

- 고경도강(HRC52~68), 프리하든강 계열의 고정밀 가공 엔드밀
- 고품질 실리콘계 코팅(Si) 처리하여 내마모성이 우수합니다.
- 고정밀 공차 적용으로 초정밀 가공에 적합합니다.
- 코너R 형상을 날부치핑이 적도록 설계하였습니다.
- 다양한 코너R과 전장으로 맞춤 가공이 가능합니다.
- 초미립자 초경합금(0.2µm)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.
- Designed for minimizing edge chipping by corner R shape.
- Various corner R and overall length for wide range application.
- Outstanding performance at high speed machining by ultra fine (0.2µm) WC grade.

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UWC
초미립자

TISIN-S
Coating

R
±0.005

R
±0.01

R
±0.015

30°
Helix Angle

CUTTING
DATA

R0.05 ~ 0.5 R1 ~ 1.5 R2 ~ 3 418P

Condition	D Size	D Tolerance	Condition	D Size	D Tolerance
ØD ≠ Ød	Ø0.4 ~ 16	+0 ~ -0.01mm	ØD = Ød	Ø3 ~ 12	-0.005 ~ -0.015mm
				Ø14 ~ 16	-0.01 ~ -0.02mm

단위 : mm

Order Number	날경 Diameter D × R	날장 Length of cut L1	전장 Overall Length L	샙크 Shank Dia d	비고	Order Number	날경 Diameter D × R	날장 Length of cut L1	전장 Overall Length L	샙크 Shank Dia d	비고
New 4JJC 004 0005 S04	0.4 X R0.05	0.8	45	4		4JJC 040 001 S06	4 X R0.1	10	70	6	
4JJC 005 0005 S04	0.5 X R0.05	1	45	4		4JJC 040 002 S04	4 X R0.2	9	60	4	
4JJC 005 001 S04	0.5 X R0.1	1	45	4		4JJC 040 002 S06	4 X R0.2	10	70	6	
4JJC 006 0005 S04	0.6 X R0.05	1.2	45	4		4JJC 040 003 S04	4 X R0.3	9	60	4	
4JJC 006 001 S04	0.6 X R0.1	1.2	45	4		4JJC 040 003 S06	4 X R0.3	10	70	6	
4JJC 007 0005 S04	0.7 X R0.05	1.4	45	4		4JJC 040 005 S04	4 X R0.5	9	60	4	
4JJC 007 001 S04	0.7 X R0.1	1.4	45	4		4JJC 040 005 S06	4 X R0.5	10	70	6	
4JJC 008 0005 S04	0.8 X R0.05	1.6	45	4		4JJC 040 010 S04	4 X R1	9	60	4	
4JJC 008 001 S04	0.8 X R0.1	1.6	45	4		4JJC 040 010 S06	4 X R1	10	70	6	
4JJC 009 0005 S04	0.9 X R0.05	1.8	45	4		4JJC 045 002 S06	4.5 X R0.2	11	75	6	
4JJC 009 001 S04	0.9 X R0.1	1.8	45	4		4JJC 045 003 S06	4.5 X R0.3	11	75	6	
4JJC 010 0005 S04	1 X R0.05	2.5	45	4		4JJC 045 005 S06	4.5 X R0.5	11	75	6	
4JJC 010 001 S04	1 X R0.1	2.5	45	4		4JJC 045 010 S06	4.5 X R1	11	75	6	
4JJC 010 002 S04	1 X R0.2	2.5	45	4		4JJC 050 001 S06	5 X R0.1	13	75	6	
4JJC 010 003 S04	1 X R0.3	2.5	45	4		4JJC 050 002 S06	5 X R0.2	13	75	6	
4JJC 015 0005 S04	1.5 X R0.05	4	45	4		4JJC 050 003 S06	5 X R0.3	13	75	6	
4JJC 015 001 S04	1.5 X R0.1	4	45	4		4JJC 050 005 S06	5 X R0.5	13	75	6	
4JJC 015 002 S04	1.5 X R0.2	4	45	4		4JJC 050 010 S06	5 X R1	13	75	6	
4JJC 015 003 S04	1.5 X R0.3	4	45	4		4JJC 060 0005 055	6 X R0.05	11	55	6	
4JJC 015 005 S04	1.5 X R0.5	4	45	4		4JJC 060 0005 080	6 X R0.05	13	80	6	
4JJC 020 0005 S04	2 X R0.05	6	45	4		4JJC 060 001 055	6 X R0.1	11	55	6	
4JJC 020 001 S04	2 X R0.1	6	45	4		4JJC 060 001 080	6 X R0.1	13	80	6	
4JJC 020 002 S04	2 X R0.2	6	45	4		4JJC 060 002 055	6 X R0.2	11	55	6	
4JJC 020 003 S04	2 X R0.3	6	45	4		4JJC 060 002 080	6 X R0.2	13	80	6	
4JJC 020 005 S04	2 X R0.5	6	45	4		4JJC 060 002 100	6 X R0.2	13	100	6	
4JJC 025 001 S04	2.5 X R0.1	6	50	4		4JJC 060 002 120	6 X R0.2	13	120	6	
4JJC 025 002 S04	2.5 X R0.2	6	50	4		4JJC 060 003 055	6 X R0.3	11	55	6	
4JJC 025 003 S04	2.5 X R0.3	6	50	4		4JJC 060 003 080	6 X R0.3	13	80	6	
4JJC 025 005 S04	2.5 X R0.5	6	50	4		4JJC 060 003 100	6 X R0.3	13	100	6	
4JJC 030 001 S03	3 X R0.1	8	60	3		4JJC 060 003 120	6 X R0.3	13	120	6	
New 4JJC 030 001 S04	3 X R0.1	8	60	4		4JJC 060 005 055	6 X R0.5	11	55	6	
4JJC 030 001 S06	3 X R0.1	8	60	6		4JJC 060 005 080	6 X R0.5	13	80	6	
4JJC 030 002 S03	3 X R0.2	8	60	3		4JJC 060 005 100	6 X R0.5	13	100	6	
New 4JJC 030 002 S04	3 X R0.2	8	60	4		4JJC 060 005 120	6 X R0.5	13	120	6	
4JJC 030 002 S06	3 X R0.2	8	60	6		4JJC 060 010 055	6 X R1	11	55	6	
4JJC 030 003 S03	3 X R0.3	8	60	3		4JJC 060 010 080	6 X R1	13	80	6	
New 4JJC 030 003 S04	3 X R0.3	8	60	4		4JJC 060 010 100	6 X R1	13	100	6	
4JJC 030 003 S06	3 X R0.3	8	60	6		4JJC 060 010 120	6 X R1	13	120	6	
4JJC 030 005 S03	3 X R0.5	8	60	3		4JJC 060 015 055	6 X R1.5	11	55	6	
New 4JJC 030 005 S04	3 X R0.5	8	60	4		4JJC 060 015 080	6 X R1.5	13	80	6	
4JJC 030 005 S06	3 X R0.5	8	60	6		4JJC 060 020 055	6 X R2	11	55	6	
4JJC 030 010 S03	3 X R1	8	60	3		4JJC 060 020 080	6 X R2	13	80	6	
New 4JJC 030 010 S04	3 X R1	8	60	4		4JJC 070 002 S08	7 X R0.2	16	80	8	
4JJC 030 010 S06	3 X R1	8	60	6		4JJC 070 003 S08	7 X R0.3	16	80	8	
4JJC 035 001 S06	3.5 X R0.1	9	70	6		4JJC 070 005 S08	7 X R0.5	16	80	8	
4JJC 035 002 S06	3.5 X R0.2	9	70	6		4JJC 070 010 S08	7 X R1	16	80	8	
4JJC 035 003 S06	3.5 X R0.3	9	70	6		4JJC 080 001 060	8 X R0.1	16	60	8	
4JJC 035 005 S06	3.5 X R0.5	9	70	6		4JJC 080 001 090	8 X R0.1	19	90	8	
4JJC 035 010 S06	3.5 X R1	9	70	6		4JJC 080 002 060	8 X R0.2	16	60	8	
4JJC 040 001 S04	4 X R0.1	9	60	4		4JJC 080 002 090	8 X R0.2	19	90	8	



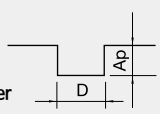
단위 : mm

Order Number	날경 Diameter D×R	날장 Length of cut L1	전장 Overall Length L	샙크 Dia d	비고	Order Number	날경 Diameter D×R	날장 Length of cut L1	전장 Overall Length L	샙크 Dia d	비고
4JJC 080 003 060	8 X R0.3	16	60	8		4JJC 120 005 110	12 X R0.5	26	110	12	
4JJC 080 003 090	8 X R0.3	19	90	8		4JJC 120 005 130	12 X R0.5	26	130	12	
4JJC 080 005 060	8 X R0.5	16	60	8		4JJC 120 005 160	12 X R0.5	26	160	12	
4JJC 080 005 090	8 X R0.5	19	90	8		4JJC 120 010 075	12 X R1	22	75	12	
4JJC 080 005 110	8 X R0.5	19	110	8		4JJC 120 010 110	12 X R1	26	110	12	
4JJC 080 005 150	8 X R0.5	19	150	8		4JJC 120 010 130	12 X R1	26	130	12	
4JJC 080 010 060	8 X R1	16	60	8		4JJC 120 010 160	12 X R1	26	160	12	
4JJC 080 010 090	8 X R1	19	90	8		4JJC 120 015 075	12 X R1.5	22	75	12	
4JJC 080 010 110	8 X R1	19	110	8		4JJC 120 015 110	12 X R1.5	26	110	12	
4JJC 080 010 150	8 X R1	19	150	8		4JJC 120 020 075	12 X R2	22	75	12	
4JJC 080 015 060	8 X R1.5	16	60	8		4JJC 120 020 110	12 X R2	26	110	12	
4JJC 080 015 090	8 X R1.5	19	90	8		4JJC 120 020 130	12 X R2	26	130	12	
4JJC 080 020 060	8 X R2	16	60	8		4JJC 120 020 160	12 X R2	26	160	12	
4JJC 080 020 090	8 X R2	19	90	8		4JJC 120 025 075	12 X R2.5	22	75	12	
4JJC 090 002 S10	9 X R0.2	20	90	10		4JJC 120 025 110	12 X R2.5	26	110	12	
4JJC 090 003 S10	9 X R0.3	20	90	10		4JJC 120 030 075	12 X R3	22	75	12	
4JJC 090 005 S10	9 X R0.5	20	90	10		4JJC 120 030 110	12 X R3	26	110	12	
4JJC 090 010 S10	9 X R1	20	90	10		4JJC 140 005 110	14 X R0.5	30	110	14	
4JJC 100 001 070	10 X R0.1	19	70	10		4JJC 140 010 110	14 X R1	30	110	14	
4JJC 100 001 100	10 X R0.1	22	100	10		4JJC 140 020 110	14 X R2	30	110	14	
4JJC 100 002 070	10 X R0.2	19	70	10		4JJC 160 005 110	16 X R0.5	32	110	16	
4JJC 100 002 100	10 X R0.2	22	100	10		4JJC 160 005 160	16 X R0.5	32	160	16	
4JJC 100 003 070	10 X R0.3	19	70	10		4JJC 160 010 110	16 X R1	32	110	16	
4JJC 100 003 100	10 X R0.3	22	100	10		4JJC 160 010 160	16 X R1	32	160	16	
4JJC 100 005 070	10 X R0.5	19	70	10							
4JJC 100 005 100	10 X R0.5	22	100	10							
4JJC 100 005 120	10 X R0.5	22	120	10							
4JJC 100 005 150	10 X R0.5	22	150	10							
4JJC 100 010 070	10 X R1	19	70	10							
4JJC 100 010 100	10 X R1	22	100	10							
4JJC 100 010 120	10 X R1	22	120	10							
4JJC 100 010 150	10 X R1	22	150	10							
4JJC 100 015 070	10 X R1.5	19	70	10							
4JJC 100 015 100	10 X R1.5	22	100	10							
4JJC 100 020 070	10 X R2	19	70	10							
4JJC 100 020 100	10 X R2	22	100	10							
4JJC 100 020 120	10 X R2	22	120	10							
4JJC 100 020 150	10 X R2	22	150	10							
4JJC 100 025 070	10 X R2.5	19	70	10							
4JJC 100 025 100	10 X R2.5	22	100	10							
4JJC 110 003 S12	11 X R0.3	24	100	12							
4JJC 110 005 S12	11 X R0.5	24	100	12							
4JJC 110 010 S12	11 X R1	24	100	12							
4JJC 120 001 075	12 X R0.1	22	75	12							
4JJC 120 001 110	12 X R0.1	26	110	12							
4JJC 120 002 075	12 X R0.2	22	75	12							
4JJC 120 002 110	12 X R0.2	26	110	12							
4JJC 120 003 075	12 X R0.3	22	75	12							
4JJC 120 003 110	12 X R0.3	26	110	12							
4JJC 120 005 075	12 X R0.5	22	75	12							

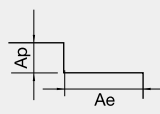
피삭재 Material		고경도강 Hardened Steels STAVAX/SKD11				열처리 / 고경도강 Heat-treated steels / Hardened Steels SKD11 / SKD61				열처리 / 고경도강 Heat-treated steels / Hardened Steels YXR7 / SKH51			
경도 Hardness		45 ~ 55HRc				55 ~ 62HRc				62 ~ 70HRc			
외경 Outside Diameter	반경 Corner Radius	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
∅ 0.5	R 0.1	33,000	85	0.01	0.01	25,000	55	0.01	0.01	25,000	45	0.01	0.01
∅ 0.6	R 0.1	33,000	95	0.02	0.02	25,000	60	0.01	0.01	20,000	50	0.01	0.01
∅ 0.7	R 0.1	30,000	115	0.02	0.10	25,000	75	0.01	0.08	20,000	55	0.01	0.08
∅ 0.8	R 0.1	25,000	120	0.04	0.15	19,000	85	0.02	0.12	16,000	60	0.02	0.12
∅ 0.9	R 0.1	23,000	160	0.06	0.18	17,500	110	0.03	0.15	14,500	95	0.03	0.14
∅ 1	R 0.3	20,500	344	0.10	0.30	16,000	216	0.05	0.20	12,500	140	0.05	0.20
∅ 1.5	R 0.1	18,000	388	0.10	0.30	13,000	235	0.07	0.30	10,500	160	0.08	0.25
"	R 0.5	18,000	388	0.13	0.40	13,000	235	0.07	0.30	10,500	160	0.08	0.25
∅ 2	R 0.1	14,500	416	0.15	0.50	11,000	256	0.10	0.45	9,500	184	0.10	0.45
"	R 0.5	14,500	416	0.15	0.50	11,000	256	0.10	0.45	9,500	184	0.10	0.45
∅ 2.5	R 0.1	9,500	416	0.20	0.70	7,500	256	0.12	0.55	6,400	184	0.12	0.55
"	R 0.5	9,500	416	0.20	0.70	7,500	256	0.12	0.55	6,400	184	0.12	0.55
∅ 3	R 0.5	8,300	424	0.23	0.80	6,400	268	0.13	0.60	5,600	192	0.13	0.60
"	R 1	8,300	424	0.23	0.80	6,400	268	0.13	0.60	5,600	192	0.13	0.60
∅ 3.5	R 0.5	7,800	432	0.25	0.90	6,000	268	0.13	0.70	5,200	192	0.14	0.70
∅ 4	R 0.5	7,200	432	0.25	0.95	5,600	268	0.15	0.75	4,750	192	0.15	0.75
"	R 1	7,200	432	0.25	1.00	5,600	268	0.15	0.80	4,750	192	0.15	0.80
∅ 4.5	R 0.5	6,400	464	0.25	1.05	5,100	296	0.15	0.85	4,450	216	0.15	0.85
∅ 5	R 0.5	6,400	464	0.25	1.05	5,100	296	0.15	0.85	4,450	216	0.15	0.85
"	R 1	6,400	464	0.30	1.20	5,100	296	0.17	0.90	4,450	216	0.17	0.85
∅ 6	R 0.5	5,300	448	0.30	1.30	4,200	280	0.20	1.00	3,700	208	0.20	0.90
"	R 1	5,300	448	0.30	1.40	4,200	296	0.20	1.00	3,700	216	0.20	0.90
"	R 1.5	5,300	448	0.35	1.50	4,200	280	0.23	1.20	3,700	208	0.22	1.20
"	R 2	5,300	448	0.35	1.60	4,200	296	0.23	1.20	3,700	216	0.22	1.20
∅ 8	R 0.5	4,000	416	0.40	1.70	3,200	264	0.25	1.35	2,800	192	0.25	1.30
"	R 1	4,000	416	0.40	1.70	3,200	264	0.25	1.35	2,800	192	0.25	1.30
"	R 1.5	4,000	416	0.45	2.00	3,200	264	0.28	1.50	2,800	192	0.27	1.40
"	R 2	4,000	416	0.45	2.00	3,200	264	0.28	1.50	2,800	192	0.27	1.40
∅ 10	R 0.5	3,200	384	0.50	2.10	2,550	248	0.30	1.70	2,200	176	0.30	1.70
"	R 1	3,200	384	0.50	2.10	2,550	248	0.30	1.70	2,200	176	0.30	1.70
"	R 1.5	3,200	384	0.55	2.30	2,550	248	0.35	1.80	2,200	176	0.35	1.80
"	R 2	3,200	384	0.55	2.30	2,550	248	0.35	1.90	2,200	176	0.35	1.90
"	R 2.5	3,200	384	0.60	2.30	2,550	248	0.35	1.90	2,200	176	0.35	1.90
∅ 12	R 0.5	2,650	384	0.60	2.60	2,100	240	0.35	2.00	1,860	176	0.35	2.00
"	R 1	2,650	384	0.60	2.60	2,100	240	0.35	2.00	1,860	176	0.35	2.00
"	R 1.5	2,650	384	0.60	2.60	2,100	240	0.35	2.00	1,860	176	0.35	2.00
"	R 2	2,650	384	0.60	2.60	2,100	240	0.35	2.00	1,860	176	0.35	2.00
"	R 2.5	2,650	384	0.80	3.00	2,100	240	0.50	2.20	1,860	176	0.45	2.30
"	R 3	2,650	384	1.00	3.00	2,100	240	0.65	2.40	1,860	176	0.55	2.50

절입량
Depth of Cut

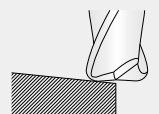
Slotting
• Ap : Axial Depth
• D : Outside Diameter



Side Milling
• Ap : Axial Depth
• Ae : Radial Depth



경사진면절삭
Inclined Cutting



- 상기 조건표는 홈 절삭 조건표이며, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 곡면 절삭시 날경의 코너R 보다 낮은 이동 PITCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도 내에서 피드를 최대30%까지 UP 해주십시오.
- 적용 기계의 회전속도가 부족한 경우에는 회전 속도와 이송 속도를 같은 비율로 줄여서 적용합니다.
- 에어브로 혹은 미스트 쿨러를 추천하며 칩 제거 주의 및 가공시 발열, 발화에 주의 하십시오.

- Above the table is a reference for groove milling, and adjust parameters depending on material shape, milling purpose, and CNC machine.
- For curved milling, set up the pitch value lower than corner radius value.
- For curved milling, raise up the feed up to 30% in stable condition.
- If the table over the maximum RPM and feed of your machine, adjust RPM and feed in the same proportion.
- Air blow or mist coolant is recommended and note for chip emission, heat, or ignition.