



- 중저경도강 (HRC52이하), 프리하드강 계열, 탄소강, 금형강, SUS계열, Ti/Ni계 합금, 인코넬 등 다양한 피삭재 가공 엔드밀
- 고품량 실리코네 코팅 (Si) 처리하여 내마모성이 우수합니다.
- 코너R 형상을 날부치평이 적도록 설계하였습니다.
- 다양한 코너R과 전장으로 맞춤 가공이 가능합니다.
- 경제적인 가격으로 가공 생산비 절감을 극대화합니다.
- 항절력이 높은 미립자 초경합금 (0.5µm)을 채택, 엔드밀의 파손을 최소화 하였습니다.

Endmills for various work materials (~HRC52), pre-hardened steels, carbon steels, mold steels

- Good wear resistance by high quality Si-based PVD coating.
- Designed for minimizing edge chipping by corner R shape.
- Various corner R and overall length for wide range application.
- Maximize the manufacturing cost saving with low price of products.
- Minimize fracturing by high TRS fine (0.5µm) WC grade.

4

WC
미립자

BLUE
Coating

R
± 0.005

R
± 0.01

R
± 0.015

30°
Helix Angle

CUTTING
DATA

0.1 ~ 0.5R 1 ~ 1.5R 2R 447P

Condition	D Size	D Tolerance	Condition	D Size	D Tolerance
ØD ≠ Ød	Ø1 ~ 12	+0 ~ -0.01mm	ØD = Ød	Ø4 ~ 12	-0.005 ~ -0.015mm

단위 : mm

Order Number	날경 Diameter D × R	날장 Length of cut L1	전장 Overall Length L	샤프크 Shank Dia d	비고	Order Number	날경 Diameter D × R	날장 Length of cut L1	전장 Overall Length L	샤프크 Shank Dia d	비고
4NCRE 010 001 S04	1 X R0.1	3	50	4		4NCRE 050 002 S06	5 X R0.2	10	50	6	
4NCRE 010 002 S04	1 X R0.2	3	50	4		4NCRE 050 002 075	5 X R0.2	13	75	6	
4NCRE 010 003 S04	1 X R0.3	3	50	4		4NCRE 050 003 S06	5 X R0.3	10	50	6	
4NCRE 012 001 S04	1.2 X R0.1	4	50	4		4NCRE 050 003 075	5 X R0.3	13	75	6	
4NCRE 012 002 S04	1.2 X R0.2	4	50	4		4NCRE 050 005 S06	5 X R0.5	10	50	6	
4NCRE 012 003 S04	1.2 X R0.3	4	50	4		4NCRE 050 005 075	5 X R0.5	13	75	6	
4NCRE 015 001 S04	1.5 X R0.1	4	50	4		4NCRE 050 010 S06	5 X R1	10	50	6	
4NCRE 015 002 S04	1.5 X R0.2	4	50	4		4NCRE 050 010 075	5 X R1	13	75	6	
4NCRE 015 003 S04	1.5 X R0.3	4	50	4		4NCRE 060 001 050	6 X R0.1	10	50	6	
4NCRE 015 005 S04	1.5 X R0.5	4	50	4		4NCRE 060 001 080	6 X R0.1	13	80	6	
4NCRE 020 001 S04	2 X R0.1	6	50	4		4NCRE 060 002 050	6 X R0.2	10	50	6	
4NCRE 020 002 S04	2 X R0.2	6	50	4		4NCRE 060 002 080	6 X R0.2	13	80	6	
4NCRE 020 003 S04	2 X R0.3	6	50	4		4NCRE 060 003 050	6 X R0.3	10	50	6	
4NCRE 020 005 S04	2 X R0.5	6	50	4		4NCRE 060 003 080	6 X R0.3	13	80	6	
4NCRE 025 001 S04	2.5 X R0.1	6	50	4		4NCRE 060 005 050	6 X R0.5	10	50	6	
4NCRE 025 002 S04	2.5 X R0.2	6	50	4		4NCRE 060 005 080	6 X R0.5	13	80	6	
4NCRE 025 003 S04	2.5 X R0.3	6	50	4		4NCRE 060 010 050	6 X R1	10	50	6	
4NCRE 025 005 S04	2.5 X R0.5	6	50	4		4NCRE 060 010 080	6 X R1	13	80	6	
4NCRE 030 001 S04	3 X R0.1	8	50	4		4NCRE 080 002 060	8 X R0.2	16	60	8	
4NCRE 030 001 S06	3 X R0.1	8	50	6		4NCRE 080 002 090	8 X R0.2	19	90	8	
4NCRE 030 001 060	3 X R0.1	8	60	6		4NCRE 080 003 060	8 X R0.3	16	60	8	
4NCRE 030 002 S04	3 X R0.2	8	50	4		4NCRE 080 003 090	8 X R0.3	19	90	8	
4NCRE 030 002 S06	3 X R0.2	8	50	6		4NCRE 080 005 060	8 X R0.5	16	60	8	
4NCRE 030 002 060	3 X R0.2	8	60	6		4NCRE 080 005 090	8 X R0.5	19	90	8	
4NCRE 030 003 S04	3 X R0.3	8	50	4		4NCRE 080 010 060	8 X R1	16	60	8	
4NCRE 030 003 S06	3 X R0.3	8	50	6		4NCRE 080 010 090	8 X R1	19	90	8	
4NCRE 030 003 060	3 X R0.3	8	60	6		4NCRE 080 020 060	8 X R2	16	60	8	
4NCRE 030 005 S04	3 X R0.5	8	50	4		4NCRE 080 020 090	8 X R2	19	90	8	
4NCRE 030 005 S06	3 X R0.5	8	50	6		4NCRE 100 002 075	10 X R0.2	18	75	10	
4NCRE 030 005 060	3 X R0.5	8	60	6		4NCRE 100 002 100	10 X R0.2	22	100	10	
4NCRE 030 010 S04	3 X R1	8	50	4		4NCRE 100 003 075	10 X R0.3	18	75	10	
4NCRE 030 010 S06	3 X R1	8	50	6		4NCRE 100 003 100	10 X R0.3	22	100	10	
4NCRE 030 010 060	3 X R1	8	60	6		4NCRE 100 005 075	10 X R0.5	18	75	10	
4NCRE 040 001 S04	4 X R0.1	10	50	4		4NCRE 100 005 100	10 X R0.5	22	100	10	
4NCRE 040 001 S06	4 X R0.1	10	50	6		4NCRE 100 010 075	10 X R1	18	75	10	
4NCRE 040 001 070	4 X R0.1	10	70	6		4NCRE 100 010 100	10 X R1	22	100	10	
4NCRE 040 002 S04	4 X R0.2	10	50	4		4NCRE 100 020 075	10 X R2	18	75	10	
4NCRE 040 002 S06	4 X R0.2	10	50	6		4NCRE 100 020 100	10 X R2	22	100	10	
4NCRE 040 002 070	4 X R0.2	10	70	6		4NCRE 120 002 075	12 X R0.2	22	75	12	
4NCRE 040 003 S04	4 X R0.3	10	50	4		4NCRE 120 002 110	12 X R0.2	26	110	12	
4NCRE 040 003 S06	4 X R0.3	10	50	6		4NCRE 120 003 075	12 X R0.3	22	75	12	
4NCRE 040 003 070	4 X R0.3	10	70	6		4NCRE 120 003 110	12 X R0.3	26	110	12	
4NCRE 040 005 S04	4 X R0.5	10	50	4		4NCRE 120 005 075	12 X R0.5	22	75	12	
4NCRE 040 005 S06	4 X R0.5	10	50	6		4NCRE 120 005 110	12 X R0.5	26	110	12	
4NCRE 040 005 070	4 X R0.5	10	70	6		4NCRE 120 010 075	12 X R1	22	75	12	
4NCRE 040 010 S04	4 X R1	10	50	4		4NCRE 120 010 110	12 X R1	26	110	12	
4NCRE 040 010 S06	4 X R1	10	50	6		4NCRE 120 020 075	12 X R2	22	75	12	
4NCRE 040 010 070	4 X R1	10	70	6		4NCRE 120 020 110	12 X R2	26	110	12	
4NCRE 050 001 S06	5 X R0.1	10	50	6							
4NCRE 050 001 075	5 X R0.1	13	75	6							

■ 4NCRE는 RPM 동일, FEED만 최대30% Up 적용.

■ Use the same RPM and raise up the feed up to 30% for 4NCRE.

• RPM : rev./min • Feed : mm/min

홈절삭 Slotting												
피삭재 Material	공구강 / 금형강 Tool steels / Mold steels SCM / HPM				합금강 / 프리하든강 Alloy Steels / Pre-hardened Steels NAK80 / KP4M				고경도강 Hardened Steels STAVX / SKD11			
경도 Hardness	30 ~ 40Hrc				40 ~ 45Hrc				45 ~ 55Hrc			
외경 Outside Diameter	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	43,200	1,224	0.05	1.0	24,200	990	0.02	0.8	22,950	660	0.02	0.80
∅ 1.5	28,250	1,296	0.08	1.5	23,850	1,090	0.03	1.2	20,340	726	0.03	1.20
∅ 2	29,970	1,458	0.10	2.0	15,570	1,200	0.04	1.6	15,750	776	0.04	1.60
∅ 3	19,620	1,482	0.15	3.0	11,880	1,230	0.06	2.4	10,350	792	0.06	2.40
∅ 4	15,030	1,518	0.20	4.0	11,250	1,310	0.08	3.2	7,920	809	0.08	3.20
∅ 5	14,130	1,620	0.25	5.0	9,315	1,280	0.10	4.0	7,470	858	0.10	4.00
∅ 6	11,790	1,578	0.30	6.0	7,020	1,170	0.12	4.8	6,210	842	0.12	4.80
∅ 8	8,890	1,440	0.40	8.0	5,530	1,090	0.16	6.4	4,680	776	0.16	6.40
∅ 10	7,020	1,344	0.50	10.0	4,720	1,090	0.20	8.0	3,690	726	0.20	8.00
∅ 12	5,985	1,344	0.60	12.0	4,350	1,050	0.24	9.6	3,150	726	0.24	9.60

~ 40HRC

40HRC ~

경사진면절삭
Inclined Cutting

측면절삭 Side Cutting												
피삭재 Material	공구강 / 금형강 Tool steels / Mold steels SCM / HPM				합금강 / 프리하든강 Alloy Steels / Pre-hardened Steels NAK80 / KP4M				고경도강 Hardened Steels STAVX / SKD11			
경도 Hardness	30 ~ 40Hrc				40 ~ 45Hrc				45 ~ 55Hrc			
외경 Outside Diameter	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	43,200	870	1.5	0.050	34,200	702	0.5	0.03	22,950	470	0.50	0.03
∅ 1.5	37,080	980	2.3	0.075	29,250	801	0.75	0.05	19,350	550	0.75	0.05
∅ 2	29,970	1,280	3.0	0.100	23,400	1,035	1.00	0.06	15,750	690	1.00	0.06
∅ 3	19,620	1,300	4.5	0.150	15,570	1,062	1.50	0.09	13,500	700	1.50	0.09
∅ 4	15,030	1,330	6.0	0.200	11,880	1,080	2.00	0.12	7,920	720	2.00	0.12
∅ 5	14,130	1,550	7.5	0.250	11,250	1,260	2.50	0.15	7,470	840	2.50	0.15
∅ 6	11,790	1,440	9.0	0.300	9,310	1,170	2.50	0.18	6,210	780	2.50	0.18
∅ 8	8,890	1,410	12.0	0.400	7,020	1,143	3.00	0.24	4,680	760	3.00	0.24
∅ 10	7,020	1,280	15.0	0.500	5,530	1,035	4.00	0.30	3,690	690	4.00	0.30
∅ 12	5,980	1,280	18.0	0.600	4,720	1,035	6.00	0.36	3,150	690	6.00	0.36

~ 40HRC

40HRC ~

- 상기 절삭조건표는 2날 기준이며, 4날시 회전수는 유지하고 피드는 안정적인 속도 내에서 최대30%까지 UP 해주십시오.
- HRC52 이상인 경우 같은 직경의 같은 비율로 20% DOWN 시켜주십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대30% 이하로 줄이십시오.
- 곡면 절삭시 날경의 코너R 보다 낮은 이동PITCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도 내에서 피드를 최대 30%까지 UP 해주십시오.
- 홈 절삭시 날경의 코너R 대비 Ae 값을 설정 하십시오.
- 상기 절삭조건은 참고 수치이며 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 피삭재와 절삭형상을 위한 적절한 쿨런트 사용과 가공시 발열, 발화에 주의 하십시오.
- The parameters on the table is based on 2 flutes. For using 4 flutes, use the same RPM and raise up the feed up to 30% in stable milling condition.
- When milling workpiece HRC over 52 hardened steel, reduce 20% of the RPM and feed compared to the same diameter.
- If the effective length is long, reduce the RPM and feed maximum 30%.
- For curved milling, set up the lower value of the pitch than the corner radius value of tool diameter.
- For curved milling, raise up the feed up to 30% in stable milling condition.
- For groove milling, set up the Ae value by considering of corner radius value.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- Use the adequate coolant for work material and machining geometry and note for heat and ignition.