NEW

EconoStar

FOR HIGH HARDNESS

Suitable for High Hardness
HRc 50 ~ 63

Excellent Coating in high temperature hardness and heat resistance

High precision tolerance for precision machining

WIDIN
DINE GROUP

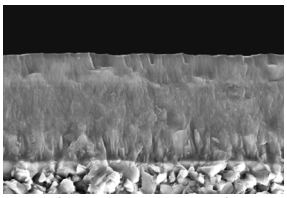
Econo Star

FOR HIGH HARDNESS

Special feature

- HRc50~63 Carbide endmill for high hardness steel
- Appropriate for precision machining by applying high precision tolerance on cutting diameter and radius

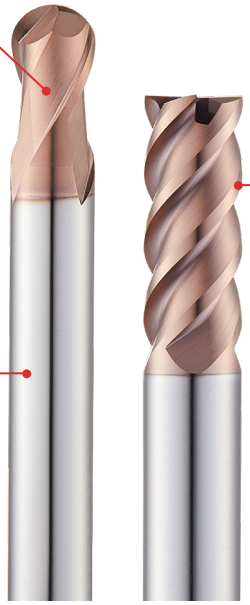
Adopt a high hardness coating



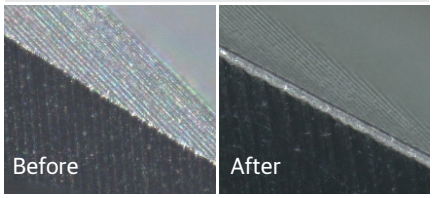
- High-content Si ingredient
- Improved wear resistance
- Stability for frictional heat

Adopt a high hardness raw-material

- Formation by ultra-micro WC + Co. 9%
- Expansion of versatility by special toughness

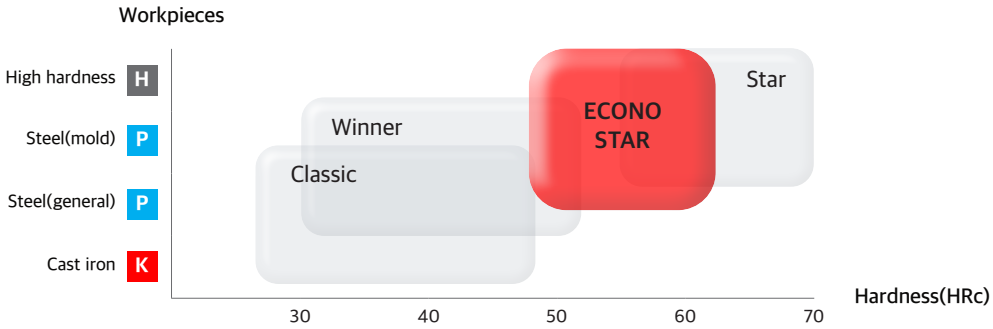


Treatment of toughness

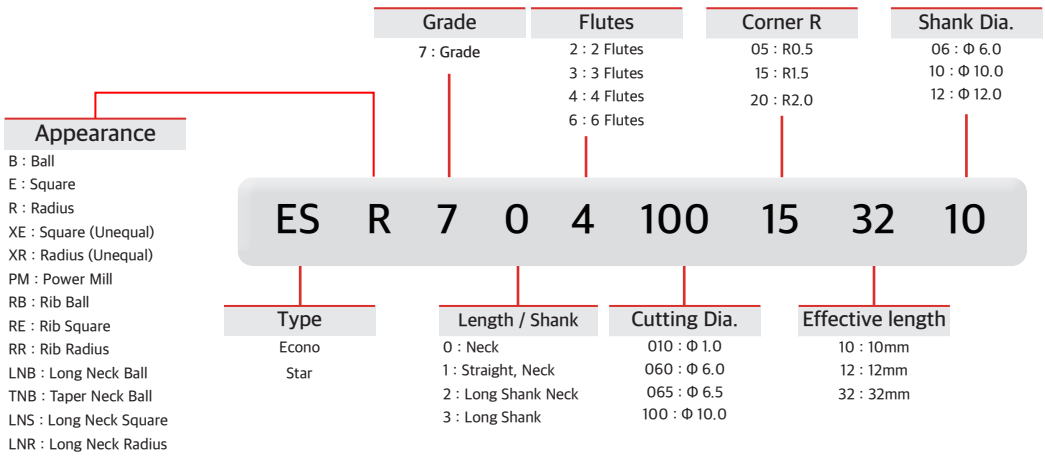


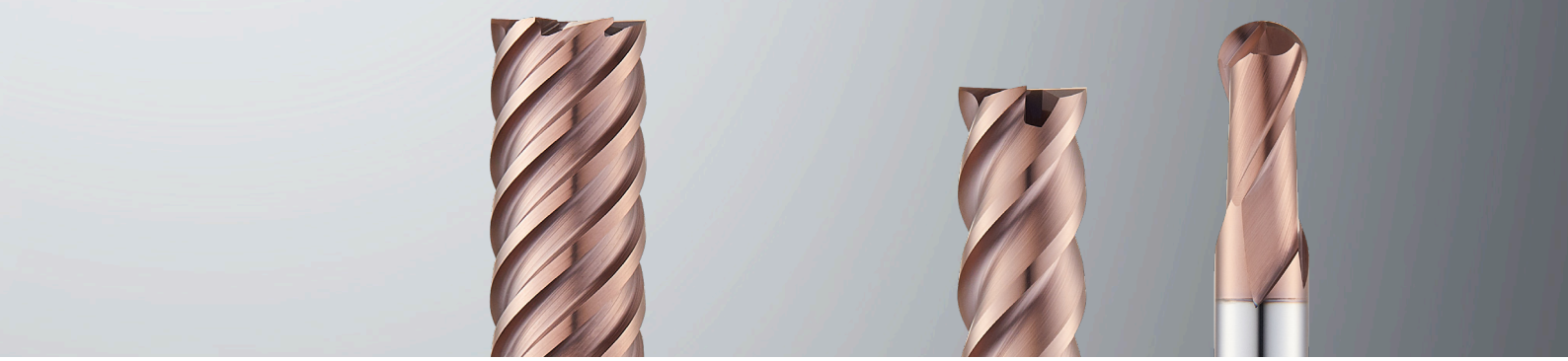
- Improved chipping resistance
- Improved wear resistance, induce to stable work

Applicable Working Material



EDP No. System

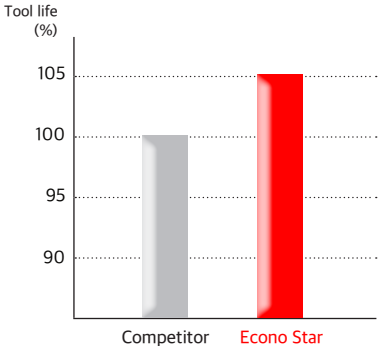


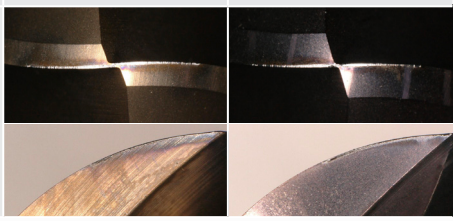


Case study

2F D12.0 BALL ENDMILL

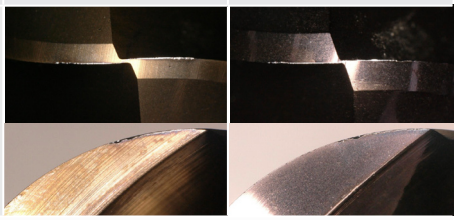
STD61 (HRc50~55)



	Competitor	Econo Star
2F D12		

Cutting condition
rpm : 3,450 / vc : 130 / vf : 828 / fz : 0.06 / ap : 12 / ae : 0.4 / coolant : AIR

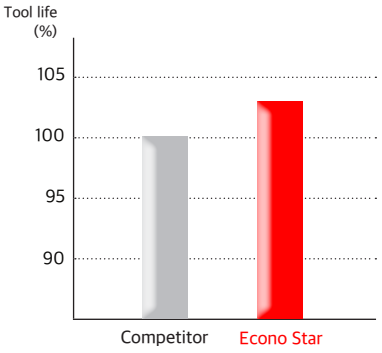
STD11 (HRc60~63))

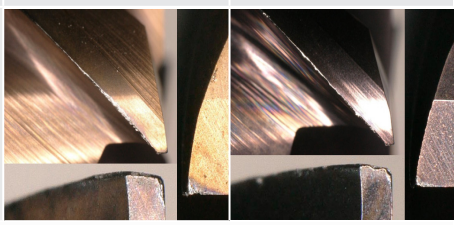
	Competitor	Econo Star
2F D12		

Cutting condition
rpm : 3,981 / vc : 150 / vf : 955 / fz : 0.12 / ap : 0.4 / ae : 0.6 / coolant : AIR

4F D12.0 SQ ENDMILL

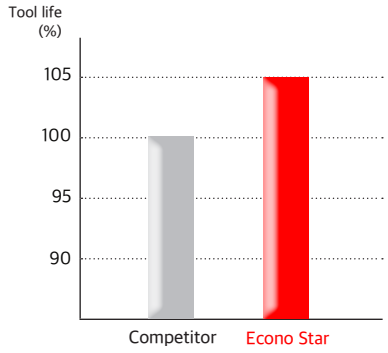
STD61 (HRc50~55)

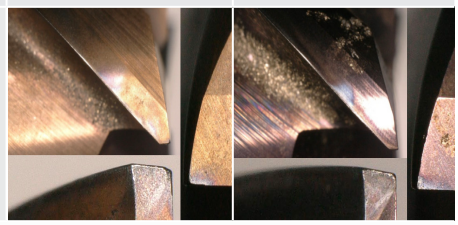


	Competitor	Econo Star
4F D12		

Cutting condition
rpm : 3,450 / vc : 130 / vf : 828 / fz : 0.06 / ap : 12 / ae : 0.4 / coolant : AIR

STD11 (HRc60~63))



	Competitor	Econo Star
4F D12		

Cutting condition
rpm : 1,858 / vc : 70 / vf : 297 / fz : 0.04 / ap : 12 / ae : 0.4 / coolant : AIR

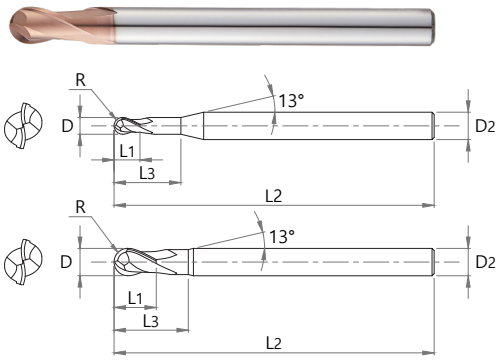
Econo Star

FOR HIGH HARDNESS

EDP No.	Appearance	Type	Standard	Page
ESB702		2 FLUTES NECK TYPE BALL ENDMILL	R0.5 ~ R6.0	5
ESB712		2 FLUTES BALL ENDMILL	R0.5 ~ R6.0	6
ESB703		3 FLUTES NECK TYPE BALL ENDMILL	R1.0 ~ R6.0	7
ESB734		4 FLUTES 15° HELIX BALL ENDMILL	R1.0 ~ R5.0	8
ESE702		2 FLUTES NECK TYPE SQUARE ENDMILL	D0.1 ~ D20.0	9
ESE712		2 FLUTES SQUARE ENDMILL	D1.0 ~ D12.0	10
ESE704		4 FLUTES NECK TYPE SQUARE ENDMILL	D1.0 ~ D20.0	11
ESE714		4 FLUTES HIGH HELIX SQUARE ENDMILL	D1.0 ~ D12.0	12
ESE724(6)		4 & 6 FLUTES HIGH HELIX SQUARE ENDMILL	D1.0 ~ D12.0	13
ESE716		6 FLUTES HIGH HELIX SQUARE ENDMILL	D6.0 ~ D20.0	14
ESR702		2 FLUTES NECK TYPE RADIUS ENDMILL	D1.0 ~ D12.0	15
ESR732		2 FLUTES LONG SHANK RADIUS ENDMILL	D1.0 ~ D12.0	18
ESR704		4 FLUTES NECK TYPE RADIUS ENDMILL	D1.0 ~ D12.0	19
ESR714		4 FLUTES RADIUS ENDMILL	D3.0 ~ D12.0	21
ESR724		4 FLUTES NECK TYPE RADIUS ENDMILL	D6.0 ~ D12.0	22
ESR734		4 FLUTES LONG SHANK RADIUS ENDMILL	D1.0 ~ D12.0	23
ESR706		6 FLUTES NECK TYPE RADIUS ENDMILL	D6.0 ~ D12.0	24
ESR736		6 FLUTES RADIUS ENDMILL	D6.0 ~ D12.0	25
ESRB712		2 FLUTES RIB BALL ENDMILL	R0.05 ~ R6.0	26
ESRE712		2 FLUTES RIB SQUARE ENDMILL	D0.1 ~ D12.0	30
ESXE704		4 FLUTES NECK TYPE SQUARE ENDMILL	D1.0 ~ D12.0	33
ESXE714		4 FLUTES SQUARE ENDMILL	D2.0 ~ D12.0	34
ESXR704		4 FLUTES NECK TYPE RADIUS ENDMILL	D1.0 ~ D12.0	35
ESLNB		2 FLUTES LONG NECK BALL ENDMILL	R0.05 ~ R2.5	36
ESTNB20		2 FLUTES TAPER NECK BALL ENDMILL	R0.1 ~ R5.0	40
ESTNB30		3 FLUTES TAPER NECK BALL ENDMILL	R1.0 ~ R2.5	43
ESLNS		2 FLUTES LONG NECK SQAURE ENDMILL	D0.1 ~ D5.0	45
ESLNS40		4 FLUTES LONG NECK SQAURE ENDMILL	D1.0 ~ D5.0	49
ESLNR		2 FLUTES LONG NECK RADIUS ENDMILL	D0.2 ~ D3.0	51
ESTNR		2 FLUTES TAPER NECK RADIUS ENDMILL	D0.2 ~ D3.0	54
ESPM4		4 FLUTES NECK TYPE RADIUS ENDMILL	D3.0 ~ D12.0	56
Recommended				57

ESB702

2 FLUTES NECK TYPE BALL ENDMILL



- Precise R tolerance on cutting edge ensures high precision machining
- High cutting edge strength by adopting the optimum rake angle

ULTRA FINE | 2 | 30° HELIX | R ±0.005 R3≥ | R ±0.008 R3< | AlTiN | Recommended p.57

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESB702001	0.1	0.05	0.15	-	40	4
ESB702002	0.2	0.1	0.3	-	40	4
ESB702003	0.3	0.15	0.5	-	40	4
ESB702004	0.4	0.2	0.6	-	40	4
ESB702005	0.5	0.25	0.7	-	40	4
ESB702006	0.6	0.3	0.9	-	40	4
ESB702007	0.7	0.35	1.1	-	40	4
ESB702008	0.8	0.4	1.2	-	40	4
ESB702009	0.9	0.45	1.4	-	40	4
ESB702010	1	0.5	1.5	3	50	6
ESB702010S4	1	0.5	1.5	-	45	4
ESB702015	1.5	0.75	2	4	50	6
ESB702015S4	1.5	0.75	2	-	45	4
ESB702020	2	1	2.5	5	50	6
ESB702020S4	2	1	2.5	-	45	4
ESB702025	2.5	1.25	3	7	50	6
ESB702030	3	1.5	4	10	60	6

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESB702030S	3	1.5	4	10	50	6
ESB702030S4	3	1.5	4	-	45	4
ESB702031	3	1.5	4	10	70	6
ESB702040	4	2	5	10	60	6
ESB702040S	4	2	5	10	50	6
ESB702040S4	4	2	5	-	45	4
ESB702041	4	2	5	10	70	6
ESB702050	5	2.5	6	12	60	6
ESB702060	6	3	7	12	60	6
ESB702061	6	3	7	12	90	6
ESB702080	8	4	9	15	70	8
ESB702081	8	4	9	15	100	8
ESB702100	10	5	11	25	75	10
ESB702101	10	5	11	25	100	10
ESB702120	12	6	12	25	80	12
ESB702121	12	6	12	25	110	12

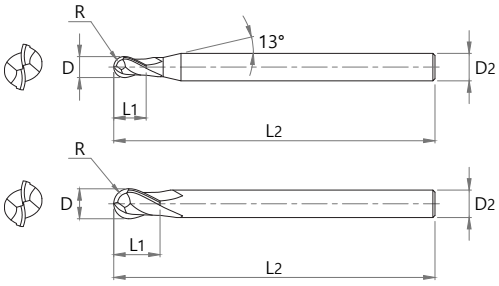
■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESB712

2 FLUTES BALL ENDMILL



- Precise R tolerance on cutting edge ensures high precision machining
- High cutting edge strength by adopting the optimum rake angle

ULTRA FINE | 2 | 30° HELIX | R ±0.005 R3≥ | R ±0.008 R3< | AlTiN | Recommended p.57

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

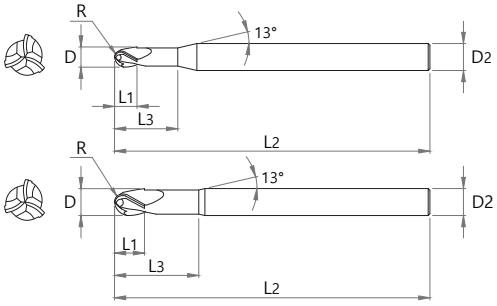
EDP No.	Dimensions(mm)				
	D	R	L1	L2	D2
ESB712010	1	0.5	2.5	50	6
ESB712010S	1	0.5	1.5	40	6
ESB712010S4	1	0.5	2.5	50	4
ESB712012	1.2	0.6	3	50	6
ESB712015	1.5	0.75	4	50	6
ESB712015S	1.5	0.75	2.5	40	6
ESB712015S4	1.5	0.75	4	50	4
ESB712020	2	1	5	50	6
ESB712020S	2	1	3	40	6
ESB712020S4	2	1	5	50	4
ESB712025	2.5	1.25	7	60	6
ESB712030	3	1.5	8	60	6
ESB712030S	3	1.5	4.5	50	6
ESB712030S4	3	1.5	8	60	4
ESB712040	4	2	8	70	6
ESB712040S	4	2	6	50	6
ESB712050	5	2.5	10	80	6
ESB712050S	5	2.5	7.5	50	6
ESB712060	6	3	12	90	6
ESB712060S	6	3	9	50	6
ESB712080S	8	4	12	50	8
ESB712081	8	4	14	100	8
ESB712100	10	5	18	100	10
ESB712100S	10	5	15	60	10
ESB712120	12	6	22	110	12
ESB712120S	12	6	18	60	12

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESB703



- Precise R tolerance on cutting edge ensures high precision machining
- High cutting edge strength by adopting the optimum rake angle
- Excellent medium/finishing work by 3 Flutes

ULTRA FINE | 3 | 30° HELIX | R ±0.005 R3≥ | R ±0.008 R3< | AlTiN | Recommended p.57

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESB703020	2	1	2.5	5	50	6
ESB703025	2.5	1.25	3	7	50	6
ESB703030	3	1.5	4	10	60	6
ESB703030S	3	1.5	4	10	50	6
ESB703031	3	1.5	4	10	70	6
ESB703040	4	2	5	10	60	6
ESB703040S	4	2	5	10	50	6
ESB703041	4	2	5	10	70	6
ESB703050	5	2.5	6	12	60	6
ESB703060	6	3	7	12	60	6
ESB703061	6	3	7	12	90	6
ESB703080	8	4	9	15	70	8
ESB703081	8	4	9	15	100	8
ESB703100	10	5	11	25	75	10
ESB703101	10	5	11	25	100	10
ESB703120	12	6	12	25	80	12
ESB703121	12	6	12	25	110	12

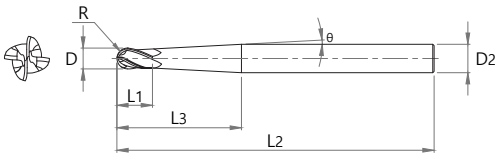
■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESB734

4 FLUTES 15° HELIX BALL ENDMILL



- Precise R tolerance on cutting edge ensures high precision machining
- High cutting edge strength by adopting the optimum rake angle
- Minimized the Neck broken and chatter by adopt a Taper type
- Suitable to depth machining by adopt a long shank type

ULTRA FINE | 4 | 15° HELIX | R ±0.005 R3≥ | R ±0.008 R3< | AlTiN | Recommended p.58

■ Tolerance

D		Shank Dia.
All sizes	0~-0.012	h5

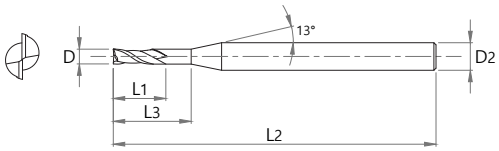
EDP No.	Dimensions(mm)						
	D	R	L1	L3	L2	θ	D2
ESB734020-2.5	2	1	2	25	60	2.5	4
ESB734020-3.5	2	1	2	18	60	3.5	4
ESB734025-2.5	2.5	1.25	3	20	60	2.5	4
ESB734025-3.0	2.5	1.25	3	17	60	3	4
ESB734030-2.0	3	1.5	3	46	70	2	6
ESB734030-2.5	3	1.5	3	37	70	2.5	6
ESB734040-2.0	4	2	4	33	70	2	6
ESB734040-2.5	4	2	4	27	70	2.5	6
ESB734050-2.5	5	2.5	5	16	70	2.5	6
ESB734060-1.5	6	3	6	44	100	1.5	8
ESB734060-2.5	6	3	6	29	100	2.5	8
ESB734080-1.5	8	4	8	46	100	1.5	10
ESB734080-2.5	8	4	8	31	100	2.5	10
ESB734100-1.5	10	5	10	48	110	1.5	12
ESB734100-2.5	10	5	10	33	110	2.5	12

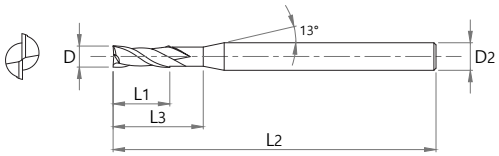
■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESE702





ULTRA FINE | 2 | 30° HELIX | AlTiN | Recommended

p.58

- Reinforced cutting edge by applying the optimum slope
- Improved cutting edge strength by optimal draft angle

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 20	0 ~ -0.015mm	

EDP No.	Dimensions(mm)				
	D	L1	L3	L2	D2
ESE702001	0.1	0.2	-	40	4
ESE702002	0.2	0.4	-	40	4
ESE702003	0.3	0.5	-	40	4
ESE702004	0.4	0.7	-	40	4
ESE702005	0.5	1	-	40	4
ESE702006	0.6	1.2	-	40	4
ESE702007	0.7	1.4	-	40	4
ESE702008	0.8	1.6	-	40	4
ESE702009	0.9	2	-	40	4
ESE702010	1	1.5	-	40	6
ESE702010S4	1	1.5	-	40	4
ESE702015	1.5	2.2	-	40	6
ESE702020	2	3	6	40	6
ESE702020S4	2	3	6	40	4
ESE702025	2.5	4	6	40	6
ESE702030	3	4	7	45	6
ESE702035	3.5	6	9	45	6
ESE702040	4	6	9	45	6
ESE702045	4.5	6	10	45	6
ESE702050	5	6	11	50	6
ESE702060	6	7	14	50	6
ESE702080	8	9	18	60	8
ESE702100	10	12	25	75	10
ESE702120	12	15	30	75	12
ESE702160	16	18	38	90	16
ESE702200	20	24	45	100	20

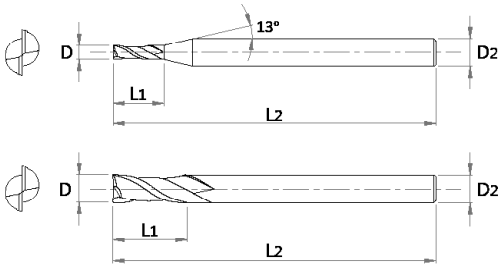
■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESE712

2 FLUTES SQUARE ENDMILL



- Reinforced cutting edge by applying the optimum slope
- Improved cutting edge strength by optimal draft angle

ULTRA FINE | 2 | 35° HELIX | AlTiN | Recommended

p.60

■ Tolerance

D		Shank Dia.
~ D7	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

EDP No.	Dimensions(mm)			
	D	R	L1	L3
ESE712010	1	3	40	6
ESE712010-02	1	2	40	6
ESE712010-02S4	1	2	40	4
ESE712010-04	1	4	40	6
ESE712012	1.2	3	40	6
ESE712015	1.5	4	40	6
ESE712015S4	1.5	4	40	4
ESE712015-06	1.5	6	40	6
ESE712015-08	1.5	8	40	6
ESE712020	2	5	40	6
ESE712020S4	2	5	40	4
ESE712020-08	2	8	40	6
ESE712020-10	2	10	50	6
ESE712025	2.5	6	40	6
ESE712025S4	2.5	6	40	4
ESE712030	3	8	45	6
ESE712030S4	3	8	45	4
ESE712030-10	3	10	50	6

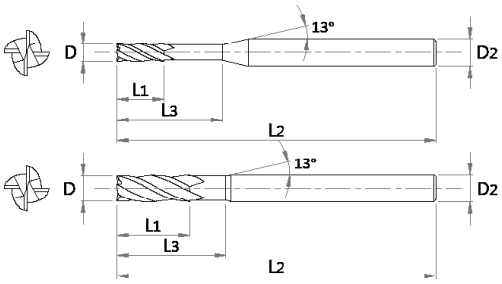
EDP No.	Dimensions(mm)			
	D	R	L1	L3
ESE712030-12	3	12	50	6
ESE712035	3.5	10	45	6
ESE712040	4	10	45	6
ESE712040S4	4	10	45	4
ESE712040-12	4	12	50	6
ESE712040-16	4	16	60	6
ESE712045	4.5	11	45	6
ESE712050	5	13	50	6
ESE712055	5.5	13	50	6
ESE712060	6	13	50	6
ESE712060-15	6	15	60	6
ESE712065	6.5	16	60	8
ESE712070	7	18	60	8
ESE712080	8	19	60	8
ESE712100	10	22	70	10
ESE712100-25	10	25	70	10
ESE712120	12	26	75	12
ESE712120-30	12	30	75	12

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESE704



- Reinforced cutting edge by applying the optimum slope
- Improved cutting edge strength by optimal draft angle

ULTRA FINE | 4 | 30° HELIX | AlTiN | Recommended

p.59

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 20	0 ~ -0.015mm	

EDP No.	Dimensions(mm)				
	D	L1	L3	L2	D2
ESE704010	1	1.5	-	40	6
ESE704010S4	1	1.5	-	40	4
ESE704015	1.5	2.2	-	40	6
ESE704015S4	1.5	2.2	-	40	4
ESE704020	2	3	6	40	6
ESE704020S4	2	3	6	40	4
ESE704025	2.5	4	6	40	6
ESE704025S4	2.5	4	6	40	4
ESE704030	3	4	7	45	6
ESE704030S4	3	4	7	45	4
ESE704035	3.5	5	9	45	6
ESE704040	4	5	9	45	6
ESE704040S4	4	5	9	45	4
ESE704045	4.5	6	10	45	6
ESE704050	5	6	11	50	6
ESE704060	6	7	14	50	6
ESE704080	8	9	18	60	8
ESE704100	10	12	25	75	10
ESE704120	12	15	30	75	12
ESE704160	16	18	38	90	16
ESE704200	20	24	45	100	20

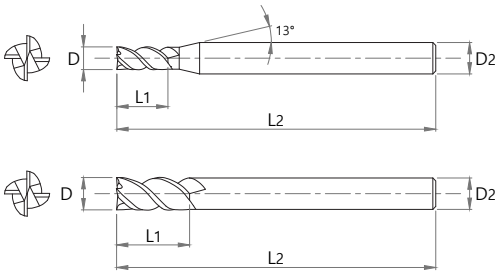
■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESE714

4 FLUTES HIGH HELIX SQUARE ENDMILL



- Reinforced cutting edge by applying the optimum slope
- Improved cutting edge strength by optimal draft angle
- Improved by 45° Helix

ULTRA FINE | 4 | 45° HELIX | AlTiN | Recommended

p.59

■ Tolerance

D		Shank Dia.
~ D7	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

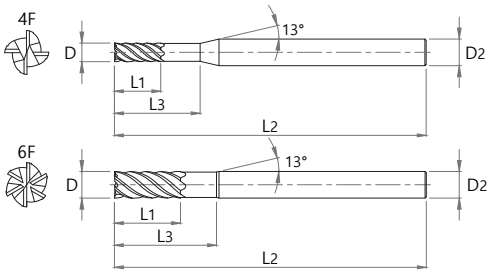
EDP No.	Dimensions(mm)			
	D	L1	L3	L2
ESE714010	1	2.5	40	6
ESE714010S4	1	2.5	40	4
ESE714012	1.2	3	40	6
ESE714015	1.5	4	40	6
ESE714015S4	1.5	4	40	4
ESE714020	2	5	40	6
ESE714020S4	2	5	40	4
ESE714025	2.5	6	40	6
ESE714025S4	2.5	6	40	4
ESE714030	3	8	45	6
ESE714030S4	3	8	45	4
ESE714035	3.5	9	45	6
ESE714040	4	10	45	6
ESE714040S4	4	10	45	4
ESE714050	5	13	50	6
ESE714060	6	13	50	6
ESE714060-15	6	15	60	6
ESE714060-15L	6	15	90	6
ESE714080	8	19	60	8
ESE714080L	8	19	100	8
ESE714100	10	22	70	10
ESE714100-25	10	25	70	10
ESE714100-25L	10	25	100	10
ESE714120	12	26	75	12
ESE714120-30	12	30	80	12
ESE714120-30L	12	30	100	12

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESE724(6)



- Reinforced cutting edge by applying the optimum slope
- Improved cutting edge strength by optimal draft angle
- Improved by 45° , 60° Helix

ULTRA FINE | 4 | 6 | 45° HELIX Z=4 | 60° HELIX Z=6 | AlTiN | Recommended p.61

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

EDP No.	Dimensions(mm)					
	D	L1	L3	L2	D2	Flutes
ESE724010	1	1.5	5	45	6	4
ESE724015	1.5	2.2	6	45	6	4
ESE724020	2	3	8	45	6	4
ESE724030	3	4	9	50	6	4
ESE724040	4	5	12	50	6	4
ESE724040S4L	4	5	12	75	4	4
ESE724050	5	6	15	50	6	4
ESE726060	6	7	20	60	6	6
ESE726080	8	9	25	70	8	6
ESE726100	10	12	32	75	10	6
ESE726120	12	15	38	80	12	6

■ Applicable working material

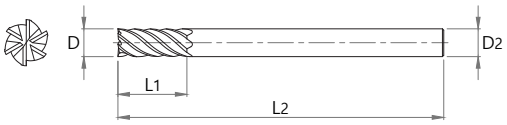
Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESE716

6 FLUTES HIGH HELIX SQUARE ENDMILL

- Reinforced cutting edge by applying the optimum slope
- Improved cutting edge strength by optimal draft angle
- Improved by 50° Helix



ULTRA FINE | 6 | 50° HELIX | AlTiN | Recommended

p.61

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 20	0 ~ -0.015mm	

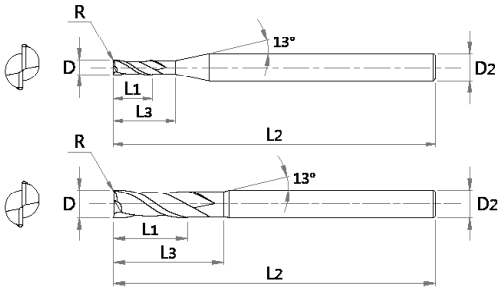
EDP No.	Dimensions(mm)			
	D	L1	L2	D2
ESE716060	6	13	50	6
ESE716080	8	18	60	8
ESE716100	10	22	70	10
ESE716120	12	26	75	12
ESE716160	16	35	90	16
ESE716200	20	44	100	20

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESR702



- Available to precise R machining with advanced chipping resistance
- Improved cutting edge strength by optimal draft angle
- Reinforced cutting edge by applying the optimum slope

ULTRA FINE | 2 | 30° HELIX | R ±0.005 R3≥ | R ±0.008 R3< | AlTiN | Recommended p.62

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESR7020100503S4	1	0.05	1.5	3	50	4
ESR7020100504S4	1	0.05	1.5	4	50	4
ESR7020100506S4	1	0.05	1.5	6	50	4
ESR7020100508S4	1	0.05	1.5	8	50	4
ESR70201000510S4	1	0.05	1.5	10	50	4
ESR702010010 3S4	1	0.1	1.5	3	50	4
ESR7020100104	1	0.1	1.5	4	50	6
ESR702010010 4S4	1	0.1	1.5	4	50	4
ESR7020100106	1	0.1	1.5	6	50	6
ESR702010010 6S4	1	0.1	1.5	6	50	4
ESR702010010 8S4	1	0.1	1.5	8	50	4
ESR702010011 0S4	1	0.1	1.5	10	50	4
ESR7020100203S4	1	0.2	1.5	3	50	4
ESR7020100204	1	0.2	1.5	4	50	6
ESR7020100204S4	1	0.2	1.5	4	50	4
ESR7020100206	1	0.2	1.5	6	50	6
ESR7020100206S4	1	0.2	1.5	6	50	4
ESR7020100208S4	1	0.2	1.5	8	50	4
ESR7020100210	1	0.2	1.5	10	50	6
ESR702010021 0S4	1	0.2	1.5	10	50	4
ESR7020100212	1	0.2	1.5	12	50	6
ESR7020100303S4	1	0.3	1.5	3	50	4
ESR7020100304S4	1	0.3	1.5	4	50	4
ESR7020100306S4	1	0.3	1.5	6	50	4
ESR7020100308S4	1	0.3	1.5	8	50	4
ESR7020100310S4	1	0.3	1.5	10	50	4
ESR7020120208	1.2	0.2	2	8	50	6
ESR7020120212	1.2	0.2	2	12	50	6
ESR7020150050 4S4	1.5	0.05	2.5	4	50	4
ESR7020150050 6S4	1.5	0.05	2.5	6	50	4

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESR7020150050 8S4	1.5	0.05	2.5	8	50	4
ESR7020150051 0S4	1.5	0.05	2.5	10	50	4
ESR7020150051 2S4	1.5	0.05	2.5	12	50	4
ESR702015010 4S4	1.5	0.1	2.5	4	50	4
ESR7020150106S4	1.5	0.1	2.5	6	50	4
ESR7020150108S4	1.5	0.1	2.5	8	50	4
ESR7020150110S4	1.5	0.1	2.5	10	50	4
ESR702015011 2S4	1.5	0.1	2.5	12	50	4
ESR7020150204	1.5	0.2	2.5	4	50	6
ESR7020150204S4	1.5	0.2	2.5	4	50	4
ESR7020150206	1.5	0.2	2.5	6	50	6
ESR7020150206S4	1.5	0.2	2.5	6	50	4
ESR7020150208	1.5	0.2	2.5	8	50	6
ESR7020150208S4	1.5	0.2	2.5	8	50	4
ESR7020150210	1.5	0.2	2.5	10	50	6
ESR7020150210S4	1.5	0.2	2.5	10	50	4
ESR7020150212S4	1.5	0.2	2.5	12	50	4
ESR7020150215	1.5	0.2	2.5	15	50	6
ESR7020150304S4	1.5	0.3	2.5	4	50	4
ESR7020150306S4	1.5	0.3	2.5	6	50	4
ESR7020150308S4	1.5	0.3	2.5	8	50	4
ESR7020150310S4	1.5	0.3	2.5	10	50	4
ESR7020150312S4	1.5	0.3	2.5	12	50	4
ESR7020150504S4	1.5	0.5	2.5	4	50	4
ESR7020150506S4	1.5	0.5	2.5	6	50	4
ESR7020150508S4	1.5	0.5	2.5	8	50	4
ESR7020150510S4	1.5	0.5	2.5	10	50	4
ESR7020150512S4	1.5	0.5	2.5	12	50	4
ESR702020010 6S4	2	0.1	3	6	50	4
ESR7020200108	2	0.1	3	8	50	6

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESR702

2 FLUTES NECK TYPE RADIUS ENDMILL

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESR7020200108S4	2	0.1	3	8	50	4
ESR7020200110S4	2	0.1	3	10	50	4
ESR7020200112	2	0.1	3	12	50	6
ESR7020200112S4	2	0.1	3	12	50	4
ESR7020200116S4	2	0.1	3	16	50	4
ESR7020200120S4	2	0.1	3	20	50	4
ESR7020200206	2	0.2	3	6	50	6
ESR7020200206S4	2	0.2	3	6	50	4
ESR7020200208S4	2	0.2	3	8	50	4
ESR7020200209	2	0.2	3	9	50	6
ESR7020200210S4	2	0.2	3	10	50	4
ESR7020200212S4	2	0.2	3	12	50	4
ESR7020200216	2	0.2	3	16	50	6
ESR7020200216S4	2	0.2	3	16	50	4
ESR7020200220S4	2	0.2	3	20	50	4
ESR7020200306	2	0.3	3	6	50	6
ESR7020200306S4	2	0.3	3	6	50	4
ESR7020200308S4	2	0.3	3	8	50	4
ESR7020200310S4	2	0.3	3	10	50	4
ESR7020200312S4	2	0.3	3	12	50	4
ESR7020200316S4	2	0.3	3	16	50	4
ESR7020200320S4	2	0.3	3	20	50	4
ESR7020200506	2	0.5	3	6	50	6
ESR7020200506S4	2	0.5	3	6	50	4
ESR7020200508S4	2	0.5	3	8	50	4
ESR7020200509	2	0.5	3	9	50	6
ESR7020200510S4	2	0.5	3	10	50	4
ESR7020200512	2	0.5	3	12	50	6
ESR7020200512S4	2	0.5	3	12	50	4
ESR7020200516	2	0.5	3	16	50	6
ESR7020200516S4	2	0.5	3	16	50	4
ESR7020200520S4	2	0.5	3	20	50	4
ESR7020250208S4	2.5	0.2	3.5	8	50	4
ESR7020250210S4	2.5	0.2	3.5	10	50	4
ESR7020250212S4	2.5	0.2	3.5	12	50	4
ESR7020250216S4	2.5	0.2	3.5	16	50	4
ESR7020250308S4	2.5	0.3	3.5	8	50	4
ESR7020250310S4	2.5	0.3	3.5	10	50	4
ESR7020250312S4	2.5	0.3	3.5	12	50	4
ESR7020250316S4	2.5	0.3	3.5	16	50	4
ESR7020250508S4	2.5	0.5	3.5	8	50	4
ESR7020250510S4	2.5	0.5	3.5	10	50	4
ESR7020250512S4	2.5	0.5	3.5	12	50	4
ESR7020250516S4	2.5	0.5	3.5	16	50	4
ESR7020300108	3	0.1	4.5	8	55	6
ESR7020300110	3	0.1	4.5	10	55	6
ESR7020300112	3	0.1	4.5	12	55	6

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESR7020300116	3	0.1	4.5	16	55	6
ESR7020300120	3	0.1	4.5	20	60	6
ESR7020300208	3	0.2	4.5	8	55	6
ESR7020300209	3	0.2	4.5	9	55	6
ESR7020300210	3	0.2	4.5	10	55	6
ESR7020300212	3	0.2	4.5	12	55	6
ESR7020300216	3	0.2	4.5	16	55	6
ESR7020300220	3	0.2	4.5	20	60	6
ESR7020300308	3	0.3	4.5	8	55	6
ESR7020300309	3	0.3	4.5	9	55	6
ESR7020300310	3	0.3	4.5	10	55	6
ESR7020300312	3	0.3	4.5	12	55	6
ESR7020300314	3	0.3	4.5	14	55	6
ESR7020300316	3	0.3	4.5	16	55	6
ESR7020300320	3	0.3	4.5	20	60	6
ESR7020300508	3	0.5	4.5	8	55	6
ESR7020300509	3	0.5	4.5	9	55	6
ESR7020300510	3	0.5	4.5	10	55	6
ESR7020300512	3	0.5	4.5	12	55	6
ESR7020300516	3	0.5	4.5	16	55	6
ESR7020300520	3	0.5	4.5	20	60	6
ESR7020301008	3	1	4.5	8	55	6
ESR7020301010	3	1	4.5	10	55	6
ESR7020301012	3	1	4.5	12	55	6
ESR7020301016	3	1	4.5	16	55	6
ESR7020301020	3	1	4.5	20	60	6
ESR7020301025	3	1	4.5	25	60	6
ESR7020400110	4	0.1	6	10	55	6
ESR7020400112	4	0.1	6	12	55	6
ESR7020400116	4	0.1	6	16	55	6
ESR7020400120	4	0.1	6	20	60	6
ESR7020400125	4	0.1	6	25	60	6
ESR7020400210	4	0.2	6	10	55	6
ESR7020400212	4	0.2	6	12	55	6
ESR7020400216	4	0.2	6	16	55	6
ESR7020400220	4	0.2	6	20	60	6
ESR7020400225	4	0.2	6	25	60	6
ESR7020400310	4	0.3	6	10	55	6
ESR7020400312	4	0.3	6	12	55	6
ESR7020400316	4	0.3	6	16	55	6
ESR7020400320	4	0.3	6	20	60	6
ESR7020400325	4	0.3	6	25	60	6
ESR7020400510	4	0.5	6	10	55	6
ESR7020400512	4	0.5	6	12	55	6
ESR7020400516	4	0.5	6	16	55	6
ESR7020400520	4	0.5	6	20	60	6
ESR7020400525	4	0.5	6	25	60	6

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESR702

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESR7020400530	4	0.5	6	30	70	6
ESR7020401010	4	1	6	10	55	6
ESR7020401012	4	1	6	12	55	6
ESR7020401016	4	1	6	16	55	6
ESR7020401020	4	1	6	20	60	6
ESR7020401025	4	1	6	25	60	6
ESR7020401030	4	1	6	30	70	6
ESR7020500318	5	0.3	8	18	60	6
ESR7020600220	6	0.2	9	20	60	6
ESR7020600320	6	0.3	9	20	60	6
ESR7020600520	6	0.5	9	20	60	6
ESR7020601020	6	1	9	20	60	6
ESR7020601520	6	1.5	9	20	60	6
ESR7020602020	6	2	9	20	60	6
ESR7020800225	8	0.2	12	25	60	8

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESR7020800325	8	0.3	12	25	60	8
ESR7020800525	8	0.5	12	25	60	8
ESR7020801025	8	1	12	25	60	8
ESR7020801525	8	1.5	12	25	60	8
ESR7021000232	10	0.2	15	32	70	10
ESR7021000332	10	0.3	15	32	70	10
ESR7021000532	10	0.5	15	32	70	10
ESR7021001032	10	1	15	32	70	10
ESR7021001532	10	1.5	15	32	70	10
ESR7021002032	10	2	15	32	70	10
ESR7021200338	12	0.3	18	38	80	12
ESR7021200538	12	0.5	18	38	80	12
ESR7021201038	12	1	18	38	80	12
ESR7021201538	12	1.5	18	38	80	12
ESR7021202038	12	2	18	38	80	12

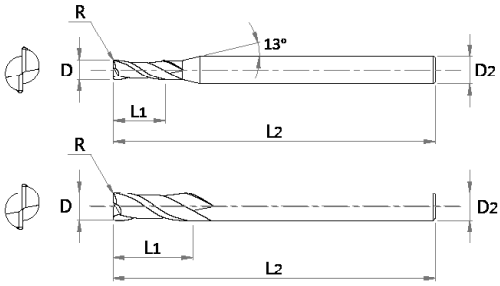
■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESR732

2 FLUTES LONG SHANK RADIUS ENDMILL



- Available to precise R machining with advanced chipping resistance
- Improved cutting edge strength by optimal draft angle
- Reinforced cutting edge by applying the optimum slope
- Suitable to depth machining with long shank type

ULTRA FINE | 2 | 30° HELIX | R ±0.005 R3≥ | R ±0.008 R3< | AlTiN | Recommended p.63

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

EDP No.	Dimensions(mm)				
	D	R	L1	L2	D2
ESR73201001	1	0.1	2	50	6
ESR73201002	1	0.2	2	50	6
ESR73201003	1	0.3	2	50	6
ESR73201501	1.5	0.1	3	50	6
ESR73201502	1.5	0.2	3	50	6
ESR73201503	1.5	0.3	3	50	6
ESR73201505	1.5	0.5	3	50	6
ESR73202001	2	0.1	5	50	6
ESR73202002	2	0.2	5	50	6
ESR73202003	2	0.3	5	50	6
ESR73202005	2	0.5	5	50	6
ESR73202501	2.5	0.1	7	60	6
ESR73202502	2.5	0.2	7	60	6
ESR73202503	2.5	0.3	7	60	6
ESR73202505	2.5	0.5	7	60	6
ESR73203001	3	0.1	8	60	6
ESR73203002	3	0.2	8	60	6
ESR73203003	3	0.3	8	60	6
ESR73203005	3	0.5	8	60	6
ESR73204001	4	0.1	10	70	6
ESR73204002	4	0.2	10	70	6
ESR73204003	4	0.3	10	70	6
ESR73204005	4	0.5	10	70	6
ESR73204010	4	1	10	70	6
ESR73205001	5	0.1	13	80	6

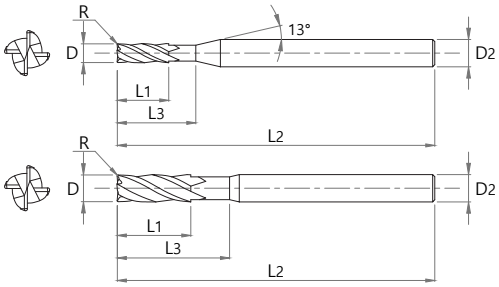
EDP No.	Dimensions(mm)				
	D	R	L1	L2	D2
ESR73205002	5	0.2	13	80	6
ESR73205003	5	0.3	13	80	6
ESR73205005	5	0.5	13	80	6
ESR73205010	5	1	13	80	6
ESR73206001	6	0.1	15	90	6
ESR73206002	6	0.2	15	90	6
ESR73206003	6	0.3	15	90	6
ESR73206005	6	0.5	15	90	6
ESR73206010	6	1	15	90	6
ESR73208001	8	0.1	20	100	8
ESR73208002	8	0.2	20	100	8
ESR73208003	8	0.3	20	100	8
ESR73208005	8	0.5	20	100	8
ESR73208010	8	1	20	100	8
ESR73208020	8	2	20	100	8
ESR73210002	10	0.2	25	100	10
ESR73210003	10	0.3	25	100	10
ESR73210005	10	0.5	25	100	10
ESR73210010	10	1	25	100	10
ESR73210020	10	2	25	100	10
ESR73212002	12	0.2	30	110	12
ESR73212003	12	0.3	30	110	12
ESR73212005	12	0.5	30	110	12
ESR73212010	12	1	30	110	12
ESR73212020	12	2	30	110	12

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESR704



- Available to precise R machining with advanced chipping resistance
- Improved cutting edge strength by optimal draft angle
- Reinforced cutting edge by applying the optimum slope

ULTRA FINE | 4 | 30° HELIX | R ±0.005 R3≥ | R ±0.008 R3< | AlTiN | Recommended p.63

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESR704010010 3S4	1	0.1	2	3	50	4
ESR704010010 4S4	1	0.1	2	4	50	4
ESR704010010 6S4	1	0.1	2	6	50	4
ESR704010020 3S4	1	0.2	2	3	50	4
ESR704010020 4S4	1	0.2	2	4	50	4
ESR704010020 6S4	1	0.2	2	6	50	4
ESR704010030 3S4	1	0.3	2	3	50	4
ESR704010030 4S4	1	0.3	2	4	50	4
ESR704010030 6S4	1	0.3	2	6	50	4
ESR704015010 4S4	1.5	0.1	2.5	4	50	4
ESR704015010 6S4	1.5	0.1	2.5	6	50	4
ESR704015020 4S4	1.5	0.2	2.5	4	50	4
ESR704015020 6S4	1.5	0.2	2.5	6	50	4
ESR704015030 4S4	1.5	0.3	2.5	4	50	4
ESR704015030 6S4	1.5	0.3	2.5	6	50	4
ESR704020010 6S4	2	0.1	3	6	50	4
ESR704020010 8S4	2	0.1	3	8	50	4
ESR704020020 6S4	2	0.2	3	6	50	4
ESR7040200208	2	0.2	3	8	50	6
ESR704020020 8S4	2	0.2	3	8	50	4
ESR7040200210	2	0.2	3	10	50	6
ESR7040200212	2	0.2	3	12	50	6
ESR704020030 6S4	2	0.3	3	6	50	4
ESR704020030 8S4	2	0.3	3	8	50	4
ESR704020050 6S4	2	0.5	3	6	50	4
ESR704020050 8S4	2	0.5	3	8	50	4
ESR704025010 6S4	2.5	0.1	3.5	6	50	4
ESR7040300108	3	0.1	4	8	55	6
ESR7040300110	3	0.1	4	10	55	6
ESR7040300112	3	0.1	4	12	55	6

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESR7040300116	3	0.1	4	16	55	6
ESR7040300120	3	0.1	4	20	60	6
ESR7040300208	3	0.2	4	8	55	6
ESR7040300210	3	0.2	4	10	55	6
ESR7040300212	3	0.2	4	12	55	6
ESR7040300216	3	0.2	4	16	55	6
ESR7040300220	3	0.2	4	20	60	6
ESR7040300308	3	0.3	4	8	55	6
ESR7040300309	3	0.3	4	9	55	6
ESR7040300310	3	0.3	4	10	55	6
ESR7040300312	3	0.3	4	12	55	6
ESR7040300316	3	0.3	4	16	55	6
ESR7040300320	3	0.3	4	20	60	6
ESR7040300508	3	0.5	4	8	55	6
ESR7040300509	3	0.5	4	9	55	6
ESR7040300510	3	0.5	4	10	55	6
ESR7040300512	3	0.5	4	12	55	6
ESR7040300516	3	0.5	4	16	55	6
ESR7040300520	3	0.5	4	20	60	6
ESR7040301008	3	1	4	8	55	6
ESR7040301010	3	1	4	10	55	6
ESR7040301012	3	1	4	12	55	6
ESR7040301016	3	1	4	16	55	6
ESR7040301020	3	1	4	20	60	6
ESR7040400110	4	0.1	6	10	55	6
ESR7040400112	4	0.1	6	12	55	6
ESR7040400116	4	0.1	6	16	55	6
ESR7040400120	4	0.1	6	20	60	6
ESR7040400125	4	0.1	6	25	60	6
ESR7040400210	4	0.2	6	10	55	6

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESR704

4 FLUTES NECK TYPE RADIUS ENDMILL

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESR7040400212	4	0.2	6	12	55	6
ESR7040400216	4	0.2	6	16	55	6
ESR7040400220	4	0.2	6	20	60	6
ESR7040400225	4	0.2	6	25	60	6
ESR7040400310	4	0.3	6	10	55	6
ESR7040400312	4	0.3	6	12	55	6
ESR7040400316	4	0.3	6	16	55	6
ESR7040400320	4	0.3	6	20	60	6
ESR7040400325	4	0.3	6	25	60	6
ESR7040400510	4	0.5	6	10	55	6
ESR7040400512	4	0.5	6	12	55	6
ESR7040400516	4	0.5	6	16	55	6
ESR7040400520	4	0.5	6	20	60	6
ESR7040400525	4	0.5	6	25	60	6
ESR7040401010	4	1	6	10	55	6
ESR7040401012	4	1	6	12	55	6
ESR7040401016	4	1	6	16	55	6
ESR7040401020	4	1	6	20	60	6
ESR7040401025	4	1	6	25	60	6
ESR7040600220	6	0.2	9	20	60	6
ESR7040600320	6	0.3	9	20	60	6

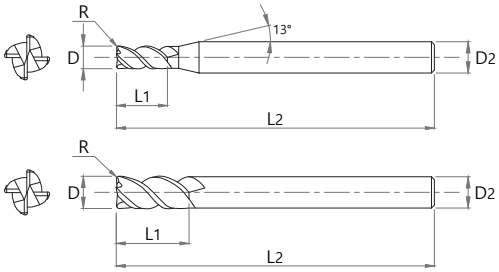
EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESR7040600520	6	0.5	9	20	60	6
ESR7040601020	6	1	9	20	60	6
ESR7040601520	6	1.5	9	20	60	6
ESR7040602020	6	2	9	20	60	6
ESR7040800225	8	0.2	12	25	60	8
ESR7040800325	8	0.3	12	25	60	8
ESR7040800525	8	0.5	12	25	60	8
ESR7040801025	8	1	12	25	60	8
ESR7040801525	8	1.5	12	25	60	8
ESR7040802025	8	2	12	25	60	8
ESR7041000232	10	0.2	15	32	70	10
ESR7041000332	10	0.3	15	32	70	10
ESR7041000532	10	0.5	15	32	70	10
ESR7041001032	10	1	15	32	70	10
ESR7041001532	10	1.5	15	32	70	10
ESR7041002032	10	2	15	32	70	10
ESR7041200338	12	0.3	18	38	80	12
ESR7041200538	12	0.5	18	38	80	12
ESR7041201038	12	1	18	38	80	12
ESR7041201538	12	1.5	18	38	80	12
ESR7041202038	12	2	18	38	80	12

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESR714



- Available to precise R machining with advanced chipping resistance
- Improved cutting edge strength by optimal draft angle
- Reinforced cutting edge by applying the optimum slope
- Improved machinability by 45° Helix

ULTRA FINE | 4 | 45° HELIX | R ±0.01 R3≥ | R ±0.015 R3< | AlTiN | Recommended p.63

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

EDP No.	Dimensions(mm)				
	D	L1	L3	L2	D2
ESR7140303	3	0.3	8	50	6
ESR7140305S4	3	0.5	8	50	4
ESR7140305	3	0.5	8	50	6
ESR7140403	4	0.3	11	50	6
ESR7140405	4	0.5	11	50	6
ESR7140405S4	4	0.5	11	50	4
ESR7140410	4	1	11	50	6
ESR7140603	6	0.3	15	60	6
ESR7140605	6	0.5	15	60	6
ESR7140610	6	1	15	60	6
ESR7140803	8	0.3	20	60	8
ESR7140805	8	0.5	20	60	8
ESR7140810	8	1	20	60	8
ESR7140815	8	1.5	20	60	8
ESR7140820	8	2	20	60	8
ESR7141003	10	0.3	25	70	10
ESR7141005	10	0.5	25	70	10
ESR7141010	10	1	25	70	10
ESR7141015	10	1.5	25	70	10
ESR7141020	10	2	25	70	10
ESR7141025	10	2.5	25	70	10
ESR7141030	10	3	25	70	10
ESR7141203	12	0.3	30	80	12
ESR7141205	12	0.5	30	80	12
ESR7141210	12	1	30	80	12
ESR7141215	12	1.5	30	80	12
ESR7141220	12	2	30	80	12
ESR7141225	12	2.5	30	80	12
ESR7141230	12	3	30	80	12

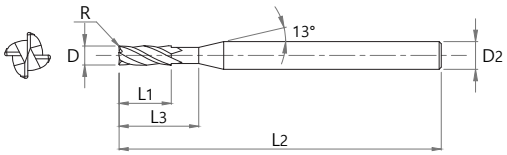
■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESR724

4 FLUTES NECK TYPE RADIUS ENDMILL



- Available to precise R machining with advanced chipping resistance
- Improved cutting edge strength by optima draft angle
- Reinforced cutting edge by applying the optimum slope

ULTRA FINE | 4 | 30° HELIX | R ±0.01 R3≥ | R ±0.015 R3< | AlTiN | Recommended p.63

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

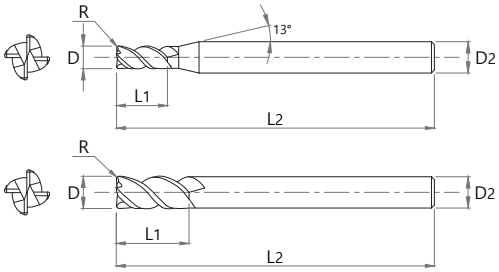
EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESR7240600520	6	0.5	9	20	90	6
ESR7240601020	6	1	9	20	90	6
ESR7240800525	8	0.5	12	25	100	8
ESR7240801025	8	1	12	25	100	8
ESR7241000532	10	0.5	15	32	100	10
ESR7241001032	10	1	15	32	100	10
ESR7241002032	10	2	15	32	100	10
ESR7241200538	12	0.5	18	38	110	12
ESR7241201038	12	1	18	38	110	12
ESR7241202038	12	2	18	38	110	12

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESR734



- Available to precise R machining with advanced chipping resistance
- Improved cutting edge strength by optima draft angle
- Reinforced cutting edge by applying the optimum slope
- Suitable to depth machining With long shank type

ULTRA FINE | 4 | 30° HELIX | R ±0.01 R3≥ | R ±0.015 R3< | AlTiN | Recommended p.63

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

EDP No.	Dimensions(mm)				
	D	R	L1	L2	D2
ESR73401001	1	0.1	2	50	6
ESR73401002	1	0.2	2	50	6
ESR73401003	1	0.3	2	50	6
ESR73401501	1.5	0.1	3	50	6
ESR73401502	1.5	0.2	3	50	6
ESR73401503	1.5	0.3	3	50	6
ESR73401505	1.5	0.5	3	50	6
ESR73402001	2	0.1	5	50	6
ESR73402002	2	0.2	5	50	6
ESR73402003	2	0.3	5	50	6
ESR73402005	2	0.5	5	50	6
ESR73402501	2.5	0.1	7	60	6
ESR73402502	2.5	0.2	7	60	6
ESR73402503	2.5	0.3	7	60	6
ESR73402505	2.5	0.5	7	60	6
ESR73403001	3	0.1	8	60	6
ESR73403002	3	0.2	8	60	6
ESR73403003	3	0.3	8	60	6
ESR73403005	3	0.5	8	60	6
ESR73404001	4	0.1	10	70	6
ESR73404002	4	0.2	10	70	6
ESR73404002S4	4	0.2	10	70	4
ESR73404003	4	0.3	10	70	6
ESR73404005	4	0.5	10	70	6
ESR73404005S4	4	0.5	10	70	4
ESR73404010	4	1	10	70	6
ESR73405001	5	0.1	13	80	6

EDP No.	Dimensions(mm)				
	D	R	L1	L2	D2
ESR73405002	5	0.2	13	80	6
ESR73405003	5	0.3	13	80	6
ESR73405005	5	0.5	13	80	6
ESR73405010	5	1	13	80	6
ESR73406001	6	0.1	15	90	6
ESR73406002	6	0.2	15	90	6
ESR73406003	6	0.3	15	90	6
ESR73406005	6	0.5	15	90	6
ESR73406010	6	1	15	90	6
ESR73408001	8	0.1	20	100	8
ESR73408002	8	0.2	20	100	8
ESR73408003	8	0.3	20	100	8
ESR73408005	8	0.5	20	100	8
ESR73408010	8	1	20	100	8
ESR73408020	8	2	20	100	8
ESR73410002	10	0.2	25	100	10
ESR73410003	10	0.3	25	100	10
ESR73410005	10	0.5	25	100	10
ESR73410010	10	1	25	100	10
ESR73410020	10	2	25	100	10
ESR73412002	12	0.2	30	110	12
ESR73412003	12	0.3	30	110	12
ESR73412005	12	0.5	30	110	12
ESR73412010	12	1	30	110	12
ESR73412010L	12	1	30	150	12
ESR73412020	12	2	30	110	12

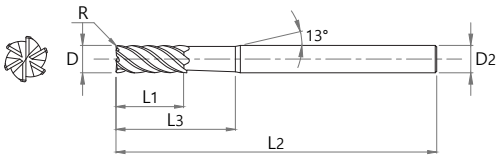
■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESR706

6 FLUTES NECK TYPE RADIUS ENDMILL



- Available to precise R machining with advanced chipping resistance
- Improved cutting edge strength by optimal draft angle
- Reinforced cutting edge by applying the optimum slope

ULTRA FINE | 6 | 45° HELIX | R ±0.01 R3≥ | R ±0.015 R3< | AlTiN | Recommended p.64

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

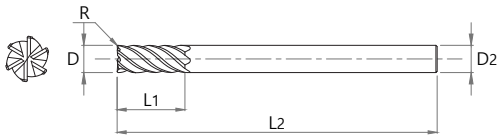
EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESR7060600314	6	0.3	6	14	50	6
ESR7060600514	6	0.5	6	14	50	6
ESR7060800524	8	0.5	8	24	60	8
ESR7060801024	8	1	8	24	60	8
ESR7061000530	10	0.5	10	30	70	10
ESR7061001030	10	1	10	30	70	10
ESR7061200530	12	0.5	12	30	75	12
ESR7061201030	12	1	12	30	75	12

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESR736



- Available to precise R machining with advance chipping resistance
- Improved cutting edge strength by optimal draft angle
- Reinforced cutting edge by applying the optimum slope

ULTRA FINE | 6 | 45° HELIX | R ±0.01 R3≥ | R ±0.015 R3< | AlTiN | Recommended p62

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

EDP No.	Dimensions(mm)				
	D	R	L1	L2	D2
ESR73606005	6	0.5	15	90	6
ESR73606010	6	1	15	90	6
ESR73608005	8	0.5	20	100	8
ESR73608010	8	1	20	100	8
ESR73610005	10	0.5	25	100	10
ESR73610010	10	1	25	100	10
ESR73612005	12	0.5	30	110	12
ESR73612010	12	1	30	110	12

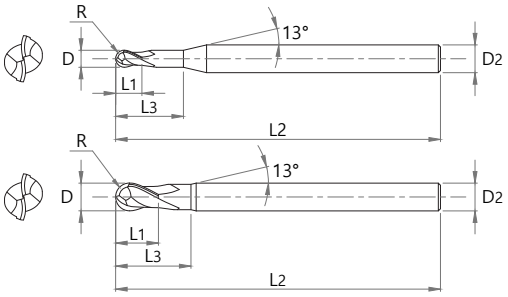
■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESRB712

2 FLUTES RIB BALL ENDMILL



- Excellent performance in high precision machining from precision tolerance
- Reinforced cutting edge by applying the optimum slope
- Suitable for machining deep grooves with wide range of neck specifications
- Minimize tool breakage and improve machining stability by reinforcing neck rigidity

ULTRA FINE | 2 | 30° HELIX | R ±0.005 R3≥ | R ±0.008 R3< | AlTiN | Recommended p.65

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRB712001002	0.1	0.05	0.1	0.2	40	4
ESRB712001003	0.1	0.05	0.1	0.3	40	4
ESRB712001005	0.1	0.05	0.1	0.5	40	4
ESRB71200101	0.1	0.05	0.1	1	40	4
ESRB712002005	0.2	0.1	0.2	0.5	40	4
ESRB712002015	0.2	0.1	0.2	1.5	40	4
ESRB71200201	0.2	0.1	0.2	1	40	4
ESRB71200202	0.2	0.1	0.2	2	40	4
ESRB71200203	0.2	0.1	0.2	3	40	4
ESRB712003015	0.3	0.15	0.3	1.5	40	4
ESRB71200301	0.3	0.15	0.3	1	40	4
ESRB712003025	0.3	0.15	0.3	2.5	40	4
ESRB71200302	0.3	0.15	0.3	2	40	4
ESRB71200303	0.3	0.15	0.3	3	40	4
ESRB71200304	0.3	0.15	0.3	4	40	4
ESRB71200305	0.3	0.15	0.3	5	40	4
ESRB712004015	0.4	0.2	0.4	1.5	40	4
ESRB71200401	0.4	0.2	0.4	1	40	4
ESRB712004025	0.4	0.2	0.4	2.5	40	4
ESRB71200402	0.4	0.2	0.4	2	40	4
ESRB71200403	0.4	0.2	0.4	3	40	4
ESRB71200404	0.4	0.2	0.4	4	40	4
ESRB71200405	0.4	0.2	0.4	5	40	4
ESRB71200406	0.4	0.2	0.4	6	40	4
ESRB71200408	0.4	0.2	0.4	8	40	4
ESRB71200410	0.4	0.2	0.4	10	40	4
ESRB712005015	0.5	0.25	0.5	1.5	45	4
ESRB71200501	0.5	0.25	0.5	1	45	4
ESRB71200501S6	0.5	0.25	0.5	1	45	6
ESRB712005025	0.5	0.25	0.5	2.5	45	4

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRB71200502	0.5	0.25	0.5	2	45	4
ESRB71200502S6	0.5	0.25	0.5	2	45	6
ESRB71200503	0.5	0.25	0.5	3	45	4
ESRB71200504	0.5	0.25	0.5	4	45	4
ESRB71200504S6	0.5	0.25	0.5	4	45	6
ESRB71200505	0.5	0.25	0.5	5	45	4
ESRB71200506	0.5	0.25	0.5	6	45	4
ESRB71200508	0.5	0.25	0.5	8	45	4
ESRB71200510	0.5	0.25	0.5	10	45	4
ESRB71200512	0.5	0.25	0.5	12	45	4
ESRB71200514	0.5	0.25	0.5	14	45	4
ESRB71200516	0.5	0.25	0.5	16	45	4
ESRB71200601	0.6	0.3	0.6	1	45	4
ESRB71200601S6	0.6	0.3	0.6	1	45	6
ESRB71200602	0.6	0.3	0.6	2	45	4
ESRB71200602S6	0.6	0.3	0.6	2	45	6
ESRB71200603	0.6	0.3	0.6	3	45	4
ESRB71200603S6	0.6	0.3	0.6	3	45	6
ESRB71200604	0.6	0.3	0.6	4	45	4
ESRB71200604S6	0.6	0.3	0.6	4	45	6
ESRB71200605	0.6	0.3	0.6	5	45	4
ESRB71200605S6	0.6	0.3	0.6	5	45	6
ESRB71200606	0.6	0.3	0.6	6	45	4
ESRB71200606S6	0.6	0.3	0.6	6	45	6
ESRB71200608	0.6	0.3	0.6	8	45	4
ESRB71200608S6	0.6	0.3	0.6	8	45	6
ESRB71200610	0.6	0.3	0.6	10	45	4
ESRB71200610S6	0.6	0.3	0.6	10	45	6
ESRB71200612	0.6	0.3	0.6	12	45	4
ESRB71200612S6	0.6	0.3	0.6	12	45	6

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESRB712

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRB71200614	0.6	0.3	0.6	14	45	4
ESRB71200614S6	0.6	0.3	0.6	14	45	6
ESRB71200616	0.6	0.3	0.6	16	45	4
ESRB71200616S6	0.6	0.3	0.6	16	50	6
ESRB71200702	0.7	0.35	0.7	2	45	4
ESRB71200704	0.7	0.35	0.7	4	45	4
ESRB71200706	0.7	0.35	0.7	6	45	4
ESRB71200708	0.7	0.35	0.7	8	45	4
ESRB71200710	0.7	0.35	0.7	10	45	4
ESRB71200712	0.7	0.35	0.7	12	45	4
ESRB71200801	0.8	0.4	0.8	1	45	4
ESRB71200801S6	0.8	0.4	0.8	1	45	6
ESRB71200802	0.8	0.4	0.8	2	45	4
ESRB71200802S6	0.8	0.4	0.8	2	45	6
ESRB71200803	0.8	0.4	0.8	3	45	4
ESRB71200803S6	0.8	0.4	0.8	3	45	6
ESRB71200804	0.8	0.4	0.8	4	45	4
ESRB71200804S6	0.8	0.4	0.8	4	45	6
ESRB71200805	0.8	0.4	0.8	5	45	4
ESRB71200805S6	0.8	0.4	0.8	5	45	6
ESRB71200806	0.8	0.4	0.8	6	45	4
ESRB71200806S6	0.8	0.4	0.8	6	45	6
ESRB71200808	0.8	0.4	0.8	8	45	4
ESRB71200808S6	0.8	0.4	0.8	8	45	6
ESRB71200810	0.8	0.4	0.8	10	45	4
ESRB71200810S6	0.8	0.4	0.8	10	45	6
ESRB71200812	0.8	0.4	0.8	12	45	4
ESRB71200812S6	0.8	0.4	0.8	12	45	6
ESRB71200814	0.8	0.4	0.8	14	45	4
ESRB71200814S6	0.8	0.4	0.8	14	45	6
ESRB71200816	0.8	0.4	0.8	16	45	4
ESRB71200816S6	0.8	0.4	0.8	16	50	6
ESRB71200820	0.8	0.4	0.8	20	50	4
ESRB71200820S6	0.8	0.4	0.8	20	55	6
ESRB71200904	0.9	0.45	0.9	4	45	4
ESRB71200906	0.9	0.45	0.9	6	45	4
ESRB71200908	0.9	0.45	0.9	8	45	4
ESRB71200910	0.9	0.45	0.9	10	45	4
ESRB71201002	1	0.5	1	2	50	4
ESRB71201002S6	1	0.5	1	2	50	6
ESRB71201003	1	0.5	1	3	50	4
ESRB71201003S6	1	0.5	1	3	50	6
ESRB71201004	1	0.5	1	4	50	4
ESRB71201004S6	1	0.5	1	4	50	6
ESRB71201005	1	0.5	1	5	50	4
ESRB71201005S6	1	0.5	1	5	50	6
ESRB71201006	1	0.5	1	6	50	4
ESRB71201006S6	1	0.5	1	6	50	6

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRB71201007	1	0.5	1	7	50	4
ESRB71201007S6	1	0.5	1	7	50	6
ESRB71201008	1	0.5	1	8	50	4
ESRB71201008S6	1	0.5	1	8	50	6
ESRB71201009	1	0.5	1	9	50	4
ESRB71201009S6	1	0.5	1	9	50	6
ESRB71201010	1	0.5	1	10	50	4
ESRB71201010S6	1	0.5	1	10	50	6
ESRB71201012	1	0.5	1	12	50	4
ESRB71201012S6	1	0.5	1	12	50	6
ESRB71201014	1	0.5	1	14	50	4
ESRB71201014S6	1	0.5	1	14	50	6
ESRB71201016	1	0.5	1	16	50	4
ESRB71201016S6	1	0.5	1	16	50	6
ESRB71201018	1	0.5	1	18	50	4
ESRB71201018S6	1	0.5	1	18	50	6
ESRB71201020	1	0.5	1	20	55	4
ESRB71201020S6	1	0.5	1	20	55	6
ESRB71201022	1	0.5	1	22	60	4
ESRB71201022S6	1	0.5	1	22	60	6
ESRB71201026	1	0.5	1	26	60	4
ESRB71201026S6	1	0.5	1	26	60	6
ESRB71201030	1	0.5	1	30	70	4
ESRB71201030S6	1	0.5	1	30	70	6
ESRB71201040	1	0.5	1	40	80	4
ESRB71201050	1	0.5	1	50	100	4
ESRB71201204	1.2	0.6	1.2	4	50	4
ESRB71201206	1.2	0.6	1.2	6	50	4
ESRB71201208	1.2	0.6	1.2	8	50	4
ESRB71201210	1.2	0.6	1.2	10	50	4
ESRB71201212	1.2	0.6	1.2	12	50	4
ESRB71201216	1.2	0.6	1.2	16	50	4
ESRB71201220	1.2	0.6	1.2	20	50	4
ESRB71201226	1.2	0.6	1.2	26	60	4
ESRB71201406	1.4	0.7	1.4	6	50	4
ESRB71201408	1.4	0.7	1.4	8	50	4
ESRB71201410	1.4	0.7	1.4	10	50	4
ESRB71201412	1.4	0.7	1.4	12	50	4
ESRB71201416	1.4	0.7	1.4	16	50	4
ESRB71201503	1.5	0.75	1.5	3	50	4
ESRB71201503S6	1.5	0.75	1.5	3	50	6
ESRB71201504	1.5	0.75	1.5	4	50	4
ESRB71201504S6	1.5	0.75	1.5	4	50	6
ESRB71201505	1.5	0.75	1.5	5	50	4
ESRB71201506	1.5	0.75	1.5	6	50	4
ESRB71201506S6	1.5	0.75	1.5	6	50	6
ESRB71201507	1.5	0.75	1.5	7	50	4
ESRB71201508	1.5	0.75	1.5	8	50	4

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESRB712

2 FLUTES RIB BALL ENDMILL

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRB71201508S6	1.5	0.75	1.5	8	50	6
ESRB71201510	1.5	0.75	1.5	10	50	4
ESRB71201510S6	1.5	0.75	1.5	10	50	6
ESRB71201512	1.5	0.75	1.5	12	50	4
ESRB71201512S6	1.5	0.75	1.5	12	50	6
ESRB71201514	1.5	0.75	1.5	14	50	4
ESRB71201514S6	1.5	0.75	1.5	14	50	6
ESRB71201516	1.5	0.75	1.5	16	50	4
ESRB71201516S6	1.5	0.75	1.5	16	50	6
ESRB71201518	1.5	0.75	1.5	18	50	4
ESRB71201518S6	1.5	0.75	1.5	18	50	6
ESRB71201520	1.5	0.75	1.5	20	55	4
ESRB71201520S6	1.5	0.75	1.5	20	55	6
ESRB71201522	1.5	0.75	1.5	22	60	4
ESRB71201522S6	1.5	0.75	1.5	22	60	6
ESRB71201526	1.5	0.75	1.5	26	60	4
ESRB71201526S6	1.5	0.75	1.5	26	60	6
ESRB71201530	1.5	0.75	1.5	30	70	4
ESRB71201530S6	1.5	0.75	1.5	30	70	6
ESRB71201535	1.5	0.75	1.5	35	70	4
ESRB71201535S6	1.5	0.75	1.5	35	70	6
ESRB71201540	1.5	0.75	1.5	40	80	4
ESRB71201540S6	1.5	0.75	1.5	40	80	6
ESRB71201604	1.6	0.8	1.6	4	50	4
ESRB71201606	1.6	0.8	1.6	6	50	4
ESRB71201608	1.6	0.8	1.6	8	50	4
ESRB71201610	1.6	0.8	1.6	10	50	4
ESRB71201612	1.6	0.8	1.6	12	50	4
ESRB71201616	1.6	0.8	1.6	16	50	4
ESRB71201620	1.6	0.8	1.6	20	50	4
ESRB71201804	1.8	0.9	1.8	4	50	4
ESRB71201806	1.8	0.9	1.8	6	50	4
ESRB71201808	1.8	0.9	1.8	8	50	4
ESRB71201810	1.8	0.9	1.8	10	50	4
ESRB71201812	1.8	0.9	1.8	12	50	4
ESRB71201816	1.8	0.9	1.8	16	50	4
ESRB71201820	1.8	0.9	1.8	20	50	4
ESRB71202004	2	1	2	4	50	4
ESRB71202004S6	2	1	2	4	50	6
ESRB71202006	2	1	2	6	50	4
ESRB71202006S6	2	1	2	6	50	6
ESRB71202008	2	1	2	8	50	4
ESRB71202008S6	2	1	2	8	50	6
ESRB71202010	2	1	2	10	50	4
ESRB71202010S6	2	1	2	10	50	6
ESRB71202012	2	1	2	12	50	4
ESRB71202012S6	2	1	2	12	50	6
ESRB71202014	2	1	2	14	50	4

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRB71202014S6	2	1	2	14	50	6
ESRB71202016	2	1	2	16	50	4
ESRB71202016S6	2	1	2	16	50	6
ESRB71202018	2	1	2	18	55	4
ESRB71202018S6	2	1	2	18	55	6
ESRB71202020	2	1	2	20	55	4
ESRB71202020S6	2	1	2	20	55	6
ESRB71202022	2	1	2	22	60	4
ESRB71202022S6	2	1	2	22	60	6
ESRB71202026	2	1	2	26	60	4
ESRB71202026S6	2	1	2	26	60	6
ESRB71202030	2	1	2	30	70	4
ESRB71202030S6	2	1	2	30	70	6
ESRB71202035	2	1	2	35	70	4
ESRB71202035S6	2	1	2	35	70	6
ESRB71202040	2	1	2	40	80	4
ESRB71202040S6	2	1	2	40	80	6
ESRB71202045	2	1	2	45	90	4
ESRB71202045S6	2	1	2	45	90	6
ESRB71202050	2	1	2	50	100	4
ESRB71202050S6	2	1	2	50	100	6
ESRB71202060	2	1	2	60	110	4
ESRB71202508	2.5	1.25	2.5	8	50	4
ESRB71202510	2.5	1.25	2.5	10	50	4
ESRB71202512	2.5	1.25	2.5	12	50	4
ESRB71202516	2.5	1.25	2.5	16	50	4
ESRB71202520	2.5	1.25	2.5	20	50	4
ESRB71202522	2.5	1.25	2.5	22	60	4
ESRB71202526	2.5	1.25	2.5	26	60	4
ESRB71202530	2.5	1.25	2.5	30	70	4
ESRB71202535	2.5	1.25	2.5	35	70	4
ESRB71202540	2.5	1.25	2.5	40	80	4
ESRB71202545	2.5	1.25	2.5	45	90	4
ESRB71202550	2.5	1.25	2.5	50	100	4
ESRB71203006	3	1.5	3	6	50	6
ESRB71203008	3	1.5	3	8	50	6
ESRB71203010	3	1.5	3	10	50	6
ESRB71203012	3	1.5	3	12	50	6
ESRB71203014	3	1.5	3	14	60	6
ESRB71203016	3	1.5	3	16	60	6
ESRB71203018	3	1.5	3	18	60	6
ESRB71203020	3	1.5	3	20	60	6
ESRB71203022	3	1.5	3	22	65	6
ESRB71203026	3	1.5	3	26	65	6
ESRB71203030	3	1.5	3	30	70	6
ESRB71203035	3	1.5	3	35	70	6
ESRB71203040	3	1.5	3	40	80	6
ESRB71203045	3	1.5	3	45	90	6

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESRB712

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRB71203050	3	1.5	3	50	100	6
ESRB71203060	3	1.5	3	60	100	6
ESRB71203510	3.5	1.75	3	10	50	6
ESRB71203516	3.5	1.75	3	16	60	6
ESRB71203520	3.5	1.75	3	20	60	6
ESRB71203526	3.5	1.75	3	26	65	6
ESRB71203530	3.5	1.75	3	30	70	6
ESRB71204008	4	2	4	8	50	6
ESRB71204010	4	2	4	10	50	6
ESRB71204012	4	2	4	12	50	6
ESRB71204014	4	2	4	14	60	6
ESRB71204016	4	2	4	16	60	6
ESRB71204018	4	2	4	18	60	6
ESRB71204020	4	2	4	20	60	6
ESRB71204022	4	2	4	22	65	6
ESRB71204026	4	2	4	26	65	6
ESRB71204030	4	2	4	30	70	6
ESRB71204035	4	2	4	35	70	6
ESRB71204040	4	2	4	40	80	6
ESRB71204045	4	2	4	45	90	6
ESRB71204050	4	2	4	50	100	6
ESRB71204055	4	2	4	55	100	6
ESRB71204060	4	2	4	60	100	6
ESRB71205015	5	2.5	6	15	60	6
ESRB71205020	5	2.5	6	20	60	6

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRB71205026	5	2.5	6	26	65	6
ESRB71205030	5	2.5	6	30	70	6
ESRB71205035	5	2.5	6	35	70	6
ESRB71205040	5	2.5	6	40	80	6
ESRB71205045	5	2.5	6	45	90	6
ESRB71205050	5	2.5	6	50	100	6
ESRB71205055	5	2.5	6	55	100	6
ESRB71205060	5	2.5	6	60	100	6
ESRB7120602090	6	3	12	20	90	6
ESRB71206020	6	3	8	20	60	6
ESRB7120603090	6	3	12	30	90	6
ESRB71206030	6	3	8	30	60	6
ESRB71208025100	8	4	14	25	100	8
ESRB71208025	8	4	10	25	70	8
ESRB71208035100	8	4	14	35	100	8
ESRB71208035	8	4	10	35	70	8
ESRB71210030100	10	5	18	30	100	10
ESRB71210030	10	5	12	30	75	10
ESRB71210040100	10	5	18	40	100	10
ESRB71210040	10	5	12	40	75	10
ESRB71212032110	12	6	22	32	110	12
ESRB71212032	12	6	14	32	80	12
ESRB71212045110	12	6	22	45	110	12
ESRB71212045	12	6	14	45	80	12

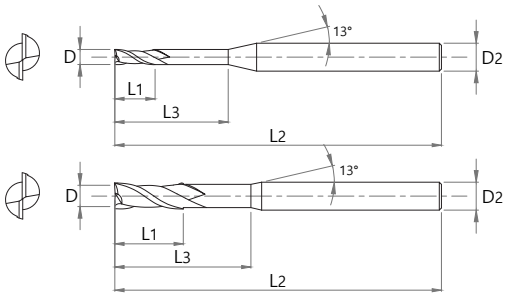
■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESRE712

2 FLUTES RIB NECK TYPE SQUARE ENDMILL



- Reinforced cutting edge by applying the optimum slope
- Improved cutting edge strength by optimal draft angle
- Suitable for machining deep grooves with wide range of neck specifications
- Minimize tool breakage and improve machining stability by reinforcing neck rigidity

ULTRA FINE | 4 | 30° HELIX | AlTiN | Recommended

p.70

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

EDP No.	Dimensions(mm)				
	D	L1	L3	L2	D2
ESRE712001003	0.1	0.15	0.3	40	4
ESRE712001005	0.1	0.15	0.5	40	4
ESRE71200101	0.1	0.15	1	40	4
ESRE712002005	0.2	0.3	0.5	40	4
ESRE712002015	0.2	0.3	1.5	40	4
ESRE71200201	0.2	0.3	1	40	4
ESRE71200202	0.2	0.3	2	40	4
ESRE712003015	0.3	0.5	1.5	40	4
ESRE71200301	0.3	0.5	1	40	4
ESRE712003025	0.3	0.5	2.5	40	4
ESRE71200302	0.3	0.5	2	40	4
ESRE71200303	0.3	0.5	3	40	4
ESRE71200304	0.3	0.5	4	40	4
ESRE71200305	0.4	0.5	5	40	4
ESRE712004015	0.4	0.6	1.5	40	4
ESRE71200401	0.4	0.6	1	40	4
ESRE712004025	0.4	0.6	2.5	40	4
ESRE71200402	0.4	0.6	2	40	4
ESRE71200403	0.4	0.6	3	40	4
ESRE71200404	0.4	0.6	4	40	4
ESRE71200405	0.4	0.6	5	40	4
ESRE71200406	0.4	0.6	6	40	4
ESRE71200408	0.4	0.6	8	40	4
ESRE71200410	0.5	0.6	10	40	4
ESRE712005015	0.5	0.7	1.5	45	4
ESRE71200501	0.5	0.7	1	45	4
ESRE712005025	0.5	0.7	2.5	45	4
ESRE71200502	0.5	0.7	2	45	4
ESRE71200503	0.5	0.7	3	45	4
ESRE71200504	0.5	0.7	4	45	4
ESRE71200505	0.5	0.7	5	45	4

EDP No.	Dimensions(mm)				
	D	L1	L3	L2	D2
ESRE71200506	0.5	0.7	6	45	4
ESRE71200508	0.5	0.7	8	45	4
ESRE71200510	0.5	0.7	10	45	4
ESRE71200512	0.5	0.7	12	45	4
ESRE71200514	0.5	0.7	14	45	4
ESRE71200516	0.5	0.7	16	45	4
ESRE71200602	0.6	0.9	2	45	4
ESRE71200603	0.6	0.9	3	45	4
ESRE71200604	0.6	0.9	4	45	4
ESRE71200605	0.6	0.9	5	45	4
ESRE71200606	0.6	0.9	6	45	4
ESRE71200608	0.6	0.9	8	45	4
ESRE71200610	0.6	0.9	10	45	4
ESRE71200612	0.6	0.9	12	45	4
ESRE71200614	0.6	0.9	14	45	4
ESRE71200616	0.6	0.9	16	45	4
ESRE71200702	0.7	1.2	2	45	4
ESRE71200704	0.7	1.2	4	45	4
ESRE71200706	0.7	1.2	6	45	4
ESRE71200708	0.7	1.2	8	45	4
ESRE71200710	0.7	1.2	10	45	4
ESRE71200712	0.7	1.2	12	45	4
ESRE71200802	0.8	1.2	2	45	4
ESRE71200803	0.8	1.2	3	45	4
ESRE71200804	0.8	1.2	4	45	4
ESRE71200805	0.8	1.2	5	45	4
ESRE71200806	0.8	1.2	6	45	4
ESRE71200808	0.8	1.2	8	45	4
ESRE71200810	0.8	1.2	10	45	4
ESRE71200812	0.8	1.2	12	45	4
ESRE71200814	0.8	1.2	14	45	4

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESRE712

EDP No.	Dimensions(mm)				
	D	L1	L3	L2	D2
ESRE71200816	0.8	1.2	16	45	4
ESRE71200820	0.8	1.2	20	50	4
ESRE71200906	0.9	1.3	6	45	4
ESRE71200908	0.9	1.3	8	45	4
ESRE71200910	0.9	1.3	10	45	4
ESRE71201002	1	1.5	2	50	4
ESRE71201003	1	1.5	3	50	4
ESRE71201004	1	1.5	4	50	4
ESRE71201005	1	1.5	5	50	4
ESRE71201006	1	1.5	6	50	4
ESRE71201007	1	1.5	7	50	4
ESRE71201008	1	1.5	8	50	4
ESRE71201010	1	1.5	10	50	4
ESRE71201012	1	1.5	12	50	4
ESRE71201014	1	1.5	14	50	4
ESRE71201016	1	1.5	16	50	4
ESRE71201018	1	1.5	18	50	4
ESRE71201020	1	1.5	20	50	4
ESRE71201022	1	1.5	22	60	4
ESRE71201026	1	1.5	26	60	4
ESRE71201030	1	1.5	30	70	4
ESRE71201040	1	1.5	40	80	4
ESRE71201050	1	1.5	50	100	4
ESRE71201204	1.2	1.8	4	50	4
ESRE71201206	1.2	1.8	6	50	4
ESRE71201208	1.2	1.8	8	50	4
ESRE71201210	1.2	1.8	10	50	4
ESRE71201212	1.2	1.8	12	50	4
ESRE71201214	1.2	1.8	14	50	4
ESRE71201216	1.2	1.8	16	50	4
ESRE71201220	1.2	1.8	20	50	4
ESRE71201226	1.2	1.8	26	60	4
ESRE71201230	1.2	1.8	30	70	4
ESRE71201406	1.4	2.1	6	50	4
ESRE71201408	1.4	2.1	8	50	4
ESRE71201410	1.4	2.1	10	50	4
ESRE71201414	1.4	2.1	14	50	4
ESRE71201416	1.4	2.1	16	50	4
ESRE71201420	1.4	2.1	20	50	4
ESRE71201504	1.5	2.3	4	50	4
ESRE71201505	1.5	2.3	5	50	4
ESRE71201506	1.5	2.3	6	50	4
ESRE71201507	1.5	2.3	7	50	4
ESRE71201508	1.5	2.3	8	50	4
ESRE71201510	1.5	2.3	10	50	4
ESRE71201512	1.5	2.3	12	50	4
ESRE71201514	1.5	2.3	14	50	4
ESRE71201516	1.5	2.3	16	50	4

EDP No.	Dimensions(mm)				
	D	L1	L3	L2	D2
ESRE71201518	1.5	2.3	18	50	4
ESRE71201520	1.5	2.3	20	50	4
ESRE71201522	1.5	2.3	22	60	4
ESRE71201526	1.5	2.3	26	60	4
ESRE71201530	1.5	2.3	30	70	4
ESRE71201608	1.6	2.3	8	50	4
ESRE71201610	1.6	2.3	10	50	4
ESRE71201612	1.6	2.3	12	50	4
ESRE71201616	1.6	2.3	16	50	4
ESRE71201620	1.6	2.3	20	50	4
ESRE71201808	1.8	2.7	8	50	4
ESRE71201810	1.8	2.7	10	50	4
ESRE71201812	1.8	2.7	12	50	4
ESRE71201816	1.8	2.7	16	50	4
ESRE71201820	1.8	2.7	20	50	4
ESRE71202006	2	3	6	50	4
ESRE71202008	2	3	8	50	4
ESRE71202010	2	3	10	50	4
ESRE71202012	2	3	12	50	4
ESRE71202014	2	3	14	50	4
ESRE71202016	2	3	16	50	4
ESRE71202018	2	3	18	50	4
ESRE71202020	2	3	20	50	4
ESRE71202022	2	3	22	60	4
ESRE71202026	2	3	26	60	4
ESRE71202030	2	3	30	70	4
ESRE71202035	2	3	35	70	4
ESRE71202040	2	3	40	80	4
ESRE71202045	2	3	45	90	4
ESRE71202050	2	3	50	100	4
ESRE71202060	2	3	60	110	4
ESRE71202508	2.5	4	8	50	4
ESRE71202510	2.5	4	10	50	4
ESRE71202512	2.5	4	12	50	4
ESRE71202514	2.5	4	14	50	4
ESRE71202516	2.5	4	16	50	4
ESRE71202518	2.5	4	18	50	4
ESRE71202520	2.5	4	20	50	4
ESRE71202522	2.5	4	22	60	4
ESRE71202526	2.5	4	26	60	4
ESRE71202530	2.5	4	30	70	4
ESRE71202535	2.5	4	35	70	4
ESRE71202540	2.5	4	40	80	4
ESRE71202545	2.5	4	45	90	4
ESRE71202550	2.5	4	50	100	4
ESRE71203006	3	4.5	6	50	6
ESRE71203008	3	4.5	8	50	6
ESRE71203010	3	4.5	10	50	6

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESRE712

2 FLUTES RIB NECK TYPE SQUARE ENDMILL

EDP No.	Dimensions(mm)				
	D	L1	L3	L2	D2
ESRE71203012	3	4.5	12	50	6
ESRE71203014	3	4.5	14	60	6
ESRE71203016	3	4.5	16	60	6
ESRE71203018	3	4.5	18	60	6
ESRE71203020	3	4.5	20	60	6
ESRE71203022	3	4.5	22	65	6
ESRE71203026	3	4.5	26	65	6
ESRE71203030	3	4.5	30	70	6
ESRE71203035	3	4.5	35	70	6
ESRE71203040	3	4.5	40	80	6
ESRE71203045	3	4.5	45	90	6
ESRE71203050	3	4.5	50	100	6
ESRE71203060	3	4.5	60	100	6
ESRE71204008	4	6	8	50	6
ESRE71204010	4	6	10	50	6
ESRE71204012	4	6	12	50	6
ESRE71204014	4	6	14	60	6
ESRE71204016	4	6	16	60	6
ESRE71204018	4	6	18	60	6
ESRE71204020	4	6	20	60	6
ESRE71204022	4	6	22	65	6
ESRE71204026	4	6	26	65	6
ESRE71204030	4	6	30	70	6
ESRE71204035	4	6	35	70	6
ESRE71204040	4	6	40	80	6

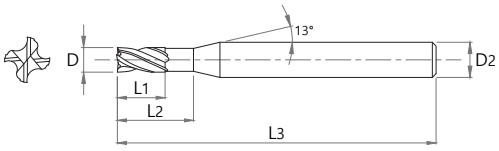
EDP No.	Dimensions(mm)				
	D	L1	L3	L2	D2
ESRE71204045	4	6	45	90	6
ESRE71204050	4	6	50	100	6
ESRE71204060	4	6	60	100	6
ESRE71205016	5	8	16	60	6
ESRE71205020	5	8	20	60	6
ESRE71205026	5	8	26	65	6
ESRE71205030	5	8	30	70	6
ESRE71205035	5	8	35	75	6
ESRE71205040	5	8	40	80	6
ESRE71205050	5	8	50	90	6
ESRE71205060	5	8	60	100	6
ESRE71206015	6	9	15	60	6
ESRE71206020	6	9	20	60	6
ESRE71206030	6	9	30	70	6
ESRE71206032	6	9	32	90	6
ESRE71208025	8	12	25	70	8
ESRE71208030	8	12	30	80	8
ESRE71208042	8	12	42	100	8
ESRE71210030	10	15	30	75	10
ESRE71210035	10	15	35	80	10
ESRE71210045	10	15	45	100	10
ESRE71212035	12	20	35	80	12
ESRE71212040	12	20	40	90	12
ESRE71212050	12	20	50	110	12

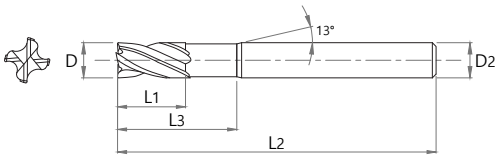
■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESXE704





ULTRA FINE | 4 | M HELIX | AlTiN | Recommended

p.75

- Reinforced cutting edge by applying the optimum slope
- Improved cutting edge strength by optimal draft angle
- Excellent surface on high speed machining by variable helix
- Reinforce tool life by less chattering

■ Tolerance

D		Shank Dia.
All sizes	0~-0.02	h5

EDP No.	Dimensions(mm)				
	D	L1	L3	L2	D2
ESXE704010	1	1.5	4	45	4
ESXE704020	2	3	6	45	4
ESXE704030	3	4	7	45	6
ESXE704040	4	5	9	45	6
ESXE704060	6	7	14	50	6
ESXE704080	8	9	18	60	8
ESXE704100	10	12	25	75	10
ESXE704120	12	15	30	75	12

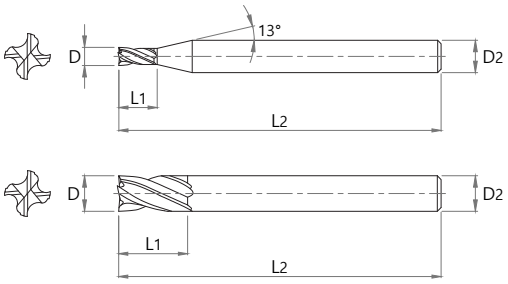
■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESXE714

4 FLUTES SQUARE ENDMILL



- Reinforced cutting edge by applying the optimum slope
- Improved cutting edge strength by optimal draft angle
- Excellent surface on high speed machining by variable helix
- Reinforce tool life by less chattering

ULTRA FINE | 4 | M HELIX | AlTiN | Recommended

p.75

■ Tolerance

D		Shank Dia.
All sizes	0~-0.02	h5

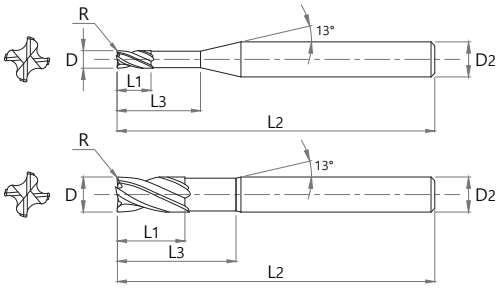
EDP No.	Dimensions(mm)			
	D	L1	L2	D2
ESXE714020	2	5	45	4
ESXE714030	3	8	45	6
ESXE714040	4	10	45	6
ESXE714040S4	4	10	45	4
ESXE714060	6	16	50	6
ESXE714080	8	20	60	8
ESXE714100	10	25	75	10
ESXE714120	12	35	85	12

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESXR704



- Improved anti-chipping on corner R part
- Improved cutting edge strength by optimal draft angle
- Excellent surface on high speed machining by variable helix
- Reinforce tool life by less chattering

ULTRA FINE | 4 | M HELIX | R ±0.01 R3≥ | R ±0.015 R3< | AlTiN | Recommended p.75

■ Tolerance

D		Shank Dia.
All sizes	0~-0.02	h5

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESXR70401000504	1	0.05	1.5	4	45	4
ESXR70402000506	2	0.05	3	6	45	4
ESXR70402000507	2	0.05	2.5	7	50	4
ESXR7040200107	2	0.1	2.5	7	50	4
ESXR7040300107	3	0.1	4	7	45	6
ESXR7040300109	3	0.1	4	9	55	6
ESXR7040300209	3	0.2	4	9	55	6
ESXR7040300309	3	0.3	4	9	55	6
ESXR7040300312	3	0.3	4	12	55	6
ESXR7040300316	3	0.3	4	16	55	6
ESXR7040400109	4	0.1	5	9	45	6
ESXR7040400212	4	0.2	5	12	55	6
ESXR7040400212S4	4	0.2	5	12	55	4
ESXR7040400312	4	0.3	5	12	55	6
ESXR7040400316	4	0.3	5	16	55	6
ESXR7040400320	4	0.3	5	20	55	6
ESXR7040400512	4	0.5	5	12	55	6
ESXR7040400516	4	0.5	5	16	55	6
ESXR7040400516S4	4	0.5	5	16	55	4
ESXR7040400520	4	0.5	5	20	55	6
ESXR7040401012	4	1	5	12	55	6
ESXR7040500116	5	0.1	6	16	60	6
ESXR7040500216	5	0.2	6	16	60	6
ESXR7040500316	5	0.3	6	16	60	6
ESXR7040500516	5	0.5	6	16	60	6
ESXR7040501016	5	1	6	16	60	6
ESXR7040600120	6	0.1	7	20	60	6
ESXR7040600214	6	0.2	7	14	50	6

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESXR7040600220	6	0.2	7	20	60	6
ESXR7040600320	6	0.3	7	20	60	6
ESXR7040600520	6	0.5	7	20	60	6
ESXR7040601020	6	1	7	20	60	6
ESXR7040601520	6	1.5	7	20	60	6
ESXR7040800125	8	0.1	9	25	60	8
ESXR7040800218	8	0.2	9	18	60	8
ESXR7040800225	8	0.2	9	25	60	8
ESXR7040800325	8	0.3	9	25	60	8
ESXR7040800525	8	0.5	9	25	60	8
ESXR7040801025	8	1	9	25	60	8
ESXR7040801525	8	1.5	9	25	60	8
ESXR7040802025	8	2	9	25	60	8
ESXR7041000225	10	0.2	12	25	75	10
ESXR7041000232	10	0.2	11	32	75	10
ESXR7041000332	10	0.3	11	32	75	10
ESXR7041000532	10	0.5	11	32	75	10
ESXR7041001032	10	1	11	32	75	10
ESXR7041001532	10	1.5	11	32	75	10
ESXR7041002032	10	2	11	32	75	10
ESXR7041200238	12	0.2	12	38	75	12
ESXR7041200330	12	0.3	15	30	75	12
ESXR7041200338	12	0.3	12	38	75	12
ESXR7041200538	12	0.5	12	38	75	12
ESXR7041201038	12	1	12	38	75	12
ESXR7041201538	12	1.5	12	38	75	12
ESXR7041202038	12	2	12	38	75	12

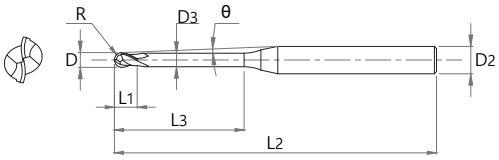
■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESLNB20

2 FLUTES LONG NECK TYPE BALL ENDMILL



- Excellent performance in high precision machining from precision tolerance
- Improved cutting edge strength by optimal draft angle
- Suitable for machining deep grooves and inclined surfaces with various neck specifications
- Various effective length from draft angle of workpiece cover a wide range of machining

■ Tolerance

D		Shank Dia.
All sizes	0~-0.02	h5

ULTRA FINE | 2 | 30° HELIX | R ±0.005 R3≥ | AlTiN | Recommended p.75

EDP No.	Dimensions(mm)								Effective length from draft angle of workpiece				
	D	R	L1	L3	D3	L2	D2	θ	0.5°	1°	1.5°	2°	3°
ESLNB2001-0.2	0.1	0.05	0.08	0.2	0.08	45	4	11.8	0.3	0.3	0.3	0.4	0.4
ESLNB2001-0.3	0.1	0.05	0.08	0.3	0.08	45	4	11.7	0.4	0.4	0.5	0.5	0.5
ESLNB2001-0.5	0.1	0.05	0.08	0.5	0.08	45	4	11.4	0.6	0.7	0.7	0.7	0.8
ESLNB2002-0.5	0.2	0.1	0.15	0.5	0.17	50	4	11.5	1.2	1.3	1.5	1.6	2
ESLNB2002-1	0.2	0.1	0.15	1	0.17	50	4	10.9	1.7	1.9	2.1	2.3	2.7
ESLNB2002-1.5	0.2	0.1	0.15	1.5	0.17	50	4	10.4	2.3	2.5	2.8	3	3.4
ESLNB2002-2	0.2	0.1	0.15	2	0.17	50	4	9.9	2.8	3.1	3.4	3.6	4.1
ESLNB2002-2.5	0.2	0.1	0.15	2.5	0.17	50	4	9.5	3.4	3.7	4	4.2	4.7
ESLNB2002-3.0	0.2	0.1	0.15	3	0.17	50	4	9.1	3.9	4.3	4.6	4.9	5.4
ESLNB2003-1	0.3	0.15	0.25	1	0.27	50	4	10.9	1.7	1.9	2.1	2.3	2.7
ESLNB2003-1.5	0.3	0.15	0.25	1.5	0.27	50	4	10.4	2.3	2.5	2.7	3	3.4
ESLNB2003-2	0.3	0.15	0.25	2	0.27	50	4	9.9	2.8	3.1	3.4	3.6	4
ESLNB2003-2.5	0.3	0.15	0.25	2.5	0.27	50	4	9.5	3.4	3.7	4	4.2	4.7
ESLNB2003-3	0.3	0.15	0.25	3	0.27	50	4	9.1	3.9	4.3	4.6	4.8	5.3
ESLNB2004-1	0.4	0.2	0.3	1	0.37	50	4	11	1.7	1.9	2.1	2.3	2.7
ESLNB2004-1.5	0.4	0.2	0.3	1.5	0.37	50	4	10.4	2.3	2.5	2.7	2.9	3.4
ESLNB2004-2	0.4	0.2	0.3	2	0.37	50	4	9.9	2.8	3.1	3.4	3.6	4
ESLNB2004-2.5	0.4	0.2	0.3	2.5	0.37	50	4	9.5	3.4	3.7	4	4.2	4.7
ESLNB2004-3	0.4	0.2	0.3	3	0.37	50	4	9.1	3.9	4.3	4.6	4.8	5.3
ESLNB2004-3.5	0.4	0.2	0.3	3.5	0.37	50	4	8.7	4.5	4.8	5.2	5.4	6
ESLNB2004-4	0.4	0.2	0.3	4	0.37	50	4	8.3	5	5.4	5.7	6	6.6
ESLNB2004-4.5	0.4	0.2	0.3	4.5	0.37	50	4	8	5.6	6	6.3	6.6	7.2
ESLNB2005-1	0.5	0.25	0.35	1	0.47	50	4	11	1.7	1.9	2.1	2.3	2.6
ESLNB2005-2	0.5	0.25	0.35	2	0.47	50	4	9.9	2.8	3.1	3.3	3.6	4
ESLNB2005-3	0.5	0.25	0.35	3	0.47	50	4	9	3.9	4.3	4.6	4.8	5.3
ESLNB2005-4	0.5	0.25	0.35	4	0.47	50	4	8.3	5	5.4	5.7	6	6.6
ESLNB2005-5	0.5	0.25	0.35	5	0.47	50	4	7.7	6.1	6.5	6.9	7.2	7.8
ESLNB2005-6	0.5	0.25	0.35	6	0.47	50	4	7.1	7.2	7.6	8	8.4	9

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESLNB20

EDP No.	Dimensions(mm)								Effective length from draft angle of workpiece				
	D	R	L1	L3	D3	L2	D2	θ	0.5°	1°	1.5°	2°	3°
ESLNB2005-8	0.5	0.25	0.35	8	0.47	50	4	6.3	9.3	9.9	10.3	10.7	11.4
ESLNB2006-1	0.6	0.3	0.4	1	0.57	50	4	11	1.7	1.9	2.1	2.3	2.6
ESLNB2006-2	0.6	0.3	0.4	2	0.57	50	4	9.9	2.8	3.1	3.3	3.6	4
ESLNB2006-3	0.6	0.3	0.4	3	0.57	50	4	9	3.9	4.3	4.5	4.8	5.3
ESLNB2006-4	0.6	0.3	0.4	4	0.57	50	4	8.3	5	5.4	5.7	6	6.6
ESLNB2006-5	0.6	0.3	0.4	5	0.57	50	4	7.6	6.1	6.5	6.9	7.2	7.8
ESLNB2006-6	0.6	0.3	0.4	6	0.57	50	4	7.1	7.2	7.6	8	8.4	9
ESLNB2006-7	0.6	0.3	0.4	7	0.57	50	4	6.6	8.3	8.8	9.2	9.5	10.2
ESLNB2006-8	0.6	0.3	0.4	8	0.57	50	4	6.2	9.3	9.9	10.3	10.7	11.4
ESLNB2006-9	0.6	0.3	0.4	9	0.57	50	4	5.8	10.4	10.9	11.4	11.8	12.5
ESLNB2006-10	0.6	0.3	0.4	10	0.57	50	4	5.5	11.4	12	12.5	12.9	13.7
ESLNB2006-12	0.6	0.3	0.4	12	0.57	50	4	5	13.6	14.2	14.7	15.2	16
ESLNB2008-2	0.8	0.4	0.5	2	0.77	50	4	9.9	2.8	3.1	3.3	3.5	4
ESLNB2008-4	0.8	0.4	0.5	4	0.77	50	4	8.2	5	5.4	5.7	6	6.5
ESLNB2008-5	0.8	0.4	0.5	5	0.77	50	4	7.5	6.1	6.5	6.9	7.2	7.8
ESLNB2008-6	0.8	0.4	0.5	6	0.77	50	4	7	7.2	7.6	8	8.4	9
ESLNB2008-8	0.8	0.4	0.5	8	0.77	50	4	6.1	9.3	9.8	10.3	10.7	11.3
ESLNB2008-10	0.8	0.4	0.5	10	0.77	50	4	5.4	11.4	12	12.5	12.9	13.7
ESLNB2010-2	1	0.5	0.8	2	0.96	50	4	9.9	2.9	3.1	3.3	3.5	4
ESLNB2010-3	1	0.5	0.8	3	0.96	50	4	8.9	4	4.3	4.5	4.8	5.3
ESLNB2010-4	1	0.5	0.8	4	0.96	50	4	8.1	5	5.4	5.7	6	6.5
ESLNB2010-5	1	0.5	0.8	5	0.96	50	4	7.4	6.1	6.5	6.9	7.2	7.8
ESLNB2010-6	1	0.5	0.8	6	0.96	50	4	6.8	7.2	7.7	8	8.4	9
ESLNB2010-7	1	0.5	0.8	7	0.96	50	4	6.3	8.3	8.8	9.2	9.5	10.2
ESLNB2010-8	1	0.5	0.8	8	0.96	50	4	5.9	9.3	9.9	10.3	10.7	11.3
ESLNB2010-9	1	0.5	0.8	9	0.96	50	4	5.5	10.4	11	11.4	11.8	12.5
ESLNB2010-10	1	0.5	0.8	10	0.96	50	4	5.2	11.5	12	12.5	12.9	13.7
ESLNB2010-12	1	0.5	0.8	12	0.96	55	4	4.6	13.6	14.2	14.7	15.2	15.9
ESLNB2010-14	1	0.5	0.8	14	0.96	55	4	4.2	15.7	16.4	16.9	17.4	18.5
ESLNB2010-16	1	0.5	0.8	16	0.96	55	4	3.8	17.8	18.5	19.1	19.6	21.2
ESLNB2010-18	1	0.5	0.8	18	0.96	60	4	3.5	19.9	20.7	21.3	21.8	23.8
ESLNB2010-20	1	0.5	0.8	20	0.96	60	4	3.3	22	22.8	23.4	24	26.5
ESLNB2012-4	1.2	0.6	1.1	4	1.15	50	4	7.9	5.1	5.4	5.7	6	6.5
ESLNB2012-6	1.2	0.6	1.1	6	1.15	50	4	6.6	7.2	7.7	8	8.4	9
ESLNB2012-8	1.2	0.6	1.1	8	1.15	50	4	5.7	9.4	9.9	10.3	10.7	11.3
ESLNB2012-10	1.2	0.6	1.1	10	1.15	50	4	5	11.5	12.1	12.5	12.9	13.7
ESLNB2012-12	1.2	0.6	1.1	12	1.15	55	4	4.5	13.6	14.2	14.7	15.2	15.9
ESLNB2014-8	1.4	0.7	1.3	8	1.34	50	4	5.5	9.4	9.9	10.3	10.7	11.3
ESLNB2014-12	1.4	0.7	1.3	12	1.34	55	4	4.3	13.6	14.2	14.7	15.2	15.9
ESLNB2014-16	1.4	0.7	1.3	16	1.34	55	4	3.5	17.8	18.5	19.1	19.6	21.2
ESLNB2015-4	1.5	0.75	1.35	4	1.44	50	4	7.7	5.1	5.4	5.7	6	6.5
ESLNB2015-6	1.5	0.75	1.35	6	1.44	50	4	6.4	7.3	7.7	8	8.4	9
ESLNB2015-8	1.5	0.75	1.35	8	1.44	50	4	5.4	9.4	9.9	10.3	10.7	11.3
ESLNB2015-10	1.5	0.75	1.35	10	1.44	50	4	4.7	11.5	12.1	12.5	12.9	13.7
ESLNB2015-12	1.5	0.75	1.35	12	1.44	55	4	4.2	13.6	14.2	14.7	15.2	15.9

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESLNB20

2 FLUTES LONG NECK TYPE BALL ENDMILL

EDP No.	Dimensions(mm)								Effective length from draft angle of workpiece				
	D	R	L1	L3	D3	L2	D2	θ	0.5°	1°	1.5°	2°	3°
ESLNB2015-14	1.5	0.75	1.35	14	1.44	55	4	3.8	15.7	16.4	16.9	17.4	18.5
ESLNB2015-16	1.5	0.75	1.35	16	1.44	55	4	3.4	17.8	18.5	19.1	19.6	21.1
ESLNB2015-20	1.5	0.75	1.35	20	1.44	60	4	2.9	22	22.8	23.4	24	-
ESLNB2016-8	1.6	0.8	1.4	8	1.54	50	4	5.3	9.4	9.9	10.3	10.7	11.3
ESLNB2016-10	1.6	0.8	1.4	10	1.54	55	4	4.6	11.5	12.1	12.5	12.9	13.7
ESLNB2016-12	1.6	0.8	1.4	12	1.54	55	4	4.1	13.6	14.2	14.7	15.2	15.9
ESLNB2016-16	1.6	0.8	1.4	16	1.54	55	4	3.3	17.8	18.5	19.1	19.6	21.1
ESLNB2016-20	1.6	0.8	1.4	20	1.54	60	4	2.8	22	22.8	23.4	24	-
ESLNB2018-8	1.8	0.9	1.6	8	1.73	50	4	5.1	9.4	9.9	10.3	10.7	11.3
ESLNB2018-12	1.8	0.9	1.6	12	1.73	55	4	3.9	13.7	14.3	14.7	15.2	15.9
ESLNB2018-16	1.8	0.9	1.6	16	1.73	55	4	3.1	17.9	18.6	19.1	19.6	21.1
ESLNB2018-20	1.8	0.9	1.6	20	1.73	60	4	2.6	22	22.8	23.4	24	-
ESLNB2020-3	2	1	1.7	3	1.92	50	4	8.3	4.1	4.4	4.6	4.8	5.2
ESLNB2020-4	2	1	3	4	1.92	50	4	7.3	5.2	5.5	5.8	6	6.5
ESLNB2020-6	2	1	3	6	1.92	50	4	5.8	7.3	7.7	8.1	8.4	9
ESLNB2020-8	2	1	3	8	1.92	50	4	4.9	9.5	9.9	10.3	10.7	11.3
ESLNB2020-10	2	1	3	10	1.92	50	4	4.2	11.6	12.1	12.6	12.9	13.6
ESLNB2020-12	2	1	3	12	1.92	55	4	3.7	13.7	14.3	14.8	15.2	15.9
ESLNB2020-14	2	1	3	14	1.92	55	4	3.2	15.8	16.4	16.9	17.4	18.5
ESLNB2020-16	2	1	3	16	1.92	55	4	2.9	17.9	18.6	19.1	19.6	-
ESLNB2020-18	2	1	3	18	1.92	60	4	2.7	20	20.7	21.3	21.8	-
ESLNB2020-20	2	1	3	20	1.92	60	4	2.4	22.1	22.8	23.4	24	-
ESLNB2020-22	2	1	3	22	1.92	60	4	2.3	24.1	24.9	25.6	26.3	-
ESLNB2020-25	2	1	3	25	1.92	65	4	2	27.3	28.1	28.8	-	-
ESLNB2020-30	2	1	3	30	1.92	70	4	1.7	32.4	33.4	34.2	-	-
ESLNB2020-35	2	1	3	35	1.92	75	4	1.5	37.6	38.6	-	-	-
ESLNB2020-40	2	1	3	40	1.92	80	4	1.4	42.8	43.8	-	-	-
ESLNB2025-10	2.5	1.25	4	10	2.4	50	4	3.4	11.6	12.1	12.6	13	13.6
ESLNB2025-16	2.5	1.25	4	16	2.4	55	4	2.3	17.9	18.6	19.1	19.6	-
ESLNB2025-20	2.5	1.25	4	20	2.4	60	4	1.9	22.1	22.8	23.5	-	-
ESLNB2030-8	3	1.5	4	8	2.88	55	6	6.2	9.6	10	10.4	10.7	11.3
ESLNB2030-10	3	1.5	4	10	2.88	55	6	5.5	11.7	12.2	12.6	13	13.6
ESLNB2030-13	3	1.5	4	13	2.88	60	6	4.6	14.8	15.4	15.9	16.3	17.1
ESLNB2030-16	3	1.5	4	16	2.88	60	6	4	18	18.6	19.1	19.6	21.1
ESLNB2030-18	3	1.5	4	18	2.88	60	6	3.6	20	20.7	21.3	21.8	23.7
ESLNB2030-20	3	1.5	4	20	2.88	65	6	3.4	22.1	22.9	23.5	24	26.4
ESLNB2030-25	3	1.5	4	25	2.88	70	6	2.8	27.3	28.2	28.8	29.9	-
ESLNB2030-30	3	1.5	4	30	2.88	75	6	2.2	37.7	38.7	40	41.9	-
ESLNB2030-35	3	1.5	4	35	2.88	80	6	4.5	11.6	12.1	12.5	12.9	13.5
ESLNB2040-10	4	2	5	10	3.9	55	6	3.6	14.7	15.3	15.8	16.2	17
ESLNB2040-13	4	2	5	13	3.9	60	6	3.1	17.9	18.5	19.1	19.5	20.9
ESLNB2040-16	4	2	5	16	3.9	60	6	2.5	22.1	22.8	23.4	23.9	-
ESLNB2040-20	4	2	5	20	3.9	65	6	2.1	27.3	28.1	28.8	29.8	-
ESLNB2040-25	4	2	5	25	3.9	70	6	1.8	32.4	33.4	34.2	-	-
ESLNB2040-30	4	2	5	30	3.9	75	6	1.6	37.6	38.6	39.9	-	-

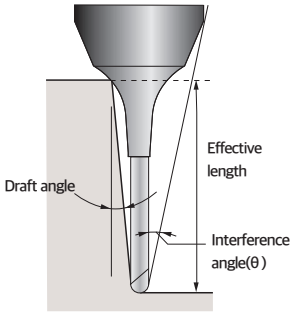
■ Applicable working material

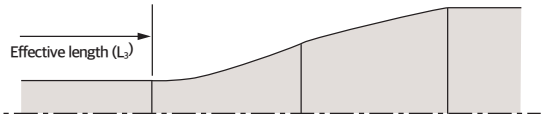
Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESLNB20

EDP No.	Dimensions(mm)								Effective length from draft angle of workpiece				
	D	R	L1	L3	D3	L2	D2	θ	0.5°	1°	1.5°	2°	3°
ESLNB2040-35	4	2	5	35	3.9	80	6	1.4	42.8	43.8	-	-	-
ESLNB2040-40	4	2	5	40	3.9	80	6	1.2	47.9	49.1	-	-	-
ESLNB2040-45	4	2	5	45	3.9	90	6	1.1	53.1	54.5	-	-	-
ESLNB2040-50	4	2	5	50	3.9	100	6	1.4	22	22.8	-	-	-
ESLNB2050-20	5	2.5	6	20	4.9	65	6	1.2	27.2	28.1	-	-	-
ESLNB2050-25	5	2.5	6	25	4.9	70	6	1	32.4	-	-	-	-
ESLNB2050-30	5	2.5	6	30	4.9	75	6	0.8	42.8	-	-	-	-
ESLNB2050-35	5	2.5	6	35	4.9	80	6	0.7	42.8	-	-	-	-
ESLNB2050-40	5	2.5	6	40	4.9	90	6						





※ Marked effective length is set to prevent interfering in workpiece. You need to take proper control when machining.

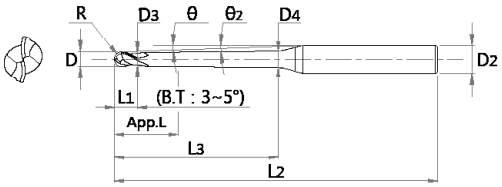
■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESTNB

2 FLUTES TAPERED NECK TYPE BALL ENDMILL



※R2 and below are not back draft type.

- Excellent performance in high precision machining from precision tolerance
- Improved cutting edge strength by optimal draft angle
- Suitable for machining deep grooves and incline surfaces with various neck specifications
- Various effective length from draft angle of workpiece cover a wide range of machining
- Reinforced strength and reduction vibration with tapered neck

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

ULTRA FINE | 2 | 30° HELIX | R ±0.01 R3≥ | R ±0.015 R3< | AlTiN | Recommended p.76

EDP No.	Dimensions(mm)											Effective length from draft angle of workpiece				
	D	R	L1	L3	θ2	D3	D4	L2	D2	App.L	θ	0.5°	1°	1.5°	2°	3°
ESTNB2002-1-04	0.2	0.1	0.15	1	0.4	0.17	0.18	50	4	1.35	10.9	1.5	1.7	1.8	2	2.3
ESTNB2002-1.5-04	0.2	0.1	0.15	1.5	0.4	0.17	0.19	50	4	1.77	10.4	2	2.2	2.4	2.6	2.9
ESTNB2002-2-09	0.2	0.1	0.15	2	0.9	0.17	0.23	50	4	1.10	10.1	-	2.8	3.1	3.4	3.9
ESTNB2002-2.5-09	0.2	0.1	0.15	2.5	0.9	0.17	0.24	50	4	1.10	9.6	-	3.3	3.7	4	4.5
ESTNB2003-2-04	0.3	0.15	0.25	2	0.4	0.28	0.29	50	4	2.19	10	2.5	2.8	3	3.2	3.5
ESTNB2003-3-09	0.3	0.15	0.25	3	0.9	0.28	0.36	50	4	1.20	9.3	-	3.8	4.2	4.5	5.1
ESTNB2003-4-09	0.3	0.15	0.25	4	0.9	0.28	0.39	50	4	1.20	8.6	-	4.8	5.3	5.7	6.3
ESTNB2004-2-04	0.4	0.2	0.3	2	0.4	0.37	0.39	50	4	2.20	10	2.5	2.8	3	3.2	3.5
ESTNB2004-3-04	0.4	0.2	0.3	3	0.4	0.37	0.41	50	4	2.44	9.1	3.6	3.9	4.1	4.4	4.8
ESTNB2004-4-04	0.4	0.2	0.3	4	0.4	0.37	0.42	50	4	2.44	8.4	4.7	5.2	5.6	5.9	6.5
ESTNB2004-4-09	0.4	0.2	0.3	4	0.9	0.37	0.49	50	4	1.25	8.5	-	4.8	5.3	5.7	6.3
ESTNB2004-5-04	0.4	0.2	0.3	5	0.4	0.37	0.44	50	4	2.44	7.8	5.7	6.3	6.7	7.1	7.7
ESTNB2004-5-09	0.4	0.2	0.3	5	0.9	0.37	0.52	50	4	1.25	7.9	-	5.9	6.4	6.8	7.5
ESTNB2005-4-04	0.5	0.25	0.35	4	0.4	0.47	0.52	50	4	2.49	8.4	4.6	5	5.3	5.5	5.9
ESTNB2005-8-09	0.5	0.25	0.35	8	0.9	0.47	0.71	50	4	1.30	6.5	-	8.9	9.6	10.1	10.9
ESTNB2005-12-09	0.5	0.25	0.35	12	0.9	0.47	0.84	50	4	1.30	5.3	-	13	13.9	14.5	15.4
ESTNB20054-2-04	0.54	0.27	0.37	2	0.4	0.52	0.54	50	4	1.80	10	2.3	2.5	2.7	2.8	3
ESTNB20054-4-04	0.54	0.27	0.37	4	0.4	0.52	0.57	50	4	1.80	8.4	4.5	4.9	5.2	5.5	5.9
ESTNB20054-5-04	0.54	0.27	0.37	5	0.4	0.52	0.59	50	4	1.80	7.8	5.5	6	6.3	6.6	7.1
ESTNB20054-6-04	0.54	0.27	0.37	6	0.4	0.52	0.60	50	4	1.80	7.2	6.7	7.3	7.8	8.2	8.8
ESTNB20054-6.5-04	0.54	0.27	0.37	6.5	0.4	0.52	0.61	50	4	1.80	7	7.2	7.9	8.3	8.7	9.4
ESTNB20054-7-04	0.54	0.27	0.37	7	0.4	0.52	0.61	50	4	1.80	6.8	7.7	8.4	8.9	9.3	10
ESTNB2006-2-04	0.6	0.3	0.4	2	0.4	0.57	0.59	50	4	2.17	10	2.4	2.5	2.7	2.8	3
ESTNB2006-4-04	0.6	0.3	0.4	4	0.4	0.57	0.62	50	4	2.54	8.4	4.6	5	5.2	5.5	5.9
ESTNB2006-6-04	0.6	0.3	0.4	6	0.4	0.57	0.65	50	4	2.54	7.2	6.8	7.4	7.8	8.2	8.8
ESTNB2006-6-09	0.6	0.3	0.4	6	0.9	0.57	0.75	50	4	1.35	7.3	-	6.9	7.5	7.9	8.6
ESTNB2006-8-09	0.6	0.3	0.4	8	0.9	0.57	0.81	50	4	1.35	6.4	-	8.9	9.6	10.1	10.9
ESTNB2006-10-04	0.6	0.3	0.4	10	0.4	0.57	0.70	50	4	2.54	5.6	10.8	11.7	12.2	12.7	13.5
ESTNB2006-10-09	0.6	0.3	0.4	10	0.9	0.57	0.87	50	4	1.35	5.7	-	11	11.8	12.3	13.2
ESTNB2006-12-09	0.6	0.3	0.4	12	0.9	0.57	0.93	55	4	1.35	5.2	-	13	13.9	14.5	15.4

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESTNB

EDP No.	Dimensions(mm)											Effective length from draft angle of workpiece				
	D	R	L1	L3	θ2	D3	D4	L2	D2	App.L	θ	0.5°	1°	1.5°	2°	3°
ESTNB2006-15-04	0.6	0.3	0.4	15	0.4	0.57	0.77	55	4	2.54	4.4	15.9	17	17.6	18.2	19.2
ESTNB2006-15-09	0.6	0.3	0.4	15	0.9	0.57	1.03	55	4	1.35	4.5	-	16.1	17.1	17.7	18.8
ESTNB2008-4-04	0.8	0.4	0.5	4	0.4	0.77	0.82	50	4	2.64	8.3	4.6	4.9	5.2	5.5	5.9
ESTNB2008-6-04	0.8	0.4	0.5	6	0.4	0.77	0.85	50	4	2.64	7.1	6.6	7.1	7.5	7.7	8.3
ESTNB2008-8-09	0.8	0.4	0.5	8	0.9	0.77	1.01	50	4	1.45	6.3	-	8.9	9.6	10.1	10.9
ESTNB2008-12-09	0.8	0.4	0.5	12	0.9	0.77	1.13	55	4	1.45	5	-	13	13.9	14.5	15.4
ESTNB2008-16-09	0.8	0.4	0.5	16	0.9	0.77	1.26	55	4	1.45	4.2	-	17.1	18.1	18.8	19.9
ESTNB2009-4-04	0.9	0.45	0.6	4	0.4	0.86	0.91	50	4	3.46	8.2	4.5	4.7	4.9	5.1	5.4
ESTNB2009-8-04	0.9	0.45	0.6	8	0.4	0.86	0.96	55	4	3.46	6.1	8.7	9.3	9.7	10	10.6
ESTNB2009-12-04	0.9	0.45	0.6	12	0.4	0.86	1.02	55	4	3.46	4.8	12.9	13.8	14.4	14.9	15.7
ESTNB2009-16-04	0.9	0.45	0.6	16	0.4	0.86	1.08	60	4	3.46	4	17	18	18.7	19.3	20.5
ESTNB2009-18-04	0.9	0.45	0.6	18	0.4	0.86	1.10	65	4	3.46	3.7	19.1	20.1	20.9	21.5	23.1
ESTNB2009-20-04	0.9	0.45	0.6	20	0.4	0.86	1.13	65	4	3.46	3.4	21.1	22.2	23	23.6	25.6
ESTNB2009-22-04	0.9	0.45	0.6	22	0.4	0.86	1.16	65	4	3.46	3.2	23.1	24.3	25.1	25.8	28.2
ESTNB2009-24-04	0.9	0.45	0.6	24	0.4	0.86	1.19	70	4	3.46	3	25.2	26.4	27.2	27.9	-
ESTNB2010-6-04	1	0.5	0.8	6	0.4	0.94	1.01	50	6	5.09	8.3	6.8	7.2	7.5	7.8	8.3
ESTNB2010-8-04	1	0.5	0.8	8	0.4	0.94	1.04	55	6	5.09	7.5	8.8	9.3	9.7	10	10.6
ESTNB2010-10-04	1	0.5	0.8	10	0.4	0.94	1.07	55	6	5.09	6.8	11	11.7	12.3	12.7	13.5
ESTNB2010-10-09	1	0.5	0.8	10	0.9	0.94	1.23	55	6	2.70	6.9	-	11.2	11.9	12.4	13.2
ESTNB2010-15-09	1	0.5	0.8	15	0.9	0.94	1.39	60	6	2.70	5.7	-	16.2	17.1	17.8	18.8
ESTNB2010-20-04	1	0.5	0.8	20	0.4	0.94	1.21	65	6	5.09	4.7	21.2	22.3	23	23.6	25.7
ESTNB2010-20-09	1	0.5	0.8	20	0.4	0.94	1.54	65	6	2.70	4.8	-	21.3	22.4	23.1	24.6
ESTNB2010-25-09	1	0.5	0.8	25	0.4	0.94	1.70	70	6	2.70	4.2	-	26.4	27.6	28.4	30.8
ESTNB2010-30-04	1	0.5	0.8	30	0.4	0.94	1.35	75	6	5.09	3.6	31.3	32.7	33.6	34.8	38.5
ESTNB2010-30-09	1	0.5	0.8	30	0.9	0.94	1.86	75	6	2.70	3.7	-	31.4	32.8	33.7	36.9
ESTNB2010-35-09	1	0.5	0.8	35	0.9	0.94	2.02	80	6	2.70	3.3	-	36.5	38	39	43.1
ESTNB2010-40-09	1	0.5	0.8	40	0.9	0.94	2.17	85	6	2.70	3	-	41.6	43.2	44.4	-
ESTNB2010-50-09	1	0.5	0.8	50	0.9	0.94	2.49	95	6	2.70	2.5	-	51.7	53.5	55.5	-
ESTNB2010-60-09	1	0.5	0.8	60	0.9	0.94	2.80	105	6	2.70	2.2	-	61.8	63.8	66.6	-
ESTNB2010-70-09	1	0.5	0.8	70	0.9	0.94	3.11	115	6	2.70	1.9	-	71.9	74	-	-
ESTNB2015-8-04	1.5	0.75	1.35	8	0.4	1.42	1.51	55	6	7.07	7.3	8.9	9.4	9.7	10	10.6
ESTNB2015-10-04	1.5	0.75	1.35	10	0.4	1.42	1.54	55	6	7.07	6.6	10.9	11.5	11.9	12.2	12.9
ESTNB2015-12-04	1.5	0.75	1.35	12	0.4	1.42	1.57	55	6	7.07	6	13	13.6	14	14.4	15.4
ESTNB2015-15-09	1.5	0.75	1.35	15	0.9	1.42	1.85	60	6	3.89	5.4	-	16.4	17.2	17.8	18.8
ESTNB2015-20-09	1.5	0.75	1.35	20	0.9	1.42	2.01	65	6	3.89	4.5	-	21.4	22.4	23.2	24.7
ESTNB2015-30-09	1.5	0.75	1.35	30	0.9	1.42	2.32	75	6	3.89	3.4	-	31.5	32.9	33.7	37
ESTNB2018-4-04	1.8	0.9	1.6	4	0.4	1.73	1.76	50	6	4.38	9.2	4.6	4.8	4.9	5.1	5.4
ESTNB2018-8-04	1.8	0.9	1.6	8	0.4	1.73	1.82	50	6	6.61	7.1	8.6	9	9.2	9.4	10.2
ESTNB2018-12-04	1.8	0.9	1.6	12	0.4	1.73	1.88	55	6	6.61	5.8	12.9	13.5	14	14.4	15.4
ESTNB2018-16-04	1.8	0.9	1.6	16	0.4	1.73	1.93	60	6	6.61	4.9	17	17.7	18.3	18.7	20.5
ESTNB2018-20-04	1.8	0.9	1.6	20	0.4	1.73	1.99	65	6	6.61	4.3	21.2	22.3	23	23.6	25.6
ESTNB2018-24-04	1.8	0.9	1.6	24	0.4	1.73	2.04	65	6	6.61	3.8	25.3	26.5	27.3	27.9	30.8
ESTNB2018-28-04	1.8	0.9	1.6	28	0.4	1.73	2.10	70	6	6.61	3.4	29.4	30.6	31.5	32.4	35.9
ESTNB2018-32-04	1.8	0.9	1.6	32	0.4	1.73	2.15	70	6	6.61	3	33.4	34.8	35.7	37.1	-
ESTNB2018-36-04	1.8	0.9	1.6	36	0.4	1.73	2.21	75	6	6.61	2.8	37.5	38.9	39.9	41.7	-
ESTNB2018-38-04	1.8	0.9	1.6	38	0.4	1.73	2.24	80	6	6.61	2.7	39.5	41	42.0	44	-
ESTNB2018-40-04	1.8	0.9	1.6	40	0.4	1.73	2.27	80	6	6.61	2.6	41.5	43.1	44.2	46.3	-

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESTNB

2 FLUTES TAPERED NECK TYPE BALL ENDMILL

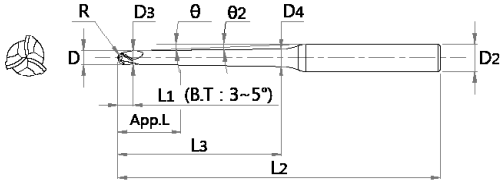
EDP No.	Dimensions(mm)											Effective length from draft angle of workpiece				
	D	R	L1	L3	θ2	D3	D4	L2	D2	App.L	θ	0.5°	1°	1.5°	2°	3°
ESTNB2020-8-04	2	1	1.7	8	0.4	1.92	2.01	50	6	7.42	7	8.7	9	9.2	9.5	10.2
ESTNB2020-12-04	2	1	1.7	12	0.4	1.92	2.06	55	6	7.42	5.7	13.0	13.6	14.0	14.4	15.4
ESTNB2020-16-04	2	1	1.7	16	0.4	1.92	2.12	60	6	7.42	4.8	17.0	17.7	18.3	18.7	20.5
ESTNB2020-20-04	2	1	1.7	20	0.4	1.92	2.18	65	6	7.42	4.1	21.3	22.3	23.0	23.6	25.6
ESTNB2020-20-09	2	1	1.7	20	0.9	1.92	2.50	65	6	4.24	4.2	-	21.4	22.4	23.2	24.6
ESTNB2020-25-09	2	1	1.7	25	0.9	1.92	2.65	65	6	4.24	3.6	-	26.5	27.7	28.5	30.8
ESTNB2020-30-04	2	1	1.7	30	0.4	1.92	2.32	70	6	7.42	3.1	31.4	32.7	33.6	34.8	38.5
ESTNB2020-30-09	2	1	1.7	30	0.9	1.92	2.81	70	6	4.24	3.2	-	31.6	32.9	33.7	36.9
ESTNB2020-35-09	2	1	1.7	35	0.9	1.92	2.97	75	6	4.24	2.8	-	36.6	38	39	-
ESTNB2020-40-04	2	1	1.7	40	0.4	1.92	2.46	80	6	7.42	2.5	41.5	43.1	44.2	46.3	-
ESTNB2020-40-09	2	1	1.7	40	0.9	1.92	3.12	80	6	4.24	2.6	-	41.7	43.2	44.5	-
ESTNB2020-50-09	2	1	1.7	50	0.9	1.92	3.44	90	6	4.24	2.1	-	51.5	53.5	55.5	-
ESTNB2020-60-09	2	1	1.7	60	0.9	1.92	3.75	100	6	4.24	1.8	-	61.9	63.8	-	-
ESTNB2020-70-09	2	1	1.7	70	0.9	1.92	4.07	110	6	4.24	1.8	-	72	74.1	-	-
ESTNB2030-8-04	3	1.5	2.5	8	0.4	2.86	2.94	50	6	8.50	6.3	8.8	9.1	9.3	9.5	10.3
ESTNB2030-16-04	3	1.5	2.5	16	0.4	2.86	3.05	55	6	12.52	4.1	17.2	17.8	18.3	18.7	20.6
ESTNB2030-20-04	3	1.5	2.5	20	0.4	2.86	3.10	60	6	12.52	3.4	21.2	22	22.6	23.3	25.7
ESTNB2030-30-04	3	1.5	2.5	30	0.4	2.86	3.24	70	6	12.52	2.5	31.6	32.8	33.7	34.9	-
ESTNB2030-30-09	3	1.5	2.5	30	0.9	2.86	3.72	70	6	6.95	2.6	-	31.8	33.0	33.8	-
ESTNB2030-40-04	3	1.5	2.5	40	0.4	2.86	3.38	80	6	12.52	2	41.7	43.2	44.3	-	-
ESTNB2030-40-09	3	1.5	2.5	40	0.9	2.86	4.04	80	6	6.95	2	-	41.9	43.3	-	-
ESTNB2030-50-09	3	1.5	2.5	50	0.9	2.86	4.35	90	6	6.95	1.7	-	52	53.6	-	-
ESTNB2030-60-09	3	1.5	2.5	60	0.9	2.86	4.67	100	6	6.95	1.4	-	62.1	-	-	-
ESTNB2030-70-09	3	1.5	2.5	70	0.9	2.86	4.98	110	6	6.95	1.2	-	72.1	-	-	-
ESTNB2040-20-10	4	2	8	20	1	3.86	4.28	70	8	12.01	5	20.5	21.6	22.3	22.8	23.5
ESTNB2040-30-10	4	2	8	30	1	3.86	4.63	80	8	12.01	3.51	22	31.6	32.5	33.2	34.16
ESTNB2040-40-10	4	2	8	40	1	3.86	4.98	90	8	12.01	2.7	22	42	43.4	44.3	-
ESTNB2040-50-10	4	2	8	50	1	3.86	5.33	100	8	12.01	2.2	22	52	53.6	54.7	-
ESTNB2040-60-10	4	2	8	60	1	3.86	5.68	110	8	12.01	1.9	22	62	63.8	-	-
ESTNB2050-30-10	5	2.5	10	30	1	4.86	5.56	80	8	14.01	2.8	25.5	31.7	32.6	33.2	-
ESTNB2050-40-10	5	2.5	10	40	1	4.86	5.91	90	8	14.01	2.1	25.5	41.7	42.8	43.5	-
ESTNB2050-60-10	5	2.5	10	60	1	4.86	6.61	110	8	14.01	1.5	25.5	62.1	-	-	-
ESTNB2060-30-10	6	3	12	30	1	5.86	6.49	80	8	16.01	1.9	29	31.8	32.6	-	-
ESTNB2060-40-10	6	3	12	40	1	5.86	6.84	90	8	16.01	1.5	29	41.8	-	-	-
ESTNB2060-50-10	6	3	12	50	1	5.86	7.19	100	8	16.01	1.2	29	51.8	-	-	-
ESTNB2060-60-10	6	3	12	60	1	5.86	7.54	110	10	16.01	1.9	29	62.2	63.9	-	-
ESTNB2060-70-10	6	3	12	70	1	5.86	7.89	120	10	16.01	1.7	29	72.2	74.1	-	-
ESTNB2060-80-10	6	3	12	80	1	5.86	8.23	130	10	16.01	1.5	29	82.2	-	-	-
ESTNB2080-50-10	8	4	14	50	1	7.86	9.12	110	10	18.01	1.2	32	51.9	-	-	-
ESTNB2080-60-10	8	4	14	60	1	7.86	9.47	120	10	18.01	1	32	-	-	-	-
ESTNB2080-70-10	8	4	14	70	1	7.86	9.82	130	10	18.01	0.9	32	-	-	-	-
ESTNB2080-80-10	8	4	14	80	1	7.86	10.16	140	12	18.01	1.5	32	82.3	-	-	-
ESTNB2100-60-10	10	5	18	60	1	9.86	11.33	130	12	22.01	1.1	39	62.1	-	-	-
ESTNB2100-75-10	10	5	18	75	1	9.86	11.85	140	12	22.01	0.9	39	-	-	-	-

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCEELENT

ESTNB30



R2 and below are not back draft type

- Excellent performance in high precision machining from precision tolerance
- Improved cutting edge strength by optimal draft angle
- Suitable for machining deep grooves and inclined surfaces with various neck specifications
- Various effective length from draft angle of workpiece cover a wide range of machining
- Reinforced strength and reduction vibration with tapered neck

ULTRA FINE | 3 | 30° HELIX | R ±0.005 ALL SIZES | AlTiN | Recommended p.79

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 12	0 ~ -0.015mm	

EDP No.	Dimensions(mm)											Effective length from draft angle of workpiece				
	D	R	L1	L3	θ2	D3	D4	L2	D2	App.L	θ	0.5°	1°	1.5°	2°	3°
ESTNB3020-8-04	2	1	1.7	8	0.4	1.92	2.01	50	6	7.42	7	8.7	9	9.2	9.5	10.2
ESTNB3020-12-04	2	1	1.7	12	0.4	1.92	2.06	55	6	7.42	5.7	13	13.6	14	14.4	15.4
ESTNB3020-16-04	2	1	1.7	16	0.4	1.92	2.12	60	6	7.42	4.8	17	17.7	18.3	18.7	20.5
ESTNB3020-20-04	2	1	1.7	20	0.4	1.92	2.18	65	6	7.42	4.1	21.3	22.3	23	23.6	25.6
ESTNB3020-20-09	2	1	1.7	20	0.9	1.92	2.5	65	6	4.24	4.2	-	21.4	22.4	23.2	24.6
ESTNB3020-25-09	2	1	1.7	25	0.9	1.92	2.65	65	6	4.24	3.6	-	26.5	27.7	28.5	30.8
ESTNB3020-30-04	2	1	1.7	30	0.4	1.92	2.32	70	6	7.42	3.1	31.4	32.7	33.6	34.8	38.5
ESTNB3020-30-09	2	1	1.7	30	0.9	1.92	2.81	70	6	4.24	3.2	-	31.6	32.9	33.7	36.9
ESTNB3020-35-09	2	1	1.7	35	0.9	1.92	2.97	75	6	4.24	2.8	-	36.6	38	39	-
ESTNB3020-40-04	2	1	1.7	40	0.4	1.92	2.46	80	6	7.42	2.5	41.5	43.1	44.2	46.3	-
ESTNB3020-40-09	2	1	1.7	40	0.9	1.92	3.12	80	6	4.24	2.6	-	41.7	43.2	44.5	-
ESTNB3020-50-09	2	1	1.7	50	0.9	1.92	3.44	90	6	4.24	2.1	-	51.8	53.5	55.5	-
ESTNB3020-60-09	2	1	1.7	60	0.9	1.92	3.75	100	6	4.24	1.8	-	61.9	63.8	-	-
ESTNB3020-70-09	2	1	1.7	70	0.9	1.92	4.07	110	6	4.24	1.6	-	72	74.1	-	-
ESTNB3030-8-04	3	1.5	2.5	8	0.4	2.86	2.94	50	6	8.5	6.3	8.8	9.1	9.3	9.5	10.3
ESTNB3030-16-04	3	1.5	2.5	16	0.4	2.86	3.05	55	6	12.52	4.1	17.2	17.8	18.3	18.7	20.6
ESTNB3030-20-04	3	1.5	2.5	20	0.4	2.86	3.1	60	6	12.52	3.4	21.2	22	22.6	23.3	25.7
ESTNB3030-30-04	3	1.5	2.5	30	0.4	2.86	3.24	70	6	12.52	2.5	31.6	32.8	33.7	34.9	-
ESTNB3030-30-09	3	1.5	2.5	30	0.9	2.86	3.72	70	6	6.95	2.6	-	31.8	33	33.8	-
ESTNB3030-40-04	3	1.5	2.5	40	0.4	2.86	3.38	80	6	12.52	2	41.7	43.2	44.3	-	-
ESTNB3030-40-09	3	1.5	2.5	40	0.9	2.86	4.04	80	6	6.95	2	-	41.9	43.3	-	-
ESTNB3030-50-09	3	1.5	2.5	50	0.9	2.86	4.35	90	6	6.95	1.7	-	52	53.6	-	-
ESTNB3030-60-09	3	1.5	2.5	60	0.9	2.86	4.67	100	6	6.95	1.4	-	62.1	-	-	-
ESTNB3030-70-09	3	1.5	2.5	70	0.9	2.86	4.98	110	6	6.95	1.2	-	72.1	-	-	-
ESTNB3040-20-10	4	2	8	20	1	3.86	4.28	70	8	12.01	5	20.5	21.6	22.3	22.8	23.5
ESTNB3040-30-10	4	2	8	30	1	3.86	4.63	80	8	12.01	3.6	22	31.6	32.5	33.2	34.1
ESTNB3040-40-10	4	2	8	40	1	3.86	4.98	90	8	12.01	2.7	22	42	43.4	44.3	-
ESTNB3040-50-10	4	2	8	50	1	3.86	5.33	100	8	12.01	2.2	22	52	53.6	54.7	-
ESTNB3040-60-10	4	2	8	60	1	3.86	5.68	110	8	12.01	1.9	22	62	63.8	-	-
ESTNB3050-30-10	5	2.5	10	30	1	4.86	5.56	80	8	14.01	2.8	25.5	31.7	32.6	33.2	-

■ Applicable working material

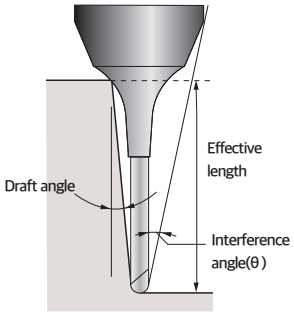
Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

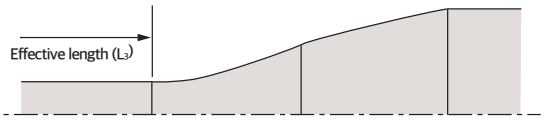
○ : GOOD ◎ : EXCEELENT

ESTNB30

2 FLUTES TAPERED NECK TYPE BALL ENDMILL

EDP No.	Dimensions(mm)											Effective length from draft angle of workpiece				
	D	R	L1	L3	θ2	D3	D4	L2	D2	App.L	θ	0.5°	1°	1.5°	2°	3°
ESTNB3050-40-10	5	2.5	10	40	1	4.86	5.91	90	8	14.01	2.1	25.5	41.7	42.8	43.5	-
ESTNB3050-60-10	5	2.5	10	60	1	4.86	6.61	110	8	12.52	1.5	25.5	62.1	-	-	-





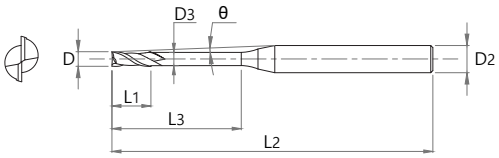
※ Marked effective length is set to prevent interfering in workpiece. You need to take proper control when machining.

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESLNS



※R2 and below are not back draft type

- Excellent performance in high precision machining from precision tolerance
- Improved cutting edge strength by optimal draft angle
- Suitable for machining deep grooves and inclined surfaces with various neck specifications
- Various effective length from draft angle of workpiece cover a wide range of machining

ULTRA FINE | 4 | 45° HELIX | AlTiN | Recommended

p.83

■ Tolerance

D		Shank Dia.
All sizes	0~-0.02	h5

EDP No.	Dimensions(mm)							Effective length from draft angle of workpiece				
	D	L1	L3	D3	L2	D2	θ	0.5°	1°	1.5°	2°	3°
ESLNS2001-0.3	0.1	0.15	0.3	0.08	45	4	11.6	0.4	0.4	0.5	0.5	0.5
ESLNS2001-0.5	0.1	0.15	0.5	0.08	45	4	11.4	0.6	0.7	0.7	0.7	0.8
ESLNS2001-1	0.1	0.15	1	0.08	45	4	10.9	1.2	1.2	1.2	1.3	1.4
ESLNS2002-0.5	0.2	0.3	0.5	0.17	50	4	11.3	1.2	1.3	1.5	1.7	2
ESLNS2002-1	0.2	0.3	1	0.17	50	4	10.8	1.7	1.9	2.2	2.4	2.7
ESLNS2002-1.5	0.2	0.3	1.5	0.17	50	4	10.3	2.3	2.5	2.8	3	3.4
ESLNS2003-1	0.3	0.45	1	0.27	50	4	10.8	1.7	1.9	2.2	2.4	2.7
ESLNS2003-1.5	0.3	0.45	1.5	0.27	50	4	10.3	2.3	2.5	2.8	3	3.4
ESLNS2003-2	0.3	0.45	2	0.27	50	4	9.8	2.8	3.1	3.4	3.6	4.1
ESLNS2003-2.5	0.3	0.45	2.5	0.27	50	4	9.4	3.4	3.7	4	4.3	4.7
ESLNS2003-3	0.3	0.45	3	0.27	50	4	9	3.9	4.3	4.6	4.9	5.4
ESLNS2004-1	0.4	0.6	1	0.37	50	4	10.7	1.7	1.9	2.2	2.4	2.7
ESLNS2004-1.5	0.4	0.6	1.5	0.37	50	4	10.2	2.3	2.5	2.8	3	3.4
ESLNS2004-2	0.4	0.6	2	0.37	50	4	9.7	2.8	3.1	3.4	3.6	4.1
ESLNS2004-2.5	0.4	0.6	2.5	0.37	50	4	9.3	3.4	3.7	4	4.3	4.7
ESLNS2004-3	0.4	0.6	3	0.37	50	4	8.9	3.9	4.3	4.6	4.9	5.4
ESLNS2004-3.5	0.4	0.6	3.5	0.37	50	4	8.6	4.5	4.9	5.2	5.5	6
ESLNS2004-4	0.4	0.6	4	0.37	50	4	8.2	5	5.4	5.8	6.1	6.6
ESLNS2004-5	0.4	0.6	5	0.37	50	4	7.6	6.1	6.6	6.9	7.3	7.8
ESLNS2004-6	0.4	0.6	6	0.37	50	4	7.1	7.2	7.7	8.1	8.4	9
ESLNS2005-1	0.5	0.75	1	0.47	50	4	10.7	1.7	1.9	2.2	2.4	2.7
ESLNS2005-1.5	0.5	0.75	1.5	0.47	50	4	10.2	2.3	2.5	2.8	3	3.4
ESLNS2005-2	0.5	0.75	2	0.47	50	4	9.7	2.8	3.1	3.4	3.6	4.1
ESLNS2005-2.5	0.5	0.75	2.5	0.47	50	4	9.3	3.4	3.7	4	4.3	4.7
ESLNS2005-3	0.5	0.75	3	0.47	50	4	8.9	3.9	4.3	4.6	4.9	5.4
ESLNS2005-4	0.5	0.75	4	0.47	50	4	8.1	5	5.4	5.8	6.1	6.6
ESLNS2005-5	0.5	0.75	5	0.47	50	4	7.5	6.1	6.6	6.9	7.3	7.8
ESLNS2005-6	0.5	0.75	6	0.47	50	4	7	7.2	7.7	8.1	8.4	9
ESLNS2005-8	0.5	0.75	8	0.47	50	4	6.2	9.3	9.9	10.3	10.7	11.4
ESLNS2006-2	0.6	0.9	2	0.57	50	4	9.6	2.8	3.1	3.4	3.6	4.1

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESLNS

2 FLUTES LONG NECK TYPE SQUARE ENDMILL

EDP No.	Dimensions(mm)							Effective length from draft angle of workpiece				
	D	L1	L3	D3	L2	D2	θ	0.5°	1°	1.5°	2°	3°
ESLNS2006-4	0.6	0.9	6	0.57	50	4	6.9	7.2	7.7	8.1	8.4	9
ESLNS2006-6	0.6	0.9	8	0.57	50	4	6.1	9.3	9.9	10.3	10.7	11.4
ESLNS2006-8	0.6	0.9	10	0.57	50	4	5.4	11.5	12.1	12.6	13	13.7
ESLNS2006-10	0.7	1.05	2	0.67	50	4	9.6	2.8	3.1	3.4	3.6	4.1
ESLNS2007-2	0.7	1.05	4	0.67	50	4	8	5	5.4	5.8	6.1	6.6
ESLNS2007-4	0.7	1.05	6	0.67	50	4	6.9	7.2	7.7	8.1	8.4	9
ESLNS2007-6	0.7	1.05	8	0.67	50	4	6	9.3	9.9	10.3	10.7	11.4
ESLNS2007-8	0.7	1.05	10	0.67	50	4	5.3	11.5	12.1	12.6	13	13.7
ESLNS2007-10	0.8	1.2	4	0.77	50	4	7.9	5	5.4	5.8	6.1	6.6
ESLNS2008-4	0.8	1.2	6	0.77	50	4	6.8	7.2	7.7	8.1	8.4	9
ESLNS2008-6	0.8	1.2	8	0.77	50	4	5.9	9.3	9.9	10.3	10.7	11.4
ESLNS2008-8	0.8	1.2	10	0.77	50	4	5.2	11.5	12.1	12.6	13	13.7
ESLNS2008-10	0.8	1.2	12	0.77	55	4	4.7	13.6	14.2	14.8	15.2	16
ESLNS2008-12	0.9	1.35	6	0.86	50	4	6.7	7.2	7.7	8.1	8.4	9.1
ESLNS2009-6	0.9	1.35	8	0.86	50	4	5.8	9.4	9.9	10.4	10.7	11.4
ESLNS2009-8	0.9	1.35	10	0.86	50	4	5.1	11.5	12.1	12.6	13	13.7
ESLNS2009-10	0.9	1.35	12	0.86	55	4	4.6	13.6	14.3	14.8	15.2	16
ESLNS2009-12	1	1.5	2	0.96	50	4	9.4	2.9	3.2	3.4	3.7	4.1
ESLNS2010-2	1	1.5	4	0.96	50	4	7.7	5.1	5.5	5.8	6.1	6.6
ESLNS2010-4	1	1.5	6	0.96	50	4	6.6	7.2	7.7	8.1	8.4	9.1
ESLNS2010-6	1	1.5	8	0.96	50	4	5.7	9.4	9.9	10.4	10.7	11.4
ESLNS2010-8	1	1.5	10	0.96	50	4	5	11.5	12.1	12.6	13	13.7
ESLNS2010-10	1	1.5	12	0.96	55	4	4.5	13.6	14.3	14.8	15.2	16
ESLNS2010-12	1	1.5	14	0.96	55	4	4.1	15.7	16.4	17	17.4	18.7
ESLNS2010-14	1	1.5	16	0.96	60	4	3.8	17.8	18.6	19.1	19.6	21.3
ESLNS2010-16	1	1.5	20	0.96	60	4	3.2	22	22.8	23.5	24	26.6
ESLNS2010-20	1.2	1.8	6	1.15	50	4	6.3	7.3	7.7	8.1	8.5	9.1
ESLNS2012-6	1.2	1.8	8	1.15	50	4	5.5	9.4	9.9	10.4	10.8	11.4
ESLNS2012-8	1.2	1.8	10	1.15	50	4	4.8	11.5	12.1	12.6	13	13.7
ESLNS2012-10	1.2	10	1.15	50	4	4.8	11.5	12.1	12.6	13	13.7	16
ESLNS2012-12	1.2	1.8	12	1.15	55	4	4.3	13.6	14.3	14.8	15.2	16
ESLNS2012-16	1.2	1.8	16	1.15	55	4	3.6	17.8	18.6	19.2	19.7	21.3
ESLNS2014-6	1.4	2.1	6	1.34	50	4	6.1	7.3	7.8	8.1	8.5	9.1
ESLNS2014-8	1.4	2.1	8	1.34	50	4	5.3	9.4	10	10.4	10.8	11.5
ESLNS2014-10	1.4	2.1	10	1.34	50	4	4.6	11.6	12.1	12.6	13	13.8
ESLNS2014-12	1.4	2.1	12	1.34	55	4	4.1	13.7	14.3	14.8	15.3	16.1
ESLNS2014-14	1.4	2.1	14	1.34	55	4	3.7	15.8	16.5	17	17.5	18.7
ESLNS2014-16	1.4	2.1	16	1.34	55	4	3.4	17.9	18.6	19.2	19.7	21.4
ESLNS2015-4	1.5	2.25	4	1.44	50	4	7.2	5.2	5.5	5.9	6.2	6.7
ESLNS2015-6	1.5	2.25	6	1.44	50	4	6	7.3	7.8	8.1	8.5	9.1
ESLNS2015-8	1.5	2.25	8	1.44	50	4	5.1	9.4	10	10.4	10.8	11.5
ESLNS2015-10	1.5	2.25	10	1.44	50	4	4.5	11.6	12.1	12.6	13	13.8
ESLNS2015-12	1.5	2.25	12	1.44	55	4	4	13.7	14.3	14.8	15.3	16.1
ESLNS2015-14	1.5	2.25	14	1.44	55	4	3.6	15.8	16.5	17	17.5	18.7
ESLNS2015-16	1.5	2.25	16	1.44	55	4	3.3	17.9	18.6	19.2	19.7	-
ESLNS2015-18	1.5	2.25	18	1.44	60	4	3	20	20.7	21.3	21.9	-
ESLNS2015-20	1.5	2.25	20	1.44	60	4	2.8	22	22.9	23.5	24.1	-
ESLNS2015-25	1.5	2.25	25	1.44	65	4	2.4	27.3	28.1	28.8	30	-

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESLNS

EDP No.	Dimensions(mm)							Effective length from draft angle of workpiece				
	D	L1	L3	D3	L2	D2	θ	0.5°	1°	1.5°	2°	3°
ESLNS2016-6	1.6	2.4	6	1.54	50	4	5.9	7.3	7.8	8.1	8.5	9.1
ESLNS2016-8	1.6	2.4	8	1.54	50	4	5	9.4	10	10.4	10.8	11.5
ESLNS2016-10	1.6	2.4	10	1.54	50	4	4.4	11.6	12.1	12.6	13	13.8
ESLNS2016-12	1.6	2.4	12	1.54	55	4	3.9	13.7	14.3	14.8	15.3	16.1
ESLNS2016-14	1.6	2.4	14	1.54	55	4	3.5	15.8	16.5	17	17.5	18.7
ESLNS2016-16	1.6	2.4	16	1.54	55	4	3.2	17.9	18.6	19.2	19.7	21.4
ESLNS2016-18	1.6	2.4	18	1.54	60	4	2.9	20	20.7	21.3	21.9	-
ESLNS2016-20	1.6	2.4	20	1.54	60	4	2.7	22	22.9	23.5	24.1	-
ESLNS2018-6	1.8	2.7	6	1.73	50	4	5.6	7.4	7.8	8.2	8.5	9.1
ESLNS2018-8	1.8	2.7	8	1.73	50	4	4.8	9.5	10	10.4	10.8	11.5
ESLNS2018-10	1.8	2.7	10	1.73	50	4	4.2	11.6	12.2	12.6	13	13.8
ESLNS2018-12	1.8	2.7	12	1.73	55	4	3.7	13.7	14.3	14.8	15.3	16.1
ESLNS2018-14	1.8	2.7	14	1.73	55	4	3.3	15.8	16.5	17	17.5	18.8
ESLNS2018-16	1.8	2.7	16	1.73	55	4	3	17.9	18.6	19.2	19.7	-
ESLNS2018-18	1.8	2.7	18	1.73	60	4	2.7	20	20.7	21.3	21.9	-
ESLNS2018-20	1.8	2.7	20	1.73	60	4	2.5	22.1	22.9	23.5	24.1	-
ESLNS2020-4	2	3	4	1.92	50	4	6.5	5.3	5.6	5.9	6.2	6.7
ESLNS2020-6	2	3	6	1.92	50	4	5.3	7.4	7.8	8.2	8.5	9.1
ESLNS2020-8	2	3	8	1.92	50	4	4.5	9.5	10	10.4	10.8	11.5
ESLNS2020-10	2	3	10	1.92	50	4	3.9	11.6	12.2	12.7	13.1	13.8
ESLNS2020-12	2	3	12	1.92	55	4	3.4	13.7	14.3	14.9	15.3	16.1
ESLNS2020-14	2	3	14	1.92	55	4	3.1	15.8	16.5	17	17.5	18.8
ESLNS2020-16	2	3	16	1.92	55	4	2.8	17.9	18.6	19.2	19.7	-
ESLNS2020-18	2	3	18	1.92	60	4	2.6	20	20.8	21.4	21.9	-
ESLNS2020-20	2	3	20	1.92	60	4	2.4	22.1	22.9	23.5	24.1	-
ESLNS2020-25	2	3	25	1.92	65	4	2	27.3	28.2	28.9	-	-
ESLNS2020-30	2	3	30	1.92	70	4	1.7	32.5	33.4	34.4	-	-
ESLNS2025-8	2.5	3.75	8	2.4	50	4	3.7	9.6	10.1	10.5	10.9	11.5
ESLNS2025-10	2.5	3.75	10	2.4	50	4	3.1	11.7	12.2	12.7	13.1	13.8
ESLNS2025-12	2.5	3.75	12	2.4	55	4	2.7	13.8	14.4	14.9	15.3	-
ESLNS2025-14	2.5	3.75	14	2.4	55	4	2.4	15.9	16.5	17.1	17.5	-
ESLNS2025-16	2.5	3.75	16	2.4	55	4	2.2	18	18.7	19.2	19.7	-
ESLNS2025-18	2.5	3.75	18	2.4	55	4	2	20.1	20.8	21.4	-	-
ESLNS2025-20	2.5	3.75	20	2.4	60	4	1.8	22.1	22.9	23.5	-	-
ESLNS2025-25	2.5	3.75	25	2.4	60	4	1.5	27.3	28.2	-	-	-
ESLNS2025-30	2.5	3.75	30	2.4	70	4	1.3	32.6	33.5	-	-	-
ESLNS2030-8	3	4.5	8	2.88	55	6	5.6	9.6	10.1	10.5	10.9	11.5
ESLNS2030-10	3	4.5	10	2.88	55	6	5	11.7	12.3	12.7	13.1	13.8
ESLNS2030-12	3	4.5	12	2.88	60	6	4.5	13.8	14.4	14.9	15.4	16.3
ESLNS2030-14	3	4.5	14	2.88	60	6	4.1	15.9	16.6	17.1	17.6	18.9
ESLNS2030-16	3	4.5	16	2.88	60	6	3.7	18	18.7	19.3	19.8	21.6
ESLNS2030-18	3	4.5	18	2.88	60	6	3.4	20.1	20.8	21.4	21.9	24.2
ESLNS2030-20	3	4.5	20	2.88	65	6	3.2	22.2	23	23.6	24.2	26.9
ESLNS2030-25	3	4.5	25	2.88	70	6	2.7	27.4	28.2	28.9	30.2	-
ESLNS2030-30	3	4.5	30	2.88	75	6	2.4	32.6	33.5	34.5	36.2	-
ESLNS2030-35	3	4.5	35	2.88	80	6	2.1	37.7	38.7	40.2	42.2	-
ESLNS2030-40	3	4.5	40	2.88	90	6	1.9	42.9	43.9	45.9	-	-
ESLNS2040-12	4	6	12	3.85	60	6	3.4	13.9	14.5	15	15.4	16.3

■ Applicable working material

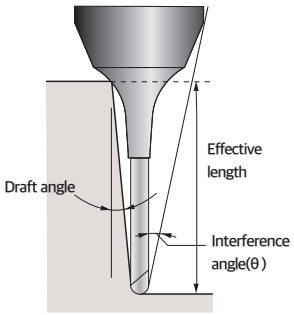
Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESLNS20

2 FLUTES LONG NECK TYPE SQUARE ENDMILL

EDP No.	Dimensions(mm)							Effective length from draft angle of workpiece				
	D	L1	L3	D3	L2	D2	θ	0.5°	1°	1.5°	2°	3°
ESLNS2040-16	4	6	16	3.85	60	6	2.8	18.1	18.8	19.3	19.8	-
ESLNS2040-20	4	6	20	3.85	70	6	2.3	22.3	23	23.6	24.3	-
ESLNS2040-25	4	6	25	3.85	70	6	2	27.4	28.3	28.9	-	-
ESLNS2040-30	4	6	30	3.85	80	6	1.7	32.6	33.5	34.6	-	-
ESLNS2040-35	4	6	35	3.85	80	6	1.5	37.8	38.8	-	-	-
ESLNS2040-40	4	6	40	3.85	90	6	1.3	42.9	44	-	-	-
ESLNS2040-45	4	6	45	3.85	90	6	1.2	48.1	49.4	-	-	-
ESLNS2040-50	4	6	50	3.85	100	6	1.1	53.2	54.8	-	-	-
ESLNS2050-16	5	7.5	16	4.85	60	6	1.5	18.1	18.8	-	-	-
ESLNS2050-20	5	7.5	20	4.85	60	6	1.3	22.3	23	-	-	-
ESLNS2050-25	5	7.5	25	4.85	70	6	1.1	27.4	28.3	-	-	-
ESLNS2050-30	5	7.5	30	4.85	70	6	0.9	32.6	-	-	-	-
ESLNS2050-35	5	7.5	35	4.85	80	6	0.8	37.8	-	-	-	-
ESLNS2050-40	5	7.5	40	4.85	90	6	0.7	42.9	-	-	-	-
ESLNS2050-50	5	7.5	50	4.85	100	6	0.6	53.2	-	-	-	-



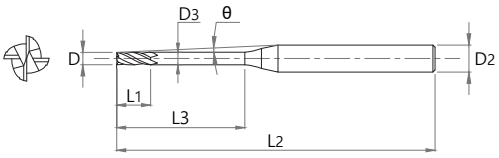
※ Marked effective length is set to prevent interfering in workpiece. You need to take proper control when machining.

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESLNS40



※R2 and below are not back draft type

- Improved cutting edge strength by optimal draft angle
- Anti-chipping and enhanced wear resistance
- Suitable for machining deep grooves and inclined surfaces with various neck specifications
- Various effective length from draft angle of workpiece cover a wide range of machining
- Excellent machining surface roughness for medium/ finishing

ULTRA FINE | 4 | 30° HELIX | AlTiN | Recommended

p.83

■ Tolerance

D		Shank Dia.
All sizes	0~-0.012	h5

EDP No.	Dimensions(mm)							Effective length from draft angle of workpiece				
	D	L1	L3	D3	L2	D2	θ	0.5°	1°	1.5°	2°	3°
ESLNS4010-4	1	1.5	4	0.96	50	4	7.7	5.1	5.5	5.8	6.1	6.6
ESLNS4010-6	1	1.5	6	0.96	50	4	6.6	7.2	7.7	8.1	8.4	9.1
ESLNS4010-8	1	1.5	8	0.96	50	4	5.7	9.4	9.9	10.4	10.7	11.4
ESLNS4010-10	1	1.5	10	0.96	50	4	5	11.5	12.1	12.6	13	13.7
ESLNS4015-4	1.5	2.25	4	1.44	50	4	7.2	5.2	5.5	5.9	6.2	6.7
ESLNS4015-6	1.5	2.25	6	1.44	50	4	6	7.3	7.8	8.1	8.5	9.1
ESLNS4015-8	1.5	2.25	8	1.44	50	4	5.1	9.4	10	10.4	10.8	11.5
ESLNS4015-10	1.5	2.25	10	1.44	50	4	4.5	11.6	12.1	12.6	13	13.8
ESLNS4015-12	1.5	2.25	12	1.44	55	4	4	13.7	14.3	14.8	15.3	16.1
ESLNS4015-14	1.5	2.25	14	1.44	55	4	3.6	15.8	16.5	17	17.5	18.7
ESLNS4015-16	1.5	2.25	16	1.44	55	4	3.3	17.9	18.6	19.2	19.7	-
ESLNS4015-18	1.5	2.25	18	1.44	60	4	3	20	20.7	21.3	21.9	-
ESLNS4015-20	1.5	2.25	20	1.44	60	4	2.8	22	22.9	23.5	24.1	-
ESLNS4015-25	1.5	2.25	25	1.44	65	4	2.4	27.3	28.1	28.8	30	-
ESLNS4020-4	2	3	4	1.92	50	4	6.5	5.3	5.6	5.9	6.2	6.7
ESLNS4020-6	2	3	6	1.92	50	4	5.3	7.4	7.8	8.2	8.5	9.1
ESLNS4020-8	2	3	8	1.92	50	4	4.5	9.5	10	10.4	10.8	11.5
ESLNS4020-10	2	3	10	1.92	50	4	3.9	11.6	12.2	12.7	13.1	13.8
ESLNS4020-12	2	3	12	1.92	55	4	3.4	13.7	14.3	14.9	15.3	16.1
ESLNS4020-14	2	3	14	1.92	55	4	3.1	15.8	16.5	17	17.5	18.8
ESLNS4020-16	2	3	16	1.92	55	4	2.8	17.9	18.6	19.2	19.7	-
ESLNS4020-18	2	3	18	1.92	60	4	2.6	20	20.8	21.4	21.9	-
ESLNS4020-20	2	3	20	1.92	60	4	2.4	22.1	22.9	23.5	24.1	-
ESLNS4020-25	2	3	25	1.92	65	4	2	27.3	28.2	28.9	-	-
ESLNS4020-30	2	3	30	1.92	70	4	1.7	32.5	33.4	34.4	-	-
ESLNS4025-8	2.5	3.75	8	2.4	50	4	3.7	9.6	10.1	10.5	10.9	11.5
ESLNS4025-10	2.5	3.75	10	2.4	50	4	3.1	11.7	12.2	12.7	13.1	13.8
ESLNS4025-12	2.5	3.75	12	2.4	55	4	2.7	13.8	14.4	14.9	15.3	-
ESLNS4025-14	2.5	3.75	14	2.4	55	4	2.4	15.9	16.5	17.1	17.5	-
ESLNS4025-16	2.5	3.75	16	2.4	55	4	2.2	18	18.7	19.2	19.7	-

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESLNS40

4 FLUTES LONG NECK TYPE SQUARE ENDMILL

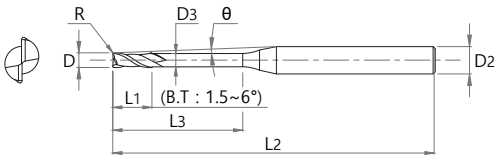
EDP No.	Dimensions(mm)							Effective length from draft angle of workpiece				
	D	L1	L3	D3	L2	D2	θ	0.5°	1°	1.5°	2°	3°
ESLNS4025-18	2.5	3.75	18	2.4	60	4	2	20.1	20.8	21.4	-	-
ESLNS4025-20	2.5	3.75	20	2.4	60	4	1.8	22.1	22.9	23.5	-	-
ESLNS4025-25	2.5	3.75	25	2.4	65	4	1.5	27.3	28.2	-	-	-
ESLNS4025-30	2.5	3.75	30	2.4	70	4	1.3	32.6	33.5	-	-	-
ESLNS4030-8	3	4.5	8	2.88	55	6	5.6	9.6	10.1	10.5	10.9	11.5
ESLNS4030-10	3	4.5	10	2.88	55	6	5	11.7	12.3	12.7	13.1	13.8
ESLNS4030-12	3	4.5	12	2.88	60	6	4.5	13.8	14.4	14.9	15.4	16.3
ESLNS4030-14	3	4.5	14	2.88	60	6	4.1	15.9	16.6	17.1	17.6	18.9
ESLNS4030-16	3	4.5	16	2.88	60	6	3.7	18	18.7	19.3	19.8	21.6
ESLNS4030-18	3	4.5	18	2.88	60	6	3.4	20.1	20.8	21.4	21.9	24.2
ESLNS4030-20	3	4.5	20	2.88	65	6	3.2	22.2	23	23.6	24.2	26.9
ESLNS4030-25	3	4.5	25	2.88	70	6	2.7	27.4	28.2	28.9	30.2	-
ESLNS4030-30	3	4.5	30	2.88	75	6	2.4	32.6	33.5	34.5	36.2	-
ESLNS4030-35	3	4.5	35	2.88	80	6	2.1	37.7	38.7	40.2	42.2	-
ESLNS4030-40	3	4.5	40	2.88	90	6	1.9	42.9	43.9	45.9	-	-
ESLNS4040-12	4	6	12	3.85	60	6	3.4	13.9	14.5	15	15.4	16.3
ESLNS4040-16	4	6	16	3.85	60	6	2.8	18.1	18.8	19.3	19.8	-
ESLNS4040-20	4	6	20	3.85	70	6	2.3	22.3	23	23.6	24.3	-
ESLNS4040-25	4	6	25	3.85	70	6	2	27.4	28.3	28.9	-	-
ESLNS4040-30	4	6	30	3.85	80	6	1.7	32.6	33.5	34.6	-	-
ESLNS4040-35	4	6	35	3.85	80	6	1.5	37.8	38.8	-	-	-
ESLNS4040-40	4	6	40	3.85	90	6	1.3	42.9	44	-	-	-
ESLNS4040-45	4	6	45	3.85	90	6	1.2	48.1	49.4	-	-	-
ESLNS4040-50	4	6	50	3.85	100	6	1.1	53.2	54.8	-	-	-
ESLNS4050-16	5	7.5	16	4.85	60	6	1.5	18.1	18.8	-	-	-
ESLNS4050-20	5	7.5	20	4.85	60	6	1.3	22.3	23	-	-	-
ESLNS4050-25	5	7.5	25	4.85	70	6	1.1	27.4	28.3	-	-	-
ESLNS4050-30	5	7.5	30	4.85	70	6	0.9	32.6	-	-	-	-
ESLNS4050-35	5	7.5	35	4.85	80	6	0.8	37.8	-	-	-	-
ESLNS4050-40	5	7.5	40	4.85	90	6	0.7	42.9	-	-	-	-
ESLNS4050-50	5	7.5	50	4.85	100	6	0.6	53.2	-	-	-	-

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESLNR



※R2 and below are not back draft type

- Improved cutting edge strength by optimal draft angle
- Anti-chipping and enhanced wear resistance
- Suitable for machining deep grooves and inclined surfaces with various neck specifications
- Various effective length from draft angle of workpiece cover a wide range of machining
- Excellent machining surface roughness for medium/ finishing

ULTRA FINE | 2 | 30° HELIX | R ±0.01 ALL SIZES | AlTiN | Recommended p.84

■ Tolerance

D		Shank Dia.
All sizes	0~-0.012	h5

EDP No.	Dimensions(mm)								Effective length from draft angle of workpiece				
	D	R	L1	L3	D3	L2	D2	θ	0.5°	1°	1.5°	2°	3°
ESLNR2002-0.5-005	0.2	0.05	0.15	0.5	0.17	50	4	11.4	0.9	1	1	1.1	12
ESLNR2002-1-005	0.2	0.05	0.15	1	0.17	50	4	10.9	1.6	1.7	1.9	2	2.3
ESLNR2002-1.5-005	0.2	0.05	0.15	1.5	0.17	50	4	10.3	2.1	2.3	2.5	2.7	3
ESLNR2002-2-005	0.2	0.05	0.15	2	0.17	50	4	9.9	2.8	3.1	3.4	3.6	4.1
ESLNR2003-1-005	0.3	0.05	0.25	1	0.27	50	4	10.8	1.4	1.5	1.6	1.7	1.9
ESLNR2003-1.5-005	0.3	0.05	0.25	1.5	0.27	50	4	10.3	2.1	2.3	2.5	2.7	3
ESLNR2003-2.5-005	0.3	0.05	0.25	2.5	0.27	50	4	9.8	2.7	2.9	3.1	3.3	3.6
ESLNR2003-2-005	0.3	0.05	0.25	2	0.27	50	4	9.4	3.2	3.5	3.7	3.9	4.3
ESLNR2003-3-005	0.3	0.05	0.25	3	0.27	50	4	9	3.9	4.3	4.6	4.9	5.4
ESLNR2004-1-005	0.4	0.05	0.3	1	0.37	50	4	10.8	1.4	1.5	1.6	1.7	1.9
ESLNR2004-1.5-005	0.4	0.05	0.3	1.5	0.37	50	4	10.3	2	2.1	2.2	2.3	2.5
ESLNR2004-2-005	0.4	0.05	0.3	2	0.37	50	4	9.8	2.7	2.9	3.1	3.3	3.6
ESLNR2004-2.5-005	0.4	0.05	0.3	2.5	0.37	50	4	9.4	3.2	3.5	3.7	3.9	4.3
ESLNR2004-3-005	0.4	0.05	0.3	3	0.37	50	4	9	3.8	4	4.3	4.5	4.9
ESLNR2004-3.5-005	0.4	0.05	0.3	3.5	0.37	50	4	8.6	4.3	4.6	4.9	5.1	5.5
ESLNR2004-4-005	0.4	0.05	0.3	4	0.37	50	4	8.3	5	5.4	5.8	6.1	6.6
ESLNR2004-2-01	0.4	0.1	0.3	2	0.37	50	4	9.8	2.7	2.9	3.1	3.3	3.6
ESLNR2004-3-01	0.4	0.1	0.3	3	0.37	50	4	9	3.8	4	4.3	4.5	4.9
ESLNR2004-4-01	0.4	0.1	0.3	4	0.37	50	4	8.3	5	5.4	5.8	6.1	6.6
ESLNR2005-1-005	0.5	0.05	0.35	1	0.47	50	4	10.8	1.4	1.5	1.6	1.7	1.9
ESLNR2005-2-005	0.5	0.05	0.35	2	0.47	50	4	9.7	2.5	2.6	2.8	2.9	3.1
ESLNR2005-3-005	0.5	0.05	0.35	3	0.47	50	4	8.9	3.8	4	4.3	4.5	4.9
ESLNR2005-4-005	0.5	0.05	0.35	4	0.47	50	4	8.2	4.8	5.2	5.4	5.7	6.1
ESLNR2005-5-005	0.5	0.05	0.35	5	0.47	50	4	7.6	6.1	6.6	6.9	7.3	7.8
ESLNR2005-6-005	0.5	0.05	0.35	6	0.47	50	4	7	7.2	7.7	8.1	8.4	9
ESLNR2005-1-01	0.5	0.1	0.35	1	0.47	50	4	10.8	1.4	1.5	1.6	1.7	1.9
ESLNR2005-2-01	0.5	0.1	0.35	2	0.47	50	4	9.8	2.5	2.6	2.8	2.9	3.1
ESLNR2005-3-01	0.5	0.1	0.35	3	0.47	50	4	8.9	3.8	4	4.3	4.5	4.9
ESLNR2005-4-01	0.5	0.1	0.35	4	0.47	50	4	8.2	4.8	5.2	5.4	5.7	6.1
ESLNR2005-5-01	0.5	0.1	0.35	5	0.47	50	4	7.6	6.1	6.5	6.9	7.2	7.8
ESLNR2005-6-01	0.5	0.1	0.35	6	0.47	50	4	7.1	7.2	7.7	8.1	8.4	9

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESLNR

2 FLUTES LONG NECK TYPE RADIUS ENDMILL

EDP No.	Dimensions(mm)								Effective length from draft angle of workpiece				
	D	R	L1	L3	D3	L2	D2	θ	0.5°	1°	1.5°	2°	3°
ESLNR2006-2-01	0.6	0.1	0.4	2	0.57	50	4	9.7	2.5	2.6	2.8	2.9	3.1
ESLNR2006-4-01	0.6	0.1	0.4	4	0.57	50	4	8.1	4.8	5.2	5.4	5.7	6.1
ESLNR2006-6-01	0.6	0.1	0.4	6	0.57	50	4	7	7.2	7.7	8.1	8.4	9
ESLNR2006-8-01	0.6	0.1	0.4	8	0.57	50	4	6.1	9.3	9.9	10.3	10.7	11
ESLNR2006-10-01	0.6	0.1	0.4	10	0.57	50	4	5.5	11.5	12.1	12.5	13	13.7
ESLNR2008-4-01	0.8	0.1	0.5	4	4	50	4	8	4.8	5.2	5.4	5.7	6.1
ESLNR2008-6-01	0.8	0.1	0.5	6	6	50	4	6.8	7	7.4	7.7	7.9	8.4
ESLNR2008-8-01	0.8	0.1	0.5	8	8	50	4	5.9	9.3	9.9	10.3	10.7	11.4
ESLNR2008-12-01	0.8	0.1	0.5	12	12	50	4	4.7	13.6	14.2	14.7	15.2	16
ESLNR2008-4-02	0.8	0.2	0.5	4	4	50	4	8	4.8	5.1	5.4	5.6	6.1
ESLNR2008-6-02	0.8	0.2	0.5	6	6	50	4	6.9	7	7.3	7.7	7.9	8.4
ESLNR2010-4-01	1	0.1	0.8	4	0.94	50	4	7.7	4.7	4.9	5.1	5.2	5.5
ESLNR2010-6-01	1	0.1	0.8	6	0.94	50	4	6.6	7.1	7.4	7.7	8.0	8.5
ESLNR2010-8-01	1	0.1	0.8	8	0.94	50	4	5.7	9.2	9.6	9.9	10.2	10.8
ESLNR2010-10-01	1	0.1	0.8	10	0.94	50	4	5.1	11.6	12.1	12.6	13.0	13.7
ESLNR2010-12-01	1	0.1	0.8	12	0.94	55	4	4.5	13.7	14.3	14.8	15.3	16.0
ESLNR2010-16-01	1	0.1	0.8	16	0.94	60	4	3.8	17.9	18.6	19.2	19.7	21.3
ESLNR2010-20-01	1	0.1	0.8	20	0.94	60	4	3.2	22.0	22.8	23.5	24.0	26.7
ESLNR2010-4-02	1	0.2	0.8	4	0.94	50	4	7.8	4.7	4.9	5.1	5.2	5.5
ESLNR2010-6-02	1	0.2	0.8	6	0.94	50	4	6.6	7.1	7.4	7.7	8	8.5
ESLNR2010-8-02	1	0.2	0.8	8	0.94	50	4	5.8	9.2	9.6	9.9	10.2	10.8
ESLNR2010-10-02	1	0.2	0.8	10	0.94	50	4	5.1	11.6	12.1	12.6	13.0	13.7
ESLNR2010-12-02	1	0.2	0.8	12	0.94	55	4	4.6	13.7	14.3	14.8	15.2	16.0
ESLNR2010-16-02	1	0.2	0.8	16	0.94	60	4	3.8	17.9	18.6	19.2	19.7	21.3
ESLNR2010-20-02	1	0.2	0.8	20	0.94	60	4	3.2	22.0	22.8	23.5	24.0	26.6
ESLNR2010-6-03	1	0.3	0.8	6	0.94	50	4	6.7	7.1	7.4	7.7	8	8.4
ESLNR2010-10-03	1	0.3	0.8	10	0.94	50	4	5.1	11.5	12.1	12.6	13	13.7
ESLNR2010-16-03	1	0.3	0.8	16	0.94	60	4	3.8	17.9	18.6	19.1	19.6	21.3
ESLNR2010-20-03	1	0.3	0.8	20	0.94	60	4	3.2	22	22.8	23.5	24	26.6
ESLNR2015-4-01	1.5	0.1	1.35	4	1.42	50	4	7.2	4.8	4.9	5.1	5.3	5.5
ESLNR2015-8-01	1.5	0.1	1.35	8	1.42	50	4	5.2	9.2	9.6	10	10.3	10.8
ESLNR2015-12-01	1.5	0.1	1.35	12	1.42	55	4	4	13.4	13.9	14.3	14.7	16.1
ESLNR2015-15-01	1.5	0.1	1.35	15	1.42	55	4	3.5	16.9	17.6	18.1	18.6	20.1
ESLNR2015-20-01	1.5	0.1	1.35	20	1.42	60	4	2.8	22.1	22.9	23.5	24.1	-
ESLNR2015-4-02	1.5	0.2	1.35	4	1.42	50	4	7.3	4.7	4.9	5.1	5.3	5.5
ESLNR2015-8-02	1.5	0.2	1.35	8	1.42	50	4	5.2	9.2	9.6	10	10.3	10.8
ESLNR2015-12-02	1.5	0.2	1.35	12	1.42	55	4	4.1	13.4	13.9	14.3	14.7	16.1
ESLNR2015-15-02	1.5	0.2	1.35	15	1.42	55	4	3.5	16.9	17.5	18.1	18.6	20
ESLNR2015-20-02	1.5	0.2	1.35	20	1.42	60	4	2.8	22.1	22.9	23.5	24.1	-
ESLNR2015-8-03	1.5	0.3	1.35	8	1.42	50	4	5.2	9.2	9.6	10	10.3	10.8
ESLNR2015-15-03	1.5	0.3	1.35	15	1.42	55	4	3.5	16.9	17.5	18.1	18.6	20
ESLNR2015-20-03	1.5	0.3	1.35	20	1.42	60	4	2.8	22.1	22.9	23.5	24	-
ESLNR2020-6-02	2	0.2	1.7	6	1.92	50	4	5.4	6.8	7.1	7.3	7.5	8.1
ESLNR2020-8-02	2	0.2	1.7	8	1.92	50	4	4.6	8.9	9.2	9.4	9.7	10.8
ESLNR2020-12-02	2	0.2	1.7	12	1.92	55	4	3.5	13.4	13.9	14.3	14.7	16.1
ESLNR2020-16-02	2	0.2	1.7	16	1.92	55	4	2.8	17.6	18.1	18.6	19.3	-
ESLNR2020-20-02	2	0.2	1.7	20	1.92	60	4	2.4	22.1	22.9	23.5	24.1	-

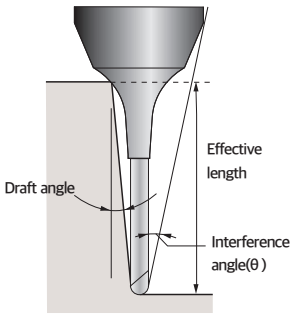
■ Applicable working material

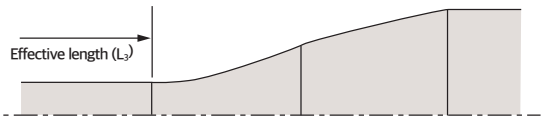
Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESLNR

EDP No.	Dimensions(mm)								Effective length from draft angle of workpiece				
	D	R	L1	L3	D3	L2	D2	θ	0.5°	1°	1.5°	2°	3°
ESLNR2020-25-02	2	0.2	1.7	25	1.92	65	4	2	27.3	28.2	28.8	-	-
ESLNR2020-30-02	2	0.2	1.7	30	1.92	70	4	1.7	32.5	33.4	34.4	-	-
ESLNR2020-8-03	2	0.3	1.7	8	1.92	50	4	4.6	8.9	9.2	9.4	9.7	10.7
ESLNR2020-16-03	2	0.3	1.7	16	1.92	55	4	2.8	17.6	18.1	18.6	19.3	-
ESLNR2020-20-03	2	0.3	1.7	20	1.92	60	4	2.4	22.1	22.9	23.5	24	-
ESLNR2020-6-05	2	0.5	1.7	6	1.92	50	4	5.5	6.8	7.1	7.3	7.4	8
ESLNR2020-8-05	2	0.5	1.7	8	1.92	50	4	4.7	8.9	9.2	9.4	9.6	10.7
ESLNR2020-12-05	2	0.5	1.7	12	1.92	55	4	3.5	13.4	13.9	14.3	14.6	16
ESLNR2020-16-05	2	0.5	1.7	16	1.92	55	4	2.9	17.6	18.1	18.6	19.2	-
ESLNR2020-20-05	2	0.5	1.7	20	1.92	60	4	2.4	22.1	22.9	23.5	24	-
ESLNR2020-25-05	2	0.5	1.7	25	1.92	65	4	2	27.3	28.1	28.8	-	-
ESLNR2020-30-05	2	0.5	1.7	30	1.92	70	4	1.7	32.5	33.4	34.3	-	-
ESLNR2020-8-08	2	0.8	1.7	8	1.92	50	4	4.8	8.9	9.2	9.4	9.6	10.6
ESLNR2020-16-08	2	0.8	1.7	16	1.92	55	4	2.9	17.6	18.1	18.6	19.2	-
ESLNR2020-20-08	2	0.8	1.7	20	1.92	60	4	2.4	22.1	22.8	23.5	24	-
ESLNR2030-8-02	3	0.2	2.5	8	2.86	55	6	5.7	9	9.3	9.5	9.9	10.9
ESLNR2030-12-02	3	0.2	2.5	12	2.86	60	6	4.5	13.1	13.5	14	14.7	16.2
ESLNR2030-16-02	3	0.2	2.5	16	2.86	60	6	3.8	17.7	18.2	18.7	19.5	21.6
ESLNR2030-20-02	3	0.2	2.5	20	2.86	65	6	3.2	21.8	22.4	23.1	24.2	26.9
ESLNR2030-30-02	3	0.2	2.5	30	2.86	75	6	2.4	32.6	33.5	34.5	36.2	-
ESLNR2030-35-02	3	0.2	2.5	35	2.86	80	6	2.1	37.7	38.7	40.2	42.2	-
ESLNR2030-8-03	3	0.3	2.5	8	2.86	55	6	5.7	9	9.3	9.5	9.9	10.9
ESLNR2030-16-03	3	0.3	2.5	16	2.86	60	6	3.8	17.7	18.2	18.7	19.4	21.5
ESLNR2030-20-03	3	0.3	2.5	20	2.86	65	6	3.2	21.8	22.4	23.1	24.2	26.8
ESLNR2030-30-03	3	0.3	2.5	30	2.86	75	6	2.4	32.6	33.5	34.5	36.2	-
ESLNR2030-8-05	3	0.5	2.5	8	2.86	55	6	5.8	9	9.3	9.5	9.8	10.8
ESLNR2030-12-05	3	0.5	2.5	12	2.86	60	6	4.6	13.1	13.5	13.9	14.6	16.2
ESLNR2030-16-05	3	0.5	2.5	16	2.86	60	6	3.8	17.7	18.2	18.7	19.4	21.5
ESLNR2030-20-05	3	0.5	2.5	20	2.86	65	6	3.2	21.8	22.4	23.1	24.2	26.8
ESLNR2030-30-05	3	0.5	2.5	30	2.86	75	6	2.4	32.6	33.5	34.5	36.1	-
ESLNR2030-35-05	3	0.5	2.5	35	2.86	80	6	2.1	37.7	38.7	40.2	42.1	-





※ Marked effective length is set to prevent interfering in workpiece. You need to take proper control when machining.

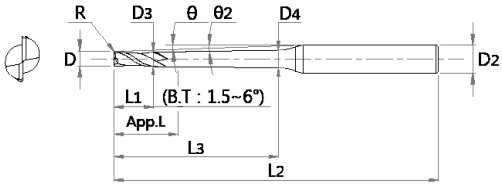
■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESTNR

2 FLUTES TAPERED NECK TYPE RADIUS ENDMILL



※R2 and below are not back draft type

- Improved anti-chipping on corner R part
- Anti-chipping and enhanced wear resistance
- Improved cutting edge strength by optimal draft angle
- Suitable for machining deep grooves and inclined surfaces with various neck specifications
- Various effective length from draft angle of workpiece cover a wide range of machining
- Reinforced strength and reduction vibration with tapered neck

ULTRA FINE | 2 | 30° HELIX | R ±0.01 ALL SIZES | AlTiN | Recommended p.87

■ Tolerance

D		Shank Dia.
All sizes	0~-0.012	h5

EDP No.	Dimensions(mm)											Effective length from draft angle of workpiece				
	D	R	L1	L3	θ2	D3	D4	L2	D2	App.L	θ	0.5°	1°	1.5°	2°	3°
ESTNR2002-2-09005	0.2	0.05	0.15	2	0.9	0.17	0.23	50	4	1.10	10	-	2.8	3.1	3.4	3.9
ESTNR2004-4-09005	0.4	0.05	0.3	4	0.9	0.37	0.49	50	4	1.25	8.4	-	4.9	5.3	5.7	6.3
ESTNR2004-5-09005	0.4	0.05	0.3	5	0.9	0.37	0.52	50	4	1.25	7.8	-	5.9	6.4	6.8	7.5
ESTNR2004-4-0901	0.4	0.1	0.3	4	0.9	0.37	0.49	50	4	1.25	8.5	-	4.9	5.3	5.7	6.3
ESTNR2004-5-0901	0.4	0.1	0.3	5	0.9	0.37	0.52	50	4	1.25	7.9	-	5.9	6.4	6.8	7.5
ESTNR2005-5-0901	0.5	0.1	0.35	5	0.9	0.47	0.62	50	4	1.30	7.8	-	5.9	6.4	6.8	7.5
ESTNR2005-8-0901	0.5	0.1	0.35	8	0.9	0.47	0.71	50	4	1.30	6.4	-	9	9.7	10.2	11
ESTNR2005-10-0901	0.5	0.1	0.35	10	0.9	0.47	0.77	55	4	1.30	5.8	-	11	11.8	12.4	13.2
ESTNR2006-12-0901	0.6	0.1	0.4	12	0.9	0.57	0.93	55	4	1.35	5.1	-	13	13.9	14.5	15.5
ESTNR2006-15-0901	0.6	0.1	0.4	15	0.9	0.57	13	55	4	1.35	4.5	-	16.1	17.1	17.8	18.8
ESTNR2008-6-0402	0.8	0.2	0.5	6	0.4	0.77	0.85	50	4	2.64	7	6.6	7.1	7.5	7.8	8.3
ESTNR2008-12-0902	0.8	0.2	0.5	12	0.9	0.77	1.13	55	4	1.45	5	-	13	13.9	14.5	15.5
ESTNR2010-8-0402	1	0.2	0.8	8	0.4	0.94	14	55	6	5.09	7.4	8.8	9.3	9.7	10.1	10.6
ESTNR2010-10-0902	1	0.2	0.8	10	0.9	0.94	1.23	55	6	5.09	6.8	-	11.2	11.9	12.4	13.3
ESTNR2010-15-0902	1	0.2	0.8	15	0.9	0.94	1.39	60	6	2.70	5.6	-	16.3	17.2	17.8	18.8
ESTNR2010-20-0902	1	0.2	0.8	20	0.9	0.94	1.54	65	6	2.70	4.8	-	21.3	22.4	23.2	24.7
ESTNR2010-25-0902	1	0.2	0.8	25	0.9	0.94	1.70	70	6	2.70	4.1	-	26.4	27.6	28.5	30.9
ESTNR2010-30-0902	1	0.2	0.8	30	0.9	0.94	1.86	75	6	2.70	3.7	-	31.5	32.8	33.7	37
ESTNR2010-35-0902	1	0.2	0.8	35	0.9	0.94	22	80	6	2.70	3.3	-	36.5	38	39	43.2
ESTNR2010-8-0403	1	0.3	0.8	8	0.4	0.94	14	55	6	2.70	7.4	8.8	9.3	9.7	10	10.6
ESTNR2010-15-0903	1	0.3	0.8	15	0.9	0.94	1.39	60	6	2.70	5.6	-	16.3	17.2	17.8	18.8
ESTNR2010-25-0903	1	0.3	0.8	25	0.9	0.94	1.70	70	6	2.70	4.2	-	26.4	27.6	28.5	30.8
ESTNR2010-30-0903	1	0.3	0.8	30	0.9	0.94	1.86	75	6	2.70	3.7	-	31.5	32.8	33.7	37
ESTNR2015-10-0402	1.5	0.2	1.35	10	0.4	1.42	1.54	55	6	7.07	6.4	11	11.5	11.9	12.3	13
ESTNR2015-15-0902	1.5	0.2	1.35	15	0.9	1.42	1.85	60	6	7.07	5.3	-	16.4	17.3	17.9	18.9
ESTNR2015-20-0902	1.5	0.2	1.35	20	0.9	1.42	21	65	6	3.89	4.5	-	21.5	22.5	23.2	24.9
ESTNR2015-25-0902	1.5	0.2	1.35	25	0.9	1.42	2.16	70	6	3.89	3.9	-	26.6	27.7	28.5	31
ESTNR2015-30-0902	1.5	0.2	1.35	30	0.9	1.42	2.32	75	6	3.89	3.4	-	31.6	32.9	33.8	37.1
ESTNR2015-10-0403	1.5	0.3	1.35	10	0.4	1.42	1.54	55	6	3.89	6.4	11	11.5	11.9	12.3	13
ESTNR2015-20-0903	1.5	0.3	1.35	20	0.9	1.42	21	65	6	3.89	4.5	-	21.5	22.5	23.2	24.8

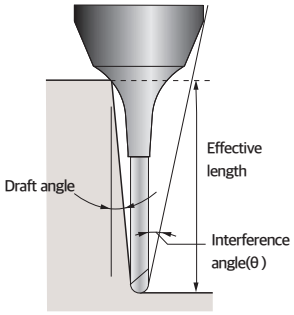
■ Applicable working material

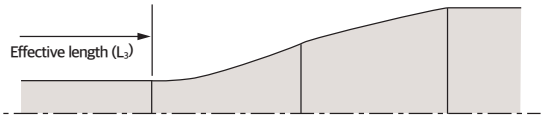
Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESTNR

EDP No.	Dimensions(mm)											Effective length from draft angle of workpiece				
	D	R	L1	L3	θ2	D3	D4	L2	D2	App.L	θ	0.5°	1°	1.5°	2°	3°
ESTNR2015-25-0903	1.5	0.3	1.35	25	0.9	1.42	2.16	70	6	3.89	3.9	-	26.5	27.7	28.5	31
ESTNR2015-30-0903	1.5	0.3	1.35	30	0.9	1.42	2.32	75	6	3.89	3.4	-	31.6	32.9	33.8	37.1
ESTNR2020-30-0902	2	0.2	1.7	30	0.9	1.92	2.81	70	6	7.42	3.1	-	31.6	32.9	33.8	37.2
ESTNR2020-40-0902	2	0.2	1.7	40	0.9	1.92	3.12	80	6	7.42	2.5	-	41.8	43.3	44.6	-
ESTNR2020-50-0902	2	0.2	1.7	50	0.9	1.92	3.44	90	6	7.42	2.1	-	51.9	53.6	55.7	-
ESTNR2020-12-0403	2	0.3	1.7	12	0.4	1.92	2.06	55	6	7.42	5.5	13	13.6	14.1	14.5	15.6
ESTNR2020-20-0903	2	0.3	1.7	20	0.9	1.92	2.50	65	6	4.24	4.1	-	21.5	22.5	23.2	24.9
ESTNR2020-30-0903	2	0.3	1.7	30	0.9	1.92	2.81	70	6	4.24	3.1	-	31.6	32.9	33.8	37.1
ESTNR2020-40-0903	2	0.3	1.7	40	0.9	1.92	3.12	80	6	4.24	2.5	-	41.7	43.3	44.6	-
ESTNR2020-50-0903	2	0.3	1.7	50	0.9	1.92	3.44	90	6	4.24	2.1	-	51.8	53.6	55.7	-
ESTNR2020-8-0405	2	0.5	1.7	8	0.4	1.92	2.01	50	6	4.24	6.8	8.7	9	9.3	9.5	10.4
ESTNR2020-12-0405	2	0.5	1.7	12	0.4	1.92	2.06	55	6	4.24	5.6	13	13.6	14.1	14.4	15.5
ESTNR2020-16-0405	2	0.5	1.7	16	0.4	1.92	2.12	60	6	4.24	4.7	17	17.8	18.3	18.7	20.7
ESTNR2020-20-0905	2	0.5	1.7	20	0.9	1.92	2.50	65	6	4.24	4.2	-	21.5	22.5	23.2	24.8
ESTNR2020-25-0905	2	0.5	1.7	25	0.9	1.92	2.65	65	6	4.24	3.6	-	26.6	27.7	28.5	30.9
ESTNR2020-30-0905	2	0.5	1.7	30	0.9	1.92	2.81	70	6	4.24	3.1	-	31.6	32.9	33.8	37.1
ESTNR2020-40-0905	2	0.5	1.7	40	0.9	1.92	3.12	80	6	4.24	2.5	-	41.7	43.2	44.6	-
ESTNR2020-50-0905	2	0.5	1.7	50	0.9	1.92	3.44	90	6	4.24	2.1	-	51.8	53.6	55.6	-
ESTNR2030-40-0902	3	0.2	2.5	40	0.9	2.86	4.04	80	6	6.95	2	-	42	43.4	-	-
ESTNR2030-50-0902	3	0.2	2.5	50	0.9	2.86	4.35	90	6	6.95	1.6	-	52.1	53.7	-	-
ESTNR2030-60-0902	3	0.2	2.5	60	0.9	2.86	4.67	100	6	6.95	1.4	-	62.2	-	-	-
ESTNR2030-40-0903	3	0.3	2.5	40	0.9	2.86	4.04	80	6	6.95	2	-	42	43.4	-	-
ESTNR2030-50-0903	3	0.3	2.5	50	0.9	2.86	4.35	90	6	6.95	1.7	-	52.1	53.7	-	-
ESTNR2030-60-0903	3	0.3	2.5	60	0.9	2.86	4.67	100	6	6.95	1.4	-	62.2	-	-	-
ESTNR2030-40-0905	3	0.5	2.5	40	0.9	2.86	4.04	80	6	6.95	2	-	42	43.4	-	-
ESTNR2030-50-0905	3	0.5	2.5	50	0.9	2.86	4.35	90	6	6.95	1.7	-	52.1	53.7	-	-
ESTNR2030-60-0905	3	0.5	2.5	60	0.9	2.86	4.67	100	6	6.95	1.4	-	62.1	-	-	-





※ Marked effective length is set to prevent interfering in workpiece. You need to take proper control when machining.

■ Applicable working material

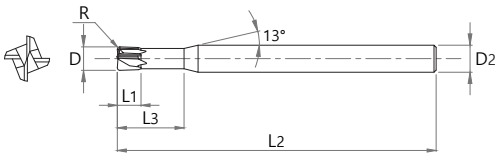
Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESPM4

4 FLUTES NECK TYPE RADIUS ENDMILL

- Minimized corner damage
- Back draft type to prevent chattering and slip
- Straight type



ULTRA FINE | 4 | 0° HELIX | R ±0.01 R3≥ | R ±0.015 R3< | AlTiN | Recommended p.89

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 20	0 ~ -0.015mm	

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESPM4030-05	3	0.5	1.2	8	50	6
ESPM4040-05	4	0.5	1.5	10	50	6
ESPM4060-05	6	0.5	2.5	12	60	6
ESPM4060-10	6	1	2.5	12	60	6
ESPM4060-15	6	1.5	2.5	12	60	6
ESPM4060-15L	6	1.5	2.5	12	90	6
ESPM4080-10	8	1	3.5	16	60	8
ESPM4080-20	8	2	3.5	16	60	8
ESPM4080-20L	8	2	3.5	16	100	8
ESPM4100-10	10	1	4	20	70	10
ESPM4100-20	10	2	4	20	70	10
ESPM4100-20L	10	2	4	20	100	10
ESPM4120-20	12	2	5	25	80	12
ESPM4120-30	12	3	5	25	80	12
ESPM4120-30L	12	3	5	25	110	12

■ Applicable working material

Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

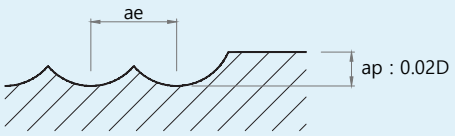
Recommended Cutting Condition

[ESB702, ESB712 series]

WORK PIECES	HARDENED STEELS, HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
~0.2	50,000	1,200	50,000	1,050	45,000	960	40,000	770	35,000	674	31,500	570
0.3	50,000	1,500	50,000	1,350	45,000	1,200	40,000	765	35,000	840	31,500	700
0.4	50,000	1,900	50,000	1,700	45,000	1,500	40,000	1,200	35,000	1,050	31,500	1,100
0.5	50,000	2,400	50,000	2,100	45,000	1,900	40,000	1,500	35,000	1,300	31,500	1,100
0.6	50,000	2,900	50,000	2,500	45,000	2,200	40,000	1,800	35,000	1,600	31,500	1,400
0.8	50,000	3,900	50,000	3,300	45,000	3,000	40,000	2,400	35,000	1,600	31,500	1,800
1	50,000	4,800	50,000	4,200	45,000	3,800	40,000	3,000	35,000	2,600	35,000	2,300
1.5	50,000	5,400	48,000	4,500	43,000	4,000	23,000	3,100	33,000	2,700	29,700	2,300
2	49,700	5,700	47,800	4,800	40,000	4,000	35,000	3,150	32,000	2,800	28,500	2,300
3	33,100	6,000	31,800	5,300	26,500	4,000	23,500	3,150	21,000	28,00	19,000	2,300
4	24,900	6,000	23,900	5,300	20,000	4,000	17,500	3,150	16,000	2,800	14,500	2,300
5	18.600	5,800	17,800	4,900	15,000	3,750	13,500	3,050	11,500	2,550	10,500	2,100
6	13,900	4,850	13,400	4,100	11,000	3,100	10,000	2,500	8,800	2,150	8,000	1,750
8	11,100	4,200	10,700	3,500	9,000	2,700	8,000	2,150	7,000	1,850	6,500	1,550
10	9,300	3,700	8,900	3,100	7,500	2,400	6,600	1,900	5,800	1,650	5,300	1,380
12	6,950	2,950	6,680	2,500	5,600	1,900	5,000	1,550	4,400	1,250	4,000	1,050

RPM = rev. / min.
FEED - mm / min.

*ae : D1~D4 = 0.05xD
D5~D8 = 0.025mm
D10~D20 = 0.30mm

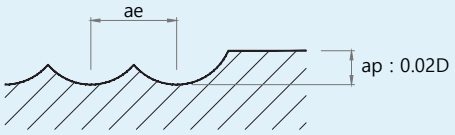


[ESB703 series]

WORK PIECES	HARDENED STEELS											
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	57,000	7,100	55,000	6,000	46,000	5,000	40,300	3,900	36,800	3,500	32,800	2,900
2.5	57,000	7,100	55,000	6,000	46,000	5,000	40,300	3,900	36,800	3,500	32,800	2,900
3	38,000	7,500	36,600	6,600	30,500	5,000	27,000	3,900	24,200	3,500	21,900	2,900
4	28,500	7,500	27,500	6,600	23,000	5,000	20,100	3,900	18,400	3,500	16,700	2,900
5	21,500	7,300	20,500	6,100	17,300	4,700	15,500	3,800	13,200	3,200	12,100	2,600
6	16,000	6,100	15,400	5,100	12,700	3,900	11,500	3,100	10,100	2,700	9,200	2,200
8	12,700	5,300	12,300	4,400	10,400	3,400	9,200	2,700	8,100	2,300	7,500	1,900
10	10,700	4,600	10,200	3,900	8,600	3,000	7,600	2,400	6,700	2,100	6,100	1,700
12	8,000	3,700	7,700	3,100	6,400	2,400	5,800	1,900	5,100	1,600	4,600	1,300

RPM = rev. / min.
FEED - mm / min.

*ae : D1~D4 = 0.05xD
D5~D8 = 0.025mm
D10~D20 = 0.30mm



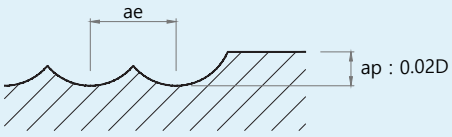
Recommended Cutting Condition

[ESB734 series]

WORK PIECES	HARDENED STEELS											
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	62,100	8,600	59,800	7,200	50,000	6,000	43,800	4,700	40,000	4,200	35,600	3,500
2.5	62,100	8,600	59,800	7,200	50,000	6,000	43,800	4,700	40,000	4,200	35,600	3,500
3	41,400	9,000	39,800	8,000	33,100	6,000	29,400	4,700	26,300	4,200	23,800	3,500
4	31,100	9,000	29,900	8,000	25,000	6,000	21,900	4,700	20,000	4,200	18,100	3,500
5	23,300	8,700	22,300	7,400	18,800	5,600	16,900	4,600	14,400	3,800	13,100	3,200
6	17,400	7,300	16,800	6,200	13,800	4,700	12,500	3,800	11,000	3,200	10,000	2,600
8	13,900	6,300	13,400	5,300	11,300	4,100	10,000	3,200	8,800	2,800	8,100	2,300
10	11,600	5,600	11,100	4,700	9,400	3,600	8,300	2,900	7,300	2,500	6,600	2,100

RPM = rev. / min.
FEED - mm / min.

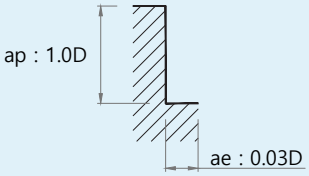
*ae : D1~D4 = 0.05xD
D5~D8 = 0.025mm
D10~D20 = 0.30mm



[ESE702 series] ▶ Side cutting

WORK PIECES	HARDENED STEELS, HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	48,000	1,050	38,000	820	25,500	510	20,500	310	16,000	190	12,500	125
2	33,300	1,200	26,000	970	17,500	600	14,500	370	11,000	230	9,500	165
3	21,800	1,200	17,300	970	11,500	600	9,500	370	7,500	230	6,400	165
4	16,700	1,250	13,200	1,000	8,800	625	7,200	385	5,600	240	4,750	170
5	15,700	1,450	12,500	1,150	8,300	710	6,400	410	5,100	260	4,450	190
6	13,100	1,350	10,350	1,100	6,900	690	5,300	400	4,200	255	3,700	185
8	9,880	1,320	7,800	1,030	5,200	635	4,000	365	3,200	235	2,800	170
10	7,800	1,200	6,150	970	4,100	590	3,200	340	2,550	220	2,200	160
12	6,650	1,200	5,250	970	3,500	590	2,650	340	2,100	220	1,860	160
16	4,900	1,050	3,900	840	2,600	520	2,000	300	1,600	190	1,400	140
20	3,900	950	3,100	750	2,050	475	1,600	275	1,300	175	1,100	125

RPM = rev. / min.
FEED - mm / min.

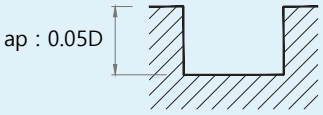


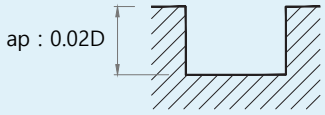
Recommended Cutting Condition

[ESE702 series] ▶ Slotting

WORK PIECES	HARDENED STEELS, HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
~0.2	50,000	130	45,000	115	40,000	95	33,000	60	33,000	45	26,400	30
0.3	50,000	190	45,000	140	40,000	115	33,000	70	25,000	50	20,000	35
0.4	50,000	235	45,000	180	40,000	140	33,000	90	25,000	55	20,000	40
0.5	50,000	370	45,000	280	40,000	220	33,000	140	25,000	85	20,000	60
0.6	50,000	470	45,000	360	40,000	285	33,000	160	25,000	105	20,000	75
0.8	50,000	600	40,000	440	30,000	295	25,000	185	19,000	110	15,200	80
0.9	49,000	655	39,000	520	27,800	330	22,700	205	17,500	125	14,000	90
1	48,000	750	38,000	570	25,500	360	20,500	215	16,000	135	12,500	85
2	33,300	850	26,000	680	17,500	420	14,500	260	11,000	160	9,500	115
3	21,800	850	17,300	680	11,500	420	9,500	260	7,500	160	6,400	115
4	16,700	880	13,200	700	8,800	440	7,200	270	5,600	170	4,750	118
5	15,700	1,000	12,500	805	8,300	500	6,400	285	5,100	180	4,450	132
6	13,100	950	10,350	770	6,900	480	5,300	280	4,200	180	3,700	130
8	9,880	930	7,800	720	5,200	445	4,000	255	3,200	165	2,800	120
10	7,800	850	6,150	680	4,100	415	3,200	240	2,550	155	2,200	122
12	6,650	850	5,250	680	3,500	415	2,650	240	2,100	155	1,860	112
16	4,900	730	3,900	580	2,600	365	2,000	210	1,600	135	1,400	95
20	3,900	660	3,100	525	2,050	335	1,600	195	1,300	125	1,100	85

RPM = rev. / min.
FEED - mm / min.

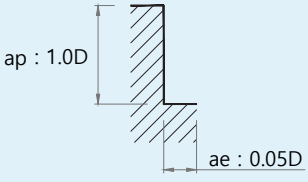


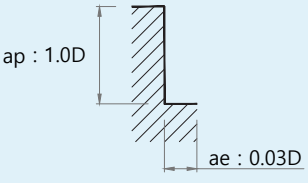


[ESE704, ESE714 series] ▶ Side cutting

WORK PIECES	HARDENED STEELS, HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	48,000	1,480	38,000	1,050	25,500	710	20,500	430	16,000	270	12,500	175
2	33,300	1,750	26,000	1,250	17,500	840	14,500	520	11,000	320	9,500	230
3	21,800	1,750	17,300	1,250	11,500	840	9,500	520	7,500	320	6,400	230
4	16,700	1,800	13,200	1,300	8,800	880	7,200	540	5,600	335	4,750	240
5	15,700	2,000	12,500	1,500	8,300	1,000	6,400	580	5,100	370	4,450	270
6	13,100	1,950	10,350	1,400	6,900	950	5,300	560	4,200	350	3,700	260
8	9,880	1,880	7,800	1,350	5,200	900	4,000	520	3,200	330	2,800	240
10	7,800	1,750	6,150	1,260	4,100	840	3,200	480	2,550	310	2,200	220
12	6,650	1,750	5,250	1,260	3,500	840	2,650	480	2,100	300	1,860	220
16	4,900	1,500	3,900	1,100	2,600	730	2,000	420	1,600	270	1,400	200
20	3,900	1,300	3,100	970	2,050	650	1,600	380	1,300	250	1,100	180

RPM = rev. / min.
FEED - mm / min.



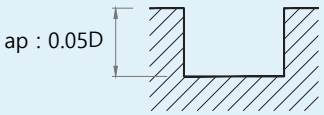


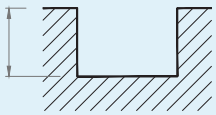
Recommended Cutting Condition

[ESE712 series] ▶ Slotting

WORK PIECES	HARDENED STEELS, HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
0.2	50,000	130	45,000	115	40,000	95	33,000	60	33,000	45	26,400	30
0.3	50,000	190	45,000	140	40,000	115	33,000	70	25,000	50	20,000	35
0.4	50,000	235	45,000	180	40,000	140	33,000	90	25,000	55	20,000	40
0.5	50,000	370	45,000	280	40,000	220	33,000	140	25,000	85	20,000	60
0.6	50,000	470	45,000	360	40,000	285	30,000	160	25,000	105	20,000	75
0.8	50,000	600	40,000	440	30,000	295	25,000	185	19,000	110	15,200	80
0.9	49,000	655	39,000	520	27,800	330	22,700	205	17,500	125	14,000	90
1	48,000	750	38,000	570	25,500	360	20,500	215	16,000	135	12,500	85
2	33,300	850	26,000	680	17,500	420	14,500	260	11,000	160	9,500	115
3	21,800	850	17,300	680	11,500	420	9,500	260	7,500	160	6,400	115
4	16,700	880	13,200	700	8,800	440	7,200	270	5,600	170	4,750	118
5	15,700	1,000	12,500	805	8,300	500	6,400	285	5,100	180	4,450	132
6	13,100	950	10,350	770	6,900	480	5,300	280	4,200	180	3,700	130
8	9,880	930	7,800	720	5,200	445	4,000	255	3,200	165	2,800	120
10	7,800	850	6,150	680	4,100	415	3,200	240	2,550	155	2,200	112
12	6,650	850	5,250	680	3,500	415	2,650	240	2,100	155	1,860	112
16	4,900	730	3,900	580	2,600	365	2,000	210	1,600	135	1,400	95
20	3,900	660	3,100	525	2,050	335	1,600	195	1,300	125	1,100	85

RPM = rev. / min.
FEED - mm / min.

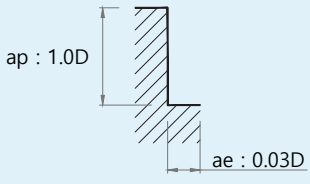




[ESE712 series] ▶ Side cutting

WORK PIECES	HARDENED STEELS, HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	48,000	1,050	38,000	820	25,500	510	20,500	310	16,000	190	12,500	125
2	33,300	1,200	26,000	970	17,500	600	14,500	370	11,000	230	9,500	165
3	21,800	1,200	17,300	970	11,500	600	9,500	370	7,500	230	6,400	165
4	16,700	1,250	13,200	1,000	8,800	625	7,200	385	5,600	240	4,750	170
5	15,700	1,450	12,500	1,150	8,300	710	6,400	410	5,100	260	4,450	190
6	13,100	1,350	10,350	1,100	6,900	690	5,300	400	4,200	255	3,700	185
8	9,880	1,320	7,800	1,030	5,200	635	4,000	365	3,200	235	2,800	170
10	7,800	1,200	6,150	970	4,100	590	3,200	340	2,550	220	2,200	160
12	6,650	1,200	5,250	970	3,500	590	2,650	340	2,100	220	1,860	160
16	4,900	1,050	3,900	840	2,600	520	2,000	300	1,600	190	1,400	140
20	3,900	950	3,100	750	2,050	475	1,600	275	1,300	175	1,100	125

RPM = rev. / min.
FEED - mm / min.

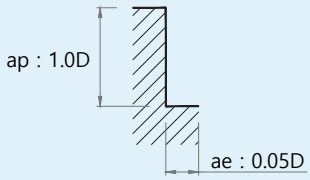


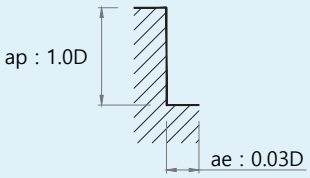
Recommended Cutting Condition

[ESE716 series] ▶ Side cutting

WORK PIECES	HARDENED STEELS, HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	24,800	5,350	23,500	4,900	16,000	4,900	13,500	3,300	10,500	2,100	8,000	1,450
8	20,000	5,500	19,000	5,000	12,000	4,600	10,000	3,100	8,000	2,000	6,000	1,400
10	16,000	4,900	15,500	4,500	9,500	4,100	8,000	2,900	6,400	1,800	4,800	1,300
12	13,000	4,500	12,500	4,100	8,000	3,800	6,600	2,500	5,300	1,600	4,000	1,150
16	10,000	4,000	9,700	3,700	6,000	3,400	5,000	2,300	4,000	1,250	3,000	870
20	8,000	3,350	7,800	3,400	4,800	3,200	4,000	2,100	3,200	1,020	2,400	690

RPM = rev. / min.
FEED - mm / min.

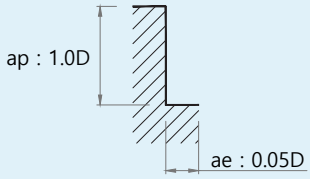


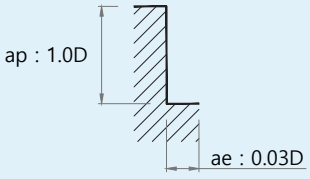


[ESE724 series] ▶ Side cutting

WORK PIECES	HARDENED STEELS, HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	48,000	1,480	38,000	1,050	25,500	710	20,500	430	16,000	270	12,500	175
2	33,300	1,750	26,000	1,250	17,500	840	14,500	520	11,000	320	9,500	230
3	21,800	1,750	17,300	1,250	11,500	840	9,500	520	7,500	320	6,400	230
4	16,700	1,800	13,200	1,300	8,800	880	7,200	540	5,600	335	4,750	240
5	15,700	2,000	12,500	1,500	8,300	1,000	6,400	580	5,100	370	4,450	270
6	13,100	1,950	10,350	1,400	6,900	950	5,300	560	4,200	350	3,700	260
8	9,880	1,880	7,800	1,350	5,200	900	4,000	520	3,200	330	2,800	240
10	7,800	1,750	6,150	1,260	4,100	840	3,200	480	2,550	310	2,200	220
12	6,650	1,750	5,250	1,260	3,500	840	2,650	480	2,100	300	1,860	220
16	4,900	1,500	3,900	1,100	2,600	730	2,000	420	1,600	270	1,400	200
20	3,900	1,300	3,100	970	2,050	650	1,600	380	1,300	250	1,100	180

RPM = rev. / min.
FEED - mm / min.



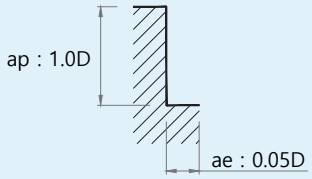


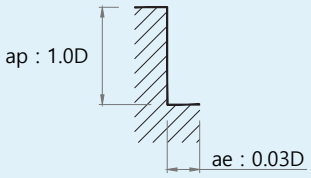
Recommended Cutting Condition

[ESE726, ESR736 series]

WORK PIECES	HARDENED STEELS, HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	24,800	5,350	23,500	4,900	16,000	4,900	13,500	3,300	10,500	2,100	8,000	1,450
8	20,000	5,500	19,000	5,000	12,000	4,600	10,000	3,100	8,000	2,000	6,000	1,400
10	16,000	4,900	15,500	4,500	9,500	4,100	8,000	2,900	6,400	1,800	4,800	1,300
12	13,000	4,500	12,500	4,100	8,000	3,800	6,600	2,500	5,300	1,600	4,000	1,150
16	10,000	4,000	9,700	3,700	6,000	3,400	5,000	2,300	4,000	1,250	3,000	870
20	8,000	3,350	7,800	3,400	4,800	3,200	4,000	2,100	3,200	1,020	2,400	690

RPM = rev. / min.
FEED - mm / min.

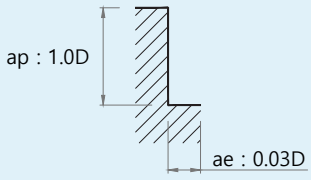




[ESR702 series] ▶ Side cutting

WORK PIECES	HARDENED STEELS, HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	33,300	960	26,000	776	17,500	480	14,500	296	11,000	184	9,500	132
3	21,800	960	17,300	776	11,500	480	9,500	296	7,500	184	6,400	132
4	16,700	1,000	13,200	800	8,800	500	7,200	308	5,600	192	4,750	136
5	15,700	1,160	12,500	920	8,300	568	6,400	328	5,100	208	4,450	152
6	13,100	1,080	10,350	880	6,900	552	5,300	320	4,200	204	3,700	148
8	9,880	1,056	7,800	824	5,200	508	4,000	292	3,200	188	2,800	136
10	7,800	960	6,150	776	4,100	472	3,200	272	2,550	176	2,200	128
12	6,650	960	5,250	776	3,500	472	2,650	272	2,100	176	1,860	128
16	4,900	840	3,900	672	2,600	416	2,000	240	1,600	152	1,400	112
20	3,900	760	3,100	600	2,050	380	1,600	220	1,300	140	1,100	100

RPM = rev. / min.
FEED - mm / min.

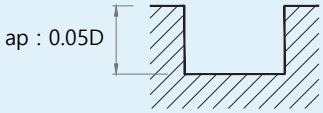


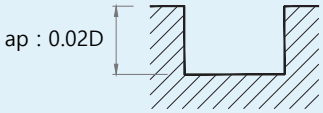
Recommended Cutting Condition

[ESR702, ESR732 series] ▶ Slotting

WORK PIECES	HARDENED STEELS, HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	33,300	680	26,000	544	17,500	336	14,500	208	11,000	128	9,500	92
3	21,800	680	17,300	544	11,500	336	9,500	208	7,500	128	6,400	92
4	16,700	704	13,200	560	8,800	352	7,200	216	5,600	136	4,750	94
5	15,700	800	12,500	644	8,300	400	6,400	228	5,100	144	4,450	106
6	13,100	760	10,350	616	6,900	384	5,300	224	4,200	144	3,700	104
8	9,880	744	7,800	576	5,200	356	4,000	204	3,200	132	2,800	96
10	7,800	680	6,150	544	4,100	332	3,200	192	2,550	124	2,200	90
12	6,650	680	5,250	544	3,500	332	2,650	192	2,100	124	1,860	90
16	4,900	584	3,900	464	2,600	292	2,000	168	1,600	108	1,400	78
20	3,900	528	3,100	420	2,050	268	1,600	168	1,300	100	1,100	70

RPM = rev. / min.
FEED - mm / min.

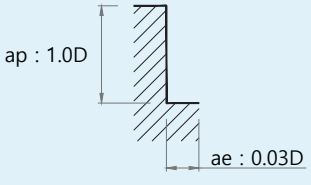




[ESR724, ESR714, ESR734, ESR704 series] ▶ Side cutting

WORK PIECES	HARDENED STEELS, HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3	21,800	1,400	17,300	1,000	11,500	672	9,500	416	7,500	256	6,400	184
4	16,700	1,440	13,200	1,040	8,800	704	7,200	432	5,600	268	4,750	192
5	15,700	1,600	12,500	1,200	8,300	800	6,400	464	5,100	296	4,450	216
6	13,100	1,560	10,350	1,120	6,900	760	5,300	448	4,200	280	3,700	208
8	9,880	1,504	7,800	1,080	5,200	720	4,000	416	3,200	264	2,800	192
10	7,800	1,400	6,150	1,008	4,100	672	3,200	384	2,550	248	2,200	176
12	6,650	1,400	5,250	1,008	3,500	672	2,650	384	2,100	240	1,860	176
16	4,900	1,200	3,900	880	2,600	584	2,000	336	1,600	216	1,400	160
20	3,900	1,040	3,100	776	2,050	520	1,600	304	1,300	200	1,100	144

RPM = rev. / min.
FEED - mm / min.

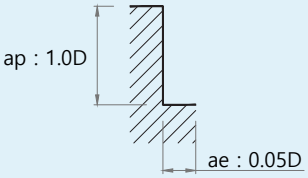


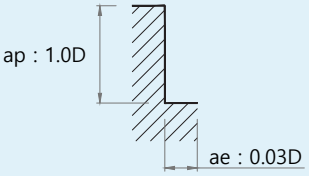
Recommended Cutting Condition

[ESR706 series]

WORK PIECES	HARDENED STEELS, HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	24,800	5,350	23,500	4,900	16,000	4,900	13,500	3,300	10,500	2,100	8,000	1,450
8	20,000	5,500	19,000	5,000	12,000	4,600	10,000	3,100	8,000	2,000	6,000	1,400
10	16,000	4,900	15,500	4,500	9,500	4,100	8,000	2,900	6,400	1,800	4,800	1,300
12	13,000	4,500	12,500	4,100	8,000	3,800	6,600	2,500	5,300	1,600	4,000	1,150
16	10,000	4,000	9,700	3,700	6,000	3,400	5,000	2,300	4,000	1,250	3,000	870
20	8,000	3,350	7,800	3,400	4,800	3,200	4,000	2,100	3,200	1,020	2,400	690

RPM = rev. / min.
FEED - mm / min.





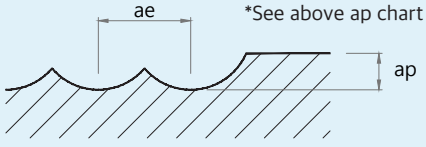
Recommended Cutting Condition

[ESRB712 series]

WORK PIECES		CARBON STEEL, ALLOY STEEL (SCM, SNCM, S45C)			PREHARDEN STEEL (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm2			1100~1500N/mm2			1500~2000N/mm2		
DIAMETER (mm)	Effective Length	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)
0.1	0.3	50,000	240	0.009	50,000	215	0.007	50,000	190	0.005
0.1	0.5	50,000	240	0.006	50,000	215	0.005	50,000	190	0.004
0.1	1	45,000	195	0.002	45,000	175	0.002	45,000	155	0.001
0.2	0.5	50,000	335	0.018	50,000	310	0.014	43,200	260	0.010
0.2	1	50,000	335	0.013	50,000	310	0.010	43,200	260	0.007
0.2	1.5	45,000	270	0.007	45,000	250	0.006	38,880	210	0.004
0.2	2	45,000	270	0.005	45,000	250	0.004	38,880	210	0.003
0.2	3	45,000	270	0.003	45,000	250	0.003	38,880	210	0.002
0.3	1	50,000	475	0.019	50,000	430	0.015	42,800	365	0.011
0.3	1.5	50,000	475	0.019	50,000	430	0.015	42,800	365	0.011
0.3	2	45,000	385	0.011	45,000	350	0.008	38,520	295	0.006
0.3	2.5	45,000	385	0.007	45,000	350	0.005	38,520	295	0.004
0.3	3	45,000	385	0.007	45,000	350	0.005	38,520	295	0.004
0.3	4	40,000	305	0.004	40,000	275	0.003	34,240	235	0.002
0.3	5	30,000	200	0.003	30,000	180	0.002	25,680	155	0.002
0.4	1	41,000	490	0.036	38,800	425	0.028	34,200	340	0.020
0.4	1.5	41,000	490	0.025	38,800	425	0.020	34,200	340	0.014
0.4	2	41,000	490	0.025	38,800	425	0.020	34,200	340	0.014
0.4	2.5	36,900	395	0.014	34,920	345	0.011	30,780	275	0.008
0.4	3	36,900	395	0.014	34,920	345	0.011	30,780	275	0.008
0.4	4	36,900	395	0.009	34,920	345	0.007	30,780	275	0.005
0.4	5	32,800	315	0.009	31,040	270	0.007	27,360	220	0.005
0.4	6	32,800	315	0.005	31,040	270	0.004	27,360	220	0.003
0.4	8	24,600	205	0.004	23,280	180	0.003	20,520	145	0.002
0.4	10	12,300	90	0.004	11,640	75	0.003	10,260	60	0.002
0.5	1	34,200	685	0.045	32,300	580	0.035	28,500	515	0.025
0.5	1.5	34,200	685	0.045	32,300	580	0.035	28,500	515	0.025
0.5	2	34,200	685	0.032	32,300	580	0.025	28,500	515	0.018
0.5	2.5	34,200	685	0.032	32,300	580	0.025	28,500	515	0.018
0.5	3	30,780	555	0.018	29,070	470	0.014	25,650	415	0.010
0.5	4	30,780	555	0.018	29,070	470	0.014	25,650	415	0.010
0.5	5	30,780	555	0.011	29,070	470	0.009	25,650	415	0.006
0.5	6	27,360	440	0.011	25,840	370	0.009	22,800	330	0.006
0.5	8	20,520	290	0.007	19,380	245	0.005	17,100	215	0.004
0.5	10	20,520	290	0.005	19,380	245	0.004	17,100	215	0.003
0.5	12	10,260	125	0.005	9,690	105	0.004	8,550	95	0.003
0.5	14	10,260	125	0.005	9,690	105	0.004	8,550	95	0.003
0.5	16	3,420	35	0.005	3,230	30	0.004	2,850	25	0.003
0.6	1	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
0.6	2	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
0.6	3	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
0.6	4	30,780	830	0.022	29,070	680	0.017	25,650	555	0.012
0.6	5	30,780	830	0.014	29,070	680	0.011	25,650	555	0.008
0.6	6	30,780	830	0.014	29,070	680	0.011	25,650	555	0.008
0.6	8	27,360	655	0.008	25,840	540	0.006	22,800	440	0.005
0.6	10	20,520	430	0.005	19,380	355	0.004	17,100	290	0.003

RPM = rev. / min.
FEED - mm / min.

*ae : D1~D4 = 0.05xD
D5~D8 = 0.025mm
D10~D20 = 0.30mm



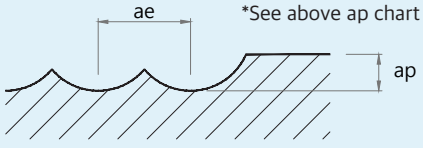
Recommended Cutting Condition

[ESRB712 series]

WORK PIECES		CARBON STEEL, ALLOY STEEL (SCM, SNCM, S45C)			PREHARDEN STEEL (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm2			1100~1500N/mm2			1500~2000N/mm2		
DIAMETER (mm)	Effective Length	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)
0.6	12	20,520	430	0.005	19,380	355	0.004	17,100	290	0.003
0.6	14	10,260	185	0.005	9,690	150	0.004	8,550	125	0.003
0.6	16	10,260	185	0.005	9,690	150	0.004	8,550	125	0.003
0.7	2	34,200	1,130	0.063	32,300	930	0.049	28,500	765	0.035
0.7	4	30,780	915	0.025	29,070	755	0.020	25,650	620	0.014
0.7	6	30,780	915	0.016	29,070	755	0.012	25,650	620	0.009
0.7	8	27,360	725	0.016	25,840	595	0.012	22,800	490	0.009
0.7	10	27,360	725	0.009	25,840	595	0.007	22,800	490	0.005
0.7	12	20,520	475	0.006	19,380	390	0.005	17,100	320	0.004
0.8	2	34,200	1,230	0.072	32,300	1,035	0.056	28,500	855	0.040
0.8	3	34,200	1,230	0.050	32,300	1,035	0.039	28,500	855	0.028
0.8	4	34,200	1,230	0.050	32,300	1,035	0.039	28,500	855	0.028
0.8	5	30,780	995	0.029	29,070	840	0.022	25,650	695	0.016
0.8	6	30,780	995	0.029	29,070	840	0.022	25,650	695	0.016
0.8	8	30,780	995	0.018	29,070	840	0.014	25,650	695	0.010
0.8	10	27,360	785	0.018	25,840	660	0.014	22,800	545	0.010
0.8	12	27,360	785	0.011	25,840	660	0.008	22,800	545	0.006
0.8	14	20,520	515	0.007	19,380	435	0.006	17,100	360	0.004
0.8	16	20,520	515	0.007	19,380	435	0.006	17,100	360	0.004
0.8	20	10,260	220	0.007	9,690	185	0.006	8,550	155	0.004
0.9	4	29,250	1,120	0.032	27,630	935	0.025	24,390	775	0.018
0.9	6	29,250	1,120	0.032	27,630	935	0.025	24,390	775	0.018
0.9	8	29,250	1,120	0.020	27,630	935	0.016	24,390	775	0.011
0.9	10	26,000	885	0.020	24,560	740	0.016	21,680	610	0.011
1.0	2	30,800	1,540	0.090	29,100	1,310	0.070	25,700	1,075	0.050
1.0	3	30,800	1,540	0.090	29,100	1,310	0.070	25,700	1,075	0.050
1.0	4	30,800	1,540	0.063	29,100	1,310	0.049	25,700	1,075	0.035
1.0	5	30,800	1,540	0.063	29,100	1,310	0.049	25,700	1,075	0.035
1.0	6	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
1.0	7	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
1.0	8	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
1.0	10	27,720	1,245	0.023	26,190	1,060	0.018	23,130	870	0.013
1.0	12	24,640	985	0.023	23,280	840	0.018	20,560	690	0.013
1.0	14	24,640	985	0.014	23,280	840	0.011	20,560	690	0.008
1.0	16	18,480	645	0.014	17,460	550	0.011	15,420	450	0.008
1.0	18	18,480	645	0.009	17,460	550	0.007	15,420	450	0.005
1.0	20	18,480	645	0.009	17,460	550	0.007	15,420	450	0.005
1.0	22	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
1.0	26	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
1.0	30	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
1.0	40	3,080	75	0.009	2,910	65	0.007	2,570	55	0.005
1.0	50	3,080	75	0.006	2,910	65	0.005	2,570	55	0.003
1.2	4	26,300	1,375	0.076	24,800	1,150	0.059	21,900	950	0.042
1.2	6	26,300	1,375	0.076	24,800	1,150	0.059	21,900	950	0.042
1.2	8	23,670	1,115	0.043	22,320	930	0.034	19,710	770	0.024
1.2	10	23,670	1,115	0.027	22,320	930	0.021	19,710	770	0.015

RPM = rev. / min.
FEED - mm / min.

*ae : D1~D4 = 0.05xD
D5~D8 = 0.025mm
D10~D20 = 0.30mm



*See above ap chart

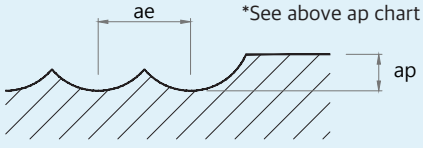
Recommended Cutting Condition

[ESRB712 series]

WORK PIECES		CARBON STEEL, ALLOY STEEL (SCM, SNCM, S45C)			PREHARDEN STEEL (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm2			1100~1500N/mm2			1500~2000N/mm2		
DIAMETER (mm)	Effective Length	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)
1.2	12	23,670	1,115	0.027	22,320	930	0.021	19,710	770	0.015
1.2	16	21,040	880	0.016	19,840	735	0.013	17,520	610	0.009
1.2	20	15,780	580	0.011	14,880	485	0.008	13,140	400	0.006
1.2	26	7,890	245	0.011	7,440	205	0.008	6,570	170	0.006
1.4	6	21,500	1,295	0.088	20,300	1,100	0.069	18,000	935	0.049
1.4	8	19,350	1,050	0.050	18,270	890	0.039	16,200	755	0.028
1.4	10	19,350	1,050	0.050	18,270	890	0.039	16,200	755	0.028
1.4	16	17,200	830	0.032	16,240	705	0.025	14,400	600	0.018
1.5	4	23,900	1,580	0.135	22,600	1,355	0.105	20,000	1,075	0.075
1.5	5	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
1.5	6	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
1.5	7	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
1.5	8	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.030
1.5	10	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.030
1.5	12	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.030
1.5	14	21,510	1,280	0.034	20,340	1,100	0.026	18,000	870	0.019
1.5	16	19,120	1,010	0.034	18,080	865	0.026	16,000	690	0.019
1.5	18	19,120	1,010	0.034	18,080	865	0.026	16,000	690	0.019
1.5	20	19,120	1,010	0.020	18,080	865	0.016	16,000	690	0.011
1.5	22	19,120	1,010	0.020	18,080	865	0.016	16,000	690	0.011
1.5	26	14,340	665	0.014	13,560	570	0.011	12,000	450	0.008
1.5	30	14,340	665	0.014	13,560	570	0.011	12,000	450	0.008
1.5	35	7,170	285	0.010	6,780	245	0.008	6,000	195	0.005
1.5	40	7,170	285	0.010	6,780	245	0.008	6,000	195	0.005
1.6	4	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
1.6	6	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
1.6	8	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
1.6	10	19,980	1,260	0.058	18,900	1,055	0.045	16,650	900	0.032
1.6	12	19,980	1,260	0.058	18,900	1,055	0.045	16,650	900	0.032
1.6	16	19,980	1,260	0.036	18,900	1,055	0.028	16,650	900	0.020
1.6	20	17,760	995	0.036	16,800	830	0.028	14,800	710	0.020
1.8	4	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
1.8	6	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
1.8	8	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
1.8	10	19,980	1,440	0.065	18,900	1,190	0.050	16,650	990	0.036
1.8	12	19,980	1,440	0.065	18,900	1,190	0.050	16,650	990	0.036
1.8	16	19,980	1,440	0.041	18,900	1,190	0.032	16,650	990	0.023
1.8	20	17,760	1,140	0.041	16,800	940	0.032	14,800	785	0.023
2.0	6	18,000	1,795	0.180	17,000	1,525	0.140	15,000	1,285	0.100
2.0	8	18,000	1,795	0.126	17,000	1,525	0.098	15,000	1,285	0.070
2.0	10	18,000	1,795	0.126	17,000	1,525	0.098	15,000	1,285	0.070
2.0	12	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
2.0	14	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
2.0	16	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
2.0	18	16,200	1,455	0.045	15,300	1,235	0.035	13,500	1,040	0.025
2.0	20	16,200	1,455	0.045	15,300	1,235	0.035	13,500	1,040	0.025

RPM = rev. / min.
FEED - mm / min.

*ae : D1~D4 = 0.05xD
D5~D8 = 0.025mm
D10~D20 = 0.30mm



*See above ap chart

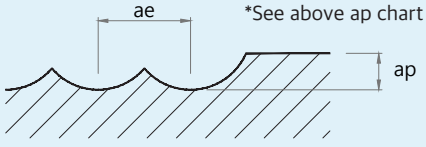
Recommended Cutting Condition

[ESRB712 series]

WORK PIECES		CARBON STEEL, ALLOY STEEL (SCM, SNCM, S45C)			PREHARDEN STEEL (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm2			1100~1500N/mm2			1500~2000N/mm2		
DIAMETER (mm)	Effective Length	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)
2.0	22	14,400	1,150	0.045	13,600	975	0.035	12,000	820	0.025
2.0	26	14,400	1,150	0.045	13,600	975	0.035	12,000	820	0.025
2.0	30	14,400	1,150	0.027	13,600	975	0.021	12,000	820	0.015
2.0	35	10,800	755	0.018	10,200	640	0.014	9,000	540	0.010
2.0	40	10,800	755	0.018	10,200	640	0.014	9,000	540	0.010
2.0	45	5,400	325	0.018	5,100	275	0.014	4,500	230	0.010
2.0	50	5,400	325	0.018	5,100	275	0.014	4,500	230	0.010
2.0	60	5,400	325	0.018	5,100	275	0.014	4,500	230	0.010
2.5	8	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
2.5	10	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
2.5	12	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
2.5	16	14,220	1,560	0.090	13,410	1,300	0.070	11,880	1,055	0.050
2.5	20	14,220	1,560	0.090	13,410	1,300	0.070	11,880	1,055	0.050
2.5	22	14,220	1,560	0.056	13,410	1,300	0.044	11,880	1,055	0.031
2.5	26	12,640	1,230	0.056	11,920	1,025	0.044	10,560	835	0.031
2.5	30	12,640	1,230	0.056	11,920	1,025	0.044	10,560	835	0.031
2.5	35	12,640	1,230	0.034	11,920	1,025	0.026	10,560	835	0.019
2.5	40	9,480	810	0.034	8,940	675	0.026	7,920	550	0.019
2.5	45	9,480	810	0.023	8,940	675	0.018	7,920	550	0.013
2.5	50	9,480	810	0.023	8,940	675	0.018	7,920	550	0.013
3.0	6	13,700	2,050	0.270	12,900	1,730	0.210	11,400	1,435	0.150
3.0	8	13,700	2,050	0.270	12,900	1,730	0.210	11,400	1,435	0.150
3.0	10	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
3.0	12	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
3.0	14	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
3.0	16	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.060
3.0	18	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.060
3.0	20	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.060
3.0	22	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.060
3.0	26	12,330	1,660	0.068	11,610	1,400	0.053	10,260	1,160	0.038
3.0	30	12,330	1,660	0.068	11,610	1,400	0.053	10,260	1,160	0.038
3.0	35	10,960	1,310	0.068	10,320	1,105	0.053	9,120	920	0.038
3.0	40	10,960	1,310	0.041	10,320	1,105	0.032	9,120	920	0.023
3.0	45	10,960	1,310	0.041	10,320	1,105	0.032	9,120	920	0.023
3.0	50	8,220	860	0.027	7,740	725	0.021	6,840	605	0.015
3.0	60	8,220	860	0.027	7,740	725	0.021	6,840	605	0.015
4.0	8	9,800	1,965	0.360	9,300	1,670	0.280	8,200	1,395	0.200
4.0	10	9,800	1,965	0.360	9,300	1,670	0.280	8,200	1,395	0.200
4.0	12	9,800	1,965	0.360	9,300	1,670	0.280	8,200	1,395	0.200
4.0	14	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
4.0	16	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
4.0	18	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
4.0	20	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
4.0	22	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080
4.0	26	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080
4.0	30	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080

RPM = rev. / min.
FEED - mm / min.

*ae : D1~D4 = 0.05xD
D5~D8 = 0.025mm
D10~D20 = 0.30mm



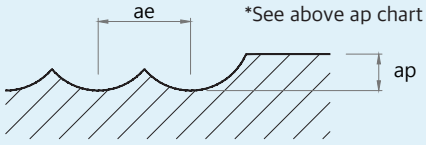
Recommended Cutting Condition

[ESRB712 series]

WORK PIECES		CARBON STEEL, ALLOY STEEL (SCM, SNCM, S45C)			PREHARDEN STEEL (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm2			1100~1500N/mm2			1500~2000N/mm2		
DIAMETER (mm)	Effective Length	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)
4.0	35	8,820	1,590	0.090	8,370	1,355	0.070	7,380	1,130	0.050
4.0	40	8,820	1,590	0.090	8,370	1,355	0.070	7,380	1,130	0.050
4.0	45	7,840	1,260	0.090	7,440	1,070	0.070	6,560	895	0.050
4.0	50	7,840	1,260	0.090	7,440	1,070	0.070	6,560	895	0.050
4.0	60	7,840	1,260	0.054	7,440	1,070	0.042	6,560	895	0.030
5.0	15	7,700	1,845	0.315	7,300	1,455	0.245	6,400	1,285	0.175
5.0	20	7,700	1,845	0.315	7,300	1,455	0.245	6,400	1,285	0.175
5.0	26	6,930	1,495	0.180	6,570	1,180	0.140	5,760	1,040	0.100
5.0	30	6,930	1,495	0.180	6,570	1,180	0.140	5,760	1,040	0.100
5.0	35	6,930	1,495	0.180	6,570	1,180	0.140	5,760	1,040	0.100
5.0	40	6,930	1,495	0.180	6,570	1,180	0.140	5,760	1,040	0.100
5.0	50	6,930	1,495	0.113	6,570	1,180	0.088	5,760	1,040	0.063
5.0	60	6,160	1,180	0.113	5,840	930	0.088	5,120	820	0.063
6.0	20	6,500	1,900	0.378	6,200	1,600	0.294	5,500	1,330	0.210
6.0	30	6,500	1,900	0.378	6,200	1,600	0.294	5,500	1,330	0.210
8.0	25	4,850	1,800	0.504	4,600	1,500	0.392	4,000	1,280	0.280
8.0	30	4,850	1,800	0.504	4,600	1,500	0.392	4,000	1,280	0.280
10.0	30	3,850	1,650	0.900	3,680	1,400	0.700	3,200	1,200	0.500
10.0	40	3,850	1,650	0.630	3,680	1,400	0.490	3,200	1,200	0.350
12.0	32	3,200	1,520	1.080	3,050	1,300	0.840	2,650	1,100	0.600
12.0	45	3,200	1,520	0.756	3,050	1,300	0.588	2,650	1,100	0.420

RPM = rev. / min.
FEED - mm / min.

*ae : D1~D4 = 0.05xD
D5~D8 = 0.025mm
D10~D20 = 0.30mm

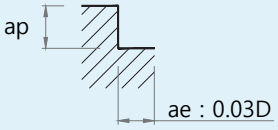


Recommended Cutting Condition

[ESRE712 series] ▶ Side cutting

WORK PIECES		CARBON STEEL, ALLOY STEEL (SCM, SNCM, S45C)			PREHARDEN STEEL (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm2			1100~1500N/mm2			1500~2000N/mm2		
DIAMETER (mm)	Effective Length	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)
0.1	0.3	50,000	315	0.009	46,200	230	0.007	40,600	170	0.005
0.1	0.5	50,000	315	0.006	46,200	230	0.005	40,600	170	0.004
0.1	1	45,000	255	0.002	41,580	185	0.002	36,540	140	0.001
0.2	0.5	38,500	380	0.018	36,300	270	0.014	32,100	200	0.010
0.2	1	38,500	380	0.013	36,300	270	0.010	32,100	200	0.007
0.2	1.5	34,650	310	0.007	32,670	220	0.006	28,890	160	0.004
0.2	2	34,650	310	0.005	32,670	220	0.004	28,890	160	0.003
0.3	1	34,200	390	0.019	32,300	270	0.015	28,500	230	0.011
0.3	1.5	34,200	390	0.019	32,300	270	0.015	25,800	230	0.011
0.3	2	30,780	315	0.011	29,070	220	0.008	25,650	185	0.006
0.3	2.5	30,780	315	0.007	29,070	220	0.005	25,650	185	0.004
0.3	3	30,780	315	0.007	29,070	220	0.005	25,650	185	0.004
0.3	4	27,360	250	0.004	25,840	175	0.003	22,800	145	0.002
0.3	5	20,520	165	0.003	19,380	115	0.002	17,100	95	0.002
0.4	1	27,400	540	0.036	25,800	380	0.028	22,800	280	0.020
0.4	1.5	27,400	540	0.025	25,800	380	0.020	22,800	280	0.014
0.4	2	27,400	540	0.025	25,800	380	0.020	22,800	280	0.014
0.4	2.5	24,660	435	0.014	23,220	310	0.011	20,520	225	0.008
0.4	3	24,660	435	0.014	23,220	310	0.011	20,520	225	0.008
0.4	4	24,660	435	0.009	23,220	310	0.007	20,520	225	0.005
0.4	5	21,920	345	0.009	20,640	245	0.007	18,240	180	0.005
0.4	6	21,920	345	0.005	20,640	245	0.004	18,240	180	0.003
0.4	8	16,440	225	0.004	15,480	160	0.003	13,680	120	0.002
0.4	10	8,220	95	0.004	7,740	70	0.003	6,840	50	0.002
0.5	1	27,400	540	0.045	25,800	425	0.035	22,800	285	0.025
0.5	1.5	27,400	540	0.045	25,800	425	0.035	22,800	285	0.025
0.5	2	27,400	540	0.032	25,800	425	0.025	22,800	285	0.018
0.5	2.5	27,400	540	0.032	25,800	425	0.025	22,800	285	0.018
0.5	3	24,660	435	0.018	23,220	345	0.014	20,520	230	0.010
0.5	4	24,660	435	0.018	23,220	345	0.014	20,520	230	0.010
0.5	5	24,660	435	0.011	23,220	345	0.009	20,520	230	0.006
0.5	6	21,920	345	0.011	20,640	270	0.009	18,240	180	0.006
0.5	8	16,440	225	0.007	15,480	180	0.005	13,680	120	0.004
0.5	10	16,440	225	0.005	15,480	180	0.004	13,680	120	0.003
0.5	12	8,220	95	0.005	7,740	75	0.004	6,840	50	0.003
0.5	14	8,220	95	0.005	7,740	75	0.004	6,840	50	0.003
0.5	16	2,740	25	0.005	2,580	20	0.004	2,280	15	0.003
0.6	2	27,400	775	0.038	25,800	545	0.029	22,800	405	0.021
0.6	3	27,400	775	0.038	25,800	545	0.029	22,800	405	0.021
0.6	4	24,660	630	0.022	23,220	440	0.017	20,520	330	0.012
0.6	5	24,660	630	0.014	23,220	440	0.011	20,520	330	0.008
0.6	6	24,660	630	0.014	23,220	440	0.011	20,520	330	0.008
0.6	8	21,920	495	0.008	20,640	350	0.006	18,240	260	0.005
0.6	10	16,440	325	0.005	15,480	230	0.004	13,680	170	0.003
0.6	12	16,440	325	0.005	15,480	230	0.004	13,680	170	0.003
0.6	14	8,220	140	0.005	7,740	100	0.004	6,840	75	0.003

RPM = rev. / min.
FEED - mm / min.



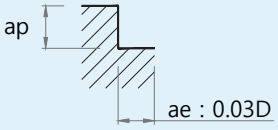
*See above ap chart

Recommended Cutting Condition

[ESRE712 series]

WORK PIECES		CARBON STEEL, ALLOY STEEL (SCM, SNCM, S45C)			PREHARDEN STEEL (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm2			1100~1500N/mm2			1500~2000N/mm2		
DIAMETER (mm)	Effective Length	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)
0.6	16	8,220	140	0.005	7,740	100	0.004	6,840	75	0.003
0.7	2	27,400	775	0.063	25,800	545	0.049	22,800	405	0.035
0.7	4	24,660	630	0.025	23,220	440	0.020	20,520	330	0.014
0.7	6	24,660	630	0.016	23,220	440	0.012	20,520	330	0.009
0.7	8	21,920	495	0.016	20,640	350	0.012	18,240	260	0.009
0.7	10	21,920	495	0.009	20,640	350	0.007	18,240	260	0.005
0.7	12	16,440	325	0.009	15,480	230	0.005	13,680	170	0.004
0.8	2	27,400	775	0.072	25,800	605	0.056	22,800	450	0.040
0.8	3	27,400	775	0.050	25,800	605	0.039	22,800	450	0.028
0.8	4	27,400	775	0.050	25,800	605	0.039	22,800	450	0.028
0.8	5	24,660	630	0.029	23,220	490	0.022	20,520	365	0.016
0.8	6	24,660	630	0.029	23,220	490	0.022	20,520	365	0.016
0.8	8	24,660	630	0.018	23,220	490	0.014	20,520	365	0.010
0.8	10	21,920	495	0.018	20,640	385	0.014	18,240	290	0.010
0.8	12	21,920	495	0.011	20,640	385	0.008	18,240	290	0.006
0.8	14	16,440	325	0.007	15,480	255	0.006	13,680	190	0.004
0.8	16	16,440	325	0.007	15,480	255	0.006	13,680	190	0.004
0.8	20	8,220	140	0.007	7,740	110	0.006	6,840	80	0.004
0.9	6	22,140	575	0.032	20,970	440	0.025	18,450	330	0.018
0.9	8	22,140	575	0.020	20,970	440	0.016	18,450	330	0.011
0.9	10	19,680	455	0.020	18,640	350	0.016	16,400	260	0.011
1.0	2	24,600	1,045	0.090	23,300	890	0.070	20,500	665	0.050
1.0	3	24,600	1,045	0.090	23,300	890	0.070	20,500	665	0.050
1.0	4	24,600	1,045	0.063	23,300	890	0.049	20,500	665	0.035
1.0	5	24,600	1,045	0.063	23,300	890	0.049	20,500	665	0.035
1.0	6	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
1.0	7	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
1.0	8	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
1.0	10	22,140	845	0.023	20,970	720	0.018	18,450	540	0.013
1.0	12	19,680	670	0.023	18,640	570	0.018	16,400	425	0.013
1.0	14	19,680	670	0.014	18,640	570	0.011	16,400	425	0.008
1.0	16	14,760	440	0.014	13,980	375	0.011	12,300	280	0.008
1.0	18	14,760	440	0.009	13,980	375	0.007	12,300	280	0.005
1.0	20	14,760	440	0.009	13,980	375	0.007	12,300	280	0.005
1.0	22	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
1.0	26	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
1.0	30	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
1.0	40	2,460	50	0.009	2,330	45	0.007	2,050	35	0.005
1.0	50	2,460	50	0.006	2,330	45	0.005	2,050	35	0.003
1.2	4	21,900	930	0.076	20,700	720	0.059	18,200	485	0.042
1.2	6	21,900	930	0.076	20,700	720	0.059	18,200	485	0.042
1.2	8	19,710	755	0.043	18,630	585	0.034	16,380	395	0.024
1.2	10	19,710	755	0.027	18,630	585	0.021	16,380	395	0.015
1.2	12	19,710	755	0.027	18,630	585	0.021	16,380	395	0.015
1.2	14	17,520	595	0.027	16,560	460	0.021	14,560	310	0.015
1.2	16	17,520	595	0.016	16,560	460	0.013	14,560	310	0.009

RPM = rev. / min.
FEED - mm / min.



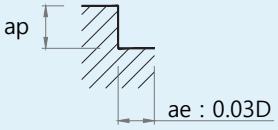
*See above ap chart

Recommended Cutting Condition

[ESRE712 series] ▶ Side cutting

WORK PIECES		CARBON STEEL, ALLOY STEEL (SCM, SNCM, S45C)			PREHARDEN STEEL (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm2			1100~1500N/mm2			1500~2000N/mm2		
DIAMETER (mm)	Effective Length	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)
1.2	20	13,140	390	0.011	12,420	300	0.008	10,920	205	0.006
1.2	26	6,570	165	0.011	6,210	130	0.008	5,460	85	0.006
1.2	30	6,570	165	0.011	6,210	130	0.008	5,460	85	0.006
1.4	6	19,200	815	0.088	18,100	570	0.069	16,000	425	0.049
1.4	8	17,280	660	0.050	16,290	460	0.039	14,400	345	0.028
1.4	10	17,280	660	0.050	16,290	460	0.039	14,400	345	0.028
1.4	14	17,280	660	0.032	16,290	460	0.025	14,400	345	0.018
1.4	16	15,360	520	0.032	14,480	365	0.025	12,800	270	0.018
1.4	20	15,360	520	0.019	14,480	365	0.015	12,800	270	0.011
1.5	4	19,200	905	0.135	18,100	635	0.105	16,000	475	0.075
1.5	5	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
1.5	6	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
1.5	7	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
1.5	8	17,280	735	0.054	16,290	515	0.042	14,400	385	0.030
1.5	10	17,280	735	0.054	16,290	515	0.042	14,400	385	0.030
1.5	12	17,280	735	0.054	16,290	515	0.042	14,400	385	0.030
1.5	14	17,280	735	0.034	16,290	515	0.026	14,400	385	0.019
1.5	16	15,360	580	0.034	14,480	405	0.026	12,800	305	0.019
1.5	18	15,360	580	0.034	14,480	405	0.026	12,800	305	0.019
1.5	20	15,360	580	0.020	14,480	405	0.016	12,800	305	0.011
1.5	22	15,360	580	0.020	14,480	405	0.016	12,800	305	0.011
1.5	26	11,520	380	0.014	10,860	265	0.011	9,600	200	0.008
1.5	30	11,520	380	0.014	10,860	265	0.011	9,600	200	0.008
1.6	8	17,800	840	0.101	16,800	655	0.078	14,800	490	0.056
1.6	10	16,020	680	0.058	15,120	530	0.045	13,320	395	0.032
1.6	12	16,020	680	0.058	15,120	530	0.045	13,320	395	0.032
1.6	16	16,020	680	0.036	15,120	530	0.028	13,320	395	0.020
1.6	20	14,240	540	0.036	13,440	420	0.028	11,840	315	0.020
1.8	8	17,800	840	0.113	16,800	655	0.088	14,800	490	0.063
1.8	10	16,020	680	0.065	15,120	530	0.050	13,320	395	0.036
1.8	12	16,020	680	0.065	15,120	530	0.050	13,320	395	0.036
1.8	16	16,020	680	0.041	15,120	530	0.032	13,320	395	0.023
1.8	20	14,240	540	0.041	13,440	420	0.032	11,840	315	0.023
2.0	6	14,400	820	0.180	13,600	620	0.140	12,000	475	0.100
2.0	8	14,400	820	0.126	13,600	620	0.098	12,000	475	0.070
2.0	10	14,400	820	0.126	13,600	620	0.098	12,000	475	0.070
2.0	12	12,960	665	0.072	12,240	500	0.056	10,800	385	0.040
2.0	14	12,960	665	0.072	12,240	500	0.056	10,800	385	0.040
2.0	16	12,960	665	0.072	12,240	500	0.056	10,800	385	0.040
2.0	18	12,960	665	0.045	12,240	500	0.035	10,800	385	0.025
2.0	20	12,960	665	0.045	12,240	500	0.035	10,800	385	0.025
2.0	22	11,520	525	0.045	10,880	395	0.035	9,600	305	0.025
2.0	26	11,520	525	0.045	10,880	395	0.035	9,600	305	0.025
2.0	30	11,520	525	0.027	10,880	395	0.021	9,600	305	0.015
2.0	35	8,640	345	0.018	8,160	260	0.014	7,200	200	0.010
2.0	40	8,640	345	0.018	8,160	260	0.014	7,200	200	0.010

RPM = rev. / min.
FEED - mm / min.



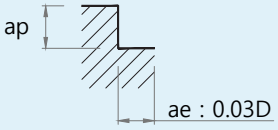
*See above ap chart

Recommended Cutting Condition

[ESRE712 series]

WORK PIECES		CARBON STEEL, ALLOY STEEL (SCM, SNCM, S45C)			PREHARDEN STEEL (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm2			1100~1500N/mm2			1500~2000N/mm2		
DIAMETER (mm)	Effective Length	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)
2.0	45	4,320	150	0.018	4,080	110	0.014	3,600	85	0.010
2.0	50	4,320	150	0.018	4,080	110	0.014	3,600	85	0.010
2.0	60	4,320	150	0.018	4,080	110	0.014	3,600	85	0.010
2.5	8	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
2.5	10	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
2.5	12	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
2.5	14	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
2.5	16	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
2.5	18	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
2.5	20	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
2.5	22	11,070	785	0.056	10,440	550	0.044	9,270	415	0.031
2.5	26	9,840	620	0.056	9,280	435	0.044	8,240	325	0.031
2.5	30	9,840	620	0.056	9,280	435	0.044	8,240	325	0.031
2.5	35	9,840	620	0.034	9,280	435	0.026	8,240	325	0.019
2.5	40	7,380	405	0.034	6,960	285	0.026	6,180	215	0.019
2.5	45	7,380	405	0.023	6,960	285	0.018	6,180	215	0.013
2.5	50	7,380	405	0.023	6,960	285	0.018	6,180	215	0.013
3.0	6	10,900	860	0.270	10,300	605	0.210	6,600	450	0.150
3.0	8	10,900	860	0.270	10,300	605	0.210	6,600	450	0.150
3.0	10	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
3.0	12	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
3.0	14	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
3.0	16	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
3.0	18	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
3.0	20	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
3.0	22	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
3.0	26	9,810	695	0.068	9,270	490	0.053	5,940	365	0.038
3.0	30	9,810	695	0.068	9,270	490	0.053	5,940	365	0.038
3.0	35	8,720	550	0.068	8,240	385	0.053	5,280	290	0.038
3.0	40	8,720	550	0.041	8,240	385	0.032	5,280	290	0.023
3.0	45	8,720	550	0.041	8,240	385	0.032	5,280	290	0.023
3.0	50	6,540	360	0.027	6,180	255	0.021	3,960	190	0.015
3.0	60	6,540	360	0.027	6,180	255	0.021	3,960	190	0.015
4.0	8	8,000	1,300	0.360	7,600	1,160	0.280	6,700	770	0.200
4.0	10	8,000	1,300	0.360	7,600	1,160	0.280	6,700	770	0.200
4.0	12	8,000	1,300	0.360	7,600	1,160	0.280	6,700	770	0.200
4.0	14	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
4.0	16	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
4.0	18	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
4.0	20	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
4.0	22	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
4.0	26	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
4.0	30	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
4.0	35	7,200	1,055	0.090	6,840	940	0.070	6,030	625	0.050
4.0	40	7,200	1,055	0.090	6,840	940	0.070	6,030	625	0.050
4.0	45	6,400	830	0.090	6,080	740	0.070	5,360	495	0.050

RPM = rev. / min.
FEED - mm / min.



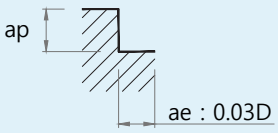
*See above ap chart

Recommended Cutting Condition

[ESRE712 series] ▶ Side cutting

WORK PIECES		CARBON STEEL, ALLOY STEEL (SCM, SNCM, S45C)			PREHARDEN STEEL (NAK, CENA, KP4)			HARDENED STEELS (SKD, SKT, STAVAX)		
HARDNESS		~HRc35			HRc35~HRc45			HRc45~HRc55		
STRENGTH		~1100N/mm2			1100~1500N/mm2			1500~2000N/mm2		
DIAMETER (mm)	Effective Length	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)
4.0	50	6,400	830	0.090	6,080	740	0.070	5,360	495	0.050
4.0	60	6,400	830	0.054	6,080	740	0.042	5,360	495	0.030
5.0	16	6,400	1,155	0.315	6,100	900	0.245	5,400	605	0.175
5.0	20	6,400	1,155	0.315	6,100	900	0.245	5,400	605	0.175
5.0	26	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
5.0	30	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
5.0	35	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
5.0	40	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
5.0	50	5,760	935	0.113	5,490	730	0.088	4,860	490	0.063
5.0	60	5,120	740	0.113	4,880	575	0.088	4,320	385	0.063
6.0	15	5,300	1,055	0.540	5,000	820	0.420	4,400	550	0.300
6.0	20	5,300	1,055	0.378	5,000	820	0.294	4,400	550	0.210
6.0	30	5,300	1,055	0.378	5,000	820	0.294	4,400	550	0.210
6.0	32	4,770	855	0.216	4,500	665	0.168	3,960	445	0.120
8.0	25	4,000	950	0.504	3,800	750	0.392	3,300	500	0.280
8.0	30	4,000	950	0.504	3,800	750	0.392	3,300	500	0.280
8.0	42	3,600	770	0.288	3,400	605	0.224	2,950	405	0.160
10.0	30	3,200	900	0.900	3,050	680	0.700	2,630	400	0.500
10.0	35	3,200	900	0.630	3,050	680	0.490	2,630	400	0.350
10.0	45	3,200	900	0.630	3,050	680	0.490	2,630	400	0.350
12.0	35	2,650	800	1.080	2,520	600	0.840	2,180	350	0.600
12.0	40	2,650	800	0.756	2,520	600	0.588	2,180	350	0.420
12.0	50	2,650	800	0.756	2,520	600	0.588	2,180	350	0.420

RPM = rev. / min.
FEED - mm / min.



*See above ap chart

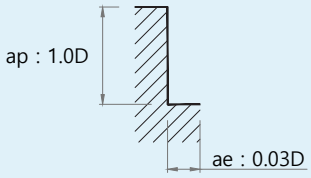
Recommended Cutting Condition

[ESXR704, ESXE704, ESXE714 series]

▶ Side cutting

WORK PIECES	HARDENED STEELS, HEAT RESISTANT STEELS		HARDENED STEELS							
HARDNESS	HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65		HRc65 ~ HRc70	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
4	17,200	1,690	11,440	1,140	9,360	700	7,280	430	6,170	310
6	13,450	1,820	8,970	1,230	6,890	720	5,460	450	4,810	330
8	9,100	1,750	6,760	1,170	5,200	670	4,160	420	3,640	310
10	8,000	1,630	5,330	1,090	4,160	620	3,320	400	2,860	280
12	6,830	1,630	4,550	1,010	3,450	580	2,730	370	2,420	260

RPM = rev. / min.
FEED - mm / min.

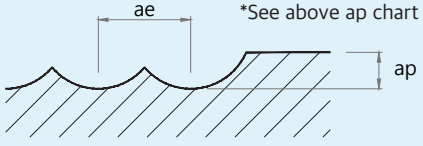


[ESLNB series]

WORK PIECES	ALLOY STEEL HEAT RESISTANT STEELS			HARDENED STEELS			HARDENED STEELS			COPPER, COPPER ALLOY		
HARDNESS	HRc30 ~ HRc45			HRc45 ~ HRc55			HRc55 ~ HRc65					
DIAMETER (mm)	RPM	FEED	ap(mm)	RPM	FEED	ap(mm)	RPM	FEED	ap(mm))	RPM	FEED	ap(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

RPM = rev. / min.
FEED - mm / min.

*ae : D1~D4 = 0.05xD
D5~D8 = 0.025mm
D10~D20 = 0.30mm



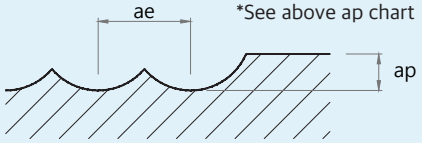
Recommended Cutting Condition

[ESTNB series]

WORK PIECES					CARBON STEELS, ALLOY STEELS (180~250HB)		PREHARDENED STEELS (HRc35~45)		HARDENED STEELS (HRc45~55)		HARDENED STEELS (HRc55~65)	
Ratio to standard depth of cut					Depth of Cut X 100%		Depth of Cut X 100%		Depth of CutX 100%		Depth of Cut X 100%	
Mill Dia (mm)	R (mm)	Neck Length (mm)	Neck Angle (°)	Depth of Cut (mm)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	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

RPM = rev. / min.
FEED - mm / min.

*ae : D1~D4 = 0.05xD
D5~D8 = 0.025mm
D10~D20 = 0.30mm



- Please try to use 20-30% slow down than recommendation when chips are not evacuated well -Rib machining, slotting, etc.
ex)ESTNB2040-20-10, HRc 55, Rib machining
ap : 0.32(ap from chart) X 0.65(constant value) X 0.8 = 0.17mm

- The above recommendation table may differ from the actual situation, adjust it according to the machine condition, processing type and purpose.

- In the case of low RPM, reduce the feed rate at the same rate.

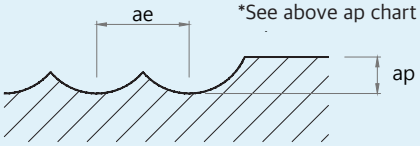
Recommended Cutting Condition

[ESTNB series]

WORK PIECES					CARBON STEELS, ALLOY STEELS (180~250HB)		PREHARDENED STEELS (HRc35~45)		HARDENED STEELS (HRc45~55)		HARDENED STEELS (HRc55~65)	
Ratio to standard depth of cut					Depth of Cut X 100%		Depth of Cut X 100%		Depth of CutX 100%		Depth of Cut X 100%	
Mill Dia (mm)	R (mm)	Neck Length (mm)	Neck Angle (°)	Depth of Cut (mm)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)
0.9	1.8	4	0.4	0.120	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		8	0.4	0.100	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		12	0.4	0.080	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		16	0.4	0.071	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		20	0.4	0.062	9,230	1,329	6,461	814	6,000	756	6,000	648
		24	0.4	0.053	9,230	1,329	6,461	814	6,000	756	6,000	648
		28	0.4	0.044	9,230	1,329	6,461	814	6,000	756	6,000	648
		32	0.4	0.036	9,230	1,329	6,461	814	6,000	756	6,000	648
		36	0.4	0.028	9,230	1,329	6,461	814	6,000	756	6,000	648
		38	0.4	0.020	8,000	1,152	5,600	706	5,200	655	5,200	562
		40	0.4	0.015	8,000	1,152	5,600	706	5,200	655	5,200	562
1	2	8	0.4	0.150	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		12	0.4	0.090	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		16	0.4	0.090	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		20	0.4	0.060	12,160	2,189	8,512	1,532	7,904	1,265	7,904	1,107
		20	0.9	0.070	12,160	2,189	8,512	1,532	7,904	1,265	7,904	1,107
		25	0.9	0.070	9,880	1,581	6,916	968	6,442	899	6,422	771
		30	0.4	0.040	9,880	1,581	6,916	968	6,442	899	6,422	771
		30	0.9	0.045	9,880	1,581	6,916	968	6,442	899	6,422	771
		35	0.9	0.045	9,880	1,581	6,916	968	6,442	899	6,422	771
		40	0.4	0.030	9,880	1,581	6,916	968	6,442	899	6,422	771
		40	0.9	0.035	9,880	1,581	6,916	968	6,442	899	6,422	771
		50	0.9	0.170	8,512	1,192	5,958	775	5,533	664	5,533	553
		60	0.9	0.009	7,235	1,013	5,065	658	4,703	564	4,703	470
		70	0.9	0.005	6,150	861	4,305	560	3,997	480	3,997	400
1.5	3	8	0.4	0.320	12,720	3,816	8,904	2,404	8,268	1,984	8,268	1,736
		16	0.4	0.220	12,720	3,816	8,904	2,404	8,268	1,984	8,268	1,736
		20	0.4	0.150	12,720	3,434	8,904	2,137	8,268	1,736	8,268	1,488
		30	0.4	0.080	10,176	2,748	7,123	1,496	6,614	1,389	6,614	1,191
		30	0.9	0.090	10,176	2,748	7,123	1,496	6,614	1,389	6,614	1,191
		40	0.4	0.060	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		40	0.9	0.070	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		50	0.9	0.050	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		60	0.9	0.030	7,123	1,710	4,986	1,047	4,630	972	4,630	833
		70	0.9	0.020	6,233	1,496	4,363	916	4,051	851	4,051	729

RPM = rev. / min.
FEED - mm / min.

*ae : D1~D4 = 0.05xD
D5~D8 = 0.025mm
D10~D20 = 0.30mm



*See above ap chart

- Please try to use 20-30% slow down than recommendation when chips are not evacuated well -Rib machining, slotting, etc.
ex)ESTNB2040-20-10, HRc 55, Rib machining
ap : 0.32(ap from chart) X 0.65(constant value) X 0.8 = 0.17mm

- The above recommendation table may differ from the actual situation, adjust it according to the machine condition, processing type and purpose.

- In the case of low RPM, reduce the feed rate at the same rate.

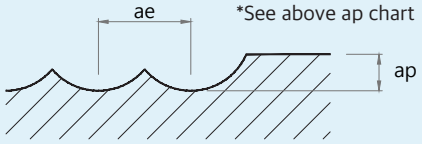
Recommended Cutting Condition

[ESTNB series]

WORK PIECES					CARBON STEELS, ALLOY STEELS (180~250HB)		PREHARDENED STEELS (HRc35~45)		HARDENED STEELS (HRc45~55)		HARDENED STEELS (HRc55~65)	
Ratio to standard depth of cut					Depth of Cut X 100%		Depth of Cut X 100%		Depth of CutX 100%		Depth of Cut X 100%	
Mill Dia (mm)	R (mm)	Neck Length (mm)	Neck Angle (°)	Depth of Cut (mm)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)
2	4	20	1	0.32	11,900	2,860	9,000	2,050	7,800	1,680	7,800	1,590
		30	1	0.23	11,900	2,570	9,000	1,850	7,800	1,520	7,800	1,430
		40	1	0.14	9,500	1,940	7,200	1,400	6,200	1,140	6,200	1,080
		50	1	0.11	7,800	1,590	5,800	1,120	5,000	920	5,000	870
		60	1	0.07	7,800	1,590	5,800	1,120	5,000	920	5,000	870
2.5	5	30	1	0.34	9,500	2,140	7,200	1,540	6,200	1,260	6,200	1,190
		40	1	0.25	9,500	2,140	7,200	1,540	6,200	1,260	6,200	1,190
		60	1	0.15	6,200	1,320	4,700	950	4,000	770	4,000	720
3	6	30	1	0.45	8,000	2,000	6,000	1,430	5,200	1,170	5,200	1,110
		40	1	0.40	8,000	1,800	6,000	1,280	5,200	1,050	5,200	990
		50	1	0.32	8,000	1,800	6,000	1,280	5,200	1,050	5,200	990
		60	1	0.22	6,400	1,360	4,800	970	4,100	780	4,100	740
		70	1	0.18	5,200	1,110	3,900	790	3,400	650	3,400	610
		80	1	0.14	5,200	1,110	3,900	790	3,400	650	3,400	610
4	8	50	1	0.50	6,000	1,460	4,500	1,040	3,900	850	3,900	810
		60	1	0.43	6,000	1,460	4,500	1,040	3,900	850	3,900	810
		70	1	0.33	6,000	1,460	4,500	1,040	3,900	850	3,900	810
		80	1	0.25	4,800	1,100	3,600	780	3,100	640	3,100	600
5	10	60	1	0.70	4,800	1,300	3,600	920	3,100	750	3,100	710
		75	1	0.50	4,800	1,300	3,600	920	3,100	750	3,100	710

RPM = rev. / min.
FEED - mm / min.

*ae : D1~D4 = 0.05xD
D5~D8 = 0.025mm
D10~D20 = 0.30mm



- Please try to use 20-30% slow down than recommendation when chips are not evacuated well -Rib machining, slotting, etc.

ex)ESTNB2040-20-10, HRc 55, Rib machining

ap : 0.32(ap from chart) X 0.65(constant value) X 0.8 = 0.17mm

- The above recommendation table may differ from the actual situation, adjust it according to the machine condition, processing type and purpose.

- In the case of low RPM, reduce the feed rate at the same rate.

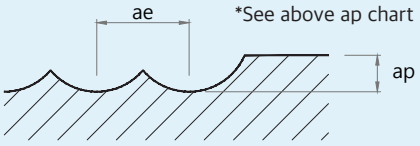
Recommended Cutting Condition

[ESTNB30 series]

WORK PIECES					CARBON STEELS, ALLOY STEELS (180~250HB)		PREHARDENED STEELS (HRc35~45)		HARDENED STEELS (HRc45~55)		HARDENED STEELS (HRc55~65)	
Ratio to standard depth of cut					Depth of Cut X 100%		Depth of Cut X 100%		Depth of CutX 100%		Depth of Cut X 100%	
Mill Dia (mm)	R (mm)	Neck Length (mm)	Neck Angle (°)	Depth of Cut (mm)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	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

RPM = rev. / min.
FEED - mm / min.

*ae : D1~D4 = 0.05xD
D5~D8 = 0.025mm
D10~D20 = 0.30mm



- Please try to use 20-30% slow down than recommendation when chips are not evacuated well -Rib machining, slotting, etc.
ex)ESTNB3040-20-10, HRc 55, Rib machining
ap : 0.32(ap from chart) X 0.65(constant value) X 0.8 = 0.17mm

- The above recommendation table may differ from the actual situation, adjust it according to the machine condition, processing type and purpose.

- In the case of low RPM, reduce the feed rate at the same rate.

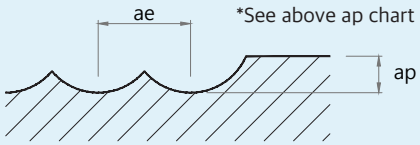
Recommended Cutting Condition

[ESTNB30 series]

WORK PIECES					CARBON STEELS, ALLOY STEELS (180~250HB)		PREHARDENED STEELS (HRc35~45)		HARDENED STEELS (HRc45~55)		HARDENED STEELS (HRc55~65)	
Ratio to standard depth of cut					Depth of Cut X 100%		Depth of Cut X 100%		Depth of CutX 100%		Depth of Cut X 100%	
Mill Dia (mm)	R (mm)	Neck Length (mm)	Neck Angle (°)	Depth of Cut (mm)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	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

RPM = rev. / min.
FEED - mm / min.

*ae : D1~D4 = 0.05xD
D5~D8 = 0.025mm
D10~D20 = 0.30mm



*See above ap chart

- Please try to use 20-30% slow down than recommendation when chips are not evacuated well -Rib machining, slotting, etc.
ex)ESTNB3040-20-10, HRc 55, Rib machining
ap : 0.32(ap from chart) X 0.65(constant value) X 0.8 = 0.17mm

- The above recommendation table may differ from the actual situation, adjust it according to the machine condition, processing type and purpose.

- In the case of low RPM, reduce the feed rate at the same rate.

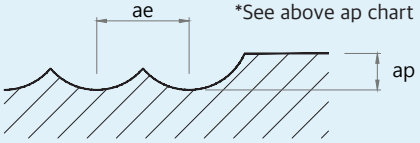
Recommended Cutting Condition

[ESTNB30 series]

WORK PIECES					CARBON STEELS, ALLOY STEELS (180~250HB)		PREHARDENED STEELS (HRc35~45)		HARDENED STEELS (HRc45~55)		HARDENED STEELS (HRc55~65)	
Ratio to standard depth of cut					Depth of Cut X 100%		Depth of Cut X 100%		Depth of CutX 100%		Depth of Cut X 100%	
Mill Dia (mm)	R (mm)	Neck Length (mm)	Neck Angle (°)	Depth of Cut (mm)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)
0.9	1.8	4	0.4	0.120	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		8	0.4	0.100	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		12	0.4	0.080	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		16	0.4	0.071	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		20	0.4	0.062	9,230	1,329	6,461	814	6,000	756	6,000	648
		24	0.4	0.053	9,230	1,329	6,461	814	6,000	756	6,000	648
		28	0.4	0.044	9,230	1,329	6,461	814	6,000	756	6,000	648
		32	0.4	0.036	9,230	1,329	6,461	814	6,000	756	6,000	648
		36	0.4	0.028	9,230	1,329	6,461	814	6,000	756	6,000	648
		38	0.4	0.020	8,000	1,152	5,600	706	5,200	655	5,200	562
		40	0.4	0.015	8,000	1,152	5,600	706	5,200	655	5,200	562
1	2	8	0.4	0.150	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		12	0.4	0.090	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		16	0.4	0.090	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		20	0.4	0.060	12,160	2,189	8,512	1,532	7,904	1,265	7,904	1,107
		20	0.9	0.070	12,160	2,189	8,512	1,532	7,904	1,265	7,904	1,107
		25	0.9	0.070	9,880	1,581	6,916	968	6,442	899	6,422	771
		30	0.4	0.040	9,880	1,581	6,916	968	6,442	899	6,422	771
		30	0.9	0.045	9,880	1,581	6,916	968	6,442	899	6,422	771
		35	0.9	0.045	9,880	1,581	6,916	968	6,442	899	6,422	771
		40	0.4	0.030	9,880	1,581	6,916	968	6,442	899	6,422	771
		40	0.9	0.035	9,880	1,581	6,916	968	6,442	899	6,422	771
		50	0.9	0.170	8,512	1,192	5,958	775	5,533	664	5,533	553
		60	0.9	0.009	7,235	1,013	5,065	658	4,703	564	4,703	470
		70	0.9	0.005	6,150	861	4,305	560	3,997	480	3,997	400
1.5	3	8	0.4	0.320	12,720	3,816	8,904	2,404	8,268	1,984	8,268	1,736
		16	0.4	0.220	12,720	3,816	8,904	2,404	8,268	1,984	8,268	1,736
		20	0.4	0.150	12,720	3,434	8,904	2,137	8,268	1,736	8,268	1,488
		30	0.4	0.080	10,176	2,748	7,123	1,496	6,614	1,389	6,614	1,191
		30	0.9	0.090	10,176	2,748	7,123	1,496	6,614	1,389	6,614	1,191
		40	0.4	0.060	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		40	0.9	0.070	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		50	0.9	0.050	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		60	0.9	0.030	7,123	1,710	4,986	1,047	4,630	972	4,630	833
		70	0.9	0.020	6,233	1,496	4,363	916	4,051	851	4,051	729

RPM = rev. / min.
FEED - mm / min.

*ae : D1~D4 = 0.05xD
D5~D8 = 0.025mm
D10~D20 = 0.30mm



- Please try to use 20-30% slow down than recommendation when chips are not evacuated well -Rib machining, slotting, etc.

ex)ESTNB3040-20-10, HRc 55, Rib machining

ap : 0.32(ap from chart) X 0.65(constant value) X 0.8 = 0.17mm

- The above recommendation table may differ from the actual situation, adjust it according to the machine condition, processing type and purpose.

- In the case of low RPM, reduce the feed rate at the same rate.

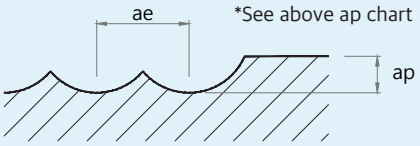
Recommended Cutting Condition

[ESTNB30 series]

WORK PIECES					CARBON STEELS, ALLOY STEELS (180~250HB)		PREHARDENED STEELS (HRc35~45)		HARDENED STEELS (HRc45~55)		HARDENED STEELS (HRc55~65)	
Ratio to standard depth of cut					Depth of Cut X 100%		Depth of Cut X 100%		Depth of CutX 100%		Depth of Cut X 100%	
Mill Dia (mm)	R (mm)	Neck Length (mm)	Neck Angle (°)	Depth of Cut (mm)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)
2	4	20	1	0.32	11,900	2,860	9,000	2,050	7,800	1,680	7,800	1,590
		30	1	0.23	11,900	2,570	9,000	1,850	7,800	1,520	7,800	1,430
		40	1	0.14	9,500	1,940	7,200	1,400	6,200	1,140	6,200	1,080
		50	1	0.11	7,800	1,590	5,800	1,120	5,000	920	5,000	870
		60	1	0.07	7,800	1,590	5,800	1,120	5,000	920	5,000	870
2.5	5	30	1	0.34	9,500	2,140	7,200	1,540	6,200	1,260	6,200	1,190
		40	1	0.25	9,500	2,140	7,200	1,540	6,200	1,260	6,200	1,190
		60	1	0.15	6,200	1,320	4,700	950	4,000	770	4,000	720
3	6	30	1	0.45	8,000	2,000	6,000	1,430	5,200	1,170	5,200	1,110
		40	1	0.40	8,000	1,800	6,000	1,280	5,200	1,050	5,200	990
		50	1	0.32	8,000	1,800	6,000	1,280	5,200	1,050	5,200	990
		60	1	0.22	6,400	1,360	4,800	970	4,100	780	4,100	740
		70	1	0.18	5,200	1,110	3,900	790	3,400	650	3,400	610
		80	1	0.14	5,200	1,110	3,900	790	3,400	650	3,400	610
4	8	50	1	0.50	6,000	1,460	4,500	1,040	3,900	850	3,900	810
		60	1	0.43	6,000	1,460	4,500	1,040	3,900	850	3,900	810
		70	1	0.33	6,000	1,460	4,500	1,040	3,900	850	3,900	810
		80	1	0.25	4,800	1,100	3,600	780	3,100	640	3,100	600
5	10	60	1	0.70	4,800	1,300	3,600	920	3,100	750	3,100	710
		75	1	0.50	4,800	1,300	3,600	920	3,100	750	3,100	710

RPM = rev. / min.
FEED - mm / min.

*ae : D1~D4 = 0.05xD
D5~D8 = 0.025mm
D10~D20 = 0.30mm



- Please try to use 20-30% slow down than recommendation when chips are not evacuated well -Rib machining, slotting, etc.
ex)ESTNB2040-20-10, HRc 55, Rib machining
ap : 0.32(ap from chart) X 0.65(constant value) X 0.8 = 0.17mm

- The above recommendation table may differ from the actual situation, adjust it according to the machine condition, processing type and purpose.

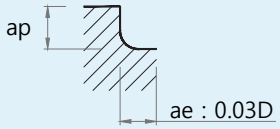
- In the case of low RPM, reduce the feed rate at the same rate.

Recommended Cutting Condition

[ESLNS20, ESLNS40 series]

WORK PIECES	HARDENED STEELS, HEAT RESISTANT STEELS		HARDENED STEELS									
HARDNESS	HRc30~ HRc40		HRc40~ HRc50		HRc50~ HRc55		HRc55~ HRc60		HRc60~ HRc65		HRc65~ HRc70	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
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

RPM = rev. / min.
FEED - mm / min.



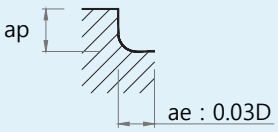
*See above ap chart

Recommended Cutting Condition

[ESLNR series]

WORKSPIECE				CARBON STEELS, ALLOY STEELS (180~250HB)		PREHARDENED STEELS (HRc35~45)		HARDENED STEELS (HRc45~55)		HARDENED STEELS (HRc55~65)	
Ratio to standard depth of cut				Depth of Cut X 100%		Depth of Cut X 100%		Depth of CutX 100%		Depth of Cut X 100%	
Mill Dia (mm)	R (mm)	Neck Length (mm)	Depth of Cut (mm)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)
0.2	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
		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	0.01	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	0.02	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	0.01	30,000	320	30,000	250	21,600	160	19,200	150
0.5	0.05	1	0.03	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	0.03	50,000	898	40,000	464	30,000	378	28,000	315
		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
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

RPM = rev. / min.
FEED - mm / min.



*See above ap chart

- The above recommendation table may differ from the actual situation, adjust it according to the machine condition, processing type and purpose.

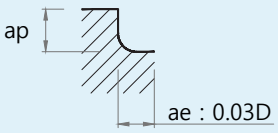
- In the case of low RPM, reduce the feed rate at the same rate.

Recommended Cutting Condition

[ESLNR series]

WORK PIECES				CARBON STEELS, ALLOY STEELS (180~250HB)		PREHARDENED STEELS (HRc35~45)		HARDENED STEELS (HRc45~55)		HARDENED STEELS (HRc55~65)	
Ratio to standard depth of cut				Depth of Cut X 100%		Depth of Cut X 100%		Depth of CutX 100%		Depth of Cut X 100%	
Mill Dia (mm)	R (mm)	Neck Length (mm)	Depth of Cut (mm)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)
2	0.2	6	0.08	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.07	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		12	0.04	15,309	1,083	13,013	921	11,482	722	10,716	590
		16	0.04	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.035	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.025	11,907	843	10,121	716	8,930	562	8,335	459
		30	0.017	11,312	800	9,615	680	8,484	534	7,918	436
	0.3	8	0.09	18,900	1,651	16,065	1,403	14,175	991	13,230	809
		16	0.06	13,608	1,070	11,567	909	10,206	713	9,526	583
		20	0.037	11,907	936	10,121	796	8,930	624	8,335	510
	0.5	6	0.017	20,709	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.014	18,900	1,651	16,065	1,403	14,175	991	13,230	809
		12	0.08	15,309	1,204	13,013	1,023	11,482	802	10,716	655
		16	0.08	13,608	1,070	11,567	909	10,206	713	9,526	583
		20	0.05	11,907	936	10,121	796	8,930	624	8,335	510
		25	0.05	11,907	936	10,121	796	8,930	624	8,335	510
		30	0.03	11,312	889	9,615	756	8,484	593	7,918	484
	0.8	8	0.2	18,900	1,651	16,065	1,403	14,175	991	13,230	809
		16	0.1	13,608	1,070	11,567	909	10,206	713	9,526	583
		20	0.06	11,907	936	10,121	796	8,930	624	8,335	510
3	0.2	8	0.09	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		12	0.07	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		16	0.05	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		20	0.05	11,664	1,146	9,914	974	8,748	764	8,165	624
		30	0.04	9,072	1,146	7,711	974	6,804	764	6,350	624
		35	0.035	9,072	1,146	7,711	974	6,804	764	6,350	624
	0.3	8	0.13	14,400	1,572	12,240	1,337	10,800	943	10,080	771
		16	0.075	14,400	1,572	12,240	1,337	10,800	943	10,080	771
		20	0.075	11,664	1,274	9,914	1,083	8,748	849	8,165	693
		30	0.06	9,072	1,274	7,711	1,083	6,804	849	6,350	693
	0.5	8	0.18	14,400	1,572	12,240	1,337	10,800	943	10,080	771
		12	0.13	14,400	1,572	12,240	1,337	10,800	943	10,080	771
		16	0.1	14,400	1,572	12,240	1,337	10,800	943	10,080	771
		20	0.1	11,664	1,274	9,914	1,083	8,748	849	8,165	693
		30	0.08	9,072	1,274	7,711	1,083	6,804	849	6,350	693
		35	0.065	9,072	1,274	7,711	1,083	6,804	849	6,350	693

RPM = rev. / min.
FEED - mm / min.



*See above ap chart

- The above recommendation table may differ from the actual situation, adjust it according to the machine condition, processing type and purpose.

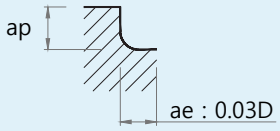
- In the case of low RPM, reduce the feed rate at the same rate.

Recommended Cutting Condition

[ESLNR series]

WORK PIECES				CARBON STEELS, ALLOY STEELS (180~250HB)		PREHARDENED STEELS (HRc35~45)		HARDENED STEELS (HRc45~55)		HARDENED STEELS (HRc55~65)	
Ratio to standard depth of cut				Depth of Cut X 100%		Depth of Cut X 100%		Depth of CutX 100%		Depth of Cut X 100%	
Mill Dia (mm)	R (mm)	Neck Length (mm)	Depth of Cut (mm)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)
0.8	0.1	4	0.032	48,000	1,102	28,000	518	20,000	320	20,000	288
		6	0.019	38,700	800	25,000	461	18,000	288	18,000	256
		8	0.015	29,025	600	20,000	369	16,200	259	16,200	230
		12	0.012	29,025	570	20,000	350	16,200	246	16,200	219
	0.2	4	0.056	48,000	1,102	28,000	518	20,000	320	20,000	288
		6	0.032	38,700	800	25,000	461	18,000	288	18,000	256
1	0.1	4	0.038	32,400	1,359	27,540	1,039	24,300	815	22,680	666
		6	0.024	26,244	990	22,307	842	19,683	660	18,371	539
		8	0.024	23,328	880	19,829	748	17,496	587	16,330	479
		10	0.015	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.015	18,144	609	15,422	453	13,608	399	12,701	320
		16	0.009	18,144	533	15,422	420	13,608	342	12,701	266
		20	0.006	13,608	399	11,567	315	10,206	257	9,526	200
	0.2	4	0.07	32,400	1,359	27,540	1,039	24,300	815	22,680	666
		6	0.04	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
		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	6	0.04	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	0.01	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	0.07	24,930	1,130	20,956	868	18,711	678	17,364	556
		8	0.06	22,680	1,027	19,278	873	17,010	685	15,876	559
		12	0.06	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	0.03	14,112	568	11,995	423	10,584	373	9,878	298
	0.3	8	0.06	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	0.03	14,112	568	11,995	423	10,584	373	9,878	298

RPM = rev. / min.
FEED - mm / min.



*See above ap chart

- The above recommendation table may differ from the actual situation, adjust it according to the machine condition, processing type and purpose.

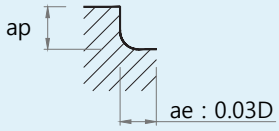
- In the case of low RPM, reduce the feed rate at the same rate.

Recommended Cutting Condition

[ESTNR series]

WORK PIECES					CARBON STEELS, ALLOY STEELS (180~250HB)		PREHARDENED STEELS (HRc35~45)		HARDENED STEELS (HRc45~55)		HARDENED STEELS (HRc55~65)	
Ratio to standard depth of cut					Depth of Cut X 100%		Depth of Cut X 100%		Depth of CutX 100%		Depth of Cut X 100%	
Mill Dia (mm)	R (mm)	Neck Length (mm)	Neck Angle (°)	Depth of Cut (mm)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)
0.2	0.05	2	0.007	39,660	887	33,660	754	29,700	591	27,720	483	1,165
0.4	0.05	4	0.009	30,096	899	25,582	764	22,572	599	21,067	489	1,165
		5	0.007	26,752	710	22,739	528	20,064	466	18,726	373	745
	0.1	4	0.009	31,680	946	26,928	804	23,760	631	22,176	515	519
		5	0.007	28,160	747	23,936	556	21,120	490	19,712	392	454
0.5	0.1	5	0.013	30,413	1,090	25,851	753	22,810	562	21,289	453	1,159
		8	0.008	24,330	678	20,681	468	18,248	350	17,031	282	1,159
		10	0.007	18,248	509	15,511	351	13,686	262	12,773	211	646
0.6	0.1	12	0.010	20,377	791	17,320	546	15,282	408	14,264	329	646
		15	0.006	16,727	649	14,218	448	12,545	335	11,709	270	646
0.8	0.2	6	0.045	31,680	1,084	26,928	921	23,760	723	22,176	590	556
		12	0.020	28,160	943	23,936	695	21,120	613	19,712	490	556
1	0.2	8	0.040	28,512	1,463	24,235	1,244	21,384	976	19,958	797	497
		10	0.035	28,512	1,596	24,235	1,357	21,384	1,064	19,958	869	1,165
		15	0.028	25,344	1,261	21,542	938	19,008	828	17,741	662	1,165
		20	0.020	19,008	828	16,157	653	14,256	532	13,306	414	946
		25	0.017	15,840	690	13,464	544	11,880	443	11,088	345	946
		30	0.017	15,840	690	13,464	544	11,880	443	11,088	345	649
		35	0.010	15,840	690	13,464	544	11,880	443	11,088	345	649
	0.3	8	0.040	28,512	1,463	24,235	1,244	21,384	976	19,958	797	649
		15	0.028	25,344	1,261	21,542	938	19,008	828	17,741	662	568
		25	0.017	15,840	690	13,464	544	11,880	443	11,088	345	406
		30	0.017	15,840	690	13,464	544	11,880	443	11,088	345	406
1.5	0.2	10	0.050	21,683	1,079	18,431	803	16,262	708	15,178	567	338
		15	0.045	19,712	981	16,755	730	14,784	644	13,798	515	325
		20	0.042	17,347	863	14,745	642	13,010	567	12,143	453	309
		25	0.032	14,784	644	12,566	508	11,088	414	10,349	322	293
		30	0.028	12,320	536	10,472	423	9,240	345	8,624	268	276
	0.3	10	0.050	21,683	1,079	18,431	803	16,262	708	15,178	567	1,158
		20	0.042	17,347	863	14,745	642	13,010	567	12,143	453	1,158
		25	0.032	14,784	644	12,566	508	11,088	414	10,349	322	1,158
		30	0.028	12,320	536	10,472	423	9,240	345	8,624	268	926

RPM = rev. / min.
FEED - mm / min.



*See above ap chart

- The above recommendation table may differ from the actual situation, adjust it according to the machine condition, processing type and purpose.

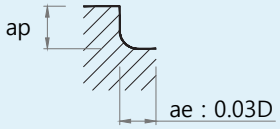
- In the case of low RPM, reduce the feed rate at the same rate.

Recommended Cutting Condition

[ESTNR series]

WORK PIECES				CARBON STEELS, ALLOY STEELS (180~250HB)		PREHARDENED STEELS (HRc35~45)		HARDENED STEELS (HRc45~55)		HARDENED STEELS (HRc55~65)	
Ratio to standard depth of cut				Depth of Cut X 100%		Depth of Cut X 100%		Depth of CutX 100%		Depth of Cut X 100%	
Mill Dia (mm)	R (mm)	Neck Length (mm)	Depth of Cut (mm)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)	n (min^{-1})	Vf (mm/min)
2	0.2	30	0.045	13,440	1,254	11,424	933	10,080	823	9,408	658
		40	0.035	10,080	823	8,568	650	7,560	529	7,056	412
		50	0.017	8,400	686	7,140	541	6,300	441	5,880	343
	0.3	12	0.088	22,680	1,814	19,278	1,427	17,010	1,191	15,876	1,048
		20	0.054	18,144	1,452	15,422	1,141	13,608	953	12,701	838
		30	0.045	13,440	1,393	11,424	1,036	10,080	914	9,408	732
		40	0.035	10,080	914	8,568	722	7,560	588	7,056	457
		50	0.017	8,400	762	7,140	601	6,300	490	5,880	381
	0.5	8	0.170	22,680	1,814	19,278	1,427	17,010	1,191	15,876	1,048
		12	0.088	22,680	1,814	19,278	1,427	17,010	1,191	15,876	1,048
		16	0.088	19,278	1,542	16,386	1,213	14,459	1,012	13,495	891
		20	0.054	18,114	1,452	15,422	1,141	13,608	953	12,701	838
		25	0.054	15,876	1,270	13,495	999	11,907	833	11,113	733
		30	0.045	13,440	1,393	11,424	1,036	10,080	914	9,408	732
		40	0.035	10,080	914	8,568	722	7,560	588	7,056	457
		50	0.017	8,400	762	7,140	601	6,300	490	5,880	381
3	0.2	40	0.070	10,240	956	8,704	711	7,680	627	7,168	502
		50	0.050	7,680	627	6,528	495	5,760	403	5,376	314
		60	0.030	6,400	523	5,440	412	4,800	336	4,480	261
	0.3	40	0.070	10,240	1,062	8,704	790	7,680	697	7,168	557
		50	0.050	7,680	697	6,528	550	5,760	448	5,376	348
		60	0.030	6,400	581	5,440	458	4,800	373	4,480	290
	0.5	40	0.070	10,240	1,062	8,704	790	7,680	697	7,168	557
		50	0.050	7,680	697	6,528	550	5,760	448	5,376	348
		60	0.030	6,400	581	5,440	458	4,800	373	4,480	290

RPM = rev. / min.
FEED - mm / min.



*See above ap chart

- The above recommendation table may differ from the actual situation, adjust it according to the machine condition, processing type and purpose.

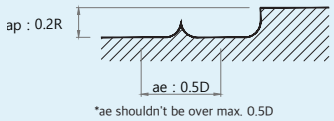
- In the case of low RPM, reduce the feed rate at the same rate.

Recommended Cutting Condition

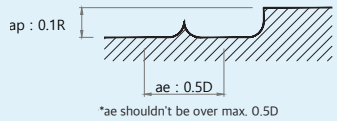
[ESPM4 series] ▶ Side cutting

WORK PIECES	HARDENED STEELS, HEAT RESISTANT STEELS		HARDENED STEELS							
HARDNESS	~HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3 X R0.5	9,550	6,500	6,900	4,150	4,550	2,750	2,850	1,150	1,900	610
4 X R0.5	7,950	7,000	5,750	4,600	4,000	3,200	2,550	1,350	1,750	700
6 X R0.5	5,800	7,650	4,100	4,900	2,900	3,500	1,850	1,850	1,350	795
6 X R1.0	5,800	7,650	4,100	4,900	2,900	3,500	1,850	1,850	1,350	795
8 X R1.0	4,350	7,650	3,050	4,900	2,200	3,500	1,400	1,850	995	795
8 X R2.0	4,350	7,650	3,050	4,900	2,200	3,500	1,400	1,850	995	795
10 X R1.0	3,500	7,650	2,450	4,900	1,750	3,500	1,100	1,850	795	795
10 X R2.0	3,500	7,650	2,450	4,900	1,750	3,500	1,100	1,850	795	795
12 X R2.0	2,900	7,650	2,050	4,900	1,450	3,500	925	1,850	665	795
12 X R3.0	2,900	7,650	2,050	4,900	1,450	3,500	925	1,850	665	795

RPM = rev. / min.
FEED - mm / min.



*ae shouldn't be over max. 0.5D

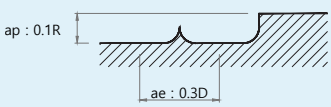


*ae shouldn't be over max. 0.5D

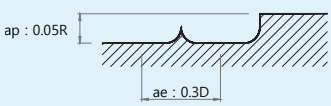
[ESPM4 series] ▶ Speed Cutting

WORK PIECES	HARDENED STEELS, HEAT RESISTANT STEELS		HARDENED STEELS							
HARDNESS	~HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65	
DIAMETER (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3 X R0.5	22,000	16,000	17,000	10,000	12,500	8,000	9,500	4,600	6,900	2,500
4 X R0.5	17,000	17,500	13,000	12,000	11,000	9,200	8,000	5,500	5,600	2,900
6 X R0.5	13,500	18,500	10,500	13,800	9,000	11,000	6,400	6,400	4,500	3,600
6 X R1.0	13,500	18,500	10,500	13,800	9,000	11,000	6,400	6,400	4,500	3,600
8 X R1.0	10,000	18,500	8,000	14,000	6,800	11,000	4,800	6,700	3,400	4,100
8 X R2.0	10,000	18,500	8,000	14,000	6,800	11,000	4,800	6,700	3,400	4,100
10 X R1.0	8,000	18,500	6,400	14,000	5,400	11,000	3,800	6,800	2,700	3,800
10 X R2.0	8,000	18,500	6,400	14,000	5,400	11,000	3,800	6,800	2,700	3,800
12 X R2.0	6,600	18,500	5,300	14,000	4,500	11,000	3,200	7,000	2,250	3,600
12 X R3.0	6,600	18,500	5,300	14,000	4,500	11,000	3,200	7,000	2,250	3,600

RPM = rev. / min.
FEED - mm / min.



*ae shouldn't be over max. 0.3D



*ae shouldn't be over max. 0.3D

ver. II
WD2022.01-ENG-BO3

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