	4	2.4	12	55	1.54	3.9	13.7	14.3	14.8	15.3	16.1
1-04-053777	ESLNS2016-14	1.6	4	2.4	14	55	1.54	3.5	15.8	16.5	17	17.5	18.7
1-04-053778	ESLNS2016-16	1.6	4	2.4	16	55	1.54	3.2	17.9	18.6	19.2	19.7	21.4
1-04-053779	ESLNS2016-18	1.6	4	2.4	18	60	1.54	2.9	20	20.7	21.3	21.9	-
1-04-053780	ESLNS2016-20	1.6	4	2.4	20	60	1.54	2.7	22	22.9	23.5	24.1	-
1-04-053781	ESLNS2018-6	1.8	4	2.7	6	50	1.73	5.6	7.4	7.8	8.2	8.5	9.1
1-04-053782	ESLNS2018-8	1.8	4	2.7	8	50	1.73	4.8	9.5	10	10.4	10.8	11.5
1-04-053783	ESLNS2018-10	1.8	4	2.7	10	50	1.73	4.2	11.6	12.2	12.6	13	13.8
1-04-053784	ESLNS2018-12	1.8	4	2.7	12	55	1.73	3.7	13.7	14.3	14.8	15.3	16.1
1-04-053785	ESLNS2018-14	1.8	4	2.7	14	55	1.73	3.3	15.8	16.5	17	17.5	18.8
1-04-053786	ESLNS2018-16	1.8	4	2.7	16	55	1.73	3	17.9	18.6	19.2	19.7	-
1-04-053787	ESLNS2018-18	1.8	4	2.7	18	60	1.73	2.7	20	20.7	21.3	21.9	-
1-04-053788	ESLNS2018-20	1.8	4	2.7	20	60	1.73	2.5	22.1	22.9	23.5	24.1	-
1-04-053789	ESLNS2020-4	2	4	3	4	50	1.92	6.5	5.3	5.6	5.9	6.2	6.7
1-04-053790	ESLNS2020-6	2	4	3	6	50	1.92	5.3	7.4	7.8	8.2	8.5	9.1
1-04-053791	ESLNS2020-8	2	4	3	8	50	1.92	4.5	9.5	10	10.4	10.8	11.5
1-04-053792	ESLNS2020-10	2	4	3	10	50	1.92	3.9	11.6	12.2	12.7	13.1	13.8
1-04-053793	ESLNS2020-12	2	4	3	12	55	1.92	3.4	13.7	14.3	14.9	15.3	16.1
1-04-053794	ESLNS2020-14	2	4	3	14	55	1.92	3.1	15.8	16.5	17	17.5	18.8
1-04-053795	ESLNS2020-16	2	4	3	16	55	1.92	2.8	17.9	18.6	19.2	19.7	-
1-04-053796	ESLNS2020-18	2	4	3	18	60	1.92	2.6	20	20.8	21.4	21.9	-
1-04-053797	ESLNS2020-20	2	4	3	20	60	1.92	2.4	22.1	22.9	23.5	24.1	-
1-04-053798	ESLNS2020-25	2	4	3	25	65	1.92	2	27.3	28.2	28.9	-	-
1-04-053799	ESLNS2020-30	2	4	3	30	70	1.92	1.7	32.5	33.4	34.4	-	-
1-04-053800	ESLNS2025-8	2.5	4	3.75	8	50	2.4	3.7	9.6	10.1	10.5	10.9	11.5
1-04-053801	ESLNS2025-10	2.5	4	3.75	10	50	2.4	3.1	11.7	12.2	12.7	13.1	13.8
1-04-053802	ESLNS2025-12	2.5	4	3.75	12	55	2.4	2.7	13.8	14.4	14.9	15.3	-
1-04-053803	ESLNS2025-14	2.5	4	3.75	14	55	2.4	2.4	15.9	16.5	17.1	17.5	-
1-04-053804	ESLNS2025-16	2.5	4	3.75	16	55	2.4	2.2	18	18.7	19.2	19.7	-
1-04-053805	ESLNS2025-18	2.5	4	3.75	18	55	2.4	2	20.1	20.8	21.4	-	-
1-04-053806	ESLNS2025-20	2.5	4	3.75	20	60	2.4	1.8	22.1	22.9	23.5	-	-
1-04-053807	ESLNS2025-25	2.5	4	3.75	25	60	2.4	1.5	27.3	28.2	-	-	-
1-04-053808	ESLNS2025-30	2.5	4	3.75	30	70	2.4	1.3	32.6	33.5	-	-	-
1-04-053809	ESLNS2030-8	3	6	4.5	8	55	2.88	5.6	9.6	10.1	10.5	10.9	11.5
1-04-053810	ESLNS2030-10	3	6	4.5	10	55	2.88	5	11.7	12.3	12.7	13.1	13.8
1-04-053811	ESLNS2030-12	3	6	4.5	12	60	2.88	4.5	13.8	14.4	14.9	15.4	16.3
1-04-053812	ESLNS2030-14	3	6	4.5	14	60	2.88	4.1	15.9	16.6	17.1	17.6	18.9
1-04-053813	ESLNS2030-16	3	6	4.5	16	60	2.88	3.7	18	18.7	19.3	19.8	21.6
1-04-053814	ESLNS2030-18	3	6	4.5	18	60	2.88	3.4	20.1	20.8	21.4	21.9	24.2

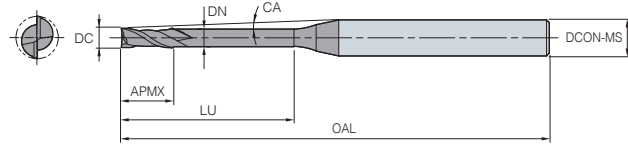
ESLNS20

2 flutes long neck type flat



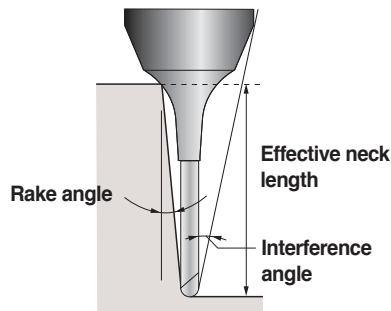
DC	Tolerance
ALL	0.000 ~ -0.012

p.135



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	DN	CA	Effective length by inclination angle				
									0.5°	1°	1.5°	2°	3°
1-04-053815	ESLNS2030-20	3	6	4.5	20	65	2.88	3.2	22.2	23	23.6	24.2	26.9
1-04-053816	ESLNS2030-25	3	6	4.5	25	70	2.88	2.7	27.4	28.2	28.9	30.2	-
1-04-053817	ESLNS2030-30	3	6	4.5	30	75	2.88	2.4	32.6	33.5	34.5	36.2	-
1-04-053818	ESLNS2030-35	3	6	4.5	35	80	2.88	2.1	37.7	38.7	40.2	42.2	-
1-04-053819	ESLNS2030-40	3	6	4.5	40	90	2.88	1.9	42.9	43.9	45.9	-	-
1-04-053820	ESLNS2040-12	4	6	6	12	60	3.85	3.4	13.9	14.5	15	15.4	16.3
1-04-053821	ESLNS2040-16	4	6	6	16	60	3.85	2.8	18.1	18.8	19.3	19.8	-
1-04-053822	ESLNS2040-20	4	6	6	20	70	3.85	2.3	22.3	23	23.6	24.3	-
1-04-053823	ESLNS2040-25	4	6	6	25	70	3.85	2	27.4	28.3	28.9	-	-
1-04-053824	ESLNS2040-30	4	6	6	30	80	3.85	1.7	32.6	33.5	34.6	-	-
1-04-053825	ESLNS2040-35	4	6	6	35	80	3.85	1.5	37.8	38.8	-	-	-
1-04-053826	ESLNS2040-40	4	6	6	40	90	3.85	1.3	42.9	44	-	-	-
1-04-053827	ESLNS2040-45	4	6	6	45	90	3.85	1.2	48.1	49.4	-	-	-
1-04-053828	ESLNS2040-50	4	6	6	50	100	3.85	1.1	53.2	54.8	-	-	-
1-04-053829	ESLNS2050-16	5	6	7.5	16	60	4.85	1.5	18.1	18.8	-	-	-
1-04-053830	ESLNS2050-20	5	6	7.5	20	60	4.85	1.3	22.3	23	-	-	-
1-04-053831	ESLNS2050-25	5	6	7.5	25	70	4.85	1.1	27.4	28.3	-	-	-
1-04-053832	ESLNS2050-30	5	6	7.5	30	70	4.85	0.9	32.6	-	-	-	-
1-04-053833	ESLNS2050-35	5	6	7.5	35	80	4.85	0.8	37.8	-	-	-	-
1-04-053834	ESLNS2050-40	5	6	7.5	40	90	4.85	0.7	42.9	-	-	-	-
1-04-053835	ESLNS2050-50	5	6	7.5	50	100	4.85	0.6	53.2	-	-	-	-



※ The marked effective neck length is the default value to prevent interference with the workpiece.
Proper control of the processing environment is required.

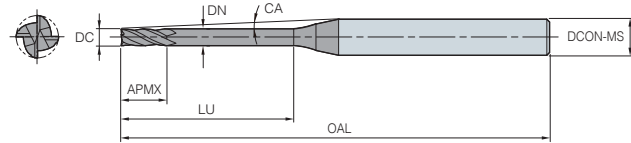
ESLNS40

4 flutes long neck type flat



p.135

DC	Tolerance
ALL	0.000 ~ -0.012



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	DN	CA	Effective length by inclination angle				
									0.5°	1°	1.5°	2°	3°
1-04-053836	ESLNS4010-4	1	4	1.5	4	50	0.96	7.7	5.1	5.5	5.8	6.1	6.6
1-04-053837	ESLNS4010-6	1	4	1.5	6	50	0.96	6.6	7.2	7.7	8.1	8.4	9.1
1-04-053838	ESLNS4010-8	1	4	1.5	8	50	0.96	5.7	9.4	9.9	10.4	10.7	11.4
1-04-053839	ESLNS4010-10	1	4	1.5	10	50	0.96	5	11.5	12.1	12.6	13	13.7
1-04-053840	ESLNS4015-4	1.5	4	2.25	4	50	1.44	7.2	5.2	5.5	5.9	6.2	6.7
1-04-053841	ESLNS4015-6	1.5	4	2.25	6	50	1.44	6	7.3	7.8	8.1	8.5	9.1
1-04-053842	ESLNS4015-8	1.5	4	2.25	8	50	1.44	5.1	9.4	10	10.4	10.8	11.5
1-04-053843	ESLNS4015-10	1.5	4	2.25	10	50	1.44	4.5	11.6	12.1	12.6	13	13.8
1-04-053844	ESLNS4015-12	1.5	4	2.25	12	55	1.44	4	13.7	14.3	14.8	15.3	16.1
1-04-053845	ESLNS4015-14	1.5	4	2.25	14	55	1.44	3.6	15.8	16.5	17	17.5	18.7
1-04-053846	ESLNS4015-16	1.5	4	2.25	16	55	1.44	3.3	17.9	18.6	19.2	19.7	-
1-04-053847	ESLNS4015-18	1.5	4	2.25	18	60	1.44	3	20	20.7	21.3	21.9	-
1-04-053848	ESLNS4015-20	1.5	4	2.25	20	60	1.44	2.8	22	22.9	23.5	24.1	-
1-04-053849	ESLNS4015-25	1.5	4	2.25	25	65	1.44	2.4	27.3	28.1	28.8	30	-
1-04-053850	ESLNS4020-4	2	4	3	4	50	1.92	6.5	5.3	5.6	5.9	6.2	6.7
1-04-053851	ESLNS4020-6	2	4	3	6	50	1.92	5.3	7.4	7.8	8.2	8.5	9.1
1-04-053852	ESLNS4020-8	2	4	3	8	50	1.92	4.5	9.5	10	10.4	10.8	11.5
1-04-053853	ESLNS4020-10	2	4	3	10	50	1.92	3.9	11.6	12.2	12.7	13.1	13.8
1-04-053854	ESLNS4020-12	2	4	3	12	55	1.92	3.4	13.7	14.3	14.9	15.3	16.1
1-04-053855	ESLNS4020-14	2	4	3	14	55	1.92	3.1	15.8	16.5	17	17.5	18.8
1-04-053856	ESLNS4020-16	2	4	3	16	55	1.92	2.8	17.9	18.6	19.2	19.7	-
1-04-053857	ESLNS4020-18	2	4	3	18	60	1.92	2.6	20	20.8	21.4	21.9	-
1-04-053858	ESLNS4020-20	2	4	3	20	60	1.92	2.4	22.1	22.9	23.5	24.1	-
1-04-053859	ESLNS4020-25	2	4	3	25	65	1.92	2	27.3	28.2	28.9	-	-
1-04-053860	ESLNS4020-30	2	4	3	30	70	1.92	1.7	32.5	33.4	34.4	-	-
1-04-053861	ESLNS4025-8	2.5	4	3.75	8	50	2.4	3.7	9.6	10.1	10.5	10.9	11.5
1-04-053862	ESLNS4025-10	2.5	4	3.75	10	50	2.4	3.1	11.7	12.2	12.7	13.1	13.8
1-04-053863	ESLNS4025-12	2.5	4	3.75	12	55	2.4	2.7	13.8	14.4	14.9	15.3	-
1-04-053864	ESLNS4025-14	2.5	4	3.75	14	55	2.4	2.4	15.9	16.5	17.1	17.5	-
1-04-053865	ESLNS4025-16	2.5	4	3.75	16	55	2.4	2.2	18	18.7	19.2	19.7	-
1-04-053866	ESLNS4025-18	2.5	4	3.75	18	60	2.4	2	20.1	20.8	21.4	-	-
1-04-053867	ESLNS4025-20	2.5	4	3.75	20	60	2.4	1.8	22.1	22.9	23.5	-	-
1-04-053868	ESLNS4025-25	2.5	4	3.75	25	65	2.4	1.5	27.3	28.2	-	-	-
1-04-053869	ESLNS4025-30	2.5	4	3.75	30	70	2.4	1.3	32.6	33.5	-	-	-
1-04-053870	ESLNS4030-8	3	6	4.5	8	55	2.88	5.6	9.6	10.1	10.5	10.9	11.5
1-04-053871	ESLNS4030-10	3	6	4.5	10	55	2.88	5	11.7	12.3	12.7	13.1	13.8
1-04-053872	ESLNS4030-12	3	6	4.5	12	60	2.88	4.5	13.8	14.4	14.9	15.4	16.3
1-04-053873	ESLNS4030-14	3	6	4.5	14	60	2.88	4.1	15.9	16.6	17.1	17.6	18.9
1-04-053874	ESLNS4030-16	3	6	4.5	16	60	2.88	3.7	18	18.7	19.3	19.8	21.6
1-04-053875	ESLNS4030-18	3	6	4.5	18	60	2.88	3.4	20.1	20.8	21.4	21.9	24.2

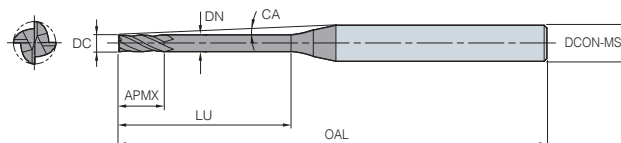
ESLNS40

4 flutes long neck type flat



p.135

DC	Tolerance
ALL	0.000 ~ -0.012



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	DN	CA	Effective length by inclination angle				
									0.5°	1°	1.5°	2°	3°
1-04-053876	ESLNS4030-20	3	6	4.5	20	65	2.88	3.2	22.2	23	23.6	24.2	26.9
1-04-053877	ESLNS4030-25	3	6	4.5	25	70	2.88	2.7	27.4	28.2	28.9	30.2	-
1-04-053878	ESLNS4030-30	3	6	4.5	30	75	2.88	2.4	32.6	33.5	34.5	36.2	-
1-04-053879	ESLNS4030-35	3	6	4.5	35	80	2.88	2.1	37.7	38.7	40.2	42.2	-
1-04-053880	ESLNS4030-40	3	6	4.5	40	90	2.88	1.9	42.9	43.9	45.9	-	-
1-04-053881	ESLNS4040-12	4	6	6	12	60	3.85	3.4	13.9	14.5	15	15.4	16.3
1-04-053882	ESLNS4040-16	4	6	6	16	60	3.85	2.8	18.1	18.8	19.3	19.8	-
1-04-053883	ESLNS4040-20	4	6	6	20	70	3.85	2.3	22.3	23	23.6	24.3	-
1-04-053884	ESLNS4040-25	4	6	6	25	70	3.85	2	27.4	28.3	28.9	-	-
1-04-053885	ESLNS4040-30	4	6	6	30	80	3.85	1.7	32.6	33.5	34.6	-	-
1-04-053886	ESLNS4040-35	4	6	6	35	80	3.85	1.5	37.8	38.8	-	-	-
1-04-053887	ESLNS4040-40	4	6	6	40	90	3.85	1.3	42.9	44	-	-	-
1-04-053888	ESLNS4040-45	4	6	6	45	90	3.85	1.2	48.1	49.4	-	-	-
1-04-053889	ESLNS4040-50	4	6	6	50	100	3.85	1.1	53.2	54.8	-	-	-
1-04-053890	ESLNS4050-16	5	6	7.5	16	60	4.85	1.5	18.1	18.8	-	-	-
1-04-053891	ESLNS4050-20	5	6	7.5	20	60	4.85	1.3	22.3	23	-	-	-
1-04-053892	ESLNS4050-25	5	6	7.5	25	70	4.85	1.1	27.4	28.3	-	-	-
1-04-053893	ESLNS4050-30	5	6	7.5	30	70	4.85	0.9	32.6	-	-	-	-
1-04-053894	ESLNS4050-35	5	6	7.5	35	80	4.85	0.8	37.8	-	-	-	-
1-04-053895	ESLNS4050-40	5	6	7.5	40	90	4.85	0.7	42.9	-	-	-	-
1-04-053896	ESLNS4050-50	5	6	7.5	50	100	4.85	0.6	53.2	-	-	-	-

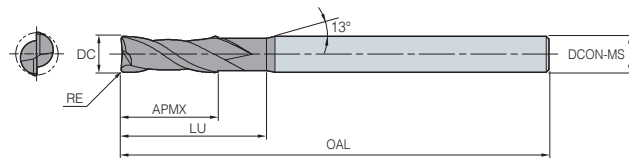
ESR702

2 flutes neck type radius



p.136

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

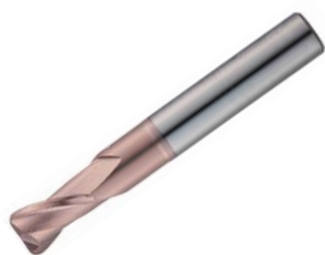


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-052407	ESR70201000503S4	1	4	1.5	3	50	0.05
1-04-052408	ESR70201000504S4	1	4	1.5	4	50	0.05
1-04-052409	ESR70201000506S4	1	4	1.5	6	50	0.05
1-04-052410	ESR70201000508S4	1	4	1.5	8	50	0.05
1-04-052411	ESR70201000510S4	1	4	1.5	10	50	0.05
1-04-052412	ESR7020100103S4	1	4	1.5	3	50	0.1
1-04-052427	ESR7020100104	1	6	1.5	4	50	0.1
1-04-052413	ESR7020100104S4	1	4	1.5	4	50	0.1
1-04-052428	ESR7020100106	1	6	1.5	6	50	0.1
1-04-052414	ESR7020100106S4	1	4	1.5	6	50	0.1
1-04-052415	ESR7020100108S4	1	4	1.5	8	50	0.1
1-04-052416	ESR7020100110S4	1	4	1.5	10	50	0.1
1-04-052417	ESR7020100203S4	1	4	1.5	3	50	0.2
1-04-052429	ESR7020100204	1	6	1.5	4	50	0.2
1-04-052418	ESR7020100204S4	1	4	1.5	4	50	0.2
1-04-052430	ESR7020100206	1	6	1.5	6	50	0.2
1-04-052419	ESR7020100206S4	1	4	1.5	6	50	0.2
1-04-052420	ESR7020100208S4	1	4	1.5	8	50	0.2
1-04-052431	ESR7020100210	1	6	1.5	10	50	0.2
1-04-052421	ESR7020100210S4	1	4	1.5	10	50	0.2
1-04-052432	ESR7020100212	1	6	1.5	12	50	0.2
1-04-052422	ESR7020100303S4	1	4	1.5	3	50	0.3
1-04-052423	ESR7020100304S4	1	4	1.5	4	50	0.3
1-04-052424	ESR7020100306S4	1	4	1.5	6	50	0.3
1-04-052425	ESR7020100308S4	1	4	1.5	8	50	0.3
1-04-052426	ESR7020100310S4	1	4	1.5	10	50	0.3
1-04-052433	ESR7020120208	1.2	6	2	8	50	0.2
1-04-052434	ESR7020120212	1.2	6	2	12	50	0.2
1-04-052435	ESR70201500504S4	1.5	4	2.5	4	50	0.05
1-04-052436	ESR70201500506S4	1.5	4	2.5	6	50	0.05
1-04-052437	ESR70201500508S4	1.5	4	2.5	8	50	0.05
1-04-052438	ESR70201500510S4	1.5	4	2.5	10	50	0.05
1-04-052439	ESR70201500512S4	1.5	4	2.5	12	50	0.05
1-04-052440	ESR7020150104S4	1.5	4	2.5	4	50	0.1
1-04-052441	ESR7020150106S4	1.5	4	2.5	6	50	0.1
1-04-052442	ESR7020150108S4	1.5	4	2.5	8	50	0.1
1-04-052443	ESR7020150110S4	1.5	4	2.5	10	50	0.1
1-04-052444	ESR7020150112S4	1.5	4	2.5	12	50	0.1
1-04-052460	ESR7020150204	1.5	6	2.5	4	50	0.2

ESR702

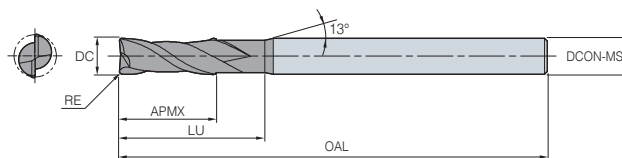
2 flutes neck type radius



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

DC6 or below Above DC6

p.136

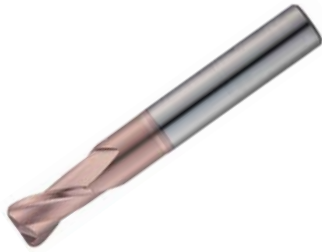


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-052445	ESR7020150204S4	1.5	4	2.5	4	50	0.2
1-04-052461	ESR7020150206	1.5	6	2.5	6	50	0.2
1-04-052446	ESR7020150206S4	1.5	4	2.5	6	50	0.2
1-04-052462	ESR7020150208	1.5	6	2.5	8	50	0.2
1-04-052447	ESR7020150208S4	1.5	4	2.5	8	50	0.2
1-04-052463	ESR7020150210	1.5	6	2.5	10	50	0.2
1-04-052448	ESR7020150210S4	1.5	4	2.5	10	50	0.2
1-04-052449	ESR7020150212S4	1.5	4	2.5	12	50	0.2
1-04-052464	ESR7020150215	1.5	6	2.5	15	50	0.2
1-04-052450	ESR7020150304S4	1.5	4	2.5	4	50	0.3
1-04-052451	ESR7020150306S4	1.5	4	2.5	6	50	0.3
1-04-052452	ESR7020150308S4	1.5	4	2.5	8	50	0.3
1-04-052453	ESR7020150310S4	1.5	4	2.5	10	50	0.3
1-04-052454	ESR7020150312S4	1.5	4	2.5	12	50	0.3
1-04-052455	ESR7020150504S4	1.5	4	2.5	4	50	0.5
1-04-052456	ESR7020150506S4	1.5	4	2.5	6	50	0.5
1-04-052457	ESR7020150508S4	1.5	4	2.5	8	50	0.5
1-04-052458	ESR7020150510S4	1.5	4	2.5	10	50	0.5
1-04-052459	ESR7020150512S4	1.5	4	2.5	12	50	0.5
1-04-052465	ESR7020200106S4	2	4	3	6	50	0.1
1-04-052542	ESR7020200108	2	6	3	8	50	0.1
1-04-052466	ESR7020200108S4	2	4	3	8	50	0.1
1-04-054170	ESR7020200110S4	2	4	3	10	50	0.1
1-04-052543	ESR7020200112	2	6	3	12	50	0.1
1-04-052467	ESR7020200112S4	2	4	3	12	50	0.1
1-04-052468	ESR7020200116S4	2	4	3	16	50	0.1
1-04-052469	ESR7020200120S4	2	4	3	20	50	0.1
1-04-052544	ESR7020200206	2	6	3	6	50	0.2
1-04-052470	ESR7020200206S4	2	4	3	6	50	0.2
1-04-052471	ESR7020200208S4	2	4	3	8	50	0.2
1-04-052545	ESR7020200209	2	6	3	9	50	0.2
1-04-052472	ESR7020200210S4	2	4	3	10	50	0.2
1-04-052473	ESR7020200212S4	2	4	3	12	50	0.2
1-04-052546	ESR7020200216	2	6	3	16	50	0.2
1-04-052474	ESR7020200216S4	2	4	3	16	50	0.2
1-04-052475	ESR7020200220S4	2	4	3	20	50	0.2
1-04-052547	ESR7020200306	2	6	3	6	50	0.3
1-04-052476	ESR7020200306S4	2	4	3	6	50	0.3
1-04-052477	ESR7020200308S4	2	4	3	8	50	0.3

ESR702

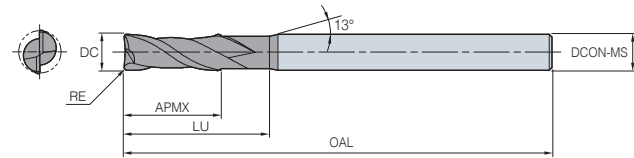
2 flutes neck type radius



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

DC6 or below Above DC6

p.136

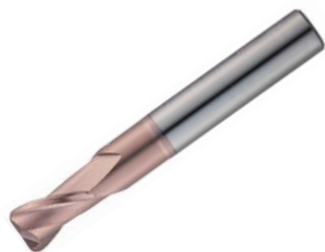


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-052478	ESR7020200310S4	2	4	3	10	50	0.3
1-04-052479	ESR7020200312S4	2	4	3	12	50	0.3
1-04-052480	ESR7020200316S4	2	4	3	16	50	0.3
1-04-052481	ESR7020200320S4	2	4	3	20	50	0.3
1-04-052548	ESR7020200506	2	6	3	6	50	0.5
1-04-052536	ESR7020200506S4	2	4	3	6	50	0.5
1-04-052537	ESR7020200508S4	2	4	3	8	50	0.5
1-04-052549	ESR7020200509	2	6	3	9	50	0.5
1-04-052538	ESR7020200510S4	2	4	3	10	50	0.5
1-04-052550	ESR7020200512	2	6	3	12	50	0.5
1-04-052539	ESR7020200512S4	2	4	3	12	50	0.5
1-04-052551	ESR7020200516	2	6	3	16	50	0.5
1-04-052540	ESR7020200516S4	2	4	3	16	50	0.5
1-04-052541	ESR7020200520S4	2	4	3	20	50	0.5
1-04-052552	ESR7020250208S4	2.5	4	3.5	8	50	0.2
1-04-052553	ESR7020250210S4	2.5	4	3.5	10	50	0.2
1-04-052554	ESR7020250212S4	2.5	4	3.5	12	50	0.2
1-04-052555	ESR7020250216S4	2.5	4	3.5	16	50	0.2
1-04-052556	ESR7020250308S4	2.5	4	3.5	8	50	0.3
1-04-052557	ESR7020250310S4	2.5	4	3.5	10	50	0.3
1-04-052558	ESR7020250312S4	2.5	4	3.5	12	50	0.3
1-04-052559	ESR7020250316S4	2.5	4	3.5	16	50	0.3
1-04-052560	ESR7020250508S4	2.5	4	3.5	8	50	0.5
1-04-052561	ESR7020250510S4	2.5	4	3.5	10	50	0.5
1-04-052562	ESR7020250512S4	2.5	4	3.5	12	50	0.5
1-04-052563	ESR7020250516S4	2.5	4	3.5	16	50	0.5
1-04-052564	ESR7020300108	3	6	4.5	8	55	0.1
1-04-052565	ESR7020300110	3	6	4.5	10	55	0.1
1-04-052566	ESR7020300112	3	6	4.5	12	55	0.1
1-04-052567	ESR7020300116	3	6	4.5	16	55	0.1
1-04-052568	ESR7020300120	3	6	4.5	20	60	0.1
1-04-052569	ESR7020300208	3	6	4.5	8	55	0.2
1-04-052570	ESR7020300209	3	6	4.5	9	55	0.2
1-04-052571	ESR7020300210	3	6	4.5	10	55	0.2
1-04-052572	ESR7020300212	3	6	4.5	12	55	0.2
1-04-052573	ESR7020300216	3	6	4.5	16	55	0.2
1-04-052569	ESR7020300208	3	6	4.5	8	55	0.2
1-04-052570	ESR7020300209	3	6	4.5	9	55	0.2
1-04-052571	ESR7020300210	3	6	4.5	10	55	0.2

ESR702

2 flutes neck type radius



DC6 or below

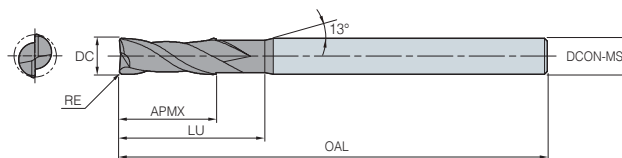


Above DC6



p.136

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

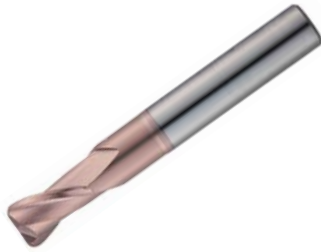


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-052572	ESR7020300212	3	6	4.5	12	55	0.2
1-04-052573	ESR7020300216	3	6	4.5	16	55	0.2
1-04-052574	ESR7020300220	3	6	4.5	20	60	0.2
1-04-052575	ESR7020300308	3	6	4.5	8	55	0.3
1-04-052576	ESR7020300309	3	6	4.5	9	55	0.3
1-04-052577	ESR7020300310	3	6	4.5	10	55	0.3
1-04-052578	ESR7020300312	3	6	4.5	12	55	0.3
1-04-052579	ESR7020300314	3	6	4.5	14	55	0.3
1-04-052580	ESR7020300316	3	6	4.5	16	55	0.3
1-04-052581	ESR7020300320	3	6	4.5	20	60	0.3
1-04-052582	ESR7020300508	3	6	4.5	8	55	0.5
1-04-052583	ESR7020300509	3	6	4.5	9	55	0.5
1-04-052584	ESR7020300510	3	6	4.5	10	55	0.5
1-04-052585	ESR7020300512	3	6	4.5	12	55	0.5
1-04-052586	ESR7020300516	3	6	4.5	16	55	0.5
1-04-052587	ESR7020300520	3	6	4.5	20	60	0.5
1-04-052588	ESR7020301008	3	6	4.5	8	55	1
1-04-052589	ESR7020301010	3	6	4.5	10	55	1
1-04-052482	ESR7020301012	3	6	4.5	12	55	1
1-04-052483	ESR7020301016	3	6	4.5	16	55	1
1-04-052484	ESR7020301020	3	6	4.5	20	60	1
1-04-052485	ESR7020301025	3	6	4.5	25	60	1
1-04-052486	ESR7020400110	4	6	6	10	55	0.1
1-04-052487	ESR7020400112	4	6	6	12	55	0.1
1-04-052488	ESR7020400116	4	6	6	16	55	0.1
1-04-052489	ESR7020400120	4	6	6	20	60	0.1
1-04-052490	ESR7020400125	4	6	6	25	60	0.1
1-04-052491	ESR7020400210	4	6	6	10	55	0.2
1-04-052492	ESR7020400212	4	6	6	12	55	0.2
1-04-052493	ESR7020400216	4	6	6	16	55	0.2
1-04-052494	ESR7020400220	4	6	6	20	60	0.2
1-04-052495	ESR7020400225	4	6	6	25	60	0.2
1-04-052496	ESR7020400310	4	6	6	10	55	0.3
1-04-052497	ESR7020400312	4	6	6	12	55	0.3
1-04-052498	ESR7020400316	4	6	6	16	55	0.3
1-04-052499	ESR7020400320	4	6	6	20	60	0.3
1-04-052500	ESR7020400325	4	6	6	25	60	0.3
1-04-052501	ESR7020400510	4	6	6	10	55	0.5
1-04-052502	ESR7020400512	4	6	6	12	55	0.5

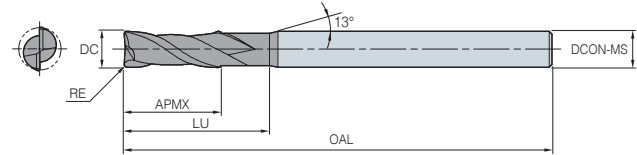
ESR702

2 flutes neck type radius



p.136

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-052503	ESR7020400516	4	6	6	16	55	0.5
1-04-052504	ESR7020400520	4	6	6	20	60	0.5
1-04-052505	ESR7020400525	4	6	6	25	60	0.5
1-04-052506	ESR7020400530	4	6	6	30	70	0.5
1-04-052507	ESR7020401010	4	6	6	10	55	1
1-04-052508	ESR7020401012	4	6	6	12	55	1
1-04-052509	ESR7020401016	4	6	6	16	55	1
1-04-052510	ESR7020401020	4	6	6	20	60	1
1-04-052511	ESR7020401025	4	6	6	25	60	1
1-04-052512	ESR7020401030	4	6	6	30	70	1
1-04-052513	ESR7020500318	5	6	8	18	60	0.3
1-04-052514	ESR7020600220	6	6	9	20	60	0.2
1-04-052515	ESR7020600320	6	6	9	20	60	0.3
1-04-052516	ESR7020600520	6	6	9	20	60	0.5
1-04-052517	ESR7020601020	6	6	9	20	60	1
1-04-052518	ESR7020601520	6	6	9	20	60	1.5
1-04-052519	ESR7020602020	6	6	9	20	60	2
1-04-052520	ESR7020800225	8	8	12	25	60	0.2
1-04-052521	ESR7020800325	8	8	12	25	60	0.3
1-04-052522	ESR7020800525	8	8	12	25	60	0.5
1-04-052523	ESR7020801025	8	8	12	25	60	1
1-04-052524	ESR7020801525	8	8	12	25	60	1.5
1-04-052525	ESR7021000232	10	10	15	32	70	0.2
1-04-052526	ESR7021000332	10	10	15	32	70	0.3
1-04-052527	ESR7021000532	10	10	15	32	70	0.5
1-04-052528	ESR7021001032	10	10	15	32	70	1
1-04-052529	ESR7021001532	10	10	15	32	70	1.5
1-04-052530	ESR7021002032	10	10	15	32	70	2
1-04-052531	ESR7021200338	12	12	18	38	80	0.3
1-04-052532	ESR7021200538	12	12	18	38	80	0.5
1-04-052533	ESR7021201038	12	12	18	38	80	1
1-04-052534	ESR7021201538	12	12	18	38	80	1.5
1-04-052535	ESR7021202038	12	12	18	38	80	2

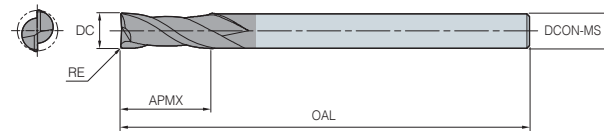
ESR732

2 flutes long shank radius



p.136

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	OAL	RE
1-04-052737	ESR73201001	1	6	2	50	0.1
1-04-052738	ESR73201002	1	6	2	50	0.2
1-04-052739	ESR73201003	1	6	2	50	0.3
1-04-052740	ESR73201501	1.5	6	3	50	0.1
1-04-052741	ESR73201502	1.5	6	3	50	0.2
1-04-052742	ESR73201503	1.5	6	3	50	0.3
1-04-052743	ESR73201505	1.5	6	3	50	0.5
1-04-052744	ESR73202001	2	6	5	50	0.1
1-04-052745	ESR73202002	2	6	5	50	0.2
1-04-052746	ESR73202003	2	6	5	50	0.3
1-04-052747	ESR73202005	2	6	5	50	0.5
1-04-052748	ESR73202501	2.5	6	7	60	0.1
1-04-052749	ESR73202502	2.5	6	7	60	0.2
1-04-052750	ESR73202503	2.5	6	7	60	0.3
1-04-052751	ESR73202505	2.5	6	7	60	0.5
1-04-052752	ESR73203001	3	6	8	60	0.1
1-04-052753	ESR73203002	3	6	8	60	0.2
1-04-052754	ESR73203003	3	6	8	60	0.3
1-04-052755	ESR73203005	3	6	8	60	0.5
1-04-052756	ESR73204001	4	6	10	70	0.1
1-04-052757	ESR73204002	4	6	10	70	0.2
1-04-052758	ESR73204003	4	6	10	70	0.3
1-04-052759	ESR73204005	4	6	10	70	0.5
1-04-052760	ESR73204010	4	6	10	70	1
1-04-052761	ESR73205001	5	6	13	80	0.1
1-04-052762	ESR73205002	5	6	13	80	0.2
1-04-052763	ESR73205003	5	6	13	80	0.3
1-04-052764	ESR73205005	5	6	13	80	0.5
1-04-052765	ESR73205010	5	6	13	80	1
1-04-052766	ESR73206001	6	6	15	90	0.1
1-04-052767	ESR73206002	6	6	15	90	0.2
1-04-052768	ESR73206003	6	6	15	90	0.3
1-04-052769	ESR73206005	6	6	15	90	0.5
1-04-052770	ESR73206010	6	6	15	90	1
1-04-052771	ESR73208001	8	8	20	100	0.1
1-04-052772	ESR73208002	8	8	20	100	0.2
1-04-052773	ESR73208003	8	8	20	100	0.3

ESR732

2 flutes long shank radius

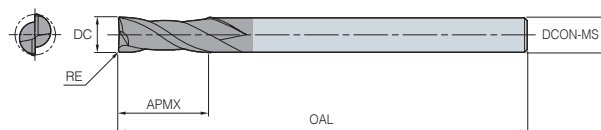


DC6 or below

Above DC6

p.136

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	OAL	RE
1-04-052774	ESR73208005	8	8	20	100	0.5
1-04-052775	ESR73208010	8	8	20	100	1
1-04-052776	ESR73208020	8	8	20	100	2
1-04-052777	ESR73210002	10	10	25	100	0.2
1-04-052778	ESR73210003	10	10	25	100	0.3
1-04-052779	ESR73210005	10	10	25	100	0.5
1-04-052780	ESR73210010	10	10	25	100	1
1-04-052781	ESR73210020	10	10	25	100	2
1-04-052782	ESR73212002	12	12	30	110	0.2
1-04-052783	ESR73212003	12	12	30	110	0.3
1-04-052784	ESR73212005	12	12	30	110	0.5
1-04-052785	ESR73212010	12	12	30	110	1
1-04-052786	ESR73212020	12	12	30	110	2

ESR704

4 flutes neck type radius



DC6 or below

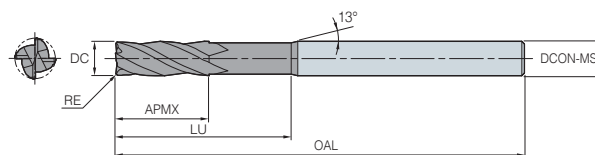


Above DC6



p.137

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-052628	ESR7040100103S4	1	4	2	3	50	0.1
1-04-052629	ESR7040100104S4	1	4	2	4	50	0.1
1-04-052630	ESR7040100106S4	1	4	2	6	50	0.1
1-04-052631	ESR7040100203S4	1	4	2	3	50	0.2
1-04-052632	ESR7040100204S4	1	4	2	4	50	0.2
1-04-052633	ESR7040100206S4	1	4	2	6	50	0.2
1-04-052634	ESR7040100303S4	1	4	2	3	50	0.3
1-04-052635	ESR7040100304S4	1	4	2	4	50	0.3
1-04-052636	ESR7040100306S4	1	4	2	6	50	0.3
1-04-052637	ESR7040150104S4	1.5	4	2.5	4	50	0.1
1-04-052638	ESR7040150106S4	1.5	4	2.5	6	50	0.1
1-04-052639	ESR7040150204S4	1.5	4	2.5	4	50	0.2
1-04-052640	ESR7040150206S4	1.5	4	2.5	6	50	0.2
1-04-052641	ESR7040150304S4	1.5	4	2.5	4	50	0.3
1-04-052642	ESR7040150306S4	1.5	4	2.5	6	50	0.3
1-04-052643	ESR7040200106S4	2	4	3	6	50	0.1
1-04-052644	ESR7040200108S4	2	4	3	8	50	0.1
1-04-052645	ESR7040200206S4	2	4	3	6	50	0.2
1-04-052651	ESR7040200208	2	6	3	8	50	0.2
1-04-052646	ESR7040200208S4	2	4	3	8	50	0.2
1-04-052652	ESR7040200210	2	6	3	10	50	0.2
1-04-052653	ESR7040200212	2	6	3	12	50	0.2
1-04-052647	ESR7040200306S4	2	4	3	6	50	0.3
1-04-052648	ESR7040200308S4	2	4	3	8	50	0.3
1-04-052649	ESR7040200506S4	2	4	3	6	50	0.5
1-04-052650	ESR7040200508S4	2	4	3	8	50	0.5
1-04-052654	ESR7040250106S4	2.5	4	3.5	6	50	0.1
1-04-052655	ESR7040300108	3	6	4	8	55	0.1
1-04-052656	ESR7040300110	3	6	4	10	55	0.1
1-04-052657	ESR7040300112	3	6	4	12	55	0.1
1-04-052658	ESR7040300116	3	6	4	16	55	0.1
1-04-052659	ESR7040300120	3	6	4	20	60	0.1
1-04-052660	ESR7040300208	3	6	4	8	55	0.2
1-04-052661	ESR7040300210	3	6	4	10	55	0.2
1-04-052662	ESR7040300212	3	6	4	12	55	0.2
1-04-052663	ESR7040300216	3	6	4	16	55	0.2

ESR704

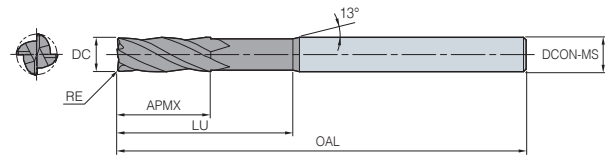
4 flutes neck type radius



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

DC6 or below Above DC6

p.137



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-052664	ESR7040300220	3	6	4	20	60	0.2
1-04-052665	ESR7040300308	3	6	4	8	55	0.3
1-04-052590	ESR7040300309	3	6	4	9	55	0.3
1-04-052591	ESR7040300310	3	6	4	10	55	0.3
1-04-052592	ESR7040300312	3	6	4	12	55	0.3
1-04-052593	ESR7040300316	3	6	4	16	55	0.3
1-04-052594	ESR7040300320	3	6	4	20	60	0.3
1-04-052595	ESR7040300508	3	6	4	8	55	0.5
1-04-052596	ESR7040300509	3	6	4	9	55	0.5
1-04-052597	ESR7040300510	3	6	4	10	55	0.5
1-04-052598	ESR7040300512	3	6	4	12	55	0.5
1-04-052599	ESR7040300516	3	6	4	16	55	0.5
1-04-052600	ESR7040300520	3	6	4	20	60	0.5
1-04-052601	ESR7040301008	3	6	4	8	55	1
1-04-052602	ESR7040301010	3	6	4	10	55	1
1-04-052603	ESR7040301012	3	6	4	12	55	1
1-04-052604	ESR7040301016	3	6	4	16	55	1
1-04-052605	ESR7040301020	3	6	4	20	60	1
1-04-052606	ESR7040400110	4	6	6	10	55	0.1
1-04-052607	ESR7040400112	4	6	6	12	55	0.1
1-04-052608	ESR7040400116	4	6	6	16	55	0.1
1-04-052609	ESR7040400120	4	6	6	20	60	0.1
1-04-052610	ESR7040400125	4	6	6	25	60	0.1
1-04-052611	ESR7040400210	4	6	6	10	55	0.2
1-04-052612	ESR7040400212	4	6	6	12	55	0.2
1-04-052613	ESR7040400216	4	6	6	16	55	0.2
1-04-052614	ESR7040400220	4	6	6	20	60	0.2
1-04-052615	ESR7040400225	4	6	6	25	60	0.2
1-04-052616	ESR7040400310	4	6	6	10	55	0.3
1-04-052617	ESR7040400312	4	6	6	12	55	0.3
1-04-052618	ESR7040400316	4	6	6	16	55	0.3
1-04-052619	ESR7040400320	4	6	6	20	60	0.3
1-04-052620	ESR7040400325	4	6	6	25	60	0.3
1-04-052621	ESR7040400510	4	6	6	10	55	0.5
1-04-052622	ESR7040400512	4	6	6	12	55	0.5
1-04-052623	ESR7040400516	4	6	6	16	55	0.5

ESR704

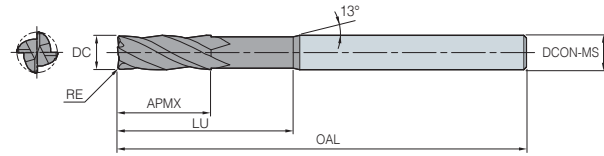
4 flutes neck type radius



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

DC6 or below Above DC6

p.137



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-052624	ESR7040400520	4	6	6	20	60	0.5
1-04-052625	ESR7040400525	4	6	6	25	60	0.5
1-04-052626	ESR7040401010	4	6	6	10	55	1
1-04-052627	ESR7040401012	4	6	6	12	55	1
1-04-052666	ESR7040401016	4	6	6	16	55	1
1-04-052667	ESR7040401020	4	6	6	20	60	1
1-04-052668	ESR7040401025	4	6	6	25	60	1
1-04-052669	ESR7040600220	6	6	9	20	60	0.2
1-04-052670	ESR7040600320	6	6	9	20	60	0.3
1-04-052671	ESR7040600520	6	6	9	20	60	0.5
1-04-052672	ESR7040601020	6	6	9	20	60	1
1-04-052673	ESR7040601520	6	6	9	20	60	1.5
1-04-052674	ESR7040602020	6	6	9	20	60	2
1-04-052675	ESR7040800225	8	8	12	25	60	0.2
1-04-052676	ESR7040800325	8	8	12	25	60	0.3
1-04-052677	ESR7040800525	8	8	12	25	60	0.5
1-04-052678	ESR7040801025	8	8	12	25	60	1
1-04-052679	ESR7040801525	8	8	12	25	60	1.5
1-04-052680	ESR7040802025	8	8	12	25	60	2
1-04-052681	ESR7041000232	10	10	15	32	70	0.2
1-04-052682	ESR7041000332	10	10	15	32	70	0.3
1-04-052683	ESR7041000532	10	10	15	32	70	0.5
1-04-052684	ESR7041001032	10	10	15	32	70	1
1-04-052685	ESR7041001532	10	10	15	32	70	1.5
1-04-052686	ESR7041002032	10	10	15	32	70	2
1-04-052687	ESR7041200338	12	12	18	38	80	0.3
1-04-052688	ESR7041200538	12	12	18	38	80	0.5
1-04-052689	ESR7041201038	12	12	18	38	80	1
1-04-052690	ESR7041201538	12	12	18	38	80	1.5
1-04-052691	ESR7041202038	12	12	18	38	80	2

ESR714

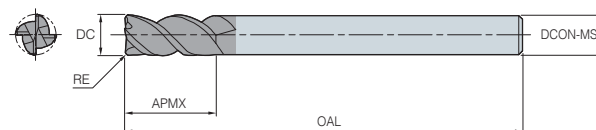
4 flutes radius



p.137

DC6 or below Above DC6

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	OAL	RE
1-04-052700	ESR7140303	3	6	8	50	0.3
1-04-054171	ESR7140305S4	3	4	8	50	0.5
1-04-052701	ESR7140305	3	6	8	50	0.5
1-04-052702	ESR7140403	4	6	11	50	0.3
1-04-052703	ESR7140405	4	6	11	50	0.5
1-04-054172	ESR7140405S4	4	4	11	50	0.5
1-04-052704	ESR7140410	4	6	11	50	1
1-04-052705	ESR7140603	6	6	15	60	0.3
1-04-052706	ESR7140605	6	6	15	60	0.5
1-04-052707	ESR7140610	6	6	15	60	1
1-04-052708	ESR7140803	8	8	20	60	0.3
1-04-052709	ESR7140805	8	8	20	60	0.5
1-04-052710	ESR7140810	8	8	20	60	1
1-04-052711	ESR7140815	8	8	20	60	1.5
1-04-052712	ESR7140820	8	8	20	60	2
1-04-052713	ESR7141003	10	10	25	70	0.3
1-04-052714	ESR7141005	10	10	25	70	0.5
1-04-052715	ESR7141010	10	10	25	70	1
1-04-052716	ESR7141015	10	10	25	70	1.5
1-04-052717	ESR7141020	10	10	25	70	2
1-04-052718	ESR7141025	10	10	25	70	2.5
1-04-052719	ESR7141030	10	10	25	70	3
1-04-052720	ESR7141203	12	12	30	80	0.3
1-04-052721	ESR7141205	12	12	30	80	0.5
1-04-052722	ESR7141210	12	12	30	80	1
1-04-052723	ESR7141215	12	12	30	80	1.5
1-04-052724	ESR7141220	12	12	30	80	2
1-04-052725	ESR7141225	12	12	30	80	2.5
1-04-052726	ESR7141230	12	12	30	80	3

ESR724

4 flutes neck type radius



DC6 or below

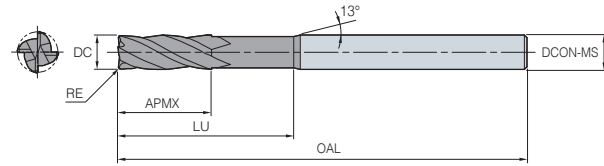


Above DC6



p.137

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



(mm)

K.P. Code	Designation	DC	DCN-MS	APMX	LU	OAL	RE
1-04-052727	ESR7240600520	6	6	9	20	90	0.5
1-04-052728	ESR7240601020	6	6	9	20	90	1
1-04-052729	ESR7240800525	8	8	12	25	100	0.5
1-04-052730	ESR7240801025	8	8	12	25	100	1
1-04-052731	ESR7241000532	10	10	15	32	100	0.5
1-04-052732	ESR7241001032	10	10	15	32	100	1
1-04-052733	ESR7241002032	10	10	15	32	100	2
1-04-052734	ESR7241200538	12	12	18	38	110	0.5
1-04-052735	ESR7241201038	12	12	18	38	110	1
1-04-052736	ESR7241202038	12	12	18	38	110	2

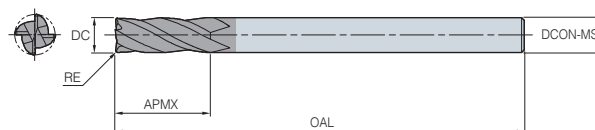
ESR734

4 flutes long shank radius



p.137

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	OAL	RE
1-04-052787	ESR73401001	1	6	2	50	0.1
1-04-052788	ESR73401002	1	6	2	50	0.2
1-04-052789	ESR73401003	1	6	2	50	0.3
1-04-052790	ESR73401501	1.5	6	3	50	0.1
1-04-052791	ESR73401502	1.5	6	3	50	0.2
1-04-052792	ESR73401503	1.5	6	3	50	0.3
1-04-052793	ESR73401505	1.5	6	3	50	0.5
1-04-052794	ESR73402001	2	6	5	50	0.1
1-04-052795	ESR73402002	2	6	5	50	0.2
1-04-052796	ESR73402003	2	6	5	50	0.3
1-04-052797	ESR73402005	2	6	5	50	0.5
1-04-052798	ESR73402501	2.5	6	7	60	0.1
1-04-052799	ESR73402502	2.5	6	7	60	0.2
1-04-052800	ESR73402503	2.5	6	7	60	0.3
1-04-052801	ESR73402505	2.5	6	7	60	0.5
1-04-052802	ESR73403001	3	6	8	60	0.1
1-04-052803	ESR73403002	3	6	8	60	0.2
1-04-052804	ESR73403003	3	6	8	60	0.3
1-04-052805	ESR73403005	3	6	8	60	0.5
1-04-052806	ESR73404001	4	6	10	70	0.1
1-04-052807	ESR73404002	4	6	10	70	0.2
1-04-054173	ESR73404002S4	4	4	10	70	0.2
1-04-052808	ESR73404003	4	6	10	70	0.3
1-04-052809	ESR73404005	4	6	10	70	0.5
1-04-054174	ESR73404005S4	4	4	10	70	0.5
1-04-052810	ESR73404010	4	6	10	70	1
1-04-052811	ESR73405001	5	6	13	80	0.1
1-04-052812	ESR73405002	5	6	13	80	0.2
1-04-052813	ESR73405003	5	6	13	80	0.3
1-04-052814	ESR73405005	5	6	13	80	0.5
1-04-052815	ESR73405010	5	6	13	80	1
1-04-052816	ESR73406001	6	6	15	90	0.1
1-04-052817	ESR73406002	6	6	15	90	0.2
1-04-052818	ESR73406003	6	6	15	90	0.3
1-04-052819	ESR73406005	6	6	15	90	0.5
1-04-052820	ESR73406010	6	6	15	90	1

ESR734

4 flutes long shank radius



DC6 or below

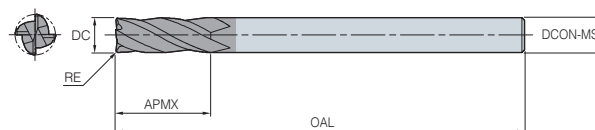


Above DC6



p.137

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	OAL	RE
1-04-052821	ESR73408001	8	8	20	100	0.1
1-04-052822	ESR73408002	8	8	20	100	0.2
1-04-052823	ESR73408003	8	8	20	100	0.3
1-04-052824	ESR73408005	8	8	20	100	0.5
1-04-052825	ESR73408010	8	8	20	100	1
1-04-052826	ESR73408020	8	8	20	100	2
1-04-052827	ESR73410002	10	10	25	100	0.2
1-04-052828	ESR73410003	10	10	25	100	0.3
1-04-052829	ESR73410005	10	10	25	100	0.5
1-04-052830	ESR73410010	10	10	25	100	1
1-04-052831	ESR73410020	10	10	25	100	2
1-04-052832	ESR73412002	12	12	30	110	0.2
1-04-052833	ESR73412003	12	12	30	110	0.3
1-04-052834	ESR73412005	12	12	30	110	0.5
1-04-052835	ESR73412010	12	12	30	110	1
1-04-054175	ESR73412010L	12	12	30	150	1
1-04-052836	ESR73412020	12	12	30	110	2

ESR706

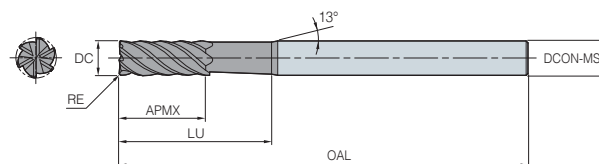
6 flutes neck type radius



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

DC6 or below Above DC6

p.137

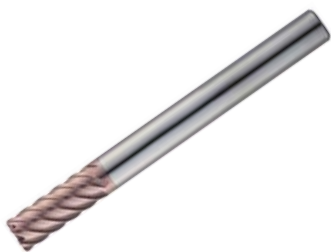


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-052692	ESR7060600314	6	6	6	14	50	0.3
1-04-052693	ESR7060600514	6	6	6	14	50	0.5
1-04-052694	ESR7060800524	8	8	8	24	60	0.5
1-04-052695	ESR7060801024	8	8	8	24	60	1
1-04-052696	ESR7061000530	10	10	10	30	70	0.5
1-04-052697	ESR7061001030	10	10	10	30	70	1
1-04-052698	ESR7061200530	12	12	12	30	75	0.5
1-04-052699	ESR7061201030	12	12	12	30	75	1

ESR736

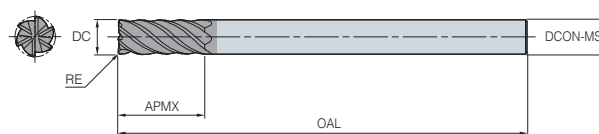
6 flutes type radius



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

DC6 or below Above DC6

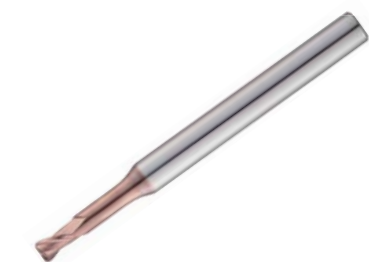
p.125



K.P. Code	Designation	DC	DCON-MS	APMX	OAL	RE
1-04-052837	ESR73606005	6	6	15	90	0.5
1-04-052838	ESR73606010	6	6	15	90	1
1-04-052839	ESR73608005	8	8	20	100	0.5
1-04-052840	ESR73608010	8	8	20	100	1
1-04-052841	ESR73610005	10	10	25	100	0.5
1-04-052842	ESR73610010	10	10	25	100	1
1-04-052843	ESR73612005	12	12	30	110	0.5
1-04-052844	ESR73612010	12	12	30	110	1

ESRR712

2 flutes rib ball



DC6 or below

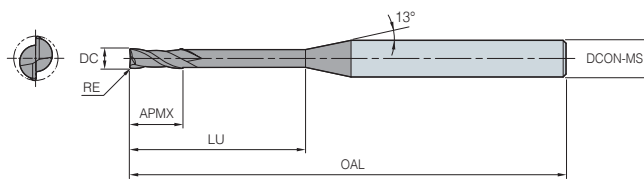


Above DC6



p.138~147

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-054804	ESRR712002002005	0.2	4	0.2	0.5	40	0.02
1-04-054805	ESRR71200200201	0.2	4	0.2	1	40	0.02
1-04-054806	ESRR712002002015	0.2	4	0.2	1.5	40	0.02
1-04-054807	ESRR712002005005	0.2	4	0.2	0.5	40	0.05
1-04-054808	ESRR71200200501	0.2	4	0.2	1	40	0.05
1-04-054809	ESRR712002005015	0.2	4	0.2	1.5	40	0.05
1-04-054810	ESRR71200300201	0.3	4	0.3	1	40	0.02
1-04-054811	ESRR71200300202	0.3	4	0.3	2	40	0.02
1-04-054812	ESRR71200300203	0.3	4	0.3	3	40	0.02
1-04-054813	ESRR71200300501	0.3	4	0.3	1	40	0.05
1-04-054814	ESRR71200300502	0.3	4	0.3	2	40	0.05
1-04-054815	ESRR71200300503	0.3	4	0.3	3	40	0.05
1-04-054816	ESRR71200400201	0.4	4	0.4	1	40	0.02
1-04-054817	ESRR71200400202	0.4	4	0.4	2	40	0.02
1-04-054818	ESRR71200400203	0.4	4	0.4	3	40	0.02
1-04-054819	ESRR71200400204	0.4	4	0.4	4	40	0.02
1-04-054820	ESRR71200400501	0.4	4	0.4	1	40	0.05
1-04-054821	ESRR71200400502	0.4	4	0.4	2	40	0.05
1-04-054822	ESRR71200400503	0.4	4	0.4	3	40	0.05
1-04-054823	ESRR71200400504	0.4	4	0.4	4	40	0.05
1-04-054824	ESRR71200401001	0.4	4	0.4	1	40	0.1
1-04-054825	ESRR712004010015	0.4	4	0.4	1.5	40	0.1
1-04-054826	ESRR71200401002	0.4	4	0.4	2	40	0.1
1-04-054827	ESRR71200401003	0.4	4	0.4	3	40	0.1
1-04-054828	ESRR71200401004	0.4	4	0.4	4	40	0.1
1-04-054829	ESRR71200500201	0.5	4	0.5	1	45	0.02
1-04-054830	ESRR712005002015	0.5	4	0.5	1.5	45	0.02
1-04-054831	ESRR71200500202	0.5	4	0.5	2	45	0.02
1-04-054832	ESRR712005002025	0.5	4	0.5	2.5	45	0.02
1-04-054833	ESRR71200500203	0.5	4	0.5	3	45	0.02
1-04-054834	ESRR71200500204	0.5	4	0.5	4	45	0.02
1-04-054835	ESRR71200500205	0.5	4	0.5	5	45	0.02
1-04-054836	ESRR71200500206	0.5	4	0.5	6	45	0.02
1-04-054837	ESRR71200500208	0.5	4	0.5	8	45	0.02
1-04-054838	ESRR71200500210	0.5	4	0.5	10	45	0.02
1-04-054839	ESRR71200500501	0.5	4	0.5	1	45	0.05
1-04-054840	ESRR712005005015	0.5	4	0.5	1.5	45	0.05
1-04-054841	ESRR71200500502	0.5	4	0.5	2	45	0.05
1-04-054842	ESRR712005005025	0.5	4	0.5	2.5	45	0.05

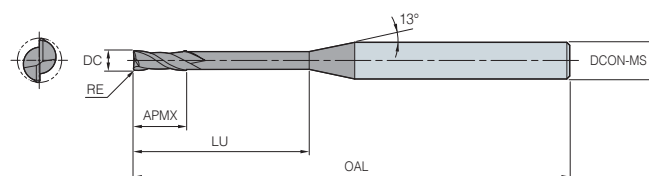
ESRR712

2 flutes rib ball



p.138~147

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

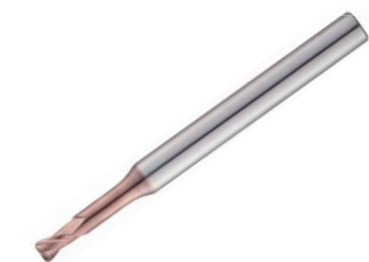


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-054843	ESRR71200500503	0.5	4	0.5	3	45	0.05
1-04-054844	ESRR71200500504	0.5	4	0.5	4	45	0.05
1-04-054845	ESRR71200500505	0.5	4	0.5	5	45	0.05
1-04-054846	ESRR71200500506	0.5	4	0.5	6	45	0.05
1-04-054847	ESRR71200500508	0.5	4	0.5	8	45	0.05
1-04-054848	ESRR71200500510	0.5	4	0.5	10	45	0.05
1-04-054849	ESRR71200501001	0.5	4	0.5	1	45	0.1
1-04-054850	ESRR712005010015	0.5	4	0.5	1.5	45	0.1
1-04-054851	ESRR71200501002	0.5	4	0.5	2	45	0.1
1-04-054852	ESRR712005010025	0.5	4	0.5	2.5	45	0.1
1-04-054853	ESRR71200501003	0.5	4	0.5	3	45	0.1
1-04-054854	ESRR71200501004	0.5	4	0.5	4	45	0.1
1-04-054855	ESRR71200501005	0.5	4	0.5	5	45	0.1
1-04-054856	ESRR71200501006	0.5	4	0.5	6	45	0.1
1-04-054857	ESRR71200501008	0.5	4	0.5	8	45	0.1
1-04-054858	ESRR71200501010	0.5	4	0.5	10	45	0.1
1-04-054859	ESRR71200600202	0.6	4	0.6	2	45	0.02
1-04-054860	ESRR71200600203	0.6	4	0.6	3	45	0.02
1-04-054861	ESRR71200600204	0.6	4	0.6	4	45	0.02
1-04-054862	ESRR71200600206	0.6	4	0.6	6	45	0.02
1-04-054863	ESRR71200600208	0.6	4	0.6	8	45	0.02
1-04-054864	ESRR71200600210	0.6	4	0.6	10	45	0.02
1-04-054865	ESRR71200600212	0.6	4	0.6	12	50	0.02
1-04-054866	ESRR71200600502	0.6	4	0.6	2	45	0.05
1-04-054867	ESRR71200600503	0.6	4	0.6	3	45	0.05
1-04-054868	ESRR71200600504	0.6	4	0.6	4	45	0.05
1-04-054869	ESRR71200600506	0.6	4	0.6	6	45	0.05
1-04-054870	ESRR71200600508	0.6	4	0.6	8	45	0.05
1-04-054871	ESRR71200600510	0.6	4	0.6	10	45	0.05
1-04-054872	ESRR71200600512	0.6	4	0.6	12	50	0.05
1-04-054873	ESRR71200601002	0.6	4	0.6	2	45	0.1
1-04-054874	ESRR71200601003	0.6	4	0.6	3	45	0.1
1-04-054875	ESRR71200601004	0.6	4	0.6	4	45	0.1
1-04-054876	ESRR71200601006	0.6	4	0.6	6	45	0.1
1-04-054877	ESRR71200601008	0.6	4	0.6	8	45	0.1
1-04-054878	ESRR71200601010	0.6	4	0.6	10	45	0.1
1-04-054879	ESRR71200601012	0.6	4	0.6	12	50	0.1
1-04-054880	ESRR71200701002	0.7	4	0.7	2	45	0.1
1-04-054881	ESRR71200701004	0.7	4	0.7	4	45	0.1

ESRR712

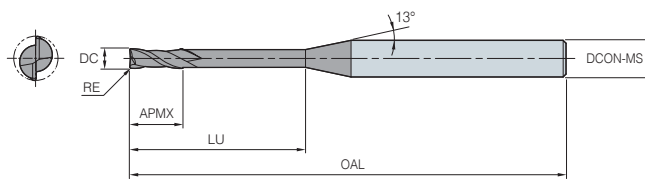
2 flutes rib ball



DC6 or below Above DC6

p.138~147

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-054882	ESRR71200701006	0.7	4	0.7	6	45	0.1
1-04-054883	ESRR71200701008	0.7	4	0.7	8	45	0.1
1-04-054884	ESRR71200701010	0.7	4	0.7	10	45	0.1
1-04-054885	ESRR71200800202	0.8	4	0.8	2	45	0.02
1-04-054886	ESRR71200800204	0.8	4	0.8	4	45	0.02
1-04-054887	ESRR71200800206	0.8	4	0.8	6	45	0.02
1-04-054888	ESRR71200800208	0.8	4	0.8	8	45	0.02
1-04-054889	ESRR71200800210	0.8	4	0.8	10	45	0.02
1-04-054890	ESRR71200800212	0.8	4	0.8	12	50	0.02
1-04-054891	ESRR71200800502	0.8	4	0.8	2	45	0.05
1-04-054892	ESRR71200800504	0.8	4	0.8	4	45	0.05
1-04-054893	ESRR71200800506	0.8	4	0.8	6	45	0.05
1-04-054894	ESRR71200800508	0.8	4	0.8	8	45	0.05
1-04-054895	ESRR71200800510	0.8	4	0.8	10	45	0.05
1-04-054896	ESRR71200800512	0.8	4	0.8	12	50	0.05
1-04-054897	ESRR71200801002	0.8	4	0.8	2	45	0.1
1-04-054898	ESRR71200801004	0.8	4	0.8	4	45	0.1
1-04-054899	ESRR71200801006	0.8	4	0.8	6	45	0.1
1-04-054900	ESRR71200801008	0.8	4	0.8	8	45	0.1
1-04-054901	ESRR71200801010	0.8	4	0.8	10	45	0.1
1-04-054902	ESRR71200801012	0.8	4	0.8	12	50	0.1
1-04-054903	ESRR71200802002	0.8	4	0.8	2	45	0.2
1-04-054904	ESRR71200802004	0.8	4	0.8	4	45	0.2
1-04-054905	ESRR71200802006	0.8	4	0.8	6	45	0.2
1-04-054906	ESRR71200802008	0.8	4	0.8	8	45	0.2
1-04-054907	ESRR71200802010	0.8	4	0.8	10	45	0.2
1-04-054908	ESRR71200802012	0.8	4	0.8	12	50	0.2
1-04-054909	ESRR71201000204	1	4	1	4	45	0.02
1-04-054910	ESRR71201000206	1	4	1	6	45	0.02
1-04-054911	ESRR71201000208	1	4	1	8	45	0.02
1-04-054912	ESRR71201000210	1	4	1	10	50	0.02
1-04-054913	ESRR71201000212	1	4	1	12	50	0.02
1-04-054914	ESRR71201000214	1	4	1	14	50	0.02
1-04-054915	ESRR71201000216	1	4	1	16	50	0.02
1-04-054916	ESRR71201000220	1	4	1	20	50	0.02
1-04-054917	ESRR71201000504	1	4	1	4	45	0.05
1-04-054918	ESRR71201000506	1	4	1	6	45	0.05
1-04-054919	ESRR71201000508	1	4	1	8	45	0.05
1-04-054920	ESRR71201000510	1	4	1	10	50	0.05

ESRR712

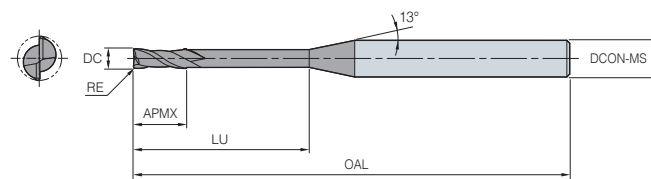
2 flutes rib ball



DC6 or below Above DC6

p.138~147

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-054921	ESRR71201000512	1	4	1	12	50	0.05
1-04-054922	ESRR71201000514	1	4	1	14	50	0.05
1-04-054923	ESRR71201000516	1	4	1	16	50	0.05
1-04-054924	ESRR71201000520	1	4	1	20	50	0.05
1-04-054925	ESRR71201001004	1	4	1	4	45	0.1
1-04-054926	ESRR71201001006	1	4	1	6	45	0.1
1-04-054927	ESRR71201001008	1	4	1	8	45	0.1
1-04-054928	ESRR71201001010	1	4	1	10	50	0.1
1-04-054929	ESRR71201001012	1	4	1	12	50	0.1
1-04-054930	ESRR71201001014	1	4	1	14	50	0.1
1-04-054931	ESRR71201001016	1	4	1	16	50	0.1
1-04-054932	ESRR71201001020	1	4	1	20	50	0.1
1-04-054933	ESRR71201002004	1	4	1	4	45	0.2
1-04-054934	ESRR71201002006	1	4	1	6	45	0.2
1-04-054935	ESRR71201002008	1	4	1	8	45	0.2
1-04-054936	ESRR71201002010	1	4	1	10	50	0.2
1-04-054937	ESRR71201002012	1	4	1	12	50	0.2
1-04-054938	ESRR71201002014	1	4	1	14	50	0.2
1-04-054939	ESRR71201002016	1	4	1	16	50	0.2
1-04-054940	ESRR71201002020	1	4	1	20	50	0.2
1-04-054941	ESRR71201003004	1	4	1	4	45	0.3
1-04-054942	ESRR71201003006	1	4	1	6	45	0.3
1-04-054943	ESRR71201003008	1	4	1	8	45	0.3
1-04-054944	ESRR71201003010	1	4	1	10	50	0.3
1-04-054945	ESRR71201003012	1	4	1	12	50	0.3
1-04-054946	ESRR71201003014	1	4	1	14	50	0.3
1-04-054947	ESRR71201003016	1	4	1	16	50	0.3
1-04-054948	ESRR71201003020	1	4	1	20	50	0.3
1-04-054949	ESRR71201200204	1.2	4	1.2	4	45	0.02
1-04-054950	ESRR71201200206	1.2	4	1.2	6	45	0.02
1-04-054951	ESRR71201200208	1.2	4	1.2	8	45	0.02
1-04-054952	ESRR71201200210	1.2	4	1.2	10	50	0.02
1-04-054953	ESRR71201200212	1.2	4	1.2	12	50	0.02
1-04-054954	ESRR71201200214	1.2	4	1.2	14	50	0.02
1-04-054955	ESRR71201200216	1.2	4	1.2	16	50	0.02
1-04-054956	ESRR71201200220	1.2	4	1.2	20	50	0.02
1-04-054957	ESRR71201200504	1.2	4	1.2	4	45	0.05
1-04-054958	ESRR71201200506	1.2	4	1.2	6	45	0.05
1-04-054959	ESRR71201200508	1.2	4	1.2	8	45	0.05

ESRR712

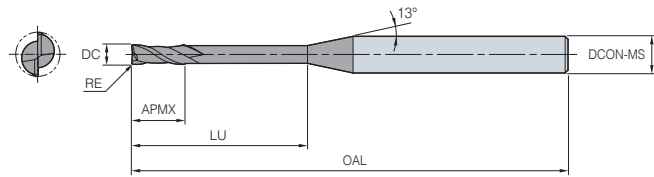
2 flutes rib ball



DC6 or below Above DC6

p.138~147

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-054960	ESRR71201200510	1.2	4	1.2	10	50	0.05
1-04-054961	ESRR71201200512	1.2	4	1.2	12	50	0.05
1-04-054962	ESRR71201200514	1.2	4	1.2	14	50	0.05
1-04-054963	ESRR71201200516	1.2	4	1.2	16	50	0.05
1-04-054964	ESRR71201200520	1.2	4	1.2	20	50	0.05
1-04-054965	ESRR71201201004	1.2	4	1.2	4	45	0.1
1-04-054966	ESRR71201201006	1.2	4	1.2	6	45	0.1
1-04-054967	ESRR71201201008	1.2	4	1.2	8	45	0.1
1-04-054968	ESRR71201201010	1.2	4	1.2	10	50	0.1
1-04-054969	ESRR71201201012	1.2	4	1.2	12	50	0.1
1-04-054970	ESRR71201201014	1.2	4	1.2	14	50	0.1
1-04-054971	ESRR71201201016	1.2	4	1.2	16	50	0.1
1-04-054972	ESRR71201201020	1.2	4	1.2	20	50	0.1
1-04-054973	ESRR71201202004	1.2	4	1.2	4	45	0.2
1-04-054974	ESRR71201202006	1.2	4	1.2	6	45	0.2
1-04-054975	ESRR71201202008	1.2	4	1.2	8	45	0.2
1-04-054976	ESRR71201202010	1.2	4	1.2	10	50	0.2
1-04-054977	ESRR71201202012	1.2	4	1.2	12	50	0.2
1-04-054978	ESRR71201202014	1.2	4	1.2	14	50	0.2
1-04-054979	ESRR71201202016	1.2	4	1.2	16	50	0.2
1-04-054980	ESRR71201202020	1.2	4	1.2	20	50	0.2
1-04-054981	ESRR71201203004	1.2	4	1.2	4	45	0.3
1-04-054982	ESRR71201203006	1.2	4	1.2	6	45	0.3
1-04-054983	ESRR71201203008	1.2	4	1.2	8	45	0.3
1-04-054984	ESRR71201203010	1.2	4	1.2	10	50	0.3
1-04-054985	ESRR71201203012	1.2	4	1.2	12	50	0.3
1-04-054986	ESRR71201203014	1.2	4	1.2	14	50	0.3
1-04-054987	ESRR71201203016	1.2	4	1.2	16	50	0.3
1-04-054988	ESRR71201203020	1.2	4	1.2	20	50	0.3
1-04-054989	ESRR71201500204	1.5	4	1.5	4	45	0.02
1-04-054990	ESRR71201500206	1.5	4	1.5	6	45	0.02
1-04-054991	ESRR71201500208	1.5	4	1.5	8	45	0.02
1-04-054992	ESRR71201500210	1.5	4	1.5	10	50	0.02
1-04-054993	ESRR71201500212	1.5	4	1.5	12	50	0.02
1-04-054994	ESRR71201500214	1.5	4	1.5	14	50	0.02
1-04-054995	ESRR71201500216	1.5	4	1.5	16	50	0.02
1-04-054996	ESRR71201500220	1.5	4	1.5	20	50	0.02
1-04-054997	ESRR71201500504	1.5	4	1.5	4	45	0.05
1-04-054998	ESRR71201500506	1.5	4	1.5	6	45	0.05

ESRR712

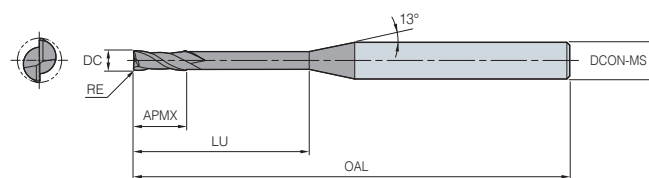
2 flutes rib ball



DC6 or below Above DC6

p.138~147

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-054999	ESRR71201500508	1.5	4	1.5	8	45	0.05
1-04-055000	ESRR71201500510	1.5	4	1.5	10	50	0.05
1-04-055001	ESRR71201500512	1.5	4	1.5	12	50	0.05
1-04-055002	ESRR71201500514	1.5	4	1.5	14	50	0.05
1-04-055003	ESRR71201500516	1.5	4	1.5	16	50	0.05
1-04-055004	ESRR71201500520	1.5	4	1.5	20	50	0.05
1-04-055005	ESRR71201501004	1.5	4	1.5	4	45	0.1
1-04-055006	ESRR71201501006	1.5	4	1.5	6	45	0.1
1-04-055007	ESRR71201501008	1.5	4	1.5	8	45	0.1
1-04-055008	ESRR71201501010	1.5	4	1.5	10	50	0.1
1-04-055009	ESRR71201501012	1.5	4	1.5	12	50	0.1
1-04-055010	ESRR71201501014	1.5	4	1.5	14	50	0.1
1-04-055011	ESRR71201501016	1.5	4	1.5	16	50	0.1
1-04-055012	ESRR71201501020	1.5	4	1.5	20	50	0.1
1-04-055013	ESRR71201502004	1.5	4	1.5	4	45	0.2
1-04-055014	ESRR71201502006	1.5	4	1.5	6	45	0.2
1-04-055015	ESRR71201502008	1.5	4	1.5	8	45	0.2
1-04-055016	ESRR71201502010	1.5	4	1.5	10	50	0.2
1-04-055017	ESRR71201502012	1.5	4	1.5	12	50	0.2
1-04-055018	ESRR71201502014	1.5	4	1.5	14	50	0.2
1-04-055019	ESRR71201502016	1.5	4	1.5	16	50	0.2
1-04-055020	ESRR71201502020	1.5	4	1.5	20	50	0.2
1-04-055021	ESRR71201503004	1.5	4	1.5	4	45	0.3
1-04-055022	ESRR71201503006	1.5	4	1.5	6	45	0.3
1-04-055023	ESRR71201503008	1.5	4	1.5	8	45	0.3
1-04-055024	ESRR71201503010	1.5	4	1.5	10	50	0.3
1-04-055025	ESRR71201503012	1.5	4	1.5	12	50	0.3
1-04-055026	ESRR71201503014	1.5	4	1.5	14	50	0.3
1-04-055027	ESRR71201503016	1.5	4	1.5	16	50	0.3
1-04-055028	ESRR71201503020	1.5	4	1.5	20	50	0.3
1-04-055029	ESRR71201505004	1.5	4	1.5	4	45	0.5
1-04-055030	ESRR71201505006	1.5	4	1.5	6	45	0.5
1-04-055031	ESRR71201505008	1.5	4	1.5	8	45	0.5
1-04-055032	ESRR71201505010	1.5	4	1.5	10	50	0.5
1-04-055033	ESRR71201505012	1.5	4	1.5	12	50	0.5
1-04-055034	ESRR71201505014	1.5	4	1.5	14	50	0.5
1-04-055035	ESRR71201505016	1.5	4	1.5	16	50	0.5
1-04-055036	ESRR71201505020	1.5	4	1.5	20	50	0.5
1-04-055037	ESRR71202000206	2	4	2	6	45	0.02

ESRR712

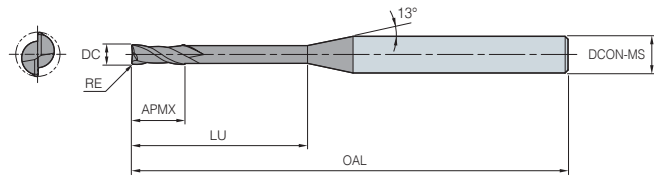
2 flutes rib ball



DC6 or below Above DC6

p.138~147

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055038	ESRR71202000208	2	4	2	8	45	0.02
1-04-055039	ESRR71202000210	2	4	2	10	50	0.02
1-04-055040	ESRR71202000212	2	4	2	12	50	0.02
1-04-055041	ESRR71202000214	2	4	2	14	50	0.02
1-04-055042	ESRR71202000216	2	4	2	16	50	0.02
1-04-055043	ESRR71202000220	2	4	2	20	50	0.02
1-04-055044	ESRR71202000225	2	4	2	25	60	0.02
1-04-055045	ESRR71202000506	2	4	2	6	45	0.05
1-04-055046	ESRR71202000508	2	4	2	8	45	0.05
1-04-055047	ESRR71202000510	2	4	2	10	50	0.05
1-04-055048	ESRR71202000512	2	4	2	12	50	0.05
1-04-055049	ESRR71202000514	2	4	2	14	50	0.05
1-04-055050	ESRR71202000516	2	4	2	16	50	0.05
1-04-055051	ESRR71202000520	2	4	2	20	50	0.05
1-04-055052	ESRR71202000525	2	4	2	25	60	0.05
1-04-055053	ESRR71202001006	2	4	2	6	45	0.1
1-04-055054	ESRR71202001008	2	4	2	8	45	0.1
1-04-055055	ESRR71202001010	2	4	2	10	50	0.1
1-04-055056	ESRR71202001012	2	4	2	12	50	0.1
1-04-055057	ESRR71202001014	2	4	2	14	50	0.1
1-04-055058	ESRR71202001016	2	4	2	16	50	0.1
1-04-055059	ESRR71202001020	2	4	2	20	50	0.1
1-04-055060	ESRR71202001025	2	4	2	25	60	0.1
1-04-055061	ESRR71202001030	2	4	2	30	70	0.1
1-04-055062	ESRR71202002006	2	4	2	6	45	0.2
1-04-055063	ESRR71202002008	2	4	2	8	45	0.2
1-04-055064	ESRR71202002010	2	4	2	10	50	0.2
1-04-055065	ESRR71202002012	2	4	2	12	50	0.2
1-04-055066	ESRR71202002014	2	4	2	14	50	0.2
1-04-055067	ESRR71202002016	2	4	2	16	50	0.2
1-04-055068	ESRR71202002020	2	4	2	20	50	0.2
1-04-055069	ESRR71202002025	2	4	2	25	60	0.2
1-04-055070	ESRR71202002030	2	4	2	30	70	0.2
1-04-055071	ESRR71202003006	2	4	2	6	45	0.3
1-04-055072	ESRR71202003008	2	4	2	8	45	0.3
1-04-055073	ESRR71202003010	2	4	2	10	50	0.3
1-04-055074	ESRR71202003012	2	4	2	12	50	0.3
1-04-055075	ESRR71202003014	2	4	2	14	50	0.3
1-04-055076	ESRR71202003016	2	4	2	16	50	0.3

ESRR712

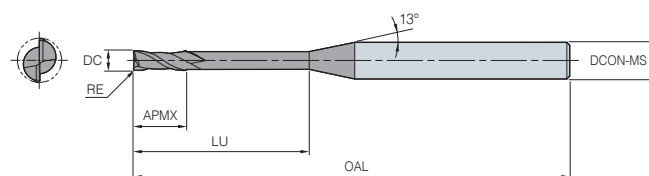
2 flutes rib ball



DC6 or below Above DC6

p.138~147

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055077	ESRR71202003020	2	4	2	20	50	0.3
1-04-055078	ESRR71202003025	2	4	2	25	60	0.3
1-04-055079	ESRR71202003030	2	4	2	30	70	0.3
1-04-055080	ESRR71202005006	2	4	2	6	45	0.5
1-04-055081	ESRR71202005008	2	4	2	8	45	0.5
1-04-055082	ESRR71202005010	2	4	2	10	50	0.5
1-04-055083	ESRR71202005012	2	4	2	12	50	0.5
1-04-055084	ESRR71202005014	2	4	2	14	50	0.5
1-04-055085	ESRR71202005016	2	4	2	16	50	0.5
1-04-055086	ESRR71202005020	2	4	2	20	50	0.5
1-04-055087	ESRR71202005025	2	4	2	25	60	0.5
1-04-055088	ESRR71202005030	2	4	2	30	70	0.5
1-04-055089	ESRR71202501010	2.5	4	2.5	10	50	0.1
1-04-055090	ESRR71202501016	2.5	4	2.5	16	50	0.1
1-04-055091	ESRR71202501020	2.5	4	2.5	20	50	0.1
1-04-055092	ESRR71202501025	2.5	4	2.5	25	60	0.1
1-04-055093	ESRR71202501030	2.5	4	2.5	30	70	0.1
1-04-055094	ESRR71202502010	2.5	4	2.5	10	50	0.2
1-04-055095	ESRR71202502016	2.5	4	2.5	16	50	0.2
1-04-055096	ESRR71202502020	2.5	4	2.5	20	50	0.2
1-04-055097	ESRR71202503010	2.5	4	2.5	10	50	0.3
1-04-055098	ESRR71202503016	2.5	4	2.5	16	50	0.3
1-04-055099	ESRR71202503020	2.5	4	2.5	20	50	0.3
1-04-055100	ESRR71202505010	2.5	4	2.5	10	50	0.5
1-04-055101	ESRR71202505016	2.5	4	2.5	16	50	0.5
1-04-055102	ESRR71202505020	2.5	4	2.5	20	50	0.5
1-04-055103	ESRR71203001010	3	6	3	10	50	0.1
1-04-055104	ESRR71203001012	3	6	3	12	50	0.1
1-04-055105	ESRR71203001016	3	6	3	16	55	0.1
1-04-055106	ESRR71203001020	3	6	3	20	60	0.1
1-04-055107	ESRR71203001025	3	6	3	25	65	0.1
1-04-055108	ESRR71203001030	3	6	3	30	70	0.1
1-04-055109	ESRR71203001035	3	6	3	35	75	0.1
1-04-055110	ESRR71203001040	3	6	3	40	80	0.1
1-04-055111	ESRR71203002010	3	6	3	10	50	0.2
1-04-055112	ESRR71203002012	3	6	3	12	50	0.2
1-04-055113	ESRR71203002016	3	6	3	16	55	0.2
1-04-055114	ESRR71203002020	3	6	3	20	60	0.2
1-04-055115	ESRR71203002025	3	6	3	25	65	0.2

ESRR712

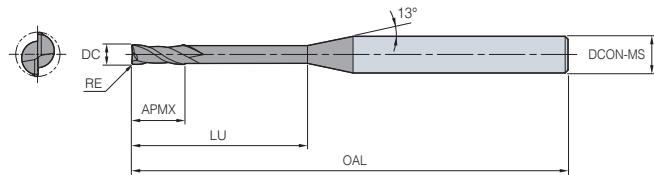
2 flutes rib ball



DC6 or below Above DC6

p.138~147

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055116	ESRR71203002030	3	6	3	30	70	0.2
1-04-055117	ESRR71203002035	3	6	3	35	75	0.2
1-04-055118	ESRR71203002040	3	6	3	40	80	0.2
1-04-055119	ESRR71203003010	3	6	3	10	50	0.3
1-04-055120	ESRR71203003012	3	6	3	12	50	0.3
1-04-055121	ESRR71203003016	3	6	3	16	55	0.3
1-04-055122	ESRR71203003020	3	6	3	20	60	0.3
1-04-055123	ESRR71203003025	3	6	3	25	65	0.3
1-04-055124	ESRR71203003030	3	6	3	30	70	0.3
1-04-055125	ESRR71203003035	3	6	3	35	75	0.3
1-04-055126	ESRR71203003040	3	6	3	40	80	0.3
1-04-055127	ESRR71203005010	3	6	3	10	50	0.5
1-04-055128	ESRR71203005012	3	6	3	12	50	0.5
1-04-055129	ESRR71203005016	3	6	3	16	55	0.5
1-04-055130	ESRR71203005020	3	6	3	20	60	0.5
1-04-055131	ESRR71203005025	3	6	3	25	65	0.5
1-04-055132	ESRR71203005030	3	6	3	30	70	0.5
1-04-055133	ESRR71203005035	3	6	3	35	75	0.5
1-04-055134	ESRR71203005040	3	6	3	40	80	0.5
1-04-055135	ESRR71203010010	3	6	3	10	50	1
1-04-055136	ESRR71203010012	3	6	3	12	50	1
1-04-055137	ESRR71203010016	3	6	3	16	55	1
1-04-055138	ESRR71203010020	3	6	3	20	60	1
1-04-055139	ESRR71203010025	3	6	3	25	65	1
1-04-055140	ESRR71203010030	3	6	3	30	70	1
1-04-055141	ESRR71203010035	3	6	3	35	75	1
1-04-055142	ESRR71203010040	3	6	3	40	80	1
1-04-055143	ESRR71204001012	4	6	4	12	50	0.1
1-04-055144	ESRR71204001016	4	6	4	16	55	0.1
1-04-055145	ESRR71204001020	4	6	4	20	60	0.1
1-04-055146	ESRR71204001025	4	6	4	25	65	0.1
1-04-055147	ESRR71204001030	4	6	4	30	70	0.1
1-04-055148	ESRR71204001035	4	6	4	35	75	0.1
1-04-055149	ESRR71204001040	4	6	4	40	80	0.1
1-04-055150	ESRR71204002012	4	6	4	12	50	0.2
1-04-055151	ESRR71204002016	4	6	4	16	55	0.2
1-04-055152	ESRR71204002020	4	6	4	20	60	0.2
1-04-055153	ESRR71204002025	4	6	4	25	65	0.2
1-04-055154	ESRR71204002030	4	6	4	30	70	0.2

ESRR712

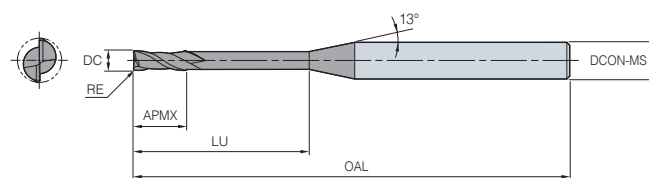
2 flutes rib ball



p.138~147

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

DC6 or below Above DC6

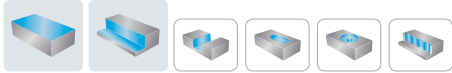


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055155	ESRR71204002035	4	6	4	35	75	0.2
1-04-055156	ESRR71204002040	4	6	4	40	80	0.2
1-04-055157	ESRR71204003012	4	6	4	12	50	0.3
1-04-055158	ESRR71204003016	4	6	4	16	55	0.3
1-04-055159	ESRR71204003020	4	6	4	20	60	0.3
1-04-055160	ESRR71204003025	4	6	4	25	65	0.3
1-04-055161	ESRR71204003030	4	6	4	30	70	0.3
1-04-055162	ESRR71204003035	4	6	4	35	75	0.3
1-04-055163	ESRR71204003040	4	6	4	40	80	0.3
1-04-055164	ESRR71204005012	4	6	4	12	50	0.5
1-04-055165	ESRR71204005016	4	6	4	16	55	0.5
1-04-055166	ESRR71204005020	4	6	4	20	60	0.5
1-04-055167	ESRR71204005025	4	6	4	25	65	0.5
1-04-055168	ESRR71204005030	4	6	4	30	70	0.5
1-04-055169	ESRR71204005035	4	6	4	35	75	0.5
1-04-055170	ESRR71204005040	4	6	4	40	80	0.5
1-04-055171	ESRR71204010012	4	6	4	12	50	1
1-04-055172	ESRR71204010016	4	6	4	16	55	1
1-04-055173	ESRR71204010020	4	6	4	20	60	1
1-04-055174	ESRR71204010025	4	6	4	25	65	1
1-04-055175	ESRR71204010030	4	6	4	30	70	1
1-04-055176	ESRR71204010035	4	6	4	35	75	1
1-04-055177	ESRR71204010040	4	6	4	40	80	1
1-04-055178	ESRR71205002015	5	6	6	15	60	0.2
1-04-055179	ESRR71205002025	5	6	6	25	70	0.2
1-04-055180	ESRR71205002030	5	6	6	30	70	0.2
1-04-055181	ESRR71205002040	5	6	6	40	80	0.2
1-04-055182	ESRR71205005015	5	6	6	15	60	0.5
1-04-055183	ESRR71205005025	5	6	6	25	70	0.5
1-04-055184	ESRR71205005030	5	6	6	30	70	0.5
1-04-055185	ESRR71205005040	5	6	6	40	80	0.5
1-04-055186	ESRR71205010015	5	6	6	15	60	1
1-04-055187	ESRR71205010025	5	6	6	25	70	1
1-04-055188	ESRR71205010030	5	6	6	30	70	1
1-04-055189	ESRR71205010040	5	6	6	40	80	1
1-04-055190	ESRR71206001020	6	6	7	20	60	0.1
1-04-055191	ESRR71206001040	6	6	7	40	80	0.1
1-04-055192	ESRR71206002020	6	6	7	20	60	0.2
1-04-055193	ESRR71206002040	6	6	7	40	80	0.2

ESRR712

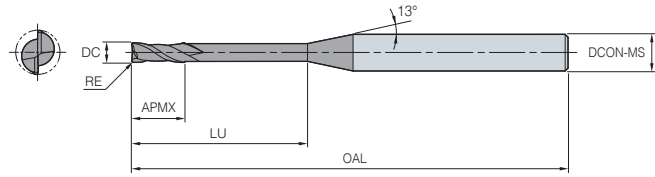
2 flutes rib ball



DC6 or below Above DC6

p.138~147

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055194	ESRR71206003020	6	6	7	20	60	0.3
1-04-055195	ESRR71206003040	6	6	7	40	80	0.3
1-04-055196	ESRR71206005020	6	6	7	20	60	0.5
1-04-055197	ESRR71206005040	6	6	7	40	80	0.5
1-04-055198	ESRR71206010020	6	6	7	20	60	1
1-04-055199	ESRR71206010040	6	6	7	40	80	1
1-04-055200	ESRR71206015020	6	6	7	20	60	1.5
1-04-055201	ESRR71206015040	6	6	7	40	80	1.5
1-04-055202	ESRR71208002022	8	8	9	22	65	0.2
1-04-055203	ESRR71208003022	8	8	9	22	65	0.3
1-04-063546	ESRR71208005022	8	8	9	22	65	0.5
1-04-055205	ESRR71208010022	8	8	9	22	65	1
1-04-055206	ESRR71208015022	8	8	9	22	65	1.5
1-04-055207	ESRR71210002024	10	10	11	24	70	0.2
1-04-055208	ESRR71210003024	10	10	11	24	70	0.3
1-04-055209	ESRR71210005024	10	10	11	24	70	0.5
1-04-055210	ESRR71210010024	10	10	11	24	70	1
1-04-055211	ESRR71210015024	10	10	11	24	70	1.5
1-04-055212	ESRR71210020024	10	10	11	24	70	2
1-04-055213	ESRR71212002026	12	12	13	26	80	0.2
1-04-055214	ESRR71212003026	12	12	13	26	80	0.3
1-04-055215	ESRR71212005026	12	12	13	26	80	0.5
1-04-055216	ESRR71212010026	12	12	13	26	80	1
1-04-055217	ESRR71212015026	12	12	13	26	80	1.5
1-04-055218	ESRR71212020026	12	12	13	26	80	2
1-04-055219	ESRR71212030026	12	12	13	26	80	3
1-04-055220	ESRR71216005035	16	16	20	35	110	0.5
1-04-055221	ESRR71216010035	16	16	20	35	110	1

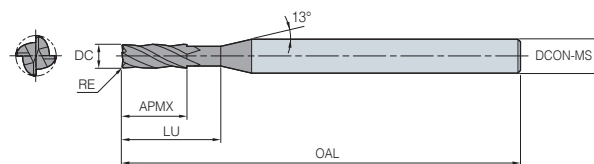
ESRR714

4 flutes rib ball



p.148~159

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055222	ESRR71400500502	0.5	4	0.5	2	45	0.05
1-04-055223	ESRR71400500504	0.5	4	0.5	4	45	0.05
1-04-055224	ESRR71400500506	0.5	4	0.5	6	45	0.05
1-04-055225	ESRR71400500508	0.5	4	0.5	8	45	0.05
1-04-055226	ESRR71400501002	0.5	4	0.5	2	45	0.1
1-04-055227	ESRR71400501004	0.5	4	0.5	4	45	0.1
1-04-055228	ESRR71400501006	0.5	4	0.5	6	45	0.1
1-04-055229	ESRR71400501008	0.5	4	0.5	8	45	0.1
1-04-055230	ESRR71400600502	0.6	4	0.6	2	45	0.05
1-04-055231	ESRR71400600504	0.6	4	0.6	4	45	0.05
1-04-055232	ESRR71400600506	0.6	4	0.6	6	45	0.05
1-04-055233	ESRR71400600508	0.6	4	0.6	8	45	0.05
1-04-055234	ESRR71400601002	0.6	4	0.6	2	45	0.1
1-04-055235	ESRR71400601004	0.6	4	0.6	4	45	0.1
1-04-055236	ESRR71400601006	0.6	4	0.6	6	45	0.1
1-04-055237	ESRR71400601008	0.6	4	0.6	8	45	0.1
1-04-055238	ESRR71400700502	0.7	4	0.7	2	45	0.05
1-04-055239	ESRR71400700504	0.7	4	0.7	4	45	0.05
1-04-055240	ESRR71400700506	0.7	4	0.7	6	45	0.05
1-04-055241	ESRR71400700508	0.7	4	0.7	8	45	0.05
1-04-055242	ESRR71400701002	0.7	4	0.7	2	45	0.1
1-04-055243	ESRR71400701004	0.7	4	0.7	4	45	0.1
1-04-055244	ESRR71400701006	0.7	4	0.7	6	45	0.1
1-04-055245	ESRR71400701008	0.7	4	0.7	8	45	0.1
1-04-055246	ESRR71400800202	0.8	4	0.8	2	45	0.02
1-04-055247	ESRR71400800204	0.8	4	0.8	4	45	0.02
1-04-055248	ESRR71400800206	0.8	4	0.8	6	45	0.02
1-04-055249	ESRR71400800208	0.8	4	0.8	8	45	0.02
1-04-055250	ESRR71400800210	0.8	4	0.8	10	45	0.02
1-04-055251	ESRR71400800212	0.8	4	0.8	12	50	0.02
1-04-055252	ESRR71400800502	0.8	4	0.8	2	45	0.05
1-04-055253	ESRR71400800504	0.8	4	0.8	4	45	0.05
1-04-055254	ESRR71400800506	0.8	4	0.8	6	45	0.05
1-04-055255	ESRR71400800508	0.8	4	0.8	8	45	0.05
1-04-055256	ESRR71400800510	0.8	4	0.8	10	45	0.05
1-04-055257	ESRR71400800512	0.8	4	0.8	12	50	0.05
1-04-055258	ESRR71400801002	0.8	4	0.8	2	45	0.1
1-04-055259	ESRR71400801004	0.8	4	0.8	4	45	0.1
1-04-055260	ESRR71400801006	0.8	4	0.8	6	45	0.1

ESRR714

4 flutes rib ball

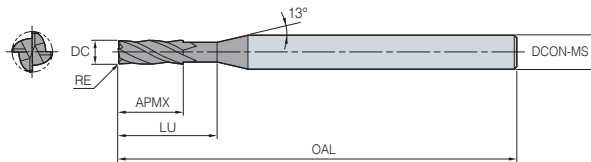


DC6 or below

Above DC6

p.148~159

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

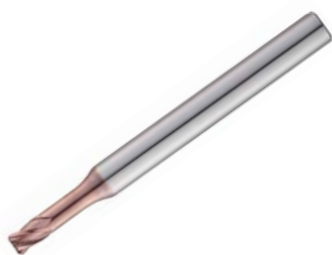


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055261	ESRR71400801008	0.8	4	0.8	8	45	0.1
1-04-055262	ESRR71400801010	0.8	4	0.8	10	45	0.1
1-04-055263	ESRR71400801012	0.8	4	0.8	12	50	0.1
1-04-055264	ESRR71401000204	1	4	1	4	45	0.02
1-04-055265	ESRR71401000206	1	4	1	6	45	0.02
1-04-055266	ESRR71401000208	1	4	1	8	45	0.02
1-04-055267	ESRR71401000210	1	4	1	10	50	0.02
1-04-055268	ESRR71401000212	1	4	1	12	50	0.02
1-04-055269	ESRR71401000214	1	4	1	14	50	0.02
1-04-055270	ESRR71401000216	1	4	1	16	50	0.02
1-04-055271	ESRR71401000220	1	4	1	20	50	0.02
1-04-055272	ESRR71401000503	1	4	1	3	45	0.05
1-04-055273	ESRR71401000504	1	4	1	4	45	0.05
1-04-055274	ESRR71401000506	1	4	1	6	45	0.05
1-04-055275	ESRR71401000508	1	4	1	8	45	0.05
1-04-055276	ESRR71401000510	1	4	1	10	50	0.05
1-04-055277	ESRR71401000512	1	4	1	12	50	0.05
1-04-055278	ESRR71401000514	1	4	1	14	50	0.05
1-04-055279	ESRR71401000516	1	4	1	16	50	0.05
1-04-055280	ESRR71401000520	1	4	1	20	50	0.05
1-04-055281	ESRR71401001003	1	4	1	3	45	0.1
1-04-055282	ESRR71401001004	1	4	1	4	45	0.1
1-04-055283	ESRR71401001006	1	4	1	6	45	0.1
1-04-055284	ESRR71401001008	1	4	1	8	45	0.1
1-04-055285	ESRR71401001010	1	4	1	10	50	0.1
1-04-055286	ESRR71401001012	1	4	1	12	50	0.1
1-04-055287	ESRR71401001014	1	4	1	14	50	0.1
1-04-055288	ESRR71401001016	1	4	1	16	50	0.1
1-04-055289	ESRR71401001020	1	4	1	20	50	0.1
1-04-055290	ESRR71401002003	1	4	1	3	45	0.2
1-04-055291	ESRR71401002004	1	4	1	4	45	0.2
1-04-055292	ESRR71401002006	1	4	1	6	45	0.2
1-04-055293	ESRR71401002008	1	4	1	8	45	0.2
1-04-055294	ESRR71401002010	1	4	1	10	50	0.2
1-04-055295	ESRR71401002012	1	4	1	12	50	0.2
1-04-055296	ESRR71401002014	1	4	1	14	50	0.2
1-04-055297	ESRR71401002016	1	4	1	16	50	0.2
1-04-055298	ESRR71401002020	1	4	1	20	50	0.2
1-04-055299	ESRR71401003003	1	4	1	3	45	0.3

ESRR714

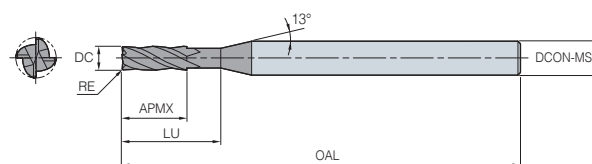
4 flutes rib ball



DC6 or below Above DC6

p.148~159

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055300	ESRR71401003004	1	4	1	4	45	0.3
1-04-055301	ESRR71401003006	1	4	1	6	45	0.3
1-04-055302	ESRR71401003008	1	4	1	8	45	0.3
1-04-055303	ESRR71401003010	1	4	1	10	50	0.3
1-04-055304	ESRR71401003012	1	4	1	12	50	0.3
1-04-055305	ESRR71401003014	1	4	1	14	50	0.3
1-04-055306	ESRR71401003016	1	4	1	16	50	0.3
1-04-055307	ESRR71401003020	1	4	1	20	50	0.3
1-04-055308	ESRR71401200204	1.2	4	1.2	4	45	0.02
1-04-055309	ESRR71401200206	1.2	4	1.2	6	45	0.02
1-04-055310	ESRR71401200208	1.2	4	1.2	8	45	0.02
1-04-055311	ESRR71401200210	1.2	4	1.2	10	50	0.02
1-04-055312	ESRR71401200212	1.2	4	1.2	12	50	0.02
1-04-055313	ESRR71401200214	1.2	4	1.2	14	50	0.02
1-04-055314	ESRR71401200216	1.2	4	1.2	16	50	0.02
1-04-055315	ESRR71401200220	1.2	4	1.2	20	50	0.02
1-04-055316	ESRR71401200503	1.2	4	1.2	3	45	0.05
1-04-055317	ESRR71401200504	1.2	4	1.2	4	45	0.05
1-04-055318	ESRR71401200506	1.2	4	1.2	6	45	0.05
1-04-055319	ESRR71401200508	1.2	4	1.2	8	45	0.05
1-04-055320	ESRR71401200510	1.2	4	1.2	10	50	0.05
1-04-055321	ESRR71401200512	1.2	4	1.2	12	50	0.05
1-04-055322	ESRR71401200514	1.2	4	1.2	14	50	0.05
1-04-055323	ESRR71401200516	1.2	4	1.2	16	50	0.05
1-04-055324	ESRR71401200520	1.2	4	1.2	20	50	0.05
1-04-055325	ESRR71401201003	1.2	4	1.2	3	45	0.1
1-04-055326	ESRR71401201004	1.2	4	1.2	4	45	0.1
1-04-055327	ESRR71401201006	1.2	4	1.2	6	45	0.1
1-04-055328	ESRR71401201008	1.2	4	1.2	8	45	0.1
1-04-055329	ESRR71401201010	1.2	4	1.2	10	50	0.1
1-04-055330	ESRR71401201012	1.2	4	1.2	12	50	0.1
1-04-055331	ESRR71401201014	1.2	4	1.2	14	50	0.1
1-04-055332	ESRR71401201016	1.2	4	1.2	16	50	0.1
1-04-055333	ESRR71401201020	1.2	4	1.2	20	50	0.1
1-04-055334	ESRR71401202003	1.2	4	1.2	3	45	0.2
1-04-055335	ESRR71401202004	1.2	4	1.2	4	45	0.2
1-04-055336	ESRR71401202006	1.2	4	1.2	6	45	0.2
1-04-055337	ESRR71401202008	1.2	4	1.2	8	45	0.2
1-04-055338	ESRR71401202010	1.2	4	1.2	10	50	0.2

ESRR714

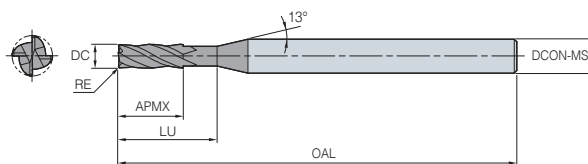
4 flutes rib ball



DC6 or below Above DC6

p.148~159

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055339	ESRR71401202012	1.2	4	1.2	12	0.2	50
1-04-055340	ESRR71401202014	1.2	4	1.2	14	0.2	50
1-04-055341	ESRR71401202016	1.2	4	1.2	16	0.2	50
1-04-055342	ESRR71401202020	1.2	4	1.2	20	0.2	50
1-04-055343	ESRR71401203003	1.2	4	1.2	3	0.3	45
1-04-055344	ESRR71401203004	1.2	4	1.2	4	0.3	45
1-04-055345	ESRR71401203006	1.2	4	1.2	6	0.3	45
1-04-055346	ESRR71401203008	1.2	4	1.2	8	0.3	45
1-04-055347	ESRR71401203010	1.2	4	1.2	10	0.3	50
1-04-055348	ESRR71401203012	1.2	4	1.2	12	0.3	50
1-04-055349	ESRR71401203016	1.2	4	1.2	16	0.3	50
1-04-055350	ESRR71401203020	1.2	4	1.2	20	0.3	50
1-04-055351	ESRR71401500206	1.5	4	1.5	6	0.02	45
1-04-055352	ESRR71401500208	1.5	4	1.5	8	0.02	45
1-04-055353	ESRR71401500210	1.5	4	1.5	10	0.02	50
1-04-055354	ESRR71401500212	1.5	4	1.5	12	0.02	50
1-04-055355	ESRR71401500214	1.5	4	1.5	14	0.02	50
1-04-055356	ESRR71401500216	1.5	4	1.5	16	0.02	50
1-04-055357	ESRR71401500220	1.5	4	1.5	20	0.02	50
1-04-055358	ESRR71401500222	1.5	4	1.5	22	0.02	60
1-04-055359	ESRR71401500504	1.5	4	1.5	4	0.05	45
1-04-055360	ESRR71401500506	1.5	4	1.5	6	0.05	45
1-04-055361	ESRR71401500508	1.5	4	1.5	8	0.05	45
1-04-055362	ESRR71401500510	1.5	4	1.5	10	0.05	50
1-04-055363	ESRR71401500512	1.5	4	1.5	12	0.05	50
1-04-055364	ESRR71401500514	1.5	4	1.5	14	0.05	50
1-04-055365	ESRR71401500516	1.5	4	1.5	16	0.05	50
1-04-055366	ESRR71401500520	1.5	4	1.5	20	0.05	50
1-04-055367	ESRR71401500522	1.5	4	1.5	22	0.05	60
1-04-055368	ESRR71401500526	1.5	4	1.5	26	0.05	60
1-04-055369	ESRR71401501004	1.5	4	1.5	4	0.1	45
1-04-055370	ESRR71401501006	1.5	4	1.5	6	0.1	45
1-04-055371	ESRR71401501008	1.5	4	1.5	8	0.1	45
1-04-055372	ESRR71401501010	1.5	4	1.5	10	0.1	50
1-04-055373	ESRR71401501012	1.5	4	1.5	12	0.1	50
1-04-055374	ESRR71401501014	1.5	4	1.5	14	0.1	50
1-04-055375	ESRR71401501016	1.5	4	1.5	16	0.1	50
1-04-055376	ESRR71401501020	1.5	4	1.5	20	0.1	50
1-04-055377	ESRR71401501022	1.5	4	1.5	22	0.1	60

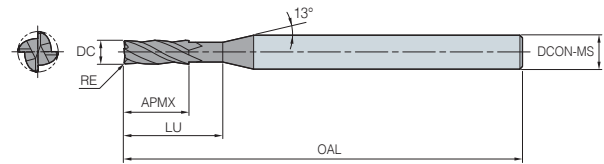
ESRR714

4 flutes rib ball



p.148~159

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055378	ESRR71401501026	1.5	4	1.5	26	60	0.1
1-04-055379	ESRR71401502004	1.5	4	1.5	4	45	0.2
1-04-055380	ESRR71401502006	1.5	4	1.5	6	45	0.2
1-04-055381	ESRR71401502008	1.5	4	1.5	8	45	0.2
1-04-055382	ESRR71401502010	1.5	4	1.5	10	50	0.2
1-04-055383	ESRR71401502012	1.5	4	1.5	12	50	0.2
1-04-055384	ESRR71401502014	1.5	4	1.5	14	50	0.2
1-04-055385	ESRR71401502016	1.5	4	1.5	16	50	0.2
1-04-055386	ESRR71401502020	1.5	4	1.5	20	50	0.2
1-04-055387	ESRR71401502022	1.5	4	1.5	22	60	0.2
1-04-055388	ESRR71401502025	1.5	4	1.5	25	60	0.2
1-04-055389	ESRR71401503004	1.5	4	1.5	4	45	0.3
1-04-055390	ESRR71401503006	1.5	4	1.5	6	45	0.3
1-04-055391	ESRR71401503008	1.5	4	1.5	8	45	0.3
1-04-055392	ESRR71401503010	1.5	4	1.5	10	50	0.3
1-04-055393	ESRR71401503012	1.5	4	1.5	12	50	0.3
1-04-055394	ESRR71401503014	1.5	4	1.5	14	50	0.3
1-04-055395	ESRR71401503016	1.5	4	1.5	16	50	0.3
1-04-055396	ESRR71401503020	1.5	4	1.5	20	50	0.3
1-04-055397	ESRR71401503022	1.5	4	1.5	22	60	0.3
1-04-055398	ESRR71401503025	1.5	4	1.5	25	60	0.3
1-04-055399	ESRR71401505004	1.5	4	1.5	4	45	0.5
1-04-055400	ESRR71401505006	1.5	4	1.5	6	45	0.5
1-04-055401	ESRR71401505008	1.5	4	1.5	8	45	0.5
1-04-055402	ESRR71401505010	1.5	4	1.5	10	50	0.5
1-04-055403	ESRR71401505012	1.5	4	1.5	12	50	0.5
1-04-055404	ESRR71401505014	1.5	4	1.5	14	50	0.5
1-04-055405	ESRR71401505016	1.5	4	1.5	16	50	0.5
1-04-055406	ESRR71401505020	1.5	4	1.5	20	50	0.5
1-04-055407	ESRR71401505022	1.5	4	1.5	22	60	0.5
1-04-055408	ESRR71401505025	1.5	4	1.5	25	60	0.5
1-04-055409	ESRR71402000206	2	4	2	6	45	0.02
1-04-055410	ESRR71402000208	2	4	2	8	45	0.02
1-04-055411	ESRR71402000210	2	4	2	10	50	0.02
1-04-055412	ESRR71402000212	2	4	2	12	50	0.02
1-04-055413	ESRR71402000214	2	4	2	14	50	0.02
1-04-055414	ESRR71402000216	2	4	2	16	50	0.02
1-04-055415	ESRR71402000220	2	4	2	20	50	0.02
1-04-055416	ESRR71402000225	2	4	2	25	60	0.02

ESRR714

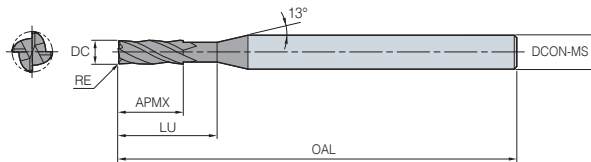
4 flutes rib ball



DC6 or below Above DC6

p.148~159

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055417	ESRR71402000230	2	4	2	30	70	0.02
1-04-055418	ESRR71402000506	2	4	2	6	45	0.05
1-04-055419	ESRR71402000508	2	4	2	8	45	0.05
1-04-055420	ESRR71402000510	2	4	2	10	50	0.05
1-04-055421	ESRR71402000512	2	4	2	12	50	0.05
1-04-055422	ESRR71402000514	2	4	2	14	50	0.05
1-04-055423	ESRR71402000516	2	4	2	16	50	0.05
1-04-055424	ESRR71402000520	2	4	2	20	50	0.05
1-04-055425	ESRR71402000525	2	4	2	25	60	0.05
1-04-055426	ESRR71402000530	2	4	2	30	70	0.05
1-04-055427	ESRR71402001006	2	4	2	6	45	0.1
1-04-055428	ESRR71402001008	2	4	2	8	45	0.1
1-04-055429	ESRR71402001010	2	4	2	10	50	0.1
1-04-055430	ESRR71402001012	2	4	2	12	50	0.1
1-04-055431	ESRR71402001014	2	4	2	14	50	0.1
1-04-055432	ESRR71402001016	2	4	2	16	50	0.1
1-04-055433	ESRR71402001020	2	4	2	20	50	0.1
1-04-055434	ESRR71402001022	2	4	2	22	60	0.1
1-04-055435	ESRR71402001025	2	4	2	25	60	0.1
1-04-055436	ESRR71402001030	2	4	2	30	70	0.1
1-04-055437	ESRR71402002006	2	4	2	6	45	0.2
1-04-055438	ESRR71402002008	2	4	2	8	45	0.2
1-04-055439	ESRR71402002010	2	4	2	10	50	0.2
1-04-055440	ESRR71402002012	2	4	2	12	50	0.2
1-04-055441	ESRR71402002014	2	4	2	14	50	0.2
1-04-055442	ESRR71402002016	2	4	2	16	50	0.2
1-04-055443	ESRR71402002020	2	4	2	20	50	0.2
1-04-055444	ESRR71402002022	2	4	2	22	60	0.2
1-04-055445	ESRR71402002025	2	4	2	25	60	0.2
1-04-055446	ESRR71402002030	2	4	2	30	70	0.2
1-04-055447	ESRR71402003006	2	4	2	6	45	0.3
1-04-055448	ESRR71402003008	2	4	2	8	45	0.3
1-04-055449	ESRR71402003010	2	4	2	10	50	0.3
1-04-055450	ESRR71402003012	2	4	2	12	50	0.3
1-04-055451	ESRR71402003014	2	4	2	14	50	0.3
1-04-055452	ESRR71402003016	2	4	2	16	50	0.3
1-04-055453	ESRR71402003020	2	4	2	20	50	0.3
1-04-055454	ESRR71402003022	2	4	2	22	60	0.3
1-04-055455	ESRR71402003025	2	4	2	25	60	0.3

ESRR714

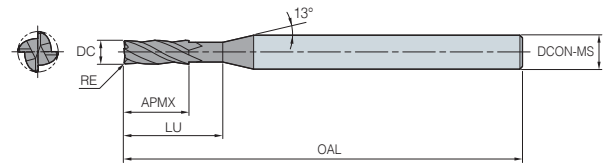
4 flutes rib ball



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

DC6 or below Above DC6

p.148~159



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055456	ESRR71402003030	2	4	2	30	70	0.3
1-04-055457	ESRR71402005006	2	4	3	6	45	0.5
1-04-055458	ESRR71402005008	2	4	2	8	45	0.5
1-04-055459	ESRR71402005010	2	4	2	10	50	0.5
1-04-055460	ESRR71402005012	2	4	2	12	50	0.5
1-04-055461	ESRR71402005014	2	4	2	14	50	0.5
1-04-055462	ESRR71402005016	2	4	2	16	50	0.5
1-04-055463	ESRR71402005020	2	4	2	20	50	0.5
1-04-055464	ESRR71402005022	2	4	2	22	60	0.5
1-04-055465	ESRR71402005025	2	4	2	25	60	0.5
1-04-055466	ESRR71402005030	2	4	2	30	70	0.5
1-04-055467	ESRR71402501008	2.5	4	2.5	8	45	0.1
1-04-055468	ESRR71402501010	2.5	4	2.5	10	50	0.1
1-04-055469	ESRR71402501012	2.5	4	2.5	12	50	0.1
1-04-055470	ESRR71402501014	2.5	4	2.5	14	50	0.1
1-04-055471	ESRR71402501016	2.5	4	2.5	16	50	0.1
1-04-055472	ESRR71402501020	2.5	4	2.5	20	50	0.1
1-04-055473	ESRR71402501025	2.5	4	2.5	25	60	0.1
1-04-055474	ESRR71402501030	2.5	4	2.5	30	70	0.1
1-04-055475	ESRR71402502008	2.5	4	2.5	8	45	0.2
1-04-055476	ESRR71402502010	2.5	4	2.5	10	50	0.2
1-04-055477	ESRR71402502012	2.5	4	2.5	12	50	0.2
1-04-055478	ESRR71402502014	2.5	4	2.5	14	50	0.2
1-04-055479	ESRR71402502016	2.5	4	2.5	16	50	0.2
1-04-055480	ESRR71402502020	2.5	4	2.5	20	50	0.2
1-04-055481	ESRR71402502025	2.5	4	2.5	25	60	0.2
1-04-055482	ESRR71402502030	2.5	4	2.5	30	70	0.2
1-04-055483	ESRR71402503008	2.5	4	2.5	8	45	0.3
1-04-055484	ESRR71402503010	2.5	4	2.5	10	50	0.3
1-04-055485	ESRR71402503012	2.5	4	2.5	12	50	0.3
1-04-055486	ESRR71402503014	2.5	4	2.5	14	50	0.3
1-04-055487	ESRR71402503016	2.5	4	2.5	16	50	0.3
1-04-055488	ESRR71402503020	2.5	4	2.5	20	50	0.3
1-04-055489	ESRR71402503025	2.5	4	2.5	25	60	0.3
1-04-055490	ESRR71402503030	2.5	4	2.5	30	70	0.3
1-04-055491	ESRR71402505008	2.5	4	2.5	8	45	0.5
1-04-055492	ESRR71402505010	2.5	4	2.5	10	50	0.5
1-04-055493	ESRR71402505012	2.5	4	2.5	12	50	0.5
1-04-055494	ESRR71402505014	2.5	4	2.5	14	50	0.5

ESRR714

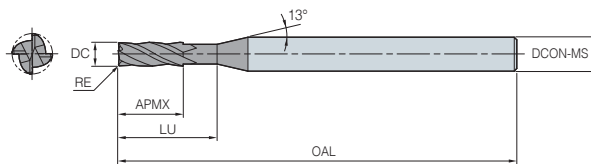
4 flutes rib ball



DC6 or below Above DC6

p.148~159

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055495	ESRR71402505016	2.5	4	2.5	16	50	0.5
1-04-055496	ESRR71402505020	2.5	4	2.5	20	50	0.5
1-04-055497	ESRR71402505025	2.5	4	2.5	25	60	0.5
1-04-055498	ESRR71402505030	2.5	4	2.5	30	70	0.5
1-04-055499	ESRR71403001008	3	6	3	8	45	0.1
1-04-055500	ESRR71403001010	3	6	3	10	50	0.1
1-04-055501	ESRR71403001012	3	6	3	12	50	0.1
1-04-055502	ESRR71403001014	3	6	3	14	50	0.1
1-04-055503	ESRR71403001016	3	6	3	16	55	0.1
1-04-055504	ESRR71403001020	3	6	3	20	60	0.1
1-04-055505	ESRR71403001025	3	6	3	25	65	0.1
1-04-055506	ESRR71403001030	3	6	3	30	70	0.1
1-04-055507	ESRR71403001035	3	6	3	35	75	0.1
1-04-055508	ESRR71403001040	3	6	3	40	80	0.1
1-04-055509	ESRR71403001045	3	6	3	45	90	0.1
1-04-055510	ESRR71403002008	3	6	3	8	45	0.2
1-04-055511	ESRR71403002010	3	6	3	10	50	0.2
1-04-055512	ESRR71403002012	3	6	3	12	50	0.2
1-04-055513	ESRR71403002014	3	6	3	14	50	0.2
1-04-055514	ESRR71403002016	3	6	3	16	55	0.2
1-04-055515	ESRR71403002020	3	6	3	20	60	0.2
1-04-055516	ESRR71403002025	3	6	3	25	65	0.2
1-04-055517	ESRR71403002030	3	6	3	30	70	0.2
1-04-055518	ESRR71403002035	3	6	3	35	75	0.2
1-04-055519	ESRR71403002040	3	6	3	40	80	0.2
1-04-055520	ESRR71403002045	3	6	3	45	90	0.2
1-04-055521	ESRR71403003008	3	6	3	8	45	0.3
1-04-055522	ESRR71403003010	3	6	3	10	50	0.3
1-04-055523	ESRR71403003012	3	6	3	12	50	0.3
1-04-055524	ESRR71403003014	3	6	3	14	50	0.3
1-04-055525	ESRR71403003016	3	6	3	16	55	0.3
1-04-055526	ESRR71403003020	3	6	3	20	60	0.3
1-04-055527	ESRR71403003025	3	6	3	25	65	0.3
1-04-055528	ESRR71403003030	3	6	3	30	70	0.3
1-04-055529	ESRR71403003035	3	6	3	35	75	0.3
1-04-055530	ESRR71403003040	3	6	3	40	80	0.3
1-04-055531	ESRR71403003045	3	6	3	45	90	0.3
1-04-055532	ESRR71403005008	3	6	3	8	45	0.5
1-04-055533	ESRR71403005010	3	6	3	10	50	0.5

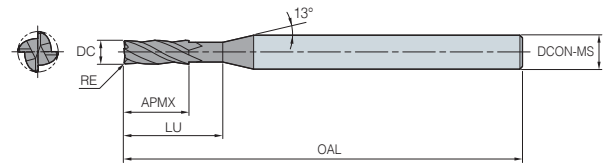
ESRR714

4 flutes rib ball



p.148~159

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

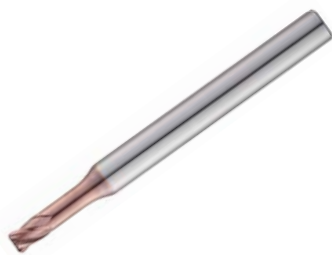


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055534	ESRR71403005012	3	6	3	12	50	0.5
1-04-055535	ESRR71403005014	3	6	3	14	50	0.5
1-04-055536	ESRR71403005016	3	6	3	16	55	0.5
1-04-055537	ESRR71403005020	3	6	3	20	60	0.5
1-04-055538	ESRR71403005025	3	6	3	25	65	0.5
1-04-055539	ESRR71403005030	3	6	3	30	70	0.5
1-04-055540	ESRR71403005035	3	6	3	35	75	0.5
1-04-055541	ESRR71403005040	3	6	3	40	80	0.5
1-04-055542	ESRR71403005045	3	6	3	45	90	0.5
1-04-055543	ESRR71403005050	3	6	3	50	100	0.5
1-04-055544	ESRR71403010008	3	6	3	8	45	1
1-04-055545	ESRR71403010010	3	6	3	10	50	1
1-04-055546	ESRR71403010012	3	6	3	12	50	1
1-04-055547	ESRR71403010014	3	6	3	14	50	1
1-04-055548	ESRR71403010016	3	6	3	16	55	1
1-04-055549	ESRR71403010020	3	6	3	20	60	1
1-04-055550	ESRR71403010025	3	6	3	25	65	1
1-04-055551	ESRR71403010030	3	6	3	30	70	1
1-04-055552	ESRR71403010035	3	6	3	35	75	1
1-04-055553	ESRR71403010040	3	6	3	40	80	1
1-04-055554	ESRR71403010045	3	6	3	45	90	1
1-04-055555	ESRR71403010050	3	6	3	50	100	1
1-04-055556	ESRR71404001010	4	6	4	10	50	0.1
1-04-055557	ESRR71404001012	4	6	4	12	50	0.1
1-04-055558	ESRR71404001013	4	6	4	13	55	0.1
1-04-055559	ESRR71404001016	4	6	4	16	55	0.1
1-04-055560	ESRR71404001020	4	6	4	20	60	0.1
1-04-055561	ESRR71404001025	4	6	4	25	65	0.1
1-04-055562	ESRR71404001030	4	6	4	30	70	0.1
1-04-055563	ESRR71404001035	4	6	4	35	75	0.1
1-04-055564	ESRR71404001040	4	6	4	40	80	0.1
1-04-055565	ESRR71404001045	4	6	4	45	90	0.1
1-04-055566	ESRR71404001050	4	6	4	50	100	0.1
1-04-055567	ESRR71404002010	4	6	4	10	50	0.2
1-04-055568	ESRR71404002012	4	6	4	12	50	0.2
1-04-055569	ESRR71404002013	4	6	4	13	55	0.2
1-04-055570	ESRR71404002016	4	6	4	16	55	0.2
1-04-055571	ESRR71404002020	4	6	4	20	60	0.2
1-04-055572	ESRR71404002025	4	6	4	25	65	0.2

ESRR714

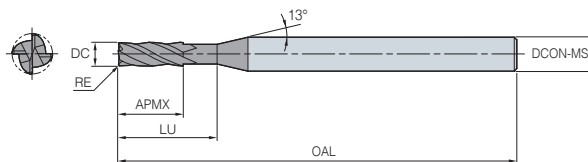
4 flutes rib ball



DC6 or below Above DC6

p.148-159

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

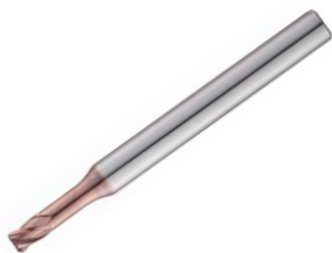


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055573	ESRR71404002030	4	6	4	30	70	0.2
1-04-055574	ESRR71404002035	4	6	4	35	75	0.2
1-04-055575	ESRR71404002040	4	6	4	40	80	0.2
1-04-055576	ESRR71404002045	4	6	4	45	90	0.2
1-04-055577	ESRR71404002050	4	6	4	50	100	0.2
1-04-055578	ESRR71404003010	4	6	4	10	50	0.3
1-04-055579	ESRR71404003012	4	6	4	12	50	0.3
1-04-055580	ESRR71404003013	4	6	4	13	55	0.3
1-04-055581	ESRR71404003016	4	6	4	16	55	0.3
1-04-055582	ESRR71404003020	4	6	4	20	60	0.3
1-04-055583	ESRR71404003025	4	6	4	25	65	0.3
1-04-055584	ESRR71404003030	4	6	4	30	70	0.3
1-04-055585	ESRR71404003035	4	6	4	35	75	0.3
1-04-055586	ESRR71404003040	4	6	4	40	80	0.3
1-04-055587	ESRR71404003045	4	6	4	45	90	0.3
1-04-055588	ESRR71404003050	4	6	4	50	100	0.3
1-04-055589	ESRR71404005010	4	6	4	10	50	0.5
1-04-055590	ESRR71404005012	4	6	4	12	50	0.5
1-04-055591	ESRR71404005013	4	6	4	13	55	0.5
1-04-055592	ESRR71404005016	4	6	4	16	55	0.5
1-04-055593	ESRR71404005020	4	6	4	20	60	0.5
1-04-055594	ESRR71404005025	4	6	4	25	65	0.5
1-04-055595	ESRR71404005030	4	6	4	30	70	0.5
1-04-055596	ESRR71404005035	4	6	4	35	75	0.5
1-04-055597	ESRR71404005040	4	6	4	40	80	0.5
1-04-055598	ESRR71404005045	4	6	4	45	90	0.5
1-04-055599	ESRR71404005050	4	6	4	50	100	0.5
1-04-055600	ESRR71404005055	4	6	4	55	100	0.5
1-04-055601	ESRR71404010010	4	6	4	10	50	1
1-04-055602	ESRR71404010012	4	6	4	12	50	1
1-04-055603	ESRR71404010013	4	6	4	13	55	1
1-04-055604	ESRR71404010016	4	6	4	16	55	1
1-04-055605	ESRR71404010020	4	6	4	20	60	1
1-04-055606	ESRR71404010025	4	6	4	25	65	1
1-04-055607	ESRR71404010030	4	6	4	30	70	1
1-04-055608	ESRR71404010035	4	6	4	35	75	1
1-04-055609	ESRR71404010040	4	6	4	40	80	1
1-04-055610	ESRR71404010045	4	6	4	45	90	1
1-04-055611	ESRR71404010050	4	6	4	50	100	1

ESRR714

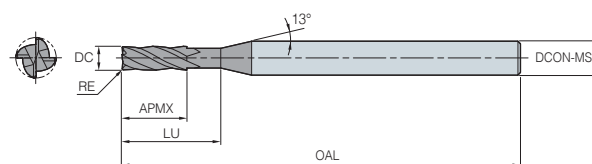
4 flutes rib ball



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

DC6 or below Above DC6

p.148~159



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055612	ESRR71404010055	4	6	4	55	100	1
1-04-055613	ESRR71405001016	5	6	5	16	60	0.1
1-04-055614	ESRR71405001030	5	6	5	30	70	0.1
1-04-055615	ESRR71405001040	5	6	5	40	80	0.1
1-04-055616	ESRR71405002016	5	6	5	16	60	0.2
1-04-055617	ESRR71405002030	5	6	5	30	70	0.2
1-04-055618	ESRR71405002040	5	6	5	40	80	0.2
1-04-055619	ESRR71405003016	5	6	5	16	60	0.3
1-04-055620	ESRR71405003030	5	6	5	30	70	0.3
1-04-055621	ESRR71405003040	5	6	5	40	80	0.3
1-04-055622	ESRR71405005016	5	6	5	16	60	0.5
1-04-055623	ESRR71405005030	5	6	5	30	70	0.5
1-04-055624	ESRR71405005040	5	6	5	40	80	0.5
1-04-055625	ESRR71405005050	5	6	5	50	100	0.5
1-04-055626	ESRR71405005060	5	6	5	60	110	0.5
1-04-055627	ESRR71405010016	5	6	5	16	60	1
1-04-055628	ESRR71405010030	5	6	5	30	70	1
1-04-055629	ESRR71405010040	5	6	5	40	80	1
1-04-055630	ESRR71405010050	5	6	5	50	100	1
1-04-055631	ESRR71405010060	5	6	5	60	110	1
1-04-055632	ESRR71405015015	5	6	5	15	60	1.5
1-04-055633	ESRR71405020015	5	6	5	15	60	2
1-04-055634	ESRR71406001020	6	6	7	20	60	0.1
1-04-055635	ESRR71406001040	6	6	7	40	80	0.1
1-04-055636	ESRR71406001050	6	6	7	50	100	0.1
1-04-055637	ESRR71406002020	6	6	7	20	60	0.2
1-04-055638	ESRR71406002040	6	6	7	40	80	0.2
1-04-055639	ESRR71406002050	6	6	7	50	100	0.2
1-04-055640	ESRR71406003020	6	6	7	20	60	0.3
1-04-055641	ESRR71406003030	6	6	7	30	70	0.3
1-04-055642	ESRR71406003040	6	6	7	40	80	0.3
1-04-055643	ESRR71406003050	6	6	7	50	100	0.3
1-04-055644	ESRR71406005020	6	6	7	20	60	0.5
1-04-055645	ESRR71406005030	6	6	7	30	70	0.5
1-04-055646	ESRR71406005040	6	6	7	40	80	0.5
1-04-055647	ESRR71406005050	6	6	7	50	100	0.5
1-04-055648	ESRR71406005060	6	6	7	60	110	0.5
1-04-055649	ESRR71406010020	6	6	7	20	60	1
1-04-055650	ESRR71406010030	6	6	7	30	70	1

ESRR714

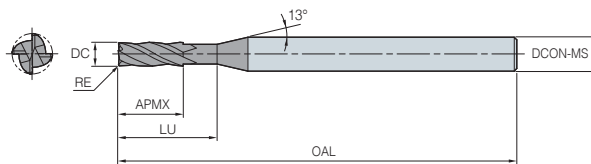
4 flutes rib ball



DC6 or below Above DC6

p.148~159

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

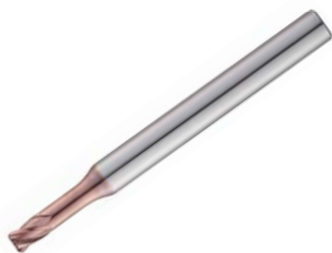


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055651	ESRR71406010040	6	6	7	40	80	1
1-04-055652	ESRR71406010050	6	6	7	50	100	1
1-04-055653	ESRR71406010060	6	6	7	60	110	1
1-04-055654	ESRR71406015020	6	6	7	20	60	1.5
1-04-055655	ESRR71406015040	6	6	7	40	80	1.5
1-04-055656	ESRR71406015050	6	6	7	50	100	1.5
1-04-055657	ESRR71406020020	6	6	7	20	60	2
1-04-055658	ESRR71406020030	6	6	7	30	70	2
1-04-055659	ESRR71406020040	6	6	7	40	80	2
1-04-055660	ESRR71406020050	6	6	7	50	100	2
1-04-055661	ESRR71408001025	8	8	9	25	70	0.1
1-04-055662	ESRR71408002022	8	8	9	22	65	0.2
1-04-055663	ESRR71408002040	8	8	9	40	100	0.2
1-04-055664	ESRR71408003022	8	8	9	22	65	0.3
1-04-055665	ESRR71408003040	8	8	9	40	100	0.3
1-04-055666	ESRR71408005022	8	8	9	22	65	0.5
1-04-055667	ESRR71408005035	8	8	9	35	100	0.5
1-04-055668	ESRR71408005040	8	8	9	40	100	0.5
1-04-055669	ESRR71408005050	8	8	9	50	120	0.5
1-04-055670	ESRR71408005060	8	8	9	60	120	0.5
1-04-055671	ESRR71408010022	8	8	9	22	65	1
1-04-055672	ESRR71408010035	8	8	9	35	100	1
1-04-055673	ESRR71408010040	8	8	9	40	100	1
1-04-055674	ESRR71408010050	8	8	9	50	120	1
1-04-055675	ESRR71408010060	8	8	9	60	120	1
1-04-055676	ESRR71408015022	8	8	9	22	65	1.5
1-04-055677	ESRR71408015040	8	8	9	40	100	1.5
1-04-055678	ESRR71408020022	8	8	9	22	65	2
1-04-055679	ESRR71408020040	8	8	9	40	100	2
1-04-055680	ESRR71408020050	8	8	9	50	120	2
1-04-055681	ESRR71410001030	10	10	11	30	75	0.1
1-04-055682	ESRR71410002024	10	10	11	24	70	0.2
1-04-055683	ESRR71410002040	10	10	11	40	100	0.2
1-04-055684	ESRR71410003024	10	10	11	24	70	0.3
1-04-055685	ESRR71410003040	10	10	11	40	100	0.3
1-04-055686	ESRR71410005024	10	10	11	24	70	0.5
1-04-055687	ESRR71410005040	10	10	11	40	100	0.5
1-04-055688	ESRR71410005050	10	10	11	50	120	0.5
1-04-055689	ESRR71410005060	10	10	11	60	120	0.5

ESRR714

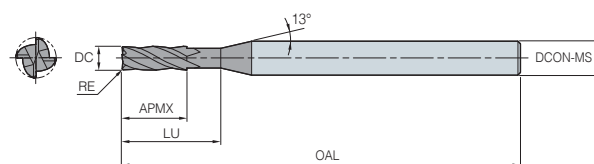
4 flutes rib ball



DC6 or below Above DC6

p.148~159

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-055690	ESRR71410010024	10	10	11	24	70	1
1-04-055691	ESRR71410010040	10	10	11	40	100	1
1-04-055692	ESRR71410010050	10	10	11	50	120	1
1-04-055693	ESRR71410010060	10	10	11	60	120	1
1-04-055694	ESRR71410015024	10	10	11	24	70	1.5
1-04-055695	ESRR71410015040	10	10	11	40	100	1.5
1-04-055696	ESRR71410020024	10	10	11	24	70	2
1-04-055697	ESRR71410020040	10	10	11	40	100	2
1-04-055698	ESRR71410020050	10	10	11	50	120	2
1-04-055699	ESRR71410025024	10	10	11	24	70	2.5
1-04-055700	ESRR71412002032	12	12	13	32	80	0.2
1-04-055701	ESRR71412003026	12	12	13	26	80	0.3
1-04-055702	ESRR71412003045	12	12	13	45	110	0.3
1-04-055703	ESRR71412005026	12	12	13	26	80	0.5
1-04-055704	ESRR71412005040	12	12	13	40	110	0.5
1-04-055705	ESRR71412005060	12	12	13	60	130	0.5
1-04-055706	ESRR71412010026	12	12	13	26	80	1
1-04-055707	ESRR71412010040	12	12	13	40	110	1
1-04-055708	ESRR71412010060	12	12	13	60	130	1
1-04-055709	ESRR71412015026	12	12	13	26	80	1.5
1-04-055710	ESRR71412020026	12	12	13	26	80	2
1-04-055711	ESRR71412020040	12	12	13	40	110	2
1-04-055712	ESRR71412030026	12	12	13	26	80	3
1-04-055713	ESRR71416005035	16	16	20	35	100	0.5
1-04-055714	ESRR71416005050	16	20	35	50	150	0.5
1-04-055715	ESRR71416010035	16	16	20	35	100	1
1-04-055716	ESRR71416010050	16	20	35	50	150	1
1-04-055717	ESRR71420005040	20	20	25	40	100	0.5
1-04-055718	ESRR71420005055	20	20	40	55	150	0.5
1-04-055719	ESRR71420010040	20	20	25	40	100	1
1-04-055720	ESRR71420010055	20	20	40	55	150	1

ESXR704

4 flutes neck type radius



DC6 or below

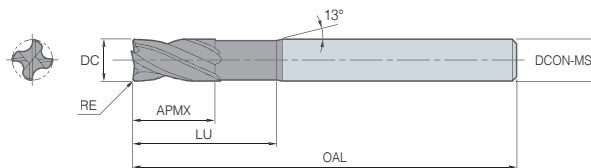


Above DC6



p.135

DC	Tolerance
ALL	0.000 ~ -0.020



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-053354	ESXR70401000504	1	4	1.5	4	45	0.05
1-04-053356	ESXR70402000506	2	4	3	6	45	0.05
1-04-053391	ESXR70402000507	2	4	2.5	7	50	0.05
1-04-053392	ESXR7040200107	2	4	2.5	7	50	0.1
1-04-053358	ESXR7040300107	3	6	4	7	45	0.1
1-04-053393	ESXR7040300109	3	6	4	9	55	0.1
1-04-053394	ESXR7040300209	3	6	4	9	55	0.2
1-04-053395	ESXR7040300309	3	6	4	9	55	0.3
1-04-053396	ESXR7040300312	3	6	4	12	55	0.3
1-04-053397	ESXR7040300316	3	6	4	16	55	0.3
1-04-053360	ESXR7040400109	4	6	5	9	45	0.1
1-04-053398	ESXR7040400212	4	6	5	12	55	0.2
1-04-054177	ESXR7040400212S4	4	4	5	12	55	0.2
1-04-053399	ESXR7040400312	4	6	5	12	55	0.3
1-04-053400	ESXR7040400316	4	6	5	16	55	0.3
1-04-053401	ESXR7040400320	4	6	5	20	55	0.3
1-04-053402	ESXR7040400512	4	6	5	12	55	0.5
1-04-053403	ESXR7040400516	4	6	5	16	55	0.5
1-04-054178	ESXR7040400516S4	4	4	5	16	55	0.5
1-04-053404	ESXR7040400520	4	6	5	20	55	0.5
1-04-053405	ESXR7040401012	4	6	5	12	55	1
1-04-053406	ESXR7040500116	5	6	6	16	60	0.1
1-04-053407	ESXR7040500216	5	6	6	16	60	0.2
1-04-053408	ESXR7040500316	5	6	6	16	60	0.3
1-04-053409	ESXR7040500516	5	6	6	16	60	0.5
1-04-053410	ESXR7040501016	5	6	6	16	60	1
1-04-053411	ESXR7040600120	6	6	7	20	60	0.1
1-04-053362	ESXR7040600214	6	6	7	14	50	0.2
1-04-053412	ESXR7040600220	6	6	7	20	60	0.2
1-04-053413	ESXR7040600320	6	6	7	20	60	0.3
1-04-053414	ESXR7040600520	6	6	7	20	60	0.5
1-04-053415	ESXR7040601020	6	6	7	20	60	1
1-04-053416	ESXR7040601520	6	6	7	20	60	1.5
1-04-053417	ESXR7040800125	8	8	9	25	60	0.1
1-04-053364	ESXR7040800218	8	8	9	18	60	0.2
1-04-053418	ESXR7040800225	8	8	9	25	60	0.2
1-04-053419	ESXR7040800325	8	8	9	25	60	0.3
1-04-053420	ESXR7040800525	8	8	9	25	60	0.5
1-04-053376	ESXR7040801025	8	8	9	25	60	1

ESXR704

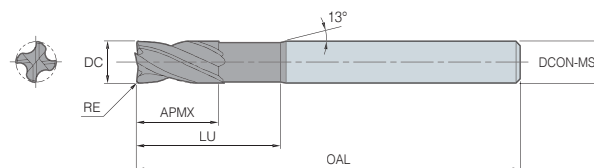
4 flutes neck type radius



DC	Tolerance
ALL	0.000 ~ -0.020

DC6 or below Above DC6

p.135

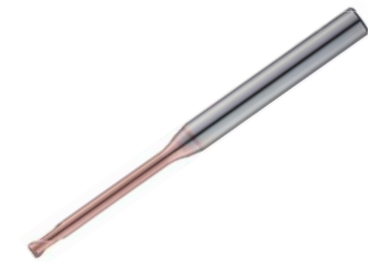


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-053377	ESXR7040801525	8	8	9	25	60	1.5
1-04-053378	ESXR7040802025	8	8	9	25	60	2
1-04-053366	ESXR7041000225	10	10	12	25	75	0.2
1-04-053379	ESXR7041000232	10	10	11	32	75	0.2
1-04-053380	ESXR7041000332	10	10	11	32	75	0.3
1-04-053381	ESXR7041000532	10	10	11	32	75	0.5
1-04-053382	ESXR7041001032	10	10	11	32	75	1
1-04-053383	ESXR7041001532	10	10	11	32	75	1.5
1-04-053384	ESXR7041002032	10	10	11	32	75	2
1-04-053385	ESXR7041200238	12	12	12	38	75	0.2
1-04-053368	ESXR7041200330	12	12	15	30	75	0.3
1-04-053386	ESXR7041200338	12	12	12	38	75	0.3
1-04-053387	ESXR7041200538	12	12	12	38	75	0.5
1-04-053388	ESXR7041201038	12	12	12	38	75	1
1-04-053389	ESXR7041201538	12	12	12	38	75	1.5
1-04-053390	ESXR7041202038	12	12	12	38	75	2

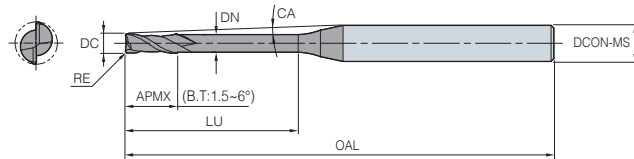
ESLNR20

2 flutes long neck type radius



p.160~162

DC	Tolerance
ALL	0.000 ~ -0.012

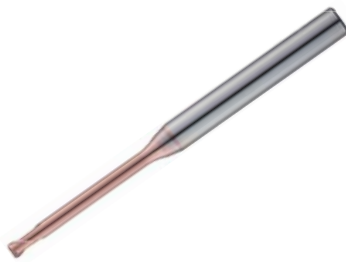


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	DN	CA	RE	Effective length by inclination angle				
										0.5°	1°	1.5°	2°	3°
1-04-054185	ESLNR2002-0.5-005	0.2	4	0.15	0.5	50	0.17	11.4	0.05	0.9	1	1	1.1	12
1-04-054187	ESLNR2002-1-005	0.2	4	0.15	1	50	0.17	10.9	0.05	1.6	1.7	1.9	2	2.3
1-04-054186	ESLNR2002-1.5-005	0.2	4	0.15	1.5	50	0.17	10.3	0.05	2.1	2.3	2.5	2.7	3
1-04-054188	ESLNR2002-2-005	0.2	4	0.15	2	50	0.17	9.9	0.05	2.8	3.1	3.4	3.6	4.1
1-04-054190	ESLNR2003-1-005	0.3	4	0.25	1	50	0.27	10.8	0.05	1.4	1.5	1.6	1.7	1.9
1-04-054189	ESLNR2003-1.5-005	0.3	4	0.25	1.5	50	0.27	10.3	0.05	2.1	2.3	2.5	2.7	3
1-04-054191	ESLNR2003-2.5-005	0.3	4	0.25	2.5	50	0.27	9.8	0.05	2.7	2.9	3.1	3.3	3.6
1-04-054192	ESLNR2003-2-005	0.3	4	0.25	2	50	0.27	9.4	0.05	3.2	3.5	3.7	3.9	4.3
1-04-054193	ESLNR2003-3-005	0.3	4	0.25	3	50	0.27	9	0.05	3.9	4.3	4.6	4.9	5.4
1-04-054195	ESLNR2004-1-005	0.4	4	0.3	1	50	0.37	10.8	0.05	1.4	1.5	1.6	1.7	1.9
1-04-054194	ESLNR2004-1.5-005	0.4	4	0.3	1.5	50	0.37	10.3	0.05	2	2.1	2.2	2.3	2.5
1-04-054197	ESLNR2004-2-005	0.4	4	0.3	2	50	0.37	9.8	0.05	2.7	2.9	3.1	3.3	3.6
1-04-054196	ESLNR2004-2.5-005	0.4	4	0.3	2.5	50	0.37	9.4	0.05	3.2	3.5	3.7	3.9	4.3
1-04-054200	ESLNR2004-3-005	0.4	4	0.3	3	50	0.37	9	0.05	3.8	4	4.3	4.5	4.9
1-04-054199	ESLNR2004-3.5-005	0.4	4	0.3	3.5	50	0.37	8.6	0.05	4.3	4.6	4.9	5.1	5.5
1-04-054202	ESLNR2004-4-005	0.4	4	0.3	4	50	0.37	8.3	0.05	5	5.4	5.8	6.1	6.6
1-04-054198	ESLNR2004-2-01	0.4	4	0.3	2	50	0.37	9.8	0.1	2.7	2.9	3.1	3.3	3.6
1-04-054201	ESLNR2004-3-01	0.4	4	0.3	3	50	0.37	9	0.1	3.8	4	4.3	4.5	4.9
1-04-054203	ESLNR2004-4-01	0.4	4	0.3	4	50	0.37	8.3	0.1	5	5.4	5.8	6.1	6.6
1-04-054204	ESLNR2005-1-005	0.5	4	0.35	1	50	0.47	10.8	0.05	1.4	1.5	1.6	1.7	1.9
1-04-054206	ESLNR2005-2-005	0.5	4	0.35	2	50	0.47	9.7	0.05	2.5	2.6	2.8	2.9	3.1
1-04-054208	ESLNR2005-3-005	0.5	4	0.35	3	50	0.47	8.9	0.05	3.8	4	4.3	4.5	4.9
1-04-054210	ESLNR2005-4-005	0.5	4	0.35	4	50	0.47	8.2	0.05	4.8	5.2	5.4	5.7	6.1
1-04-054212	ESLNR2005-5-005	0.5	4	0.35	5	50	0.47	7.6	0.05	6.1	6.6	6.9	7.3	7.8
1-04-054214	ESLNR2005-6-005	0.5	4	0.35	6	50	0.47	7	0.05	7.2	7.7	8.1	8.4	9
1-04-054205	ESLNR2005-1-01	0.5	4	0.35	1	50	0.47	10.8	0.1	1.4	1.5	1.6	1.7	1.9
1-04-054207	ESLNR2005-2-01	0.5	4	0.35	2	50	0.47	9.8	0.1	2.5	2.6	2.8	2.9	3.1
1-04-054209	ESLNR2005-3-01	0.5	4	0.35	3	50	0.47	8.9	0.1	3.8	4	4.3	4.5	4.9
1-04-054211	ESLNR2005-4-01	0.5	4	0.35	4	50	0.47	8.2	0.1	4.8	5.2	5.4	5.7	6.1
1-04-054213	ESLNR2005-5-01	0.5	4	0.35	5	50	0.47	7.6	0.1	6.1	6.5	6.9	7.2	7.8
1-04-054215	ESLNR2005-6-01	0.5	4	0.35	6	50	0.47	7.1	0.1	7.2	7.7	8.1	8.4	9
1-04-054217	ESLNR2006-2-01	0.6	4	0.4	2	50	0.57	9.7	0.1	2.5	2.6	2.8	2.9	3.1
1-04-054218	ESLNR2006-4-01	0.6	4	0.4	4	50	0.57	8.1	0.1	4.8	5.2	5.4	5.7	6.1
1-04-054219	ESLNR2006-6-01	0.6	4	0.4	6	50	0.57	7	0.1	7.2	7.7	8.1	8.4	9

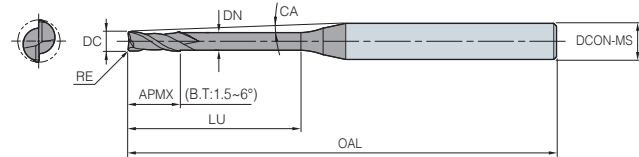
ESLNR20

2 flutes long neck type radius



p.160~162

DC	Tolerance
ALL	0.000 ~ -0.012

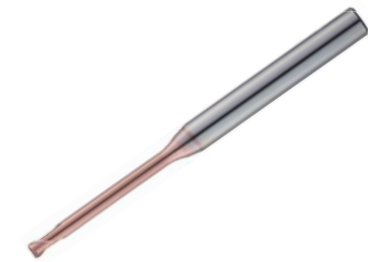


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	DN	CA	RE	Effective length by inclination angle				
										0.5°	1°	1.5°	2°	3°
1-04-054220	ESLNR2006-8-01	0.6	4	0.4	8	50	0.57	6.1	0.1	9.3	9.9	10.3	10.7	11
1-04-054216	ESLNR2006-10-01	0.6	4	0.4	10	50	0.57	5.5	0.1	11.5	12.1	12.5	13	13.7
1-04-054222	ESLNR2008-4-01	0.8	4	0.5	4	50	4	8	0.1	4.8	5.2	5.4	5.7	6.1
1-04-054224	ESLNR2008-6-01	0.8	4	0.5	6	50	6	6.8	0.1	7	7.4	7.7	7.9	8.4
1-04-054226	ESLNR2008-8-01	0.8	4	0.5	8	50	8	5.9	0.1	9.3	9.9	10.3	10.7	11.4
1-04-054221	ESLNR2008-12-01	0.8	4	0.5	12	50	12	4.7	0.1	13.6	14.2	14.7	15.2	16
1-04-054223	ESLNR2008-4-02	0.8	4	0.5	4	50	4	8	0.2	4.8	5.1	5.4	5.6	6.1
1-04-054225	ESLNR2008-6-02	0.8	4	0.5	6	50	6	6.9	0.2	7	7.3	7.7	7.9	8.4
1-04-054227	ESLNR2010-4-01	1	4	0.8	4	50	0.94	7.7	0.1	4.7	4.9	5.1	5.2	5.5
1-04-054229	ESLNR2010-6-01	1	4	0.8	6	50	0.94	6.6	0.1	7.1	7.4	7.7	8	8.5
1-04-054231	ESLNR2010-8-01	1	4	0.8	8	50	0.94	5.7	0.1	9.2	9.6	9.9	10.2	10.8
1-04-054233	ESLNR2010-10-01	1	4	0.8	10	50	0.94	5.1	0.1	11.6	12.1	12.6	13	13.7
1-04-054235	ESLNR2010-12-01	1	4	0.8	12	55	0.94	4.5	0.1	13.7	14.3	14.8	15.3	16
1-04-054237	ESLNR2010-16-01	1	4	0.8	16	60	0.94	3.8	0.1	17.9	18.6	19.2	19.7	21.3
1-04-054239	ESLNR2010-20-01	1	4	0.8	20	60	0.94	3.2	0.1	22	22.8	23.5	24	26.7
1-04-054228	ESLNR2010-4-02	1	4	0.8	4	50	0.94	7.8	0.2	4.7	4.9	5.1	5.2	5.5
1-04-054230	ESLNR2010-6-02	1	4	0.8	6	50	0.94	6.6	0.2	7.1	7.4	7.7	8	8.5
1-04-054232	ESLNR2010-8-02	1	4	0.8	8	50	0.94	5.8	0.2	9.2	9.6	9.9	10.2	10.8
1-04-054234	ESLNR2010-10-02	1	4	0.8	10	50	0.94	5.1	0.2	11.6	12.1	12.6	13	13.7
1-04-054236	ESLNR2010-12-02	1	4	0.8	12	55	0.94	4.6	0.2	13.7	14.3	14.8	15.2	16
1-04-054238	ESLNR2010-16-02	1	4	0.8	16	60	0.94	3.8	0.2	17.9	18.6	19.2	19.7	21.3
1-04-054240	ESLNR2010-20-02	1	4	0.8	20	60	0.94	3.2	0.2	22	22.8	23.5	24	26.6
1-04-053897	ESLNR2010-6-03	1	4	0.8	6	50	0.94	6.7	0.3	7.1	7.4	7.7	8	8.4
1-04-053898	ESLNR2010-10-03	1	4	0.8	10	50	0.94	5.1	0.3	11.5	12.1	12.6	13	13.7
1-04-053899	ESLNR2010-16-03	1	4	0.8	16	60	0.94	3.8	0.3	17.9	18.6	19.1	19.6	21.3
1-04-053900	ESLNR2010-20-03	1	4	0.8	20	60	0.94	3.2	0.3	22	22.8	23.5	24	26.6
1-04-053901	ESLNR2015-4-01	1.5	4	1.35	4	50	1.42	7.2	0.1	4.8	4.9	5.1	5.3	5.5
1-04-053902	ESLNR2015-8-01	1.5	4	1.35	8	50	1.42	5.2	0.1	9.2	9.6	10	10.3	10.8
1-04-053903	ESLNR2015-12-01	1.5	4	1.35	12	55	1.42	4	0.1	13.4	13.9	14.3	14.7	16.1
1-04-053904	ESLNR2015-15-01	1.5	4	1.35	15	55	1.42	3.5	0.1	16.9	17.6	18.1	18.6	20.1
1-04-053905	ESLNR2015-20-01	1.5	4	1.35	20	60	1.42	2.8	0.1	22.1	22.9	23.5	24.1	-
1-04-053906	ESLNR2015-4-02	1.5	4	1.35	4	50	1.42	7.3	0.2	4.7	4.9	5.1	5.3	5.5
1-04-053907	ESLNR2015-8-02	1.5	4	1.35	8	50	1.42	5.2	0.2	9.2	9.6	10	10.3	10.8
1-04-053908	ESLNR2015-12-02	1.5	4	1.35	12	55	1.42	4.1	0.2	13.4	13.9	14.3	14.7	16.1

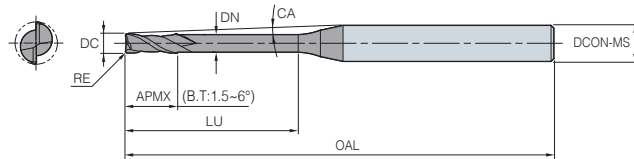
ESLNR20

2 flutes long neck type radius



p.160~162

DC	Tolerance
ALL	0.000 ~ -0.012



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	DN	CA	RE	Effective length by inclination angle				
										0.5°	1°	1.5°	2°	3°
1-04-053909	ESLNR2015-15-02	1.5	4	1.35	15	55	1.42	3.5	0.2	16.9	17.5	18.1	18.6	20
1-04-053910	ESLNR2015-20-02	1.5	4	1.35	20	60	1.42	2.8	0.2	22.1	22.9	23.5	24.1	-
1-04-053911	ESLNR2015-8-03	1.5	4	1.35	8	50	1.42	5.2	0.3	9.2	9.6	10	10.3	10.8
1-04-053912	ESLNR2015-15-03	1.5	4	1.35	15	55	1.42	3.5	0.3	16.9	17.5	18.1	18.6	20
1-04-053913	ESLNR2015-20-03	1.5	4	1.35	20	60	1.42	2.8	0.3	22.1	22.9	23.5	24	-
1-04-053914	ESLNR2020-6-02	2	4	1.7	6	50	1.92	5.4	0.2	6.8	7.1	7.3	7.5	8.1
1-04-053915	ESLNR2020-8-02	2	4	1.7	8	50	1.92	4.6	0.2	8.9	9.2	9.4	9.7	10.8
1-04-053916	ESLNR2020-12-02	2	4	1.7	12	55	1.92	3.5	0.2	13.4	13.9	14.3	14.7	16.1
1-04-053917	ESLNR2020-16-02	2	4	1.7	16	55	1.92	2.8	0.2	17.6	18.1	18.6	19.3	-
1-04-053918	ESLNR2020-20-02	2	4	1.7	20	60	1.92	2.4	0.2	22.1	22.9	23.5	24.1	-
1-04-053919	ESLNR2020-25-02	2	4	1.7	25	65	1.92	2	0.2	27.3	28.2	28.8	-	-
1-04-053920	ESLNR2020-30-02	2	4	1.7	30	70	1.92	1.7	0.2	32.5	33.4	34.4	-	-
1-04-053921	ESLNR2020-8-03	2	4	1.7	8	50	1.92	4.6	0.3	8.9	9.2	9.4	9.7	10.7
1-04-053922	ESLNR2020-16-03	2	4	1.7	16	55	1.92	2.8	0.3	17.6	18.1	18.6	19.3	-
1-04-053923	ESLNR2020-20-03	2	4	1.7	20	60	1.92	2.4	0.3	22.1	22.9	23.5	24	-
1-04-053924	ESLNR2020-6-05	2	4	1.7	6	50	1.92	5.5	0.5	6.8	7.1	7.3	7.4	8
1-04-053925	ESLNR2020-8-05	2	4	1.7	8	50	1.92	4.7	0.5	8.9	9.2	9.4	9.6	10.7
1-04-053926	ESLNR2020-12-05	2	4	1.7	12	55	1.92	3.5	0.5	13.4	13.9	14.3	14.6	16
1-04-053927	ESLNR2020-16-05	2	4	1.7	16	55	1.92	2.9	0.5	17.6	18.1	18.6	19.2	-
1-04-053928	ESLNR2020-20-05	2	4	1.7	20	60	1.92	2.4	0.5	22.1	22.9	23.5	24	-
1-04-053929	ESLNR2020-25-05	2	4	1.7	25	65	1.92	2	0.5	27.3	28.1	28.8	-	-
1-04-053930	ESLNR2020-30-05	2	4	1.7	30	70	1.92	1.7	0.5	32.5	33.4	34.3	-	-
1-04-053931	ESLNR2020-8-08	2	4	1.7	8	50	1.92	4.8	0.8	8.9	9.2	9.4	9.6	10.6
1-04-053932	ESLNR2020-16-08	2	4	1.7	16	55	1.92	2.9	0.8	17.6	18.1	18.6	19.2	-
1-04-053933	ESLNR2020-20-08	2	4	1.7	20	60	1.92	2.4	0.8	22.1	22.8	23.5	24	-
1-04-053934	ESLNR2030-8-02	3	6	2.5	8	55	2.86	5.7	0.2	9	9.3	9.5	9.9	10.9
1-04-053935	ESLNR2030-12-02	3	6	2.5	12	60	2.86	4.5	0.2	13.1	13.5	14	14.7	16.2
1-04-053936	ESLNR2030-16-02	3	6	2.5	16	60	2.86	3.8	0.2	17.7	18.2	18.7	19.5	21.6
1-04-053937	ESLNR2030-20-02	3	6	2.5	20	65	2.86	3.2	0.2	21.8	22.4	23.1	24.2	26.9
1-04-053938	ESLNR2030-30-02	3	6	2.5	30	75	2.86	2.4	0.2	32.6	33.5	34.5	36.2	-
1-04-053939	ESLNR2030-35-02	3	6	2.5	35	80	2.86	2.1	0.2	37.7	38.7	40.2	42.2	-
1-04-053940	ESLNR2030-8-03	3	6	2.5	8	55	2.86	5.7	0.3	9	9.3	9.5	9.9	10.9
1-04-053941	ESLNR2030-16-03	3	6	2.5	16	60	2.86	3.8	0.3	17.7	18.2	18.7	19.4	21.5
1-04-053942	ESLNR2030-20-03	3	6	2.5	20	65	2.86	3.2	0.3	21.8	22.4	23.1	24.2	26.8

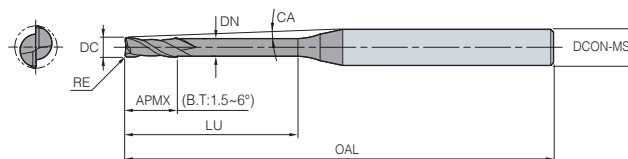
ESLNR20

2 flutes long neck type radius



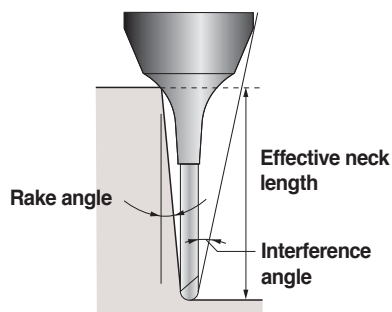
DC	Tolerance
ALL	0.000 ~ -0.012

p.160~162



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	DN	CA	RE	Effective length by inclination angle				
										0.5°	1°	1.5°	2°	3°
1-04-053943	ESLNR2030-30-03	3	6	2.5	30	75	2.86	2.4	0.3	32.6	33.5	34.5	36.2	-
1-04-053944	ESLNR2030-8-05	3	6	2.5	8	55	2.86	5.8	0.5	9	9.3	9.5	9.8	10.8
1-04-053945	ESLNR2030-12-05	3	6	2.5	12	60	2.86	4.6	0.5	13.1	13.5	13.9	14.6	16.2
1-04-053946	ESLNR2030-16-05	3	6	2.5	16	60	2.86	3.8	0.5	17.7	18.2	18.7	19.4	21.5
1-04-053947	ESLNR2030-20-05	3	6	2.5	20	65	2.86	3.2	0.5	21.8	22.4	23.1	24.2	26.8
1-04-053948	ESLNR2030-30-05	3	6	2.5	30	75	2.86	2.4	0.5	32.6	33.5	34.5	36.1	-
1-04-053949	ESLNR2030-35-05	3	6	2.5	35	80	2.86	2.1	0.5	37.7	38.7	40.2	42.1	-



※ The marked effective neck length is the default value to prevent interference with the workpiece.

Proper control of the processing environment is required.

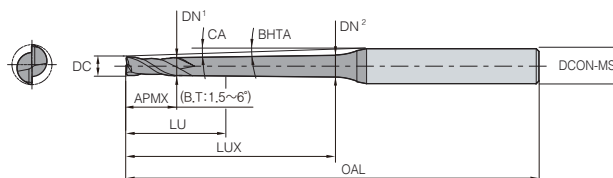
ESTNR20

2 flutes tapered neck type radius



p.163~164

DC	Tolerance
ALL	0.000 ~ -0.012

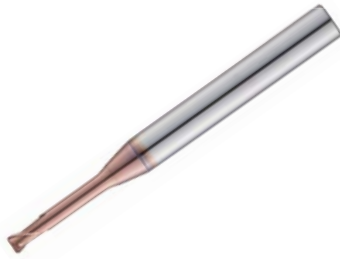


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	LUX	CA	BHTA (°)	DN1	DN2	OAL	RE	Effective length by inclination angle				
													0.5°	1°	1.5°	2°	3°
1-04-053950	ESTNR2002-2-09005	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
1-04-053951	ESTNR2004-4-09005	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
1-04-053952	ESTNR2004-5-09005	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
1-04-053953	ESTNR2004-4-0901	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
1-04-053954	ESTNR2004-5-0901	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
1-04-053955	ESTNR2005-5-0901	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
1-04-053956	ESTNR2005-8-0901	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
1-04-053957	ESTNR2005-10-0901	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
1-04-053958	ESTNR2006-12-0901	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
1-04-053959	ESTNR2006-15-0901	0.6	4	0.4	1.35	15	0.9	4.5	0.57	1.3	55	0.1	-	16.1	17.1	17.8	18.8
1-04-053960	ESTNR2008-6-0402	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
1-04-053961	ESTNR2008-12-0902	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
1-04-053962	ESTNR2010-8-0402	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
1-04-053963	ESTNR2010-10-0902	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
1-04-053964	ESTNR2010-15-0902	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
1-04-053965	ESTNR2010-20-0902	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
1-04-053966	ESTNR2010-25-0902	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
1-04-053967	ESTNR2010-30-0902	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
1-04-053968	ESTNR2010-35-0902	1	6	0.8	2.7	35	0.9	3.3	0.94	2.2	80	0.2	-	36.5	38	39	43.2
1-04-053969	ESTNR2010-8-0403	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
1-04-053970	ESTNR2010-15-0903	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
1-04-053971	ESTNR2010-25-0903	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
1-04-053972	ESTNR2010-30-0903	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
1-04-053973	ESTNR2015-10-0402	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
1-04-053974	ESTNR2015-15-0902	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
1-04-053975	ESTNR2015-20-0902	1.5	6	1.35	3.89	20	0.9	4.5	1.42	2.1	65	0.2	-	21.5	22.5	23.2	24.9
1-04-053976	ESTNR2015-25-0902	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
1-04-053977	ESTNR2015-30-0902	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
1-04-053978	ESTNR2015-10-0403	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
1-04-053979	ESTNR2015-20-0903	1.5	6	1.35	3.89	20	0.9	4.5	1.42	2.1	65	0.3	-	21.5	22.5	23.2	24.8
1-04-053980	ESTNR2015-25-0903	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
1-04-053981	ESTNR2015-30-0903	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
1-04-053982	ESTNR2020-30-0902	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
1-04-053983	ESTNR2020-40-0902	2	6	1.7	7.42	40	0.9	2.5	1.92	3.12	80	0.2	-	41.8	43.3	44.6	-
1-04-053984	ESTNR2020-50-0902	2	6	1.7	7.42	50	0.9	2.1	1.92	3.44	90	0.2	-	51.9	53.6	55.7	-
1-04-053985	ESTNR2020-12-0403	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
1-04-053986	ESTNR2020-20-0903	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
1-04-053987	ESTNR2020-30-0903	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

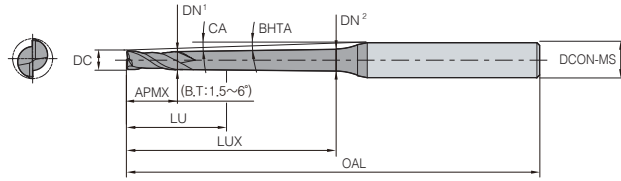
ESTNR20

2 flutes tapered neck type radius



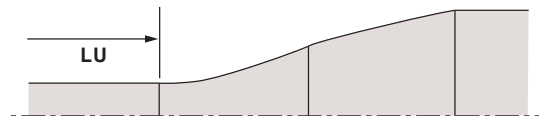
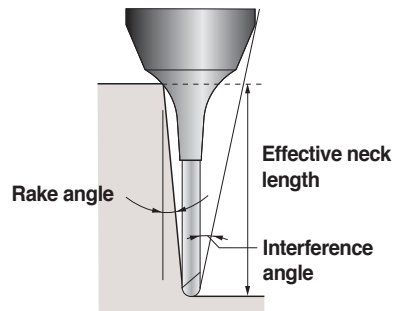
DC	Tolerance
ALL	0.000 ~ -0.012

p.163~164



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	LUX	CA	BHTA (°)	DN¹	DN²	OAL	RE	Effective length by inclination angle				
													0.5°	1°	1.5°	2°	3°
1-04-053988	ESTNR2020-40-0903	2	6	1.7	4.24	40	0.9	2.5	1.92	3.12	80	0.3	-	41.7	43.3	44.6	-
1-04-053989	ESTNR2020-50-0903	2	6	1.7	4.24	50	0.9	2.1	1.92	3.44	90	0.3	-	51.8	53.6	55.7	-
1-04-053990	ESTNR2020-8-0405	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
1-04-053991	ESTNR2020-12-0405	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
1-04-053992	ESTNR2020-16-0405	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
1-04-053993	ESTNR2020-20-0905	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
1-04-053994	ESTNR2020-25-0905	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
1-04-053995	ESTNR2020-30-0905	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
1-04-053996	ESTNR2020-40-0905	2	6	1.7	4.24	40	0.9	2.5	1.92	3.12	80	0.5	-	41.7	43.2	44.6	-
1-04-053997	ESTNR2020-50-0905	2	6	1.7	4.24	50	0.9	2.1	1.92	3.44	90	0.5	-	51.8	53.6	55.6	-
1-04-053998	ESTNR2030-40-0902	3	6	2.5	6.95	40	0.9	2	2.86	4.04	80	0.2	-	42	43.4	-	-
1-04-053999	ESTNR2030-50-0902	3	6	2.5	6.95	50	0.9	1.6	2.86	4.35	90	0.2	-	52.1	53.7	-	-
1-04-054000	ESTNR2030-60-0902	3	6	2.5	6.95	60	0.9	1.4	2.86	4.67	100	0.2	-	62.2	-	-	-
1-04-054001	ESTNR2030-40-0903	3	6	2.5	6.95	40	0.9	2	2.86	4.04	80	0.3	-	42	43.4	-	-
1-04-054002	ESTNR2030-50-0903	3	6	2.5	6.95	50	0.9	1.7	2.86	4.35	90	0.3	-	52.1	53.7	-	-
1-04-054003	ESTNR2030-60-0903	3	6	2.5	6.95	60	0.9	1.4	2.86	4.67	100	0.3	-	62.2	-	-	-
1-04-054004	ESTNR2030-40-0905	3	6	2.5	6.95	40	0.9	2	2.86	4.04	80	0.5	-	42	43.4	-	-
1-04-054005	ESTNR2030-50-0905	3	6	2.5	6.95	50	0.9	1.7	2.86	4.35	90	0.5	-	52.1	53.7	-	-
1-04-054006	ESTNR2030-60-0905	3	6	2.5	6.95	60	0.9	1.4	2.86	4.67	100	0.5	-	62.1	-	-	-



※ The marked effective neck length is the default value to prevent interference with the workpiece.
Proper control of the processing environment is required.

ESPM4

4 flutes neck type radius

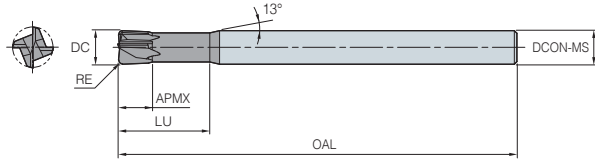


DC6 or below

Above DC6

p.165

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-054007	ESPM4030-05	3	6	1.2	8	50	0.5
1-04-054008	ESPM4040-05	4	6	1.5	10	50	0.5
1-04-054009	ESPM4060-05	6	6	2.5	12	60	0.5
1-04-054010	ESPM4060-10	6	6	2.5	12	60	1
1-04-054011	ESPM4060-15	6	6	2.5	12	60	1.5
1-04-054012	ESPM4060-15L	6	6	2.5	12	90	1.5
1-04-054013	ESPM4080-10	8	8	3.5	16	60	1
1-04-054014	ESPM4080-20	8	8	3.5	16	60	2
1-04-054015	ESPM4080-20L	8	8	3.5	16	100	2
1-04-054016	ESPM4100-10	10	10	4	20	70	1
1-04-054017	ESPM4100-20	10	10	4	20	70	2
1-04-054018	ESPM4100-20L	10	10	4	20	100	2
1-04-054019	ESPM4120-20	12	12	5	25	80	2
1-04-054020	ESPM4120-30	12	12	5	25	80	3
1-04-054021	ESPM4120-30L	12	12	5	25	110	3

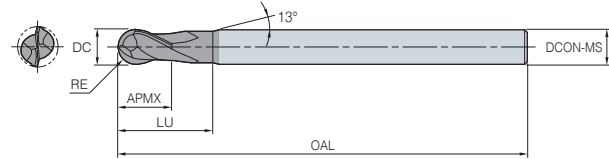
ESB702

2 flutes neck type ball



p.166

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-052214	ESB702001	0.1	4	0.15	-	40	0.05
1-04-052215	ESB702002	0.2	4	0.3	-	40	0.1
1-04-052216	ESB702003	0.3	4	0.5	-	40	0.15
1-04-052217	ESB702004	0.4	4	0.6	-	40	0.2
1-04-052218	ESB702005	0.5	4	0.7	-	40	0.25
1-04-052219	ESB702006	0.6	4	0.9	-	40	0.3
1-04-052220	ESB702007	0.7	4	1.1	-	40	0.35
1-04-052221	ESB702008	0.8	4	1.2	-	40	0.4
1-04-052222	ESB702009	0.9	4	1.4	-	40	0.45
1-04-052224	ESB702010	1	6	1.5	3	50	0.5
1-04-052223	ESB702010S4	1	4	1.5	-	45	0.5
1-04-052226	ESB702015	1.5	6	2.0	4	50	0.75
1-04-052225	ESB702015S4	1.5	4	2.0	-	45	0.75
1-04-052228	ESB702020	2	6	2.5	5	50	1
1-04-052227	ESB702020S4	2	4	2.5	-	45	1
1-04-052229	ESB702025	2.5	6	3.0	7	50	1.25
1-04-052232	ESB702030	3	6	4.0	10	60	1.5
1-04-052231	ESB702030S	3	6	4.0	10	50	1.5
1-04-052230	ESB702030S4	3	4	4.0	-	45	1.5
1-04-052233	ESB702031	3	6	4.0	10	70	1.5
1-04-052236	ESB702040	4	6	5.0	10	60	2
1-04-052235	ESB702040S	4	6	5.0	10	50	2
1-04-052234	ESB702040S4	4	4	5.0	-	45	2
1-04-052237	ESB702041	4	6	5.0	10	70	2
1-04-052238	ESB702050	5	6	6.0	12	60	2.5
1-04-052239	ESB702060	6	6	7.0	12	60	3
1-04-052240	ESB702061	6	6	7.0	12	90	3
1-04-052241	ESB702080	8	8	9.0	15	70	4
1-04-052242	ESB702081	8	8	9.0	15	100	4
1-04-052243	ESB702100	10	10	11.0	25	75	5
1-04-052244	ESB702101	10	10	11.0	25	100	5
1-04-052245	ESB702120	12	12	12	25	80	6
1-04-052246	ESB702121	12	12	12	25	110	6

ESB712

2 flutes ball



DC6 or below

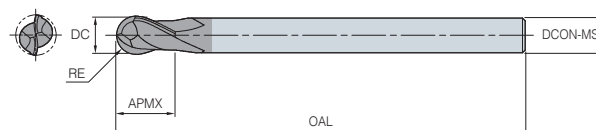


Above DC6



p.166

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

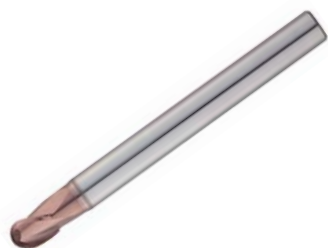


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	OAL	RE
1-04-052266	ESB712010	1	6	2.5	50	0.5
1-04-052264	ESB712010S	1	6	1.5	40	0.5
1-04-052265	ESB712010S4	1	4	2.5	50	0.5
1-04-052267	ESB712012	1.2	6	3	50	0.6
1-04-052270	ESB712015	1.5	6	4	50	0.75
1-04-052268	ESB712015S	1.5	6	2.5	40	0.75
1-04-052269	ESB712015S4	1.5	4	4	50	0.75
1-04-052273	ESB712020	2	6	5	50	1
1-04-052271	ESB712020S	2	6	3	40	1
1-04-052272	ESB712020S4	2	4	5	50	1
1-04-052274	ESB712025	2.5	6	7	60	1.25
1-04-052277	ESB712030	3	6	8	60	1.5
1-04-052275	ESB712030S	3	6	4.5	50	1.5
1-04-052276	ESB712030S4	3	4	8	60	1.5
1-04-052279	ESB712040	4	6	8	70	2
1-04-052278	ESB712040S	4	6	6	50	2
1-04-052281	ESB712050	5	6	10	80	2.5
1-04-052280	ESB712050S	5	6	7.5	50	2.5
1-04-052283	ESB712060	6	6	12	90	3
1-04-052282	ESB712060S	6	6	9	50	3
1-04-052284	ESB712080S	8	8	12	50	4
1-04-052285	ESB712081	8	8	14	100	4
1-04-052287	ESB712100	10	10	18	100	5
1-04-052286	ESB712100S	10	10	15	60	5
1-04-052289	ESB712120	12	12	22	110	6
1-04-052288	ESB712120S	12	12	18	60	6

ESB703

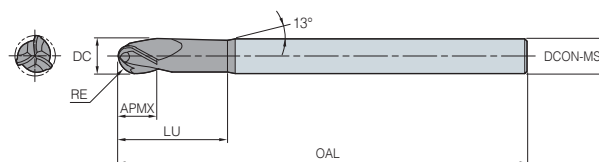
3 flutes neck type ball



DC6 or below Above DC6

p.166

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-052247	ESB703020	2	6	2.5	5	50	1
1-04-052248	ESB703025	2.5	6	3	7	50	1.25
1-04-052250	ESB703030	3	6	4	10	60	1.5
1-04-052249	ESB703030S	3	6	4	10	50	1.5
1-04-052251	ESB703031	3	6	4	10	70	1.5
1-04-052253	ESB703040	4	6	5	10	60	2
1-04-052252	ESB703040S	4	6	5	10	50	2
1-04-052254	ESB703041	4	6	5	10	70	2
1-04-052255	ESB703050	5	6	6	12	60	2.5
1-04-052256	ESB703060	6	6	7	12	60	3
1-04-052257	ESB703061	6	6	7	12	90	3
1-04-052258	ESB703080	8	8	9	15	70	4
1-04-052259	ESB703081	8	8	9	15	100	4
1-04-052260	ESB703100	10	10	11	25	75	5
1-04-052261	ESB703101	10	10	11	25	100	5
1-04-052262	ESB703120	12	12	12	25	80	6
1-04-052263	ESB703121	12	12	12	25	110	6

ESB734

4 flutes 15° helix ball



DC6 or below

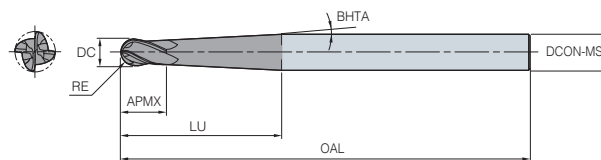


Above DC6



p.167

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

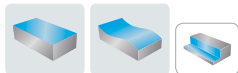
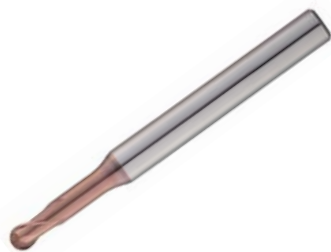


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE	BHTA(°)
1-04-052290	ESB734020-2.5	2	4	2	25	60	1	2.5
1-04-052291	ESB734020-3.5	2	4	2	18	60	1	3.5
1-04-052292	ESB734025-2.5	2.5	4	3	20	60	1.25	2.5
1-04-052293	ESB734025-3.0	2.5	4	3	17	60	1.25	3
1-04-052294	ESB734030-2.0	3	6	3	46	70	1.5	2
1-04-052295	ESB734030-2.5	3	6	3	37	70	1.5	2.5
1-04-052296	ESB734040-2.0	4	6	4	33	70	2	2
1-04-052297	ESB734040-2.5	4	6	4	27	70	2	2.5
1-04-052298	ESB734050-2.5	5	6	5	16	70	2.5	2.5
1-04-052299	ESB734060-1.5	6	8	6	44	100	3	1.5
1-04-052300	ESB734060-2.5	6	8	6	29	100	3	2.5
1-04-052301	ESB734080-1.5	8	10	8	46	100	4	1.5
1-04-052302	ESB734080-2.5	8	10	8	31	100	4	2.5
1-04-052303	ESB734100-1.5	10	12	10	48	110	5	1.5
1-04-052304	ESB734100-2.5	10	12	10	33	110	5	2.5

ESRB712

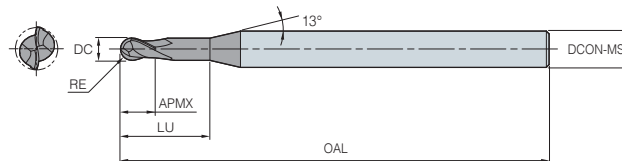
2 flutes rib ball



DC6 or below Above DC6

p.168~172

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

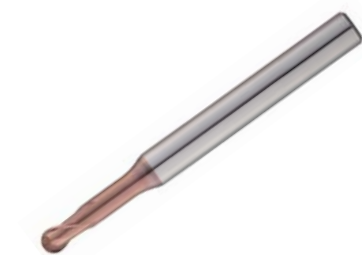


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-052845	ESRB712001002	0.1	4	0.1	0.2	40	0.05
1-04-052846	ESRB712001003	0.1	4	0.1	0.3	40	0.05
1-04-052847	ESRB712001005	0.1	4	0.1	0.5	40	0.05
1-04-052848	ESRB71200101	0.1	4	0.1	1	40	0.05
1-04-052849	ESRB712002005	0.2	4	0.2	0.5	40	0.1
1-04-052850	ESRB712002015	0.2	4	0.2	1.5	40	0.1
1-04-052851	ESRB71200201	0.2	4	0.2	1	40	0.1
1-04-052852	ESRB71200202	0.2	4	0.2	2	40	0.1
1-04-052853	ESRB71200203	0.2	4	0.2	3	40	0.1
1-04-052854	ESRB712003015	0.3	4	0.3	1.5	40	0.15
1-04-052855	ESRB71200301	0.3	4	0.3	1	40	0.15
1-04-052856	ESRB712003025	0.3	4	0.3	2.5	40	0.15
1-04-052857	ESRB71200302	0.3	4	0.3	2	40	0.15
1-04-052858	ESRB71200303	0.3	4	0.3	3	40	0.15
1-04-052859	ESRB71200304	0.3	4	0.3	4	40	0.15
1-04-052860	ESRB71200305	0.3	4	0.3	5	40	0.15
1-04-052861	ESRB712004015	0.4	4	0.4	1.5	40	0.2
1-04-052862	ESRB71200401	0.4	4	0.4	1	40	0.2
1-04-052863	ESRB712004025	0.4	4	0.4	2.5	40	0.2
1-04-052864	ESRB71200402	0.4	4	0.4	2	40	0.2
1-04-052865	ESRB71200403	0.4	4	0.4	3	40	0.2
1-04-052866	ESRB71200404	0.4	4	0.4	4	40	0.2
1-04-052867	ESRB71200405	0.4	4	0.4	5	40	0.2
1-04-052868	ESRB71200406	0.4	4	0.4	6	40	0.2
1-04-052869	ESRB71200408	0.4	4	0.4	8	40	0.2
1-04-052870	ESRB71200410	0.4	4	0.4	10	40	0.2
1-04-052871	ESRB712005015	0.5	4	0.5	1.5	45	0.25
1-04-052872	ESRB71200501	0.5	4	0.5	1	45	0.25
1-04-052873	ESRB71200501S6	0.5	6	0.5	1	45	0.25
1-04-052874	ESRB712005025	0.5	4	0.5	2.5	45	0.25
1-04-052875	ESRB71200502	0.5	4	0.5	2	45	0.25
1-04-052876	ESRB71200502S6	0.5	6	0.5	2	45	0.25
1-04-052877	ESRB71200503	0.5	4	0.5	3	45	0.25
1-04-052878	ESRB71200504	0.5	4	0.5	4	45	0.25
1-04-052879	ESRB71200504S6	0.5	6	0.5	4	45	0.25
1-04-052880	ESRB71200505	0.5	4	0.5	5	45	0.25
1-04-052881	ESRB71200506	0.5	4	0.5	6	45	0.25
1-04-052882	ESRB71200508	0.5	4	0.5	8	45	0.25
1-04-052883	ESRB71200510	0.5	4	0.5	10	45	0.25

ESRB712

2 flutes rib ball



DC6 or below

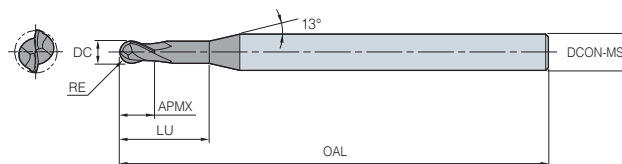


Above DC6



p.168~172

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

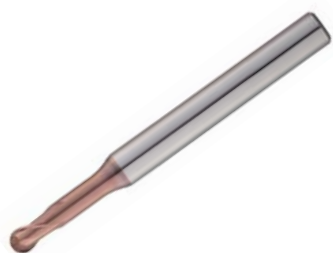


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-052884	ESRB71200512	0.5	4	0.5	12	45	0.25
1-04-052885	ESRB71200514	0.5	4	0.5	14	45	0.25
1-04-052886	ESRB71200516	0.5	4	0.5	16	45	0.25
1-04-052887	ESRB71200601	0.6	4	0.6	1	45	0.3
1-04-052888	ESRB71200601S6	0.6	6	0.6	1	45	0.3
1-04-052889	ESRB71200602	0.6	4	0.6	2	45	0.3
1-04-052890	ESRB71200602S6	0.6	6	0.6	2	45	0.3
1-04-052891	ESRB71200603	0.6	4	0.6	3	45	0.3
1-04-052892	ESRB71200603S6	0.6	6	0.6	3	45	0.3
1-04-052893	ESRB71200604	0.6	4	0.6	4	45	0.3
1-04-052894	ESRB71200604S6	0.6	6	0.6	4	45	0.3
1-04-052895	ESRB71200605	0.6	4	0.6	5	45	0.3
1-04-052896	ESRB71200605S6	0.6	6	0.6	5	45	0.3
1-04-052897	ESRB71200606	0.6	4	0.6	6	45	0.3
1-04-052898	ESRB71200606S6	0.6	6	0.6	6	45	0.3
1-04-052899	ESRB71200608	0.6	4	0.6	8	45	0.3
1-04-052900	ESRB71200608S6	0.6	6	0.6	8	45	0.3
1-04-052901	ESRB71200610	0.6	4	0.6	10	45	0.3
1-04-052902	ESRB71200610S6	0.6	6	0.6	10	45	0.3
1-04-052903	ESRB71200612	0.6	4	0.6	12	45	0.3
1-04-052904	ESRB71200612S6	0.6	6	0.6	12	45	0.3
1-04-052905	ESRB71200614	0.6	4	0.6	14	45	0.3
1-04-052906	ESRB71200614S6	0.6	6	0.6	14	45	0.3
1-04-052907	ESRB71200616	0.6	4	0.6	16	45	0.3
1-04-052908	ESRB71200616S6	0.6	6	0.6	16	50	0.3
1-04-052909	ESRB71200702	0.7	4	0.7	2	45	0.35
1-04-052910	ESRB71200704	0.7	4	0.7	4	45	0.35
1-04-052911	ESRB71200706	0.7	4	0.7	6	45	0.35
1-04-052912	ESRB71200708	0.7	4	0.7	8	45	0.35
1-04-052913	ESRB71200710	0.7	4	0.7	10	45	0.35
1-04-052914	ESRB71200712	0.7	4	0.7	12	45	0.35
1-04-052915	ESRB71200801	0.8	4	0.8	1	45	0.4
1-04-052916	ESRB71200801S6	0.8	6	0.8	1	45	0.4
1-04-052917	ESRB71200802	0.8	4	0.8	2	45	0.4
1-04-052918	ESRB71200802S6	0.8	6	0.8	2	45	0.4
1-04-052919	ESRB71200803	0.8	4	0.8	3	45	0.4
1-04-052920	ESRB71200803S6	0.8	6	0.8	3	45	0.4
1-04-052921	ESRB71200804	0.8	4	0.8	4	45	0.4
1-04-052922	ESRB71200804S6	0.8	6	0.8	4	45	0.4

ESRB712

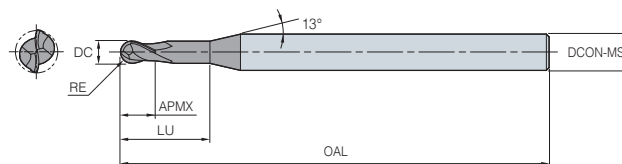
2 flutes rib ball



DC6 or below Above DC6

p.168~172

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

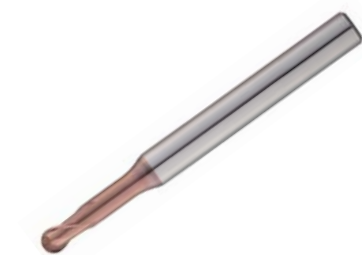


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-052923	ESRB71200805	0.8	4	0.8	5	45	0.4
1-04-052924	ESRB71200805S6	0.8	6	0.8	5	45	0.4
1-04-052925	ESRB71200806	0.8	4	0.8	6	45	0.4
1-04-052926	ESRB71200806S6	0.8	6	0.8	6	45	0.4
1-04-052927	ESRB71200808	0.8	4	0.8	8	45	0.4
1-04-052928	ESRB71200808S6	0.8	6	0.8	8	45	0.4
1-04-052929	ESRB71200810	0.8	4	0.8	10	45	0.4
1-04-052930	ESRB71200810S6	0.8	6	0.8	10	45	0.4
1-04-052931	ESRB71200812	0.8	4	0.8	12	45	0.4
1-04-052932	ESRB71200812S6	0.8	6	0.8	12	45	0.4
1-04-052933	ESRB71200814	0.8	4	0.8	14	45	0.4
1-04-052934	ESRB71200814S6	0.8	6	0.8	14	45	0.4
1-04-052935	ESRB71200816	0.8	4	0.8	16	45	0.4
1-04-052936	ESRB71200816S6	0.8	6	0.8	16	50	0.4
1-04-052937	ESRB71200820	0.8	4	0.8	20	50	0.4
1-04-052938	ESRB71200820S6	0.8	6	0.8	20	55	0.4
1-04-052939	ESRB71200904	0.9	4	0.9	4	45	0.45
1-04-052940	ESRB71200906	0.9	4	0.9	6	45	0.45
1-04-052941	ESRB71200908	0.9	4	0.9	8	45	0.45
1-04-052942	ESRB71200910	0.9	4	0.9	10	45	0.45
1-04-052943	ESRB71201002	1	4	1	2	50	0.5
1-04-052944	ESRB71201002S6	1	6	1	2	50	0.5
1-04-052945	ESRB71201003	1	4	1	3	50	0.5
1-04-052946	ESRB71201003S6	1	6	1	3	50	0.5
1-04-052947	ESRB71201004	1	4	1	4	50	0.5
1-04-052948	ESRB71201004S6	1	6	1	4	50	0.5
1-04-052949	ESRB71201005	1	4	1	5	50	0.5
1-04-052950	ESRB71201005S6	1	6	1	5	50	0.5
1-04-052951	ESRB71201006	1	4	1	6	50	0.5
1-04-052952	ESRB71201006S6	1	6	1	6	50	0.5
1-04-052953	ESRB71201007	1	4	1	7	50	0.5
1-04-052954	ESRB71201007S6	1	6	1	7	50	0.5
1-04-052955	ESRB71201008	1	4	1	8	50	0.5
1-04-052956	ESRB71201008S6	1	6	1	8	50	0.5
1-04-052957	ESRB71201009	1	4	1	9	50	0.5
1-04-052958	ESRB71201009S6	1	6	1	9	50	0.5
1-04-052959	ESRB71201010	1	4	1	10	50	0.5
1-04-052960	ESRB71201010S6	1	6	1	10	50	0.5
1-04-052961	ESRB71201012	1	4	1	12	50	0.5

ESRB712

2 flutes rib ball

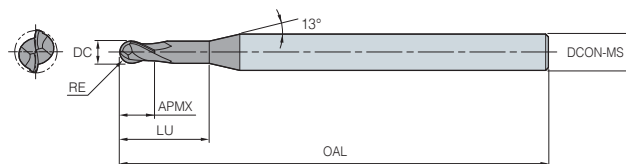


DC6 or below Above DC6



p.168~172

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

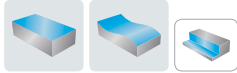
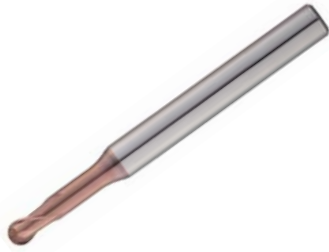


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-052962	ESRB71201012S6	1	6	1	12	50	0.5
1-04-052963	ESRB71201014	1	4	1	14	50	0.5
1-04-052964	ESRB71201014S6	1	6	1	14	50	0.5
1-04-052965	ESRB71201016	1	4	1	16	50	0.5
1-04-052966	ESRB71201016S6	1	6	1	16	50	0.5
1-04-052967	ESRB71201018	1	4	1	18	50	0.5
1-04-052968	ESRB71201018S6	1	6	1	18	50	0.5
1-04-052969	ESRB71201020	1	4	1	20	55	0.5
1-04-052970	ESRB71201020S6	1	6	1	20	55	0.5
1-04-052971	ESRB71201022	1	4	1	22	60	0.5
1-04-052972	ESRB71201022S6	1	6	1	22	60	0.5
1-04-052973	ESRB71201026	1	4	1	26	60	0.5
1-04-052974	ESRB71201026S6	1	6	1	26	60	0.5
1-04-052975	ESRB71201030	1	4	1	30	70	0.5
1-04-052976	ESRB71201030S6	1	6	1	30	70	0.5
1-04-052977	ESRB71201040	1	4	1	40	80	0.5
1-04-052978	ESRB71201050	1	4	1	50	100	0.5
1-04-052979	ESRB71201204	1.2	4	1.2	4	50	0.6
1-04-052980	ESRB71201206	1.2	4	1.2	6	50	0.6
1-04-052981	ESRB71201208	1.2	4	1.2	8	50	0.6
1-04-052982	ESRB71201210	1.2	4	1.2	10	50	0.6
1-04-052983	ESRB71201212	1.2	4	1.2	12	50	0.6
1-04-052984	ESRB71201216	1.2	4	1.2	16	50	0.6
1-04-052985	ESRB71201220	1.2	4	1.2	20	50	0.6
1-04-052986	ESRB71201226	1.2	4	1.2	26	60	0.6
1-04-052987	ESRB71201406	1.4	4	1.4	6	50	0.7
1-04-052988	ESRB71201408	1.4	4	1.4	8	50	0.7
1-04-052989	ESRB71201410	1.4	4	1.4	10	50	0.7
1-04-052990	ESRB71201412	1.4	4	1.4	12	50	0.7
1-04-052991	ESRB71201416	1.4	4	1.4	16	50	0.7
1-04-052992	ESRB71201503	1.5	4	1.5	3	50	0.75
1-04-052993	ESRB71201503S6	1.5	6	1.5	3	50	0.75
1-04-052994	ESRB71201504	1.5	4	1.5	4	50	0.75
1-04-052995	ESRB71201504S6	1.5	6	1.5	4	50	0.75
1-04-052996	ESRB71201505	1.5	4	1.5	5	50	0.75
1-04-052997	ESRB71201506	1.5	4	1.5	6	50	0.75
1-04-052998	ESRB71201506S6	1.5	6	1.5	6	50	0.75
1-04-052999	ESRB71201507	1.5	4	1.5	7	50	0.75
1-04-053000	ESRB71201508	1.5	4	1.5	8	50	0.75

ESRB712

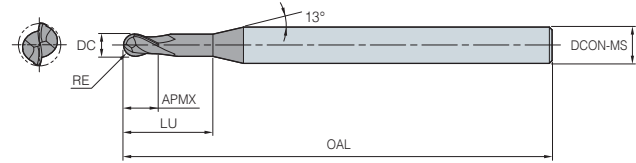
2 flutes rib ball



DC6 or below Above DC6

p.168~172

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

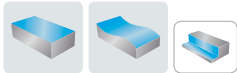
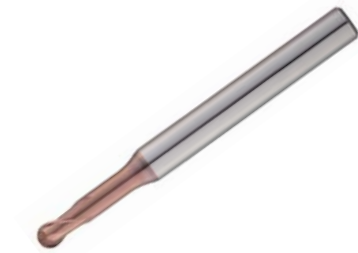


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-053001	ESRB71201508S6	1.5	6	1.5	8	50	0.75
1-04-053002	ESRB71201510	1.5	4	1.5	10	50	0.75
1-04-053003	ESRB71201510S6	1.5	6	1.5	10	50	0.75
1-04-053004	ESRB71201512	1.5	4	1.5	12	50	0.75
1-04-053005	ESRB71201512S6	1.5	6	1.5	12	50	0.75
1-04-053006	ESRB71201514	1.5	4	1.5	14	50	0.75
1-04-053007	ESRB71201514S6	1.5	6	1.5	14	50	0.75
1-04-053008	ESRB71201516	1.5	4	1.5	16	50	0.75
1-04-053009	ESRB71201516S6	1.5	6	1.5	16	50	0.75
1-04-053010	ESRB71201518	1.5	4	1.5	18	50	0.75
1-04-053011	ESRB71201518S6	1.5	6	1.5	18	50	0.75
1-04-053012	ESRB71201520	1.5	4	1.5	20	55	0.75
1-04-053013	ESRB71201520S6	1.5	6	1.5	20	55	0.75
1-04-053014	ESRB71201522	1.5	4	1.5	22	60	0.75
1-04-053015	ESRB71201522S6	1.5	6	1.5	22	60	0.75
1-04-053016	ESRB71201526	1.5	4	1.5	26	60	0.75
1-04-053017	ESRB71201526S6	1.5	6	1.5	26	60	0.75
1-04-053018	ESRB71201530	1.5	4	1.5	30	70	0.75
1-04-053019	ESRB71201530S6	1.5	6	1.5	30	70	0.75
1-04-053020	ESRB71201535	1.5	4	1.5	35	70	0.75
1-04-053021	ESRB71201535S6	1.5	6	1.5	35	70	0.75
1-04-053022	ESRB71201540	1.5	4	1.5	40	80	0.75
1-04-053023	ESRB71201540S6	1.5	6	1.5	40	80	0.75
1-04-053024	ESRB71201604	1.6	4	1.6	4	50	0.8
1-04-053025	ESRB71201606	1.6	4	1.6	6	50	0.8
1-04-053026	ESRB71201608	1.6	4	1.6	8	50	0.8
1-04-053027	ESRB71201610	1.6	4	1.6	10	50	0.8
1-04-053028	ESRB71201612	1.6	4	1.6	12	50	0.8
1-04-053029	ESRB71201616	1.6	4	1.6	16	50	0.8
1-04-053030	ESRB71201620	1.6	4	1.6	20	50	0.8
1-04-053031	ESRB71201804	1.8	4	1.8	4	50	0.9
1-04-053032	ESRB71201806	1.8	4	1.8	6	50	0.9
1-04-053033	ESRB71201808	1.8	4	1.8	8	50	0.9
1-04-053034	ESRB71201810	1.8	4	1.8	10	50	0.9
1-04-053035	ESRB71201812	1.8	4	1.8	12	50	0.9
1-04-053036	ESRB71201816	1.8	4	1.8	16	50	0.9
1-04-053037	ESRB71201820	1.8	4	1.8	20	50	0.9
1-04-053038	ESRB71202004	2	4	2	4	50	1
1-04-053039	ESRB71202004S6	2	6	2	4	50	1

ESRB712

2 flutes rib ball

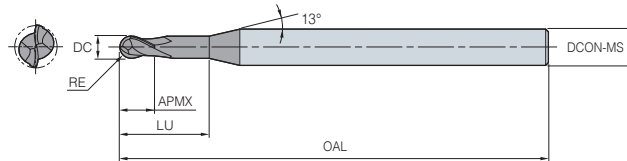


DC6 or below



p.168~172

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

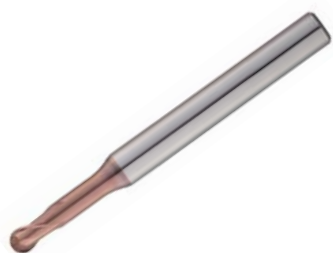


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-053040	ESRB71202006	2	4	2	6	50	1
1-04-053041	ESRB71202006S6	2	6	2	6	50	1
1-04-053042	ESRB71202008	2	4	2	8	50	1
1-04-053043	ESRB71202008S6	2	6	2	8	50	1
1-04-053044	ESRB71202010	2	4	2	10	50	1
1-04-053045	ESRB71202010S6	2	6	2	10	50	1
1-04-053046	ESRB71202012	2	4	2	12	50	1
1-04-053047	ESRB71202012S6	2	6	2	12	50	1
1-04-053048	ESRB71202014	2	4	2	14	50	1
1-04-053049	ESRB71202014S6	2	6	2	14	50	1
1-04-053050	ESRB71202016	2	4	2	16	50	1
1-04-053051	ESRB71202016S6	2	6	2	16	50	1
1-04-053052	ESRB71202018	2	4	2	18	55	1
1-04-053053	ESRB71202018S6	2	6	2	18	55	1
1-04-053054	ESRB71202020	2	4	2	20	55	1
1-04-053055	ESRB71202020S6	2	6	2	20	55	1
1-04-053056	ESRB71202022	2	4	2	22	60	1
1-04-053057	ESRB71202022S6	2	6	2	22	60	1
1-04-053058	ESRB71202026	2	4	2	26	60	1
1-04-053059	ESRB71202026S6	2	6	2	26	60	1
1-04-053060	ESRB71202030	2	4	2	30	70	1
1-04-053061	ESRB71202030S6	2	6	2	30	70	1
1-04-053062	ESRB71202035	2	4	2	35	70	1
1-04-053063	ESRB71202035S6	2	6	2	35	70	1
1-04-053064	ESRB71202040	2	4	2	40	80	1
1-04-053065	ESRB71202040S6	2	6	2	40	80	1
1-04-053066	ESRB71202045	2	4	2	45	90	1
1-04-053067	ESRB71202045S6	2	6	2	45	90	1
1-04-053068	ESRB71202050	2	4	2	50	100	1
1-04-053069	ESRB71202050S6	2	6	2	50	100	1
1-04-053070	ESRB71202060	2	4	2	60	110	1
1-04-053071	ESRB71202508	2.5	4	2.5	8	50	1.25
1-04-053072	ESRB71202510	2.5	4	2.5	10	50	1.25
1-04-053073	ESRB71202512	2.5	4	2.5	12	50	1.25
1-04-053074	ESRB71202516	2.5	4	2.5	16	50	1.25
1-04-053075	ESRB71202520	2.5	4	2.5	20	50	1.25
1-04-053076	ESRB71202522	2.5	4	2.5	22	60	1.25
1-04-053077	ESRB71202526	2.5	4	2.5	26	60	1.25
1-04-053078	ESRB71202530	2.5	4	2.5	30	70	1.25

ESRB712

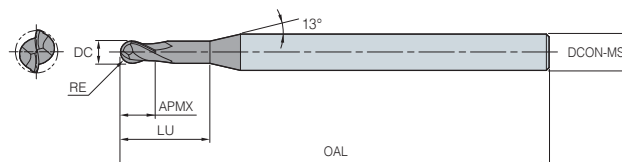
2 flutes rib ball



DC6 or below Above DC6

p.168~172

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

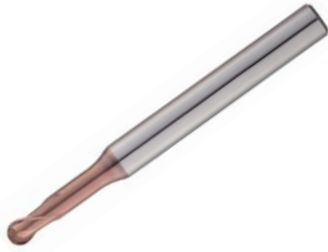


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-053079	ESRB71202535	2.5	4	2.5	35	70	1.25
1-04-053080	ESRB71202540	2.5	4	2.5	40	80	1.25
1-04-053081	ESRB71202545	2.5	4	2.5	45	90	1.25
1-04-053082	ESRB71202550	2.5	4	2.5	50	100	1.25
1-04-053083	ESRB71203006	3	6	3	6	50	1.5
1-04-053084	ESRB71203008	3	6	3	8	50	1.5
1-04-053085	ESRB71203010	3	6	3	10	50	1.5
1-04-053086	ESRB71203012	3	6	3	12	50	1.5
1-04-053087	ESRB71203014	3	6	3	14	60	1.5
1-04-053088	ESRB71203016	3	6	3	16	60	1.5
1-04-053089	ESRB71203018	3	6	3	18	60	1.5
1-04-053090	ESRB71203020	3	6	3	20	60	1.5
1-04-053091	ESRB71203022	3	6	3	22	65	1.5
1-04-053092	ESRB71203026	3	6	3	26	65	1.5
1-04-053093	ESRB71203030	3	6	3	30	70	1.5
1-04-053094	ESRB71203035	3	6	3	35	70	1.5
1-04-053095	ESRB71203040	3	6	3	40	80	1.5
1-04-053096	ESRB71203045	3	6	3	45	90	1.5
1-04-053097	ESRB71203050	3	6	3	50	100	1.5
1-04-053098	ESRB71203060	3	6	3	60	100	1.5
1-04-053099	ESRB71203510	3.5	6	3	10	50	1.75
1-04-053100	ESRB71203516	3.5	6	3	16	60	1.75
1-04-053101	ESRB71203520	3.5	6	3	20	60	1.75
1-04-053102	ESRB71203526	3.5	6	3	26	65	1.75
1-04-053103	ESRB71203530	3.5	6	3	30	70	1.75
1-04-053104	ESRB71204008	4	6	4	8	50	2
1-04-053105	ESRB71204010	4	6	4	10	50	2
1-04-053106	ESRB71204012	4	6	4	12	50	2
1-04-053107	ESRB71204014	4	6	4	14	60	2
1-04-053108	ESRB71204016	4	6	4	16	60	2
1-04-053109	ESRB71204018	4	6	4	18	60	2
1-04-053110	ESRB71204020	4	6	4	20	60	2
1-04-053111	ESRB71204022	4	6	4	22	65	2
1-04-053112	ESRB71204026	4	6	4	26	65	2
1-04-053113	ESRB71204030	4	6	4	30	70	2
1-04-053114	ESRB71204035	4	6	4	35	70	2
1-04-053115	ESRB71204040	4	6	4	40	80	2
1-04-053116	ESRB71204045	4	6	4	45	90	2
1-04-053117	ESRB71204050	4	6	4	50	100	2

ESRB712

2 flutes rib ball



DC6 or below

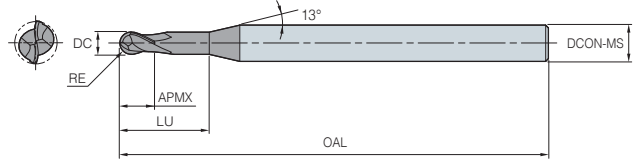


Above DC6



p.168~172

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

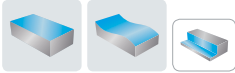


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	RE
1-04-053118	ESRB71204055	4	6	4	55	100	2
1-04-053119	ESRB71204060	4	6	4	60	100	2
1-04-053120	ESRB71205015	5	6	6	15	60	2.5
1-04-053121	ESRB71205020	5	6	6	20	60	2.5
1-04-053122	ESRB71205026	5	6	6	26	65	2.5
1-04-053123	ESRB71205030	5	6	6	30	70	2.5
1-04-053124	ESRB71205035	5	6	6	35	70	2.5
1-04-053125	ESRB71205040	5	6	6	40	80	2.5
1-04-053126	ESRB71205045	5	6	6	45	90	2.5
1-04-053127	ESRB71205050	5	6	6	50	100	2.5
1-04-053128	ESRB71205055	5	6	6	55	100	2.5
1-04-053129	ESRB71205060	5	6	6	60	100	2.5
1-04-053130	ESRB7120602090	6	6	12	20	90	3
1-04-053131	ESRB71206020	6	6	8	20	60	3
1-04-053132	ESRB7120603090	6	6	12	30	90	3
1-04-053133	ESRB71206030	6	6	8	30	60	3
1-04-053134	ESRB71208025100	8	8	14	25	100	4
1-04-053135	ESRB71208025	8	8	10	25	70	4
1-04-053136	ESRB71208035100	8	8	14	35	100	4
1-04-053137	ESRB71208035	8	8	10	35	70	4
1-04-053138	ESRB71210030100	10	10	18	30	100	5
1-04-053139	ESRB71210030	10	10	12	30	75	5
1-04-053140	ESRB71210040100	10	10	18	40	100	5
1-04-053141	ESRB71210040	10	10	12	40	75	5
1-04-053142	ESRB71212032110	12	12	22	32	110	6
1-04-053143	ESRB71212032	12	12	14	32	80	6
1-04-053144	ESRB71212045110	12	12	22	45	110	6
1-04-053145	ESRB71212045	12	12	14	45	80	6

ESLNB20

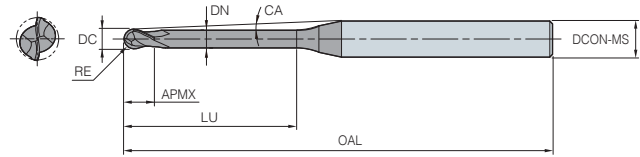
2 flutes long neck type ball



DC	Tolerance
ALL	0.000 ~ -0.012

DC6 or below Above DC6

p.173

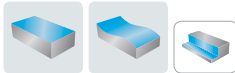


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	DN	CA	RE	Effective length by inclination angle				
										0.5°	1°	1.5°	2°	3°
1-04-053421	ESLNB2001-0.2	0.1	4	0.08	0.2	45	0.08	11.8	0.05	0.3	0.3	0.3	0.4	0.4
1-04-053422	ESLNB2001-0.3	0.1	4	0.08	0.3	45	0.08	11.7	0.05	0.4	0.4	0.5	0.5	0.5
1-04-053423	ESLNB2001-0.5	0.1	4	0.08	0.5	45	0.08	11.4	0.05	0.6	0.7	0.7	0.7	0.8
1-04-053424	ESLNB2002-0.5	0.2	4	0.15	0.5	50	0.17	11.5	0.1	1.2	1.3	1.5	1.6	2
1-04-053425	ESLNB2002-1	0.2	4	0.15	1	50	0.17	10.9	0.1	1.7	1.9	2.1	2.3	2.7
1-04-053426	ESLNB2002-1.5	0.2	4	0.15	1.5	50	0.17	10.4	0.1	2.3	2.5	2.8	3	3.4
1-04-053427	ESLNB2002-2	0.2	4	0.15	2	50	0.17	9.9	0.1	2.8	3.1	3.4	3.6	4.1
1-04-053428	ESLNB2002-2.5	0.2	4	0.15	2.5	50	0.17	9.5	0.1	3.4	3.7	4	4.2	4.7
1-04-053429	ESLNB2002-3.0	0.2	4	0.15	3	50	0.17	9.1	0.1	3.9	4.3	4.6	4.9	5.4
1-04-053430	ESLNB2003-1	0.3	4	0.25	1	50	0.27	10.9	0.15	1.7	1.9	2.1	2.3	2.7
1-04-053431	ESLNB2003-1.5	0.3	4	0.25	1.5	50	0.27	10.4	0.15	2.3	2.5	2.7	3	3.4
1-04-053432	ESLNB2003-2	0.3	4	0.25	2	50	0.27	9.9	0.15	2.8	3.1	3.4	3.6	4
1-04-053433	ESLNB2003-2.5	0.3	4	0.25	2.5	50	0.27	9.5	0.15	3.4	3.7	4	4.2	4.7
1-04-053434	ESLNB2003-3	0.3	4	0.25	3	50	0.27	9.1	0.15	3.9	4.3	4.6	4.8	5.3
1-04-053435	ESLNB2004-1	0.4	4	0.3	1	50	0.37	11	0.2	1.7	1.9	2.1	2.3	2.7
1-04-053436	ESLNB2004-1.5	0.4	4	0.3	1.5	50	0.37	10.4	0.2	2.3	2.5	2.7	2.9	3.4
1-04-053437	ESLNB2004-2	0.4	4	0.3	2	50	0.37	9.9	0.2	2.8	3.1	3.4	3.6	4
1-04-053438	ESLNB2004-2.5	0.4	4	0.3	2.5	50	0.37	9.5	0.2	3.4	3.7	4	4.2	4.7
1-04-053439	ESLNB2004-3	0.4	4	0.3	3	50	0.37	9.1	0.2	3.9	4.3	4.6	4.8	5.3
1-04-053440	ESLNB2004-3.5	0.4	4	0.3	3.5	50	0.37	8.7	0.2	4.5	4.8	5.2	5.4	6
1-04-053441	ESLNB2004-4	0.4	4	0.3	4	50	0.37	8.3	0.2	5	5.4	5.7	6	6.6
1-04-053442	ESLNB2004-4.5	0.4	4	0.3	4.5	50	0.37	8	0.2	5.6	6	6.3	6.6	7.2
1-04-053443	ESLNB2005-1	0.5	4	0.35	1	50	0.47	11	0.25	1.7	1.9	2.1	2.3	2.6
1-04-053444	ESLNB2005-2	0.5	4	0.35	2	50	0.47	9.9	0.25	2.8	3.1	3.3	3.6	4
1-04-053445	ESLNB2005-3	0.5	4	0.35	3	50	0.47	9	0.25	3.9	4.3	4.6	4.8	5.3
1-04-053446	ESLNB2005-4	0.5	4	0.35	4	50	0.47	8.3	0.25	5	5.4	5.7	6	6.6
1-04-053447	ESLNB2005-5	0.5	4	0.35	5	50	0.47	7.7	0.25	6.1	6.5	6.9	7.2	7.8
1-04-053448	ESLNB2005-6	0.5	4	0.35	6	50	0.47	7.1	0.25	7.2	7.6	8	8.4	9
1-04-053449	ESLNB2005-8	0.5	4	0.35	8	50	0.47	6.3	0.25	9.3	9.9	10.3	10.7	11.4
1-04-053450	ESLNB2006-1	0.6	4	0.4	1	50	0.57	11	0.3	1.7	1.9	2.1	2.3	2.6
1-04-053451	ESLNB2006-2	0.6	4	0.4	2	50	0.57	9.9	0.3	2.8	3.1	3.3	3.6	4
1-04-053452	ESLNB2006-3	0.6	4	0.4	3	50	0.57	9	0.3	3.9	4.3	4.5	4.8	5.3
1-04-053453	ESLNB2006-4	0.6	4	0.4	4	50	0.57	8.3	0.3	5	5.4	5.7	6	6.6
1-04-053454	ESLNB2006-5	0.6	4	0.4	5	50	0.57	7.6	0.3	6.1	6.5	6.9	7.2	7.8
1-04-053455	ESLNB2006-6	0.6	4	0.4	6	50	0.57	7.1	0.3	7.2	7.6	8	8.4	9
1-04-053456	ESLNB2006-7	0.6	4	0.4	7	50	0.57	6.6	0.3	8.3	8.8	9.2	9.5	10.2

ESLNB20

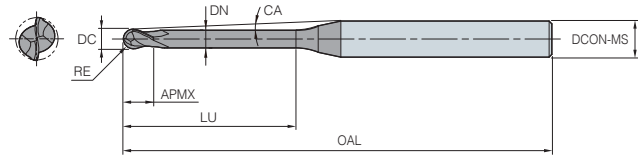
2 flutes long neck type ball



DC	Tolerance
ALL	0.000 ~ -0.012

DC6 or below Above DC6

p.173



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	DN	CA	RE	Effective length by inclination angle				
										0.5°	1°	1.5°	2°	3°
1-04-053457	ESLNB2006-8	0.6	4	0.4	8	50	0.57	6.2	0.3	9.3	9.9	10.3	10.7	11.4
1-04-053458	ESLNB2006-9	0.6	4	0.4	9	50	0.57	5.8	0.3	10.4	10.9	11.4	11.8	12.5
1-04-053459	ESLNB2006-10	0.6	4	0.4	10	50	0.57	5.5	0.3	11.4	12	12.5	12.9	13.7
1-04-053460	ESLNB2006-12	0.6	4	0.4	12	50	0.57	5	0.3	13.6	14.2	14.7	15.2	16
1-04-053461	ESLNB2008-2	0.8	4	0.5	2	50	0.77	9.9	0.4	2.8	3.1	3.3	3.5	4
1-04-053462	ESLNB2008-4	0.8	4	0.5	4	50	0.77	8.2	0.4	5	5.4	5.7	6	6.5
1-04-053463	ESLNB2008-5	0.8	4	0.5	5	50	0.77	7.5	0.4	6.1	6.5	6.9	7.2	7.8
1-04-053464	ESLNB2008-6	0.8	4	0.5	6	50	0.77	7	0.4	7.2	7.6	8	8.4	9
1-04-053465	ESLNB2008-8	0.8	4	0.5	8	50	0.77	6.1	0.4	9.3	9.8	10.3	10.7	11.3
1-04-053466	ESLNB2008-10	0.8	4	0.5	10	50	0.77	5.4	0.4	11.4	12	12.5	12.9	13.7
1-04-053467	ESLNB2010-2	1	4	0.8	2	50	0.96	9.9	0.5	2.9	3.1	3.3	3.5	4
1-04-053468	ESLNB2010-3	1	4	0.8	3	50	0.96	8.9	0.5	4	4.3	4.5	4.8	5.3
1-04-053469	ESLNB2010-4	1	4	0.8	4	50	0.96	8.1	0.5	5	5.4	5.7	6	6.5
1-04-053470	ESLNB2010-5	1	4	0.8	5	50	0.96	7.4	0.5	6.1	6.5	6.9	7.2	7.8
1-04-053471	ESLNB2010-6	1	4	0.8	6	50	0.96	6.8	0.5	7.2	7.7	8	8.4	9
1-04-053472	ESLNB2010-7	1	4	0.8	7	50	0.96	6.3	0.5	8.3	8.8	9.2	9.5	10.2
1-04-053473	ESLNB2010-8	1	4	0.8	8	50	0.96	5.9	0.5	9.3	9.9	10.3	10.7	11.3
1-04-053474	ESLNB2010-9	1	4	0.8	9	50	0.96	5.5	0.5	10.4	11	11.4	11.8	12.5
1-04-053475	ESLNB2010-10	1	4	0.8	10	50	0.96	5.2	0.5	11.5	12	12.5	12.9	13.7
1-04-053476	ESLNB2010-12	1	4	0.8	12	55	0.96	4.6	0.5	13.6	14.2	14.7	15.2	15.9
1-04-053477	ESLNB2010-14	1	4	0.8	14	55	0.96	4.2	0.5	15.7	16.4	16.9	17.4	18.5
1-04-053478	ESLNB2010-16	1	4	0.8	16	55	0.96	3.8	0.5	17.8	18.5	19.1	19.6	21.2
1-04-053479	ESLNB2010-18	1	4	0.8	18	60	0.96	3.5	0.5	19.9	20.7	21.3	21.8	23.8
1-04-053480	ESLNB2010-20	1	4	0.8	20	60	0.96	3.3	0.5	22	22.8	23.4	24	26.5
1-04-053481	ESLNB2012-4	1.2	4	1.1	4	50	1.15	7.9	0.6	5.1	5.4	5.7	6	6.5
1-04-053482	ESLNB2012-6	1.2	4	1.1	6	50	1.15	6.6	0.6	7.2	7.7	8	8.4	9
1-04-053483	ESLNB2012-8	1.2	4	1.1	8	50	1.15	5.7	0.6	9.4	9.9	10.3	10.7	11.3
1-04-053484	ESLNB2012-10	1.2	4	1.1	10	50	1.15	5	0.6	11.5	12.1	12.5	12.9	13.7
1-04-053485	ESLNB2012-12	1.2	4	1.1	12	55	1.15	4.5	0.6	13.6	14.2	14.7	15.2	15.9
1-04-053486	ESLNB2014-8	1.4	4	1.3	8	50	1.34	5.5	0.7	9.4	9.9	10.3	10.7	11.3
1-04-053487	ESLNB2014-12	1.4	4	1.3	12	55	1.34	4.3	0.7	13.6	14.2	14.7	15.2	15.9
1-04-053488	ESLNB2014-16	1.4	4	1.3	16	55	1.34	3.5	0.7	17.8	18.5	19.1	19.6	21.2
1-04-053489	ESLNB2015-4	1.5	4	1.35	4	50	1.44	7.7	0.75	5.1	5.4	5.7	6	6.5
1-04-053490	ESLNB2015-6	1.5	4	1.35	6	50	1.44	6.4	0.75	7.3	7.7	8	8.4	9
1-04-053491	ESLNB2015-8	1.5	4	1.35	8	50	1.44	5.4	0.75	9.4	9.9	10.3	10.7	11.3
1-04-053492	ESLNB2015-10	1.5	4	1.35	10	50	1.44	4.7	0.75	11.5	12.1	12.5	12.9	13.7

ESLNB20

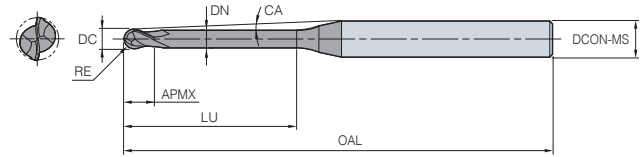
2 flutes long neck type ball



DC	Tolerance
ALL	0.000 ~ -0.012

DC6 or below Above DC6

p.173

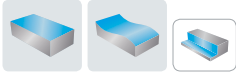


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	DN	CA	RE	Effective length by inclination angle				
										0.5°	1°	1.5°	2°	3°
1-04-053493	ESLNB2015-12	1.5	4	1.35	12	55	1.44	4.2	0.75	13.6	14.2	14.7	15.2	15.9
1-04-053494	ESLNB2015-14	1.5	4	1.35	14	55	1.44	3.8	0.75	15.7	16.4	16.9	17.4	18.5
1-04-053495	ESLNB2015-16	1.5	4	1.35	16	55	1.44	3.4	0.75	17.8	18.5	19.1	19.6	21.1
1-04-053496	ESLNB2015-20	1.5	4	1.35	20	60	1.44	2.9	0.75	22	22.8	23.4	24	-
1-04-053497	ESLNB2016-8	1.6	4	1.4	8	50	1.54	5.3	0.8	9.4	9.9	10.3	10.7	11.3
1-04-053498	ESLNB2016-10	1.6	4	1.4	10	55	1.54	4.6	0.8	11.5	12.1	12.5	12.9	13.7
1-04-053499	ESLNB2016-12	1.6	4	1.4	12	55	1.54	4.1	0.8	13.6	14.2	14.7	15.2	15.9
1-04-053500	ESLNB2016-16	1.6	4	1.4	16	55	1.54	3.3	0.8	17.8	18.5	19.1	19.6	21.1
1-04-053501	ESLNB2016-20	1.6	4	1.4	20	60	1.54	2.8	0.8	22	22.8	23.4	24	-
1-04-053502	ESLNB2018-8	1.8	4	1.6	8	50	1.73	5.1	0.9	9.4	9.9	10.3	10.7	11.3
1-04-053503	ESLNB2018-12	1.8	4	1.6	12	55	1.73	3.9	0.9	13.7	14.3	14.7	15.2	15.9
1-04-053504	ESLNB2018-16	1.8	4	1.6	16	55	1.73	3.1	0.9	17.9	18.6	19.1	19.6	21.1
1-04-053505	ESLNB2018-20	1.8	4	1.6	20	60	1.73	2.6	0.9	22	22.8	23.4	24	-
1-04-053506	ESLNB2020-3	2	4	1.7	3	50	1.92	8.3	1	4.1	4.4	4.6	4.8	5.2
1-04-053507	ESLNB2020-4	2	4	3	4	50	1.92	7.3	1	5.2	5.5	5.8	6	6.5
1-04-053508	ESLNB2020-6	2	4	3	6	50	1.92	5.8	1	7.3	7.7	8.1	8.4	9
1-04-053509	ESLNB2020-8	2	4	3	8	50	1.92	4.9	1	9.5	9.9	10.3	10.7	11.3
1-04-053510	ESLNB2020-10	2	4	3	10	50	1.92	4.2	1	11.6	12.1	12.6	12.9	13.6
1-04-053511	ESLNB2020-12	2	4	3	12	55	1.92	3.7	1	13.7	14.3	14.8	15.2	15.9
1-04-053512	ESLNB2020-14	2	4	3	14	55	1.92	3.2	1	15.8	16.4	16.9	17.4	18.5
1-04-053513	ESLNB2020-16	2	4	3	16	55	1.92	2.9	1	17.9	18.6	19.1	19.6	-
1-04-053514	ESLNB2020-18	2	4	3	18	60	1.92	2.7	1	20	20.7	21.3	21.8	-
1-04-053515	ESLNB2020-20	2	4	3	20	60	1.92	2.4	1	22.1	22.8	23.4	24	-
1-04-053516	ESLNB2020-22	2	4	3	22	60	1.92	2.3	1	24.1	24.9	25.6	26.3	-
1-04-053517	ESLNB2020-25	2	4	3	25	65	1.92	2	1	27.3	28.1	28.8	-	-
1-04-053518	ESLNB2020-30	2	4	3	30	70	1.92	1.7	1	32.4	33.4	34.2	-	-
1-04-053519	ESLNB2020-35	2	4	3	35	75	1.92	1.5	1	37.6	38.6	-	-	-
1-04-053520	ESLNB2020-40	2	4	3	40	80	1.92	1.4	1	42.8	43.8	-	-	-
1-04-053521	ESLNB2025-10	2.5	4	4	10	50	2.4	3.4	1.25	11.6	12.1	12.6	13	13.6
1-04-053522	ESLNB2025-16	2.5	4	4	16	55	2.4	2.3	1.25	17.9	18.6	19.1	19.6	-
1-04-053523	ESLNB2025-20	2.5	4	4	20	60	2.4	1.9	1.25	22.1	22.8	23.5	-	-
1-04-053524	ESLNB2030-8	3	6	4	8	55	2.88	6.2	1.5	9.6	10	10.4	10.7	11.3
1-04-053525	ESLNB2030-10	3	6	4	10	55	2.88	5.5	1.5	11.7	12.2	12.6	13	13.6
1-04-053526	ESLNB2030-13	3	6	4	13	60	2.88	4.6	1.5	14.8	15.4	15.9	16.3	17.1
1-04-053527	ESLNB2030-16	3	6	4	16	60	2.88	4	1.5	18	18.6	19.1	19.6	21.1
1-04-053528	ESLNB2030-18	3	6	4	18	60	2.88	3.6	1.5	20	20.7	21.3	21.8	23.7

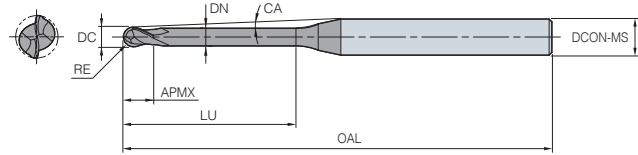
ESLNB20

2 flutes long neck type ball



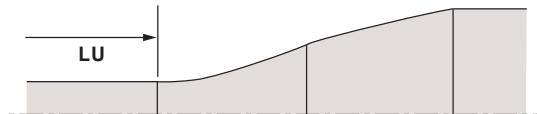
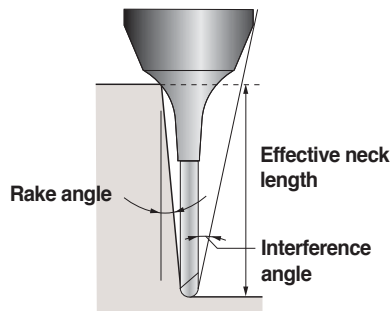
DC6 or below Above DC6

p.173



(mm)

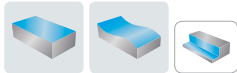
K.P. Code	Designation	DC	DCON-MS	APMX	LU	OAL	DN	CA	RE	Effective length by inclination angle				
										0.5°	1°	1.5°	2°	3°
1-04-053529	ESLNB2030-20	3	6	4	20	65	2.88	3.4	1.5	22.1	22.9	23.5	24	26.4
1-04-053530	ESLNB2030-25	3	6	4	25	70	2.88	2.8	1.5	27.3	28.2	28.8	29.9	-
1-04-053531	ESLNB2030-30	3	6	4	30	75	2.88	2.5	1.5	32.5	33.4	34.3	35.9	-
1-04-053532	ESLNB2030-35	3	6	4	35	80	2.88	2.2	1.5	37.7	38.7	40	41.9	-
1-04-053533	ESLNB2040-10	4	6	5	10	55	3.9	4.5	2	11.6	12.1	12.5	12.9	13.5
1-04-053534	ESLNB2040-13	4	6	5	13	60	3.9	3.6	2	14.7	15.3	15.8	16.2	17
1-04-053535	ESLNB2040-16	4	6	5	16	60	3.9	3.1	2	17.9	18.5	19.1	19.5	20.9
1-04-053536	ESLNB2040-20	4	6	5	20	65	3.9	2.5	2	22.1	22.8	23.4	23.9	-
1-04-053537	ESLNB2040-25	4	6	5	25	70	3.9	2.1	2	27.3	28.1	28.8	29.8	-
1-04-053538	ESLNB2040-30	4	6	5	30	75	3.9	1.8	2	32.4	33.4	34.2	-	-
1-04-053539	ESLNB2040-35	4	6	5	35	80	3.9	1.6	2	37.6	38.6	39.9	-	-
1-04-053540	ESLNB2040-40	4	6	5	40	80	3.9	1.4	2	42.8	43.8	-	-	-
1-04-053541	ESLNB2040-45	4	6	5	45	90	3.9	1.2	2	47.9	49.1	-	-	-
1-04-053542	ESLNB2040-50	4	6	5	50	100	3.9	1.1	2	53.1	54.5	-	-	-
1-04-053543	ESLNB2050-20	5	6	6	20	65	4.9	1.4	2.5	22	22.8	-	-	-
1-04-053544	ESLNB2050-25	5	6	6	25	70	4.9	1.2	2.5	27.2	28.1	-	-	-
1-04-053545	ESLNB2050-30	5	6	6	30	75	4.9	1	2.5	32.4	-	-	-	-
1-04-053546	ESLNB2050-35	5	6	6	35	80	4.9	0.8	2.5	42.8	-	-	-	-
1-04-053547	ESLNB2050-40	5	6	6	40	90	4.9	0.7	2.5	42.8	-	-	-	-



※ The marked effective neck length is the default value to prevent interference with the workpiece.
Proper control of the processing environment is required.

ESTNB20

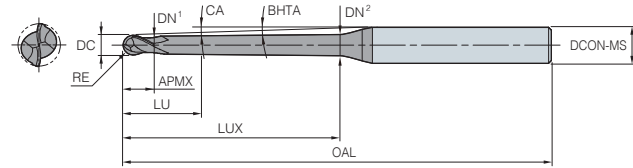
2 flutes long neck type ball



DC6 or below Above DC6

p.174~176

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	LUX	OAL	DN1	DN2	RE	BHTA (°)	CA	Effective length by inclination angle				
													0.5°	1°	1.5°	2°	3°
1-04-053548	ESTNB2002-1-04	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
1-04-053549	ESTNB2002-1.5-04	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
1-04-053550	ESTNB2002-2-09	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
1-04-053551	ESTNB2002-2.5-09	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
1-04-053552	ESTNB2003-2-04	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
1-04-053553	ESTNB2003-3-09	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
1-04-053554	ESTNB2003-4-09	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
1-04-053555	ESTNB2004-2-04	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
1-04-053556	ESTNB2004-3-04	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
1-04-053557	ESTNB2004-4-04	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
1-04-053558	ESTNB2004-4-09	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
1-04-053559	ESTNB2004-5-04	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
1-04-053560	ESTNB2004-5-09	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
1-04-053561	ESTNB2005-4-04	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
1-04-053562	ESTNB2005-8-09	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
1-04-053563	ESTNB2005-12-09	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
1-04-053564	ESTNB20054-2-04	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
1-04-053565	ESTNB20054-4-04	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
1-04-053566	ESTNB20054-5-04	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
1-04-053567	ESTNB20054-6-04	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
1-04-053568	ESTNB20054-6.5-04	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
1-04-053569	ESTNB20054-7-04	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
1-04-053570	ESTNB2006-2-04	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
1-04-053571	ESTNB2006-4-04	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
1-04-053572	ESTNB2006-6-04	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
1-04-053573	ESTNB2006-6-09	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
1-04-053574	ESTNB2006-8-09	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
1-04-053575	ESTNB2006-10-04	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
1-04-053576	ESTNB2006-10-09	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
1-04-053577	ESTNB2006-12-09	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
1-04-053578	ESTNB2006-15-04	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
1-04-053579	ESTNB2006-15-09	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
1-04-053580	ESTNB2008-4-04	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
1-04-053581	ESTNB2008-6-04	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
1-04-053582	ESTNB2008-8-09	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
1-04-053583	ESTNB2008-12-09	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

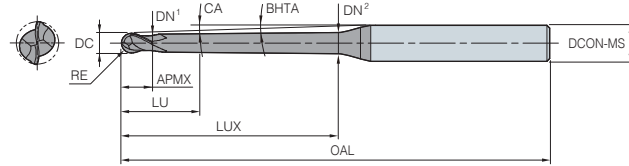
2 flutes long neck type ball



DC6 or below Above DC6

p.174~176

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

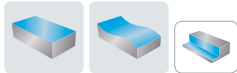


(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	LUX	OAL	DN ¹	DN ²	RE	BHTA (°)	CA	Effective length by inclination angle				
													0.5°	1°	1.5°	2°	3°
1-04-053584	ESTNB2008-16-09	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
1-04-053585	ESTNB2009-4-04	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
1-04-053586	ESTNB2009-8-04	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
1-04-053587	ESTNB2009-12-04	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
1-04-053588	ESTNB2009-16-04	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
1-04-053589	ESTNB2009-18-04	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
1-04-053590	ESTNB2009-20-04	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
1-04-053591	ESTNB2009-22-04	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
1-04-053592	ESTNB2009-24-04	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	-
1-04-053593	ESTNB2010-6-04	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
1-04-053594	ESTNB2010-8-04	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
1-04-053595	ESTNB2010-10-04	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
1-04-053596	ESTNB2010-10-09	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
1-04-053597	ESTNB2010-15-09	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
1-04-053598	ESTNB2010-20-04	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
1-04-053599	ESTNB2010-20-09	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
1-04-053600	ESTNB2010-25-09	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
1-04-053601	ESTNB2010-30-04	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
1-04-053602	ESTNB2010-30-09	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
1-04-053603	ESTNB2010-35-09	1	6	0.8	2.7	35	80	0.94	2.02	0.5	0.9	3.3	-	36.5	38	39	43.1
1-04-053604	ESTNB2010-40-09	1	6	0.8	2.7	40	85	0.94	2.17	0.5	0.9	3	-	41.6	43.2	44.4	-
1-04-053605	ESTNB2010-50-09	1	6	0.8	2.7	50	95	0.94	2.49	0.5	0.9	2.5	-	51.7	53.5	55.5	-
1-04-053606	ESTNB2010-60-09	1	6	0.8	2.7	60	105	0.94	2.8	0.5	0.9	2.2	-	61.8	63.8	66.6	-
1-04-053607	ESTNB2010-70-09	1	6	0.8	2.7	70	115	0.94	3.11	0.5	0.9	1.9	-	71.9	74	-	-
1-04-053608	ESTNB2015-8-04	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
1-04-053609	ESTNB2015-10-04	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
1-04-053610	ESTNB2015-12-04	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
1-04-053611	ESTNB2015-15-09	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
1-04-053612	ESTNB2015-20-09	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
1-04-053613	ESTNB2015-30-09	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
1-04-053614	ESTNB2018-4-04	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
1-04-053615	ESTNB2018-8-04	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
1-04-053616	ESTNB2018-12-04	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
1-04-053617	ESTNB2018-16-04	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
1-04-053618	ESTNB2018-20-04	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
1-04-053619	ESTNB2018-24-04	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

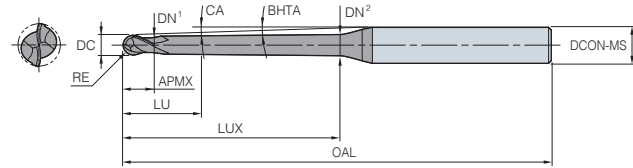
2 flutes long neck type ball



DC6 or below Above DC6

p.174~176

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



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	LUX	OAL	DN1	DN2	RE	BHTA (°)	CA	Effective length by inclination angle				
													0.5°	1°	1.5°	2°	3°
1-04-053620	ESTNB2018-28-04	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
1-04-053621	ESTNB2018-32-04	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	-
1-04-053622	ESTNB2018-36-04	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	-
1-04-053623	ESTNB2018-38-04	1.8	6	1.6	6.61	38	80	1.73	2.24	0.9	0.4	2.7	39.5	41	42	44	-
1-04-053624	ESTNB2018-40-04	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	-
1-04-053625	ESTNB2020-8-04	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
1-04-053626	ESTNB2020-12-04	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
1-04-053627	ESTNB2020-16-04	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
1-04-053628	ESTNB2020-20-04	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
1-04-053629	ESTNB2020-20-09	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
1-04-053630	ESTNB2020-25-09	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
1-04-053631	ESTNB2020-30-04	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
1-04-053632	ESTNB2020-30-09	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
1-04-054179	ESTNB2020-35-09	2	6	1.7	4.24	35	75	1.92	2.97	1	0.9	2.8	-	36.6	38	39	-
1-04-054180	ESTNB2020-40-04	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	-
1-04-054181	ESTNB2020-40-09	2	6	1.7	4.24	40	80	1.92	3.12	1	0.9	2.6	-	41.7	43.2	44.5	-
1-04-054182	ESTNB2020-50-09	2	6	1.7	4.24	50	90	1.92	3.44	1	0.9	2.1	-	51.5	53.5	55.5	-
1-04-054183	ESTNB2020-60-09	2	6	1.7	4.24	60	100	1.92	3.75	1	0.9	1.8	-	61.9	63.8	-	-
1-04-054184	ESTNB2020-70-09	2	6	1.7	4.24	70	110	1.92	4.07	1	0.9	1.8	-	72	74.1	-	-
1-04-053633	ESTNB2030-8-04	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
1-04-053634	ESTNB2030-16-04	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
1-04-053635	ESTNB2030-20-04	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
1-04-053636	ESTNB2030-30-04	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	-
1-04-053637	ESTNB2030-30-09	3	6	2.5	6.95	30	70	2.86	3.72	1.5	0.9	2.6	-	31.8	33	33.8	-
1-04-053638	ESTNB2030-40-04	3	6	2.5	12.52	40	80	2.86	3.38	1.5	0.4	2	41.7	43.2	44.3	-	-
1-04-053639	ESTNB2030-40-09	3	6	2.5	6.95	40	80	2.86	4.04	1.5	0.9	2	-	41.9	43.3	-	-
1-04-053640	ESTNB2030-50-09	3	6	2.5	6.95	50	90	2.86	4.35	1.5	0.9	1.7	-	52	53.6	-	-
1-04-053641	ESTNB2030-60-09	3	6	2.5	6.95	60	100	2.86	4.67	1.5	0.9	1.4	-	62.1	-	-	-
1-04-053642	ESTNB2030-70-09	3	6	2.5	6.95	70	110	2.86	4.98	1.5	0.9	1.2	-	72.1	-	-	-
1-04-053643	ESTNB2040-20-10	4	8	8	12.01	20	70	3.86	4.28	2	1	5	20.5	21.6	22.3	22.8	23.5
1-04-053644	ESTNB2040-30-10	4	8	8	12.01	30	80	3.86	4.63	2	1	3.51	22	31.6	32.5	33.2	34.16
1-04-053645	ESTNB2040-40-10	4	8	8	12.01	40	90	3.86	4.98	2	1	2.7	22	42	43.4	44.3	-
1-04-053646	ESTNB2040-50-10	4	8	8	12.01	50	100	3.86	5.33	2	1	2.2	22	52	53.6	54.7	-
1-04-053647	ESTNB2040-60-10	4	8	8	12.01	60	110	3.86	5.68	2	1	1.9	22	62	63.8	-	-
1-04-053648	ESTNB2050-30-10	5	8	10	14.01	30	80	4.86	5.56	2.5	1	2.8	25.5	31.7	32.6	33.2	-
1-04-053649	ESTNB2050-40-10	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

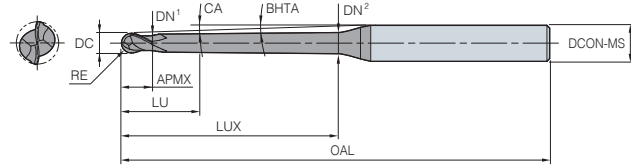
2 flutes long neck type ball



DC6 or below Above DC6

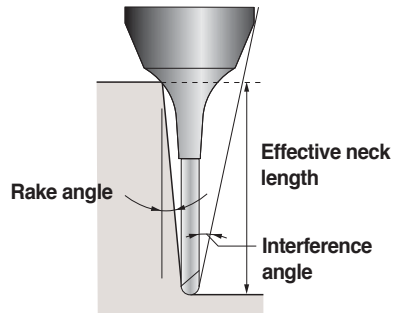
p.174~176

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



(mm)

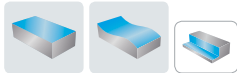
K.P. Code	Designation	DC	DCON-MS	APMX	LU	LUX	OAL	DN ¹	DN ²	RE	BHTA (°)	CA	Effective length by inclination angle				
													0.5°	1°	1.5°	2°	3°
1-04-053650	ESTNB2050-60-10	5	8	10	14.01	60	110	4.86	6.61	2.5	1	1.5	25.5	62.1	-	-	-
1-04-053651	ESTNB2060-30-10	6	8	12	16.01	30	80	5.86	6.49	3	1	1.9	29	31.8	32.6	-	-
1-04-053652	ESTNB2060-40-10	6	8	12	16.01	40	90	5.86	6.84	3	1	1.5	29	41.8	-	-	-
1-04-053653	ESTNB2060-50-10	6	8	12	16.01	50	100	5.86	7.19	3	1	1.2	29	51.8	-	-	-
1-04-053654	ESTNB2060-60-10	6	10	12	16.01	60	110	5.86	7.54	3	1	1.9	29	62.2	63.9	-	-
1-04-053655	ESTNB2060-70-10	6	10	12	16.01	70	120	5.86	7.89	3	1	1.7	29	72.2	74.1	-	-
1-04-053656	ESTNB2060-80-10	6	10	12	16.01	80	130	5.86	8.23	3	1	1.5	29	82.2	-	-	-
1-04-053657	ESTNB2080-50-10	8	10	14	18.01	50	110	7.86	9.12	4	1	1.2	32	51.9	-	-	-
1-04-053658	ESTNB2080-60-10	8	10	14	18.01	60	120	7.86	9.47	4	1	1	32	-	-	-	-
1-04-053659	ESTNB2080-70-10	8	10	14	18.01	70	130	7.86	9.82	4	1	0.9	32	-	-	-	-
1-04-053660	ESTNB2080-80-10	8	12	14	18.01	80	140	7.86	10.16	4	1	1.5	32	82.3	-	-	-
1-04-053661	ESTNB2100-60-10	10	12	18	22.01	60	130	9.86	11.33	5	1	1.1	39	62.1	-	-	-
1-04-053662	ESTNB2100-75-10	10	12	18	22.01	75	140	9.86	11.85	5	1	0.9	39	-	-	-	-



※ The marked effective neck length is the default value to prevent interference with the workpiece.
Proper control of the processing environment is required.

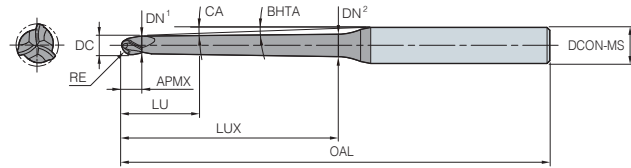
ESTNB30

3 flutes tapered neck type ball



p.177~179

DC	Tolerance
ALL	0.000 ~ -0.015



(mm)

K.P. Code	Designation	DC	DCON-MS	APMX	LU	LUX	OAL	DN1	DN2	RE	BHTA (°)	CA	Effective length by inclination angle				
													0.5°	1°	1.5°	2°	3°
1-04-053663	ESTNB3020-8-04	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
1-04-053664	ESTNB3020-12-04	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
1-04-053665	ESTNB3020-16-04	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
1-04-053666	ESTNB3020-20-04	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
1-04-053667	ESTNB3020-20-09	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
1-04-053668	ESTNB3020-25-09	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
1-04-053669	ESTNB3020-30-04	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
1-04-053670	ESTNB3020-30-09	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
1-04-053671	ESTNB3020-35-09	2	6	1.7	4.24	35	75	1.92	2.97	1	0.9	2.8	-	36.6	38	39	-
1-04-053672	ESTNB3020-40-04	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	-
1-04-053673	ESTNB3020-40-09	2	6	1.7	4.24	40	80	1.92	3.12	1	0.9	2.6	-	41.7	43.2	44.5	-
1-04-053674	ESTNB3020-50-09	2	6	1.7	4.24	50	90	1.92	3.44	1	0.9	2.1	-	51.8	53.5	55.5	-
1-04-053675	ESTNB3020-60-09	2	6	1.7	4.24	60	100	1.92	3.75	1	0.9	1.8	-	61.9	63.8	-	-
1-04-053676	ESTNB3020-70-09	2	6	1.7	4.24	70	110	1.92	4.07	1	0.9	1.6	-	72	74.1	-	-
1-04-053677	ESTNB3030-8-04	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
1-04-053678	ESTNB3030-16-04	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
1-04-053679	ESTNB3030-20-04	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
1-04-053680	ESTNB3030-30-04	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	-
1-04-053681	ESTNB3030-30-09	3	6	2.5	6.95	30	70	2.86	3.72	1.5	0.9	2.6	-	31.8	33	33.8	-
1-04-053682	ESTNB3030-40-04	3	6	2.5	12.52	40	80	2.86	3.38	1.5	0.4	2	41.7	43.2	44.3	-	-
1-04-053683	ESTNB3030-40-09	3	6	2.5	6.95	40	80	2.86	4.04	1.5	0.9	2	-	41.9	43.3	-	-
1-04-053684	ESTNB3030-50-09	3	6	2.5	6.95	50	90	2.86	4.35	1.5	0.9	1.7	-	52	53.6	-	-
1-04-053685	ESTNB3030-60-09	3	6	2.5	6.95	60	100	2.86	4.67	1.5	0.9	1.4	-	62.1	-	-	-
1-04-053686	ESTNB3030-70-09	3	6	2.5	6.95	70	110	2.86	4.98	1.5	0.9	1.2	-	72.1	-	-	-
1-04-053687	ESTNB3040-20-10	4	8	8	12.01	20	70	3.86	4.28	2	1	5	20.5	21.6	22.3	22.8	23.5
1-04-053688	ESTNB3040-30-10	4	8	8	12.01	30	80	3.86	4.63	2	1	3.6	22	31.6	32.5	33.2	34.1
1-04-053689	ESTNB3040-40-10	4	8	8	12.01	40	90	3.86	4.98	2	1	2.7	22	42	43.4	44.3	-
1-04-053690	ESTNB3040-50-10	4	8	8	12.01	50	100	3.86	5.33	2	1	2.2	22	52	53.6	54.7	-
1-04-053691	ESTNB3040-60-10	4	8	8	12.01	60	110	3.86	5.68	2	1	1.9	22	62	63.8	-	-
1-04-053692	ESTNB3050-30-10	5	8	10	14.01	30	80	4.86	5.56	2.5	1	2.8	25.5	31.7	32.6	33.2	-
1-04-053693	ESTNB3050-40-10	5	8	10	14.01	40	90	4.86	5.91	2.5	1	2.1	25.5	41.7	42.8	43.5	-
1-04-053694	ESTNB3050-60-10	5	8	10	12.52	60	110	4.86	6.61	2.5	1	1.5	25.5	62.1	-	-	-

Recommended Cutting Conditions

—

H-Star Endmill



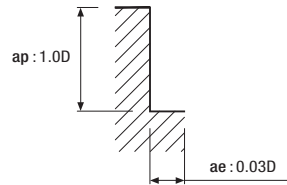


ESE702A, ESE712A series _ Side cutting

(inch)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)
1/32	48,000	41	38,000	32	25,500	20	20,500	12	16,000	7	12,500	5
3/32	33,300	47	26,000	38	17,500	24	14,500	15	11,000	9	9,500	6
1/8	21,800	47	17,300	38	11,500	24	9,500	15	7,500	9	6,400	6
5/32	16,700	49	13,200	39	8,800	25	7,200	15	5,600	9	4,750	7
3/16	15,700	57	12,500	45	8,300	28	6,400	16	5,100	10	4,450	7
1/4	13,100	53	10,350	43	6,900	27	5,300	16	4,200	10	3,700	7
5/16	9,880	52	7,800	41	5,200	25	4,000	14	3,200	9	2,800	7
3/8	7,800	47	6,150	38	4,100	23	3,200	13	2,550	9	2,200	6
1/2	6,650	47	5,250	38	3,500	23	2,650	13	2,100	9	1,860	6
5/8	4,900	41	3,900	33	2,600	20	2,000	12	1,600	7	1,400	6
3/4	3,900	37	3,100	30	2,050	19	1,600	11	1,300	7	1,100	5

Application Tip

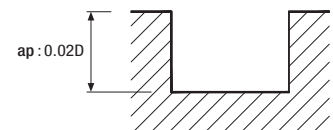
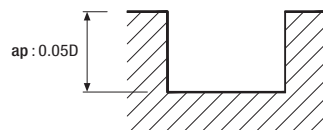


ESE702A, ESE712A series _ Slotting

(inch)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)
1/32	48,000	30	38,000	22	25,500	14	20,500	8	16,000	5	12,500	3
3/32	33,300	33	26,000	27	17,500	17	14,500	10	11,000	6	9,500	5
1/8	21,800	33	17,300	27	11,500	17	9,500	10	7,500	6	6,400	5
5/32	16,700	35	13,200	28	8,800	17	7,200	11	5,600	7	4,750	5
3/16	15,700	39	12,500	32	8,300	20	6,400	11	5,100	7	4,450	5
1/4	13,100	37	10,350	30	6,900	19	5,300	11	4,200	7	3,700	5
5/16	9,880	37	7,800	28	5,200	18	4,000	10	3,200	6	2,800	5
3/8	7,800	33	6,150	27	4,100	16	3,200	9	2,550	6	2,200	5
1/2	6,650	33	5,250	27	3,500	16	2,650	9	2,100	6	1,860	4
5/8	4,900	29	3,900	23	2,600	14	2,000	8	1,600	5	1,400	4

Application Tip

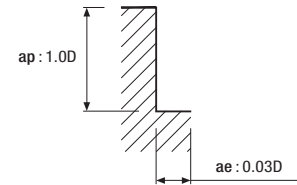
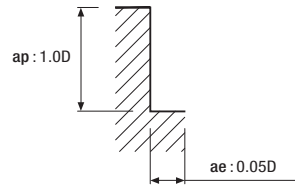


↪ ESE704A, ESE714A, ESE744A series _ Side cutting

(inch)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)
1/32	48,000	58	38,000	41	25,500	28	20,500	17	16,000	11	12,500	7
3/32	33,300	69	26,000	49	17,500	33	14,500	20	11,000	13	9,500	9
1/8	21,800	69	17,300	49	11,500	33	9,500	20	7,500	13	6,400	9
5/32	16,700	71	13,200	51	8,800	35	7,200	21	5,600	13	4,750	9
3/16	15,700	79	12,500	59	8,300	39	6,400	23	5,100	15	4,450	11
1/4	13,100	77	10,350	55	6,900	37	5,300	22	4,200	14	3,700	10
5/16	9,880	74	7,800	53	5,200	35	4,000	20	3,200	13	2,800	9
3/8	7,800	69	6,150	50	4,100	33	3,200	19	2,550	12	2,200	9
1/2	6,650	69	5,250	50	3,500	33	2,650	19	2,100	12	1,860	9
5/8	4,900	59	3,900	43	2,600	29	2,000	17	1,600	11	1,400	8
3/4	3,900	51	3,100	38	2,050	26	1,600	15	1,300	10	1,100	7

Application Tip

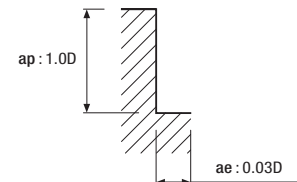
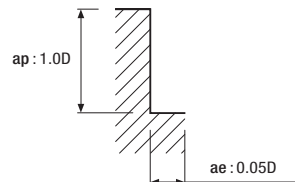


↪ ESE716A series _ Side cutting

(inch)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)
1/4	24,800	211	23,500	193	16,000	193	13,500	130	10,500	83	8,000	57
5/16	20,000	217	19,000	197	12,000	181	10,000	122	8,000	79	6,000	55
3/8	16,000	193	15,500	177	9,500	161	8,000	114	6,400	71	4,800	51
1/2	13,000	177	12,500	161	8,000	150	6,600	98	5,300	63	4,000	45
5/8	10,000	157	9,700	146	6,000	134	5,000	91	4,000	49	3,000	34
3/4	8,000	132	7,800	134	4,800	126	4,000	83	3,200	40	2,400	27

Application Tip

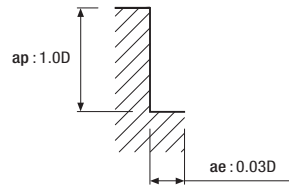


➤ ESR704A, ESR714A series _ Side cutting

(inch)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)
1/8	21,800	55	17,300	39	11,500	26	9,500	16	7,500	10	6,400	7
5/32	16,700	57	13,200	41	8,800	28	7,200	17	5,600	11	4,750	8
3/16	15,700	63	12,500	47	8,300	31	6,400	18	5,100	12	4,450	9
1/4	13,100	61	10,350	44	6,900	30	5,300	18	4,200	11	3,700	8
5/16	9,880	59	7,800	43	5,200	28	4,000	16	3,200	10	2,800	8
3/8	7,800	55	6,150	40	4,100	26	3,200	15	2,550	10	2,200	7
1/2	6,650	55	5,250	40	3,500	26	2,650	15	2,100	9	1,860	7
5/8	4,900	47	3,900	35	2,600	23	2,000	13	1,600	9	1,400	6
3/4	3,900	41	3,100	31	2,050	20	1,600	12	1,300	8	1,100	6

Application Tip

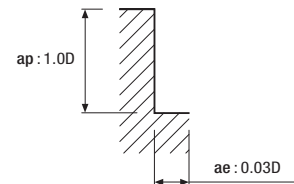
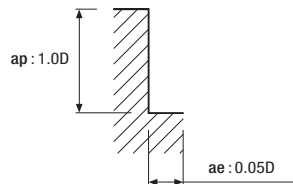


➤ ESR706A, ESR716A series _ Side cutting

(inch)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)
1/4	24,800	211	23,500	193	16,000	193	13,500	130	10,500	83	8,000	57
5/16	20,000	217	19,000	197	12,000	181	10,000	122	8,000	79	6,000	55
3/8	16,000	193	15,500	177	9,500	161	8,000	114	6,400	71	4,800	51
1/2	13,000	177	12,500	161	8,000	150	6,600	98	5,300	63	4,000	45
5/8	10,000	157	9,700	146	6,000	134	5,000	91	4,000	49	3,000	34
3/4	8,000	132	7,800	134	4,800	126	4,000	83	3,200	40	2,400	27

Application Tip

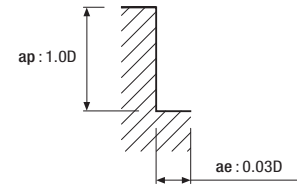
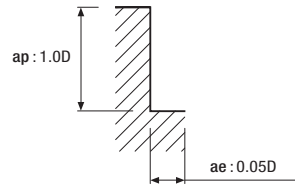


ESR718A series _ Side cutting

(inch)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)
5/16	19,600	175	19,600	175	13,200	172	11,150	115	8,700	73	6,600	51
3/8	1,700	167	17,000	167	11,350	162	9,500	108	7,450	69	5,700	49
1/2	11,800	152	11,800	152	7,550	141	6,250	93	5,000	59	3,800	43
5/8	19,800	147	9,800	147	6,050	135	5,050	92	4,050	50	3,000	34
3/4	8,600	133	8,600	133	5,300	123	4,400	83	3,550	44	2,650	30
1	6,150	106	6,150	106	3,800	100	3,150	65	2,500	31	1,900	22

Application Tip

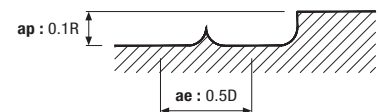
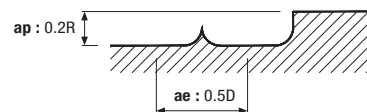


ESPM4A series _ Side cutting

(inch)

Workpiece Conditions Diameter(Ø) × R	Hardened steel Heat resistant alloy		Hardened steels							
	~HrC40		HrC40~50		HrC50~55		HrC55~60		HrC60~65	
	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)
1/8 × R2/64	9,550	256	6,900	163	4,550	108	2,850	45	1,900	24
3/16 × R4/64	7,950	276	5,750	181	4,000	126	2,550	53	1,750	28
1/4 × R2/64	5,800	301	4,100	193	2,900	138	1,850	73	1,350	31
1/4 × R4/64	5,800	301	4,100	193	2,900	138	1,850	73	1,350	31
5/16 × R2/64	4,350	301	3,050	193	2,200	138	1,400	73	995	31
5/16 × R6/64	4,350	301	3,050	193	2,200	138	1,400	73	995	31
3/8 × R2/64	3,500	301	2,450	193	1,750	138	1,100	73	795	31
3/8 × R6/64	3,500	301	2,450	193	1,750	138	1,100	73	795	31
1/2 × R6/64	2,900	301	2,050	193	1,450	138	925	73	665	31
1/2 × R8/64	2,900	301	2,050	193	1,450	138	925	73	665	31

Application Tip

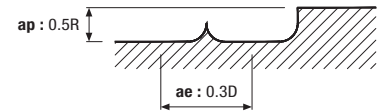
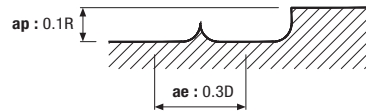


➔ ESPM4A series _ High Speed Cutting

(inch)

Workpiece Conditions Diameter(Ø) × R	Hardened steel Heat resistant alloy		Hardened steels							
	~HrC40		HrC40~50		HrC50~55		HrC55~60		HrC60~65	
	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)
1/8 × R2/64	22,000	630	17,000	394	12,500	315	9,500	181	6,900	98
3/16 × R4/64	17,000	689	13,000	472	11,000	362	8,000	217	5,600	114
1/4 × R2/64	13,500	728	10,500	543	9,000	433	6,400	252	4,500	142
1/4 × R4/64	13,500	728	10,500	543	9,000	433	6,400	252	4,500	142
5/16 × R2/64	10,000	728	8,000	551	6,800	433	4,800	264	3,400	161
5/16 × R6/64	10,000	728	8,000	551	6,800	433	4,800	264	3,400	161
3/8 × R2/64	8,000	728	6,400	551	5,400	433	3,800	268	2,700	150
3/8 × R6/64	8,000	728	6,400	551	5,400	433	3,800	268	2,700	150
1/2 × R6/64	6,600	728	5,300	551	4,500	433	3,200	276	2,250	142
1/2 × R8/64	6,600	728	5,300	551	4,500	433	3,200	276	2,250	142

Application Tip



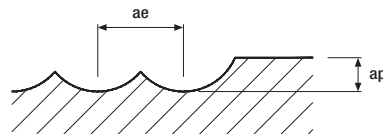
➔ ESB702A, ESB712A series

(inch)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)
1/32	50,000	189	50,000	165	45,000	150	40,000	118	35,000	102	35,000	91
1/16	50,000	213	48,000	177	43,000	157	23,000	122	33,000	106	29,700	91
3/32	49,700	224	47,800	189	40,000	157	35,000	124	32,000	110	28,500	91
1/8	33,100	236	31,800	209	26,500	157	23,500	124	21,000	110	19,000	91
5/32	24,900	236	23,900	209	20,000	157	17,500	124	16,000	110	14,500	91
3/16	18,600	228	17,800	193	15,000	148	13,500	120	11,500	100	10,500	83
1/4	13,900	191	13,400	161	11,000	122	10,000	98	8,800	85	8,000	69
5/16	11,100	165	10,700	138	9,000	106	8,000	85	7,000	73	6,500	61
3/8	9,300	146	8,900	122	7,500	94	6,600	75	5,800	65	5,300	54
1/2	6,950	116	6,680	98	5,600	75	5,000	61	4,400	49	4,000	41
5/8	5,570	104	5,350	87	4,500	67	4,000	53	3,500	39	3,200	34
3/4	4,450	93	4,300	77	3,600	59	3,200	47	2,800	32	2,550	26

Application Tip

- ap : D1/32 ~ D5/32 = 0.05 × D
D3/16 ~ D5/16 = 0.001
D3/8 ~ D1/2 = 0.0118
- ae : 0.1 × D



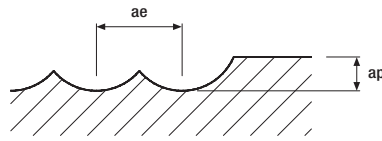
ESB703A series

(inch)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)
3/32	57,000	280	55,000	236	46,000	197	40,300	154	36,800	138	32,800	114
1/8	38,000	295	36,600	260	30,500	197	27,000	154	24,200	138	21,900	114
5/32	28,500	295	27,500	260	23,000	197	20,100	154	18,400	138	16,700	114
3/16	21,500	287	20,500	240	17,300	185	15,500	150	13,200	126	12,100	102
1/4	16,000	240	15,400	201	12,700	154	11,500	122	10,100	106	9,200	87
5/16	12,700	209	12,300	173	10,400	134	9,200	106	8,100	91	7,500	75
3/8	10,700	181	10,200	154	8,600	118	7,600	94	6,700	83	6,100	67
1/2	8,000	146	7,700	122	6,400	94	5,800	75	5,100	63	4,600	51

Application Tip

- ap : D1/32 ~ D5/32 = 0.05 × D
D3/16 ~ D5/16 = 0.001
D3/8 ~ D1/2 = 0.0118
- ae : 0.1 × D



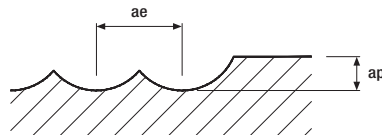
ESB714A, ESB734A series

(inch)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)	R.P.M n(min ⁻¹)	Feed vf(in/min)
3/32	62,100	339	59,800	283	50,000	236	43,800	185	40,000	165	35,600	138
1/8	41,400	354	39,800	315	33,100	236	29,400	185	26,300	165	23,800	138
5/32	31,100	354	29,900	315	25,000	236	21,900	185	20,000	165	18,100	138
3/16	23,300	343	22,300	291	18,800	220	16,900	181	14,400	150	13,100	126
1/4	17,400	287	16,800	244	13,800	185	12,500	150	11,000	126	10,000	102
5/16	13,900	248	13,400	209	11,300	161	10,000	126	8,800	110	8,100	91
3/8	11,600	220	11,100	185	9,400	142	8,300	114	7,300	98	6,600	83

Application Tip

- ap : D1/32 ~ D5/32 = 0.05 × D
D3/16 ~ D5/16 = 0.001
D3/8 ~ D1/2 = 0.0118
- ae : 0.1 × D

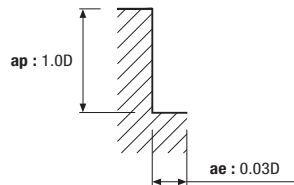


➤ ESE702 series _ Side cutting

(mm)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
1.0	48,000	1,050	38,000	820	25,500	510	20,500	310	16,000	190	12,500	125
2.0	33,300	1,200	26,000	970	17,500	600	14,500	370	11,000	230	9,500	165
3.0	21,800	1,200	17,300	970	11,500	600	9,500	370	7,500	230	6,400	165
4.0	16,700	1,250	13,200	1,000	8,800	625	7,200	385	5,600	240	4,750	170
5.0	15,700	1,450	12,500	1,150	8,300	710	6,400	410	5,100	260	4,450	190
6.0	13,100	1,350	10,350	1,100	6,900	690	5,300	400	4,200	255	3,700	185
8.0	9,880	1,320	7,800	1,030	5,200	635	4,000	365	3,200	235	2,800	170
10.0	7,800	1,200	6,150	970	4,100	590	3,200	340	2,550	220	2,200	160
12.0	6,650	1,200	5,250	970	3,500	590	2,650	340	2,100	220	1,860	160
16.0	4,900	1,050	3,900	840	2,600	520	2,000	300	1,600	190	1,400	140
20.0	3,900	950	3,100	750	2,050	475	1,600	275	1,300	175	1,100	125

Application Tip

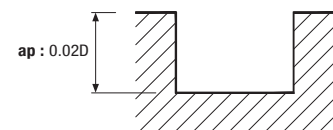
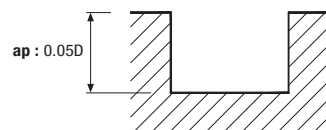


➤ ESE702 series _ Slotting

(mm)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed 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
1.0	48,000	750	38,000	570	25,500	360	20,500	215	16,000	135	12,500	85
2.0	33,300	850	26,000	680	17,500	420	14,500	260	11,000	160	9,500	115
3.0	21,800	850	17,300	680	11,500	420	9,500	260	7,500	160	6,400	115
4.0	16,700	880	13,200	700	8,800	440	7,200	270	5,600	170	4,750	118
5.0	15,700	1,000	12,500	805	8,300	500	6,400	285	5,100	180	4,450	132
6.0	13,100	950	10,350	770	6,900	480	5,300	280	4,200	180	3,700	130
8.0	9,880	930	7,800	720	5,200	445	4,000	255	3,200	165	2,800	120
10.0	7,800	850	6,150	680	4,100	415	3,200	240	2,550	155	2,200	122
12.0	6,650	850	5,250	680	3,500	415	2,650	240	2,100	155	1,860	112
16.0	4,900	730	3,900	580	2,600	365	2,000	210	1,600	135	1,400	95
20.0	3,900	660	3,100	525	2,050	335	1,600	195	1,300	125	1,100	85

Application Tip

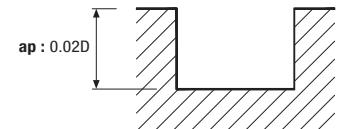
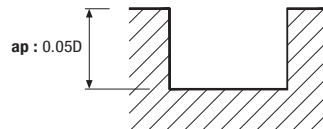


↪ ESE712 series _ Slotting

(mm)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed 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
1.0	48,000	750	38,000	570	25,500	360	20,500	215	16,000	135	12,500	85
2.0	33,300	850	26,000	680	17,500	420	14,500	260	11,000	160	9,500	115
3.0	21,800	850	17,300	680	11,500	420	9,500	260	7,500	160	6,400	115
4.0	16,700	880	13,200	700	8,800	440	7,200	270	5,600	170	4,750	118
5.0	15,700	1,000	12,500	805	8,300	500	6,400	285	5,100	180	4,450	132
6.0	13,100	950	10,350	770	6,900	480	5,300	280	4,200	180	3,700	130
8.0	9,880	930	7,800	720	5,200	445	4,000	255	3,200	165	2,800	120
10.0	7,800	850	6,150	680	4,100	415	3,200	240	2,550	155	2,200	112
12.0	6,650	850	5,250	680	3,500	415	2,650	240	2,100	155	1,860	112
16.0	4,900	730	3,900	580	2,600	365	2,000	210	1,600	135	1,400	95
20.0	3,900	660	3,100	525	2,050	335	1,600	195	1,300	125	1,100	85

Application Tip

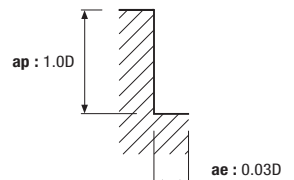


↪ ESE712 series _ Side cutting

(mm)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
1.0	48,000	1,050	38,000	820	25,500	510	20,500	310	16,000	190	12,500	125
2.0	33,300	1,200	26,000	970	17,500	600	14,500	370	11,000	230	9,500	165
3.0	21,800	1,200	17,300	970	11,500	600	9,500	370	7,500	230	6,400	165
4.0	16,700	1,250	13,200	1,000	8,800	625	7,200	385	5,600	240	4,750	170
5.0	15,700	1,450	12,500	1,150	8,300	710	6,400	410	5,100	260	4,450	190
6.0	13,100	1,350	10,350	1,100	6,900	690	5,300	400	4,200	255	3,700	185
8.0	9,880	1,320	7,800	1,030	5,200	635	4,000	365	3,200	235	2,800	170
10.0	7,800	1,200	6,150	970	4,100	590	3,200	340	2,550	220	2,200	160
12.0	6,650	1,200	5,250	970	3,500	590	2,650	340	2,100	220	1,860	160
16.0	4,900	1,050	3,900	840	2,600	520	2,000	300	1,600	190	1,400	140
20.0	3,900	950	3,100	750	2,050	475	1,600	275	1,300	175	1,100	125

Application Tip

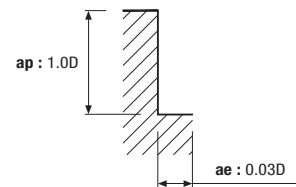
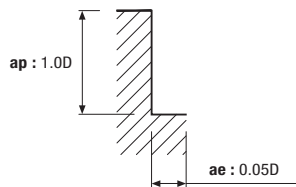


➔ ESE704, ESE714, ESE744 series _ Side cutting

(mm)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
1.0	48,000	1,480	38,000	1,050	25,500	710	20,500	430	16,000	270	12,500	175
2.0	33,300	1,750	26,000	1,250	17,500	840	14,500	520	11,000	320	9,500	230
3.0	21,800	1,750	17,300	1,250	11,500	840	9,500	520	7,500	320	6,400	230
4.0	16,700	1,800	13,200	1,300	8,800	880	7,200	540	5,600	335	4,750	240
5.0	15,700	2,000	12,500	1,500	8,300	1,000	6,400	580	5,100	370	4,450	270
6.0	13,100	1,950	10,350	1,400	6,900	950	5,300	560	4,200	350	3,700	260
8.0	9,880	1,880	7,800	1,350	5,200	900	4,000	520	3,200	330	2,800	240
10.0	7,800	1,750	6,150	1,260	4,100	840	3,200	480	2,550	310	2,200	220
12.0	6,650	1,750	5,250	1,260	3,500	840	2,650	480	2,100	300	1,860	220
16.0	4,900	1,500	3,900	1,100	2,600	730	2,000	420	1,600	270	1,400	200
20.0	3,900	1,300	3,100	970	2,050	650	1,600	380	1,300	250	1,100	180

Application Tip

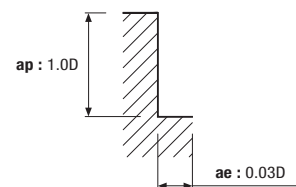
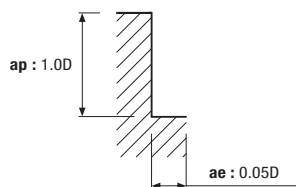


➔ ESE724 series _ Side cutting

(mm)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HRC30~40		HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
1.0	48,000	1,480	38,000	1,050	25,500	710	20,500	430	16,000	270	12,500	175
2.0	33,300	1,750	26,000	1,250	17,500	840	14,500	520	11,000	320	9,500	230
3.0	21,800	1,750	17,300	1,250	11,500	840	9,500	520	7,500	320	6,400	230
4.0	16,700	1,800	13,200	1,300	8,800	880	7,200	540	5,600	335	4,750	240
5.0	15,700	2,000	12,500	1,500	8,300	1,000	6,400	580	5,100	370	4,450	270
6.0	13,100	1,950	10,350	1,400	6,900	950	5,300	560	4,200	350	3,700	260
8.0	9,880	1,880	7,800	1,350	5,200	900	4,000	520	3,200	330	2,800	240
10.0	7,800	1,750	6,150	1,260	4,100	840	3,200	480	2,550	310	2,200	220
12.0	6,650	1,750	5,250	1,260	3,500	840	2,650	480	2,100	300	1,860	220
16.0	4,900	1,500	3,900	1,100	2,600	730	2,000	420	1,600	270	1,400	200
20.0	3,900	1,300	3,100	970	2,050	650	1,600	380	1,300	250	1,100	180

Application Tip

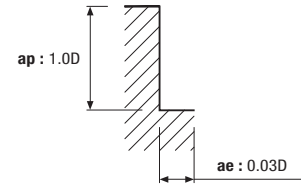
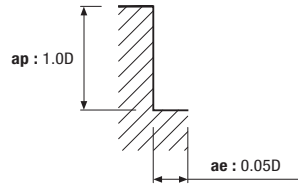


↪ ESE716 series _ Side cutting

(mm)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
6.0	24,800	5,350	23,500	4,900	16,000	4,900	13,500	3,300	10,500	2,100	8,000	1,450
8.0	20,000	5,500	19,000	5,000	12,000	4,600	10,000	3,100	8,000	2,000	6,000	1,400
10.0	16,000	4,900	15,500	4,500	9,500	4,100	8,000	2,900	6,400	1,800	4,800	1,300
12.0	13,000	4,500	12,500	4,100	8,000	3,800	6,600	2,500	5,300	1,600	4,000	1,150
16.0	10,000	4,000	9,700	3,700	6,000	3,400	5,000	2,300	4,000	1,250	3,000	870
20.0	8,000	3,350	7,800	3,400	4,800	3,200	4,000	2,100	3,200	1,020	2,400	690

Application Tip

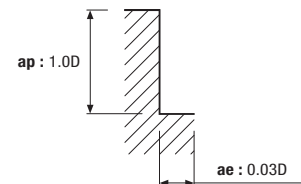
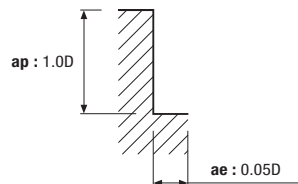


↪ ESE726, ESR736 series

(mm)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
6.0	24,800	5,350	23,500	4,900	16,000	4,900	13,500	3,300	10,500	2,100	8,000	1,450
8.0	20,000	5,500	19,000	5,000	12,000	4,600	10,000	3,100	8,000	2,000	6,000	1,400
10.0	16,000	4,900	15,500	4,500	9,500	4,100	8,000	2,900	6,400	1,800	4,800	1,300
12.0	13,000	4,500	12,500	4,100	8,000	3,800	6,600	2,500	5,300	1,600	4,000	1,150
16.0	10,000	4,000	9,700	3,700	6,000	3,400	5,000	2,300	4,000	1,250	3,000	870
20.0	8,000	3,350	7,800	3,400	4,800	3,200	4,000	2,100	3,200	1,020	2,400	690

Application Tip



➔ **ESRE712 series** _ Side cutting

(mm)

Workpiece		Alloy steels, Carbon steels (SCM, SNCM, S45C)			Pre-hardened steels (NAK, CENA, KP4)			Hardened steels (SKD, SKT, STAVAX)		
Strength		~HrC35			HrC35~45			HrC45~55		
Conditions		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
Diameter(Ø)	Effective Length	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	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
	0.5	50,000	315	0.006	46,200	230	0.005	40,600	170	0.004
	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
	1	38,500	380	0.013	36,300	270	0.010	32,100	200	0.007
	1.5	34,650	310	0.007	32,670	220	0.006	28,890	160	0.004
	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
	1.5	34,200	390	0.019	32,300	270	0.015	25,800	230	0.011
	2	30,780	315	0.011	29,070	220	0.008	25,650	185	0.006
	2.5	30,780	315	0.007	29,070	220	0.005	25,650	185	0.004
	3	30,780	315	0.007	29,070	220	0.005	25,650	185	0.004
	4	27,360	250	0.004	25,840	175	0.003	22,800	145	0.002
	5	20,520	165	0.003	19,380	115	0.002	17,100	95	0.002
	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
	2	27,400	540	0.025	25,800	380	0.020	22,800	280	0.014
	2.5	24,660	435	0.014	23,220	310	0.011	20,520	225	0.008
	3	24,660	435	0.014	23,220	310	0.011	20,520	225	0.008
	4	24,660	435	0.009	23,220	310	0.007	20,520	225	0.005
	5	21,920	345	0.009	20,640	245	0.007	18,240	180	0.005
	6	21,920	345	0.005	20,640	245	0.004	18,240	180	0.003
	8	16,440	225	0.004	15,480	160	0.003	13,680	120	0.002
	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
	1.5	27,400	540	0.045	25,800	425	0.035	22,800	285	0.025
	2	27,400	540	0.032	25,800	425	0.025	22,800	285	0.018
	2.5	27,400	540	0.032	25,800	425	0.025	22,800	285	0.018
	3	24,660	435	0.018	23,220	345	0.014	20,520	230	0.010
	4	24,660	435	0.018	23,220	345	0.014	20,520	230	0.010
	5	24,660	435	0.011	23,220	345	0.009	20,520	230	0.006
	6	21,920	345	0.011	20,640	270	0.009	18,240	180	0.006
	8	16,440	225	0.007	15,480	180	0.005	13,680	120	0.004
	10	16,440	225	0.005	15,480	180	0.004	13,680	120	0.003
	12	8,220	95	0.005	7,740	75	0.004	6,840	50	0.003
	14	8,220	95	0.005	7,740	75	0.004	6,840	50	0.003
	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
	3	27,400	775	0.038	25,800	545	0.029	22,800	405	0.021
	4	24,660	630	0.022	23,220	440	0.017	20,520	330	0.012
	5	24,660	630	0.014	23,220	440	0.011	20,520	330	0.008
	6	24,660	630	0.014	23,220	440	0.011	20,520	330	0.008
	8	21,920	495	0.008	20,640	350	0.006	18,240	260	0.005
	10	16,440	325	0.005	15,480	230	0.004	13,680	170	0.003

ESRE712 series _ Side cutting

(mm)

Workpiece		Alloy steels, Carbon steels (SCM, SNCM, S45C)			Pre-hardened steels (NAK, CENA, KP4)			Hardened steels (SKD, SKT, STAVAX)		
Strength		~HRC35			HRC35~45			HRC45~55		
Conditions		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
Diameter(Ø)	Effective Length	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)
0.6	12	16,440	325	0.005	15,480	230	0.004	13,680	170	0.003
	14	8,220	140	0.005	7,740	100	0.004	6,840	75	0.003
	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
	4	24,660	630	0.025	23,220	440	0.020	20,520	330	0.014
	6	24,660	630	0.016	23,220	440	0.012	20,520	330	0.009
	8	21,920	495	0.016	20,640	350	0.012	18,240	260	0.009
	10	21,920	495	0.009	20,640	350	0.007	18,240	260	0.005
	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
	3	27,400	775	0.050	25,800	605	0.039	22,800	450	0.028
	4	27,400	775	0.050	25,800	605	0.039	22,800	450	0.028
	5	24,660	630	0.029	23,220	490	0.022	20,520	365	0.016
	6	24,660	630	0.029	23,220	490	0.022	20,520	365	0.016
	8	24,660	630	0.018	23,220	490	0.014	20,520	365	0.010
	10	21,920	495	0.018	20,640	385	0.014	18,240	290	0.010
	12	21,920	495	0.011	20,640	385	0.008	18,240	290	0.006
	14	16,440	325	0.007	15,480	255	0.006	13,680	190	0.004
	16	16,440	325	0.007	15,480	255	0.006	13,680	190	0.004
	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
	8	22,140	575	0.020	20,970	440	0.016	18,450	330	0.011
	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
	3	24,600	1,045	0.090	23,300	890	0.070	20,500	665	0.050
	4	24,600	1,045	0.063	23,300	890	0.049	20,500	665	0.035
	5	24,600	1,045	0.063	23,300	890	0.049	20,500	665	0.035
	6	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
	7	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
	8	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
	10	22,140	845	0.023	20,970	720	0.018	18,450	540	0.013
	12	19,680	670	0.023	18,640	570	0.018	16,400	425	0.013
	14	19,680	670	0.014	18,640	570	0.011	16,400	425	0.008
	16	14,760	440	0.014	13,980	375	0.011	12,300	280	0.008
	18	14,760	440	0.009	13,980	375	0.007	12,300	280	0.005
	20	14,760	440	0.009	13,980	375	0.007	12,300	280	0.005
	22	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
	26	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
	30	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
	40	2,460	50	0.009	2,330	45	0.007	2,050	35	0.005
	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
	6	21,900	930	0.076	20,700	720	0.059	18,200	485	0.042
	8	19,710	755	0.043	18,630	585	0.034	16,380	395	0.024

➔ **ESRE712 series** _ Side cutting

(mm)

Workpiece		Alloy steels, Carbon steels (SCM, SNCM, S45C)			Pre-hardened steels (NAK, CENA, KP4)			Hardened steels (SKD, SKT, STAVAX)		
Strength		~HRC35			HRC35~45			HRC45~55		
Conditions		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
Diameter(Ø)	Effective Length	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)
1.2	10	19,710	755	0.027	18,630	585	0.021	16,380	395	0.015
	12	19,710	755	0.027	18,630	585	0.021	16,380	395	0.015
	14	17,520	595	0.027	16,560	460	0.021	14,560	310	0.015
	16	17,520	595	0.016	16,560	460	0.013	14,560	310	0.009
	20	13,140	390	0.011	12,420	300	0.008	10,920	205	0.006
	26	6,570	165	0.011	6,210	130	0.008	5,460	85	0.006
	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
	8	17,280	660	0.050	16,290	460	0.039	14,400	345	0.028
	10	17,280	660	0.050	16,290	460	0.039	14,400	345	0.028
	14	17,280	660	0.032	16,290	460	0.025	14,400	345	0.018
	16	15,360	520	0.032	14,480	365	0.025	12,800	270	0.018
	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
	5	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
	6	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
	7	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
	8	17,280	735	0.054	16,290	515	0.042	14,400	385	0.030
	10	17,280	735	0.054	16,290	515	0.042	14,400	385	0.030
	12	17,280	735	0.054	16,290	515	0.042	14,400	385	0.030
	14	17,280	735	0.034	16,290	515	0.026	14,400	385	0.019
	16	15,360	580	0.034	14,480	405	0.026	12,800	305	0.019
	18	15,360	580	0.034	14,480	405	0.026	12,800	305	0.019
	20	15,360	580	0.020	14,480	405	0.016	12,800	305	0.011
	22	15,360	580	0.020	14,480	405	0.016	12,800	305	0.011
	26	11,520	380	0.014	10,860	265	0.011	9,600	200	0.008
	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
	10	16,020	680	0.058	15,120	530	0.045	13,320	395	0.032
	12	16,020	680	0.058	15,120	530	0.045	13,320	395	0.032
	16	16,020	680	0.036	15,120	530	0.028	13,320	395	0.020
	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
	10	16,020	680	0.065	15,120	530	0.050	13,320	395	0.036
	12	16,020	680	0.065	15,120	530	0.050	13,320	395	0.036
	16	16,020	680	0.041	15,120	530	0.032	13,320	395	0.023
	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
	8	14,400	820	0.126	13,600	620	0.098	12,000	475	0.070
	10	14,400	820	0.126	13,600	620	0.098	12,000	475	0.070
	12	12,960	665	0.072	12,240	500	0.056	10,800	385	0.040
	14	12,960	665	0.072	12,240	500	0.056	10,800	385	0.040
	16	12,960	665	0.072	12,240	500	0.056	10,800	385	0.040
	18	12,960	665	0.045	12,240	500	0.035	10,800	385	0.025

ESRE712 series _ Side cutting

(mm)

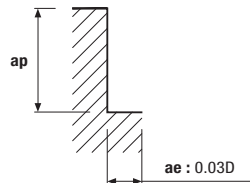
Workpiece		Alloy steels, Carbon steels (SCM, SNCM, S45C)			Pre-hardened steels (NAK, CENA, KP4)			Hardened steels (SKD, SKT, STAVAX)		
Strength		~HrC35			HrC35~45			HrC45~55		
Conditions		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
Diameter(Ø)	Effective Length	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)
2.0	20	12,960	665	0.045	12,240	500	0.035	10,800	385	0.025
	22	11,520	525	0.045	10,880	395	0.035	9,600	305	0.025
	26	11,520	525	0.045	10,880	395	0.035	9,600	305	0.025
	30	11,520	525	0.027	10,880	395	0.021	9,600	305	0.015
	35	8,640	345	0.018	8,160	260	0.014	7,200	200	0.010
	40	8,640	345	0.018	8,160	260	0.014	7,200	200	0.010
	45	4,320	150	0.018	4,080	110	0.014	3,600	85	0.010
	50	4,320	150	0.018	4,080	110	0.014	3,600	85	0.010
	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
	10	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
	12	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
	14	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
	16	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
	18	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
	20	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
	22	11,070	785	0.056	10,440	550	0.044	9,270	415	0.031
	26	9,840	620	0.056	9,280	435	0.044	8,240	325	0.031
	30	9,840	620	0.056	9,280	435	0.044	8,240	325	0.031
	35	9,840	620	0.034	9,280	435	0.026	8,240	325	0.019
	40	7,380	405	0.034	6,960	285	0.026	6,180	215	0.019
	45	7,380	405	0.023	6,960	285	0.018	6,180	215	0.013
	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
	8	10,900	860	0.270	10,300	605	0.210	6,600	450	0.150
	10	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
	12	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
	14	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
	16	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
	18	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
	20	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
	22	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
	26	9,810	695	0.068	9,270	490	0.053	5,940	365	0.038
	30	9,810	695	0.068	9,270	490	0.053	5,940	365	0.038
	35	8,720	550	0.068	8,240	385	0.053	5,280	290	0.038
	40	8,720	550	0.041	8,240	385	0.032	5,280	290	0.023
	45	8,720	550	0.041	8,240	385	0.032	5,280	290	0.023
	50	6,540	360	0.027	6,180	255	0.021	3,960	190	0.015
	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
	10	8,000	1,300	0.360	7,600	1,160	0.280	6,700	770	0.200
	12	8,000	1,300	0.360	7,600	1,160	0.280	6,700	770	0.200
	14	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
	16	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140

➔ **ESRE712 series** _ Side cutting

(mm)

Workpiece		Alloy steels, Carbon steels (SCM, SNCM, S45C)			Pre-hardened steels (NAK, CENA, KP4)			Hardened steels (SKD, SKT, STAVAX)		
Strength		~HRC35			HRC35~45			HRC45~55		
Conditions		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
Diameter(Ø)	Effective Length	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)
4.0	18	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
	20	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
	22	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
	26	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
	30	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
	35	7,200	1,055	0.090	6,840	940	0.070	6,030	625	0.050
	40	7,200	1,055	0.090	6,840	940	0.070	6,030	625	0.050
	45	6,400	830	0.090	6,080	740	0.070	5,360	495	0.050
	50	6,400	830	0.090	6,080	740	0.070	5,360	495	0.050
	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
	20	6,400	1,155	0.315	6,100	900	0.245	5,400	605	0.175
	26	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
	30	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
	35	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
	40	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
	50	5,760	935	0.113	5,490	730	0.088	4,860	490	0.063
	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
	20	5,300	1,055	0.378	5,000	820	0.294	4,400	550	0.210
	30	5,300	1,055	0.378	5,000	820	0.294	4,400	550	0.210
	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
	30	4,000	950	0.504	3,800	750	0.392	3,300	500	0.280
	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
	35	3,200	900	0.630	3,050	680	0.490	2,630	400	0.350
	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
	40	2,650	800	0.756	2,520	600	0.588	2,180	350	0.420
	50	2,650	800	0.756	2,520	600	0.588	2,180	350	0.420

Application Tip



ESRE714 series

(mm)

Workpiece		Alloy steels, Carbon steels (SCM, SNCM, S45C)			Pre-hardened steels (NAK, CENA, KP4)			Hardened steels (SKD, SKT, STAVAX)		
Strength		~HrC35			HrC35~45			HrC45~55		
Conditions		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
Diameter(Ø)	Effective Length	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)
0.5	1	27,400	756	0.045	25,800	595	0.035	22,800	399	0.025
	2	27,400	756	0.032	25,800	595	0.025	22,800	399	0.018
	3	24,660	609	0.018	23,220	483	0.014	20,520	322	0.01
	4	24,660	609	0.018	23,220	483	0.014	20,520	322	0.01
	5	24,660	609	0.011	23,220	483	0.009	20,520	322	0.006
	6	21,920	483	0.011	20,640	378	0.009	18,240	252	0.006
	8	16,440	315	0.007	15,480	252	0.005	13,680	168	0.004
	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
	2	27,400	1,085	0.038	25,800	763	0.029	22,800	567	0.021
	3	27,400	1,085	0.038	25,800	763	0.029	22,800	567	0.021
	4	24,660	882	0.022	23,220	616	0.017	20,520	462	0.012
	5	24,660	882	0.014	23,220	616	0.011	20,520	462	0.008
	6	24,660	882	0.014	23,220	616	0.011	20,520	462	0.008
	8	21,920	693	0.008	20,640	490	0.006	18,240	364	0.005
	10	16,440	455	0.005	15,480	322	0.004	13,680	238	0.003
0.7	12	16,440	455	0.005	15,480	322	0.004	13,680	238	0.003
	2	27,400	1,085	0.063	25,800	763	0.049	22,800	567	0.035
	4	24,660	882	0.025	23,220	616	0.02	20,520	462	0.014
	6	24,660	693	0.016	23,220	616	0.012	20,520	462	0.009
	8	21,920	693	0.016	20,640	490	0.012	18,240	364	0.009
0.8	10	21,920	693	0.009	20,640	490	0.007	18,240	364	0.005
	1	27,400	1,085	0.072	25,800	847	0.056	22,800	630	0.04
	2	27,400	1,085	0.072	25,800	847	0.056	22,800	630	0.04
	3	27,400	1,085	0.05	25,800	847	0.039	22,800	630	0.028
	4	27,400	1,085	0.05	25,800	847	0.039	22,800	630	0.028
	5	24,660	882	0.029	23,220	686	0.022	20,520	511	0.016
	6	24,660	882	0.029	23,220	686	0.022	20,520	511	0.016
	8	24,660	882	0.018	23,220	686	0.014	20,520	511	0.01
	10	21,920	693	0.018	20,640	539	0.014	18,240	406	0.01
	12	21,920	693	0.011	20,640	539	0.008	18,240	406	0.006
1.0	16	16,440	455	0.007	15,480	357	0.006	13,680	266	0.004
	2	24,600	1,463	0.09	23,300	1,246	0.07	20,500	931	0.05
	3	24,600	1,463	0.09	23,300	1,246	0.07	20,500	931	0.05
	4	24,600	1,463	0.063	23,300	1,246	0.049	20,500	931	0.035
	6	22,140	1,183	0.036	20,970	1,008	0.028	18,450	756	0.02
	8	22,140	1,183	0.036	20,970	1,008	0.028	18,450	756	0.02
	10	22,140	1,183	0.023	20,970	1,008	0.018	18,450	756	0.013
	12	19,680	938	0.023	18,640	798	0.018	16,400	595	0.013
	14	19,680	938	0.014	18,640	798	0.011	16,400	595	0.008
	16	14,760	616	0.014	13,980	525	0.011	12,300	392	0.008
	18	14,760	616	0.009	13,980	525	0.007	12,300	392	0.005
	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
	6	21,900	1,302	0.076	20,700	1,008	0.059	18,200	679	0.042
	8	19,710	1,057	0.043	18,630	819	0.034	16,380	553	0.024
	10	19,710	1,057	0.027	18,630	819	0.021	16,380	553	0.015
	12	19,710	1,057	0.027	18,630	819	0.021	16,380	553	0.015

➔ **ESRE714 series**

(mm)

Workpiece		Alloy steels, Carbon steels (SCM, SNCM, S45C)			Pre-hardened steels (NAK, CENA, KP4)			Hardened steels (SKD, SKT, STAVAX)		
Strength		~HrC35			HrC35~45			HrC45~55		
Conditions		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
Diameter(Ø)	Effective Length	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)
1.2	16	17,520	833	0.016	16,560	644	0.013	14,560	434	0.009
	18	17,520	833	0.016	16,560	644	0.013	14,560	434	0.009
	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
	8	17,280	924	0.05	16,290	644	0.039	14,400	483	0.028
	10	17,280	924	0.05	16,290	644	0.039	14,400	483	0.028
	12	17,280	924	0.05	16,290	644	0.039	14,400	483	0.028
	14	17,280	924	0.032	16,290	644	0.025	14,400	483	0.018
	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
	6	19,200	1,267	0.095	18,100	889	0.074	16,000	665	0.053
	8	17,280	1,029	0.054	16,290	721	0.042	14,400	539	0.03
	10	17,280	1,029	0.054	16,290	721	0.042	14,400	539	0.03
	12	17,280	1,029	0.054	16,290	721	0.042	14,400	539	0.03
	16	15,360	812	0.034	14,480	567	0.026	12,800	427	0.019
	18	15,360	812	0.034	14,480	567	0.026	12,800	427	0.019
	20	15,360	812	0.02	14,480	567	0.016	12,800	427	0.011
	25	11,520	532	0.014	10,860	371	0.011	9,600	280	0.008
1.6	30	11,520	532	0.014	10,860	371	0.011	9,600	280	0.008
	6	17,800	1,176	0.101	16,800	917	0.078	14,800	686	0.056
	8	17,800	1,176	0.101	16,800	917	0.078	14,800	686	0.056
	10	16,020	952	0.058	15,120	742	0.045	13,320	553	0.032
	12	16,020	952	0.058	15,120	742	0.045	13,320	553	0.032
	14	16,020	952	0.058	15,120	742	0.045	13,320	553	0.032
	16	16,020	952	0.036	15,120	752	0.028	13,320	553	0.02
	18	16,020	952	0.036	15,120	752	0.028	13,320	553	0.02
	20	14,240	756	0.036	13,440	588	0.028	11,840	441	0.02
1.8	25	14,240	756	0.036	13,440	588	0.028	11,840	441	0.02
	6	17,800	1,176	0.113	16,800	917	0.088	14,800	686	0.063
	8	17,800	1,176	0.113	16,800	917	0.088	14,800	686	0.063
	10	16,020	952	0.065	15,120	742	0.05	13,320	553	0.036
	12	16,020	952	0.065	15,120	742	0.05	13,320	553	0.036
	16	16,020	952	0.041	15,120	742	0.032	13,320	553	0.023
	20	14,240	756	0.041	13,440	588	0.032	11,840	441	0.023
2.0	25	14,240	756	0.041	13,440	588	0.032	11,840	441	0.023
	4	14,400	1,148	0.18	13,600	868	0.14	12,000	665	0.1
	6	14,400	1,148	0.18	13,600	868	0.14	12,000	665	0.1
	8	14,400	1,148	0.126	13,600	868	0.098	12,000	665	0.07
	10	14,400	1,148	0.126	13,600	868	0.098	12,000	665	0.07
	12	12,960	931	0.072	12,240	700	0.056	10,800	539	0.04
	14	12,960	931	0.072	12,240	700	0.056	10,800	539	0.04
	16	12,960	931	0.072	12,240	700	0.056	10,800	539	0.04
	18	12,960	931	0.045	12,240	700	0.035	10,800	539	0.025
	20	12,960	931	0.045	12,240	700	0.035	10,800	539	0.025
	22	11,520	735	0.045	10,880	553	0.035	9,600	427	0.025
2.5	25	11,520	735	0.045	10,880	553	0.035	9,600	427	0.025
	30	11,520	735	0.027	10,880	553	0.021	9,600	427	0.015
	10	12,300	1,358	0.158	11,600	952	0.123	10,300	714	0.088

 ESRE714 series

(mm)

Workpiece		Alloy steels, Carbon steels (SCM, SNCM, S45C)			Pre-hardened steels (NAK, CENA, KP4)			Hardened steels (SKD, SKT, STAVAX)		
Strength		~HrC35			HrC35~45			HrC45~55		
Conditions		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
Diameter(Ø)	Effective Length	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)
2.5	12	12,300	1,358	0.158	11,600	952	0.123	10,300	714	0.088
	16	11,070	1,099	0.09	10,440	770	0.07	9,270	581	0.05
	20	11,070	1,099	0.09	10,440	770	0.07	9,270	581	0.05
	25	9,840	868	0.056	9,280	609	0.044	8,240	455	0.031
	30	9,840	868	0.056	9,280	609	0.044	8,240	455	0.031
3.0	6	10,900	1,204	0.27	10,300	847	0.21	6,600	630	0.15
	8	10,900	1,204	0.27	10,300	847	0.21	6,600	630	0.15
	10	10,900	1,204	0.189	10,300	847	0.147	6,600	630	0.105
	12	10,900	1,204	0.189	10,300	847	0.147	6,600	630	0.105
	16	9,810	973	0.108	9,270	686	0.084	5,940	511	0.06
	20	9,810	973	0.108	9,270	686	0.084	5,940	511	0.06
	25	9,810	973	0.068	9,270	686	0.053	5,940	511	0.038
	30	9,810	973	0.068	9,270	686	0.053	5,940	511	0.038
	35	8,720	770	0.068	8,240	539	0.053	5,280	406	0.038
	40	8,720	770	0.041	8,240	539	0.032	5,280	406	0.023
	45	8,720	770	0.041	8,240	539	0.032	5,280	406	0.023
	50	6,540	504	0.027	6,180	357	0.021	3,960	266	0.015
	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
	16	8,380	1,158	0.135	7,920	816	0.105	5,070	608	0.075
	20	8,380	1,158	0.135	7,920	816	0.105	5,070	608	0.047
	25	8,380	1,158	0.085	7,920	816	0.066	5,070	608	0.047
	30	8,380	1,158	0.085	7,920	816	0.066	5,070	608	0.047
	35	7,450	916	0.085	7,040	641	0.066	4,510	483	0.047
	40	7,450	916	0.051	7,040	641	0.04	4,510	483	0.028
4.0	6	8,000	1,820	0.36	7,600	1,624	0.28	6,700	1,078	0.2
	8	8,000	1,820	0.36	7,600	1,624	0.28	6,700	1,078	0.2
	10	8,000	1,820	0.36	7,600	1,624	0.28	6,700	1,078	0.2
	12	8,000	1,820	0.36	7,600	1,624	0.28	6,700	1,078	0.2
	16	8,000	1,820	0.252	7,600	1,624	0.196	6,700	1,078	0.14
	20	8,000	1,820	0.252	7,600	1,624	0.196	6,700	1,078	0.14
	25	7,200	1,477	0.144	6,840	1,316	0.112	6,030	875	0.08
	30	7,200	1,477	0.144	6,840	1,316	0.112	6,030	875	0.08
	40	7,200	1,477	0.09	6,840	1,316	0.07	6,030	875	0.05
	45	6,400	1,162	0.09	6,080	1,036	0.07	5,360	693	0.05
	50	6,400	1,162	0.09	6,080	1,036	0.07	5,360	693	0.05
	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
	16	6,830	2,166	0.315	6,490	1,933	0.245	5,720	1,283	0.175
	20	6,830	2,166	0.315	6,490	1,933	0.245	5,720	1,283	0.175
	25	6,150	1,758	0.18	5,840	1,566	0.14	5,150	1,041	0.1
	30	6,150	1,758	0.18	5,840	1,566	0.14	5,150	1,041	0.1
	40	6,150	1,758	0.112	5,840	1,566	0.087	5,150	1,041	0.062
5.0	16	6,400	1,617	0.315	6,100	1,260	0.245	5,400	847	0.175
	20	6,400	1,617	0.315	6,100	1,260	0.245	5,400	847	0.175
	25	5,760	1,309	0.18	5,490	1,022	0.14	4,860	686	0.1
	30	5,760	1,309	0.18	5,490	1,022	0.14	4,860	686	0.1
	40	5,760	1,309	0.18	5,490	1,022	0.14	4,860	686	0.1

ESRE714 series

(mm)

Workpiece		Alloy steels, Carbon steels (SCM, SNCM, S45C)			Pre-hardened steels (NAK, CENA, KP4)			Hardened steels (SKD, SKT, STAVAX)		
Strength		~HRC35			HRC35~45			HRC45~55		
Conditions		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
Diameter(Ø)	Effective Length	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)
5.0	50	5,760	1,309	0.113	5,490	1,022	0.088	4,860	686	0.063
	60	5,120	1,036	0.113	4,880	805	0.088	4,320	539	0.063
6.0	20	5,300	1,477	0.378	5,000	1,148	0.294	4,400	770	0.21
	30	5,300	1,477	0.378	5,000	1,148	0.294	4,400	770	0.21
	40	4,770	1,197	0.216	4,500	931	0.168	3,960	623	0.12
	50	4,770	1,197	0.216	4,500	931	0.168	3,960	623	0.12
	60	4,370	958	0.141	4,171	931	0.11	3,690	623	0.078
8.0	25	4,000	1,330	0.504	3,800	1,050	0.392	3,300	700	0.28
	40	3,600	1,078	0.288	3,400	847	0.224	2,950	567	0.16
	50	3,600	1,078	0.288	3,400	847	0.224	2,950	567	0.16
10.0	30	3,200	1,260	0.9	3,050	952	0.7	2,630	560	0.5
	50	3,200	1,260	0.63	3,050	952	0.49	2,630	560	0.35
	60	3,200	1,260	0.63	3,050	952	0.49	2,630	560	0.35
12.0	40	2,650	1,120	0.756	2,520	840	0.588	2,180	490	0.42
	60	2,360	896	0.472	2,250	672	0.367	1,940	392	0.262
	70	2,360	896	0.472	2,250	672	0.367	1,940	392	0.262

Application Tip

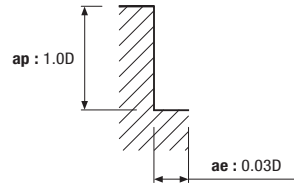


ESXE704, ESXE714, ESXR704 series _ Side cutting

(mm)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels							
	HRC40~50		HRC50~55		HRC55~60		HRC60~65		HRC65~70	
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
4.0	17,200	1,690	11,440	1,140	9,360	700	7,280	430	6,170	310
6.0	13,450	1,820	8,970	1,230	6,890	720	5,460	450	4,810	330
8.0	9,100	1,750	6,760	1,170	5,200	670	4,160	420	3,640	310
10.0	8,000	1,630	5,330	1,090	4,160	620	3,320	400	2,860	280
12.0	6,830	1,630	4,550	1,010	3,450	580	2,730	370	2,420	260

Application Tip

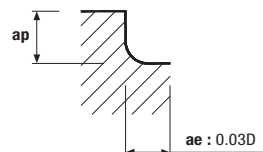


ESLNS20, ESLNS40 series

(mm)

Workpiece Conditions Diameter(Ø)	Alloy steels, Heat resistant steels HRC30~45			Hardened steels HRC45~55			Hardened steels HRC55~65			Copper, Copper alloy		
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ae (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ae (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ae (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ae (mm)
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ae (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ae (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ae (mm)	R.P.M n(min ⁻¹)	Feed 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

Application Tip

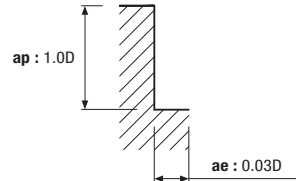


➤ ESR702 series _ Side cutting

(mm)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
2.0	33,300	960	26,000	776	17,500	480	14,500	296	11,000	184	9,500	132
3.0	21,800	960	17,300	776	11,500	480	9,500	296	7,500	184	6,400	132
4.0	16,700	1,000	13,200	800	8,800	500	7,200	308	5,600	192	4,750	136
5.0	15,700	1,160	12,500	920	8,300	568	6,400	328	5,100	208	4,450	152
6.0	13,100	1,080	10,350	880	6,900	552	5,300	320	4,200	204	3,700	148
8.0	9,880	1,056	7,800	824	5,200	508	4,000	292	3,200	188	2,800	136
10.0	7,800	960	6,150	776	4,100	472	3,200	272	2,550	176	2,200	128
12.0	6,650	960	5,250	776	3,500	472	2,650	272	2,100	176	1,860	128
16.0	4,900	840	3,900	672	2,600	416	2,000	240	1,600	152	1,400	112
20.0	3,900	760	3,100	600	2,050	380	1,600	220	1,300	140	1,100	100

Application Tip

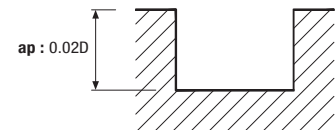
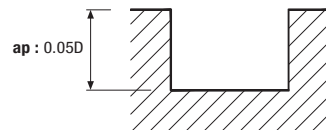


➤ ESR702, ESR732 series _ Slotting

(mm)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
2.0	33,300	680	26,000	544	17,500	336	14,500	208	11,000	128	9,500	92
3.0	21,800	680	17,300	544	11,500	336	9,500	208	7,500	128	6,400	92
4.0	16,700	704	13,200	560	8,800	352	7,200	216	5,600	136	4,750	94
5.0	15,700	800	12,500	644	8,300	400	6,400	228	5,100	144	4,450	106
6.0	13,100	760	10,350	616	6,900	384	5,300	224	4,200	144	3,700	104
8.0	9,880	744	7,800	576	5,200	356	4,000	204	3,200	132	2,800	96
10.0	7,800	680	6,150	544	4,100	332	3,200	192	2,550	124	2,200	90
12.0	6,650	680	5,250	544	3,500	332	2,650	192	2,100	124	1,860	90
16.0	4,900	584	3,900	464	2,600	292	2,000	168	1,600	108	1,400	78
20.0	3,900	528	3,100	420	2,050	268	1,600	168	1,300	100	1,100	70

Application Tip

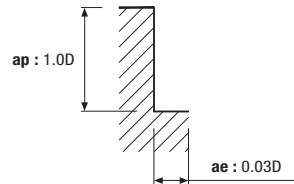


↪ ESR704, ESR714, ESR724, ESR734 series _ Side cutting

(mm)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
3.0	21,800	1,400	17,300	1,000	11,500	672	9,500	416	7,500	256	6,400	184
4.0	16,700	1,440	13,200	1,040	8,800	704	7,200	432	5,600	268	4,750	192
5.0	15,700	1,600	12,500	1,200	8,300	800	6,400	464	5,100	296	4,450	216
6.0	13,100	1,560	10,350	1,120	6,900	760	5,300	448	4,200	280	3,700	208
8.0	9,880	1,504	7,800	1,080	5,200	720	4,000	416	3,200	264	2,800	192
10.0	7,800	1,400	6,150	1,008	4,100	672	3,200	384	2,550	248	2,200	176
12.0	6,650	1,400	5,250	1,008	3,500	672	2,650	384	2,100	240	1,860	176
16.0	4,900	1,200	3,900	880	2,600	584	2,000	336	1,600	216	1,400	160
20.0	3,900	1,040	3,100	776	2,050	520	1,600	304	1,300	200	1,100	144

Application Tip

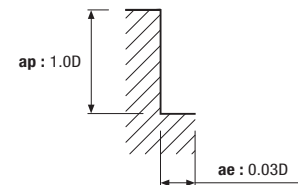
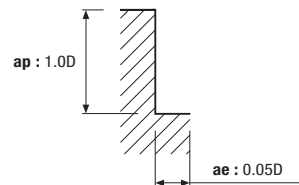


↪ ESR706 series

(mm)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
6.0	24,800	5,350	23,500	4,900	16,000	4,900	13,500	3,300	10,500	2,100	8,000	1,450
8.0	20,000	5,500	19,000	5,000	12,000	4,600	10,000	3,100	8,000	2,000	6,000	1,400
10.0	16,000	4,900	15,500	4,500	9,500	4,100	8,000	2,900	6,400	1,800	4,800	1,300
12.0	13,000	4,500	12,500	4,100	8,000	3,800	6,600	2,500	5,300	1,600	4,000	1,150
16.0	10,000	4,000	9,700	3,700	6,000	3,400	5,000	2,300	4,000	1,250	3,000	870
20.0	8,000	3,350	7,800	3,400	4,800	3,200	4,000	2,100	3,200	1,020	2,400	690

Application Tip



➔ **ESRR712 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HRC35~45		Hardened steels HRC45~55		High-hardened steels HRC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (ϕ)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed 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

 ESRR712 series

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (Ø)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed 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

➔ **ESRR712 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HRC35~45		Hardened steels HRC45~55		High-hardened steels HRC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter ($\varnothing$)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed 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	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

➔ **ESRR712 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (Ø)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
1.0	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

➔ **ESRR712 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HRC35~45		Hardened steels HRC45~55		High-hardened steels HRC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter ($\varnothing$)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed 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

➔ **ESRR712 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (Ø)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed 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	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	12,828	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	17,104	1,284	14,539	1,092	12,828	807	11,973	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	17,104	1,284	14,539	1,092	12,828	807	11,973	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
	0.2	30	0.01	11,312	719	9,615	611	8,484	480	7,918	391
		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

➤ **ESRR712 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HRC35~45		Hardened steels HRC45~55		High-hardened steels HRC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (ϕ)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
2.0	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	1,143	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	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

➔ **ESRR712 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (Ø)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
3.0	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	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	1,293	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	1,293	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

➔ **ESRR712 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HRC35~45		Hardened steels HRC45~55		High-hardened steels HRC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (Ø)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
4.0	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	1,293	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	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	1,541	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	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

ESRR712 series

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter ($\varnothing$)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
8.0	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	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	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	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

- Please adjust the cutting depth index according to the cutting depth factors of above table
- In actual machining, the condition should be adjusted according to the machining shape, purpose and machine type
- If RPM of the machine is low, the feed rate should be low in the same ratio as RPM

➔ **ESRR714 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HRC35~45		Hardened steels HRC45~55		High-hardened steels HRC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (Ø)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed 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	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

➔ **ESRR714 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (Ø)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
1.0	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

➤ **ESRR714 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HRC35~45		Hardened steels HRC45~55		High-hardened steels HRC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (Ø)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed 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

➔ **ESRR714 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (Ø)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed 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

ESRR714 series

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HRC35~45		Hardened steels HRC45~55		High-hardened steels HRC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (ϕ)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed 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	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

➔ **ESRR714 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (Ø)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
2.0	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

➔ **ESRR714 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HRC35~45		Hardened steels HRC45~55		High-hardened steels HRC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (Ø)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed 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	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

ESRR714 series

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (Ø)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
3.0	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	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	2,116	7,599	1,479	6,684	1,139
		20	0.055	10,255	2,496	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	1,505	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	2,116	7,599	1,479	6,684	1,139
		20	0.11	10,255	2,496	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	1,505	5,491	963	5,124	785
		40	0.07	9,247	2,000	6,225	1,262	5,217	842	4,621	643

➤ **ESRR714 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HRC35~45		Hardened steels HRC45~55		High-hardened steels HRC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (Ø)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
4.0	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	2,496	8,697	2,116	7,599	1,479	6,684	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	2,496	8,697	2,116	7,599	1,479	6,684	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	6,684	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	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
	0.3	16	0.24	9,154	2,786	7,781	23,68	6,866	1,671	6,408	1,365

➔ **ESRR714 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (Ø)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
5.0	0.3	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	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
8.0	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

➔ **ESRR714 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HRC35~45		Hardened steels HRC45~55		High-hardened steels HRC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter ($\varnothing$)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
8.0	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	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	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
		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

➔ **ESRR714 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (Ø)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
12.0	1	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	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	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

- Please adjust the cutting depth index according to the cutting depth factors of above table
- In actual machining, the condition should be adjusted according to the machining shape, purpose and machine type
- If RPM of the machine is low, the feed rate should be low in the same ratio as RPM

➔ **ESLNR20 series**

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HRC35~45		Hardened steels HRC45~55		High-hardened steels HRC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter ($\varnothing$)	Corner R	Neck length	Depth of Cut	R.P.M n (min ⁻¹)	Feed vf (mm/min)	R.P.M n (min ⁻¹)	Feed vf (mm/min)	R.P.M n (min ⁻¹)	Feed vf (mm/min)	R.P.M n (min ⁻¹)	Feed 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
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	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

 ESLNR20 series

(mm)

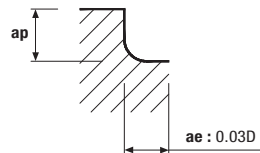
Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter (Ø)	Corner R	Neck length	Depth of Cut	R.P.M n (min ⁻¹)	Feed vf (mm/min)	R.P.M n (min ⁻¹)	Feed vf (mm/min)	R.P.M n (min ⁻¹)	Feed vf (mm/min)	R.P.M n (min ⁻¹)	Feed vf (mm/min)
1.0	0.1	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
	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
2.0	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
	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

ESLNR20 series

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HRC35~45		Hardened steels HRC45~55		High-hardened steels HRC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter ($\varnothing$)	Corner R	Neck length	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
3.0	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

Application Tip



- Please adjust the cutting depth index according to the cutting depth factors of above table
- In actual machining, the condition should be adjusted according to the machining shape, purpose and machine type
- If RPM of the machine is low, the feed rate should be low in the same ratio as RPM

 ESTNR20 series

(mm)

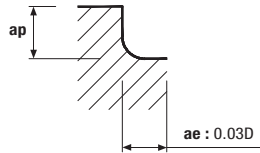
Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter ($\varnothing$)	Corner R	Neck length	Depth of Cut	R.P.M n (min ⁻¹)	Feed vf (mm/min)	R.P.M n (min ⁻¹)	Feed vf (mm/min)	R.P.M n (min ⁻¹)	Feed vf (mm/min)	R.P.M n (min ⁻¹)	Feed 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	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	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
	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

ESTNR20 series

(mm)

Workpiece				Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HRC35~45		Hardened steels HRC45~55		High-hardened steels HRC55~65	
Ratio to standard depth of cut				Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
Diameter ($\varnothing$)	Corner R	Neck length	Depth of Cut	R.P.M n (min ⁻¹)	Feed vf (mm/min)	R.P.M n (min ⁻¹)	Feed vf (mm/min)	R.P.M n (min ⁻¹)	Feed vf (mm/min)	R.P.M n (min ⁻¹)	Feed vf (mm/min)
2.0	0.5	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	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

Application Tip



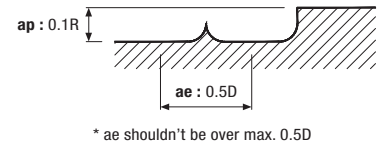
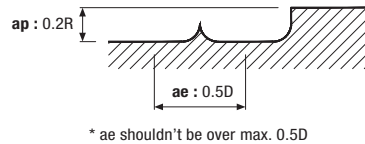
- Please adjust the cutting depth index according to the cutting depth factors of above table
- In actual machining, the condition should be adjusted according to the machining shape, purpose and machine type
- If RPM of the machine is low, the feed rate should be low in the same ratio as RPM

ESPM4 series _ Side cutting

(mm)

Workpiece Conditions Diameter(Ø) × R	Hardened steel Heat resistant alloy		Hardened steels							
	~HrC40		HrC40~50		HrC50~55		HrC55~60		HrC60~65	
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
3.0 × R0.5	9,550	6,500	6,900	4,150	4,550	2,750	2,850	1,150	1,900	610
4.0 × R0.5	7,950	7,000	5,750	4,600	4,000	3,200	2,550	1,350	1,750	700
6.0 × R0.5	5,800	7,650	4,100	4,900	2,900	3,500	1,850	1,850	1,350	795
6.0 × R1.0	5,800	7,650	4,100	4,900	2,900	3,500	1,850	1,850	1,350	795
8.0 × R1.0	4,350	7,650	3,050	4,900	2,200	3,500	1,400	1,850	995	795
8.0 × R2.0	4,350	7,650	3,050	4,900	2,200	3,500	1,400	1,850	995	795
10.0 × R1.0	3,500	7,650	2,450	4,900	1,750	3,500	1,100	1,850	795	795
10.0 × R2.0	3,500	7,650	2,450	4,900	1,750	3,500	1,100	1,850	795	795
12.0 × R2.0	2,900	7,650	2,050	4,900	1,450	3,500	925	1,850	665	795
12.0 × R3.0	2,900	7,650	2,050	4,900	1,450	3,500	925	1,850	665	795

Application Tip

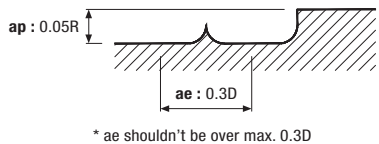
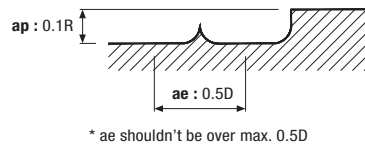


ESPM4 series _ High speed processing

(mm)

Workpiece Conditions Diameter(Ø) × R	Hardened steel Heat resistant alloy		Hardened steels							
	~HrC40		HrC40~50		HrC50~55		HrC55~60		HrC60~65	
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
3.0 × R0.5	22,000	16,000	17,000	10,000	12,500	8,000	9,500	4,600	6,900	2,500
4.0 × R0.5	17,000	17,500	13,000	12,000	11,000	9,200	8,000	5,500	5,600	2,900
6.0 × R0.5	13,500	18,500	10,500	13,800	9,000	11,000	6,400	6,400	4,500	3,600
6.0 × R1.0	13,500	18,500	10,500	13,800	9,000	11,000	6,400	6,400	4,500	3,600
8.0 × R1.0	10,000	18,500	8,000	14,000	6,800	11,000	4,800	6,700	3,400	4,100
8.0 × R2.0	10,000	18,500	8,000	14,000	6,800	11,000	4,800	6,700	3,400	4,100
10.0 × R1.0	8,000	18,500	6,400	14,000	5,400	11,000	3,800	6,800	2,700	3,800
10.0 × R2.0	8,000	18,500	6,400	14,000	5,400	11,000	3,800	6,800	2,700	3,800
12.0 × R2.0	6,600	18,500	5,300	14,000	4,500	11,000	3,200	7,000	2,250	3,600
12.0 × R3.0	6,600	18,500	5,300	14,000	4,500	11,000	3,200	7,000	2,250	3,600

Application Tip

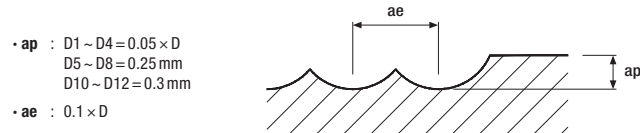


→ ESB702, ESB712 series

(mm)

Workpiece Conditions Diameter(Ø)	Hardened steel Heat resistant alloy		Hardened steels									
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed 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
1.0	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
2.0	49,700	5,700	47,800	4,800	40,000	4,000	35,000	3,150	32,000	2,800	28,500	2,300
3.0	33,100	6,000	31,800	5,300	26,500	4,000	23,500	3,150	21,000	28,00	19,000	2,300
4.0	24,900	6,000	23,900	5,300	20,000	4,000	17,500	3,150	16,000	2,800	14,500	2,300
5.0	18,600	5,800	17,800	4,900	15,000	3,750	13,500	3,050	11,500	2,550	10,500	2,100
6.0	13,900	4,850	13,400	4,100	11,000	3,100	10,000	2,500	8,800	2,150	8,000	1,750
8.0	11,100	4,200	10,700	3,500	9,000	2,700	8,000	2,150	7,000	1,850	6,500	1,550
10.0	9,300	3,700	8,900	3,100	7,500	2,400	6,600	1,900	5,800	1,650	5,300	1,380
12.0	6,950	2,950	6,680	2,500	5,600	1,900	5,000	1,550	4,400	1,250	4,000	1,050

Application Tip

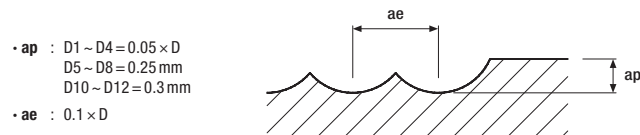


→ ESB703 series

(mm)

Workpiece Conditions D×R(mm)	Hardened steels											
	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
2.0	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
3.0	38,000	7,500	36,600	6,600	30,500	5,000	27,000	3,900	24,200	3,500	21,900	2,900
4.0	28,500	7,500	27,500	6,600	23,000	5,000	20,100	3,900	18,400	3,500	16,700	2,900
5.0	21,500	7,300	20,500	6,100	17,300	4,700	15,500	3,800	13,200	3,200	12,100	2,600
6.0	16,000	6,100	15,400	5,100	12,700	3,900	11,500	3,100	10,100	2,700	9,200	2,200
8.0	12,700	5,300	12,300	4,400	10,400	3,400	9,200	2,700	8,100	2,300	7,500	1,900
10.0	10,700	4,600	10,200	3,900	8,600	3,000	7,600	2,400	6,700	2,100	6,100	1,700
12.0	8,000	3,700	7,700	3,100	6,400	2,400	5,800	1,900	5,100	1,600	4,600	1,300

Application Tip



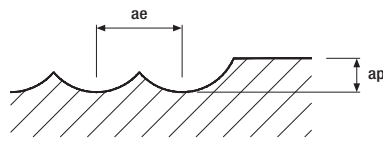
ESB734 series

(mm)

Workpiece	Hardened steels											
Conditions	HrC30~40		HrC40~50		HrC50~55		HrC55~60		HrC60~65		HrC65~70	
Diameter($\varnothing$)	R.P.M $n(\text{min}^{-1})$	Feed $v_f(\text{mm/min})$	R.P.M $n(\text{min}^{-1})$	Feed $v_f(\text{mm/min})$	R.P.M $n(\text{min}^{-1})$	Feed $v_f(\text{mm/min})$	R.P.M $n(\text{min}^{-1})$	Feed $v_f(\text{mm/min})$	R.P.M $n(\text{min}^{-1})$	Feed $v_f(\text{mm/min})$	R.P.M $n(\text{min}^{-1})$	Feed $v_f(\text{mm/min})$
2.0	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
3.0	41,400	9,000	39,800	8,000	33,100	6,000	29,400	4,700	26,300	4,200	23,800	3,500
4.0	31,100	9,000	29,900	8,000	25,000	6,000	21,900	4,700	20,000	4,200	18,100	3,500
5.0	23,300	8,700	22,300	7,400	18,800	5,600	16,900	4,600	14,400	3,800	13,100	3,200
6.0	17,400	7,300	16,800	6,200	13,800	4,700	12,500	3,800	11,000	3,200	10,000	2,600
8.0	13,900	6,300	13,400	5,300	11,300	4,100	10,000	3,200	8,800	2,800	8,100	2,300
10.0	11,600	5,600	11,100	4,700	9,400	3,600	8,300	2,900	7,300	2,500	6,600	2,100

Application Tip

- **ap** : D1 ~ D4 = $0.05 \times D$
D5 ~ D8 = 0.25 mm
D10 ~ D12 = 0.3 mm
- **ae** : $0.1 \times D$



➔ **ESRB712 series**

(mm)

Workpiece		Alloy steels, Carbon steels (SCM, SNCM, S45C)			Pre-hardened steels (NAK, CENA, KP4)			Hardened steels (SKD, SKT, STAVAX)		
Strength		~HrC35			HrC35~45			HrC45~55		
Conditions		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
Diameter(Ø)	Effective Length	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)
0.1	0.3	50,000	240	0.009	50,000	215	0.007	50,000	190	0.005
	0.5	50,000	240	0.006	50,000	215	0.005	50,000	190	0.004
	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
	1	50,000	335	0.013	50,000	310	0.010	43,200	260	0.007
	1.5	45,000	270	0.007	45,000	250	0.006	38,880	210	0.004
	2	45,000	270	0.005	45,000	250	0.004	38,880	210	0.003
	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
	1.5	50,000	475	0.019	50,000	430	0.015	42,800	365	0.011
	2	45,000	385	0.011	45,000	350	0.008	38,520	295	0.006
	2.5	45,000	385	0.007	45,000	350	0.005	38,520	295	0.004
	3	45,000	385	0.007	45,000	350	0.005	38,520	295	0.004
	4	40,000	305	0.004	40,000	275	0.003	34,240	235	0.002
	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
	1.5	41,000	490	0.025	38,800	425	0.020	34,200	340	0.014
	2	41,000	490	0.025	38,800	425	0.020	34,200	340	0.014
	2.5	36,900	395	0.014	34,920	345	0.011	30,780	275	0.008
	3	36,900	395	0.014	34,920	345	0.011	30,780	275	0.008
	4	36,900	395	0.009	34,920	345	0.007	30,780	275	0.005
	5	32,800	315	0.009	31,040	270	0.007	27,360	220	0.005
	6	32,800	315	0.005	31,040	270	0.004	27,360	220	0.003
	8	24,600	205	0.004	23,280	180	0.003	20,520	145	0.002
0.5	10	12,300	90	0.004	11,640	75	0.003	10,260	60	0.002
	1	34,200	685	0.045	32,300	580	0.035	28,500	515	0.025
	1.5	34,200	685	0.045	32,300	580	0.035	28,500	515	0.025
	2	34,200	685	0.032	32,300	580	0.025	28,500	515	0.018
	2.5	34,200	685	0.032	32,300	580	0.025	28,500	515	0.018
	3	30,780	555	0.018	29,070	470	0.014	25,650	415	0.010
	4	30,780	555	0.018	29,070	470	0.014	25,650	415	0.010
	5	30,780	555	0.011	29,070	470	0.009	25,650	415	0.006
	6	27,360	440	0.011	25,840	370	0.009	22,800	330	0.006
	8	20,520	290	0.007	19,380	245	0.005	17,100	215	0.004
	10	20,520	290	0.005	19,380	245	0.004	17,100	215	0.003
	12	10,260	125	0.005	9,690	105	0.004	8,550	95	0.003
	14	10,260	125	0.005	9,690	105	0.004	8,550	95	0.003
	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
	2	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
	3	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
	4	30,780	830	0.022	29,070	680	0.017	25,650	555	0.012
	5	30,780	830	0.014	29,070	680	0.011	25,650	555	0.008
	6	30,780	830	0.014	29,070	680	0.011	25,650	555	0.008

ESRB712 series

(mm)

Workpiece		Alloy steels, Carbon steels (SCM, SNCM, S45C)			Pre-hardened steels (NAK, CENA, KP4)			Hardened steels (SKD, SKT, STAVAX)		
Strength		~HrC35			HrC35~45			HrC45~55		
Conditions		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
Diameter(Ø)	Effective Length	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)
0.6	8	27,360	655	0.008	25,840	540	0.006	22,800	440	0.005
	10	20,520	430	0.005	19,380	355	0.004	17,100	290	0.003
	12	20,520	430	0.005	19,380	355	0.004	17,100	290	0.003
	14	10,260	185	0.005	9,690	150	0.004	8,550	125	0.003
	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
	4	30,780	915	0.025	29,070	755	0.020	25,650	620	0.014
	6	30,780	915	0.016	29,070	755	0.012	25,650	620	0.009
	8	27,360	725	0.016	25,840	595	0.012	22,800	490	0.009
	10	27,360	725	0.009	25,840	595	0.007	22,800	490	0.005
	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
	3	34,200	1,230	0.050	32,300	1,035	0.039	28,500	855	0.028
	4	34,200	1,230	0.050	32,300	1,035	0.039	28,500	855	0.028
	5	30,780	995	0.029	29,070	840	0.022	25,650	695	0.016
	6	30,780	995	0.029	29,070	840	0.022	25,650	695	0.016
	8	30,780	995	0.018	29,070	840	0.014	25,650	695	0.010
	10	27,360	785	0.018	25,840	660	0.014	22,800	545	0.010
	12	27,360	785	0.011	25,840	660	0.008	22,800	545	0.006
	14	20,520	515	0.007	19,380	435	0.006	17,100	360	0.004
	16	20,520	515	0.007	19,380	435	0.006	17,100	360	0.004
	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
	6	29,250	1,120	0.032	27,630	935	0.025	24,390	775	0.018
	8	29,250	1,120	0.020	27,630	935	0.016	24,390	775	0.011
	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
	3	30,800	1,540	0.090	29,100	1,310	0.070	25,700	1,075	0.050
	4	30,800	1,540	0.063	29,100	1,310	0.049	25,700	1,075	0.035
	5	30,800	1,540	0.063	29,100	1,310	0.049	25,700	1,075	0.035
	6	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
	7	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
	8	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
	10	27,720	1,245	0.023	26,190	1,060	0.018	23,130	870	0.013
	12	24,640	985	0.023	23,280	840	0.018	20,560	690	0.013
	14	24,640	985	0.014	23,280	840	0.011	20,560	690	0.008
	16	18,480	645	0.014	17,460	550	0.011	15,420	450	0.008
	18	18,480	645	0.009	17,460	550	0.007	15,420	450	0.005
	20	18,480	645	0.009	17,460	550	0.007	15,420	450	0.005
	22	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
	26	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
	30	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
	40	3,080	75	0.009	2,910	65	0.007	2,570	55	0.005
	50	3,080	75	0.006	2,910	65	0.005	2,570	55	0.003

➔ **ESRB712 series**

(mm)

Workpiece		Alloy steels, Carbon steels (SCM, SNCM, S45C)			Pre-hardened steels (NAK, CENA, KP4)			Hardened steels (SKD, SKT, STAVAX)		
Strength		~HrC35			HrC35~45			HrC45~55		
Conditions		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
Diameter(Ø)	Effective Length	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)
1.2	4	26,300	1,375	0.076	24,800	1,150	0.059	21,900	950	0.042
	6	26,300	1,375	0.076	24,800	1,150	0.059	21,900	950	0.042
	8	23,670	1,115	0.043	22,320	930	0.034	19,710	770	0.024
	10	23,670	1,115	0.027	22,320	930	0.021	19,710	770	0.015
	12	23,670	1,115	0.027	22,320	930	0.021	19,710	770	0.015
	16	21,040	880	0.016	19,840	735	0.013	17,520	610	0.009
	20	15,780	580	0.011	14,880	485	0.008	13,140	400	0.006
	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
	8	19,350	1,050	0.050	18,270	890	0.039	16,200	755	0.028
	10	19,350	1,050	0.050	18,270	890	0.039	16,200	755	0.028
	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
	5	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
	6	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
	7	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
	8	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.030
	10	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.030
	12	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.030
	14	21,510	1,280	0.034	20,340	1,100	0.026	18,000	870	0.019
	16	19,120	1,010	0.034	18,080	865	0.026	16,000	690	0.019
	18	19,120	1,010	0.034	18,080	865	0.026	16,000	690	0.019
	20	19,120	1,010	0.020	18,080	865	0.016	16,000	690	0.011
	22	19,120	1,010	0.020	18,080	865	0.016	16,000	690	0.011
	26	14,340	665	0.014	13,560	570	0.011	12,000	450	0.008
	30	14,340	665	0.014	13,560	570	0.011	12,000	450	0.008
	35	7,170	285	0.010	6,780	245	0.008	6,000	195	0.005
	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
	6	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
	8	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
	10	19,980	1,260	0.058	18,900	1,055	0.045	16,650	900	0.032
	12	19,980	1,260	0.058	18,900	1,055	0.045	16,650	900	0.032
	16	19,980	1,260	0.036	18,900	1,055	0.028	16,650	900	0.020
	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
	6	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
	8	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
	10	19,980	1,440	0.065	18,900	1,190	0.050	16,650	990	0.036
	12	19,980	1,440	0.065	18,900	1,190	0.050	16,650	990	0.036
	16	19,980	1,440	0.041	18,900	1,190	0.032	16,650	990	0.023
	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
	8	18,000	1,795	0.126	17,000	1,525	0.098	15,000	1,285	0.070

 ESRB712 series

(mm)

Workpiece		Alloy steels, Carbon steels (SCM, SNCM, S45C)			Pre-hardened steels (NAK, CENA, KP4)			Hardened steels (SKD, SKT, STAVAX)		
Strength		~HrC35			HrC35~45			HrC45~55		
Conditions		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
Diameter(Ø)	Effective Length	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)
2.0	10	18,000	1,795	0.126	17,000	1,525	0.098	15,000	1,285	0.070
	12	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
	14	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
	16	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
	18	16,200	1,455	0.045	15,300	1,235	0.035	13,500	1,040	0.025
	20	16,200	1,455	0.045	15,300	1,235	0.035	13,500	1,040	0.025
	22	14,400	1,150	0.045	13,600	975	0.035	12,000	820	0.025
	26	14,400	1,150	0.045	13,600	975	0.035	12,000	820	0.025
	30	14,400	1,150	0.027	13,600	975	0.021	12,000	820	0.015
	35	10,800	755	0.018	10,200	640	0.014	9,000	540	0.010
	40	10,800	755	0.018	10,200	640	0.014	9,000	540	0.010
	45	5,400	325	0.018	5,100	275	0.014	4,500	230	0.010
	50	5,400	325	0.018	5,100	275	0.014	4,500	230	0.010
	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
	10	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
	12	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
	16	14,220	1,560	0.090	13,410	1,300	0.070	11,880	1,055	0.050
	20	14,220	1,560	0.090	13,410	1,300	0.070	11,880	1,055	0.050
	22	14,220	1,560	0.056	13,410	1,300	0.044	11,880	1,055	0.031
	26	12,640	1,230	0.056	11,920	1,025	0.044	10,560	835	0.031
	30	12,640	1,230	0.056	11,920	1,025	0.044	10,560	835	0.031
	35	12,640	1,230	0.034	11,920	1,025	0.026	10,560	835	0.019
	40	9,480	810	0.034	8,940	675	0.026	7,920	550	0.019
	45	9,480	810	0.023	8,940	675	0.018	7,920	550	0.013
	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
	8	13,700	2,050	0.270	12,900	1,730	0.210	11,400	1,435	0.150
	10	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
	12	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
	14	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
	16	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.06
	18	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.06
	20	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.06
	22	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.06
	26	12,330	1,660	0.068	11,610	1,400	0.053	10,260	1,160	0.038
	30	12,330	1,660	0.068	11,610	1,400	0.053	10,260	1,160	0.038
	35	10,960	1,310	0.068	10,320	1,105	0.053	9,120	920	0.038
	40	10,960	1,310	0.041	10,320	1,105	0.032	9,120	920	0.023
	45	10,960	1,310	0.041	10,320	1,105	0.032	9,120	920	0.023
	50	8,220	860	0.027	7,740	725	0.021	6,840	605	0.015
	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
	10	9,800	1,965	0.360	9,300	1,670	0.280	8,200	1,395	0.200

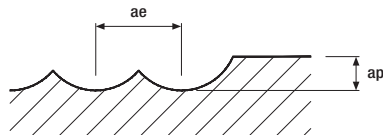
ESRB712 series

(mm)

Workpiece		Alloy steels, Carbon steels (SCM, SNCM, S45C)			Pre-hardened steels (NAK, CENA, KP4)			Hardened steels (SKD, SKT, STAVAX)		
Strength		~HrC35			HrC35~45			HrC45~55		
Conditions		~1100N/mm ²			1100~1500N/mm ²			1500~2000N/mm ²		
Diameter(Ø)	Effective Length	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ap (mm)
4.0	12	9,800	1,965	0.360	9,300	1,670	0.280	8,200	1,395	0.200
	14	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
	16	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
	18	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
	20	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
	22	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080
	26	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080
	30	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080
	35	8,820	1,590	0.090	8,370	1,355	0.070	7,380	1,130	0.050
	40	8,820	1,590	0.090	8,370	1,355	0.070	7,380	1,130	0.050
	45	7,840	1,260	0.090	7,440	1,070	0.070	6,560	895	0.050
	50	7,840	1,260	0.090	7,440	1,070	0.070	6,560	895	0.050
	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
	20	7,700	1,845	0.315	7,300	1,455	0.245	6,400	1,285	0.175
	26	6,930	1,495	0.180	6,570	1,180	0.140	5,760	1,040	0.100
	30	6,930	1,495	0.180	6,570	1,180	0.140	5,760	1,040	0.100
	35	6,930	1,495	0.180	6,570	1,180	0.140	5,760	1,040	0.100
	40	6,930	1,495	0.180	6,570	1,180	0.140	5,760	1,040	0.100
	50	6,930	1,495	0.113	6,570	1,180	0.088	5,760	1,040	0.063
	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
	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
	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
	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
	45	3,200	1,520	0.756	3,050	1,300	0.588	2,650	1,100	0.420

Application Tip

- **ap** : D1 ~ D4 = 0.05 × D
D5 ~ D8 = 0.25 mm
D10 ~ D12 = 0.3 mm
- **ae** : 0.1 × D



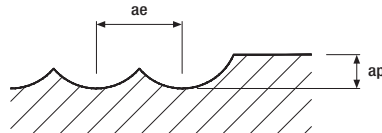
↪ ESLNB20 series

(mm)

Workpiece Conditions Diameter(Ø)	Alloy steels, Heat resistant steels HRC30~45			Hardened steels HRC45~55			Hardened steels HRC55~65			Copper, Copper alloy		
	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ae (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ae (mm)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	ae (mm)	R.P.M n(min ⁻¹)	Feed 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

Application Tip

- ap : D1 ~ D4 = 0.05 × D
D5 ~ D8 = 0.25 mm
D10 ~ D12 = 0.3 mm
- ae : 0.1 × D



ESTNB20 series

(mm)

Workpiece					Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut					Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
R (mm)	Diameter (Ø)	Neck length	Neck Angle (°)	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed 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
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

ESTNB20 series

(mm)

Workpiece					Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HRC35~45		Hardened steels HRC45~55		High-hardened steels HRC55~65	
Ratio to standard depth of cut					Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
R (mm)	Diameter (Ø)	Neck length	Neck Angle (°)	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
0.9	1.8	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
1.0	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
2.0	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
3.0	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

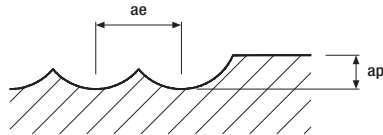
ESTNB20 series

(mm)

Workpiece					Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut					Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
R (mm)	Diameter (Ø)	Neck length	Neck Angle (°)	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)
3.0	6	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
4.0	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
5.0	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

Application Tip

- **ap** : D1 ~ D4 = 0.05 × D
D5 ~ D8 = 0.25 mm
D10 ~ D12 = 0.3 mm
- **ae** : 0.1 × D



- Please adjust the cutting depth index according to the cutting depth factors of above table.
- For Rib or Slotting machining process which are not easy for chip ejection, please reduce the cutting depth by 20~30% from the above cutting condition.
ex) ESTNB2040-20-10, HrC 55, Rib processing
ex) Cutting depth: $0.32(\text{standard cutting depth}) \times 0.65 \times 0.8 = 0.17 \text{ mm}$
- In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
- If RPM of the machine is low, the feed rate should be low in the same ratio as RPM.

 ESTNB30 series

(mm)

Workpiece					Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut					Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
R (mm)	Diameter (Ø)	Neck length	Neck Angle (°)	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed 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

 ESTNB30 series

(mm)

Workpiece					Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut					Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
R (mm)	Diameter (Ø)	Neck length	Neck Angle (°)	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed 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
1.0	2	40	0.4	0.015	8,000	1,152	5,600	706	5,200	655	5,200	562
		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

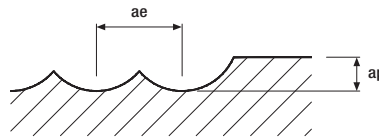
➡ ESTNB30 series

(mm)

Workpiece					Carbon steels, Alloy steels 180~250HB		Pre-hardened steels HrC35~45		Hardened steels HrC45~55		High-hardened steels HrC55~65	
Ratio to standard depth of cut					Depth of Cut × 100%		Depth of Cut × 80%		Depth of Cut × 65%		Depth of Cut × 60%	
R (mm)	Diameter (Ø)	Neck length	Neck Angle (°)	Depth of Cut	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed vf(mm/min)	R.P.M n(min ⁻¹)	Feed 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
2.0	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
3.0	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
4.0	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
5.0	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

Application Tip

- ap : D1 ~ D4 = $0.05 \times D$
D5 ~ D8 = 0.25 mm
D10 ~ D12 = 0.3 mm
- ae : $0.1 \times D$



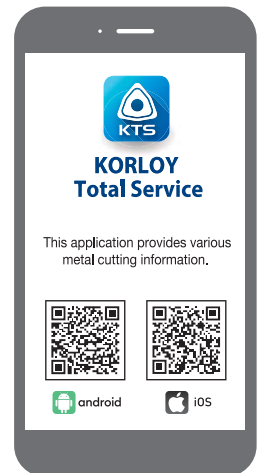
- Please adjust the cutting depth index according to the cutting depth factors of above table.
- For Rib or Slotting machining process which are not easy for chip ejection, please reduce the cutting depth by 20~30% from the above cutting condition.
ex) ESTNB2040-20-10, HrC 55, Rib processing
ex) Cutting depth: $0.32(\text{standard cutting depth}) \times 0.65 \times 0.8 = 0.17 \text{ mm}$
- In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
- If RPM of the machine is low, the feed rate should be low in the same ratio as RPM.

⚠ For the safe metalcutting

- Use safety supplies such as protective gloves to prevent possible injury while touching the edge of tools.
- Use safety glasses or safety cover to hedge possible dangers. Inappropriate usage or excessive cutting condition may lead tool's breakage or even the fragment's scattering.
- Clamp the workpiece tightly enough to prevent its movement while its machining.
- Properly manage the tool change phase because the inordinately used tool can be easily broken under the excessive cutting load or severe wear, and it may threat the operator's safety.
- Use safety cover because chips evacuated during cutting are hot and sharp and may cause burns and cuts. To remove chips safely, stop machining, put on protective gloves, and use a hook or other tools.
- Prepare for fire prevention measures as the use of the non-water soluble cutting oil may cause fire.
- Use safety cover and other safety supplies because the spare parts or the inserts can be pulled out due to centrifugal force while high speed machining.



Head Office: Holystar B/D, 326, Seocho-daero, Seocho-gu, Seoul, 06633, Republic of Korea
Tel: +82-2-522-3181 Fax: +82-2-522-3184, +82-2-3474-4744 Web: www.korloy.com E-mail: sales.khq@korloy.com



KORLOY AMERICA

620 Maple Avenue, Torrance, CA 90503, USA
Tel : +1-310-782-3800 Toll Free : +1-888-711-0001 Fax : +1-310-782-3885
E-mail : sales.kai@korloy.com

KORLOY INDIA

Plot No. 415, Sector 8, IMT Manesar, Gurgaon 122051, Haryana, India
Tel : +91-124-4391790 Fax : +91-124-4050032
E-mail : sales.kip@korloy.com

KORLOY TURKIYE

Serifali Mahallesi, Burhan Sokak NO: 34
Dudullu OSB/Umraniye/Istanbul, 34775, Turkey
Tel : +90-216-415-8874 E-mail : sales.kti@korloy.com

KORLOY RUSSIA

123242, Moscow, vn.ter.g. municipal district Presnensky,
per Kapranova, house 3 building 3, premises 1/3
Tel : +7-495-280-1458 Fax : +7-495-280-1459 E-mail: tech.sales@korloy.ru

KORLOY EUROPE

Gablonzer Str. 25-27, 61440 Oberursel, Germany
Tel : +49-6171-277-83-0 Fax : +49-6171-277-83-59
E-mail : sales.keg@korloy.com

KORLOY BRASIL

Av. Aruana 280, conj.12, WLC, Alphaville, Barueri,
CEP06460-010, SP, Brasil
Tel : +55-11-4193-3810 E-mail : sales.kbl@korloy.com

KORLOY CHILE

Av. Providencia 1650, Office 1009, 7500027
Providencia-Santiago, Chile
Tel : +56-229-295-490 E-mail : sales.kcs@korloy.com

KORLOY MEXICO

Avenida de las ciencias, No.3015, Interior 507, Juriquilla, Santa Fe,
Queretaro, Queretaro, C.P. 76230
Tel: +52-442-673-7388 E-mail: sales.kml@korloy.com