

- 고경도강(HRc52~68), 프리하드강 계열의 고정밀 가공 엔드밀
- 고품량 실리콘계 코팅(Si) 처리하여 내마모성이 우수합니다.
- 고정밀 공차 적용으로 초정밀 가공에 적합합니다.
- 인선부 강성을 보강하여 날부치핑을 최소화 하였습니다.
- 초미립자 초경합금(0.2 $\mu$ m)을 채택, 고속절삭시 뛰어난 성능을 발휘합니다.

#### • Endmills for pre-hardened and hardened steels(HRc52~68)

- Good wear resistance by high quality Si-based PVD coating.
- High precise edge tolerance.
- Reinforced edge design for preventing edge chipping.
- Outstanding performance at high speed machining by ultra fine (0.2 $\mu$ m) WC grade.



Shield Edge 412P

Condition	D Size	D Tolerance	Condition	D Size	D Tolerance
øD ≠ ød	ø0.1 ~ 0.15	+0 ~ -0.005mm	øD = ød	ø6	-0.005 ~ -0.015mm
	ø0.2 ~ 6	+0 ~ -0.01mm		ø8 ~ 12	-0.01 ~ -0.025mm
	ø8 ~ 12	+0 ~ -0.015mm			

단위 : mm

Order Number	날경 Diameter D	날장 Length of cut L1	유효장 Effective Length L2	전장 Overall Length L	생크 Shank Dia d	비고	Order Number	날경 Diameter D	날장 Length of cut L1	유효장 Effective Length L2	전장 Overall Length L	생크 Shank Dia d	비고
2JJRE 001 003 S04	0.1	0.15	0.3	40	4		2JJRE 005 140 S04	0.5	0.5	14	45	4	
2JJRE 001 005 S04	0.1	0.15	0.5	40	4		2JJRE 005 160 S04	0.5	0.5	16	45	4	
2JJRE 0015 003 S04	0.15	0.15	0.3	40	4		2JJRE 006 010 S04	0.6	0.6	1	40	4	
2JJRE 0015 005 S04	0.15	0.15	0.5	40	4		2JJRE 006 020 S04	0.6	0.6	2	40	4	
2JJRE 0015 0075 S04	0.15	0.15	0.75	40	4		2JJRE 006 030 S04	0.6	0.6	3	40	4	
2JJRE 0015 010 S04	0.15	0.15	1	40	4		2JJRE 006 040 S04	0.6	0.6	4	40	4	
2JJRE 002 005 S04	0.2	0.2	0.5	40	4		2JJRE 006 050 S04	0.6	0.6	5	40	4	
2JJRE 002 010 S04	0.2	0.2	1	40	4		2JJRE 006 060 S04	0.6	0.6	6	40	4	
2JJRE 002 015 S04	0.2	0.2	1.5	40	4		2JJRE 006 080 S04	0.6	0.6	8	45	4	
2JJRE 002 020 S04	0.2	0.2	2	40	4		2JJRE 006 100 S04	0.6	0.6	10	45	4	
2JJRE 002 025 S04	0.2	0.2	2.5	40	4		2JJRE 006 120 S04	0.6	0.6	12	45	4	
2JJRE 002 030 S04	0.2	0.2	3	40	4		2JJRE 006 140 S04	0.6	0.6	14	45	4	
2JJRE 0025 005 S04	0.25	0.25	0.5	40	4		2JJRE 006 160 S04	0.6	0.6	16	45	4	
2JJRE 0025 010 S04	0.25	0.25	1	40	4		2JJRE 006 180 S04	0.6	0.6	18	50	4	
2JJRE 0025 015 S04	0.25	0.25	1.5	40	4		2JJRE 007 020 S04	0.7	0.7	2	40	4	
2JJRE 0025 020 S04	0.25	0.25	2	40	4		2JJRE 007 040 S04	0.7	0.7	4	40	4	
2JJRE 0025 025 S04	0.25	0.25	2.5	40	4		2JJRE 007 060 S04	0.7	0.7	6	40	4	
2JJRE 0025 030 S04	0.25	0.25	3	40	4		2JJRE 007 080 S04	0.7	0.7	8	45	4	
2JJRE 003 010 S04	0.3	0.3	1	40	4		2JJRE 007 100 S04	0.7	0.7	10	45	4	
2JJRE 003 015 S04	0.3	0.3	1.5	40	4		2JJRE 007 120 S04	0.7	0.7	12	45	4	
2JJRE 003 020 S04	0.3	0.3	2	40	4		2JJRE 007 140 S04	0.7	0.7	14	45	4	
2JJRE 003 025 S04	0.3	0.3	2.5	40	4		2JJRE 007 160 S04	0.7	0.7	16	45	4	
2JJRE 003 030 S04	0.3	0.3	3	40	4		2JJRE 008 010 S04	0.8	0.8	1	40	4	
2JJRE 003 035 S04	0.3	0.3	3.5	40	4		2JJRE 008 020 S04	0.8	0.8	2	40	4	
2JJRE 003 040 S04	0.3	0.3	4	40	4		2JJRE 008 030 S04	0.8	0.8	3	40	4	
2JJRE 003 050 S04	0.3	0.3	5	40	4		2JJRE 008 040 S04	0.8	0.8	4	40	4	
2JJRE 003 060 S04	0.3	0.3	6	40	4		2JJRE 008 050 S04	0.8	0.8	5	40	4	
2JJRE 003 070 S04	0.3	0.3	7	40	4		2JJRE 008 060 S04	0.8	0.8	6	40	4	
2JJRE 003 080 S04	0.3	0.3	8	40	4		2JJRE 008 080 S04	0.8	0.8	8	45	4	
2JJRE 004 010 S04	0.4	0.4	1	40	4		2JJRE 008 100 S04	0.8	0.8	10	45	4	
2JJRE 004 015 S04	0.4	0.4	1.5	40	4		2JJRE 008 120 S04	0.8	0.8	12	45	4	
2JJRE 004 020 S04	0.4	0.4	2	40	4		2JJRE 008 140 S04	0.8	0.8	14	45	4	
2JJRE 004 025 S04	0.4	0.4	2.5	40	4		2JJRE 008 160 S04	0.8	0.8	16	45	4	
2JJRE 004 030 S04	0.4	0.4	3	40	4		2JJRE 008 180 S04	0.8	0.8	18	50	4	
2JJRE 004 035 S04	0.4	0.4	3.5	40	4		2JJRE 008 200 S04	0.8	0.8	20	50	4	
2JJRE 004 040 S04	0.4	0.4	4	40	4		2JJRE 009 040 S04	0.9	0.9	4	40	4	
2JJRE 004 050 S04	0.4	0.4	5	40	4		2JJRE 009 060 S04	0.9	0.9	6	40	4	
2JJRE 004 060 S04	0.4	0.4	6	40	4		2JJRE 009 080 S04	0.9	0.9	8	45	4	
2JJRE 004 080 S04	0.4	0.4	8	40	4		2JJRE 009 100 S04	0.9	0.9	10	45	4	
2JJRE 004 100 S04	0.4	0.4	10	45	4		2JJRE 010 020 S04	1	1	2	45	4	
2JJRE 004 120 S04	0.4	0.4	12	45	4		2JJRE 010 030 S04	1	1	3	45	4	
2JJRE 005 010 S04	0.5	0.5	1	40	4		2JJRE 010 040 S04	1	1	4	45	4	
2JJRE 005 020 S04	0.5	0.5	2	40	4		2JJRE 010 050 S04	1	1	5	45	4	
2JJRE 005 030 S04	0.5	0.5	3	40	4		2JJRE 010 060 S04	1	1	6	45	4	
2JJRE 005 040 S04	0.5	0.5	4	40	4		2JJRE 010 080 S04	1	1	8	45	4	
2JJRE 005 050 S04	0.5	0.5	5	40	4		2JJRE 010 100 S04	1	1	10	45	4	
2JJRE 005 060 S04	0.5	0.5	6	40	4		2JJRE 010 120 S04	1	1	12	50	4	
2JJRE 005 080 S04	0.5	0.5	8	45	4		2JJRE 010 140 S04	1	1	14	50	4	
2JJRE 005 100 S04	0.5	0.5	10	45	4		2JJRE 010 160 S04	1	1	16	50	4	
2JJRE 005 120 S04	0.5	0.5	12	45	4		2JJRE 010 180 S04	1	1	18	50	4	

단위 : mm

Order Number	날경 Diameter D	날장 Length of cut L1	유효장 Effective Length L2	전장 Overall Length L	샙크 Dia d	비고	Order Number	날경 Diameter D	날장 Length of cut L1	유효장 Effective Length L2	전장 Overall Length L	샙크 Dia d	비고
2JJRE 010 200 S04	1	1	20	50	4		2JJRE 025 350 S04	2.5	2.5	35	70	4	
2JJRE 010 220 S04	1	1	22	60	4		2JJRE 025 400 S04	2.5	2.5	40	80	4	
2JJRE 010 250 S04	1	1	25	60	4		2JJRE 025 450 S04	2.5	2.5	45	90	4	
2JJRE 010 300 S04	1	1	30	70	4		2JJRE 025 500 S04	2.5	2.5	50	90	4	
2JJRE 012 040 S04	1.2	1.2	4	45	4		2JJRE 030 060 S06	3	3	6	45	6	
2JJRE 012 060 S04	1.2	1.2	6	45	4		2JJRE 030 080 S06	3	3	8	45	6	
2JJRE 012 080 S04	1.2	1.2	8	45	4		2JJRE 030 100 S06	3	3	10	50	6	
2JJRE 012 100 S04	1.2	1.2	10	45	4		2JJRE 030 120 S06	3	3	12	50	6	
2JJRE 012 120 S04	1.2	1.2	12	50	4		2JJRE 030 160 S06	3	3	16	55	6	
2JJRE 012 160 S04	1.2	1.2	16	50	4		2JJRE 030 200 S06	3	3	20	60	6	
2JJRE 012 200 S04	1.2	1.2	20	50	4		2JJRE 030 250 S06	3	3	25	65	6	
2JJRE 012 250 S04	1.2	1.2	25	60	4		2JJRE 030 300 S06	3	3	30	70	6	
2JJRE 014 080 S04	1.4	1.4	8	45	4		2JJRE 030 350 S06	3	3	35	75	6	
2JJRE 014 100 S04	1.4	1.4	10	45	4		2JJRE 030 400 S06	3	3	40	80	6	
2JJRE 014 140 S04	1.4	1.4	14	50	4		2JJRE 030 450 S06	3	3	45	90	6	
2JJRE 014 160 S04	1.4	1.4	16	50	4		2JJRE 030 500 S06	3	3	50	100	6	
2JJRE 014 200 S04	1.4	1.4	20	50	4		2JJRE 030 600 S06	3	3	60	100	6	
2JJRE 014 220 S04	1.4	1.4	22	60	4		2JJRE 035 120 S06	3.5	3.5	12	50	6	
2JJRE 015 040 S04	1.5	1.5	4	45	4		2JJRE 035 160 S06	3.5	3.5	16	55	6	
2JJRE 015 060 S04	1.5	1.5	6	45	4		2JJRE 035 200 S06	3.5	3.5	20	60	6	
2JJRE 015 080 S04	1.5	1.5	8	45	4		2JJRE 035 250 S06	3.5	3.5	25	65	6	
2JJRE 015 100 S04	1.5	1.5	10	50	4		2JJRE 035 300 S06	3.5	3.5	30	70	6	
2JJRE 015 120 S04	1.5	1.5	12	50	4		2JJRE 035 350 S06	3.5	3.5	35	75	6	
2JJRE 015 140 S04	1.5	1.5	14	50	4		2JJRE 035 400 S06	3.5	3.5	40	80	6	
2JJRE 015 160 S04	1.5	1.5	16	50	4		2JJRE 040 080 S06	4	4	8	50	6	
2JJRE 015 180 S04	1.5	1.5	18	50	4		2JJRE 040 100 S06	4	4	10	50	6	
2JJRE 015 200 S04	1.5	1.5	20	50	4		2JJRE 040 120 S06	4	4	12	50	6	
2JJRE 015 220 S04	1.5	1.5	22	60	4		2JJRE 040 160 S06	4	4	16	55	6	
2JJRE 015 250 S04	1.5	1.5	25	60	4		2JJRE 040 200 S06	4	4	20	60	6	
2JJRE 015 350 S04	1.5	1.5	35	70	4		2JJRE 040 250 S06	4	4	25	65	6	
2JJRE 015 400 S04	1.5	1.5	40	80	4		2JJRE 040 300 S06	4	4	30	70	6	
2JJRE 016 060 S04	1.6	1.6	6	45	4		2JJRE 040 350 S06	4	4	35	75	6	
2JJRE 016 100 S04	1.6	1.6	10	50	4		2JJRE 040 400 S06	4	4	40	80	6	
2JJRE 016 140 S04	1.6	1.6	14	50	4		2JJRE 040 450 S06	4	4	45	90	6	
2JJRE 016 180 S04	1.6	1.6	18	50	4		2JJRE 040 500 S06	4	4	50	100	6	
2JJRE 016 200 S04	1.6	1.6	20	50	4		2JJRE 040 600 S06	4	4	60	100	6	
2JJRE 018 100 S04	1.8	1.8	10	50	4		2JJRE 045 120 S06	4.5	4.5	12	50	6	
2JJRE 018 120 S04	1.8	1.8	12	50	4		2JJRE 045 160 S06	4.5	4.5	16	55	6	
2JJRE 018 140 S04	1.8	1.8	14	50	4		2JJRE 045 200 S06	4.5	4.5	20	60	6	
2JJRE 018 160 S04	1.8	1.8	16	50	4		2JJRE 045 250 S06	4.5	4.5	25	65	6	
2JJRE 018 180 S04	1.8	1.8	18	50	4		2JJRE 045 300 S06	4.5	4.5	30	70	6	
2JJRE 018 200 S04	1.8	1.8	20	50	4		2JJRE 045 400 S06	4.5	4.5	40	80	6	
2JJRE 018 250 S04	1.8	1.8	25	60	4		2JJRE 050 160 S06	5	6	16	60	6	
2JJRE 020 060 S04	2	2	6	45	4		2JJRE 050 200 S06	5	6	20	60	6	
2JJRE 020 080 S04	2	2	8	45	4		2JJRE 050 250 S06	5	6	25	65	6	
2JJRE 020 100 S04	2	2	10	50	4		2JJRE 050 300 S06	5	6	30	70	6	
2JJRE 020 120 S04	2	2	12	50	4		2JJRE 050 350 S06	5	6	35	75	6	
2JJRE 020 140 S04	2	2	14	50	4		2JJRE 050 400 S06	5	6	40	80	6	
2JJRE 020 160 S04	2	2	16	50	4		2JJRE 050 500 S06	5	6	50	100	6	
2JJRE 020 180 S04	2	2	18	50	4		2JJRE 050 600 S06	5	6	60	100	6	
2JJRE 020 200 S04	2	2	20	50	4		2JJRE 060 200 S06	6	10	20	60	6	
2JJRE 020 220 S04	2	2	22	60	4		2JJRE 060 300 S06	6	10	30	75	6	
2JJRE 020 250 S04	2	2	25	60	4		2JJRE 060 400 S06	6	10	40	80	6	
2JJRE 020 300 S04	2	2	30	60	4		2JJRE 060 500 S06	6	10	50	90	6	
2JJRE 020 350 S04	2	2	35	70	4		2JJRE 060 600 S06	6	10	60	110	6	
2JJRE 020 400 S04	2	2	40	80	4		2JJRE 080 300 S08	8	12	30	80	8	
2JJRE 020 450 S04	2	2	45	90	4		2JJRE 080 500 S08	8	12	50	100	8	
2JJRE 020 500 S04	2	2	50	90	4		2JJRE 100 400 S10	10	15	40	90	10	
2JJRE 025 100 S04	2.5	2.5	10	50	4		2JJRE 100 600 S10	10	15	60	110	10	
2JJRE 025 120 S04	2.5	2.5	12	50	4		2JJRE 120 500 S12	12	18	50	100	12	
2JJRE 025 160 S04	2.5	2.5	16	50	4		2JJRE 120 700 S12	12	18	70	120	12	
2JJRE 025 200 S04	2.5	2.5	20	50	4								
2JJRE 025 250 S04	2.5	2.5	25	60	4								
2JJRE 025 300 S04	2.5	2.5	30	70	4								

피삭재 Material		합금강 / 프리하드강 Alloy Steels / Prehardened Steels NAK80/KP4M				고경도강 Hardened Steels STAVAX/SKD11				열처리 / 고경도강 Heat-treated steels / Hardened Steels SKD11 / SKD61			
경도 Hardness		40 ~ 45HRC				45 ~ 55HRC				55 ~ 62HRC			
외경 Outside Diameter	유효장 Effective Length	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
∅ 1	4	24,480	936	0.100	0.100	21,600	699	0.100	0.100	20,160	563	0.100	0.100
"	6	22,032	773	0.040	0.040	19,440	577	0.040	0.040	18,144	465	0.040	0.040
"	8	22,032	773	0.040	0.040	19,440	577	0.040	0.040	18,144	465	0.040	0.040
"	10	22,032	773	0.025	0.025	19,440	577	0.025	0.025	18,144	465	0.025	0.025
"	12	19,584	502	0.025	0.025	17,280	443	0.025	0.025	16,128	348	0.025	0.025
"	14	19,584	502	0.025	0.025	17,280	443	0.025	0.025	16,128	348	0.025	0.025
"	16	19,584	476	0.015	0.015	17,280	373	0.015	0.015	16,128	283	0.015	0.015
∅ 1.2	6	21,760	764	0.084	0.084	19,200	570	0.084	0.084	17,920	460	0.084	0.084
"	8	19,584	687	0.048	0.048	17,280	513	0.048	0.048	16,128	414	0.048	0.048
"	10	19,584	687	0.030	0.030	17,280	513	0.030	0.030	16,128	414	0.030	0.030
"	12	19,584	687	0.030	0.030	17,280	513	0.030	0.030	16,128	414	0.030	0.030
"	16	17,408	611	0.020	0.020	15,360	456	0.020	0.020	14,336	368	0.020	0.020
∅ 1.4	8	19,040	668	0.100	0.100	16,800	499	0.100	0.100	15,680	402	0.100	0.100
"	10	17,136	601	0.056	0.056	15,120	449	0.056	0.056	14,112	362	0.056	0.056
"	14	17,136	601	0.035	0.035	15,120	449	0.035	0.035	14,112	362	0.035	0.035
"	16	15,232	391	0.035	0.035	13,440	345	0.035	0.035	12,544	271	0.035	0.035
∅ 1.5	6	19,040	668	0.110	0.110	16,800	499	0.110	0.110	15,680	402	0.110	0.110
"	8	19,040	668	0.110	0.110	16,800	499	0.110	0.110	15,680	402	0.110	0.110
"	10	17,136	601	0.060	0.060	15,120	449	0.060	0.060	14,112	362	0.060	0.060
"	12	17,136	601	0.060	0.060	15,120	449	0.060	0.060	14,112	362	0.060	0.060
"	14	17,136	601	0.060	0.060	15,120	449	0.060	0.060	14,112	362	0.060	0.060
"	16	15,232	391	0.038	0.038	13,440	345	0.038	0.038	12,544	271	0.038	0.038
"	18	15,232	391	0.038	0.038	13,440	345	0.038	0.038	12,544	271	0.038	0.038
"	20	15,232	391	0.038	0.038	13,440	345	0.038	0.038	12,544	271	0.038	0.038
"	25	11,424	278	0.023	0.023	10,080	218	0.023	0.023	9,408	165	0.023	0.023
∅ 1.6	10	15,912	621	0.040	0.040	14,040	463	0.040	0.040	13,104	373	0.040	0.040
"	14	15,912	621	0.040	0.040	14,040	463	0.040	0.040	13,104	373	0.040	0.040
"	18	15,912	621	0.040	0.040	14,040	463	0.040	0.040	13,104	373	0.040	0.040
∅ 1.8	10	15,912	621	0.072	0.072	14,040	463	0.072	0.072	13,104	373	0.072	0.072
"	14	15,912	621	0.072	0.072	14,040	463	0.072	0.072	13,104	373	0.072	0.072
"	18	15,912	621	0.072	0.072	14,040	463	0.072	0.072	13,104	373	0.072	0.072
∅ 2	6	14,280	668	0.200	0.200	12,600	499	0.200	0.200	11,760	402	0.200	0.200
"	8	14,280	668	0.140	0.140	12,600	499	0.140	0.140	11,760	402	0.140	0.140
"	10	14,280	668	0.140	0.140	12,600	499	0.140	0.140	11,760	402	0.140	0.140
"	12	12,852	601	0.080	0.080	11,340	449	0.080	0.080	10,584	362	0.080	0.080
"	14	12,852	601	0.080	0.080	11,340	449	0.080	0.080	10,584	362	0.080	0.080
"	16	12,852	601	0.080	0.080	11,340	449	0.080	0.080	10,584	362	0.080	0.080
"	18	12,852	601	0.050	0.050	11,340	449	0.050	0.050	10,584	362	0.050	0.050
"	20	12,852	601	0.050	0.050	11,340	449	0.050	0.050	10,584	362	0.050	0.050
"	25	11,424	391	0.050	0.050	10,080	345	0.050	0.050	9,408	271	0.050	0.050
"	30	11,424	391	0.030	0.030	10,080	345	0.030	0.030	9,408	271	0.030	0.030
∅ 2.5	12	12,240	716	0.180	0.180	10,800	535	0.180	0.180	10,080	431	0.180	0.180
"	16	11,116	644	0.100	0.100	9,720	388	0.100	0.100	9,072	388	0.100	0.100
"	20	11,116	644	0.100	0.100	9,720	481	0.100	0.100	9,072	388	0.100	0.100
∅ 3	12	10,880	636	0.210	0.210	9,600	475	0.210	0.210	8,960	383	0.210	0.210
"	16	9,792	573	0.120	0.120	8,640	428	0.120	0.120	8,064	345	0.120	0.120
"	20	9792	573	0.12	0.120	8640	428	0.12	0.120	8064	345	0.12	0.120
"	25	9792	573	0.08	0.080	8640	428	0.08	0.080	8064	345	0.08	0.080
"	30	9792	573	0.08	0.080	8640	428	0.08	0.080	8064	345	0.08	0.080
"	40	8704	509	0.05	0.050	7680	380	0.05	0.050	7168	307	0.05	0.050
∅ 4	12	8000	1358	0.4	0.400	7050	902	0.4	0.400	6580	727	0.4	0.400
"	16	8000	1358	0.4	0.400	7050	902	0.4	0.400	6580	727	0.4	0.400
"	20	7800	1200	0.3	0.300	6800	800	0.3	0.300	6200	720	0.3	0.300
"	25	7800	1200	0.3	0.300	6800	800	0.3	0.300	6200	720	0.3	0.300
"	30	7800	1200	0.3	0.300	6800	800	0.3	0.300	6200	720	0.3	0.300
"	35	7600	1150	0.2	0.200	6700	780	0.2	0.200	6000	700	0.2	0.200
"	40	7600	1150	0.2	0.200	6700	780	0.2	0.200	6000	700	0.2	0.200
"	45	7600	1150	0.2	0.200	6700	780	0.2	0.200	6000	700	0.2	0.200
"	50	7600	1150	0.2	0.200	6700	780	0.2	0.200	6000	700	0.2	0.200
∅ 5	16	7400	1060	0.60	0.600	6600	760	0.4	0.400	5900	680	0.4	0.400
"	20	7400	1060	0.60	0.600	6600	760	0.4	0.400	5900	680	0.4	0.400
"	25	7400	1060	0.450	0.450	6600	760	0.3	0.300	5900	680	0.3	0.300
"	30	7200	1000	0.300	0.300	6200	740	0.2	0.200	5800	650	0.2	0.200
"	35	7200	1000	0.300	0.300	6200	740	0.2	0.200	5800	650	0.2	0.200
"	40	7000	980	0.300	0.300	6000	700	0.2	0.200	5600	620	0.2	0.200
"	50	7000	980	0.300	0.300	6000	700	0.2	0.200	5600	620	0.2	0.200
∅ 6	20	6800	950	0.150	0.150	5800	680	0.1	0.100	5400	600	0.1	0.100
"	30	6800	950	0.150	0.150	5800	680	0.1	0.100	5400	600	0.1	0.100

# 2JJRE/4JJRE

■ 4JJRE는 RPM 동일, FEED만 최대 50% Up 적용.  
 ■ Use the same RPM and raise up the feed up to 50% for 4JJRE.

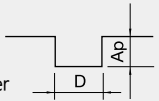
• RPM : rev./min • Feed : mm/min

피삭재 Material		합금강 / 프리하드강 Alloy Steels / Prehardened Steels NAK80/KP4M				고경도강 Hardened Steels STAVAX/SKD11				열처리 / 고경도강 Heat-treated steels / Hardened Steels SKD11 / SKD61			
경도 Hardness		38 ~ 45HRC				45 ~ 55HRC				55 ~ 62HRC			
외경 Outside Diameter	유효장 Effective Length	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
∅	40	6800	950	0.150	0.150	5800	680	0.1	0.100	5400	600	0.1	0.100
∅	50	6500	900	0.135	0.135	5600	650	0.09	0.090	5000	560	0.09	0.090
∅	60	6500	900	0.135	0.135	5600	650	0.09	0.090	5000	560	0.09	0.090

**절입량**  
Depth of Cut

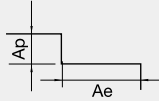
Slotting

- Ap : Axial Depth
- D : Outside Diameter



Side Milling

- Ap : Axial Depth
- Ae : Radial Depth

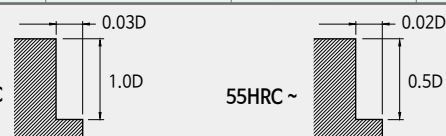


- 4날시 회전수는 유지하고, 피드는 안정적인 속도내에서 최대 50%까지 UP 해주십시오.
- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- HRC65 이상 고경도강 가공 시 같은 직경의 같은 비율로 20% DOWN 해주십시오.
- 상기 절삭조건은 참고 수치이므로 실 가공시에는 가공 형상, 가공 목적, 적용 기계 등에 따라 조건을 조정 하십시오.
- 조건 표가 기계의 최대스핀들 속도를 초과 하거나 버 및 적열 현상이 발생할때 스펀들 속도와 이송 속도를 비례하여 조정 하십시오.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다.(∅1 이하 사용 시 진동 허용 관리 5 $\mu$ m 이내일 것.)
- 에어브로, 절삭유, 오일미스트 콜러트를 추천하며, 칩을 잘 제거하고 가공시 발열과 발화에 주의 하십시오
- For 4JJRE, use the same RPM and raise up the feed up to 50% in stable condition.
- The edge of the flute precisely grinded. If you want to measure the tool, and to avoid damaging on the flutes, use non-contact measuring method.
- When milling hardened material, HRC over 65, decrease by 20% RPM and feed compared to the same diameter.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- If the table over the maximum RPM and feed of your machine, or found red heat on the material, adjust RPM and feed in the same proportion.
- Use a machine with low vibration and good rigidity ( $\emptyset 1$  or less, the vibration tolerance management will be within 5 $\mu$ m.)
- Air blow or mist coolants are recommended and note for chip emission, heat or ignition.

# 4JJE Cutting Condition

# 4JJHE

688JJHE : RPM 동일, FEED만 최대 50% Up 적용.  
 Use the same RPM, raise up the feed up to 50%

피삭재 Material	합금강 / 프리하드강 Alloy Steels / Prehardened Steels NAK80/KP4M		고경도강 Hardened Steels STAVAX/SKD11		피삭재 Material	열처리 / 고경도강 Heat-treated steels / Hardened Steels SKD11 / SKD61				열처리 / 고경도강 Heat-treated steels / Hardened Steels YXR7 / SKH51						
	경도 Hardness	40 ~ 45HRC	45 ~ 55HRC	경도 Hardness		55 ~ 62HRC				62 ~ 70HRC						
외경 Outside Diameter	RPM	FEED	RPM	FEED	외경 Outside Diameter	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth			
∅ 1	31,500	1,050	20,300	710	∅ 1	32,000	800	0.5	0.02	28,000	500	0.5	0.02			
∅ 2	20,200	1,250	14,300	840	∅ 1.5	30,000	900	0.75	0.03	25,000	550	0.75	0.03			
∅ 3	14,300	1,250	8,500	840	∅ 2	24,000	1,000	1	0.04	16,000	600	1	0.04			
∅ 4	11,400	1,300	7,200	880	∅ 3	38,400	1,600	1.5	0.06	19,200	1,140	1.5	0.06			
∅ 5	10,500	1,500	6,700	1,000	∅ 4	28,800	1,850	2	0.08	14,400	1,320	2	0.08			
∅ 6	8,450	1,400	5,600	950	∅ 5	24,000	2,100	2.5	0.1	12,000	1,500	2.5	0.1			
∅ 7	7,800	1,380	4,200	900	∅ 6	19,200	2,430	3	0.12	9,600	1,740	3	0.12			
∅ 8	6,500	1,350	3,830	840	∅ 8	14,400	2,430	4	0.16	7,200	1,740	4	0.16			
∅ 9	6,150	1,260	3,500	840	∅ 10	11,520	2,430	5	0.2	5,760	1,740	5	0.2			
∅ 10	5,250	1,260	2,800	800	∅ 12	9,600	2,010	6	0.24	4,800	1,440	6	0.24			
∅ 11	4,300	1,150	2,500	800	∅ 16	7,200	1,500	8	0.32	3,600	1,080	8	0.32			
∅ 12	4,300	1,150	2,300	760	∅ 20	5,760	1,200	10	0.4	2,880	850	10	0.4			
∅ 14	3,500	1,050	2,100	760	<p><b>절입량</b> Depth of Cut</p> 											
∅ 16	3,500	1,050	2,000	700												
∅ 18	2,800	1,000	2,000	700												
∅ 20	2,600	980	1,800	650												

- HRC55 이하 피삭재(합금강, 공구강) 가공시 같은 파이에 대비 상기 절삭조건 20% UP 해주십시오.
- JJHE의 6~8날 가공시 회전수는 유지하고, 안정적인 속도내에서 피드를 최대 50%까지 UP 해주십시오.
- JJHE Series 제품은 홈절삭보다 측면절삭에 효율이 높은점 참고 바랍니다.
- 상기 절삭조건은 참고 수치이므로 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건 변경 요망합니다.
- 조건표가 기계의 최대스핀들 속도를 초과 하거나 버 및 적열 현상이 발생할때 스펀들 속도와 이송 속도를 비례하여 조정 하십시오.
- 소재 및 가공 형상에 적합한 절삭유를 사용하십시오.
- When milling workpiece, HRC below 55 (Alloy steel, tool steel), Raise up 20% RPM and feed compared to the same diameter.
- For 6~8 flutes of JJHE, keep the RPM and raise up the feed up to 50% in the stable milling condition.
- Note that JJHE series performs better in side milling rather than groove milling.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- If the table over the maximum RPM and feed of your machine, or found red heat on the material, adjust RPM and feed in the same proportion.
- Use suitable cutting oil for material and machining geometry.