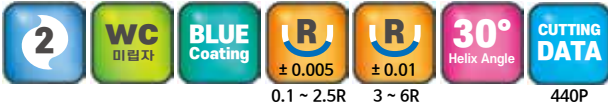


- 중저경도강(HRc52이하), 프리하든강 계열, 탄소강, 금형강등 다양한 피삭재 가공 엔드밀
- 고품량 실리콘계 코팅(Si)처리하여 내마모성이 우수합니다.
- 넓은 영역의 피삭재 가공에 적합한 형상으로 설계 하였습니다.
- 항절력이 높은 미립자 초경합금(0.5µm)을 채택, 엔드밀의 파손을 최소화 하였습니다.

#### Endmills for various work materials (~HRc52), pre-hardened steels, carbon steels, mold steels

- Good wear resistance by high quality Si-based PVD coating.
- Suitable shape is designed for tooling in wide areas.
- Minimize fracturing by high TRS fine(0.5µm) WC grade.

E series



Condition	D Size	D Tolerance	Condition	D Size	D Tolerance
ØD ≠ Ød	Ø0.2 ~ 12	+0 ~ -0.01mm	ØD = Ød	Ø6 ~ 12	-0.005 ~ -0.015mm

단위 : mm

Order Number	날경 Diameter R × D	날장 Length of cut L1	유효장 Effective Length L2	전장 Overall Length L	샙크 Shank Dia d	비고
2HRBE 002 005 S04	0.1R X 0.2	0.2	0.5	40	4	
2HRBE 002 010 S04	0.1R X 0.2	0.2	1	40	4	
2HRBE 002 015 S04	0.1R X 0.2	0.2	1.5	40	4	
2HRBE 002 020 S04	0.1R X 0.2	0.2	2	40	4	
2HRBE 003 010 S04	0.15R X 0.3	0.3	1	40	4	
2HRBE 003 015 S04	0.15R X 0.3	0.3	1.5	40	4	
2HRBE 003 020 S04	0.15R X 0.3	0.3	2	40	4	
2HRBE 003 030 S04	0.15R X 0.3	0.3	3	40	4	
2HRBE 003 040 S04	0.15R X 0.3	0.3	4	40	4	
2HRBE 004 010 S04	0.2R X 0.4	0.4	1	40	4	
2HRBE 004 020 S04	0.2R X 0.4	0.4	2	40	4	
2HRBE 004 030 S04	0.2R X 0.4	0.4	3	40	4	
2HRBE 004 040 S04	0.2R X 0.4	0.4	4	40	4	
2HRBE 004 050 S04	0.2R X 0.4	0.4	5	40	4	
2HRBE 004 060 S04	0.2R X 0.4	0.4	6	40	4	
2HRBE 004 080 S04	0.2R X 0.4	0.4	8	40	4	
2HRBE 005 010 S04	0.25R X 0.5	0.5	1	45	4	
2HRBE 005 020 S04	0.25R X 0.5	0.5	2	45	4	
2HRBE 005 030 S04	0.25R X 0.5	0.5	3	45	4	
2HRBE 005 040 S04	0.25R X 0.5	0.5	4	45	4	
2HRBE 005 050 S04	0.25R X 0.5	0.5	5	45	4	
2HRBE 005 060 S04	0.25R X 0.5	0.5	6	45	4	
2HRBE 005 080 S04	0.25R X 0.5	0.5	8	45	4	
2HRBE 005 100 S04	0.25R X 0.5	0.5	10	45	4	
2HRBE 005 120 S04	0.25R X 0.5	0.5	12	45	4	
2HRBE 006 010 S04	0.3R X 0.6	0.6	1	45	4	
2HRBE 006 020 S04	0.3R X 0.6	0.6	2	45	4	
2HRBE 006 030 S04	0.3R X 0.6	0.6	3	45	4	
2HRBE 006 040 S04	0.3R X 0.6	0.6	4	45	4	
2HRBE 006 050 S04	0.3R X 0.6	0.6	5	45	4	
2HRBE 006 060 S04	0.3R X 0.6	0.6	6	45	4	
2HRBE 006 080 S04	0.3R X 0.6	0.6	8	45	4	
2HRBE 006 100 S04	0.3R X 0.6	0.6	10	45	4	
2HRBE 006 120 S04	0.3R X 0.6	0.6	12	45	4	
2HRBE 006 140 S04	0.3R X 0.6	0.6	14	45	4	
2HRBE 007 020 S04	0.35R X 0.7	0.7	2	45	4	
2HRBE 007 040 S04	0.35R X 0.7	0.7	4	45	4	
2HRBE 007 060 S04	0.35R X 0.7	0.7	6	45	4	
2HRBE 007 080 S04	0.35R X 0.7	0.7	8	45	4	
2HRBE 007 100 S04	0.35R X 0.7	0.7	10	45	4	
2HRBE 007 120 S04	0.35R X 0.7	0.7	12	45	4	
2HRBE 008 020 S04	0.4R X 0.8	0.8	2	45	4	
2HRBE 008 030 S04	0.4R X 0.8	0.8	3	45	4	
2HRBE 008 040 S04	0.4R X 0.8	0.8	4	45	4	
2HRBE 008 050 S04	0.4R X 0.8	0.8	5	45	4	
2HRBE 008 060 S04	0.4R X 0.8	0.8	6	45	4	
2HRBE 008 080 S04	0.4R X 0.8	0.8	8	45	4	
2HRBE 008 100 S04	0.4R X 0.8	0.8	10	45	4	
2HRBE 008 120 S04	0.4R X 0.8	0.8	12	45	4	
2HRBE 009 040 S04	0.45R X 0.9	0.9	4	45	4	

Order Number	날경 Diameter R × D	날장 Length of cut L1	유효장 Effective Length L2	전장 Overall Length L	샙크 Shank Dia d	비고
2HRBE 009 060 S04	0.45R X 0.9	0.9	6	45	4	
2HRBE 009 080 S04	0.45R X 0.9	0.9	8	45	4	
2HRBE 009 100 S04	0.45R X 0.9	0.9	10	50	4	
2HRBE 010 020 S04	0.5R X 1	1	2	45	4	
2HRBE 010 030 S04	0.5R X 1	1	3	45	4	
2HRBE 010 040 S04	0.5R X 1	1	4	45	4	
2HRBE 010 050 S04	0.5R X 1	1	5	45	4	
2HRBE 010 060 S04	0.5R X 1	1	6	45	4	
2HRBE 010 080 S04	0.5R X 1	1	8	45	4	
2HRBE 010 100 S04	0.5R X 1	1	10	50	4	
2HRBE 010 120 S04	0.5R X 1	1	12	50	4	
2HRBE 010 140 S04	0.5R X 1	1	14	50	4	
2HRBE 010 160 S04	0.5R X 1	1	16	50	4	
2HRBE 010 180 S04	0.5R X 1	1	18	50	4	
2HRBE 010 200 S04	0.5R X 1	1	20	50	4	
2HRBE 010 220 S04	0.5R X 1	1	22	60	4	
2HRBE 010 250 S04	0.5R X 1	1	25	60	4	
2HRBE 012 040 S04	0.6R X 1.2	1.2	4	45	4	
2HRBE 012 060 S04	0.6R X 1.2	1.2	6	45	4	
2HRBE 012 080 S04	0.6R X 1.2	1.2	8	45	4	
2HRBE 012 100 S04	0.6R X 1.2	1.2	10	50	4	
2HRBE 012 120 S04	0.6R X 1.2	1.2	12	50	4	
2HRBE 012 160 S04	0.6R X 1.2	1.2	16	50	4	
2HRBE 012 200 S04	0.6R X 1.2	1.2	20	50	4	
2HRBE 012 240 S04	0.6R X 1.2	1.2	24	60	4	
2HRBE 014 060 S04	0.7R X 1.4	1.4	6	45	4	
2HRBE 014 080 S04	0.7R X 1.4	1.4	8	45	4	
2HRBE 014 120 S04	0.7R X 1.4	1.4	12	50	4	
2HRBE 014 160 S04	0.7R X 1.4	1.4	16	50	4	
2HRBE 015 030 S04	0.75R X 1.5	1.5	3	45	4	
2HRBE 015 040 S04	0.75R X 1.5	1.5	4	45	4	
2HRBE 015 060 S04	0.75R X 1.5	1.5	6	45	4	
2HRBE 015 080 S04	0.75R X 1.5	1.5	8	45	4	
2HRBE 015 100 S04	0.75R X 1.5	1.5	10	50	4	
2HRBE 015 120 S04	0.75R X 1.5	1.5	12	50	4	
2HRBE 015 140 S04	0.75R X 1.5	1.5	14	50	4	
2HRBE 015 160 S04	0.75R X 1.5	1.5	16	50	4	
2HRBE 015 180 S04	0.75R X 1.5	1.5	18	50	4	
2HRBE 015 200 S04	0.75R X 1.5	1.5	20	50	4	
2HRBE 015 220 S04	0.75R X 1.5	1.5	22	60	4	
2HRBE 015 250 S04	0.75R X 1.5	1.5	25	60	4	
2HRBE 015 300 S04	0.75R X 1.5	1.5	30	70	4	
2HRBE 016 060 S04	0.8R X 1.6	1.6	6	45	4	
2HRBE 016 080 S04	0.8R X 1.6	1.6	8	45	4	
2HRBE 016 120 S04	0.8R X 1.6	1.6	12	50	4	
2HRBE 016 160 S04	0.8R X 1.6	1.6	16	50	4	
2HRBE 016 200 S04	0.8R X 1.6	1.6	20	50	4	
2HRBE 018 060 S04	0.9R X 1.8	1.8	6	45	4	
2HRBE 018 080 S04	0.9R X 1.8	1.8	8	45	4	
2HRBE 018 120 S04	0.9R X 1.8	1.8	12	50	4	

단위 : mm

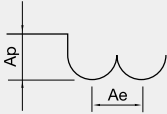
Order Number	날경 Diameter R × D	날장 Length of cut L1	유효장 Effective Length L2	전장 Overall Length L	생크 Shank Dia d	비고	Order Number	날경 Diameter R × D	날장 Length of cut L1	유효장 Effective Length L2	전장 Overall Length L	생크 Shank Dia d	비고
2HRBE 018 160 S04	0.9R X 1.8	1.8	16	50	4		2HRBE 100 300 070	5R X 10	16	30	70	10	
2HRBE 018 200 S04	0.9R X 1.8	1.8	20	50	4		2HRBE 120 300 075	6R X 12	18	30	75	12	
2HRBE 020 040 S04	1R X 2	2	4	45	4								
2HRBE 020 060 S04	1R X 2	2	6	45	4								
2HRBE 020 080 S04	1R X 2	2	8	45	4								
2HRBE 020 100 S04	1R X 2	2	10	50	4								
2HRBE 020 120 S04	1R X 2	2	12	50	4								
2HRBE 020 140 S04	1R X 2	2	14	50	4								
2HRBE 020 160 S04	1R X 2	2	16	50	4								
2HRBE 020 180 S04	1R X 2	2	18	50	4								
2HRBE 020 200 S04	1R X 2	2	20	50	4								
2HRBE 020 220 S04	1R X 2	2	22	60	4								
2HRBE 020 250 S04	1R X 2	2	25	60	4								
2HRBE 020 300 S04	1R X 2	2	30	60	4								
2HRBE 025 080 S04	1.25R X 2.5	2.5	8	45	4								
2HRBE 025 100 S04	1.25R X 2.5	2.5	10	50	4								
2HRBE 025 120 S04	1.25R X 2.5	2.5	12	50	4								
2HRBE 025 160 S04	1.25R X 2.5	2.5	16	50	4								
2HRBE 025 200 S04	1.25R X 2.5	2.5	20	60	4								
2HRBE 025 250 S04	1.25R X 2.5	2.5	25	60	4								
2HRBE 025 300 S04	1.25R X 2.5	2.5	30	70	4								
2HRBE 030 060 S06	1.5R X 3	3	6	50	6								
2HRBE 030 080 S06	1.5R X 3	3	8	50	6								
2HRBE 030 100 S06	1.5R X 3	3	10	50	6								
2HRBE 030 120 S06	1.5R X 3	3	12	50	6								
2HRBE 030 160 S06	1.5R X 3	3	16	60	6								
2HRBE 030 200 S06	1.5R X 3	3	20	60	6								
2HRBE 030 250 S06	1.5R X 3	3	25	65	6								
2HRBE 030 300 S06	1.5R X 3	3	30	70	6								
2HRBE 030 350 S06	1.5R X 3	3	35	75	6								
2HRBE 030 400 S06	1.5R X 3	3	40	80	6								
2HRBE 030 450 S06	1.5R X 3	3	45	90	6								
2HRBE 040 080 S06	2R X 4	4	8	50	6								
2HRBE 040 100 S06	2R X 4	4	10	50	6								
2HRBE 040 120 S06	2R X 4	4	12	50	6								
2HRBE 040 160 S06	2R X 4	4	16	60	6								
2HRBE 040 200 S06	2R X 4	4	20	60	6								
2HRBE 040 250 S06	2R X 4	4	25	65	6								
2HRBE 040 300 S06	2R X 4	4	30	70	6								
2HRBE 040 350 S06	2R X 4	4	35	75	6								
2HRBE 040 400 S06	2R X 4	4	40	80	6								
2HRBE 040 450 S06	2R X 4	4	45	90	6								
2HRBE 050 160 S06	2.5R X 5	6	16	60	6								
2HRBE 050 200 S06	2.5R X 5	6	20	60	6								
2HRBE 050 250 S06	2.5R X 5	6	25	70	6								
2HRBE 050 300 S06	2.5R X 5	6	30	75	6								
2HRBE 050 400 S06	2.5R X 5	6	40	80	6								
2HRBE 050 500 S06	2.5R X 5	6	50	90	6								
2HRBE 060 150 S06	3R X 6	10	15	55	6								
2HRBE 080 250 060	4R X 8	12	25	60	8								





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			
반경 Corner Radius	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
R 2.5	16	9,600	2,590	0.406	0.900	7,800	1350	0.324	0.800	5,600	1050	0.252	0.800
"	20	9,600	2,100	0.406	0.900	7,800	1240	0.324	0.600	5,600	950	0.252	0.600
"	25	9,600	2,100	0.406	0.900	7,800	1240	0.324	0.600	5,600	950	0.252	0.600
"	30	8,200	1,320	0.305	0.900	7,800	760	0.243	0.600	4,800	600	0.197	0.600
"	40	7,000	830	0.230	0.900	7,800	470	0.200	0.600	4,300	380	0.154	0.600
R 3	15	8,000	2,530	0.555	1.800	7,400	1670	0.443	1.200	5,200	1300	0.360	1.200
R 4	25	9,000	2,400	0.600	1.500	7,200	1200	0.500	1.000	5,200	920	0.350	1.000
R 5	30	7,800	1,300	0.300	0.900	6,800	720	0.230	0.600	4,600	570	0.190	0.570
R 6	30	7,410	1,235	0.285	0.855	6,350	684	0.210	0.570	4,370	541	0.181	0.550

**절입량**  
Depth of Cut



Ap : Axial Depth 축방향의절입깊이(mm)  
 Ae : Radial Depth 반경방향의절입깊이(mm)  
 D : Outside Diameter 외경(mm)  
 n : Speed 회전속도 (min<sup>-1</sup>)  
 Vf : Feed 이송속도 (mm/min)

- HRC52 이상 고경도강 가공시 같은 직경의 같은 비율로 20% DOWN 시켜주십시오.
- 유효장이 없는 절삭조건은 같은 직경에 더 짧은 유효장 대비 같은 비율로 DOWN 해주십시오.
- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 에어브로 혹은 미스트 쿨러트를 추천하며, 동가공시 습식 쿨러트 추천 합니다.
- 상기 절삭조건은 참고 수치이므로 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (Ø1이하 사용시 진동 허용 관리 5µm이내 일것.)
- 칩 제거 주의 및 가공시 발열, 발화에 주의 하십시오.
- When milling workpiece HRC over 52 hardened steel , reduce 20% of the RPM and feed compared to the same diameter.
- If the effective length of your tool does not show above the table, use the shorten effective length of parameter and reduce the parameters in the same proportion.
- In case of long effective length, reduce the RPM and feed in same proportion.
- Air blow or oil mist is recommended for smooth chip emission, and dry milling is recommended for copper material.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- Use a machine with low vibration and good rigidity (Ø1 or less, the vibration tolerance management should be within 5µm).
- During the chip evacuation, note for heat and ignition.