

IT-2

Dot Mill, 2-Flute Short

Dia. mm	Carbon Steels Structural Steels		Alloy Steels · Tool Steels		Prehardened Steels		Cast Iron	
	SS · SS55C		SCM · SKT · SKS · SKD		HPM-1 · NAK55 · SKT		FC · FCD	
	Rotation	FEED	Rotation	FEED	Rotation	FEED	Rotation	FEED
	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min
0.1 ~ 0.14	32,000	15	32,000	15	32,000	10	32,000	15
0.15 ~ 0.19	32,000	20	32,000	18	32,000	15	32,000	20
0.2 ~ 0.24	32,000	30	32,000	25	32,000	20	32,000	30
0.25 ~ 0.29	32,000	35	32,000	30	29,300	20	32,000	35
0.3 ~ 0.34	31,500	45	31,000	35	25,100	20	31,500	45
0.35 ~ 0.39	31,500	50	27,000	35	22,000	20	31,500	50
0.4 ~ 0.49	26,500	60	21,600	40	17,400	25	28,200	60
0.5 ~ 0.59	21,000	60	18,000	40	14,500	25	23,500	65
0.6 ~ 0.79	15,500	65	13,500	40	11,000	25	17,500	75
0.8 ~ 0.89	14,000	70	11,500	40	10,000	25	15,500	80
0.9 ~ 0.99	12,500	75	10,500	40	8,900	25	14,000	90
1 ~ 1.09	11,500	85	9,800	40	8,100	30	12,500	95
1.1 ~ 1.19	10,500	85	9,000	40	7,400	30	11,500	95
1.2 ~ 1.29	9,800	85	8,300	40	6,850	30	10,800	95
1.3 ~ 1.39	9,100	85	7,700	45	6,350	30	10,000	95
1.4 ~ 1.49	8,500	85	7,200	45	5,550	30	9,500	95
1.5 ~ 1.69	7,500	90	6,400	45	5,250	30	8,400	95
1.7 ~ 1.79	7,000	95	6,000	50	4,950	30	7,950	100
1.8 ~ 1.99	6,400	100	5,400	55	4,450	30	7,150	105
2 ~ 2.19	5,800	100	4,900	60	4,050	30	6,500	110
2.2 ~ 2.39	5,300	100	4,500	65	3,700	30	5,950	110
2.4 ~ 2.59	4,900	100	4,200	65	3,400	30	5,500	110
2.6 ~ 2.79	4,500	100	3,900	70	3,150	30	5,100	110
2.28 ~ 3	4,200	100	3,600	75	2,950	30	4,750	110

Dia.	Cut depth
$D < \phi 0.2$	0.05D
$\phi 0.2 \leq D < \phi 1$	0.1D
$\phi 1 \leq D$	0.3D

IT-2L · IT-2LL

Dot Mill, 2-Flute Long

Dia. mm	Carbon Steels · Structural Steels		Alloy Steels · Tool Steels		Prehardened Steels		Cast Iron	
	SS · SS55C		SCM · SKT · SKS · SKD		HPM-1 · NAK55 · SKT		FC · FCD	
	Rotation	FEED	Rotation	FEED	Rotation	FEED	Rotation	FEED
	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min
0.1 ~ 0.2	32,000	15	32,000	15	32,000	15	32,000	15
0.3 ~ 0.4	19,000	20	19,000	20	19,000	20	19,000	20
0.5 ~ 0.6	13,000	25	13,000	25	10,000	20	13,000	25
0.7 ~ 0.8	9,600	30	9,600	30	7,400	20	9,600	30
0.9 ~ 1	7,500	40	7,500	40	5,800	25	7,500	40
1.1 ~ 1.2	6,200	40	6,200	40	4,800	25	6,200	40
1.3 ~ 1.4	5,300	40	5,300	40	4,100	30	5,300	40
1.5 ~ 1.6	4,600	40	4,600	40	3,600	30	4,600	40
1.7 ~ 1.8	4,100	40	4,100	40	3,200	30	4,100	40
1.9 ~ 2	3,700	40	3,700	40	2,800	30	3,700	40
2.1 ~ 2.2	3,300	50	3,300	50	2,600	35	3,300	50
2.3 ~ 2.4	3,000	50	3,000	50	2,400	35	3,000	50
2.5 ~ 2.6	2,800	55	2,800	55	2,200	40	2,800	55
2.7 ~ 2.8	2,600	55	2,600	55	2,000	40	2,600	55
2.9 ~ 3	2,500	60	2,500	60	1,900	40	2,500	60

Dia.	Cut width	Cut depth
$D < \phi 0.2$	0.05D	0.4D
$\phi 0.2 \leq D < \phi 1$	0.1D	0.4D
$\phi 1 \leq d$	0.3D	0.8D

IT-2A

Dot Mill, 2-Flute Short TiAlN Coating

Dia. mm	Carbon Steels · Structural Steels		Alloy Steels · Tool Steels		Prehardened Steels		Cast Iron	
	SS · SS55C		SCM · SKT · SKS · SKD		HPM-1 · NAK55 · SKT		FC · FCD	
	Rotation	FEED	Rotation	FEED	Rotation	FEED	Rotation	FEED
	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min
0.1 ~ 0.14	32,000	15	32,000	15	32,000	10	32,000	15
0.15 ~ 0.19	32,000	20	32,000	18	32,000	15	32,000	20
0.2 ~ 0.24	32,000	80	32,000	80	32,000	65	32,000	80
0.25 ~ 0.29	32,000	90	32,000	90	32,000	65	32,000	90
0.3 ~ 0.34	32,000	100	32,000	100	32,000	70	32,000	100
0.35 ~ 0.39	32,000	110	32,000	110	32,000	75	32,000	110
0.4 ~ 0.49	32,000	115	32,000	115	32,000	80	32,000	115
0.5 ~ 0.59	32,000	115	29,500	115	25,000	80	32,000	115
0.6 ~ 0.79	32,000	115	24,500	115	21,000	85	32,000	115
0.8 ~ 0.89	24,500	115	18,500	115	15,500	90	24,500	115
0.9 ~ 0.99	22,000	115	16,500	115	14,000	90	22,000	115
1 ~ 1.09	19,500	120	14,500	115	12,500	90	19,500	120
1.1 ~ 1.19	18,400	120	13,700	115	11,800	90	18,400	120
1.2 ~ 1.29	17,300	130	12,900	115	11,100	90	17,300	130
1.3 ~ 1.39	16,200	130	12,100	115	10,400	90	16,200	130
1.4 ~ 1.49	15,100	140	11,300	115	9,700	90	15,100	140
1.5 ~ 1.69	14,000	140	10,500	115	8,900	90	14,000	140
1.7 ~ 1.79	13,000	150	9,800	115	8,300	90	13,000	150
1.8 ~ 1.99	12,000	150	9,100	115	7,600	90	12,000	150
2 ~ 2.19	11,000	160	8,400	120	7,000	90	11,000	160
2.2 ~ 2.39	10,000	160	7,900	125	6,600	90	10,000	160
2.4 ~ 2.59	9,000	170	7,400	130	6,200	95	9,000	170
2.6 ~ 2.79	8,000	170	6,900	135	5,800	95	8,000	170
2.28 ~ 3	7,400	180	6,350	140	5,300	100	7,400	180

Dia.	Cut depth
D < φ 0.2	0.05D
φ 0.2 ≤ D < φ 1	0.1D
φ 1 ≤ D	0.3D

IT-2LA · IT-2LLA

Dot Mill, 2-Flute TiAlN Coating

Dia. mm	Carbon Steels · Structural Steels		Alloy Steels · Tool Steels		Prehardened Steels		Cast Iron	
	SS · SS55C		SCM · SKT · SKS · SKD		HPM-1 · NAK55 · SKT		FC · FCD	
	Rotation	FEED	Rotation	FEED	Rotation	FEED	Rotation	FEED
	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min
0.1 ~ 0.2	32,000	20	32,000	18	32,000	15	32,000	20
0.3 ~ 0.4	32,000	25	27,800	20	22,000	20	32,000	25
0.5 ~ 0.6	21,000	35	18,500	30	14,800	25	21,000	35
0.7 ~ 0.8	15,900	40	14,000	35	11,100	30	15,900	40
0.9 ~ 1	12,500	45	11,000	40	8,900	30	12,500	45
1.1 ~ 1.2	10,500	50	9,200	45	7,400	35	10,500	50
1.3 ~ 1.4	9,000	50	8,000	45	6,350	35	9,000	50
1.5 ~ 1.6	8,000	55	7,000	50	5,550	40	8,000	55
1.7 ~ 1.8	7,000	55	6,100	50	4,950	40	7,000	55
1.9 ~ 2	6,350	60	5,500	55	4,450	45	6,350	60
2.1 ~ 2.2	5,750	70	5,000	60	4,000	50	5,750	70
2.3 ~ 2.4	5,300	70	4,600	60	3,700	50	5,300	70
2.5 ~ 2.6	4,900	75	4,200	65	3,400	55	4,900	75
2.7 ~ 2.8	4,500	75	4,000	65	3,150	55	4,500	75
2.9 ~ 3	4,200	80	3,700	70	2,950	60	4,200	80

Dia.	Cut width	Cut depth
D < φ 0.2	0.05D	0.4D
φ 0.2 ≤ D < φ 1	0.1D	0.4D
φ 1 ≤ d	0.3D	0.8D

IT-2CRA

Dot Mill, Corner Rounding End Mill TiAlN Coating

Dia. mm	Carbon Steels · Structural Steels SS · S55C		Alloy Steels · Tool Steels SCM · SKT · SKS · SKD		Prehardened Steels HPM-1 · NAK55 · SKT		Cast Iron FC · FCD	
	Rotation	FEED	Rotation	FEED	Rotation	FEED	Rotation	FEED
	min-1	mm/min	min-1	mm/min	min-1	mm/min	min-1	mm/min
0.5	32,000	115	29,500	115	25,000	80	32,000	115
0.6	32,000	115	24,500	115	21,000	85	32,000	115
0.7	32,000	115	24,500	115	21,000	85	32,000	115
0.8	24,500	115	18,500	115	15,500	90	24,500	115
0.9	22,000	115	16,500	115	14,000	90	22,000	115
1	19,500	120	14,500	115	12,500	90	19,500	120
1.2	17,300	130	12,900	115	11,100	90	17,300	130
1.5	14,000	140	10,500	115	8,900	90	14,000	140
1.6	14,000	140	10,500	15	8,900	90	14,000	140
1.8	12,000	150	9,100	115	7,600	90	12,000	150
2	11,000	160	8,400	120	7,000	90	11,000	160
2.5	9,000	170	7,400	130	6,200	95	9,000	170
3	7,400	180	6,350	140	5,300	100	7,400	180

DEKAO

DEKAO, Carbide Ball End Mill

R	Carbon Steels		Alloy Steels		Prehardened Steels	
	Rotation	FEED	Rotation	FEED	Rotation	FEED
	(rpm)	(mm/min)	(rpm)	(mm/min)	(rpm)	(mm/min)
1R	17,000	1,500	15,500	1,100	13,000	750
2R	16,500	2,000	15,000	1,500	12,500	1,000
3R	15,500	2,200	14,000	1,600	12,000	1,100
4R	15,000	2,500	13,500	1,800	11,000	1,250
5R	14,500	3,000	13,000	2,300	11,000	1,500
6R	14,000	3,300	12,600	2,500	10,500	1,650
8R	13,500	3,500	12,000	2,600	10,000	1,750
10R	12,000	3,500	11,000	2,600	9,000	1,750
12R	9,500	3,000	9,000	2,300	7,500	1,500
12.5R	9,500	3,000	9,000	2,300	7,500	1,500

IT-2V

Dot Mill, V Cut End Mill 60°/90°/120°

Dia. mm	Carbon Steels · Structural Steels						Alloy Steels · Tool Steels					
	SS · S55C						SCM · SKT · SKD					
	Chamfering · End milling		V-grooving		Centering · Drilling		Chamfering · End milling		V-grooving		Centering · Drilling	
	Cutting Speed	FEED	Cutting Speed	FEED	Cutting Speed	FEED	Cutting Speed	FEED	Cutting Speed	FEED	Cutting Speed	FEED
	m/min	mm/rev	m/min	mm/rev	m/min	mm/rev	m/min	mm/rev	m/min	mm/rev	m/min	mm/rev
0.3 ~ 0.4	10 ~ 18	0.002 ~ 0.01	10 ~ 18	0.002 ~ 0.01	10 ~ 18	0.01 ~ 0.02	10 ~ 18	0.002 ~ 0.01	8 ~ 15	0.001 ~ 0.003	8 ~ 15	0.004 ~ 0.01
0.5 ~ 0.6	10 ~ 18	0.002 ~ 0.01	10 ~ 18	0.002 ~ 0.01	10 ~ 18	0.01 ~ 0.02	10 ~ 18	0.002 ~ 0.01	8 ~ 15	0.001 ~ 0.003	8 ~ 15	0.004 ~ 0.01
0.7 ~ 0.9	15 ~ 25	0.006 ~ 0.02	15 ~ 25	0.006 ~ 0.02	15 ~ 25	0.01 ~ 0.03	10 ~ 18	0.006 ~ 0.02	10 ~ 18	0.001 ~ 0.003	10 ~ 18	0.006 ~ 0.02
1 ~ 2	15 ~ 25	0.01 ~ 0.03	15 ~ 25	0.01 ~ 0.03	15 ~ 25	0.02 ~ 0.04	10 ~ 20	0.006 ~ 0.02	10 ~ 20	0.002 ~ 0.005	10 ~ 20	0.008 ~ 0.02
2 ~ 3	15 ~ 25	0.01 ~ 0.03	15 ~ 25	0.01 ~ 0.03	15 ~ 25	0.02 ~ 0.04	10 ~ 20	0.006 ~ 0.02	10 ~ 20	0.002 ~ 0.005	10 ~ 20	0.01 ~ 0.03
Dia. mm	Aluminium Alloy						Cast Iron					
	ADC · AC						FC · FDC					
	Chamfering · End milling		V-grooving		Centering · Drilling		Chamfering · End milling		V-grooving		Centering · Drilling	
	Cutting Speed	FEED	Cutting Speed	FEED	Cutting Speed	FEED	Cutting Speed	FEED	Cutting Speed	FEED	Cutting Speed	FEED
	m/min	mm/rev	m/min	mm/rev	m/min	mm/rev	m/min	mm/rev	m/min	mm/rev	m/min	mm/rev
0.3 ~ 0.4	25 ~ 35	0.006 ~ 0.016	25 ~ 35	0.006 ~ 0.016	25 ~ 35	0.02 ~ 0.04	25 ~ 35	0.006 ~ 0.016	25 ~ 35	0.006 ~ 0.016	25 ~ 35	0.01 ~ 0.03
0.5 ~ 0.6	25 ~ 35	0.006 ~ 0.016	25 ~ 35	0.006 ~ 0.016	25 ~ 35	0.02 ~ 0.04	25 ~ 35	0.006 ~ 0.016	25 ~ 35	0.006 ~ 0.016	25 ~ 35	0.01 ~ 0.03
0.7 ~ 0.9	30 ~ 40	0.01 ~ 0.02	30 ~ 40	0.01 ~ 0.02	30 ~ 40	0.03 ~ 0.07	30 ~ 40	0.01 ~ 0.02	30 ~ 40	0.01 ~ 0.02	30 ~ 40	0.01 ~ 0.03
1 ~ 2	40 ~ 80	0.02 ~ 0.04	40 ~ 80	0.02 ~ 0.04	40 ~ 80	0.04 ~ 0.08	30 ~ 45	0.02 ~ 0.04	30 ~ 45	0.02 ~ 0.04	30 ~ 45	0.03 ~ 0.06
2 ~ 3	40 ~ 80	0.02 ~ 0.04	40 ~ 80	0.02 ~ 0.04	40 ~ 80	0.06 ~ 0.1	30 ~ 45	0.02 ~ 0.04	30 ~ 45	0.02 ~ 0.04	30 ~ 45	0.06 ~ 0.08

[Processing example]

Application	Chamfering	End milling	V-grooving	Plate Chamfering	Centering	Drilling
IT-2V-60°	○	○	×	○	×	×
IT-2V-90°	○	○	○	○	□	△
IT-2V-120°	○	○	○	○	○	○

○ Good □ Good for Cast Iron △ Thin thing of the thickness × Not Used

[Tip Flat Dia.]

Dia. (φ)	Tip Angle 60°	Tip Angle 90°	Tip Angle 120°
	Tip flat Dia. (φ)	Tip flat Dia. (φ)	Tip flat Dia. (φ)
0.3	0.04	0.04	0.04
0.4	0.04	0.04	0.04
0.5	0.06	0.06	0.06
0.6	0.06	0.06	0.06
0.7	0.06	0.06	0.06
0.8	0.06	0.06	0.06
0.9	0.06	0.06	0.06
1	0.08	0.1	0.1
1.1	0.08	0.1	0.1
1.2	0.08	0.1	0.1
1.3	0.08	0.1	0.1
1.4	0.08	0.1	0.1
1.5	0.08	0.1	0.1
1.6	0.08	0.1	0.1
1.7	0.08	0.1	0.1
1.8	0.08	0.1	0.1
1.9	0.08	0.1	0.1
2	0.1	0.2	0.2
2.1	0.1	0.2	0.2
2.2	0.1	0.2	0.2
2.3	0.1	0.2	0.2
2.4	0.1	0.2	0.2
2.5	0.1	0.2	0.2
2.6	0.1	0.2	0.2
2.7	0.1	0.2	0.2
2.8	0.1	0.2	0.2
2.9	0.1	0.2	0.2
3	0.1	0.2	0.2

● Tolerance of Flat Dia. ± 0.04

IT-2VA

Dot Mill, V Cut End Mill 60°/90°/120°

Dia. mm	Carbon Steels · Structural Steels						Alloy Steels · Tool Steels					
	SS · S55C						SCM · SKT · SKD					
	Chamfering · End milling		V-grooving		Centering · Drilling		Chamfering · End milling		V-grooving		Centering · Drilling	
	Cutting Speed	FEED	Cutting Speed	FEED	Cutting Speed	FEED	Cutting Speed	FEED	Cutting Speed	FEED	Cutting Speed	FEED
m/min	mm/rev	m/min	mm/rev	m/min	mm/rev	m/min	mm/rev	m/min	mm/rev	m/min	mm/rev	
0.3 ~ 0.4	10 ~ 20	0.002 ~ 0.01	10 ~ 20	0.002 ~ 0.01	10 ~ 20	0.01 ~ 0.02	10 ~ 20	0.002 ~ 0.01	8 ~ 15	0.001 ~ 0.003	8 ~ 15	0.004 ~ 0.01
0.5 ~ 0.6	15 ~ 25	0.002 ~ 0.01	15 ~ 25	0.002 ~ 0.01	15 ~ 25	0.01 ~ 0.02	15 ~ 25	0.002 ~ 0.01	10 ~ 20	0.001 ~ 0.003	8 ~ 15	0.004 ~ 0.01
0.7 ~ 0.9	20 ~ 35	0.006 ~ 0.02	20 ~ 35	0.006 ~ 0.02	20 ~ 35	0.01 ~ 0.03	15 ~ 25	0.006 ~ 0.02	15 ~ 25	0.001 ~ 0.003	15 ~ 25	0.006 ~ 0.02
1 ~ 2	20 ~ 35	0.01 ~ 0.03	20 ~ 35	0.01 ~ 0.03	20 ~ 35	0.02 ~ 0.04	15 ~ 35	0.006 ~ 0.02	15 ~ 35	0.002 ~ 0.005	15 ~ 35	0.008 ~ 0.02
2 ~ 3	20 ~ 35	0.01 ~ 0.03	20 ~ 35	0.01 ~ 0.03	20 ~ 35	0.02 ~ 0.04	15 ~ 35	0.006 ~ 0.02	15 ~ 35	0.002 ~ 0.005	15 ~ 35	0.01 ~ 0.03
Dia. mm	Aluminium Alloy						Cast Iron					
	ADC · AC						FC · FDC					
	Chamfering · End milling		V-grooving		Centering · Drilling		Chamfering · End milling		V-grooving		Centering · Drilling	
	Cutting Speed	FEED	Cutting Speed	FEED	Cutting Speed	FEED	Cutting Speed	FEED	Cutting Speed	FEED	Cutting Speed	FEED
m/min	mm/rev	m/min	mm/rev	m/min	mm/rev	m/min	mm/rev	m/min	mm/rev	m/min	mm/rev	
0.3 ~ 0.4	25 ~ 40	0.006 ~ 0.016	25 ~ 40	0.006 ~ 0.016	25 ~ 40	0.02 ~ 0.04	25 ~ 40	0.006 ~ 0.016	25 ~ 40	0.006 ~ 0.016	25 ~ 40	0.01 ~ 0.03
0.5 ~ 0.6	30 ~ 50	0.006 ~ 0.016	30 ~ 50	0.006 ~ 0.016	30 ~ 50	0.02 ~ 0.04	30 ~ 50	0.006 ~ 0.016	30 ~ 50	0.006 ~ 0.016	30 ~ 50	0.01 ~ 0.03
0.7 ~ 0.9	45 ~ 60	0.01 ~ 0.02	45 ~ 60	0.01 ~ 0.02	45 ~ 60	0.03 ~ 0.07	45 ~ 60	0.01 ~ 0.02	45 ~ 60	0.01 ~ 0.02	45 ~ 60	0.01 ~ 0.03
1 ~ 2	60 ~ 120	0.02 ~ 0.04	60 ~ 120	0.02 ~ 0.04	60 ~ 120	0.04 ~ 0.08	45 ~ 70	0.02 ~ 0.04	45 ~ 70	0.02 ~ 0.04	45 ~ 70	0.03 ~ 0.06
2 ~ 3	60 ~ 120	0.02 ~ 0.04	60 ~ 120	0.02 ~ 0.04	60 ~ 120	0.06 ~ 0.1	45 ~ 70	0.02 ~ 0.04	45 ~ 70	0.02 ~ 0.04	45 ~ 70	0.06 ~ 0.08

[Processing example]

Application	Chamfering	End milling	V-grooving	Plate Chamfering	Centering	Drilling
IT-2VA-60°	○	○	×	○	×	×
IT-2VA-90°	○	○	○	○	□	△
IT-2VA-120°	○	○	○	○	○	○

○ Good □ Good for Cast Iron △ Thin thing of the thickness × Not Used

[Tip Flat Dia.]

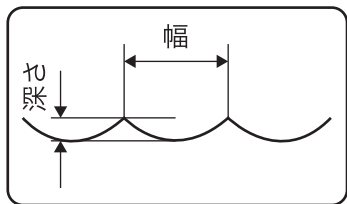
Dia. (φ)	Tip Angle 60°	Tip Angle 90°	Tip Angle 120°
	Tip flat Dia. (φ)	Tip flat Dia. (φ)	Tip flat Dia. (φ)
0.3	0.04	0.04	0.04
0.4	0.04	0.04	0.04
0.5	0.06	0.06	0.06
0.6	0.06	0.06	0.06
0.7	0.06	0.06	0.06
0.8	0.06	0.06	0.06
0.9	0.06	0.06	0.06
1	0.08	0.1	0.1
1.1	0.08	0.1	0.1
1.2	0.08	0.1	0.1
1.3	0.08	0.1	0.1
1.4	0.08	0.1	0.1
1.5	0.08	0.1	0.1
1.6	0.08	0.1	0.1
1.7	0.08	0.1	0.1
1.8	0.08	0.1	0.1
1.9	0.08	0.1	0.1
2	0.1	0.2	0.2
2.1	0.1	0.2	0.2
2.2	0.1	0.2	0.2
2.3	0.1	0.2	0.2
2.4	0.1	0.2	0.2
2.5	0.1	0.2	0.2
2.6	0.1	0.2	0.2
2.7	0.1	0.2	0.2
2.8	0.1	0.2	0.2
2.9	0.1	0.2	0.2
3	0.1	0.2	0.2

●フラット径公差 ±0.04

YBE

Slid Carbide Ball End Mill

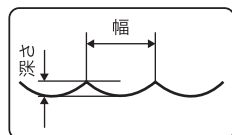
R	Nonferrous Metals		Carbon Steels		Alloy Steels		Hardened Steels		Depth of Cut
	Al.Cu		FC.FCD.S50C		SCM.SKD.SUS304		HPM.NAK		
	Cutting speed		Cutting speed		Cutting speed		Cutting speed		
	40 ~ 60m/min		20 ~ 40m/min		15 ~ 30m/min		10 ~ 20m/min		
	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed	Depth x Width
	rpm	mm/min	rpm	mm/min	rpm	mm/min	rpm	mm/min	
1.0R	6,366 ~ 9,550	764 ~ 2,292	3,183 ~ 6,366	255 ~ 1,019	2,387 ~ 4,775	153 ~ 611	1,592 ~ 3,183	76 ~ 306	0.2 X 0.6
1.5R	4,244 ~ 6,366	525 ~ 1,576	2,122 ~ 4,244	175 ~ 700	1,592 ~ 3,183	105 ~ 420	1,061 ~ 2,122	53 ~ 210	0.3 X 0.9
2.0R	3,183 ~ 4,775	406 ~ 1,218	1,592 ~ 3,183	135 ~ 541	1,194 ~ 2,387	81 ~ 325	796 ~ 1,592	41 ~ 162	0.4 X 1.2
2.5R	2,547 ~ 3,820	334 ~ 1,003	1,273 ~ 2,547	111 ~ 446	955 ~ 1,910	67 ~ 267	637 ~ 1,273	33 ~ 134	0.5 X 1.5
3.0R	2,122 ~ 3,183	286 ~ 859	1,061 ~ 2,122	95 ~ 382	796 ~ 1,592	57 ~ 229	531 ~ 1,061	29 ~ 115	0.6 X 1.8
3.5R	1,819 ~ 2,728	252 ~ 757	909 ~ 1,819	84 ~ 337	682 ~ 1,364	50 ~ 202	455 ~ 909	25 ~ 101	0.7 X 2.1
4.0R	1,592 ~ 2,387	227 ~ 680	796 ~ 1,592	76 ~ 302	597 ~ 1,194	45 ~ 181	398 ~ 796	23 ~ 91	0.8 X 2.4
4.5R	1,415 ~ 2,122	207 ~ 621	707 ~ 1,415	69 ~ 276	531 ~ 1,061	41 ~ 166	354 ~ 707	21 ~ 83	0.9 X 2.7
5.0R	1,273 ~ 1,910	191 ~ 573	637 ~ 1,273	64 ~ 255	477 ~ 955	38 ~ 153	318 ~ 637	19 ~ 76	1.0 X 3.0
6.0R	1,061 ~ 1,592	167 ~ 501	531 ~ 1,061	56 ~ 223	398 ~ 796	33 ~ 134	265 ~ 531	17 ~ 67	1.2 X 3.6
6.5R	979 ~ 1,469	158 ~ 474	490 ~ 979	53 ~ 211	367 ~ 735	32 ~ 126	245 ~ 490	16 ~ 63	1.3 X 3.9
7.0R	909 ~ 1,364	150 ~ 450	455 ~ 909	50 ~ 200	341 ~ 682	30 ~ 120	227 ~ 455	15 ~ 60	1.4 X 4.2
7.5R	849 ~ 1,273	143 ~ 430	424 ~ 849	48 ~ 191	318 ~ 637	29 ~ 115	212 ~ 424	14 ~ 57	1.5 X 4.5
8.0R	796 ~ 1,194	137 ~ 412	398 ~ 796	46 ~ 183	298 ~ 597	27 ~ 110	199 ~ 398	14 ~ 55	1.6 X 4.8
8.5R	749 ~ 1,123	132 ~ 396	374 ~ 749	44 ~ 176	281 ~ 562	26 ~ 106	187 ~ 374	13 ~ 53	1.7 X 5.1
9.0R	707 ~ 1,061	127 ~ 382	354 ~ 707	42 ~ 170	265 ~ 531	25 ~ 102	177 ~ 354	13 ~ 51	1.8 X 5.4
9.5R	670 ~ 1,005	123 ~ 369	335 ~ 670	41 ~ 164	251 ~ 503	25 ~ 99	168 ~ 335	12 ~ 49	1.9 X 5.7
10.0R	637 ~ 955	119 ~ 358	318 ~ 637	40 ~ 159	239 ~ 477	24 ~ 95	159 ~ 318	12 ~ 48	2.0 X 6.0



BE2

2-Flute Ball End Mill

R	Nonferrous Metals		Carbon Steels		Alloy Steels		Hardened Steels ~ 38HRC		Depth of Cut
	Al,Cu		FC,FCD,S50C		SCM,SKD,SUS304		HPM,NAK		
	Cutting speed		Cutting speed		Cutting speed		Cutting speed		
	15 ~ 30m/min		12 ~ 25m/min		10 ~ 25m/min		8 ~ 20m/min		
	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed	Depth x Width
rpm	mm/min	rpm	mm/min	rpm	mm/min	rpm	mm/min		
1.0R	2,387 ~ 4,775	107 ~ 430	1,910 ~ 3,979	57 ~ 239	1,592 ~ 3,979	38 ~ 143	1,273 ~ 3,183	23 ~ 95	0.2 X 0.6
1.25R	1,910 ~ 3,820	90 ~ 358	1,528 ~ 3,183	48 ~ 199	1,273 ~ 3,183	32 ~ 119	1,019 ~ 2,547	19 ~ 80	0.25 X 0.75
1.5R	1,592 ~ 3,183	78 ~ 310	1,273 ~ 2,653	41 ~ 172	1,061 ~ 2,653	28 ~ 103	849 ~ 2,122	17 ~ 69	0.3 X 0.9
1.75R	1,364 ~ 2,728	69 ~ 276	1,091 ~ 2,274	37 ~ 153	909 ~ 2,274	25 ~ 92	728 ~ 1,819	15 ~ 61	0.35 X 1.05
2R	1,194 ~ 2,387	63 ~ 251	955 ~ 1,989	33 ~ 139	796 ~ 1,989	22 ~ 84	637 ~ 1,592	13 ~ 56	0.4 X 1.2
2.25R	1,061 ~ 2,122	58 ~ 231	849 ~ 1,768	31 ~ 128	707 ~ 1,768	21 ~ 77	566 ~ 1,415	12 ~ 51	0.45 X 1.35
2.5R	955 ~ 1,910	54 ~ 215	764 ~ 1,592	29 ~ 119	637 ~ 1,592	19 ~ 72	509 ~ 1,273	11 ~ 48	0.5 X 1.5
2.75	868 ~ 1,736	50 ~ 202	695 ~ 1,447	27 ~ 112	579 ~ 1,447	18 ~ 67	463 ~ 1,158	11 ~ 45	0.55 X 1.65
3R	796 ~ 1,592	48 ~ 191	637 ~ 1,326	25 ~ 106	531 ~ 1,326	17 ~ 64	424 ~ 1,061	10 ~ 42	0.6 X 1.8
3.25R	735 ~ 1,469	45 ~ 182	588 ~ 1,224	24 ~ 101	490 ~ 1,224	16 ~ 61	392 ~ 979	10 ~ 40	0.65 X 1.95
3.5R	682 ~ 1,364	43 ~ 174	546 ~ 1,137	23 ~ 97	455 ~ 1,137	15 ~ 58	364 ~ 909	9 ~ 39	0.7 X 2.1
3.75R	637 ~ 1,273	42 ~ 167	509 ~ 1,061	22 ~ 93	424 ~ 1,061	15 ~ 56	340 ~ 849	9 ~ 37	0.75 X 2.25
4R	597 ~ 1,194	40 ~ 161	477 ~ 995	21 ~ 90	398 ~ 995	14 ~ 54	318 ~ 796	9 ~ 36	0.8 X 2.4
4.5R	531 ~ 1,061	38 ~ 151	424 ~ 884	20 ~ 84	354 ~ 884	13 ~ 50	283 ~ 707	8 ~ 34	0.9 X 2.7
5R	477 ~ 955	36 ~ 143	382 ~ 796	19 ~ 80	318 ~ 796	13 ~ 48	255 ~ 637	8 ~ 32	1.0 X 3.0
5.5R	434 ~ 868	34 ~ 137	347 ~ 723	18 ~ 76	289 ~ 723	12 ~ 46	232 ~ 579	7 ~ 30	1.1 X 3.3
6R	398 ~ 796	33 ~ 131	318 ~ 663	18 ~ 73	265 ~ 663	12 ~ 44	212 ~ 531	7 ~ 29	1.2 X 3.6
6.5R	367 ~ 735	32 ~ 127	294 ~ 612	17 ~ 70	245 ~ 612	11 ~ 42	196 ~ 490	7 ~ 28	1.3 X 3.9
7R	341 ~ 682	31 ~ 123	273 ~ 568	16 ~ 68	227 ~ 568	11 ~ 41	182 ~ 455	7 ~ 27	1.4 X 4.2
7.5R	318 ~ 637	30 ~ 119	255 ~ 531	16 ~ 66	212 ~ 531	11 ~ 40	170 ~ 424	6 ~ 27	1.5 X 4.5
8R	298 ~ 597	29 ~ 116	239 ~ 497	16 ~ 65	199 ~ 497	10 ~ 39	159 ~ 398	6 ~ 26	1.6 X 4.8
8.5R	281 ~ 562	28 ~ 114	225 ~ 468	15 ~ 63	187 ~ 468	10 ~ 38	150 ~ 374	6 ~ 25	1.7 X 5.1
9R	265 ~ 531	28 ~ 111	212 ~ 442	15 ~ 62	177 ~ 442	10 ~ 37	141 ~ 354	6 ~ 25	1.8 X 5.4
9.5R	251 ~ 503	27 ~ 109	201 ~ 419	15 ~ 61	168 ~ 419	10 ~ 36	134 ~ 335	6 ~ 24	1.9 X 5.7
10R	239 ~ 477	27 ~ 107	191 ~ 398	14 ~ 60	159 ~ 398	10 ~ 36	127 ~ 318	6 ~ 24	2.0 X 6.0
11R	217 ~ 434	26 ~ 104	174 ~ 362	14 ~ 58	145 ~ 362	9 ~ 35	116 ~ 289	6 ~ 23	2.2 X 6.6
12R	199 ~ 398	25 ~ 101	159 ~ 332	14 ~ 56	133 ~ 332	9 ~ 34	106 ~ 265	5 ~ 23	2.4 X 7.2
13R	184 ~ 367	25 ~ 99	147 ~ 306	13 ~ 55	122 ~ 306	9 ~ 33	98 ~ 245	5 ~ 22	2.6 X 7.8
14R	171 ~ 341	24 ~ 97	136 ~ 284	13 ~ 54	114 ~ 284	9 ~ 32	91 ~ 227	5 ~ 22	2.8 X 8.4
15R	159 ~ 318	24 ~ 95	127 ~ 265	13 ~ 53	106 ~ 265	8 ~ 32	85 ~ 212	5 ~ 21	3.0 X 9.0
16R	149 ~ 298	24 ~ 94	119 ~ 249	13 ~ 52	99 ~ 249	8 ~ 31	80 ~ 199	5 ~ 21	3.2 X 9.6
17R	140 ~ 281	23 ~ 93	112 ~ 234	12 ~ 51	94 ~ 234	8 ~ 31	75 ~ 187	5 ~ 21	3.4 X 10.2
18R	133 ~ 265	23 ~ 92	106 ~ 221	12 ~ 51	88 ~ 221	8 ~ 31	71 ~ 177	5 ~ 20	3.6 X 10.8
19R	126 ~ 251	23 ~ 90	101 ~ 209	12 ~ 50	84 ~ 209	8 ~ 30	67 ~ 168	5 ~ 20	3.8 X 11.4
20R	119 ~ 239	22 ~ 90	95 ~ 199	12 ~ 50	80 ~ 199	8 ~ 30	64 ~ 159	5 ~ 20	4.0 X 12.0
22R	109 ~ 217	22 ~ 88	87 ~ 181	12 ~ 49	72 ~ 181	8 ~ 29	58 ~ 145	5 ~ 20	4.4 X 13.2
25R	95 ~ 191	21 ~ 86	76 ~ 159	11 ~ 48	64 ~ 159	8 ~ 29	51 ~ 127	5 ~ 19	5.0 X 15.0
26R	92 ~ 184	21 ~ 85	73 ~ 153	11 ~ 47	61 ~ 153	8 ~ 28	49 ~ 122	5 ~ 19	5.2 X 15.6
28R	85 ~ 171	21 ~ 84	68 ~ 142	11 ~ 47	57 ~ 142	8 ~ 28	45 ~ 114	5 ~ 19	5.6 X 16.8
30R	80 ~ 159	21 ~ 84	64 ~ 133	11 ~ 46	53 ~ 133	7 ~ 28	42 ~ 106	4 ~ 19	6.0 X 18.0



SLEM • SLEML

Slotting End Mill • Slotting End Mill Long

Dia.	Nonferrous Metals		Carbon Steels		Alloy Steels		Depth of Cut
	Al.Cu		FC.FCD.S50C		SCM.SKD.SUS304		
	Cutting speed		Cutting speed		Cutting speed		
	12 ~ 25m/min		10 ~ 22m/min		9 ~ 18m/min		
	Cutting speed		Cutting speed		Cutting speed		Depth x Width
rpm	mm/min	rpm	mm/min	rpm	mm/min		
1	3,820 ~ 7,958	168 ~ 700	3,183 ~ 7,003	70 ~ 308	2,865 ~ 5,730	47 ~ 189	0.5 X 0.05
1.5	2,547 ~ 5,305	117 ~ 488	2,122 ~ 4,669	49 ~ 215	1,910 ~ 3,820	33 ~ 132	0.75 X 0.08
2	1,910 ~ 3,979	92 ~ 382	1,592 ~ 3,502	38 ~ 168	1,432 ~ 2,865	26 ~ 103	1.0 X 0.1
2.5	1,528 ~ 3,183	76 ~ 318	1,273 ~ 2,801	32 ~ 140	1,146 ~ 2,292	21 ~ 86	1.25 X 0.13
3	1,273 ~ 2,653	66 ~ 276	1,061 ~ 2,334	28 ~ 121	955 ~ 1,910	19 ~ 74	1.5 X 0.15
3.5	1,091 ~ 2,274	59 ~ 246	909 ~ 2,001	25 ~ 108	819 ~ 1,637	17 ~ 66	1.75 X 0.18
4	955 ~ 1,989	53 ~ 223	796 ~ 1,751	22 ~ 98	716 ~ 1,432	15 ~ 60	2.0 X 0.2
4.5	849 ~ 1,768	49 ~ 205	707 ~ 1,556	21 ~ 90	637 ~ 1,273	14 ~ 55	2.25 X 0.23
5	764 ~ 1,592	46 ~ 191	637 ~ 1,401	19 ~ 84	573 ~ 1,146	13 ~ 52	2.5 X 0.25
5.5	695 ~ 1,447	43 ~ 179	579 ~ 1,273	18 ~ 79	521 ~ 1,042	12 ~ 48	2.75 X 0.28
6	637 ~ 1,326	41 ~ 170	531 ~ 1,167	17 ~ 75	477 ~ 955	11 ~ 46	3.0 X 0.3
6.5	588 ~ 1,224	39 ~ 162	490 ~ 1,077	16 ~ 71	441 ~ 881	11 ~ 44	3.25 X 0.33
7	546 ~ 1,137	37 ~ 155	455 ~ 1,000	15 ~ 68	409 ~ 819	10 ~ 42	3.5 X 0.35
7.5	509 ~ 1,061	36 ~ 149	424 ~ 934	15 ~ 65	382 ~ 764	10 ~ 40	3.75 X 0.38
8	477 ~ 995	34 ~ 143	398 ~ 875	14 ~ 63	358 ~ 716	10 ~ 39	4.0 X 0.4
8.5	449 ~ 936	33 ~ 139	374 ~ 824	14 ~ 61	337 ~ 674	9 ~ 37	4.25 X 0.43
9	424 ~ 884	32 ~ 134	354 ~ 778	13 ~ 59	318 ~ 637	9 ~ 36	4.5 X 0.45
9.5	402 ~ 838	31 ~ 131	335 ~ 737	13 ~ 57	302 ~ 603	9 ~ 35	4.75 X 0.48
10	382 ~ 796	31 ~ 127	318 ~ 700	13 ~ 56	286 ~ 573	9 ~ 34	5.0 X 0.5
11	347 ~ 723	29 ~ 122	289 ~ 637	12 ~ 53	260 ~ 521	8 ~ 33	5.5 X 0.55
12	318 ~ 663	28 ~ 117	265 ~ 584	12 ~ 51	239 ~ 477	8 ~ 32	6.0 X 0.6
13	294 ~ 612	27 ~ 113	245 ~ 539	11 ~ 50	220 ~ 441	8 ~ 30	6.5 X 0.65
14	273 ~ 568	26 ~ 109	227 ~ 500	11 ~ 48	205 ~ 409	7 ~ 29	7.0 X 0.7
15	255 ~ 531	25 ~ 106	212 ~ 467	11 ~ 47	191 ~ 382	7 ~ 29	7.5 X 0.75
16	239 ~ 497	25 ~ 103	199 ~ 438	10 ~ 46	179 ~ 358	7 ~ 28	8.0 X 0.8
17	225 ~ 468	24 ~ 101	187 ~ 412	10 ~ 44	169 ~ 337	7 ~ 27	8.5 X 0.85
18	212 ~ 442	24 ~ 99	177 ~ 389	10 ~ 44	159 ~ 318	7 ~ 27	9.0 X 0.9
19	201 ~ 419	23 ~ 97	168 ~ 369	10 ~ 43	151 ~ 302	7 ~ 26	9.5 X 0.95
20	191 ~ 398	23 ~ 95	159 ~ 350	10 ~ 42	143 ~ 286	6 ~ 26	10.0 X 1.0
22	174 ~ 362	22 ~ 93	145 ~ 318	9 ~ 41	130 ~ 260	6 ~ 25	11.0 X 1.1
24	159 ~ 332	22 ~ 90	133 ~ 292	9 ~ 40	119 ~ 239	6 ~ 24	12.0 X 1.2
26	147 ~ 306	21 ~ 88	122 ~ 269	9 ~ 39	110 ~ 220	6 ~ 24	13.0 X 1.3
28	136 ~ 284	21 ~ 86	114 ~ 250	9 ~ 38	102 ~ 205	6 ~ 23	14.0 X 1.4
30	127 ~ 265	20 ~ 85	106 ~ 233	8 ~ 37	95 ~ 191	6 ~ 23	15.0 X 1.5
32	119 ~ 249	20 ~ 84	99 ~ 219	8 ~ 37	90 ~ 179	6 ~ 23	16.0 X 1.6
35	109 ~ 227	20 ~ 82	91 ~ 200	8 ~ 36	82 ~ 164	6 ~ 22	17.5 X 1.75
36	106 ~ 221	20 ~ 81	88 ~ 195	8 ~ 36	80 ~ 159	5 ~ 22	18.0 X 1.8
38	101 ~ 209	19 ~ 80	84 ~ 184	8 ~ 35	75 ~ 151	5 ~ 22	19.0 X 1.9
40	95 ~ 199	19 ~ 80	80 ~ 175	8 ~ 35	72 ~ 143	5 ~ 21	20.0 X 2.0
42	91 ~ 189	19 ~ 79	76 ~ 167	8 ~ 35	68 ~ 136	5 ~ 21	21.0 X 2.1
44	87 ~ 181	19 ~ 78	72 ~ 159	8 ~ 34	65 ~ 130	5 ~ 21	22.0 X 2.2
45	85 ~ 177	19 ~ 78	71 ~ 156	8 ~ 34	64 ~ 127	5 ~ 21	22.5 X 2.25
48	80 ~ 166	18 ~ 77	66 ~ 146	8 ~ 34	60 ~ 119	5 ~ 21	24.0 X 2.4
50	76 ~ 159	18 ~ 76	64 ~ 140	8 ~ 34	57 ~ 115	5 ~ 21	25.0 X 2.5
55	69 ~ 145	18 ~ 75	58 ~ 127	8 ~ 33	52 ~ 104	5 ~ 20	27.5 X 2.75
60	64 ~ 133	18 ~ 74	53 ~ 117	7 ~ 33	48 ~ 95	5 ~ 20	30. X 3.0

CM

Center Chamfering End Mill

Size	Nonferrous Metals		Carbon Steels		Alloy Steels		Hardened Steels ~ 38HRC	
	Al,Cu		FC.FCD.S50C		SCM.SKD.SUS304		HPM.NAK	
	Cutting speed		Cutting speed		Cutting speed		Cutting speed	
	15 ~ 25m/min		12 ~ 16m/min		10 ~ 14m/min		8 ~ 12m/min	
	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed
	rpm	mm/min	rpm	mm/min	rpm	mm/min	rpm	mm/min
4 X 60°	1,194 ~ 1,989	50 ~ 83	955 ~ 1,273	40 ~ 53	796 ~ 1,114	33 ~ 46	637 ~ 955	26 ~ 40
6 X 60°	796 ~ 1,326	38 ~ 63	637 ~ 849	30 ~ 40	531 ~ 743	25 ~ 35	424 ~ 637	20 ~ 30
8 X 60°	597 ~ 995	32 ~ 53	477 ~ 637	26 ~ 34	398 ~ 557	21 ~ 30	318 ~ 477	17 ~ 26
10 X 60°	477 ~ 796	28 ~ 47	382 ~ 509	23 ~ 30	318 ~ 446	19 ~ 26	255 ~ 382	15 ~ 23
12 X 60°	398 ~ 663	26 ~ 43	318 ~ 424	21 ~ 28	265 ~ 371	17 ~ 24	212 ~ 318	14 ~ 21
16 X 60°	298 ~ 497	23 ~ 38	239 ~ 318	18 ~ 25	199 ~ 279	15 ~ 22	159 ~ 239	12 ~ 18
20 X 60°	239 ~ 398	21 ~ 35	191 ~ 255	17 ~ 23	159 ~ 223	14 ~ 20	127 ~ 191	11 ~ 17
25 X 60°	191 ~ 318	20 ~ 33	153 ~ 204	16 ~ 21	127 ~ 178	13 ~ 19	102 ~ 153	11 ~ 16
30 X 60°	159 ~ 265	19 ~ 32	127 ~ 170	15 ~ 20	106 ~ 149	13 ~ 18	85 ~ 127	10 ~ 15
35 X 60°	136 ~ 227	18 ~ 30	109 ~ 146	15 ~ 19	91 ~ 127	12 ~ 17	73 ~ 109	10 ~ 15
4 X 120°	1,194 ~ 1,989	75 ~ 125	955 ~ 1,273	60 ~ 80	796 ~ 1,114	50 ~ 70	637 ~ 955	40 ~ 60
6 X 120°	796 ~ 1,326	57 ~ 95	637 ~ 849	46 ~ 61	531 ~ 743	38 ~ 53	424 ~ 637	31 ~ 46
8 X 120°	597 ~ 995	48 ~ 81	477 ~ 637	39 ~ 52	398 ~ 557	32 ~ 45	318 ~ 477	26 ~ 39
10 X 120°	477 ~ 796	43 ~ 72	382 ~ 509	34 ~ 46	318 ~ 446	29 ~ 40	255 ~ 382	23 ~ 34
12 X 120°	398 ~ 663	39 ~ 66	318 ~ 424	32 ~ 42	265 ~ 371	26 ~ 37	212 ~ 318	21 ~ 32
16 X 120°	298 ~ 497	35 ~ 58	239 ~ 318	28 ~ 37	199 ~ 279	23 ~ 33	159 ~ 239	19 ~ 28
20 X 120°	239 ~ 398	32 ~ 54	191 ~ 255	26 ~ 34	159 ~ 223	21 ~ 30	127 ~ 191	17 ~ 26
25 X 120°	191 ~ 318	30 ~ 50	153 ~ 204	24 ~ 32	127 ~ 178	20 ~ 28	102 ~ 153	16 ~ 24
30 X 120°	159 ~ 265	29 ~ 48	127 ~ 170	23 ~ 31	106 ~ 149	19 ~ 27	85 ~ 127	15 ~ 23
35 X 120°	136 ~ 227	28 ~ 46	109 ~ 146	22 ~ 29	91 ~ 127	18 ~ 26	73 ~ 109	15 ~ 22

CHRR

Carbide Helical lapping reamer

Dia.	Nonferrous Metals		Carbon Steels		Alloy Steels		Hardened Steels		removal amount
	Al.Cu		FC.FCD.S50C		SCM.SKD.SUS304		HPM.NAK		
	Cutting speed		Cutting speed		Cutting speed		Cutting speed		
	16 ~ 30m/min		11 ~ 15m/min		10 ~ 14m/min		7 ~ 9m/min		
	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed	(mm/dia)
	rpm	mm/min	rpm	mm/min	rpm	mm/min	rpm	mm/min	
1	5,093 ~ 9,549	43 ~ 134	3,501 ~ 4,775	29 ~ 67	3,183 ~ 4,456	27 ~ 63	2,228 ~ 2,865	19 ~ 40	0.06
1.2	4,244 ~ 7,958	48 ~ 149	2,918 ~ 3,979	33 ~ 74	2,653 ~ 3,714	30 ~ 69	1,857 ~ 2,387	21 ~ 45	0.06
1.4	3,638 ~ 6,821	61 ~ 191	2,501 ~ 3,410	42 ~ 96	2,274 ~ 3,183	38 ~ 89	1,592 ~ 2,046	27 ~ 57	0.06
1.6	3,183 ~ 5,968	80 ~ 251	2,188 ~ 2,984	55 ~ 126	1,989 ~ 2,785	50 ~ 117	1,393 ~ 1,790	35 ~ 75	0.08
1.8	2,829 ~ 5,305	103 ~ 322	1,945 ~ 2,653	71 ~ 161	1,768 ~ 2,476	64 ~ 150	1,238 ~ 1,592	45 ~ 97	0.08
2	2,546 ~ 4,775	117 ~ 366	1,751 ~ 2,387	80 ~ 183	1,592 ~ 2,228	73 ~ 171	1,114 ~ 1,432	51 ~ 110	0.08
2.2	2,315 ~ 4,341	123 ~ 386	1,592 ~ 2,170	85 ~ 193	1,447 ~ 2,026	77 ~ 180	1,013 ~ 1,302	54 ~ 116	0.1
2.4	2,122 ~ 3,979	127 ~ 398	1,459 ~ 1,989	87 ~ 199	1,326 ~ 1,857	79 ~ 186	928 ~ 1,194	56 ~ 119	0.1
2.6	1,959 ~ 3,673	132 ~ 412	1,347 ~ 1,836	90 ~ 206	1,224 ~ 1,714	82 ~ 192	857 ~ 1,102	58 ~ 124	0.1
2.8	1,819 ~ 3,410	132 ~ 440	1,251 ~ 1,705	91 ~ 220	1,137 ~ 1,592	83 ~ 205	796 ~ 1,023	58 ~ 132	0.1
3	1,698 ~ 3,183	137 ~ 429	1,167 ~ 1,592	94 ~ 214	1,061 ~ 1,485	86 ~ 200	743 ~ 955	60 ~ 129	0.1
3.5	1,455 ~ 2,728	121 ~ 378	1,000 ~ 1,364	83 ~ 189	909 ~ 1,273	75 ~ 176	637 ~ 819	53 ~ 113	0.1
4	1,273 ~ 2,387	108 ~ 339	875 ~ 1,194	75 ~ 170	796 ~ 1,114	68 ~ 158	557 ~ 716	47 ~ 102	0.1
4.5	1,132 ~ 2,122	99 ~ 310	778 ~ 1,061	68 ~ 155	707 ~ 990	62 ~ 144	495 ~ 637	43 ~ 93	0.1
5	1,019 ~ 1,910	91 ~ 286	700 ~ 955	63 ~ 143	637 ~ 891	57 ~ 133	446 ~ 573	40 ~ 86	0.1
5.5	926 ~ 1,736	85 ~ 266	637 ~ 868	58 ~ 133	579 ~ 810	53 ~ 124	405 ~ 521	37 ~ 80	0.1
6	849 ~ 1,592	80 ~ 250	584 ~ 796	55 ~ 125	531 ~ 743	50 ~ 117	371 ~ 477	35 ~ 75	0.1
7	728 ~ 1,364	72 ~ 224	500 ~ 682	49 ~ 112	455 ~ 637	45 ~ 105	318 ~ 409	31 ~ 67	0.1
8	637 ~ 1,194	66 ~ 205	438 ~ 597	45 ~ 103	398 ~ 557	41 ~ 96	279 ~ 358	29 ~ 62	0.1

TPD • TPDT

Taper Pin Drill

Size	Nonferrous Metals		Carbon Steels		Alloy Steels		Hardened Steels ~ 38HRC	
	Al,Cu		FC.FCD.S50C		SCM.SKD.SUS304		HPM.NAK	
	Cutting speed		Cutting speed		Cutting speed		Cutting speed	
	15 ~ 25m/min		12 ~ 16m/min		10 ~ 14m/min		8 ~ 12m/min	
	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed
	rpm	mm/min	rpm	mm/min	rpm	mm/min	rpm	mm/min
2	1,865 ~ 3,109	59 ~ 149	1,492 ~ 1,989	24 ~ 48	1,243 ~ 1,741	15 ~ 35	995 ~ 1,492	6 ~ 19
3	1,270 ~ 2,116	44 ~ 110	1,016 ~ 1,355	18 ~ 35	847 ~ 1,185	11 ~ 26	677 ~ 1,016	5 ~ 14
4	970 ~ 1,617	37 ~ 91	776 ~ 1,035	15 ~ 29	647 ~ 906	9 ~ 21	518 ~ 776	4 ~ 12
5	785 ~ 1,309	31 ~ 78	628 ~ 838	12 ~ 25	524 ~ 733	8 ~ 18	419 ~ 628	3 ~ 10
6	660 ~ 1,100	27 ~ 68	528 ~ 704	11 ~ 22	440 ~ 616	7 ~ 16	352 ~ 528	3 ~ 9
7	562 ~ 936	22 ~ 56	449 ~ 599	9 ~ 18	374 ~ 524	6 ~ 13	300 ~ 449	2 ~ 7
8	488 ~ 813	19 ~ 47	390 ~ 520	8 ~ 15	325 ~ 455	5 ~ 11	260 ~ 390	2 ~ 6
9	431 ~ 718	16 ~ 40	345 ~ 460	6 ~ 13	287 ~ 402	4 ~ 9	230 ~ 345	2 ~ 5
10	395 ~ 659	16 ~ 40	316 ~ 422	6 ~ 13	264 ~ 369	4 ~ 9	211 ~ 316	2 ~ 5
11	361 ~ 602	15 ~ 38	289 ~ 385	6 ~ 12	241 ~ 337	4 ~ 9	193 ~ 289	2 ~ 5
12	333 ~ 555	14 ~ 36	266 ~ 355	6 ~ 12	222 ~ 311	4 ~ 8	178 ~ 266	2 ~ 5
13	309 ~ 515	14 ~ 34	247 ~ 329	5 ~ 11	206 ~ 288	3 ~ 8	165 ~ 247	1 ~ 4
14	281 ~ 469	11 ~ 28	225 ~ 300	5 ~ 9	187 ~ 262	3 ~ 7	150 ~ 225	1 ~ 4
15	266 ~ 443	11 ~ 28	212 ~ 283	5 ~ 9	177 ~ 248	3 ~ 7	142 ~ 212	1 ~ 4
16	252 ~ 419	11 ~ 28	201 ~ 268	5 ~ 9	168 ~ 235	3 ~ 7	134 ~ 201	1 ~ 4
18	223 ~ 371	10 ~ 25	178 ~ 238	4 ~ 8	149 ~ 208	2 ~ 6	119 ~ 178	1 ~ 3
20	204 ~ 340	10 ~ 25	163 ~ 217	4 ~ 8	136 ~ 190	2 ~ 6	109 ~ 163	1 ~ 3
25	165 ~ 275	10 ~ 25	132 ~ 176	4 ~ 8	110 ~ 154	2 ~ 6	88 ~ 132	1 ~ 3

CRS

CRT

PCS

60°

Countersinks With Straight Shank

Countersinks With Taper Shank

Parasol Anglemill Cutter With Straight Shank

Size	Nonferrous Metals		Carbon Steels		Alloy Steels	
	Al.Cu		FC.FCD.S50C		SCM.SKD.SUS304	
	Cutting speed		Cutting speed		Cutting speed	
	9 ~ 16m/min		5 ~ 10m/min		4 ~ 8m/min	
	Spindle speed	feed	Spindle speed	feed	Spindle speed	eed
rpm	mm/min	rpm	mm/min	rpm	mm/min	
6 X 60°	477 ~ 849	45 ~ 119	265 ~ 531	12 ~ 50	212 ~ 424	8 ~ 32
8 X 60°	358 ~ 637	34 ~ 91	199 ~ 398	9 ~ 38	159 ~ 318	6 ~ 24
10 X 60°	286 ~ 509	28 ~ 74	159 ~ 318	7 ~ 31	127 ~ 255	5 ~ 20
12 X 60°	239 ~ 424	24 ~ 63	133 ~ 265	6 ~ 26	106 ~ 212	4 ~ 17
15 X 60°	191 ~ 340	19 ~ 52	106 ~ 212	5 ~ 21	85 ~ 170	3 ~ 14
16 X 60°	179 ~ 318	18 ~ 49	99 ~ 199	5 ~ 20	80 ~ 159	3 ~ 13
20 X 60°	143 ~ 254	20 ~ 54	80 ~ 159	5 ~ 22	64 ~ 127	4 ~ 14
22 X 60°	130 ~ 231	19 ~ 50	72 ~ 145	5 ~ 21	58 ~ 116	3 ~ 13
25 X 60°	115 ~ 204	17 ~ 45	64 ~ 127	5 ~ 19	51 ~ 102	3 ~ 12
30 X 60°	95 ~ 170	18 ~ 48	53 ~ 106	5 ~ 20	42 ~ 85	3 ~ 13
35 X 60°	82 ~ 146	16 ~ 43	45 ~ 91	4 ~ 18	36 ~ 73	3 ~ 11
40 X 60°	72 ~ 127	18 ~ 47	40 ~ 80	5 ~ 20	32 ~ 64	3 ~ 12
45 X 60°	64 ~ 113	16 ~ 43	35 ~ 71	4 ~ 18	28 ~ 57	3 ~ 11
50 X 60°	57 ~ 102	15 ~ 40	32 ~ 64	4 ~ 17	25 ~ 51	3 ~ 11
55 X 60°	52 ~ 93	14 ~ 38	29 ~ 58	4 ~ 16	23 ~ 46	3 ~ 10
60 X 60°	48 ~ 85	16 ~ 41	27 ~ 53	4 ~ 17	21 ~ 42	3 ~ 11
65 X 60°	44 ~ 78	15 ~ 39	24 ~ 49	4 ~ 16	20 ~ 39	3 ~ 11
70 X 60°	41 ~ 73	14 ~ 38	23 ~ 45	4 ~ 16	18 ~ 36	3 ~ 10
75 X 60°	38 ~ 68	14 ~ 36	21 ~ 42	4 ~ 15	17 ~ 34	2 ~ 10
80 X 60°	36 ~ 64	13 ~ 35	20 ~ 40	4 ~ 15	16 ~ 32	2 ~ 9
90 X 60°	32 ~ 57	12 ~ 33	18 ~ 35	3 ~ 14	14 ~ 28	2 ~ 9
100 X 60°	29 ~ 51	12 ~ 31	16 ~ 32	3 ~ 13	13 ~ 25	2 ~ 8

CRS

Countersinks With Straight Shank

CRT

Countersinks With Taper Shank

PCS

Parasol Anglemill Cutter With Straight Shank

90°

Size	Nonferrous Metals		Carbon Steels		Alloy Steels	
	Al.Cu		FC.FCD.S50C		SCM.SKD.SUS304	
	Cutting speed		Cutting speed		Cutting speed	
	9 ~ 16m/min		5 ~ 10m/min		4 ~ 8m/min	
	Spindle speed	feed	Spindle speed	feed	Spindle speed	eed
rpm	mm/min	rpm	mm/min	rpm	mm/min	
6 X 90°	531 ~ 955	49 ~ 131	318 ~ 637	15 ~ 58	265 ~ 531	10 ~ 39
8 X 90°	398 ~ 716	37 ~ 100	239 ~ 477	11 ~ 44	199 ~ 398	7 ~ 30
10 X 90°	318 ~ 573	30 ~ 82	191 ~ 382	9 ~ 36	159 ~ 318	6 ~ 24
12 X 90°	265 ~ 477	26 ~ 69	159 ~ 318	8 ~ 31	133 ~ 265	5 ~ 20
15 X 90°	212 ~ 382	21 ~ 57	127 ~ 255	6 ~ 25	106 ~ 212	4 ~ 17
16 X 90°	199 ~ 358	20 ~ 54	119 ~ 239	6 ~ 24	99 ~ 199	4 ~ 16
20 X 90°	159 ~ 286	22 ~ 59	95 ~ 191	7 ~ 26	80 ~ 159	4 ~ 18
22 X 90°	145 ~ 260	20 ~ 55	87 ~ 174	6 ~ 24	72 ~ 145	4 ~ 16
25 X 90°	127 ~ 229	18 ~ 49	76 ~ 153	5 ~ 22	64 ~ 127	4 ~ 15
30 X 90°	106 ~ 191	20 ~ 53	64 ~ 127	6 ~ 24	53 ~ 106	4 ~ 16
35 X 90°	91 ~ 164	18 ~ 47	55 ~ 109	5 ~ 21	45 ~ 91	4 ~ 14
40 X 90°	80 ~ 143	19 ~ 52	48 ~ 95	6 ~ 23	40 ~ 80	4 ~ 15
45 X 90°	71 ~ 127	18 ~ 47	42 ~ 85	5 ~ 21	35 ~ 71	4 ~ 14
50 X 90°	64 ~ 115	16 ~ 44	38 ~ 76	5 ~ 20	32 ~ 64	3 ~ 13
55 X 90°	58 ~ 104	15 ~ 41	35 ~ 69	5 ~ 18	29 ~ 58	3 ~ 12
60 X 90°	53 ~ 95	17 ~ 46	32 ~ 64	5 ~ 20	27 ~ 53	3 ~ 14
65 X 90°	49 ~ 88	16 ~ 43	29 ~ 59	5 ~ 19	24 ~ 49	3 ~ 13
70 X 90°	45 ~ 82	15 ~ 42	27 ~ 55	5 ~ 18	23 ~ 45	3 ~ 12
75 X 90°	42 ~ 76	15 ~ 40	25 ~ 51	4 ~ 18	21 ~ 42	3 ~ 12
80 X 90°	40 ~ 72	14 ~ 38	24 ~ 48	4 ~ 17	20 ~ 40	3 ~ 11
90 X 90°	35 ~ 64	13 ~ 36	21 ~ 42	4 ~ 16	18 ~ 35	3 ~ 11
100 X 90°	32 ~ 57	13 ~ 34	19 ~ 38	4 ~ 15	16 ~ 32	3 ~ 10

CRS

Countersinks With Straight Shank

CRT

Countersinks With Taper Shank

PCS

Parasol Anglemill Cutter With Straight Shank

120°

Size	Nonferrous Metals		Carbon Steels		Alloy Steels	
	Al.Cu		FC.FCD.S50C		SCM.SKD.SUS304	
	Cutting speed		Cutting speed		Cutting speed	
	9 ~ 16m/min		5 ~ 10m/min		4 ~ 8m/min	
	Spindle speed	feed	Spindle speed	feed	Spindle speed	eed
rpm	mm/min	rpm	mm/min	rpm	mm/min	
6 X 120°	531 ~ 955	52 ~ 141	318 ~ 637	16 ~ 63	265 ~ 531	10 ~ 42
8 X 120°	398 ~ 716	40 ~ 108	239 ~ 477	12 ~ 48	199 ~ 398	8 ~ 32
10 X 120°	318 ~ 573	32 ~ 88	191 ~ 382	10 ~ 39	159 ~ 318	6 ~ 26
12 X 120°	265 ~ 477	28 ~ 74	159 ~ 318	8 ~ 33	133 ~ 265	6 ~ 22
15 X 120°	212 ~ 382	23 ~ 61	127 ~ 255	7 ~ 27	106 ~ 212	5 ~ 18
16 X 120°	199 ~ 358	21 ~ 58	119 ~ 239	6 ~ 26	99 ~ 199	4 ~ 17
20 X 120°	159 ~ 286	24 ~ 64	95 ~ 191	7 ~ 28	80 ~ 159	5 ~ 19
22 X 120°	145 ~ 260	22 ~ 59	87 ~ 174	7 ~ 26	72 ~ 145	4 ~ 17
25 X 120°	127 ~ 229	20 ~ 53	76 ~ 153	6 ~ 24	64 ~ 127	4 ~ 16
30 X 120°	106 ~ 191	21 ~ 57	64 ~ 127	6 ~ 25	53 ~ 106	4 ~ 17
35 X 120°	91 ~ 164	19 ~ 51	55 ~ 109	6 ~ 23	45 ~ 91	4 ~ 15
40 X 120°	80 ~ 143	21 ~ 55	48 ~ 95	6 ~ 25	40 ~ 80	4 ~ 16
45 X 120°	71 ~ 127	19 ~ 51	42 ~ 85	6 ~ 23	35 ~ 71	4 ~ 15
50 X 120°	64 ~ 115	18 ~ 47	38 ~ 76	5 ~ 21	32 ~ 64	4 ~ 14
55 X 120°	58 ~ 104	16 ~ 45	35 ~ 69	5 ~ 20	29 ~ 58	3 ~ 13
60 X 120°	53 ~ 95	18 ~ 49	32 ~ 64	5 ~ 22	27 ~ 53	4 ~ 15

CSCR・CBSCR

Carbide Chucking Reamer

Dia.	Nonferrous Metals		Carbon Steels		Alloy Steels		Hardened Steels		removal amount (mm/dia)
	Al.Cu		FC.FCD.S50C		SCM.SKD.SUS304		HPM.NAK		
	Cutting speed		Cutting speed		Cutting speed		Cutting speed		
	16 ~ 30m/min		11 ~ 15m/min		10 ~ 14m/min		7 ~ 10m/min		
	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed	
rpm	mm/min	rpm	mm/min	rpm	mm/min	rpm	mm/min		
3	1,698 ~ 3,183	117 ~ 367	1,167 ~ 1,592	81 ~ 183	1,061 ~ 1,485	73 ~ 171	743 ~ 1,061	51 ~ 122	0.1
3.5	1,455 ~ 2,728	103 ~ 323	1,000 ~ 1,364	71 ~ 162	909 ~ 1,273	65 ~ 151	637 ~ 909	45 ~ 108	0.1
4	1,273 ~ 2,387	93 ~ 290	875 ~ 1,194	64 ~ 145	796 ~ 1,114	58 ~ 135	557 ~ 796	41 ~ 97	0.1
4.5	1,132 ~ 2,122	85 ~ 265	778 ~ 1,061	58 ~ 132	707 ~ 990	53 ~ 124	495 ~ 707	37 ~ 88	0.1
5	1,019 ~ 1,910	78 ~ 244	700 ~ 955	54 ~ 122	637 ~ 891	49 ~ 114	446 ~ 637	34 ~ 81	0.1
5.5	926 ~ 1,736	73 ~ 228	637 ~ 868	50 ~ 114	579 ~ 810	46 ~ 106	405 ~ 579	32 ~ 76	0.1
6	849 ~ 1,592	68 ~ 214	584 ~ 796	47 ~ 107	531 ~ 743	43 ~ 100	371 ~ 531	30 ~ 71	0.1
Dia.	Cutting speed		Cutting speed		Cutting speed		Cutting speed		emoval amount (mm/dia)
	15 ~ 26m/min		10 ~ 14m/min		8 ~ 12m/min		6 ~ 8m/min		
7	682 ~ 1,182	54 ~ 162	455 ~ 637	36 ~ 87	364 ~ 546	29 ~ 75	273 ~ 364	22 ~ 50	0.1
8	597 ~ 1,035	49 ~ 148	398 ~ 557	33 ~ 80	318 ~ 477	26 ~ 69	239 ~ 318	20 ~ 46	0.1
9	531 ~ 920	46 ~ 138	354 ~ 495	31 ~ 74	283 ~ 424	24 ~ 64	212 ~ 283	18 ~ 42	0.15
10	477 ~ 828	43 ~ 129	318 ~ 446	29 ~ 70	255 ~ 382	23 ~ 60	191 ~ 255	17 ~ 40	0.15
12	398 ~ 690	39 ~ 116	265 ~ 371	26 ~ 63	212 ~ 318	21 ~ 54	159 ~ 212	15 ~ 36	0.15
14	341 ~ 591	36 ~ 107	227 ~ 318	24 ~ 58	182 ~ 273	19 ~ 49	136 ~ 182	14 ~ 33	0.15
16	298 ~ 517	33 ~ 100	199 ~ 279	22 ~ 54	159 ~ 239	18 ~ 46	119 ~ 159	13 ~ 31	0.15
18	265 ~ 460	32 ~ 95	177 ~ 248	21 ~ 51	141 ~ 212	17 ~ 44	106 ~ 141	13 ~ 29	0.15
20	239 ~ 414	30 ~ 90	159 ~ 223	20 ~ 49	127 ~ 191	16 ~ 42	95 ~ 127	12 ~ 28	0.2
22	217 ~ 376	29 ~ 87	145 ~ 203	19 ~ 47	116 ~ 174	15 ~ 40	87 ~ 116	12 ~ 27	0.2
24	199 ~ 345	28 ~ 84	133 ~ 186	19 ~ 45	106 ~ 159	15 ~ 39	80 ~ 106	11 ~ 26	0.2
26	184 ~ 318	27 ~ 81	122 ~ 171	18 ~ 44	98 ~ 147	14 ~ 38	73 ~ 98	11 ~ 25	0.2
28	171 ~ 296	26 ~ 79	114 ~ 159	18 ~ 43	91 ~ 136	14 ~ 37	68 ~ 91	11 ~ 24	0.2
30	159 ~ 276	26 ~ 77	106 ~ 149	17 ~ 42	85 ~ 127	14 ~ 36	64 ~ 85	10 ~ 24	0.2

●φ 6.5 ~ φ 30 まで付刃

CLHR

Carbide Solid Long Hnd Reamer

Dia.	Nonferrous Metals		Carbon Steels		Alloy Steels		Hardened Steels		removal amount (mm/dia)
	Al.Cu		FC.FCD.S50C		SCM.SKD.SUS304		HPM.NAK		
	Cutting speed		Cutting speed		Cutting speed		Cutting speed		
	16 ~ 30m/min		11 ~ 15m/min		10 ~ 14m/min		7 ~ 10m/min		
	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed	
rpm	mm/min	rpm	mm/min	rpm	mm/min	rpm	mm/min		
0.4	12,732 ~ 23,873	36 ~ 112	8,754 ~ 11,937	25 ~ 56	7,958 ~ 11,141	22 ~ 52	5,570 ~ 7,958	16 ~ 37	0.05
0.6	8,488 ~ 15,915	39 ~ 122	5,836 ~ 7,958	27 ~ 61	5,305 ~ 7,427	24 ~ 57	3,714 ~ 5,305	17 ~ 41	0.05
0.8	6,366 ~ 11,937	39 ~ 122	4,377 ~ 5,968	27 ~ 61	3,979 ~ 5,570	24 ~ 57	2,785 ~ 3,979	17 ~ 41	0.06
1	5,093 ~ 9,549	39 ~ 122	3,501 ~ 4,775	27 ~ 61	3,183 ~ 4,456	24 ~ 57	2,228 ~ 3,183	17 ~ 41	0.06
1.2	4,244 ~ 7,958	43 ~ 135	2,918 ~ 3,979	30 ~ 68	2,653 ~ 3,714	27 ~ 63	1,857 ~ 2,653	19 ~ 45	0.06
1.4	3,638 ~ 6,821	56 ~ 174	2,501 ~ 3,410	38 ~ 87	2,274 ~ 3,183	35 ~ 81	1,592 ~ 2,274	24 ~ 58	0.06
1.6	3,183 ~ 5,968	73 ~ 228	2,188 ~ 2,984	50 ~ 114	1,989 ~ 2,785	46 ~ 107	1,393 ~ 1,989	32 ~ 76	0.08
1.8	2,829 ~ 5,305	94 ~ 293	1,945 ~ 2,653	64 ~ 147	1,768 ~ 2,476	59 ~ 137	1,238 ~ 1,768	41 ~ 98	0.08
2	2,546 ~ 4,775	110 ~ 345	1,751 ~ 2,387	76 ~ 172	1,592 ~ 2,228	69 ~ 161	1,114 ~ 1,592	48 ~ 115	0.08
2.2	2,315 ~ 4,341	112 ~ 351	1,592 ~ 2,170	77 ~ 175	1,447 ~ 2,026	70 ~ 164	1,013 ~ 1,447	49 ~ 117	0.1
2.4	2,122 ~ 3,979	116 ~ 362	1,459 ~ 1,989	80 ~ 181	1,326 ~ 1,857	72 ~ 169	928 ~ 1,326	51 ~ 121	0.1
2.6	1,959 ~ 3,673	120 ~ 375	1,347 ~ 1,836	82 ~ 187	1,224 ~ 1,714	75 ~ 175	857 ~ 1,224	52 ~ 125	0.1
2.8	1,819 ~ 3,410	128 ~ 400	1,251 ~ 1,705	88 ~ 200	1,137 ~ 1,592	80 ~ 187	796 ~ 1,137	56 ~ 133	0.1
3	1,698 ~ 3,183	125 ~ 390	1,167 ~ 1,592	86 ~ 195	1,061 ~ 1,485	78 ~ 182	743 ~ 1,061	55 ~ 130	0.1
3.5	1,455 ~ 2,728	110 ~ 343	1,000 ~ 1,364	76 ~ 172	909 ~ 1,273	69 ~ 160	637 ~ 909	48 ~ 114	0.1
4	1,273 ~ 2,387	99 ~ 308	875 ~ 1,194	68 ~ 154	796 ~ 1,114	62 ~ 144	557 ~ 796	43 ~ 103	0.1
4.5	1,132 ~ 2,122	90 ~ 281	778 ~ 1,061	62 ~ 141	707 ~ 990	56 ~ 131	495 ~ 707	39 ~ 94	0.1
5	1,019 ~ 1,910	83 ~ 260	700 ~ 955	57 ~ 130	637 ~ 891	52 ~ 121	446 ~ 637	36 ~ 87	0.1
6	849 ~ 1,592	73 ~ 227	584 ~ 796	50 ~ 114	531 ~ 743	45 ~ 106	371 ~ 531	32 ~ 76	0.1
7	728 ~ 1,364	65 ~ 204	500 ~ 682	45 ~ 102	455 ~ 637	41 ~ 95	318 ~ 455	29 ~ 68	0.1
8	637 ~ 1,194	60 ~ 187	438 ~ 597	41 ~ 93	398 ~ 557	37 ~ 87	279 ~ 398	26 ~ 62	0.1
9	566 ~ 1,061	55 ~ 173	389 ~ 531	38 ~ 87	354 ~ 495	35 ~ 81	248 ~ 354	24 ~ 58	0.15
10	509 ~ 955	52 ~ 162	350 ~ 477	36 ~ 81	318 ~ 446	32 ~ 76	223 ~ 318	23 ~ 54	0.15

DR • DRT

Drill Reamer

Size	Nonferrous Metals		Carbon Steels		Alloy Steels	
	Al.Cu		FC.FCD.S50C		SCM.SKD.SUS304	
	Cutting speed		Cutting speed		Cutting speed	
	16 ~ 25m/min		12 ~ 18m/min		10 ~ 16m/min	
	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed
	rpm	mm/min	rpm	mm/min	rpm	mm/min
5	1,019 ~ 1,592	20 ~ 127	764 ~ 1,146	15 ~ 92	637 ~ 1,019	13 ~ 81
6	849 ~ 1,326	17 ~ 106	637 ~ 955	13 ~ 76	531 ~ 849	11 ~ 68
7	728 ~ 1,137	15 ~ 91	546 ~ 819	11 ~ 65	455 ~ 728	9 ~ 58
8	637 ~ 995	13 ~ 80	477 ~ 716	10 ~ 57	398 ~ 637	8 ~ 51
9	566 ~ 884	11 ~ 71	424 ~ 637	8 ~ 51	354 ~ 566	7 ~ 45
10	509 ~ 796	10 ~ 64	382 ~ 573	8 ~ 46	318 ~ 509	6 ~ 41
12	424 ~ 663	8 ~ 53	318 ~ 477	6 ~ 38	265 ~ 424	5 ~ 34
14	364 ~ 568	7 ~ 45	273 ~ 409	5 ~ 33	227 ~ 364	5 ~ 29
16	318 ~ 497	6 ~ 40	239 ~ 358	5 ~ 29	199 ~ 318	4 ~ 25
18	283 ~ 442	6 ~ 35	212 ~ 318	4 ~ 25	177 ~ 283	4 ~ 23
20	255 ~ 398	5 ~ 32	191 ~ 286	4 ~ 23	159 ~ 255	3 ~ 20
25	204 ~ 318	4 ~ 25	153 ~ 229	3 ~ 18	127 ~ 204	3 ~ 16
30	170 ~ 265	3 ~ 21	127 ~ 191	3 ~ 15	106 ~ 170	2 ~ 14
35	146 ~ 227	3 ~ 18	109 ~ 164	2 ~ 13	91 ~ 146	2 ~ 12
40	127 ~ 199	3 ~ 16	95 ~ 143	2 ~ 11	80 ~ 127	2 ~ 10

NIC-SPR

Sprue Reamer With Nick

Dia.	Nonferrous Metals		Carbon Steels		Alloy Steels		Hardened Steels ~ 38HRC	
	Al.Cu		FC.FCD.S50C		SCM.SKD.SUS304		HPM.NAK	
	Cutting speed		Cutting speed		Cutting speed		Cutting speed	
	10 ~ 15m/min		7 ~ 10m/min		5 ~ 8m/min		4 ~ 7m/min	
	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed
	rpm	mm/min	rpm	mm/min	rpm	mm/min	rpm	mm/min
1	3,183 ~ 4,775	25 ~ 38	2,228 ~ 3,183	18 ~ 25	1,592 ~ 2,546	13 ~ 20	1,273 ~ 2,228	10 ~ 18
2	1,592 ~ 2,387	15 ~ 23	1,114 ~ 1,592	11 ~ 15	796 ~ 1,273	8 ~ 12	637 ~ 1,114	6 ~ 11
3	1,061 ~ 1,592	12 ~ 18	743 ~ 1,061	8 ~ 12	531 ~ 849	6 ~ 9	424 ~ 743	5 ~ 8
4	796 ~ 1,194	10 ~ 15	557 ~ 796	7 ~ 10	398 ~ 637	5 ~ 8	318 ~ 557	4 ~ 7
5	637 ~ 955	9 ~ 13	446 ~ 637	6 ~ 9	318 ~ 509	4 ~ 7	255 ~ 446	4 ~ 6
6	531 ~ 796	8 ~ 12	371 ~ 531	6 ~ 8	265 ~ 424	4 ~ 7	212 ~ 371	3 ~ 6
7	455 ~ 682	8 ~ 12	318 ~ 455	5 ~ 8	227 ~ 364	4 ~ 6	182 ~ 318	3 ~ 5
8	398 ~ 597	7 ~ 11	279 ~ 398	5 ~ 7	199 ~ 318	4 ~ 6	159 ~ 279	3 ~ 5
9	354 ~ 531	7 ~ 11	248 ~ 354	5 ~ 7	177 ~ 283	4 ~ 6	141 ~ 248	3 ~ 5
10	318 ~ 477	7 ~ 10	223 ~ 318	5 ~ 7	159 ~ 255	3 ~ 5	127 ~ 223	3 ~ 5
11	289 ~ 434	7 ~ 10	203 ~ 289	5 ~ 7	145 ~ 231	3 ~ 5	116 ~ 203	3 ~ 5
12	265 ~ 398	6 ~ 10	186 ~ 265	5 ~ 6	133 ~ 212	3 ~ 5	106 ~ 186	3 ~ 5
13	245 ~ 367	6 ~ 10	171 ~ 245	4 ~ 6	122 ~ 196	3 ~ 5	98 ~ 171	3 ~ 4
14	227 ~ 341	6 ~ 9	159 ~ 227	4 ~ 6	114 ~ 182	3 ~ 5	91 ~ 159	3 ~ 4
15	212 ~ 318	6 ~ 9	149 ~ 212	4 ~ 6	106 ~ 170	3 ~ 5	85 ~ 149	2 ~ 4
16	199 ~ 298	6 ~ 9	139 ~ 199	4 ~ 6	99 ~ 159	3 ~ 5	80 ~ 139	2 ~ 4
17	187 ~ 281	6 ~ 9	131 ~ 187	4 ~ 6	94 ~ 150	3 ~ 5	75 ~ 131	2 ~ 4
18	177 ~ 265	6 ~ 9	124 ~ 177	4 ~ 6	88 ~ 141	3 ~ 5	71 ~ 124	2 ~ 4
19	168 ~ 251	6 ~ 9	117 ~ 168	4 ~ 6	84 ~ 134	3 ~ 5	67 ~ 117	2 ~ 4
20	159 ~ 239	6 ~ 9	111 ~ 159	4 ~ 6	80 ~ 127	3 ~ 5	64 ~ 111	2 ~ 4
21	152 ~ 227	6 ~ 9	106 ~ 152	4 ~ 6	76 ~ 121	3 ~ 5	61 ~ 106	2 ~ 4
22	145 ~ 217	6 ~ 9	101 ~ 145	4 ~ 6	72 ~ 116	3 ~ 5	58 ~ 101	2 ~ 4
23	138 ~ 208	6 ~ 9	97 ~ 138	4 ~ 6	69 ~ 111	3 ~ 5	55 ~ 97	2 ~ 4
24	133 ~ 199	6 ~ 8	93 ~ 133	4 ~ 6	66 ~ 106	3 ~ 5	53 ~ 93	2 ~ 4
25	127 ~ 191	6 ~ 8	89 ~ 127	4 ~ 6	64 ~ 102	3 ~ 4	51 ~ 89	2 ~ 4
26	122 ~ 184	6 ~ 8	86 ~ 122	4 ~ 6	61 ~ 98	3 ~ 4	49 ~ 86	2 ~ 4
27	118 ~ 177	6 ~ 8	83 ~ 118	4 ~ 6	59 ~ 94	3 ~ 4	47 ~ 83	2 ~ 4
28	114 ~ 171	6 ~ 8	80 ~ 114	4 ~ 6	57 ~ 91	3 ~ 4	45 ~ 80	2 ~ 4
29	110 ~ 165	5 ~ 8	77 ~ 110	4 ~ 5	55 ~ 88	3 ~ 4	44 ~ 77	2 ~ 4
30	106 ~ 159	5 ~ 8	74 ~ 106	4 ~ 5	53 ~ 85	3 ~ 4	42 ~ 74	2 ~ 4

TC

T-Slot Cutter (HSS)

(Wet type)

Work Material	Structural Steels · Carbon Steels SS400, S55C (~ 200HB)		Alloy Steels · Tool Steels SCM, SKD, SUS (200 ~ 250HB)		Nonferrous Metals · Aluminium Alloy		
	Cutting condition	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed
	Dia.(D)	rpm	mm/min	rpm	mm/min	rpm	mm/min
8	860	48	720	48	1,960	72	
10	680	48	570	48	1,550	72	
13	580	48	480	48	1,320	72	
15	460	48	380	48	1,050	72	
18	400	48	340	48	900	72	
20	340	48	290	48	760	72	
25	260	48	230	48	620	72	
30	230	42	190	42	500	60	
35	190	40	170	40	430	60	
40	170	40	145	40	380	60	
45	145	40	130	40	340	60	
50	130	40	115	40	300	60	
60	110	35	100	35	250	54	
70	95	35	85	35	220	54	
80	85	35	70	35	190	54	
90	70	35	60	35	170	54	
100	60	35	60	35	160	54	
Depth of cut	Depth = 0.5T		Depth = 0.5T		Depth = 0.5T		

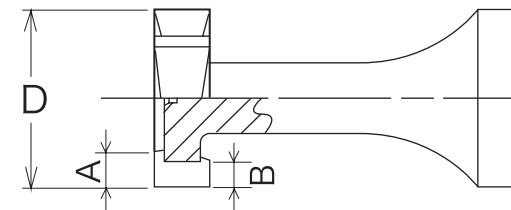
(T=Blade width)

TC : Length of side blade

刃径	A	B	刃径	A	B
8	1.5	1.5	32	6	6
9	2	1.5	35	6.5	6.5
10	2	1.5	36	7	7
12	2.5	2	38	7.5	7.5
13	3	2	40	7.5	7.5
14	3	2	42	8	8
15	3	2.5	45	8.5	8.5
16	3	3	48	9	9
18	3	3	50	9	9
19	3.5	3.5	55	10	10
20	3.5	3.5	60	10	10
22	3.5	3.5	65	11	11
24	4	4	70	11	11
25	4.5	4.5	75	11	11
26	4.5	4.5	80	12	12
28	5	5	90	12.5	12.5
30	6	6	100	14	14

LS-TC : Length of side blade

刃径	A	B	刃径	A	B
10	2	1.5	32	6	4.5
12	2.5	2	34	6	5
13	3	2	35	6.5	5
14	3	2.5	36	7	5.5
15	3	2	38	7	6
16	3	2.5	40	7.5	7
18	3	3	42	8	8
19	3.5	3	45	8.5	8.5
20	3.5	3	48	9	9
22	3.5	3	50	9	9
24	4	3.5	55	10	10
25	4.5	3.5	60	10	10
26	4.5	3.5	65	11	11
28	5	4	70	11	11
30	6	4	75	11.5	11.5



STC

Staggered Tooth T-Slot Cutter (HSS-Co)

(Wet type)

Work Material	Structural Steels · Carbon Steels SS400, S55C (~ 200HB)		Alloy Steels · Tool Steels SCM, SKD, SUS (200 ~ 250HB)		Nonferrous Metals · Aluminium Alloy		
	Cutting condition	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed
	Dia.(D)	rpm	mm/min	rpm	mm/min	rpm	mm/min
10	980	60	820	60	2,200	90	
13	840	60	700	60	1,900	90	
15	670	60	550	60	1,500	90	
18	580	60	500	60	1,300	90	
20	500	60	420	60	1,100	90	
25	380	60	330	60	900	90	
30	340	50	280	50	730	75	
35	280	50	250	50	620	75	
40	250	50	210	50	550	75	
45	210	50	190	50	500	75	
50	190	50	170	50	430	75	
60	160	45	150	45	360	65	
70	140	45	120	45	320	65	
80	130	45	100	45	280	65	
90	100	45	90	45	250	65	
100	90	45	80	45	230	65	
Depth of cut	Depth = 0.5T		Depth = 0.5T		Depth = 0.5T		

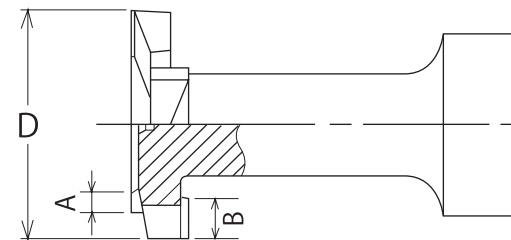
(T=Blade width)

STC : Length of side blade

刃径	A	B	刃径	A	B
10	2.5	1.5	35	8.5	6
12	2.5	2	38	9	7
13	3	2.5	40	9	7
114	3	2.5	42	9.5	8
15	3.5	3	45	10	8.5
16	3	2.5	48	10	9
18	3.5	3	50	11	10
19	4	3.5	55	11	9.5
20	4	3.5	60	11	11
22	4.5	3	65	11	11
24	4.5	3.5	70	11	11
25	5	4	75	11	11
26	5.5	4.5	80	12	12
28	6	5	90	13	13
30	6.5	5.5	100	14	14
32	7.5	6			

LS-STC : Length of side blade

刃径	A	B
15	3.5	2.5
20	4	3
25	5	3.5
30	6.5	5
35	8.5	6
40	9	7
45	10	8.5
50	11	10
55	11	9.5
60	11	11



MHC

Mini Corner R Cutter

R	Nonferrous Metals		Carbon Steels		Alloy Steels		Hardened Steels ~ 38HRC	
	Al.Cu		FC.FCD.S50C		SCM.SKD.SUS304		HPM.NAK	
	Cutting speed		Cutting speed		Cutting speed		Cutting speed	
	12 ~ 20m/min		10 ~ 16m/min		8 ~ 12m/min		6 ~ 10m/min	
	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed
	rpm	mm/min	rpm	mm/min	rpm	mm/min	rpm	mm/min
0.5R	1,273 ~ 2,122	21 ~ 69	1,061 ~ 1,698	13 ~ 40	849 ~ 1,273	10 ~ 30	637 ~ 1,061	5 ~ 17
0.75R	1,091 ~ 1,819	19 ~ 63	909 ~ 1,455	12 ~ 37	728 ~ 1,091	10 ~ 28	546 ~ 909	5 ~ 16
1R	955 ~ 1,592	18 ~ 60	796 ~ 1,273	11 ~ 35	637 ~ 955	9 ~ 26	477 ~ 796	4 ~ 15
1.25R	849 ~ 1,415	17 ~ 57	707 ~ 1,132	11 ~ 33	566 ~ 849	9 ~ 25	424 ~ 707	4 ~ 14
1.5R	764 ~ 1,273	16 ~ 54	637 ~ 1,019	10 ~ 32	509 ~ 764	8 ~ 24	382 ~ 637	4 ~ 14
1.75R	694 ~ 1,157	16 ~ 52	579 ~ 926	10 ~ 31	463 ~ 694	8 ~ 23	347 ~ 579	4 ~ 13
2R	637 ~ 1,061	15 ~ 51	531 ~ 849	10 ~ 30	424 ~ 637	8 ~ 22	318 ~ 531	4 ~ 13
2.25R	588 ~ 979	15 ~ 49	490 ~ 784	9 ~ 29	392 ~ 588	8 ~ 22	294 ~ 490	4 ~ 12
2.5R	546 ~ 909	14 ~ 48	455 ~ 728	9 ~ 28	364 ~ 546	7 ~ 21	273 ~ 455	4 ~ 12
2.75R	509 ~ 849	14 ~ 47	424 ~ 679	9 ~ 28	340 ~ 509	7 ~ 21	255 ~ 424	4 ~ 12
3R	477 ~ 796	14 ~ 46	398 ~ 637	9 ~ 27	318 ~ 477	7 ~ 20	239 ~ 398	3 ~ 11
3.5R	382 ~ 637	13 ~ 43	318 ~ 509	8 ~ 25	255 ~ 382	7 ~ 19	191 ~ 318	3 ~ 11
4R	347 ~ 579	13 ~ 42	289 ~ 463	8 ~ 25	231 ~ 347	6 ~ 19	174 ~ 289	3 ~ 11
4.5R	318 ~ 531	12 ~ 41	265 ~ 424	8 ~ 24	212 ~ 318	6 ~ 18	159 ~ 265	3 ~ 10
5R	294 ~ 490	12 ~ 41	245 ~ 392	8 ~ 24	196 ~ 294	6 ~ 18	147 ~ 245	3 ~ 10
6R	255 ~ 424	12 ~ 40	212 ~ 340	8 ~ 23	170 ~ 255	6 ~ 18	127 ~ 212	3 ~ 10
7R	225 ~ 374	12 ~ 39	187 ~ 300	7 ~ 23	150 ~ 225	6 ~ 17	112 ~ 187	3 ~ 10
8R	201 ~ 335	11 ~ 38	168 ~ 268	7 ~ 22	134 ~ 201	6 ~ 17	101 ~ 168	3 ~ 10

CMHC

Carbide Mini Corner R Cutter

R	Nonferrous Metals		Carbon Steels		Alloy Steels		Hardened Steels ~ 38HRC	
	Al.Cu		FC.FCD.S50C		SCM.SKD.SUS304		HPM.NAK	
	Cutting speed		Cutting speed		Cutting speed		Cutting speed	
	15 ~ 30m/min		12 ~ 20m/min		10 ~ 16m/min		8 ~ 14m/min	
	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed
	rpm	mm/min	rpm	mm/min	rpm	mm/min	rpm	mm/min
R0.5	1,768 ~ 3,537	32 ~ 128	1,415 ~ 2,358	19 ~ 64	1,179 ~ 1,886	16 ~ 51	943 ~ 1,650	9 ~ 30
R0.75	1,492 ~ 2,984	29 ~ 117	1,194 ~ 1,989	18 ~ 58	995 ~ 1,592	15 ~ 47	796 ~ 1,393	8 ~ 27
R1	1,290 ~ 2,581	27 ~ 109	1,032 ~ 1,721	16 ~ 54	860 ~ 1,376	14 ~ 44	688 ~ 1,204	7 ~ 25
R1.25	1,137 ~ 2,274	26 ~ 103	909 ~ 1,516	15 ~ 51	758 ~ 1,213	13 ~ 41	606 ~ 1,061	7 ~ 24
R1.5	1,016 ~ 2,032	24 ~ 98	813 ~ 1,355	15 ~ 49	677 ~ 1,084	12 ~ 39	542 ~ 948	7 ~ 23
R1.75	918 ~ 1,836	24 ~ 94	735 ~ 1,224	14 ~ 47	612 ~ 979	12 ~ 38	490 ~ 857	6 ~ 22
R2	838 ~ 1,675	23 ~ 91	670 ~ 1,117	14 ~ 45	558 ~ 894	11 ~ 36	447 ~ 782	6 ~ 21
R2.25	770 ~ 1,540	22 ~ 88	616 ~ 1,027	13 ~ 44	513 ~ 821	11 ~ 35	411 ~ 719	6 ~ 21
R2.5	713 ~ 1,425	21 ~ 86	570 ~ 950	13 ~ 43	475 ~ 760	11 ~ 34	380 ~ 665	6 ~ 20
R2.75	663 ~ 1,326	21 ~ 84	531 ~ 884	13 ~ 42	442 ~ 707	10 ~ 34	354 ~ 619	6 ~ 20
R3	620 ~ 1,240	21 ~ 82	496 ~ 827	12 ~ 41	413 ~ 661	10 ~ 33	331 ~ 579	5 ~ 19
R3.5	477 ~ 955	19 ~ 76	382 ~ 637	11 ~ 38	318 ~ 509	10 ~ 31	255 ~ 446	5 ~ 18
R4	434 ~ 868	19 ~ 75	347 ~ 579	11 ~ 37	289 ~ 463	9 ~ 30	231 ~ 405	5 ~ 17
R4.5	398 ~ 796	18 ~ 73	318 ~ 531	11 ~ 37	265 ~ 424	9 ~ 29	212 ~ 371	5 ~ 17
R5	367 ~ 735	18 ~ 72	294 ~ 490	11 ~ 36	245 ~ 392	9 ~ 29	196 ~ 343	5 ~ 17
R6	318 ~ 637	18 ~ 70	255 ~ 424	11 ~ 35	212 ~ 340	9 ~ 28	170 ~ 297	5 ~ 16
R7	281 ~ 562	17 ~ 69	225 ~ 374	10 ~ 34	187 ~ 300	9 ~ 27	150 ~ 262	5 ~ 16
R8	251 ~ 503	17 ~ 67	201 ~ 335	10 ~ 34	168 ~ 268	8 ~ 27	134 ~ 235	4 ~ 16

RC

R Cutter

Size	Nonferrous Metals		Carbon Steels		Alloy Steels		Hardened Steels ~ 38HRC	
	Al.Cu		FC.FCD.S50C		SCM.SKD.SUS304		HPM.NAK	
	Cutting speed		Cutting speed		Cutting speed		Cutting speed	
	12 ~ 20m/min		10 ~ 16m/min		8 ~ 14m/min		6 ~ 10/min	
	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed	Spindle speed	feed
	rpm	mm/min	rpm	mm/min	rpm	mm/min	rpm	mm/min
R10.5	212 ~ 354	11 ~ 35	177 ~ 283	5 ~ 17	141 ~ 248	4 ~ 14	106 ~ 177	2 ~ 5
R15.5	153 ~ 255	8 ~ 25	127 ~ 204	4 ~ 12	102 ~ 178	3 ~ 10	76 ~ 127	2 ~ 4
R20.5	109 ~ 182	5 ~ 18	91 ~ 146	3 ~ 9	73 ~ 127	2 ~ 7	55 ~ 91	1 ~ 3

Reamer tolerance

Fitting Size Tolerance

■ Hole Tolerance

Unit: μm

Size (mm)		B			C			D			E			F			G		H						JS			K			M			N		P		R	S	T	U	X				
Over	Under	B10	C9	C10	D8	D9	D10	E7	E8	E9	F6	F7	F8	G6	G7	H5	H6	H7	H8	H9	H10	JS5	JS6	JS7	K5	K6	K7	M5	M6	M7	N6	N7	P6	P7	R7	S7	T7	U7	X7							
-	3	+180 +140	+85 +60	+100 +20	+34 +20	+45 +20	+60 +20	+24 +14	+28 +14	+39 +14	+12 +6	+16 +6	+20 +6	+8 +2	+12 +2	+4 0	+6 0	+10 0	+14 0	+25 +40	± 2	± 3	± 5	0	0	0	-4	-6	-10	-2	-2	-2	-4	-4	-6	-6	-10	-14	-12	-16	-20	-24	-18	-20		
3	6	+188 +140	+100 +70	+118 +30	+48 +30	+60 +30	+78 +20	+32 +20	+38 +20	+50 +20	+18 +10	+22 +10	+28 +4	+12 +4	+16 +4	+5 0	+8 0	+12 0	+18 0	+30 0	+48 0	± 2.5	± 4	± 6	0	+2	+3	-3	-1	0	-5	-4	-9	-8	-11	-15	-20	-23	-27	-19	-24	-31	-36			
6	10	+208 +150	+116 +80	+138 +40	+62 +40	+76 +40	+98 +40	+40 +25	+47 +25	+61 +25	+22 +13	+28 +13	+35 +13	+14 +5	+20 +5	+6 0	+9 0	+15 0	+22 0	+36 0	+58 0	± 3	± 4.5	± 7.5	+1	+2	+5	-4	-3	0	-7	-4	-12	-9	-13	-17	-21	-24	-28	-32	-22	-28	-43			
10	14	+220 +150	+138 +95	+165 +95	+77 +50	+93 +50	+120 +50	+50 +32	+59 +32	+75 +32	+27 +16	+34 +16	+43 +16	+17 +6	+24 +6	+8 0	+11 0	+18 0	+27 0	+43 0	+70 0	± 4	± 5.5	± 9	+2	+2	+6	-4	-4	0	-9	-5	-15	-11	-16	-21	-26	-29	-34	-39	-26	-51	-38			
14	18																																													
18	24	+244 +160	+162 +110	+194 +110	+98 +65	+117 +65	+149 +65	+61 +40	+73 +40	+92 +40	+33 +20	+41 +20	+53 +20	+20 +7	+28 +7	+9 0	+13 0	+21 0	+33 0	+52 0	+84 0	± 4.5	± 6.5	± 10.5	+1	+2	+6	-5	-4	0	-11	-7	-18	-14	-20	-27	-33	-40	-48	-54	-61	-77	-46	-67		
24	30																																													
30	40	+270 +170	+182 +120	+220 +120	+119 +80	+142 +80	+180 +80	+75 +50	+89 +50	+112 +50	+41 +25	+50 +25	+64 +25	+25 +9	+34 +9	+11 0	+16 0	+25 0	+39 0	+62 0	+100 0	± 5.5	± 8	± 12.5	+2	+3	+7	-5	-4	0	-12	-8	-21	-17	-25	-34	-45	-59	-70	-86	-51	-76	-61	-77		
40	50	+280 +180	+192 +130	+230 +130	+80 +80	+80 +80	+80 +80	+50 +50	+50 +50	+50 +50	+25 +25	+25 +25	+25 +25	+9 +9	+9 +9	0 0	0 0	0 0	0 0	0 0	0 0	± 5.5	± 8	± 12.5	+2	+3	+7	-5	-4	0	-12	-8	-21	-17	-25	-34	-45	-59	-70	-86	-51	-76	-61	-77		
50	65	+310 +190	+214 +140	+260 +140	+146 +100	+174 +100	+134 +100	+90 +60	+106 +60	+220 +60	+49 +30	+60 +30	+76 +30	+29 +10	+40 +10	+13 0	+19 0	+30 0	+46 0	+74 0	+120 0	± 6.5	± 9.5	± 15	+3	+4	+9	-6	-5	0	-14	-9	-26	-21	-38	-30	-42	-55	-76	-61	-77	-61	-77			
65	80	+320 +200	+224 +150	+270 +150	+100 +100	+100 +100	+100 +100	+60 +60	+60 +60	+60 +60	+30 +30	+30 +30	+30 +30	+10 +10	+10 +10	0 0	0 0	0 0	0 0	0 0	0 0	± 6.5	± 9.5	± 15	+3	+4	+9	-6	-5	0	-14	-9	-26	-21	-38	-30	-42	-55	-76	-61	-77	-61	-77			
80	100	+360 +200	+257 +170	+310 +170	+174 +120	+207 +120	+260 +120	+107 +72	+126 +72	+159 +72	+58 +36	+71 +36	+90 +36	+34 +12	+47 +12	+15 0	+22 0	+35 0	+54 0	+87 0	+140 0	± 7.5	± 11	± 17.5	+2	+4	+10	-8	-6	0	-16	-10	-30	-24	-48	-38	-58	-78	-111	-146	-121	-166				
100	120	+380 +240	+267 +180	+320 +180	+120 +120	+120 +120	+120 +120	+72 +72	+72 +72	+72 +72	+36 +36	+36 +36	+36 +36	+12 +12	+12 +12	0 0	0 0	0 0	0 0	0 0	0 0	± 7.5	± 11	± 17.5	+2	+4	+10	-8	-6	0	-16	-10	-30	-24	-48	-38	-58	-78	-111	-146	-121	-166				

The figure on the upper row shows the upper tolerance and the figure on the lower row shows lower tolerance.

Fitting Size Tolerance

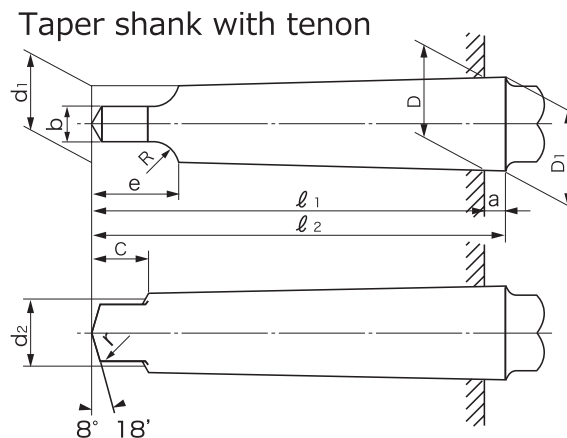
■ Shaft Tolerance

Unit: μm

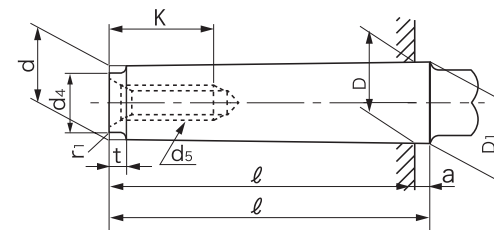
Size (mm)		b		d		e			f			g			h						js				k			m			n	p	r	s	t	u	x					
Over	Under	b9	c9	d8	d9	e7	e8	e9	f6	f7	f8	g4	g5	g6	h4	h5	h6	h7	h8	h9	js4	js5	js6	js7	k4	k5	k6	m4	m5	m6	n6	p6	r6	s6	t6	u6	x6					
-	3	-140 -165	-60 -85	-20 -34	-20 -45	-14 -24	-14 -28	-14 -39	-6 -12	-6 -16	-6 -20	-2 -5	-2 -6	-2 -8	0 -3	0 -4	0 -6	0 -10	0 -14	0 -25	± 1.5	± 2	± 3	± 5	+3	+4	+6	+5	+6	+8	+10	+12	+16	+20	-	+24	+26	+18	+20			
3	6	-140 -170	-70 -100	-30 -48	-30 -60	-20 -32	-20 -38	-20 -50	-10 -18	-10 -22	-10 -28	-4 -8	-4 -9	-4 -12	0 -4	0 -5	0 -8	0 -12	0 -18	0 -30	± 2	± 2.5	± 4	± 6	+5	+6	+9	+8	+9	+12	+16	+20	+23	+27	-	+31	+36	+28	+28			
6	10	-150 -186	-80 -116	-40 -76	-40 -62	-25 -47	-25 -61	-25 -61	-13 -22	-13 -28	-13 -35	-5 -9	-5 -11	-5 -14	0 -4	0 -6	0 -9	0 -15	0 -22	0 -36	± 2	± 3	± 4.5	± 7.5	+5	+7	+10	+10	+12	+15	+19	+24	+28	+32	-	+37	+43	+34	+34			
10	14	-150 -193	-95 -138	-50 -77	-50 -93	-32 -50	-32 -59	-32 -75	-16 -27	-16 -34	-16 -43	-6 -11	-6 -14	-6 -17	0 -5	0 -8	0 -11	0 -18	0 -27	0 -43	± 2.5	± 4	± 5.5	± 9	+6	+9	+12	+12	+15	+18	+23	+29	+34	+39	-	+44	+40	+40	+40			
14	18																																									
18	24	-160 -212	-110 -162	-65 -98	-65 -117	-40 -61	-40 -73	-40 -92	-20 -33	-20 -41	-20 -53	-7 -13	-7 -16	-7 -20	0 -6	0 -9	0 -13	0 -21	0 -33	0 -52	± 3	± 4.5	± 6.5	± 10.5	+8	+11	+15	+14	+17	+21	+28	+35	+41	+48	-	+54	+54	+54	+54			
24	30																																									
30	40	-170 -232	-120 -182	-80 -80	-80 -119	-50 -75	-50 -89	-50 -112	-25 -41	-25 -41	-25 -64	-9 -16	-9 -20	-9 -25	0 -7	0 -11	0 -16	0 -25	0 -39	0 -62	± 3.5	± 5.5	± 8	± 12.5	+9	+13	+18	+14	+20	+25	+33	+42	+50	+59	-	+64	+76	+64	+64			
40	50	-180 -242	-130 -192	-80 -119	-80 -142	-50 -75	-50 -89	-50 -112	-25 -41	-25 -41	-25 -64	-9 -16	-9 -20	-9 -25	0 -7	0 -11	0 -16	0 -25	0 -39	0 -62	± 3.5	± 5.5	± 8	± 12.5	+9	+13	+18	+14	+20	+25	+33	+42	+50	+59	-	+64	+76	+64	+64			
50	65	-190 -264	-140 -214	-80 -100	-80 -142	-50 -75	-50 -89	-50 -112	-25 -41	-25 -41	-25 -64	-9 -16	-9 -20	-9 -25	0 -7	0 -11	0 -16	0 -25	0 -39	0 -62	± 4	± 6.5	± 9.5	± 15	+10	+15	+21	+19	+24	+30	+39	+51	+60	+72	+85	+106	+87	+87	+87			
65	80	-200 -274	-150 -224	-80 -100	-80 -142	-50 -75	-50 -89	-50 -112	-25 -41	-25 -41	-25 -64	-9 -16	-9 -20	-9 -25	0 -7	0 -11	0 -16	0 -25	0 -39	0 -62	± 4	± 6.5	± 9.5	± 15	+10	+15	+21	+19	+24	+30	+39	+51	+60	+72	+85	+106	+87	+87	+87			
80	100	-220 -307	-170 -257	-80 -120	-80 -174	-50 -72	-50 -106	-50 -134	-25 -49	-25 -60	-25 -76	-9 -18	-9 -23	-9 -29	0 -8	0 -13	0 -19	0 -30	0 -46	0 -74	± 5	± 7.5	± 11	± 17.5	+13	+18	+25	+23	+28	+35	+45	+59	+73	+93	+113	+146	+124	+124	+124			
100	120	-240 -327	-180 -267	-80 -120	-80 -174	-50 -72	-50 -106	-50 -134	-25 -49	-25 -60	-25 -76	-9 -18	-9 -23	-9 -29	0 -8	0 -13	0 -19	0 -30	0 -46	0 -74	± 5	± 7.5	± 11	± 17.5	+13	+18	+25	+23	+28	+35	+45	+59	+73	+93	+113	+146	+124	+124	+124			

The figure on the upper row shows the upper tolerance and the figure on the lower row shows lower tolerance.

Morse Taper Shank



Taper shank with tapped hole



Taper shank with tenon

Morse taper	Taper		Angle on side	Taper shank with teno																
				D(2)	a	D1(3)	d1(3)	d2		l 1		l 2		b		C(4)	e		R	r
								Basic size	Tolerance	Basic size	Tolerance	Basic size	Tolerance	Basic size	Tolerance		Basic size	Tolerance	Max.	
0	1/19.212	0.05205	1° 29'27"	9.045	3	9.201	6.104	6	0 -0.3	56.5	0 -1.2	59.5	0 -1.9	3.9	0 -0.180	6.5	10.5	0 -1.1	4	1
1	1/20.047	0.04988	1° 25'43"	12.065	3.5	12.240	8.972	8.7	0 -0.3	62.0	0 -1.2	65.5	0 -1.9	5.2	0 -0.180	8.5	13.5	0 -1.1	5	1.2
2	1/20.020	0.04995	1° 25'50"	17.780	5	18.030	14.034	13.5	0 -0.43	75.0	0 -1.2	80	0 -1.9	6.3	0 -0.220	10	16	0 -1.1	6	1.6
3	1/19.922	0.05020	1° 26'16"	23.825	5	24.076	19.107	18.5	0 -0.52	94.0	0 -1.4	99	0 -2.2	7.9	0 -0.220	13	20	0 -1.3	7	2
4	1/19.254	0.05194	1° 29'15"	31.267	6.5	31.605	25.164	24.5	0 -0.52	117.5	0 -1.4	124	0 -2.5	11.9	0 -0.270	16	24	0 -1.3	8	2.5
5	1/19.002	0.05263	1° 30'26"	44.399	6.5	44.741	36.531	35.7	0 -0.62	149.5	0 -1.6	156	0 -2.5	15.9	0 -0.270	19	29	0 -1.3	10	3
6	1/19.180	0.05214	1° 29'36"	63.348	8	63.765	52.399	51.0	0 -0.74	210.0	0 -1.85	218	0 -2.9	19	0 -0.330	27	40	0 -1.6	13	4

aper shank with tapped hole

Morse taper	Taper		Angle on side	Taper shank with tapped hole														
				D(2)	a	D1(3)	d1(3)	d4		l 5		l 6		t		r1	d5	K
								Basic size	Tolerance	Basic size	Tolerance	Basic size	Tolerance	Basic size	Tolerance			Min.
0	1/19.212	0.05205	1° 29'27"	9.045	3	9.201	6.442	6	0 -0.3	50	0 -1.0	53	0 -1.9	4	0 -0.75	0.2	-	-
1	1/20.047	0.04988	1° 25'43"	12.065	3.5	12.240	9.396	9	0 -0.36	53.5	0 -1.2	57	0 -1.9	5	0 -0.75	0.2	M6	16
2	1/20.020	0.04995	1° 25'50"	17.780	5	18.030	14.583	14	0 -0.43	64	0 -1.2	69	0 -1.9	5	0 -0.75	0.2	M10	24
3	1/19.922	0.05020	1° 26'16"	23.825	5	24.076	19.759	19	0 -0.52	81	0 -1.4	86	0 -2.2	7	0 -0.9	0.6	M12	28
4	1/19.254	0.05194	1° 29'15"	31.267	6.5	31.605	25.943	25	0 -0.52	102.5	0 -1.4	109	0 -2.2	9	0 -0.9	1	M16	32
5	1/19.002	0.05263	1° 30'26"	44.399	6.5	44.741	37.584	35.7	0 -0.62	129.5	0 -1.6	136	0 -2.5	9	0 -0.9	2.5	M20	40
6	1/19.180	0.05214	1° 29'36"	63.348	8	63.765	53.859	51	0 -0.74	182	0 -1.85	190	0 -2.9	12	0 -0.10	4	M24	50