NEW

E-STAR

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

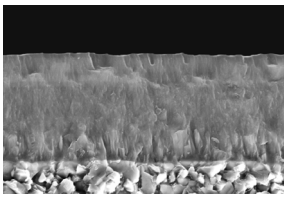
E-STAR SERIES

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

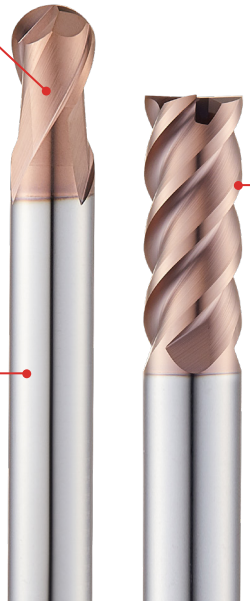
Adopt a high hardness coating



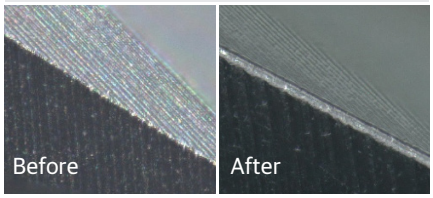
- High-content Si ingredient
- Improved wear resistance
- Stability for frictional heat

Adopt a high hardness raw-material

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

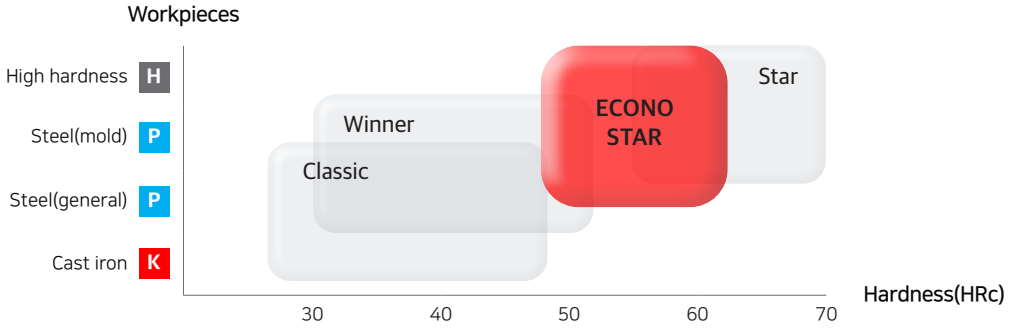


Treatment of toughness

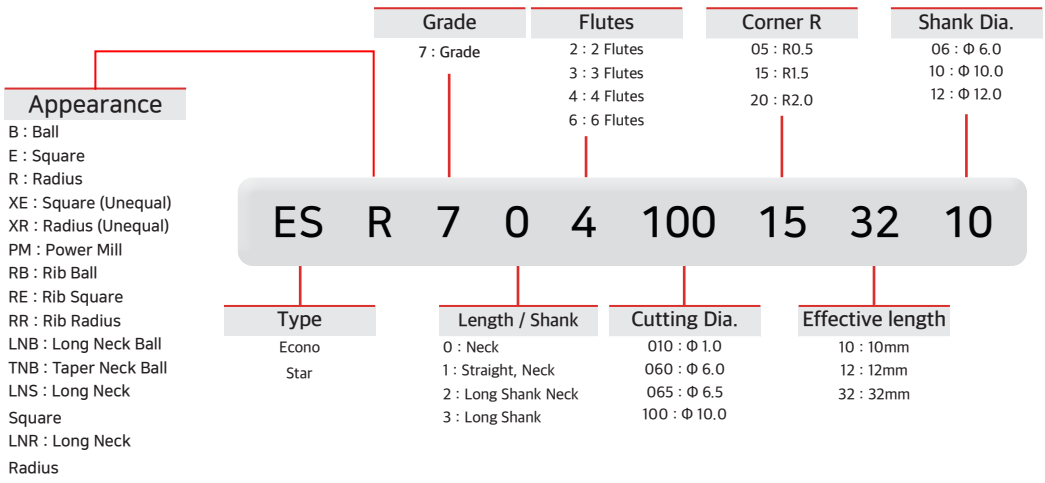


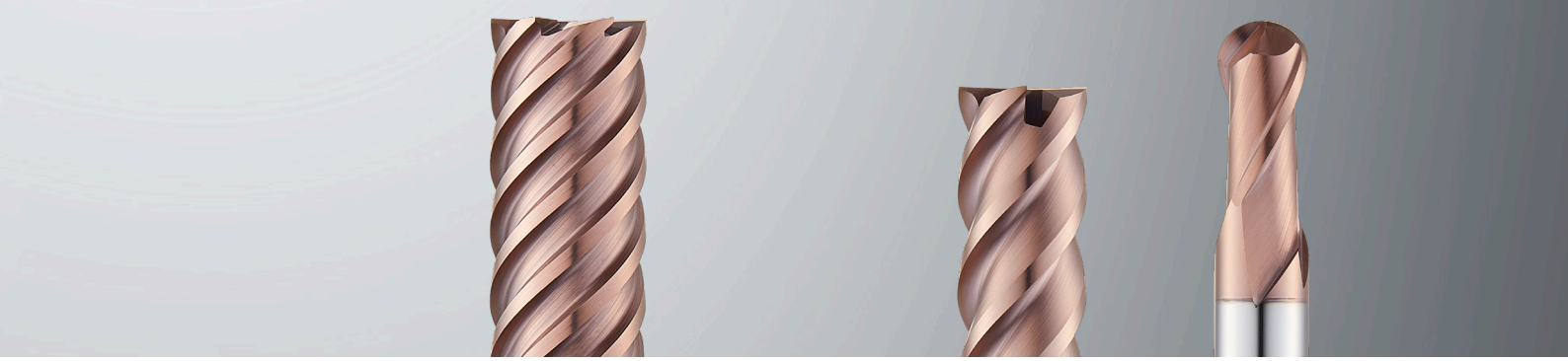
- Improved chipping resistance
- Improved wear resistance, induce to stable work

Applicable Working Material



EDP No. System

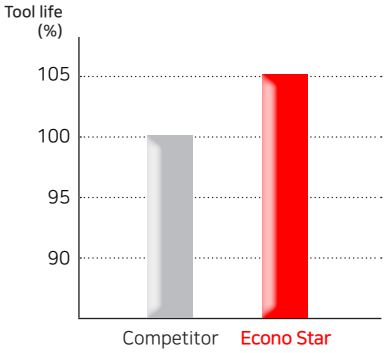


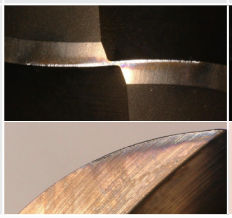
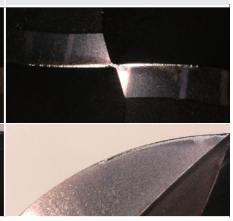


Case study

2F D12.0 BALL ENDMILL

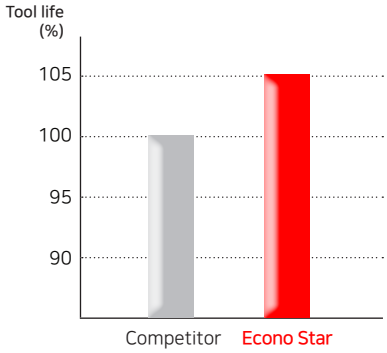
STD61 (HRc50~55)

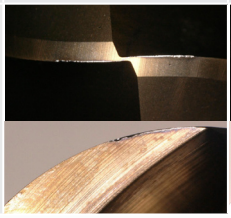
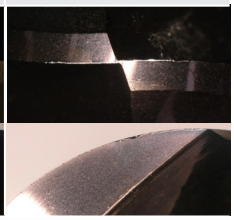


	Competitor	Econo Star
2F D12		

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

STD11 (HRc60~63)

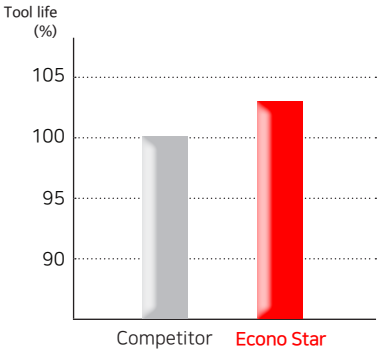


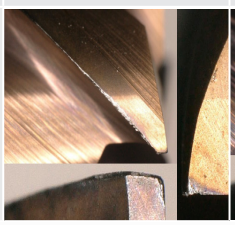
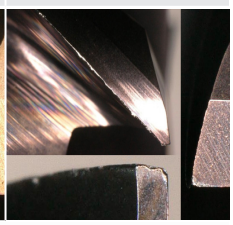
	Competitor	Econo Star
2F D12		

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

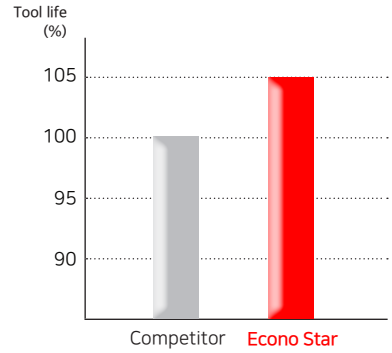
STD61 (HRc50~55)

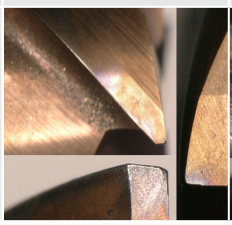
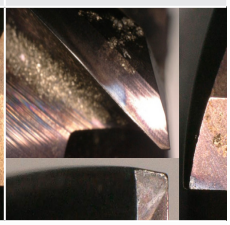


	Competitor	Econo Star
4F D12		

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

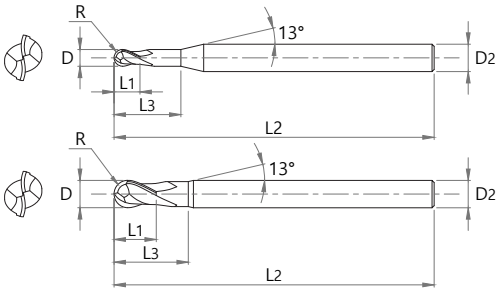
E-STAR SERIES

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
ESE744 new		4 FLUTES 35° HELIX SQUARE ENDMILL	D1.0 ~ D12.0	14
ESE716		6 FLUTES HIGH HELIX SQUARE ENDMILL	D6.0 ~ D20.0	15
ESR702		2 FLUTES NECK TYPE RADIUS ENDMILL	D1.0 ~ D12.0	16
ESR732		2 FLUTES LONG SHANK RADIUS ENDMILL	D1.0 ~ D12.0	19
ESR704		4 FLUTES NECK TYPE RADIUS ENDMILL	D1.0 ~ D12.0	20
ESR714		4 FLUTES RADIUS ENDMILL	D3.0 ~ D12.0	22
ESR724		4 FLUTES NECK TYPE RADIUS ENDMILL	D6.0 ~ D12.0	23
ESR734		4 FLUTES LONG SHANK RADIUS ENDMILL	D1.0 ~ D12.0	24
ESR706		6 FLUTES NECK TYPE RADIUS ENDMILL	D6.0 ~ D12.0	25
ESR736		6 FLUTES RADIUS ENDMILL	D6.0 ~ D12.0	26
ESRB712		2 FLUTES RIB BALL ENDMILL	R0.05 ~ R6.0	27
ESRE712		2 FLUTES RIB SQUARE ENDMILL	D0.1 ~ D12.0	31
ESRE714 new		4 FLUTES RIB SQUARE ENDMILL	D0.5 ~ D12.0	34
ESRR712 new		2 FLUTES RIB RADIUS ENDMILL	D0.2 ~ D16.0	36
ESRR714 new		4 FLUTES RIB RADIUS ENDMILL	D0.5 ~ D2.0	41
ESXE704		4 FLUTES NECK TYPE SQUARE ENDMILL	D1.0 ~ D12.0	47
ESXE714		4 FLUTES SQUARE ENDMILL	D2.0 ~ D12.0	48
ESXR704		4 FLUTES NECK TYPE RADIUS ENDMILL	D1.0 ~ D12.0	49
ESLNB20		2 FLUTES LONG NECK BALL ENDMILL	R0.05 ~ R2.5	50
ESTNB20		2 FLUTES TAPER NECK BALL ENDMILL	R0.1 ~ R5.0	51
ESTNB30		3 FLUTES TAPER NECK BALL ENDMILL	R1.0 ~ R2.5	57
ESLNS20		2 FLUTES LONG NECK SQAURE ENDMILL	D0.1 ~ D5.0	59
ESLNS40		4 FLUTES LONG NECK SQAURE ENDMILL	D1.0 ~ D5.0	63
ESLNR20		2 FLUTES LONG NECK RADIUS ENDMILL	D0.2 ~ D3.0	65
ESTNR20		2 FLUTES TAPER NECK RADIUS ENDMILL	D0.2 ~ D3.0	68
ESPM4		4 FLUTES NECK TYPE RADIUS ENDMILL	D3.0 ~ D12.0	70
Recommended				72~129

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.72

■ 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

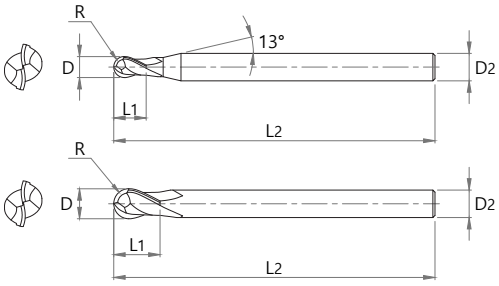
■ Applicable working material

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.72

■ Tolerance

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

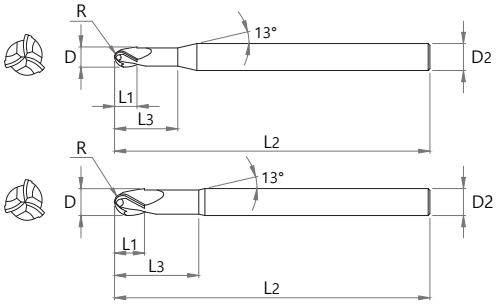
EDP No.	Dimensions(mm)				
	D	R	L1	L2	D2
ESB712010	1	0.5	2.5	50	6
ESB712010S	1	0.5	1.5	40	6
ESB712010S4	1	0.5	2.5	50	4
ESB712012	1.2	0.6	3	50	6
ESB712015	1.5	0.75	4	50	6
ESB712015S	1.5	0.75	2.5	40	6
ESB712015S4	1.5	0.75	4	50	4
ESB712020	2	1	5	50	6
ESB712020S	2	1	3	40	6
ESB712020S4	2	1	5	50	4
ESB712025	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

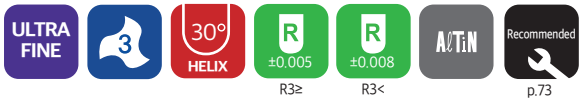
■ Applicable working material

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





p.73

- 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

■ 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

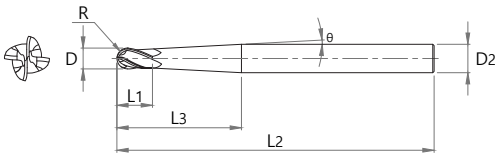
■ Applicable working material

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.74

■ Tolerance

D		Shank Dia.
All sizes	0~-0.012	h5

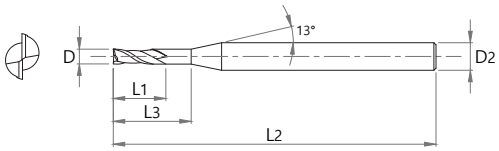
EDP No.	Dimensions(mm)						
	D	R	L1	L3	L2	θ	D2
ESB734020-2.5	2	1	2	25	60	2.5	4
ESB734020-3.5	2	1	2	18	60	3.5	4
ESB734025-2.5	2.5	1.25	3	20	60	2.5	4
ESB734025-3.0	2.5	1.25	3	17	60	3	4
ESB734030-2.0	3	1.5	3	46	70	2	6
ESB734030-2.5	3	1.5	3	37	70	2.5	6
ESB734040-2.0	4	2	4	33	70	2	6
ESB734040-2.5	4	2	4	27	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

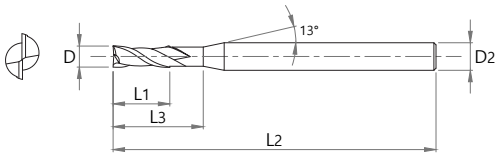
■ Applicable working material

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.75

- 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

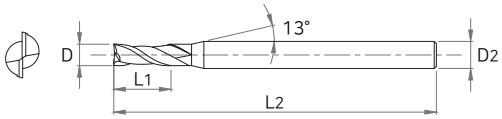
■ Applicable working material

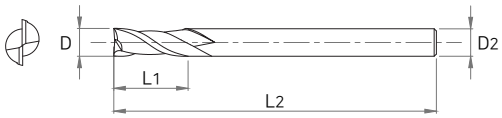
Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : 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.76

■ 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

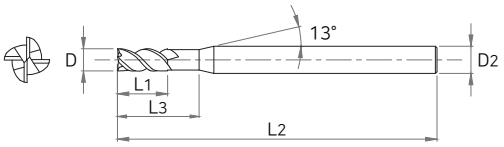
EDP No.	Dimensions(mm)			
	D	R	L1	L3
ESE712030-12	3	12	50	6
ESE712035	3.5	10	45	6
ESE712040	4	10	45	6
ESE712040S4	4	10	45	4
ESE712040-12	4	12	50	6
ESE712040-16	4	16	60	6
ESE712045	4.5	11	45	6
ESE712050	5	13	50	6
ESE712055	5.5	13	50	6
ESE712060	6	13	50	6
ESE712060-15	6	15	60	6
ESE712065	6.5	16	60	8
ESE712070	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

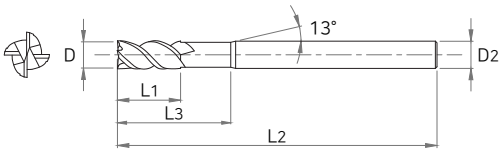
■ Applicable working material

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





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

p.77

- 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
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

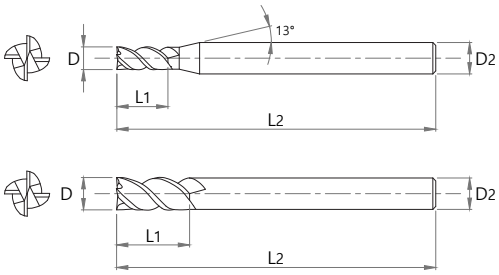
■ Applicable working material

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.77

■ Tolerance

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

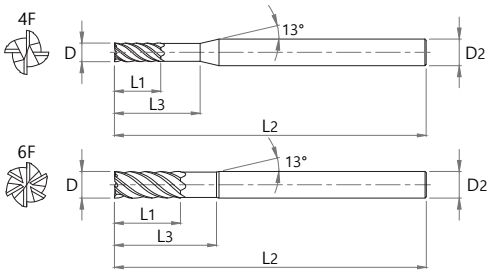
EDP No.	Dimensions(mm)			
	D	L1	L3	L2
ESE714010	1	2.5	40	6
ESE714010S4	1	2.5	40	4
ESE714012	1.2	3	40	6
ESE714015	1.5	4	40	6
ESE714015S4	1.5	4	40	4
ESE714020	2	5	40	6
ESE714020S4	2	5	40	4
ESE714025	2.5	6	40	6
ESE714025S4	2.5	6	40	4
ESE714030	3	8	45	6
ESE714030S4	3	8	45	4
ESE714035	3.5	9	45	6
ESE714040	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.78

■ 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

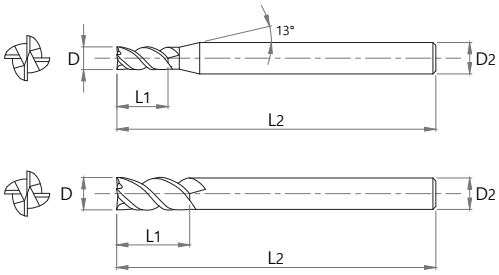
Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESE744

4 FLUTES 35° HELIX SQUARE ENDMILL

New



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

ULTRA FINE | 4 | 35° HELIX | AlTiN | Recommended

p.77

■ Tolerance

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

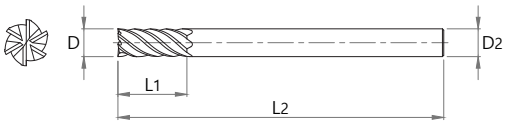
EDP No.	Dimensions(mm)			
	D	L1	L2	L2
ESE744010S3	1	2.5	40	3
ESE744010S4	1	2.5	40	4
ESE744010	1	2.5	40	6
ESE744012S3	1.2	3	40	3
ESE744012S4	1.2	3	40	4
ESE744015S3	1.5	4	40	3
ESE744015S4	1.5	4	40	4
ESE744015	1.5	4	40	6
ESE744020S3	2	6	40	3
ESE744020S4	2	6	40	4
ESE744020	2	6	40	6
ESE744025S3	2.5	8	45	3
ESE744025S4	2.5	8	45	4
ESE744025	2.5	8	45	6
ESE744030S3	3	8	50	3
ESE744030S4	3	8	45	4
ESE744030	3	8	45	6
ESE744035	3.5	10	45	6
ESE744040S4	4	11	45	4
ESE744040	4	11	45	6
ESE744045	4.5	11	45	6
ESE744050	5	13	50	6
ESE744055	5.5	13	50	6
ESE744060	6	13	50	6
ESE744080	8	19	60	8
ESE744100	10	22	70	10
ESE744120	12	26	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

ESE716



- 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.78

■ 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

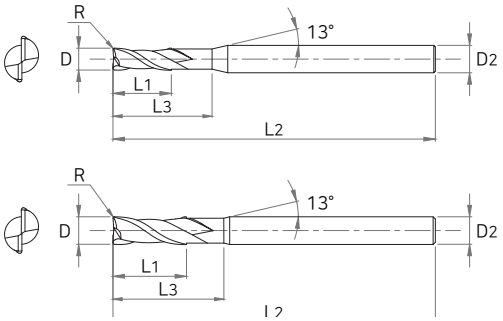
■ Applicable working material

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

2 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 | 2 | 30° HELIX | R ±0.005 R3≥ | R ±0.008 R3< | AlTiN | Recommended p.79

■ Tolerance

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

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESR70201000503S4	1	0.05	1.5	3	50	4
ESR70201000504S4	1	0.05	1.5	4	50	4
ESR70201000506S4	1	0.05	1.5	6	50	4
ESR70201000508S4	1	0.05	1.5	8	50	4
ESR70201000510S4	1	0.05	1.5	10	50	4
ESR7020100103S4	1	0.1	1.5	3	50	4
ESR7020100104	1	0.1	1.5	4	50	6
ESR7020100104S4	1	0.1	1.5	4	50	4
ESR7020100106	1	0.1	1.5	6	50	6
ESR7020100106S4	1	0.1	1.5	6	50	4
ESR7020100108S4	1	0.1	1.5	8	50	4
ESR7020100110S4	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
ESR7020100210S4	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
ESR70201500504S4	1.5	0.05	2.5	4	50	4
ESR70201500506S4	1.5	0.05	2.5	6	50	4

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESR70201500508S4	1.5	0.05	2.5	8	50	4
ESR70201500510S4	1.5	0.05	2.5	10	50	4
ESR70201500512S4	1.5	0.05	2.5	12	50	4
ESR7020150104S4	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
ESR7020150112S4	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
ESR70202000106S4	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

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

2 FLUTES NECK TYPE RADIUS ENDMILL

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

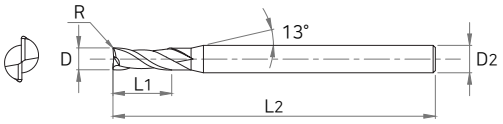
EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESR7020800325	8	0.3	12	25	60	8
ESR7020800525	8	0.5	12	25	60	8
ESR7020801025	8	1	12	25	60	8
ESR7020801525	8	1.5	12	25	60	8
ESR7021000232	10	0.2	15	32	70	10
ESR7021000332	10	0.3	15	32	70	10
ESR7021000532	10	0.5	15	32	70	10
ESR7021001032	10	1	15	32	70	10
ESR7021001532	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

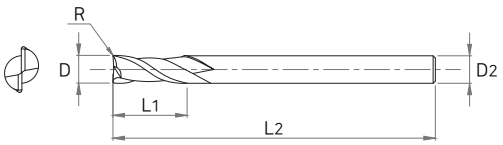
■ Applicable working material

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





- 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.79

■ 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

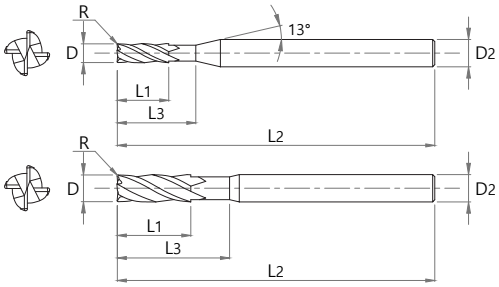
■ Applicable working material

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

4 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 | 4 | 30° HELIX | R ±0.005 R3≥ | R ±0.008 R3< | AlTiN | Recommended p.80

■ Tolerance

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

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESR7040100103S4	1	0.1	2	3	50	4
ESR7040100104S4	1	0.1	2	4	50	4
ESR7040100106S4	1	0.1	2	6	50	4
ESR7040100203S4	1	0.2	2	3	50	4
ESR7040100204S4	1	0.2	2	4	50	4
ESR7040100206S4	1	0.2	2	6	50	4
ESR7040100303S4	1	0.3	2	3	50	4
ESR7040100304S4	1	0.3	2	4	50	4
ESR7040100306S4	1	0.3	2	6	50	4
ESR7040150104S4	1.5	0.1	2.5	4	50	4
ESR7040150106S4	1.5	0.1	2.5	6	50	4
ESR7040150204S4	1.5	0.2	2.5	4	50	4
ESR7040150206S4	1.5	0.2	2.5	6	50	4
ESR7040150304S4	1.5	0.3	2.5	4	50	4
ESR7040150306S4	1.5	0.3	2.5	6	50	4
ESR7040200106S4	2	0.1	3	6	50	4
ESR7040200108S4	2	0.1	3	8	50	4
ESR7040200206S4	2	0.2	3	6	50	4
ESR7040200208	2	0.2	3	8	50	6
ESR7040200208S4	2	0.2	3	8	50	4
ESR7040200210	2	0.2	3	10	50	6
ESR7040200212	2	0.2	3	12	50	6
ESR7040200306S4	2	0.3	3	6	50	4
ESR7040200308S4	2	0.3	3	8	50	4
ESR7040200506S4	2	0.5	3	6	50	4
ESR7040200508S4	2	0.5	3	8	50	4
ESR7040250106S4	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

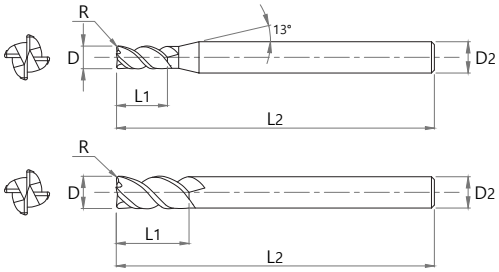
■ Applicable working material

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

4 FLUTES 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
- Improved machinability by 45° Helix

ULTRA FINE | 4 | 45° HELIX | R ±0.01 R3≥ | R ±0.015 R3< | AlTiN | Recommended p.80

■ Tolerance

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

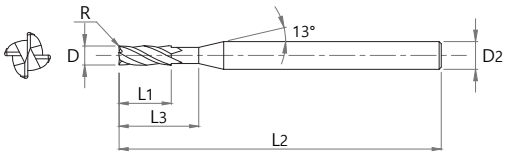
EDP No.	Dimensions(mm)				
	D	L1	L3	L2	D2
ESR7140303	3	0.3	8	50	6
ESR7140305S4	3	0.5	8	50	4
ESR7140305	3	0.5	8	50	6
ESR7140403	4	0.3	11	50	6
ESR7140405	4	0.5	11	50	6
ESR7140405S4	4	0.5	11	50	4
ESR7140410	4	1	11	50	6
ESR7140603	6	0.3	15	60	6
ESR7140605	6	0.5	15	60	6
ESR7140610	6	1	15	60	6
ESR7140803	8	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



- 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.80

■ 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

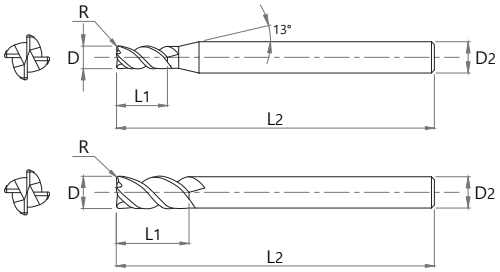
■ Applicable working material

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

4 FLUTES LONG SHANK 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
- Suitable to depth machining With long shank type

ULTRA FINE | 4 | 30° HELIX | R ±0.01 R3≥ | R ±0.015 R3< | AlTiN | Recommended p.80

■ 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

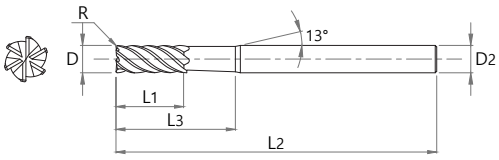
EDP No.	Dimensions(mm)				
	D	R	L1	L2	D2
ESR73405002	5	0.2	13	80	6
ESR73405003	5	0.3	13	80	6
ESR73405005	5	0.5	13	80	6
ESR73405010	5	1	13	80	6
ESR73406001	6	0.1	15	90	6
ESR73406002	6	0.2	15	90	6
ESR73406003	6	0.3	15	90	6
ESR73406005	6	0.5	15	90	6
ESR73406010	6	1	15	90	6
ESR73408001	8	0.1	20	100	8
ESR73408002	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



- 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.80

■ 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

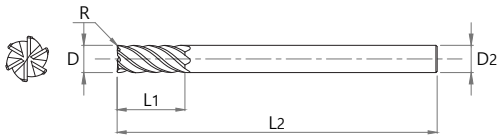
■ Applicable working material

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

6 FLUTES RADIUS ENDMILL



- 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 p.78

■ Tolerance

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

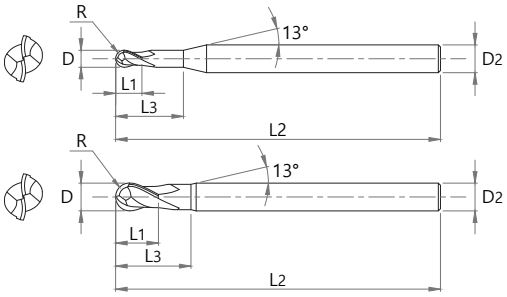
EDP No.	Dimensions(mm)				
	D	R	L1	L2	D2
ESR73606005	6	0.5	15	90	6
ESR73606010	6	1	15	90	6
ESR73608005	8	0.5	20	100	8
ESR73608010	8	1	20	100	8
ESR73610005	10	0.5	25	100	10
ESR73610010	10	1	25	100	10
ESR73612005	12	0.5	30	110	12
ESR73612010	12	1	30	110	12

■ 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



- 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.81

■ 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

2 FLUTES RIB BALL ENDMILL

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

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

2 FLUTES RIB BALL ENDMILL

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

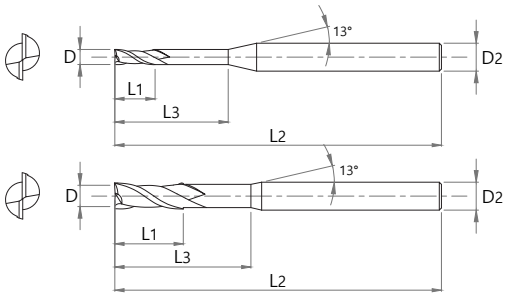
EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRB71205026	5	2.5	6	26	65	6
ESRB71205030	5	2.5	6	30	70	6
ESRB71205035	5	2.5	6	35	70	6
ESRB71205040	5	2.5	6	40	80	6
ESRB71205045	5	2.5	6	45	90	6
ESRB71205050	5	2.5	6	50	100	6
ESRB71205055	5	2.5	6	55	100	6
ESRB71205060	5	2.5	6	60	100	6
ESRB7120602090	6	3	12	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



- 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

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■ 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

2 FLUTES RIB NECK TYPE SQUARE ENDMILL

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

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

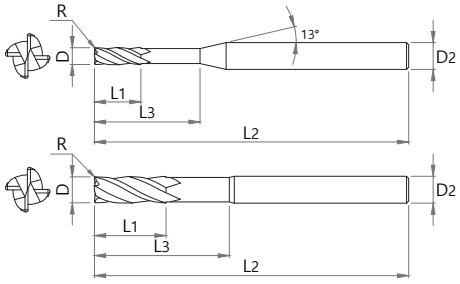
Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESRE714

4 FLUTES RIB SQAURE ENDMILL

New



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

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

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■ Tolerance

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

EDP No.	Dimensions(mm)				
	D	L1	L3	L2	D2
ESRE71400501	0.5	0.5	1	40	4
ESRE71400502	0.5	0.5	2	40	4
ESRE71400503	0.5	0.5	3	45	4
ESRE71400504	0.5	0.5	4	45	4
ESRE71400505	0.5	0.5	5	45	4
ESRE71400506	0.5	0.5	6	45	4
ESRE71400508	0.5	0.5	8	45	4
ESRE71400510	0.5	0.5	10	50	4
ESRE71400601	0.6	0.6	1	45	4
ESRE71400602	0.6	0.6	2	45	4
ESRE71400603	0.6	0.6	3	45	4
ESRE71400604	0.6	0.6	4	45	4
ESRE71400605	0.6	0.6	5	45	4
ESRE71400606	0.6	0.6	6	45	4
ESRE71400608	0.6	0.6	8	45	4
ESRE71400610	0.6	0.6	10	50	4
ESRE71400612	0.6	0.6	12	50	4
ESRE71400702	0.7	0.7	2	45	4
ESRE71400704	0.7	0.7	4	45	4
ESRE71400706	0.7	0.7	6	45	4
ESRE71400708	0.7	0.7	8	45	4
ESRE71400710	0.7	0.7	10	50	4
ESRE71400801	0.8	0.8	1	40	4
ESRE71400802	0.8	0.8	2	40	4
ESRE71400803	0.8	0.8	3	40	4
ESRE71400804	0.8	0.8	4	40	4
ESRE71400805	0.8	0.8	5	40	4
ESRE71400806	0.8	0.8	6	40	4
ESRE71400808	0.8	0.8	8	40	4
ESRE71400810	0.8	0.8	10	50	4
ESRE71400812	0.8	0.8	12	50	4

EDP No.	Dimensions(mm)				
	D	L1	L3	L2	D2
ESRE71400816	0.8	0.8	16	50	4
ESRE71401002	1	1	2	45	4
ESRE71401003	1	1	3	45	4
ESRE71401004	1	1	4	45	4
ESRE71401006	1	1	6	45	4
ESRE71401008	1	1	8	45	4
ESRE71401010	1	1	10	50	4
ESRE71401012	1	1	12	50	4
ESRE71401014	1	1	14	50	4
ESRE71401016	1	1	16	50	4
ESRE71401018	1	1	18	60	4
ESRE71401020	1	1	20	60	4
ESRE71401204	1.2	1.2	4	45	4
ESRE71401206	1.2	1.2	6	45	4
ESRE71401208	1.2	1.2	8	45	4
ESRE71401210	1.2	1.2	10	50	4
ESRE71401212	1.2	1.2	12	50	4
ESRE71401216	1.2	1.2	16	50	4
ESRE71401218	1.2	1.2	18	60	4
ESRE71401220	1.2	1.2	20	60	4
ESRE71401406	1.4	1.4	6	45	4
ESRE71401408	1.4	1.4	8	45	4
ESRE71401410	1.4	1.4	10	50	4
ESRE71401412	1.4	1.4	12	50	4
ESRE71401414	1.4	1.4	14	50	4
ESRE71401416	1.4	1.4	16	50	4
ESRE71401504	1.5	1.5	4	45	4
ESRE71401506	1.5	1.5	6	45	4
ESRE71401508	1.5	1.5	8	45	4
ESRE71401510	1.5	1.5	10	50	4
ESRE71401512	1.5	1.5	12	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

New

4 FLUTES RIB SQAURE ENDMILL

ESRE714

EDP No.	Dimensions(mm)				
	D	L1	L3	L2	D2
ESRE71401516	1.5	1.5	16	50	4
ESRE71401518	1.5	1.5	18	60	4
ESRE71401520	1.5	1.5	20	60	4
ESRE71401525	1.5	1.5	25	60	4
ESRE71401530	1.5	1.5	30	70	4
ESRE71401606	1.6	1.6	6	45	4
ESRE71401608	1.6	1.6	8	45	4
ESRE71401610	1.6	1.6	10	50	4
ESRE71401612	1.6	1.6	12	50	4
ESRE71401614	1.6	1.6	14	50	4
ESRE71401616	1.6	1.6	16	50	4
ESRE71401618	1.6	1.6	18	60	4
ESRE71401620	1.6	1.6	20	60	4
ESRE71401625	1.6	1.6	25	70	4
ESRE71401806	1.8	1.8	6	45	4
ESRE71401808	1.8	1.8	8	45	4
ESRE71401810	1.8	1.8	10	50	4
ESRE71401812	1.8	1.8	12	50	4
ESRE71401816	1.8	1.8	16	50	4
ESRE71401820	1.8	1.8	20	60	4
ESRE71401825	1.8	1.8	25	70	4
ESRE71402004	2	2	4	45	4
ESRE71402006	2	2	6	45	4
ESRE71402008	2	2	8	45	4
ESRE71402010	2	2	10	50	4
ESRE71402012	2	2	12	50	4
ESRE71402014	2	2	14	50	4
ESRE71402016	2	2	16	50	4
ESRE71402018	2	2	18	50	4
ESRE71402020	2	2	20	50	4
ESRE71402022	2	2	22	60	4
ESRE71402025	2	2	25	60	4
ESRE71402030	2	2	30	70	4
ESRE71402510	2.5	2.5	10	50	4
ESRE71402512	2.5	2.5	12	50	4
ESRE71402516	2.5	2.5	16	50	4
ESRE71402520	2.5	2.5	20	50	4
ESRE71402525	2.5	2.5	25	60	4
ESRE71402530	2.5	2.5	30	70	4
ESRE71403006	3	3	6	45	6
ESRE71403008	3	3	8	45	6
ESRE71403010	3	3	10	50	6
ESRE71403012	3	3	12	50	6
ESRE71403016	3	3	16	55	6
ESRE71403020	3	3	20	60	6
ESRE71403025	3	3	25	65	6
ESRE71403030	3	3	30	70	6
ESRE71403035	3	3	35	75	6
ESRE71403040	3	3	40	80	6

EDP No.	Dimensions(mm)				
	D	L1	L3	L2	D2
ESRE71403045	3	3	45	90	6
ESRE71403050	3	3	50	100	6
ESRE71403060	3	3	60	110	6
ESRE71403512	3.5	3.5	12	50	6
ESRE71403516	3.5	3.5	16	55	6
ESRE71403520	3.5	3.5	20	60	6
ESRE71403525	3.5	3.5	25	65	6
ESRE71403530	3.5	3.5	30	70	6
ESRE71403535	3.5	3.5	35	75	6
ESRE71403540	3.5	3.5	40	80	6
ESRE71404006	4	4	6	50	6
ESRE71404008	4	4	8	50	6
ESRE71404010	4	4	10	50	6
ESRE71404012	4	4	12	50	6
ESRE71404016	4	4	16	55	6
ESRE71404020	4	4	20	60	6
ESRE71404025	4	4	25	65	6
ESRE71404030	4	4	30	70	6
ESRE71404040	4	4	40	80	6
ESRE71404045	4	4	45	90	6
ESRE71404050	4	4	50	100	6
ESRE71404060	4	4	60	110	6
ESRE71404512	4.5	4.5	12	50	6
ESRE71404516	4.5	4.5	16	55	6
ESRE71404520	4.5	4.5	20	60	6
ESRE71404525	4.5	4.5	25	65	6
ESRE71404530	4.5	4.5	30	70	6
ESRE71404540	4.5	4.5	40	80	6
ESRE71405016	5	5	16	60	6
ESRE71405020	5	5	20	60	6
ESRE71405025	5	5	25	65	6
ESRE71405030	5	5	30	70	6
ESRE71405040	5	5	40	80	6
ESRE71405050	5	5	50	100	6
ESRE71405060	5	5	60	110	6
ESRE71406020	6	6	20	60	6
ESRE71406030	6	6	30	75	6
ESRE71406040	6	6	40	80	6
ESRE71406050	6	6	50	90	6
ESRE71406060	6	6	60	100	6
ESRE71408025	8	12	25	65	8
ESRE71408040	8	12	40	100	8
ESRE71408050	8	12	50	110	8
ESRE71410030	10	15	30	70	10
ESRE71410050	10	15	50	100	10
ESRE71410060	10	15	60	120	10
ESRE71412040	12	18	40	80	12
ESRE71412060	12	18	60	110	12
ESRE71412070	12	18	70	130	12

■ Applicable working material

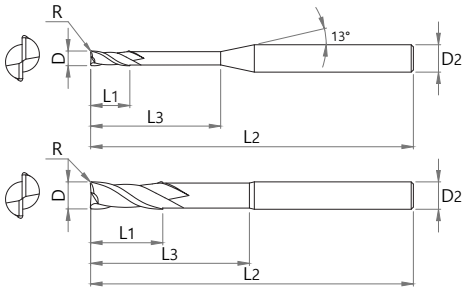
Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESRR712

2 FLUTES RIB RADIUS ENDMILL

New



- Excellent machinability with cutting edge considered the characteristics of high hardness workpiece
- Various R part and effective length specifications

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

p.95

■ Tolerance

D		Shank Dia.
~ D6	0 ~ -0.012mm	h5
D8 ~ 16	0 ~ -0.015mm	

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR712002002005	0.2	0.02	0.2	0.5	40	4
ESRR71200200201	0.2	0.02	0.2	1	40	4
ESRR712002002015	0.2	0.02	0.2	1.5	40	4
ESRR712002005005	0.2	0.05	0.2	0.5	40	4
ESRR71200200501	0.2	0.05	0.2	1	40	4
ESRR712002005015	0.2	0.05	0.2	1.5	40	4
ESRR71200300201	0.3	0.02	0.3	1	40	4
ESRR71200300202	0.3	0.02	0.3	2	40	4
ESRR71200300203	0.3	0.02	0.3	3	40	4
ESRR71200300501	0.3	0.05	0.3	1	40	4
ESRR71200300502	0.3	0.05	0.3	2	40	4
ESRR71200300503	0.3	0.05	0.3	3	40	4
ESRR71200400201	0.4	0.02	0.4	1	40	4
ESRR71200400202	0.4	0.02	0.4	2	40	4
ESRR71200400203	0.4	0.02	0.4	3	40	4
ESRR71200400204	0.4	0.02	0.4	4	40	4
ESRR71200400501	0.4	0.05	0.4	1	40	4
ESRR71200400502	0.4	0.05	0.4	2	40	4
ESRR71200400503	0.4	0.05	0.4	3	40	4
ESRR71200400504	0.4	0.05	0.4	4	40	4
ESRR71200401001	0.4	0.1	0.4	1	40	4
ESRR712004010015	0.4	0.1	0.4	1.5	40	4
ESRR71200401002	0.4	0.1	0.4	2	40	4
ESRR71200401003	0.4	0.1	0.4	3	40	4
ESRR71200401004	0.4	0.1	0.4	4	40	4
ESRR71200500201	0.5	0.02	0.5	1	45	4
ESRR712005002015	0.5	0.02	0.5	1.5	45	4
ESRR71200500202	0.5	0.02	0.5	2	45	4
ESRR712005002025	0.5	0.02	0.5	2.5	45	4
ESRR71200500203	0.5	0.02	0.5	3	45	4

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71200500204	0.5	0.02	0.5	4	45	4
ESRR71200500205	0.5	0.02	0.5	5	45	4
ESRR71200500206	0.5	0.02	0.5	6	45	4
ESRR71200500208	0.5	0.02	0.5	8	45	4
ESRR71200500210	0.5	0.02	0.5	10	45	4
ESRR71200500501	0.5	0.05	0.5	1	45	4
ESRR712005005015	0.5	0.05	0.5	1.5	45	4
ESRR71200500502	0.5	0.05	0.5	2	45	4
ESRR712005005025	0.5	0.05	0.5	2.5	45	4
ESRR71200500503	0.5	0.05	0.5	3	45	4
ESRR71200500504	0.5	0.05	0.5	4	45	4
ESRR71200500505	0.5	0.05	0.5	5	45	4
ESRR71200500506	0.5	0.05	0.5	6	45	4
ESRR71200500508	0.5	0.05	0.5	8	45	4
ESRR71200500510	0.5	0.05	0.5	10	45	4
ESRR71200501001	0.5	0.1	0.5	1	45	4
ESRR712005010015	0.5	0.1	0.5	1.5	45	4
ESRR71200501002	0.5	0.1	0.5	2	45	4
ESRR712005010025	0.5	0.1	0.5	2.5	45	4
ESRR71200501003	0.5	0.1	0.5	3	45	4
ESRR71200501004	0.5	0.1	0.5	4	45	4
ESRR71200501005	0.5	0.1	0.5	5	45	4
ESRR71200501006	0.5	0.1	0.5	6	45	4
ESRR71200501008	0.5	0.1	0.5	8	45	4
ESRR71200501010	0.5	0.1	0.5	10	45	4
ESRR71200600202	0.6	0.02	0.6	2	45	4
ESRR71200600203	0.6	0.02	0.6	3	45	4
ESRR71200600204	0.6	0.02	0.6	4	45	4
ESRR71200600206	0.6	0.02	0.6	6	45	4
ESRR71200600208	0.6	0.02	0.6	8	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

New

2 FLUTES RIB RADIUS ENDMILL

ESRR712

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71200600210	0.6	0.02	0.6	10	45	4
ESRR71200600212	0.6	0.02	0.6	12	50	4
ESRR71200600502	0.6	0.05	0.6	2	45	4
ESRR71200600503	0.6	0.05	0.6	3	45	4
ESRR71200600504	0.6	0.05	0.6	4	45	4
ESRR71200600506	0.6	0.05	0.6	6	45	4
ESRR71200600508	0.6	0.05	0.6	8	45	4
ESRR71200600510	0.6	0.05	0.6	10	45	4
ESRR71200600512	0.6	0.05	0.6	12	50	4
ESRR71200601002	0.6	0.1	0.6	2	45	4
ESRR71200601003	0.6	0.1	0.6	3	45	4
ESRR71200601004	0.6	0.1	0.6	4	45	4
ESRR71200601006	0.6	0.1	0.6	6	45	4
ESRR71200601008	0.6	0.1	0.6	8	45	4
ESRR71200601010	0.6	0.1	0.6	10	45	4
ESRR71200601012	0.6	0.1	0.6	12	50	4
ESRR71200701002	0.7	0.1	0.7	2	45	4
ESRR71200701004	0.7	0.1	0.7	4	45	4
ESRR71200701006	0.7	0.1	0.7	6	45	4
ESRR71200701008	0.7	0.1	0.7	8	45	4
ESRR71200701010	0.7	0.1	0.7	10	45	4
ESRR71200800202	0.8	0.02	0.8	2	45	4
ESRR71200800204	0.8	0.02	0.8	4	45	4
ESRR71200800206	0.8	0.02	0.8	6	45	4
ESRR71200800208	0.8	0.02	0.8	8	45	4
ESRR71200800210	0.8	0.02	0.8	10	45	4
ESRR71200800212	0.8	0.02	0.8	12	50	4
ESRR71200800502	0.8	0.05	0.8	2	45	4
ESRR71200800504	0.8	0.05	0.8	4	45	4
ESRR71200800506	0.8	0.05	0.8	6	45	4
ESRR71200800508	0.8	0.05	0.8	8	45	4
ESRR71200800510	0.8	0.05	0.8	10	45	4
ESRR71200800512	0.8	0.05	0.8	12	50	4
ESRR71200801002	0.8	0.1	0.8	2	45	4
ESRR71200801004	0.8	0.1	0.8	4	45	4
ESRR71200801006	0.8	0.1	0.8	6	45	4
ESRR71200801008	0.8	0.1	0.8	8	45	4
ESRR71200801010	0.8	0.1	0.8	10	45	4
ESRR71200801012	0.8	0.1	0.8	12	50	4
ESRR71200802002	0.8	0.2	0.8	2	45	4
ESRR71200802004	0.8	0.2	0.8	4	45	4
ESRR71200802006	0.8	0.2	0.8	6	45	4
ESRR71200802008	0.8	0.2	0.8	8	45	4
ESRR71200802010	0.8	0.2	0.8	10	45	4
ESRR71200802012	0.8	0.2	0.8	12	50	4
ESRR71201000204	1	0.02	1	4	45	4
ESRR71201000206	1	0.02	1	6	45	4

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71201000208	1	0.02	1	8	45	4
ESRR71201000210	1	0.02	1	10	50	4
ESRR71201000212	1	0.02	1	12	50	4
ESRR71201000214	1	0.02	1	14	50	4
ESRR71201000216	1	0.02	1	16	50	4
ESRR71201000220	1	0.02	1	20	50	4
ESRR71201000504	1	0.05	1	4	45	4
ESRR71201000506	1	0.05	1	6	45	4
ESRR71201000508	1	0.05	1	8	45	4
ESRR71201000510	1	0.05	1	10	50	4
ESRR71201000512	1	0.05	1	12	50	4
ESRR71201000514	1	0.05	1	14	50	4
ESRR71201000516	1	0.05	1	16	50	4
ESRR71201000520	1	0.05	1	20	50	4
ESRR71201001004	1	0.1	1	4	45	4
ESRR71201001006	1	0.1	1	6	45	4
ESRR71201001008	1	0.1	1	8	45	4
ESRR71201001010	1	0.1	1	10	50	4
ESRR71201001012	1	0.1	1	12	50	4
ESRR71201001014	1	0.1	1	14	50	4
ESRR71201001016	1	0.1	1	16	50	4
ESRR71201001020	1	0.1	1	20	50	4
ESRR71201002004	1	0.2	1	4	45	4
ESRR71201002006	1	0.2	1	6	45	4
ESRR71201002008	1	0.2	1	8	45	4
ESRR71201002010	1	0.2	1	10	50	4
ESRR71201002012	1	0.2	1	12	50	4
ESRR71201002014	1	0.2	1	14	50	4
ESRR71201002016	1	0.2	1	16	50	4
ESRR71201002020	1	0.2	1	20	50	4
ESRR71201003004	1	0.3	1	4	45	4
ESRR71201003006	1	0.3	1	6	45	4
ESRR71201003008	1	0.3	1	8	45	4
ESRR71201003010	1	0.3	1	10	50	4
ESRR71201003012	1	0.3	1	12	50	4
ESRR71201003014	1	0.3	1	14	50	4
ESRR71201003016	1	0.3	1	16	50	4
ESRR71201003020	1	0.3	1	20	50	4
ESRR71201200204	1.2	0.02	1.2	4	45	4
ESRR71201200206	1.2	0.02	1.2	6	45	4
ESRR71201200208	1.2	0.02	1.2	8	45	4
ESRR71201200210	1.2	0.02	1.2	10	50	4
ESRR71201200212	1.2	0.02	1.2	12	50	4
ESRR71201200214	1.2	0.02	1.2	14	50	4
ESRR71201200216	1.2	0.02	1.2	16	50	4
ESRR71201200220	1.2	0.02	1.2	20	50	4
ESRR71201200504	1.2	0.05	1.2	4	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

ESRR712

2 FLUTES RIB RADIUS ENDMILL

New

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71201200506	1.2	0.05	1.2	6	45	4
ESRR71201200508	1.2	0.05	1.2	8	45	4
ESRR71201200510	1.2	0.05	1.2	10	50	4
ESRR71201200512	1.2	0.05	1.2	12	50	4
ESRR71201200514	1.2	0.05	1.2	14	50	4
ESRR71201200516	1.2	0.05	1.2	16	50	4
ESRR71201200520	1.2	0.05	1.2	20	50	4
ESRR71201201004	1.2	0.1	1.2	4	45	4
ESRR71201201006	1.2	0.1	1.2	6	45	4
ESRR71201201008	1.2	0.1	1.2	8	45	4
ESRR71201201010	1.2	0.1	1.2	10	50	4
ESRR71201201012	1.2	0.1	1.2	12	50	4
ESRR71201201014	1.2	0.1	1.2	14	50	4
ESRR71201201016	1.2	0.1	1.2	16	50	4
ESRR71201201020	1.2	0.1	1.2	20	50	4
ESRR71201202004	1.2	0.2	1.2	4	45	4
ESRR71201202006	1.2	0.2	1.2	6	45	4
ESRR71201202008	1.2	0.2	1.2	8	45	4
ESRR71201202010	1.2	0.2	1.2	10	50	4
ESRR71201202012	1.2	0.2	1.2	12	50	4
ESRR71201202014	1.2	0.2	1.2	14	50	4
ESRR71201202016	1.2	0.2	1.2	16	50	4
ESRR71201202020	1.2	0.2	1.2	20	50	4
ESRR71201203004	1.2	0.3	1.2	4	45	4
ESRR71201203006	1.2	0.3	1.2	6	45	4
ESRR71201203008	1.2	0.3	1.2	8	45	4
ESRR71201203010	1.2	0.3	1.2	10	50	4
ESRR71201203012	1.2	0.3	1.2	12	50	4
ESRR71201203014	1.2	0.3	1.2	14	50	4
ESRR71201203016	1.2	0.3	1.2	16	50	4
ESRR71201203020	1.2	0.3	1.2	20	50	4
ESRR71201500204	1.5	0.02	1.5	4	45	4
ESRR71201500206	1.5	0.02	1.5	6	45	4
ESRR71201500208	1.5	0.02	1.5	8	45	4
ESRR71201500210	1.5	0.02	1.5	10	50	4
ESRR71201500212	1.5	0.02	1.5	12	50	4
ESRR71201500214	1.5	0.02	1.5	14	50	4
ESRR71201500216	1.5	0.02	1.5	16	50	4
ESRR71201500220	1.5	0.02	1.5	20	50	4
ESRR71201500504	1.5	0.05	1.5	4	45	4
ESRR71201500506	1.5	0.05	1.5	6	45	4
ESRR71201500508	1.5	0.05	1.5	8	45	4
ESRR71201500510	1.5	0.05	1.5	10	50	4
ESRR71201500512	1.5	0.05	1.5	12	50	4
ESRR71201500514	1.5	0.05	1.5	14	50	4
ESRR71201500516	1.5	0.05	1.5	16	50	4
ESRR71201500520	1.5	0.05	1.5	20	50	4

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71201501004	1.5	0.1	1.5	4	45	4
ESRR71201501006	1.5	0.1	1.5	6	45	4
ESRR71201501008	1.5	0.1	1.5	8	45	4
ESRR71201501010	1.5	0.1	1.5	10	50	4
ESRR71201501012	1.5	0.1	1.5	12	50	4
ESRR71201501014	1.5	0.1	1.5	14	50	4
ESRR71201501016	1.5	0.1	1.5	16	50	4
ESRR71201501020	1.5	0.1	1.5	20	50	4
ESRR71201502004	1.5	0.2	1.5	4	45	4
ESRR71201502006	1.5	0.2	1.5	6	45	4
ESRR71201502008	1.5	0.2	1.5	8	45	4
ESRR71201502010	1.5	0.2	1.5	10	50	4
ESRR71201502012	1.5	0.2	1.5	12	50	4
ESRR71201502014	1.5	0.2	1.5	14	50	4
ESRR71201502016	1.5	0.2	1.5	16	50	4
ESRR71201502020	1.5	0.2	1.5	20	50	4
ESRR71201503004	1.5	0.3	1.5	4	45	4
ESRR71201503006	1.5	0.3	1.5	6	45	4
ESRR71201503008	1.5	0.3	1.5	8	45	4
ESRR71201503010	1.5	0.3	1.5	10	50	4
ESRR71201503012	1.5	0.3	1.5	12	50	4
ESRR71201503014	1.5	0.3	1.5	14	50	4
ESRR71201503016	1.5	0.3	1.5	16	50	4
ESRR71201503020	1.5	0.3	1.5	20	50	4
ESRR71201505004	1.5	0.5	1.5	4	45	4
ESRR71201505006	1.5	0.5	1.5	6	45	4
ESRR71201505008	1.5	0.5	1.5	8	45	4
ESRR71201505010	1.5	0.5	1.5	10	50	4
ESRR71201505012	1.5	0.5	1.5	12	50	4
ESRR71201505014	1.5	0.5	1.5	14	50	4
ESRR71201505016	1.5	0.5	1.5	16	50	4
ESRR71201505020	1.5	0.5	1.5	20	50	4
ESRR71202000206	2	0.02	2	6	45	4
ESRR71202000208	2	0.02	2	8	45	4
ESRR71202000210	2	0.02	2	10	50	4
ESRR71202000212	2	0.02	2	12	50	4
ESRR71202000214	2	0.02	2	14	50	4
ESRR71202000216	2	0.02	2	16	50	4
ESRR71202000220	2	0.02	2	20	50	4
ESRR71202000225	2	0.02	2	25	60	4
ESRR71202000506	2	0.05	2	6	45	4
ESRR71202000508	2	0.05	2	8	45	4
ESRR71202000510	2	0.05	2	10	50	4
ESRR71202000512	2	0.05	2	12	50	4
ESRR71202000514	2	0.05	2	14	50	4
ESRR71202000516	2	0.05	2	16	50	4
ESRR71202000520	2	0.05	2	20	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

New

2 FLUTES RIB RADIUS ENDMILL

ESRR712

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71202000525	2	0.05	2	25	60	4
ESRR71202001006	2	0.1	2	6	45	4
ESRR71202001008	2	0.1	2	8	45	4
ESRR71202001010	2	0.1	2	10	50	4
ESRR71202001012	2	0.1	2	12	50	4
ESRR71202001014	2	0.1	2	14	50	4
ESRR71202001016	2	0.1	2	16	50	4
ESRR71202001020	2	0.1	2	20	50	4
ESRR71202001025	2	0.1	2	25	60	4
ESRR71202001030	2	0.1	2	30	70	4
ESRR71202002006	2	0.2	2	6	45	4
ESRR71202002008	2	0.2	2	8	45	4
ESRR71202002010	2	0.2	2	10	50	4
ESRR71202002012	2	0.2	2	12	50	4
ESRR71202002014	2	0.2	2	14	50	4
ESRR71202002016	2	0.2	2	16	50	4
ESRR71202002020	2	0.2	2	20	50	4
ESRR71202002025	2	0.2	2	25	60	4
ESRR71202002030	2	0.2	2	30	70	4
ESRR71202003006	2	0.3	2	6	45	4
ESRR71202003008	2	0.3	2	8	45	4
ESRR71202003010	2	0.3	2	10	50	4
ESRR71202003012	2	0.3	2	12	50	4
ESRR71202003014	2	0.3	2	14	50	4
ESRR71202003016	2	0.3	2	16	50	4
ESRR71202003020	2	0.3	2	20	50	4
ESRR71202003025	2	0.3	2	25	60	4
ESRR71202003030	2	0.3	2	30	70	4
ESRR71202005006	2	0.5	2	6	45	4
ESRR71202005008	2	0.5	2	8	45	4
ESRR71202005010	2	0.5	2	10	50	4
ESRR71202005012	2	0.5	2	12	50	4
ESRR71202005014	2	0.5	2	14	50	4
ESRR71202005016	2	0.5	2	16	50	4
ESRR71202005020	2	0.5	2	20	50	4
ESRR71202005025	2	0.5	2	25	60	4
ESRR71202005030	2	0.5	2	30	70	4
ESRR71202501010	2.5	0.1	2.5	10	50	4
ESRR71202501016	2.5	0.1	2.5	16	50	4
ESRR71202501020	2.5	0.1	2.5	20	50	4
ESRR71202501025	2.5	0.1	2.5	25	60	4
ESRR71202501030	2.5	0.1	2.5	30	70	4
ESRR71202502010	2.5	0.2	2.5	10	50	4
ESRR71202502016	2.5	0.2	2.5	16	50	4
ESRR71202502020	2.5	0.2	2.5	20	50	4
ESRR71202503010	2.5	0.3	2.5	10	50	4
ESRR71202503016	2.5	0.3	2.5	16	50	4

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71202503020	2.5	0.3	2.5	20	50	4
ESRR71202505010	2.5	0.5	2.5	10	50	4
ESRR71202505016	2.5	0.5	2.5	16	50	4
ESRR71202505020	2.5	0.5	2.5	20	50	4
ESRR71203001010	3	0.1	3	10	50	6
ESRR71203001012	3	0.1	3	12	50	6
ESRR71203001016	3	0.1	3	16	55	6
ESRR71203001020	3	0.1	3	20	60	6
ESRR71203001025	3	0.1	3	25	65	6
ESRR71203001030	3	0.1	3	30	70	6
ESRR71203001035	3	0.1	3	35	75	6
ESRR71203001040	3	0.1	3	40	80	6
ESRR71203002010	3	0.2	3	10	50	6
ESRR71203002012	3	0.2	3	12	50	6
ESRR71203002016	3	0.2	3	16	55	6
ESRR71203002020	3	0.2	3	20	60	6
ESRR71203002025	3	0.2	3	25	65	6
ESRR71203002030	3	0.2	3	30	70	6
ESRR71203002035	3	0.2	3	35	75	6
ESRR71203002040	3	0.2	3	40	80	6
ESRR71203003010	3	0.3	3	10	50	6
ESRR71203003012	3	0.3	3	12	50	6
ESRR71203003016	3	0.3	3	16	55	6
ESRR71203003020	3	0.3	3	20	60	6
ESRR71203003025	3	0.3	3	25	65	6
ESRR71203003030	3	0.3	3	30	70	6
ESRR71203003035	3	0.3	3	35	75	6
ESRR71203003040	3	0.3	3	40	80	6
ESRR71203005010	3	0.5	3	10	50	6
ESRR71203005012	3	0.5	3	12	50	6
ESRR71203005016	3	0.5	3	16	55	6
ESRR71203005020	3	0.5	3	20	60	6
ESRR71203005025	3	0.5	3	25	65	6
ESRR71203005030	3	0.5	3	30	70	6
ESRR71203005035	3	0.5	3	35	75	6
ESRR71203005040	3	0.5	3	40	80	6
ESRR71203010010	3	1	3	10	50	6
ESRR71203010012	3	1	3	12	50	6
ESRR71203010016	3	1	3	16	55	6
ESRR71203010020	3	1	3	20	60	6
ESRR71203010025	3	1	3	25	65	6
ESRR71203010030	3	1	3	30	70	6
ESRR71203010035	3	1	3	35	75	6
ESRR71203010040	3	1	3	40	80	6
ESRR71204001012	4	0.1	4	12	50	6
ESRR71204001016	4	0.1	4	16	55	6
ESRR71204001020	4	0.1	4	20	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

ESRR712

2 FLUTES RIB RADIUS ENDMILL

New

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71204001025	4	0.1	4	25	65	6
ESRR71204001030	4	0.1	4	30	70	6
ESRR71204001035	4	0.1	4	35	75	6
ESRR71204001040	4	0.1	4	40	80	6
ESRR71204002012	4	0.2	4	12	50	6
ESRR71204002016	4	0.2	4	16	55	6
ESRR71204002020	4	0.2	4	20	60	6
ESRR71204002025	4	0.2	4	25	65	6
ESRR71204002030	4	0.2	4	30	70	6
ESRR71204002035	4	0.2	4	35	75	6
ESRR71204002040	4	0.2	4	40	80	6
ESRR71204003012	4	0.3	4	12	50	6
ESRR71204003016	4	0.3	4	16	55	6
ESRR71204003020	4	0.3	4	20	60	6
ESRR71204003025	4	0.3	4	25	65	6
ESRR71204003030	4	0.3	4	30	70	6
ESRR71204003035	4	0.3	4	35	75	6
ESRR71204003040	4	0.3	4	40	80	6
ESRR71204005012	4	0.5	4	12	50	6
ESRR71204005016	4	0.5	4	16	55	6
ESRR71204005020	4	0.5	4	20	60	6
ESRR71204005025	4	0.5	4	25	65	6
ESRR71204005030	4	0.5	4	30	70	6
ESRR71204005035	4	0.5	4	35	75	6
ESRR71204005040	4	0.5	4	40	80	6
ESRR71204010012	4	1	4	12	50	6
ESRR71204010016	4	1	4	16	55	6
ESRR71204010020	4	1	4	20	60	6
ESRR71204010025	4	1	4	25	65	6
ESRR71204010030	4	1	4	30	70	6
ESRR71204010035	4	1	4	35	75	6
ESRR71204010040	4	1	4	40	80	6
ESRR71205002015	5	0.2	6	15	60	6
ESRR71205002025	5	0.2	6	25	70	6
ESRR71205002030	5	0.2	6	30	70	6
ESRR71205002040	5	0.2	6	40	80	6
ESRR71205005015	5	0.5	6	15	60	6
ESRR71205005025	5	0.5	6	25	70	6

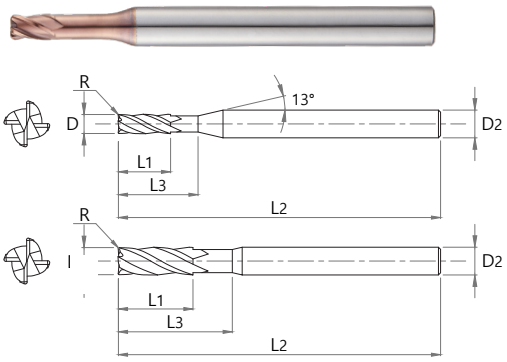
EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71205005030	5	0.5	6	30	70	6
ESRR71205005040	5	0.5	6	40	80	6
ESRR71205010015	5	1	6	15	60	6
ESRR71205010025	5	1	6	25	70	6
ESRR71205010030	5	1	6	30	70	6
ESRR71205010040	5	1	6	40	80	6
ESRR71206001020	6	0.1	7	20	60	6
ESRR71206001040	6	0.1	7	40	80	6
ESRR71206002020	6	0.2	7	20	60	6
ESRR71206002040	6	0.2	7	40	80	6
ESRR71206003020	6	0.3	7	20	60	6
ESRR71206003040	6	0.3	7	40	80	6
ESRR71206005020	6	0.5	7	20	60	6
ESRR71206005040	6	0.5	7	40	80	6
ESRR71206010020	6	1	7	20	60	6
ESRR71206010040	6	1	7	40	80	6
ESRR71206015020	6	1.5	7	20	60	6
ESRR71206015040	6	1.5	7	40	80	6
ESRR71208002022	8	0.2	9	22	65	8
ESRR71208003022	8	0.3	9	22	65	8
ESRR71208005022	8	0.5	9	22	65	8
ESRR71208010022	8	1	9	22	65	8
ESRR71208015022	8	1.5	9	22	65	8
ESRR71210002024	10	0.2	11	24	70	10
ESRR71210003024	10	0.3	11	24	70	10
ESRR71210005024	10	0.5	11	24	70	10
ESRR71210010024	10	1	11	24	70	10
ESRR71210015024	10	1.5	11	24	70	10
ESRR71210020024	10	2	11	24	70	10
ESRR71212002026	12	0.2	13	26	80	12
ESRR71212003026	12	0.3	13	26	80	12
ESRR71212005026	12	0.5	13	26	80	12
ESRR71212010026	12	1	13	26	80	12
ESRR71212015026	12	1.5	13	26	80	12
ESRR71212020026	12	2	13	26	80	12
ESRR71212030026	12	3	13	26	80	12
ESRR71216005035	16	0.5	20	35	110	16
ESRR71216010035	16	1	20	35	110	16

■ 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

ESRR714



- Excellent machinability with cutting edge considering the characteristics of high hardness workpiece
- Various R part and effective length specifications

ULTRA FINE | 4 | 30° HELIX | R ±0.01 D6≥ | R ±0.015 D6< | AlTiN | Recommended p.104

■ Tolerance

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

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71400500502	0.5	0.05	0.5	2	45	4
ESRR71400500504	0.5	0.05	0.5	4	45	4
ESRR71400500506	0.5	0.05	0.5	6	45	4
ESRR71400500508	0.5	0.05	0.5	8	45	4
ESRR71400501002	0.5	0.1	0.5	2	45	4
ESRR71400501004	0.5	0.1	0.5	4	45	4
ESRR71400501006	0.5	0.1	0.5	6	45	4
ESRR71400501008	0.5	0.1	0.5	8	45	4
ESRR71400600502	0.6	0.05	0.6	2	45	4
ESRR71400600504	0.6	0.05	0.6	4	45	4
ESRR71400600506	0.6	0.05	0.6	6	45	4
ESRR71400600508	0.6	0.05	0.6	8	45	4
ESRR71400601002	0.6	0.1	0.6	2	45	4
ESRR71400601004	0.6	0.1	0.6	4	45	4
ESRR71400601006	0.6	0.1	0.6	6	45	4
ESRR71400601008	0.6	0.1	0.6	8	45	4
ESRR71400700502	0.7	0.05	0.7	2	45	4
ESRR71400700504	0.7	0.05	0.7	4	45	4
ESRR71400700506	0.7	0.05	0.7	6	45	4
ESRR71400700508	0.7	0.05	0.7	8	45	4
ESRR71400701002	0.7	0.1	0.7	2	45	4
ESRR71400701004	0.7	0.1	0.7	4	45	4
ESRR71400701006	0.7	0.1	0.7	6	45	4
ESRR71400701008	0.7	0.1	0.7	8	45	4
ESRR71400800202	0.8	0.02	0.8	2	45	4
ESRR71400800204	0.8	0.02	0.8	4	45	4
ESRR71400800206	0.8	0.02	0.8	6	45	4
ESRR71400800208	0.8	0.02	0.8	8	45	4
ESRR71400800210	0.8	0.02	0.8	10	45	4
ESRR71400800212	0.8	0.02	0.8	12	50	4

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71400800502	0.8	0.05	0.8	2	45	4
ESRR71400800504	0.8	0.05	0.8	4	45	4
ESRR71400800506	0.8	0.05	0.8	6	45	4
ESRR71400800508	0.8	0.05	0.8	8	45	4
ESRR71400800510	0.8	0.05	0.8	10	45	4
ESRR71400800512	0.8	0.05	0.8	12	50	4
ESRR71400801002	0.8	0.1	0.8	2	45	4
ESRR71400801004	0.8	0.1	0.8	4	45	4
ESRR71400801006	0.8	0.1	0.8	6	45	4
ESRR71400801008	0.8	0.1	0.8	8	45	4
ESRR71400801010	0.8	0.1	0.8	10	45	4
ESRR71400801012	0.8	0.1	0.8	12	50	4
ESRR71401000204	1	0.02	1	4	45	4
ESRR71401000206	1	0.02	1	6	45	4
ESRR71401000208	1	0.02	1	8	45	4
ESRR71401000210	1	0.02	1	10	50	4
ESRR71401000212	1	0.02	1	12	50	4
ESRR71401000214	1	0.02	1	14	50	4
ESRR71401000216	1	0.02	1	16	50	4
ESRR71401000220	1	0.02	1	20	50	4
ESRR71401000503	1	0.05	1	3	45	4
ESRR71401000504	1	0.05	1	4	45	4
ESRR71401000506	1	0.05	1	6	45	4
ESRR71401000508	1	0.05	1	8	45	4
ESRR71401000510	1	0.05	1	10	50	4
ESRR71401000512	1	0.05	1	12	50	4
ESRR71401000514	1	0.05	1	14	50	4
ESRR71401000516	1	0.05	1	16	50	4
ESRR71401000520	1	0.05	1	20	50	4
ESRR71401001003	1	0.1	1	3	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

ESRR714

4 FLUTES RIB RADIUS ENDMILL

New

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71401001004	1	0.1	1	4	45	4
ESRR71401001006	1	0.1	1	6	45	4
ESRR71401001008	1	0.1	1	8	45	4
ESRR71401001010	1	0.1	1	10	50	4
ESRR71401001012	1	0.1	1	12	50	4
ESRR71401001014	1	0.1	1	14	50	4
ESRR71401001016	1	0.1	1	16	50	4
ESRR71401001020	1	0.1	1	20	50	4
ESRR71401002003	1	0.2	1	3	45	4
ESRR71401002004	1	0.2	1	4	45	4
ESRR71401002006	1	0.2	1	6	45	4
ESRR71401002008	1	0.2	1	8	45	4
ESRR71401002010	1	0.2	1	10	50	4
ESRR71401002012	1	0.2	1	12	50	4
ESRR71401002014	1	0.2	1	14	50	4
ESRR71401002016	1	0.2	1	16	50	4
ESRR71401002020	1	0.2	1	20	50	4
ESRR71401003003	1	0.3	1	3	45	4
ESRR71401003004	1	0.3	1	4	45	4
ESRR71401003006	1	0.3	1	6	45	4
ESRR71401003008	1	0.3	1	8	45	4
ESRR71401003010	1	0.3	1	10	50	4
ESRR71401003012	1	0.3	1	12	50	4
ESRR71401003014	1	0.3	1	14	50	4
ESRR71401003016	1	0.3	1	16	50	4
ESRR71401003020	1	0.3	1	20	50	4
ESRR71401200204	1.2	0.02	1.2	4	45	4
ESRR71401200206	1.2	0.02	1.2	6	45	4
ESRR71401200208	1.2	0.02	1.2	8	45	4
ESRR71401200210	1.2	0.02	1.2	10	50	4
ESRR71401200212	1.2	0.02	1.2	12	50	4
ESRR71401200214	1.2	0.02	1.2	14	50	4
ESRR71401200216	1.2	0.02	1.2	16	50	4
ESRR71401200220	1.2	0.02	1.2	20	50	4
ESRR71401200503	1.2	0.05	1.2	3	45	4
ESRR71401200504	1.2	0.05	1.2	4	45	4
ESRR71401200506	1.2	0.05	1.2	6	45	4
ESRR71401200508	1.2	0.05	1.2	8	45	4
ESRR71401200510	1.2	0.05	1.2	10	50	4
ESRR71401200512	1.2	0.05	1.2	12	50	4
ESRR71401200514	1.2	0.05	1.2	14	50	4
ESRR71401200516	1.2	0.05	1.2	16	50	4
ESRR71401200520	1.2	0.05	1.2	20	50	4
ESRR71401201003	1.2	0.1	1.2	3	45	4
ESRR71401201004	1.2	0.1	1.2	4	45	4
ESRR71401201006	1.2	0.1	1.2	6	45	4
ESRR71401201008	1.2	0.1	1.2	8	45	4

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71401201010	1.2	0.1	1.2	10	50	4
ESRR71401201012	1.2	0.1	1.2	12	50	4
ESRR71401201014	1.2	0.1	1.2	14	50	4
ESRR71401201016	1.2	0.1	1.2	16	50	4
ESRR71401201020	1.2	0.1	1.2	20	50	4
ESRR71401202003	1.2	0.2	1.2	3	45	4
ESRR71401202004	1.2	0.2	1.2	4	45	4
ESRR71401202006	1.2	0.2	1.2	6	45	4
ESRR71401202008	1.2	0.2	1.2	8	45	4
ESRR71401202010	1.2	0.2	1.2	10	50	4
ESRR71401202012	1.2	0.2	1.2	12	50	4
ESRR71401202014	1.2	0.2	1.2	14	50	4
ESRR71401202016	1.2	0.2	1.2	16	50	4
ESRR71401202020	1.2	0.2	1.2	20	50	4
ESRR71401203003	1.2	0.3	1.2	3	45	4
ESRR71401203004	1.2	0.3	1.2	4	45	4
ESRR71401203006	1.2	0.3	1.2	6	45	4
ESRR71401203008	1.2	0.3	1.2	8	45	4
ESRR71401203010	1.2	0.3	1.2	10	50	4
ESRR71401203012	1.2	0.3	1.2	12	50	4
ESRR71401203016	1.2	0.3	1.2	16	50	4
ESRR71401203020	1.2	0.3	1.2	20	50	4
ESRR71401500206	1.5	0.02	1.5	6	45	4
ESRR71401500208	1.5	0.02	1.5	8	45	4
ESRR71401500210	1.5	0.02	1.5	10	50	4
ESRR71401500212	1.5	0.02	1.5	12	50	4
ESRR71401500214	1.5	0.02	1.5	14	50	4
ESRR71401500216	1.5	0.02	1.5	16	50	4
ESRR71401500220	1.5	0.02	1.5	20	50	4
ESRR71401500222	1.5	0.02	1.5	22	60	4
ESRR71401500504	1.5	0.05	1.5	4	45	4
ESRR71401500506	1.5	0.05	1.5	6	45	4
ESRR71401500508	1.5	0.05	1.5	8	45	4
ESRR71401500510	1.5	0.05	1.5	10	50	4
ESRR71401500512	1.5	0.05	1.5	12	50	4
ESRR71401500514	1.5	0.05	1.5	14	50	4
ESRR71401500516	1.5	0.05	1.5	16	50	4
ESRR71401500520	1.5	0.05	1.5	20	50	4
ESRR71401500522	1.5	0.05	1.5	22	60	4
ESRR71401500526	1.5	0.05	1.5	26	60	4
ESRR71401501004	1.5	0.1	1.5	4	45	4
ESRR71401501006	1.5	0.1	1.5	6	45	4
ESRR71401501008	1.5	0.1	1.5	8	45	4
ESRR71401501010	1.5	0.1	1.5	10	50	4
ESRR71401501012	1.5	0.1	1.5	12	50	4
ESRR71401501014	1.5	0.1	1.5	14	50	4
ESRR71401501016	1.5	0.1	1.5	16	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

New

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ESRR714

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71401501020	1.5	0.1	1.5	20	50	4
ESRR71401501022	1.5	0.1	1.5	22	60	4
ESRR71401501026	1.5	0.1	1.5	26	60	4
ESRR71401502004	1.5	0.2	1.5	4	45	4
ESRR71401502006	1.5	0.2	1.5	6	45	4
ESRR71401502008	1.5	0.2	1.5	8	45	4
ESRR71401502010	1.5	0.2	1.5	10	50	4
ESRR71401502012	1.5	0.2	1.5	12	50	4
ESRR71401502014	1.5	0.2	1.5	14	50	4
ESRR71401502016	1.5	0.2	1.5	16	50	4
ESRR71401502020	1.5	0.2	1.5	20	50	4
ESRR71401502022	1.5	0.2	1.5	22	60	4
ESRR71401502025	1.5	0.2	1.5	25	60	4
ESRR71401503004	1.5	0.3	1.5	4	45	4
ESRR71401503006	1.5	0.3	1.5	6	45	4
ESRR71401503008	1.5	0.3	1.5	8	45	4
ESRR71401503010	1.5	0.3	1.5	10	50	4
ESRR71401503012	1.5	0.3	1.5	12	50	4
ESRR71401503014	1.5	0.3	1.5	14	50	4
ESRR71401503016	1.5	0.3	1.5	16	50	4
ESRR71401503020	1.5	0.3	1.5	20	50	4
ESRR71401503022	1.5	0.3	1.5	22	60	4
ESRR71401503025	1.5	0.3	1.5	25	60	4
ESRR71401505004	1.5	0.5	1.5	4	45	4
ESRR71401505006	1.5	0.5	1.5	6	45	4
ESRR71401505008	1.5	0.5	1.5	8	45	4
ESRR71401505010	1.5	0.5	1.5	10	50	4
ESRR71401505012	1.5	0.5	1.5	12	50	4
ESRR71401505014	1.5	0.5	1.5	14	50	4
ESRR71401505016	1.5	0.5	1.5	16	50	4
ESRR71401505020	1.5	0.5	1.5	20	50	4
ESRR71401505022	1.5	0.5	1.5	22	60	4
ESRR71401505025	1.5	0.5	1.5	25	60	4
ESRR71402000206	2	0.02	2	6	45	4
ESRR71402000208	2	0.02	2	8	45	4
ESRR71402000210	2	0.02	2	10	50	4
ESRR71402000212	2	0.02	2	12	50	4
ESRR71402000214	2	0.02	2	14	50	4
ESRR71402000216	2	0.02	2	16	50	4
ESRR71402000220	2	0.02	2	20	50	4
ESRR71402000225	2	0.02	2	25	60	4
ESRR71402000230	2	0.02	2	30	70	4
ESRR71402000506	2	0.05	2	6	45	4
ESRR71402000508	2	0.05	2	8	45	4
ESRR71402000510	2	0.05	2	10	50	4
ESRR71402000512	2	0.05	2	12	50	4
ESRR71402000514	2	0.05	2	14	50	4

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71402000516	2	0.05	2	16	50	4
ESRR71402000520	2	0.05	2	20	50	4
ESRR71402000525	2	0.05	2	25	60	4
ESRR71402000530	2	0.05	2	30	70	4
ESRR71402001006	2	0.1	2	6	45	4
ESRR71402001008	2	0.1	2	8	45	4
ESRR71402001010	2	0.1	2	10	50	4
ESRR71402001012	2	0.1	2	12	50	4
ESRR71402001014	2	0.1	2	14	50	4
ESRR71402001016	2	0.1	2	16	50	4
ESRR71402001020	2	0.1	2	20	50	4
ESRR71402001022	2	0.1	2	22	60	4
ESRR71402001025	2	0.1	2	25	60	4
ESRR71402001030	2	0.1	2	30	70	4
ESRR71402002006	2	0.2	2	6	45	4
ESRR71402002008	2	0.2	2	8	45	4
ESRR71402002010	2	0.2	2	10	50	4
ESRR71402002012	2	0.2	2	12	50	4
ESRR71402002014	2	0.2	2	14	50	4
ESRR71402002016	2	0.2	2	16	50	4
ESRR71402002020	2	0.2	2	20	50	4
ESRR71402002022	2	0.2	2	22	60	4
ESRR71402002025	2	0.2	2	25	60	4
ESRR71402002030	2	0.2	2	30	70	4
ESRR71402003006	2	0.3	2	6	45	4
ESRR71402003008	2	0.3	2	8	45	4
ESRR71402003010	2	0.3	2	10	50	4
ESRR71402003012	2	0.3	2	12	50	4
ESRR71402003014	2	0.3	2	14	50	4
ESRR71402003016	2	0.3	2	16	50	4
ESRR71402003020	2	0.3	2	20	50	4
ESRR71402003022	2	0.3	2	22	60	4
ESRR71402003025	2	0.3	2	25	60	4
ESRR71402003030	2	0.3	2	30	70	4
ESRR71402005006	2	0.5	3	6	45	4
ESRR71402005008	2	0.5	2	8	45	4
ESRR71402005010	2	0.5	2	10	50	4
ESRR71402005012	2	0.5	2	12	50	4
ESRR71402005014	2	0.5	2	14	50	4
ESRR71402005016	2	0.5	2	16	50	4
ESRR71402005020	2	0.5	2	20	50	4
ESRR71402005022	2	0.5	2	22	60	4
ESRR71402005025	2	0.5	2	25	60	4
ESRR71402005030	2	0.5	2	30	70	4
ESRR71402501008	2.5	0.1	2.5	8	45	4
ESRR71402501010	2.5	0.1	2.5	10	50	4
ESRR71402501012	2.5	0.1	2.5	12	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

ESRR714

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New

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71402501014	2.5	0.1	2.5	14	50	4
ESRR71402501016	2.5	0.1	2.5	16	50	4
ESRR71402501020	2.5	0.1	2.5	20	50	4
ESRR71402501025	2.5	0.1	2.5	25	60	4
ESRR71402501030	2.5	0.1	2.5	30	70	4
ESRR71402502008	2.5	0.2	2.5	8	45	4
ESRR71402502010	2.5	0.2	2.5	10	50	4
ESRR71402502012	2.5	0.2	2.5	12	50	4
ESRR71402502014	2.5	0.2	2.5	14	50	4
ESRR71402502016	2.5	0.2	2.5	16	50	4
ESRR71402502020	2.5	0.2	2.5	20	50	4
ESRR71402502025	2.5	0.2	2.5	25	60	4
ESRR71402502030	2.5	0.2	2.5	30	70	4
ESRR71402503008	2.5	0.3	2.5	8	45	4
ESRR71402503010	2.5	0.3	2.5	10	50	4
ESRR71402503012	2.5	0.3	2.5	12	50	4
ESRR71402503014	2.5	0.3	2.5	14	50	4
ESRR71402503016	2.5	0.3	2.5	16	50	4
ESRR71402503020	2.5	0.3	2.5	20	50	4
ESRR71402503025	2.5	0.3	2.5	25	60	4
ESRR71402503030	2.5	0.3	2.5	30	70	4
ESRR71402505008	2.5	0.5	2.5	8	45	4
ESRR71402505010	2.5	0.5	2.5	10	50	4
ESRR71402505012	2.5	0.5	2.5	12	50	4
ESRR71402505014	2.5	0.5	2.5	14	50	4
ESRR71402505016	2.5	0.5	2.5	16	50	4
ESRR71402505020	2.5	0.5	2.5	20	50	4
ESRR71402505025	2.5	0.5	2.5	25	60	4
ESRR71402505030	2.5	0.5	2.5	30	70	4
ESRR71403001008	3	0.1	3	8	45	6
ESRR71403001010	3	0.1	3	10	50	6
ESRR71403001012	3	0.1	3	12	50	6
ESRR71403001014	3	0.1	3	14	50	6
ESRR71403001016	3	0.1	3	16	55	6
ESRR71403001020	3	0.1	3	20	60	6
ESRR71403001025	3	0.1	3	25	65	6
ESRR71403001030	3	0.1	3	30	70	6
ESRR71403001035	3	0.1	3	35	75	6
ESRR71403001040	3	0.1	3	40	80	6
ESRR71403001045	3	0.1	3	45	90	6
ESRR71403002008	3	0.2	3	8	45	6
ESRR71403002010	3	0.2	3	10	50	6
ESRR71403002012	3	0.2	3	12	50	6
ESRR71403002014	3	0.2	3	14	50	6
ESRR71403002016	3	0.2	3	16	55	6
ESRR71403002020	3	0.2	3	20	60	6
ESRR71403002025	3	0.2	3	25	65	6

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71403002030	3	0.2	3	30	70	6
ESRR71403002035	3	0.2	3	35	75	6
ESRR71403002040	3	0.2	3	40	80	6
ESRR71403002045	3	0.2	3	45	90	6
ESRR71403003008	3	0.3	3	8	45	6
ESRR71403003010	3	0.3	3	10	50	6
ESRR71403003012	3	0.3	3	12	50	6
ESRR71403003014	3	0.3	3	14	50	6
ESRR71403003016	3	0.3	3	16	55	6
ESRR71403003020	3	0.3	3	20	60	6
ESRR71403003025	3	0.3	3	25	65	6
ESRR71403003030	3	0.3	3	30	70	6
ESRR71403003035	3	0.3	3	35	75	6
ESRR71403003040	3	0.3	3	40	80	6
ESRR71403003045	3	0.3	3	45	90	6
ESRR71403005008	3	0.5	3	8	45	6
ESRR71403005010	3	0.5	3	10	50	6
ESRR71403005012	3	0.5	3	12	50	6
ESRR71403005014	3	0.5	3	14	50	6
ESRR71403005016	3	0.5	3	16	55	6
ESRR71403005020	3	0.5	3	20	60	6
ESRR71403005025	3	0.5	3	25	65	6
ESRR71403005030	3	0.5	3	30	70	6
ESRR71403005035	3	0.5	3	35	75	6
ESRR71403005040	3	0.5	3	40	80	6
ESRR71403005045	3	0.5	3	45	90	6
ESRR71403005050	3	0.5	3	50	100	6
ESRR71403010008	3	1	3	8	45	6
ESRR71403010010	3	1	3	10	50	6
ESRR71403010012	3	1	3	12	50	6
ESRR71403010014	3	1	3	14	50	6
ESRR71403010016	3	1	3	16	55	6
ESRR71403010020	3	1	3	20	60	6
ESRR71403010025	3	1	3	25	65	6
ESRR71403010030	3	1	3	30	70	6
ESRR71403010035	3	1	3	35	75	6
ESRR71403010040	3	1	3	40	80	6
ESRR71403010045	3	1	3	45	90	6
ESRR71403010050	3	1	3	50	100	6
ESRR71404001010	4	0.1	4	10	50	6
ESRR71404001012	4	0.1	4	12	50	6
ESRR71404001013	4	0.1	4	13	55	6
ESRR71404001016	4	0.1	4	16	55	6
ESRR71404001020	4	0.1	4	20	60	6
ESRR71404001025	4	0.1	4	25	65	6
ESRR71404001030	4	0.1	4	30	70	6
ESRR71404001035	4	0.1	4	35	75	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

New

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ESRR714

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71404001040	4	0.1	4	40	80	6
ESRR71404001045	4	0.1	4	45	90	6
ESRR71404001050	4	0.1	4	50	100	6
ESRR71404002010	4	0.2	4	10	50	6
ESRR71404002012	4	0.2	4	12	50	6
ESRR71404002013	4	0.2	4	13	55	6
ESRR71404002016	4	0.2	4	16	55	6
ESRR71404002020	4	0.2	4	20	60	6
ESRR71404002025	4	0.2	4	25	65	6
ESRR71404002030	4	0.2	4	30	70	6
ESRR71404002035	4	0.2	4	35	75	6
ESRR71404002040	4	0.2	4	40	80	6
ESRR71404002045	4	0.2	4	45	90	6
ESRR71404002050	4	0.2	4	50	100	6
ESRR71404003010	4	0.3	4	10	50	6
ESRR71404003012	4	0.3	4	12	50	6
ESRR71404003013	4	0.3	4	13	55	6
ESRR71404003016	4	0.3	4	16	55	6
ESRR71404003020	4	0.3	4	20	60	6
ESRR71404003025	4	0.3	4	25	65	6
ESRR71404003030	4	0.3	4	30	70	6
ESRR71404003035	4	0.3	4	35	75	6
ESRR71404003040	4	0.3	4	40	80	6
ESRR71404003045	4	0.3	4	45	90	6
ESRR71404003050	4	0.3	4	50	100	6
ESRR71404005010	4	0.5	4	10	50	6
ESRR71404005012	4	0.5	4	12	50	6
ESRR71404005013	4	0.5	4	13	55	6
ESRR71404005016	4	0.5	4	16	55	6
ESRR71404005020	4	0.5	4	20	60	6
ESRR71404005025	4	0.5	4	25	65	6
ESRR71404005030	4	0.5	4	30	70	6
ESRR71404005035	4	0.5	4	35	75	6
ESRR71404005040	4	0.5	4	40	80	6
ESRR71404005045	4	0.5	4	45	90	6
ESRR71404005050	4	0.5	4	50	100	6
ESRR71404005055	4	0.5	4	55	100	6
ESRR71404010010	4	1	4	10	50	6
ESRR71404010012	4	1	4	12	50	6
ESRR71404010013	4	1	4	13	55	6
ESRR71404010016	4	1	4	16	55	6
ESRR71404010020	4	1	4	20	60	6
ESRR71404010025	4	1	4	25	65	6
ESRR71404010030	4	1	4	30	70	6
ESRR71404010035	4	1	4	35	75	6
ESRR71404010040	4	1	4	40	80	6
ESRR71404010045	4	1	4	45	90	6

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71404010050	4	1	4	50	100	6
ESRR71404010055	4	1	4	55	100	6
ESRR71405001016	5	0.1	5	16	60	6
ESRR71405001030	5	0.1	5	30	70	6
ESRR71405001040	5	0.1	5	40	80	6
ESRR71405002016	5	0.2	5	16	60	6
ESRR71405002030	5	0.2	5	30	70	6
ESRR71405002040	5	0.2	5	40	80	6
ESRR71405003016	5	0.3	5	16	60	6
ESRR71405003030	5	0.3	5	30	70	6
ESRR71405003040	5	0.3	5	40	80	6
ESRR71405005016	5	0.5	5	16	60	6
ESRR71405005030	5	0.5	5	30	70	6
ESRR71405005040	5	0.5	5	40	80	6
ESRR71405005050	5	0.5	5	50	100	6
ESRR71405005060	5	0.5	5	60	110	6
ESRR71405010016	5	1	5	16	60	6
ESRR71405010030	5	1	5	30	70	6
ESRR71405010040	5	1	5	40	80	6
ESRR71405010050	5	1	5	50	100	6
ESRR71405010060	5	1	5	60	110	6
ESRR71405015015	5	1.5	5	15	60	6
ESRR71405020015	5	2	5	15	60	6
ESRR71406001020	6	0.1	7	20	60	6
ESRR71406001040	6	0.1	7	40	80	6
ESRR71406001050	6	0.1	7	50	100	6
ESRR71406002020	6	0.2	7	20	60	6
ESRR71406002040	6	0.2	7	40	80	6
ESRR71406002050	6	0.2	7	50	100	6
ESRR71406003020	6	0.3	7	20	60	6
ESRR71406003030	6	0.3	7	30	70	6
ESRR71406003040	6	0.3	7	40	80	6
ESRR71406003050	6	0.3	7	50	100	6
ESRR71406005020	6	0.5	7	20	60	6
ESRR71406005030	6	0.5	7	30	70	6
ESRR71406005040	6	0.5	7	40	80	6
ESRR71406005050	6	0.5	7	50	100	6
ESRR71406005060	6	0.5	7	60	110	6
ESRR71406010020	6	1	7	20	60	6
ESRR71406010030	6	1	7	30	70	6
ESRR71406010040	6	1	7	40	80	6
ESRR71406010050	6	1	7	50	100	6
ESRR71406010060	6	1	7	60	110	6
ESRR71406015020	6	1.5	7	20	60	6
ESRR71406015040	6	1.5	7	40	80	6
ESRR71406015050	6	1.5	7	50	100	6
ESRR71406020020	6	2	7	20	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

ESRR714

4 FLUTES RIB RADIUS ENDMILL

New

EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71406020030	6	2	7	30	70	6
ESRR71406020040	6	2	7	40	80	6
ESRR71406020050	6	2	7	50	100	6
ESRR71408001025	8	0.1	9	25	70	8
ESRR71408002022	8	0.2	9	22	65	8
ESRR71408002040	8	0.2	9	40	100	8
ESRR71408003022	8	0.3	9	22	65	8
ESRR71408003040	8	0.3	9	40	100	8
ESRR71408005022	8	0.5	9	22	65	8
ESRR71408005035	8	0.5	9	35	100	8
ESRR71408005040	8	0.5	9	40	100	8
ESRR71408005050	8	0.5	9	50	120	8
ESRR71408005060	8	0.5	9	60	120	8
ESRR71408010022	8	1	9	22	65	8
ESRR71408010035	8	1	9	35	100	8
ESRR71408010040	8	1	9	40	100	8
ESRR71408010050	8	1	9	50	120	8
ESRR71408010060	8	1	9	60	120	8
ESRR71408015022	8	1.5	9	22	65	8
ESRR71408015040	8	1.5	9	40	100	8
ESRR71408020022	8	2	9	22	65	8
ESRR71408020040	8	2	9	40	100	8
ESRR71408020050	8	2	9	50	120	8
ESRR71410001030	10	0.1	11	30	75	10
ESRR71410002024	10	0.2	11	24	70	10
ESRR71410002040	10	0.2	11	40	100	10
ESRR71410003024	10	0.3	11	24	70	10
ESRR71410003040	10	0.3	11	40	100	10
ESRR71410005024	10	0.5	11	24	70	10
ESRR71410005040	10	0.5	11	40	100	10
ESRR71410005050	10	0.5	11	50	120	10
ESRR71410005060	10	0.5	11	60	120	10

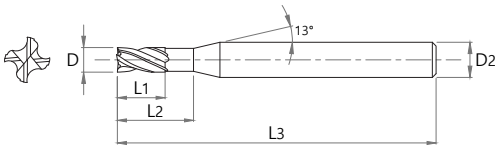
EDP No.	Dimensions(mm)					
	D	R	L1	L3	L2	D2
ESRR71410010024	10	1	11	24	70	10
ESRR71410010040	10	1	11	40	100	10
ESRR71410010050	10	1	11	50	120	10
ESRR71410010060	10	1	11	60	120	10
ESRR71410015024	10	1.5	11	24	70	10
ESRR71410015040	10	1.5	11	40	100	10
ESRR71410020024	10	2	11	24	70	10
ESRR71410020040	10	2	11	40	100	10
ESRR71410020050	10	2	11	50	120	10
ESRR71410025024	10	2.5	11	24	70	10
ESRR71412002032	12	0.2	13	32	80	12
ESRR71412003026	12	0.3	13	26	80	12
ESRR71412003045	12	0.3	13	45	110	12
ESRR71412005026	12	0.5	13	26	80	12
ESRR71412005040	12	0.5	13	40	110	12
ESRR71412005060	12	0.5	13	60	130	12
ESRR71412010026	12	1	13	26	80	12
ESRR71412010040	12	1	13	40	110	12
ESRR71412010060	12	1	13	60	130	12
ESRR71412015026	12	1.5	13	26	80	12
ESRR71412020026	12	2	13	26	80	12
ESRR71412020040	12	2	13	40	110	12
ESRR71412030026	12	3	13	26	80	12
ESRR71416005035	16	0.5	20	35	100	16
ESRR71416005050	16	0.5	35	50	150	20
ESRR71416010035	16	1	20	35	100	16
ESRR71416010050	16	1	35	50	150	20
ESRR71420005040	20	0.5	25	40	100	20
ESRR71420005055	20	0.5	40	55	150	20
ESRR71420010040	20	1	25	40	100	20
ESRR71420010055	20	1	40	55	150	20

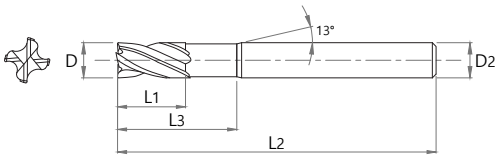
■ Applicable working material

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

ESXE704





ULTRA FINE | 4 | M HELIX | AlTiN | Recommended

p.115

- 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

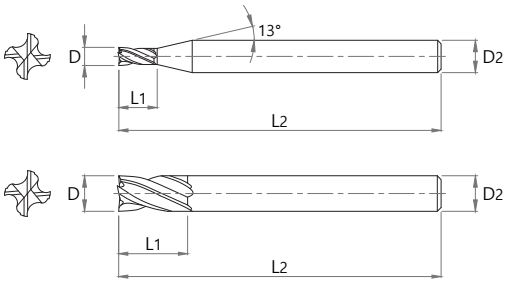
■ Applicable working material

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.115

■ Tolerance

D		Shank Dia.
All sizes	0~-0.02	h5

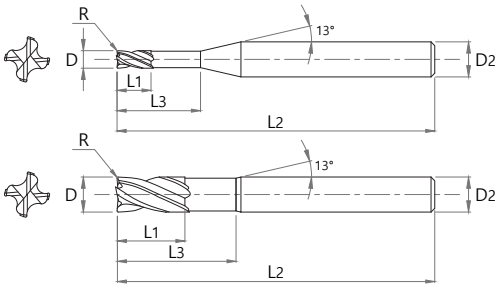
EDP No.	Dimensions(mm)			
	D	L1	L2	D2
ESXE714020	2	5	45	4
ESXE714030	3	8	45	6
ESXE714040	4	10	45	6
ESXE714040S4	4	10	45	4
ESXE714060	6	16	50	6
ESXE714080	8	20	60	8
ESXE714100	10	25	75	10
ESXE714120	12	35	85	12

■ 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.115

■ 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

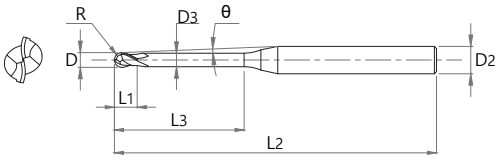
■ Applicable working material

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

ULTRA FINE | 2 | 30° HELIX | R ±0.005 R3≥ | AlTiN | Recommended p.115

■ Tolerance

D		Shank Dia.
All sizes	0~-0.02	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°
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	-	-

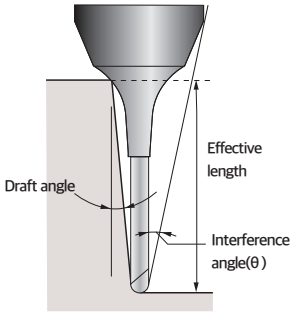
■ Applicable working material

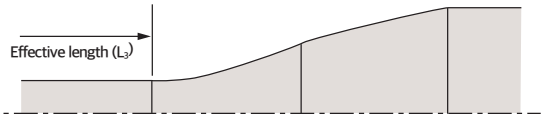
Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : 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.

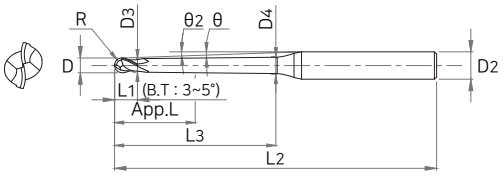
■ Applicable working material

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

ESTNB20

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.116

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

ESTNB20

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

ESTNB20

2 FLUTES TAPERED NECK TYPE BALL ENDMILL

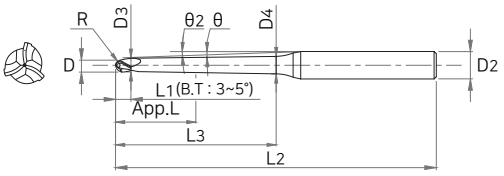
EDP No.	Dimensions(mm)											Effective length from draft angle of workpiece				
	D	R	L1	L3	θ2	D3	D4	L2	D2	App.L	θ	0.5°	1°	1.5°	2°	3°
ESTNB2020-8-04	2	1	1.7	8	0.4	1.92	2.01	50	6	7.42	7	8.7	9	9.2	9.5	10.2
ESTNB2020-12-04	2	1	1.7	12	0.4	1.92	2.06	55	6	7.42	5.7	13.0	13.6	14.0	14.4	15.4
ESTNB2020-16-04	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 ◎ : EXCELLENT

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.119

■ 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

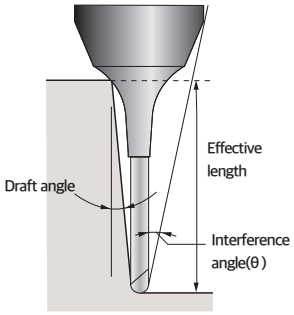
Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

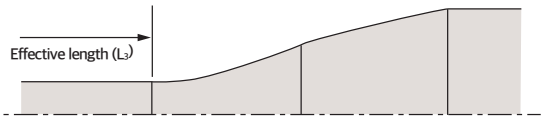
○ : GOOD ◎ : EXCELLENT

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	-	-	-





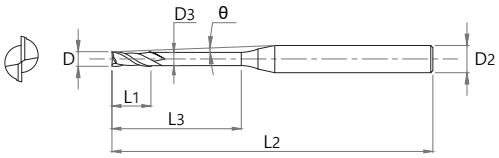
※ Marked effective length is set to prevent interfering in workpiece.
You need to take proper control when machining.

■ 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

ESLNS20



※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

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■ 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

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°
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

ESLNS20

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

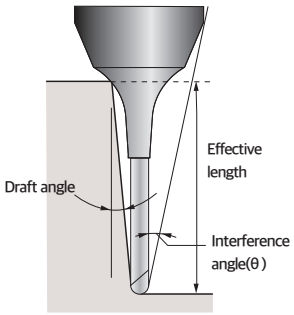
Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : 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	-	-	-	-



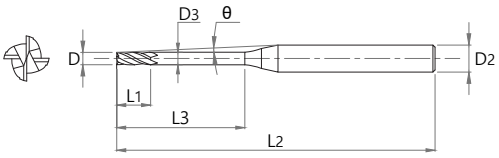
※ Marked effective length is set to prevent interfering in workpiece.
You need to take proper control when machining.

■ 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.123

■ 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°
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

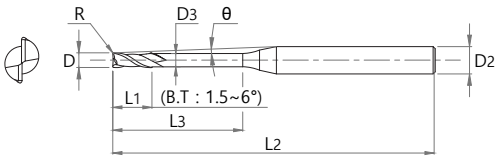
EDP No.	Dimensions(mm)							Effective length from draft angle of workpiece				
	D	L1	L3	D3	L2	D2	θ	0.5°	1°	1.5°	2°	3°
ESLNS4025-18	2.5	3.75	18	2.4	60	4	2	20.1	20.8	21.4	-	-
ESLNS4025-20	2.5	3.75	20	2.4	60	4	1.8	22.1	22.9	23.5	-	-
ESLNS4025-25	2.5	3.75	25	2.4	65	4	1.5	27.3	28.2	-	-	-
ESLNS4025-30	2.5	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

ESLNR20



※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.124

■ Tolerance

D		Shank Dia.
All sizes	0~-0.02	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

ESLNR20

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	-

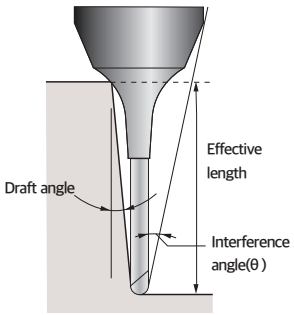
■ Applicable working material

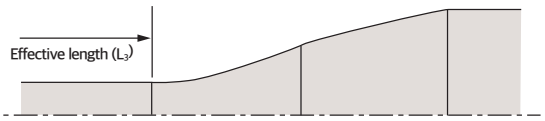
Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESLNR20

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.

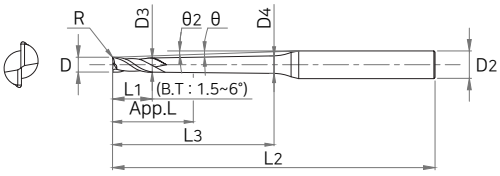
■ Applicable working material

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

ESTNR20

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.127

■ 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

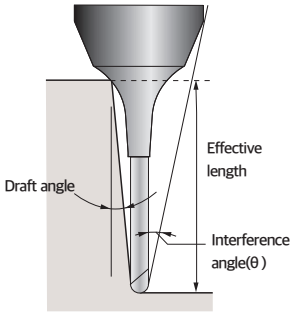
■ Applicable working material

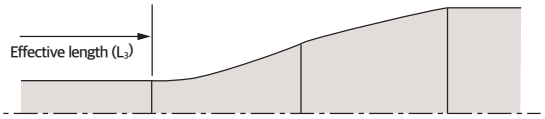
Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : GOOD ◎ : EXCELLENT

ESTNR20

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

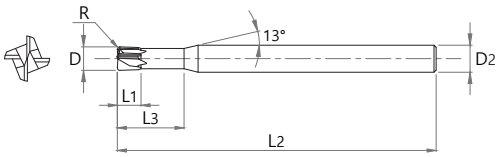
Carbon steel ~HB225	Alloy Steel HB225 ~ 325	Pre hardened Steel HB225 ~ 325	Hardened steel		Copper	Graphite	Cast iron ~ FCD500	Aluminum	Stainless Steel
			SKD61 ~HRc55	SKD11 HRc55~63					
		○	◎	◎	○				

○ : 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.129

■ 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

MEMO

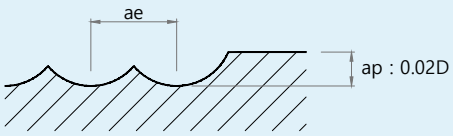
Recommended Cutting Condition

[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



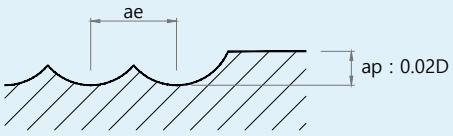
Recommended Cutting Condition

[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.

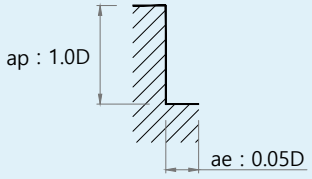
*ae : D1~D4 = 0.05xD
D5~D8 = 0.025mm
D10~D20 = 0.30mm

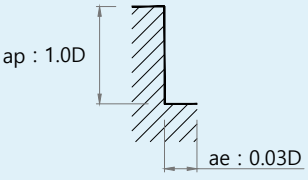


[ESB703 series] ▶ Side cutting

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.





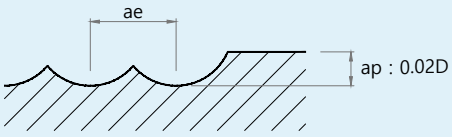
Recommended Cutting Condition

[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

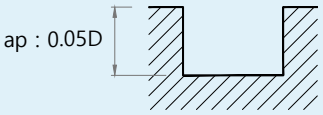


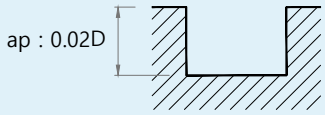
Recommended Cutting Condition

[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.

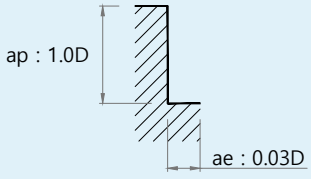




[ESE702 series] ▶ Side cutting

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.

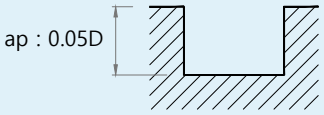


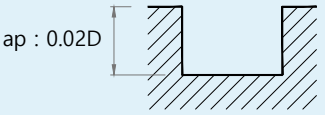
Recommended Cutting Condition

[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.

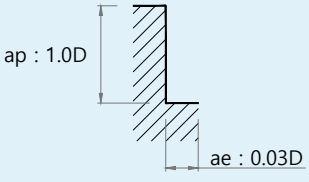




[ESE712 series] ▶ Side cutting

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.

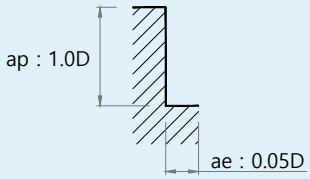


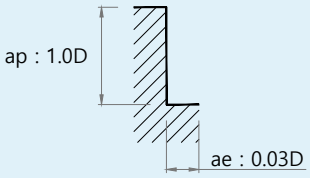
Recommended Cutting Condition

[ESE704, ESE714, ESE744 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.

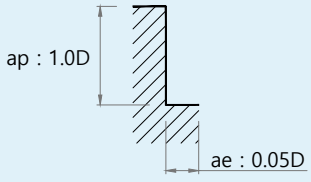


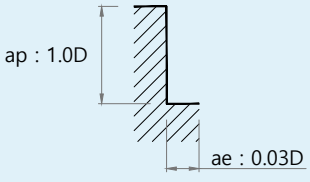


[ESE724 series] ▶ Side cutting

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.



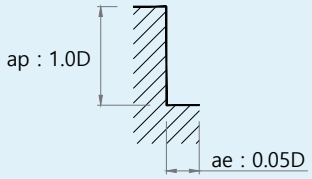


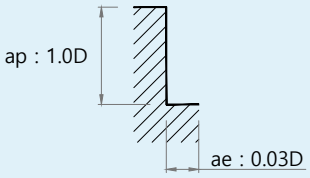
Recommended Cutting Condition

[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.

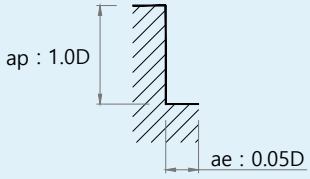


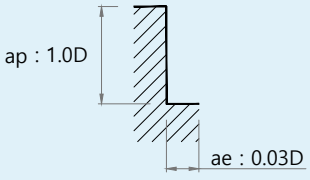


[ESE716 series] ▶ Side cutting

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.



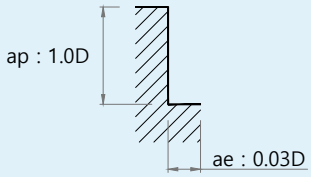


Recommended Cutting Condition

[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

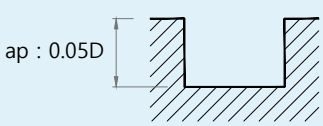
RPM = rev. / min.
FEED - mm / min.

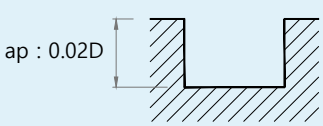


[ESR702, ESR732 series] ▶ Slotting

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.





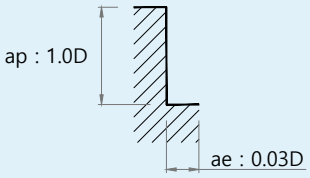
Recommended Cutting Condition

[ESR704, ESR714, ESR724, ESR734 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

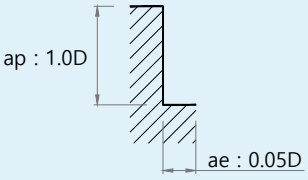
RPM = rev. / min.
FEED - mm / min.

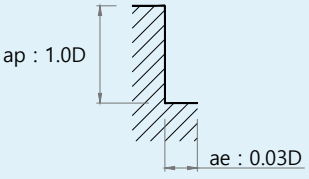


[ESR706 series]

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.





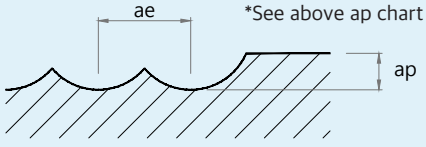
Recommended Cutting Condition

[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



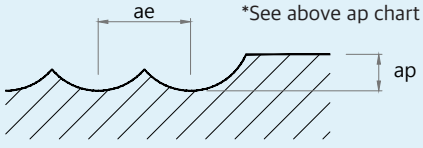
Recommended Cutting Condition

[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



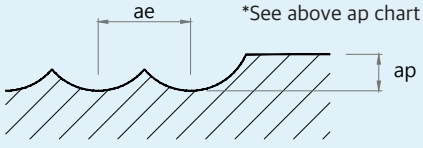
Recommended Cutting Condition

[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



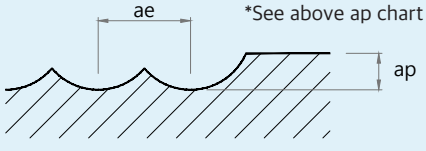
Recommended Cutting Condition

[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



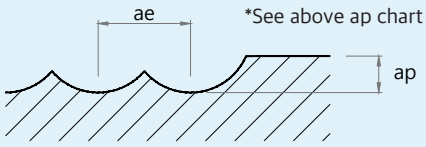
Recommended Cutting Condition

[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

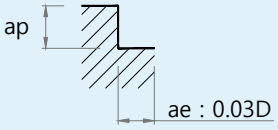


Recommended Cutting Condition

[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.



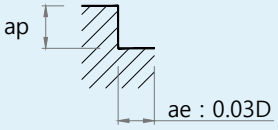
*See above ap chart

Recommended Cutting Condition

[ESRE712 series] ▶ 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)
0.6	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.



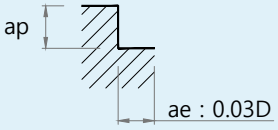
*See above ap chart

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.



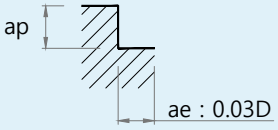
*See above ap chart

Recommended Cutting Condition

[ESRE712 series] ▶ 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)
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.



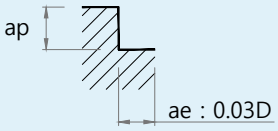
*See above ap chart

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.



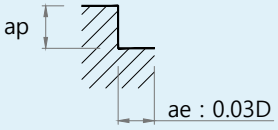
*See above ap chart

Recommended Cutting Condition

[ESRE714 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)
0.5	1	27,400	756	0.045	25,800	595	0.035	22,800	399	0.025
0.5	2	27,400	756	0.032	25,800	595	0.025	22,800	399	0.018
0.5	3	24,660	609	0.018	23,220	483	0.014	20,520	322	0.01
0.5	4	24,660	609	0.018	23,220	483	0.014	20,520	322	0.01
0.5	5	24,660	609	0.011	23,220	483	0.009	20,520	322	0.006
0.5	6	21,920	483	0.011	20,640	378	0.009	18,240	252	0.006
0.5	8	16,440	315	0.007	15,480	252	0.005	13,680	168	0.004
0.5	10	16,440	315	0.005	15,480	252	0.004	13,680	168	0.003
0.6	1	27,400	1085	0.038	25,800	763	0.029	22,800	567	0.021
0.6	2	27,400	1085	0.038	25,800	763	0.029	22,800	567	0.021
0.6	3	27,400	1085	0.038	25,800	763	0.029	22,800	567	0.021
0.6	4	24,660	882	0.022	23,220	616	0.017	20,520	462	0.012
0.6	5	24,660	882	0.014	23,220	616	0.011	20,520	462	0.008
0.6	6	24,660	882	0.014	23,220	616	0.011	20,520	462	0.008
0.6	8	21,920	693	0.008	20,640	490	0.006	18,240	364	0.005
0.6	10	16,440	455	0.005	15,480	322	0.004	13,680	238	0.003
0.6	12	16,440	455	0.005	15,480	322	0.004	13,680	238	0.003
0.7	2	27,400	1085	0.063	25,800	763	0.049	22,800	567	0.035
0.7	4	24,660	882	0.025	23,220	616	0.02	20,520	462	0.014
0.7	6	24,660	693	0.016	23,220	616	0.012	20,520	462	0.009
0.7	8	21,920	693	0.016	20,640	490	0.012	18,240	364	0.009
0.7	10	21,920		0.009	20,640	490	0.007	18,240	364	0.005
0.8	1	27,400	1085	0.072	25,800	847	0.056	22,800	630	0.04
0.8	2	27,400	1085	0.072	25,800	847	0.056	22,800	630	0.04
0.8	3	27,400	1085	0.05	25,800	847	0.039	22,800	630	0.028
0.8	4	27,400	1085	0.05	25,800	847	0.039	22,800	630	0.028
0.8	5	24,660	882	0.029	23,220	686	0.022	20,520	511	0.016
0.8	6	24,660	882	0.029	23,220	686	0.022	20,520	511	0.016
0.8	8	24,660	882	0.018	23,220	686	0.014	20,520	511	0.01
0.8	10	21,920	693	0.018	20,640	539	0.014	18,240	406	0.01
0.8	12	21,920	693	0.011	20,640	539	0.008	18,240	406	0.006
0.8	16	16,440	455	0.007	15,480	357	0.006	13,680	266	0.004
1	2	24,600	1463	0.09	23,300	1246	0.07	20,500	931	0.05
1	3	24,600	1463	0.09	23,300	1246	0.07	20,500	931	0.05
1	4	24,600	1463	0.063	23,300	1246	0.049	20,500	931	0.035
1	6	22,140	1183	0.036	20,970	1008	0.028	18,450	756	0.02
1	8	22,140	1183	0.036	20,970	1008	0.028	18,450	756	0.02
1	10	22,140	1183	0.023	20,970	1008	0.018	18,450	756	0.013
1	12	19,680	938	0.023	18,640	798	0.018	16,400	595	0.013
1	14	19,680	938	0.014	18,640	798	0.011	16,400	595	0.008
1	16	14,760	616	0.014	13,980	525	0.011	12,300	392	0.008
1	18	14,760	616	0.009	13,980	525	0.007	12,300	392	0.005
1	20	14,760	616	0.009	13,980	525	0.007	12,300	392	0.005
1.2	4	21,900	1,302	0.076	20,700	1008	0.059	18,200	679	0.042
1.2	6	21,900	1,302	0.076	20,700	1008	0.059	18,200	679	0.042
1.2	8	19,710	1,057	0.043	18,630	819	0.034	16,380	553	0.024

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



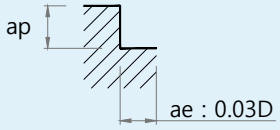
*See above ap chart

Recommended Cutting Condition

[ESRE714 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	10	19,710	1,057	0.027	18,630	819	0.021	16,380	553	0.015
1.2	12	19,710	1057	0.027	18,630	819	0.021	16,380	553	0.015
1.2	16	17,520	833	0.016	16,560	644	0.013	14,560	434	0.009
1.2	18	17,520	833	0.016	16,560	644	0.013	14,560	434	0.009
1.2	20	13,140	546	0.011	12,420	420	0.008	10,920	287	0.006
1.4	6	19,200	1141	0.088	18,100	798	0.069	16,000	595	0.049
1.4	8	17,280	924	0.05	16,290	644	0.039	14,400	483	0.028
1.4	10	17,280	924	0.05	16,290	644	0.039	14,400	483	0.028
1.4	12	17,280	924	0.05	16,290	644	0.039	14,400	483	0.028
1.4	14	17,280	924	0.032	16,290	644	0.025	14,400	483	0.018
1.4	16	15,360	728	0.032	14,480	511	0.025	12,800	378	0.018
1.5	4	19,200	1267	0.135	18,100	889	0.105	16,000	665	0.075
1.5	6	19,200	1267	0.095	18,100	889	0.074	16,000	665	0.053
1.5	8	17,280	1029	0.054	16,290	721	0.042	14,400	539	0.03
1.5	10	17,280	1029	0.054	16,290	721	0.042	14,400	539	0.03
1.5	12	17,280	1029	0.054	16,290	721	0.042	14,400	539	0.03
1.5	16	15,360	812	0.034	14,480	567	0.026	12,800	427	0.019
1.5	18	15,360	812	0.034	14,480	567	0.026	12,800	427	0.019
1.5	20	15,360	812	0.02	14,480	567	0.016	12,800	427	0.011
1.5	25	11,520	532	0.014	10,860	371	0.011	9,600	280	0.008
1.5	30	11,520	532	0.014	10,860	371	0.011	9,600	280	0.008
1.6	6	17,800	1176	0.101	16,800	917	0.078	14,800	686	0.056
1.6	8	17,800	1176	0.101	16,800	917	0.078	14,800	686	0.056
1.6	10	16,020	952	0.058	15,120	742	0.045	13,320	553	0.032
1.6	12	16,020	952	0.058	15,120	742	0.045	13,320	553	0.032
1.6	14	16,020	952	0.058	15,120	742	0.045	13,320	553	0.032
1.6	16	16,020	952	0.036	15,120	752	0.028	13,320	553	0.02
1.6	18	16,020	952	0.036	15,120	752	0.028	13,320	553	0.02
1.6	20	14,240	756	0.036	13,440	588	0.028	11,840	441	0.02
1.6	25	14,240	756	0.036	13,440	588	0.028	11,840	441	0.02
1.8	6	17,800	1176	0.113	16,800	917	0.088	14,800	686	0.063
1.8	8	17,800	1176	0.113	16,800	917	0.088	14,800	686	0.063
1.8	10	16,020	952	0.065	15,120	742	0.05	13,320	553	0.036
1.8	12	16,020	952	0.065	15,120	742	0.05	13,320	553	0.036
1.8	16	16,020	952	0.041	15,120	742	0.032	13,320	553	0.023
1.8	20	14,240	756	0.041	13,440	588	0.032	11,840	441	0.023
1.8	25	14,240	756	0.041	13,440	588	0.032	11,840	441	0.023
2	4	14,400	1148	0.18	13,600	868	0.14	12,000	665	0.1
2	6	14,400	1148	0.18	13,600	868	0.14	12,000	665	0.1
2	8	14,400	1148	0.126	13,600	868	0.098	12,000	665	0.07
2	10	14,400	1148	0.126	13,600	868	0.098	12,000	665	0.07
2	12	12,960	931	0.072	12,240	700	0.056	10,800	539	0.04
2	14	12,960	931	0.072	12,240	700	0.056	10,800	539	0.04
2	16	12,960	931	0.072	12,240	700	0.056	10,800	539	0.04
2	18	12,960	931	0.045	12,240	700	0.035	10,800	539	0.025
2	20	12,960	931	0.045	12,240	700	0.035	10,800	539	0.025

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



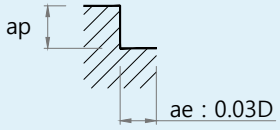
*See above ap chart

Recommended Cutting Condition

[ESRE714 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	22	11,520	735	0.045	10,880	553	0.035	9,600	427	0.025
2	25	11,520	735	0.045	10,880	553	0.035	9,600	427	0.025
2	30	11,520	735	0.027	10,880	553	0.021	9,600	427	0.015
2.5	10	12,300	1358	0.158	11,600	952	0.123	10,300	714	0.088
2.5	12	12,300	1358	0.158	11,600	952	0.123	10,300	714	0.088
2.5	16	11,070	1099	0.09	10,440	770	0.07	9,270	581	0.05
2.5	20	11,070	1099	0.09	10,440	770	0.07	9,270	581	0.05
2.5	25	9,840	868	0.056	9,280	609	0.044	8,240	455	0.031
2.5	30	9,840	868	0.056	9,280	609	0.044	8,240	455	0.031
3	6	10,900	1204	0.27	10,300	847	0.21	6,600	630	0.15
3	8	10,900	1204	0.27	10,300	847	0.21	6,600	630	0.15
3	10	10,900	1204	0.189	10,300	847	0.147	6,600	630	0.105
3	12	10,900	1204	0.189	10,300	847	0.147	6,600	630	0.105
3	16	9,810	973	0.108	9,270	686	0.084	5,940	511	0.06
3	20	9,810	973	0.108	9,270	686	0.084	5,940	511	0.06
3	25	9,810	973	0.068	9,270	686	0.053	5,940	511	0.038
3	30	9,810	973	0.068	9,270	686	0.053	5,940	511	0.038
3	35	8,720	770	0.068	8,240	539	0.053	5,280	406	0.038
3	40	8,720	770	0.041	8,240	539	0.032	5,280	406	0.023
3	45	8,720	770	0.041	8,240	539	0.032	5,280	406	0.023
3	50	6,540	504	0.027	6,180	357	0.021	3,960	266	0.015
3	60	6,540	504	0.027	6,180	357	0.021	3,960	266	0.015
3.5	12	9,310	1430	0.236	8,800	1008	0.183	5,640	750	0.131
3.5	16	8,380	1158	0.135	7,920	816	0.105	5,070	608	0.075
3.5	20	8,380	1158	0.135	7,920	816	0.105	5,070	608	0.047
3.5	25	8,380	1158	0.085	7,920	816	0.066	5,070	608	0.047
3.5	30	8,380	1158	0.085	7,920	816	0.066	5,070	608	0.047
3.5	35	7,450	916	0.085	7,040	641	0.066	4,510	483	0.047
3.5	40	7,450	916	0.051	7,040	641	0.04	4,510	483	0.028
4	6	8,000	1820	0.36	7,600	1624	0.28	6,700	1078	0.2
4	8	8,000	1820	0.36	7,600	1624	0.28	6,700	1078	0.2
4	10	8,000	1820	0.36	7,600	1624	0.28	6,700	1078	0.2
4	12	8,000	1820	0.36	7,600	1624	0.28	6,700	1078	0.2
4	16	8,000	1820	0.252	7,600	1624	0.196	6,700	1078	0.14
4	20	8,000	1820	0.252	7,600	1624	0.196	6,700	1078	0.14
4	25	7,200	1477	0.144	6,840	1316	0.112	6,030	875	0.08
4	30	7,200	1477	0.144	6,840	1316	0.112	6,030	875	0.08
4	40	7,200	1477	0.09	6,840	1316	0.07	6,030	875	0.05
4	45	6,400	1162	0.09	6,080	1036	0.07	5,360	693	0.05
4	50	6,400	1162	0.09	6,080	1036	0.07	5,360	693	0.05
4	60	6,400	1162	0.054	6,080	1036	0.042	5,360	693	0.03
4.5	12	6,830	2166	0.45	6,490	1933	0.35	5,720	1283	0.25
4.5	16	6,830	2166	0.315	6,490	1933	0.245	5,720	1283	0.175
4.5	20	6,830	2166	0.315	6,490	1933	0.245	5,720	1283	0.175
4.5	25	6,150	1758	0.18	5,840	1566	0.14	5,150	1041	0.1
4.5	30	6,150	1758	0.18	5,840	1566	0.14	5,150	1041	0.1

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



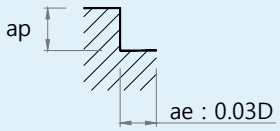
*See above ap chart

Recommended Cutting Condition

[ESRE714 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)
4.5	40	6,150	1758	0.112	5,840	1566	0.087	5,150	1041	0.062
5	16	6,400	1617	0.315	6,100	1260	0.245	5,400	847	0.175
5	20	6,400	1617	0.315	6,100	1260	0.245	5,400	847	0.175
5	25	5,760	1309	0.18	5,490	1022	0.14	4,860	686	0.1
5	30	5,760	1309	0.18	5,490	1022	0.14	4,860	686	0.1
5	40	5,760	1309	0.18	5,490	1022	0.14	4,860	686	0.1
5	50	5,760	1309	0.113	5,490	1022	0.088	4,860	686	0.063
5	60	5,120	1036	0.113	4,880	805	0.088	4,320	539	0.063
6	20	5,300	1477	0.378	5,000	1148	0.294	4,400	770	0.21
6	30	5,300	1,477	0.378	5,000	1,148	0.294	4,400	770	0.21
6	40	4,770	1,197	0.216	4,500	931	0.168	3,960	623	0.12
6	50	4,770	1,197	0.216	4,500	931	0.168	3,960	623	0.12
6	60	4,370	958	0.141	4,171	931	0.11	3,690	623	0.078
8	25	4,000	1,330	0.504	3,800	1,050	0.392	3,300	700	0.28
8	40	3,600	1,078	0.288	3,400	847	0.224	2,950	567	0.16
8	50	3,600	1,078	0.288	3,400	847	0.224	2,950	567	0.16
10	30	3,200	1,260	0.9	3,050	952	0.7	2,630	560	0.5
10	50	3,200	1,260	0.63	3,050	952	0.49	2,630	560	0.35
10	60	3,200	1,260	0.63	3,050	952	0.49	2,630	560	0.35
12	40	2,650	1,120	0.756	2,520	840	0.588	2,180	490	0.42
12	60	2,360	896	0.472	2,250	672	0.367	1,940	392	0.262
12	70	2,360	896	0.472	2,250	672	0.367	1,940	392	0.262

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



*See above ap chart

Recommended Cutting Condition

[ESRR712 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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	0.02	0.5	0.016	50,000	258	50,000	205	50,000	180	50,000	160
		1	0.011	50,000	258	50,000	205	50,000	180	50,000	160
		1.5	0.007	42,000	202	36,700	176	36,700	162	36,700	147
	0.05	0.5	0.02	50,000	258	50,000	205	50,000	180	50,000	160
		1	0.014	50,000	258	50,000	205	50,000	180	50,000	160
		1.5	0.008	50,000	240	45,900	202	45,900	170	45,900	153
0.3	0.02	1	0.016	50,000	585	50,000	456	50,000	336	50,000	320
		2	0.011	45,000	530	45,000	420	45,000	300	45,000	290
		3	0.007	35,000	412	35,000	326	30,000	200	30,000	194
	0.05	1	0.021	50,000	585	50,000	456	50,000	336	50,000	320
		2	0.012	45,000	530	45,000	420	45,000	300	45,000	290
		3	0.008	35,000	412	35,000	326	30,000	200	30,000	194
0.4	0.02	1	0.016	50,000	580	50,000	461	40,000	320	36,000	270
		2	0.013	45,000	520	45,000	410	36,000	290	34,000	240
		3	0.01	40,000	410	40,000	330	32,800	240	25,600	200
		4	0.007	30,000	320	30,000	250	21,600	160	19,200	150
	0.05	1	0.025	50,000	580	50,000	461	40,000	320	36,000	270
		2	0.016	45,000	520	45,000	410	36,000	290	34,000	240
		3	0.014	40,000	410	40,000	330	32,800	240	25,600	200
		4	0.008	30,000	320	30,000	250	21,600	160	19,200	150
	0.1	1	0.033	50,000	580	50,000	461	40,000	320	36,000	270
		1.5	0.03	50,000	580	50,000	461	40,000	320	36,000	270
		2	0.028	45,000	520	45,000	410	36,000	290	34,000	240
		3	0.016	40,000	410	40,000	330	32,800	240	25,600	200
		4	0.01	30,000	320	30,000	250	21,600	160	19,200	150
0.5	0.02	1	0.016	50,000	898	40,000	464	30,000	378	28,000	315
		1.5	0.014	50,000	898	40,000	464	30,000	378	28,000	315
		2	0.013	50,000	898	40,000	464	30,000	378	28,000	315
		2.5	0.011	45,000	810	36,000	414	27,000	315	24,500	261
		3	0.01	45,000	810	36,000	414	27,000	315	24,500	261
		4	0.008	40,000	720	32,000	378	24,000	279	20,000	234
		5	0.007	40,000	720	32,000	378	24,000	279	20,000	234
		6	0.006	28,800	480	19,400	260	18,000	250	15,000	200
		8	0.005	28,800	480	19,400	260	18,000	250	15,000	200
		10	0.004	28,800	480	19,400	260	18,000	250	15,000	200
	0.05	1	0.03	50,000	898	40,000	464	30,000	378	28,000	315
		1.5	0.026	50,000	898	40,000	464	30,000	378	28,000	315
		2	0.023	50,000	898	40,000	464	30,000	378	28,000	315
		2.5	0.02	45,000	810	36,000	414	27,000	315	24,500	261
		3	0.017	45,000	810	36,000	414	27,000	315	24,500	261
		4	0.017	40,000	720	32,000	378	24,000	279	20,000	234
		5	0.011	28,800	540	19,400	280	18,000	250	15,000	200
		6	0.008	28,800	480	19,400	260	18,000	250	15,000	200
		8	0.007	28,800	480	19,400	260	18,000	250	15,000	200
		10	0.006	28,800	480	19,400	260	18,000	250	15,000	200
	0.1	1	0.035	50,000	898	40,000	464	30,000	378	28,000	315
		1.5	0.032	50,000	898	40,000	464	30,000	378	28,000	315
		2	0.03	50,000	898	40,000	464	30,000	378	28,000	315
		2.5	0.025	45,000	810	36,000	414	27,000	315	24,500	261
		3	0.02	45,000	810	36,000	414	27,000	315	24,500	261
		4	0.02	40,000	720	32,000	378	24,000	279	20,000	234
		5	0.013	28,800	540	19,400	280	18,000	250	15,000	200
		6	0.013	28,800	480	19,400	260	18,000	250	15,000	200
		8	0.01	28,800	480	19,400	260	18,000	250	15,000	200
		10	0.08	28,800	480	19,400	260	18,000	250	15,000	200

Recommended Cutting Condition

[ESRR712 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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)
0.6	0.02	2	0.016	50,000	1,159	37,830	600	28,200	390	23,000	320
		3	0.014	40,000	830	27,800	440	23,600	280	21,000	230
		4	0.013	40,000	830	27,800	440	23,600	280	21,000	230
		6	0.01	24,000	490	18,000	300	17,800	240	15,000	210
		8	0.008	24,000	466	18,000	285	17,800	228	15,000	200
		10	0.007	24,000	451	18,000	276	17,800	221	15,000	193
		12	0.006	24,000	451	18,000	276	17,800	221	15,000	193
	0.05	2	0.028	50,000	1,159	37,830	600	28,200	390	23,000	320
		3	0.023	40,000	830	27,800	440	23,600	280	21,000	230
		4	0.019	40,000	830	27,800	440	23,600	280	21,000	230
		6	0.012	24,000	490	18,000	300	17,800	240	15,000	210
		8	0.01	24,000	466	18,000	285	17,800	228	15,000	200
		10	0.007	24,000	451	18,000	276	17,800	221	15,000	193
		12	0.006	24,000	451	18,000	276	17,800	221	15,000	193
	0.1	2	0.035	50,000	1,159	37,830	600	28,200	390	23,000	320
		3	0.03	40,000	830	27,800	440	23,600	280	21,000	230
		4	0.024	40,000	830	27,800	440	23,600	280	21,000	230
		6	0.015	24,000	490	18,000	300	17,800	240	15,000	210
		8	0.013	24,000	466	18,000	285	17,800	228	15,000	200
		10	0.009	24,000	451	18,000	276	17,800	221	15,000	193
		12	0.007	24,000	451	18,000	276	17,800	221	15,000	193
0.7	0.1	2	0.042	49,200	1,054	34,190	558	29,030	355	25,830	292
		4	0.029	40,000	830	27,800	440	23,600	280	21,000	230
		6	0.018	24,000	490	18,000	300	17,800	240	15,000	210
		8	0.015	24,000	490	18,000	300	17,800	240	15,000	210
		10	0.012	24,000	490	18,000	300	17,800	240	15,000	210
0.8	0.02	2	0.016	48,000	1,378	28,000	647	20,000	400	20,000	360
		4	0.016	48,000	1,102	28,000	518	20,000	320	20,000	288
		6	0.013	38,700	800	25,000	461	18,000	288	18,000	256
		8	0.011	29,025	600	20,000	369	16,200	259	16,200	230
		10	0.01	29,025	570	20,000	350	16,200	246	16,200	219
		12	0.09	29,025	570	20,000	350	16,200	246	16,200	219
	0.05	2	0.038	48,000	1,378	28,000	647	20,000	400	20,000	360
		4	0.026	48,000	1,102	28,000	518	20,000	320	20,000	288
		6	0.015	38,700	800	25,000	461	18,000	288	18,000	256
		8	0.012	29,025	600	20,000	369	16,200	259	16,200	230
		10	0.011	29,025	570	20,000	350	16,200	246	16,200	219
		12	0.01	29,025	570	20,000	350	16,200	246	16,200	219
	0.1	2	0.047	48,000	1,378	28,000	647	20,000	400	20,000	360
		4	0.032	48,000	1,102	28,000	518	20,000	320	20,000	288
		6	0.019	38,700	800	25,000	461	18,000	288	18,000	256
		8	0.015	29,025	600	20,000	369	16,200	259	16,200	230
		10	0.013	29,025	570	20,000	350	16,200	246	16,200	219
		12	0.012	29,025	570	20,000	350	16,200	246	16,200	219
	0.2	2	0.081	48,000	1,378	28,000	647	20,000	400	20,000	360
		4	0.056	48,000	1,102	28,000	518	20,000	320	20,000	288
		6	0.032	38,700	800	25,000	461	18,000	288	18,000	256
		8	0.018	29,025	600	20,000	369	16,200	259	16,200	230
		10	0.016	29,025	570	20,000	350	16,200	246	16,200	219
		12	0.015	29,025	570	20,000	350	16,200	246	16,200	219

Recommended Cutting Condition

[ESRR712 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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)
1	0.02	4	0.013	32,400	1,359	27,540	1,039	24,300	815	22,680	666
		6	0.01	26,244	990	22,307	842	19,683	660	18,371	539
		8	0.008	23,328	880	19,829	748	17,496	587	16,330	479
		10	0.006	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.005	18,144	609	15,422	453	13,608	399	12,701	320
		14	0.004	18,144	533	15,422	420	13,608	342	12,701	266
		16	0.004	18,144	533	15,422	420	13,608	342	12,701	266
		20	0.003	13,608	399	11,567	315	10,206	257	9,526	200
	0.05	4	0.027	32,400	1,359	28,917	1,128	24,300	815	22,680	666
		6	0.017	26,244	990	24,538	928	19,683	660	18,371	539
		8	0.016	23,328	880	19,829	748	17,496	587	16,330	479
		10	0.011	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.01	18,144	609	15,422	453	13,608	399	12,701	320
		14	0.008	18,144	533	15,422	420	13,608	342	12,701	266
		16	0.006	18,144	533	15,422	420	13,608	342	12,701	266
		20	0.004	13,608	399	11,567	315	10,206	257	9,526	200
	0.1	4	0.038	32,400	1,359	27,540	1,039	24,300	815	22,680	666
		6	0.024	26,244	990	22,307	842	19,683	660	18,371	539
		8	0.024	23,328	880	19,829	748	17,496	587	16,330	479
		10	0.015	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.015	18,144	609	15,422	453	13,608	399	12,701	320
		14	0.012	18,144	533	15,422	420	13,608	342	12,701	266
		16	0.009	18,144	533	15,422	420	13,608	342	12,701	266
		20	0.006	13,608	399	11,567	315	10,206	257	9,526	200
	0.2	4	0.07	32,400	1,359	27,540	1,039	24,300	815	22,680	666
		6	0.04	26,244	990	22,307	842	19,683	660	18,371	539
		8	0.04	23,328	880	19,829	748	17,496	587	16,330	479
		10	0.025	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.025	18,144	609	15,422	453	13,608	399	12,701	320
		14	0.02	18,144	533	15,422	420	13,608	342	12,701	266
		16	0.015	18,144	533	15,422	420	13,608	342	12,701	266
		20	0.01	13,608	399	11,567	315	10,206	257	9,526	200
	0.3	4	0.07	32,400	1,359	27,540	1,039	24,300	815	22,680	666
		6	0.04	26,244	990	22,307	842	19,683	660	18,371	539
		8	0.04	23,328	880	19,829	748	17,496	587	16,330	479
		10	0.025	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.025	18,144	609	15,422	453	13,608	399	12,701	320
		14	0.02	18,144	533	15,422	420	13,608	342	12,701	266
		16	0.015	18,144	533	15,422	420	13,608	342	12,701	266
		20	0.01	13,608	399	11,567	315	10,206	257	9,526	200

Recommended Cutting Condition

[ESRR712 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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)
1.2	0.02	4	0.013	28,868	1,154	24,538	928	21,651	727	20,208	594
		6	0.01	28,868	1,154	24,538	928	21,651	727	20,208	594
		8	0.008	24,640	962	20,944	791	18,480	620	17,248	506
		10	0.006	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.005	19,278	652	16,386	554	14,458	428	13,494	342
		14	0.004	18,144	533	15,422	453	13,608	342	12,701	266
		16	0.004	18,144	533	15,422	453	13,608	342	12,701	266
		20	0.003	13,608	399	11,567	315	10,206	257	9,526	200
	0.05	4	0.027	28,868	1,154	24,538	928	21,651	727	20,208	594
		6	0.017	28,868	1,154	24,538	928	21,651	727	20,208	594
		8	0.016	24,640	962	20,944	791	18,480	620	17,248	506
		10	0.011	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.01	19,278	652	16,386	554	14,458	428	13,494	342
		14	0.008	18,144	533	15,422	453	13,608	342	12,701	266
		16	0.006	18,144	533	15,422	453	13,608	342	12,701	266
		20	0.004	13,608	399	11,567	315	10,206	257	9,526	200
	0.1	4	0.03	28,868	1,154	24,538	928	21,651	727	20,208	594
		6	0.03	28,868	1,154	24,538	928	21,651	727	20,208	594
		8	0.022	24,640	962	20,944	791	18,480	620	17,248	506
		10	0.015	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.012	19,278	652	16,386	554	14,458	428	13,494	342
		14	0.01	18,144	533	15,422	453	13,608	342	12,701	266
		16	0.01	18,144	533	15,422	453	13,608	342	12,701	266
		20	0.006	13,608	399	11,567	315	10,206	257	9,526	200
	0.2	4	0.05	28,868	1,154	24,538	928	21,651	727	20,208	594
		6	0.05	28,868	1,154	24,538	928	21,651	727	20,208	594
		8	0.037	24,640	962	20,944	791	18,480	620	17,248	506
		10	0.025	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.02	19,278	651	16,386	554	14,458	428	13,494	342
		14	0.016	18,144	533	15,422	453	13,608	342	12,701	266
		16	0.016	18,144	533	15,422	453	13,608	342	12,701	266
		20	0.01	13,608	399	11,567	315	10,206	257	9,526	200
	0.3	4	0.05	28,868	1,154	24,538	928	21,651	727	20,208	594
		6	0.05	28,868	1,154	24,538	928	21,651	727	20,208	594
		8	0.037	24,640	962	20,944	791	18,480	620	17,248	506
		10	0.025	20,412	770	17,350	655	15,309	514	14,288	419
		12	0.02	19,278	651	16,386	554	14,458	428	13,494	342
		14	0.016	18,144	533	15,422	453	13,608	342	12,701	266
		16	0.016	18,144	533	15,422	453	13,608	342	12,701	266
		20	0.01	13,608	399	11,567	315	10,206	257	9,526	200

Recommended Cutting Condition

[ESRR712 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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)
1.5	0.02	4	0.013	24,930	1,130	20,956	947	18,711	752	17,364	611
		6	0.01	23,779	1,074	20,382	921	17,834	716	16,560	582
		8	0.008	22,680	1,027	19,278	873	17,010	685	15,876	559
		10	0.006	20,412	924	17,350	785	15,309	616	14,288	503
		12	0.005	18,144	822	15,422	698	13,608	548	12,701	447
		14	0.004	14,112	568	11,995	423	10,584	373	9,878	298
		16	0.004	14,112	568	11,995	423	10,584	373	9,878	298
		20	0.003	14,112	568	11,995	423	10,584	373	9,878	298
	0.05	4	0.027	24,930	1,130	20,956	947	18,711	752	17,364	611
		6	0.017	23,779	1,074	20,382	921	17,834	716	16,560	582
		8	0.016	22,680	1,027	19,278	873	17,010	685	15,876	559
		10	0.011	20,412	924	17,350	785	15,309	616	14,288	503
		12	0.01	18,144	822	15,422	698	13,608	548	12,701	447
		14	0.008	14,112	568	11,995	423	10,584	373	9,878	298
		16	0.006	14,112	568	11,995	423	10,584	373	9,878	298
		20	0.004	14,112	568	11,995	423	10,584	373	9,878	298
	0.1	4	0.042	24,930	1,130	20,956	947	18,711	752	17,364	611
		6	0.04	23,779	1,074	20,382	921	17,834	716	16,560	582
		8	0.036	22,680	1,027	19,278	873	17,010	685	15,876	559
		10	0.036	20,412	924	17,350	785	15,309	616	14,288	503
		12	0.036	18,144	822	15,422	698	13,608	548	12,701	447
		14	0.023	14,112	568	11,995	423	10,584	373	9,878	298
		16	0.023	14,112	568	11,995	423	10,584	373	9,878	298
		20	0.018	14,112	568	11,995	423	10,584	373	9,878	298
	0.2	4	0.07	24,930	1,130	20,956	868	18,711	678	17,364	556
		6	0.065	23,779	1,074	20,382	921	17,834	716	16,560	582
		8	0.06	22,680	1,027	19,278	873	17,010	685	15,876	559
		10	0.06	20,412	924	17,350	785	15,309	616	14,288	503
		12	0.06	18,144	822	15,422	698	13,608	548	12,701	447
		14	0.038	14,112	568	11,995	423	10,584	373	9,878	298
		16	0.038	14,112	568	11,995	423	10,584	373	9,878	298
		20	0.03	14,112	568	11,995	423	10,584	373	9,878	298
	0.3	4	0.07	24,930	1,130	20,956	868	18,711	678	17,364	556
		6	0.065	23,779	1,074	20,382	921	17,834	716	16,560	582
		8	0.06	22,680	1,027	19,278	873	17,010	685	15,876	559
		10	0.06	20,412	924	17,350	785	15,309	616	14,288	503
		12	0.06	18,144	822	15,422	698	13,608	548	12,701	447
		14	0.038	14,112	568	11,995	423	10,584	373	9,878	298
		16	0.038	14,112	568	11,995	423	10,584	373	9,878	298
		20	0.03	14,112	568	11,995	423	10,584	373	9,878	298
	0.5	4	0.085	24,930	1,130	20,956	868	18,711	678	17,364	556
		6	0.08	23,779	1,074	20,382	921	17,834	716	16,560	582
		8	0.07	22,680	1,027	19,278	873	17,010	685	15,876	559
		10	0.067	20,412	924	17,350	785	15,309	616	14,288	503
		12	0.065	18,144	822	15,422	698	13,608	548	12,701	447
		14	0.045	14,112	568	11,995	423	10,584	373	9,878	298
		16	0.045	14,112	568	11,995	423	10,584	373	9,878	298
		20	0.035	14,112	568	11,995	423	10,584	373	9,878	298

Recommended Cutting Condition

[ESRR712 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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	0.02	6	0.013	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.01	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		10	0.008	17104	1284	14539	1092	12828	807	11973	659
		12	0.006	15,309	1,083	13,013	921	11,482	722	10,716	590
		14	0.005	14,458	1023	12,290	869	10,844	682	10,121	557
		16	0.004	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.004	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.003	11,907	757	10,121	643	8,930	505	8,335	411
	0.05	6	0.027	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.017	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		10	0.016	17104	1284	14539	1092	12828	807	11973	659
		12	0.011	15,309	1,083	13,013	921	11,482	722	10,716	590
		14	0.01	14,458	1023	12,290	869	10,844	682	10,121	557
		16	0.008	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.006	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.004	11,907	757	10,121	643	8,930	505	8,335	411
	0.1	6	0.07	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.055	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		10	0.042	17104	1284	14539	1092	12828	807	11973	659
		12	0.03	15,309	1,083	13,013	921	11,482	722	10,716	590
		14	0.03	14,458	1023	12,290	869	10,844	682	10,121	557
		16	0.03	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.025	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.015	11,907	757	10,121	643	8,930	505	8,335	411
		30	0.01	11,312	719	9,615	611	8,484	480	7,918	391
	0.2	6	0.08	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.07	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		10	0.055	17,104	1,284	14,539	1,092	12,828	807	11,973	659
		12	0.04	15,309	1,083	13,013	921	11,482	722	10,716	590
		14	0.04	14,458	1,023	12,290	869	10,844	682	10,121	557
		16	0.04	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.035	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.025	11,907	757	10,121	643	8,930	505	8,335	411
		30	0.017	11,312	719	9,615	611	8,484	480	7,918	391
	0.3	6	0.11	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.09	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		10	0.075	17,104	1,284	14,539	1,092	12,828	807	11,973	659
		12	0.06	15,309	1,083	13,013	921	11,482	722	10,716	590
		14	0.06	14,458	1023	12,290	869	10,844	682	10,121	557
		16	0.06	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.037	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.03	11,907	757	10,121	643	8,930	505	8,335	411
		30	0.021	11,312	719	9,615	611	8,484	480	7,918	391
	0.5	6	0.17	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.14	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		10	0.11	17,104	1284	14,539	1143	12,828	807	11,973	659
		12	0.08	15,309	1,083	13,013	1,023	11,482	722	10,716	590
		14	0.08	14,458	1023	12,290	920	1,084	682	10,121	557
		16	0.08	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.05	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.05	11,907	757	10,121	643	8,930	505	8,335	411
		30	0.03	11,312	719	9,615	611	8,484	480	7,918	391

Recommended Cutting Condition

[ESRR712 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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)
2.5	0.1	10	0.055	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		16	0.042	16,254	1224	13,816	1040	12,190	767	11,378	626
		20	0.03	13,608	963	11,567	818	10,206	642	9,526	524
		25	0.022	12,757	860	10,844	730	9,568	573	8,930	467
		30	0.015	11,907	757	10,121	643	8,930	505	8,335	411
	0.2	10	0.07	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		16	0.055	16,254	1,224	1,386	1040	12,190	767	11,378	626
		20	0.04	13,608	963	11,567	818	10,206	642	9,526	524
	0.3	10	0.09	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		16	0.075	16,254	1,224	1,386	1040	12,190	767	11,378	626
		20	0.06	13,608	963	11,567	818	10,206	642	9,526	524
	0.5	10	0.14	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		16	0.11	16,254	1,224	1,386	1040	12,190	767	11,378	626
		20	0.08	13,608	963	11,567	818	10,206	642	9,526	524
3	0.1	10	0.06	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		12	0.05	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		16	0.035	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		20	0.035	11,664	1,146	9,914	974	8,748	687	8,165	561
		25	0.031	10,368	973	8,812	827	7,776	583	7,257	477
		30	0.027	9,072	801	7,711	681	6,804	480	6,350	393
		35	0.02	9,072	801	7,711	681	6,804	480	6,350	393
		40	0.015	9,072	801	7,711	681	6,804	480	6,350	393
	0.2	10	0.08	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		12	0.07	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		16	0.05	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		20	0.05	11,664	1,146	9,914	974	8,748	687	8,165	561
		25	0.045	10,368	973	8,812	827	7,776	583	7,257	477
		30	0.04	9,072	801	7,711	681	6,804	480	6,350	393
		35	0.035	9,072	801	7,711	681	6,804	480	6,350	393
		40	0.03	9,072	801	7,711	681	6,804	480	6,350	393
	0.3	10	0.115	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		12	0.1	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		16	0.075	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		20	0.075	11,664	1,146	9,914	974	8,748	687	8,165	561
		25	0.067	10,368	973	8,812	827	7,776	583	7,257	477
		30	0.06	9,072	801	7,711	681	6,804	480	6,350	393
		35	0.05	9,072	801	7,711	681	6,804	480	6,350	393
		40	0.04	9,072	801	7,711	681	6,804	480	6,350	393
	0.5	10	0.155	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		12	0.13	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		16	0.1	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		20	0.1	11,664	1,146	9,914	974	8,748	687	8,165	561
		25	0.09	10,368	973	8,812	827	7,776	583	7,257	477
		30	0.08	9,072	801	7,711	681	6,804	480	6,350	393
		35	0.065	9,072	801	7,711	681	6,804	480	6,350	393
		40	0.05	9,072	801	7,711	681	6,804	480	6,350	393
	1	10	0.175	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		12	0.15	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		16	0.12	14,400	1,415	12,240	1,203	10,800	849	10,080	693
		20	0.11	11,664	1,146	9,914	974	8,748	687	8,165	561
		25	0.1	10,368	973	8,812	827	7,776	583	7,257	477
		30	0.09	9,072	801	7,711	681	6,804	480	6,350	393
		35	0.075	9,072	801	7,711	681	6,804	480	6,350	393
		40	0.06	9,072	801	7,711	681	6,804	480	6,350	393

Recommended Cutting Condition

[ESRR712 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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)
4	0.1	12	0.065	11,213	1,950	9,531	1,658	8,410	1,170	7,849	956
		16	0.06	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		20	0.055	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		25	0.05	10,255	1,783	7,782	1293	6,545	872	5,904	687
		30	0.045	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		35	0.04	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		40	0.035	10,255	1,783	6,867	1,075	5,491	688	5,124	561
	0.2	12	0.14	11,213	1,950	9,531	1,658	8,410	1,170	7,849	956
		16	0.13	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		20	0.11	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		25	0.105	10,255	1,783	7,782	1293	6,545	872	5,904	687
		30	0.1	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		35	0.08	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		40	0.07	9,247	1,429	6,225	901	5,217	602	4,621	459
	0.3	12	0.22	11,213	1,950	9,531	1,658	8,410	1,170	7,849	956
		16	0.2	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		20	0.18	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		25	0.17	10,255	1,783	7,782	1293	6,545	872	5,904	687
		30	0.16	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		35	0.14	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		40	0.13	9,247	1,429	6,225	901	5,217	602	4,621	459
	0.5	12	0.35	11,213	1,950	9,531	1,658	8,410	1,170	7,849	956
		16	0.25	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		20	0.2	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		25	0.175	10,255	1,783	7,782	1293	6,545	872	5,904	687
		30	0.15	10,255	1,783	6,867	1,075	5,491	688	5,124	5
		35	0.1	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		40	0.075	9,247	1,429	6,225	901	5,217	602	4,621	459
	1	12	0.4	11,213	1,950	9,531	1,658	8,410	1,170	7,849	956
		16	0.29	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		20	0.23	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		25	0.2	10,255	1,783	7,782	1293	6,545	872	5,904	687
		30	0.17	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		35	0.12	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		40	0.09	9,247	1,429	6,225	901	5,217	602	4,621	459
5	0.2	15	0.16	9,154	1,990	7,781	1,692	6,866	1,194	6,408	975
		25	0.152	8,513	1813	7,236	1541	6,385	1088	5,959	888
		30	0.145	7,872	1637	6,691	1391	5,904	982	5,510	802
		40	0.13	6,590	1,284	5,602	1,091	4,943	770	4,613	629
	0.5	15	0.35	9,154	1,990	7,781	1,692	6,866	1,194	6,408	975
		25	0.296	8,513	1813	7,236	1541	6,385	1088	5,959	888
		30	0.24	7,872	1637	6,691	1391	5,904	982	5,510	802
		40	0.135	6,590	1,284	5,602	1,091	4,943	770	4,613	629
	1	15	0.4	9,154	1,990	7,781	1,692	6,866	1,194	6,408	975
		25	0.337	8,513	1813	7,236	1541	6,385	1088	5,959	888
		30	0.275	7,872	1637	6,691	1391	5,904	982	5,510	802
		40	0.15	6,590	1,284	5,602	1,091	4,943	770	4,613	629

Recommended Cutting Condition

[ESRR712 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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)
6	0.1	20	0.065	7,630	1,991	6,486	1,692	5,722	1,194	5,342	975
		40	0.05	6,486	1,523	5,513	1,294	4,865	914	4,540	746
	0.2	20	0.14	7,630	1,991	6,486	1,692	5,722	1,194	5,342	975
		40	0.11	6,486	1,523	5,513	1,294	4,865	914	4,540	746
	0.3	20	0.22	7,630	1,991	6,486	1,692	5,722	1,194	5,342	975
		40	0.18	6,486	1,523	5,513	1,294	4,865	914	4,540	746
	0.5	20	0.35	7,630	1,991	6,486	1,692	5,722	1,194	5,342	975
		40	0.24	6,486	1,523	5,513	1,294	4,865	914	4,540	746
	1	20	0.4	7,630	1,991	6,486	1,692	5,722	1,194	5,342	975
		40	0.28	6,486	1,523	5,513	1,294	4,865	914	4,540	746
	1.5	20	0.45	7,630	1,991	6,486	1,692	5,722	1,194	5,342	975
		40	0.3	6,486	1,523	5,513	1,294	4,865	914	4,540	746
8	0.2	22	0.35	5,730	1900	4,524	1483	3,016	914	2,320	584
	0.3	22	0.5	5,730	1900	4,524	1483	3,016	914	2,320	584
	0.5	22	0.6	5,730	1900	4,524	1483	3,016	914	2,320	584
	1	22	0.7	5,730	1900	4,524	1483	3,016	914	2,320	584
	1.5	22	0.8	5,730	1900	4,524	1483	3,016	914	2,320	584
10	0.2	24	0.4	4,524	1728	3,567	1396	2,378	849	1,856	544
	0.3	24	0.5	4,524	1728	3,567	1396	2,378	849	1,856	544
	0.5	24	0.6	4,524	1728	3,567	1396	2,378	849	1,856	544
	1	24	0.7	4,524	1728	3,567	1396	2,378	849	1,856	544
	1.5	24	0.8	4,524	1728	3,567	1396	2,378	849	1,856	544
	2	24	0.9	4,524	1728	3,567	1396	2,378	849	1,856	544
12	0.2	26	0.5	3,857	1728	3,045	1396	2,030	849	1,537	544
	0.3	26	0.6	3,857	1728	3,045	1396	2,030	849	1,537	544
	0.5	26	0.7	3,857	1728	3,045	1396	2,030	849	1,537	544
	1	26	0.8	3,857	1728	3,045	1396	2,030	849	1,537	544
	1.5	26	0.9	3,857	1728	3,045	1396	2,030	849	1,537	544
	2	26	1	3,857	1728	3,045	1396	2,030	849	1,537	544
	3	26	1	3,857	1728	3,045	1396	2,030	849	1,537	544
16	0.5	35	2	2,842	1,512	2,262	1209	1,508	748	1,160	480
	1	35	2	2,842	453	2,262	362	1,508	224	1,160	480

- 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

[ESRR714 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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)
0.5	0.05	2	0.023	50,000	1257	40,000	649	30,000	529	28,000	441
		4	0.017	40,000	1008	32,000	529	24,000	390	20,000	327
		6	0.008	28,800	672	19,400	364	18,000	350	15,000	280
		8	0.007	28,800	672	19,400	364	18,000	350	15,000	280
	0.1	2	0.03	50,000	1257	40,000	649	30,000	529	28,000	441
		4	0.02	40,000	1008	32,000	529	24,000	390	20,000	327
		6	0.013	28,800	672	19,400	364	18,000	350	15,000	280
		8	0.01	28,800	672	19,400	364	18,000	350	15,000	280
0.6	0.05	2	0.028	50,000	1622	37,830	840	28,200	546	23,000	448
		4	0.019	40,000	1,162	27,800	616	23,600	392	21,000	322
		6	0.012	24,000	686	18,000	420	17,800	336	15,000	294
		8	0.01	24,000	652	18,000	399	17,800	319	15,000	280
	0.1	2	0.035	50,000	1622	37,830	840	28,200	546	23,000	448
		4	0.024	40,000	1,162	27,800	616	23,600	392	21,000	322
		6	0.015	24,000	686	18,000	420	17,800	336	15,000	294
		8	0.013	24,000	652	18,000	399	17,800	319	15,000	280
0.7	0.05	2	0.028	49,200	1,475	34,190	781	29,030	497	25,830	408
		4	0.019	40,000	1,162	27,800	616	23,600	392	21,000	322
		6	0.012	24,000	686	18,000	420	17,800	336	15,000	294
		8	0.01	24,000	686	18,000	420	17,800	336	15,000	294
	0.1	2	0.042	49,200	1,475	34,190	781	29,030	497	25,830	408
		4	0.029	40,000	1,162	27,800	616	23,600	392	21,000	322
		6	0.018	24,000	686	18,000	420	17,800	336	15,000	294
		8	0.015	24,000	686	18,000	420	17,800	336	15,000	294
0.8	0.02	2	0.016	48,000	1929	28,000	905	20,000	560	360	504
		4	0.016	48,000	1,542	28,000	725	20,000	448	288	403
		6	0.013	38,700	1,120	25,000	645	18,000	403	256	358
		8	0.011	29,025	840	20,000	516	16,200	362	230	322
		10	0.01	29,025	798	20,000	490	16,200	344	219	306
		12	0.09	29,025	798	20,000	490	16,200	344	219	306
	0.05	2	0.038	48,000	1929	28,000	905	20,000	560	360	504
		4	0.026	48,000	1,542	28,000	725	20,000	448	288	403
		6	0.015	38,700	1,120	25,000	645	18,000	403	256	358
		8	0.012	29,025	840	20,000	516	16,200	362	230	322
		10	0.011	29,025	798	20,000	490	16,200	344	219	306
		12	0.01	29,025	798	20,000	490	16,200	344	219	306
	0.1	2	0.047	48,000	1929	28,000	905	20,000	560	360	504
		4	0.032	48,000	1,542	28,000	725	20,000	448	288	403
		6	0.019	38,700	1,120	25,000	645	18,000	403	256	358
		8	0.015	29,025	840	20,000	516	16,200	362	230	322
		10	0.013	29,025	798	20,000	490	16,200	344	219	306
		12	0.012	29,025	798	20,000	490	16,200	344	219	306

Recommended Cutting Condition

[ESRR714 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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)
1	0.02	4	0.013	32,400	1902	27,540	1454	24,300	1141	22,680	932
		6	0.01	26,244	1386	22,307	1178	19,683	924	18,371	754
		8	0.008	23,328	1232	19,829	1047	17,496	821	16,330	670
		10	0.006	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.005	18,144	852	15,422	634	13,608	558	12,701	448
		14	0.004	18,144	746	15,422	588	13,608	478	12,701	372
		16	0.004	18,144	746	15,422	588	13,608	478	12,701	372
		20	0.003	13,608	558	11,567	441	10,206	359	9,526	280
	0.05	3	0.027	32,400	1902	27,540	1454	24,300	1141	22,680	932
		4	0.027	32,400	1902	27,540	1454	24,300	1141	22,680	932
		6	0.017	26,244	1386	22,307	1178	19,683	924	18,371	754
		8	0.016	23,328	1232	19,829	1047	17,496	821	16,330	670
		10	0.011	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.01	18,144	852	15,422	634	13,608	558	12,701	448
		14	0.008	18,144	746	15,422	588	13,608	478	12,701	372
		16	0.006	18,144	746	15,422	588	13,608	478	12,701	372
		20	0.004	13,608	558	11,567	441	10,206	359	9,526	280
	0.1	3	0.038	32,400	1902	27,540	1454	24,300	1141	22,680	932
		4	0.038	32,400	1902	27,540	1454	24,300	1141	22,680	932
		6	0.024	26,244	1386	22,307	1178	19,683	924	18,371	754
		8	0.024	23,328	1232	19,829	1047	17,496	821	16,330	670
		10	0.015	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.015	18,144	852	15,422	634	13,608	558	12,701	448
		14	0.012	18,144	746	15,422	588	13,608	478	12,701	372
		16	0.009	18,144	746	15,422	588	13,608	478	12,701	372
		20	0.006	13,608	558	11,567	441	10,206	359	9,526	280
	0.2	3	0.07	32,400	1902	27,540	1454	24,300	1141	22,680	932
		4	0.07	32,400	1902	27,540	1454	24,300	1141	22,680	932
		6	0.04	26,244	1386	22,307	1178	19,683	924	18,371	754
		8	0.04	23,328	1232	19,829	1047	17,496	821	16,330	670
		10	0.025	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.025	18,144	852	15,422	634	13,608	558	12,701	448
		14	0.02	18,144	746	15,422	588	13,608	478	12,701	372
		16	0.015	18,144	746	15,422	588	13,608	478	12,701	372
		20	0.01	13,608	558	11,567	441	10,206	359	9,526	280
	0.3	3	0.07	32,400	1902	27,540	1454	24,300	1141	22,680	932
		4	0.07	32,400	1902	27,540	1454	24,300	1141	22,680	932
		6	0.04	26,244	1386	22,307	1178	19,683	924	18,371	754
		8	0.04	23,328	1232	19,829	1047	17,496	821	16,330	670
		10	0.025	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.025	18,144	852	15,422	634	13,608	558	12,701	448
		14	0.02	18,144	746	15,422	588	13,608	478	12,701	372
		16	0.015	18,144	746	15,422	588	13,608	478	12,701	372
		20	0.01	13,608	558	11,567	441	10,206	359	9,526	280

Recommended Cutting Condition

[ESRR714 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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)
1.2	0.02	4	0.013	28,868	1,615	24,538	1,299	21,651	1017	20,208	831
		6	0.01	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		8	0.008	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.006	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.005	19,278	912	16,386	775	14,458	599	13,494	478
		14	0.004	18,144	746	15,422	634	13,608	478	12,701	372
		16	0.004	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.003	13,608	558	11,567	441	10,206	359	9,526	280
	0.05	3	0.027	28,868	1,615	24,538	1,299	21,651	1017	20,208	831
		4	0.027	28,868	1,615	24,538	1,299	21,651	1017	20,208	831
		6	0.017	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		8	0.016	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.011	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.01	19,278	912	16,386	775	14,458	599	13,494	478
		14	0.008	18,144	746	15,422	634	13,608	478	12,701	372
		16	0.006	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.004	13,608	558	11,567	441	10,206	359	9,526	280
	0.1	3	0.03	28,868	1,615	24,538	1,299	21,651	1017	20,208	831
		4	0.03	28,868	1,615	24,538	1,299	21,651	1017	20,208	831
		6	0.03	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		8	0.022	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.015	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.012	19,278	912	16,386	775	14,458	599	13,494	478
		14	0.01	18,144	746	15,422	634	13,608	478	12,701	372
		16	0.01	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.006	13,608	558	11,567	441	10,206	359	9,526	280
	0.2	3	0.05	28,868	1,615	24,538	1,299	21,651	1017	20,208	831
		4	0.05	28,868	1,615	24,538	1,299	21,651	1017	20,208	831
		6	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		8	0.037	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.025	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.02	19,278	912	16,386	775	14,458	599	13,494	478
		14	0.016	18,144	746	15,422	634	13,608	478	12,701	372
		16	0.016	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.01	13,608	558	11,567	441	10,206	359	9,526	280
	0.3	3	0.05	28,868	1,615	24,538	1,299	21,651	1017	20,208	831
		4	0.05	28,868	1,615	24,538	1,299	21,651	1017	20,208	831
		6	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		8	0.037	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.025	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.02	19,278	912	16,386	775	14,458	599	13,494	478
		16	0.016	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.01	13,608	558	11,567	441	10,206	359	9,526	280

Recommended Cutting Condition

[ESRR714 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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)
1.5	0.02	6	0.01	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.008	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.006	20,412	1,293	17,350	1,222	15,309	959	14,288	782
		12	0.005	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.004	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.004	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.003	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.003	14,112	795	11,995	592	10,584	522	9,878	417
	0.05	4	0.027	24,930	1,582	20,956	1325	18,711	1052	17,364	855
		6	0.017	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.016	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.011	20,412	1,293	17,350	1,222	15,309	959	14,288	782
		12	0.01	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.008	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.006	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.004	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.004	14,112	795	11,995	592	10,584	522	9,878	417
		26	0.003	14,112	795	11,995	592	10,584	522	9,878	417
	0.1	4	0.042	24,930	1,582	20,956	1325	18,711	1052	17,364	855
		6	0.04	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.036	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.036	20,412	1,293	17,350	1,222	15,309	959	14,288	782
		12	0.036	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.023	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.023	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.018	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.015	14,112	795	11,995	592	10,584	522	9,878	417
		26	0.01	14,112	795	11,995	592	10,584	522	9,878	417
	0.2	4	0.07	24,930	1,582	20,956	1325	18,711	1052	17,364	855
		6	0.065	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.06	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.06	20,412	1,293	17,350	1,222	15,309	959	14,288	782
		12	0.06	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.038	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.038	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.03	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.025	14,112	795	11,995	592	10,584	522	9,878	417
		25	0.02	14,112	795	11,995	592	10,584	522	9,878	417
	0.3	4	0.07	24,930	1,582	20,956	1325	18,711	1052	17,364	855
		6	0.065	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.06	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.06	20,412	1,293	17,350	1,222	15,309	959	14,288	782
		12	0.06	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.038	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.038	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.03	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.025	14,112	795	11,995	592	10,584	522	9,878	417
		25	0.02	14,112	795	11,995	592	10,584	522	9,878	417

Recommended Cutting Condition

[ESRR714 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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)
1.5	0.5	4	0.085	24,930	1,582	20,956	1325	18,711	1052	17,364	855
		6	0.08	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.07	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.067	20,412	1,293	17,350	1,222	15,309	959	14,288	782
		12	0.065	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.045	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.045	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.035	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.03	14,112	795	11,995	592	10,584	522	9,878	417
		25	0.025	14,112	795	11,995	592	10,584	522	9,878	417
2	0.02	6	0.013	20,790	2289	17,672	1944	15,593	1373	14,553	1121
		8	0.01	18,900	2080	16,065	1768	14,175	1248	13,230	1019
		10	0.008	17104	1797	14539	1528	12828	1129	11973	922
		12	0.006	15,309	1516	13,013	1289	11,482	1010	10,716	826
		14	0.005	14,458	1432	12,290	1216	10,844	954	10,121	779
		16	0.004	13,608	1,348	11,567	1145	10,206	898	9,526	733
		20	0.004	11,907	1180	10,121	1002	8,930	786	8,335	642
		25	0.003	11,907	1059	10,121	900	8,930	707	8,335	575
		30	0.003	11,312	1006	9,615	855	8,484	672	7,918	547
	0.05	6	0.027	20,790	2289	17,672	1944	15,593	1373	14,553	1121
		8	0.017	18,900	2080	16,065	1768	14,175	1248	13,230	1019
		10	0.016	17104	1797	14539	1528	12828	1129	11973	922
		12	0.011	15,309	1516	13,013	1289	11,482	1010	10,716	826
		14	0.01	14,458	1432	12,290	1216	10,844	954	10,121	779
		16	0.008	13,608	1,348	11,567	1145	10,206	898	9,526	733
		20	0.006	11,907	1180	10,121	1002	8,930	786	8,335	642
		25	0.004	11,907	1059	10,121	900	8,930	707	8,335	575
		30	0.003	11,312	1006	9,615	855	8,484	672	7,918	547
	0.1	6	0.07	20,790	2289	17,672	1944	15,593	1373	14,553	1121
		8	0.055	18,900	2080	16,065	1768	14,175	1248	13,230	1019
		10	0.042	17104	1797	14539	1528	12828	1129	11973	922
		12	0.03	15,309	1516	13,013	1289	11,482	1010	10,716	826
		14	0.03	14,458	1432	12,290	1216	10,844	954	10,121	779
		16	0.03	13,608	1,348	11,567	1145	10,206	898	9,526	733
		20	0.025	11,907	1180	10,121	1002	8,930	786	8,335	642
		22	0.02	11,907	1059	10,121	900	8,930	707	8,335	575
		25	0.015	11,907	1059	10,121	900	8,930	707	8,335	575
		30	0.01	11,312	1006	9,615	855	8,484	672	7,918	547
	0.2	6	0.08	20,790	2289	17,672	1944	15,593	1373	14,553	1121
		8	0.07	18,900	2080	16,065	1768	14,175	1248	13,230	1019
		10	0.055	17104	1797	14539	1528	12828	1129	11973	922
		12	0.04	15,309	1516	13,013	1289	11,482	1010	10,716	826
		14	0.04	14,458	1432	12,290	1216	10,844	954	10,121	779
		16	0.04	13,608	1,348	11,567	1145	10,206	898	9,526	733
		20	0.035	11,907	1180	10,121	1002	8,930	786	8,335	642
		22	0.03	11,907	1059	10,121	900	8,930	707	8,335	575
		25	0.025	11,907	1059	10,121	900	8,930	707	8,335	575
		30	0.017	11,312	1006	9,615	855	8,484	672	7,918	547

Recommended Cutting Condition

[ESRR714 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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	0.3	6	0.11	20,790	2289	17,672	1944	15,593	1373	14,553	1121
		8	0.09	18,900	2080	16,065	1768	14,175	1248	13,230	1019
		10	0.075	17104	1797	14539	1528	12828	1129	11973	922
		12	0.06	15,309	1516	13,013	1289	11,482	1010	10,716	826
		14	0.06	14,458	1432	12,290	1216	10,844	954	10,121	779
		16	0.06	13,608	1,348	11,567	1145	10,206	898	9,526	733
		20	0.037	11,907	1180	10,121	1002	8,930	786	8,335	642
		22	0.033	11,907	1059	10,121	900	8,930	707	8,335	575
		25	0.03	11,907	1059	10,121	900	8,930	707	8,335	575
		30	0.021	11,312	1006	9,615	855	8,484	672	7,918	547
	0.5	6	0.17	20,790	2289	17,672	1944	15,593	1373	14,553	1121
		8	0.14	18,900	2080	16,065	1768	14,175	1248	13,230	1019
		10	0.11	17104	1797	14539	1528	12828	1129	11973	922
		12	0.08	15,309	1516	13,013	1289	11,482	1010	10,716	826
		14	0.08	14,458	1432	12,290	1216	10,844	954	10,121	779
		16	0.08	13,608	1,348	11,567	1145	10,206	898	9,526	733
		20	0.05	11,907	1180	10,121	1002	8,930	786	8,335	642
		22	0.05	11,907	1059	10,121	900	8,930	707	8,335	575
		25	0.05	11,907	1059	10,121	900	8,930	707	8,335	575
		30	0.03	11,312	1006	9,615	855	8,484	672	7,918	547
2.5	0.1	8	0.06	18,900	2,080	16,065	1,768	14,175	1248	13,230	1019
		10	0.055	18,900	2,080	16,065	1,768	14,175	1248	13,230	1019
		12	0.051	18,018	1,958	15,315	1664	13,513	1190	12,613	1019
		14	0.046	17,136	1835	14,566	1560	12,852	1132	11,995	971
		16	0.042	16,254	1,713	13,816	1,456	12,190	1,073	11,378	876
		20	0.03	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		25	0.022	12,757	1204	10,844	1022	9,568	802	8,930	653
		30	0.015	11,907	1,059	10,121	900	8,930	707	8,335	575
	0.2	8	0.08	18,900	2,080	16,065	1,768	14,175	1248	13,230	1019
		10	0.07	18,900	2,080	16,065	1,768	14,175	1248	13,230	1019
		12	0.06	18,018	1,958	15,315	1664	13,513	1190	12,613	1019
		14	0.05	17,136	1835	14,566	1560	12,852	1132	11,995	971
		16	0.055	16,254	1,713	13,816	1,456	12,190	1,073	11,378	876
		20	0.04	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		25	0.03	12,757	1204	10,844	1022	9,568	802	8,930	653
		30	0.02	11,907	1,059	10,121	900	8,930	707	8,335	575
	0.3	8	0.1	18,900	2,080	16,065	1,768	14,175	1248	13,230	1019
		10	0.09	18,900	2,080	16,065	1,768	14,175	1248	13,230	1019
		12	0.085	18,018	1,958	15,315	1664	13,513	1190	12,613	1019
		14	0.08	17,136	1835	14,566	1560	12,852	1132	11,995	971
		16	0.075	16,254	1,713	13,816	1,456	12,190	1,073	11,378	876
		20	0.06	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		25	0.065	12,757	1204	10,844	1022	9,568	802	8,930	653
		30	0.06	11,907	1,059	10,121	900	8,930	707	8,335	575
	0.5	8	0.15	18,900	2,080	16,065	1,768	14,175	1248	13,230	1019
		10	0.14	18,900	2,080	16,065	1,768	14,175	1248	13,230	1019
		12	0.13	18,018	1,958	15,315	1664	13,513	1190	12,613	1019
		14	0.12	17,136	1835	14,566	1560	12,852	1132	11,995	971
		16	0.11	16,254	1,713	13,816	1,456	12,190	1,073	11,378	876
		20	0.08	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		25	0.07	12,757	1204	10,844	1022	9,568	802	8,930	653
		30	0.05	11,907	1,059	10,121	900	8,930	707	8,335	575

Recommended Cutting Condition

[ESRR714 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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)
3	0.1	8	0.07	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		10	0.06	14400	1,981	12240	1,684	10800	1188	10080	970
		12	0.05	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		14	0.047	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		16	0.035	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		20	0.035	11,664	1,604	9,914	1,363	8,748	961	8,165	785
		25	0.031	10368	1,362	8812.5	1,158	7776	816	7257.5	667
		30	0.027	9,072	1,121	7,711	953	6,804	672	6,350	550
		35	0.02	9,072	1,121	7,711	953	6,804	672	6,350	550
		40	0.015	8,164	897	6,939	762	6,123	537	5,715	440
		45	0.01	7,258	672	6,169	572	5,443	403	5,080	330
	0.2	8	0.09	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		10	0.08	14400	1,981	12240	1,684	10800	1188	10080	970
		12	0.07	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		14	0.06	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		16	0.05	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		20	0.05	11,664	1,604	9,914	1,363	8,748	961	8,165	785
		25	0.045	10368	1,362	8812.5	1,158	7776	816	7257.5	667
		30	0.04	9,072	1,121	7,711	953	6,804	672	6,350	550
		35	0.035	9,072	1,121	7,711	953	6,804	672	6,350	550
		40	0.03	8,164	897	6,939	762	6,123	537	5,715	440
		45	0.025	7,258	672	6,169	572	5,443	403	5,080	330
	0.3	8	0.13	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		10	0.115	14400	1,981	12240	1,684	10800	1188	10080	970
		12	0.1	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		14	0.085	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		16	0.075	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		20	0.075	11,664	1,604	9,914	1,363	8,748	961	8,165	785
		25	0.0675	10368	1,362	8812.5	1,158	7776	816	7257.5	667
		30	0.06	9,072	1,121	7,711	953	6,804	672	6,350	550
		35	0.05	9,072	1,121	7,711	953	6,804	672	6,350	550
		40	0.04	8,164	897	6,939	762	6,123	537	5,715	440
		45	0.03	7,258	672	6,169	572	5,443	403	5,080	330
	0.5	8	0.18	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		10	0.155	14400	1,981	12240	1,684	10800	1188	10080	970
		12	0.13	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		14	0.12	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		16	0.1	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		20	0.1	11,664	1,604	9,914	1,363	8,748	961	8,165	785
		25	0.09	10368	1,362	8812.5	1,158	7776	816	7257.5	667
		30	0.08	9,072	1,121	7,711	953	6,804	672	6,350	550
		35	0.065	9,072	1,121	7,711	953	6,804	672	6,350	550
		40	0.05	8,164	897	6,939	762	6,123	537	5,715	440
		45	0.04	7,258	672	6,169	572	5,443	403	5,080	330
		50	0.03	6,532	538	5,552	457	4,899	322	4,572	264

Recommended Cutting Condition

[ESRR714 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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)
3	1	8	0.2	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		10	0.175	14400	1,981	12240	1,684	10800	1188	10080	970
		12	0.15	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		14	0.13	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		16	0.12	14,400	1,981	12,240	1,684	10,800	1188	10,080	970
		20	0.11	11,664	1,604	9,914	1,363	8,748	961	8,165	785
		25	0.1	10368	1,362	8812.5	1,158	7776	816	7257.5	667
		30	0.09	9,072	1,121	7,711	953	6,804	672	6,350	550
		35	0.075	9,072	1,121	7,711	953	6,804	672	6,350	550
		40	0.06	8,164	897	6,939	762	6,123	537	5,715	440
		45	0.045	7,258	672	6,169	572	5,443	403	5,080	330
		50	0.03	6,532	538	5,552	457	4,899	322	4,572	264
4	0.1	10	0.072	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1338
		12	0.065	11,213	2,730	9,531	2,321	8,410	1638	7,849	1338
		13	0.062	10,734	2,613	9,114	2,219	8,004	1558	7,266	1239
		16	0.06	10,255	2,496	8,697	2116	7,599	1479	6,684	1139
		20	0.055	10,255	2496	8,697	2,116	7,599	1479	6,884	1139
		25	0.05	10,255	2,496	7,782	1,810	6,545	1,221	5,904	962
		30	0.045	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		35	0.04	10,255	2,496	6,867	1505	5,491	963	5,124	785
		40	0.035	9,247	2,000	6,225	1,262	5,217	842	4,621	643
		45	0.03	8,240	1,505	5,584	1,019	4,944	722	4,119	501
		50	0.02	7,398	1,200	4,980	757	4,174	505	3,697	385
	0.2	10	0.15	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1338
		12	0.14	11,213	2,730	9,531	2,321	8,410	1638	7,849	1338
		13	0.135	10,734	2,613	9,114	2,219	8,004	1558	7,266	1239
		16	0.13	10,255	2,496	8,697	2116	7,599	1479	6,684	1139
		20	0.11	10,255	2496	8,697	2,116	7,599	1479	6,884	1139
		25	0.105	10,255	2,496	7,782	1,810	6,545	1,221	5,904	962
		30	0.1	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		35	0.08	10,255	2,496	6,867	1505	5,491	963	5,124	785
		40	0.07	9,247	2,000	6,225	1,262	5,217	842	4,621	643
		45	0.06	8,240	1,505	5,584	1,019	4,944	722	4,119	501
		50	0.05	7,398	1,200	4,980	757	4,174	505	3,697	385
	0.3	10	0.23	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1338
		12	0.22	11,213	2,730	9,531	2,321	8,410	1638	7,849	1338
		13	0.21	10,734	2,613	9,114	2,219	8,004	1558	7,266	1239
		16	0.2	10,255	2,496	8,697	2116	7,599	1479	6,684	1139
		20	0.18	10,255	2496	8,697	2,116	7,599	1479	6,884	1139
		25	0.17	10,255	2,496	7,782	1,810	6,545	1,221	5,904	962
		30	0.16	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		35	0.14	10,255	2,496	6,867	1505	5,491	963	5,124	785
		40	0.13	9,247	2,000	6,225	1,262	5,217	842	4,621	643
		45	0.12	8,240	1,505	5,584	1,019	4,944	722	4,119	501
		50	0.11	7,398	1,200	4,980	757	4,174	505	3,697	385

Recommended Cutting Condition

[ESRR714 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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)
4	0.5	10	0.4	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1338
		12	0.35	11,213	2,730	9,531	2,321	8,410	1638	7,849	1338
		13	0.3	10,734	2,613	9,114	2,219	8,004	1558	7,266	1239
		16	0.25	10,255	2,496	8,697	2116	7,599	1479	6,684	1139
		20	0.2	10,255	2496	8,697	2,116	7,599	1479	6,884	1139
		25	0.175	10,255	2,496	7,782	1,810	6,545	1,221	5,904	962
		30	0.15	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		35	0.1	10,255	2,496	6,867	1505	5,491	963	5,124	785
		40	0.075	9,247	2,000	6,225	1,262	5,217	842	4,621	643
		45	0.05	8,240	1,505	5,584	1,019	4,944	722	4,119	501
		50	0.04	7,398	1,200	4,980	757	4,174	505	3,697	385
		55	0.03	6,592	9903	4,467	611	3,955	433	3,295	300
	1	10	0.5	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1338
		12	0.4	11,213	2,730	9,531	2,321	8,410	1638	7,849	1338
		13	0.35	10,734	2,613	9,114	2,219	8,004	1558	7,266	1239
		16	0.29	10,255	2,496	8,697	2116	7,599	1479	6,684	1139
		20	0.23	10,255	2496	8,697	2,116	7,599	1479	6,884	1139
		25	0.2	10,255	2,496	7,782	1,810	6,545	1,221	5,904	962
		30	0.17	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		35	0.12	10,255	2,496	6,867	1505	5,491	963	5,124	785
		40	0.09	9,247	2,000	6,225	1,262	5,217	842	4,621	643
		45	0.06	8,240	1,505	5,584	1,019	4,944	722	4,119	501
		50	0.05	7,398	1,200	4,980	757	4,174	505	3,697	385
		55	0.04	6,592	9903	4,467	611	3,955	433	3,295	300
5	0.1	16	0.08	9,154	2786	7,781	2368	6,866	1671	6,408	1365
		30	0.07	7,872	2291	6,691	1948	5,904	1374	5,510	1122
		40	0.06	6,590	1797	5,602	1527	4,943	1078	4,613	880
	0.2	16	0.16	9,154	2786	7,781	2368	6,866	1671	6,408	1365
		30	0.145	7,872	2291	6,691	1948	5,904	1374	5,510	1122
		40	0.13	6,590	1797	5,602	1527	4,943	1078	4,613	880
	0.3	16	0.24	9,154	2786	7,781	2368	6,866	1671	6,408	1365
		30	0.22	7,872	2291	6,691	1948	5,904	1374	5,510	1122
		40	0.2	6,590	1797	5,602	1527	4,943	1078	4,613	880
	0.5	16	0.35	9,154	2786	7,781	2368	6,866	1671	6,408	1365
		30	0.296	7,872	2291	6,691	1948	5,904	1374	5,510	1122
		40	0.135	6,590	1797	5,602	1527	4,943	1078	4,613	880
		50	0.12	5,272	1078	4,482	916	3,954	646	3,690	528
		60	0.1	4,218	647	3,585	549	3,164	388	2,952	317
	1	16	0.4	9,154	2786	7,781	2368	6,866	1671	6,408	1365
		30	0.275	7,872	2291	6,691	1948	5,904	1374	5,510	1122
		40	0.15	6,590	1797	5,602	1527	4,943	1078	4,613	880
		50	0.13	5,272	1078	4,482	916	3,954	646	3,690	528
		60	0.11	4,218	647	3,585	549	3,164	388	2,952	317
	1.5	15	0.45	9,154	2786	7,781	2368	6,866	1671	6,408	1365
	2	15	0.5	9,154	2786	7,781	2368	6,866	1671	6,408	1365

Recommended Cutting Condition

[ESRR714 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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)
6	0.1	20	0.065	7,630	2787	6,486	2368	5,722	1671	5,432	1365
		40	0.05	6,486	2132	5,513	1811	4,865	1279	4,540	1044
		50	0.04	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	0.2	20	0.14	7,630	2787	6,486	2368	5,722	1671	5,432	1365
		40	0.11	6,486	2132	5,513	1811	4,865	1279	4,540	1044
		50	0.08	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	0.3	20	0.22	7,630	2787	6,486	2368	5,722	1671	5,432	1365
		30	0.2	7,630	2787	6,486	2368	5,722	1671	5,432	1365
		40	0.18	6,486	2132	5,513	1811	4,865	1279	4,540	1044
		50	0.14	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	0.5	20	0.35	7,630	2787	6,486	2368	5,722	1671	5,432	1365
		30	0.29	7,630	2787	6,486	2368	5,722	1671	5,432	1365
		40	0.24	6,486	2132	5,513	1811	4,865	1279	4,540	1044
		50	0.165	5,491	1,470	4,668	1,248	4,118	872	3,844	711
		60	0.1	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	1	20	0.4	7,630	2787	6,486	2368	5,722	1671	5,432	1365
		30	0.35	7,630	2787	6,486	2368	5,722	1671	5,432	1365
		40	0.28	6,486	2132	5,513	1811	4,865	1279	4,540	1044
		50	0.2	5,491	1,470	4,668	1,248	4,118	872	3,844	711
		60	0.15	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	1.5	20	0.45	7,630	2787	6,486	2368	5,722	1671	5,432	1365
		40	0.4	6,486	2132	5,513	1811	4,865	1279	4,540	1044
		50	0.3	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	2	20	0.5	7,630	2787	6,486	2368	5,722	1671	5,432	1365
		30	0.4	7,630	2787	6,486	2368	5,722	1671	5,432	1365
		40	0.3	6,486	2132	5,513	1811	4,865	1279	4,540	1044
		50	0.2	5,491	1,470	4,668	1,248	4,118	872	3,844	711
8	0.1	25	0.35	5,730	2660	4,524	2076	3,016	1279	2,320	817
	0.2	22	0.5	5,730	2660	4,524	2076	3,016	1279	2,320	817
		40	0.25	5,730	2660	4,524	2076	3,016	1279	2,320	817
	0.3	22	0.6	5,730	2660	4,524	2076	3,016	1279	2,320	817
		40	0.3	5,730	2660	4,524	2076	3,016	1279	2,320	817
	0.5	22	0.7	5,730	2660	4,524	2076	3,016	1279	2,320	817
		35	0.5	5,730	2660	4,524	2076	3,016	1279	2,320	817
		40	0.35	5,730	2660	4,524	2076	3,016	1279	2,320	817
		50	0.3	4,584	1596	3,619	1245	2,413	767	1,856	490
		60	0.25	4,584	1596	3,619	1245	2,413	767	1,856	490
	1	22	0.8	5,730	2660	4,524	2076	3,016	1279	2,320	817
		35	0.6	5,730	2660	4,524	2076	3,016	1279	2,320	817
		40	0.4	5,730	2660	4,524	2076	3,016	1279	2,320	817
		50	0.4	4,584	1596	3,619	1245	2,413	767	1,856	490
		60	0.3	4,584	1596	3,619	1245	2,413	767	1,856	490
	1.2	22	0.9	5,730	2660	4,524	2076	3,016	1279	2,320	817
		40	0.45	5,730	2660	4,524	2076	3,016	1279	2,320	817
	2	22	1	5,730	2660	4,524	2076	3,016	1279	2,320	817
		40	0.5	5,730	2660	4,524	2076	3,016	1279	2,320	817
		50	0.4	4,584	1596	3,619	1245	2,413	767	1,856	490

Recommended Cutting Condition

[ESRR714 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 80%		Depth of CutX 65%		Depth of Cut X 60%	
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)
10	0.1	30	0.4	4,524	2419	3,567	1954	2,378	1188	1,856	761
	0.2	24	0.5	4,524	2419	3,567	1954	2,378	1188	1,856	761
		40	0.25	4,524	2419	3,567	1954	2,378	1188	1,856	761
	0.3	24	0.6	4,524	2419	3,567	1954	2,378	1188	1,856	761
		40	0.3	4,524	2419	3,567	1954	2,378	1188	1,856	761
	0.5	24	0.7	4,524	2419	3,567	1954	2,378	1188	1,856	761
		40	0.4	4,524	2419	3,567	1954	2,378	1188	1,856	761
		50	0.3	3,619	1451	2,854	1172	1,902	713	1,485	456
		60	0.2	3,619	1451	2,854	1172	1,902	713	1,485	456
	1	24	0.8	4,524	2419	3,567	1954	2,378	1188	1,856	761
		40	0.5	4,524	2419	3,567	1954	2,378	1188	1,856	761
		50	0.4	3,619	1451	2,854	1172	1,902	713	1,485	456
		60	0.3	3,619	1451	2,854	1172	1,902	713	1,485	456
	1.5	24	0.9	4,524	2419	3,567	1954	2,378	1188	1,856	761
		40	0.55	4,524	2419	3,567	1954	2,378	1188	1,856	761
	2	24	1	4,524	2419	3,567	1954	2,378	1188	1,856	761
		40	0.5	3,619	1451	2,854	1172	1,902	713	1,485	456
		50	0.4	2,895	870	2,283	703	1,522	427	1,188	274
	2.5	24	1.1	4,524	2419	3,567	1954	2,378	1188	1,856	761
12	0.2	32	0.5	3,857	2419	3,045	1954	2,030	1188	1,537	761
	0.3	26	0.6	3,857	2419	3,045	1954	2,030	1188	1,537	761
		45	0.3	3,857	2419	3,045	1954	2,030	1188	1,537	761
	0.5	26	0.7	3,857	2419	3,045	1954	2,030	1188	1,537	761
		40	0.4	3,857	2419	3,045	1954	2,030	1188	1,537	761
		60	0.3	3,086	1451	2,436	1172	1,624	713	1,230	456
	1	26	0.8	3,857	2419	3,045	1954	2,030	1188	1,537	761
		40	0.5	3,857	2419	3,045	1954	2,030	1188	1,537	761
		60	0.3	3,086	1451	2,436	1172	1,624	713	1,230	456
	1.5	26	0.9	3,857	2419	3,045	1954	2,030	1188	1,537	761
	2	26	1	3,857	2419	3,045	1954	2,030	1188	1,537	761
		40	0.5	3,857	2419	3,045	1954	2,030	1188	1,537	761
	3	26	1	3,857	2419	3,045	1954	2,030	1188	1,537	761
16	0.5	35	2	2,842	2116	2,262	1692	1,508	1047	1,160	672
		50	1	2,842	2116	2,262	1692	1,508	1047	1,160	672
	1	35	2	2,842	2116	2,262	1692	1,508	1047	1,160	672
		50	1	2,842	2116	2,262	1692	1,508	1047	1,160	672
20	0.5	40	2	2,262	1915	1,798	1512	1,189	957	928	616
		55	1	2,262	1915	1,798	1512	1,189	957	928	616
	1	40	2	2,262	1915	1,798	1512	1,189	957	928	616
		55	1	2,262	1915	1,798	1512	1,189	957	928	616

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

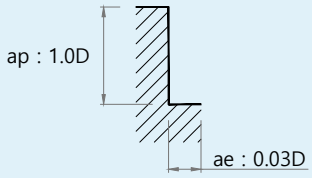
- In the case of low RPM, reduce the feed rate at the same rate.

Recommended Cutting Condition

[ESXE704, ESXE714, ESXR704 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.

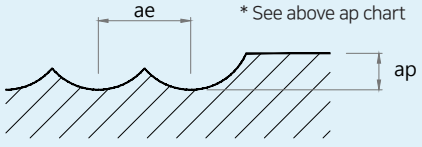


[ESLNB20 series]

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



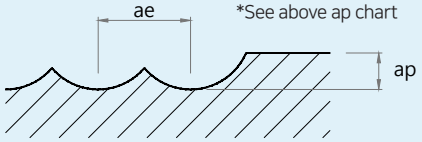
Recommended Cutting Condition

[ESTNB20 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.

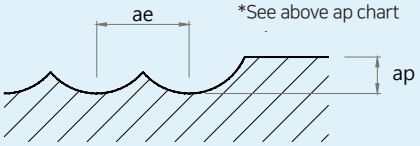
Recommended Cutting Condition

[ESTNB20 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)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.

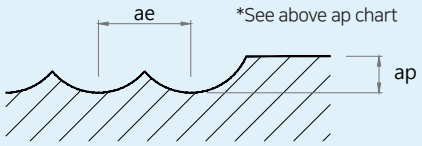
Recommended Cutting Condition

[ESTNB20 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.

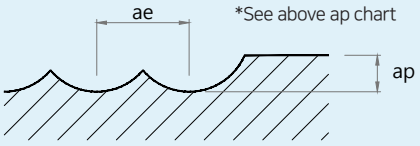
Recommended Cutting Condition

[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.

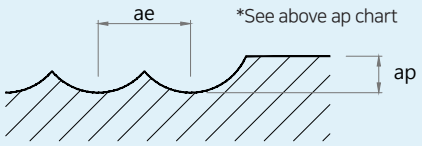
Recommended Cutting Condition

[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



- 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.

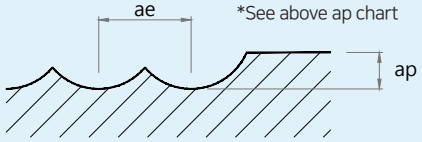
Recommended Cutting Condition

[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.

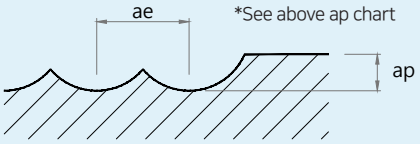
Recommended Cutting Condition

[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)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.

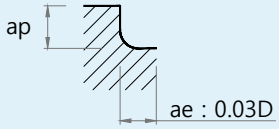
- In the case of low RPM, reduce the feed rate at the same rate.

Recommended Cutting Condition

[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.



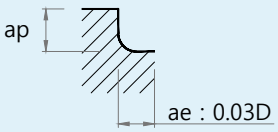
*See above ap chart

Recommended Cutting Condition

[ESLNR20 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.

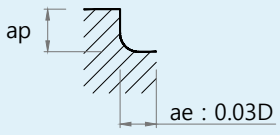
- In the case of low RPM, reduce the feed rate at the same rate.

Recommended Cutting Condition

[ESLNR20 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.

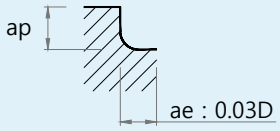
- In the case of low RPM, reduce the feed rate at the same rate.

Recommended Cutting Condition

[ESLNR20 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.

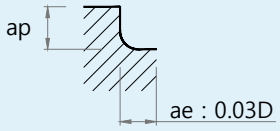
- In the case of low RPM, reduce the feed rate at the same rate.

Recommended Cutting Condition

[ESTNR20 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.

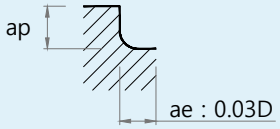
- In the case of low RPM, reduce the feed rate at the same rate.

Recommended Cutting Condition

[ESTNR20 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.

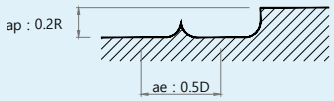
- In the case of low RPM, reduce the feed rate at the same rate.

Recommended Cutting Condition

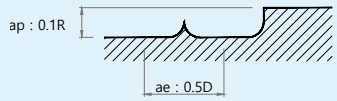
[ESPM4 series] ▶ Side cutting

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

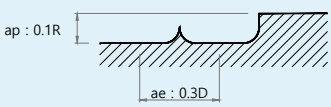


*ae shouldn't be over max. 0.5D

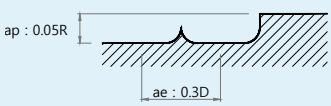
[ESPM4 series] ▶ Speed Cutting

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..3D

MEMO

MEMO

ver. III

WD2022.09-ENG-BO8

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