

Technical Data

ZSLNR20 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	0.1	8	0.024	23,328	880	19,829	748	17,496	587	16,330	479
		10	0.009	24,000	451	18,000	276	17,800	221	15,000	193
0.8	0.1	4	0.032	48,000	1,102	28,000	518	20,000	320	20,000	288
		6	0.019	38,700	800	25,000	461	18,000	288	18,000	256
		8	0.015	29,025	600	20,000	369	16,200	259	16,200	230
		12	0.012	29,025	570	20,000	350	16,200	246	16,200	219
	0.2	4	0.056	48,000	1,102	28,000	518	20,000	320	20,000	288
		6	0.032	38,700	800	25,000	461	18,000	288	18,000	256
1	0.1	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
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



ZSLNR20 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	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
2	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

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

Technical Data

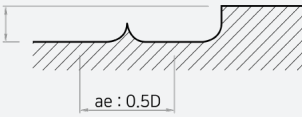
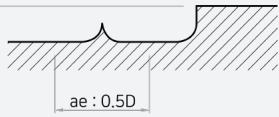
ZSTNR20 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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
	0.1	4	0.008	30,000	320	30,000	250	21,600	160	19,200	150
		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
	0.05	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
0.5	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
0.1	0.1	2	0.035	50,000	1,159	37,830	600	28,200	390	23,000	320
		4	0.024	40,000	830	27,800	440	23,600	280	21,000	230
		6	0.015	24,000	490	18,000	300	17,800	240	15,000	210
		8	0.013	24,000	466	18,000	285	17,800	228	15,000	200
		10	0.009	24,000	451	18,000	276	17,800	221	15,000	193
0.8	0.1	4	0.032	48,000	1,102	28,000	518	20,000	320	20,000	288
		6	0.019	38,700	800	25,000	461	18,000	288	18,000	256
		8	0.015	29,025	600	20,000	369	16,200	259	16,200	230
		12	0.012	29,025	570	20,000	350	16,200	246	16,200	219
	0.2	4	0.056	48,000	1,102	28,000	518	20,000	320	20,000	288
		6	0.032	38,700	800	25,000	461	18,000	288	18,000	256
1	0.1	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



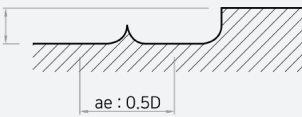
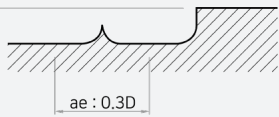
ZSPM4 SERIES

Workpiece	Hardened Steels									
Hardness	~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc 60 ~ HRc65	
D X R (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	ap : 0.2R  ae : 0.5D *ae shouldn't be over max. 0.5D	ap : 0.1R  ae : 0.5D *ae shouldn't be over max. 0.5D
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ZSPM4 SERIES ► High Speed Cutting

Workpiece	Hardened Steels									
Hardness	~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc 60 ~ HRc65	
D X R (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

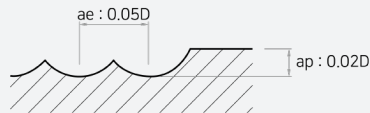
RPM = rev / min FEED = mm / min	ap : 0.1R  ae : 0.5D *ae shouldn't be over max. 0.5D	ap : 0.05R  ae : 0.3D *ae shouldn't be over max. 0.3D
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Technical Data

DB702, DB712 SERIES

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65		HRc 65 ~ 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	965	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	890
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	2,100	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	37,000	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	2,800	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



DB703 SERIES

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65		HRc 65 ~ 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



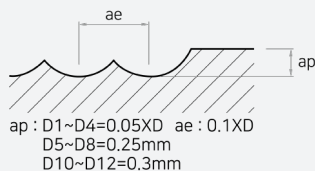
DB734 SERIES

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRC30 ~ HRC40		HRC40 ~ HRC50		HRC50 ~ HRC55		HRC55 ~ HRC60		HRC60 ~ HRC65		HRC 65 ~ 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

ZSLNB20 SERIES

Workpiece	Alloy Steels, Heat Resistant Steels			Hardened Steels			Hardened Steels			Copper, Copper alloy		
Hardness	HRC30 ~ HRC45			HRC45 ~ HRC55			HRC55 ~ HRC65			-		
Diameter (mm)	RPM	FEED	Ae (mm)	RPM	FEED	Ae (mm)	RPM	FEED	Ae (mm)	RPM	FEED	Ae (mm)
0.5	34,100 ~ 49,500	600 ~ 870	0.007 ~ 0.028	31,900 ~ 35,200	490 ~ 540	0.005 ~ 0.023	31,900 ~ 35,200	440 ~ 480	0.005 ~ 0.021	49,000 ~ 50,000	1,100 ~ 1,400	0.010 ~ 0.042
0.6	28,600 ~ 40,700	590 ~ 850	0.007 ~ 0.034	26,400 ~ 29,700	480 ~ 540	0.006 ~ 0.028	26,400 ~ 29,700	400 ~ 480	0.006 ~ 0.025	42,000 ~ 50,000	1,100 ~ 1,700	0.011 ~ 0.050
0.8	22,000 ~ 30,800	640 ~ 890	0.016 ~ 0.064	19,800 ~ 22,000	490 ~ 550	0.013 ~ 0.052	19,800 ~ 22,000	440 ~ 500	0.012 ~ 0.048	31,000 ~ 50,000	1,100 ~ 2,250	0.024 ~ 0.096
1	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	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	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	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



Technical Data

ZSTNB20, ZSTNB30 SERIES

Workpiece					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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	0.01	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	0.02	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	0.04	40,000	2,000	28,000	1,260	26,000	1,040	26,000	910
		8	0.9	0.01	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	0.05	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	0.02	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	0.02	32,000	1,382	22,400	968	20,800	799	20,800	699
		8	0.9	0.02	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	0.01	26,000	874	18,200	535	16,900	497	16,900	426
		15	0.4	0.005	22,400	753	15,680	461	14,560	367	14,560	367
		15	0.9	0.006	22,400	753	15,680	461	14,560	367	14,560	367
0.4	0.8	4	0.4	0.062	32,000	2,560	22,400	1,613	20,800	1,331	20,800	1,165
		6	0.4	0.045	32,000	2,560	22,400	1,613	20,800	1,331	20,800	1,165
		8	0.9	0.026	25,600	1,475	17,920	1,032	16,640	852	16,640	745
		12	0.9	0.02	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	0.05	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



■ ZSTNB20, ZSTNB30 SERIES

Workpiece					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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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)
0.45	0.9	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	0.02	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	0.01	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	0.07	16,960	2,544	11,872	1,603	11,024	1,323	11,024	1,158
		10	0.4	0.07	16,960	2,544	11,872	1,603	11,024	1,323	11,024	1,158
		12	0.4	0.07	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	0.04	11,024	1,323	7,717	810	7,166	752	7,166	645
		30	0.9	0.028	11,024	1,323	7,717	810	7,166	752	7,166	645
0.9	1.8	4	0.4	0.12	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		8	0.4	0.1	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		12	0.4	0.08	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	0.02	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	0.15	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		12	0.4	0.09	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		16	0.4	0.09	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		20	0.4	0.06	12,160	2,189	8,512	1,532	7,904	1,265	7,904	1,107
		20	0.9	0.07	12,160	2,189	8,512	1,532	7,904	1,265	7,904	1,107
		25	0.9	0.07	9,880	1,581	6,916	968	6,442	899	6,422	771
		30	0.4	0.04	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	0.03	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

Technical Data

ZSTNB20, ZSTNB30 SERIES

Workpiece					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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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)
1	2	50	0.9	0.17	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	0.32	12,720	3,816	8,904	2,404	8,268	1,984	8,268	1,736
		16	0.4	0.22	12,720	3,816	8,904	2,404	8,268	1,984	8,268	1,736
		20	0.4	0.15	12,720	3,434	8,904	2,137	8,268	1,736	8,268	1,488
		30	0.4	0.08	10,176	2,748	7,123	1,496	6,614	1,389	6,614	1,191
		30	0.9	0.09	10,176	2,748	7,123	1,496	6,614	1,389	6,614	1,191
		40	0.4	0.06	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		40	0.9	0.07	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		50	0.9	0.05	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		60	0.9	0.03	7,123	1,710	4,986	1,047	4,630	972	4,630	833
		70	0.9	0.02	6,233	1,496	4,363	916	4,051	851	4,051	729
2	4	20	1	0.32	11,900	2,860	9,000	2,050	7,800	1,680	7,800	1,590
		30	1	0.23	11,900	2,570	9,000	1,850	7,800	1,520	7,800	1,430
		40	1	0.14	9,500	1,940	7,200	1,400	6,200	1,140	6,200	1,080
		50	1	0.11	7,800	1,590	5,800	1,120	5,000	920	5,000	870
		60	1	0.07	7,800	1,590	5,800	1,120	5,000	920	5,000	870
2.5	5	30	1	0.34	9,500	2,140	7,200	1,540	6,200	1,260	6,200	1,190
		40	1	0.25	9,500	2,140	7,200	1,540	6,200	1,260	6,200	1,190
		60	1	0.15	6,200	1,320	4,700	950	4,000	770	4,000	720
3	6	30	1	0.45	8,000	2,000	6,000	1,430	5,200	1,170	5,200	1,110
		40	1	0.4	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	0.5	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	0.7	4,800	1,300	3,600	920	3,100	750	3,100	710
		75	1	0.5	4,800	1,300	3,600	920	3,100	750	3,100	710

· Please adjust the cutting depth index according to the cutting depth factors of above table.

· For Rib or Slotting machining process which are not easy for chip ejection, please reduce the cutting depth by 20~30% from the above cutting condition.

ex) ZSTNB2040-20-10, HRC 55, Rib processing

Cutting depth : 0.32(standard cutting depth) X 0.65 X 0.8 = 0.17mm

· In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

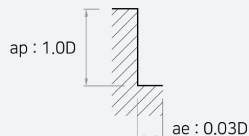
· If RPM of the machine is low, the feed rate should be low in the same ratio as RPM.



ESE702 SERIES ► Side Cutting

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65		HRc 65 ~ 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



ESE702 SERIES ► Slotting

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65		HRc 65 ~ 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

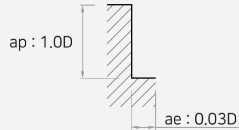


Technical Data

ESE712 SERIES ► Side Cutting

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65		HRc 65 ~ 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



ESE712 SERIES ► Slotting

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65		HRc 65 ~ 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





■ ESE704, ESE714, ESE744 SERIES ► Side Cutting

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65		HRc 65 ~ 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

ap : 1.0D
ae : 0.05D

ap : 1.0D
ae : 0.03D

■ ESE716 SERIES ► Side Cutting

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65		HRc 65 ~ 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

ap : 1.0D
ae : 0.05D

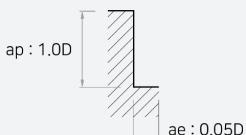
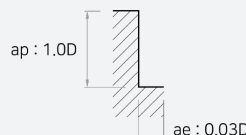
ap : 1.0D
ae : 0.03D

Technical Data

ESE724 SERIES ► Side Cutting

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65		HRc 65 ~ 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

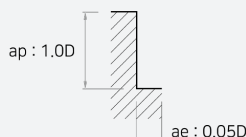
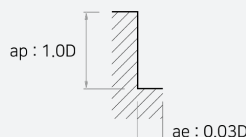
RPM = rev / min
FEED = mm / min

ESE726, ESR736 SERIES

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65		HRc 65 ~ 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



ESRE712 SERIES ► Side Cutting

Workpiece		Carbon Steels, Alloy Steels (SCM, SNCM, S45C)			Prehardened Steels (NAK, CENA, KP4)			Hardened Steels (SKD, SKT, STAVAX)		
		~ HRc35			HRc35 ~ HRc45			HRc45 ~ HRc55		
Hardness		~ 1100N/mm2			1100 ~ 1500N/mm2			1500 ~ 2000N/mm2		
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
	0.5	50,000	315	0.006	46,200	230	0.005	40,600	170	0.004
	1	45,000	255	0.002	41,580	185	0.002	36,540	140	0.001
0.2	0.5	38,500	380	0.018	36,300	270	0.014	32,100	200	0.01
	1	38,500	380	0.013	36,300	270	0.01	32,100	200	0.007
	1.5	34,650	310	0.007	32,670	220	0.006	28,890	160	0.004
	2	34,650	310	0.005	32,670	220	0.004	28,890	160	0.003
0.3	1	34,200	390	0.019	32,300	270	0.015	28,500	230	0.011
	1.5	34,200	390	0.019	32,300	270	0.015	25,800	230	0.011
	2	30,780	315	0.011	29,070	220	0.008	25,650	185	0.006
	2.5	30,780	315	0.007	29,070	220	0.005	25,650	185	0.004
	3	30,780	315	0.007	29,070	220	0.005	25,650	185	0.004
	4	27,360	250	0.004	25,840	175	0.003	22,800	145	0.002
	5	20,520	165	0.003	19,380	115	0.002	17,100	95	0.002
0.4	1	27,400	540	0.036	25,800	380	0.028	22,800	280	0.02
	1.5	27,400	540	0.025	25,800	380	0.02	22,800	280	0.014
	2	27,400	540	0.025	25,800	380	0.02	22,800	280	0.014
	2.5	24,660	435	0.014	23,220	310	0.011	20,520	225	0.008
	3	24,660	435	0.014	23,220	310	0.011	20,520	225	0.008
	4	24,660	435	0.009	23,220	310	0.007	20,520	225	0.005
	5	21,920	345	0.009	20,640	245	0.007	18,240	180	0.005
	6	21,920	345	0.005	20,640	245	0.004	18,240	180	0.003
	8	16,440	225	0.004	15,480	160	0.003	13,680	120	0.002
	10	8,220	95	0.004	7,740	70	0.003	6,840	50	0.002
0.5	1	27,400	540	0.045	25,800	425	0.035	22,800	285	0.025
	1.5	27,400	540	0.045	25,800	425	0.035	22,800	285	0.025
	2	27,400	540	0.032	25,800	425	0.025	22,800	285	0.018
	2.5	27,400	540	0.032	25,800	425	0.025	22,800	285	0.018
	3	24,660	435	0.018	23,220	345	0.014	20,520	230	0.01
	4	24,660	435	0.018	23,220	345	0.014	20,520	230	0.01
	5	24,660	435	0.011	23,220	345	0.009	20,520	230	0.006
	6	21,920	345	0.011	20,640	270	0.009	18,240	180	0.006
	8	16,440	225	0.007	15,480	180	0.005	13,680	120	0.004
	10	16,440	225	0.005	15,480	180	0.004	13,680	120	0.003
	12	8,220	95	0.005	7,740	75	0.004	6,840	50	0.003
	14	8,220	95	0.005	7,740	75	0.004	6,840	50	0.003
	16	2,740	25	0.005	2,580	20	0.004	2,280	15	0.003
0.6	2	27,400	775	0.038	25,800	545	0.029	22,800	405	0.021
	3	27,400	775	0.038	25,800	545	0.029	22,800	405	0.021
	4	24,660	630	0.022	23,220	440	0.017	20,520	330	0.012
	5	24,660	630	0.014	23,220	440	0.011	20,520	330	0.008
	6	24,660	630	0.014	23,220	440	0.011	20,520	330	0.008
	8	21,920	495	0.008	20,640	350	0.006	18,240	260	0.005

Technical Data

ESRE712 SERIES ► Side Cutting

Workpiece		Carbon Steels, Alloy Steels (SCM, SNCM, S45C)			Prehardened Steels (NAK, CENA, KP4)			Hardened Steels (SKD, SKT, STAVAX)		
		~ 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	10	16,440	325	0.005	15,480	230	0.004	13,680	170	0.003
	12	16,440	325	0.005	15,480	230	0.004	13,680	170	0.003
	14	8,220	140	0.005	7,740	100	0.004	6,840	75	0.003
	16	8,220	140	0.005	7,740	100	0.004	6,840	75	0.003
0.7	2	27,400	775	0.063	25,800	545	0.049	22,800	405	0.035
	4	24,660	630	0.025	23,220	440	0.02	20,520	330	0.014
	6	24,660	630	0.016	23,220	440	0.012	20,520	330	0.009
	8	21,920	495	0.016	20,640	350	0.012	18,240	260	0.009
	10	21,920	495	0.009	20,640	350	0.007	18,240	260	0.005
	12	16,440	325	0.009	15,480	230	0.005	13,680	170	0.004
0.8	2	27,400	775	0.072	25,800	605	0.056	22,800	450	0.04
	3	27,400	775	0.05	25,800	605	0.039	22,800	450	0.028
	4	27,400	775	0.05	25,800	605	0.039	22,800	450	0.028
	5	24,660	630	0.029	23,220	490	0.022	20,520	365	0.016
	6	24,660	630	0.029	23,220	490	0.022	20,520	365	0.016
	8	24,660	630	0.018	23,220	490	0.014	20,520	365	0.01
	10	21,920	495	0.018	20,640	385	0.014	18,240	290	0.01
	12	21,920	495	0.011	20,640	385	0.008	18,240	290	0.006
	14	16,440	325	0.007	15,480	255	0.006	13,680	190	0.004
	16	16,440	325	0.007	15,480	255	0.006	13,680	190	0.004
0.9	20	8,220	140	0.007	7,740	110	0.006	6,840	80	0.004
	6	22,140	575	0.032	20,970	440	0.025	18,450	330	0.018
	8	22,140	575	0.02	20,970	440	0.016	18,450	330	0.011
1	10	19,680	455	0.02	18,640	350	0.016	16,400	260	0.011
	2	24,600	1,045	0.09	23,300	890	0.07	20,500	665	0.05
	3	24,600	1,045	0.09	23,300	890	0.07	20,500	665	0.05
	4	24,600	1,045	0.063	23,300	890	0.049	20,500	665	0.035
	5	24,600	1,045	0.063	23,300	890	0.049	20,500	665	0.035
	6	22,140	845	0.036	20,970	720	0.028	18,450	540	0.02
	7	22,140	845	0.036	20,970	720	0.028	18,450	540	0.02
	8	22,140	845	0.036	20,970	720	0.028	18,450	540	0.02
	10	22,140	845	0.023	20,970	720	0.018	18,450	540	0.013
	12	19,680	670	0.023	18,640	570	0.018	16,400	425	0.013
	14	19,680	670	0.014	18,640	570	0.011	16,400	425	0.008
	16	14,760	440	0.014	13,980	375	0.011	12,300	280	0.008
	18	14,760	440	0.009	13,980	375	0.007	12,300	280	0.005
	20	14,760	440	0.009	13,980	375	0.007	12,300	280	0.005
	22	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
	26	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
	30	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
	40	2,460	50	0.009	2,330	45	0.007	2,050	35	0.005
	50	2,460	50	0.006	2,330	45	0.005	2,050	35	0.003
1.2	4	21,900	930	0.076	20,700	720	0.059	18,200	485	0.042



■ ESRE712 SERIES ► Side Cutting

Workpiece		Carbon Steels, Alloy Steels (SCM, SNCM, S45C)			Prehardened Steels (NAK, CENA, KP4)			Hardened Steels (SKD, SKT, STAVAX)		
		~ 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	6	21,900	930	0.076	20,700	720	0.059	18,200	485	0.042
	8	19,710	755	0.043	18,630	585	0.034	16,380	395	0.024
	10	19,710	755	0.027	18,630	585	0.021	16,380	395	0.015
	12	19,710	755	0.027	18,630	585	0.021	16,380	395	0.015
	14	17,520	595	0.027	16,560	460	0.021	14,560	310	0.015
	16	17,520	595	0.016	16,560	460	0.013	14,560	310	0.009
	20	13,140	390	0.011	12,420	300	0.008	10,920	205	0.006
	26	6,570	165	0.011	6,210	130	0.008	5,460	85	0.006
1.4	30	6,570	165	0.011	6,210	130	0.008	5,460	85	0.006
	6	19,200	815	0.088	18,100	570	0.069	16,000	425	0.049
	8	17,280	660	0.05	16,290	460	0.039	14,400	345	0.028
	10	17,280	660	0.05	16,290	460	0.039	14,400	345	0.028
	14	17,280	660	0.032	16,290	460	0.025	14,400	345	0.018
	16	15,360	520	0.032	14,480	365	0.025	12,800	270	0.018
	20	15,360	520	0.019	14,480	365	0.015	12,800	270	0.011
1.5	4	19,200	905	0.135	18,100	635	0.105	16,000	475	0.075
	5	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
	6	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
	7	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
	8	17,280	735	0.054	16,290	515	0.042	14,400	385	0.03
	10	17,280	735	0.054	16,290	515	0.042	14,400	385	0.03
	12	17,280	735	0.054	16,290	515	0.042	14,400	385	0.03
	14	17,280	735	0.034	16,290	515	0.026	14,400	385	0.019
	16	15,360	580	0.034	14,480	405	0.026	12,800	305	0.019
	18	15,360	580	0.034	14,480	405	0.026	12,800	305	0.019
	20	15,360	580	0.02	14,480	405	0.016	12,800	305	0.011
	22	15,360	580	0.02	14,480	405	0.016	12,800	305	0.011
	26	11,520	380	0.014	10,860	265	0.011	9,600	200	0.008
1.6	30	11,520	380	0.014	10,860	265	0.011	9,600	200	0.008
	8	17,800	840	0.101	16,800	655	0.078	14,800	490	0.056
	10	16,020	680	0.058	15,120	530	0.045	13,320	395	0.032
	12	16,020	680	0.058	15,120	530	0.045	13,320	395	0.032
	16	16,020	680	0.036	15,120	530	0.028	13,320	395	0.02
1.8	20	14,240	540	0.036	13,440	420	0.028	11,840	315	0.02
	8	17,800	840	0.113	16,800	655	0.088	14,800	490	0.063
	10	16,020	680	0.065	15,120	530	0.05	13,320	395	0.036
	12	16,020	680	0.065	15,120	530	0.05	13,320	395	0.036
	16	16,020	680	0.041	15,120	530	0.032	13,320	395	0.023
2	20	14,240	540	0.041	13,440	420	0.032	11,840	315	0.023
	6	14,400	820	0.18	13,600	620	0.14	12,000	475	0.1
	8	14,400	820	0.126	13,600	620	0.098	12,000	475	0.07
	10	14,400	820	0.126	13,600	620	0.098	12,000	475	0.07
	12	12,960	665	0.072	12,240	500	0.056	10,800	385	0.04

Technical Data

ESRE712 SERIES ► Side Cutting

Workpiece		Carbon Steels, Alloy Steels (SCM, SNCM, S45C)			Prehardened Steels (NAK, CENA, KP4)			Hardened Steels (SKD, SKT, STAVAX)		
		~ 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	14	12,960	665	0.072	12,240	500	0.056	10,800	385	0.04
	16	12,960	665	0.072	12,240	500	0.056	10,800	385	0.04
	18	12,960	665	0.045	12,240	500	0.035	10,800	385	0.025
	20	12,960	665	0.045	12,240	500	0.035	10,800	385	0.025
	22	11,520	525	0.045	10,880	395	0.035	9,600	305	0.025
	26	11,520	525	0.045	10,880	395	0.035	9,600	305	0.025
	30	11,520	525	0.027	10,880	395	0.021	9,600	305	0.015
	35	8,640	345	0.018	8,160	260	0.014	7,200	200	0.01
	40	8,640	345	0.018	8,160	260	0.014	7,200	200	0.01
	45	4,320	150	0.018	4,080	110	0.014	3,600	85	0.01
	50	4,320	150	0.018	4,080	110	0.014	3,600	85	0.01
	60	4,320	150	0.018	4,080	110	0.014	3,600	85	0.01
2.5	8	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
	10	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
	12	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
	14	11,070	785	0.09	10,440	550	0.07	9,270	415	0.05
	16	11,070	785	0.09	10,440	550	0.07	9,270	415	0.05
	18	11,070	785	0.09	10,440	550	0.07	9,270	415	0.05
	20	11,070	785	0.09	10,440	550	0.07	9,270	415	0.05
	22	11,070	785	0.056	10,440	550	0.044	9,270	415	0.031
	26	9,840	620	0.056	9,280	435	0.044	8,240	325	0.031
	30	9,840	620	0.056	9,280	435	0.044	8,240	325	0.031
	35	9,840	620	0.034	9,280	435	0.026	8,240	325	0.019
	40	7,380	405	0.034	6,960	285	0.026	6,180	215	0.019
	45	7,380	405	0.023	6,960	285	0.018	6,180	215	0.013
	50	7,380	405	0.023	6,960	285	0.018	6,180	215	0.013
3	6	10,900	860	0.27	10,300	605	0.21	6,600	450	0.15
	8	10,900	860	0.27	10,300	605	0.21	6,600	450	0.15
	10	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
	12	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
	14	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
	16	9,810	695	0.108	9,270	490	0.084	5,940	365	0.06
	18	9,810	695	0.108	9,270	490	0.084	5,940	365	0.06
	20	9,810	695	0.108	9,270	490	0.084	5,940	365	0.06
	22	9,810	695	0.108	9,270	490	0.084	5,940	365	0.06
	26	9,810	695	0.068	9,270	490	0.053	5,940	365	0.038
	30	9,810	695	0.068	9,270	490	0.053	5,940	365	0.038
	35	8,720	550	0.068	8,240	385	0.053	5,280	290	0.038
	40	8,720	550	0.041	8,240	385	0.032	5,280	290	0.023
	45	8,720	550	0.041	8,240	385	0.032	5,280	290	0.023
	50	6,540	360	0.027	6,180	255	0.021	3,960	190	0.015
	60	6,540	360	0.027	6,180	255	0.021	3,960	190	0.015
4	8	8,000	1,300	0.36	7,600	1,160	0.28	6,700	770	0.2



ESRE712 SERIES ► Side Cutting

Workpiece		Carbon Steels, Alloy Steels (SCM, SNCM, S45C)			Prehardened Steels (NAK, CENA, KP4)			Hardened Steels (SKD, SKT, STAVAX)		
		~ HRC35			HRC35 ~ HRC45			HRC45 ~ HRC55		
Hardness		~ 1100N/mm2			1100 ~ 1500N/mm2			1500 ~ 2000N/mm2		
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	10	8,000	1,300	0.36	7,600	1,160	0.28	6,700	770	0.2
	12	8,000	1,300	0.36	7,600	1,160	0.28	6,700	770	0.2
	14	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.14
	16	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.14
	18	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.14
	20	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.14
	22	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.08
	26	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.08
	30	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.08
	35	7,200	1,055	0.09	6,840	940	0.07	6,030	625	0.05
	40	7,200	1,055	0.09	6,840	940	0.07	6,030	625	0.05
	45	6,400	830	0.09	6,080	740	0.07	5,360	495	0.05
	50	6,400	830	0.09	6,080	740	0.07	5,360	495	0.05
	60	6,400	830	0.054	6,080	740	0.042	5,360	495	0.03
5	16	6,400	1,155	0.315	6,100	900	0.245	5,400	605	0.175
	20	6,400	1,155	0.315	6,100	900	0.245	5,400	605	0.175
	26	5,760	935	0.18	5,490	730	0.14	4,860	490	0.1
	30	5,760	935	0.18	5,490	730	0.14	4,860	490	0.1
	35	5,760	935	0.18	5,490	730	0.14	4,860	490	0.1
	40	5,760	935	0.18	5,490	730	0.14	4,860	490	0.1
	50	5,760	935	0.113	5,490	730	0.088	4,860	490	0.063
6	60	5,120	740	0.113	4,880	575	0.088	4,320	385	0.063
	15	5,300	1,055	0.54	5,000	820	0.42	4,400	550	0.3
	20	5,300	1,055	0.378	5,000	820	0.294	4,400	550	0.21
	30	5,300	1,055	0.378	5,000	820	0.294	4,400	550	0.21
8	32	4,770	855	0.216	4,500	665	0.168	3,960	445	0.12
	25	4,000	950	0.504	3,800	750	0.392	3,300	500	0.28
	30	4,000	950	0.504	3,800	750	0.392	3,300	500	0.28
10	42	3,600	770	0.288	3,400	605	0.224	2,950	405	0.16
	30	3,200	900	0.9	3,050	680	0.7	2,630	400	0.5
	35	3,200	900	0.63	3,050	680	0.49	2,630	400	0.35
12	45	3,200	900	0.63	3,050	680	0.49	2,630	400	0.35
	35	2,650	800	1.08	2,520	600	0.84	2,180	350	0.6
	40	2,650	800	0.756	2,520	600	0.588	2,180	350	0.42
12	50	2,650	800	0.756	2,520	600	0.588	2,180	350	0.42

RPM = rev / min
FEED = mm / min



Technical Data

ESRE714 SERIES

Workpiece		Carbon Steels, Alloy Steels (SCM, SNCM, S45C)			Prehardened Steels (NAK, CENA, KP4)			Hardened Steels (SKD, SKT, STAVAX)		
		~ HRC35			HRC35 ~ HRC45			HRC45 ~ HRC55		
Hardness		~ 1100N/mm2			1100 ~ 1500N/mm2			1500 ~ 2000N/mm2		
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
	2	27,400	756	0.032	25,800	595	0.025	22,800	399	0.018
	3	24,660	609	0.018	23,220	483	0.014	20,520	322	0.01
	4	24,660	609	0.018	23,220	483	0.014	20,520	322	0.01
	5	24,660	609	0.011	23,220	483	0.009	20,520	322	0.006
	6	21,920	483	0.011	20,640	378	0.009	18,240	252	0.006
	8	16,440	315	0.007	15,480	252	0.005	13,680	168	0.004
	10	16,440	315	0.005	15,480	252	0.004	13,680	168	0.003
0.6	1	27,400	1,085	0.038	25,800	763	0.029	22,800	567	0.021
	2	27,400	1,085	0.038	25,800	763	0.029	22,800	567	0.021
	3	27,400	1,085	0.038	25,800	763	0.029	22,800	567	0.021
	4	24,660	882	0.022	23,220	616	0.017	20,520	462	0.012
	5	24,660	882	0.014	23,220	616	0.011	20,520	462	0.008
	6	24,660	882	0.014	23,220	616	0.011	20,520	462	0.008
	8	21,920	693	0.008	20,640	490	0.006	18,240	364	0.005
	10	16,440	455	0.005	15,480	322	0.004	13,680	238	0.003
0.7	2	27,400	1,085	0.063	25,800	763	0.049	22,800	567	0.035
	4	24,660	882	0.025	23,220	616	0.02	20,520	462	0.014
	6	24,660	882	0.016	23,220	616	0.012	20,520	462	0.009
	8	21,920	693	0.016	20,640	490	0.012	18,240	364	0.009
	10	21,920	693	0.009	20,640	490	0.007	18,240	364	0.005
0.8	1	27,400	1,085	0.072	25,800	847	0.056	22,800	630	0.04
	2	27,400	1,085	0.072	25,800	847	0.056	22,800	630	0.04
	3	27,400	1,085	0.05	25,800	847	0.039	22,800	630	0.028
	4	27,400	1,085	0.05	25,800	847	0.039	22,800	630	0.028
	5	24,660	882	0.029	23,220	686	0.022	20,520	511	0.016
	6	24,660	882	0.029	23,220	686	0.022	20,520	511	0.016
	8	24,660	882	0.018	23,220	686	0.014	20,520	511	0.01
	10	21,920	693	0.018	20,640	539	0.014	18,240	406	0.01
	12	21,920	693	0.011	20,640	539	0.008	18,240	406	0.006
	16	16,440	455	0.007	15,480	357	0.006	13,680	266	0.004
1	2	24,600	1,463	0.09	23,300	1,246	0.07	20,500	931	0.05
	3	24,600	1,463	0.09	23,300	1,246	0.07	20,500	931	0.05
	4	24,600	1,463	0.063	23,300	1,246	0.049	20,500	931	0.035
	6	22,140	1,183	0.036	20,970	1,008	0.028	18,450	756	0.02
	8	22,140	1,183	0.036	20,970	1,008	0.028	18,450	756	0.02
	10	22,140	1,183	0.023	20,970	1,008	0.018	18,450	756	0.013
	12	19,680	938	0.023	18,640	798	0.018	16,400	595	0.013
	14	19,680	938	0.014	18,640	798	0.011	16,400	595	0.008
	16	14,760	616	0.014	13,980	525	0.011	12,300	392	0.008
	18	14,760	616	0.009	13,980	525	0.007	12,300	392	0.005
	20	14,760	616	0.009	13,980	525	0.007	12,300	392	0.005



■ ESRE714 SERIES

Workpiece		Carbon Steels, Alloy Steels (SCM, SNCM, S45C)			Prehardened Steels (NAK, CENA, KP4)			Hardened Steels (SKD, SKT, STAVAX)		
		~ 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	4	21,900	1,302	0.076	20,700	1,008	0.059	18,200	679	0.042
	6	21,900	1,302	0.076	20,700	1,008	0.059	18,200	679	0.042
	8	19,710	1,057	0.043	18,630	819	0.034	16,380	553	0.024
	10	19,710	1,057	0.027	18,630	819	0.021	16,380	553	0.015
	12	19,710	1,057	0.027	18,630	819	0.021	16,380	553	0.015
	16	17,520	833	0.016	16,560	644	0.013	14,560	434	0.009
	18	17,520	833	0.016	16,560	644	0.013	14,560	434	0.009
	20	13,140	546	0.011	12,420	420	0.008	10,920	287	0.006
1.4	6	19,200	1,141	0.088	18,100	798	0.069	16,000	595	0.049
	8	17,280	924	0.05	16,290	644	0.039	14,400	483	0.028
	10	17,280	924	0.05	16,290	644	0.039	14,400	483	0.028
	12	17,280	924	0.05	16,290	644	0.039	14,400	483	0.028
	14	17,280	924	0.032	16,290	644	0.025	14,400	483	0.018
	16	15,360	728	0.032	14,480	511	0.025	12,800	378	0.018
1.5	4	19,200	1,267	0.135	18,100	889	0.105	16,000	665	0.075
	6	19,200	1,267	0.095	18,100	889	0.074	16,000	665	0.053
	8	17,280	1,029	0.054	16,290	721	0.042	14,400	539	0.03
	10	17,280	1,029	0.054	16,290	721	0.042	14,400	539	0.03
	12	17,280	1,029	0.054	16,290	721	0.042	14,400	539	0.03
	16	15,360	812	0.034	14,480	567	0.026	12,800	427	0.019
	18	15,360	812	0.034	14,480	567	0.026	12,800	427	0.019
	20	15,360	812	0.02	14,480	567	0.016	12,800	427	0.011
	25	11,520	532	0.014	10,860	371	0.011	9,600	280	0.008
	30	11,520	532	0.014	10,860	371	0.011	9,600	280	0.008
1.6	6	17,800	1,176	0.101	16,800	917	0.078	14,800	686	0.056
	8	17,800	1,176	0.101	16,800	917	0.078	14,800	686	0.056
	10	16,020	952	0.058	15,120	742	0.045	13,320	553	0.032
	12	16,020	952	0.058	15,120	742	0.045	13,320	553	0.032
	14	16,020	952	0.058	15,120	742	0.045	13,320	553	0.032
	16	16,020	952	0.036	15,120	752	0.028	13,320	553	0.02
	18	16,020	952	0.036	15,120	752	0.028	13,320	553	0.02
	20	14,240	756	0.036	13,440	588	0.028	11,840	441	0.02
	25	14,240	756	0.036	13,440	588	0.028	11,840	441	0.02
1.8	6	17,800	1,176	0.113	16,800	917	0.088	14,800	686	0.063
	8	17,800	1,176	0.113	16,800	917	0.088	14,800	686	0.063
	10	16,020	952	0.065	15,120	742	0.05	13,320	553	0.036
	12	16,020	952	0.065	15,120	742	0.05	13,320	553	0.036
	16	16,020	952	0.041	15,120	742	0.032	13,320	553	0.023
	20	14,240	756	0.041	13,440	588	0.032	11,840	441	0.023
	25	14,240	756	0.041	13,440	588	0.032	11,840	441	0.023
2	4	14,400	1,148	0.18	13,600	868	0.14	12,000	665	0.1
	6	14,400	1,148	0.18	13,600	868	0.14	12,000	665	0.1
	8	14,400	1,148	0.126	13,600	868	0.098	12,000	665	0.07

Technical Data

ESRE714 SERIES

Workpiece		Carbon Steels, Alloy Steels (SCM, SNCM, S45C)			Prehardened Steels (NAK, CENA, KP4)			Hardened Steels (SKD, SKT, STAVAX)		
		~ HRC35			HRC35 ~ HRC45			HRC45 ~ HRC55		
Hardness		~ 1100N/mm2			1100 ~ 1500N/mm2			1500 ~ 2000N/mm2		
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	10	14,400	1,148	0.126	13,600	868	0.098	12,000	665	0.07
	12	12,960	931	0.072	12,240	700	0.056	10,800	539	0.04
	14	12,960	931	0.072	12,240	700	0.056	10,800	539	0.04
	16	12,960	931	0.072	12,240	700	0.056	10,800	539	0.04
	18	12,960	931	0.045	12,240	700	0.035	10,800	539	0.025
	20	12,960	931	0.045	12,240	700	0.035	10,800	539	0.025
	22	11,520	735	0.045	10,880	553	0.035	9,600	427	0.025
	25	11,520	735	0.045	10,880	553	0.035	9,600	427	0.025
	30	11,520	735	0.027	10,880	553	0.021	9,600	427	0.015
2.5	10	12,300	1,358	0.158	11,600	952	0.123	10,300	714	0.088
	12	12,300	1,358	0.158	11,600	952	0.123	10,300	714	0.088
	16	11,070	1,099	0.09	10,440	770	0.07	9,270	581	0.05
	20	11,070	1,099	0.09	10,440	770	0.07	9,270	581	0.05
	25	9,840	868	0.056	9,280	609	0.044	8,240	455	0.031
	30	9,840	868	0.056	9,280	609	0.044	8,240	455	0.031
3	6	10,900	1,204	0.27	10,300	847	0.21	6,600	630	0.15
	8	10,900	1,204	0.27	10,300	847	0.21	6,600	630	0.15
	10	10,900	1,204	0.189	10,300	847	0.147	6,600	630	0.105
	12	10,900	1,204	0.189	10,300	847	0.147	6,600	630	0.105
	16	9,810	973	0.108	9,270	686	0.084	5,940	511	0.06
	20	9,810	973	0.108	9,270	686	0.084	5,940	511	0.06
	25	9,810	973	0.068	9,270	686	0.053	5,940	511	0.038
	30	9,810	973	0.068	9,270	686	0.053	5,940	511	0.038
	35	8,720	770	0.068	8,240	539	0.053	5,280	406	0.038
	40	8,720	770	0.041	8,240	539	0.032	5,280	406	0.023
	45	8,720	770	0.041	8,240	539	0.032	5,280	406	0.023
	50	6,540	504	0.027	6,180	357	0.021	3,960	266	0.015
	60	6,540	504	0.027	6,180	357	0.021	3,960	266	0.015
3.5	12	9,310	1,430	0.236	8,800	1,008	0.183	5,640	750	0.131
	16	8,380	1,158	0.135	7,920	816	0.105	5,070	608	0.075
	20	8,380	1,158	0.135	7,920	816	0.105	5,070	608	0.047
	25	8,380	1,158	0.085	7,920	816	0.066	5,070	608	0.047
	30	8,380	1,158	0.085	7,920	816	0.066	5,070	608	0.047
	35	7,450	916	0.085	7,040	641	0.066	4,510	483	0.047
	40	7,450	916	0.051	7,040	641	0.04	4,510	483	0.028
4	6	8,000	1,820	0.36	7,600	1,624	0.28	6,700	1,078	0.2
	8	8,000	1,820	0.36	7,600	1,624	0.28	6,700	1,078	0.2
	10	8,000	1,820	0.36	7,600	1,624	0.28	6,700	1,078	0.2
	12	8,000	1,820	0.36	7,600	1,624	0.28	6,700	1,078	0.2
	16	8,000	1,820	0.252	7,600	1,624	0.196	6,700	1,078	0.14
	20	8,000	1,820	0.252	7,600	1,624	0.196	6,700	1,078	0.14
	25	7,200	1,477	0.144	6,840	1,316	0.112	6,030	875	0.08
	30	7,200	1,477	0.144	6,840	1,316	0.112	6,030	875	0.08



ESRE714 SERIES

Workpiece		Carbon Steels, Alloy Steels (SCM, SNCM, S45C)			Prehardened Steels (NAK, CENA, KP4)			Hardened Steels (SKD, SKT, STAVAX)		
		~ HRC35			HRC35 ~ HRC45			HRC45 ~ HRC55		
Hardness		~ 1100N/mm2			1100 ~ 1500N/mm2			1500 ~ 2000N/mm2		
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	40	7,200	1,477	0.09	6,840	1,316	0.07	6,030	875	0.05
	45	6,400	1,162	0.09	6,080	1,036	0.07	5,360	693	0.05
	50	6,400	1,162	0.09	6,080	1,036	0.07	5,360	693	0.05
	60	6,400	1,162	0.054	6,080	1,036	0.042	5,360	693	0.03
4.5	12	6,830	2,166	0.45	6,490	1,933	0.35	5,720	1283	0.25
	16	6,830	2,166	0.315	6,490	1,933	0.245	5,720	1283	0.175
	20	6,830	2,166	0.315	6,490	1,933	0.245	5,720	1283	0.175
	25	6,150	1,758	0.18	5,840	1,566	0.14	5,150	1041	0.1
	30	6,150	1,758	0.18	5,840	1,566	0.14	5,150	1041	0.1
	40	6,150	1,758	0.112	5,840	1,566	0.087	5,150	1041	0.062
5	16	6,400	1,617	0.315	6,100	1,260	0.245	5,400	847	0.175
	20	6,400	1,617	0.315	6,100	1,260	0.245	5,400	847	0.175
	25	5,760	1,309	0.18	5,490	1,022	0.14	4,860	686	0.1
	30	5,760	1,309	0.18	5,490	1,022	0.14	4,860	686	0.1
	40	5,760	1,309	0.18	5,490	1,022	0.14	4,860	686	0.1
	50	5,760	1,309	0.113	5,490	1,022	0.088	4,860	686	0.063
	60	5,120	1,036	0.113	4,880	805	0.088	4,320	539	0.063
6	20	5,300	1,477	0.378	5,000	1,148	0.294	4,400	770	0.21
	30	5,300	1,477	0.378	5,000	1,148	0.294	4,400	770	0.21
	40	4,770	1,197	0.216	4,500	931	0.168	3,960	623	0.12
	50	4,770	1,197	0.216	4,500	931	0.168	3,960	623	0.12
	60	4,370	958	0.141	4,171	931	0.11	3,690	623	0.078
8	25	4,000	1,330	0.504	3,800	1,050	0.392	3,300	700	0.28
	40	3,600	1,078	0.288	3,400	847	0.224	2,950	567	0.16
	50	3,600	1,078	0.288	3,400	847	0.224	2,950	567	0.16
10	30	3,200	1,260	0.9	3,050	952	0.7	2,630	560	0.5
	50	3,200	1,260	0.63	3,050	952	0.49	2,630	560	0.35
	60	3,200	1,260	0.63	3,050	952	0.49	2,630	560	0.35
12	40	2,650	1,120	0.756	2,520	840	0.588	2,180	490	0.42
	60	2,360	896	0.472	2,250	672	0.367	1,940	392	0.262
	70	2,360	896	0.472	2,250	672	0.367	1,940	392	0.262

RPM = rev / min
FEED = mm / min

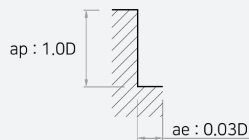


Technical Data

ESXE704, ESXE714. ESXR704 SERIES ► Side Cutting

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels							
Hardness	HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65		HRc 65 ~ 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



ESLNS20, ESLNS40 SERIES

Workpiece	Alloy Steels, Heat Resistant Steels			Hardened Steels			Hardened Steels			Copper, Copper alloy		
Hardness	HRc30 ~ HRc45			HRc45 ~ HRc55			HRc55 ~ HRc65			-		
Diameter (mm)	RPM	FEED	Ae (mm)	RPM	FEED	Ae (mm)	RPM	FEED	Ae (mm)	RPM	FEED	Ae (mm)
0.4	34,100 ~ 50,000	350 ~ 590	0.005 ~ 0.028	30,500 ~ 35,200	295 ~ 340	0.003 ~ 0.020	18,300 ~ 24,600	120 ~ 200	0.002 ~ 0.012	48,000 ~ 50,000	790 ~ 920	0.008 ~ 0.048
0.5	25,650 ~ 33,000	370 ~ 470	0.006 ~ 0.035	23,750 ~ 26,000	285 ~ 315	0.004 ~ 0.025	14,200 ~ 18,000	115 ~ 130	0.003 ~ 0.015	44,000 ~ 50,000	800 ~ 1,150	0.010 ~ 0.060
0.6	20,900 ~ 35,200	330 ~ 560	0.007 ~ 0.030	19,900 ~ 22,000	260 ~ 290	0.005 ~ 0.021	11,900 ~ 15,500	100 ~ 120	0.003 ~ 0.013	37,500 ~ 50,000	770 ~ 1,250	0.011 ~ 0.051
0.8	16,150 ~ 26,400	360 ~ 590	0.009 ~ 0.040	15,200 ~ 16,700	280 ~ 310	0.006 ~ 0.028	9,000 ~ 11,700	110 ~ 125	0.004 ~ 0.017	28,500 ~ 47,000	770 ~ 1,300	0.015 ~ 0.068
1	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	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	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	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

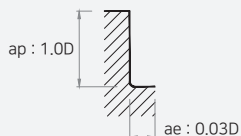




■ ESR702 SERIES ► Side Cutting

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRC30 ~ HRC40		HRC40 ~ HRC50		HRC50 ~ HRC55		HRC55 ~ HRC60		HRC60 ~ HRC65		HRC 65 ~ 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

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRC30 ~ HRC40		HRC40 ~ HRC50		HRC50 ~ HRC55		HRC55 ~ HRC60		HRC60 ~ HRC65		HRC 65 ~ 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

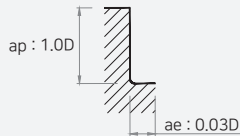


Technical Data

ESR704, ESR714, ERS724, ESR734 SERIES ► Side Cutting

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65		HRc 65 ~ 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

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65		HRc 65 ~ 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





■ ESRR712 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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
	0.05	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
		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

Technical Data

ESRR712 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	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
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



ESRR712 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	0.05	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
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

Technical Data

ESRR712 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	0.2	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
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



ESRR712 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	0.2	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
1.5	0.02	20	0.01	13,608	399	11,567	315	10,206	257	9,526	200
		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
	0.05	20	0.003	14,112	568	11,995	423	10,584	373	9,878	298
		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
	0.1	20	0.004	14,112	568	11,995	423	10,584	373	9,878	298
		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
	0.2	20	0.018	14,112	568	11,995	423	10,584	373	9,878	298
		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
	0.3	20	0.03	14,112	568	11,995	423	10,584	373	9,878	298
		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
	0.3	8	0.06	22,680	1,027	19,278	873	17,010	685	15,876	559

Technical Data

ESRR712 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	0.3	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
2	0.02	6	0.013	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.01	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		10	0.008	17,104	1,284	14,539	1,092	12,828	807	11,973	659
		12	0.006	15,309	1,083	13,013	921	11,482	722	10,716	590
		14	0.005	14,458	1,023	12,290	869	10,844	682	10,121	557
		16	0.004	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.004	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.003	11,907	757	10,121	643	8,930	505	8,335	411
	0.05	6	0.027	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.017	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		10	0.016	17,104	1,284	14,539	1,092	12,828	807	11,973	659
		12	0.011	15,309	1,083	13,013	921	11,482	722	10,716	590
		14	0.01	14,458	1,023	12,290	869	10,844	682	10,121	557
		16	0.008	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.006	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.004	11,907	757	10,121	643	8,930	505	8,335	411
	0.1	6	0.07	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.055	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		10	0.042	17,104	1,284	14,539	1,092	12,828	807	11,973	659
		12	0.03	15,309	1,083	13,013	921	11,482	722	10,716	590
		14	0.03	14,458	1,023	12,290	869	10,844	682	10,121	557
		16	0.03	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.025	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.015	11,907	757	10,121	643	8,930	505	8,335	411
	0.2	30	0.01	11,312	719	9,615	611	8,484	480	7,918	391
		6	0.08	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.07	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		10	0.055	17,104	1,284	14,539	1,092	12,828	807	11,973	659
		12	0.04	15,309	1,083	13,013	921	11,482	722	10,716	590
		14	0.04	14,458	1,023	12,290	869	10,844	682	10,121	557
		16	0.04	13,608	963	11,567	818	10,206	642	9,526	524



■ ESRR712 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	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	1,023	12,290	869	10,844	682	10,121	557
		16	0.06	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.037	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.03	11,907	757	10,121	643	8,930	505	8,335	411
		30	0.021	11,312	719	9,615	611	8,484	480	7,918	391
	0.5	6	0.17	20,790	1,635	17,672	1,389	15,593	981	14,553	801
		8	0.14	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		10	0.11	17,104	1,284	14,539	1,143	12,828	807	11,973	659
		12	0.08	15,309	1,083	13,013	1,023	11,482	722	10,716	590
		14	0.08	14,458	1,023	12,290	920	1,084	682	10,121	557
		16	0.08	13,608	963	11,567	818	10,206	642	9,526	524
		20	0.05	11,907	843	10,121	716	8,930	562	8,335	459
		25	0.05	11,907	757	10,121	643	8,930	505	8,335	411
		30	0.03	11,312	719	9,615	611	8,484	480	7,918	391
2.5	0.1	10	0.055	18,900	1,486	16,065	1,263	14,175	892	13,230	728
		16	0.042	16,254	1,224	13,816	1,040	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	1,040	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	1,040	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	1,040	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

Technical Data

ESRR712 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	0.2	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
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	1,293	6,545	872	5,904	687
		30	0.045	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		35	0.04	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		40	0.035	10,255	1,783	6,867	1,075	5,491	688	5,124	561
	0.2	12	0.14	11,213	1,950	9,531	1,658	8,410	1,170	7,849	956
		16	0.13	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		20	0.11	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		25	0.105	10,255	1,783	7,782	1,293	6,545	872	5,904	687
		30	0.1	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		35	0.08	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		40	0.07	10,255	1,783	6,867	1,075	5,491	688	5,124	561



■ ESRR712 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	0.2	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	1,293	6,545	872	5,904	687
		30	0.16	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		35	0.14	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		40	0.13	9,247	1,429	6,225	901	5,217	602	4,621	459
	0.5	12	0.35	11,213	1,950	9,531	1,658	8,410	1,170	7,849	956
		16	0.25	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		20	0.2	10,255	1,783	8,697	1,512	7,599	1,057	6,684	814
		25	0.175	10,255	1,783	7,782	1,293	6,545	872	5,904	687
		30	0.15	10,255	1,783	6,867	1,075	5,491	688	5,124	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	1,293	6,545	872	5,904	687
		30	0.17	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		35	0.12	10,255	1,783	6,867	1,075	5,491	688	5,124	561
		40	0.09	9,247	1,429	6,225	901	5,217	602	4,621	459
5	0.2	15	0.16	9,154	1,990	7,781	1,692	6,866	1,194	6,408	975
		25	0.152	8,513	1,813	7,236	1,541	6,385	1,088	5,959	888
		30	0.145	7,872	1,637	6,691	1,391	5,904	982	5,510	802
		40	0.13	6,590	1,284	5,602	1,091	4,943	770	4,613	629
	0.5	15	0.35	9,154	1,990	7,781	1,692	6,866	1,194	6,408	975
		25	0.296	8,513	1,813	7,236	1,541	6,385	1,088	5,959	888
		30	0.24	7,872	1,637	6,691	1,391	5,904	982	5,510	802
		40	0.135	6,590	1,284	5,602	1,091	4,943	770	4,613	629
	1	15	0.4	9,154	1,990	7,781	1,692	6,866	1,194	6,408	975
		25	0.337	8,513	1,813	7,236	1,541	6,385	1,088	5,959	888
		30	0.275	7,872	1,637	6,691	1,391	5,904	982	5,510	802
		40	0.15	6,590	1,284	5,602	1,091	4,943	770	4,613	629
6	0.1	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

Technical Data

ESRR712 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	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	1,900	4,524	1,483	3,016	914	2,320	584
	0.3	22	0.5	5,730	1,900	4,524	1,483	3,016	914	2,320	584
	0.5	22	0.6	5,730	1,900	4,524	1,483	3,016	914	2,320	584
	1	22	0.7	5,730	1,900	4,524	1,483	3,016	914	2,320	584
	1.5	22	0.8	5,730	1,900	4,524	1,483	3,016	914	2,320	584
10	0.2	24	0.4	4,524	1,728	3,567	1,396	2,378	849	1,856	544
	0.3	24	0.5	4,524	1,728	3,567	1,396	2,378	849	1,856	544
	0.5	24	0.6	4,524	1,728	3,567	1,396	2,378	849	1,856	544
	1	24	0.7	4,524	1,728	3,567	1,396	2,378	849	1,856	544
	1.5	24	0.8	4,524	1,728	3,567	1,396	2,378	849	1,856	544
	2	24	0.9	4,524	1,728	3,567	1,396	2,378	849	1,856	544
12	0.2	26	0.5	3,857	1,728	3,045	1,396	2,030	849	1,537	544
	0.3	26	0.6	3,857	1,728	3,045	1,396	2,030	849	1,537	544
	0.5	26	0.7	3,857	1,728	3,045	1,396	2,030	849	1,537	544
	1	26	0.8	3,857	1,728	3,045	1,396	2,030	849	1,537	544
	1.5	26	0.9	3,857	1,728	3,045	1,396	2,030	849	1,537	544
	2	26	1	3,857	1,728	3,045	1,396	2,030	849	1,537	544
	3	26	1	3,857	1,728	3,045	1,396	2,030	849	1,537	544
16	0.5	35	2	2,842	1,512	2,262	1,209	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.



ESRR714 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	1,257	40,000	649	30,000	529	28,000	441
		4	0.017	40,000	1,008	32,000	529	24,000	390	20,000	327
		6	0.008	28,800	672	19,400	364	18,000	350	15,000	280
		8	0.007	28,800	672	19,400	364	18,000	350	15,000	280
	0.1	2	0.03	50,000	1,257	40,000	649	30,000	529	28,000	441
		4	0.02	40,000	1,008	32,000	529	24,000	390	20,000	327
		6	0.013	28,800	672	19,400	364	18,000	350	15,000	280
		8	0.01	28,800	672	19,400	364	18,000	350	15,000	280
0.6	0.05	2	0.028	50,000	1,622	37,830	840	28,200	546	23,000	448
		4	0.019	40,000	1,162	27,800	616	23,600	392	21,000	322
		6	0.012	24,000	686	18,000	420	17,800	336	15,000	294
		8	0.01	24,000	652	18,000	399	17,800	319	15,000	280
	0.1	2	0.035	50,000	1,622	37,830	840	28,200	546	23,000	448
		4	0.024	40,000	1,162	27,800	616	23,600	392	21,000	322
		6	0.015	24,000	686	18,000	420	17,800	336	15,000	294
		8	0.013	24,000	652	18,000	399	17,800	319	15,000	280
0.7	0.05	2	0.028	49,200	1,475	34,190	781	29,030	497	25,830	408
		4	0.019	40,000	1,162	27,800	616	23,600	392	21,000	322
		6	0.012	24,000	686	18,000	420	17,800	336	15,000	294
		8	0.01	24,000	686	18,000	420	17,800	336	15,000	294
	0.1	2	0.042	49,200	1,475	34,190	781	29,030	497	25,830	408
		4	0.029	40,000	1,162	27,800	616	23,600	392	21,000	322
		6	0.018	24,000	686	18,000	420	17,800	336	15,000	294
		8	0.015	24,000	686	18,000	420	17,800	336	15,000	294
0.8	0.02	2	0.016	48,000	1,929	28,000	905	20,000	560	360	504
		4	0.016	48,000	1,542	28,000	725	20,000	448	288	403
		6	0.013	38,700	1,120	25,000	645	18,000	403	256	358
		8	0.011	29,025	840	20,000	516	16,200	362	230	322
		10	0.01	29,025	798	20,000	490	16,200	344	219	306
		12	0.09	29,025	798	20,000	490	16,200	344	219	306
	0.05	2	0.038	48,000	1,929	28,000	905	20,000	560	360	504
		4	0.026	48,000	1,542	28,000	725	20,000	448	288	403
		6	0.015	38,700	1,120	25,000	645	18,000	403	256	358
		8	0.012	29,025	840	20,000	516	16,200	362	230	322
		10	0.011	29,025	798	20,000	490	16,200	344	219	306
		12	0.01	29,025	798	20,000	490	16,200	344	219	306
	0.1	2	0.047	48,000	1,929	28,000	905	20,000	560	360	504
		4	0.032	48,000	1,542	28,000	725	20,000	448	288	403
		6	0.019	38,700	1,120	25,000	645	18,000	403	256	358
		8	0.015	29,025	840	20,000	516	16,200	362	230	322
		10	0.013	29,025	798	20,000	490	16,200	344	219	306
		12	0.012	29,025	798	20,000	490	16,200	344	219	306
1	0.02	4	0.013	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		6	0.01	26,244	1,386	22,307	1,178	19,683	924	18,371	754

Technical Data

ESRR714 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	8	0.008	23,328	1,232	19,829	1,047	17,496	821	16,330	670
		10	0.006	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.005	18,144	852	15,422	634	13,608	558	12,701	448
		14	0.004	18,144	746	15,422	588	13,608	478	12,701	372
		16	0.004	18,144	746	15,422	588	13,608	478	12,701	372
		20	0.003	13,608	558	11,567	441	10,206	359	9,526	280
	0.05	3	0.027	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		4	0.027	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		6	0.017	26,244	1,386	22,307	1,178	19,683	924	18,371	754
		8	0.016	23,328	1,232	19,829	1,047	17,496	821	16,330	670
		10	0.011	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.01	18,144	852	15,422	634	13,608	558	12,701	448
		14	0.008	18,144	746	15,422	588	13,608	478	12,701	372
		16	0.006	18,144	746	15,422	588	13,608	478	12,701	372
		20	0.004	13,608	558	11,567	441	10,206	359	9,526	280
	0.1	3	0.038	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		4	0.038	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		6	0.024	26,244	1,386	22,307	1,178	19,683	924	18,371	754
		8	0.024	23,328	1,232	19,829	1,047	17,496	821	16,330	670
		10	0.015	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.015	18,144	852	15,422	634	13,608	558	12,701	448
		14	0.012	18,144	746	15,422	588	13,608	478	12,701	372
		16	0.009	18,144	746	15,422	588	13,608	478	12,701	372
		20	0.006	13,608	558	11,567	441	10,206	359	9,526	280
	0.2	3	0.07	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		4	0.07	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		6	0.04	26,244	1,386	22,307	1,178	19,683	924	18,371	754
		8	0.04	23,328	1,232	19,829	1,047	17,496	821	16,330	670
		10	0.025	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.025	18,144	852	15,422	634	13,608	558	12,701	448
		14	0.02	18,144	746	15,422	588	13,608	478	12,701	372
		16	0.015	18,144	746	15,422	588	13,608	478	12,701	372
		20	0.01	13,608	558	11,567	441	10,206	359	9,526	280
	0.3	3	0.07	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		4	0.07	32,400	1,902	27,540	1,454	24,300	1,141	22,680	932
		6	0.04	26,244	1,386	22,307	1,178	19,683	924	18,371	754
		8	0.04	23,328	1,232	19,829	1,047	17,496	821	16,330	670
		10	0.025	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.025	18,144	852	15,422	634	13,608	558	12,701	448
		14	0.02	18,144	746	15,422	588	13,608	478	12,701	372
		16	0.015	18,144	746	15,422	588	13,608	478	12,701	372
		20	0.01	13,608	558	11,567	441	10,206	359	9,526	280
1.2	0.02	4	0.013	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		6	0.01	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831



■ ESRR714 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	8	0.008	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.006	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.005	19,278	912	16,386	775	14,458	599	13,494	478
		14	0.004	18,144	746	15,422	634	13,608	478	12,701	372
		16	0.004	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.003	13,608	558	11,567	441	10,206	359	9,526	280
	0.05	3	0.027	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		4	0.027	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		6	0.017	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		8	0.016	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.011	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.01	19,278	912	16,386	775	14,458	599	13,494	478
		14	0.008	18,144	746	15,422	634	13,608	478	12,701	372
		16	0.006	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.004	13,608	558	11,567	441	10,206	359	9,526	280
	0.1	3	0.03	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		4	0.03	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		6	0.03	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		8	0.022	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.015	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.012	19,278	912	16,386	775	14,458	599	13,494	478
		14	0.01	18,144	746	15,422	634	13,608	478	12,701	372
		16	0.01	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.006	13,608	558	11,567	441	10,206	359	9,526	280
	0.2	3	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		4	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		6	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		8	0.037	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.025	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.02	19,278	912	16,386	775	14,458	599	13,494	478
		14	0.016	18,144	746	15,422	634	13,608	478	12,701	372
		16	0.016	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.01	13,608	558	11,567	441	10,206	359	9,526	280
	0.3	3	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		4	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		6	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		8	0.037	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.025	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.02	19,278	912	16,386	775	14,458	599	13,494	478
		16	0.016	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.01	13,608	558	11,567	441	10,206	359	9,526	280
1.5	0.02	6	0.01	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.008	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.006	20,412	1,293	17,350	1,222	15,309	959	14,288	782

Technical Data

ESRR714 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	8	0.008	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.006	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.005	19,278	912	16,386	775	14,458	599	13,494	478
		14	0.004	18,144	746	15,422	634	13,608	478	12,701	372
		16	0.004	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.003	13,608	558	11,567	441	10,206	359	9,526	280
	0.05	3	0.027	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		4	0.027	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		6	0.017	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		8	0.016	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.011	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.01	19,278	912	16,386	775	14,458	599	13,494	478
		14	0.008	18,144	746	15,422	634	13,608	478	12,701	372
		16	0.006	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.004	13,608	558	11,567	441	10,206	359	9,526	280
	0.1	3	0.03	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		4	0.03	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		6	0.03	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		8	0.022	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.015	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.012	19,278	912	16,386	775	14,458	599	13,494	478
		14	0.01	18,144	746	15,422	634	13,608	478	12,701	372
		16	0.01	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.006	13,608	558	11,567	441	10,206	359	9,526	280
	0.2	3	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		4	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		6	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		8	0.037	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.025	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.02	19,278	912	16,386	775	14,458	599	13,494	478
		14	0.016	18,144	746	15,422	634	13,608	478	12,701	372
		16	0.016	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.01	13,608	558	11,567	441	10,206	359	9,526	280
	0.3	3	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		4	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		6	0.05	28,868	1,615	24,538	1,299	21,651	1,017	20,208	831
		8	0.037	24,640	1,346	20,944	1,107	18,480	868	17,248	708
		10	0.025	20,412	1,078	17,350	917	15,309	719	14,288	586
		12	0.02	19,278	912	16,386	775	14,458	599	13,494	478
		16	0.016	18,144	746	15,422	634	13,608	478	12,701	372
		20	0.01	13,608	558	11,567	441	10,206	359	9,526	280
1.5	0.02	6	0.01	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.008	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.006	20,412	1,293	17,350	1,222	15,309	959	14,288	782



ESRR714 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	12	0.005	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.004	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.004	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.003	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.003	14,112	795	11,995	592	10,584	522	9,878	417
	0.05	4	0.027	24,930	1,582	20,956	1,325	18,711	1,052	17,364	855
		6	0.017	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.016	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.011	20,412	1,293	17,350	1,222	15,309	959	14,288	782
		12	0.01	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.008	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.006	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.004	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.004	14,112	795	11,995	592	10,584	522	9,878	417
		26	0.003	14,112	795	11,995	592	10,584	522	9,878	417
	0.1	4	0.042	24,930	1,582	20,956	1,325	18,711	1,052	17,364	855
		6	0.04	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.036	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.036	20,412	1,293	17,350	1,222	15,309	959	14,288	782
		12	0.036	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.023	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.023	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.018	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.015	14,112	795	11,995	592	10,584	522	9,878	417
		26	0.01	14,112	795	11,995	592	10,584	522	9,878	417
	0.2	4	0.07	24,930	1,582	20,956	1,325	18,711	1,052	17,364	855
		6	0.065	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.06	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.06	20,412	1,293	17,350	1,222	15,309	959	14,288	782
		12	0.06	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.038	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.038	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.03	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.025	14,112	795	11,995	592	10,584	522	9,878	417
		25	0.02	14,112	795	11,995	592	10,584	522	9,878	417
	0.3	4	0.07	24,930	1,582	20,956	1,325	18,711	1,052	17,364	855
		6	0.065	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.06	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.06	20,412	1,293	17,350	1,222	15,309	959	14,288	782
		12	0.06	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.038	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.038	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.03	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.025	14,112	795	11,995	592	10,584	522	9,878	417

Technical Data

ESRR714 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	0.3	25	0.02	14,112	795	11,995	592	10,584	522	9,878	417
	0.5	4	0.085	24,930	1,582	20,956	1,325	18,711	1,052	17,364	855
		6	0.08	23,779	1,503	20,382	1,325	17,834	1,052	16,560	855
		8	0.07	22,680	1,437	19,278	1,289	17,010	1,002	15,876	814
		10	0.067	20,412	1,293	17,350	1,222	15,309	959	14,288	782
		12	0.065	18,144	1,150	15,422	1,099	13,608	862	12,701	704
		14	0.045	14,112	795	11,995	977	10,584	767	9,878	625
		16	0.045	14,112	795	11,995	592	10,584	522	9,878	417
		20	0.035	14,112	795	11,995	592	10,584	522	9,878	417
		22	0.03	14,112	795	11,995	592	10,584	522	9,878	417
		25	0.025	14,112	795	11,995	592	10,584	522	9,878	417
2	0.02	6	0.013	20,790	2,289	17,672	1,944	15,593	1,373	14,553	1,121
		8	0.01	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.008	17,104	1,797	14,539	1,528	12,828	1,129	11,973	922
		12	0.006	15,309	1,516	13,013	1,289	11,482	1,010	10,716	826
		14	0.005	14,458	1,432	12,290	1,216	10,844	954	10,121	779
		16	0.004	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		20	0.004	11,907	1,180	10,121	1,002	8,930	786	8,335	642
		25	0.003	11,907	1,059	10,121	900	8,930	707	8,335	575
		30	0.003	11,312	1,006	9,615	855	8,484	672	7,918	547
	0.05	6	0.027	20,790	2,289	17,672	1,944	15,593	1,373	14,553	1,121
		8	0.017	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.016	17,104	1,797	14,539	1,528	12,828	1,129	11,973	922
		12	0.011	15,309	1,516	13,013	1,289	11,482	1,010	10,716	826
		14	0.01	14,458	1,432	12,290	1,216	10,844	954	10,121	779
		16	0.008	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		20	0.006	11,907	1,180	10,121	1,002	8,930	786	8,335	642
		25	0.004	11,907	1,059	10,121	900	8,930	707	8,335	575
		30	0.003	11,312	1,006	9,615	855	8,484	672	7,918	547
	0.1	6	0.07	20,790	2,289	17,672	1,944	15,593	1,373	14,553	1,121
		8	0.055	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.042	17,104	1,797	14,539	1,528	12,828	1,129	11,973	922
		12	0.03	15,309	1,516	13,013	1,289	11,482	1,010	10,716	826
		14	0.03	14,458	1,432	12,290	1,216	10,844	954	10,121	779
		16	0.03	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		20	0.025	11,907	1,180	10,121	1,002	8,930	786	8,335	642
		22	0.02	11,907	1,059	10,121	900	8,930	707	8,335	575
		25	0.015	11,907	1,059	10,121	900	8,930	707	8,335	575
		30	0.01	11,312	1,006	9,615	855	8,484	672	7,918	547
	0.2	6	0.08	20,790	2,289	17,672	1,944	15,593	1,373	14,553	1,121
		8	0.07	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.055	17,104	1,797	14,539	1,528	12,828	1,129	11,973	922
		12	0.04	15,309	1,516	13,013	1,289	11,482	1,010	10,716	826
		14	0.04	14,458	1,432	12,290	1,216	10,844	954	10,121	779



■ ESRR714 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	16	0.04	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		20	0.035	11,907	1,180	10,121	1,002	8,930	786	8,335	642
		22	0.03	11,907	1,059	10,121	900	8,930	707	8,335	575
		25	0.025	11,907	1,059	10,121	900	8,930	707	8,335	575
		30	0.017	11,312	1,006	9,615	855	8,484	672	7,918	547
	0.3	6	0.11	20,790	2,289	17,672	1,944	15,593	1,373	14,553	1,121
		8	0.09	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.075	17,104	1,797	14,539	1,528	12,828	1,129	11,973	922
		12	0.06	15,309	1,516	13,013	1,289	11,482	1,010	10,716	826
		14	0.06	14,458	1,432	12,290	1,216	10,844	954	10,121	779
		16	0.06	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		20	0.037	11,907	1,180	10,121	1,002	8,930	786	8,335	642
		22	0.033	11,907	1,059	10,121	900	8,930	707	8,335	575
		25	0.03	11,907	1,059	10,121	900	8,930	707	8,335	575
		30	0.021	11,312	1,006	9,615	855	8,484	672	7,918	547
	0.5	6	0.17	20,790	2,289	17,672	1,944	15,593	1,373	14,553	1,121
		8	0.14	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.11	17,104	1,797	14,539	1,528	12,828	1,129	11,973	922
		12	0.08	15,309	1,516	13,013	1,289	11,482	1,010	10,716	826
		14	0.08	14,458	1,432	12,290	1,216	10,844	954	10,121	779
		16	0.08	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		20	0.05	11,907	1,180	10,121	1,002	8,930	786	8,335	642
		22	0.05	11,907	1,059	10,121	900	8,930	707	8,335	575
		25	0.05	11,907	1,059	10,121	900	8,930	707	8,335	575
		30	0.03	11,312	1,006	9,615	855	8,484	672	7,918	547
2.5	0.1	8	0.06	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.055	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		12	0.051	18,018	1,958	15,315	1,664	13,513	1,190	12,613	1,019
		14	0.046	17,136	1,835	14,566	1,560	12,852	1,132	11,995	971
		16	0.042	16,254	1,713	13,816	1,456	12,190	1,073	11,378	876
		20	0.03	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		25	0.022	12,757	1,204	10,844	1,022	9,568	802	8,930	653
		30	0.015	11,907	1,059	10,121	900	8,930	707	8,335	575
	0.2	8	0.08	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.07	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		12	0.06	18,018	1,958	15,315	1,664	13,513	1,190	12,613	1,019
		14	0.05	17,136	1,835	14,566	1,560	12,852	1,132	11,995	971
		16	0.055	16,254	1,713	13,816	1,456	12,190	1,073	11,378	876
		20	0.04	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		25	0.03	12,757	1,204	10,844	1,022	9,568	802	8,930	653
		30	0.02	11,907	1,059	10,121	900	8,930	707	8,335	575
	0.3	8	0.1	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.09	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		12	0.085	18,018	1,958	15,315	1,664	13,513	1,190	12,613	1,019

Technical Data

ESRR714 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	0.3	14	0.08	17,136	1,835	14,566	1,560	12,852	1,132	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	1,204	10,844	1,022	9,568	802	8,930	653
		30	0.06	11,907	1,059	10,121	900	8,930	707	8,335	575
	0.5	8	0.15	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		10	0.14	18,900	2,080	16,065	1,768	14,175	1,248	13,230	1,019
		12	0.13	18,018	1,958	15,315	1,664	13,513	1,190	12,613	1,019
		14	0.12	17,136	1,835	14,566	1,560	12,852	1,132	11,995	971
		16	0.11	16,254	1,713	13,816	1,456	12,190	1,073	11,378	876
		20	0.08	13,608	1,348	11,567	1,145	10,206	898	9,526	733
		25	0.07	12,757	1,204	10,844	1,022	9,568	802	8,930	653
		30	0.05	11,907	1,059	10,121	900	8,930	707	8,335	575
3	0.1	8	0.07	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		10	0.06	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		12	0.05	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		14	0.047	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		16	0.035	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		20	0.035	11,664	1,604	9,914	1,363	8,748	961	8,165	785
		25	0.031	10,368	1,362	8,812.5	1,158	7,776	816	7,257.5	667
		30	0.027	9,072	1,121	7,711	953	6,804	672	6,350	550
		35	0.02	9,072	1,121	7,711	953	6,804	672	6,350	550
		40	0.015	8,164	897	6,939	762	6,123	537	5,715	440
		45	0.01	7,258	672	6,169	572	5,443	403	5,080	330
	0.2	8	0.09	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		10	0.08	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		12	0.07	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		14	0.06	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		16	0.05	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		20	0.05	11,664	1,604	9,914	1,363	8,748	961	8,165	785
		25	0.045	10,368	1,362	8,812.5	1,158	7,776	816	7,257.5	667
		30	0.04	9,072	1,121	7,711	953	6,804	672	6,350	550
		35	0.035	9,072	1,121	7,711	953	6,804	672	6,350	550
		40	0.03	8,164	897	6,939	762	6,123	537	5,715	440
		45	0.025	7,258	672	6,169	572	5,443	403	5,080	330
	0.3	8	0.13	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		10	0.115	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		12	0.1	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		14	0.085	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		16	0.075	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		20	0.075	11,664	1,604	9,914	1,363	8,748	961	8,165	785
		25	0.0675	10,368	1,362	8,812.5	1,158	7,776	816	7,257.5	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



ESRR714 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	0.3	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	1,188	10,080	970
		10	0.155	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		12	0.13	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		14	0.12	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		16	0.1	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		20	0.1	11,664	1,604	9,914	1,363	8,748	961	8,165	785
		25	0.09	10,368	1,362	8812.5	1,158	7,776	816	7257.5	667
		30	0.08	9,072	1,121	7,711	953	6,804	672	6,350	550
		35	0.065	9,072	1,121	7,711	953	6,804	672	6,350	550
		40	0.05	8,164	897	6,939	762	6,123	537	5,715	440
		45	0.04	7,258	672	6,169	572	5,443	403	5,080	330
		50	0.03	6,532	538	5,552	457	4,899	322	4,572	264
	1	8	0.2	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		10	0.175	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		12	0.15	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		14	0.13	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		16	0.12	14,400	1,981	12,240	1,684	10,800	1,188	10,080	970
		20	0.11	11,664	1,604	9,914	1,363	8,748	961	8,165	785
		25	0.1	10,368	1,362	8812.5	1,158	7,776	816	7257.5	667
		30	0.09	9,072	1,121	7,711	953	6,804	672	6,350	550
		35	0.075	9,072	1,121	7,711	953	6,804	672	6,350	550
		40	0.06	8,164	897	6,939	762	6,123	537	5,715	440
		45	0.045	7,258	672	6,169	572	5,443	403	5,080	330
		50	0.03	6,532	538	5,552	457	4,899	322	4,572	264
4	0.1	10	0.072	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		12	0.065	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		13	0.062	10,734	2,613	9,114	2,219	8,004	1,558	7,266	1,239
		16	0.06	10,255	2,496	8,697	2,116	7,599	1,479	6,684	1,139
		20	0.055	10,255	2,496	8,697	2,116	7,599	1,479	6,884	1,139
		25	0.05	10,255	2,496	7,782	1,810	6,545	1,221	5,904	962
		30	0.045	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		35	0.04	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		40	0.035	9,247	2,000	6,225	1,262	5,217	842	4,621	643
		45	0.03	8,240	1,505	5,584	1,019	4,944	722	4,119	501
		50	0.02	7,398	1,200	4,980	757	4,174	505	3,697	385
	0.2	10	0.15	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		12	0.14	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		13	0.135	10,734	2,613	9,114	2,219	8,004	1,558	7,266	1,239
		16	0.13	10,255	2,496	8,697	2,116	7,599	1,479	6,684	1,139
		20	0.11	10,255	2,496	8,697	2,116	7,599	1,479	6,884	1,139
		25	0.105	10,255	2,496	7,782	1,810	6,545	1,221	5,904	962
		30	0.1	10,255	2,496	6,867	1,505	5,491	963	5,124	785

Technical Data

ESRR714 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	0.2	35	0.08	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		40	0.07	9,247	2,000	6,225	1,262	5,217	842	4,621	643
		45	0.06	8,240	1,505	5,584	1,019	4,944	722	4,119	501
		50	0.05	7,398	1,200	4,980	757	4,174	505	3,697	385
	0.3	10	0.23	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		12	0.22	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		13	0.21	10,734	2,613	9,114	2,219	8,004	1,558	7,266	1,239
		16	0.2	10,255	2,496	8,697	2,116	7,599	1,479	6,684	1,139
		20	0.18	10,255	2,496	8,697	2,116	7,599	1,479	6,884	1,139
		25	0.17	10,255	2,496	7,782	1,810	6,545	1,221	5,904	962
		30	0.16	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		35	0.14	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		40	0.13	9,247	2,000	6,225	1,262	5,217	842	4,621	643
		45	0.12	8,240	1,505	5,584	1,019	4,944	722	4,119	501
		50	0.11	7,398	1,200	4,980	757	4,174	505	3,697	385
	0.5	10	0.4	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		12	0.35	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		13	0.3	10,734	2,613	9,114	2,219	8,004	1,558	7,266	1,239
		16	0.25	10,255	2,496	8,697	2,116	7,599	1,479	6,684	1,139
		20	0.2	10,255	2,496	8,697	2,116	7,599	1,479	6,884	1,139
		25	0.175	10,255	2,496	7,782	1,810	6,545	1,221	5,904	962
		30	0.15	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		35	0.1	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		40	0.075	9,247	2,000	6,225	1,262	5,217	842	4,621	643
		45	0.05	8,240	1,505	5,584	1,019	4,944	722	4,119	501
		50	0.04	7,398	1,200	4,980	757	4,174	505	3,697	385
		55	0.03	6,592	9,903	4,467	611	3,955	433	3,295	300
	1	10	0.5	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		12	0.4	11,213	2,730	9,531	2,321	8,410	1,638	7,849	1,338
		13	0.35	10,734	2,613	9,114	2,219	8,004	1,558	7,266	1,239
		16	0.29	10,255	2,496	8,697	2,116	7,599	1,479	6,684	1,139
		20	0.23	10,255	2,496	8,697	2,116	7,599	1,479	6,884	1,139
		25	0.2	10,255	2,496	7,782	1,810	6,545	1,221	5,904	962
		30	0.17	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		35	0.12	10,255	2,496	6,867	1,505	5,491	963	5,124	785
		40	0.09	9,247	2,000	6,225	1,262	5,217	842	4,621	643
		45	0.06	8,240	1,505	5,584	1,019	4,944	722	4,119	501
		50	0.05	7,398	1,200	4,980	757	4,174	505	3,697	385
		55	0.04	6,592	9,903	4,467	611	3,955	433	3,295	300
5	0.1	16	0.08	9,154	2,786	7,781	2,368	6,866	1,671	6,408	1,365
		30	0.07	7,872	2,291	6,691	1,948	5,904	1,374	5,510	1,122
		40	0.06	6,590	1,797	5,602	1,527	4,943	1,078	4,613	880
	0.2	16	0.16	9,154	2,786	7,781	2,368	6,866	1,671	6,408	1,365
		30	0.145	7,872	2,291	6,691	1,948	5,904	1,374	5,510	1,122



■ ESRR714 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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)
5	0.2	40	0.13	6,590	1,797	5,602	1,527	4,943	1,078	4,613	880
	0.3	16	0.24	9,154	2,786	7,781	2,368	6,866	1,671	6,408	1,365
		30	0.22	7,872	2,291	6,691	1,948	5,904	1,374	5,510	1,122
		40	0.2	6,590	1,797	5,602	1,527	4,943	1,078	4,613	880
	0.5	16	0.35	9,154	2,786	7,781	2,368	6,866	1,671	6,408	1,365
		30	0.296	7,872	2,291	6,691	1,948	5,904	1,374	5,510	1,122
		40	0.135	6,590	1,797	5,602	1,527	4,943	1,078	4,613	880
		50	0.12	5,272	1,078	4,482	916	3,954	646	3,690	528
		60	0.1	4,218	647	3,585	549	3,164	388	2,952	317
	1	16	0.4	9,154	2,786	7,781	2,368	6,866	1,671	6,408	1,365
		30	0.275	7,872	2,291	6,691	1,948	5,904	1,374	5,510	1,122
		40	0.15	6,590	1,797	5,602	1,527	4,943	1,078	4,613	880
		50	0.13	5,272	1,078	4,482	916	3,954	646	3,690	528
		60	0.11	4,218	647	3,585	549	3,164	388	2,952	317
	1.5	15	0.45	9,154	2,786	7,781	2,368	6,866	1,671	6,408	1,365
	2	15	0.5	9,154	2,786	7,781	2,368	6,866	1,671	6,408	1,365
6	0.1	20	0.065	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		40	0.05	6,486	2,132	5,513	1,811	4,865	1,279	4,540	1,044
		50	0.04	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	0.2	20	0.14	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		40	0.11	6,486	2,132	5,513	1,811	4,865	1,279	4,540	1,044
		50	0.08	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	0.3	20	0.22	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		30	0.2	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		40	0.18	6,486	2,132	5,513	1,811	4,865	1,279	4,540	1,044
		50	0.14	5,491	1,470	4,668	1,248	4,118	872	3,844	711
		60	0.1	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	0.5	20	0.35	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		30	0.29	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		40	0.24	6,486	2,132	5,513	1,811	4,865	1,279	4,540	1,044
		50	0.165	5,491	1,470	4,668	1,248	4,118	872	3,844	711
		60	0.1	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	1	20	0.4	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		30	0.35	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		40	0.28	6,486	2,132	5,513	1,811	4,865	1,279	4,540	1,044
		50	0.2	5,491	1,470	4,668	1,248	4,118	872	3,844	711
		60	0.15	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	1.5	20	0.45	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		40	0.4	6,486	2,132	5,513	1,811	4,865	1,279	4,540	1,044
		50	0.3	5,491	1,470	4,668	1,248	4,118	872	3,844	711
	2	20	0.5	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		30	0.4	7,630	2,787	6,486	2,368	5,722	1,671	5,432	1,365
		40	0.3	6,486	2,132	5,513	1,811	4,865	1,279	4,540	1,044
		50	0.2	5,491	1,470	4,668	1,248	4,118	872	3,844	711
		60	0.1	5,491	1,470	4,668	1,248	4,118	872	3,844	711
8	0.1	25	0.35	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817

Technical Data

ESRR714 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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)
8	0.2	22	0.5	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		40	0.25	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
	0.3	22	0.6	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		40	0.3	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
	0.5	22	0.7	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		35	0.5	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		40	0.35	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		50	0.3	4,584	1,596	3,619	1,245	2,413	767	1,856	490
		60	0.25	4,584	1,596	3,619	1,245	2,413	767	1,856	490
	1	22	0.8	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		35	0.6	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		40	0.4	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		50	0.4	4,584	1,596	3,619	1,245	2,413	767	1,856	490
		60	0.3	4,584	1,596	3,619	1,245	2,413	767	1,856	490
	1.2	22	0.9	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		40	0.45	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
	2	22	1	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		40	0.5	5,730	2,660	4,524	2,076	3,016	1,279	2,320	817
		50	0.4	4,584	1,596	3,619	1,245	2,413	767	1,856	490
10	0.1	30	0.4	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
		24	0.5	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
	0.2	40	0.25	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
		24	0.6	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
	0.3	40	0.3	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
		24	0.7	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
		40	0.4	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
		50	0.3	3,619	1,451	2,854	1,172	1,902	713	1,485	456
		60	0.2	3,619	1,451	2,854	1,172	1,902	713	1,485	456
	0.5	24	0.8	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
		40	0.5	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
		50	0.4	3,619	1,451	2,854	1,172	1,902	713	1,485	456
		60	0.3	3,619	1,451	2,854	1,172	1,902	713	1,485	456
	1	24	0.9	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
		40	0.55	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
	1.5	24	1	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
		40	0.5	3,619	1,451	2,854	1,172	1,902	713	1,485	456
		50	0.4	2,895	870	2,283	703	1,522	427	1,188	274
	2.5	24	1.1	4,524	2,419	3,567	1,954	2,378	1,188	1,856	761
12	0.2	32	0.5	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		26	0.6	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
	0.3	45	0.3	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		26	0.7	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
	0.5	40	0.4	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		60	0.3	3,086	1,451	2,436	1,172	1,624	713	1,230	456



■ ESRR714 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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)
12	1	26	0.8	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		40	0.5	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		60	0.3	3,086	1,451	2,436	1,172	1,624	713	1,230	456
	1.5	26	0.9	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		40	0.5	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		60	0.3	3,086	1,451	2,436	1,172	1,624	713	1,230	456
16	0.5	26	1	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		40	0.5	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		60	0.3	3,086	1,451	2,436	1,172	1,624	713	1,230	456
	1	26	1	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		40	0.5	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		60	0.3	3,086	1,451	2,436	1,172	1,624	713	1,230	456
20	0.5	26	1	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		40	0.5	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		60	0.3	3,086	1,451	2,436	1,172	1,624	713	1,230	456
	1	26	1	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		40	0.5	3,857	2,419	3,045	1,954	2,030	1,188	1,537	761
		60	0.3	3,086	1,451	2,436	1,172	1,624	713	1,230	456

- 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.

Technical Data

ESLNR20 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%			
Mill Dia (mm)	Diameter (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		
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		



ESLNR20 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	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
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

Technical Data

ESLNR20 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	0.2	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



- 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.



ESTNR20 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	2	0.007	39,660	887	33,660	754	29,700	591	27,720	483
0.4	0.05	4	0.009	30,096	899	25,582	764	22,572	599	21,067	489
		5	0.007	26,752	710	22,739	528	20,064	466	18,726	373
	0.1	4	0.009	31,680	946	26,928	804	23,760	631	22,176	515
		5	0.007	28,160	747	23,936	556	21,120	490	19,712	392
0.5	0.1	5	0.013	30,413	1,090	25,851	753	22,810	562	21,289	453
		8	0.008	24,330	678	20,681	468	18,248	350	17,031	282
		10	0.007	18,248	509	15,511	351	13,686	262	12,773	211
0.6	0.1	12	0.01	20,377	791	17,320	546	15,282	408	14,264	329
		15	0.006	16,727	649	14,218	448	12,545	335	11,709	270
0.8	0.2	6	0.045	31,680	1,084	26,928	921	23,760	723	22,176	590
		12	0.02	28,160	943	23,936	695	21,120	613	19,712	490
1	0.2	8	0.04	28,512	1,463	24,235	1,244	21,384	976	19,958	797
		10	0.035	28,512	1,596	24,235	1,357	21,384	1,064	19,958	869
		15	0.028	25,344	1,261	21,542	938	19,008	828	17,741	662
		20	0.02	19,008	828	16,157	653	14,256	532	13,306	414
		25	0.017	15,840	690	13,464	544	11,880	443	11,088	345
		30	0.017	15,840	690	13,464	544	11,880	443	11,088	345
		35	0.01	15,840	690	13,464	544	11,880	443	11,088	345
	0.3	8	0.04	28,512	1,463	24,235	1,244	21,384	976	19,958	797
		15	0.028	25,344	1,261	21,542	938	19,008	828	17,741	662
		25	0.017	15,840	690	13,464	544	11,880	443	11,088	345
		30	0.017	15,840	690	13,464	544	11,880	443	11,088	345
	0.2	10	0.05	21,683	1,079	18,431	803	16,262	708	15,178	567
		15	0.045	19,712	981	16,755	730	14,784	644	13,798	515
		20	0.042	17,347	863	14,745	642	13,010	567	12,143	453
		25	0.032	14,784	644	12,566	508	11,088	414	10,349	322
		30	0.028	12,320	536	10,472	423	9,240	345	8,624	268
	0.3	10	0.05	21,683	1,079	18,431	803	16,262	708	15,178	567
		20	0.042	17,347	863	14,745	642	13,010	567	12,143	453
		25	0.032	14,784	644	12,566	508	11,088	414	10,349	322
		30	0.028	12,320	536	10,472	423	9,240	345	8,624	268
2	0.2	30	0.045	13,440	1,254	11,424	933	10,080	823	9,408	658
		40	0.035	10,080	823	8,568	650	7,560	529	7,056	412
		50	0.017	8,400	686	7,140	541	6,300	441	5,880	343
	0.3	12	0.088	22,680	1,814	19,278	1,427	17,010	1,191	15,876	1,048
		20	0.054	18,144	1,452	15,422	1,141	13,608	953	12,701	838
		30	0.045	13,440	1,393	11,424	1,036	10,080	914	9,408	732
		40	0.035	10,080	914	8,568	722	7,560	588	7,056	457
		50	0.017	8,400	762	7,140	601	6,300	490	5,880	381
	0.5	8	0.17	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

Technical Data

ESTNR20 SERIES

Workpiece				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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	0.5	25	0.054	15,876	1,270	13,495	999	11,907	833	11,113	733
		30	0.045	13,440	1,393	11,424	1,036	10,080	914	9,408	732
		40	0.035	10,080	914	8,568	722	7,560	588	7,056	457
		50	0.017	8,400	762	7,140	601	6,300	490	5,880	381
3	0.2	40	0.07	10,240	956	8,704	711	7,680	627	7,168	502
		50	0.05	7,680	627	6,528	495	5,760	403	5,376	314
		60	0.03	6,400	523	5,440	412	4,800	336	4,480	261
	0.3	40	0.07	10,240	1,062	8,704	790	7,680	697	7,168	557
		50	0.05	7,680	697	6,528	550	5,760	448	5,376	348
		60	0.03	6,400	581	5,440	458	4,800	373	4,480	290
	0.5	40	0.07	10,240	1,062	8,704	790	7,680	697	7,168	557
		50	0.05	7,680	697	6,528	550	5,760	448	5,376	348
		60	0.03	6,400	581	5,440	458	4,800	373	4,480	290

RPM = rev / min
FEED = mm / min



- 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.



ESPM4 SERIES ► Side Cutting

Workpiece	Hardened Steels									
Hardness	~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc 60 ~ HRc65	
D X R (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

ap : 0.2R

ae : 0.5D

*ae shouldn't be over max. 0.5D

ap : 0.1R

ae : 0.5D

*ae shouldn't be over max. 0.3D

ESPM4 SERIES ► High Speed Cutting

Workpiece	Hardened Steels									
Hardness	~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc 60 ~ HRc65	
D X R (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

ap : 0.1R

ae : 0.5D

*ae shouldn't be over max. 0.5D

ap : 0.05R

ae : 0.3D

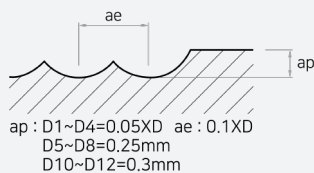
*ae shouldn't be over max. 0.3D

Technical Data

■ ESB702, ESB712 SERIES

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc50 ~ HRc55		HRc55 ~ HRc60		HRc60 ~ HRc65		HRc 65 ~ 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	2,800	19,000	2,300
4	24,900	6,000	23,900	5,300	20,000	4,000	17,500	3,150	16,000	2,800	14,500	2,300
5	18.6	5,800	17,800	4,900	15,000	3,750	13,500	3,050	11,500	2,550	10,500	2,100
6	13,900	4,850	13,400	4,100	11,000	3,100	10,000	2,500	8,800	2,150	8,000	1,750
8	11,100	4,200	10,700	3,500	9,000	2,700	8,000	2,150	7,000	1,850	6,500	1,550
10	9,300	3,700	8,900	3,100	7,500	2,400	6,600	1,900	5,800	1,650	5,300	1,380
12	6,950	2,950	6,680	2,500	5,600	1,900	5,000	1,550	4,400	1,250	4,000	1,050

RPM = rev / min
FEED = mm / min

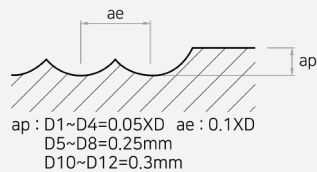




■ ESB703 SERIES

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRC30 ~ HRC40		HRC40 ~ HRC50		HRC50 ~ HRC55		HRC55 ~ HRC60		HRC60 ~ HRC65		HRC 65 ~ 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

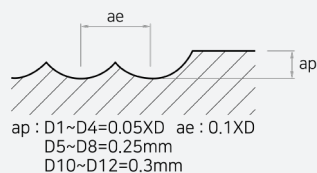
RPM = rev / min
FEED = mm / min



■ ESB734 SERIES

Workpiece	Hardened Steels Heat Resistant Steels		Hardened Steels									
Hardness	HRC30 ~ HRC40		HRC40 ~ HRC50		HRC50 ~ HRC55		HRC55 ~ HRC60		HRC60 ~ HRC65		HRC 65 ~ 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



Technical Data

ESRB712 SERIES

Workpiece		Alloy Steels, Carbon Steels (SCM, SNCM, S45C)			Prehardened Steels (NAK, CENA, KP4)			Hardened Steels (SKD, SKT, STAVAX)		
		~ HRC35			HRC35 ~ HRC45			HRC45 ~ HRC55		
Hardness		~ 1100N/mm2			1100 ~ 1500N/mm2			1500 ~ 2000N/mm2		
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
	0.5	50,000	240	0.006	50,000	215	0.005	50,000	190	0.004
	1	45,000	195	0.002	45,000	175	0.002	45,000	155	0.001
0.2	0.5	50,000	335	0.018	50,000	310	0.014	43,200	260	0.01
	1	50,000	335	0.013	50,000	310	0.01	43,200	260	0.007
	1.5	45,000	270	0.007	45,000	250	0.006	38,880	210	0.004
	2	45,000	270	0.005	45,000	250	0.004	38,880	210	0.003
	3	45,000	270	0.003	45,000	250	0.003	38,880	210	0.002
0.3	1	50,000	475	0.019	50,000	430	0.015	42,800	365	0.011
	1.5	50,000	475	0.019	50,000	430	0.015	42,800	365	0.011
	2	45,000	385	0.011	45,000	350	0.008	38,520	295	0.006
	2.5	45,000	385	0.007	45,000	350	0.005	38,520	295	0.004
	3	45,000	385	0.007	45,000	350	0.005	38,520	295	0.004
	4	40,000	305	0.004	40,000	275	0.003	34,240	235	0.002
	5	30,000	200	0.003	30,000	180	0.002	25,680	155	0.002
0.4	1	41,000	490	0.036	38,800	425	0.028	34,200	340	0.02
	1.5	41,000	490	0.025	38,800	425	0.02	34,200	340	0.014
	2	41,000	490	0.025	38,800	425	0.02	34,200	340	0.014
	2.5	36,900	395	0.014	34,920	345	0.011	30,780	275	0.008
	3	36,900	395	0.014	34,920	345	0.011	30,780	275	0.008
	4	36,900	395	0.009	34,920	345	0.007	30,780	275	0.005
	5	32,800	315	0.009	31,040	270	0.007	27,360	220	0.005
	6	32,800	315	0.005	31,040	270	0.004	27,360	220	0.003
	8	24,600	205	0.004	23,280	180	0.003	20,520	145	0.002
0.5	10	12,300	90	0.004	11,640	75	0.003	10,260	60	0.002
	1	34,200	685	0.045	32,300	580	0.035	28,500	515	0.025
	1.5	34,200	685	0.045	32,300	580	0.035	28,500	515	0.025
	2	34,200	685	0.032	32,300	580	0.025	28,500	515	0.018
	2.5	34,200	685	0.032	32,300	580	0.025	28,500	515	0.018
	3	30,780	555	0.018	29,070	470	0.014	25,650	415	0.01
	4	30,780	555	0.018	29,070	470	0.014	25,650	415	0.01
	5	30,780	555	0.011	29,070	470	0.009	25,650	415	0.006
	6	27,360	440	0.011	25,840	370	0.009	22,800	330	0.006
	8	20,520	290	0.007	19,380	245	0.005	17,100	215	0.004
	10	20,520	290	0.005	19,380	245	0.004	17,100	215	0.003
	12	10,260	125	0.005	9,690	105	0.004	8,550	95	0.003
0.6	14	10,260	125	0.005	9,690	105	0.004	8,550	95	0.003
	16	3,420	35	0.005	3,230	30	0.004	2,850	25	0.003
	1	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
	2	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
	3	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
	4	30,780	830	0.022	29,070	680	0.017	25,650	555	0.012
	5	30,780	830	0.014	29,070	680	0.011	25,650	555	0.008



■ ESRB712 SERIES

Workpiece		Alloy Steels, Carbon Steels (SCM, SNCM, S45C)			Prehardened Steels (NAK, CENA, KP4)			Hardened Steels (SKD, SKT, STAVAX)		
		~ 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	6	30,780	830	0.014	29,070	680	0.011	25,650	555	0.008
	8	27,360	655	0.008	25,840	540	0.006	22,800	440	0.005
	10	20,520	430	0.005	19,380	355	0.004	17,100	290	0.003
	12	20,520	430	0.005	19,380	355	0.004	17,100	290	0.003
	14	10,260	185	0.005	9,690	150	0.004	8,550	125	0.003
	16	10,260	185	0.005	9,690	150	0.004	8,550	125	0.003
0.7	2	34,200	1,130	0.063	32,300	930	0.049	28,500	765	0.035
	4	30,780	915	0.025	29,070	755	0.02	25,650	620	0.014
	6	30,780	915	0.016	29,070	755	0.012	25,650	620	0.009
	8	27,360	725	0.016	25,840	595	0.012	22,800	490	0.009
	10	27,360	725	0.009	25,840	595	0.007	22,800	490	0.005
	12	20,520	475	0.006	19,380	390	0.005	17,100	320	0.004
0.8	2	34,200	1,230	0.072	32,300	1,035	0.056	28,500	855	0.04
	3	34,200	1,230	0.05	32,300	1,035	0.039	28,500	855	0.028
	4	34,200	1,230	0.05	32,300	1,035	0.039	28,500	855	0.028
	5	30,780	995	0.029	29,070	840	0.022	25,650	695	0.016
	6	30,780	995	0.029	29,070	840	0.022	25,650	695	0.016
	8	30,780	995	0.018	29,070	840	0.014	25,650	695	0.01
	10	27,360	785	0.018	25,840	660	0.014	22,800	545	0.01
	12	27,360	785	0.011	25,840	660	0.008	22,800	545	0.006
	14	20,520	515	0.007	19,380	435	0.006	17,100	360	0.004
	16	20,520	515	0.007	19,380	435	0.006	17,100	360	0.004
	20	10,260	220	0.007	9,690	185	0.006	8,550	155	0.004
0.9	4	29,250	1,120	0.032	27,630	935	0.025	24,390	775	0.018
	6	29,250	1,120	0.032	27,630	935	0.025	24,390	775	0.018
	8	29,250	1,120	0.02	27,630	935	0.016	24,390	775	0.011
	10	26,000	885	0.02	24,560	740	0.016	21,680	610	0.011
1	2	30,800	1,540	0.09	29,100	1,310	0.07	25,700	1,075	0.05
	3	30,800	1,540	0.09	29,100	1,310	0.07	25,700	1,075	0.05
	4	30,800	1,540	0.063	29,100	1,310	0.049	25,700	1,075	0.035
	5	30,800	1,540	0.063	29,100	1,310	0.049	25,700	1,075	0.035
	6	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.02
	7	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.02
	8	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.02
	10	27,720	1,245	0.023	26,190	1,060	0.018	23,130	870	0.013
	12	24,640	985	0.023	23,280	840	0.018	20,560	690	0.013
	14	24,640	985	0.014	23,280	840	0.011	20,560	690	0.008
	16	18,480	645	0.014	17,460	550	0.011	15,420	450	0.008
	18	18,480	645	0.009	17,460	550	0.007	15,420	450	0.005
	20	18,480	645	0.009	17,460	550	0.007	15,420	450	0.005
	22	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
	26	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
	30	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005

Technical Data

ESRB712 SERIES

Workpiece		Alloy Steels, Carbon Steels (SCM, SNCM, S45C)			Prehardened Steels (NAK, CENA, KP4)			Hardened Steels (SKD, SKT, STAVAX)		
		~ 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	40	3,080	75	0.009	2,910	65	0.007	2,570	55	0.005
	50	3,080	75	0.006	2,910	65	0.005	2,570	55	0.003
1.2	4	26,300	1,375	0.076	24,800	1,150	0.059	21,900	950	0.042
	6	26,300	1,375	0.076	24,800	1,150	0.059	21,900	950	0.042
	8	23,670	1,115	0.043	22,320	930	0.034	19,710	770	0.024
	10	23,670	1,115	0.027	22,320	930	0.021	19,710	770	0.015
	12	23,670	1,115	0.027	22,320	930	0.021	19,710	770	0.015
	16	21,040	880	0.016	19,840	735	0.013	17,520	610	0.009
	20	15,780	580	0.011	14,880	485	0.008	13,140	400	0.006
	26	7,890	245	0.011	7,440	205	0.008	6,570	170	0.006
1.4	6	21,500	1,295	0.088	20,300	1,100	0.069	18,000	935	0.049
	8	19,350	1,050	0.05	18,270	890	0.039	16,200	755	0.028
	10	19,350	1,050	0.05	18,270	890	0.039	16,200	755	0.028
	16	17,200	830	0.032	16,240	705	0.025	14,400	600	0.018
1.5	4	23,900	1,580	0.135	22,600	1,355	0.105	20,000	1,075	0.075
	5	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
	6	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
	7	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
	8	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.03
	10	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.03
	12	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.03
	14	21,510	1,280	0.034	20,340	1,100	0.026	18,000	870	0.019
	16	19,120	1,010	0.034	18,080	865	0.026	16,000	690	0.019
	18	19,120	1,010	0.034	18,080	865	0.026	16,000	690	0.019
	20	19,120	1,010	0.02	18,080	865	0.016	16,000	690	0.011
	22	19,120	1,010	0.02	18,080	865	0.016	16,000	690	0.011
	26	14,340	665	0.014	13,560	570	0.011	12,000	450	0.008
	30	14,340	665	0.014	13,560	570	0.011	12,000	450	0.008
	35	7,170	285	0.01	6,780	245	0.008	6,000	195	0.005
	40	7,170	285	0.01	6,780	245	0.008	6,000	195	0.005
1.6	4	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
	6	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
	8	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
	10	19,980	1,260	0.058	18,900	1,055	0.045	16,650	900	0.032
	12	19,980	1,260	0.058	18,900	1,055	0.045	16,650	900	0.032
	16	19,980	1,260	0.036	18,900	1,055	0.028	16,650	900	0.02
	20	17,760	995	0.036	16,800	830	0.028	14,800	710	0.02
1.8	4	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
	6	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
	8	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
	10	19,980	1,440	0.065	18,900	1,190	0.05	16,650	990	0.036
	12	19,980	1,440	0.065	18,900	1,190	0.05	16,650	990	0.036
	16	19,980	1,440	0.041	18,900	1,190	0.032	16,650	990	0.023



■ ESRB712 SERIES

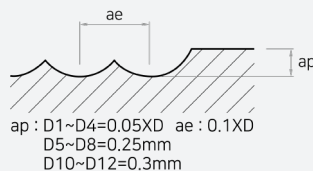
Workpiece		Alloy Steels, Carbon Steels (SCM, SNCM, S45C)			Prehardened Steels (NAK, CENA, KP4)			Hardened Steels (SKD, SKT, STAVAX)		
		~ HRc35			HRc35 ~ HRc45			HRc45 ~ HRc55		
Strength		~ 1100N/mm2			1100 ~ 1500N/mm2			1500 ~ 2000N/mm2		
Diameter (mm)	Effective Length	RPM	FEED	Ap (mm)	RPM	FEED	Ap (mm)	RPM	FEED	Ap (mm)
1.8	20	17,760	1,140	0.041	16,800	940	0.032	14,800	785	0.023
2	6	18,000	1,795	0.18	17,000	1,525	0.14	15,000	1,285	0.1
	8	18,000	1,795	0.126	17,000	1,525	0.098	15,000	1,285	0.07
	10	18,000	1,795	0.126	17,000	1,525	0.098	15,000	1,285	0.07
	12	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.04
	14	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.04
	16	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.04
	18	16,200	1,455	0.045	15,300	1,235	0.035	13,500	1,040	0.025
	20	16,200	1,455	0.045	15,300	1,235	0.035	13,500	1,040	0.025
	22	14,400	1,150	0.045	13,600	975	0.035	12,000	820	0.025
	26	14,400	1,150	0.045	13,600	975	0.035	12,000	820	0.025
	30	14,400	1,150	0.027	13,600	975	0.021	12,000	820	0.015
	35	10,800	755	0.018	10,200	640	0.014	9,000	540	0.01
	40	10,800	755	0.018	10,200	640	0.014	9,000	540	0.01
	45	5,400	325	0.018	5,100	275	0.014	4,500	230	0.01
	50	5,400	325	0.018	5,100	275	0.014	4,500	230	0.01
	60	5,400	325	0.018	5,100	275	0.014	4,500	230	0.01
2.5	8	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
	10	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
	12	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
	16	14,220	1,560	0.09	13,410	1,300	0.07	11,880	1,055	0.05
	20	14,220	1,560	0.09	13,410	1,300	0.07	11,880	1,055	0.05
	22	14,220	1,560	0.056	13,410	1,300	0.044	11,880	1,055	0.031
	26	12,640	1,230	0.056	11,920	1,025	0.044	10,560	835	0.031
	30	12,640	1,230	0.056	11,920	1,025	0.044	10,560	835	0.031
	35	12,640	1,230	0.034	11,920	1,025	0.026	10,560	835	0.019
	40	9,480	810	0.034	8,940	675	0.026	7,920	550	0.019
	45	9,480	810	0.023	8,940	675	0.018	7,920	550	0.013
	50	9,480	810	0.023	8,940	675	0.018	7,920	550	0.013
3	6	13,700	2,050	0.27	12,900	1,730	0.21	11,400	1,435	0.15
	8	13,700	2,050	0.27	12,900	1,730	0.21	11,400	1,435	0.15
	10	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
	12	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
	14	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
	16	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.06
	18	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.06
	20	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.06
	22	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.06
	26	12,330	1,660	0.068	11,610	1,400	0.053	10,260	1,160	0.038
	30	12,330	1,660	0.068	11,610	1,400	0.053	10,260	1,160	0.038
	35	10,960	1,310	0.068	10,320	1,105	0.053	9,120	920	0.038
	40	10,960	1,310	0.041	10,320	1,105	0.032	9,120	920	0.023
	45	10,960	1,310	0.041	10,320	1,105	0.032	9,120	920	0.023

Technical Data

ESRB712 SERIES

Workpiece		Alloy Steels, Carbon Steels (SCM, SNCM, S45C)			Prehardened Steels (NAK, CENA, KP4)			Hardened Steels (SKD, SKT, STAVAX)		
		~ HRC35			HRC35 ~ HRC45			HRC45 ~ HRC55		
Hardness		~ 1100N/mm2			1100 ~ 1500N/mm2			1500 ~ 2000N/mm2		
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)
3	50	8,220	860	0.027	7,740	725	0.021	6,840	605	0.015
	60	8,220	860	0.027	7,740	725	0.021	6,840	605	0.015
4	8	9,800	1,965	0.36	9,300	1,670	0.28	8,200	1,395	0.2
	10	9,800	1,965	0.36	9,300	1,670	0.28	8,200	1,395	0.2
	12	9,800	1,965	0.36	9,300	1,670	0.28	8,200	1,395	0.2
	14	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.14
	16	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.14
	18	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.14
	20	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.14
	22	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.08
	26	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.08
	30	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.08
	35	8,820	1,590	0.09	8,370	1,355	0.07	7,380	1,130	0.05
	40	8,820	1,590	0.09	8,370	1,355	0.07	7,380	1,130	0.05
	45	7,840	1,260	0.09	7,440	1,070	0.07	6,560	895	0.05
	50	7,840	1,260	0.09	7,440	1,070	0.07	6,560	895	0.05
	60	7,840	1,260	0.054	7,440	1,070	0.042	6,560	895	0.03
5	15	7,700	1,845	0.315	7,300	1,455	0.245	6,400	1,285	0.175
	20	7,700	1,845	0.315	7,300	1,455	0.245	6,400	1,285	0.175
	26	6,930	1,495	0.18	6,570	1,180	0.14	5,760	1,040	0.1
	30	6,930	1,495	0.18	6,570	1,180	0.14	5,760	1,040	0.1
	35	6,930	1,495	0.18	6,570	1,180	0.14	5,760	1,040	0.1
	40	6,930	1,495	0.18	6,570	1,180	0.14	5,760	1,040	0.1
	50	6,930	1,495	0.113	6,570	1,180	0.088	5,760	1,040	0.063
	60	6,160	1,180	0.113	5,840	930	0.088	5,120	820	0.063
6	20	6,500	1,900	0.378	6,200	1,600	0.294	5,500	1,330	0.21
	30	6,500	1,900	0.378	6,200	1,600	0.294	5,500	1,330	0.21
8	25	4,850	1,800	0.504	4,600	1,500	0.392	4,000	1,280	0.28
	30	4,850	1,800	0.504	4,600	1,500	0.392	4,000	1,280	0.28
10	30	3,850	1,650	0.9	3,680	1,400	0.7	3,200	1,200	0.5
	40	3,850	1,650	0.63	3,680	1,400	0.49	3,200	1,200	0.35
12	32	3,200	1,520	1.08	3,050	1,300	0.84	2,650	1,100	0.6
	45	3,200	1,520	0.756	3,050	1,300	0.588	2,650	1,100	0.42

RPM = rev / min
FEED = mm / min

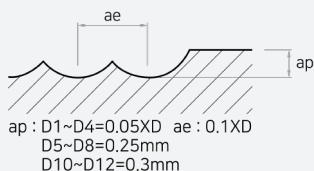




ESLNB20 SERIES

Workpiece	Alloy Steels 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	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	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	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	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



Technical Data

ESTNB20 SERIES

Workpiece					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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	0.02	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	0.05	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	0.02	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	0.01	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	0.07	16,960	2,544	11,872	1,603	11,024	1,323	11,024	1,158
		10	0.4	0.07	16,960	2,544	11,872	1,603	11,024	1,323	11,024	1,158
		12	0.4	0.07	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	0.04	11,024	1,323	7,717	810	7,166	752	7,166	645
		30	0.9	0.028	11,024	1,323	7,717	810	7,166	752	7,166	645
0.9	1.8	4	0.4	0.12	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		8	0.4	0.1	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		12	0.4	0.08	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	0.02	8,000	1,152	5,600	706	5,200	655	5,200	562



ESTNB20 SERIES

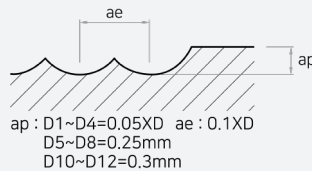
Workpiece					Carbon Steels, Alloy Steels (180~250HB)		Prehardened Steels (HRc35~45)		Hardened Steels (HRc45~55)		Hardened Steels (HRc55~65)	
Ratio to standard depth of cut					Depth of Cut X 100%		Depth of Cut X 100%		Depth of Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (mm)	Neck Length (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	40	0.4	0.015	8,000	1,152	5,600	706	5,200	655	5,200	562
1	2	8	0.4	0.15	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		12	0.4	0.09	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		16	0.4	0.09	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		20	0.4	0.06	12,160	2,189	8,512	1,532	7,904	1,265	7,904	1,107
		20	0.9	0.07	12,160	2,189	8,512	1,532	7,904	1,265	7,904	1,107
		25	0.9	0.07	9,880	1,581	6,916	968	6,442	899	6,422	771
		30	0.4	0.04	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	0.03	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	0.17	8,512	1,192	5,958	775	5,533	664	5,533	553
1.5	3	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
		8	0.4	0.32	12,720	3,816	8,904	2,404	8,268	1,984	8,268	1,736
		16	0.4	0.22	12,720	3,816	8,904	2,404	8,268	1,984	8,268	1,736
		20	0.4	0.15	12,720	3,434	8,904	2,137	8,268	1,736	8,268	1,488
		30	0.4	0.08	10,176	2,748	7,123	1,496	6,614	1,389	6,614	1,191
		30	0.9	0.09	10,176	2,748	7,123	1,496	6,614	1,389	6,614	1,191
		40	0.4	0.06	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		40	0.9	0.07	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
2	4	50	0.9	0.05	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		60	0.9	0.03	7,123	1,710	4,986	1,047	4,630	972	4,630	833
		70	0.9	0.02	6,233	1,496	4,363	916	4,051	851	4,051	729
		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
2.5	5	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
		30	1	0.34	9,500	2,140	7,200	1,540	6,200	1,260	6,200	1,190
3	6	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
		30	1	0.45	8,000	2,000	6,000	1,430	5,200	1,170	5,200	1,110
		40	1	0.4	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
4	8	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
5	10	50	1	0.5	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	0.7	4,800	1,300	3,600	920	3,100	750	3,100	710

Technical Data

ESTNB20 SERIES

Workpiece					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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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)
5	10	75	1	0.5	4,800	1,300	3,600	920	3,100	750	3,100	710

RPM = rev / min
FEED = mm / min



· 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.

ESTNB30 SERIES

Workpiece					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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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	0.01	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	0.02	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	0.04	40,000	2,000	28,000	1,260	26,000	1,040	26,000	910
		8	0.9	0.01	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	0.05	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



ESTNB30 SERIES

Workpiece					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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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)
0.27	0.54	6.5	0.4	0.02	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	0.02	32,000	1,382	22,400	968	20,800	799	20,800	699
		8	0.9	0.02	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	0.01	26,000	874	18,200	535	16,900	497	16,900	426
		15	0.4	0.005	22,400	753	15,680	461	14,560	367	14,560	367
		15	0.9	0.006	22,400	753	15,680	461	14,560	367	14,560	367
0.4	0.8	4	0.4	0.062	32,000	2,560	22,400	1,613	20,800	1,331	20,800	1,165
		6	0.4	0.045	32,000	2,560	22,400	1,613	20,800	1,331	20,800	1,165
		8	0.9	0.026	25,600	1,475	17,920	1,032	16,640	852	16,640	745
		12	0.9	0.02	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	0.05	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	0.02	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	0.01	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	0.07	16,960	2,544	11,872	1,603	11,024	1,323	11,024	1,158
		10	0.4	0.07	16,960	2,544	11,872	1,603	11,024	1,323	11,024	1,158
		12	0.4	0.07	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

Technical Data

ESTNB30 SERIES

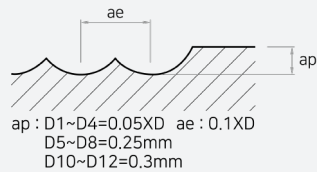
Workpiece					Carbon Steels, Alloy Steels (180~250HB)		Prehardened Steels (HRC35~45)		Hardened Steels (HRC45~55)		Hardened Steels (HRC55~65)	
Ratio to standard depth of cut					Depth of Cut X 100%		Depth of Cut X 100%		Depth of Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (mm)	Neck Length (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)
0.75	1.5	20	0.9	0.04	11,024	1,323	7,717	810	7,166	752	7,166	645
		30	0.9	0.028	11,024	1,323	7,717	810	7,166	752	7,166	645
0.9	1.8	4	0.4	0.12	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		8	0.4	0.1	14,200	2,556	9,940	1,610	9,230	1,329	9,230	1,163
		12	0.4	0.08	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	0.02	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	0.15	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		12	0.4	0.09	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		16	0.4	0.09	15,200	3,040	10,640	1,915	9,880	1,581	9,880	1,383
		20	0.4	0.06	12,160	2,189	8,512	1,532	7,904	1,265	7,904	1,107
		20	0.9	0.07	12,160	2,189	8,512	1,532	7,904	1,265	7,904	1,107
		25	0.9	0.07	9,880	1,581	6,916	968	6,442	899	6,422	771
		30	0.4	0.04	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	0.03	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	0.17	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	0.32	12,720	3,816	8,904	2,404	8,268	1,984	8,268	1,736
		16	0.4	0.22	12,720	3,816	8,904	2,404	8,268	1,984	8,268	1,736
		20	0.4	0.15	12,720	3,434	8,904	2,137	8,268	1,736	8,268	1,488
		30	0.4	0.08	10,176	2,748	7,123	1,496	6,614	1,389	6,614	1,191
		30	0.9	0.09	10,176	2,748	7,123	1,496	6,614	1,389	6,614	1,191
		40	0.4	0.06	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		40	0.9	0.07	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		50	0.9	0.05	8,268	1,984	5,788	1,215	5,374	1,129	5,374	967
		60	0.9	0.03	7,123	1,710	4,986	1,047	4,630	972	4,630	833
		70	0.9	0.02	6,233	1,496	4,363	916	4,051	851	4,051	729
2	4	20	1	0.32	11,900	2,860	9,000	2,050	7,800	1,680	7,800	1,590
		30	1	0.23	11,900	2,570	9,000	1,850	7,800	1,520	7,800	1,430
		40	1	0.14	9,500	1,940	7,200	1,400	6,200	1,140	6,200	1,080
		50	1	0.11	7,800	1,590	5,800	1,120	5,000	920	5,000	870
		60	1	0.07	7,800	1,590	5,800	1,120	5,000	920	5,000	870
2.5	5	30	1	0.34	9,500	2,140	7,200	1,540	6,200	1,260	6,200	1,190
		40	1	0.25	9,500	2,140	7,200	1,540	6,200	1,260	6,200	1,190



ESTNB30 SERIES

Workpiece					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 Cut X 100%		Depth of Cut X 100%	
Mill Dia (mm)	Diameter (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)
2.5	5	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	0.4	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	0.5	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	0.7	4,800	1,300	3,600	920	3,100	750	3,100	710
		75	1	0.5	4,800	1,300	3,600	920	3,100	750	3,100	710

RPM = rev / min
FEED = mm / min



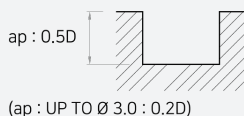
- Please try to use 20-30% slow down than recommendation when chips are not evacuated well -Rib machining, slotting, etc.
ex)ESTNB3040-20-10, HRc 55, Rib machining
ap : 0.32(ap from chart) X 0.65(constant value) X 0.8 = 0.17mm
- The above recommendation table may differ from the actual situation, adjust it according to the machine condition, processing type and purpose.
- In the case of low RPM, reduce the feed rate at the same rate.

Technical Data

UE502, UXE502 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (NAK, CENA, KP4)		Stainless Steels (SUS)		Hardened Steels (SKD, SKT, STAVAX)	
Hardness	~ HRC35		HRC35 ~ HRC45		-		HRC45 ~ HRC55	
Strength	~ 1100N/mm2		1100 ~ 1500N/mm2		-		1500 ~ 2000N/mm2	
Diameter (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	11,560	190	7,560	120	6,300	90	5,040	35
3	8,920	210	5,560	140	4,620	120	3,360	40
4	7,560	300	4,620	180	3,880	150	2,940	40
5	6,300	320	3,780	190	3,160	160	2,320	50
6	5,560	350	3,360	220	2,840	180	2,000	55
8	4,200	380	2,520	200	2,100	180	1,680	75
10	3,260	330	2,000	160	1,680	160	1,360	60
12	2,740	280	1,680	130	1,360	130	1,160	55
16	2,200	220	1,360	110	1,060	110	900	40
20	1,680	170	1,060	80	840	80	680	30
25	1,360	130	840	70	680	60	540	20

RPM = rev / min
FEED = mm / min



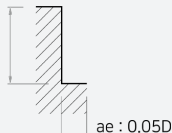


UE504,UXE504 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (NAK, CENA, KP4)		Stainless Steels (SUS)		Hardened Steels (SKD, SKT, STAVAX)	
Hardness	~ HRC35		HRC35 ~ HRC45		-		HRC45 ~ HRC55	
Strength	~ 1100N/mm2		1100 ~ 1500N/mm2		-		1500 ~ 2000N/mm2	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	11,560	280	7,560	170	6,300	140	5,040	50
3	8,920	320	5,560	200	4,620	170	3,360	60
4	7,560	570	4,620	350	3,880	280	2,940	60
5	6,300	600	3,780	360	3,160	300	2,320	70
6	5,560	660	3,360	410	2,840	330	2,000	80
8	4,200	710	2,520	380	2,100	350	1,680	110
10	3,260	610	2,000	300	1,680	300	1,360	90
12	2,740	520	1,680	250	1,360	240	1,160	80
16	2,200	410	1,360	200	1,100	300	900	60
20	1,680	320	1,060	160	840	150	680	40
25	1,360	250	840	130	680	120	540	30

RPM = rev / min
FEED = mm / min

ap : 1.0D

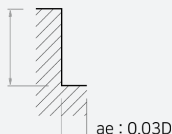


UE504H SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (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)	RPM	FEED	RPM	FEED	RPM	FEED
1	45,000	750	37,000	560	23,000	300
2	23,500	800	18,000	540	12,000	360
3	15,750	810	12,600	580	8,280	380
4	12,150	830	9,540	600	6,345	400
6	9,450	900	7,470	640	4,950	440
8	7,110	860	5,625	620	3,780	410
10	5,580	800	4,410	570	2,925	380
12	4,770	800	3,780	570	2,520	380
16	3,600	810	2,900	570	2,000	400
20	3,000	810	2,300	570	1,600	400

RPM = rev / min
FEED = mm / min

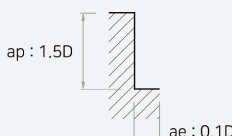
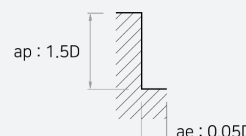
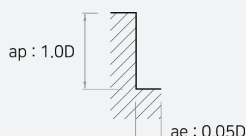
ap : 1.0D



Technical Data

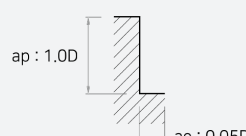
UE506 SERIES ► General Cutting

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (NAK, CENA, KP4)		Hardened Steels (SKD, SKT, STAVAX)	
Hardness	~ HRC35		HRC35 ~ HRC45		HRC45 ~ HRC55	
Strength	~ 1100N/mm ²		1100 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED
6	5,560	2,000	3,880	1,370	1,580	210
8	4,200	2,000	2,940	1,370	1,160	210
10	3,360	2,000	2,320	1,370	1,000	210
12	2,840	1,680	2,000	1,160	840	180
16	2,100	1,260	1,480	880	640	130
20	1,680	1,010	1,160	690	500	110
25	1,500	900	1,100	600	430	90

RPM = rev / min FEED = mm / min 								
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UE506 SERIES ► High Speed Cutting

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Hardened Steels (SKD, SKT, STAVAX)	
Hardness	~ HRC35		HRC45 ~ HRC55	
Strength	~ 1100N/mm ²		1500 ~ 2000N/mm ²	
Diameter (mm)	RPM	FEED	RPM	FEED
6	16,800	6,090	8,400	3,050
8	12,600	6,090	6,300	3,050
10	9,980	5,990	5,040	3,050
12	8,400	5,040	4,200	2,520
16	6,300	3,780	3,160	1,890
20	5,040	3,050	2,520	1,470
25	4,500	2,700	2,200	1,300

RPM = rev / min FEED = mm / min 					
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UE512 SERIES

Workpiece		Alloy Steels, Carbon Steels (SCM, SNCM, S45C)			Prehardened Steels (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
	0.5	50,000	315	0.006	46,200	230	0.005	40,600	170	0.004
	1	45,000	255	0.002	41,580	185	0.002	36,540	140	0.001
0.2	0.5	38,500	380	0.018	36,300	270	0.014	32,100	200	0.01
	1	38,500	380	0.013	36,300	270	0.010	32,100	200	0.007
	1.5	34,650	310	0.007	32,670	220	0.006	28,890	160	0.004
	2	34,650	310	0.005	32,670	220	0.004	28,890	160	0.003
0.3	1	34,200	390	0.019	32,300	270	0.015	28,500	230	0.011
	1.5	34,200	390	0.019	32,300	270	0.015	25,800	230	0.011
	2	30,780	315	0.011	29,070	220	0.008	25,650	185	0.006
	2.5	30,780	315	0.007	29,070	220	0.005	25,650	185	0.004
	3	30,780	315	0.007	29,070	220	0.005	25,650	185	0.004
	4	27,360	250	0.004	25,840	175	0.003	22,800	145	0.002
	5	20,520	165	0.003	19,380	115	0.002	17,100	95	0.002
0.4	1	27,400	540	0.036	25,800	380	0.028	22,800	280	0.02
	1.5	27,400	540	0.025	25,800	380	0.020	22,800	280	0.014
	2	27,400	540	0.025	25,800	380	0.020	22,800	280	0.014
	2.5	24,660	435	0.014	23,220	310	0.011	20,520	225	0.008
	3	24,660	435	0.014	23,220	310	0.011	20,520	225	0.008
	4	24,660	435	0.009	23,220	310	0.007	20,520	225	0.005
	5	21,920	345	0.009	20,640	245	0.007	18,240	180	0.005
	6	21,920	345	0.005	20,640	245	0.004	18,240	180	0.003
	8	16,440	225	0.004	15,480	160	0.003	13,680	120	0.002
	10	8,220	95	0.004	7,740	70	0.003	6,840	50	0.002
0.5	1	27,400	540	0.045	25,800	425	0.035	22,800	285	0.025
	1.5	27,400	540	0.045	25,800	425	0.035	22,800	285	0.025
	2	27,400	540	0.032	25,800	425	0.025	22,800	285	0.018
	2.5	27,400	540	0.032	25,800	425	0.025	22,800	285	0.018
	3	24,660	435	0.018	23,220	345	0.014	20,520	230	0.01
	4	24,660	435	0.018	23,220	345	0.014	20,520	230	0.01
	5	24,660	435	0.011	23,220	345	0.009	20,520	230	0.006
	6	21,920	345	0.011	20,640	270	0.009	18,240	180	0.006
	8	16,440	225	0.007	15,480	180	0.005	13,680	120	0.004
	10	16,440	225	0.005	15,480	180	0.004	13,680	120	0.003
	12	8,220	95	0.005	7,740	75	0.004	6,840	50	0.003
	14	8,220	95	0.005	7,740	75	0.004	6,840	50	0.003
	16	2,740	25	0.005	2,580	20	0.004	2,280	15	0.003
0.6	2	27,400	775	0.038	25,800	545	0.029	22,800	405	0.021
	3	27,400	775	0.038	25,800	545	0.029	22,800	405	0.021
	4	24,660	630	0.022	23,220	440	0.017	20,520	330	0.012
	5	24,660	630	0.014	23,220	440	0.011	20,520	330	0.008
	6	24,660	630	0.014	23,220	440	0.011	20,520	330	0.008
	8	21,920	495	0.008	20,640	350	0.006	18,240	260	0.005

Technical Data

UE512 SERIES

Workpiece		Alloy Steels, Carbon Steels (SCM, SNCM, S45C)			Prehardened Steels (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	10	16,440	325	0.005	15,480	230	0.004	13,680	170	0.003
	12	16,440	325	0.005	15,480	230	0.004	13,680	170	0.003
	14	8,220	140	0.005	7,740	100	0.004	6,840	75	0.003
	16	8,220	140	0.005	7,740	100	0.004	6,840	75	0.003
0.7	2	27,400	775	0.063	25,800	545	0.049	22,800	405	0.035
	4	24,660	630	0.025	23,220	440	0.020	20,520	330	0.014
	6	24,660	630	0.016	23,220	440	0.012	20,520	330	0.009
	8	21,920	495	0.016	20,640	350	0.012	18,240	260	0.009
	10	21,920	495	0.009	20,640	350	0.007	18,240	260	0.005
	12	16,440	325	0.009	15,480	230	0.005	13,680	170	0.004
0.8	2	27,400	775	0.072	25,800	605	0.056	22,800	450	0.040
	3	27,400	775	0.050	25,800	605	0.039	22,800	450	0.028
	4	27,400	775	0.050	25,800	605	0.039	22,800	450	0.028
	5	24,660	630	0.029	23,220	490	0.022	20,520	365	0.016
	6	24,660	630	0.029	23,220	490	0.022	20,520	365	0.016
	8	24,660	630	0.018	23,220	490	0.014	20,520	365	0.010
	10	21,920	495	0.018	20,640	385	0.014	18,240	290	0.01
	12	21,920	495	0.011	20,640	385	0.008	18,240	290	0.006
	14	16,440	325	0.007	15,480	255	0.006	13,680	190	0.004
	16	16,440	325	0.007	15,480	255	0.006	13,680	190	0.004
0.9	6	22,140	575	0.032	20,970	440	0.025	18,450	330	0.018
	8	22,140	575	0.020	20,970	440	0.016	18,450	330	0.011
	10	19,680	455	0.020	18,640	350	0.016	16,400	260	0.011
1.0	2	24,600	1,045	0.090	23,300	890	0.070	20,500	665	0.050
	3	24,600	1,045	0.090	23,300	890	0.070	20,500	665	0.050
	4	24,600	1,045	0.063	23,300	890	0.049	20,500	665	0.035
	5	24,600	1,045	0.063	23,300	890	0.049	20,500	665	0.035
	6	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
	7	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
	8	22,140	845	0.036	20,970	720	0.028	18,450	540	0.020
	10	22,140	845	0.023	20,970	720	0.018	18,450	540	0.013
	12	19,680	670	0.023	18,640	570	0.018	16,400	425	0.013
	14	19,680	670	0.014	18,640	570	0.011	16,400	425	0.008
	16	14,760	440	0.014	13,980	375	0.011	12,300	280	0.008
	18	14,760	440	0.009	13,980	375	0.007	12,300	280	0.005
	20	14,760	440	0.009	13,980	375	0.007	12,300	280	0.005
	22	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
	26	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
	30	7,380	190	0.009	6,990	160	0.007	6,150	120	0.005
	40	2,460	50	0.009	2,330	45	0.007	2,050	35	0.005
	50	2,460	50	0.006	2,330	45	0.005	2,050	35	0.003
1.2	4	21,900	930	0.076	20,700	720	0.059	18,200	485	0.042



UE512 SERIES

Workpiece		Alloy Steels, Carbon Steels (SCM, SNCM, S45C)			Prehardened Steels (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	6	21,900	930	0.076	20,700	720	0.059	18,200	485	0.042
	8	19,710	755	0.043	18,630	585	0.034	16,380	395	0.024
	10	19,710	755	0.027	18,630	585	0.021	16,380	395	0.015
	12	19,710	755	0.027	18,630	585	0.021	16,380	395	0.015
	14	17,520	595	0.027	16,560	460	0.021	14,560	310	0.015
	16	17,520	595	0.016	16,560	460	0.013	14,560	310	0.009
	20	13,140	390	0.011	12,420	300	0.008	10,920	205	0.006
	26	6,570	165	0.011	6,210	130	0.008	5,460	85	0.006
	30	6,570	165	0.011	6,210	130	0.008	5,460	85	0.006
1.4	6	19,200	815	0.088	18,100	570	0.069	16,000	425	0.049
	8	17,280	660	0.050	16,290	460	0.039	14,400	345	0.028
	10	17,280	660	0.050	16,290	460	0.039	14,400	345	0.028
	14	17,280	660	0.032	16,290	460	0.025	14,400	345	0.018
	16	15,360	520	0.032	14,480	365	0.025	12,800	270	0.018
	20	15,360	520	0.019	14,480	365	0.015	12,800	270	0.011
1.5	4	19,200	905	0.135	18,100	635	0.105	16,000	475	0.075
	5	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
	6	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
	7	19,200	905	0.095	18,100	635	0.074	16,000	475	0.053
	8	17,280	735	0.054	16,290	515	0.042	14,400	385	0.030
	10	17,280	735	0.054	16,290	515	0.042	14,400	385	0.03
	12	17,280	735	0.054	16,290	515	0.042	14,400	385	0.030
	14	17,280	735	0.034	16,290	515	0.026	14,400	385	0.019
	16	15,360	580	0.034	14,480	405	0.026	12,800	305	0.019
	18	15,360	580	0.034	14,480	405	0.026	12,800	305	0.019
	20	15,360	580	0.020	14,480	405	0.016	12,800	305	0.011
	22	15,360	580	0.020	14,480	405	0.016	12,800	305	0.011
	26	11,520	380	0.014	10,860	265	0.011	9,600	200	0.008
	30	11,520	380	0.014	10,860	265	0.011	9,600	200	0.008
1.6	8	17,800	840	0.101	16,800	655	0.078	14,800	490	0.056
	10	16,020	680	0.058	15,120	530	0.045	13,320	395	0.032
	12	16,020	680	0.058	15,120	530	0.045	13,320	395	0.032
	16	16,020	680	0.036	15,120	530	0.028	13,320	395	0.020
	20	14,240	540	0.036	13,440	420	0.028	11,840	315	0.020
1.8	8	17,800	840	0.113	16,800	655	0.088	14,800	490	0.063
	10	16,020	680	0.065	15,120	530	0.050	13,320	395	0.036
	12	16,020	680	0.065	15,120	530	0.050	13,320	395	0.036
	16	16,020	680	0.041	15,120	530	0.032	13,320	395	0.023
	20	14,240	540	0.041	13,440	420	0.032	11,840	315	0.023
2.0	6	14,400	820	0.180	13,600	620	0.140	12,000	475	0.100
	8	14,400	820	0.126	13,600	620	0.098	12,000	475	0.070
	10	14,400	820	0.126	13,600	620	0.098	12,000	475	0.070
	12	12,960	665	0.072	12,240	500	0.056	10,800	385	0.040

Technical Data

UE512 SERIES

Workpiece		Alloy Steels, Carbon Steels (SCM, SNCM, S45C)			Prehardened Steels (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	14	12,960	665	0.072	12,240	500	0.056	10,800	385	0.040
	16	12,960	665	0.072	12,240	500	0.056	10,800	385	0.040
	18	12,960	665	0.045	12,240	500	0.035	10,800	385	0.025
	20	12,960	665	0.045	12,240	500	0.035	10,800	385	0.025
	22	11,520	525	0.045	10,880	395	0.035	9,600	305	0.025
	26	11,520	525	0.045	10,880	395	0.035	9,600	305	0.025
	30	11,520	525	0.027	10,880	395	0.021	9,600	305	0.015
	35	8,640	345	0.018	8,160	260	0.014	7,200	200	0.010
	40	8,640	345	0.018	8,160	260	0.014	7,200	200	0.010
	45	4,320	150	0.018	4,080	110	0.014	3,600	85	0.010
	50	4,320	150	0.018	4,080	110	0.014	3,600	85	0.010
	60	4,320	150	0.018	4,080	110	0.014	3,600	85	0.010
2.5	8	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
	10	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
	12	12,300	970	0.158	11,600	680	0.123	10,300	510	0.088
	14	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
	16	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
	18	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
	20	11,070	785	0.090	10,440	550	0.070	9,270	415	0.050
	22	11,070	785	0.056	10,440	550	0.044	9,270	415	0.031
	26	9,840	620	0.056	9,280	435	0.044	8,240	325	0.031
	30	9,840	620	0.056	9,280	435	0.044	8,240	325	0.031
	35	9,840	620	0.034	9,280	435	0.026	8,240	325	0.019
	40	7,380	405	0.034	6,960	285	0.026	6,180	215	0.019
	45	7,380	405	0.023	6,960	285	0.018	6,180	215	0.013
	50	7,380	405	0.023	6,960	285	0.018	6,180	215	0.013
3.0	6	10,900	860	0.270	10,300	605	0.210	6,600	450	0.150
	8	10,900	860	0.270	10,300	605	0.210	6,600	450	0.150
	10	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
	12	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
	14	10,900	860	0.189	10,300	605	0.147	6,600	450	0.105
	16	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
	18	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
	20	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
	22	9,810	695	0.108	9,270	490	0.084	5,940	365	0.060
	26	9,810	695	0.068	9,270	490	0.053	5,940	365	0.038
	30	9,810	695	0.068	9,270	490	0.053	5,940	365	0.038
	35	8,720	550	0.068	8,240	385	0.053	5,280	290	0.038
	40	8,720	550	0.041	8,240	385	0.032	5,280	290	0.023
	45	8,720	550	0.041	8,240	385	0.032	5,280	290	0.023
	50	6,540	360	0.027	6,180	255	0.021	3,960	190	0.015
	60	6,540	360	0.027	6,180	255	0.021	3,960	190	0.015
4.0	8	8,000	1,300	0.360	7,600	1,160	0.280	6,700	770	0.200



UE512 SERIES

Workpiece		Alloy Steels, Carbon Steels (SCM, SNCM, S45C)			Prehardened Steels (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	10	8,000	1,300	0.360	7,600	1,160	0.280	6,700	770	0.200
	12	8,000	1,300	0.360	7,600	1,160	0.280	6,700	770	0.200
	14	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
	16	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
	18	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
	20	8,000	1,300	0.252	7,600	1,160	0.196	6,700	770	0.140
	22	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
	26	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
	30	7,200	1,055	0.144	6,840	940	0.112	6,030	625	0.080
	35	7,200	1,055	0.090	6,840	940	0.070	6,030	625	0.050
	40	7,200	1,055	0.090	6,840	940	0.070	6,030	625	0.050
	45	6,400	830	0.090	6,080	740	0.070	5,360	495	0.050
	50	6,400	830	0.090	6,080	740	0.070	5,360	495	0.050
	60	6,400	830	0.054	6,080	740	0.042	5,360	495	0.030
5.0	16	6,400	1,155	0.315	6,100	900	0.245	5,400	605	0.175
	20	6,400	1,155	0.315	6,100	900	0.245	5,400	605	0.175
	26	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
	30	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
	35	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
	40	5,760	935	0.180	5,490	730	0.140	4,860	490	0.100
	50	5,760	935	0.113	5,490	730	0.088	4,860	490	0.063
	60	5,120	740	0.113	4,880	575	0.088	4,320	385	0.063
6.0	15	5,300	1,055	0.540	5,000	820	0.420	4,400	550	0.300
	20	5,300	1,055	0.378	5,000	820	0.294	4,400	550	0.210
	30	5,300	1,055	0.378	5,000	820	0.294	4,400	550	0.210
	32	4,770	855	0.216	4,500	665	0.168	3,960	445	0.120
8.0	25	4,000	950	0.504	3,800	750	0.392	3,300	500	0.280
	30	4,000	950	0.504	3,800	750	0.392	3,300	500	0.280
	42	3,600	770	0.288	3,400	605	0.224	2,950	405	0.160
10	30	3,200	900	0.900	3,050	680	0.700	2,630	400	0.500
	35	3,200	900	0.630	3,050	680	0.490	2,630	400	0.350
	45	3,200	900	0.630	3,050	680	0.490	2,630	400	0.350
12	35	2,650	800	1.080	2,520	600	0.840	2,180	350	0.600
	40	2,650	800	0.756	2,520	600	0.588	2,180	350	0.420
	50	2,650	800	0.756	2,520	600	0.588	2,180	350	0.420

RPM = rev / min
FEED = mm / min

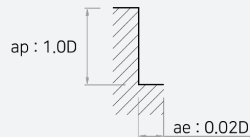


Technical Data

UE514 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (NAK, CENA, KP4)		Stainless Steels (SUS)		Hardened Steels (SKD, SKT, STAVAX)	
Hardness	~ HRC35		HRC35 ~ HRC45		-		HRC45 ~ HRC55	
Strength	~ 1100N/mm2		1100 ~ 1500N/mm2		-		1500 ~ 2000N/mm2	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1.0	22,000	310	13,500	180	10,750	140	8,500	50
1.5	17,000	320	10,700	190	8,500	150	6,500	50
2.0	13,900	330	9,070	200	7,560	165	6,000	60
2.5	12,000	350	7,600	220	6,000	180	4,500	60
3.0	10,700	380	6,670	240	5,110	200	4,030	70
4.0	9,070	680	5,540	420	4,650	330	3,530	70
5.0	7,560	720	4,530	430	3,800	360	2,780	85
6.0	6,670	790	4,030	490	3,400	390	2,400	95
8.0	5,040	850	3,020	450	2,520	420	2,010	130
10	3,910	730	2,400	360	2,010	360	1,630	105
12	3,300	620	2,010	300	1,630	280	1,400	95

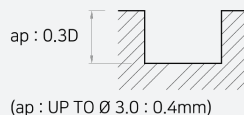
RPM = rev / min
FEED = mm / min



UE522 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (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)	RPM	FEED	RPM	FEED	RPM	FEED
2	6,300	60	5,040	50	3,150	25
3	4,410	70	3,570	60	2,200	30
4	3,570	85	2,840	70	1,790	35
5	3,050	105	2,420	85	1,580	40
6	2,630	125	2,100	105	1,370	50
8	2,000	135	1,580	105	1,050	50
10	1,680	135	1,370	105	840	50
12	1,370	105	1,160	95	700	40
16	1,160	95	890	75	560	35
20	840	70	680	50	420	25

RPM = rev / min
FEED = mm / min





UE524 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (NAK, CENA, KP4)		Hardened Steels (SKD, SKT, STAVAX)	
Hardness	~ HRC35		HRC35 ~ HRC45		HRC45 ~ HRC55	
Strength	~ 1100N/mm ²		1100 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED
2	6,300	100	5,040	80	3,150	45
3	4,410	115	3,570	100	2,200	55
4	3,570	140	2,840	115	1,790	60
5	3,050	180	2,420	140	1,580	70
6	2,630	215	2,100	180	1,370	90
8	2,000	230	1,580	180	1,050	90
10	1,680	230	1,370	180	840	90
12	1,370	180	1,160	160	700	70
16	1,160	160	890	125	560	60
20	840	115	680	90	420	45

RPM = rev / min FEED = mm / min 	
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ULE504 SERIES ► General Cutting

Workpiece	NON-Alloy Steels, Alloy Steels, Cast Iron		Hardened Steels				Stainless Steels	
Hardness	~ HRC30		HRC30 ~ HRC45		HRC45 ~ HRC55		-	
Strength	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²		-	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	12,100	320	7,900	195	2,700	47	6,600	160
3	9,400	370	5,840	230	2,000	58	4,850	195
4	7,900	655	4,850	405	1,500	58	4,070	320
5	6,600	690	3,970	415	1,300	58	3,320	345
6	5,830	760	3,530	470	1,150	58	2,980	380
8	4,410	815	2,650	435	880	58	2,200	405
10	3,420	700	2,100	345	720	46	1,760	345
12	2,880	600	1,760	290	590	46	1,430	275
16	2,310	470	1,430	230	460	29	1,150	230
20	1,760	370	1,110	185	340	29	880	175
25	1,430	290	880	150	270	23	715	140

RPM = rev / min FEED = mm / min 	
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Technical Data

UTE502 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (NAK, CENA, KP4)	
Hardness	~ HRC35		HRC35 ~ HRC45	
Strength	~ 1100N/mm2		1100 ~ 1500N/mm2	
Diameter (mm)	RPM	FEED	RPM	FEED
0.3	45,000	135	35,000	105
0.4	36,000	144	27,900	113
0.6	25,200	144	18,900	113
0.8	18,000	144	13,950	108
1	14,850	149	11,250	113
2	7,560	153	5,670	113
3	3,969	108	3,213	90
4	3,213	126	2,556	104
6	2,367	189	1,890	153
8	1,800	225	1,422	162
10	1,440	225	1,170	167

RPM = rev / min
FEED = mm / min



UTE504 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (NAK, CENA, KP4)	
Hardness	~ HRC35		HRC35 ~ HRC45	
Strength	~ 1100N/mm2		1100 ~ 1500N/mm2	
Diameter (mm)	RPM	FEED	RPM	FEED
3	3,969	216	3,213	180
4	3,213	252	2,556	207
6	2,367	378	1,890	306
8	1,800	450	1,422	324
10	1,440	450	1,170	333

RPM = rev / min
FEED = mm / min





UR502 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (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)	RPM	FEED	RPM	FEED	RPM	FEED
0.2	44,000	145	28,800	60	17,600	40
0.3	41,000	170	27,000	70	16,500	45
0.4	41,000	170	27,000	70	16,500	45
0.5	36,000	190	23,400	80	14,300	50
0.6	30,000	210	19,800	90	12,100	55
0.8	30,000	210	19,800	90	12,100	55
1	27,600	240	18,000	100	11,000	60
1.5	22,000	250	13,500	110	8,500	60
2	18,000	260	11,560	120	7,200	70
2.5	15,000	270	9,500	130	6,100	70
3	13,240	280	8,560	140	5,280	70
4	10,720	340	6,820	170	4,300	80
5	9,160	420	5,800	200	3,800	100
6	7,900	500	5,040	250	3,280	120
8	6,000	540	3,800	250	2,520	120
10	5,040	540	3,280	250	2,020	120
12	4,120	420	2,780	230	1,680	100
16	3,100	360	2,100	170	1,280	80
20	2,520	280	1,640	120	1,000	60

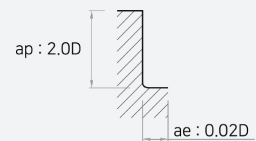
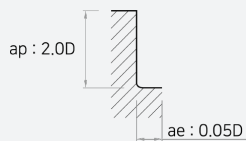
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Technical Data

UR512,UR504 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (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)	RPM	FEED	RPM	FEED	RPM	FEED
3	4,410	115	3,570	100	2,200	55
4	3,570	140	2,840	115	1,790	60
5	3,050	180	2,420	140	1,580	70
6	2,630	215	2,100	180	1,370	85
8	2,000	230	1,580	180	1,050	85
10	1,680	230	1,370	180	840	85
12	1,370	180	1,160	160	700	70
16	1,160	160	890	125	560	60
20	840	115	680	90	420	45

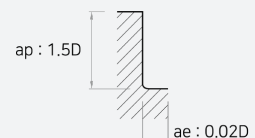
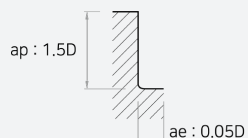
RPM = rev / min
FEED = mm / min



UR506 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (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)	RPM	FEED	RPM	FEED	RPM	FEED
6	14,880	3,210	14,100	2,940	9,600	2,940
8	12,000	3,300	11,400	3,000	7,200	2,760
10	9,600	2,940	9,300	2,700	5,700	2,460
12	7,800	2,700	7,500	2,460	4,800	2,280
16	6,000	2,400	5,820	2,220	3,600	2,040
20	4,800	2,010	4,680	2,040	2,880	1,920

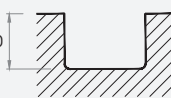
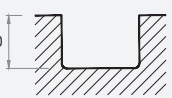
RPM = rev / min
FEED = mm / min





UR542 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (NAK, CENA, KP4)		Hardened Steels (SKD, SKT, STAVAX)	
Hardness	~ HRC35		HRC35 ~ HRC45		HRC45 ~ HRC55	
Strength	~ 1100N/mm ²		1100 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED
0.2	50,000	170	34,500	75	21,150	45
0.3	50,000	200	32,000	85	20,000	50
0.4	50,000	200	32,000	85	20,000	50
0.5	43,000	220	28,000	95	17,100	60
0.6	36,400	250	24,000	110	14,500	65
0.8	36,400	250	24,000	110	14,500	65
1	33,100	280	21,600	120	13,200	70
1.5	26,400	300	16,200	130	10,200	70
2	21,600	310	13,800	140	8,640	80
2.5	18,000	320	11,400	150	7,320	80
3	15,900	330	10,300	160	6,300	80
4	12,800	400	8,200	200	5,150	95
5	11,000	500	7,000	240	4,560	120
6	9,500	600	6,000	300	3,930	140
8	7,200	640	4,550	300	3,020	140
10	6,000	640	4,000	300	2,420	140
12	5,000	500	3,340	270	2,000	120
16	3,720	450	2,520	210	1,540	95
20	3,000	330	1,950	140	1,200	70

RPM = rev / min FEED = mm / min ap : 0.2D 	ap : 0.05D 
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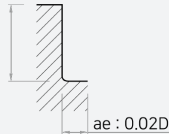
Technical Data

UR544, UXR514 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (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)	RPM	FEED	RPM	FEED	RPM	FEED
1	33,100	360	21,600	260	13,200	140
1.5	26,400	370	16,200	270	10,200	140
2	21,600	380	13,800	280	8,640	150
2.5	18,000	390	11,400	300	7,320	150
3	15,900	400	10,300	310	6,300	150
4	12,800	500	8,200	360	5,150	160
5	11,000	510	7,000	430	4,560	200
6	9,500	510	6,000	430	3,930	200
8	7,200	550	4,550	430	3,020	200
10	6,000	550	4,000	430	2,420	200
12	5,000	430	3,340	380	2,000	160
16	3,720	330	2,520	280	1,540	135
20	3,000	270	1,950	210	1,200	100

RPM = rev / min
FEED = mm / min

ap : 1.0D



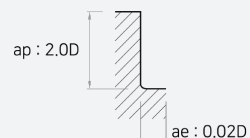
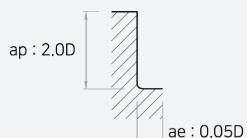
UXR504 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (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)	RPM	FEED	RPM	FEED	RPM	FEED
1	27,600	300	18,000	220	11,000	120
1.5	22,000	310	13,500	230	8,500	120
2	18,000	320	11,560	240	7,200	130
2.5	15,000	330	9,500	250	6,100	130
3	13,240	340	8,560	260	5,280	130
4	10,720	420	6,820	300	4,300	140
5	9,160	430	5,800	360	3,800	170
6	7,900	430	5,040	360	3,280	170
8	6,000	460	3,800	360	2,520	170
10	5,040	460	3,280	360	2,020	170
12	4,120	360	2,780	320	1,680	140
16	3,100	280	2,100	230	1,280	115
20	2,520	230	1,640	180	1,000	90
20	840	115	680	90	420	45



■ UXR504 SERIES

RPM = rev / min
FEED = mm / min



■ UDR503 SERIES ► General Cutting

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (NAK, CENA, KP4)		Hardened Steels (SKD, SKT, STAVAX)	
Hardness	~ HRc35		HRc35 ~ HRc45		HRc45 ~ HRc55	
Strength	~ 1100N/mm ²		1100 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED
6.0	5,100	3,500	5,500	3,750	3,850	2,700
8.0	3,800	3,400	4,150	3,700	2,850	2,550
10	3,800	3,750	3,600	3,500	2,700	2,700
12	3,200	4,200	3,250	4,250	2,250	2,300
16	2,400	3,100	2,250	2,900	1,700	1,750
20	1,900	2,500	1,800	2,350	1,350	1,400

RPM = rev / min
FEED = mm / min



■ UDR503 SERIES ► General Cutting

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (NAK, CENA, KP4)		Hardened Steels (SKD, SKT, STAVAX)	
Hardness	~ HRc35		HRc35 ~ HRc45		HRc45 ~ HRc55	
Strength	~ 1100N/mm ²		1100 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED
6.0	8,300	5,700	7,650	5,250	6,400	4,550
8.0	6,200	5,550	5,750	5,100	5,250	4,700
10	5,750	5,650	5,000	4,900	4,200	4,250
12	4,800	6,300	4,150	5,450	3,500	3,650
16	3,600	4,700	3,100	4,050	2,650	2,700
20	2,900	3,750	2,500	3,250	2,100	2,150

RPM = rev / min
FEED = mm / min

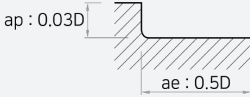
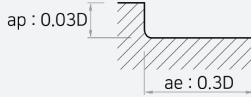


Technical Data

USPM4 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (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)	RPM	FEED	RPM	FEED	RPM	FEED
1	49,000	7,650	40,000	6,500	35,000	5,750
1.5	37,000	8,550	30,000	7,200	27,000	6,400
2	29,700	9,000	24,300	7,560	21,600	6,750
3	19,800	9,900	16,200	8,100	14,400	7,650
4	15,300	10,800	12,600	8,550	10,800	7,920
6	9,900	11,700	8,100	9,900	7,200	8,640
8	7,380	11,700	6,300	9,900	5,400	8,640
10	5,850	10,800	4,950	9,000	4,320	8,550
12	4,950	10,800	4,140	9,000	3,690	8,100
16	3,690	9,000	3,060	7,920	2,700	7,020
20	2,970	7,200	2,430	6,300	2,160	5,670

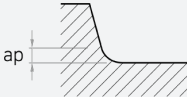
RPM = rev / min
FEED = mm / min

UTR504 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)			Prehardened Steels (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)	RPM	FEED	Ap (mm)	RPM	FEED	Ap (mm)	RPM	FEED	Ap (mm)
0.4	40,000	630	0.008~0.016	32,000	450	0.008~0.012	22,000	270	0.004~0.008
0.6	30,000	630	0.012~0.024	23,000	450	0.012~0.018	15,000	270	0.006~0.012
0.8	22,500	630	0.016~0.032	17,000	450	0.016~0.024	11,500	270	0.008~0.016
1	18,000	630	0.020~0.040	13,500	450	0.020~0.030	9,000	270	0.010~0.020
1.2	14,400	630	0.025~0.050	11,700	450	0.025~0.040	7,200	270	0.012~0.025
1.5	11,700	630	0.030~0.060	9,000	450	0.030~0.050	5,850	270	0.015~0.030
2	9,000	630	0.040~0.080	7,200	450	0.040~0.060	4,500	270	0.020~0.040

RPM = rev / min
FEED = mm / min

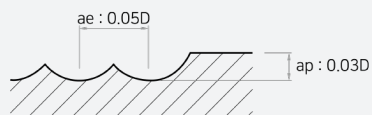




UB502, UB502-P SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (NAK, CENA, KP4)		Hardened Steels (SKD, SKT, STAVAX)	
Hardness	~ HRC35		HRC35 ~ HRC45		HRC45 ~ HRC55	
Strength	~ 1100N/mm ²		1100 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED
0.1	40,000	550	40,000	500	33,000	400
0.2	30,000	720	30,000	630	27,000	575
0.3	30,000	900	30,000	810	27,000	720
0.4	30,000	1,140	30,000	1,020	27,000	900
0.5	30,000	1,440	30,000	1,260	27,000	1,140
0.6	30,000	1,740	30,000	1,500	27,000	1,320
0.8	30,000	2,340	30,000	1,980	27,000	1,800
1	30,000	2,880	30,000	2,520	27,000	2,280
1.2	30,000	3,060	28,800	2,580	25,800	2,310
1.5	30,000	3,240	28,800	2,700	25,800	2,400
2	29,820	3,420	28,680	2,880	24,000	2,400
3	19,860	3,600	19,080	3,180	15,900	2,400
4	14,940	3,600	14,340	3,180	12,000	2,400
5	11,160	3,480	10,680	2,940	9,000	2,250
6	8,340	2,910	8,040	2,460	6,600	1,860
8	6,660	2,520	6,420	2,100	5,400	1,620
10	5,580	2,220	5,340	1,860	4,500	1,440
12	4,170	1,770	4,008	1,500	3,360	1,140
16	3,340	1,590	3,210	1,320	2,700	1,020
20	2,670	1,410	2,580	1,170	2,160	900
25	2,130	1,150	2,060	950	1,730	730

RPM = rev / min
FEED = mm / min

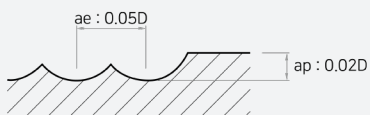


Technical Data

UB503 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (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)	RPM	FEED	RPM	FEED	RPM	FEED
3	13,500	1,700	13,200	1,620	12,500	860
4	10,600	1,700	10,300	1,620	9,800	860
5	9,400	1,650	9,050	1,570	8,600	860
6	8,600	1,750	8,250	1,670	7,850	865
8	7,000	1,550	6,700	1,460	6,350	890
10	6,050	1,450	5,800	1,360	5,450	870
12	5,450	1,420	5,200	1,330	4,900	785
16	4,300	1,200	4,000	1,100	3,700	650
20	3,600	1,050	3,200	900	3,000	550

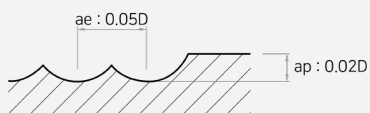
RPM = rev / min
FEED = mm / min



UB504 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (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)	RPM	FEED	RPM	FEED	RPM	FEED
1	48,000	3,300	35,000	2,350	32,000	2,200
1.5	38,400	4,100	28,000	2,900	25,600	2,700
2	31,680	4,600	23,100	3,300	21,000	3,100
3	24,000	5,430	17,500	3,880	16,000	3,650
4	20,130	5,430	14,880	3,880	14,220	3,650
5	16,780	5,430	12,400	3,690	11,670	3,470
6	15,200	6,220	12,200	4,500	11,100	3,830
8	11,300	5,250	9,200	3,980	8,320	3,350
10	9,100	4,590	7,350	3,450	6,660	2,870
12	7,590	4,260	6,130	3,190	5,530	2,400

RPM = rev / min
FEED = mm / min





UB512, UB512 S6 SERIES

Workpiece		Alloy Steels, Carbon Steels (SCM, SNCM, S45C)			Prehardened Steels (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	0.2	50,000	240	0.009	50,000	215	0.007	50,000	190	0.005
	0.3	50,000	240	0.009	50,000	215	0.007	50,000	190	0.005
	0.5	50,000	240	0.006	50,000	215	0.005	50,000	190	0.004
	1	45,000	195	0.002	45,000	175	0.002	45,000	155	0.001
0.2	0.5	50,000	335	0.018	50,000	310	0.014	43,200	260	0.010
	1	50,000	335	0.013	50,000	310	0.010	43,200	260	0.007
	1.5	45,000	270	0.007	45,000	250	0.006	38,880	210	0.004
	2	45,000	270	0.005	45,000	250	0.004	38,880	210	0.003
	3	45,000	270	0.003	45,000	250	0.003	38,880	210	0.002
0.3	1	50,000	475	0.019	50,000	430	0.015	42,800	365	0.011
	1.5	50,000	475	0.019	50,000	430	0.015	42,800	365	0.011
	2	45,000	385	0.011	45,000	350	0.008	38,520	295	0.006
	2.5	45,000	385	0.007	45,000	350	0.005	38,520	295	0.004
	3	45,000	385	0.007	45,000	350	0.005	38,520	295	0.004
	4	40,000	305	0.004	40,000	275	0.003	34,240	235	0.002
	5	30,000	200	0.003	30,000	180	0.002	25,680	155	0.002
0.4	1	41,000	490	0.036	38,800	425	0.028	34,200	340	0.020
	1.5	41,000	490	0.025	38,800	425	0.020	34,200	340	0.014
	2	41,000	490	0.025	38,800	425	0.020	34,200	340	0.014
	2.5	36,900	395	0.014	34,920	345	0.011	30,780	275	0.008
	3	36,900	395	0.014	34,920	345	0.011	30,780	275	0.008
	4	36,900	395	0.009	34,920	345	0.007	30,780	275	0.005
	5	32,800	315	0.009	31,040	270	0.007	27,360	220	0.005
	6	32,800	315	0.005	31,040	270	0.004	27,360	220	0.003
	8	24,600	205	0.004	23,280	180	0.003	20,520	145	0.002
	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
	1.5	34,200	685	0.045	32,300	580	0.035	28,500	515	0.025
	2	34,200	685	0.032	32,300	580	0.025	28,500	515	0.018
	2.5	34,200	685	0.032	32,300	580	0.025	28,500	515	0.018
	3	30,780	555	0.018	29,070	470	0.014	25,650	415	0.010
	4	30,780	555	0.018	29,070	470	0.014	25,650	415	0.010
	5	30,780	555	0.011	29,070	470	0.009	25,650	415	0.006
	6	27,360	440	0.011	25,840	370	0.009	22,800	330	0.006
	8	20,520	290	0.007	19,380	245	0.005	17,100	215	0.004
	10	20,520	290	0.005	19,380	245	0.004	17,100	215	0.003
	12	10,260	125	0.005	9,690	105	0.004	8,550	95	0.003
	14	10,260	125	0.005	9,690	105	0.004	8,550	95	0.003
	16	3,420	35	0.005	3,230	30	0.004	2,850	25	0.003
0.6	1	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
	2	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
	3	34,200	1,025	0.038	32,300	840	0.029	28,500	685	0.021
	4	30,780	830	0.022	29,070	680	0.017	25,650	555	0.012

Technical Data

UB512,UB512 S6 SERIES

Workpiece		Alloy Steels, Carbon Steels (SCM, SNCM, S45C)			Prehardened Steels (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	5	30,780	830	0.014	29,070	680	0.011	25,650	555	0.008
	6	30,780	830	0.014	29,070	680	0.011	25,650	555	0.008
	8	27,360	655	0.008	25,840	540	0.006	22,800	440	0.005
	10	20,520	430	0.005	19,380	355	0.004	17,100	290	0.003
	12	20,520	430	0.005	19,380	355	0.004	17,100	290	0.003
	14	10,260	185	0.005	9,690	150	0.004	8,550	125	0.003
	16	10,260	185	0.005	9,690	150	0.004	8,550	125	0.003
0.7	2	34,200	1,130	0.063	32,300	930	0.049	28,500	765	0.035
	4	30,780	915	0.025	29,070	755	0.020	25,650	620	0.014
	6	30,780	915	0.016	29,070	755	0.012	25,650	620	0.009
	8	27,360	725	0.016	25,840	595	0.012	22,800	490	0.009
	10	27,360	725	0.009	25,840	595	0.007	22,800	490	0.005
	12	20,520	475	0.006	19,380	390	0.005	17,100	320	0.004
0.8	2	34,200	1,230	0.072	32,300	1,035	0.056	28,500	855	0.040
	3	34,200	1,230	0.050	32,300	1,035	0.039	28,500	855	0.028
	4	34,200	1,230	0.050	32,300	1,035	0.039	28,500	855	0.028
	5	30,780	995	0.029	29,070	840	0.022	25,650	695	0.016
	6	30,780	995	0.029	29,070	840	0.022	25,650	695	0.016
	8	30,780	995	0.018	29,070	840	0.014	25,650	695	0.010
	10	27,360	785	0.018	25,840	660	0.014	22,800	545	0.010
	12	27,360	785	0.011	25,840	660	0.008	22,800	545	0.006
	14	20,520	515	0.007	19,380	435	0.006	17,100	360	0.004
	16	20,520	515	0.007	19,380	435	0.006	17,100	360	0.004
	20	10,260	220	0.007	9,690	185	0.006	8,550	155	0.004
0.9	4	29,250	1,120	0.032	27,630	935	0.025	24,390	775	0.018
	6	29,250	1,120	0.032	27,630	935	0.025	24,390	775	0.018
	8	29,250	1,120	0.020	27,630	935	0.016	24,390	775	0.011
	10	26,000	885	0.020	24,560	740	0.016	21,680	610	0.011
1.0	2	30,800	1,540	0.090	29,100	1,310	0.070	25,700	1,075	0.050
	3	30,800	1,540	0.090	29,100	1,310	0.070	25,700	1,075	0.050
	4	30,800	1,540	0.063	29,100	1,310	0.049	25,700	1,075	0.035
	5	30,800	1,540	0.063	29,100	1,310	0.049	25,700	1,075	0.035
	6	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
	7	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
	8	27,720	1,245	0.036	26,190	1,060	0.028	23,130	870	0.020
	10	27,720	1,245	0.023	26,190	1,060	0.018	23,130	870	0.013
	12	24,640	985	0.023	23,280	840	0.018	20,560	690	0.013
	14	24,640	985	0.014	23,280	840	0.011	20,560	690	0.008
	16	18,480	645	0.014	17,460	550	0.011	15,420	450	0.008
	18	18,480	645	0.009	17,460	550	0.007	15,420	450	0.005
	20	18,480	645	0.009	17,460	550	0.007	15,420	450	0.005
	22	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
	26	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005



UB512, UB512 S6 SERIES

Workpiece		Alloy Steels, Carbon Steels (SCM, SNCM, S45C)			Prehardened Steels (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)
1.0	30	9,240	275	0.009	8,730	235	0.007	7,710	195	0.005
	40	3,080	75	0.009	2,910	65	0.007	2,570	55	0.005
	50	3,080	75	0.006	2,910	65	0.005	2,570	55	0.003
1.2	4	26,300	1,375	0.076	24,800	1,150	0.059	21,900	950	0.042
	6	26,300	1,375	0.076	24,800	1,150	0.059	21,900	950	0.042
	8	23,670	1,115	0.043	22,320	930	0.034	19,710	770	0.024
	10	23,670	1,115	0.027	22,320	930	0.021	19,710	770	0.015
	12	23,670	1,115	0.027	22,320	930	0.021	19,710	770	0.015
	16	21,040	880	0.016	19,840	735	0.013	17,520	610	0.009
	20	15,780	580	0.011	14,880	485	0.008	13,140	400	0.006
	26	7,890	245	0.011	7,440	205	0.008	6,570	170	0.006
1.4	6	21,500	1,295	0.088	20,300	1,100	0.069	18,000	935	0.049
	8	19,350	1,050	0.050	18,270	890	0.039	16,200	755	0.028
	10	19,350	1,050	0.050	18,270	890	0.039	16,200	755	0.028
	16	17,200	830	0.032	16,240	705	0.025	14,400	600	0.018
1.5	4	23,900	1,580	0.135	22,600	1,355	0.105	20,000	1,075	0.075
	5	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
	6	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
	7	23,900	1,580	0.095	22,600	1,355	0.074	20,000	1,075	0.053
	8	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.030
	10	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.03
	12	21,510	1,280	0.054	20,340	1,100	0.042	18,000	870	0.030
	14	21,510	1,280	0.034	20,340	1,100	0.026	18,000	870	0.019
	16	19,120	1,010	0.034	18,080	865	0.026	16,000	690	0.019
	18	19,120	1,010	0.034	18,080	865	0.026	16,000	690	0.019
	20	19,120	1,010	0.020	18,080	865	0.016	16,000	690	0.011
	22	19,120	1,010	0.020	18,080	865	0.016	16,000	690	0.011
	26	14,340	665	0.014	13,560	570	0.011	12,000	450	0.008
	30	14,340	665	0.014	13,560	570	0.011	12,000	450	0.008
	35	7,170	285	0.010	6,780	245	0.008	6,000	195	0.005
	40	7,170	285	0.010	6,780	245	0.008	6,000	195	0.005
1.6	4	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
	6	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
	8	22,200	1,555	0.101	21,000	1,300	0.078	18,500	1,110	0.056
	10	19,980	1,260	0.058	18,900	1,055	0.045	16,650	900	0.032
	12	19,980	1,260	0.058	18,900	1,055	0.045	16,650	900	0.032
	16	19,980	1,260	0.036	18,900	1,055	0.028	16,650	900	0.020
	20	17,760	995	0.036	16,800	830	0.028	14,800	710	0.020
1.8	4	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
	6	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
	8	22,200	1,780	0.113	21,000	1,470	0.088	18,500	1,225	0.063
	10	19,980	1,440	0.065	18,900	1,190	0.050	16,650	990	0.036
	12	19,980	1,440	0.065	18,900	1,190	0.050	16,650	990	0.036

Technical Data

UB512,UB512 S6 SERIES

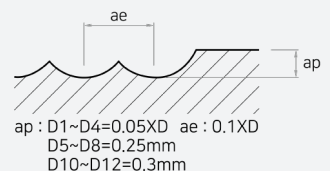
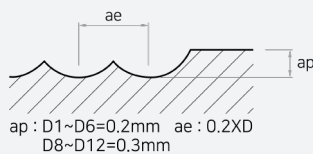
Workpiece		Alloy Steels, Carbon Steels (SCM, SNCM, S45C)			Prehardened Steels (NAK, CENA, KP4)			Hardened Steels (SKD, SKT, STAVAX)		
Hardness		~ HRC35			HRC35 ~ HRC45			HRC45 ~ HRC55		
Strength		~ 1100N/mm2			1100 ~ 1500N/mm2			1500 ~ 2000N/mm2		
Diameter (mm)	Effective Length	RPM	FEED	Ap (mm)	RPM	FEED	Ap (mm)	RPM	FEED	Ap (mm)
1.8	16	19,980	1,440	0.041	18,900	1,190	0.032	16,650	990	0.023
	20	17,760	1,140	0.041	16,800	940	0.032	14,800	785	0.023
2.0	6	18,000	1,795	0.18	17,000	1,525	0.140	15,000	1,285	0.100
	8	18,000	1,795	0.126	17,000	1,525	0.098	15,000	1,285	0.070
	10	18,000	1,795	0.126	17,000	1,525	0.098	15,000	1,285	0.070
	12	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
	14	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
	16	16,200	1,455	0.072	15,300	1,235	0.056	13,500	1,040	0.040
	18	16,200	1,455	0.045	15,300	1,235	0.035	13,500	1,040	0.025
	20	16,200	1,455	0.045	15,300	1,235	0.035	13,500	1,040	0.025
	22	14,400	1,150	0.045	13,600	975	0.035	12,000	820	0.025
	26	14,400	1,150	0.045	13,600	975	0.035	12,000	820	0.025
	30	14,400	1,150	0.027	13,600	975	0.021	12,000	820	0.015
	35	10,800	755	0.018	10,200	640	0.014	9,000	540	0.010
	40	10,800	755	0.018	10,200	640	0.014	9,000	540	0.010
	45	5,400	325	0.018	5,100	275	0.014	4,500	230	0.010
	50	5,400	325	0.018	5,100	275	0.014	4,500	230	0.010
	60	5,400	325	0.018	5,100	275	0.014	4,500	230	0.010
2.5	8	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
	10	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
	12	15,800	1,925	0.158	14,900	1,605	0.123	13,200	1,305	0.088
	16	14,220	1,560	0.090	13,410	1,300	0.070	11,880	1,055	0.050
	20	14,220	1,560	0.090	13,410	1,300	0.070	11,880	1,055	0.050
	22	14,220	1,560	0.056	13,410	1,300	0.044	11,880	1,055	0.031
	26	12,640	1,230	0.056	11,920	1,025	0.044	10,560	835	0.031
	30	12,640	1,230	0.056	11,920	1,025	0.044	10,560	835	0.031
	35	12,640	1,230	0.034	11,920	1,025	0.026	10,560	835	0.019
	40	9,480	810	0.034	8,940	675	0.026	7,920	550	0.019
	45	9,480	810	0.023	8,940	675	0.018	7,920	550	0.013
	50	9,480	810	0.023	8,940	675	0.018	7,920	550	0.013
3.0	6	13,700	2,050	0.270	12,900	1,730	0.21	11,400	1,435	0.150
	8	13,700	2,050	0.270	12,900	1,730	0.21	11,400	1,435	0.150
	10	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
	12	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
	14	13,700	2,050	0.189	12,900	1,730	0.147	11,400	1,435	0.105
	16	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.060
	18	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.060
	20	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.060
	22	12,330	1,660	0.108	11,610	1,400	0.084	10,260	1,160	0.060
	26	12,330	1,660	0.068	11,610	1,400	0.053	10,260	1,160	0.038
	30	12,330	1,660	0.068	11,610	1,400	0.053	10,260	1,160	0.038
	35	10,960	1,310	0.068	10,320	1,105	0.053	9,120	920	0.038
	40	10,960	1,310	0.041	10,320	1,105	0.032	9,120	920	0.023



UB512,UB512 S6 SERIES

Workpiece		Alloy Steels, Carbon Steels (SCM, SNCM, S45C)			Prehardened Steels (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)
3.0	45	10,960	1,310	0.041	10,320	1,105	0.032	9,120	920	0.023
	50	8,220	860	0.027	7,740	725	0.021	6,840	605	0.015
	60	8,220	860	0.027	7,740	725	0.021	6,840	605	0.015
4.0	8	9,800	1,965	0.360	9,300	1,670	0.28	8,200	1,395	0.200
	10	9,800	1,965	0.360	9,300	1,670	0.28	8,200	1,395	0.200
	12	9,800	1,965	0.360	9,300	1,670	0.28	8,200	1,395	0.200
	14	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
	16	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
	18	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
	20	9,800	1,965	0.252	9,300	1,670	0.196	8,200	1,395	0.140
	22	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080
	26	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080
	30	8,820	1,590	0.144	8,370	1,355	0.112	7,380	1,130	0.080
	35	8,820	1,590	0.090	8,370	1,355	0.07	7,380	1,130	0.050
	40	8,820	1,590	0.090	8,370	1,355	0.07	7,380	1,130	0.050
	45	7,840	1,260	0.090	7,440	1,070	0.07	6,560	895	0.050
	50	7,840	1,260	0.090	7,440	1,070	0.07	6,560	895	0.050
	60	7,840	1,260	0.054	7,440	1,070	0.042	6,560	895	0.030
5.0	15	7,700	1,845	0.315	7,300	1,455	0.245	6,400	1,285	0.175
	20	7,700	1,845	0.315	7,300	1,455	0.245	6,400	1,285	0.175
	26	6,930	1,495	0.180	6,570	1,180	0.14	5,760	1,040	0.100
	30	6,930	1,495	0.180	6,570	1,180	0.14	5,760	1,040	0.100
	35	6,930	1,495	0.180	6,570	1,180	0.14	5,760	1,040	0.100
	40	6,930	1,495	0.180	6,570	1,180	0.14	5,760	1,040	0.100
	50	6,930	1,495	0.113	6,570	1,180	0.088	5,760	1,040	0.063
	60	6,160	1,180	0.113	5,840	930	0.088	5,120	820	0.063
6.0	20	6,500	1,900	0.378	6,200	1,600	0.294	5,500	1,330	0.210
	30	6,500	1,900	0.378	6,200	1,600	0.294	5,500	1,330	0.210
8.0	25	4,850	1,800	0.504	4,600	1,500	0.392	4,000	1,280	0.280
	30	4,850	1,800	0.504	4,600	1,500	0.392	4,000	1,280	0.280
10.0	30	3,850	1,650	0.900	3,680	1,400	0.7	3,200	1,200	0.500
	40	3,850	1,650	0.630	3,680	1,400	0.49	3,200	1,200	0.350
12.0	32	3,200	1,520	1.080	3,050	1,300	0.84	2,650	1,100	0.600
	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

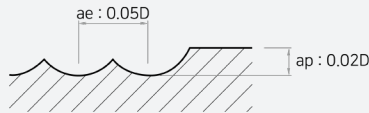


Technical Data

UB532 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (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)	RPM	FEED	RPM	FEED	RPM	FEED
3	35,000	2,800	33,000	2,600	12,000	900
4	26,000	2,300	25,000	2,200	9,000	800
5	21,000	2,100	20,000	2,000	7,000	700
6	17,000	1,900	16,000	1,800	6,000	650
8	13,000	1,700	12,000	1,600	4,500	550
10	10,500	1,450	10,000	1,400	3,500	500
12	9,000	1,400	8,000	1,300	3,000	450

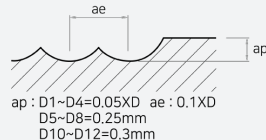
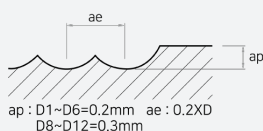
RPM = rev / min
FEED = mm / min



UB542 SERIES ► General Cutting

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (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)	RPM	FEED	RPM	FEED	RPM	FEED
0.1	16,500	80	25,500	185	25,500	160
0.2	16,500	90	25,500	220	25,500	200
0.3	15,300	112	24,000	260	24,000	220
0.4	15,300	112	24,000	260	24,000	220
0.5	13,300	128	20,800	300	20,800	250
0.6	11,200	144	17,600	330	17,600	280
0.8	11,200	144	17,600	330	17,600	280
1.0	10,180	160	16,000	370	16,000	320
1.5	9,500	220	13,000	500	12,800	400
2.0	9,250	260	11,500	640	11,300	590
3.0	8,000	370	10,200	880	9,800	850
4.0	6,720	420	8,500	880	8,200	850
5.0	5,840	460	7,500	880	7,200	850
6.0	5,500	660	6,900	920	6,500	880
8.0	4,600	740	5,600	840	5,300	800
10	4,070	820	4,850	800	4,650	770
12	3,700	890	4,350	800	4,150	770

RPM = rev / min
FEED = mm / min





■ UTB502 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (NAK, CENA, KP4)	
Hardness	~ HRC35		HRC35 ~ HRC45	
Strength	~ 1100N/mm2		1100 ~ 1500N/mm2	
Diameter (mm)	RPM	FEED	RPM	FEED
0.4	36,000	144	27,900	113
0.6	25,200	144	18,900	113
0.8	18,000	144	13,950	108
1	14,850	149	11,250	113
2	7,560	153	5,670	113
3	3,969	108	3,213	90
4	3,213	126	2,556	104

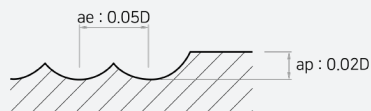
RPM = rev / min
FEED = mm / min



■ USB502 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (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)	RPM	FEED	RPM	FEED	RPM	FEED
3	13,500	1,700	13,200	1,620	12,500	860
4	10,600	1,700	10,300	1,620	9,800	860
5	9,400	1,650	9,050	1,570	8,600	860
6	8,600	1,750	8,250	1,670	7,850	865
8	7,000	1,550	6,700	1,460	6,350	890
10	6,050	1,450	5,800	1,360	5,450	870
12	5,450	1,420	5,200	1,330	4,900	785
16	4,300	1,200	4,000	1,100	3,700	650
20	3,600	1,050	3,200	900	3,000	550

RPM = rev / min
FEED = mm / min

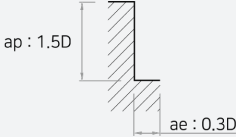
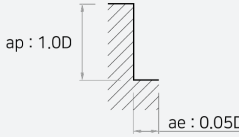


Technical Data

UF50 SERIES

Workpiece	Non ferrous Steel Alloy Steels, Cast Iron		Alloy Steels, Heat Resistant Steels		Stainless Steel		Heat Treatment Steel			
Hardness	~ HRC30		HRC30 ~ HRC38		HRC38 ~ HRC45		HRC45 ~ HRC55		HRC55 ~ HRC65	
Strength	~ 1000N/mm2		1000 ~ 1200N/mm2		1200 ~ 1400N/mm2		1400 ~ 2000N/mm2		2000N/mm2 ~	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	15,600	2,320	12,400	840	8,400	570	3,400	260	2,400	190
8	11,600	2,320	9,200	840	6,300	570	2,400	240	1,800	180
10	9,200	2,320	7,600	840	5,100	570	2,000	290	1,300	190
12	8,000	2,400	6,000	800	4,200	570	1,680	260	1,200	190
14	6,800	2,400	5,200	840	3,600	570	1,400	200	900	130
16	6,000	2,400	4,800	760	3,300	510	1,200	160	800	110
18	5,200	2,320	4,400	720	2,700	420	1,100	150	700	100
20	4,800	2,160	3,600	560	2,400	360	1,000	150	660	100
25	4,300	2,150	3,200	620	2,160	410	900	160	600	100

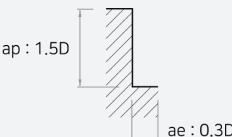
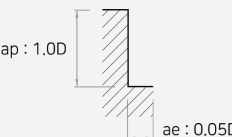
RPM = rev / min
FEED = mm / min

UF51 SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, SNCM, S45C)		Prehardened Steels (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)	RPM	FEED	RPM	FEED	RPM	FEED
6	12,400	840	8,400	570	3,400	260
8	9,200	840	6,300	570	2,400	240
10	7,600	840	5,100	570	2,000	290
12	6,000	800	4,200	570	1,680	260
14	5,200	840	3,600	570	1,400	200
16	4,800	760	3,300	510	1,200	160
18	4,400	720	2,700	420	1,100	150
20	3,600	560	2,400	360	1,000	150
25	3,200	620	2,160	410	900	160

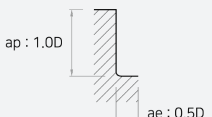
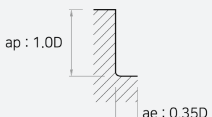
RPM = rev / min
FEED = mm / min



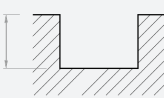
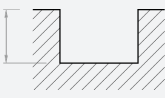
UF51-H SERIES

Workpiece	Alloy Steels, Carbon Steels (SCM, S45C, S50C)		Alloy Steels, Carbon Steels, Prehardened Steels (SCM, SKD, NAK, KP4)		Alloy Steels, Carbon Steels (SCM, S45C, S50C)		Alloy Steels, Carbon Steels, Prehardened Steels (SCM, SKD, NAK, KP4)	
Hardness	~ HRC25		HRC25 ~ HRC40		~ HRC25		HRC25 ~ HRC40	
Strength	-		-		-		-	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	12,000	1,550	10,600	1,100	15,800	2,570	14,300	1,850
8	9,000	1,650	8,100	1,180	11,900	2,700	10,700	1,950
10	7,200	1,650	6,400	1,180	9,500	2,700	8,500	1,950
12	6,000	1,540	5,400	1,140	8,000	2,570	7,100	1,850
16	4,500	1,500	4,100	1,050	6,000	2,450	5,400	1,750
20	3,600	1,330	3,200	900	4,800	2,140	4,300	1,500

RPM = rev / min FEED = mm / min  ap : 1.0D	 ap : 0.8D	 ap : 1.0D ae : 0.5D	 ap : 1.0D ae : 0.35D
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TX202, TX222, TX302 SERIES

Workpiece	NON-Alloy Steels, Alloy Steels, Cast Iron		Alloy Steels, Heat Resistant Steels		Stainless Steels		Cast Iron		Aluminum Alloys		Copper, Brass, nonferrous Metals	
Hardness	~ HRC30		HRC30 ~ HRC45		-		-		-		-	
Strength	~ 1000N/mm ²		1000 ~ 1500N/mm ²		-		-		-		-	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	14,300	105	8,500	65	7,150	50	18,700	205	44,000	330	24,700	200
1.5	9,350	150	5,550	85	5,600	80	12,100	205	27,500	385	20,300	300
2	7,850	160	5,150	100	4,300	80	9,350	220	22,000	460	16,500	340
3	6,100	180	3,800	120	3,150	100	6,050	220	15,400	460	11,000	340
4	5,150	255	3,150	155	2,650	130	4,600	220	11,000	460	8,800	340
5	4,300	270	2,550	160	2,150	135	3,650	220	9,150	460	6,800	340
6	3,800	300	2,300	190	1,950	155	2,950	255	7,600	485	5,700	375
8	2,850	325	1,700	170	1,450	155	2,200	275	5,700	485	4,400	375
10	2,200	280	1,350	135	1,150	135	1,850	285	4,600	485	3,400	375
12	1,850	240	1,150	110	950	110	1,450	295	3,750	485	2,850	375
14	1,700	215	1,050	100	850	100	1,300	310	3,300	485	2,400	375
16	1,500	185	950	95	700	95	1,100	320	2,850	485	2,200	375
20	1,150	145	700	70	550	70	900	340	2,200	485	1,700	375

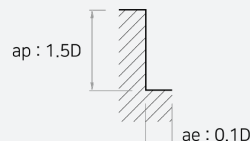
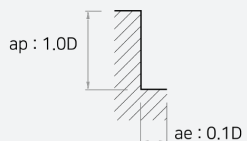
RPM = rev / min FEED = mm / min  ap : 0.5D (ap : UP TO Ø 3.0 : 0.2D)	 ap : 1.0D
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Technical Data

TX204, TX224, TX304 SERIES

Workpiece	NON-Alloy Steels, Alloy Steels, Cast Iron		Alloy Steels, Heat Resistant Steels		Stainless Steels		Cast Iron		Aluminum Alloys		Copper, Brass, nonferrous Metals	
Hardness	~ HRC30		HRC30 ~ HRC45		-		-		-		-	
Strength	~ 1000N/mm ²		1000 ~ 1500N/mm ²		-		-		-		-	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	17,600	150	10,250	85	8,650	75	18,700	620	44,000	1,050	24,700	605
1.5	11,800	215	7,050	115	7,050	120	12,100	620	27,500	1,160	20,300	910
2	9,850	240	6,450	145	5,350	120	9,350	640	22,000	1,320	16,500	1,035
3	7,600	270	4,750	170	3,950	145	6,050	640	15,400	1,320	11,000	1,035
4	6,450	485	3,950	300	3,300	240	4,600	640	11,000	1,320	8,800	1,035
5	5,350	510	3,200	305	2,700	255	3,650	640	9,150	1,320	6,800	1,035
6	4,750	560	2,850	350	2,400	280	2,950	770	7,600	1,430	5,700	1,100
8	3,550	605	2,150	325	1,800	300	2,200	815	5,700	1,430	4,400	1,100
10	2,750	520	1,700	255	1,450	255	1,850	860	4,600	1,430	3,400	1,100
12	2,350	440	1,450	215	1,150	205	1,450	900	3,750	1,430	2,850	1,100
14	2,100	395	1,300	195	1,050	190	1,300	945	3,300	1,430	2,400	1,100
16	1,850	350	1,150	170	950	170	1,100	970	2,850	1,430	2,200	1,100
20	1,450	270	900	135	700	130	900	1,035	2,200	1,430	1,700	1,100

RPM = rev / min
FEED = mm / min



* The FEED for long & extra long types, should be reduced by around 30~40%.



TX304H SERIES

Workpiece	NON-Alloy Steels, Alloy Steels, Cast Iron		Alloy Steels, Heat Resistant Steels		Stainless Steels		Cast Iron		Aluminum Alloys		Copper, Brass, nonferrous Metals	
Hardness	~ HRC30		HRC30 ~ HRC45		-		-		-		-	
Strength	~ 1000N/mm ²		1000 ~ 1500N/mm ²		-		-		-		-	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	17,600	150	10,250	85	8,650	75	18,700	620	44,000	1,050	24,700	605
1.5	11,800	215	7,050	115	7,050	120	12,100	620	27,500	1,160	20,300	910
2	9,850	240	6,450	145	5,350	120	9,350	640	22,000	1,320	16,500	1,035
3	7,600	270	4,750	170	3,950	145	6,050	640	15,400	1,320	11,000	1,035
4	6,450	485	3,950	300	3,300	240	4,600	640	11,000	1,320	8,800	1,035
5	5,350	510	3,200	305	2,700	255	3,650	640	9,150	1,320	6,800	1,035
6	4,750	560	2,850	350	2,400	280	2,950	770	7,600	1,430	5,700	1,100
8	3,550	605	2,150	325	1,800	300	2,200	815	5,700	1,430	4,400	1,100
10	2,750	520	1,700	255	1,450	255	1,850	860	4,600	1,430	3,400	1,100
12	2,350	440	1,450	215	1,150	205	1,450	900	3,750	1,430	2,850	1,100
14	2,100	395	1,300	195	1,080	190	1,300	945	3,300	1,430	2,400	1,100
16	1,850	350	1,150	170	950	170	1,100	970	2,850	1,430	2,200	1,100
20	1,450	270	900	135	700	130	900	1,035	2,200	1,430	1,700	1,100

RPM = rev / min FEED = mm / min ap : 1.0D ae : 0.1D	ap : 1.5D ae : 0.1D
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Technical Data

ZE302, ZE322 SERIES ► General Cutting

Workpiece	Alloy Steels, Heat Resistant Steels		Hardened Steels		Stainless Steels	
Hardness	HRC30 ~ HRC40		HRC40 ~ HRC50		-	
Strength	1000 ~ 1250N/mm2		1250 ~ 1750N/mm2		-	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED
2	9,700	220	6,350	135	5,300	105
3	7,500	240	4,670	160	3,880	135
4	6,350	345	3,880	205	3,250	175
5	5,300	370	3,170	220	2,650	185
6	4,670	405	2,830	255	2,380	205
8	3,530	435	2,120	230	1,760	205
10	2,730	380	1,680	185	1,420	185
12	2,310	320	1,420	150	1,140	150
16	1,850	255	1,140	125	890	125
20	1,420	195	890	90	705	90
25	1,150	150	705	80	580	70

RPM = rev / min
FEED = mm / min

ap : 0.5D



(ap : UP TO Ø 3.0 : 0.2D)

ap : 0.05D



ZE302, ZE322 SERIES ► High Speed Cutting

Workpiece	Alloy Steels, Heat Resistant Steels		Hardened Steels				Stainless Steels	
Hardness	HRC30 ~ HRC40		HRC40 ~ HRC50		HRC40 ~ HRC55		-	
Strength	1000 ~ 1250N/mm2		1250 ~ 1750N/mm2		1750 ~ 2000N/mm2		-	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	18,000	665	11,800	415	8,700	175	9,800	345
3	11,000	655	6,800	435	5,600	185	6,200	370
4	10,300	725	6,300	430	4,300	185	5,300	370
5	9,350	715	5,570	420	3,700	185	4,620	355
6	8,200	750	4,930	470	3,250	185	4,100	390
8	6,300	770	3,780	410	2,470	185	3,120	355
10	4,830	750	2,940	360	2,000	160	2,470	310
12	4,100	750	2,520	345	1,680	160	2,100	300
16	3,260	715	2,000	355	1,890	150	1,940	290
20	2,520	665	1,580	310	1,680	150	1,630	275
25	2,000	635	1,260	340	1,570	150	1,420	290

RPM = rev / min
FEED = mm / min

ap : 0.5D



(ap : UP TO Ø 3.0 : 0.2D)

ap : 0.05D

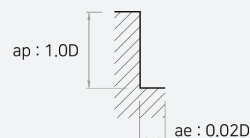
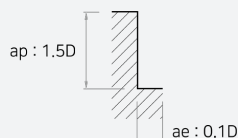




ZE304, ZE324 SERIES ► General Cutting

Workpiece	Alloy Steels, Heat Resistant Steels		Hardened Steels				Stainless Steels	
Hardness	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc40 ~ HRc55		-	
Strength	1000 ~ 1250N/mm2		1250 ~ 1750N/mm2		1750 ~ 2000N/mm2		-	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	12,100	320	7,900	195	2,700	47	6,600	160
3	9,400	370	5,840	230	2,000	58	4,850	195
4	7,900	655	4,850	405	1,500	58	4,070	320
5	6,600	690	3,970	415	1,300	58	3,320	345
6	5,830	760	3,530	470	1,150	58	2,980	380
8	4,410	815	2,650	435	880	58	2,200	405
10	3,420	700	2,100	345	720	46	1,760	345
12	2,880	600	1,760	290	590	46	1,430	275
16	2,310	470	1,430	230	460	29	1,150	230
20	1,760	370	1,110	185	340	29	880	175
25	1,430	290	880	150	270	23	715	140

RPM = rev / min
FEED = mm / min

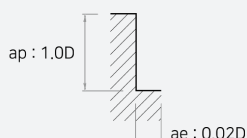


* Please reduce cutting speed around 20~30% from the above table or ZE524 & ZE324 series.

ZE304, ZE324 SERIES ► High Speed Cutting

Workpiece	Alloy Steels, Heat Resistant Steels		Hardened Steels				Stainless Steels	
Hardness	HRc30 ~ HRc40		HRc40 ~ HRc50		HRc40 ~ HRc55		-	
Strength	1000 ~ 1250N/mm2		1250 ~ 1750N/mm2		1750 ~ 2000N/mm2		-	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	31,400	1,230	23,500	520	12,600	275	21,600	465
3	19,300	1,210	13,600	735	8,900	390	13,500	660
4	18,100	1,330	12,600	865	7,090	465	11,800	775
5	16,400	1,310	11,100	1,010	6,040	530	10,300	910
6	14,400	1,380	9,900	1,100	5,300	580	9,100	990
8	11,000	1,430	7,600	1,090	3,990	575	6,900	980
10	8,500	1,380	5,880	1,110	3,150	580	5,420	1,000
12	7,200	1,380	5,040	1,090	2,620	575	4,600	985
16	5,700	1,320	3,990	1,010	2,000	535	3,590	910
20	4,400	1,270	3,150	930	1,580	490	2,840	840
25	3,500	1,170	2,520	755	1,260	390	2,270	680

RPM = rev / min
FEED = mm / min



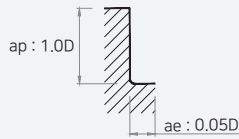
* Please reduce cutting speed around 20~30% from the above table or ZE524 & ZE324 series.

Technical Data

ZR304H, ZR324H SERIES

Workpiece	NON-Alloy Steels, Alloy Steels, Cast Iron		Alloy Steels, Heat Resistant Steels		Hardened Steels	
Hardness	~ HRC30		HRC30 ~ HRC45		HRC45 ~ HRC50	
Strength	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED
6	7,000	910	4,200	560	3,000	140
8	5,300	980	3,200	530	2,500	190
10	4,100	840	2,500	410	2,050	165
12	3,500	730	2,100	340	1,700	140

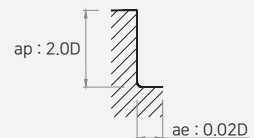
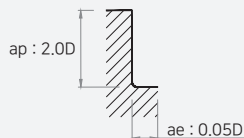
RPM = rev / min
FEED = mm / min



ZR322 SERIES ► Side Cutting

Workpiece	NON-Alloy Steels, Alloy Steels, Cast Iron		Alloy Steels, Heat Resistant Steels		Hardened Steels	
Hardness	~ HRC30		HRC30 ~ HRC45		HRC45 ~ HRC50	
Strength	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	6,950	195	4,500	150	3,300	100
4	5,600	240	3,600	170	2,700	105
5	4,800	250	3,050	210	2,350	125
6	4,150	250	2,650	210	2,050	125
8	3,150	265	2,000	210	1,600	125
10	2,150	265	1,700	210	1,250	125
12	1,800	210	1,500	185	1,050	105
16	1,800	185	1,100	140	840	90
20	1,300	130	860	105	625	65

RPM = rev / min
FEED = mm / min





ZR322 SERIES ► Slotting

Workpiece	NON-Alloy Steels, Alloy Steels, Cast Iron		Alloy Steels, Heat Resistant Steels		Hardened Steels	
Hardness	~ HRc30		HRc30 ~ HRc45		HRc45 ~ HRc50	
Strength	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	6,950	160	4,500	80	3,300	55
4	5,600	195	3,600	100	2,700	60
5	4,800	240	3,050	115	2,350	75
6	4,150	290	2,650	145	2,050	90
8	3,150	210	2,000	145	1,600	90
10	2,150	250	1,700	140	1,250	90
12	1,800	200	1,500	135	1,050	75
16	1,800	215	1,100	100	840	60
20	1,300	160	860	70	625	45

RPM = rev / min
FEED = mm / min

ZR324 SERIES

Workpiece	NON-Alloy Steels, Alloy Steels, Cast Iron		Alloy Steels, Heat Resistant Steels		Hardened Steels	
Hardness	~ HRc30		HRc30 ~ HRc45		HRc45 ~ HRc50	
Strength	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	6,950	195	4,500	150	3,300	100
4	5,600	240	3,600	170	2,700	105
5	4,800	250	3,050	210	2,350	125
6	4,150	250	2,650	210	2,050	125
8	3,150	265	2,000	210	1,600	125
10	2,150	265	1,700	210	1,250	125
12	1,800	210	1,500	185	1,050	105
16	1,880	185	1,100	140	840	90
20	1,300	130	860	105	625	65

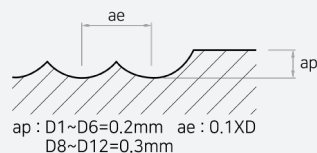
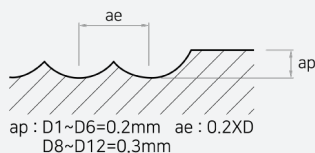
RPM = rev / min
FEED = mm / min

Technical Data

DB312, DB342 SERIES ► General Cutting

Workpiece	NON-Alloy Steels, Alloy Steels, Cast Iron		Alloy Steels, Heat Resistant Steels		Hardened Steels	
Hardness	~ HRC30		HRC30 ~ HRC45		HRC45 ~ HRC50	
Strength	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED
1	16,500	290	13,300	230	6,100	105
1.5	16,500	405	12,700	310	5,590	140
2	15,100	865	11,200	565	4,900	175
2.5	15,100	865	11,200	565	4,900	175
3	13,800	780	10,500	530	4,750	175
4	11,000	850	8,800	610	4,410	205
5	9,600	945	7,600	665	3,860	205
6	8,900	1,150	7,200	955	3,340	220
8	7,500	1,500	6,050	1,060	2,590	255
10	6,700	1,750	5,300	1,170	2,140	260
12	6,150	2,000	4,900	1,280	1,840	280
16	5,000	1,950	3,900	1,220	1,420	280
20	4,350	1,900	3,400	1,200	1,170	290

RPM = rev / min
FEED = mm / min



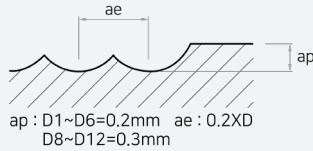
* Please reduce cutting speed around 20~30% from the above table or DB522 series.



■ DB312, DB342 SERIES ► High Speed Cutting

Workpiece	NON-Alloy Steels, Alloy Steels, Cast Iron		Alloy Steels, Heat Resistant Steels	
Hardness	~ HRc45		HRc30 ~ HRc40	
Strength	~ 1000N/mm ²		1500 ~ 2000N/mm ²	
Diameter (mm)	RPM	FEED	RPM	FEED
1	26,000	1,500	26,000	920
1.5	24,000	1,600	24,000	990
2	22,000	1,700	22,000	1,080
2.5	22,000	2,000	20,000	1,130
3	22,000	2,300	17,800	1,200
4	22,000	3,350	14,300	1,300
5	22,000	4,150	12,600	1,380
6	22,000	4,600	11,000	1,440
8	17,500	4,600	8,800	1,440
10	14,700	4,450	7,350	1,380
12	12,800	4,450	6,400	1,330
16	10,000	4,000	5,000	1,150
20	8,350	3,650	4,150	1,060

RPM = rev / min
FEED = mm / min



* Please reduce cutting speed around 20~30% from the above table or DB522 series.

Technical Data

TXB202, TXB222, TXB232, TXB302 SERIES

Workpiece	Carbon Steels, Alloy Steels, Tool Steels				Hardened Steels		Cast Iron		Aluminum Alloys	
Hardness	~ HRC30		HRC30 ~ HRC45		HRC45 ~ HRC55		-		-	
Strength	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²		-		-	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	12,350	640	9,150	415	4,000	125	10,500	220	30,800	395
3	11,400	575	8,550	390	3,800	125	7,050	230	20,500	395
4	8,950	630	7,150	450	3,600	150	5,150	285	15,400	395
5	7,800	700	6,200	490	3,100	150	4,150	330	12,100	470
6	7,250	870	5,900	705	2,700	160	3,400	360	10,300	470
8	6,100	1,090	4,900	785	2,050	190	2,500	460	7,900	540
10	5,450	1,330	4,350	870	1,750	190	2,050	460	6,150	540
12	4,990	1,500	3,950	950	1,500	210	1,750	460	5,150	630
14	4,530	1,495	3,600	925	1,300	210	1,400	460	4,300	630
16	4,085	1,470	3,200	905	1,150	210	1,300	460	3,850	540
18	3,800	1,425	3,000	890	1,050	210	1,100	460	3,400	540
20	3,550	1,425	2,800	885	950	210	1,050	420	2,950	540

RPM = rev / min
FEED = mm / min

* Please reduce cutting speed 30~40% from the above table when using long and extra long type

TXB204, TXB304 SERIES

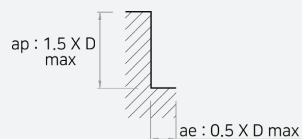
Workpiece	Carbon Steels, Alloy Steels, Tool Steels				Hardened Steels		Cast Iron		Aluminum Alloys	
Hardness	~ HRC30		HRC30 ~ HRC45		HRC45 ~ HRC55		-		-	
Strength	~ 1000N/mm ²		1000 ~ 1500N/mm ²		1500 ~ 2000N/mm ²		-		-	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	15,400	1,000	11,400	600	5,000	200	13,100	300	38,500	600
3	14,300	900	10,700	600	4,800	200	8,800	300	25,600	600
4	11,200	900	8,900	700	4,500	200	6,400	400	19,300	600
5	9,800	1,100	7,800	700	3,900	200	5,200	500	15,100	700
6	9,100	1,300	7,400	1,100	3,400	200	4,300	500	12,900	700
8	7,600	1,600	6,100	1,200	2,600	300	3,100	700	9,900	800
10	6,800	2,000	5,400	1,300	2,200	300	2,600	700	7,700	800
12	6,200	2,300	4,900	1,400	1,900	300	2,200	700	6,400	900
14	5,700	2,200	4,500	1,400	1,600	300	1,800	700	5,400	900
16	5,100	2,200	4,000	1,400	1,400	300	1,600	700	4,800	800
18	4,800	2,100	3,800	1,300	1,300	300	1,400	700	4,300	800
20	4,400	2,100	3,500	1,300	1,200	300	1,300	600	3,700	800



X-STAR SERIES

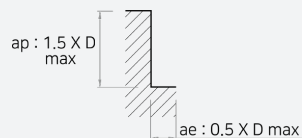
Workpiece	Low Carbon Steels		Low Carbon Steels		Med Alloy Steels		Mold&Die Steels		Grey Cast Iron		Cast Iron-Ductile	
Hardness	~ HB175		~ HB275		~ HB275		~ HB275		~ HB200		~ HB300	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3	16,500	335	13,585	276	11,320	230	5,820	118	15,360	300	7,765	158
4	12,340	326	10,190	326	8,520	340	4,380	175	11,550	462	5,810	232
5	9,895	502	8,150	413	6,790	345	3,490	177	9,215	468	4,655	236
6	8,250	586	6,795	483	5,660	403	2,910	207	7,680	546	3,880	276
8	6,185	754	5,095	620	4,245	517	2,185	266	5,760	702	2,910	354
10	4,950	955	4,075	786	3,395	656	1,745	337	4,610	889	2,330	449
12	4,125	963	3,395	793	2,830	661	1,455	340	3,840	897	1,940	453
14	3,535	890	2,910	733	2,425	592	1,250	314	3,290	829	1,665	419
16	3,095	817	2,545	672	2,125	561	1,090	288	2,880	761	1,455	384
18	2,750	809	2,265	667	1,885	556	970	285	2,560	754	1,295	381
20	2,475	804	2,040	662	1,700	552	875	283	2,305	749	1,165	378
25	1,975	631	1,630	521	1,360	435	700	230	1,850	600	930	300

RPM = rev / min
FEED = mm / min



Workpiece	Cast Iron Malleable		Stainless 300 Series		Stainless 400 Series		Stainless PH Series		Titanium Alloys		Heat Resistant Steels	
Hardness	~ HB300		~ HB275		~ HB185		~ HB325		~ HB295		~ HB300	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
3	4,850	95	9,705	175	13,585	250	8,085	125	9,705	225	2,590	50
4	3,660	146	7,245	290	10,190	407	6,050	242	7,245	290	1,910	76
5	2,910	147	5,820	300	8,150	430	4,850	250	5,820	355	1,550	75
6	2,425	173	4,850	355	6,795	560	4,045	300	4,850	405	1,295	75
8	1,820	221	3,640	405	5,095	635	3,030	355	3,640	455	970	100
10	1,455	280	2,910	405	4,075	635	2,425	355	2,910	455	775	100
12	1,215	283	2,425	405	3,395	635	2,020	355	2,425	455	645	100
14	1,040	262	2,080	405	2,910	635	1,735	355	2,080	455	555	100
16	910	240	1,820	405	2,545	635	1,515	355	1,820	455	485	100
18	810	238	1,615	380	2,265	560	1,350	300	1,615	405	430	100
20	730	236	1,455	380	2,040	560	1,215	300	1,455	405	390	100
25	585	187	1,160	370	1,630	560	970	300	1,160	405	305	73

RPM = rev / min
FEED = mm / min



Technical Data

X-STAR SERIES ► General Cutting

Workpiece	Hardened Steels	
Hardness	HRc30 ~ HRc45	
Diameter (mm)	RPM	FEED
3	6,900	552
4	5,175	414
5	4,140	331
6	3,450	414
8	2,588	414
10	2,070	414
12	1,725	414
14	1,479	414
16	1,294	414
18	1,150	368
20	1,035	414
25	828	397

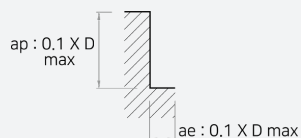
RPM = rev / min
FEED = mm / min



X-STAR SERIES ► Side Cutting

Workpiece	Hardened Steels	
Hardness	HRc30 ~ HRc45	
Diameter (mm)	RPM	FEED
3	8,493	679
4	6,369	510
5	5,096	611
6	4,246	849
8	3,185	764
10	2,548	713
12	2,123	764
14	1,820	728
16	1,592	701
18	1,415	679
20	1,274	662
25	1,019	611

RPM = rev / min
FEED = mm / min

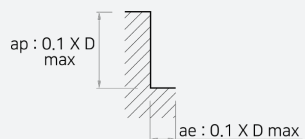




■ X-STAR SERIES ► High Speed Cutting

Workpiece	Hardened Steels	
Hardness	HRC30 ~ HRC45	
Diameter (mm)	RPM	FEED
3	18,047	2,166
4	13,535	1,624
5	10,828	1,732
6	9,023	2,166
8	6,768	1,895
10	5,414	1,732
12	4,512	1,985
14	3,867	1,856
16	3,384	1,895
18	3,008	1,805
20	2,707	1,841
25	2,166	1,646

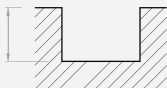
RPM = rev / min
FEED = mm / min



Technical Data

SE502 SERIES ▶ Slotting

Workpiece	Carbon Steels, Alloy Steels, Tool Steels				Stainless Steels 300 Series		Stainless Steels 400 Series	
Hardness	~ HRc30		HRc30 ~ HRc40					
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	13,000	220	9,800	160	21,000	170	29,600	100
1.2	12,500	210	9,000	150	17,500	140	24,000	100
1.5	12,000	200	8,300	140	14,000	110	19,600	100
2	11,560	190	7,560	120	10,500	85	14,800	100
2.5	10,240	200	6,560	130	8,500	70	11,600	105
3	8,920	210	5,560	140	8,000	65	11,200	90
4	7,560	300	4,620	180	7,500	75	10,500	80
5	6,300	320	3,780	190	6,000	80	8,400	105
6	5,560	350	3,360	220	5,000	80	7,000	120
8	4,200	380	2,520	200	3,750	90	5,200	150
10	3,260	330	2,000	160	3,000	90	4,200	195
12	2,740	280	1,680	130	2,500	95	3,500	200
14	2,470	250	1,520	120	2,150	100	3,000	180
16	2,200	220	1,360	110	1,880	105	2,600	165
18	1,940	195	1,210	95	1,670	110	2,300	160
20	1,680	170	1,060	80	1,500	115	2,100	160

RPM = rev / min FEED = mm / min ap : 0.5D  (ap : UP TO Ø 3.0 : 0.2D)	ap : 0.2D 
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SE503 SERIES ► Slotting

Workpiece	Carbon Steels, Alloy Steels, Tool Steels						Cast Iron		Stainless Steels		Copper Alloy		Titanium Alloys		Inconel	
Hardness	~ HRC20		HRC20 ~ HRC30		HRC30 ~ HRC45											
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	30,000	1,000	23,000	800	16,500	450	20,000	500	16,500	350	25,000	360	16,500	380	6,500	100
1.5	20,000	1,000	15,500	800	11,000	450	13,000	500	11,000	350	16,500	360	11,000	380	4,500	100
2	15,000	1,000	11,500	800	8,200	450	10,000	500	8,400	350	12,500	360	8,200	380	3,500	100
2.5	12,000	1,000	9,400	800	7,500	450	8,000	500	6,500	350	10,000	360	6,500	380	2,600	100
3	10,080	950	7,750	740	5,550	395	6,700	520	5,550	350	8,300	360	5,550	395	2,200	100
4	7,550	1,400	5,850	1,100	4,200	595	5,050	550	4,200	320	6,200	400	4,200	595	1,650	105
5	6,000	1,500	4,700	1,200	3,300	650	4,000	600	3,300	350	5,000	420	3,300	600	1,400	120
6	5,050	1,650	3,850	1,250	2,800	700	3,350	660	2,800	370	4,100	440	2,800	700	1,150	130
8	3,750	1,700	2,950	1,330	2,100	710	2,500	665	2,100	375	3,100	500	2,100	710	850	120
10	3,050	1,650	2,300	1,250	1,650	665	2,000	630	1,350	355	2,500	530	1,650	665	650	120
12	2,500	1,500	2,000	1,200	1,350	605	1,650	570	1,350	320	2,000	550	1,350	605	555	110
14	2,150	1,550	1,700	1,200	1,200	605	1,450	580	1,200	250	1,700	600	1,200	605	500	110
16	1,850	1,600	1,450	1,250	1,000	650	1,250	600	1,000	200	1,500	650	1,000	610	400	115
18	1,650	1,650	1,300	1,300	920	700	1,100	620	900	150	1,300	700	900	615	350	120
20	1,500	1,700	1,150	1,350	840	750	1,000	640	800	100	1,200	750	800	620	320	125

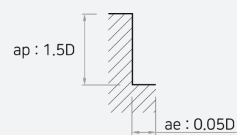
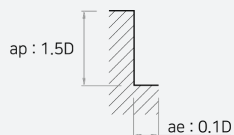
RPM = rev / min FEED = mm / min	ap : 0.5D 	ap : 0.2D 
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Technical Data

SE503 SERIES ► Side Cutting

Workpiece	Carbon Steels, Alloy Steels, Tool Steels						Cast Iron		Stainless Steels		Copper Alloy		Titanium Alloys		Inconel	
Hardness	~ HRc20		HRc20 ~ HRc30		HRc30 ~ HRc45											
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	30,000	1,130	23,000	904	16,500	510	20,000	565	16,500	395	25,000	405	16,500	430	6,500	115
1.5	20,000	1,130	15,500	904	11,000	510	13,000	565	11,000	395	16,500	405	11,000	430	4,500	115
2	15,000	1,130	11,500	904	8,200	510	10,000	565	8,400	395	12,500	405	8,200	430	3,500	115
2.5	12,000	1,130	9,400	904	7,500	510	8,000	565	6,500	395	10,000	405	6,500	430	2,600	115
3	10,080	1,080	7,750	850	5,550	450	6,700	605	5,550	365	8,300	390	5,550	450	2,200	110
4	7,550	1,630	5,850	1,260	4,200	680	5,050	630	4,200	365	6,200	440	4,200	680	1,650	125
5	6,000	1,695	4,700	1,355	3,300	735	4,000	680	3,300	395	5,000	475	3,300	680	1,400	135
6	5,050	1,910	3,850	1,470	2,800	810	3,350	755	2,800	430	4,100	490	2,800	810	1,150	150
8	3,750	1,950	2,950	1,500	2,100	810	2,500	770	2,100	430	3,100	550	2,100	810	850	140
10	3,050	1,890	2,300	1,400	1,650	775	2,000	720	1,350	415	2,500	570	1,650	775	650	140
12	2,500	1,700	2,000	1,340	1,350	700	1,650	665	1,350	365	2,000	620	1,350	700	555	125
14	2,150	1,750	1,700	1,355	1,200	685	1,450	655	1,200	280	1,700	680	1,200	685	500	125
16	1,850	1,805	1,450	1,410	1,000	735	1,250	680	1,000	225	1,500	735	1,000	690	400	130
18	1,650	1,865	1,300	1,470	920	790	1,100	700	900	170	1,300	790	900	695	350	135
20	1,500	1,920	1,150	1,525	840	845	1,000	725	800	115	1,200	850	800	700	320	140

RPM = rev / min
FEED = mm / min





SE504, SR504 SERIES ► Side Cutting

Workpiece	Alloy Steels, Cast Iron		Stainless Steels 300 Series		Stainless Steels 400 Series		Titanium		Inconel	
Hardness	~ HB230									
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	40,500	300	20,000	250	28,000	160	23,925	225	9,330	60
1.5	27,000	300	13,000	180	18,500	160	15,730	185	6,135	50
2	20,300	300	10,000	150	14,000	160	12,010	165	4,685	45
2.5	16,200	300	8,000	120	11,000	165	9,490	155	3,700	40
3	13,500	275	6,690	105	9,350	145	8,045	135	3,135	35
4	10,100	370	5,050	135	7,000	185	6,005	195	2,340	50
5	8,090	410	4,050	165	5,600	230	4,815	360	1,875	60
6	6,750	480	3,350	190	4,700	265	4,030	415	1,570	70
8	5,050	620	2,500	250	3,500	340	3,000	545	1,170	95
10	4,050	780	2,050	320	2,800	430	2,430	695	945	120
12	3,370	750	1,680	310	2,350	435	2,010	685	780	115
14	2,890	670	1,400	280	2,000	405	1,700	820	715	150
16	2,500	630	1,250	265	1,750	370	1,500	950	600	180
18	2,250	630	1,100	260	1,550	365	1,320	1,245	515	250
20	2,000	620	1,000	260	1,400	365	1,200	1,875	480	390

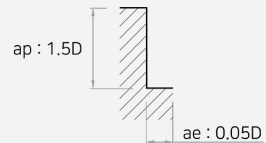
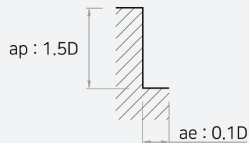
RPM = rev / min FEED = mm / min ap : 1.0D	ap : 0.2D
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Technical Data

SE504, SR504 SERIES ► Side Cutting

Workpiece	Alloy Steels, Cast Iron		Stainless Steels 300 Series		Stainless Steels 400 Series		Titanium		Inconel	
Hardness	~ HB230									
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	40,500	335	20,000	280	28,000	180	23,925	260	9,570	65
1.5	27,000	335	13,000	200	18,500	180	15,730	215	6,290	55
2	20,300	335	10,000	170	14,000	180	12,010	195	4,805	50
2.5	16,200	335	8,000	135	11,000	185	9,490	180	3,795	45
3	13,500	310	6,690	115	9,350	160	8,045	155	3,215	40
4	10,100	415	5,050	150	7,000	205	6,000	335	2,520	60
5	8,090	460	4,050	185	5,600	260	4,815	410	2,020	75
6	6,750	540	3,350	215	4,700	295	4,030	470	1,690	85
8	5,050	700	2,500	280	3,500	380	3,000	620	1,260	110
10	4,050	880	2,050	360	2,800	485	2,430	790	1,020	145
12	3,370	845	1,680	350	2,350	490	2,010	780	845	140
14	2,890	755	1,400	315	2,000	455	1,700	925	715	170
16	2,500	710	1,250	295	1,750	415	1,500	1,075	600	205
18	2,250	710	1,100	290	1,550	410	1,320	1,410	515	275
20	2,000	700	1,000	290	1,400	410	1,200	2,120	480	430

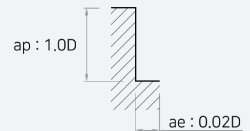
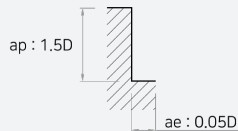
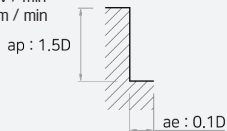
RPM = rev / min
FEED = mm / min



SE506 SERIES ► Side Cutting - Normal Speed

Workpiece	Carbon Steels, Alloy Steels, Tool Steels				Stainless Steels, Titanium Alloy		Inconel	
Hardness	~ HRc30		HRc30 ~ HRc40					
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	5,560	2,000	3,880	1,370	3,370	1,100	1,350	280
8	4,200	2,000	2,940	1,370	2,490	1,100	1,000	280
10	3,360	2,000	2,320	1,370	1,920	1,100	440	280
12	2,840	1,680	2,000	1,160	1,610	1,000	400	250
16	2,100	1,260	1,480	880	1,160	770	310	190
20	1,680	1,010	1,160	690	900	620	250	155

RPM = rev / min
FEED = mm / min





SE506 SERIES ► Side Cutting - High Speed

Workpiece	Carbon Steels, Alloy Steels, Tool Steels				Stainless Steels, Titanium Alloy		Inconel	
Hardness	~ HRc30		HRc30 ~ HRc40					
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
6	22,200	8,000	16,800	6,090	13,400	4,400	5,400	1,100
8	16,800	8,000	12,600	6,090	9,900	4,400	4,000	1,100
10	13,400	8,000	9,988	5,990	7,600	4,400	1,700	1,100
12	11,350	6,720	8,400	5,040	6,400	4,000	1,600	1,000
16	8,400	5,040	6,300	3,780	4,600	3,000	1,200	760
20	6,700	4,040	5,040	3,050	3,600	2,400	1,000	620

RPM = rev / min
FEED = mm / min

ap : 1.5D
ae : 0.1D

ap : 1.5D
ae : 0.05D

SR505 SERIES ► Side Cutting

Workpiece	Alloy Steels, Tool Steels HRc30~45		Stainless Steels, Titanium		Inconel	
Hardness						
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED
6	6,400	640	4,000	500	3,200	240
8	4,800	720	3,000	450	2,400	240
10	3,900	780	2,400	480	2,000	250
12	3,200	800	2,000	500	1,600	240
16	2,400	720	1,500	450	1,200	240
20	2,000	600	1,200	360	1,000	250

RPM = rev / min
FEED = mm / min

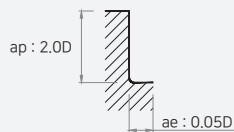
ap : 2.0D
ae : 0.05D

Technical Data

SR507 SERIES ► Side Cutting

Workpiece	Alloy Steels, Tool Steels HRC30~45		Stainless Steels, Titanium		Inconel	
Hardness						
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED
6	6,400	890	4,000	700	3,200	330
8	4,800	1,000	3,000	630	2,400	330
10	3,900	1,090	2,400	670	2,000	350
12	3,200	1,120	2,000	700	1,600	330
16	2,400	1,000	1,500	630	1,200	330
20	2,000	840	1,200	500	1,000	350

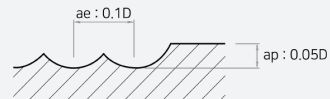
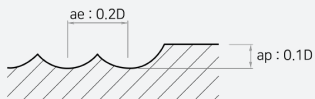
RPM = rev / min
FEED = mm / min



SB502 SERIES

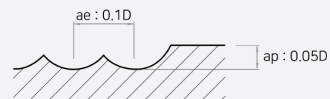
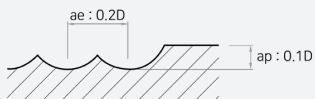
Workpiece	Carbon Steel, Cast Iron		Alloy Steels, Prehardened Steels		Heat Treated Steels			
Hardness	150 ~ 250HB		25 ~ 35HRc		35 ~ 45HRc		45 ~ 55HRc	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	19,100	770	12,800	370	10,200	270	8,900	190
4	10,800	1,100	7,200	550	5,700	400	5,000	280
6	7,700	1,300	5,200	660	4,100	480	3,600	330
8	6,000	1,400	4,000	700	3,200	510	2,800	360
10	4,800	1,400	3,200	700	2,600	520	2,300	370
12	4,000	1,400	2,700	710	2,200	530	1,900	370

RPM = rev / min
FEED = mm / min



Workpiece	Stainless Steels 300 Series				Ni Alloy, Ti Alloy			
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
2	8,900	210	6,400	120	10,200	270	8,900	190
4	5,000	310	3,600	180	5,700	400	5,000	280
6	3,600	380	2,600	210	4,100	480	3,600	330
8	2,800	400	2,000	230	3,200	510	2,800	360
10	2,300	410	1,600	230	2,600	520	2,300	370
12	1,900	410	1,400	240	2,200	530	1,900	370

RPM = rev / min
FEED = mm / min

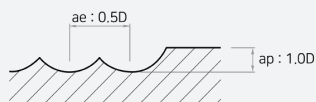




SB504 SERIES

Workpiece	Alloy Steels,, Cast Iron		Stainless Steels 300 Series, Titanium		Stainless Steels 400 Series	
Hardness	~ HB230					
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED
3	13,500	275	6,690	105	9,350	145
4	10,100	370	5,050	135	7,000	185
5	8,090	410	4,050	165	5,600	230
6	6,750	480	3,350	190	4,700	265
8	5,050	620	2,500	250	3,500	340
10	4,050	780	2,050	320	2,800	430
12	3,370	750	1,680	310	2,350	435
16	2,530	700	1,250	300	1,750	395
20	2,030	680	1,000	290	1,400	370

RPM = rev / min
FEED = mm / min



SF51H SERIES ► Slotting

Workpiece	Stainless Steels, Titanium alloys (SUS304, SUS316, Ti6A)	
Diameter (mm)	RPM	FEED
3	5,000	380
4	4,800	350
5	4,700	350
6	4,400	340
7	3,800	340
8	3,300	340
9	3,000	340
10	2,700	330
12	2,200	330
14	2,000	310
16	1,750	300
20	1,300	210

RPM = rev / min
FEED = mm / min



Technical Data

AWE311 SERIES ▶ Slotting

Workpiece	Acrylic		Aluminium	
Diameter (mm)	RPM	FEED	RPM	FEED
1	32,000	2,000	23,000	1,300
2	32,000	2,200	23,000	1,500
3	25,000	2,400	18,000	1,700
4	20,000	2,400	15,000	1,800
5	15,000	2,200	12,000	1,800
6	13,500	2,300	10,000	1,800
8	10,000	2,400	7,800	1,900
10	8,000	2,400	6,000	2,000
12	7,000	2,200	5,000	1,900

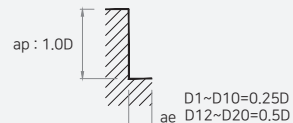
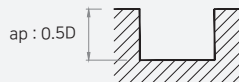
RPM = rev / min
FEED = mm / min



AWE312 SERIES

Processing method	Slotting		Side Cutting	
Workpiece	Aluminium, NON Ferrous Metals		Aluminium, NON Ferrous Metals	
Diameter (mm)	RPM	FEED	RPM	FEED
1	16,870	505	16,870	845
1.2	16,450	510	16,450	850
1.5	13,150	525	13,150	790
2	11,300	565	11,300	790
2.5	10,565	635	10,565	845
3	10,000	700	10,000	900
4	10,000	900	10,000	1,100
5	10,000	1,000	10,000	1,300
6	10,000	1,200	10,000	1,500
7	8,850	1,240	8,850	1,505
8	8,000	1,400	8,000	1,800
10	8,000	1,700	8,000	2,100
12	8,000	2,100	8,000	2,600
14	6,000	1,800	6,000	2,200
16	6,000	1,900	6,000	2,400
18	4,000	1,400	4,000	1,800
20	4,000	1,600	4,000	1,900

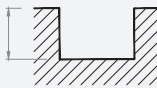
RPM = rev / min
FEED = mm / min





■ AWE313, AWE323 SERIES

Processing method	Slotting		Side Cutting	
Workpiece	Aluminium, NON Ferrous Metals		Aluminium, NON Ferrous Metals	
Diameter (mm)	RPM	FEED	RPM	FEED
1	17,000	550	17,000	900
1.2	16,000	550	16,000	850
1.5	13,000	500	13,000	850
2	10,000	400	10,000	640
2.5	8,000	380	8,000	520
3	7,000	350	7,000	455
3.5	7,000	350	7,000	550
4	7,000	441	7,000	546
4.5	7,000	500	7,000	600
5	7,000	504	7,000	651
5.5	7,000	605	7,000	700
6	7,000	606	7,000	756
7	6,000	700	6,000	820
8	5,600	700	5,600	861
9	5,600	800	5,600	900
10	5,600	854	5,600	1,050
12	5,600	1,050	5,600	822
14	4,200	903	4,200	1,106
16	4,200	945	4,200	1,211
18	2,800	700	2,800	910
20	2,800	805	2,800	956

RPM = rev / min FEED = mm / min ap : 0.2D 	ap : 2.5D  ae : 0.15D
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Technical Data

AWR312 SERIES

Processing method	Slotting		Side Cutting	
Workpiece	Aluminium, NON Ferrous Metals		Aluminium, NON Ferrous Metals	
Diameter (mm)	RPM	FEED	RPM	FEED
1	16,870	505	16,870	845
1.5	13,150	525	13,150	790
2	11,300	565	11,300	790
2.5	10,565	635	10,565	845
3	10,000	700	10,000	900
4	10,000	900	10,000	1,100
5	10,000	1,000	10,000	1,300
6	10,000	1,200	10,000	1,500
8	8,000	1,400	8,000	1,800
10	8,000	1,700	8,000	2,100
12	8,000	2,100	8,000	2,600
14	6,000	1,800	6,000	2,200
16	6,000	1,900	6,000	2,400
18	4,000	1,400	4,000	1,800
20	4,000	1,600	4,000	1,900

RPM = rev / min
FEED = mm / min

ap : 0.5D



ap : 1.0D

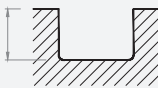


D1~D10=0.25D
D12~D20=0.5D



AWR313 SERIES

Processing method	Slotting		Side Cutting	
Workpiece	Aluminium, NON Ferrous Metals		Aluminium, NON Ferrous Metals	
Diameter (mm)	RPM	FEED	RPM	FEED
1	17,000	550	17,000	900
1.5	13,000	500	13,000	850
2	10,000	400	10,000	640
2.5	8,000	380	8,000	520
3	10,000	350	10,000	650
4	10,000	630	10,000	780
5	10,000	720	10,000	930
6	10,000	865	10,000	1,080
8	8,000	1,000	8,000	1,230
10	8,000	1,220	8,000	1,500
12	8,000	1,500	8,000	1,260
14	6,000	1,290	6,000	1,580
16	6,000	1,350	6,000	1,730
18	4,000	1,000	4,000	1,300
20	4,000	1,150	4,000	1,365

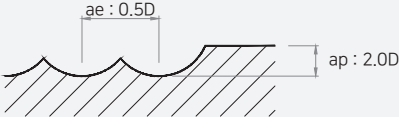
RPM = rev / min FEED = mm / min ap : 0.5D 	ap : 1.0D  D1~D10=0.25D D12~D20=0.5D
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Technical Data

AWB312 SERIES ► Slotting

Workpiece	Aluminium, NON Ferrous Metals	
Diameter (mm)	RPM	FEED
6	18,000	1,750
8	14,000	2,000
10	14,000	2,350
12	14,000	3,000
16	11,000	2,700
20	8,000	2,200

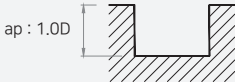
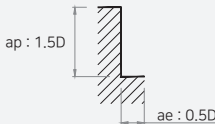
RPM = rev / min
 FEED = mm / min



AWN513 SERIES

Processing method	Slotting		Side Cutting	
Workpiece	Aluminium, NON Ferrous Metals		Aluminium, NON Ferrous Metals	
Diameter (mm)	RPM	FEED	RPM	FEED
3	51,778	3,946	64,723	4,932
4	38,834	4,893	48,542	6,116
5	31,067	5,499	38,834	6,874
6	25,889	5,918	32,362	7,398
8	19,417	5,534	24,271	6,917
10	15,534	5,326	19,417	6,658
12	12,945	5,918	16,181	7,398
16	9,708	4,883	12,136	6,103
20	7,767	4,439	9,708	5,548

RPM = rev / min
 FEED = mm / min



AWF513 SERIES

Processing method	Slotting		Side Cutting	
Workpiece	Aluminium, NON Ferrous Metals		Aluminium, NON Ferrous Metals	
Diameter (mm)	RPM	FEED	RPM	FEED
4	15,000	7,000	20,000	9,000
5	12,000	6,000	16,000	8,000
6	10,500	5,300	13,500	6,800
8	8,000	4,000	10,500	5,300
10	6,500	3,500	8,500	4,300
12	5,250	2,500	6,800	3,400
14	4,500	2,200	5,800	2,900
16	4,000	2,000	5,200	2,600
18	3,550	1,770	4,700	2,350
20	3,200	1,600	4,200	2,100

RPM = rev / min
FEED = mm / min

AWF583 SERIES

Processing method	Slotting		Side Cutting	
Workpiece	Aluminium, NON Ferrous Metals		Aluminium, NON Ferrous Metals	
Diameter (mm)	RPM	FEED	RPM	FEED
4	15,000	7,000	20,000	9,000
5	12,000	6,000	16,000	8,000
6	10,500	5,300	13,500	6,800
8	8,000	4,000	10,500	5,300
10	6,500	3,500	8,500	4,300
12	5,250	2,500	6,800	3,400
14	4,500	2,200	5,800	2,900
16	4,000	2,000	5,200	2,600
18	3,550	1,770	4,700	2,350
20	3,200	1,600	4,200	2,100

RPM = rev / min
FEED = mm / min

Technical Data

E302, E322, EL422 SERIES

Processing method	Side Cutting				Slotting			
	Depth of Cut : 1.5D, Width : 0.1D				Depth of Cut : 0.5D, Width : 0.1D			
Workpiece	Carbon Steels, Alloy Steels, Tool Steels		Alloy Steels, Tool Steels		Carbon Steels, Alloy Steels, Tool Steels		Alloy Steels, Tool Steels	
Hardness	~ HB225		HB225 ~ HB325		~ HB225		HB225 ~ HB325	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	5,300	60	4,300	50	4,300	40	3,500	20
2	4,500	80	3,800	60	3,800	50	3,100	30
3	3,700	80	3,200	60	3,200	50	2,650	30
4	2,750	110	2,400	60	2,400	50	2,000	30
6	1,850	110	1,600	60	1,600	50	1,320	30
8	1,400	110	1,200	90	1,200	60	1,000	40
10	1,100	110	950	90	950	60	800	40
12	930	110	800	90	800	60	660	40
16	700	110	600	90	600	60	500	40
20	560	110	480	90	480	60	400	40
25	450	110	380	90	380	60	320	40

* Please reduce cutting speed around 20~30% from the above table or E322, E422 series.

E304, E324 SERIES

Processing method	Side Cutting				Slotting			
	Depth of Cut : 1.5D, Width : 0.1D				Depth of Cut : 0.5D, Width : 0.1D			
Workpiece	Carbon Steels, Alloy Steels, Tool Steels		Alloy Steels, Tool Steels		Carbon Steels, Alloy Steels, Tool Steels		Alloy Steels, Tool Steels	
Hardness	~ HB225		HB225 ~ HB325		~ HB225		HB225 ~ HB325	
Diameter (mm)	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
1	5,300	60	4,300	50	4,300	40	3,500	20
2	4,500	80	3,800	60	3,800	50	3,100	30
3	3,700	80	3,200	60	3,200	50	2,650	30
4	2,750	110	2,400	60	2,400	50	2,000	30
6	1,850	110	1,600	60	1,600	50	1,320	30
8	1,400	110	1,200	90	1,200	60	1,000	40
10	1,100	110	950	90	950	60	800	40
12	930	110	800	90	800	60	660	40
16	700	110	600	90	600	60	500	40
20	560	110	480	90	480	60	400	40
25	450	110	380	90	380	60	320	40

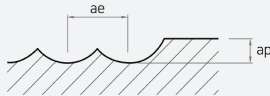
* Please reduce cutting speed around 20~30% from the above table or E324 series.



B302, BL422 SERIES

Workpiece	Carbon Steels, Alloy Steels, Tool Steels		Alloy Steels, Tool Steels	
Hardness	~ HB225		HB225 ~ HB325	
Diameter (mm)	RPM	FEED	RPM	FEED
R0.5	31,800	572	27,900	502
R1	31,800	1,910	27,900	1,670
R2	15,900	1,910	13,900	1,670
R3	10,600	1,910	9,280	1,670
R4	7,960	1,910	6,960	1,670
R5	6,370	1,780	5,570	1,560
R6	5,310	1,590	4,640	1,390
R8	4,000	1,300	3,500	1,050
R10	3,200	1,000	2,800	840
R12.5	2,400	800	2,100	650

RPM = rev / min
FEED = mm / min



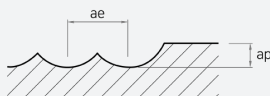
R	ap	ae
$R \leq 1.0$	$0.05 \times R0.1\delta$	$0.2 \times R0.1\delta$
$1.0 < R$	$0.1 \times R0.1\delta$	$0.2 \times R0.1\delta$

* Please reduce cutting speed around 20~30% from the above table or BL422 series.

B304 SERIES

Workpiece	Carbon Steels, Alloy Steels, Tool Steels		Alloy Steels, Tool Steels	
Hardness	~ HB225		HB225 ~ HB325	
Diameter (mm)	RPM	FEED	RPM	FEED
R0.5	39,750	718.25	34,875	6,275
R1	39,750	2,387.5	34,875	2,087.5
R2	19,875	2,387.5	17,375	2,087.5
R3	13,250	2,387.5	11,600	2,087.5
R4	9,950	2,387.5	8,700	2,087.5
R5	7,962.5	2,225	6,962.5	1,950
R6	6,637.5	1,987.5	5,800	1,737.5
R8	5,000	1,625	4,375	1,312.5
R10	4,000	1,250	3,500	1,050
R12.5	3,000	1,000	2,625	812.5

RPM = rev / min
FEED = mm / min



R	ap	ae
$R \leq 1.0$	$0.05 \times R0.1\delta$	$0.2 \times R0.1\delta$
$1.0 < R$	$0.1 \times R0.1\delta$	$0.2 \times R0.1\delta$

Technical Data

RC502 SERIES

Workpiece	Unalloyed Copper			
Diameter (mm)	RPM	FEED	RPM	FEED
3	44,500	2,350	50,000	3,700
4	33,400	2,100	50,000	4,700
6	22,300	2,100	33,400	4,900
8	16,700	2,100	25,000	4,700
10	13,370	2,100	20,000	4,800
12	11,100	2,100	16,700	4,700

RPM = rev / min
 FEED = mm / min

ap : 1.0D
ae : 0.5D

ap : 0.5D

BC502 SERIES

Workpiece		Unalloyed Copper			
Mill Dia (mm)	Diameter (mm)	RPM	FEED	Rd	Ad
0.5	1	41,000	1,660	0.04	0.063
0.75	1.5	27,000	1,830	0.068	0.087
1	2	20,000	1,780	0.089	0.112
1.25	2.5	16,000	1,840	0.115	0.09
1.5	3	13,000	2,220	0.171	0.168
2	4	10,000	2,080	0.208	0.2
2.5	5	8,300	1,990	0.24	0.2
3	6	6,900	1,940	0.281	0.25
4	8	5,720	1,000	0.175	0.4
5	10	4,550	700	0.154	0.5
6	12	3,770	600	0.159	0.6

RPM = rev / min
 FEED = mm / min

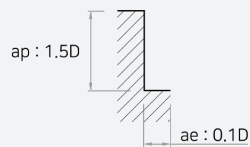
ae
ap



■ GE SERIES

Workpiece	Graphite	
Diameter (mm)	RPM	FEED
0.4	40,000	200
0.6	40,000	350
0.8	40,000	550
1	40,000	700
2	25,000	800
3	20,000	800
4	18,000	950
5	14,000	1,200
6	11,000	1,400
8	8,000	1,300
10	6,500	1,200
12	5,500	1,200

RPM = rev / min
FEED = mm / min

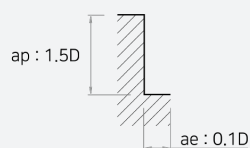


* Please reduce cutting speed 50% from the above table when using long and extra long type

■ WGE504 SERIES

Workpiece	Graphite	
Diameter (mm)	RPM	FEED
3	20,000	1,600
4	18,000	1,900
5	14,000	2,400
6	11,000	2,800
8	8,000	2,600
10	6,500	2,400
12	5,500	2,400
16	4,200	2,450
20	3,300	2,400

RPM = rev / min
FEED = mm / min



* Please reduce cutting speed 50% from the above table when using long and extra long type

Technical Data

WGR502 SERIES

Workpiece	Graphite	
Diameter (mm)	RPM	FEED
0.4	40,000	640
0.6	40,000	640
0.8	40,000	800
1	40,000	960
1.2	40,000	1,200
1.5	40,000	1,440
2	40,000	1,600
3	27,000	1,900
4	20,000	2,300
5	16,000	2,300
6	14,000	2,300

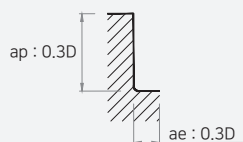
RPM = rev / min
FEED = mm / min



WGR504 SERIES

Workpiece	Graphite	
Diameter (mm)	RPM	FEED
4	40,000	3,500
6	40,000	5,600
8	32,000	5,600
10	26,000	5,700
12	21,000	5,450
16	15,800	5,450
20	12,800	5,500

RPM = rev / min
FEED = mm / min

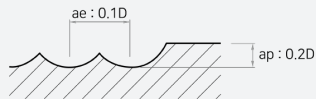




■ G SERIES

Workpiece	Graphite	
Diameter (mm)	RPM	FEED
0.5	16,000	480
0.75	16,000	640
1	16,000	800
1.5	16,000	1,450
2	16,000	2,100
3	15,000	2,950
4	13,000	3,000
5	11,500	3,050
6	10,500	3,150
8	8,555	2,960

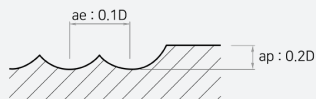
RPM = rev / min
FEED = mm / min



■ WGB504 SERIES

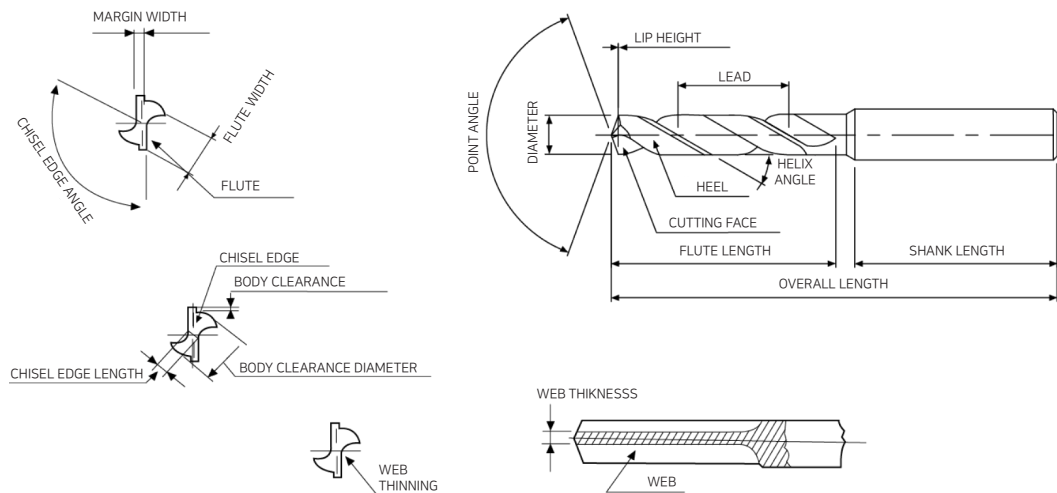
Workpiece	Graphite	
Diameter (mm)	RPM	FEED
1	20,000	700
2	16,000	1,200
3	16,000	2,000
4	16,000	3,100
5	15,000	3,800
6	15,000	4,400
8	13,000	4,500
10	12,000	4,600
12	10,000	4,700
16	7,500	3,800
20	6,000	3,500

RPM = rev / min
FEED = mm / min



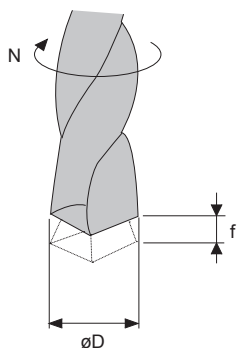
Technical Data

Nomenclature of Drill



Working of Main Angle

POINT ANGLE	HELIX ANGLE	LIP RELIEF ANGLE
Low High	Low High	Low High
Large → Torque → Small Small → Thrust → Large	Bad → Torque → Good Good → Thrust → Bad Large → Rigidity of tool → Small	Small → Tool Wear → Large Small → Unalloyed Copper → Large



Cutting Speed	$V = \frac{\pi \times D \times N}{1000} \text{ (m/min)}$	V : Cutting Speed D : Diameter of drill N : Revolution $\pi : 3.14$	(m/min) (mm) (rpm)
Feed	$f_z = F_n \times N \text{ (m/rev)}$	F : Feed F _n : Feed rate per revolution N : Revolution	(m/rev) (mm) (rpm)
Helix Angle	$\theta^\circ = \tan^{-1}\left(\frac{\pi D}{L}\right)$	θ° : Helix angle D : Diameter of drill L : Lead $\pi : 3.14$	(mm)



Technical Solutions about general problems to use drill

Problems and Circumstances	Cause	Technical Countermeasures
Not drill into workpiece	· No enough Lip Relief · Thick Web	· Re-grinding of Lip Relief · Get the Web thinner
Chipping-off on margin part	· large jig-bushing	· Use the right sized bushing on drill
Balance of cutting flutes	· To overheat on drill during the operation	· Reduce feed rate Supply enough cutting oil
Chipped-off on cutting flutes	· Large relief angle · High feed rate	· Adjust Lip Relief · Reduce feed rate
Damage on tang	· Incomplete adhesiveness between socket and shaft	· Remove foreign substance and replace it to new one when it is worn out
Damage on a drill during a processing of brass	· Wrong choice of shape of drill · Clogged-up with chips in groove	· Choose suitable drill for material
Crack on center of drill	· Lack of number of flutes · Huge feed rate	· Re-grinding with proper relief angle · Reduce feed rate
Getting hole size larger	· Difference between point angle and cutting flutes · Loose main spindle	· Choose good qualitative drill · Adjust spindle within measure
Damage on edge	· High feed rate · Foreign substance on workpiece · Lack of cutting oil supply on drill tip · The wear and tear of a drill	· Grind tip of drill suitable for workpiece · Reduce feed rate · Regrind it on early stage
Irregular size of chip	· Inappropriate grind on edge of flute or using only one side of flute	· Need a exact re-grinding · Choose good qualitative drill
Roughness of hole	· Blunt edge of flute or inappropriate grinding excessive feed rate · No supply cutting oil on tip of drill · loose fixture	· Regrind flute edge angle · Supply plenty of appropriate cutting oil · Reduce feed rate · Fasten fixture

Technical Data

NDPG, NDPK SERIES

Workpiece	Carbon Steels(C<0.3%) Alloy Steels/SS400 SCM ~710N/mm ²		Carbon Steels(C>0.3%) Alloy Steels/S50C SCM ~1,060N/mm ²		Grey Cast Iron <HB240		Grey Cast Iron <HB350		Stainless Steels	
Vc	80~120		80~120		120~200		80~130		40~45	
Dia.	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)
1	13,000	0.04	13,000	0.04	21,300	0.04	14,200	0.04	7,160	0.03
2	13,000	0.06	13,000	0.06	21,300	0.06	14,200	0.06	7,160	0.04
3	13,000	0.13	13,000	0.13	21,000	0.13	14,000	0.13	4,780	0.07
4	9,500	0.14	9,500	0.14	16,000	0.14	10,500	0.14	3,600	0.08
5	7,600	0.15	7,600	0.15	13,000	0.15	8,300	0.15	2,850	0.09
6	6,400	0.17	6,400	0.17	11,000	0.17	6,900	0.17	2,400	0.1
8	4,800	0.21	4,800	0.21	8,000	0.21	5,200	0.21	1,800	0.12
10	3,800	0.25	3,800	0.25	6,400	0.25	4,150	0.25	1,450	0.15
12	3,200	0.27	3,200	0.27	5,300	0.27	3,450	0.27	1,200	0.17
14	2,750	0.29	2,750	0.29	4,550	0.29	3,000	0.29	1,000	0.19
16	2,400	0.31	2,400	0.31	4,000	0.31	2,600	0.31	900	0.21
18	2,100	0.33	2,100	0.33	3,550	0.33	2,300	0.33	800	0.23
20	1,900	0.35	1,900	0.35	3,200	0.35	2,100	0.35	700	0.25

* Recommended conditions in the above table are ideal conditions, and work by adjusting the conditions according to the equipment and other conditions.
 · 7D : Apply 85% of the table

NDPGH SERIES

Workpiece	Carbon Steels, Alloy Steels SS400, SM50C, SCM, SCr ~900N/mm ² / ~HRc 28		Alloy Steels SCM, SCr ~1,100N/mm ² HRc 28~35		Alloy Steels, Hardened Steels ~HRc40		Cast Iron ~350N/mm ²		Ductile Iron 400~600N/mm ²		Stainless Steels SUS300, SUS400	
Vc	80~120m/min		60~90m/min		30~60m/min		80~120m/min		60~100m/min		40~70m/min	
Dia.	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)
3	10,600	0.09	8,000	0.09	4,800	0.08	10,600	0.09	8,500	0.09	5,800	0.09
4	8,000	0.14	6,000	0.14	3,600	0.1	8,000	0.14	6,400	0.14	4,400	0.14
6	5,300	0.17	4,000	0.17	2,400	0.14	5,300	0.17	4,200	0.21	2,900	0.17
8	4,000	0.21	3,000	0.21	1,800	0.18	4,000	0.21	3,200	0.24	2,200	0.21
10	3,200	0.25	2,400	0.25	1,400	0.22	3,200	0.25	2,500	0.26	1,800	0.25
12	2,700	0.27	2,000	0.27	1,200	0.24	2,700	0.27	2,100	0.28	1,500	0.27
14	2,300	0.29	1,700	0.29	1,000	0.26	2,300	0.29	1,800	0.31	1,300	0.29
16	2,000	0.31	1,500	0.31	900	0.29	2,000	0.31	1,600	0.33	1,100	0.31
18	1,800	0.33	1,300	0.33	800	0.32	1,800	0.33	1,400	0.35	1,000	0.33
20	1,600	0.35	1,200	0.35	700	0.34	1,600	0.35	1,300	0.37	900	0.35

* In actual machining, the condition should be adjusted according to the machining shape, purpose and machine type.
 * 8D : apply 75 % of above cutting condition



PF50, P50, HP50 SERIES

Work piece	Carbon Steels (C<0.3%) Alloy Steels/SS400 SCM ~710N/mm ²		Carbon Steels (C>0.3%) Alloy Steels/S50C SCM ~1,060N/mm ²		SUJ2 · SUS440		SKD61 HRC34~43		HRC43~48		SKD11 HRC48~53		Cast Iron FC 250~350		DuctileFC 400~500	
V (m/min)	80~125		80~125		63~80		40~63		32~45		25~36		80~125		63~90	
Diameter (mm)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)
2	12,000	0.06~0.08	12,000	0.06~0.08	11,000	0.06~0.08	8,000	0.06~0.08	6,000	0.05~0.07	4,500	0.03~0.06	15,000	0.06~0.08	11,000	0.06~0.08
3	9,600	0.09~0.12	9,600	0.09~0.12	7,500	0.09~0.12	5,300	0.09~0.12	4,000	0.07~0.11	3,200	0.05~0.09	10,000	0.09~0.12	7,600	0.09~0.12
4	8,000	0.10~0.15	8,000	0.10~0.15	5,650	0.10~0.15	4,000	0.10~0.15	3,000	0.08~0.13	2,600	0.06~0.10	8,000	0.10~0.15	6,000	0.10~0.15
5	6,400	0.12~0.18	6,400	0.12~0.18	4,550	0.12~0.18	3,300	0.12~0.18	2,400	0.10~0.15	2,000	0.8~0.12	6,400	0.12~0.18	4,800	0.12~0.18
6	5,300	0.14~0.20	5,300	0.14~0.20	3,800	0.14~0.20	2,750	0.14~0.20	2,000	0.12~0.18	1,700	0.09~0.15	5,300	0.14~0.20	4,000	0.14~0.20
8	4,000	0.16~0.24	4,000	0.16~0.24	2,850	0.16~0.24	2,100	0.16~0.24	1,500	0.14~0.22	1,300	0.12~0.20	4,000	0.16~0.24	3,000	0.16~0.24
10	3,200	0.18~0.27	3,200	0.18~0.27	2,250	0.18~0.27	1,700	0.18~0.27	1,200	0.15~0.25	1,000	0.13~0.23	3,200	0.18~0.27	2,400	0.18~0.27
12	2,650	0.20~0.30	2,650	0.20~0.30	1,900	0.20~0.30	1,400	0.20~0.30	1,000	0.17~0.26	850	0.14~0.24	2,700	0.20~0.30	2,000	0.20~0.30
14	2,300	0.22~0.35	2,300	0.22~0.35	1,600	0.22~0.35	1,200	0.22~0.35	860	0.18~0.30	730	0.15~0.26	2,300	0.22~0.35	1,700	0.22~0.35
16	2,000	0.25~0.36	2,000	0.25~0.36	1,400	0.25~0.36	1,050	0.25~0.36	760	0.20~0.32	640	0.16~0.26	2,000	0.25~0.36	1,500	0.25~0.36
18	1,800	0.28~0.38	1,800	0.28~0.38	1,250	0.28~0.38	920	0.28~0.38	670	0.23~0.33	570	0.18~0.28	1,800	0.28~0.38	1,350	0.28~0.38
20	1,600	0.30~0.40	1,600	0.30~0.40	1,150	0.30~0.40	850	0.30~0.40	600	0.25~0.35	500	0.20~0.30	1,600	0.30~0.40	1,200	0.30~0.40

SF, HPI SERIES

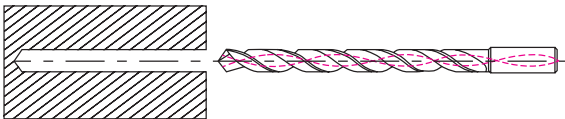
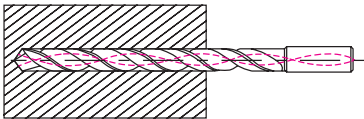
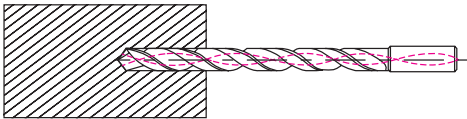
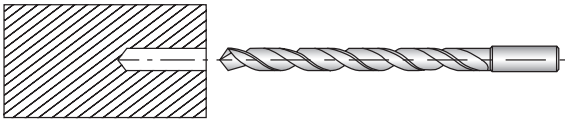
Work piece	Carbon Steels (C<0.3%) Alloy Steels/SS400 SCM ~710N/mm ²		Carbon Steels (C>0.3%) Alloy Steels/S50C SCM ~1,060N/mm ²		SUJ2 · SUS440		SKD61 HRC34~43		HRC43~48		SKD11 HRC48~53		Cast Iron FC 250~350		DuctileFC 400~500	
V (m/min)	80~125		80~125		63~80		40~63		32~45		25~36		80~125		63~90	
Diameter (mm)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)
3	12,000	0.09~0.12	13,000	0.09~0.12	7,600	0.09~0.12	6,400	0.09~0.12	5,300	0.07~0.11	3,800	0.05~0.09	12,000	0.09~0.12	8,500	0.09~0.12
4	9,500	0.1~0.15	10,000	0.1~0.15	5,700	0.1~0.15	4,800	0.1~0.15	4,000	0.08~0.13	2,950	0.06~0.1	9,000	0.1~0.15	6,350	0.1~0.15
5	7,600	0.12~0.18	8,000	0.12~0.18	4,600	0.12~0.18	3,800	0.12~0.18	3,200	0.1~0.15	2,300	0.08~0.12	7,600	0.12~0.18	5,100	0.12~0.18
6	6,400	0.14~0.20	6,600	0.14~0.20	3,800	0.14~0.20	3,200	0.14~0.20	2,650	0.12~0.18	1,900	0.09~0.15	6,400	0.14~0.20	4,250	0.14~0.20
8	4,800	0.16~0.24	5,000	0.16~0.24	2,900	0.16~0.24	2,400	0.16~0.24	2,000	0.14~0.22	1,450	0.12~0.2	4,800	0.16~0.24	3,200	0.16~0.24
10	3,800	0.18~0.27	4,000	0.18~0.27	2,300	0.18~0.27	1,900	0.18~0.27	1,600	0.15~0.25	1,150	0.13~0.23	3,800	0.18~0.27	2,550	0.18~0.27
12	3,200	0.20~0.30	3,300	0.20~0.30	1,900	0.20~0.30	1,600	0.20~0.30	1,300	0.17~0.26	950	0.14~0.24	3,200	0.20~0.30	2,100	0.20~0.30
14	2,700	0.22~0.35	2,800	0.22~0.35	1,600	0.22~0.35	1,350	0.22~0.35	1,150	0.18~0.3	800	0.15~0.26	2,700	0.22~0.35	1,800	0.22~0.35
16	2,400	0.25~0.36	2,500	0.25~0.36	1,400	0.25~0.36	1,200	0.25~0.36	1,000	0.2~0.32	700	0.16~0.26	2,400	0.25~0.36	1,600	0.25~0.36
18	2,100	0.28~0.38	2,200	0.28~0.38	1,300	0.28~0.38	1,100	0.28~0.38	900	0.23~0.33	650	0.18~0.28	2,100	0.28~0.38	1,400	0.28~0.38
20	1,900	0.30~0.40	2,000	0.30~0.40	1,150	0.30~0.40	1,000	0.30~0.40	800	0.25~0.35	600	0.2~0.3	1,900	0.30~0.40	1,250	0.30~0.40

· 8D : fn 70~80%

Technical Data

SF510, SF520 SERIES

Workpiece	Carbon Steels, Alloy Steels ~ 1060N/mm2		Cast Iron 250 ~ 350N/mm2		Ductile Cast Iron 400 ~ 500N/mm2	
V(m/min)	80~125		80~125		63~90	
Diameter (mm)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)
3	7,500	0.06 ~ 0.12	7,500	0.06 ~ 0.12	7,500	0.06 ~ 0.12
4	6,400	0.08 ~ 0.16	6,400	0.08 ~ 0.16	5,600	0.08 ~ 0.16
5	5,800	0.10 ~ 0.20	5,800	0.10 ~ 0.20	4,500	0.10 ~ 0.20
6	4,800	0.12 ~ 0.24	4,800	0.12 ~ 0.24	3,800	0.12 ~ 0.24
8	3,600	0.16 ~ 0.28	3,600	0.16 ~ 0.28	2,800	0.16 ~ 0.28
10	2,900	0.20 ~ 0.35	2,900	0.20 ~ 0.35	2,300	0.20 ~ 0.35
12	2,900	0.24 ~ 0.42	2,400	0.24 ~ 0.42	1,900	0.24 ~ 0.42
14	2,050	0.28 ~ 0.46	2,050	0.28 ~ 0.46	1,600	0.28 ~ 0.46



1. Guide Drilling should be done as Diameter+0.1mm between 3D and 5D
2. For Main Drilling, proceed with low RPM at Guide Drilling segment. (RPM 300, FEED 400mm/min)
3. Just before the end of Guide Drilling segment, reduce feed to zero and increase the RPM according to Recommended
4. After then, proceed main drilling by increasing feed without step drilling.
5. When coming out from Guide Drilling start point after drilling, RPM should be reduced as 300 and feed should be 1000 mm/min.
6. When coming out from Guide Drilling segment to the outside, the feed should be decreased as 50%



SSD, SSDL, SSTD, SSTD L SERIES

Workpiece	Tool Steels, Alloy Steels		Aluminium, Aluminium Alloy		Brass, Bronze		Epoxy, Resin	
Diameter (mm)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)	RPM	fn (mm/rev)
3	4,000~7,000	0.02	10,000~12,000	0.03	7,000~10,000	0.02	9,000~12,000	0.08
5	2,400~4,200	0.03	6,000~8,000	0.05	4,200~6,000	0.04	5,400~7,200	0.08
8	1,500~2,600	0.05	3,700~5,000	0.08	2,600~3,700	0.08	3,400~4,500	0.09
12	1,000~1,700	0.06	2,500~3,200	0.12	1,700~2,500	0.12	2,200~3,000	0.11

APF505 SERIES

Workpiece	Aluminium Alloy Steels	Cast Aluminium	Magnesium	Copper&Brass	Titanium
Type	6061	380			6Al-4V
V(m/min)	140~200	90~150	75~150	75~151	30~90
Diameter (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)
4	0.15~0.20	0.11~0.23	0.11~0.23	0.08~0.18	0.08~0.18
6	0.19~0.38	0.15~0.30	0.15~0.30	0.15~0.23	0.15~0.23
8	0.27~0.45	0.23~0.38	0.23~0.38	0.15~0.23	0.15~0.23
10	0.34~0.53	0.23~0.45	0.23~0.45	0.15~0.30	0.15~0.30
12	0.45~0.60	0.27~0.53	0.27~0.53	0.23~0.38	0.23~0.38
16	0.49~0.75	0.30~0.60	0.30~0.60	0.21~0.45	0.21~0.45

Technical Data

WH Limits

WIDIN applies an unique WH limits system in order to fulfill the degree of an internal thread and provides users the best taps for suitable working and operating conditions.

1. $\{P \leq 0.6(T.P.I. \geq 40)\}$

Upper Limits : $0.010 + 0.015 \times n$

Lower Limits : Upper Limits - 0.015

Unit :mm (n=WH number)

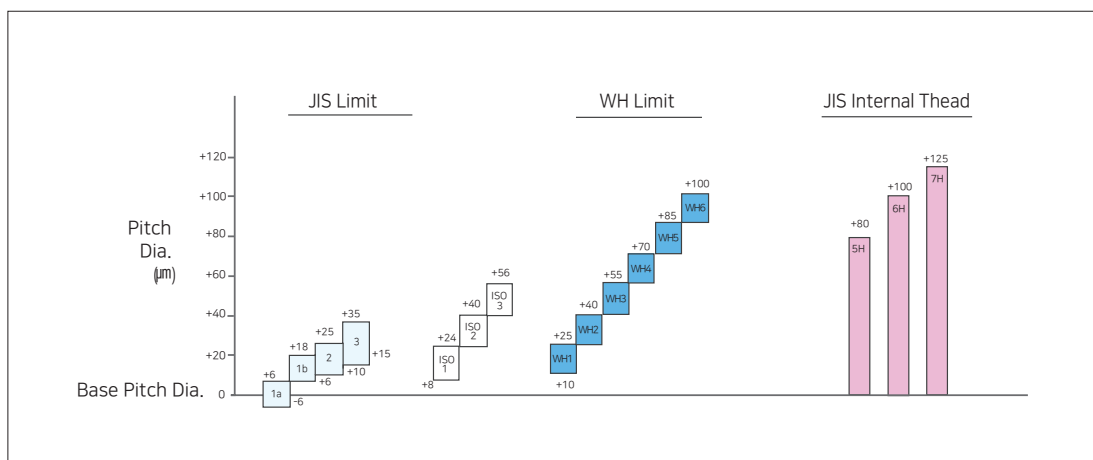
2. $\{P \leq 0.7(T.P.I. \leq 36)\}$

Upper Limits : $0.020 \times n$

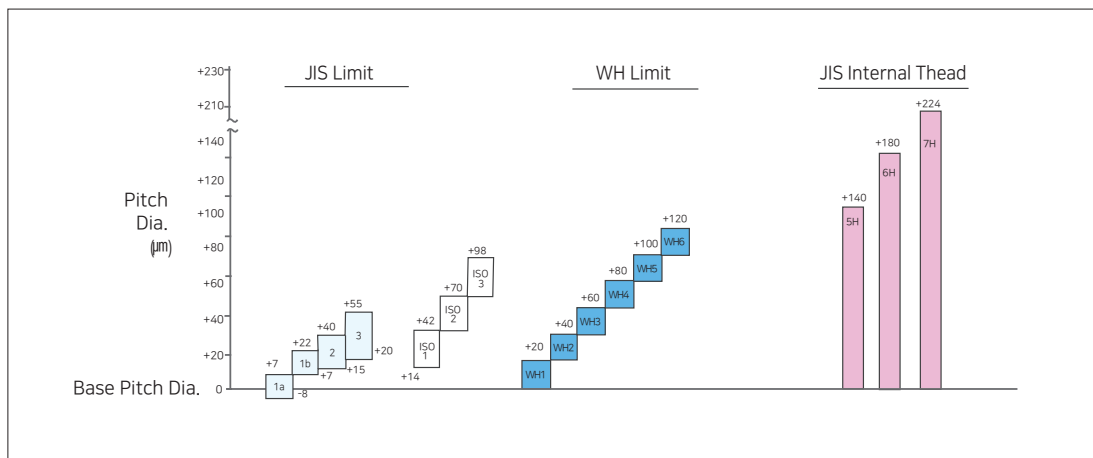
Lower Limits : Upper Limits - 0.020

Unit:mm (n=WH number)

► Example M3×0.5



► Example M10x1.5

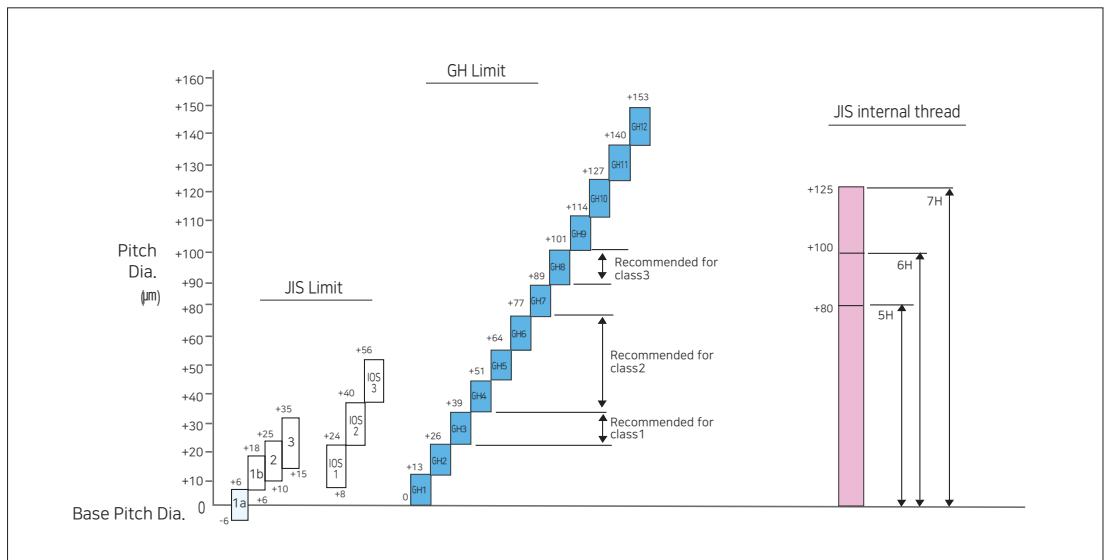




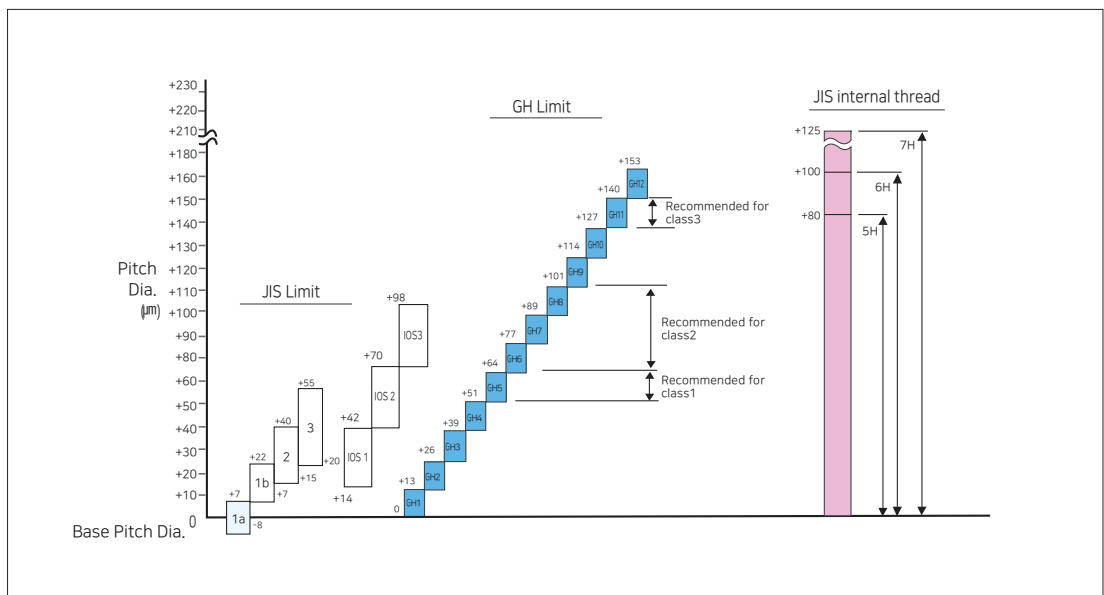
GH Limits

Since roll taps process female threads by plastic deformation, strict drill diameter management is required, unlike other cutting taps. Tap limit is strictly applied to. WIDIN adopts the limit of $12.7\mu\text{m}$ (0.0005") increments.

► Example M3x0.5



► Example M10x1.5



Technical Data

Recommended tapping speeds and cutting fluids

Tapping speeds depend on very important factors such as material type of tap, chamfer length, drill size, work materials and cutting fluids.

Users need to check every aspect before applying it.

Moreover, cutting fluids, cooling and abrasion resistance are three important factors affecting cutting fluids.

Therefore, users should provide enough fluids during the tapping process.

Work Material			Tapping(m/min)					Cutting Fluids			
ISO	Work Material	KS	Straight Tap	Spiral Tap	Point Tap	Carbide Tap	Roll Tap	Non Water soluble	Water soluble	Semidry	Dry
P	Low Carbon Steels	C ~0.25%	8~13	8~13	15~25	-	8~13	☉	○	△	△
	Medium Carbon Steels	C0.25 ~ 0.45%	7~12	7~12	10~15	-	7~10	☉	○	△	△
	High Carbon Steels	C0.45%~	6~9	6~9	8~13	-	5~8	☉	○	△	△
	Alloy Steels	SCM	7~12	7~12	10~15	-	5~8	☉	△	△	△
	Hardened Steels	25~45 HRC	3~5	3~5	4~6	-	-	☉	△	-	-
	Tool Steels	SKD	6~9	6~9	7~10	-	-	☉	-	-	-
	Cast Steels	SC	6~11	6~11	10~15	-	-	☉	○	-	-
M	Stainless Steels	SUS	4~7	5~8	8~13	-	5~10	☉	○	-	-
	Precipitation Hardened Stainless Steels	SUS630 SUS631	3~5	3~5	4~6	-	-	☉	-	-	-
S	Cast Iron	FC	10~15	-	-	10~20	-	☉	○	○	○
	Ductile, Cast Iron	FCD	7~12	7~12	10~20	10~20	-	☉	○	○	-
N	Unalloyed Copper	Cu	6~9	6~11	7~12	10~20	7~12	○	○	-	-
	Brass, Brass Casting	Bs, Bsc	10~15	10~20	15~25	15~25	7~12	○	○	○	○
	Bronze, Bronze Casting	PB, PBC	6~11	6~11	10~20	10~20	7~12	○	○	-	-
	Aluminum	AL	10~20	10~20	15~25	-	10~20	☉	○	△	-
	Aluminum, Alloy Casting	AC, ADC	10~15	10~15	15~20	10~20	10~25	☉	○	△	-
	Magnesium, Alloy Casting	MC	7~12	7~12	10~15	10~20	-	☉	○	○	-
	Zinc, Alloy Casting	ZDC	1~12	7~12	10~15	10~20	7~12	☉	○	△	-
	Thermo, Setting Plastic	Bakelite, Phenol Epoxy	10~20	-	-	15~25	-	-	○	○	○
	Thermo, Plastic	Vinyl Chloride Nylon	10~20	10~15	10~20	10~20	-	-	○	○	○

☉: Ideal / ○: Good / △: Applicable / -: Not Applicable



Recommended Drill hole size with JIS internal thread Class 2

Thread Size			
Thread Size	Recommended Drill Size(mm)	Drill Size(mm)	
		Min	Max
M3 X 0.5	2.50	2.459	2.599
M4 X 0.7	3.30	3.242	3.422
M5 X 0.8	4.20	4.134	4.334
M6 X 1.0	5.00	4.917	5.153
M8 X 1.25	6.80	6.647	6.912
M10 X 1.25	8.80	8.647	8.912
M10 X 1.5	8.50	8.376	8.676
M12 X 1.0	11.00	10.917	11.153
M12 X 1.25	10.80	10.647	10.912
M12 X 1.5	10.50	10.376	10.676
M12 X 1.75	10.30	10.106	10.441
M14 X 1.5	12.50	12.376	12.676
M14 X 2.0	12.00	11.835	12.21
M16 X 1.5	14.50	14.376	14.676
M16 X 2.0	14.00	13.835	14.21
M18 X 1.5	16.50	16.376	16.676
M18 X 2.5	15.50	15.294	15.744
M20 X 1.5	18.50	18.376	18.676
M20 X 2.5	17.50	17.294	17.744

Technical Data

■ CFT, CCT, CCF SERIES ► Metric

Workpiece	Carbon Steels		Alloy Steels		Prehardened Steels	
	(< Si 4%)		(< Si 8%)		(Die Casting)	
Alloy Steel (mm)	RPM	FEED	RPM	FEED	RPM	FEED
2	3,400 - 7,000	70 - 100	2,600 - 5,200	50 - 90	2,000 - 4,000	40 - 60
3	2,700 - 5,300	60 - 85	2,100 - 4,200	45 - 70	1,600 - 3,200	35 - 50
4	2,000 - 4,000	50 - 70	1,600 - 3,200	40 - 55	1,200 - 2,400	30 - 40
5	1,700 - 3,400	45 - 60	1,400 - 2,600	35 - 50	1,000 - 2,000	26 - 35
6	1,300 - 2,700	40 - 50	1,100 - 2,100	30 - 40	800 - 1,600	22 - 30
7	1,150 - 2,400	35 - 45	950 - 1,900	28 - 37	700 - 1,400	21 - 28
8	1,000 - 2,000	30 - 40	800 - 1,600	26 - 34	600 - 1,200	20 - 25
9	900 - 1,800	30 - 40	700 - 1,450	24 - 32	550 - 1,100	18 - 23
10	800 - 1,600	30 - 37	600 - 1,300	23 - 29	500 - 1,000	17 - 22
11	750 - 1,450	30 - 37	550 - 1,200	22 - 28	450 - 900	16 - 21
12	700 - 1,300	28 - 35	500 - 1,100	21 - 27	400 - 800	16 - 20

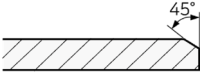
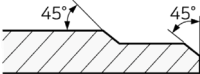
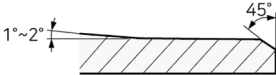
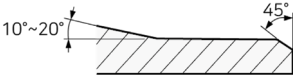


Recommendation of Cutting Conditions in Reamer

Workpiece			Diameter(mm)	Cutting Conditions	
Material	Strength(Kg/mm2)	Hardness(HB)		V(m/min)	fn(mm/rev)
Carbon Steels, Alloy Steels	~ 100	-	~ 10 10 ~ 25 25 ~ 40	8 ~ 12	0.15 ~ 0.25 0.20 ~ 0.40 0.30 ~ 0.50
	100 ~ 140	-	~ 10 10 ~ 25 25 ~ 40	6 ~ 10	0.12 ~ 0.20 0.15 ~ 0.30 0.20 ~ 0.40
Steel Castings	40 ~ 50	-	~ 10 10 ~ 25 25 ~ 40	8 ~ 12	0.15 ~ 0.25 0.20 ~ 0.40 0.30 ~ 0.50
	50 ~ 70	-	~ 10 10 ~ 25 25 ~ 40	6 ~ 10	0.12 ~ 0.20 0.15 ~ 0.30 0.20 ~ 0.40
Cast Iron	-	~ 200	~ 10 10 ~ 25 25 ~ 40	8 ~ 15	0.20 ~ 0.30 0.30 ~ 0.50 0.40 ~ 0.70
	-	200 ~	~ 10 10 ~ 25 25 ~ 40	6 ~ 12	0.15 ~ 0.25 0.20 ~ 0.40 0.30 ~ 0.50
Alumunum Alloys	-	-	~ 10	15 ~ 25	0.20 ~ 0.30 0.30 ~ 0.50 0.40 ~ 0.70
	-	-	10 ~ 25 25 ~ 40	20 ~ 30	

Technical Data

The Effect of Chamfer

Twist Direction	Characteristics
	If the work piece is caught by sharp blade edge, dent occurs on the machined surface. It is applied to chucking reamer, etc.
	Guide edge was rounded. The ground surface is excellent but round machining is difficult and it may deteriorate the machined surface.
	It is 2 blade-type. Chip is produced in 2 stages and it provides good results. But regrinding is difficult.
	The guide part of second stage of cutting edge is 1~2°. Cutting edge blade is long and life is limited. It provides good results on finish machining
	The guide part of second stage is 10~20. It is very economical as the length of blade is short and utilized length is long
	It is used for finish machining. It is applied to hand reamer.

The Effect of Twist Angle

Twist Direction	Characteristics
(1) Straight blade (twist angle is 0°)	• Surface is generally poor except cast iron.
(2) Right twist blade	• Excellent machinability and easy to discharge chip • Applicable work piece range is wide. • Excellent for high hardness work piece • Pulling the chip to the groove
(3) Left twist blade	• Excellent surface roughness for work piece of aluminium alloys, copper, and copper alloys • It is good for machining soft materials • Pushing the chip in the processing direction.



Trouble Shooting of Reaming

Plan	Plan	Measures
(1) Enlarged Hole	Increase burnishing effects	• Decrease chamfer angle • Increase margin width • Decrease back taper • Grind 2 stages chamfer • Check reamer diameter
	Suppress the occurrence of built-up-edge	• Increase margin width • Grind 2 stages chamfer • Change heat treatment conditions and microstructure of workpiece • Increase cutting oil supply • Increase cutting speed and reduce feed rate
	Reduce the unbalance of cutting force	• The cutting edge difference shall be less than 0.005mm • Increase cutting speed • Reduce the deviation of main axis and basic Diameter • Check wear conditions of bush and replace it • Change water soluble cutting oil to non-water soluble oil
(2) Shrunk Hole	Reduce finish effects	• Increase the clearance angle of cutting edge • Decrease margin width • Increase back taper • Increase cutting speed
(3) Poor roundness	Reduce Chattering	• Increase the strength of machine • Reduce the tolerance of bush • Change to left helix reamer • Increase margin width • Increase back taper • Decrease cutting speed • Increase feed rate
(4) Poor surface roughness	Increase burnishing	• Use left helix • Decrease chamfer angle • Grind with 2 stage chamfer
	Remove deposit	• Increase rake angle • Reduce feed rate • Increase cutting speed
	Remove chattering	• The cutting edge difference shall be less than 0.005mm • Increase cutting speed • Align main axis center and basic diameter center • Change water soluble cutting oil to non-water soluble oil
	Remove chip interference	• Change shape of flute type • Increase the depth of flute

MEMO

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