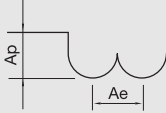


피삭재 Material		프리하든강/고경도강 Prehardened Steels / Hardened Steels NAK / SKD61				고경도강 Hardened Steels STAVX / SKD61				고경도강 Hardened Steels SKD11 / YXR7 / SKH51			
경도 Hardness		30 ~ 45HRC				45 ~ 55HRC				55 ~ 68HRC			
반경 Radius	유효장 Effective Length	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
R 0.1	0.2	50,000	326	0.005	0.005	50,000	216	0.004	0.004	50,000	120	0.003	0.003
^	0.5	50,000	308	0.004	0.004	50,000	198	0.003	0.003	50,000	110	0.002	0.003
R 0.15	0.3	50,000	800	0.006	0.010	50,000	520	0.004	0.005	50,000	410	0.003	0.005
^	0.5	50,000	720	0.006	0.010	50,000	450	0.003	0.005	50,000	390	0.003	0.005
^	1	50,000	650	0.006	0.010	50,000	410	0.003	0.005	50,000	350	0.003	0.004
R 0.2	0.3	50,000	1,120	0.010	0.010	50,000	750	0.005	0.006	50,000	650	0.005	0.005
^	1	50,000	1,050	0.010	0.010	50,000	710	0.005	0.005	50,000	600	0.005	0.005
^	3	50,000	540	0.005	0.005	50,000	360	0.003	0.003	50,000	310	0.002	0.003
R 0.25	0.4	50,000	1,420	0.010	0.020	50,000	1,210	0.050	0.010	50,000	1,030	0.005	0.001
^	1	50,000	1,290	0.010	0.015	50,000	1,100	0.005	0.010	50,000	980	0.005	0.010
^	3	50,000	1,090	0.010	0.015	50,000	850	0.005	0.010	50,000	730	0.005	0.010
R 0.3	0.5	50,000	2,300	0.020	0.020	50,000	1,890	0.015	0.015	50,000	1,520	0.010	0.010
^	1	50,000	2,180	0.020	0.020	50,000	1,760	0.010	0.010	50,000	1,490	0.010	0.010
^	3	40,000	1,300	0.015	0.020	40,000	1,060	0.010	0.010	40,000	870	0.010	0.010
^	5	30,000	650	0.015	0.050	30,000	590	0.010	0.010	30,000	390	0.005	0.005
R 0.4	0.6	50,000	2,600	0.020	0.030	50,000	1,980	0.020	0.020	50,000	1,720	0.010	0.020
^	2	40,000	2,100	0.015	0.020	40,000	1,450	0.015	0.015	40,000	1,210	0.010	0.010
^	4	30,000	1,540	0.015	0.015	30,000	940	0.010	0.015	30,000	840	0.010	0.010
^	8	24,000	970	0.010	0.010	24,000	650	0.005	0.010	24,000	470	0.005	0.005
R 0.5	1.5	40,000	2,560	0.030	0.040	40,000	1,980	0.020	0.030	40,000	1,590	0.020	0.020
^	3	30,000	2,100	0.030	0.030	30,000	1,650	0.020	0.030	30,000	1,240	0.020	0.020
^	5	30,000	1,700	0.030	0.030	30,000	1,360	0.015	0.020	30,000	1,080	0.010	0.015
^	10	25,000	780	0.015	0.015	25,000	620	0.010	0.015	16,000	500	0.010	0.010
R 0.75	2	40,000	2,300	0.040	0.040	40,000	1,920	0.030	0.030	40,000	1,530	0.020	0.030
^	4	30,000	2,010	0.030	0.030	30,000	1,600	0.025	0.025	30,000	1,280	0.020	0.020
^	8	30,000	1,700	0.030	0.030	30,000	1,360	0.020	0.030	30,000	1,080	0.010	0.010
R 1	2	40,000	3,310	0.050	0.050	40,000	2,640	0.040	0.040	40,000	2,110	0.030	0.040
^	6	40,000	3,020	0.030	0.040	40,000	2,410	0.030	0.030	40,000	1,930	0.020	0.030
^	10	24,000	1,210	0.020	0.030	24,000	970	0.010	0.030	24,000	770	0.010	0.020
^	14	16,000	920	0.010	0.020	16,000	780	0.010	0.010	16,000	630	0.010	0.010
R 1.5	3	40,000	2,500	0.030	0.040	40,000	2,000	0.030	0.030	40,000	1,600	0.020	0.030
^	6	32,000	2,100	0.030	0.030	32,000	1,680	0.020	0.030	32,000	1,340	0.020	0.030
^	10	21,000	1,700	0.020	0.030	21,000	1,360	0.020	0.020	21,000	1,080	0.010	0.020
^	16	16,000	1,100	0.020	0.030	16,000	880	0.010	0.020	16,000	700	0.010	0.010
R 2	4	40,000	2,100	0.030	0.040	40,000	1,680	0.030	0.030	40,000	1,340	0.020	0.030
^	10	21,000	1,620	0.020	0.030	21,000	1,290	0.020	0.020	21,000	1,030	0.010	0.020
^	16	16,000	1,060	0.010	0.020	16,000	840	0.010	0.020	16,000	670	0.010	0.010
R 3		16,000~ 50,000	960~ 8,000	0.050	0.060	13,000~ 50,000	780~ 6,000	0.050	0.060	11,000~ 50,000	540~ 4,000	0.050	0.060

**절입량**  
Depth of Cut



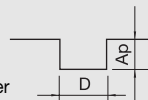
Ap : Axial Depth 축 방향의 절입 깊이 (mm)  
 Ae : Radial Depth 반경 방향의 절입 깊이 (mm)  
 D : Outside Diameter 외경 (mm)  
 n : Speed 회전속도 (rpm)  
 Vf : Feed 이송속도 (mm/rev)

- HRC68 이상 고경도강 가공시 68HRC 조건의 같은 직경 파이에 대비 상기 절삭조건의 20% DOWN 해주십시오.
- 이 절삭 조건표는 절삭조건의 참고 수치입니다. 실제 가공시에는 가공 형상, 가공 목적, 적용 기계 등에 따라 조건을 조정 하십시오.
- 절삭조건이 없는 유효장은 비슷한 유효장에 비례하여 사용 하십시오.
- 길이가 긴 엔드밀의 경우 떨림, 이상음이 발생할 경우에는 상기표의 회전속도와 이송속도를 같은 비율로 내려서 사용해 주십시오.
- In case machining Hardened steel HRC upper 68, reduce 20% of cutting parameter on the table.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- If there is no effective length of your endmill on the table, use a similar type of effective length and apply the same proportion.
- In case of long length endmill shaking or abnormal sound, lower the rotation speed and feed speed of the table above by the same ratio.

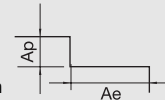
피삭재 Material		프리하든강/고경도강 Prehardened Steels / Hardened Steels NAK / SKD61				고경도강 Hardened Steels STAVX / SKD61				고경도강 Hardened Steels SKD11 / YXR7 / SKH51			
경도 Hardness		30 ~ 45HRC				45 ~ 55HRC				55 ~ 68HRC			
외경 Outside Diameter	유효장 Effective Length	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
ø0.2	0.2	50,000	211	0.005	0.005	50,000	140	0.004	0.004	50,000	78	0.003	0.003
-	0.5	50,000	200	0.004	0.004	50,000	130	0.003	0.003	50,000	71	0.002	0.003
ø0.3	0.3	50,000	520	0.006	0.010	50,000	290	0.004	0.005	50,000	260	0.003	0.005
-	0.5	50,000	460	0.006	0.010	50,000	270	0.003	0.005	50,000	250	0.003	0.005
-	1	50,000	422	0.006	0.010	50,000	260	0.003	0.005	50,000	220	0.003	0.004
ø0.4	0.3	50,000	840	0.010	0.010	50,000	490	0.005	0.006	50,000	430	0.005	0.005
-	1	50,000	690	0.010	0.010	50,000	470	0.005	0.005	50,000	420	0.005	0.005
-	2	50,000	370	0.005	0.005	50,000	240	0.003	0.003	50,000	209	0.002	0.003
ø0.5	0.4	50,000	940	0.010	0.020	50,000	810	0.050	0.010	50,000	732	0.005	0.010
-	1	50,000	850	0.010	0.015	50,000	560	0.005	0.010	50,000	523	0.005	0.010
-	3	50,000	560	0.010	0.015	50,000	530	0.005	0.010	50,000	504	0.005	0.010
ø0.8	0.6	50,000	1,530	0.020	0.020	50,000	1,254	0.015	0.015	50,000	1,083	0.010	0.010
-	2	50,000	1,440	0.020	0.020	50,000	1,169	0.010	0.010	50,000	1,064	0.010	0.010
-	4	40,000	860	0.015	0.020	40,000	703	0.010	0.010	40,000	620	0.010	0.010
-	6	30,000	440	0.015	0.050	30,000	390	0.010	0.010	30,000	280	0.005	0.005
ø1	0.7	50,000	1,730	0.020	0.030	50,000	1,311	0.020	0.020	50,000	1,230	0.010	0.020
-	2	40,000	1,390	0.015	0.200	40,000	960	0.015	0.015	40,000	870	0.010	0.010
-	4	30,000	1,030	0.015	0.015	30,000	620	0.010	0.015	30,000	600	0.010	0.010
-	8	24,000	650	0.010	0.010	24,000	440	0.005	0.010	24,000	340	0.005	0.005
ø1.5	0.8	40,000	1,700	0.030	0.040	40,000	1,090	0.020	0.030	40,000	1,130	0.020	0.020
-	2	30,000	1,400	0.030	0.030	30,000	1,100	0.020	0.030	30,000	880	0.020	0.020
-	4	30,000	1,130	0.030	0.030	30,000	900	0.015	0.020	30,000	770	0.010	0.015
-	8	16,000	520	0.015	0.015	16,000	410	0.010	0.015	16,000	350	0.010	0.010
ø2	2	40,000	1,530	0.040	0.040	40,000	1,270	0.030	0.030	40,000	1,090	0.020	0.030
-	4	30,000	1,330	0.030	0.030	30,000	1,060	0.025	0.025	30,000	910	0.020	0.020
-	8	26,000	1,130	0.030	0.030	26,000	900	0.020	0.030	26,000	770	0.010	0.010
ø2.5	1.2	40,000	2,200	0.050	0.050	40,000	1,760	0.040	0.040	40,000	1,500	0.030	0.040
-	4	40,000	1,540	0.030	0.040	40,000	1,240	0.030	0.030	40,000	1,150	0.020	0.030
-	10	24,000	810	0.020	0.030	24,000	650	0.010	0.030	24,000	260	0.010	0.020
ø3	6	40,000	1,400	0.030	0.030	40,000	1,120	0.020	0.030	40,000	960	0.020	0.030
-	10	21,000	1,130	0.020	0.030	21,000	900	0.020	0.020	21,000	770	0.010	0.020
-	16	16,000	730	0.020	0.030	16,000	590	0.010	0.020	16,000	500	0.010	0.010
ø4	6	40,000	1,430	0.030	0.040	40,000	1,120	0.030	0.030	40,000	1,040	0.020	0.030
-	10	21,000	1,080	0.020	0.030	21,000	850	0.020	0.020	21,000	740	0.010	0.020
-	16	16,000	700	0.010	0.020	21,000	560	0.010	0.020	16,000	470	0.010	0.010
ø6		16,000~ 50,000	740~ 6,000	0.050	0.060	13,000~ 50,000	590~ 4,000	0.050	0.060	11,000~ 50,000	390~ 3,000	0.050	0.060

절입량  
Depth of Cut

Slotting  
• Ap : Axial Depth  
• D : Outside Diameter



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



- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- HRC68 이상 고경도강 가공시 68HRC 조건의 같은 직경 파이에 대비 상기 절삭조건의 20% DOWN 해주십시오.
- 이 절삭 조건표는 절삭 조건의 참고 수치입니다. 실제 가공시에는 가공 형상, 가공 목적, 적용 기계 등에 따라 조건을 조정 하십시오.
- 절삭조건이 없는 유효장은 비슷한 유효장에 비례하여 사용 하십시오.
- 길이가 긴 엔드밀의 경우 떨림, 이상음이 발생할 경우에는 상기표의 회전속도와 이송속도를 같은 비율로 내려서 사용해 주십시오.
- 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.
- In case machining Hardened steel HRC upper 68, reduce 20% of cutting parameter on the table.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- If there is no effective length of your endmill on the table, use a similar type of effective length and apply the same proportion.
- In case of long length endmill shaking or abnormal sound, lower the rotation speed and feed speed of the table above by the same ratio.

피삭재 Material		프리하든강/고경도강 Prehardened Steels / Hardened Steels NAK / SKD61				고경도강 Hardened Steels STAVX / SKD61				고경도강 Hardened Steels SKD11 / YXR7 / SKH51			
경도 Hardness		30 ~ 45HRC				45 ~ 55HRC				55 ~ 68HRC			
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
Ø0.4	0.3	50,000	890	0.010	0.010	50,000	520	0.005	0.006	50,000	450	0.005	0.005
	1	50,000	730	0.010	0.010	50,000	500	0.005	0.005	50,000	430	0.005	0.005
	2	50,000	390	0.005	0.005	50,000	250	0.003	0.003	50,000	220	0.002	0.003
Ø0.5	0.4	50,000	990	0.010	0.020	50,000	850	0.005	0.010	50,000	770	0.005	0.010
	1	50,000	900	0.010	0.015	50,000	590	0.005	0.010	50,000	550	0.005	0.010
	3	50,000	630	0.010	0.015	50,000	560	0.005	0.010	50,000	530	0.005	0.010
Ø0.8	0.6	50,000	1,610	0.020	0.020	50,000	1,320	0.015	0.015	50,000	1,140	0.010	0.010
	2	50,000	1,520	0.020	0.020	50,000	1,230	0.010	0.010	50,000	1,120	0.010	0.010
	4	40,000	910	0.015	0.020	40,000	740	0.010	0.010	40,000	650	0.010	0.010
	6	30,000	460	0.015	0.050	30,000	410	0.010	0.010	30,000	290	0.005	0.005
Ø1	0.7	50,000	1,820	0.020	0.030	50,000	1,380	0.020	0.020	50,000	1,290	0.010	0.020
	2	40,000	1,470	0.015	0.200	40,000	1,010	0.015	0.015	40,000	910	0.010	0.010
	4	30,000	1,080	0.015	0.015	30,000	660	0.010	0.015	30,000	630	0.010	0.010
	8	24,000	680	0.010	0.010	24,000	460	0.005	0.010	24,000	360	0.005	0.005
Ø1.5	0.8	40,000	1,790	0.030	0.040	40,000	1,150	0.020	0.030	40,000	1,190	0.020	0.020
	2	30,000	1,470	0.030	0.030	30,000	1,160	0.020	0.030	30,000	930	0.020	0.020
	4	30,000	1,190	0.030	0.030	30,000	950	0.015	0.020	30,000	810	0.010	0.015
	8	24,000	550	0.015	0.015	24,000	430	0.010	0.015	24,000	370	0.010	0.010
Ø2	2	40,000	1,610	0.040	0.040	40,000	1,340	0.030	0.030	40,000	1,150	0.020	0.030
	4	30,000	1,400	0.030	0.030	30,000	1,120	0.025	0.025	30,000	960	0.020	0.020
	8	30,000	1,190	0.030	0.030	30,000	950	0.020	0.030	30,000	810	0.010	0.010
Ø2.5	1.2	40,000	2,317	0.050	0.050	40,000	1,850	0.040	0.040	40,000	1,580	0.030	0.040
	4	40,000	1,620	0.030	0.040	40,000	1,300	0.030	0.030	40,000	1,210	0.020	0.030
	10	24,000	850	0.020	0.030	24,000	680	0.010	0.030	24,000	280	0.010	0.020
Ø3	6	40,000	1,470	0.030	0.030	40,000	1,180	0.020	0.030	40,000	1,010	0.020	0.030
	10	21,000	1,190	0.020	0.030	21,000	950	0.020	0.020	21,000	810	0.010	0.020
	16	16,000	770	0.020	0.030	16,000	620	0.010	0.020	16,000	530	0.010	0.010
Ø4	6	40,000	1,510	0.030	0.040	40,000	1,180	0.030	0.030	40,000	1,100	0.020	0.030
	10	21,000	1,140	0.020	0.030	21,000	900	0.020	0.020	21,000	780	0.010	0.020
	16	16,000	740	0.010	0.020	16,000	590	0.010	0.020	16,000	500	0.010	0.010
Ø6		16,000~ 50,000	740~ 6,000	0.050	0.060	13,000~ 50,000	590~ 4,000	0.050	0.060	11,000~ 50,000	390~ 3,000	0.050	0.060

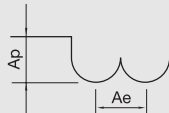


- HRC68 이상 고경도강 가공시 68HRC 조건의 같은 직경 파이에 대비 상기 절삭조건 20% DOWN 해주십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30% 이하로 줄이십시오.
- 4날 사용시 Feed 20% 증가, 절입량을 5% 감소하여 사용 하십시오.
- 측면 절삭시 코너 R 부분과 각도 내용을 참고하여 절삭 하시기 바랍니다.
- 곡면 절삭시 날경의 코너 R 보다 낮은 이동 PITCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도 내에서 피드를 최대 30%까지 UP 해주십시오.
- 이 절삭 조건표는 절삭조건 1의 참고 수치 입니다. 실제 가공시에는 가공 형상, 가공 목적, 적용 기계 등에 따라 조건을 조정 하십시오.
- 절삭조건이 없는 유효장은 비슷한 유효장에 비례하여 사용 하십시오.
- 길이가 긴 엔드밀의 경우 떨림, 이상음이 발생할 경우에는 상기표의 회전속도와 이송속도를 같은 비율로 내려서 사용해 주십시오.
- In case machining Hardened steel HRC upper 68, reduce 20% of cutting parameter on the table.
- In case of long effective length, reduce the RPM and feed by 30% or less.
- For using 4 flutes, reduce the feed by 20% and the depth of cut by 5%.
- For side milling, refer to the corner R section and the angle.
- For curved milling, set up a pitch below than corner radius of the tool diameter.
- For curved milling, raise the feed upto 30% at a stable speed.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- If there is no effective length of your endmill on the table, use a similar type of effective length and apply the same proportion.
- In case of long length endmill shaking or abnormal sound, lower the rotation speed and feed speed of the table above by the same ratio.

피삭재 Material		고경도강 Hardened Steels				고경도강 Hardened Steels				고경도강 Hardened Steels			
경도 Hardness		55 ~ 62HRC				62 ~ 66HRC				66 ~ 70HRC			
반경 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 0.1	0.5	60,000	200	0.002	0.003	60,000	130	0.002	0.003	45,000	65	0.002	0.003
-	1	60,000	200	0.002	0.003	60,000	130	0.002	0.003	45,000	65	0.002	0.003
-	1.5	48,000	80	0.001	0.002	48,000	65	0.001	0.002	36,000	30	0.001	0.002
-	2	48,000	50	0.001	0.001	48,000	40	0.001	0.001	36,000	20	0.001	0.001
R 0.15	1	45,000	310	0.004	0.007	43,500	180	0.003	0.005	32,500	90	0.003	0.005
-	1.5	45,000	310	0.004	0.007	43,500	180	0.003	0.005	32,500	90	0.003	0.005
-	2	45,000	190	0.003	0.005	43,500	110	0.002	0.004	32,500	55	0.002	0.004
-	3	32,000	80	0.002	0.004	32,000	65	0.001	0.002	24,000	30	0.001	0.002
R 0.2	1	37,500	420	0.007	0.012	35,000	240	0.005	0.008	26,250	120	0.005	0.008
-	2	37,500	420	0.007	0.012	35,000	240	0.005	0.008	26,250	120	0.005	0.008
-	3	31,900	210	0.004	0.008	30,500	160	0.003	0.005	22,800	80	0.002	0.005
-	4	25,500	150	0.002	0.004	24,300	120	0.002	0.004	18,200	60	0.002	0.004
R 0.25	1	33,000	530	0.010	0.020	30,000	300	0.007	0.010	22,500	150	0.007	0.010
-	2	33,000	530	0.010	0.020	30,000	300	0.007	0.010	22,500	150	0.007	0.010
-	3	31,000	400	0.007	0.010	28,550	230	0.005	0.008	21,400	115	0.005	0.008
-	4	27,150	150	0.003	0.008	25,650	100	0.002	0.005	19,900	50	0.002	0.005
-	5	24,200	110	0.002	0.005	23,500	75	0.002	0.004	17,600	35	0.002	0.004
-	6	21,300	75	0.001	0.003	21,300	50	0.001	0.002	16,000	25	0.001	0.002
-	8	15,900	40	0.001	0.002	15,900	25	0.001	0.002	11,950	12	0.001	0.002
R 0.3	1	30,000	1,500	0.030	0.130	26,500	1,000	0.015	0.090	20,000	500	0.015	0.090
-	2	30,000	1,200	0.020	0.100	26,500	800	0.010	0.075	20,000	400	0.010	0.075
-	3	30,000	800	0.015	0.090	26,500	520	0.008	0.065	20,000	260	0.008	0.065
-	4	30,000	500	0.010	0.075	26,500	340	0.006	0.050	20,000	170	0.006	0.050
-	5	25,000	390	0.007	0.050	23,000	260	0.005	0.040	18,000	130	0.005	0.040
-	6	21,000	320	0.005	0.040	19,500	210	0.004	0.030	15,000	105	0.004	0.030
-	8	16,000	240	0.003	0.020	16,000	160	0.003	0.020	12,000	80	0.003	0.020
-	10	14,900	175	0.002	0.015	14,900	115	0.002	0.015	11,100	55	0.002	0.015
-	12	13,800	110	0.001	0.010	13,800	70	0.001	0.010	10,350	35	0.001	0.010
R 0.4	2	27,000	1,600	0.040	0.170	23,500	1,000	0.020	0.120	17,500	500	0.020	0.120
-	4	27,000	1,200	0.025	0.135	23,500	600	0.012	0.095	17,500	300	0.012	0.095
-	6	23,000	600	0.012	0.095	20,500	400	0.006	0.065	15,500	200	0.006	0.065
-	8	18,000	375	0.007	0.070	17,000	285	0.005	0.060	12,750	140	0.005	0.060
-	10	14,700	340	0.005	0.060	14,650	225	0.004	0.050	11,000	110	0.004	0.050
R 0.5	2	24,000	2,000	0.100	0.300	21,000	1,750	0.050	0.200	16,000	875	0.050	0.200
-	3	24,000	2,000	0.050	0.200	21,000	1,750	0.030	0.170	16,000	875	0.030	0.170
-	4	24,000	2,000	0.050	0.200	21,000	1,750	0.030	0.170	16,000	875	0.030	0.170
-	5	24,000	2,000	0.050	0.200	21,000	1,750	0.030	0.170	16,000	875	0.030	0.170
-	6	21,500	1,250	0.030	0.170	19,700	1,050	0.025	0.150	14,500	525	0.025	0.150
-	8	18,500	580	0.015	0.120	18,400	480	0.015	0.120	13,800	240	0.015	0.120
-	10	14,800	430	0.010	0.090	14,700	360	0.010	0.090	11,100	180	0.010	0.090
-	12	13,400	380	0.008	0.080	13,300	290	0.008	0.080	9,950	140	0.008	0.080
-	14	12,000	350	0.007	0.080	12,000	220	0.007	0.080	9,000	110	0.007	0.080
-	16	10,500	250	0.005	0.045	10,500	160	0.005	0.045	7,850	80	0.005	0.045
-	18	9,750	200	0.004	0.035	9,750	130	0.004	0.035	7,300	85	0.004	0.035
-	20	9,000	150	0.003	0.020	9,000	100	0.003	0.020	6,750	50	0.003	0.020
-	22	9,000	110	0.002	0.012	9,000	75	0.002	0.012	6,750	35	0.002	0.012
R 0.6	6	20,000	2,000	0.060	0.240	17,500	1,750	0.036	0.200	13,100	875	0.036	0.200
-	8	16,600	900	0.025	0.170	15,850	750	0.025	0.170	11,900	375	0.025	0.170
-	10	15,500	580	0.015	0.130	15,350	480	0.015	0.130	11,500	240	0.015	0.130
R 0.7	8	15,350	1,250	0.040	0.230	14,050	1,050	0.030	0.200	10,550	525	0.030	0.200
R 0.75	3	17,000	2,000	0.120	0.400	15,000	1,750	0.060	0.290	11,250	875	0.060	0.290
-	4	17,000	2,000	0.120	0.400	15,000	1,750	0.060	0.290	11,250	875	0.060	0.290
-	6	17,000	2,000	0.070	0.310	15,000	1,750	0.040	0.240	11,250	875	0.040	0.240
-	8	15,000	1,250	0.045	0.250	14,000	1,050	0.030	0.210	10,500	525	0.030	0.210
-	10	15,000	1,250	0.045	0.250	14,000	1,050	0.030	0.210	10,500	525	0.030	0.210
-	12	13,000	580	0.020	0.170	13,000	480	0.020	0.170	9,750	240	0.020	0.170
-	14	10,900	485	0.015	0.145	10,900	385	0.015	0.145	8,200	190	0.015	0.145
-	16	8,850	390	0.012	0.130	8,800	290	0.012	0.130	6,600	145	0.012	0.130
-	20	8,000	350	0.010	0.120	8,000	220	0.010	0.120	6,000	110	0.010	0.120
R 0.8	8	17,500	2,100	0.080	0.320	15,300	1,800	0.050	0.275	11,500	900	0.050	0.275
-	12	13,500	600	0.024	0.190	13,400	490	0.024	0.190	10,050	245	0.025	0.190
-	16	10,800	450	0.016	0.150	10,700	370	0.016	0.150	8,000	185	0.016	0.150
R 1	4	14,000	2,100	0.150	0.500	12,250	1,800	0.080	0.350	9,200	900	0.080	0.350
-	6	14,000	2,100	0.100	0.400	12,250	1,800	0.060	0.300	9,200	900	0.060	0.300
-	8	14,000	2,100	0.100	0.400	12,250	1,800	0.060	0.300	9,200	900	0.060	0.300
-	10	14,000	2,100	0.100	0.400	12,250	1,800	0.060	0.300	9,200	900	0.060	0.300
-	12	12,400	1,350	0.060	0.340	11,500	1,100	0.045	0.270	8,650	550	0.045	0.270
-	14	12,400	1,350	0.060	0.340	11,500	1,100	0.045	0.270	8,650	550	0.045	0.270

피삭재 Material		고경도강 Hardened Steels				고경도강 Hardened Steels				고경도강 Hardened Steels			
경도 Hardness		55 ~ 62HRC				62 ~ 66HRC				66 ~ 70HRC			
반경 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
-	16	10,800	600	0.030	0.240	10,700	490	0.030	0.240	8,000	245	0.030	0.240
-	18	9,700	520	0.025	0.220	9,650	430	0.025	0.220	7,250	215	0.025	0.220
-	20	8,650	450	0.020	0.190	8,560	370	0.020	0.190	6,400	185	0.020	0.190
-	22	8,200	440	0.018	0.180	8,200	330	0.018	0.180	6,150	165	0.018	0.180
-	25	7,800	440	0.016	0.160	7,800	290	0.016	0.160	5,850	145	0.016	0.160
-	30	7,000	350	0.014	0.160	7,000	220	0.014	0.160	5,250	110	0.014	0.160
R 1.25	20	9,600	630	0.040	0.310	9,600	510	0.040	0.310	7,200	255	0.040	0.310
R 1.5	6	10,500	2,200	0.200	0.700	9,200	1,900	0.120	0.550	6,900	950	0.120	0.550
-	8	10,500	2,200	0.200	0.700	9,200	1,900	0.120	0.550	6,900	950	0.120	0.550
-	10	10,500	2,200	0.150	0.650	9,200	1,900	0.100	0.500	6,900	950	0.100	0.500
-	12	10,500	2,200	0.150	0.650	9,200	1,900	0.100	0.500	6,900	950	0.100	0.500
-	16	10,500	2,200	0.150	0.650	9,200	1,900	0.100	0.500	6,900	950	0.100	0.500
-	20	9,250	1,400	0.100	0.500	8,600	1,150	0.075	0.450	6,450	575	0.075	0.450
-	25	8,000	630	0.050	0.380	8,000	510	0.050	0.380	6,000	255	0.050	0.380
-	30	5,750	450	0.030	0.290	5,700	370	0.030	0.290	4,275	185	0.030	0.290
-	35	5,350	440	0.025	0.270	5,350	310	0.025	0.270	4,000	155	0.025	0.270
-	40	4,900	390	0.200	0.240	4,950	250	0.020	0.240	3,700	125	0.020	0.240
R 2	8	9,000	2,300	0.250	0.950	7,900	2,000	0.150	0.750	5,900	1,000	0.150	0.750
-	10	9,000	2,300	0.250	0.950	7,900	2,000	0.150	0.750	5,900	1,000	0.150	0.750
-	12	9,000	2,300	0.200	0.850	7,900	2,000	0.130	0.700	5,900	1,000	0.130	0.700
-	16	9,000	2,300	0.200	0.850	7,900	2,000	0.130	0.700	5,900	1,000	0.130	0.700
-	20	9,000	2,300	0.200	0.850	7,900	2,000	0.130	0.700	5,900	1,000	0.130	0.700
-	25	8,000	1,450	0.130	0.700	7,450	1,250	0.090	0.550	5,600	625	0.090	0.550
-	30	7,000	660	0.060	0.450	7,000	540	0.060	0.450	5,250	270	0.060	0.450
-	35	6,000	630	0.055	0.430	6,000	510	0.055	0.430	4,500	255	0.055	0.430
-	40	4,300	450	0.040	0.390	4,300	370	0.040	0.390	3,200	185	0.040	0.390
R 2.5	20	7,200	2,300	0.250	1.050	6,350	2,000	0.160	0.880	4,750	1,000	0.160	0.880
-	30	6,400	1,450	0.160	0.880	6,200	1,250	0.110	0.730	4,650	625	0.110	0.730
-	40	6,000	690	0.080	0.625	6,000	570	0.080	0.625	4,500	285	0.080	0.625
R 3	15	6,500	2,500	0.300	1.300	5,700	2,200	0.200	1.000	4,300	1,100	0.200	1.000
R 4	25	5,200	2,200	0.400	1.700	4,500	1,900	0.250	1.350	3,400	950	0.250	1.350
R 5	30	4,300	2,000	0.500	2.100	3,750	1,750	0.300	1.700	2,800	875	0.300	1.700
R 6	30	3,600	1,750	0.600	2.600	3,150	1,500	0.350	2.000	2,350	750	0.350	2.000

절입량  
Depth of Cut

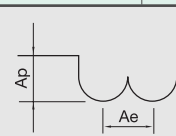


Ap : Axial Depth 축 방향의 절입 깊이 (mm)  
 Ae : Radial Depth 반경 방향의 절입 깊이 (mm)  
 D : Outside Diameter 외경 (mm)  
 n : Speed 회전속도 (rpm)  
 Vf : Feed 이송속도 (mm/rev)

- HRC55 이하 피삭재 (합금강, 공구강) 가공시 같은 파이에 대비 상기 절삭조건외 20% UP 해주십시오.
- 에어브로 혹은 미스트 클린트를 추천하며, 동 가공시 습식 클린트 추천 합니다.
- 상기 절삭 조건의 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건 변경 요망 합니다.
- 진동이 적고 강성이 좋은 공작 기계 사용 요망 합니다 (Ø1이하 사용시 진동 허용 관리 5 $\mu$ m이내 일것.)
- 칩 제거 주의 및 가공시 발열, 발화에 주의 하십시오.
- When milling workpiece HRC below 55 (Alloy steel, tool steel), Raise up 20% RPM and feed compared to the same diameter.
- Air blow or mist coolant is recommended, and wet coolants are recommended for copper milling.
- 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 ( $\phi 1$  or less, the vibration tolerance management will be within 5 $\mu$ m).
- Note for chip emission, heat, or ignition.

피삭재 Material		고경도강 Hardened Steels				고경도강 Hardened Steels				고경도강 Hardened Steels			
경도 Hardness		55 ~ 62HRC				62 ~ 66HRC				66 ~ 70HRC			
반경 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 0.5	4	25,500	2,360	0.050	0.200	21,000	2,000	0.030	0.170	16,000	960	0.030	0.170
-	8	18,500	760	0.015	0.120	18,400	710	0.015	0.120	13,800	287	0.015	0.120
-	12	13,400	540	0.008	0.080	13,300	405	0.008	0.080	9,950	189	0.008	0.080
-	16	10,500	320	0.005	0.045	10,500	225	0.005	0.045	7,850	115	0.005	0.045
R 0.75	8	15,000	1,389	0.045	0.250	14,000	1,280	0.030	0.210	10,500	648	0.030	0.210
-	16	8,850	530	0.012	0.130	8,800	489	0.012	0.130	6,600	208	0.012	0.130
R 1	8	14,000	2,350	0.100	0.400	12,250	1,960	0.060	0.300	9,200	1,060	0.060	0.300
-	16	10,800	776	0.030	0.240	10,700	580	0.030	0.240	8,000	335	0.030	0.240
-	25	7,800	530	0.016	0.160	7,800	380	0.016	0.160	5,850	320	0.016	0.160
R 1.5	16	10,500	2,500	0.150	0.650	9,200	2,100	0.100	0.500	6,900	1,100	0.100	0.500
-	25	8,000	820	0.050	0.380	8,000	640	0.050	0.380	6,000	355	0.050	0.380
-	40	4,900	530	0.200	0.240	4,950	360	0.020	0.240	3,700	220	0.020	0.240
R 2	20	9,000	2,680	0.200	0.850	7,900	2,250	0.130	0.700	5,900	1,240	0.130	0.700
-	30	7,000	845	0.060	0.450	7,000	710	0.060	0.450	5,250	374	0.060	0.450
-	40	4,300	640	0.040	0.390	4,300	420	0.040	0.390	3,200	267	0.040	0.390
R 2.5	30	6,400	1,630	0.160	0.880	6,200	1,430	0.110	0.730	4,650	775	0.110	0.730
-	40	6,000	820	0.080	0.625	5,900	760	0.080	0.625	4,500	415	0.080	0.625
-	50	5,300	530	0.050	0.410	5,200	490	0.040	0.400	4,300	295	0.035	0.370
R 3	20	6,500	2,820	0.300	1.300	5,700	2,390	0.200	1.000	4,300	1,360	0.200	1.000
-	30	6,400	1,720	0.160	0.880	6,200	1,538	0.110	0.730	4,650	843	0.110	0.730
R 4	25	5,200	2,350	0.400	1.700	4,500	2,100	0.250	1.350	3,400	1,060	0.250	1.350
-	40	3,600	1,570	0.300	0.850	2,700	1,260	0.150	0.720	2,040	636	0.120	0.700
R 5	30	4,300	2,170	0.500	2.100	3,750	1,860	0.300	1.700	2,800	986	0.300	1.700
-	50	3,400	1,330	0.400	1.050	2,419	1,200	0.200	0.750	1,806	636	0.190	0.680
R 6	35	3,600	1,890	0.600	2.600	3,150	1,680	0.350	2.000	2,350	840	0.350	2.000
-	60	2,700	1,180	0.500	1.300	1,956	1,043	0.250	0.900	1,459	522	0.220	0.850

**절삭량**  
Depth of Cut



Ap : Axial Depth 축 방향의 절삭 깊이 (mm)  
 Ae : Radial Depth 반경 방향의 절삭 깊이 (mm)  
 D : Outside Diameter 외경 (mm)  
 n : Speed 회전속도 (min<sup>-1</sup>)  
 Vf : Feed 이송속도 (mm/min)

- HRC55 이하 피삭재 (합금강, 공구강) 가공시 같은 파이에 대비 상기 절삭조건 20% UP 해주십시오.
- 에어브로 혹은 미스트 클린트를 추천하며, 동 가공시 습식 클린트 추천 합니다.
- 상기 절삭조건 20% UP는 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 5µm 이내 일것.)
- 칩 제거 주의 및 가공시 발열, 발화에 주의 하십시오.
- When milling workpiece HRC below 55 (Alloy steel, tool steel), Raise up 20% RPM and feed compared to the same diameter.
- Air blow or mist coolant is recommended, and wet coolants are recommended for copper milling.
- 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 will be within 5µm).
- Note for chip emission, heat, or ignition.

피삭재 Material			동/탄소강 Copper / Carbon Steels Cu / S45C / S50C			프리하든강 Prehardened Steels			고경도강 Hardened Steels			고경도강 Hardened Steels		
경도 Hardness			30 ~ 45HRC			30 ~ 45HRC			45 ~ 55HRC			55 ~ 68HRC		
반경 Radius	유효장 Effective Length	각도 Taper Angle	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth
R 0.1	1.5	0°30	42,000	630	0.007	28,350	431	0.005	27,300	326	0.005	27,300	252	0.004
^	2	0°30	32,550	368	0.005	22,575	252	0.004	21,000	200	0.003	21,000	179	0.003
^	1.5	1°	42,000	630	0.007	28,350	431	0.005	27,300	326	0.005	27,300	252	0.004
^	2	1°	32,550	368	0.005	22,575	252	0.004	21,000	200	0.003	21,000	179	0.003
^	2.5	1°	28,000	230	0.002	19,500	180	0.001	17,000	155	0.001	17,000	155	0.001
^	1.5	1°30	42,000	630	0.007	28,350	431	0.005	27,300	326	0.005	27,300	252	0.004
^	2	1°30	32,550	368	0.005	22,575	252	0.004	21,000	200	0.003	21,000	179	0.003
^	2.5	1°30	28,000	230	0.003	19,500	180	0.001	17,000	155	0.001	17,000	155	0.001
^	1.5	2°	42,000	630	0.007	28,350	431	0.005	27,300	326	0.005	27,300	252	0.004
^	2	2°	32,550	368	0.005	22,575	252	0.004	21,000	200	0.003	21,000	179	0.003
^	2.5	2°	28,000	230	0.004	19,500	180	0.002	17,000	155	0.001	17,000	155	0.001
^	1.5	3°	42,000	630	0.007	28,350	431	0.005	27,300	326	0.005	27,300	252	0.004
^	2	3°	32,550	368	0.005	22,575	252	0.004	21,000	200	0.003	21,000	179	0.003
^	2.5	3°	28,000	230	0.004	19,500	180	0.002	17,000	155	0.001	17,000	155	0.001
R 0.15	3	0°30	34,650	641	0.008	23,310	399	0.006	21,525	336	0.005	21,525	294	0.004
^	2	1°	34,650	641	0.008	23,310	399	0.006	21,525	336	0.005	21,525	294	0.004
^	3	1°	34,650	641	0.008	23,310	399	0.006	21,525	336	0.005	21,525	294	0.004
^	4	1°	32,550	494	0.005	22,050	326	0.004	19,950	242	0.003	19,950	189	0.001
^	5	1°	32,550	494	0.003	22,050	326	0.002	19,950	242	0.002	19,950	189	0.001
^	2	1°30	34,650	641	0.008	23,310	399	0.006	21,525	336	0.005	21,525	294	0.004
^	3	1°30	34,650	641	0.008	23,310	399	0.006	21,525	336	0.005	21,525	294	0.004
^	4	1°30	32,550	494	0.003	22,050	326	0.002	19,950	242	0.002	19,950	189	0.002
^	5	1°30	32,550	494	0.003	22,050	326	0.002	19,950	242	0.002	19,950	189	0.002
^	2	2°	34,650	641	0.008	23,310	399	0.006	21,525	336	0.005	21,525	294	0.004
^	3	2°	34,650	641	0.008	23,310	399	0.006	21,525	336	0.005	21,525	294	0.004
^	4	2°	32,550	494	0.003	22,050	326	0.002	19,950	242	0.002	19,950	189	0.002
^	5	2°	32,550	494	0.003	22,050	326	0.002	19,950	242	0.002	19,950	189	0.002
^	2	3°	34,650	641	0.008	23,310	399	0.006	21,525	336	0.005	21,525	294	0.004
^	3	3°	34,650	641	0.008	23,310	399	0.006	21,525	336	0.005	21,525	294	0.004
^	4	3°	32,550	494	0.004	22,050	326	0.003	19,950	242	0.002	19,950	189	0.003
^	5	3°	32,550	494	0.004	22,050	326	0.003	19,950	242	0.002	19,950	189	0.003
R 0.2	2	0°30	32,000	1,155	0.016	28,350	788	0.013	26,250	672	0.011	26,250	473	0.008
^	3	0°30	30,000	950	0.016	26,300	650	0.013	23,800	580	0.011	23,800	395	0.008
^	4	0°30	28,000	780	0.010	21,000	500	0.008	19,000	475	0.007	19,000	325	0.005
^	5	0°30	25,200	525	0.004	17,850	326	0.003	16,800	294	0.003	16,800	252	0.002
^	6	0°30	25,200	525	0.004	17,850	326	0.003	16,800	294	0.003	16,800	252	0.002
^	2	1°	32,000	1,155	0.016	28,350	788	0.013	26,250	672	0.011	26,250	473	0.008
^	3	1°	30,000	950	0.016	26,300	650	0.013	23,800	580	0.011	23,800	395	0.008
^	4	1°	28,000	780	0.010	21,000	500	0.008	19,000	475	0.007	19,000	325	0.005
^	5	1°	25,200	525	0.004	17,850	326	0.003	16,800	294	0.003	16,800	252	0.002
^	6	1°	25,200	525	0.004	17,850	326	0.003	16,800	294	0.003	16,800	252	0.002
^	2	2°	32,000	1,155	0.016	28,350	788	0.013	26,250	672	0.011	26,250	473	0.008
^	3	2°	30,000	950	0.016	26,300	650	0.013	23,800	580	0.011	23,800	395	0.008
^	4	2°	28,000	780	0.010	21,000	500	0.008	19,000	475	0.007	19,000	325	0.005
^	5	2°	25,200	525	0.004	17,850	326	0.003	16,800	294	0.003	16,800	252	0.002
^	6	2°	25,200	525	0.004	17,850	326	0.003	16,800	294	0.003	16,800	252	0.002
R 0.25	4	0°30	34,650	1,187	0.019	28,350	861	0.015	24,675	630	0.013	24,675	609	0.011
^	6	0°30	21,525	609	0.006	17,850	431	0.005	15,750	368	0.004	15,750	326	0.003
^	4	1°	34,650	1,187	0.019	28,350	861	0.015	24,675	630	0.013	24,675	609	0.011
^	6	1°	21,525	609	0.006	17,850	431	0.005	15,750	368	0.004	15,750	326	0.003
^	8	1°	21,525	609	0.005	17,850	431	0.004	15,750	368	0.003	15,750	326	0.003
^	10	1°	21,525	609	0.004	17,850	431	0.003	15,750	368	0.003	15,750	326	0.003
^	4	1°30	34,650	1,187	0.019	28,350	861	0.015	24,675	630	0.013	24,675	609	0.011
^	6	1°30	21,525	609	0.008	17,850	431	0.005	15,750	368	0.006	15,750	326	0.005
^	8	1°30	21,525	609	0.007	17,850	431	0.005	15,750	368	0.005	15,750	326	0.004
^	10	1°30	21,525	609	0.006	17,850	431	0.005	15,750	368	0.004	15,750	326	0.003
^	4	2°	34,650	1,187	0.019	28,350	861	0.015	24,675	630	0.013	24,675	609	0.011
^	6	2°	21,525	609	0.006	17,850	431	0.005	15,750	368	0.004	15,750	326	0.003
^	8	2°	21,525	609	0.006	17,850	431	0.005	15,750	368	0.004	15,750	326	0.003
^	10	2°	21,525	609	0.006	17,850	431	0.005	15,750	368	0.004	15,750	326	0.003
R 0.3	4	0°30	43,050	2,142	0.032	31,500	1,418	0.022	23,625	788	0.021	23,625	704	0.016
^	8	0°30	26,775	998	0.016	22,050	735	0.013	16,800	515	0.011	16,800	410	0.008
^	12	0°30	26,250	893	0.008	22,575	714	0.006	14,700	399	0.005	13,650	336	0.004
^	4	1°	43,050	2,142	0.032	31,500	1,418	0.022	23,625	788	0.021	23,625	704	0.016
^	8	1°	26,775	998	0.020	22,050	735	0.015	16,800	515	0.013	16,800	410	0.009
^	12	1°	26,250	893	0.010	22,575	714	0.012	14,700	399	0.008	13,650	336	0.005

# 2JJTB Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material			동/탄소강 Copper / Carbon Steels Cu / S45C / S50C			프리하든강 Prehardened Steels			고경도강 Hardened Steels			고경도강 Hardened Steels		
경도 Hardness			30 ~ 45HRC			30 ~ 45HRC			45 ~ 55HRC			55 ~ 68HRC		
반경 Radius	유효장 Effective Length	각도 Taper Angle	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth
R 0.3	4	1°30	43,050	2,142	0.032	31,500	1,418	0.022	23,625	788	0.021	23,625	704	0.016
	8	1°30	26,775	998	0.020	22,050	735	0.015	16,800	515	0.015	16,800	410	0.010
	12	1°30	26,250	893	0.010	22,575	714	0.012	14,700	399	0.010	13,650	336	0.007
	4	2°	43,050	2,142	0.032	31,500	1,418	0.022	23,625	788	0.021	23,625	704	0.016
	8	2°	26,775	998	0.022	22,050	735	0.017	16,800	515	0.016	16,800	410	0.010
	12	2°	26,250	893	0.012	22,575	714	0.014	14,700	399	0.012	13,650	336	0.007
R 0.4	4	0°30	43,050	2,310	0.037	29,400	1,470	0.028	24,150	861	0.026	24,150	714	0.016
	8	0°30	26,775	1,365	0.021	18,900	945	0.016	15,750	630	0.016	15,750	578	0.011
	12	0°30	26,775	1,050	0.016	16,275	525	0.013	12,600	462	0.011	12,600	420	0.007
	4	1°	43,050	2,310	0.037	29,400	1,470	0.028	24,150	861	0.026	24,150	714	0.016
	8	1°	26,775	1,365	0.021	18,900	945	0.016	15,750	630	0.016	15,750	578	0.011
	12	1°	26,775	1,050	0.016	16,275	525	0.013	12,600	462	0.011	12,600	420	0.007
	4	1°30	43,050	2,310	0.037	29,400	1,470	0.028	24,150	861	0.026	24,150	714	0.016
	8	1°30	26,775	1,365	0.021	18,900	945	0.016	15,750	630	0.016	15,750	578	0.011
	12	1°30	26,775	1,050	0.016	16,275	525	0.013	12,600	462	0.011	12,600	420	0.007
	4	2°	43,050	2,310	0.037	29,400	1,470	0.028	24,150	861	0.026	24,150	714	0.016
	8	2°	26,775	1,365	0.021	18,900	945	0.016	15,750	630	0.016	15,750	578	0.011
	12	2°	26,775	1,050	0.016	16,275	525	0.013	12,600	462	0.011	12,600	420	0.007

# 2JJTB/3JJTBS Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material			동/탄소강 Copper / Carbon Steels Cu / S45C / S50C			프리하든강 Prehardened Steels			고경도강 Hardened Steels			고경도강 Hardened Steels			
경도 Hardness			30 ~ 45HRC			30 ~ 45HRC			45 ~ 55HRC			55 ~ 68HRC			
반경 Radius	유효장 Effective Length	각도 Taper Angle	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth	
R 0.5	6	0°30	26,250	2,100	0.047	17,850	1,365	0.037	17,850	1,050	0.032	16,800	861	0.026	
	10	0°30	17,850	1,103	0.023	12,600	767	0.019	11,550	683	0.017	11,550	525	0.013	
	20	0°30	15,750	945	0.014	10,500	683	0.011	9,450	567	0.008	9,450	462	0.008	
	6	1°	26,250	2,100	0.047	17,850	1,365	0.037	17,850	1,050	0.032	16,800	861	0.026	
	10	1°	17,850	1,103	0.023	12,600	767	0.019	11,550	683	0.017	11,550	525	0.013	
	20	1°	15,750	945	0.014	10,500	683	0.011	9,450	567	0.008	9,450	462	0.008	
	30	1°	15,750	750	0.007	10,500	540	0.005	9,450	430	0.004	9,450	360	0.004	
	6	1°30	26,250	2,100	0.047	17,850	1,365	0.037	17,850	1,050	0.032	16,800	861	0.026	
	10	1°30	17,850	1,103	0.023	12,600	767	0.019	11,550	683	0.017	11,550	525	0.013	
	20	1°30	15,750	945	0.014	10,500	683	0.011	9,450	567	0.008	9,450	462	0.008	
	30	1°30	15,750	750	0.007	10,500	540	0.005	9,450	430	0.004	9,450	360	0.004	
	20	2°	15,750	945	0.014	10,500	683	0.011	9,450	567	0.008	9,450	462	0.008	
	30	2°	15,750	750	0.007	10,500	540	0.005	9,450	430	0.004	9,450	360	0.004	
	20	3°	15,750	945	0.014	10,500	683	0.011	9,450	567	0.008	9,450	462	0.008	
	30	3°	15,750	750	0.007	10,500	540	0.005	9,450	430	0.004	9,450	360	0.004	
	40	3°	12,250	550	0.004	8,550	420	0.002	7,800	365	0.002	7,800	285	0.002	
	R 0.75	10	0°30	18,900	2,205	0.063	12,600	1,470	0.042	12,600	1,155	0.037	12,600	893	0.032
		20	0°30	13,650	1,260	0.032	9,450	945	0.021	9,450	735	0.016	9,450	630	0.014
30		0°30	9,450	893	0.016	7,350	651	0.013	7,350	546	0.011	7,350	504	0.011	
10		1°	18,900	2,205	0.063	12,600	1,470	0.042	12,600	1,155	0.037	12,600	893	0.032	
20		1°	13,650	1,260	0.032	9,450	945	0.021	9,450	735	0.016	9,450	630	0.014	
30		1°	9,450	893	0.016	7,350	651	0.013	7,350	546	0.011	7,350	504	0.011	
10		1°30	18,900	2,205	0.063	12,600	1,470	0.042	12,600	1,155	0.037	12,600	893	0.032	
20		1°30	13,650	1,260	0.036	9,450	945	0.024	9,450	735	0.018	9,450	630	0.016	
30		1°30	9,450	893	0.017	7,350	651	0.014	7,350	546	0.012	7,350	504	0.011	
40		1°30	8,400	675	0.010	6,300	510	0.008	6,300	420	0.007	6,300	400	0.006	
10		2°	18,900	2,205	0.063	12,600	1,470	0.042	12,600	1,155	0.037	12,600	893	0.032	
20		2°	13,650	1,260	0.036	9,450	945	0.024	9,450	735	0.018	9,450	630	0.016	
30		2°	9,450	893	0.017	7,350	651	0.014	7,350	546	0.012	7,350	504	0.011	
40		2°	8,400	675	0.010	6,300	510	0.008	6,300	420	0.007	6,300	400	0.006	
R 1		12	0°30	15,750	2,468	0.084	11,550	1,785	0.068	11,025	1,428	0.059	11,025	1,124	0.048
		20	0°30	10,500	1,470	0.063	8,400	1,050	0.053	9,450	1,050	0.047	9,450	924	0.037
		30	0°30	9,450	1,260	0.047	7,350	840	0.037	7,350	819	0.032	7,350	672	0.026
		40	0°30	9,450	1,260	0.037	7,035	819	0.032	6,300	735	0.026	6,300	609	0.021
	12	1°	15,750	2,468	0.084	11,550	1,785	0.068	11,025	1,428	0.059	11,025	1,124	0.048	
	20	1°	10,500	1,470	0.063	8,400	1,050	0.053	9,450	1,050	0.047	9,450	924	0.037	



피삭재 Material			동/탄소강 Copper / Carbon Steels Cu / S45C / S50C			프리하든강 Prehardened Steels			고경도강 Hardened Steels			고경도강 Hardened Steels		
경도 Hardness			30 ~ 45HRC			30 ~ 45HRC			45 ~ 55HRC			55 ~ 68HRC		
반경 Radius	유효장 Effective Length	각도 Taper Angle	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth
R 1	30	1°	9,450	1,260	0.047	7,350	840	0.037	7,350	819	0.032	7,350	672	0.026
^	40	1°	9,450	1,260	0.037	7,035	819	0.032	6,300	735	0.026	6,300	609	0.021
^	50	1°	7,900	990	0.027	6,650	770	0.025	5,600	655	0.022	5,600	525	0.015
^	12	1°30'	15,750	2,468	0.090	11,550	1,785	0.068	11,025	1,428	0.065	11,025	1,124	0.052
^	20	1°30'	10,500	1,470	0.074	8,400	1,050	0.060	9,450	1,050	0.054	9,450	924	0.042
^	30	1°30'	9,450	1,260	0.055	7,350	840	0.043	7,350	819	0.038	7,350	672	0.031
^	40	1°30'	9,450	1,260	0.043	7,035	819	0.037	6,300	735	0.033	6,300	609	0.026
^	50	1°30'	7,900	990	0.030	6,650	770	0.028	5,600	655	0.029	5,600	525	0.021
^	30	2°	9,450	1,260	0.055	7,350	840	0.043	7,350	819	0.038	7,350	672	0.031
^	40	2°	9,450	1,260	0.043	7,035	819	0.037	6,300	735	0.033	6,300	609	0.026
^	50	2°	7,900	990	0.030	6,650	770	0.028	5,600	655	0.029	5,600	525	0.021
^	30	3°	9,450	1,260	0.055	7,350	840	0.043	7,350	819	0.038	7,350	672	0.031
^	40	3°	9,450	1,260	0.043	7,035	819	0.037	6,300	735	0.033	6,300	609	0.026
^	50	3°	7,900	990	0.030	6,650	770	0.028	5,600	655	0.029	5,600	525	0.021
R 1.5	20	0°30'	10,500	2,310	0.095	8,400	1,365	0.074	7,350	1,260	0.063	7,350	1,155	0.053
^	30	0°30'	9,450	1,890	0.079	7,350	1,103	0.063	6,300	1,050	0.053	6,300	924	0.044
^	40	0°30'	7,875	1,470	0.063	5,250	924	0.053	5,355	840	0.042	5,355	735	0.037
^	50	0°30'	7,875	1,365	0.042	5,250	840	0.032	5,355	788	0.026	5,355	683	0.024
^	20	1°	10,500	2,310	0.095	8,400	1,365	0.074	7,350	1,260	0.063	7,350	1,155	0.053
^	30	1°	9,450	1,890	0.079	7,350	1,103	0.063	6,300	1,050	0.053	6,300	924	0.044
^	40	1°	7,875	1,470	0.063	5,250	924	0.053	5,155	840	0.042	5,155	735	0.037
^	50	1°	7,875	1,365	0.042	5,250	840	0.032	5,155	788	0.026	5,155	683	0.024
^	60	1°	6,400	1,225	0.028	4,325	710	0.021	4,300	670	0.018	4,300	540	0.016
^	20	1°30'	10,500	2,310	0.095	8,400	1,365	0.074	7,350	1,260	0.063	7,350	1,155	0.053
^	30	1°30'	9,450	1,890	0.079	7,350	1,103	0.063	6,300	1,050	0.053	6,300	924	0.044
^	40	1°30'	7,875	1,470	0.063	5,250	924	0.053	5,355	840	0.042	5,355	735	0.037
^	50	1°30'	7,875	1,365	0.042	5,250	840	0.032	5,355	788	0.026	5,355	683	0.024
^	60	1°30'	6,400	1,225	0.028	4,325	710	0.021	4,300	670	0.018	4,300	540	0.016
^	20	2°	10,500	2,310	0.095	8,400	1,365	0.074	7,350	1,260	0.063	7,350	1,155	0.053
^	30	2°	9,450	1,890	0.079	7,350	1,103	0.063	6,300	1,050	0.053	6,300	924	0.044
^	48	2°	7,875	1,365	0.042	5,250	840	0.032	5,355	788	0.026	5,355	683	0.024
^	60	2°	6,400	1,225	0.028	4,325	710	0.021	4,300	670	0.018	4,300	540	0.016
^	30	3°	9,450	1,890	0.079	7,350	1,103	0.063	6,300	1,050	0.053	6,300	924	0.044
^	50	3°	7,875	1,365	0.042	5,250	840	0.032	5,355	788	0.026	5,355	683	0.024
R 2	40	0°30'	6,300	1,260	0.085	3,675	630	0.068	3,360	557	0.053	3,360	525	0.045
^	60	0°30'	4,200	767	0.063	3,150	473	0.047	2,940	420	0.042	2,940	368	0.033
^	50	1°	5,250	1,010	0.074	3,450	550	0.058	3,120	480	0.048	3,110	445	0.038
^	60	1°	4,200	767	0.063	3,150	473	0.047	2,940	420	0.042	2,940	368	0.033
^	70	1°	3,200	540	0.048	2,760	320	0.036	2,770	360	0.036	2,770	300	0.028
^	45	1°30'	5,250	1,010	0.074	3,450	550	0.058	3,120	480	0.048	3,110	445	0.038
^	60	1°30'	4,200	767	0.063	3,150	473	0.047	2,940	420	0.042	2,940	368	0.033
^	70	1°30'	3,200	540	0.048	2,760	320	0.036	2,770	360	0.036	2,770	300	0.028
^	25	3°	9,450	1,890	0.079	7,350	1,103	0.063	6,300	1,050	0.053	6,300	924	0.044
^	42	3°	7,875	1,365	0.042	5,250	840	0.032	5,355	788	0.026	5,355	683	0.024
R 2.5	40	1°	6,300	1,260	0.085	3,675	630	0.068	3,360	557	0.053	3,360	525	0.045
^	60	1°	4,200	767	0.063	3,150	473	0.047	2,940	420	0.042	2,940	368	0.033
^	90	1°	2,200	480	0.041	2,450	280	0.030	2,470	250	0.028	2,200	237	0.023
^	40	1°30'	6,300	1,260	0.085	3,675	630	0.068	3,360	557	0.053	3,360	525	0.045
^	60	1°30'	4,200	767	0.063	3,150	473	0.047	2,940	420	0.042	2,940	368	0.033
^	90	1°30'	2,200	480	0.041	2,450	280	0.030	2,470	250	0.028	2,200	237	0.023
R 3	40	1°	9,450	2,205	0.147	7,350	1,103	0.105	6,300	998	0.084	6,300	893	0.061
^	50	1°	7,800	1,910	0.122	5,980	980	0.088	5,000	845	0.070	5,300	760	0.055
^	60	1°	6,100	1,670	0.105	5,285	820	0.070	4,180	760	0.062	4,300	620	0.048
^	70	1°	4,725	1,470	0.074	4,095	735	0.063	3,570	683	0.053	3,570	578	0.042
^	80	1°	3,540	1,320	0.061	3,400	640	0.046	2,100	510	0.040	2,100	468	0.033
^	49	1°30'	7,800	1,910	0.122	5,980	980	0.088	5,000	845	0.070	5,300	760	0.055
^	85	1°30'	3,360	1,220	0.055	3,100	580	0.040	1,880	460	0.035	1,880	448	0.028
^	60	2°	6,100	1,670	0.105	5,285	820	0.070	4,180	760	0.062	4,300	620	0.048
^	90	2°	3,000	1,050	0.055	2,870	520	0.040	1,720	410	0.035	1,720	400	0.028
R 4	50	1°	9,345	2,310	0.189	7,350	1,155	0.147	6,300	1,050	0.105	6,300	840	0.086
^	60	1°	7,150	1,846	0.138	5,330	916	0.114	4,550	820	0.080	4,550	655	0.064
^	80	1°	4,515	1,365	0.095	3,360	683	0.084	3,045	578	0.068	3,045	473	0.042
^	52	1°30'	9,345	2,310	0.197	7,350	1,155	0.154	6,300	1,050	0.113	6,300	840	0.094
^	89	1°30'	3,400	1,090	0.073	2,970	578	0.046	1,890	454	0.041	1,860	443	0.033

# 2JJTB/3JJTBS Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material			동/탄소강 Copper / Carbon Steels Cu / S45C / S50C			프리하든강 Prehardened Steels			고경도강 Hardened Steels			고경도강 Hardened Steels		
경도 Hardness			30 ~ 45HRC			30 ~ 45HRC			45 ~ 55HRC			55 ~ 68HRC		
반경 Radius	유효장 Effective Length	각도 Taper Angle	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth
R 5	60	1°	5,775	1,785	0.194	3,675	893	0.168	3,570	735	0.126	3,570	630	0.084
-	75	1°	4,200	998	0.093	3,150	504	0.068	2,940	420	0.053	2,940	336	0.034
-	54	1°30'	6,175	1,850	0.220	3,935	923	0.185	3,760	768	0.146	3,760	678	0.097
R 6	85	1°30'	2,940	336	0.063	1,995	168	0.032	1,575	158	0.016	1,575	105	0.011
-	63	3°	3,990	735	0.126	2,940	368	0.086	2,625	326	0.063	2,625	231	0.047

**절입량**  
Depth of Cut

Ap : Axial Depth 축 방향의 절입 깊이 (mm)  
 Ae : Radial Depth 반경 방향의 절입 깊이 (mm)  
 D : Outside Diameter 외경 (mm)  
 v : Speed 회전속도 (min<sup>-1</sup>)  
 Vf : Feed 이송속도 (mm/min)

- 절삭조건에 없는 각도는 같은 직경에 이전 각도와 비례하여 사용 하십시오.
- 이송속도 및 축 방향의 절입 깊이는 리브창과 테이퍼각에 따라 고려하시고, 절삭 상황에 맞추어 조정 하십시오.
- 에어브로 혹은 미스트 클린트를 추천하며, 동 가공시 습식 클린트 추천 합니다.
- 상기 절삭조건외의 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 적용 기계의 회전속도가 부족한 경우에는 회전 속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- 칩 제거 주의 및 가공시 발열, 발화에 주의 하십시오.
- If there is no same taper angle of your endmill on the table, refer to the previous taper angle of diameter and apply the same proportion.
- Adjust the value of the feed and Ap based on the effective length and taper angle, and adjust the milling condition.
- Air blow or mist coolant is recommended, and wet coolants are recommended for copper milling.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- Where the parameters exceed the machine's maximum spindle speed, the RPM and feedrate should be reduced proportionally.
- Note for chip emission, heat or ignition.

# 2JJSP Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	합금강 / 공구강 Alloy Steels / Tool Steels		프리하든강 Prehardened Steels		스테인레스강 Stainless Steels		고경도강 Hardened Steels		고경도강 Hardened Steels	
경도 Hardness	~ 30HRC		30 ~ 38HRC		38 ~ 45HRC		45 ~ 55HRC		55 ~ 70HRC	
반경 Radius	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
R 0.5	25,600	680	25,600	680	25,600	680	25,600	680	25,600	610
R 0.75	22,000	850	22,000	850	22,000	850	22,000	850	22,000	750
R 1	19,200	1,080	19,200	1,080	19,200	1,080	19,200	1,080	17,600	960
R 2	12,400	1,440	11,200	1,240	10,800	1,160	10,000	1,080	8,800	920
R 3	8,400	1,480	7,600	1,360	7,200	1,280	6,800	1,200	5,900	1,040
R 4	6,400	1,120	5,700	1,000	5,500	960	5,100	880	4,400	790
R 5	5,100	880	4,600	800	4,400	784	4,000	720	3,600	640
R 6	4,800	840	3,800	670	3,640	640	3,400	600	3,000	540

**절입량**  
Depth of Cut

Ap	Ae
0.05D	0.05D

- 절삭조건외의 ap, ae 수치는 황삭 및 황중삭의 수치 이므로, 견고한 조도의 가공을 원하시면 황삭 값의 50%를 적용 하십시오.
- 상기 절삭조건외의 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과 하거나 버 및 적열 현상이 발생할 때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- The values of ap and ae on the table are for roughing or semi-roughing. If you need a great surface roughness, apply 50% of the value.
- 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.

# 4JJSP/4JJSPM Cutting Condition

•RPM : rev./min •Feed : mm/min

파삭재 Material	합금강 / 공구강 Alloy Steels / Tool Steels	프리하든강 Prehardened Steels	스테인레스강 Stainless Steels	고경도강 Hardened Steels	고경도강 Hardened Steels					
경도 Hardness	~ 30HRC		30 ~ 38HRC		38 ~ 45HRC		45 ~ 55HRC		55 ~ 70HRC	
반경 Radius	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
R 0.5	25,600	806	25,600	806	25,600	806	25,600	806	25,600	723
R 0.75	22,000	1,007	22,000	1,007	22,000	1,007	22,000	1,007	22,000	889
R 1	19,200	1,280	19,200	1,280	19,200	1,280	19,200	1,280	17,600	1,138
R 2	12,400	1,706	11,200	1,469	10,800	1,375	10,000	1,280	8,800	1,090
R 3	8,400	1,754	7,600	1,612	7,200	1,517	6,800	1,422	5,900	1,232
R 4	6,400	1,327	5,700	1,185	5,500	1,138	5,100	1,043	4,400	936
R 5	5,100	1,043	4,600	948	4,400	929	4,000	853	3,600	758
R 6	4,800	995	3,800	794	3,640	758	3,400	711	3,000	640

**절입량 Depth of Cut**

Ap	Ae
0.05D	0.05D

- 절삭조건인 ap, ae 수치는 황삭 및 활삭의 수치이므로, 견고한 조도의 가공을 원하시면 황삭 값의 50%를 적용 하십시오.
- 상기 절삭조건은 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- The values of ap and ae on the table are for roughing or semi-roughing. If you need a great surface roughness, apply 50% of the value.
- 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.

# 2JJSB/2JJB/3JJB/4JJSB/4JJB

- 3JJB/4JJSB/4JJB는 RPM 동일 FEED만 최대 50% Up 적용
- Use the same RPM and raise up the feed up to 50% for 3JJB/ 4JJSB/ 4JJB

파삭재 Material	고경도강 Hardened Steels				고경도강 Hardened Steels				고경도강 Hardened Steels			
경도 Hardness	55 ~ 62HRC				62 ~ 65HRC				65 ~ 68HRC			
반경 Radius	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae
			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth
R 0.05	60,000	150	0.002	0.003	60,000	100	0.001	0.0012	52,500	30	0.001	0.002
R 0.1	60,000	180	0.002	0.003	60,000	120	0.002	0.003	45,000	60	0.002	0.003
R 0.15	45,000	310	0.004	0.007	43,500	180	0.003	0.005	32,500	90	0.003	0.005
R 0.2	37,500	420	0.007	0.012	35,000	240	0.005	0.008	26,250	120	0.005	0.008
R 0.25	33,000	530	0.010	0.02	30,000	300	0.007	0.01	22,500	150	0.007	0.01
R 0.3	30,000	1,200	0.02	0.1	26,500	800	0.01	0.075	20,000	400	0.01	0.075
R 0.4	27,000	1,600	0.04	0.17	23,500	1,000	0.02	0.12	17,500	500	0.02	0.12
R 0.5	24,000	2,000	0.1	0.3	21,000	1,750	0.05	0.2	16,000	875	0.05	0.2
R 0.6	21,000	2,000	0.1	0.3	18,000	1,750	0.05	0.2	14,500	875	0.05	0.2
R 0.75	17,000	2,000	0.12	0.4	15,000	1,750	0.06	0.29	11,250	875	0.06	0.29
R 1	14,000	2,100	0.15	0.5	12,250	1,800	0.08	0.35	9,200	900	0.08	0.35
R 1.25	12,250	2,150	0.17	0.6	10,700	1,850	0.1	0.45	8,050	925	0.1	0.45
R 1.5	10,500	2,200	0.2	0.7	9,200	1,900	0.12	0.55	6,900	950	0.12	0.55
R 2	9,000	2,300	0.25	0.95	7,900	2,000	0.15	0.75	5,900	1,000	0.15	0.75
R 2.5	7,800	2,500	0.25	1.05	6,800	2,100	0.15	0.85	5,100	1,050	0.15	0.85
R 3	6,500	2,500	0.3	1.3	5,700	2,200	0.2	1	4,300	1,100	0.2	1
R 4	5,200	2,200	0.4	1.7	4,500	1,900	0.25	1.35	3,400	950	0.25	1.35
R 5	4,300	2,000	0.5	2.1	3,750	1,750	0.3	1.7	2,800	875	0.3	1.7
R 6	3,600	1,750	0.6	2.6	3,150	1,500	0.35	2	2,350	750	0.35	2

**절입량 Depth of Cut**

Ap : Axial Depth 축 방향의 절입 깊이 (mm)  
 Ae : Radial Depth 반경 방향의 절입 깊이 (mm)  
 D : Outside Diameter 외경 (mm)  
 n : Speed 회전속도 (mm/rev)  
 Vf : Feed 이송속도 (mm/min)

- HRC55 이하 파삭재 (합금강, 공구강) 가공시 같은 직경 파이에 대비 상기 절삭조건 20% UP 해주십시오.
- 날수 변화시 회전수는 유지하고, 피드는 안정적인 속도내에서 최대 50%까지 UP 해주십시오.(3JJB, 4JJSB, 4JJB)
- 상기 절삭조건은 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (Ø1이하 사용자 진동 허용 관리 5µm 이내 일것.)
- 에어브로 혹은 미스트 클린트를 추천 합니다.
- When milling workpiece, HRC below 55 (Alloy steel, tool steel), Raise up 20% RPM and feed compared to the same diameter.
- Changing flutes from 3 to 4, use the same RPM and raise up the feed up to 50% in stable condition (3JJB, 4JJSB, 4JJB).
- 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 (Ø1 or less, the vibration tolerance management will be within 5µm).
- Air blow or mist coolants are recommended.

피삭재 Material		탄소강 Carbon Steels				합금강 Alloy Steels				프리하트강/경도강 Prehardened Steels/ Hardened Steels			
경도 Hardness		38 ~ 45HRC				45 ~ 55HRC				55 ~ 65HRC			
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	9,792	573	0.12	0.120	8,640	428	0.12	0.120	8,064	345	0.12	0.120
-	25	9,792	573	0.08	0.080	8,640	428	0.08	0.080	8,064	345	0.08	0.080
-	30	9,792	573	0.08	0.080	8,640	428	0.08	0.080	8,064	345	0.08	0.080
-	40	8,704	509	0.05	0.050	7,680	380	0.05	0.050	7,168	307	0.05	0.050
∅4	12	8,000	1,358	0.4	0.400	7,050	902	0.4	0.400	6,580	727	0.4	0.400
-	16	8,000	1,358	0.4	0.400	7,050	902	0.4	0.400	6,580	727	0.4	0.400
-	20	7,800	1,200	0.3	0.300	6,800	800	0.3	0.300	6,200	720	0.3	0.300
-	25	7,800	1,200	0.3	0.300	6,800	800	0.3	0.300	6,200	720	0.3	0.300
-	30	7,800	1,200	0.3	0.300	6,800	800	0.3	0.300	6,200	720	0.3	0.300
-	35	7,600	1,150	0.2	0.200	6,700	780	0.2	0.200	6,000	700	0.2	0.200
-	40	7,600	1,150	0.2	0.200	6,700	780	0.2	0.200	6,000	700	0.2	0.200
-	45	7,600	1,150	0.2	0.200	6,700	780	0.2	0.200	6,000	700	0.2	0.200
-	50	7,600	1,150	0.2	0.200	6,700	780	0.2	0.200	6,000	700	0.2	0.200
∅5	16	7,400	1,060	0.1	0.100	6,600	760	0.4	0.400	5,900	680	0.4	0.400
-	20	7,400	1,060	0.1	0.100	6,600	760	0.4	0.400	5,900	680	0.4	0.400
-	25	7,400	1,060	0.1	0.100	6,600	760	0.3	0.300	5,900	680	0.3	0.300
-	30	7,200	1,000	0.09	0.090	6,200	740	0.2	0.200	5,800	650	0.2	0.200
-	35	7,200	1,000	0.09	0.090	6,200	740	0.2	0.200	5,800	650	0.2	0.200
-	40	7,000	980	0.09	0.090	6,000	700	0.2	0.200	5,600	620	0.2	0.200
-	50	7,000	980	0.09	0.090	6,000	700	0.2	0.200	5,600	620	0.2	0.200
∅6	20	6,800	950	0.08	0.080	5,800	680	0.1	0.100	5,400	600	0.1	0.100
-	30	6,800	950	0.08	0.080	5,800	680	0.1	0.100	5,400	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.

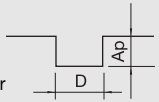
RPM : rev./min • Feed : mm/min

피삭재 Material		탄소강 Carbon Steels				합금강 Alloy Steels				프리하트강/경도강 Prehardened Steels/ Hardened Steels			
경도 Hardness		38 ~ 45HRC				45 ~ 55HRC				55 ~ 65HRC			
외경 Outside Diameter	유효장 Effective Length	RPM	FEED	Ap Ae		RPM	FEED	Ap Ae		RPM	FEED	Ap Ae	
				Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth
~	40	6800	950	0.08	0.080	5800	680	0.1	0.100	5400	600	0.1	0.100
~	50	6500	900	0.05	0.050	5600	650	0.09	0.090	5000	560	0.09	0.090
~	60	6500	900	0.05	0.050	5600	650	0.09	0.090	5000	560	0.09	0.090

절입량 Depth of Cut

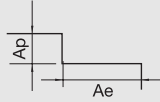
Slotting

- 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 경도강 가공시 65HRC 조건의 같은 직경 파이에 대비 상기 절삭조건의 20% DOWN 해주십시오.
- 상기 절삭조건의 참고는 수치미로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (Ø1이하 사용자 진동 허용 관리 5µm 이내 일것.)
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 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 ( $\phi 1$  or less, the vibration tolerance management will be within 5µm).
- Air blow or mist coolants are recommended and note for chip emission, heat or ignition.

# 4JJE Cutting Condition

4JJHE 6&8JJHE : RPM 동일 FEED만 최대 50% Up 적용  
Use the same RPM, raise up the feed up to 50%

피삭재 Material		경도강 Hardened Steels				경도강 Hardened Steels		경도강 Hardened Steels						
경도 Hardness		40 ~ 50HRC		50 ~ 55HRC		경도 Hardness		55 ~ 62HRC		62 ~ 68HRC				
외경 Outside Diameter	RPM	FEED	RPM	FEED	외경 Outside Diameter	RPM	FEED	Ap Ae		RPM	FEED	Ap Ae		
								Axial Depth	Radial Depth			Axial Depth	Radial Depth	
Ø1	31,500	1,050	20,300	710	Ø1	32,000	800	0.5	0.02	28,000	500	0.5	0.02	
Ø2	20,200	1,250	14,300	840	Ø1.5	30,000	900	0.75	0.03	25,000	550	0.75	0.03	
Ø3	14,300	1,250	8,500	840	Ø2	24,000	1,000	1	0.04	16,000	600	1	0.04	
Ø4	11,400	1,300	7,200	880	Ø3	38,400	4,560	1.5	0.06	19,200	2,280	1.5	0.06	
Ø5	10,500	1,500	6,700	1,000	Ø4	28,800	5,280	2	0.08	14,400	2,640	2	0.08	
Ø6	8,450	1,400	5,600	950	Ø5	24,000	6,000	2.5	0.1	12,000	3,000	2.5	0.1	
Ø7	7,800	1,380	4,200	900	Ø6	19,200	6,960	3	0.12	9,600	3,480	3	0.12	
Ø8	6,500	1,350	3,830	840	Ø8	14,400	6,960	4	0.16	7,200	3,480	4	0.16	
Ø9	6,150	1,260	3,500	840	Ø10	11,520	6,960	5	0.2	5,760	3,480	5	0.2	
Ø10	5,250	1,260	2,800	800	Ø12	9,600	5,760	6	0.24	4,800	2,880	6	0.24	
Ø11	4,300	1,150	2,500	800	Ø16	7,200	4,320	8	0.32	3,600	2,160	8	0.32	
Ø12	4,300	1,150	2,300	760	Ø20	5,760	3,480	10	0.4	2,880	1,680	10	0.4	
Ø14	3,500	1,050	2,100	760	절입량 Depth of Cut		~ 55HRC		0.03D 1.0D		55HRC ~		0.02D 0.5D	
Ø16	3,500	1,050	2,000	700										
Ø18	2,800	1,000	2,000	700										
Ø20	2,600	980	1,800	650										

- HRC55 이하 피삭재 (합금강, 공구강) 가공시 같은 직경 파이에 대비 상기 절삭조건의 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 절삭조건의 참고는 수치미로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피들 속도와 이송속도를 비례적으로 조정 하십시오.
- 소재 및 가공 형상에 적합한 절삭유를 사용 하십시오.
- 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.

피삭재 Material	홈 절삭 Slotting						측면 절삭 Side Cutting							
	고경도강 Hardened Steels						고경도강 Hardened Steels							
	경도 Hardness		55 ~ 60HRC		60 ~ 65HRC		65 ~ 68HRC		55 ~ 60HRC		60 ~ 65HRC		65 ~ 68HRC	
외경 Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
∅0.1	33,000	50	33,000	40	26,400	30	• 측면절삭 불가 • Side cutting is not possible.							
∅0.2	33,000	60	33,000	45	20,000	35								
∅0.3	33,000	70	25,000	50	20,000	40								
∅0.4	33,000	90	25,000	55	20,000	60								
∅0.5	33,000	140	25,000	85	20,000	75								
∅0.6	30,000	160	25,000	105	15,200	80								
∅0.8	25,000	185	19,000	110	14,000	90								
∅0.9	22,700	205	17,500	125	12,500	85								
∅1	20,500	215	16,000	135	12,500	85	20,500	310	16,000	190	12,500	125		
∅2	14,500	260	11,000	160	9,500	115	14,500	370	11,000	230	9,500	165		
∅3	9,500	260	7,500	160	6,400	115	9,500	370	7,500	230	6,400	165		
∅4	7,200	270	5,600	170	4,750	118	7,200	385	5,600	240	4,750	170		
∅5	6,400	285	5,100	180	4,450	132	6,400	410	5,100	260	4,450	190		
∅6	5,300	280	4,200	180	3,700	130	5,300	400	4,200	255	3,700	185		
∅8	4,000	255	3,200	165	2,800	120	4,000	365	3,200	235	2,800	170		
∅10	3,200	240	2,550	155	2,200	112	3,200	340	2,550	220	2,200	160		
∅12	2,650	240	2,100	155	1,860	112	2,650	340	2,100	220	1,860	160		
∅16	1,840	180	1,800	100	1,460	100	1,840	300	1,800	190	1,800	190		
∅18	1,840	180	1,800	100	1,460	100	1,840	300	1,800	190	1,800	190		
∅20	1,460	180	1,400	100	1,100	100	1,460	295	1,400	180	1,400	180		
절입량 Depth of Cut														

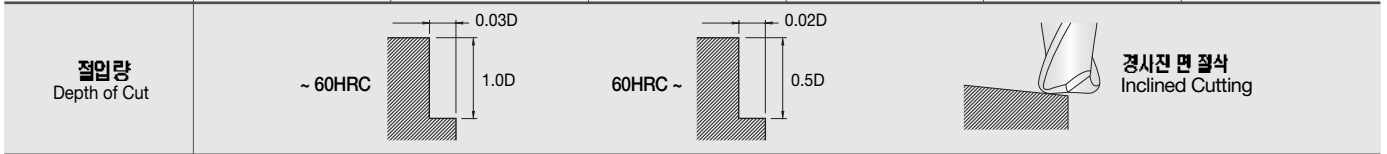
- HRC55 이하 피삭재 (합금강, 공구강) 가공시 같은 직경 파이에 대비 상기 절삭조건 20% UP 해주십시오.
- 상기 절삭조건은 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피드 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피드 속도와 이송속도를 비례적으로 조정 하십시오.
- 소재 및 가공 형상에 적합한 절삭유를 사용 하십시오.
- When milling workpiece, HRC below 55 (Alloy steel, tool steel), Raise up 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 suitable cutting oil for material and machining geometry.

## 홈 절삭 Slotting

피삭재 Material		고경도강 Hardened Steels											
경도 Hardness		55 ~ 60HRC				60 ~ 65HRC				65 ~ 68HRC			
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
∅0.4	R 0.1	33,000	105	0.01	0.01	25,000	60	0.005	0.008	25,000	60	0.005	0.008
∅0.5	R 0.1	33,000	110	0.015	0.02	25,000	65	0.007	0.010	20,000	40	0.007	0.010
∅0.8	R 0.2	30,000	125	0.02	0.10	25,000	85	0.01	0.075	20,000	50	0.01	0.075
∅1	R 0.3	25,000	145	0.04	0.15	19,000	90	0.02	0.12	16,000	55	0.02	0.12
∅1.5	R 0.5	20,500	172	0.10	0.30	16,000	108	0.05	0.20	12,500	70	0.05	0.20
∅2	R 0.5	14,500	208	0.15	0.50	11,000	128	0.1	0.25	9,500	92	0.10	0.30
∅2.5	R 0.5	9,500	208	0.20	0.50	7,500	128	0.12	0.35	6,400	92	0.12	0.40
∅3	R 0.5	9,500	208	0.20	0.50	7,500	128	0.12	0.35	6,400	92	0.12	0.40
∅4	R 0.3	7,200	216	0.25	0.30	5,600	136	0.15	0.20	4,750	94	0.15	0.30
∅5	R 0.5	6,400	228	0.25	0.50	5,100	144	0.15	0.50	4,450	105	0.15	0.40
-	R 1	6,400	228	0.40	1.05	5,100	144	0.35	0.80	4,450	105	0.30	0.70
∅6	R 0.5	5,300	224	0.20	0.70	4,200	144	0.2	0.60	3,700	104	0.20	0.50
-	R 1	5,300	224	0.30	1.00	4,200	144	0.3	0.80	3,700	104	0.20	0.65
-	R 1.5	5,300	224	0.50	1.30	4,200	144	0.4	1.00	3,700	104	0.30	0.80
∅8	R 0.5	4,000	204	0.30	0.70	3,200	132	0.20	0.60	2,800	96	0.20	0.50
-	R 1	4,000	204	0.40	1.00	3,200	132	0.25	0.90	2,800	96	0.25	0.70
-	R 1.5	4,000	204	0.40	1.30	3,200	132	0.25	1.20	2,800	96	0.25	0.80
∅10	R 0.5	3,200	192	0.40	0.80	2,550	124	0.2	0.60	2,200	90	0.20	0.50
-	R 1	3,200	192	0.50	1.00	2,550	124	0.3	0.80	2,200	90	0.30	0.80
-	R 2	3,200	192	0.50	1.70	2,550	124	0.3	1.50	2,200	90	0.30	1.30
∅12	R 0.5	2,650	192	0.50	1.00	2,100	124	0.35	0.80	1,860	90	0.20	0.60
-	R 1	2,650	192	0.60	1.30	2,100	124	0.35	1.20	1,860	90	0.30	1.00
-	R 2	2,650	192	0.60	1.80	2,100	124	0.35	1.70	1,860	90	0.30	1.40
-	R 3	2,650	192	0.60	2.50	2,100	124	0.40	2.00	1,860	90	0.30	1.80

## 측면 절삭 Side Cutting

피삭재 Material		고경도강 Hardened Steels											
경도 Hardness		55 ~ 60HRC				60 ~ 65HRC				65 ~ 68HRC			
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
∅0.4		33,000	105	0.4	0.012	25,000	60	0.2	0.008	25,000	60	0.2	0.008
∅0.5		33,000	110	0.5	0.015	25,000	65	0.25	0.010	20,000	40	0.25	0.010
∅0.8		30,000	125	0.8	0.024	25,000	85	0.4	0.016	20,000	50	0.4	0.016
∅1		25,000	145	1	0.030	19,000	90	0.5	0.02	16,000	55	0.5	0.02
∅2		14,500	208	2	0.060	11,000	128	1	0.04	9,500	92	1	0.04
∅3		9,500	208	3	0.090	7,500	128	1.5	0.06	6,400	92	1.5	0.06
∅4		7,200	216	4	0.120	5,600	136	2	0.08	4,750	94	2	0.08
∅6		5,300	224	6	0.180	4,200	144	3	0.12	3,700	104	3	0.12
∅8		4,000	204	8	0.240	3,200	132	4	0.16	2,800	96	4	0.16
∅10		3,200	192	10	0.300	2,550	124	5	0.20	2,200	90	5	0.20
∅12		2,650	192	12	0.360	2,100	124	6	0.24	1,860	90	6	0.24

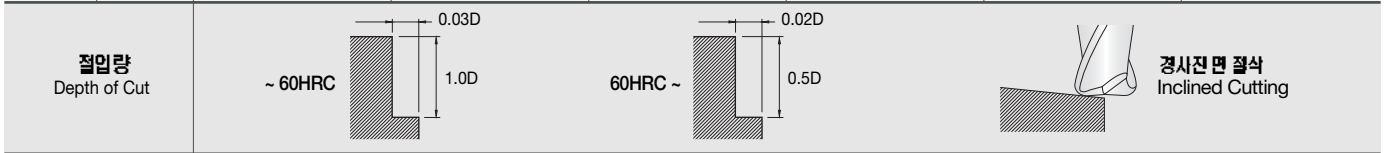


- HRC55이하 피삭재 (합금강, 공구강) 가공시 같은 직경 파이에 대비 상기 절삭조건 20% UP 해주십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30%이하로 줄이십시오.
- 측면 절삭시 코너 R 부분과 각도내용을 참고하여 절삭 하시기 바랍니다.
- 곡면 절삭시 날경의 코너 R 보다 낮은 이동 PITCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도 내에서 피드를 최대 30%까지 UP 해주십시오.
- 상기 절삭조건 20%의 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 에어브로 혹은 미스트 쿨런트를 추천하며 칩 제거 주의 및 가공시 발열, 발화에 주의 하십시오.
- When milling workpiece, HRC below 55 (Alloy steel, tool steel), Raise up 20% RPM and feed compared to the same diameter.
- In case of long effective length, reduce the RPM and feed by 30% or less.
- For side milling, refer to the corner radius and
- For curved milling, set up the lower value of the pitch than the corner milling radius value of tool diameter.
- For curved milling, raise up the feed by 30% in stable condition.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

# 4JJCR/6JJCR/4JJTC

6JJCR은 RPM 동일 FEED만 최대 50% Up 적용  
 Use the same RPM and raise up the feed up to 50% for 6JJCR.

피삭재 Material		고경도강 Hardened Steels											
경도 Hardness		55 ~ 60HRC				60 ~ 65HRC				65 ~ 68HRC			
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
ø0.5	R 0.1	33,000	365	0.015	0.02	25,000	245	0.007	0.010	20,000	140	0.007	0.010
ø0.6	R 0.1	30,000	380	0.02	0.10	25,000	250	0.01	0.075	20,000	150	0.01	0.075
ø0.7	R 0.1	28,000	39	0.03	0.13	21,000	255	0.01	0.080	18,000	150	0.01	0.080
ø0.8	R 0.1	25,500	400	0.04	0.15	19,000	260	0.02	0.12	16,000	155	0.02	0.12
ø1	R 0.1	20,500	430	0.08	0.80	16,000	270	0.04	0.06	12,500	175	0.03	0.05
-	R 0.3	20,500	430	0.10	0.40	16,000	270	0.05	0.08	12,500	175	0.05	0.06
ø1.5	R 0.1	18,000	460	0.12	1.30	13,000	300	0.07	0.10	10,500	200	0.05	0.08
-	R 0.5	18,000	460	0.15	0.50	13,000	300	0.10	0.12	10,500	200	0.07	0.10
ø2	R 0.1	14,500	520	0.15	1.80	11,000	320	0.10	0.12	9,500	230	0.10	0.10
-	R 0.5	14,500	520	0.18	1.00	11,000	320	0.10	0.14	9,500	230	0.10	0.12
ø2.5	R 0.1	11,500	520	0.16	2.00	8,500	320	0.10	0.13	7,500	230	0.10	0.10
-	R 0.5	11,500	520	0.19	1.50	8,500	320	0.10	0.15	7,500	230	0.10	0.12
ø3	R 0.1	9,500	520	0.16	2.50	7,500	320	0.12	0.13	6,400	230	0.12	0.10
-	R 0.5	9,500	520	0.18	2.00	7,500	320	0.12	0.14	6,400	230	0.12	0.12
-	R 1	9,500	520	0.20	1.00	7,500	320	0.12	0.16	6,400	230	0.12	0.13
ø4	R 0.1	7,200	540	0.20	3.50	5,600	335	0.12	0.16	4,750	240	0.12	0.13
-	R 0.5	7,200	540	0.25	3.00	5,600	335	0.12	0.20	4,750	240	0.15	0.16
-	R 1	7,200	540	0.25	2.00	5,600	335	0.15	0.20	4,750	240	0.15	0.16
ø5	R 0.1	6,400	580	0.25	4.50	5,100	370	0.12	0.20	4,450	270	0.12	0.16
-	R 0.5	6,400	580	0.28	4.00	5,100	370	0.15	0.22	4,450	270	0.15	0.18
-	R 1	6,400	580	0.30	3.00	5,100	370	0.15	0.24	4,450	270	0.15	0.19
ø6	R 0.1	5,300	560	0.30	5.50	4,200	350	0.20	0.24	3,700	260	0.20	0.19
-	R 0.5	5,300	560	0.30	5.00	4,200	350	0.20	0.24	3,700	260	0.20	0.19
-	R 1	5,300	560	0.40	4.00	4,200	350	0.25	0.32	3,700	260	0.25	0.26
-	R 1.5	5,300	560	0.40	3.00	4,200	350	0.25	0.32	3,700	260	0.25	0.26
ø8	R 0.5	4,000	520	0.30	7.50	3,200	330	0.20	0.24	2,800	240	0.20	0.19
-	R 1	4,000	520	0.30	6.00	3,200	330	0.20	0.24	2,800	240	0.20	0.19
-	R 1.5	4,000	520	0.40	5.00	3,200	330	0.25	0.32	2,800	240	0.25	0.26
-	R 2	4,000	520	0.50	4.00	3,200	330	0.30	0.40	2,800	240	0.25	0.32
ø10	R 0.5	3,200	480	0.40	9.50	2,550	310	0.20	0.32	2,200	220	0.20	0.26
-	R 1	3,200	480	0.45	9.00	2,550	310	0.25	0.36	2,200	220	0.25	0.29
-	R 1.5	3,200	480	0.50	7.00	2,550	310	0.30	0.40	2,200	220	0.30	0.32
-	R 2	3,200	480	0.50	6.00	2,550	310	0.30	0.40	2,200	220	0.30	0.32
-	R 2.5	3,200	480	0.50	5.00	2,550	310	0.30	0.40	2,200	220	0.30	0.32
ø12	R 0.5	2,650	480	0.50	11.00	2,100	300	0.35	0.40	1,860	220	0.30	0.32
-	R 1	2,650	480	0.70	10.00	2,100	300	0.35	0.56	1,860	220	0.35	0.45
-	R 1.5	2,650	480	0.80	9.00	2,100	300	0.40	0.64	1,860	220	0.35	0.51
-	R 2	2,650	480	0.80	8.00	2,100	300	0.40	0.64	1,860	220	0.35	0.51
-	R 3	2,650	480	0.80	6.00	2,100	300	0.40	0.64	1,860	220	0.35	0.51



- 상기 조건표는 홈 절삭 조건표이며, 측면 절삭시 절입기준표를 참고 바랍니다.
- HRC55 이하 피삭재 (합금강, 공구강) 가공시 같은 직경 파이에 대비 상기 절삭 조건의 20% UP 해주십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30% 이하로 줄이십시오.
- 곡면 절삭시 날경의 코너 R 보다 낮은 이동 PTCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도 내에서 피드를 최대 30%까지 UP 해주십시오.
- 6날시 회전수는 유지하고, 피드는 안정적인 속도 내에서 최대 50%까지 UP 해주십시오.
- Above the table is a reference for groove milling, and refer to the depth of cut for side milling.
- When milling workpiece, HRC below 55 (Alloy steel, tool steel), Raise up 20% RPM and feed compared to the same diameter.
- In case of long effective length, reduce the RPM and feed by 30% or less.
- For curved milling, use the lower value of pitch than corner radius value of tool diameter.
- For curved milling, raise up the feed up to 30% in stable condition.
- With 6flutes milling, raise up the feed up to 50% in stable condition.



피삭재 Material		고경도강 Hardened Steels											
경도 Hardness		55 ~ 60HRC				60 ~ 65HRC				65 ~ 68HRC			
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
ø0.2	R 0.02	40,000	55	0.005	0.005	37,000	30	0.002	0.005	36,000	30	0.003	0.005
ø0.3	R 0.02	40,000	60	0.007	0.007	37,000	35	0.003	0.006	36,000	35	0.004	0.006
ø0.4	R 0.1	33,000	70	0.010	0.01	25,000	40	0.005	0.008	25,000	40	0.005	0.008
ø0.5	R 0.1	33,000	80	0.015	0.02	25,000	45	0.007	0.010	20,000	30	0.007	0.010
ø0.6	R 0.2	30,000	90	0.02	0.10	25,000	60	0.01	0.075	20,000	35	0.01	0.075
ø0.8	R 0.2	25,000	100	0.04	0.15	19,000	65	0.02	0.12	16,000	40	0.02	0.12
ø1	R 0.3	20,500	248	0.10	0.30	16,000	152	0.05	0.20	12,500	100	0.05	0.20
ø1.5	R 0.1	16,500	265	0.12	0.35	13,000	168	0.07	0.30	10,500	118	0.07	0.30
ø2	R 0.1	14,500	296	0.15	0.40	11,000	184	0.10	0.35	9,500	132	0.10	0.30
ø2.5	R 0.1	11,500	296	0.20	0.60	8,800	184	0.12	0.40	7,400	132	0.10	0.35
-	R 0.5	11,500	296	0.21	0.60	8,800	184	0.12	0.45	7,400	132	0.10	0.40
ø3	R 0.1	9,500	300	0.20	0.50	7,500	188	0.15	0.55	6,400	134	0.12	0.45
-	R 0.5	9,500	300	0.22	0.50	7,500	188	0.15	0.55	6,400	134	0.12	0.45
-	R 1	9,500	300	0.25	0.70	7,500	188	0.20	0.65	6,400	134	0.16	0.55
ø4	R 0.1	7,200	308	0.25	0.95	5,600	192	0.15	0.75	4,750	136	0.15	0.65
-	R 0.5	7,200	308	0.25	0.95	5,600	192	0.15	0.75	4,750	136	0.15	0.65
-	R 1	7,200	308	0.30	1.20	5,600	192	0.20	1.00	4,750	136	0.20	0.90
ø5	R 0.1	6,400	328	0.20	0.90	5,100	208	0.15	0.70	4,450	152	0.15	0.85
-	R 0.5	6,400	328	0.20	0.90	5,100	208	0.15	0.70	4,450	152	0.15	0.85
-	R 1	6,400	328	0.25	1.10	5,100	208	0.20	0.90	4,450	152	0.20	1.00
ø6	R 0.5	5,300	320	0.30	1.30	4,200	204	0.20	0.80	3,700	148	0.20	0.80
-	R 1	5,300	320	0.30	1.30	4,200	204	0.20	0.80	3,700	148	0.20	0.80
-	R 1.5	5,300	320	0.30	1.40	4,200	204	0.25	1.20	3,700	148	0.25	1.20
-	R 2.5	5,300	320	0.30	1.40	4,200	204	0.25	1.20	3,700	148	0.25	1.20
ø8	R 0.5	4,000	292	0.30	1.70	3,200	188	0.25	1.35	2,800	136	0.25	1.35
-	R 1	4,000	292	0.30	1.70	3,200	188	0.25	1.35	2,800	136	0.25	1.35
-	R 1.5	4,000	292	0.30	1.70	3,200	188	0.25	1.35	2,800	136	0.25	1.35
-	R 2	4,000	292	0.40	2.00	3,200	188	0.25	1.50	2,800	136	0.30	1.40
-	R 2.5	4,000	292	0.40	2.00	3,200	188	0.25	1.50	2,800	136	0.30	1.40
-	R 3	4,000	292	0.40	2.00	3,200	188	0.25	1.50	2,800	136	0.30	1.40
ø10	R 0.5	3,200	272	0.50	2.10	2,550	176	0.30	1.70	2,200	128	0.30	1.50
-	R 1	3,200	272	0.50	2.10	2,550	176	0.30	1.70	2,200	128	0.30	1.50
-	R 1.5	3,200	272	0.60	2.40	2,550	176	0.30	1.80	2,200	128	0.30	1.60
-	R 2	3,200	272	0.60	2.40	2,550	176	0.30	1.80	2,200	128	0.30	1.60
-	R 2.5	3,200	272	0.60	2.40	2,550	176	0.30	1.80	2,200	128	0.30	1.60
ø12	R 0.5	2,650	272	0.80	2.50	2,100	176	0.40	2.00	1,860	128	0.35	1.80
-	R 1	2,650	272	0.80	2.50	2,100	176	0.40	2.00	1,860	128	0.35	1.80
-	R 1.5	2,650	272	0.80	2.50	2,100	176	0.40	2.00	1,860	128	0.35	1.80
-	R 2	2,650	272	1.00	2.60	2,100	176	0.50	2.10	1,860	128	0.40	2.00
-	R 2.5	2,650	272	1.00	2.60	2,100	176	0.50	2.10	1,860	128	0.40	2.00
-	R 3	2,650	272	1.00	2.60	2,100	176	0.50	2.10	1,860	128	0.40	2.00



- 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 최대 30%까지 UP 해주십시오.
- 적용 기계의 회전속도가 부족한 경우에는 회전속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- 에어브로 혹은 미스트 콜런트를 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.

피삭재 Material		고경도강 Hardened Steels											
경도 Hardness		55 ~ 60HRC				60 ~ 65HRC				65 ~ 68HRC			
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

<b>절입량</b> Depth of Cut	Slotting • Ap : Axial Depth • D : Outside Diameter		Side Milling • Ap : Axial Depth • Ae : Radial Depth			<b>경사진 면 절삭</b> Inclined Cutting
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- 상기 조건표는 홈 절삭 조건표이며, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 곡면 절삭시 날경의 코너 R 보다 낮은 이동 PITCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도 내에서 피드를 최대 30%까지 UP 해주십시오.
- 적용 기계의 회전속도가 부족한 경우에는 회전 속도와 이송속도를 같은 비율로 줄여서 적용합니다.
- 에어브로 혹은 미스트 클린트를 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.

# 6JJCR L Cutting Condition

•RPM : rev./min •Feed : mm/min

파삭재 Material	홈 절삭 Slotting						측면 절삭 Side Cutting							
	고경도강 Hardened Steels						고경도강 Hardened Steels							
	경도 Hardness		35 ~ 45HRC		45 ~ 55HRC		55 ~ 60HRC		35 ~ 45HRC		45 ~ 55HRC		55 ~ 60HRC	
외경 Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
ø3	7,800	800	6,900	400	6,000	220	11,500	1,100	10,500	860	9,500	650		
ø4	7,150	800	6,100	450	5,750	250	9,200	1,100	7,600	900	7,100	680		
ø5	6,500	900	5,700	510	5,100	300	7,200	1,200	6,400	950	6,000	720		
ø6	6,100	1,000	5,150	520	4,850	320	6,200	1,300	5,300	1,040	4,950	810		
ø8	5,800	1,100	4,810	520	4,150	330	4,800	1,400	4,100	1,120	3,900	820		
ø10	5,500	1,200	4,200	500	3,850	310	3,700	1,300	3,000	1,030	2,600	810		
ø12	5,100	1,100	3,950	450	3,500	290	3,000	1,200	2,700	980	2,100	780		
ø16	4,750	1,100	3,700	430	3,200	290	2,750	1,200	2,450	980	1,950	760		

절입량  
Depth of Cut

경사면 절삭  
Inclined Cutting

- 안정적인 절삭을 위해 홈 가공시 날경의 코너R을 유의하여 ae 값을 설정 하십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30%이하로 줄어하십시오.
- HRC60 이상인 경우 같은 직경의 같은 비율로 20% DOWN 시켜주십시오.
- 곡면 절삭시 날경의 코너R 보다 낮은 이동 PITCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도 내에서 피드를 최대 30%까지 UP 해주십시오.
- 상기 절삭조건외의 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 파삭재와 절삭형상을 위한 적절한 클린트 사용과 가공시 발열, 발화에 주의 하십시오.
- For stable cutting, set the ae value by paying attention to the corner radius during grooving machining.
- In case of long effective length, reduce the RPM and feed by 30% or less.
- In case the material of HRC over 60, reduce the RPM and feed by 20%.
- 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.
- 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.
- Air blow or mist coolant is recommended and note for chip emission, heat, or ignition.

# 4&6JJDR C Cutting Condition

•RPM : rev./min •Feed : mm/min

파삭재 Material	고경도강 Hardened Steels				고경도강 Hardened Steels				고경도강 Hardened Steels				고경도강 Hardened Steels							
	경도 Hardness				50 ~ 55HRC				55 ~ 62HRC				62 ~ 66HRC				66 ~ 72HRC			
	외경 Outside Diameter	날수 No. of flutes	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth		
ø1	4	30,250	4,700	0.04	0.6	20,700	1,670	0.02	0.6	17,510	1,370	0.018	0.6	14,330	690	0.013	0.5			
ø2	4	15,100	4,700	0.08	1.2	10,350	1,680	0.04	1.2	8,760	1,370	0.036	1.2	7,170	690	0.026	1.0			
ø3	4	10,000	4,900	0.12	1.8	6,900	1,780	0.06	1.8	5,840	1,285	0.054	1.8	4,780	720	0.039	1.5			
ø4	4	7,560	4,670	0.16	2.4	5,170	2,170	0.08	2.4	4,380	1,314	0.072	2.4	3,580	860	0.052	2.0			
ø5	4	6,050	4,840	0.20	3.0	4,140	2,230	0.10	3.0	3,500	1,330	0.090	3.0	2,870	920	0.065	2.5			
ø6	6	5,040	7,500	0.24	3.6	3,450	2,790	0.12	3.6	2,920	2,010	0.108	3.6	2,390	1,140	0.078	3.0			
ø8	6	3,780	7,900	0.28	4.2	2,590	2,870	0.14	4.2	2,190	2,100	0.144	4.2	1,790	1,220	0.091	3.5			
ø10	6	3,025	7,740	0.32	4.8	2,070	2,800	0.16	4.8	1,750	2,000	0.181	4.8	1,430	1,240	0.104	4.0			
ø12	6	2,520	7,410	0.36	5.4	1,720	3,300	0.18	5.4	1,460	1,840	0.217	5.4	1,200	1,200	0.117	4.5			

절입량  
Depth of Cut

Slotting

- Ap : Axial Depth
- D : Outside Diameter

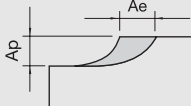
Side Milling

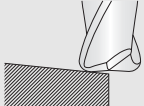
- Ap : Axial Depth
- Ae : Radial Depth

- 날경 보다 낮은 이동 PITCH를 설정 하십시오.(날경 보다 클 시 경우 CUSP가 남는다)
- 윤곽 가공시 가장 추천하며, 가능한 가공성이 좋은 기계를 사용 하십시오.
- 상기 절삭조건외의 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 적용 기계의 회전속도가 부족한 경우에는 회전속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- 파삭재와 가공 모양에 따라 적절한 클린트를 사용 하십시오.
- Use lower value of pitch than tool diameter. If not, cusp will appear on the workpiece.
- Contouring machining method is the most recommended, and use great rigidity of CNC.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- If your CNC machine cannot run enough RPM and Feed, reduce the RPM and feed in same proportion.
- Depending on the workpiece and shape, use adequate coolant.

피삭재 Material		합금강 / 공구강 Alloy Steels / Tool Steels				고경도강 Hardened Steels				고경도강 Hardened Steels			
경도 Hardness		30 ~ 45HRC				45 ~ 55HRC				55 ~ 62HRC			
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
ø1	R 0.2	42,000	7,800	0.03	0.05	35,000	6,800	0.02	0.05	25,000	2,600	0.02	0.05
ø1.5	R 0.5	40,000	8,000	0.04	0.06	30,000	7,000	0.03	0.60	21,000	2,800	0.02	0.06
ø2	R 0.5	27,000	8,400	0.05	0.08	24,000	7,500	0.04	0.80	16,000	3,000	0.03	0.80
ø3	R 0.5	18,000	9,000	0.08	1.20	16,000	8,500	0.06	1.20	11,000	3,300	0.05	1.20
ø4	R 0.5	16,000	10,000	0.13	1.70	13,000	10,000	0.09	1.70	9,000	4,000	0.08	1.70
-	R 1.0	14,000	9,500	0.12	1.50	12,000	8,800	0.08	1.50	8,000	3,500	0.07	1.50
ø5	R 0.5	12,000	12,000	0.17	2.30	11,000	10,000	0.12	2.30	7,300	4,300	0.09	2.30
-	R 1.0	11,000	11,000	0.15	2.00	9,600	9,500	0.10	2.00	6,400	3,800	0.08	2.00
ø6	R 0.3	10,900	13,200	0.18	2.95	10,000	13,000	0.12	2.95	6,500	4,600	0.12	2.95
-	R 0.5	10,600	13,000	0.17	2.85	9,500	12,000	0.11	2.85	6,300	4,500	0.11	2.85
-	R 1.0	12,654	12,600	0.17	2.80	9,000	11,000	0.11	2.80	5,800	4,100	0.11	2.80
-	R 1.5	9,000	11,000	0.15	2.50	8,000	9,600	0.10	2.50	5,300	3,800	0.10	2.50
ø8	R 0.3	8,400	13,500	0.24	3.54	7,300	15,000	0.18	3.54	4,700	4,484	0.15	3.54
-	R 0.5	8,200	13,000	0.23	3.42	7,100	13,000	0.17	3.42	4,600	4,370	0.15	3.42
-	R 1.0	8,000	12,000	0.22	3.36	6,700	11,000	0.17	3.36	4,520	4,294	0.15	3.36
-	R 2.0	7,000	11,000	0.20	3.00	6,000	9,600	0.15	3.00	4,000	3,800	0.13	3.00
ø10	R 0.3	6,490	12,980	0.24	5.31	5,664	11,210	0.18	5.31	3,776	4,484	0.15	5.31
-	R 0.5	6,325	12,650	0.23	5.13	5,520	10,925	0.17	5.13	3,680	4,370	0.15	5.13
-	R 1.0	6,160	12,320	0.22	5.04	5,376	10,640	0.17	5.04	3,584	4,256	0.15	5.04
-	R 2.0	5,500	11,000	0.20	4.50	4,800	9,500	0.15	4.50	3,200	3,800	0.13	4.50
ø12	R 0.5	5,428	11,800	0.35	5.31	4,838	10,620	0.30	5.31	3,186	4,130	0.24	5.31
-	R 1.0	5,290	11,500	0.34	5.13	4,715	10,350	0.29	5.13	3,105	4,025	0.23	5.13
-	R 2.0	5,152	11,200	0.34	5.04	4,592	10,080	0.28	5.04	3,024	3,920	0.22	5.04
-	R 3.0	4,600	10,000	0.30	4.50	4,100	9,000	0.25	4.50	2,700	3,500	0.20	4.50
ø16	R 1.0	4,012	10,384	0.25	7.10	3,540	9,204	0.22	7.15	2,360	3,776	0.13	7.35
-	R 2.0	3,400	8,800	0.30	7.50	3,000	7,800	0.25	7.50	2,000	3,200	0.20	7.50

절입량  
Depth of Cut





경사절삭  
Inclined Cutting

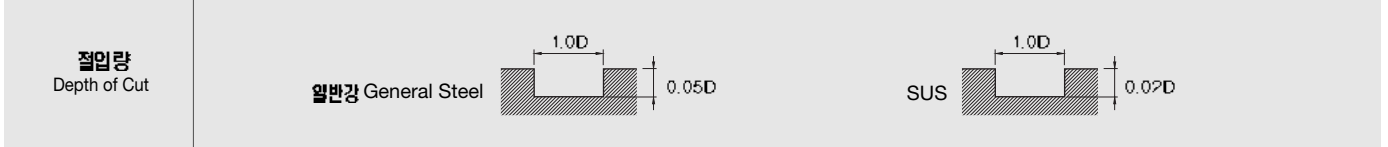
### ■ Coefficients respective of tool overhang

Type	Overhang	Revolution	Feed rate	Depth of Cut ap
Straight	L/D ≤ 5	100%	100%	100%
	L/D = 6	90%	80%	80%
	L/D = 7	80%	70%	70%
Taper neck	L/D = 6	100%	100%	100%
	L/D = 8	90%	80%	80%
	L/D ≤ 10	80%	70%	70%

- 곡면 절삭시 날경의 코너R 보다 낮은 이동 PITCH를 설정 하십시오.
- 상기 조건표는 4날 기준입니다.
- 날수에 따라 회전수는 유지하고, 피드는 안정적인 속도 내에서 최대 50%까지 UP 해주십시오.
- 상기 절삭조건외 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건 변경 요망 합니다.
- 적용 기계의 회전속도가 부족한 경우에는 회전속도와 이송속도를 같은 비율로 줄여 주십시오.
- 유효장 길이가 긴 경우, 위 표와같이 RPM과 FEED를 낮춰주세요.
- 절입 깊이가 얇은 경우, RPM과 FEED를 증가해 주세요
- 원활한 칩배출을 위하여 에어브로우나 오일 미스트를 추천 합니다.
- For curved milling, raise up the feed up to 30% in stable condition.
- The parameters on the table are based on 4 flutes.
- With 6 flutes milling, raise up the feed up to 50% in stable condition.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- If your CNC machine cannot run enough RPM and Feed, reduce the RPM and feed in same proportion.
- In case of long effective length, reduce the RPM and feed by 30% or less.
- If you use small value of Ap, raise up the RPM and feed.
- Air blow or oil mist is recommended for smooth chip emission.

## 홈 절삭 Slotting

외경 Outside Diameter	합금강 Alloy Steel S45C / SCM440 / SS400				프리하든강/경도강 Prehardened Steel / Hardened Steel NAK / SKD / SKT				스테인레스강 Stainless Steel SUS304 / SUS316				스테인레스강 Stainless Steel SUS630 / SUS631			
	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
ø6	5,940	671	0.3	6.0	4,950	405	0.3	6.0	4,050	270	0.12	6.0	3,105	225	0.12	6.0
ø8	4,410	765	0.4	8.0	3,762	495	0.4	8.0	3,042	342	0.16	8.0	2,322	252	0.16	8.0
ø10	3,582	707	0.6	10.0	2,970	495	0.6	10.0	2,430	315	0.20	10.0	1,863	234	0.20	10.0
ø12	2,979	689	0.8	12.0	2,502	414	0.8	12.0	2,025	315	0.24	12.0	1,548	243	0.24	12.0
ø16	2,250	576	0.8	16.0	1,881	342	0.8	16.0	1,521	225	0.32	16.0	1,170	207	0.32	16.0
ø20	1,791	495	1.0	20.0	1,503	315	1.0	20.0	1,215	225	0.40	20.0	927	180	0.40	20.0



## 측면 절삭 Side Cutting

외경 Outside Diameter	합금강 Alloy Steel S45C / SCM440 / SS400				프리하든강/경도강 Prehardened Steel / Hardened Steel NAK / SKD / SKT				스테인레스강 Stainless Steel SUS304 / SUS316				스테인레스강 Stainless Steel SUS630 / SUS631			
	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
ø6	6,600	745	6	0.18	5,500	450	6	0.18	4,500	300	3	0.12	3,450	250	3	0.12
ø8	4,900	850	8	0.25	4,180	550	8	0.25	3,380	380	4	0.16	2,580	280	4	0.16
ø10	3,980	785	10	0.3	3,300	550	10	0.3	2,700	350	5	0.2	2,070	260	5	0.2
ø12	3,310	765	12	0.36	2,780	460	12	0.36	2,250	350	6	0.24	1,720	270	6	0.24
ø16	1,990	640	16	0.48	2,090	380	16	0.48	1,690	250	8	0.32	1,300	230	8	0.32
ø20	2,500	550	20	0.6	1,670	350	20	0.6	1,350	250	10	0.4	1,030	200	10	0.4



- 가능한 공구 길이 측정시 유압식 측정이 아닌 레이저식 도구 세터를 사용 하십시오.
- 가공 진입시 가능한 피삭재 밖에서 진입 하십시오.
- 상기 절삭가공 조건의 참고 수치이므로 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다 .
- 공작기계와 가공물의 강성이 없는 경우 진동이 발생할 시 조건표에 회전속도와 이송속도를 같은 비율로 줄여서 적용 합니다 .
- 피삭재와 가공 모양에 따라 적절한 쿨런트를 사용 하십시오.
- 스테인레스, 내열합금강 등의 절단 가공 시 수용성 절삭유가 가장 효과적 입니다.
- Use laser tool measurement instead of hydraulic measurement when measuring tool length as possible.
- When entering the tool to the workpiece, enter the tool from outside to the workpiece.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- In case of workpiece and machine do not have enough rigidity and make vibration, reduce the RPM and feed in same proportion.
- Depending on the workpiece and shape, use adequate coolant.
- For stainless and heat resistant alloy, water-soluble oil is the most effective.

피삭재 Material		동 Copper				프리하든강/고경도강 Prehardened Steel / Hardened Steel				고경도강 Hardened Steels				고경도강 Hardened Steels			
경도 Hardness		30 ~ 45HRC								45 ~ 55HRC				55 ~ 62HRC			
반경 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	RPM	FEED	Ap Axial Depth	Ae Radial Depth
R0.05	0.3	50,000	85	0.004	0.004	45,000	70	0.004	0.004	45,000	50	0.002	0.002	45,000	40	0.002	0.002
-	0.5	50,000	75	0.004	0.004	45,000	60	0.002	0.002	45,000	30	0.002	0.002	45,000	30	0.002	0.002
R0.1	0.5	50,000	492	0.010	0.010	45,000	396	0.006	0.007	45,000	260	0.006	0.006	45,000	220	0.005	0.006
-	1	50,000	432	0.007	0.008	45,000	372	0.004	0.005	45,000	276	0.004	0.004	45,000	200	0.004	0.004
-	1.5	50,000	360	0.006	0.006	42,000	276	0.003	0.004	42,000	216	0.003	0.004	42,000	180	0.003	0.003
R0.15	1	50,000	744	0.012	0.013	45,000	552	0.010	0.010	38,000	420	0.090	0.010	38,000	348	0.007	0.009
-	3	48,000	528	0.008	0.009	40,800	360	0.006	0.007	33,600	264	0.005	0.005	33,600	216	0.004	0.005
-	5	39,600	336	0.004	0.005	28,800	216	0.003	0.003	24,000	168	0.003	0.003	21,600	120	0.002	0.002
R0.2	1	61,200	1,020	0.021	0.034	54,000	768	0.016	0.022	39,600	516	0.013	0.022	39,600	432	0.011	0.021
-	3	55,200	768	0.015	0.016	44,400	480	0.010	0.010	32,400	312	0.009	0.010	32,400	264	0.008	0.010
-	5	39,600	468	0.008	0.016	30,000	372	0.008	0.010	26,400	288	0.006	0.010	26,400	228	0.004	0.005
R0.25	1	63,600	1,560	0.026	0.047	45,600	960	0.020	0.033	33,600	636	0.014	0.032	33,600	312	0.007	0.020
-	5	52,800	1,032	0.012	0.014	34,800	552	0.008	0.008	31,200	444	0.007	0.010	31,200	216	0.006	0.009
-	10	38,400	528	0.008	0.016	28,800	456	0.007	0.010	28,800	372	0.005	0.010	27,600	216	0.005	0.009
R0.3	1	63,600	1,956	0.030	0.140	39,600	960	0.022	0.091	27,600	600	0.019	0.091	26,400	516	0.014	0.091
-	5	50,400	1,104	0.014	0.068	28,800	504	0.012	0.043	26,400	396	0.008	0.042	26,400	336	0.007	0.040
-	10	31,200	540	0.006	0.032	24,000	360	0.005	0.020	22,800	312	0.004	0.020	22,800	240	0.003	0.018
R0.4	2	61,200	2,280	0.054	0.160	34,800	816	0.045	0.100	27,600	552	0.038	0.100	26,400	456	0.030	0.100
-	6	51,600	1,452	0.035	0.100	28,800	636	0.028	0.068	21,600	420	0.020	0.068	21,600	348	0.015	0.065
-	10	31,000	630	0.022	0.080	23,400	468	0.020	0.050	17,300	408	0.015	0.050	16,800	336	0.010	0.050
R0.5	2	50,400	2,160	0.068	0.320	33,600	900	0.052	0.220	21,600	540	0.040	0.220	18,000	540	0.008	0.140
-	5	50,400	2,160	0.068	0.320	33,600	900	0.052	0.220	21,600	540	0.040	0.220	18,000	540	0.008	0.140
-	10	30,000	1,164	0.024	0.086	16,320	600	0.020	0.056	15,000	456	0.014	0.056	13,680	312	0.008	0.050
-	16	17,640	720	0.018	0.086	13,680	480	0.016	0.056	12,360	384	0.012	0.056	11,520	252	0.005	0.030
R0.75	3	31,200	2,400	0.167	0.320	21,600	1,152	0.120	0.210	12,960	672	0.100	0.210	12,000	600	0.090	0.210
-	10	26,400	1,680	0.100	0.220	14,760	780	0.080	0.170	9,720	480	0.062	0.170	9,720	456	0.050	0.160
-	18	12,120	624	0.030	0.160	12,120	504	0.022	0.110	9,600	432	0.020	0.110	9,600	408	0.012	0.110
-	30	9,840	516	0.014	0.080	9,840	456	0.012	0.050	9,480	420	0.010	0.050	9,480	396	0.010	0.050
R1	4	26,400	2,448	0.220	0.520	21,000	1,392	0.180	0.350	14,640	1,080	0.140	0.350	14,640	900	0.120	0.350
-	10	26,400	2,256	0.180	0.350	21,000	1,224	0.140	0.230	14,640	972	0.110	0.230	14,640	792	0.090	0.230
-	20	15,960	1,164	0.090	0.165	15,960	600	0.060	0.110	12,720	600	0.055	0.110	12,720	492	0.035	0.110
-	30	10,200	636	0.025	0.070	10,200	480	0.020	0.050	10,200	480	0.015	0.050	10,200	384	0.015	0.045
R1.5	6	16,800	3,240	0.250	0.500	14,400	1,824	0.200	0.340	9,840	1,320	0.160	0.320	6,480	732	0.160	0.320
-	10	16,800	3,240	0.250	0.500	14,400	1,824	0.200	0.340	9,840	1,320	0.160	0.320	6,480	732	0.160	0.300
-	20	14,040	2,244	0.200	0.450	12,360	1,476	0.145	0.320	8,520	1,128	0.120	0.310	5,760	660	0.080	0.300
-	30	10,920	1,620	0.120	0.220	9,360	816	0.100	0.150	8,520	816	0.080	0.150	5,760	384	0.070	0.300
R2	8	12,600	3,012	0.350	0.850	10,440	1,752	0.290	0.550	7,200	1,332	0.220	0.500	7,200	1,056	0.150	0.500
-	20	12,600	3,012	0.350	0.850	10,440	1,752	0.290	0.550	7,200	1,332	0.220	0.500	7,200	1,056	0.150	0.500
-	30	11,160	2,040	0.250	0.500	8,880	1,380	0.200	0.320	6,600	1,056	0.150	0.300	6,600	816	0.130	0.300
-	40	8,160	1,464	0.150	0.500	7,200	1,056	0.132	0.320	6,600	1,056	0.100	0.300	6,600	816	0.090	0.300
R2.5	15	10,800	2,880	0.380	0.800	8,400	1,500	0.300	0.700	6,000	1,140	0.220	0.700	6,000	900	0.200	0.650
-	25	10,800	2,400	0.380	0.800	8,400	1,380	0.300	0.550	6,000	1,080	0.220	0.550	6,000	816	0.200	0.500
-	40	9,360	1,320	0.250	0.800	6,720	840	0.200	0.550	4,920	660	0.150	0.550	4,920	504	0.130	0.500
R3	15	8,400	2,676	0.500	1.000	8,160	1,764	0.420	0.800	5,760	1,320	0.300	0.800	4,440	864	0.300	0.800
-	30	8,400	1,812	0.380	0.900	7,200	1,680	0.300	0.650	5,040	1,176	0.220	0.650	4,440	792	0.220	0.600
R4	25	8,160	1,764	0.410	1.000	7,200	1,176	0.350	0.750	4,920	912	0.180	0.600	4,560	732	0.200	0.630
-	30	7,680	1,680	0.380	1.000	6,960	1,128	0.300	0.750	4,800	864	0.160	0.600	4,320	720	0.200	0.600
R5	30	6,240	1,344	0.560	1.200	5,880	1,128	0.370	0.900	4,800	852	0.200	0.670	4,200	708	0.200	0.650
-	35	6,000	1,296	0.500	1.000	5,400	1,080	0.350	0.850	4,560	816	0.150	0.600	3,840	648	0.200	0.600
R6	30	5,160	1,104	0.650	1.400	4,800	984	0.420	0.900	4,320	828	0.250	0.600	3,600	600	0.250	0.600
-	40	4,920	1,080	0.600	1.200	4,560	960	0.400	0.850	4,080	780	0.200	0.600	3,600	600	0.200	0.600

**절입량**  
Depth of Cut

- Ap : Axial Depth
- Ae : Radial Depth
- D : Outside Diameter
- n : Speed
- Vf : Feed

- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰 주세요.
- 상기 절삭조건은 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 적용 기계의 회전속도가 부족한 경우에는 회전속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (Ø1이하 사용시 진동 허용 관리 5 $\mu$ m 이내 일것.)
- 원활한 칩배출을 위하여 에어브로 혹은 미스트 클린트 사용을 추천하며, 동 가공시 습식 클린트를 추천 합니다.
- If the effective length is long, reduce the RPM and feed in the same proportion.
- 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, adjust RPM and feed in the same proportion.
- Use a machine with low vibration and good rigidity ( $\phi$ 1 or less, the vibration tolerance management should be within 5 $\mu$ m).
- Air blow or oil mist is recommended for smooth chip emission, and dry milling is recommended for copper material.

# 2PHCB/2HSB/2HCB Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material		동 Copper				프리하든강/고경도강 Prehardened Steel / Hardened Steel				고경도강 Hardened Steels				고경도강 Hardened Steels			
경도 Hardness		30 ~ 45HRC								45 ~ 55HRC				55 ~ 62HRC			
반경 Radius	날장 Cutting 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	RPM	FEED	Ap Axial Depth	Ae Radial Depth
R0.05	0.2	40,000	300	0.010	0.050	40,000	300	0.005	0.040	30,000	200	0.004	0.040	Cutting is not possible.			
R0.1	0.2	54,000	430	0.012	0.008	54,000	630	0.020	0.060	44,300	450	0.040	0.012	30,000	300	0.023	0.008
-	0.4	54,000	430	0.007	0.008	54,000	430	0.020	0.051	44,300	345	0.016	0.040	32,800	260	0.010	0.023
R0.15	0.3	54,000	720	0.020	0.013	54,000	750	0.030	0.090	44,300	600	0.024	0.072	32,800	450	0.015	0.042
-	0.6	54,000	720	0.012	0.013	54,000	715	0.030	0.075	44,300	575	0.024	0.060	32,800	430	0.015	0.035
R0.2	0.4	54,000	870	0.028	0.016	54,000	1,000	0.040	0.120	44,300	800	0.032	0.096	32,800	600	0.020	0.056
-	0.8	54,000	870	0.016	0.016	54,000	880	0.040	0.105	44,300	700	0.032	0.084	32,800	525	0.020	0.049
R0.25	0.5	56,000	1,250	0.035	0.022	53,000	1,250	0.050	0.150	43,500	1,000	0.040	0.120	32,200	750	0.025	0.070
-	1	56,000	1,380	0.021	0.022	50,000	1,000	0.050	0.125	41,350	800	0.040	0.100	30,600	600	0.025	0.058
R0.3	0.6	58,000	1,510	0.042	0.026	52,000	1,380	0.060	0.180	42,650	1,100	0.048	0.144	31,500	825	0.030	0.084
-	1.2	58,000	1,710	0.025	0.026	48,500	1,020	0.060	0.155	40,500	810	0.048	0.124	30,000	610	0.030	0.072
R0.4	0.8	52,000	1,870	0.056	0.036	48,000	1,500	0.080	0.240	39,500	1,200	0.064	0.192	29,250	900	0.040	0.112
-	2	52,000	1,970	0.033	0.036	45,000	1,085	0.080	0.200	37,500	870	0.064	0.160	27,800	650	0.040	0.093
R0.5	1	41,000	1,660	0.063	0.040	38,540	1,560	0.100	0.300	36,900	1,250	0.080	0.240	27,300	940	0.050	0.140
-	2.5	41,000	1,880	0.022	0.040	38,540	1,000	0.100	0.200	31,500	800	0.080	0.160	23,000	600	0.050	0.090
R0.6	3	34,000	2,120	0.072	0.051	31,960	1,550	0.120	0.360	32,800	1,250	0.096	0.288	24,400	940	0.060	0.168
R0.75	1.5	27,000	2,280	0.087	0.068	25,380	1,600	0.150	0.450	28,700	1,280	0.120	0.360	21,500	960	0.075	0.210
-	4	27,000	1,830	0.052	0.068	25,380	1,000	0.150	0.325	26,000	800	0.120	0.260	19,250	600	0.075	0.152
R1	2	32,700	3,560	0.112	0.089	30,738	1,850	0.200	0.600	24,600	1,480	0.160	0.480	18,250	1,110	0.100	0.280
-	5	32,700	2,980	0.067	0.089	30,738	1,350	0.200	0.435	22,000	1,080	0.160	0.348	16,250	810	0.100	0.203
R1.25	6	30,600	3,680	0.067	0.115	28,764	1,600	0.250	0.542	27,901	1,280	0.200	0.430	15,500	960	0.125	0.251
R1.5	3	26,100	4,400	0.197	0.171	24,534	2,520	0.300	0.957	23,798	2,050	0.240	0.766	15,500	1,530	0.150	0.447
-	8	26,100	4,110	0.100	0.171	24,534	2,350	0.300	0.765	23,798	1,880	0.240	0.612	15,500	1,410	0.150	0.357
R2	4	18,800	4,160	0.266	0.208	17,672	2,450	0.400	1.380	17,142	1,960	0.320	1.100	12,800	1,470	0.200	0.644
-	8	18,800	3,920	0.134	0.208	17,672	2,350	0.400	1.020	17,142	1,880	0.320	0.816	12,800	1,410	0.200	0.476
R2.5	5	17,300	3,980	0.215	0.240	16,262	2,560	0.500	1.660	15,774	2,050	0.400	1.330	11,000	1,530	0.250	0.770
-	10	17,300	3,660	0.180	0.240	16,262	2,300	0.500	1.275	15,774	1,840	0.400	1.020	11,000	1,380	0.250	0.595
R3	6	16,500	3,880	0.290	0.281	15,510	2,700	0.600	2.340	15,045	2,160	0.480	1.870	9,600	1,620	0.300	1.090
-	12	16,500	3,500	0.230	0.281	15,510	2,400	0.600	1.530	15,045	1,920	0.480	1.225	9,600	1,440	0.300	0.715
R4	8	11,660	4,000	0.400	0.175	10,960	2,300	0.800	3.100	10,632	1,840	0.640	2.480	7,600	1,380	0.400	1.446
-	14	11,660	3,850	0.400	0.175	10,960	2,000	0.800	2.050	10,632	1,600	0.640	1.640	7,600	1,200	0.400	0.957
R5	10	9,560	4,100	0.500	0.154	8,986	2,200	1.000	3.750	8,717	1,780	0.800	3.000	6,400	1,340	0.500	1.750
-	18	9,560	3,720	0.500	0.154	8,986	1,700	1.000	2.550	8,717	1,360	0.800	2.040	6,400	1,020	0.500	1.190
R6	12	7,100	4,000	0.600	0.159	6,674	1,850	1.200	4.420	6,474	1,480	0.960	3.540	5,450	1,110	0.600	2.060
-	22	7,100	3,250	0.600	0.159	6,674	1,600	1.200	3.050	6,474	1,280	0.960	2.440	5,450	960	0.600	1.423
R8	30	4,650	2,000	0.115	0.450	4,371	1,630	3.870	1.120	4,240	1,100	2.350	0.790	4,000	810	1.742	0.500
R10	38	3,200	2,200	0.100	0.400	3,008	1,450	4.120	1.100	2,918	1,100	2.530	0.840	3,100	800	1.866	0.520

**절입량**  
Depth of Cut

- Ap : Axial Depth
- Ae : Radial Depth
- D : Outside Diameter
- n : Speed
- Vf : Feed

- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰 주세요.
- 삼기 절삭조건은 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 적용 기계의 회전속도가 부족한 경우에는 회전속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (Ø1이하 사용시 진동 허용 관리 5 $\mu$ m 이내 일것.)
- 원활한 칩배출을 위하여 에어브로 혹은 미스트 클린트 사용을 추천하며, 동 가공시 습식 클린트를 추천 합니다.
- If the effective length is long, reduce the RPM and feed in the same proportion.
- 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, adjust RPM and feed in the same proportion.
- Use a machine with low vibration and good rigidity ( $\phi$ 1 or less, the vibration tolerance management should be within 5 $\mu$ m).
- Air blow or oil mist is recommended for smooth chip emission, and dry milling is recommended for copper material.

# 3HCB / 4HSB / 4HCB

■ 3HCB는 RPM 동일 FEED만 최대 20% Down 적용  
 ■ Use the same RPM, reduce the feed rate up to 20% for 3HCB

피삭재 Material	동 Copper				프린하든강/고경도강 Prehardened Steel / Hardened Steel				고경도강 Hardened Steels				고경도강 Hardened Steels			
경도 Hardness					30 ~ 45HRC				45 ~ 55HRC				55 ~ 62HRC			
반경 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	RPM	FEED	Ap Axial Depth	Ae Radial Depth
R 0.5	41,000	1990	0.063	0.040	38,540	1870	0.100	0.300	36,900	1500	0.080	0.240	27,300	1120	0.050	0.140
R 0.75	27,000	2740	0.087	0.068	25,380	1920	0.150	0.450	28,700	1530	0.120	0.360	21,500	1150	0.075	0.210
R 1	32,700	4200	0.112	0.089	30,738	2220	0.200	0.600	24,600	1770	0.160	0.480	18,250	1330	0.100	0.280
R 1.25	30,600	4400	0.067	0.115	28,764	1920	0.250	0.542	27,901	1540	0.200	0.430	15,500	1150	0.125	0.251
R 1.5	26,100	5280	0.197	0.171	24,534	3020	0.300	0.957	23,798	1820	0.240	0.766	15,500	1840	0.150	0.447
R 2	18,800	4990	0.266	0.208	17,672	2940	0.400	1.380	17,142	1850	0.320	1.100	12,800	1760	0.200	0.644
R 2.5	17,300	4770	0.215	0.240	16,262	3070	0.500	1.660	15,774	1870	0.400	1.330	11,000	1800	0.250	0.770
R 3	16,500	4650	0.290	0.281	15,510	3240	0.600	2.340	15,045	1900	0.480	1.870	9,600	2000	0.300	1.090
R 4	11,660	4800	0.400	0.175	10,960	2760	0.800	3.100	10,632	1820	0.640	2.480	7,600	1650	0.400	1.446
R 5	9,560	4920	0.500	0.154	8,986	2640	1.000	3.750	8,717	1850	0.800	3.000	6,400	1600	0.500	1.750
R 6	7,100	4800	0.600	0.159	6,674	2220	1.200	4.420	6,474	1770	0.960	3.540	5,450	1650	0.600	2.060
R 8	4,650	3900	0.115	0.450	4,371	1950	3.870	1.120	4,240	1760	2.350	0.790	4,000	1670	1.742	0.500
R 10	3,200	3950	0.100	0.400	3,008	1740	4.120	1.100	2,918	1750	2.530	0.840	3,100	1680	1.866	0.520

<b>절입량</b> Depth of Cut	<ul style="list-style-type: none"> <li>• Ap : Axial Depth</li> <li>• Ae : Radial Depth</li> <li>• D : Outside Diameter</li> <li>• n : Speed</li> <li>• Vf : Feed</li> </ul>	
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- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰 주세요.
- 상기 조건표는 4날 기준이며, 3날시 회전수는 유지하고, 피드는 안정적인 속도내로 최대 20%까지 DOWN 해주십시오.(3HCB)
- 상기 절삭조건외 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 적용 기계의 회전속도가 부족한 경우에는 회전속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (Ø1이하 사용시 진동 허용 관리 5µm이내 일것)
- 원활한 칩배출을 위하여 에어브로 혹은 미스트 클린트 사용을 추천하며, 동 가공시 습식 클린트를 추천 합니다.
- If the effective length is long, reduce the RPM and feed in the same proportion.
- The parameters on the table is based on 4flutes. For using 3 flutes (3HCB), use the same RPM and reduce the feed maximum 20% in stable milling condition.
- 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, adjust RPM and feed in the same proportion.
- Use a machine with low vibration and good rigidity (Ø1 or less, the vibration tolerance management should be within 5µm).
- Air blow or oil mist is recommended for smooth chip emission, and dry milling is recommended for copper material.



피삭재 Material		탄소강 Carbon Steels				합금강 Alloy steel				프리하든강/고경도강 Prehardened Steel / Hardened Steel				고경도강 Hardened Steels			
경도 Hardness		S45C / S50C (~225HB)				225 ~ 325HB				35 ~ 45HRC				45 ~ 60HRC			
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	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø0.2	0.5	56,000	340	0.006	0.16	56,000	310	0.005	0.16	56,000	270	0.003	0.16	44,800	180	0.002	0.144
-	1	50,900	290	0.005	0.02	50,900	260	0.005	0.02	50,900	230	0.004	0.02	40,800	160	0.003	0.018
-	1.5	48,200	250	0.003	0.006	48,200	230	0.003	0.006	48,200	200	0.002	0.006	38,500	140	0.002	0.0054
Ø0.3	1	60,000	560	0.009	0.101	60,000	500	0.008	0.101	60,000	400	0.006	0.101	52,100	330	0.004	0.0909
-	1.5	50,800	460	0.008	0.057	50,800	410	0.007	0.057	50,800	360	0.005	0.057	42,700	260	0.004	0.0513
-	2	41,500	350	0.006	0.013	41,500	320	0.005	0.013	41,500	280	0.004	0.013	33,200	190	0.003	0.0117
-	3	31,900	240	0.002	0.004	31,900	220	0.002	0.004	31,900	190	0.001	0.004	25,500	130	0.001	0.0036
-	4	26,200	170	0.001	0.003	26,200	160	0.001	0.003	26,200	140	0.001	0.003	20,900	100	0.001	0.0027
-	5	20,400	100	0.001	0.002	20,400	90	0.001	0.002	20,400	80	0.001	0.002	16,300	60	0.001	0.0018
Ø0.4	1	52,700	660	0.012	0.054	57,700	640	0.010	0.054	48,100	470	0.008	0.054	38,500	320	0.005	0.0486
-	5	38,500	380	0.003	0.003	34,200	300	0.003	0.003	30,100	240	0.002	0.003	24,100	160	0.001	0.0027
-	10	33,700	260	0.001	0.001	27,300	190	0.001	0.001	24,600	150	0.001	0.001	19,700	100	0.001	0.0009
Ø0.5	2	56,800	900	0.020	0.098	54,000	760	0.016	0.098	40,600	510	0.014	0.098	32,500	350	0.010	0.0882
-	3	44,200	660	0.080	0.016	39,900	530	0.090	0.016	32,200	370	0.008	0.016	25,700	260	0.006	0.0144
-	4	40,600	580	0.009	0.012	36,100	460	0.008	0.012	29,700	330	0.008	0.012	23,700	230	0.005	0.0108
-	5	37,000	500	0.080	0.008	32,300	390	0.008	0.008	27,200	290	0.006	0.008	21,700	200	0.004	0.0072
-	6	33,400	420	0.005	0.004	28,500	320	0.005	0.004	24,700	250	0.003	0.004	19,700	170	0.002	0.0036
-	8	29,100	320	0.002	0.002	24,100	240	0.002	0.002	21,600	190	0.001	0.002	17,400	130	0.001	0.0018
-	10	26,100	250	0.001	0.001	21,200	180	0.001	0.001	19,600	150	0.001	0.001	15,600	100	0.001	0.0009
-	14	21,500	120	0.001	0.001	16,700	80	0.001	0.001	16,300	70	0.001	0.001	13,000	50	0.001	0.0009
Ø0.6	2	63,600	1,240	0.025	0.203	53,300	930	0.020	0.203	39,100	600	0.016	0.203	31,300	410	0.011	0.1827
-	3	52,500	990	0.018	0.114	44,000	740	0.016	0.114	33,500	500	0.013	0.114	26,800	340	0.009	0.1026
-	4	41,300	740	0.012	0.025	34,700	550	0.011	0.025	27,900	390	0.009	0.025	22,300	270	0.006	0.0225
-	5	36,700	630	0.010	0.017	30,900	470	0.009	0.017	25,500	340	0.007	0.017	20,400	240	0.005	0.0153
-	6	32,100	520	0.007	0.008	27,000	390	0.006	0.008	23,000	290	0.005	0.008	18,400	200	0.003	0.0072
-	8	26,800	390	0.004	0.003	22,600	300	0.004	0.003	20,000	230	0.003	0.003	16,000	160	0.002	0.0027
-	10	23,400	30	0.002	0.002	19,700	230	0.002	0.002	17,900	180	0.002	0.002	14,300	130	0.001	0.0018
-	12	20,900	240	0.002	0.001	17,600	180	0.001	0.001	16,400	150	0.001	0.001	13,100	100	0.001	0.0009
-	16	16,200	100	0.001	0.001	13,700	80	0.001	0.001	13,500	70	0.001	0.001	10,800	50	0.001	0.0009
Ø0.7	2	59,800	1,380	0.030	0.038	50,200	1,040	0.027	0.038	36,100	660	0.021	0.038	28,800	430	0.015	0.0342
-	4	38,900	840	0.017	0.047	32,700	630	0.015	0.047	25,800	440	0.012	0.047	20,600	290	0.009	0.0423
-	6	30,200	600	0.010	0.014	25,400	450	0.009	0.014	21,200	330	0.007	0.014	16,900	230	0.005	0.0126
-	8	25,300	460	0.006	0.006	21,300	350	0.005	0.006	18,400	260	0.004	0.006	14,700	190	0.003	0.0054
-	10	22,000	360	0.004	0.003	18,500	270	0.003	0.003	16,500	220	0.003	0.003	13,200	160	0.002	0.0027
Ø0.8	2	41,200	1,050	0.033	0.108	34,500	460	0.029	0.108	26,200	530	0.023	0.108	21,000	370	0.016	0.0972
-	4	37,100	930	0.027	0.08	31,100	700	0.024	0.08	24,100	480	0.019	0.08	19,300	330	0.013	0.072
-	6	28,800	680	0.015	0.024	24,200	510	0.013	0.024	19,800	370	0.010	0.024	15,800	250	0.007	0.0216
-	8	24,100	520	0.009	0.01	20,300	390	0.008	0.01	17,200	300	0.006	0.01	13,800	200	0.004	0.009
-	10	21,000	420	0.006	0.005	17,700	320	0.005	0.005	15,500	240	0.004	0.005	12,400	170	0.003	0.0045
-	12	18,700	340	0.004	0.003	15,800	260	0.003	0.003	14,100	200	0.003	0.003	11,300	140	0.002	0.0027
-	14	15,600	230	0.002	0.001	13,200	180	0.002	0.001	12,300	150	0.001	0.001	980	100	0.001	0.0009
Ø0.9	6	27,600	790	0.019	0.019	23,000	590	0.017	0.019	18,500	420	0.013	0.019	14,800	290	0.010	0.0171
-	8	23,000	600	0.012	0.012	19,300	450	0.011	0.012	16,100	330	0.008	0.012	12,900	230	0.006	0.0108
-	10	20,000	470	0.008	0.008	16,800	360	0.007	0.008	14,500	270	0.005	0.008	11,600	190	0.004	0.0072
Ø1.0	2	37,900	1,340	0.048	0.263	31,500	990	0.043	0.263	23,400	6,500	0.034	0.263	18,700	440	0.0237	0.237
-	3	37,900	1,340	0.048	0.263	31,500	990	0.043	0.263	23,400	6,500	0.034	0.263	18,700	440	0.0237	0.237
-	4	34,100	1,170	0.040	0.195	28,400	870	0.036	0.195	21,500	580	0.028	0.195	17,200	400	0.0176	0.176
-	5	30,300	1,000	0.032	0.013	25,300	750	0.029	0.013	19,600	510	0.022	0.013	15,700	360	0.011	0.011
-	6	26,500	850	0.023	0.058	22,100	630	0.021	0.058	17,600	440	0.016	0.058	14,100	310	0.0052	0.052
-	8	22,100	660	0.014	0.024	18,600	490	0.013	0.024	15,300	360	0.010	0.024	12,300	250	0.0022	0.022
-	10	19,200	530	0.010	0.013	16,200	400	0.009	0.013	13,800	300	0.007	0.013	11,000	210	0.0012	0.012
-	12	17,200	440	0.007	0.007	14,500	330	0.006	0.007	12,600	250	0.005	0.007	10,100	170	0.0006	0.006
-	14	15,600	360	0.005	0.005	13,200	270	0.004	0.005	11,700	210	0.003	0.005	9,400	150	0.0005	0.005
-	16	14,300	300	0.004	0.003	12,100	230	0.003	0.003	11,000	180	0.003	0.003	8,800	130	0.0003	0.003
-	20	12,500	200	0.003	0.001	10,600	160	0.003	0.001	9,800	130	0.002	0.001	7,900	90	0.0001	0.001
-	25	10,800	120	0.003	0.001	9,200	90	0.002	0.001	8,800	80	0.002	0.001	7,100	50	0.0001	0.001
-	30	9,700	50	0.002	0.001	8,200	40	0.002	0.001	8,100	30	0.001	0.001	6,500	30	0.0001	0.0009
Ø1.2	4	28,900	1,180	0.050	0.189	24,100	870	0.047	0.189	18,300	580	0.036	0.189	14,500	400	0.0170	0.170
-	6	24,800	970	0.037	0.120	20,700	720	0.034	0.120	16,100	490	0.026	0.120	12,800	340	0.0108	0.108
-	8	20,700	760	0.024	0.051	17,300	570	0.021	0.051	13,900	400	0.016	0.051	11,100	280	0.0046	0.046
-	10	18,000	620	0.016	0.026	15,100	470	0.014	0.026	12,400	340	0.011	0.026	9,900	230	0.0023	0.023
-	12	16,100	520	0.011	0.015	13,500	390	0.010	0.015	11,400	290	0.008	0.015	9,100	200	0.0014	0.014
-	16	13,400	380	0.006	0.006	11,300	290	0.005	0.006	9,800	220	0.004	0.006	7,900	150	0.0005	0.005
-	20	11,700	280	0.004	0.003	9,900	210	0.004	0.003	8,800	170	0.003	0.003	7,000	120	0.0003	0.003
-	25	10,800	120	0.003	0.001	9,200	90	0.002	0.001	8,800	80	0.002	0.001	7,100	50	0.0001	0.001
-	30	9,700	50	0.002	0.001	8,200	40	0.002	0.001	8,100	30	0.001	0.001	6,500	30	0.0001	0.0009

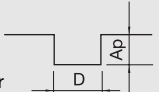
피삭재 Material		탄소강 Carbon Steels				합금강 Alloy steel				프리하트강/고경도강 Prehardened Steel / Hardened Steel				고경도강 Hardened Steels			
경도 Hardness		S45C / S50C (-225HB)				225 ~ 325HB				35 ~ 45HRC				45 ~ 60HRC			
외경 Outside Diameter	유효장 Effective Length	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
ø1.4	6	23,300	1,070	0.052	0.222	19,400	800	0.047	0.222	14,800	540	0.060	0.222	11,900	370	0.200	0.200
-	8	19,500	850	0.035	0.094	16,300	640	0.032	0.094	12,900	440	0.025	0.094	10,300	310	0.085	0.085
-	10	16,900	710	0.025	0.048	14,200	530	0.022	0.048	11,500	380	0.017	0.048	9,200	260	0.043	0.043
-	14	13,700	510	0.013	0.018	11,500	390	0.012	0.018	9,700	290	0.009	0.018	7,800	200	0.016	0.016
-	16	12,600	450	0.010	0.012	10,600	340	0.009	0.012	9,100	250	0.007	0.012	7,300	180	0.011	0.011
-	20	10,300	300	0.006	0.005	8,700	230	0.005	0.005	7,800	180	0.004	0.005	6,200	120	0.005	0.005
ø1.5	4	26,600	1,340	0.073	0.462	22,100	1,000	0.065	0.462	16,300	640	0.051	0.462	13,000	440	0.416	0.416
-	6	22,800	1,120	0.057	0.293	19,000	840	0.051	0.293	14,400	550	0.040	0.293	11,500	380	0.264	0.264
-	8	19,000	900	0.041	0.124	15,900	670	0.037	0.124	12,500	460	0.029	0.124	10,000	320	0.112	0.112
-	10	16,600	750	0.030	0.063	13,800	560	0.027	0.063	11,200	390	0.021	0.063	8,900	270	0.057	0.057
-	12	14,800	630	0.023	0.037	12,400	470	0.020	0.037	10,200	340	0.016	0.037	8,200	240	0.033	0.033
-	14	13,400	550	0.017	0.023	11,200	410	0.016	0.023	9,500	300	0.012	0.023	7,600	210	0.021	0.021
-	16	12,300	480	0.013	0.015	10,300	360	0.012	0.015	8,900	270	0.009	0.015	7,100	190	0.014	0.014
-	18	11,500	420	0.011	0.011	9,600	310	0.010	0.011	8,400	240	0.007	0.011	6,700	170	0.010	0.010
-	20	10,700	370	0.009	0.008	9,000	280	0.008	0.008	7,900	220	0.006	0.008	6,300	150	0.007	0.007
-	25	9,300	270	0.005	0.004	7,800	200	0.005	0.004	7,100	160	0.004	0.004	5,700	110	0.004	0.004
-	30	8,300	200	0.004	0.002	7,000	150	0.004	0.002	6,500	120	0.003	0.002	5,200	90	0.002	0.002
ø1.6	10	16,100	780	0.035	0.082	13,500	580	0.032	0.082	10,800	410	0.025	0.082	8,600	280	0.018	0.074
-	14	13,000	580	0.020	0.030	10,900	430	0.018	0.030	9,100	320	0.014	0.030	7,300	220	0.010	0.027
-	18	11,100	450	0.013	0.014	9,300	340	0.012	0.014	8,000	260	0.009	0.014	6,400	180	0.006	0.013
ø2	4	23,000	1,500	0.070	0.966	20,000	1,200	0.060	0.966	14,000	750	0.052	0.966	12,000	500	0.040	0.869
-	6	20,300	1,350	0.064	0.926	17,400	1,030	0.058	0.926	12,500	650	0.045	0.926	10,000	450	0.032	0.833
-	8	17,000	1,090	0.054	0.391	14,500	830	0.048	0.391	10,800	540	0.038	0.391	8,700	380	0.027	0.352
-	10	14,800	920	0.045	0.200	12,600	700	0.040	0.200	9,700	470	0.031	0.200	7,800	330	0.022	0.180
-	12	13,200	790	0.037	0.116	11,200	600	0.034	0.116	8,900	420	0.026	0.116	7,100	290	0.019	0.104
-	14	12,000	700	0.031	0.073	10,200	530	0.028	0.073	8,200	370	0.022	0.073	6,600	260	0.016	0.066
-	16	11,100	620	0.026	0.049	9,400	470	0.024	0.049	7,700	340	0.018	0.049	6,100	230	0.013	0.044
-	18	10,300	550	0.022	0.034	8,700	420	0.020	0.034	7,200	310	0.015	0.034	5,800	210	0.011	0.031
-	20	9,600	500	0.018	0.025	8,100	380	0.016	0.025	6,900	280	0.013	0.025	5,500	190	0.009	0.023
-	22	8,700	420	0.014	0.018	7,500	320	0.014	0.018	6,500	250	0.010	0.018	5,200	170	0.008	0.016
-	25	8,400	390	0.012	0.013	7,100	290	0.011	0.013	6,200	230	0.008	0.013	4,900	160	0.006	0.012
-	30	7,500	310	0.008	0.007	6,300	230	0.007	0.007	5,600	180	0.005	0.007	4,500	130	0.004	0.006
ø2.5	8	15,000	1,340	0.077	0.954	12,800	1,020	0.069	0.954	9,600	670	0.054	0.954	7,700	460	0.039	0.859
-	10	13,100	1,140	0.068	0.488	11,100	860	0.061	0.488	8,600	590	0.048	0.488	6,900	400	0.034	0.439
-	12	11,800	1,000	0.060	0.283	10,000	750	0.054	0.283	7,900	520	0.042	0.283	6,300	360	0.030	0.255
-	16	9,900	790	0.045	0.119	8,400	590	0.040	0.119	6,800	430	0.031	0.119	5,500	290	0.022	0.107
-	20	8,700	650	0.033	0.061	7,300	490	0.030	0.061	6,100	360	0.023	0.061	4,900	250	0.017	0.055
-	25	7,600	520	0.022	0.031	6,400	390	0.019	0.031	5,500	300	0.015	0.031	4,400	210	0.011	0.028
-	30	6,800	430	0.014	0.018	5,700	320	0.012	0.018	5,000	250	0.010	0.018	4,000	1,700	0.007	0.016
-	35	6,200	380	0.009	0.012	5,200	280	0.008	0.012	4,800	190	0.007	0.012	3,800	1,400	0.005	0.011
-	40	5,700	290	0.005	0.008	4,800	220	0.004	0.008	4,400	170	0.003	0.008	3,500	120	0.002	0.007
-	50	5,000	190	0.001	0.004	4,200	140	0.001	0.004	3,900	120	0.001	0.004	3,100	80	0.001	0.004
ø3	6	13,200	1,470	0.103	1.978	10,900	1,080	0.093	1.978	8,000	700	0.072	1.978	6,400	480	0.052	1.780
-	10	11,600	1,270	0.092	1.013	9,600	930	0.083	1.013	7,200	620	0.064	1.013	5,800	430	0.046	0.912
-	12	10,500	1,110	0.081	0.586	8,700	830	0.073	0.586	6,700	560	0.057	0.586	5,300	380	0.041	0.527
-	16	8,900	900	0.064	0.247	7,400	670	0.058	0.247	5,900	470	0.045	0.247	4,700	320	0.032	0.222
-	20	7,800	750	0.050	0.127	6,600	560	0.045	0.127	5,300	400	0.035	0.127	4,300	280	0.025	0.114
-	25	6,900	620	0.036	0.065	5,800	460	0.032	0.065	4,800	340	0.025	0.065	3,900	230	0.018	0.059
-	30	6,200	520	0.026	0.038	5,200	390	0.023	0.038	4,500	290	0.018	0.038	3,600	200	0.013	0.034
-	35	5,700	440	0.018	0.024	4,800	330	0.016	0.024	4,200	250	0.013	0.024	3,300	170	0.009	0.022
-	40	5,300	370	0.013	0.016	4,500	280	0.012	0.016	3,900	220	0.009	0.016	3,100	150	0.006	0.014
-	45	5,000	330	0.008	0.012	4,200	230	0.008	0.012	3,700	180	0.006	0.012	2,900	130	0.005	0.011
-	50	4,700	270	0.006	0.008	3,900	200	0.005	0.008	3,600	160	0.004	0.008	2,800	110	0.003	0.007
-	60	4,500	250	0.003	0.005	3,600	180	0.003	0.005	3,200	130	0.003	0.005	2,500	90	0.002	0.005
ø4	8	10,000	1,600	0.014	1.990	8,800	1,100	0.140	1.990	6,800	770	0.093	1.990	5,300	500	0.070	1.791
-	10	9,200	1,400	0.120	1.960	8,000	1,000	0.120	1.960	5,900	690	0.085	1.960	4,700	460	0.066	1.764
-	12	8,500	1,280	0.112	1.852	7,100	950	0.101	1.852	5,100	600	0.078	1.852	4,100	410	0.056	1.667
-	16	7,200	1,050	0.093	0.781	6,000	770	0.084	0.781	4,400	510	0.065	0.781	3,600	350	0.046	0.703
-	20	6,300	880	0.077	0.400	5,200	650	0.069	0.400	4,000	440	0.054	0.400	3,200	300	0.038	0.360
-	25	5,600	750	0.061	0.205	4,600	540	0.055	0.205	3,600	380	0.042	0.205	2,900	260	0.030	0.185
-	30	5,000	630	0.048	0.119	4,100	460	0.043	0.119	3,300	330	0.033	0.119	2,600	230	0.024	0.107
-	35	4,600	540	0.038	0.075	3,800	400	0.034	0.075	3,100	290	0.026	0.075	2,500	200	0.019	0.068
-	40	4,200	470	0.030	0.050	3,500	350	0.027	0.050	2,900	250	0.021	0.050	2,300	180	0.015	0.045
-	45	3,900	410	0.023	0.035	3,300	300	0.021	0.035	2,700	230	0.016	0.035	2,200	160	0.012	0.032
-	50	3,700	360	0.018	0.026	3,100	270	0.016	0.026	2,600	200	0.013	0.026	2,100	140	0.009	0.023
-	55	3,500	320	0.015	0.020	2,950	250	0.015	0.020	2,500	180	0.010	0.020	2,000	130	0.007	0.018
-	60	3,300	280	0.011	0.015	2,800	210	0.010	0.015	2,400	160	0.008	0.015	1,900	110	0.006	0.014

피삭재 Material		탄소강 Carbon Steels				합금강 Alloy steel				프리하든강/고경도강 Prehardened Steel / Hardened Steel				고경도강 Hardened Steels			
경도 Hardness		S45C / S50C (~225HB)				225 ~ 325HB				35 ~ 45HRC				45 ~ 60HRC			
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	RPM	FEED	Ap Axial Depth	Ae Radial Depth
ø5	16	6,000	1,140	0.127	1.907	5,100	860	0.114	1.907	3,500	520	0.089	1.907	2,800	360	0.064	1.716
	20	5,300	980	0.121	0.977	4,400	730	0.109	0.977	3,100	440	0.085	0.977	2,500	310	0.061	0.879
	25	4,600	820	0.109	0.500	3,800	600	0.099	0.500	2,800	390	0.077	0.500	2,200	270	0.055	0.450
	30	4,200	710	0.094	0.289	3,400	510	0.085	0.289	2,500	340	0.066	0.289	2,000	230	0.047	0.260
	35	3,800	620	0.077	0.182	3,100	450	0.069	0.182	2,300	300	0.054	0.182	1,900	210	0.038	0.164
	40	3,500	540	0.060	0.122	2,800	390	0.054	0.122	2,200	270	0.042	0.122	1,700	180	0.030	0.110
	50	3,100	430	0.031	0.063	2,400	300	0.028	0.063	1,900	210	0.022	0.063	1,500	150	0.016	0.057
ø6	20	4,200	960	0.126	2.025	3,800	780	0.114	2.025	2,600	470	0.088	2.025	2,100	330	0.063	1.823
	30	3,400	730	0.109	0.600	2,800	540	0.099	0.600	2,000	340	0.077	0.600	1,600	240	0.055	0.540
	40	3,000	600	0.083	0.253	2,300	410	0.074	0.253	1,700	260	0.058	0.253	1,300	170	0.041	0.228
	50	2,600	480	0.054	0.130	1,900	310	0.049	0.130	1,500	220	0.038	0.130	1,200	160	0.027	0.117
	60	2,400	410	0.031	0.075	1,700	260	0.028	0.075	1,300	170	0.022	0.075	1,000	120	0.016	0.068
	ø8	20	3,200	910	0.180	1.600	2,800	710	0.160	1.600	2,300	450	0.130	1.600	1,700	330	0.090
ø10	25	2,900	890	0.200	1.760	2,700	680	0.180	1.760	2,100	430	0.130	1.760	1,500	310	0.080	1.584
ø10	45	2,200	580	0.140	0.240	2,000	400	0.120	0.240	1,300	220	0.700	0.240	900	150	0.050	0.216

**절입량**  
Depth of Cut

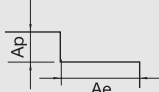
Slotting

- Ap : Axial Depth
- D : Outside Diameter



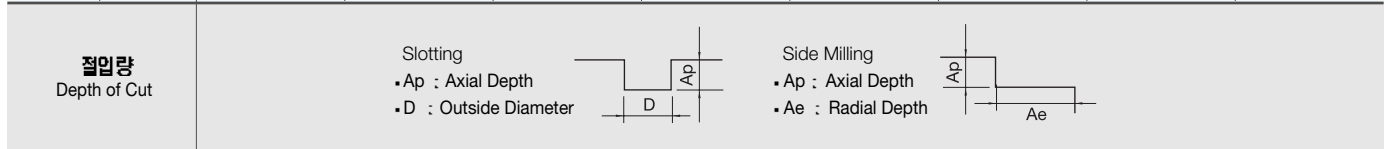
Side Milling

- Ap : Axial Depth
- Ae : Radial Depth



- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- HRC60 이상 고경도강 가공시 60HRC 조건의 같은 직경 대비 상기 절삭조건의 20% DOWN 해주십시오.
- 상기 절삭조건의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피드 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피드 속도와 이송속도를 비례적으로 조정 하십시오.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (ø10이하 사용시 진동 허용 관리 5 $\mu$ m이내 일것.)
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- 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 workpiece, HRC over 60 hardened steel, reduce 20% of the 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.
- Use a machine with low vibration and good rigidity ( $\phi 1$  or less, the vibration tolerance management should be within 5 $\mu$ m).
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

피삭재 Material		탄소강 Carbon Steels				합금강 Alloy steel				프리하트강/고경도강 Prehardened Steel / Hardened Steel				고경도강 Hardened Steels			
경도 Hardness		S45C / S50C (-225HB)				225 ~ 325HB				30 ~ 45HRC				45 ~ 60HRC			
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	RPM	FEED	Ap Axial Depth	Ae Radial Depth
ø0.8	8	25,000	750	0.009	0.01	21,600	560	0.008	0.01	18,300	450	0.006	0.01	15,900	300	0.004	0.009
-	16	16,800	340	0.002	0.001	15,700	270	0.020	0.001	13,300	240	0.001	0.001	10,400	200	0.001	0.001
ø1	8	24,000	720	0.014	0.024	20,300	490	0.013	0.024	16,900	390	0.010	0.024	14,200	265	0.007	0.022
-	16	15,800	325	0.004	0.003	14,300	250	0.003	0.003	12,200	220	0.003	0.003	9,200	178	0.002	0.003
-	25	12,600	165	0.003	0.001	11,200	120	0.002	0.001	10,800	105	0.002	0.001	8,300	88	0.001	0.001
ø1.5	8	21,000	980	0.041	0.124	18,800	740	0.037	0.124	14,600	520	0.029	0.124	12,400	355	0.020	0.112
-	16	13,600	544	0.013	0.015	12,200	410	0.012	0.015	10,500	322	0.009	0.015	8,000	230	0.007	0.014
-	25	11,400	318	0.005	0.004	10,500	240	0.005	0.004	8,600	196	0.004	0.004	6,200	138	0.003	0.004
ø2	8	19,600	1,197	0.054	0.391	17,000	970	0.048	0.391	12,800	630	0.038	0.391	10,600	470	0.027	0.352
-	16	12,300	740	0.026	0.049	11,600	574	0.024	0.049	9,800	378	0.018	0.049	7,300	268	0.013	0.044
-	25	10,100	456	0.012	0.013	9,700	348	0.011	0.013	7,900	262	0.008	0.013	6,400	184	0.006	0.012
ø2.5	10	16,600	1,240	0.068	0.488	14,300	1,035	0.061	0.488	10,200	689	0.048	0.488	8,350	510	0.034	0.439
-	16	11,600	890	0.045	0.119	9,800	710	0.040	0.119	7,220	480	0.031	0.119	6,700	326	0.022	0.107
-	25	8,700	630	0.022	0.031	8,300	460	0.019	0.031	6,360	338	0.015	0.031	5,500	273	0.011	0.028
ø3	8	14,800	1,390	0.092	1.978	12,100	1,100	0.083	1.978	8,800	736	0.064	1.978	6,900	553	0.046	1.780
-	16	10,200	968	0.064	0.247	8,600	816	0.058	0.247	6,300	543	0.045	0.247	5,890	362	0.032	0.222
-	25	7,600	740	0.036	0.038	7,100	518	0.032	0.038	5,880	397	0.025	0.038	3,900	293	0.018	0.034
-	35	6,200	415	0.018	0.024	5,300	374	0.016	0.024	4,730	322	0.013	0.024	3,300	216	0.009	0.022
ø4	8	12,300	1,830	0.14	1.990	10,200	1,210	0.140	1.990	7,400	848	0.093	1.990	6,300	500	0.070	1.791
-	16	8,600	1,240	0.093	0.781	7,200	860	0.084	0.781	5,100	573	0.065	0.781	5,150	397	0.046	0.703
-	25	6,400	890	0.061	0.205	5,000	590	0.055	0.205	4,180	433	0.042	0.205	3,180	304	0.030	0.185
-	40	4,950	510	0.030	0.050	3,900	385	0.027	0.050	3,300	341	0.021	0.050	2,770	208	0.015	0.045
ø5	16	7,200	1,280	0.127	1.907	6,400	944	0.114	1.907	4,387	554	0.089	1.907	4,220	378	0.064	1.716
-	25	5,400	955	0.109	0.500	4,600	665	0.099	0.500	3,668	412	0.077	0.500	2,740	280	0.055	0.450
-	40	4,100	660	0.060	0.122	3,300	470	0.054	0.122	3,655	298	0.042	0.122	2,320	180	0.030	0.110
ø6	20	4,880	1,088	0.126	2.025	4,433	726	0.114	2.025	2,980	528	0.088	2.025	2,640	356	0.063	1.823
-	40	3,800	720	0.083	0.253	2,950	497	0.074	0.253	2,100	326	0.058	0.253	2,078	226	0.041	0.228
ø8	20	4,460	980	0.180	1.600	3,600	787	0.160	1.600	2,540	487	0.130	1.600	2,430	343	0.090	1.440
-	40	3,400	780	0.120	0.200	2,460	516	0.100	0.200	1,890	297	0.080	0.200	1,770	211	0.060	0.180
ø10	25	3,400	926	0.200	1.760	3,160	726	0.180	1.760	2,360	467	0.130	1.760	1,650	326	0.080	1.584
-	35	2,170	640	0.140	0.240	2,120	615	0.120	0.240	1,780	412	0.090	0.240	1,180	192	0.070	0.216
ø12	30	2,500	710	0.220	1.840	2,300	580	0.200	1.840	2,000	400	0.140	1.840	1,400	280	0.080	1.656
-	40	1,880	526	0.120	0.280	1,820	474	0.110	0.280	1,690	345	0.080	0.280	1,020	184	0.060	0.252



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- HRC60 이상 고경도강 가공시 60HRC 조건의 같은 직경 대비 상기 절삭조건의 20% DOWN 해주십시오.
- 상기 절삭조건의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피들 속도와 이송속도를 비례적으로 조정 하십시오.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (ø1이하 사용시 진동 허용 관리 5µm이내 일것.)
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- 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 workpiece, HRC over 60 hardened steel , reduce 20% of the 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.
- Use a machine with low vibration and good rigidity (ø1 or less, the vibration tolerance management should be within 5µm).
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

## 홈 절삭 Slotting

피삭재 Material	합금강 Alloy Steel		프리카하든강/고경도강 Prehardened Steel / Hardened Steel		고경도강 Hardened Steels		고경도강 Hardened Steels	
	경도 Hardness		경도 Hardness		경도 Hardness		경도 Hardness	
외경 Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
Ø 0.1	50,000	100	45,000	100	40,000	90	33,000	50
Ø 0.2	50,000	130	45,000	115	40,000	95	33,000	60
Ø 0.3	50,000	190	45,000	140	40,000	115	33,000	70
Ø 0.4	50,000	235	45,000	180	40,000	140	33,000	90
Ø 0.5	50,000	370	45,000	280	40,000	220	33,000	140
Ø 0.6	50,000	470	45,000	360	40,000	285	30,000	160
Ø 0.8	50,000	600	40,000	440	30,000	295	25,000	185
Ø 0.9	49,000	655	39,000	520	27,800	330	22,700	205
Ø 1	48,000	750	38,000	570	25,500	360	20,500	215
Ø 2	33,300	850	26,000	680	17,500	420	14,500	260
Ø 3	21,800	850	17,300	680	11,500	420	9,500	260
Ø 4	16,700	880	13,200	700	8,800	440	7,200	270
Ø 5	15,700	1,000	12,500	805	8,300	500	6,400	285
Ø 6	13,100	950	10,350	770	6,900	480	5,300	280
Ø 8	9,880	930	7,800	720	5,200	445	4,000	255
Ø 10	7,800	850	6,150	680	4,100	415	3,200	240
Ø 12	6,650	850	5,250	680	3,500	415	2,650	240
Ø 16	5,540	780	4,340	610	2,600	360	1,840	180
Ø 18	5,540	780	4,340	610	2,600	360	1,840	180
Ø 20	4,640	720	4,340	570	2,100	300	1,460	180

절입량  
Depth of Cut

~ 55HRC

절입량  
Depth of Cut

55HRC ~

## 측면 절삭 Side Cutting

피삭재 Material	합금강 Alloy Steel		프리카하든강/고경도강 Prehardened Steel / Hardened Steel		고경도강 Hardened Steels		고경도강 Hardened Steels	
	경도 Hardness		경도 Hardness		경도 Hardness		경도 Hardness	
외경 Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
Ø 1	48,000	1,050	38,000	820	25,500	510	20,500	310
Ø 2	33,300	1,200	26,000	970	17,500	600	14,500	370
Ø 3	21,800	1,200	17,300	970	11,500	600	9,500	370
Ø 4	16,700	1,250	13,200	1,000	8,800	625	7,200	385
Ø 5	15,700	1,450	12,500	1,150	8,300	710	6,400	410
Ø 6	13,100	1,350	10,350	1,100	6,900	690	5,300	400
Ø 8	9,880	1,320	7,800	1,030	5,200	635	4,000	365
Ø 10	7,800	1,200	6,150	970	4,100	590	3,200	340
Ø 12	6,650	1,200	5,250	970	3,500	590	2,650	340
Ø 16	5,540	1,000	4,340	880	2,600	530	1,840	300
Ø 18	5,540	1,000	4,200	880	2,450	530	1,650	300
Ø 20	4,640	950	3,650	800	2,100	500	1,460	295

절입량  
Depth of Cut

~ 55HRC

절입량  
Depth of Cut

55HRC ~

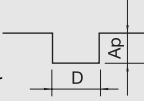
- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정하십시오.
- HRC60 이상 고경도강 가공시 60HRC 조건의 같은 직경 대비 상기 절삭조건의 20% DOWN 해주십시오.
- 상기 절삭조건의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
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- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (Ø1이하 사용시 진동 허용 관리 5µm 이내 일것.)
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
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- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

## 홈 절삭 Slotting

피삭재 Material	합금강/공구강 Alloy Steel/ Tool Steel				프리하든강/고경도강 Prehardened Steel / Hardened Steel				고경도강 Hardened Steels				고경도강 Hardened Steels			
	30 ~ 40HRC				40 ~ 50HRC				50 ~ 55HRC				55 ~ 60HRC			
경도 Hardness	30 ~ 40HRC		40 ~ 50HRC		40 ~ 50HRC		40 ~ 50HRC		50 ~ 55HRC		50 ~ 55HRC		55 ~ 60HRC		55 ~ 60HRC	
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	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø0.3	50,000	190	0.03	0.3	45,000	140	0.03	0.3	40,000	115	0.02	0.150	33,000	70	0.01	0.075
Ø0.4	50,000	235	0.04	0.4	45,000	180	0.04	0.4	40,000	140	0.02	0.200	33,000	90	0.01	0.100
Ø0.5	50,000	370	0.05	0.5	45,000	280	0.05	0.5	40,000	220	0.03	0.250	33,000	140	0.01	0.125
Ø0.6	50,000	470	0.06	0.6	45,000	360	0.06	0.6	40,000	285	0.03	0.300	30,000	160	0.02	0.150
Ø0.8	50,000	600	0.08	0.8	40,000	440	0.08	0.8	30,000	295	0.04	0.400	25,000	185	0.02	0.200
Ø0.9	49,000	655	0.09	0.9	39,000	520	0.09	0.9	27,800	330	0.05	0.450	22,700	205	0.02	0.225
Ø1	48,000	1,050	0.1	1.0	38,000	684	0.1	1.0	25,500	430	0.05	0.500	20,500	260	0.03	0.250
Ø2	33,300	1,190	0.2	2.0	26,000	816	0.2	2.0	17,500	500	0.10	1.000	14,500	310	0.05	0.500
Ø3	21,800	1,190	0.3	3.0	17,300	816	0.3	3.0	11,500	500	0.15	1.500	9,500	310	0.08	0.750
Ø4	16,700	1,232	0.4	4.0	13,200	840	0.4	4.0	8,800	530	0.20	2.000	7,200	325	0.10	1.000
Ø5	15,700	1,400	0.5	5.0	12,500	966	0.5	5.0	8,300	600	0.25	2.500	6,400	340	0.13	1.250
Ø6	13,100	1,330	0.6	6.0	10,350	924	0.6	6.0	6,900	575	0.30	3.000	5,300	335	0.15	1.500
Ø8	9,880	1,300	0.8	8.0	7,800	864	0.8	8.0	5,200	535	0.40	4.000	4,000	300	0.20	2.000
Ø10	7,800	1,190	1.0	10.0	6,150	816	1.0	10.0	4,100	500	0.50	5.000	3,200	290	0.25	2.500
Ø12	6,650	1,190	1.2	12.0	5,250	816	1.2	12.0	3,500	500	0.60	6.000	2,650	290	0.30	3.000
Ø16	5,540	1,090	1.6	16.0	4,340	732	1.6	16.0	2,600	430	0.80	8.000	1,840	215	0.40	4.000
Ø18	5,540	1,090	1.8	18.0	4,340	730	1.8	18.0	2,600	430	0.90	9.000	1,840	215	0.45	4.500
Ø20	4,640	1,008	2.0	20.0	4,340	730	2.0	20.0	2,600	430	1.00	10.000	1,840	215	0.50	5.000

**절입량**  
Depth of Cut

Slotting  
 • Ap : Axial Depth  
 • D : Outside Diameter



## 측면 절삭 Side Cutting

피삭재 Material	합금강/공구강 Alloy Steel/ Tool Steel				프리하든강/고경도강 Prehardened Steel / Hardened Steel				고경도강 Hardened Steels				고경도강 Hardened Steels			
	30 ~ 40HRC				40 ~ 50HRC				50 ~ 55HRC				55 ~ 60HRC			
경도 Hardness	30 ~ 40HRC		40 ~ 50HRC		40 ~ 50HRC		40 ~ 50HRC		50 ~ 55HRC		50 ~ 55HRC		55 ~ 60HRC		55 ~ 60HRC	
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	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø0.3	50,000	228	0.3	0.009	45,000	168	0.3	0.009	40,000	138	0.15	0.006	33,000	84	0.08	0.003
Ø0.4	50,000	282	0.4	0.012	45,000	216	0.4	0.012	40,000	168	0.20	0.008	33,000	108	0.10	0.004
Ø0.5	50,000	444	0.5	0.015	45,000	336	0.5	0.015	40,000	264	0.25	0.010	33,000	168	0.13	0.005
Ø0.6	50,000	564	0.6	0.018	45,000	432	0.6	0.018	40,000	342	0.30	0.012	30,000	192	0.15	0.006
Ø0.8	50,000	720	0.8	0.024	40,000	528	0.8	0.024	30,000	354	0.40	0.016	25,000	222	0.20	0.008
Ø0.9	49,000	786	0.9	0.027	39,000	624	0.9	0.027	27,800	396	0.45	0.018	22,700	246	0.23	0.009
Ø1	48,000	1,260	1.0	0.030	38,000	821	1.0	0.030	25,500	516	0.50	0.020	20,500	312	0.25	0.010
Ø2	33,300	1,428	2.0	0.060	26,000	979	2.0	0.060	17,500	600	1.00	0.040	14,500	372	0.50	0.020
Ø3	21,800	1,428	3.0	0.090	17,300	979	3.0	0.090	11,500	600	1.50	0.060	9,500	372	0.75	0.030
Ø4	16,700	1,478	4.0	0.120	13,200	1,008	4.0	0.120	8,800	636	2.00	0.080	7,200	390	1.00	0.040
Ø5	15,700	1,680	5.0	0.150	12,500	1,159	5.0	0.150	8,300	720	2.50	0.100	6,400	408	1.25	0.050
Ø6	13,100	1,596	6.0	0.180	10,350	1,109	6.0	0.180	6,900	690	3.00	0.120	5,300	402	1.50	0.060
Ø8	9,880	1,560	8.0	0.240	7,800	1,037	8.0	0.240	5,200	642	4.00	0.160	4,000	360	2.00	0.080
Ø10	7,800	1,428	10.0	0.300	6,150	979	10.0	0.300	4,100	600	5.00	0.200	3,200	348	2.50	0.100
Ø12	6,650	1,428	12.0	0.360	5,250	979	12.0	0.360	3,500	600	6.00	0.240	2,650	348	3.00	0.120
Ø16	5,540	1,308	16.0	0.480	4,340	878	16.0	0.480	2,600	516	8.00	0.320	1,840	258	4.00	0.160
Ø18	5,540	1,308	18.0	0.540	4,340	876	18.0	0.540	2,600	516	9.00	0.360	1,840	258	4.50	0.180
Ø20	4,640	1,210	20.0	0.600	4,340	876	20.0	0.600	2,600	516	10.00	0.400	1,840	258	5.00	0.200

**절입량**  
Depth of Cut

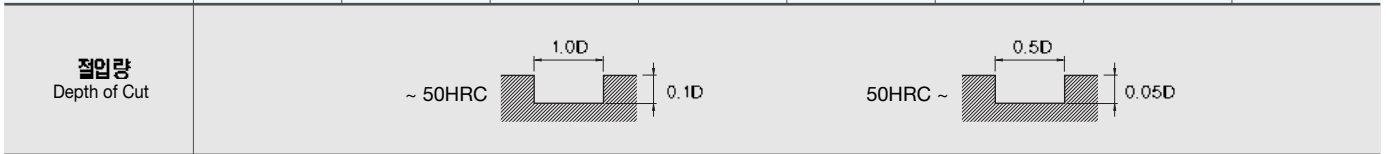
Side Milling  
 • Ap : Axial Depth  
 • Ae : Radial Depth



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- 상기 절삭조건에 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
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- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (Ø1이하 사용시 진동 허용 관리 5µm이내 일것.)
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- 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 workpiece, HRC over 60 hardened steel , reduce 20% of the 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.
- Use a machine with low vibration and good rigidity (Ø1 or less, the vibration tolerance management should be within 5µm).
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

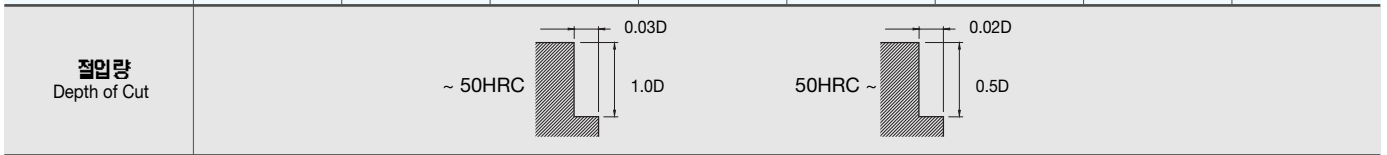
## 홈 절삭 Slotting

파삭재 Material	합금강/공구강 Alloy Steel/ Tool Steel		프리하든강/고경도강 Prehardened Steel / Hardened Steel		고경도강 Hardened Steels		고경도강 Hardened Steels	
경도 Hardness	30 ~ 40HRC		40 ~ 50HRC		50 ~ 55HRC		55 ~ 62HRC	
외경 Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
Ø 1	13,000	60	9,000	35	5,700	15	6,500	20
Ø 1.5	10,000	60	6,000	45	4,500	15	4,500	35
Ø 2	6,400	60	4,800	45	3,000	15	3,500	30
Ø 3	4,200	60	3,400	55	2,100	20	2,600	40
Ø 4	3,400	60	2,700	30	1,700	20	1,600	20
Ø 5	2,900	60	2,300	40	1,500	20	1,350	25
Ø 6	2,500	60	2,000	50	1,300	25	1,100	30
Ø 8	1,900	60	1,500	50	1,000	25	900	35
Ø 10	1,600	60	1,300	50	800	25	710	30
Ø 12	1,300	60	1,100	45	670	20	600	25
Ø 16	1,000	40	820	30	500	15	450	20
Ø 20	800	30	650	25	400	13	360	15
Ø 25	650	25	520	20	320	10	280	12



## 측면 절삭 Side Cutting

파삭재 Material	합금강/공구강 Alloy Steel/ Tool Steel		프리하든강/고경도강 Prehardened Steel / Hardened Steel		고경도강 Hardened Steels		고경도강 Hardened Steels	
경도 Hardness	30 ~ 40HRC		40 ~ 50HRC		50 ~ 55HRC		55 ~ 62HRC	
외경 Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
Ø 1	13,000	60	9,000	35	6,500	20	6,500	20
Ø 1.5	10,000	60	6,000	45	5,000	35	4,500	25
Ø 2	6,400	60	4,800	45	3,500	30	3,500	25
Ø 3	4,200	65	3,400	55	2,600	40	2,600	30
Ø 4	3,400	80	2,700	65	2,100	50	1,600	35
Ø 5	2,900	100	2,300	80	1,800	60	1,350	40
Ø 6	2,500	120	2,000	100	1,500	75	1,100	50
Ø 8	1,900	130	1,500	100	1,200	85	900	50
Ø 10	1,600	130	1,300	100	950	75	710	50
Ø 12	1,300	120	1,100	90	800	60	600	40
Ø 16	1,000	80	820	65	600	45	450	30
Ø 20	800	65	650	50	480	40	360	25
Ø 25	650	50	520	40	380	30	280	20



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- 상기 조건표는 2날 기준이며, 4날시 회전수는 유지하고, 피드는 안정적인 속도내에서 최대 50%까지 UP 해주십시오.
- HRC55 이상 고경도강 가공시 55HRC 조건의 같은 직경 대비 상기 절삭조건외 20% DOWN 해주십시오.
- 상기 절삭조건외의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피들 속도와 이송속도를 비례적으로 조정 하십시오.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (Ø1이하 사용시 진동 허용 관리 5µm 이내 일것.)
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- 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.
- 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 50% in stable milling condition.
- When milling workpiece, HRC over 60 hardened steel , reduce 20% of the RPM and feed compared to the same diameter.
- When milling workpiece, HRC over 60 hardened steel, reduce 20% of the 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.
- Use a machine with low vibration and good rigidity (Ø1 or less, the vibration tolerance management should be within 5µm).
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

**측면 절삭 Side Cutting**

피삭재 Material	합금강 Alloy Steel				고경도강 Hardened Steels				고경도강 Hardened Steels				고경도강 Hardened Steels						
	경도 Hardness				30 ~ 40HRC				40 ~ 50HRC				50 ~ 55HRC				55 ~ 60HRC		
외경 Outside Diameter	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae			
			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			
ø1	40,000	1,200	1.5	0.05	45,000	1,100	1.5	0.05	40,000	770	0.5	0.03	38,000	308	0.5	0.06			
ø1.5	40,000	1,500	2.25	0.075	40,000	1,250	2.25	0.075	38,500	875	0.75	0.045	35,600	350	0.75	0.24			
ø2	40,000	2,000	3	0.1	38,000	1,800	3	0.1	36,500	1,260	1	0.06	31,000	504	1	0.045			
ø3	38,400	4,560	4.5	0.15	34,560	4,104	4.5	0.15	27,648	2,873	1.5	0.09	22,118	1,149	1.5	0.3			
ø4	28,800	5,280	6	0.2	25,920	4,752	6	0.2	20,736	3,326	2	0.12	16,589	1,331	2	0.03			
ø5	24,000	6,000	7.5	0.25	21,600	5,400	7.5	0.25	17,280	3,780	2.5	0.15	13,824	1,512	2.5	0.09			
ø6	19,200	6,960	9	0.3	17,280	6,264	9	0.3	13,824	4,385	3	0.18	11,059	1,754	3	0.12			
ø8	14,400	6,960	12	0.4	12,960	6,264	12	0.4	10,368	4,385	4	0.24	8,294	1,754	4	0.75			
ø10	11,520	6,960	15	0.5	10,368	6,264	15	0.5	8,294	4,385	5	0.3	6,636	1,754	5	0.6			
ø12	9,600	5,760	18	0.6	8,640	5,184	18	0.6	6,912	3,629	6	0.36	5,530	1,452	6	0.48			
ø16	7,200	4,320	24	0.8	6,480	3,888	24	0.8	5,184	2,722	8	0.48	4,147	1,089	8	0.36			
ø20	5,760	3,480	30	1	5,184	3,132	30	1	4,147	2,192	10	0.6	3,318	877	10	0.15			
ø25	5,150	3,120	37.5	1.25	4,635	2,808	37.5	1.25	3,708	2,246	12.5	0.75	2,966	899	12.5	0.18			

절입량  
Depth of Cut

~ 50HRC

50HRC ~

- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- 상기 조건표는 4날 기준이며, 6&8날시 회전수는 유지하고 피드는 안정적인 속도 내에서 최대 50%까지 UP 해주십시오.
- HRC62 이상 고경도강 가공시 62HRC 조건의 같은 직경 대비 상기 절삭조건의 20% DOWN 해주십시오.
- 유효장이 길게 체결할시 회전수와 피드를 같은 비율로 DOWN 해주십시오.
- 상기 절삭조건의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피들 속도와 이송속도를 비례적으로 조정 하십시오.
- 에어브로, 절삭유, 오일 미스트 콜러트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- 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.
- The parameters on the table is based on 4flutes. For using 6 or 8flutes, use the same RPM and raise up the feed up to 50% in stable milling condition.
- When milling workpiece, HRC over 60 hardened steel , reduce 20% of the 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.



피삭재 Material		동 Copper				프리하든강/고경도강 Prehardened Steel / Hardened Steel				고경도강 Hardened Steels				고경도강 Hardened Steels			
경도 Hardness		30 ~ 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	RPM	FEED	Ap Axial Depth	Ae Radial Depth
∅0.2	1	50,000	352	0.264	0.020	50,000	196	0.006	0.020	34,500	150	0.004	0.020	14,950	24	0.001	0.015
-	1.5	50,000	311	0.017	0.010	50,000	173	0.005	0.010	26,450	104	0.003	0.010	11,730	20	0.001	0.007
∅0.3	1	50,000	890	0.029	0.020	50,000	495	0.007	0.020	34,500	345	0.005	0.015	21,505	34	0.004	0.015
-	3	50,000	393	0.029	0.015	50,000	219	0.006	0.015	24,150	81	0.003	0.010	14,605	20	0.002	0.010
∅0.4	1	47,150	890	0.047	0.062	50,000	495	0.013	0.070	39,675	368	0.011	0.070	23,575	39	0.004	0.070
-	3	33,350	683	0.026	0.053	26,450	380	0.008	0.026	26,450	276	0.007	0.026	15,755	29	0.003	0.026
∅0.5	1	48,300	2,008	0.079	0.114	48,300	1,116	0.033	0.119	39,100	840	0.029	0.119	24,150	92	0.013	0.119
-	3	31,050	1,118	0.056	0.088	31,050	621	0.022	0.110	25,415	460	0.020	0.110	15,755	51	0.008	0.110
-	5	25,760	827	0.026	0.044	25,760	459	0.011	0.010	20,700	345	0.010	0.010	12,995	38	0.004	0.010
∅0.6	2	27,945	890	0.111	0.158	27,945	495	0.010	0.214	23,000	380	0.010	0.214	14,835	42	0.004	0.214
-	6	16,445	435	0.035	0.044	16,445	242	0.003	0.010	13,570	184	0.003	0.010	8,740	21	0.001	0.010
∅0.8	4	17,250	787	0.129	0.194	17,020	437	0.014	0.114	14,720	345	0.015	0.114	9,890	40	0.007	0.114
-	8	12,650	475	0.029	0.098	12,650	264	0.005	0.088	10,695	184	0.004	0.088	7,475	20	0.002	0.088
∅1	4	13,800	1,449	0.196	0.396	13,800	805	0.029	0.264	11,730	655	0.034	0.264	8,280	78	0.017	0.264
-	10	8,625	559	0.047	0.308	8,625	311	0.011	0.123	7,475	264	0.013	0.123	5,290	31	0.006	0.123
-	16	6,900	331	0.018	0.220	6,900	184	0.004	0.026	5,980	161	0.005	0.026	4,255	19	0.002	0.026
∅1.2	6	9,200	1,035	0.182	0.457	9,200	575	0.018	0.088	8,165	483	0.015	0.088	6,095	59	0.011	0.088
-	12	6,670	662	0.053	0.396	6,670	368	0.007	0.070	5,980	299	0.008	0.070	4,370	37	0.004	0.070
∅1.5	4	12,880	1,925	0.293	0.660	12,880	1,070	0.044	0.440	11,730	920	0.059	0.440	8,970	121	0.032	0.440
-	10	8,280	1,325	0.147	0.554	8,280	736	0.031	0.282	7,590	633	0.041	0.282	5,865	83	0.022	0.282
-	20	5,865	725	0.041	0.352	6,350	403	0.005	0.106	4,160	345	0.006	0.106	3,870	45	0.003	0.106
∅2	6	12,535	1,801	0.314	0.836	12,535	1,001	0.042	0.792	11,730	909	0.059	0.792	9,430	130	0.035	0.792
-	12	9,200	1,449	0.182	0.704	9,200	805	0.030	0.440	8,280	725	0.043	0.440	6,785	105	0.025	0.440
-	20	6,900	1,139	0.091	0.651	6,200	633	0.017	0.194	3,520	564	0.023	0.194	3,226	82	0.014	0.194
-	30	5,865	973	0.049	0.440	3,300	541	0.005	0.132	2,860	495	0.005	0.132	2,386	68	0.002	0.132
∅2.5	10	10,350	1,801	0.331	0.836	10,350	1,001	0.051	0.528	9,775	943	0.073	0.528	8,165	151	0.047	0.528
-	30	6,210	787	0.067	0.616	6,210	437	0.011	0.176	5,865	414	0.016	0.176	4,830	65	0.010	0.176
∅3	12	10,350	2,029	0.381	0.831	10,350	1,127	0.103	0.616	9,775	874	0.103	0.655	8,740	196	0.073	0.655
-	20	8,165	1,553	0.254	0.762	6,050	863	0.071	0.567	3,420	667	0.071	0.567	3,108	147	0.043	0.567
-	30	6,900	1,263	0.137	0.674	3,300	702	0.049	0.371	2,890	541	0.049	0.371	2,440	115	0.028	0.352
∅4	12	8,740	1,904	0.401	1.525	8,740	1,058	0.081	1.124	7,360	920	0.117	1.124	6,210	210	0.083	1.124
-	20	6,785	1,458	0.375	1.325	5,880	810	0.053	0.880	5,750	840	0.078	0.880	4,830	194	0.057	0.880
-	30	5,750	752	0.196	1.210	2,950	418	0.028	0.671	2,540	656	0.041	0.671	2,160	149	0.030	0.708
-	45	4,715	500	0.096	1.118	2,300	278	0.007	0.326	2,015	322	0.010	0.326	1,800	75	0.007	0.326
∅5	15	7,705	3,064	0.697	2.277	7,705	1,702	0.106	1.346	5,520	1,139	0.150	1.346	4,600	342	0.110	1.346
-	30	5,290	1,470	0.342	1.760	2,780	817	0.053	1.035	3,795	541	0.075	1.035	3,220	164	0.055	1.035
∅6	20	5,980	2,194	0.600	2.194	5,460	1,219	0.476	1.356	3,565	1,035	0.186	1.356	3,105	393	0.145	1.356
-	40	4,600	1,635	0.565	2.049	2,380	909	0.410	1.304	2,160	759	0.164	1.304	2,040	304	0.123	1.304
∅8	22	5,520	1,946	0.528	2.542	5,520	1,081	0.419	1.518	3,220	909	0.164	1.518	2,760	346	0.128	1.518
-	40	4,140	1,449	0.497	2.277	2,120	805	0.361	1.323	2,080	667	0.144	1.323	1,955	268	0.108	1.323
∅10	24	4,600	1,656	0.449	2.887	4,485	920	0.356	1.645	2,760	771	0.139	1.645	2,300	294	0.108	1.645
-	45	3,450	1,221	0.423	2.438	3,450	679	0.307	1.334	1,955	564	0.122	1.334	1,725	228	0.092	1.334
∅12	26	3,795	1,387	0.377	3.013	3,795	771	0.299	2.024	2,300	644	0.117	2.024	1,955	247	0.091	2.024
-	50	2,875	1,035	0.355	2.415	2,875	575	0.258	1.403	1,725	483	0.103	1.403	1,380	191	0.077	1.403
∅16	35	2,990	1,097	0.302	2.921	2,990	610	0.239	2.162	1,725	518	0.094	2.162	1,610	198	0.073	2.162

<b>절입량</b> Depth of Cut	Slotting • Ap : Axial Depth • D : Outside Diameter		Side Milling • Ap : Axial Depth • Ae : Radial Depth		경사진면 절삭 Inclined Cutting 
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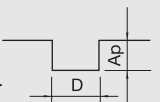
- HRC62 이상인 경우 같은 직경의 같은 비율로 20% DOWN 시켜주십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30% 이하로 줄어하십시오.
- Ae값 설정시 코너R 치수를 고려 해주십시오.
- 곡면 절삭시 날경의 코너R 보다 낮은 이동 PITCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도내 에서 피드를 최대 30%까지 UP 해주십시오.
- When milling workpiece HRC over 62, reduce 20% of the RPM and feed with the same diameter.
- If the effective length is long, reduce the RPM and feed maximum 30%.
- Consider the corner radius value when you set up the Ae value.
- 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.

피삭재 Material		프리하든강/고경도강 Prehardened Steel / Hardened Steel				고경도강 Hardened Steels			
경도 Hardness		30 ~ 45HRC				45 ~ 55HRC			
외경 Outside Diameter	유효장 Effective Length	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
ø1	4	13,455	1,265	0.038	0.264	11,730	1,046	0.030	0.238
-	10	8,625	495	0.011	0.123	7,475	495	0.009	0.098
ø1.2	4	12,880	1,380	0.031	0.440	11,730	1,070	0.023	0.293
-	10	8,855	782	0.017	0.176	7,130	587	0.009	0.147
ø1.5	6	11,385	1,265	0.040	0.475	10,350	1,150	0.037	0.435
-	12	9,280	817	0.028	0.317	6,790	759	0.025	0.290
ø2	6	12,650	1,265	0.063	0.633	11,730	1,173	0.059	0.713
-	12	9,970	1,012	0.045	0.396	8,280	943	0.043	0.396
ø2.5	10	10,580	1,380	0.065	0.528	9,775	1,150	0.065	0.528
-	20	8,160	1,150	0.047	0.264	7,845	655	0.030	0.220
ø3	10	11,040	2,070	0.094	0.684	10,235	2,070	0.059	0.684
-	20	7,340	1,495	0.057	0.567	6,230	1,495	0.035	0.567
ø4	13	9,085	1,576	0.105	1.150	7,590	1,530	0.082	1.150
-	20	7,130	1,380	0.069	0.920	5,980	1,288	0.054	0.920
-	30	6,325	1,104	0.043	0.745	5,290	1,058	0.033	0.745
ø6	20	5,635	1,691	0.176	2.305	3,335	978	0.176	1.281
-	40	2,875	782	0.098	1.320	1,610	460	0.098	0.733
ø8	22	4,600	1,840	0.212	2.921	2,760	782	0.212	1.518
ø10	24	3,680	2,013	0.242	3.140	2,185	621	0.253	1.645
ø12	26	2,875	2,070	0.265	3.105	1,725	495	0.276	1.714

**절입량**  
Depth of Cut

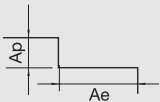
Slotting

- Ap : Axial Depth
- D : Outside Diameter

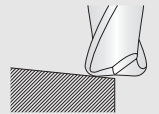


Side Milling

- Ap : Axial Depth
- Ae : Radial Depth



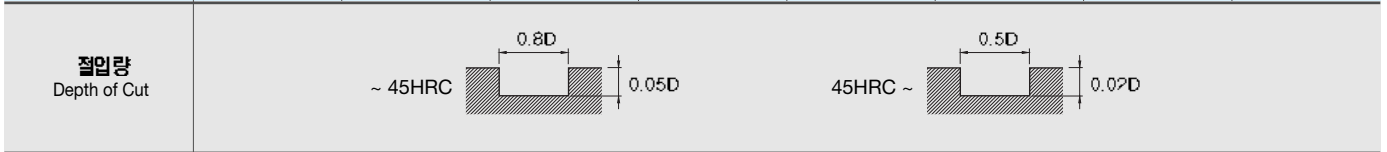
**경사진면 절삭**  
Inclined Cutting



- HRC62 이상인 경우 같은 직경의 같은 비율로 20% DOWN 시켜주세요.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30% 이하로 줄이주세요.
- Ae값 설정시 코너 R 치수를 고려 해주세요.
- 곡면 절삭시 날경의 코너 R 보다 낮은 이동 PITCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도내 에서 피드를 최대 30%까지 UP 해주세요.
- When milling workpiece HRC over 62, reduce 20% of the RPM and feed with the same diameter.
- If the effective length is long, reduce the RPM and feed maximum 30%.
- Consider the corner radius value when you set up the Ae value.
- 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.

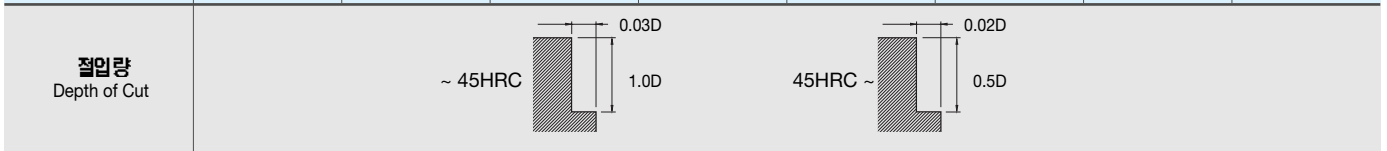
## 홈 절삭 Slotting

피삭재 Material	합금강 Alloy Steel				프리하든강/고경도강 Prehardened Steel / Hardened Steel				고경도강 Hardened Steels				고경도강 Hardened Steels						
	경도 Hardness				30 ~ 40HRC				40 ~ 45HRC				45 ~ 55HRC				55 ~ 62HRC		
외경 Outside Diameter	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae			
			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			
ø0.4	50,000	662	0.020	0.32	45,000	315	0.020	0.32	40,000	126	0.008	0.20	33,000	70	0.008	0.20			
ø0.5	50,000	756	0.025	0.4	45,000	360	0.025	0.4	40,000	144	0.01	0.25	33,000	80	0.01	0.25			
ø0.6	50,000	851	0.03	0.48	45,000	405	0.03	0.48	40,000	162	0.012	0.3	30,000	90	0.012	0.3			
ø0.8	50,000	945	0.04	0.64	45,000	450	0.04	0.64	30,000	180	0.016	0.4	25,000	100	0.016	0.4			
ø1	48,000	2,344	0.05	0.8	38,000	1,116	0.05	0.8	25,500	446	0.02	0.5	20,500	248	0.02	0.5			
ø2	33,300	2,797	0.1	1.6	26,000	1,332	0.1	1.6	17,500	533	0.04	1	14,500	296	0.04	1			
ø3	21,800	2,835	0.15	2.4	17,300	1,350	0.15	2.4	11,500	540	0.06	1.5	9,500	300	0.06	1.5			
ø4	16,700	2,911	0.2	3.2	13,200	1,386	0.2	3.2	8,800	554	0.08	2	7,200	308	0.08	2			
ø5	15,700	3,100	0.25	4	12,500	1,476	0.25	4	8,300	590	0.1	2.5	6,400	328	0.1	2.5			
ø6	13,100	3,024	0.3	4.8	10,350	1,440	0.3	4.8	6,900	576	0.12	3	5,300	320	0.12	3			
ø8	9,880	2,759	0.4	6.4	7,800	1,314	0.4	6.4	5,200	526	0.16	4	4,000	292	0.16	4			
ø10	7,800	2,570	0.5	8	6,150	1,224	0.5	8	4,100	490	0.2	5	3,200	272	0.2	5			
ø12	6,650	2,570	0.6	9.6	5,250	1,224	0.6	9.6	3,500	490	0.24	6	2,650	272	0.24	6			
ø16	6,150	2,400	0.8	12.8	5,500	1,180	0.8	12.8	3,210	450	0.32	8	2,420	250	0.32	8			



## 측면 절삭 Side Cutting

피삭재 Material	합금강 Alloy Steel				프리하든강/고경도강 Prehardened Steel / Hardened Steel				고경도강 Hardened Steels				고경도강 Hardened Steels						
	경도 Hardness				30 ~ 40HRC				40 ~ 45HRC				45 ~ 55HRC				55 ~ 62HRC		
외경 Outside Diameter	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae			
			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			
ø0.4	50,000	278	0.4	0.01	45,000	250	0.4	0.01	40,000	150	0.20	0.01	33,000	70	0.20	0.01			
ø0.5	50,000	308	0.5	0.015	45,000	277	0.5	0.015	40,000	166	0.25	0.01	33,000	80	0.25	0.01			
ø0.6	50,000	309	0.6	0.018	45,000	278	0.6	0.018	40,000	167	0.30	0.012	30,000	90	0.30	0.012			
ø0.8	50,000	503	0.8	0.024	40,000	452	0.8	0.024	30,000	271	0.40	0.016	25,000	100	0.40	0.016			
ø1	48,000	980	1	0.03	38,000	882	1	0.03	25,500	529	0.50	0.02	20,500	248	0.50	0.02			
ø2	33,300	1,440	2	0.06	26,000	1,296	2	0.06	17,500	778	1.00	0.04	14,500	296	1.00	0.04			
ø3	21,800	1,470	3	0.09	17,300	1,323	3	0.09	11,500	794	1.50	0.06	9,500	296	1.50	0.06			
ø4	16,700	1,500	4	0.12	13,200	1,350	4	0.12	8,800	810	2.00	0.08	7,200	308	2.00	0.08			
ø5	15,700	1,740	5	0.15	12,500	1,566	5	0.15	8,300	940	2.50	0.1	6,400	328	2.50	0.1			
ø6	13,100	1,620	6	0.18	10,350	1,458	6	0.18	6,900	875	3.00	0.12	5,300	320	3.00	0.12			
ø8	9,880	1,584	8	0.24	7,800	1,426	8	0.24	5,200	855	4.00	0.16	4,000	292	4.00	0.16			
ø10	7,800	1,440	10	0.3	6,150	1,296	10	0.3	4,100	778	5.00	0.2	3,200	272	5.00	0.2			
ø12	6,650	1,440	12	0.36	5,250	1,296	12	0.36	3,500	778	6.00	0.24	2,650	272	6.00	0.24			
ø16	6,280	1,290	16	0.48	5,100	1,120	16	0.48	3,410	750	8.00	0.32	2,440	250	8.00	0.32			



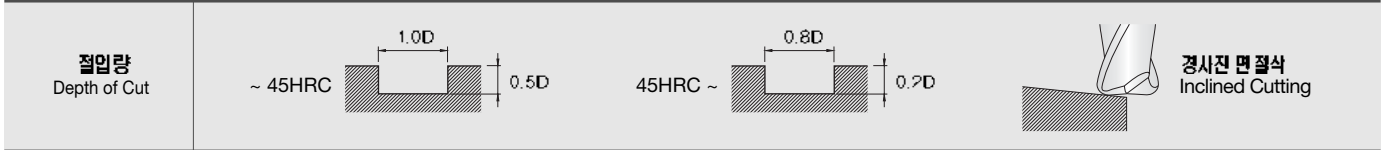
- HRC62 이상인 경우 같은 직경의 같은 비율로 20% DOWN 시켜 주십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30% 이하로 줄이십시오.
- 곡면 절삭시 날경의 코너R 보다 낮은 이동 PITCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도 내에서 피드를 최대 30%까지 UP 해주십시오.
- 상기 절삭조건표는 2날 기준이며, 4날시 회전수는 유지하고, 피드는 안정적인 속도 내에서 최대 30%까지 UP 해주십시오.
- 홈 절삭시 날경의 코너R 대비 Ae 값을 설정 하십시오.

- 상기 절삭조건표의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 피삭재와 절삭 형상을 위한 적절한 클린트 사용과 가공시 발열, 발화에 주의 하십시오.

- When milling workpiece HRC over 62, reduce 20% of the RPM and feed with 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.
- The parameters on the table is based on 2flutes. For using 4flutes, use the same RPM and raise up the feed up to 50% 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

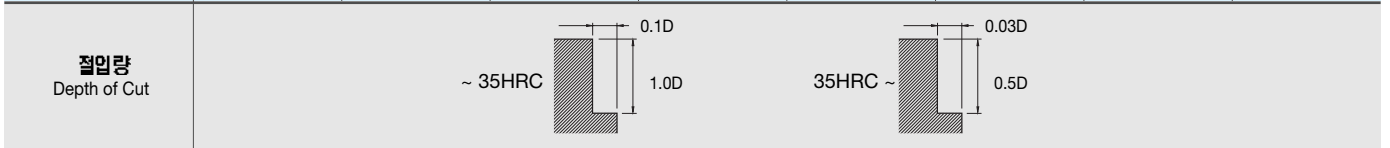
## 홈 절삭 Slotting

피삭재 Material	합금강 Alloy Steel								고경도강 Hardened Steels							
	200 ~ 250HB				25 ~ 35HRC				35 ~ 45HRC				45 ~ 62HRC			
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	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø1	19,250	150	0.50	1	19,250	150	0.50	1	17,280	122	0.50	1	15,552	98	0.2	0.8
Ø1.5	12,845	230	0.75	2	12,800	220	0.75	2	11,520	178	0.75	2	10,368	142	0.3	1.2
Ø2	9,600	345	1.00	2	9,500	330	1.00	2	8,550	267	1.00	2	7,695	212	0.4	1.6
Ø3	6,400	490	1.50	3	6,400	440	1.50	3	5,800	360	1.50	3	5,300	240	0.6	2.4
Ø4	4,800	550	2.00	4	4,800	500	2.00	4	4,400	410	2.00	4	4,000	280	0.8	3.2
Ø5	3,850	600	2.50	5	3,800	550	2.50	5	3,420	446	2.50	5	3,078	356	1.0	4.0
Ø6	3,200	610	3.00	6	3,200	550	3.00	6	2,900	450	3.00	6	2,700	310	1.2	4.8
Ø8	2,400	650	4.00	8	2,400	590	4.00	8	2,200	480	4.00	8	2,000	330	1.6	6.4
Ø10	1,900	580	5.00	10	1,900	520	5.00	10	1,800	440	5.00	10	1,600	290	2.0	8.0
Ø12	1,600	540	6.00	12	1,600	480	6.00	12	1,500	400	6.00	12	1,300	260	2.4	9.6
Ø16	1,200	520	8.00	16	1,200	510	8.00	16	1,080	413	8.00	16	972	328	3.2	12.8
Ø20	960	510	10.00	20	950	500	10.00	20	855	405	10.00	20	770	324	4.0	1.6



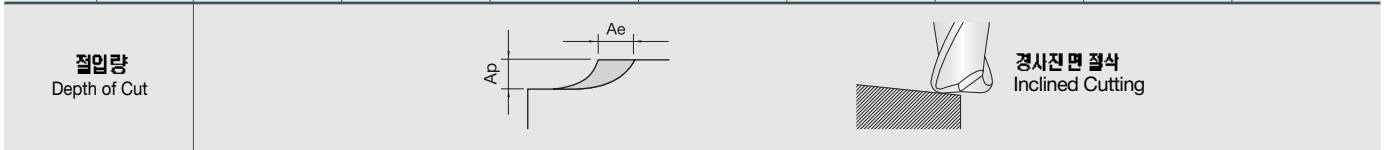
## 측면 절삭 Side Cutting

피삭재 Material	합금강 Alloy Steel								고경도강 Hardened Steels							
	200 ~ 250HB				25 ~ 35HRC				35 ~ 45HRC				45 ~ 62HRC			
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	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø1	28,790	115	1	0.1	25,911	104	1	0.1	22,024	88	0.5	0.03	17,619	70	0.5	0.03
Ø1.5	19,200	403	2	0.2	17,280	363	2	0.2	14,688	308	0.8	0.045	11,750	247	0.8	0.045
Ø2	14,400	690	2	0.2	12,960	621	2	0.2	11,016	528	1.0	0.06	8,813	422	1.0	0.06
Ø3	9,600	860	3	0.3	9,600	770	3	0.3	8,500	610	1.5	0.09	7,400	460	1.5	0.09
Ø4	7,200	920	4	0.4	7,200	830	4	0.4	6,400	660	2.0	0.12	5,600	500	2.0	0.12
Ø5	5,750	960	5	0.5	5,175	864	5	0.5	4,399	734	2.5	0.15	3,519	588	2.5	0.15
Ø6	4,800	1,080	6	0.6	4,800	970	6	0.6	5,100	720	3.0	0.18	3,700	580	3.0	0.18
Ø8	3,600	1,150	8	0.8	3,600	1,040	8	0.8	4,200	750	4.0	0.24	2,800	630	4.0	0.24
Ø10	2,900	1,070	10	1.0	2,900	960	10	1.0	2,500	740	5.0	0.3	2,200	570	5.0	0.3
Ø12	2,400	1,000	12	1.2	2,400	900	12	1.2	2,100	700	6.0	0.36	1,900	550	6.0	0.36
Ø16	1,800	1,000	16	1.6	1,620	900	16	1.6	1,377	765	8.0	0.48	1,102	612	8.0	0.48
Ø20	1,440	930	20	2.0	1,296	837	20	2.0	1,102	711	10.0	0.6	881	569	10.0	0.6



- 상기 조건표는 4날 기준이며, 6날 가공시 회전수는 유지하고, 안정적인 속도 내에서 피드를 최대 30%까지 UP 해주십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30% 이하로 줄어십시오.
- 측면 절삭시 코너 R 참고하여 절삭 하시기 바랍니다.
- 곡면 절삭시 날경의 코너 R 보다 낮은 이동 PITCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도 내에서 피드를 최대 30%까지 UP 해주십시오.
- 상기 절삭조건외의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과 하거나 버 및 적열 현상이 발생할 때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 소재 및 가공 형상에 적합한 절삭유를 사용 하십시오.
- The parameters on the table is based on 4flutes. For using 6flutes, use the same RPM and raise up the feed up to 30% in stable milling condition.
- If the effective length is long, reduce the RPM and feed maximum 30%.
- For side milling, refer to the corner radius value.
- 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.
- 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.

피삭재 Material		합금강 Alloy Steel				합금강/공구강 Alloy Steels/ Tool Steels				고경도강 Hardened Steels				고경도강 Hardened Steels			
경도 Hardness		~ 30HRC				30 ~ 45HRC				45 ~ 55HRC				55 ~ 62HRC			
외경 Outside Diameter	반경 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	RPM	FEED	Ap Axial Depth	Ae Radial Depth
ø1	R0.2	45,000	7,000	0.05	0.06	42,000	7,800	0.03	0.05	35,000	6,800	0.02	0.05	25,000	2,600	0.02	0.05
ø1.5	R0.5	40,000	9,000	0.06	0.72	40,000	8,000	0.04	0.65	30,000	7,000	0.03	0.60	21,000	2,800	0.02	0.06
ø2	R0.5	33,000	10,000	0.08	0.96	27,000	8,400	0.05	0.86	24,000	7,500	0.04	0.80	16,000	3,000	0.03	0.80
ø3	R0.5	22,000	11,000	0.12	1.44	18,000	9,000	0.08	1.30	16,000	8,500	0.06	1.20	11,000	3,300	0.05	1.20
ø4	R0.5	19,000	13,000	0.17	2.04	16,000	10,000	0.13	1.84	13,000	10,000	0.09	1.70	900	4,000	0.08	1.70
-	R1.0	17,000	12,000	0.15	1.80	14,000	9,500	0.12	1.62	12,000	8,800	0.08	1.50	8,000	3,500	0.07	1.50
ø5	R0.5	15,000	14,000	0.23	2.76	12,000	12,000	0.17	2.48	11,000	10,000	0.12	2.30	7,300	4,300	0.09	2.30
-	R1.0	13,000	13,000	0.20	2.40	11,000	11,000	0.15	2.16	9,600	9,500	0.10	2.00	6,400	3,800	0.08	2.00
ø6	R0.3	13,310	15,730	0.30	3.54	10,900	13,200	0.18	3.19	10,000	13,000	0.12	2.95	6,500	4,600	0.12	2.95
-	R0.5	12,980	15,340	0.29	3.42	10,600	13,000	0.17	3.08	9,500	12,000	0.11	2.85	6,300	4,500	0.11	2.85
-	R1.0	12,600	12,600	0.28	3.36	12,654	12,600	0.17	3.02	9,000	11,000	0.11	2.80	5,800	4,100	0.11	2.80
-	R1.5	11,000	13,000	0.25	3.00	9,000	11,000	0.15	2.70	8,000	9,600	0.10	2.50	5,300	3,800	0.10	2.50
ø8	R0.3	9,800	17,500	0.35	4.25	8,400	13,500	0.24	3.82	7,300	15,000	0.18	3.54	4,700	4,484	0.15	3.54
-	R0.5	8,800	16,500	0.34	4.10	8,200	13,000	0.23	3.69	7,100	13,000	0.17	3.42	4,600	4,370	0.15	3.42
-	R1.0	8,400	15,000	0.34	4.03	8,000	12,000	0.22	3.63	6,700	11,000	0.17	3.36	4,520	4,294	0.15	3.36
-	R2.0	8,200	13,000	0.30	3.60	7,000	11,000	0.20	3.24	6,000	9,600	0.15	3.00	4,000	3,800	0.13	3.00
ø10	R0.3	7,670	15,340	0.35	6.37	6,490	12,980	0.24	5.73	5,664	11,210	0.18	5.31	3,776	4,484	0.15	5.31
-	R0.5	7,475	14,950	0.34	6.16	6,325	12,650	0.23	5.54	5,520	10,925	0.17	5.13	3,680	4,370	0.15	5.13
-	R1.0	7,280	14,560	0.34	6.05	6,160	12,320	0.22	5.44	5,376	10,640	0.17	5.04	3,584	4,256	0.15	5.04
-	R2.0	6,500	13,000	0.30	5.40	5,500	11,000	0.20	4.86	4,800	9,500	0.15	4.50	3,200	3,800	0.13	4.50
ø12	R0.5	7,000	1,500	0.53	6.37	5,428	11,800	0.35	5.73	4,838	10,620	0.30	5.31	3,186	4,130	0.24	5.31
-	R1.0	6,400	14,000	0.51	6.16	5,290	11,500	0.34	5.54	4,715	10,350	0.29	5.13	3,105	4,025	0.23	5.13
-	R2.0	6,000	12,500	0.50	6.05	5,152	11,200	0.34	5.44	4,592	10,080	0.28	5.04	3,024	3,920	0.22	5.04
-	R3.0	5,500	12,000	0.45	5.40	4,600	10,000	0.30	4.86	4,100	9,000	0.25	4.50	2,700	3,500	0.20	4.50
ø16	R1.0	4,838	11,800	0.42	8.58	4,012	10,384	0.25	7.72	3,540	9,204	0.22	7.15	2,360	3,776	0.13	7.35
-	R2.0	4,100	10,000	0.45	9.00	3,400	8,800	0.30	8.10	3,000	7,800	0.25	7.50	2,000	3,200	0.20	7.50



### ■ Coefficients respective of tool overhang

Type	Overhang	Revolution	Feed rate	Depth of Cut ap
Straight	L/D ≦ 5	100%	100%	100%
	L/D = 6	90%	80%	80%
	L/D = 7	80%	70%	70%
Taper neck	L/D = 6	100%	100%	100%
	L/D = 8	90%	80%	80%
	L/D ≧ 10	80%	70%	70%

- 상기 조건표는 4날 기준이며, 6날 가공시 회전수는 유지하고, 안정적인 속도 내에서 피드를 최대 30%까지 UP 해주십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30% 이하로 줄이십시오.
- 측면 절삭시 코너 R 참고하여 절삭 하시기 바랍니다.
- 곡면 절삭시 날경의 코너 R 보다 낮은 이동 PITCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도 내에서 피드를 최대 30%까지 UP 해주십시오.
- 상기 절삭조건은 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 적용 기계의 회전속도가 부족한 경우에는 회전 속도와 이송속도를 같은 비율로 줄여서 적용합니다.
- 유효장 길이가 긴 경우, 위 표와같이 RPM과 FEED를 낮춰주세요.
- 절입깊이가 얇은 경우, RPM과 FEED를 증가해주세요.
- 원활한 칩배출을 위하여 에어브로우나 오일 미스트를 추천합니다.
- The parameters on the table is based on 4flutes. For using 6flutes, use the same RPM and raise up the feed up to 30% in stable milling condition.
- If the effective length is long, reduce the RPM and feed maximum 30%.
- For side milling, refer to the corner radius value.
- 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.
- 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, adjust RPM and feed in the same proportion.
- If the effective length is long, refer to the table (Coefficients respective of tool overhang) and adjust the RPM and feed.
- If you use small value of Ap, raise up the RPM and feed.
- Air blow or oil mist is recommended for smooth chip emission.

## 홈 절삭 Slotting

피삭재 Material	일반구조강/ 탄소강 Mild Steels/ Carbon Steels				합금강/ 공구강 Alloy Steels/ Tool Steels				공구강/ 프리하드강 Tool Steels/ Prehardened Steels				공구강/ 스테인레스강 Tool Steels/ Stainless Steels						
	경도 Hardness				~ 750N/mm <sup>2</sup>				~ 30HRC				30 ~ 38HRC				38 ~ 45HRC		
외경 Outside Diameter	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae			
			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			
ø4	4,000	430	2.8	4	3,800	200	2.8	4	2,800	140	2	4	2,400	110	2	4			
ø5	4,000	430	3.5	5	3,400	220	3.5	5	2,500	160	2.5	5	2,200	130	2.5	5			
ø6	3,600	430	4.2	6	3,000	240	4.2	6	2,300	185	3	6	1,900	150	3	6			
ø8	2,700	430	5.6	8	2,200	270	5.6	8	1,800	210	4	8	1,400	180	4	8			
ø10	2,200	430	7	10	1,800	290	7	10	1,400	220	5	10	1,200	185	5	10			
ø12	1,800	430	8.4	12	1,500	300	8.4	12	1,200	230	6	12	960	190	6	12			
ø16	1,400	430	11.2	16	1,100	310	11.2	16	900	250	8	16	720	200	8	16			
ø20	1,100	410	14	20	900	310	14	20	700	240	10	20	560	185	10	20			



## 측면 절삭 Side Cutting

피삭재 Material	일반구조강/ 탄소강 Mild Steels/ Carbon Steels				합금강/ 공구강 Alloy Steels/ Tool Steels				공구강/ 프리하드강 Tool Steels/ Prehardened Steels				공구강/ 스테인레스강 Tool Steels/ Stainless Steels						
	경도 Hardness				~ 750N/mm <sup>2</sup>				~ 30HRC				30 ~ 38HRC				38 ~ 45HRC		
외경 Outside Diameter	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae			
			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			
ø4	5,000	510	6	1.2	4,200	260	6	1.2	3,600	180	6	1.2	2,800	130	4	0.8			
ø5	5,000	510	7.5	1.5	4,200	270	7.5	1.5	3,200	200	7.5	1.5	2,400	150	5	1			
ø6	4,200	510	9	1.8	3,600	290	9	1.8	2,800	220	9	1.8	2,100	170	6	1.2			
ø8	3,200	510	12	2.4	2,700	330	12	2.4	2,100	250	12	2.4	1,600	190	8	1.6			
ø10	2,600	510	15	3	2,200	345	15	3	1,600	260	15	3	1,300	210	10	2			
ø12	2,100	510	18	3.6	1,800	360	18	3.6	1,400	270	18	3.6	1,100	215	12	2.4			
ø16	1,600	510	24	4.8	1,400	385	24	4.8	1,000	290	24	4.8	800	220	16	3.2			
ø20	1,300	480	30	6	1,100	375	30	6	800	280	30	6	640	210	20	4			



- 가능한 공구 길이 측정시 유압식 측정이 아닌 레이저식 도구 세터를 사용 하십시오.
- 가공 진입시 가능한 피삭재 밖에서 진입 하십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30% 이하로 줄이십시오.
- 상기 절삭조건외의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 공작기계와 가공물의 강성이 없는 경우, 진동이 발생할시 조건표에 회전속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- 피삭재와 가공 모양에 따라 적절한 클린트를 사용 하십시오.
- 스테인레스, 내열합금강 등의 절단 가공시 수용성 절삭유가 가장 효과적 입니다.
- Use laser tool measurement instead of hydraulic measurement when measuring tool length as possible.
- When entering the tool to the workpiece, enter the tool from outside to the workpiece.
- If the effective length is long, reduce the RPM and feed maximum 30%.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- In case of workpiece and machine do not have enough rigidity and make vibration, reduce the RPM and feed in same proportion.
- Depending on the workpiece and shape, use adequate coolant.
- For stainless and heat resistant alloy, water-soluble oil is the most effective.

## 홈 절삭 Slotting

파삭재 Material	일반구조강/ 탄소강 Mild Steels/ Carbon Steels				합금강/ 공구강 Alloy Steels/ Tool Steels				공구강/ 프리하드강 Tool Steels/ Prehardened Steels				공구강/ 스테인레스강 Tool Steels/ Stainless Steels						
	경도 Hardness				~ 750N/mm <sup>2</sup>				~ 30HRC				30 ~ 38HRC				38 ~ 45HRC		
외경 Outside Diameter	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae			
			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			
ø4	4,600	500	3.2	4	4,400	230	3.2	4	3,200	160	3.2	4	2,800	130	2.4	4			
ø5	4,600	500	4	5	4,000	250	4	5	2,900	180	4	5	2,500	150	3	5			
ø6	4,100	500	4.8	6	3,500	280	4.8	6	2,700	210	4.8	6	2,200	170	3.6	6			
ø8	3,100	500	6.4	8	2,500	310	6.4	8	2,100	240	6.4	8	1,700	210	4.8	8			
ø10	2,500	500	8	10	2,100	330	8	10	1,600	250	8	10	1,300	210	6	10			
ø12	2,100	500	9.6	12	1,700	350	9.6	12	1,400	270	9.6	12	1,100	220	7.2	12			
ø16	1,600	500	12.8	16	1,300	360	12.8	16	1,000	290	12.8	16	800	230	4.8	16			
ø20	1,300	480	16	20	1,000	360	16	20	800	270	16	20	650	210	12	20			

절입량  
Depth of Cut

~ 38HRC

38HRC ~

## 측면 절삭 Side Cutting

파삭재 Material	일반구조강/ 탄소강 Mild Steels/ Carbon Steels				합금강/ 공구강 Alloy Steels/ Tool Steels				공구강/ 프리하드강 Tool Steels/ Prehardened Steels				공구강/ 스테인레스강 Tool Steels/ Stainless Steels						
	경도 Hardness				~ 750N/mm <sup>2</sup>				~ 30HRC				30 ~ 38HRC				38 ~ 45HRC		
외경 Outside Diameter	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae			
			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			
ø4	5,800	600	6	2	4,800	300	6	2	4,100	200	6	2	3,200	150	4	1.6			
ø5	5,800	600	7.5	2.5	4,800	310	7.5	2.5	3,700	230	7.5	2.5	2,800	170	5	2			
ø6	4,800	600	9	3	4,200	330	9	3	3,200	250	9	3	2,400	200	6	2.4			
ø8	3,700	600	12	4	3,100	380	12	4	2,400	290	12	4	1,800	220	8	3.2			
ø10	3,000	600	15	5	2,500	400	15	5	1,800	300	15	5	1,500	250	10	4			
ø12	2,400	600	18	6	2,100	410	18	6	1,600	310	18	6	1,300	250	12	4.8			
ø16	1,850	600	24	8	1,600	440	24	8	1,200	330	24	8	1,000	250	16	6.4			
ø20	1,500	550	30	10	1,300	430	30	10	900	320	30	10	750	240	20	8			

절입량  
Depth of Cut

~ 38HRC

38HRC ~

- 가능한 공구 길이 측정시 유압식 측정이 아닌 레이저식 도구 세터를 사용 하십시오.
- 가공 진입시 가능한 파삭재 밖에서 진입 하십시오.
- 유효장치가 긴 경우에는 회전수와 이송속도를 최대 30% 이하로 줄이십시오.
- 상기 절삭조건외의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 동작기계와 가공물의 강성이 없는 경우, 진동이 발생할시 조건표에 회전속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- 파삭재와 가공 모양에 따라 적절한 클런트를 사용 하십시오.
- 스테인레스, 내열합금강 등의 절단 가공시 수용성 절삭유가 가장 효과적 입니다.
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- If the effective length is long, reduce the RPM and feed maximum 30%.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- In case of workpiece and machine do not have enough rigidity and make vibration, reduce the RPM and feed in same proportion.
- Depending on the workpiece and shape, use adequate coolant.
- For stainless and heat resistant alloy, water-soluble oil is the most effective.

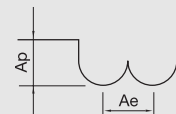
피삭재 Material		합금강 Alloy Steels				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness		30 ~ 40HRC				40 ~ 50HRC				50 ~ 52HRC			
반경 Corner Radius	유효장 Effective Length	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
R 0.1	0.5	54,000	430	0.010	0.010	48,000	350	0.006	0.007	48,000	280	0.006	0.007
-	1	54,000	380	0.008	0.008	48,000	330	0.005	0.005	48,000	250	0.005	0.005
-	1.5	47,000	320	0.006	0.006	47,000	250	0.004	0.004	47,000	200	0.004	0.004
-	2	42,000	290	0.004	0.004	42,000	200	0.003	0.003	42,000	200	0.003	0.003
R 0.15	1	54,000	640	0.014	0.015	48,000	480	0.010	0.010	41,000	370	0.009	0.010
-	2	49,000	530	0.011	0.011	43,000	370	0.008	0.008	37,000	270	0.008	0.008
-	3	43,000	460	0.009	0.010	38,000	320	0.007	0.006	32,000	240	0.006	0.006
-	4	37,000	300	0.004	0.006	28,000	200	0.003	0.004	24,000	160	0.003	0.004
R 0.2	1	54,000	870	0.023	0.036	48,000	660	0.018	0.024	37,000	450	0.015	0.024
-	2	54,000	790	0.022	0.036	48,000	590	0.018	0.024	37,000	400	0.015	0.020
-	3	50,000	660	0.017	0.018	41,000	420	0.012	0.012	31,000	280	0.011	0.012
-	4	50,000	640	0.012	0.018	38,000	400	0.009	0.012	30,000	270	0.009	0.012
-	5	37,000	410	0.009	0.018	29,000	330	0.008	0.012	26,000	260	0.007	0.012
-	6	37,000	360	0.006	0.010	29,000	260	0.005	0.006	26,000	200	0.004	0.006
-	8	27,000	200	0.003	0.006	27,000	170	0.003	0.003	23,000	150	0.002	0.003
R 0.25	1	57,000	1,380	0.029	0.054	42,000	830	0.023	0.036	32,000	550	0.018	0.036
-	2	57,000	1,250	0.028	0.054	42,000	750	0.022	0.036	32,000	500	0.018	0.036
-	3	55,000	1,010	0.021	0.036	38,000	580	0.017	0.024	31,000	400	0.014	0.024
-	4	55,000	1,010	0.021	0.036	38,000	580	0.017	0.024	31,000	400	0.014	0.024
-	5	48,000	800	0.016	0.018	33,000	480	0.012	0.012	30,000	390	0.009	0.012
-	6	36,000	610	0.009	0.018	28,000	400	0.008	0.012	27,000	330	0.005	0.012
-	8	36,000	590	0.009	0.018	28,000	400	0.008	0.012	27,000	330	0.005	0.012
-	10	36,000	460	0.009	0.018	28,000	400	0.008	0.012	27,000	330	0.005	0.012
-	12	24,000	280	0.004	0.010	26,000	280	0.004	0.006	24,000	280	0.002	0.006
R 0.3	1	57,000	1,670	0.035	0.144	37,000	840	0.027	0.096	27,000	540	0.023	0.096
-	2	57,000	1,540	0.034	0.144	37,000	770	0.027	0.096	27,000	500	0.021	0.096
-	3	57,000	1,540	0.034	0.144	37,000	770	0.027	0.096	27,000	500	0.021	0.096
-	4	54,000	1,130	0.026	0.108	35,000	600	0.020	0.072	26,000	380	0.016	0.072
-	5	46,000	960	0.019	0.072	28,000	460	0.016	0.048	26,000	370	0.012	0.048
-	6	46,000	960	0.019	0.072	28,000	460	0.016	0.048	26,000	370	0.012	0.048
-	8	30,000	570	0.010	0.054	24,000	400	0.009	0.036	23,000	320	0.006	0.036
-	10	30,000	490	0.007	0.036	24,000	330	0.006	0.024	23,000	290	0.004	0.024
-	12	30,000	490	0.007	0.036	24,000	330	0.006	0.024	23,000	290	0.004	0.024
-	14	20,000	300	0.004	0.027	22,000	300	0.004	0.018	20,000	250	0.002	0.018
R 0.35	2	56,000	1,800	0.050	0.162	35,000	740	0.039	0.108	27,000	500	0.031	0.108
-	4	54,500	1,500	0.045	0.063	33,000	600	0.035	0.042	26,500	410	0.029	0.096
-	8	32,000	800	0.019	0.072	12,215	420	0.020	0.048	22,500	355	0.012	0.048
-	10	26,500	540	0.017	0.063	22,500	380	0.014	0.042	21,500	330	0.011	0.042
-	12	23,000	420	0.017	0.063	21,500	380	0.012	0.032	21,500	320	0.010	0.042
R 0.4	2	55,000	2,060	0.063	0.180	33,000	710	0.050	0.120	27,000	500	0.041	0.120
-	4	55,000	1,860	0.063	0.180	31,000	600	0.050	0.120	27,000	440	0.041	0.120
-	6	47,000	1,410	0.038	0.108	28,000	570	0.030	0.072	22,000	390	0.024	0.072
-	8	34,000	1,040	0.027	0.090	21,000	430	0.021	0.060	22,000	390	0.018	0.060
-	10	23,000	600	0.027	0.090	21,000	430	0.021	0.060	20,000	370	0.017	0.060
-	12	16,000	350	0.027	0.090	19,000	430	0.018	0.040	20,000	350	0.016	0.060
R 0.45	6	50,500	1,900	0.067	0.190	32,000	685	0.054	0.130	24,500	460	0.043	0.180
R 0.5	2	46,000	2,000	0.072	0.360	32,000	770	0.057	0.240	22,000	480	0.045	0.240
-	3	46,000	2,000	0.072	0.360	32,000	770	0.057	0.240	22,000	480	0.045	0.240
-	4	46,000	2,000	0.071	0.360	32,000	770	0.057	0.240	22,000	480	0.045	0.240
-	5	46,000	2,000	0.071	0.360	32,000	770	0.057	0.240	22,000	480	0.045	0.240
-	6	39,000	1,500	0.071	0.180	26,000	760	0.055	0.120	17,600	480	0.009	0.120
-	8	39,000	1,500	0.043	0.180	26,000	760	0.034	0.120	17,600	480	0.027	0.120
-	10	29,000	1,110	0.028	0.090	17,600	530	0.024	0.060	16,500	420	0.018	0.060
-	12	18,700	660	0.027	0.090	17,600	530	0.024	0.060	16,500	420	0.018	0.060
-	14	18,700	640	0.022	0.090	15,400	440	0.018	0.060	14,300	360	0.014	0.060
-	16	18,700	640	0.022	0.090	15,400	440	0.018	0.060	14,300	360	0.014	0.060
-	18	18,700	540	0.017	0.090	14,300	440	0.013	0.060	13,200	360	0.009	0.060
-	20	18,700	540	0.017	0.054	14,300	360	0.013	0.036	13,200	300	0.009	0.036
-	22	18,700	540	0.017	0.054	14,300	360	0.013	0.036	13,200	300	0.009	0.036
-	25	18,700	540	0.016	0.052	14,300	360	0.013	0.030	13,200	300	0.009	0.030
R 0.6	4	38,000	2,000	0.085	0.360	26,000	770	0.068	0.240	18,200	480	0.054	0.240
-	6	38,000	2,000	0.085	0.360	26,000	770	0.068	0.240	18,200	480	0.054	0.240
-	8	32,000	1,490	0.084	0.360	21,000	700	0.067	0.240	15,100	440	0.054	0.240
-	10	24,000	1,080	0.036	0.180	16,400	530	0.027	0.120	15,100	420	0.022	0.120
-	12	24,000	1,080	0.036	0.180	16,400	530	0.027	0.120	14,100	420	0.022	0.120
-	16	15,400	580	0.024	0.144	13,100	460	0.019	0.096	11,900	380	0.016	0.096
-	20	15,400	580	0.017	0.090	12,100	380	0.013	0.060	11,000	320	0.009	0.060
-	24	15,400	580	0.010	0.060	11,100	320	0.009	0.040	9,800	290	0.070	0.040



피삭재 Material		합금강 Alloy Steels				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness		30 ~ 40HRC				40 ~ 50HRC				50 ~ 52HRC			
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 0.7	6	28,000	1,470	0.099	0.270	17,600	680	0.076	0.180	13,600	440	0.063	0.180
^	8	28,000	1,470	0.099	0.270	17,600	680	0.079	0.180	13,600	440	0.063	0.180
^	12	19,800	1,080	0.042	0.270	13,800	530	0.033	0.180	13,600	420	0.027	0.180
^	16	13,200	620	0.033	0.180	13,100	480	0.027	0.120	11,900	390	0.021	0.120
R 0.75	3	30,000	2,200	0.171	0.324	21,000	1060	0.137	0.216	14,800	660	0.110	0.216
^	4	30,000	2,200	0.171	0.324	21,000	1060	0.137	0.216	14,800	660	0.110	0.216
^	6	30,000	1,980	0.147	0.324	21,000	940	0.117	0.216	14,800	580	0.090	0.216
^	8	26,000	1,500	0.106	0.270	16,300	700	0.084	0.180	12,100	450	0.069	0.180
^	10	26,000	1,500	0.106	0.270	16,300	700	0.084	0.180	12,100	450	0.069	0.180
^	12	26,000	1,500	0.106	0.270	16,300	700	0.084	0.180	12,100	450	0.069	0.180
^	14	18,700	1,100	0.045	0.180	12,600	530	0.036	0.120	12,100	440	0.027	0.120
^	16	12,100	620	0.036	0.180	12,400	480	0.027	0.120	11,600	390	0.022	0.120
^	18	12,100	620	0.036	0.180	12,400	480	0.027	0.120	11,600	390	0.022	0.120
^	20	12,100	620	0.019	0.090	12,400	480	0.016	0.060	11,600	390	0.012	0.060
^	22	12,100	620	0.019	0.090	12,400	480	0.016	0.060	11,000	390	0.012	0.060
^	25	11,000	500	0.019	0.090	12,400	440	0.016	0.060	11,000	390	0.012	0.060
^	30	10,700	450	0.019	0.090	10,900	400	0.016	0.060	11,000	390	0.012	0.060
R 0.8	6	27,040	2,600	0.220	0.580	18,900	1200	0.180	0.390	1,650	760	0.150	0.390
^	8	26,000	1,970	0.157	0.324	18,900	940	0.126	0.216	13,800	580	0.102	0.216
^	12	25,000	1,490	0.112	0.180	15,100	700	0.090	0.120	11,500	440	0.072	0.120
^	16	17,600	110	0.046	0.144	12,300	530	0.036	0.096	11,400	440	0.030	0.096
^	20	11,000	630	0.036	0.090	11,500	480	0.030	0.060	10,900	400	0.024	0.060
R 0.9	6	32,000	2,600	0.230	0.021	18,400	1200	0.185	0.320	18,400	738	0.150	0.320
^	8	26,000	1,950	0.165	0.270	16,300	930	0.132	0.240	13,800	570	0.108	0.240
^	12	21,000	1,480	0.120	0.270	13,800	700	0.094	0.180	10,300	440	0.077	0.180
^	16	15,400	1,080	0.048	0.180	10,800	530	0.039	0.120	9,900	420	0.031	0.120
^	20	10,500	630	0.039	0.090	10,200	480	0.031	0.060	9,700	400	0.025	0.060
R 1	4	22,000	2,140	0.232	0.540	18,500	1260	0.185	0.360	13,200	960	0.150	0.360
^	6	22,000	2,140	0.232	0.540	18,500	1260	0.185	0.360	13,200	960	0.150	0.360
^	8	22,000	1,920	0.185	0.360	18,500	1120	0.147	0.240	13,200	870	0.120	0.240
^	10	22,000	1,920	0.185	0.360	18,500	1120	0.147	0.240	13,200	870	0.120	0.240
^	12	18,700	1,470	0.166	0.360	16,000	990	0.133	0.240	11,700	780	0.107	0.240
^	14	18,700	1,470	0.166	0.360	16,000	990	0.133	0.240	11,700	780	0.107	0.240
^	16	18,700	1,470	0.148	0.360	16,000	990	0.118	0.240	11,700	780	0.090	0.240
^	18	14,300	1,070	0.093	0.180	14,700	580	0.074	0.120	11,600	580	0.061	0.120
^	20	14,300	1,070	0.093	0.180	14,700	580	0.074	0.120	11,600	580	0.061	0.120
^	22	9,500	630	0.074	0.180	10,600	450	0.058	0.120	10,200	450	0.045	0.120
^	25	9,500	630	0.074	0.180	10,600	450	0.058	0.120	10,200	450	0.045	0.120
^	30	9,500	530	0.033	0.090	10,600	450	0.026	0.060	10,200	380	0.021	0.060
R 1.25	8	18,400	2,400	0.232	0.360	14,500	1400	0.185	0.240	9,700	1080	0.150	0.240
^	10	18,400	2,400	0.232	0.360	14,500	1400	0.185	0.240	9,700	1080	0.150	0.240
^	16	16,100	1,810	0.208	0.360	13,500	1230	0.166	0.240	8,400	980	0.135	0.240
^	20	11,500	1,330	0.116	0.180	10,200	950	0.093	0.120	8,400	980	0.074	0.120
^	25	6,900	770	0.093	0.180	8,400	540	0.074	0.120	8,400	560	0.061	0.120
^	30	6,900	770	0.040	0.090	8,400	540	0.033	0.060	8,400	560	0.026	0.060
R 1.5	6	15,000	2,890	0.278	0.540	12,900	1680	0.222	0.360	9,200	1300	0.180	0.360
^	8	15,000	2,890	0.278	0.540	12,900	1680	0.222	0.360	9,200	1300	0.180	0.360
^	10	15,000	2,600	0.278	0.540	12,900	1680	0.222	0.360	9,200	1300	0.180	0.360
^	12	15,000	2,600	0.278	0.540	12,900	1510	0.222	0.360	9,200	1170	0.180	0.360
^	16	12,700	1,970	0.029	0.504	11,300	1330	0.166	0.360	8,100	1040	0.135	0.360
^	20	12,700	1,970	0.029	0.504	11,300	1330	0.166	0.360	8,100	1040	0.135	0.360
^	25	10,100	1,450	0.139	0.270	8,800	1040	0.111	0.180	8,100	1040	0.090	0.180
^	30	10,100	1,450	0.139	0.270	8,800	780	0.111	0.180	8,100	780	0.090	0.180
^	35	6,600	840	0.073	0.270	7,900	620	0.055	0.180	7,500	650	0.045	0.180
^	40	6,600	840	0.073	0.270	7,900	620	0.055	0.180	7,500	520	0.045	0.180
^	45	4,500	500	0.040	0.270	6,200	500	0.035	0.100	7,000	450	0.023	0.180
R 2	8	11,500	2,710	0.370	0.900	9,700	1560	0.297	0.600	6,800	1210	0.241	0.600
^	10	11,500	2,710	0.370	0.900	9,700	1560	0.297	0.600	6,800	1210	0.241	0.600
^	12	11,500	2,710	0.390	0.900	9,700	1560	0.297	0.600	6,800	1210	0.241	0.600
^	16	11,500	2,710	0.390	0.900	9,700	1560	0.297	0.600	6,800	1210	0.241	0.600
^	20	11,500	2,710	0.390	0.900	9,700	1560	0.297	0.600	6,800	1210	0.241	0.600
^	25	10,300	1,850	0.279	0.540	8,400	1250	0.223	0.360	6,000	980	0.180	0.360
^	30	10,300	1,850	0.279	0.540	8,400	1250	0.223	0.360	6,000	980	0.180	0.361
^	35	7,500	1,360	0.185	0.540	6,600	950	0.148	0.360	6,000	700	0.120	0.360
^	40	7,500	1,360	0.185	0.540	6,600	950	0.148	0.360	6,000	700	0.120	0.360
^	45	5,000	780	0.093	0.360	5,900	470	0.074	0.240	5,600	490	0.060	0.240

피삭재 Material		합금강 Alloy Steels				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness		30 ~ 40HRC				40 ~ 50HRC				50 ~ 52HRC			
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

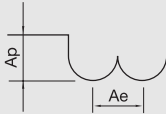


Ap : Axial Depth 축 방향의 절입 깊이 (mm)  
 Ae : Radial Depth 반경 방향의 절입 깊이 (mm)  
 D : Outside Diameter 외경 (mm)  
 n : Speed 회전속도 (min<sup>-1</sup>)  
 Vf : Feed 이송속도 (mm/min)

- HRC52 이상 고경도강 가공시 52HRC 조건의 같은 직경 대비 상기 절삭조건의 20% DOWN 해주십시오.
- 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 클린트를 추천하며, 동가공시 습식 클린트 추천 합니다.
- 상기 절삭조건의 참고는 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.

피삭재 Material	합금강 Alloy Steels				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness	30 ~ 40HRC				40 ~ 50HRC				50 ~ 52HRC			
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
R 0.15	35,100	728	0.100	0.015	31,200	598	0.093	0.015	25,740	364	0.088	0.015
R 0.2	35,100	936	0.200	0.020	31,200	728	0.186	0.020	25,740	468	0.176	0.020
R 0.25	35,100	1456	0.300	0.025	31,200	1144	0.279	0.025	25,740	728	0.264	0.025
R 0.3	35,100	1872	0.350	0.030	31,200	1482	0.326	0.030	23,400	832	0.308	0.030
R 0.35	31,200	2288	0.400	0.040	23,400	1534	0.372	0.040	19,500	962	0.352	0.040
R0.4	30,420	2704	0.450	0.045	21,684	1716	0.419	0.045	17,706	1066	0.396	0.045
R0.5	29,640	2964	0.450	0.050	19,890	1872	0.419	0.050	15,990	1118	0.396	0.050
R0.75	24,960	3250	0.525	0.075	16,770	2028	0.488	0.075	13,650	1235	0.462	0.075
R 1	20,280	3536	0.600	0.100	13,650	2184	0.558	0.100	11,310	1352	0.528	0.100
R1.25	16,887	3536	0.700	0.125	11,310	2184	0.651	0.125	9,360	1352	0.616	0.125
R1.5	13,494	3536	0.800	0.150	8,970	2184	0.744	0.150	7,410	1352	0.704	0.150
R2	10,296	3640	1.000	0.200	6,864	2288	0.930	0.200	5,616	1404	0.880	0.200
R2.5	9,750	4186	1.200	0.250	6,474	2600	1.116	0.250	4,992	1482	1.056	0.250
R3	8,073	4004	1.500	0.300	5,382	2496	1.395	0.300	4,134	1456	1.320	0.300
R4	6,084	3744	2.000	0.400	4,056	2314	1.860	0.400	3,120	1326	1.760	0.400
R5	4,797	3536	2.500	1.000	3,198	2158	2.325	1.000	2,496	1248	2.200	1.000
R6	4,095	3536	3.000	1.200	2,730	2158	2.790	1.200	2,067	1248	2.640	1.200
R8	3,385	3172	4.000	1.600	2,028	1872	3.720	1.600	1,435	935	3.520	1.600

**절입량**  
Depth of Cut

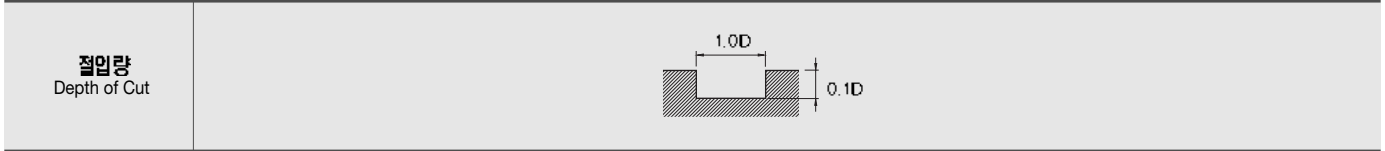


Ap : Axial Depth 축 방향의 절입 깊이 (mm)  
 Ae : Radial Depth 반경 방향의 절입 깊이 (mm)  
 D : Outside Diameter 외경 (mm)  
 n : Speed 회전속도 (min<sup>-1</sup>)  
 Vf : Feed 이송속도 (mm/min)

- HRC52 이상 고경도강 가공시 52HRC 조건의 같은 직경 대비 상기 절삭조건의 20% DOWN 해주십시오.
- 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 클린트를 추천하며, 동가공시 습식 클린트 추천 합니다.
- 상기 절삭조건의 참고는 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 5 $\mu$ m 이내 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 ( $\phi 1$  or less, the vibration tolerance management should be within 5 $\mu$ m).
- During the chip evacuation, note for heat and ignition.

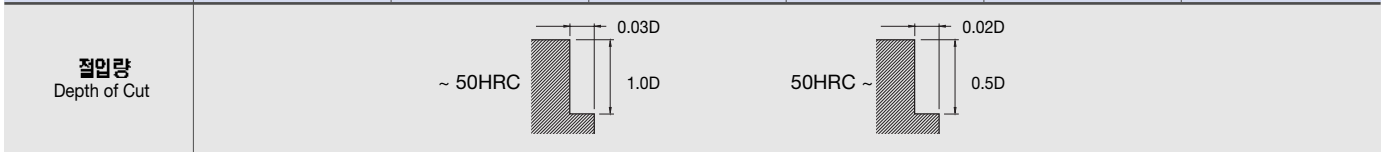
**홈 절삭 Slotting**

피삭재 Material	합금강 Alloy Steels				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness	30 ~ 40HRC				40 ~ 50HRC				50 ~ 52HRC			
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
Ø0.2	50,000	230	0.02	0.15	45,000	207	0.02	0.15	40,000	176	0.02	0.15
Ø0.5	50,000	660	0.05	0.45	45,000	594	0.05	0.45	40,000	505	0.05	0.45
Ø0.7	50,000	810	0.07	0.65	45,000	729	0.07	0.65	37,500	620	0.07	0.65
Ø0.9	49,000	1,180	0.09	0.80	39,000	1062	0.09	0.80	27,800	903	0.09	0.80
Ø1	48,000	1,350	0.10	1.00	38,000	1215	0.10	1.00	25,500	1033	0.10	1.00
Ø1.5	42,000	1,440	0.15	1.50	30,000	1296	0.15	1.50	21,500	1102	0.15	1.50
Ø2	33,300	1,530	0.20	2.00	26,000	1377	0.20	2.00	17,500	1170	0.20	2.00
Ø2.5	26,500	1,530	0.25	2.50	22,500	1377	0.25	2.50	15,800	1170	0.25	2.50
Ø3	21,800	1,800	0.30	3.00	17,300	1620	0.30	3.00	11,500	1377	0.30	3.00
Ø4	16,700	2,160	0.40	4.00	13,200	1944	0.40	4.00	8,800	1652	0.40	4.00
Ø5	15,700	2,610	0.50	5.00	12,500	2349	0.50	5.00	8,300	1997	0.50	5.00
Ø6	13,100	2,700	0.60	6.00	10,350	2430	0.60	6.00	6,900	2066	0.60	6.00
Ø8	9,880	2,375	0.80	8.00	7,800	2137	0.80	8.00	5,200	1817	0.80	8.00
Ø10	7,800	2,050	1.00	10.00	6,150	1845	1.00	10.00	4,100	1568	1.00	10.00
Ø12	6,650	1,710	1.20	12.00	5,250	1539	1.20	12.00	3,500	1308	1.20	12.00
Ø16	5,540	1,670	1.60	16.00	4,340	1503	1.60	16.00	2,600	1278	1.60	16.00



**측면 절삭 Side Cutting**

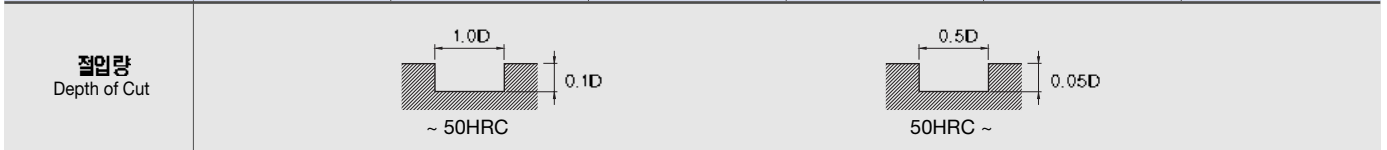
피삭재 Material	합금강 Alloy Steels				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness	30 ~ 40HRC				40 ~ 50HRC				50 ~ 52HRC			
외경 Outside Diameter	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø1	48,000	1,260	1.00	0.03	38,000	980	1.00	0.03	25,500	610	1.00	0.02
Ø2	33,300	1,440	2.00	0.06	26,000	1160	2.00	0.06	17,500	720	2.00	0.04
Ø3	21,800	1,440	3.00	0.09	17,300	1160	3.00	0.09	11,500	720	3.00	0.06
Ø4	16,700	1,500	4.00	0.12	13,200	1200	4.00	0.12	8,800	750	4.00	0.08
Ø5	15,700	1,740	5.00	0.15	12,500	1380	5.00	0.15	8,300	850	5.00	0.10
Ø6	13,100	1,620	6.00	0.18	10,350	1320	6.00	0.18	6,900	830	6.00	0.12
Ø8	9,880	1,584	8.00	0.24	7,800	1230	8.00	0.24	5,200	760	8.00	0.16
Ø10	7,800	1,440	10.00	0.30	6,150	1160	10.00	0.30	4,100	700	10.00	0.20
Ø12	6,650	1,440	12.00	0.36	5,250	1160	12.00	0.36	3,500	700	12.00	0.24
Ø16	5,540	1,200	16.00	0.39	4,340	1055	16.00	0.39	2,600	630	16.00	0.32



- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- HRC52 이상 고경도강 가공시 52HRC 조건의 같은 직경 대비 상기 절삭조건에 20% DOWN 해주십시오.
- 상기 절삭 조건표는 2날 기준이며, 4날시 회전수는 유지하고, 피드는 안정적인 속도 내에서 최대 30%까지 UP 해주십시오.
- 상기 절삭조건에 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할때 스피들 속도와 이송속도를 비례적으로 조정 하십시오.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (Ø1이하 사용시 진동 허용 관리 5µm 이내 일것.)
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- 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 workpiece HRC over 52 hardened steel , reduce 20% of the RPM and feed compared to the same diameter.
- The parameters on the table is based on 2flutes. For using 4flutes, use the same RPM and raise up the feed up to 30% in stable milling condition.
- 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 (Ø1 or less, the vibration tolerance management should be within 5µm).
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

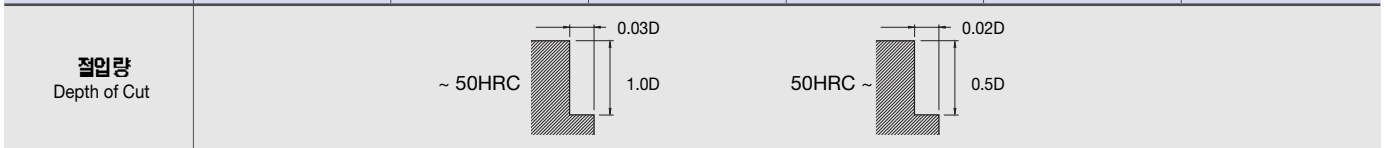
## 홈 절삭 Slotting

피삭재 Material	합금강 Alloy Steels				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
	30 ~ 40HRC				40 ~ 50HRC				50 ~ 52HRC			
경도 Hardness	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø1	13,000	60	0.10	1.0	9,000	40	0.10	1.0	5,700	15	0.05	0.50
Ø1.5	10,000	60	0.15	1.5	6,000	50	0.15	1.5	4,500	15	0.08	0.75
Ø2	6,400	60	0.20	2.0	4,800	50	0.20	2.0	3,000	15	0.10	1.00
Ø3	4,200	65	0.30	3.0	3,400	60	0.30	3.0	2,100	20	0.15	1.50
Ø4	3,400	65	0.40	4.0	2,700	33	0.40	4.0	1,700	20	0.20	2.00
Ø5	2,900	65	0.50	5.0	2,300	44	0.50	5.0	1,500	20	0.25	2.50
Ø6	2,500	70	0.60	6.0	2,000	55	0.60	6.0	1,300	28	0.30	3.00
Ø8	1,900	70	0.80	8.0	1,500	55	0.80	8.0	1,000	28	0.40	4.00
Ø10	1,600	70	1.00	10.0	1,300	55	1.00	10.0	800	28	0.50	5.00
Ø12	1,300	65	1.20	12.0	1,100	50	1.20	12.0	670	22	0.60	6.00



## 측면 절삭 Side Cutting

피삭재 Material	합금강 Alloy Steels				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
	30 ~ 40HRC				40 ~ 50HRC				50 ~ 52HRC			
경도 Hardness	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø1	13,000	60	1	0.030	9,000	35	1	0.030	5,700	20	0.50	0.02
Ø1.5	10,000	60	2	0.045	6,000	45	2	0.045	4,500	35	0.75	0.03
Ø2	6,400	60	2	0.060	4,800	45	2	0.060	3,000	30	1.00	0.04
Ø3	4,200	65	3	0.090	3,400	55	3	0.090	2,100	40	1.50	0.06
Ø4	3,400	80	4	0.120	2,700	65	4	0.120	1,700	50	2.00	0.08
Ø5	2,900	100	5	0.150	2,300	80	5	0.150	1,500	60	2.50	0.10
Ø6	2,500	120	6	0.180	2,000	100	6	0.180	1,300	75	3.00	0.12
Ø8	1,900	130	8	0.240	1,500	100	8	0.240	1,000	85	4.00	0.16
Ø10	1,600	130	10	0.300	1,300	100	10	0.300	800	75	5.00	0.20
Ø12	1,300	120	12	0.360	1,100	90	12	0.360	670	60	6.00	0.24



- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- HRC55 이상 고경도강 가공시 55HRC 조건의 같은 직경 대비 상기 절삭조건의 20% DOWN 해주십시오.
- 상기 절삭 조건표는 3날 기준이며, 4날시 회전수는 유지하고, 피드는 안정적인 속도 내에서 최대 50%까지 UP 해주십시오.
- 상기 절삭조건의 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할때 스피들 속도와 이송속도를 비례적으로 조정 하십시오.
- 에어브로, 절삭유, 오일 미스트 콜런트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- 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 workpiece HRC over 55 hardened steel , reduce 20% of the RPM and feed compared to the same diameter.
- The parameters on the table is based on 3flutes. For using 4flutes, use the same RPM and raise up the feed up to 50% in stable milling condition.
- 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

## 측면 절삭 Side Cutting

피삭재 Material	합금강 Alloy Steels				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness	30 ~ 40HRC				40 ~ 50HRC				50 ~ 52HRC			
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
Ø1	40,000	960	1.5	0.050	40,000	880	1.5	0.050	40,000	615	0.50	0.03
Ø1.5	40,000	1,200	2.3	0.075	40,000	1000	2.3	0.075	38,500	700	0.75	0.05
Ø2	40,000	1,600	3.0	0.100	38,000	1440	3.0	0.100	36,500	1000	1.00	0.06
Ø3	38,400	3,650	4.5	0.150	34,560	3280	4.5	0.150	27,650	2300	1.50	0.09
Ø4	28,800	4,220	6.0	0.200	25,920	3800	6.0	0.200	20,730	2660	2.00	0.12
Ø5	24,000	4,800	7.5	0.250	21,600	4320	7.5	0.250	17,280	3020	2.50	0.15
Ø6	19,200	5,570	9.0	0.300	17,280	5010	9.0	0.300	13,820	3500	2.50	0.18
Ø8	14,400	5,570	12.0	0.400	12,960	5010	12.0	0.400	10,370	3500	3.00	0.24
Ø10	11,520	5,570	15.0	0.500	10,360	5010	15.0	0.500	8,290	3500	4.00	0.30
Ø12	9,600	4,600	18.0	0.600	8,640	4140	18.0	0.600	6,900	2900	6.00	0.36
Ø14	8,950	4,130	21.0	0.700	8,140	3740	21.0	0.700	6,120	2460	7.00	0.42
Ø16	7,200	3,460	24.0	0.800	6,480	3110	24.0	0.800	5,190	2180	8.00	0.48

~ 50HRC

50HRC ~

- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- HRC52 이상 고경도강 가공시 52HRC 조건의 같은 직경 대비 상기 절삭조건의 20% DOWN 해주십시오.
- 유효장이 길게 체결할시 회전수와 피드를 같은 비율로 DOWN 해주십시오.
- 상기 절삭조건의 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할때 스피들 속도와 이송속도를 비례적으로 조정 하십시오.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- 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 workpiece HRC over 52 hardened steel , reduce 20% of the RPM and feed compared to the same diameter.
- If you clamp the endmill with long overhang of effective length, reduce the RPM and feed in the same proportion.
- 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

홈 절삭 Slotting												
피삭재 Material	합금강 Alloy Steels				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness	30 ~ 40HRC				40 ~ 50HRC				50 ~ 52HRC			
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
Ø1	43,200	2,040	0.05	1.0	24,200	990	0.05	1.0	22,950	400	0.02	0.80
Ø1.5	28,250	2,160	0.08	1.5	23,850	1,090	0.08	1.5	20,340	440	0.03	1.20
Ø2	29,970	2,430	0.10	2.0	15,570	1,200	0.10	2.0	15,750	470	0.04	1.60
Ø3	19,620	2,470	0.15	3.0	11,880	1,230	0.15	3.0	10,350	480	0.06	2.40
Ø4	15,030	2,530	0.20	4.0	11,250	1,310	0.20	4.0	7,920	490	0.08	3.20
Ø5	14,130	2,700	0.25	5.0	9,315	1,280	0.25	5.0	7,470	520	0.10	4.00
Ø6	11,790	2,630	0.30	6.0	7,020	1,170	0.30	6.0	6,210	510	0.12	4.80
Ø8	8,890	2,400	0.40	8.0	5,530	1,090	0.40	8.0	4,680	470	0.16	6.40
Ø10	7,020	2,240	0.50	10.0	4,720	1,090	0.50	10.0	3,690	440	0.20	8.00
Ø12	5,985	2,240	0.60	12.0	4,350	1,050	0.60	12.0	3,150	440	0.24	9.60

절입량  
Depth of Cut

~ 50HRC

50HRC ~

경사진면 절삭  
Inclined Cutting

측면 절삭 Side Cutting												
피삭재 Material	합금강 Alloy Steels				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness	30 ~ 40HRC				40 ~ 50HRC				50 ~ 52HRC			
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
Ø1	43,200	870	1.5	0.050	34,200	780	1.5	0.050	22,950	470	0.50	0.03
Ø1.5	37,080	980	2.3	0.075	29,250	890	2.3	0.075	19,350	550	0.75	0.05
Ø2	29,970	1,280	3.0	0.100	23,400	1,150	3.0	0.100	15,750	690	1.00	0.06
Ø3	19,620	1,300	4.5	0.150	15,570	1,180	4.5	0.150	13,500	700	1.50	0.09
Ø4	15,030	1,330	6.0	0.200	11,880	1,200	6.0	0.200	7,920	720	2.00	0.12
Ø5	14,130	1,550	7.5	0.250	11,250	1,400	7.5	0.250	7,470	840	2.50	0.15
Ø6	11,790	1,440	9.0	0.300	9,310	1,300	9.0	0.300	6,210	780	2.50	0.18
Ø8	8,890	1,410	12.0	0.400	7,020	1,270	12.0	0.400	4,680	760	3.00	0.24
Ø10	7,020	1,280	15.0	0.500	5,530	1,150	15.0	0.500	3,690	690	4.00	0.30
Ø12	5,980	1,280	18.0	0.600	4,720	1,150	18.0	0.600	3,150	690	6.00	0.36

절입량  
Depth of Cut

~ 50HRC

50HRC ~

- 상기 절삭조건표는 2날 기준이며, 4날시 회전수는 유지하고 피드는 안정적인 속도 내에서 최대 30%까지 UP 해주십시오.
- HRC52 이상인 경우 같은 직경의 같은 비율로 20% DOWN 시켜 주십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30% 이하로 줄이십시오.
- 곡면 절삭시 날경의 코너R 보다 낮은 이동 PITCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도 내에서 피드를 최대 30%까지 UP 해주십시오.
- 홈 절삭시 날경의 코너R 대비 Ae 값을 설정 하십시오.
- 상기 절삭조건표의 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 피삭재와 절삭형상을 위한 적절한 클러트 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.

피삭재 Material		합금강 Alloy Steels				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness		30 ~ 40HRC				40 ~ 50HRC				50 ~ 52HRC			
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
∅1	R0.2	40,500	6,230	0.05	0.06	37,800	6,940	0.03	0.05	31,500	6,050	0.02	0.05
∅1.5	R0.5	36,000	8,010	0.06	0.72	36,000	7,120	0.04	0.65	27,000	6,230	0.03	0.60
∅2	R0.5	29,700	8,900	0.08	0.96	24,300	7,480	0.05	0.86	21,600	6,670	0.04	0.80
∅3	R0.5	19,800	9,790	0.12	1.44	16,200	8,010	0.08	1.30	14,400	7,560	0.06	1.20
∅4	R0.5	17,100	11,570	0.17	2.04	14,400	8,900	0.13	1.84	11,700	8,900	0.09	1.70
-	R1.0	15,300	10,680	0.15	1.80	12,600	8,450	0.12	1.62	10,800	7,830	0.08	1.50
∅5	R0.5	13,500	12,460	0.23	2.76	10,800	10,680	0.17	2.48	9,900	8,900	0.12	2.30
-	R1.0	11,700	11,570	0.20	2.40	9,900	9,790	0.15	2.16	8,640	8,450	0.10	2.00
∅6	R0.5	11,680	13,650	0.29	3.42	9,540	11,570	0.17	3.08	8,550	10,680	0.11	2.85
-	R1.0	11,340	11,210	0.28	3.36	8,930	11,210	0.17	3.02	8,100	9,790	0.11	2.80
-	R1.5	9,900	11,570	0.25	3.00	8,100	9,790	0.15	2.70	7,200	8,540	0.10	2.50
∅8	R0.5	7,920	14,680	0.34	4.10	7,380	11,570	0.23	3.69	6,390	11,570	0.17	3.42
-	R1.0	7,560	13,350	0.34	4.03	7,200	10,680	0.22	3.63	6,030	9,790	0.17	3.36
-	R2.0	7,380	11,570	0.30	3.60	6,300	9,790	0.20	3.24	5,400	8,540	0.15	3.00
∅10	R0.5	6,730	13,300	0.34	6.16	5,700	11,260	0.23	5.54	4,970	9,720	0.17	5.13
-	R1.0	6,550	12,960	0.34	6.05	5,540	10,960	0.22	5.44	4,840	9,470	0.17	5.04
-	R2.0	5,850	11,570	0.30	5.40	4,950	9,790	0.20	4.86	4,320	8,450	0.15	4.50
∅12	R0.5	6,300	13,350	0.53	6.37	4,880	10,502	0.35	5.73	4,350	9,450	0.30	5.31
-	R1.0	5,760	12,460	0.51	6.16	4,760	10,230	0.34	5.54	4,240	9,210	0.29	5.13
-	R2.0	5,400	11,120	0.50	6.05	4,640	9,970	0.34	5.44	4,130	8,970	0.28	5.04
-	R3.0	4,950	10,680	0.45	5.40	4,140	8,900	0.30	4.86	3,690	8,010	0.25	4.50

<p><b>절입량</b> Depth of Cut</p>		<p><b>경사진면 절삭</b> Inclined Cutting</p>
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### ■ Coefficients respective of tool overhang

Type	Overhang	Revolution	Feed rate	Depth of Cut ap
Straight	L/D ≤ 5	100%	100%	100%
	L/D = 6	90%	80%	80%
	L/D = 7	80%	70%	70%
Taper neck	L/D = 6	100%	100%	100%
	L/D = 8	90%	80%	80%
	L/D ≤ 10	80%	70%	70%

- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30% 이하로 줄어십시오.
- 측면 절삭시 코너 R 참고하여 절삭 하시기 바랍니다.
- 곡면 절삭시 날경의 코너 R 보다 낮은 이동 PITCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도 내에서 피드를 최대 30%까지 UP 해주십시오.
- 상기 절삭조건외의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 적용 기계의 회전속도가 부족한 경우에는 회전 속도와 이송속도를 같은 비율로 줄여서 적용합니다.
- 유효장 길이가 긴 경우, 위 표와같이 RPM과 FEED를 낮춰주세요.
- 절입깊이가 얇은 경우, RPM과 FEED를 증가해주세요.
- 원활한 칩배출을 위하여 에어브로우나 오일 미스트를 추천합니다.
- If the effective length is long, reduce the RPM and feed maximum 30%.
- For side milling, refer to the corner radius value.
- 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.
- 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, adjust RPM and feed in the same proportion.
- If the effective length is long, refer to the table (Coefficients respective of tool overhang) and adjust the RPM and feed.
- If you use small value of Ap, raise up the RPM and feed.
- Air blow or oil mist is recommended for smooth chip emission.



피삭재 Material		동 Copper				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness						40 ~ 50HRC				50 ~ 52HRC			
반경 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
R0.05	—	54,000	85	0.004	0.004	48,000	75	0.004	0.004	48,000	55	0.002	0.002
	0.5	54,000	430	0.010	0.010	48,000	350	0.006	0.007	48,000	280	0.006	0.007
R0.1	1	54,000	380	0.008	0.008	48,000	330	0.005	0.005	48,000	250	0.005	0.005
	1.5	47,000	320	0.006	0.006	47,000	250	0.004	0.004	47,000	200	0.004	0.004
	2	42,000	290	0.004	0.004	42,000	200	0.003	0.003	42,000	200	0.003	0.003
	1.5	54,000	640	0.014	0.015	48,000	480	0.010	0.010	41,000	370	0.009	0.010
R0.15	2	49,000	530	0.011	0.011	43,000	370	0.008	0.008	37,000	270	0.008	0.008
	3	43,000	460	0.009	0.010	38,000	320	0.007	0.006	32,000	240	0.006	0.006
	4	37,000	300	0.004	0.006	28,000	200	0.003	0.004	24,000	160	0.003	0.004
	5	31,000	200	0.002	0.004	26,000	125	0.001	0.003	18,000	110	0.002	0.003
	1	54,000	870	0.023	0.036	48,000	660	0.018	0.024	37,000	450	0.015	0.024
	2	54,000	790	0.022	0.036	48,000	590	0.018	0.024	37,000	400	0.015	0.020
R0.2	3	50,000	660	0.017	0.018	41,000	420	0.012	0.012	31,000	280	0.011	0.012
	4	50,000	640	0.012	0.018	38,000	400	0.009	0.012	30,000	270	0.009	0.012
	5	37,000	410	0.009	0.018	29,000	330	0.008	0.012	26,000	260	0.007	0.012
	6	37,000	360	0.006	0.010	29,000	260	0.005	0.006	26,000	200	0.004	0.006
	8	27,000	200	0.003	0.006	27,000	170	0.003	0.003	23,000	150	0.002	0.003
	10	20,000	110	0.002	0.004	25,000	110	0.002	0.002	20,000	110	0.001	0.002
	1	57,000	1,380	0.029	0.054	42,000	830	0.023	0.036	32,000	550	0.018	0.036
	2	57,000	1,250	0.028	0.054	42,000	750	0.022	0.036	32,000	500	0.018	0.036
R0.25	3	55,000	1,010	0.021	0.036	38,000	580	0.017	0.024	31,000	400	0.014	0.024
	4	55,000	1,010	0.021	0.036	38,000	580	0.017	0.024	31,000	400	0.014	0.024
	5	48,000	800	0.016	0.018	33,000	480	0.012	0.012	30,000	390	0.009	0.012
	6	36,000	610	0.009	0.018	28,000	400	0.008	0.012	27,000	330	0.005	0.012
	8	36,000	590	0.009	0.018	28,000	400	0.008	0.012	27,000	330	0.005	0.012
	10	36,000	460	0.009	0.018	28,000	400	0.008	0.012	27,000	330	0.005	0.012
	12	24,000	280	0.004	0.010	26,000	280	0.004	0.006	24,000	280	0.002	0.006
	14	16,000	170	0.001	0.006	24,000	200	0.002	0.003	21,000	240	0.001	0.003
	1	57,000	1,670	0.035	0.144	37,000	840	0.027	0.096	27,000	540	0.023	0.096
	2	57,000	1,540	0.034	0.144	37,000	770	0.027	0.096	27,000	500	0.021	0.096
R0.3	3	57,000	1,540	0.034	0.144	37,000	770	0.027	0.096	27,000	500	0.021	0.096
	4	54,000	1,130	0.026	0.108	35,000	600	0.020	0.072	26,000	380	0.016	0.072
	5	46,000	960	0.019	0.072	28,000	460	0.016	0.048	26,000	370	0.012	0.048
	6	46,000	960	0.019	0.072	28,000	460	0.016	0.048	26,000	370	0.012	0.048
	8	30,000	570	0.010	0.054	24,000	400	0.009	0.036	23,000	320	0.006	0.036
	10	30,000	490	0.007	0.036	24,000	330	0.006	0.024	23,000	290	0.004	0.024
	12	30,000	490	0.007	0.036	24,000	330	0.006	0.024	23,000	290	0.004	0.024
	14	20,000	300	0.004	0.027	22,000	300	0.004	0.018	20,000	250	0.002	0.018
	16	13,000	180	0.002	0.020	21,000	260	0.002	0.014	18,000	220	0.001	0.014
	2	56,000	1,800	0.050	0.162	35,000	740	0.039	0.108	27,000	500	0.031	0.108
R0.35	4	54,500	1,500	0.045	0.063	33,000	600	0.035	0.042	26,500	410	0.029	0.096
	8	32,000	800	0.019	0.072	12,215	420	0.020	0.048	22,500	355	0.012	0.048
	10	26,500	540	0.017	0.063	22,500	380	0.014	0.042	21,500	330	0.011	0.042
	12	23,000	420	0.017	0.063	21,500	380	0.012	0.032	21,500	320	0.010	0.042
	2	55,000	2,060	0.063	0.180	33,000	710	0.050	0.120	27,000	500	0.041	0.120
	4	55,000	1,860	0.063	0.180	31,000	600	0.050	0.120	27,000	440	0.041	0.120
R0.4	6	47,000	1,410	0.038	0.108	28,000	570	0.030	0.072	22,000	390	0.024	0.072
	8	34,000	1,040	0.027	0.090	21,000	430	0.021	0.060	22,000	390	0.018	0.060
	10	23,000	600	0.027	0.090	21,000	430	0.021	0.060	20,000	370	0.017	0.060
	12	16,000	350	0.027	0.090	19,000	430	0.018	0.040	20,000	350	0.016	0.060
	14	11,000	200	0.027	0.090	19,000	430	0.015	0.027	20,000	330	0.015	0.060
	16	7,600	115	0.027	0.090	16,000	430	0.013	0.018	20,000	310	0.014	0.060
R0.45	4	50,500	1,900	0.067	0.190	32,000	685	0.054	0.130	24,500	460	0.043	0.180
	2	46,000	2,000	0.072	0.360	32,000	770	0.057	0.240	22,000	480	0.045	0.240
	3	46,000	2,000	0.072	0.360	32,000	770	0.057	0.240	22,000	480	0.045	0.240
	4	46,000	2,000	0.071	0.360	32,000	770	0.057	0.240	22,000	480	0.045	0.240
	5	46,000	2,000	0.071	0.360	32,000	770	0.057	0.240	22,000	480	0.045	0.240
R0.5	6	39,000	1,500	0.071	0.180	26,000	760	0.055	0.120	17,600	480	0.009	0.120
	8	39,000	1,500	0.043	0.180	26,000	760	0.034	0.120	17,600	480	0.027	0.120
	10	29,000	1,110	0.028	0.090	17,600	530	0.024	0.060	16,500	420	0.018	0.060
	12	18,700	660	0.027	0.090	17,600	530	0.024	0.060	16,500	420	0.018	0.060
	14	18,700	640	0.022	0.090	15,400	440	0.018	0.060	14,300	360	0.014	0.060
	16	18,700	640	0.022	0.090	15,400	440	0.018	0.060	14,300	360	0.014	0.060
	18	18,700	540	0.017	0.090	14,300	440	0.013	0.060	13,200	360	0.009	0.060
	20	18,700	540	0.017	0.054	14,300	360	0.013	0.036	13,200	300	0.009	0.036
	22	18,700	540	0.017	0.054	14,300	360	0.013	0.036	13,200	300	0.009	0.036
	25	18,700	540	0.016	0.052	14,300	360	0.013	0.030	13,200	300	0.009	0.030

피삭재 Material		동 Copper				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness						40 ~ 50HRC				50 ~ 52HRC			
반경 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
R0.6	4	38,000	2,000	0.085	0.360	26,000	770	0.068	0.024	18,200	480	0.054	0.240
	6	38,000	2,000	0.085	0.360	26,000	770	0.068	0.240	18,200	480	0.054	0.240
	8	32,000	1,490	0.084	0.360	21,000	700	0.067	0.240	15,100	440	0.054	0.240
	10	24,000	1,080	0.036	0.180	16,400	530	0.027	0.120	15,100	420	0.022	0.120
	12	24,000	1,080	0.036	0.018	15,300	530	0.027	0.120	14,100	420	0.022	0.120
	16	15,400	580	0.024	0.144	13,100	460	0.019	0.096	11,900	380	0.016	0.096
	20	15,400	580	0.017	0.090	12,100	380	0.013	0.060	11,000	320	0.009	0.060
24	15,400	580	0.010	0.060	11,100	320	0.009	0.040	9,800	290	0.070	0.040	
R0.7	6	28,000	1,470	0.099	0.270	17,600	680	0.076	0.180	13,600	440	0.063	0.180
	8	28,000	1,470	0.099	0.270	17,600	680	0.079	0.180	13,600	440	0.063	0.180
	12	19,800	1,080	0.042	0.270	13,800	530	0.033	0.180	13,600	420	0.027	0.180
	16	13,200	620	0.033	0.180	13,100	480	0.027	0.120	11,900	390	0.021	0.120
R0.75	3	30,000	2,200	0.171	0.324	21,000	1060	0.137	0.216	14,800	660	0.110	0.216
	4	30,000	2,200	0.171	0.324	21,000	1060	0.137	0.216	14,800	660	0.110	0.216
	6	30,000	1,980	0.147	0.324	21,000	940	0.117	0.216	14,800	580	0.090	0.216
	8	26,000	1,500	0.106	0.270	16,300	700	0.084	0.180	12,100	450	0.069	0.180
	10	26,000	1,500	0.106	0.270	16,300	700	0.084	0.180	12,100	450	0.069	0.180
	12	26,000	1,500	0.106	0.270	16,300	700	0.084	0.180	12,100	450	0.069	0.180
	14	18,700	1,100	0.045	0.180	12,600	530	0.036	0.120	12,100	440	0.027	0.120
	16	12,100	620	0.036	0.180	12,400	480	0.027	0.120	11,600	390	0.022	0.120
	18	12,100	620	0.036	0.180	12,400	480	0.027	0.120	11,600	390	0.022	0.120
	20	12,100	620	0.019	0.090	12,400	480	0.016	0.060	11,600	390	0.012	0.060
	22	12,100	620	0.019	0.090	12,400	480	0.016	0.060	11,000	390	0.012	0.060
	25	11,000	500	0.019	0.090	12,400	440	0.016	0.060	11,000	390	0.012	0.060
30	10,700	450	0.019	0.090	10,900	400	0.016	0.060	11,000	390	0.012	0.060	
35	10,700	410	0.019	0.090	9,000	380	0.016	0.060	11,000	390	0.012	0.060	
R0.8	6	27,040	2,600	0.220	0.580	18,900	1200	0.180	0.390	16,500	760	0.150	0.390
	8	26,000	1,970	0.157	0.324	18,900	940	0.126	0.216	13,800	580	0.102	0.216
	12	25,000	1,490	0.112	0.180	15,100	700	0.090	0.120	11,500	440	0.072	0.120
	16	17,600	1,100	0.046	0.144	12,300	530	0.036	0.096	11,400	440	0.030	0.096
	20	11,000	630	0.036	0.090	11,500	480	0.030	0.060	10,900	400	0.024	0.060
R0.9	6	32,000	2,600	0.230	0.021	18,400	1200	0.185	0.320	18,400	738	0.150	0.320
	8	26,000	1,950	0.165	0.270	16,300	930	0.132	0.240	13,800	570	0.108	0.240
	12	21,000	1,480	0.120	0.270	13,800	700	0.094	0.180	10,300	440	0.077	0.180
	16	15,400	1,080	0.048	0.180	10,800	530	0.039	0.120	9,900	420	0.031	0.120
	20	10,500	630	0.039	0.090	10,200	480	0.031	0.060	9,700	400	0.025	0.060
R1	4	22,000	2,140	0.232	0.540	18,500	1260	0.185	0.360	13,200	960	0.150	0.360
	6	22,000	2,140	0.232	0.540	18,500	1260	0.185	0.360	13,200	960	0.150	0.360
	8	22,000	1,920	0.185	0.360	18,500	1120	0.147	0.240	13,200	870	0.120	0.240
	10	22,000	1,920	0.185	0.360	18,500	1120	0.147	0.240	13,200	870	0.120	0.240
	12	18,700	1,470	0.166	0.360	16,000	990	0.133	0.240	11,700	780	0.107	0.240
	14	18,700	1,470	0.166	0.360	16,000	990	0.133	0.240	11,700	780	0.107	0.240
	16	18,700	1,470	0.148	0.360	16,000	990	0.118	0.240	11,700	780	0.090	0.240
	18	14,300	1,070	0.093	0.180	14,700	580	0.074	0.120	11,600	580	0.061	0.120
	20	14,300	1,070	0.093	0.180	14,700	580	0.074	0.120	11,600	580	0.061	0.120
	22	9,500	630	0.074	0.180	10,600	450	0.058	0.120	10,200	450	0.045	0.120
	25	9,500	630	0.074	0.180	10,600	450	0.058	0.120	10,200	450	0.045	0.120
	30	9,500	530	0.033	0.090	10,600	450	0.026	0.060	10,200	380	0.021	0.060
35	9,500	530	0.026	0.090	10,600	380	0.019	0.060	10,200	380	0.017	0.060	
40	9,500	530	0.026	0.090	10,600	380	0.019	0.060	10,200	380	0.017	0.060	
45	9,500	445	0.011	0.045	10,000	380	0.009	0.030	10,200	320	0.008	0.030	
R1.25	8	18,400	2,400	0.232	0.360	14,500	1400	0.185	0.240	9,700	1080	0.150	0.240
	10	18,400	2,400	0.232	0.360	14,500	1400	0.185	0.240	9,700	1080	0.150	0.240
	16	16,100	1,810	0.208	0.360	13,500	1230	0.166	0.240	8,400	980	0.135	0.240
	20	11,500	1,330	0.116	0.180	10,200	950	0.093	0.120	8,400	980	0.074	0.120
	25	6,900	770	0.093	0.180	8,400	540	0.074	0.120	8,400	560	0.061	0.120
	30	6,900	770	0.040	0.090	8,400	540	0.033	0.060	8,400	560	0.026	0.060
35	6,900	770	0.018	0.050	8,400	540	0.015	0.030	8,400	560	0.011	0.030	
R1.5	6	15,000	2,890	0.278	0.540	12,900	1680	0.222	0.360	9,200	1300	0.180	0.360
	8	15,000	2,890	0.278	0.540	12,900	1680	0.222	0.360	9,200	1300	0.180	0.360
	10	15,000	2,600	0.278	0.540	12,900	1680	0.222	0.360	9,200	1300	0.180	0.360
	12	15,000	2,600	0.278	0.540	12,900	1510	0.222	0.360	9,200	1170	0.180	0.360
	16	12,700	1,970	0.029	0.504	11,300	1330	0.166	0.360	8,100	1040	0.135	0.360
	20	12,700	1,970	0.029	0.504	11,300	1330	0.166	0.360	8,100	1040	0.135	0.360
	25	10,100	1,450	0.139	0.270	8,800	1040	0.111	0.180	8,100	1040	0.090	0.180
	30	10,100	1,450	0.139	0.270	8,800	780	0.111	0.180	8,100	780	0.090	0.180
35	6,600	840	0.073	0.270	7,900	620	0.055	0.180	7,500	650	0.045	0.180	

피삭재 Material		동 Copper				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness						40 ~ 50HRC				50 ~ 52HRC			
반경 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
R1.5	40	6,600	840	0.073	0.270	7,900	620	0.055	0.180	7,500	520	0.045	0.180
	45	4,500	500	0.040	0.270	6,200	500	0.035	0.100	7,000	450	0.023	0.180
	50	4,300	490	0.040	0.270	6,200	500	0.030	0.090	7,000	350	0.023	0.180
	60	3,700	420	0.034	0.360	5,900	450	0.030	0.080	6,000	300	0.020	0.150
R2	8	11,500	2,710	0.370	0.900	9,700	1560	0.297	0.600	6,800	1210	0.241	0.600
	10	11,500	2,710	0.370	0.900	9,700	1560	0.297	0.600	6,800	1210	0.241	0.600
	12	11,500	2,710	0.390	0.900	9,700	1560	0.297	0.600	6,800	1210	0.241	0.600
	16	11,500	2,710	0.390	0.900	9,700	1560	0.297	0.600	6,800	1210	0.241	0.600
	20	11,500	2,710	0.390	0.900	9,700	1560	0.297	0.600	6,800	1210	0.241	0.600
	25	10,300	1,850	0.279	0.540	8,400	1250	0.223	0.360	6,000	980	0.180	0.360
	30	10,300	1,850	0.279	0.540	8,400	1250	0.223	0.360	6,000	980	0.180	0.361
	35	7,500	1,360	0.185	0.540	6,600	950	0.148	0.360	6,000	700	0.120	0.360
R2.5	40	7,500	1,360	0.185	0.540	6,600	950	0.148	0.360	6,000	700	0.120	0.360
	45	5,000	780	0.093	0.360	5,900	470	0.074	0.240	5,600	490	0.060	0.240
	50	5,000	780	0.093	0.360	5,900	470	0.074	0.240	5,600	490	0.060	0.240
	55	4,500	640	0.090	0.330	5,200	375	0.068	0.225	5,400	370	0.050	0.251
	60	4,000	500	0.078	0.300	5,000	280	0.062	0.210	5,200	250	0.040	0.180
	15	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
R3	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
	45	5,000	520	0.173	0.900	6,800	290	0.165	0.600	3,900	240	0.120	0.600
	50	4,500	330	0.131	0.900	6,800	180	0.135	0.600	3,500	150	0.094	0.600
	60	4,000	300	0.099	0.800	6,800	110	0.112	0.600	3,300	100	0.074	0.600
	15	8,000	2,530	0.555	1.800	7,400	1670	0.443	1.200	5,200	1300	0.360	1.200
R4	30	8,000	1,810	0.418	1.080	7,400	1500	0.334	0.720	4,600	1170	0.270	0.720
	25	9,000	2,400	0.600	1.500	7,200	1200	0.500	1.000	5,200	920	0.350	1.000
R5	30	7,700	1,500	0.450	1.200	7,200	740	0.380	0.800	4,500	580	0.300	0.800
	30	7,800	1,300	0.300	0.900	6,800	720	0.230	0.600	4,600	570	0.190	0.570
R6	35	7,125	1,292	0.176	0.513	6,800	902	0.140	0.340	5,700	665	0.110	0.340
	30	7,410	1,235	0.285	0.855	6,350	684	0.210	0.570	4,370	541	0.181	0.550
R6	40	6,800	1,100	0.260	0.780	6,350	630	0.200	0.520	4,020	500	0.160	0.500

<p><b>절삭깊이</b> Depth of Cut</p>	<ul style="list-style-type: none"> <li>• Ap : Axial Depth</li> <li>• Ae : Radial Depth</li> <li>• D : Outside Diameter</li> <li>• n : Speed</li> <li>• Vf : Feed</li> </ul>	
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- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰 주세요.
- 절삭조건이 없는 직경 및 유효장은 비슷한 직경 및 유효장에 비례하여 UP&DOWN 하여 설정 하십시오.
- HRC52 이상 고경도강 가공시 52HRC 조건의 같은 직경 대비 상기 절삭조건의 20% DOWN 해주십시오.
- 상기 절삭조건의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 적용 기계의 회전속도가 부족한 경우에는 회전 속도와 이송속도를 같은 비율로 줄여서 적용합니다.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (Ø1이하 사용시 진동 허용 관리 5µm이내 일것.)
- 원활한 칩배출을 위하여 에어브로 혹은 미스트 클린트 사용을 추천하며, 동 가공시 습식 클린트를 추천 합니다.
- If the effective length is long, reduce the RPM and feed in the same proportion.
- If the effective length or overall length of your tool are not show above the table, adjust your parameter with upper or lower diameter of parameter.
- When milling workpiece HRC over 52 hardened steel , reduce 20% of the 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, adjust RPM and feed in the same proportion.
- Use a machine with low vibration and good rigidity ( Ø1 or less, the vibration tolerance management should be within 5µm).
- Air blow or oil mist is recommended for smooth chip emission, and dry milling is recommended for copper material.

피삭재 Material		동 Copper				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness						40 ~ 50HRC				50 ~ 52HRC			
반경 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
R0.05	0.2	54,000	360	0.010	0.050	43,200	306	0.009	0.045	34,560	245	0.007	0.036
R0.075	0.15	54,000	456	0.010	0.030	43,200	388	0.009	0.027	34,560	310	0.007	0.022
R0.1	0.2	54,000	516	0.012	0.008	43,200	439	0.011	0.007	34,560	351	0.009	0.006
	0.4	54,000	516	0.005	0.008	43,200	439	0.005	0.007	34,560	351	0.004	0.006
R0.1.5	0.3	54,000	864	0.020	0.013	43,200	734	0.018	0.012	34,560	588	0.014	0.009
	0.6	54,000	864	0.010	0.013	43,200	734	0.009	0.012	34,560	588	0.007	0.009
R0.2	0.4	54,000	1,044	0.028	0.016	43,200	887	0.025	0.014	34,560	710	0.020	0.012
	0.8	54,000	1,044	0.014	0.016	43,200	887	0.013	0.014	34,560	710	0.010	0.012
R0.25	0.5	56,000	1,500	0.035	0.022	44,800	1,275	0.032	0.020	35,840	1,020	0.025	0.016
R0.3	0.6	58,000	1,812	0.042	0.026	46,400	1,540	0.038	0.023	37,120	1,232	0.030	0.019
R0.35	0.7	55,000	2,028	0.049	0.031	44,000	1,724	0.044	0.028	35,200	1,379	0.035	0.022
R0.4	0.8	52,000	2,244	0.056	0.036	41,600	1,907	0.050	0.032	33,280	1,526	0.040	0.026
	2	52,000	2,244	0.300	0.036	41,600	1,907	0.270	0.032	33,280	1,526	0.216	0.026
R0.5	1	41,000	1,992	0.063	0.040	32,800	1,693	0.057	0.036	26,240	1,355	0.045	0.029
	2.5	41,000	1,992	0.022	0.040	32,800	1,693	0.020	0.036	26,240	1,355	0.016	0.029
R0.6	3	34,000	2,088	0.650	0.400	27,200	1,775	0.585	0.360	21,760	1,420	0.468	0.288
R0.75	1.5	27,000	2,196	0.087	0.068	21,600	1,867	0.078	0.061	17,280	1,493	0.063	0.049
	4	27,000	2,196	0.052	0.068	21,600	1,867	0.047	0.061	17,280	1,493	0.037	0.049
R1	2	20,000	2,136	0.112	0.089	16,000	1,816	0.101	0.080	12,800	1,452	0.081	0.064
	5	20,000	2,136	0.070	0.091	16,000	1,816	0.063	0.082	12,800	1,452	0.050	0.066
R1.25	6	16,000	2,208	0.067	0.115	12,800	1,877	0.060	0.104	10,240	1,501	0.048	0.083
R1.5	3	13,000	2,664	0.197	0.171	10,400	2,264	0.177	0.154	8,320	1,812	0.142	0.123
	8	13,000	2,664	0.100	0.171	10,400	2,264	0.090	0.154	8,320	1,812	0.072	0.123
R1.75	8	11,500	2,580	0.183	0.190	9,200	2,193	0.165	0.171	7,360	1,754	0.132	0.136
R2	4	10,000	2,496	0.266	0.208	8,000	2,122	0.239	0.187	6,400	1,697	0.192	0.150
	8	10,000	2,496	0.134	0.208	8,000	2,122	0.121	0.187	6,400	1,697	0.096	0.150
R2.5	5	8,300	2,388	0.215	0.240	6,640	2,030	0.194	0.216	5,312	1,624	0.155	0.173
	8	8,300	2,388	0.200	0.240	6,640	2,030	0.180	0.216	5,312	1,624	0.144	0.173
R3	10	6,900	2,328	0.290	0.281	5,520	1,979	0.261	0.253	4,416	1,583	0.209	0.202
	12	6,900	2,328	0.250	0.281	5,520	1,979	0.225	0.253	4,416	1,583	0.180	0.202
R3.5	14	6,310	1,764	0.230	0.281	5,520	1,979	0.207	0.253	4,416	1,583	0.166	0.202
	14	6,310	1,764	0.315	0.228	5,048	1,499	0.284	0.205	4,038	1,200	0.227	0.164
R4	8	5,720	1,200	0.400	0.175	4,576	1,020	0.360	0.158	3,661	816	0.288	0.126
	14	5,720	1,200	0.400	0.175	4,576	1,020	0.360	0.158	3,661	816	0.288	0.126
R4.5	16	5,135	1,020	0.450	0.165	4,108	867	0.405	0.148	3,286	694	0.324	0.118
	10	4,550	840	0.500	0.154	3,640	714	0.450	0.139	2,912	571	0.360	0.111
R5	15	4,550	840	0.500	0.154	3,640	714	0.450	0.139	2,912	571	0.360	0.111
	18	4,550	840	0.500	0.154	3,640	714	0.450	0.139	2,912	571	0.360	0.111
R5.5	20	4,160	780	0.550	0.157	3,328	663	0.495	0.141	2,662	530	0.396	0.113
	18	3,770	720	0.600	0.159	3,016	612	0.540	0.143	2,413	490	0.432	0.114
R6	22	3,770	720	0.600	0.159	3,016	612	0.540	0.143	2,413	490	0.432	0.114
	24	3,728	784	0.549	0.156	2,982	666	0.494	0.140	2,386	533	0.395	0.112
R7	24	3,686	847	0.498	0.153	2,948	720	0.448	0.137	2,359	576	0.359	0.110
R8	30	2,985	720	0.413	0.147	2,388	612	0.372	0.132	1,911	490	0.298	0.106
R10	38	2,429	432	0.276	0.133	1,943	367	0.248	0.120	1,554	294	0.198	0.096

<b>절입량</b> Depth of Cut	<ul style="list-style-type: none"> <li>• Ap : Axial Depth</li> <li>• Ae : Radial Depth</li> <li>• D : Outside Diameter</li> <li>• n : Speed</li> <li>• Vf : Feed</li> </ul>	
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- HRC52 이상 고경도강 가공시 52HRC 조건의 같은 직경 대비 상기 절삭조건의 20% DOWN 해주십시오.
- 상기 절삭조건의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 적용 기계의 회전속도가 부족한 경우에는 회전 속도와 이송속도를 같은 비율로 줄여서 적용합니다.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (Ø1이하 사용시 진동 허용 관리 5µm이내 일것.)
- 원활한 칩배출을 위하여 에어브로 혹은 미스트 클린트 사용을 추천하며, 동 가공시 습식 클린트를 추천 합니다.
- If the effective length is long, reduce the RPM and feed in the same proportion.
- If the effective length or overall length of your tool are not show above the table, adjust your parameter with upper or lower diameter of parameter.
- When milling workpiece HRC over 52 hardened steel , reduce 20% of the 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, adjust RPM and feed in the same proportion.
- Use a machine with low vibration and good rigidity (Ø1 or less, the vibration tolerance management should be within 5µm).
- Air blow or oil mist is recommended for smooth chip emission, and dry milling is recommended for copper material.

파삭재 Material		동 Copper				프리하든강 Prehardened Steels				경도강 Hardened Steels			
경도 Hardness		40 ~ 50HRC								50 ~ 52HRC			
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
Ø0.1	0.3	56,000	544	0.006	0.16	47,600	435	0.005	0.144	42,840	392	0.005	0.122
-	0.5	50,900	464	0.005	0.02	43,265	371	0.005	0.018	38,939	334	0.004	0.015
Ø0.2	0.5	56,000	544	0.006	0.16	47,600	435	0.005	0.144	42,840	392	0.005	0.122
-	1	50,900	464	0.005	0.02	43,265	371	0.005	0.018	38,939	334	0.004	0.015
-	2	48,200	400	0.003	0.006	40,970	320	0.003	0.005	36,873	288	0.002	0.005
Ø0.3	1	60,000	896	0.009	0.101	51,000	717	0.008	0.091	45,900	645	0.007	0.077
-	1.5	50,800	736	0.008	0.057	43,180	589	0.007	0.051	38,862	530	0.006	0.044
-	2	41,500	560	0.006	0.013	35,275	448	0.005	0.012	31,748	403	0.005	0.010
-	3	31,900	384	0.002	0.004	27,115	307	0.002	0.004	24,404	276	0.002	0.003
-	4	26,200	272	0.001	0.003	22,270	218	0.001	0.003	20,043	196	0.001	0.002
-	5	20,400	160	0.001	0.002	17,340	128	0.001	0.002	15,606	115	0.001	0.002
Ø0.4	1	52,700	1,056	0.012	0.054	44,795	845	0.011	0.049	40,316	760	0.009	0.041
-	5	38,500	608	0.003	0.003	32,725	486	0.003	0.003	29,453	438	0.002	0.002
-	10	33,700	416	0.001	0.001	28,645	333	0.001	0.001	25,781	300	0.001	0.001
Ø0.5	2	56,800	1,440	0.020	0.098	48,280	1,152	0.018	0.088	43,452	1,037	0.015	0.075
-	3	44,200	1,056	0.080	0.016	37,570	845	0.072	0.014	33,813	760	0.061	0.012
-	4	40,600	928	0.009	0.012	34,510	742	0.008	0.011	31,059	668	0.007	0.009
-	5	37,000	800	0.080	0.008	31,450	640	0.072	0.007	28,305	576	0.061	0.006
-	6	33,400	672	0.005	0.004	28,390	538	0.005	0.004	25,551	484	0.004	0.003
-	8	29,100	512	0.002	0.002	24,735	410	0.002	0.002	22,262	369	0.002	0.002
-	10	26,100	400	0.001	0.001	22,185	320	0.001	0.001	19,967	288	0.001	0.001
-	14	21,500	192	0.001	0.001	18,275	154	0.001	0.001	16,448	138	0.001	0.001
Ø0.6	2	63,600	1,984	0.025	0.203	54,060	1,587	0.023	0.183	48,654	1,428	0.019	0.155
-	3	52,500	1,584	0.018	0.114	44,625	1,267	0.016	0.103	40,163	1,140	0.014	0.087
-	4	41,300	1,184	0.012	0.025	35,105	947	0.011	0.023	31,595	852	0.009	0.019
-	5	36,700	1,008	0.010	0.017	31,195	806	0.009	0.015	28,076	726	0.008	0.013
-	6	32,100	832	0.007	0.008	27,285	666	0.006	0.007	24,557	599	0.005	0.006
-	8	26,800	624	0.004	0.003	22,780	499	0.004	0.003	20,502	449	0.003	0.002
-	10	23,400	48	0.002	0.002	19,890	38	0.002	0.002	17,901	35	0.002	0.002
-	12	20,900	384	0.002	0.001	17,765	307	0.002	0.001	15,989	276	0.002	0.001
-	16	16,200	160	0.001	0.001	13,770	128	0.001	0.001	12,393	115	0.001	0.001
Ø0.7	2	59,800	2,208	0.030	0.038	50,830	1,766	0.027	0.034	45,747	1,590	0.023	0.029
-	4	38,900	1,344	0.017	0.047	33,065	1,075	0.015	0.042	29,759	968	0.013	0.036
-	6	30,200	960	0.010	0.014	25,670	768	0.009	0.013	23,103	691	0.008	0.011
-	8	25,300	736	0.006	0.006	21,505	589	0.005	0.005	19,355	530	0.005	0.005
-	10	22,000	576	0.004	0.003	18,700	461	0.004	0.003	16,830	415	0.003	0.002
Ø0.8	2	41,200	1,680	0.033	0.108	35,020	1,344	0.030	0.097	31,518	1,210	0.025	0.083
-	4	37,100	1,488	0.027	0.08	31,535	1,190	0.024	0.072	28,382	1,071	0.021	0.061
-	6	28,800	1,088	0.015	0.024	24,480	870	0.014	0.022	22,032	783	0.011	0.018
-	8	24,100	832	0.009	0.01	20,485	666	0.008	0.009	18,437	599	0.007	0.008
-	10	21,000	672	0.006	0.005	17,850	538	0.005	0.005	16,065	484	0.005	0.004
-	12	18,700	544	0.004	0.003	15,895	435	0.004	0.003	14,306	392	0.003	0.002
-	14	15,600	368	0.002	0.001	13,260	294	0.002	0.001	11,934	265	0.002	0.001
Ø0.9	6	27,600	1,264	0.019	0.019	23,460	1,011	0.017	0.017	21,114	910	0.015	0.015
-	8	23,000	960	0.012	0.012	19,550	768	0.011	0.011	17,595	691	0.009	0.009
-	10	20,000	752	0.008	0.008	17,000	602	0.007	0.007	15,300	541	0.006	0.006
Ø1.0	2	37,900	2,144	0.048	0.263	30,320	1,822	0.038	0.210	27,288	1,640	0.033	0.179
-	3	37,900	2,144	0.048	0.263	30,320	1,822	0.038	0.210	27,288	1,640	0.033	0.179
-	4	34,100	1,872	0.040	0.195	27,280	1,591	0.032	0.156	24,552	1,432	0.027	0.133
-	5	30,300	1,600	0.032	0.013	24,240	1,360	0.026	0.010	21,816	1,224	0.022	0.009
-	6	26,500	1,360	0.023	0.058	21,200	1,156	0.018	0.046	19,080	1,040	0.016	0.039
-	8	22,100	1,056	0.014	0.024	17,680	898	0.011	0.019	15,912	808	0.010	0.016
-	10	19,200	848	0.010	0.013	15,360	721	0.008	0.010	13,824	649	0.007	0.009
-	12	17,200	704	0.007	0.007	13,760	598	0.006	0.006	12,384	539	0.005	0.005
-	14	15,600	576	0.005	0.005	12,480	490	0.004	0.004	11,232	441	0.003	0.003
-	16	14,300	480	0.004	0.003	11,440	408	0.003	0.002	10,296	367	0.003	0.002
-	20	12,500	320	0.003	0.001	10,000	272	0.002	0.001	9,000	245	0.002	0.001
-	25	10,800	192	0.003	0.001	8,640	163	0.002	0.001	7,776	147	0.002	0.001
-	30	9,700	80	0.002	0.001	7,760	68	0.002	0.001	6,984	61	0.001	0.001
Ø1.2	4	28,900	1,888	0.050	0.189	23,120	1,605	0.040	0.151	20,808	1,444	0.034	0.129
-	6	24,800	1,552	0.037	0.120	19,840	1,319	0.030	0.096	17,856	1,187	0.025	0.082
-	8	20,700	1,216	0.024	0.051	16,560	1,034	0.019	0.041	14,904	930	0.016	0.035
-	10	18,000	992	0.016	0.026	14,400	843	0.013	0.021	12,960	759	0.011	0.018
-	12	16,100	832	0.011	0.015	12,880	707	0.009	0.012	11,592	636	0.007	0.010
-	16	13,400	608	0.006	0.006	10,720	517	0.005	0.005	9,648	465	0.004	0.004
-	20	11,700	448	0.004	0.003	9,360	381	0.003	0.002	8,424	343	0.003	0.002
-	25	10,800	192	0.003	0.001	8,640	163	0.002	0.001	7,776	147	0.002	0.001
-	30	9,700	80	0.002	0.001	7,760	68	0.002	0.001	6,984	61	0.001	0.001

피삭재 Material		동 Copper				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness						40 ~ 50HRC				50 ~ 52HRC			
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
ø1.4	6	23,300	1,712	0.052	0.222	18,640	1,455	0.042	0.178	16,776	1,310	0.035	0.151
-	8	19,500	1,360	0.035	0.094	15,600	1,156	0.028	0.075	14,040	1,040	0.024	0.064
-	10	16,900	1,136	0.025	0.048	13,520	966	0.020	0.038	12,168	869	0.017	0.033
-	14	13,700	816	0.013	0.018	10,960	694	0.010	0.014	9,864	624	0.009	0.012
-	16	12,600	720	0.010	0.012	10,080	612	0.008	0.010	9,072	551	0.007	0.008
-	20	10,300	480	0.006	0.005	8,240	408	0.005	0.004	7,416	367	0.004	0.003
ø1.5	4	26,600	2,144	0.073	0.462	21,280	1,822	0.058	0.370	19,152	1,640	0.050	0.314
-	6	22,800	1,792	0.057	0.293	18,240	1,523	0.046	0.234	16,416	1,371	0.039	0.199
-	8	19,000	1,440	0.041	0.124	15,200	1,224	0.033	0.099	13,680	1,102	0.028	0.084
-	10	16,600	1,200	0.030	0.063	13,280	1,020	0.024	0.050	11,952	918	0.020	0.043
-	12	14,800	1,008	0.023	0.037	11,840	857	0.018	0.030	10,656	771	0.016	0.025
-	14	13,400	880	0.017	0.023	10,720	748	0.014	0.018	9,648	673	0.012	0.016
-	16	12,300	768	0.013	0.015	9,840	653	0.010	0.012	8,856	588	0.009	0.010
-	18	11,500	672	0.011	0.011	9,200	571	0.009	0.009	8,280	514	0.007	0.007
-	20	10,700	592	0.009	0.008	8,560	503	0.007	0.006	7,704	453	0.006	0.005
-	25	9,300	432	0.005	0.004	7,440	367	0.004	0.003	6,696	330	0.003	0.003
-	30	8,300	320	0.004	0.002	6,640	272	0.003	0.002	5,976	245	0.003	0.001
ø1.6	10	16,100	1,248	0.035	0.082	12,880	1,061	0.028	0.066	11,592	955	0.024	0.056
-	14	13,000	928	0.020	0.030	10,400	789	0.016	0.024	9,360	710	0.014	0.020
-	18	11,100	720	0.013	0.014	8,880	612	0.010	0.011	7,992	551	0.009	0.010
ø2.0	4	23,000	2,400	0.070	0.966	18,400	2,040	0.056	0.773	16,560	1,836	0.048	0.657
-	6	20,300	2,160	0.064	0.926	16,240	1,836	0.051	0.741	14,616	1,652	0.044	0.630
-	8	17,000	1,744	0.054	0.391	13,600	1,482	0.043	0.313	12,240	1,334	0.037	0.266
-	10	14,800	1,472	0.045	0.200	11,840	1,251	0.036	0.160	10,656	1,126	0.031	0.136
-	12	13,200	1,264	0.037	0.116	10,560	1,074	0.030	0.093	9,504	967	0.025	0.079
-	14	12,000	1,120	0.031	0.073	9,600	952	0.025	0.058	8,640	857	0.021	0.050
-	16	11,100	992	0.026	0.049	8,880	843	0.021	0.039	7,992	759	0.018	0.033
-	18	10,300	880	0.022	0.034	8,240	748	0.018	0.027	7,416	673	0.015	0.023
-	20	9,600	800	0.018	0.025	7,680	680	0.014	0.020	6,912	612	0.012	0.017
-	22	8,700	672	0.014	0.018	6,960	571	0.011	0.014	6,264	514	0.010	0.012
-	25	8,400	624	0.012	0.013	6,720	530	0.010	0.010	6,048	477	0.008	0.009
-	30	7,500	496	0.008	0.007	6,000	422	0.006	0.006	5,400	379	0.005	0.005
ø2.5	8	15,000	2,144	0.077	0.954	12,000	1,822	0.062	0.763	10,800	1,640	0.052	0.649
-	10	13,100	1,824	0.068	0.488	10,480	1,550	0.054	0.390	9,432	1,395	0.046	0.332
-	12	11,800	1,600	0.060	0.283	9,440	1,360	0.048	0.226	8,496	1,224	0.041	0.192
-	16	9,900	1,264	0.045	0.119	7,920	1,074	0.036	0.095	7,128	967	0.031	0.081
-	20	8,700	1,040	0.033	0.061	6,960	884	0.026	0.049	6,264	796	0.022	0.041
-	25	7,600	832	0.022	0.031	6,080	707	0.018	0.025	5,472	636	0.015	0.021
-	30	6,800	688	0.014	0.018	5,440	585	0.011	0.014	4,896	526	0.010	0.012
-	35	6,200	608	0.009	0.012	4,960	517	0.007	0.010	4,464	465	0.006	0.008
-	40	5,700	464	0.005	0.008	4,560	394	0.004	0.006	4,104	355	0.003	0.005
-	50	5,000	304	0.001	0.004	4,000	258	0.001	0.003	3,600	233	0.001	0.003
ø3	6	13,200	2,352	0.103	1.978	10,560	1,999	0.082	1.582	9,504	1,799	0.070	1.345
-	10	11,600	2,032	0.092	1.013	9,280	1,727	0.074	0.810	8,352	1,554	0.063	0.689
-	12	10,500	1,776	0.081	0.586	8,400	1,510	0.065	0.469	7,560	1,359	0.055	0.398
-	16	8,900	1,440	0.064	0.247	7,120	1,224	0.051	0.198	6,408	1,102	0.044	0.168
-	20	7,800	1,200	0.050	0.127	6,240	1,020	0.040	0.102	5,616	918	0.034	0.086
-	25	6,900	992	0.036	0.065	5,520	843	0.029	0.052	4,968	759	0.024	0.044
-	30	6,200	832	0.026	0.038	4,960	707	0.021	0.030	4,464	636	0.018	0.026
-	35	5,700	704	0.018	0.024	4,560	598	0.014	0.019	4,104	539	0.012	0.016
-	40	5,300	592	0.013	0.016	4,240	503	0.010	0.013	3,816	453	0.009	0.011
-	45	5,000	528	0.008	0.012	4,000	449	0.006	0.010	3,600	404	0.005	0.008
-	50	4,700	432	0.006	0.008	3,760	367	0.005	0.006	3,384	330	0.004	0.005
-	60	4,500	400	0.003	0.005	3,600	340	0.002	0.004	3,240	306	0.002	0.003
ø4	8	10,000	2,560	0.014	1.990	8,000	2,176	0.011	1.592	7,200	1,958	0.010	1.353
-	10	9,200	2,240	0.120	1.960	7,360	1,904	0.096	1.568	6,624	1,714	0.082	1.333
-	12	8,500	2,048	0.112	1.852	6,800	1,741	0.090	1.482	6,120	1,567	0.076	1.259
-	16	7,200	1,680	0.093	0.781	5,760	1,428	0.074	0.625	5,184	1,285	0.063	0.531
-	20	6,300	1,408	0.077	0.400	5,040	1,197	0.062	0.320	4,536	1,077	0.052	0.272
-	25	5,600	1,200	0.061	0.205	4,480	1,020	0.049	0.164	4,032	918	0.041	0.139
-	30	5,000	1,008	0.048	0.119	4,000	857	0.038	0.095	3,600	771	0.033	0.081
-	35	4,600	864	0.038	0.075	3,680	734	0.030	0.060	3,312	661	0.026	0.051
-	40	4,200	752	0.030	0.050	3,360	639	0.024	0.040	3,024	575	0.020	0.034
-	45	3,900	656	0.023	0.035	3,120	558	0.018	0.028	2,808	502	0.016	0.024
-	50	3,700	576	0.018	0.026	2,960	490	0.014	0.021	2,664	441	0.012	0.018
-	55	3,500	512	0.015	0.020	2,800	435	0.012	0.016	2,520	392	0.010	0.014
-	60	3,300	448	0.011	0.015	2,640	381	0.009	0.012	2,376	343	0.007	0.010

파삭재 Material		동 Copper				프리하든강 Prehardened Steels				고경도강 Hardened Steels							
경도 Hardness		40 ~ 50HRC												50 ~ 52HRC			
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				
Ø5	16	6,000	1,824	0.127	1.907	4,800	1,550	0.102	1.526	4,320	1,395	0.086	1.297				
-	20	5,300	1,568	0.121	0.977	4,240	1,333	0.097	0.782	3,816	1,200	0.082	0.664				
-	25	4,600	1,312	0.109	0.500	3,680	1,115	0.087	0.400	3,312	1,004	0.074	0.340				
-	30	4,200	1,136	0.094	0.289	3,360	966	0.075	0.231	3,024	869	0.064	0.197				
-	35	3,800	992	0.077	0.182	3,040	843	0.062	0.146	2,736	759	0.052	0.124				
-	40	3,500	864	0.060	0.122	2,800	734	0.048	0.098	2,520	661	0.041	0.083				
-	50	3,100	688	0.031	0.063	2,480	585	0.025	0.050	2,232	526	0.021	0.043				
-	60	2,800	560	0.013	0.036	2,240	476	0.010	0.029	2,016	428	0.009	0.024				
Ø6	20	4,200	1,536	0.126	2.025	3,360	1,306	0.101	1.620	3,024	1,175	0.086	1.377				
-	30	3,400	1,168	0.109	0.600	2,720	993	0.087	0.480	2,448	894	0.074	0.408				
-	40	3,000	960	0.083	0.253	2,400	816	0.066	0.202	2,160	734	0.056	0.172				
-	50	2,600	768	0.054	0.130	2,080	653	0.043	0.104	1,872	588	0.037	0.088				
-	60	2,400	656	0.031	0.075	1,920	558	0.025	0.060	1,728	502	0.021	0.051				
Ø8	20	3,200	1,456	0.180	1.600	2,560	1,238	0.144	1.280	2,304	1,114	0.122	1.088				
-	40	2,600	960	0.120	0.200	2,080	816	0.096	0.160	1,872	734	0.082	0.136				
Ø10	25	2,900	1,424	0.200	1.760	2,320	1,210	0.160	1.408	2,088	1,089	0.136	1.197				
-	45	2,200	928	0.140	0.240	1,760	789	0.112	0.192	1,584	710	0.095	0.163				
Ø12	30	2,000	1,296	0.190	1.650	1,600	1,102	0.152	1.320	1,440	991	0.129	1.122				
-	50	1,950	912	0.150	0.250	1,560	775	0.120	0.200	1,404	698	0.102	0.170				

**절입량**  
Depth of Cut

Slotting

- Ap : Axial Depth
- D : Outside Diameter



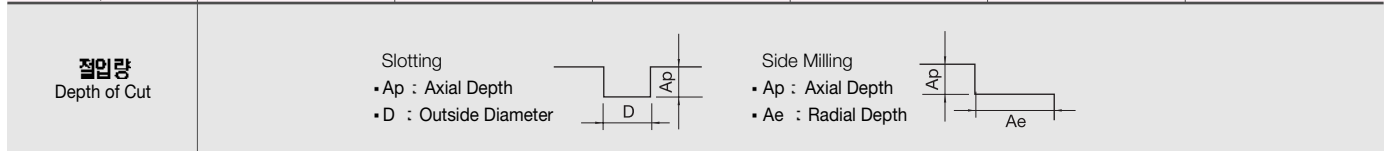
Side Milling

- Ap : Axial Depth
- Ae : Radial Depth



- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- HRC52 이상 고경도강 가공시 52HRC 조건의 같은 직경 대비 상기 절삭조건의 20% DOWN 해주십시오.
- 상기 절삭조건의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과 하거나 버 및 적열 현상이 발생할때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (Ø10이하 사용시 진동 허용 관리 5µm이내 일것.)
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- 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 workpiece HRC over 52 hardened steel, reduce 20% of the 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 (Ø1 or less, the vibration tolerance management should be within 5µm).
- Air blow or oil mist is recommended for smooth chip emission, and dry milling is recommended for copper material.

피삭재 Material		동 Copper				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness						40 ~ 50HRC				50 ~ 52HRC			
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
ø0.8	8	24,100	1,235	0.009	0.01	20,485	988	0.008	0.01	18,430	840	0.006	0.01
-	12	18,700	707	0.004	0.003	15,895	566	0.004	0.003	14,306	481	0.003	0.002
ø1	8	22,100	1,373	0.014	0.024	17,680	1,098	0.011	0.019	15,912	934	0.010	0.016
-	16	14,300	624	0.004	0.003	11,440	499	0.003	0.002	10,296	424	0.003	0.002
-	25	10,800	250	0.003	0.001	8,640	200	0.002	0.001	7,776	170	0.002	0.001
ø1.5	8	19,000	1,872	0.041	0.124	15,200	1,498	0.033	0.099	13,680	1,273	0.028	0.084
-	16	12,300	998	0.013	0.015	9,840	799	0.010	0.012	8,856	679	0.009	0.010
-	25	9,300	562	0.005	0.004	7,440	449	0.004	0.003	6,696	382	0.003	0.003
ø2	8	17,000	2,267	0.054	0.391	13,600	1,814	0.043	0.313	12,240	1,542	0.037	0.266
-	16	11,100	1,290	0.026	0.049	8,880	1,032	0.021	0.039	7,992	877	0.018	0.033
-	25	8,400	811	0.012	0.013	6,720	649	0.010	0.010	6,048	552	0.008	0.009
ø2.5	10	13,100	2,371	0.068	0.488	10,480	1,897	0.054	0.390	9,432	1,612	0.046	0.332
-	16	9,900	1,643	0.045	0.119	7,920	1,315	0.036	0.095	7,128	1,117	0.031	0.081
-	30	6,800	894	0.014	0.018	5,440	716	0.011	0.014	4,896	608	0.010	0.012
ø3	10	11,600	2,642	0.092	1.013	9,280	2,113	0.074	0.810	8,352	1,796	0.063	0.689
-	16	8,900	1,872	0.064	0.247	7,120	1,498	0.051	0.198	6,408	1,273	0.044	0.168
-	25	6,900	1,290	0.036	0.065	5,520	1,032	0.029	0.052	4,968	877	0.024	0.044
-	35	5,700	915	0.018	0.024	4,560	732	0.014	0.019	4,104	622	0.012	0.016
ø4	10	9,200	2,912	0.120	1.960	7,360	2,330	0.096	1.568	6,624	1,980	0.082	1.333
-	16	7,200	2,184	0.093	0.781	5,760	1,747	0.074	0.625	5,184	1,485	0.063	0.531
-	25	5,600	1,560	0.061	0.205	4,480	1,248	0.049	0.164	4,032	1,061	0.041	0.139
-	40	4,200	978	0.030	0.050	3,360	782	0.024	0.040	3,024	665	0.020	0.034
ø5	15	6,000	2,371	0.127	1.907	4,800	1,897	0.102	1.526	4,320	1,612	0.086	1.297
-	25	4,600	1,706	0.109	0.500	3,680	1,364	0.087	0.400	3,312	1,160	0.074	0.340
-	40	3,500	1,123	0.060	0.122	2,800	899	0.048	0.098	2,520	764	0.041	0.083
ø6	20	4,200	1,997	0.126	2.025	3,360	1,597	0.101	1.620	3,024	1,358	0.086	1.377
-	40	3,000	1,248	0.083	0.253	2,400	998	0.066	0.202	2,160	849	0.056	0.172
ø8	20	3,200	1,893	0.180	1.600	2,560	1,514	0.144	1.280	2,304	1,287	0.122	1.088
-	40	2,600	1,248	0.120	0.200	2,080	998	0.096	0.160	1,872	849	0.082	0.136
ø10	25	2,900	1,851	0.200	1.760	2,320	1,481	0.160	1.408	2,088	1,259	0.136	1.197
-	45	2,200	1,206	0.140	0.240	1,760	965	0.112	0.192	1,584	820	0.095	0.163
ø12	30	2,000	1,685	0.190	1.650	1,600	1,348	0.152	1.320	1,440	1,146	0.129	1.122
-	50	1,950	1,186	0.150	0.250	1,560	948	0.120	0.200	1,404	806	0.102	0.170



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- HRC52 이상 고경도강 가공시 52HRC 조건의 같은 직경 대비 상기 절삭조건의 20% DOWN 해주십시오.
- 상기 절삭조건의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과 하거나 버 및 적열 현상이 발생할때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (ø1이하 사용시 진동 허용 관리 5µm이내 일것.)
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- 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 workpiece HRC over 52 hardened steel, reduce 20% of the 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 (ø1 or less, the vibration tolerance management should be within 5µm).
- Air blow or oil mist is recommended for smooth chip emission, and dry milling is recommended for copper material.



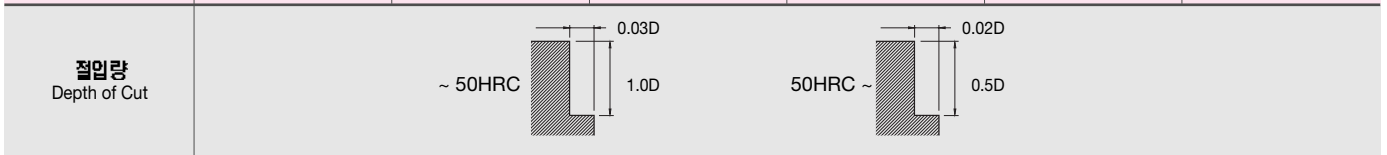
### 홈 절삭 Slotting

피삭재 Material	종 Copper				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
	경도 Hardness				40 ~ 50HRC				50 ~ 52HRC			
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
Ø0.1	50,000	300	0.01	0.1	45,000	240	0.01	0.1	40,500	168	0.08	0.05
Ø0.2	50,000	390	0.02	0.2	45,000	312	0.02	0.2	40,500	218	0.16	0.10
Ø0.3	50,000	570	0.03	0.3	45,000	456	0.03	0.3	40,500	319	0.24	0.15
Ø0.4	50,000	705	0.04	0.4	45,000	564	0.04	0.4	40,500	395	0.32	0.20
Ø0.5	50,000	1,110	0.05	0.5	45,000	888	0.05	0.5	40,500	622	0.40	0.25
Ø0.6	50,000	1,410	0.06	0.6	45,000	1,128	0.06	0.6	40,500	790	0.48	0.30
Ø0.8	50,000	1,800	0.08	0.8	40,000	1,440	0.08	0.8	30,000	1,008	0.64	0.40
Ø0.9	49,000	1,965	0.09	0.9	39,000	1,572	0.09	0.9	27,800	1,100	0.72	0.45
Ø1	48,000	2,250	0.10	1.0	38,000	1,800	0.10	1.0	25,500	1,260	0.80	0.50
Ø2	33,300	2,550	0.20	2.0	26,000	2,040	0.20	2.0	17,500	1,428	1.60	1.00
Ø3	21,800	2,550	0.30	3.0	17,300	2,040	0.30	3.0	11,500	1,428	2.40	1.50
Ø4	16,700	2,640	0.40	4.0	13,200	2,112	0.40	4.0	8,800	1,478	3.20	2.00
Ø5	15,700	3,000	0.50	5.0	12,500	2,400	0.50	5.0	8,300	1,680	4.00	2.50
Ø6	13,000	2,850	0.60	6.0	10,350	2,280	0.60	6.0	6,900	1,596	4.80	3.00
Ø8	9,880	2,790	0.80	8.0	7,800	2,232	0.80	8.0	5,200	1,562	6.40	4.00
Ø10	7,800	2,550	1.00	10.0	6,150	2,040	1.00	10.0	4,100	1,428	8.00	5.00
Ø12	6,650	2,550	1.20	12.0	5,250	2,040	1.20	12.0	3,500	1,428	9.60	6.00
Ø16	5,540	2,340	1.60	16.0	4,340	1,872	1.60	16.0	2,600	1,310	12.80	8.00
Ø18	5,540	2,340	1.80	18.0	4,340	1,872	1.80	18.0	2,600	1,310	14.40	9.00
Ø20	4,640	2,160	2.00	20.0	4,340	1,728	2.00	20.0	2,100	1,210	16.00	10.00



### 측면 절삭 Side Cutting

피삭재 Material	종 Copper				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
	경도 Hardness				40 ~ 50HRC				50 ~ 52HRC			
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
Ø1	48,000	1,050	1	0.03	38,000	735	1	0.03	25,500	515	0.50	0.02
Ø2	33,300	1,200	2	0.06	26,000	840	2	0.06	17,500	588	1.00	0.04
Ø3	21,800	1,200	3	0.09	17,300	840	3	0.09	11,500	588	1.50	0.06
Ø4	16,700	1,250	4	0.12	13,200	875	4	0.12	8,800	613	2.00	0.08
Ø5	15,700	1,450	5	0.15	12,500	1,015	5	0.15	8,300	711	2.50	0.10
Ø6	13,000	1,350	6	0.18	10,350	945	6	0.18	6,900	662	3.00	0.12
Ø8	9,880	1,320	8	0.24	7,800	924	8	0.24	5,200	647	4.00	0.16
Ø10	7,800	1,200	10	0.30	6,150	840	10	0.30	4,100	588	5.00	0.20
Ø12	6,650	1,200	12	0.36	5,250	840	12	0.36	3,500	588	6.00	0.24
Ø16	5,540	1,000	16	0.48	4,340	700	16	0.48	2,600	490	8.00	0.32
Ø18	5,540	1,000	18	0.54	4,340	700	18	0.54	2,600	490	9.00	0.36
Ø20	4,640	950	20	0.60	4,340	760	20	0.60	2,100	532	10.00	0.40



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- 상기 절삭조건의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
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- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (Ø1이하 사용시 진동 허용 관리 5µm이내 일것.)
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- 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 (Ø1 or less, the vibration tolerance management should be within 5µm).
- Air blow or oil mist is recommended for smooth chip emission, and dry milling is recommended for copper material.

### 홈 절삭 Slotting

파삭재 Material	동 Copper				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness					40 ~ 50HRC				50 ~ 52HRC			
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
Ø1	48,000	2,700	0.10	1.0	38,000	2,160	0.10	1.0	25,500	1,512	0.80	0.50
Ø2	33,300	3,060	0.20	2.0	26,000	2,448	0.20	2.0	17,500	1,714	1.60	1.00
Ø3	21,800	3,060	0.30	3.0	17,300	2,448	0.30	3.0	11,500	1,714	2.40	1.50
Ø4	16,700	3,168	0.40	4.0	13,200	2,534	0.40	4.0	8,800	1,774	3.20	2.00
Ø5	15,700	3,600	0.50	5.0	12,500	2,880	0.50	5.0	8,300	2,016	4.00	2.50
Ø6	13,000	3,420	0.60	6.0	10,350	2,736	0.60	6.0	6,900	1,915	4.80	3.00
Ø8	9,880	3,348	0.80	8.0	7,800	2,678	0.80	8.0	5,200	1,875	6.40	4.00
Ø10	7,800	3,060	1.00	10.0	6,150	2,448	1.00	10.0	4,100	1,714	8.00	5.00
Ø12	6,650	3,060	1.20	12.0	5,250	2,448	1.20	12.0	3,500	1,714	9.60	6.00
Ø16	5,540	2,808	1.60	16.0	4,340	2,246	1.60	16.0	2,600	1,572	12.80	8.00
Ø18	5,540	2,808	1.80	18.0	4,340	2,246	1.80	18.0	2,600	1,572	14.40	9.00
Ø20	4,640	2,592	2.00	20.0	4,340	2,074	2.00	20.0	2,100	1,452	16.00	10.00

절입량 Depth of Cut

~ 50HRC

50HRC ~

### 측면 절삭 Side Cutting

파삭재 Material	동 Copper				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness					40 ~ 50HRC				50 ~ 52HRC			
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
Ø1	48,000	1,155	1	0.03	38,000	809	1	0.03	25,500	566	0.50	0.02
Ø2	33,300	1,320	2	0.06	26,000	924	2	0.06	17,500	647	1.00	0.04
Ø3	21,800	1,320	3	0.09	17,300	924	3	0.09	11,500	647	1.50	0.06
Ø4	16,700	1,375	4	0.12	13,200	963	4	0.12	8,800	674	2.00	0.08
Ø5	15,700	1,595	5	0.15	12,500	1,117	5	0.15	8,300	782	2.50	0.10
Ø6	13,000	1,485	6	0.18	10,350	1,040	6	0.18	6,900	728	3.00	0.12
Ø8	9,880	1,452	8	0.24	7,800	1,016	8	0.24	5,200	711	4.00	0.16
Ø10	7,800	1,320	10	0.30	6,150	924	10	0.30	4,100	647	5.00	0.20
Ø12	6,650	1,320	12	0.36	5,250	924	12	0.36	3,500	647	6.00	0.24
Ø16	5,540	1,100	16	0.48	4,340	770	16	0.48	2,600	539	8.00	0.32
Ø18	5,540	1,100	18	0.54	4,340	770	18	0.54	2,600	539	9.00	0.36
Ø20	4,640	1,045	20	0.60	4,340	836	20	0.60	2,100	585	10.00	0.40

절입량 Depth of Cut

~ 50HRC

50HRC ~

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- Use a machine with low vibration and good rigidity (Ø1 or less, the vibration tolerance management should be within 5µm).
- Air blow or oil mist is recommended for smooth chip emission, and dry milling is recommended for copper material.

## 측면 절삭 Side Cutting

피삭재 Material	합금강 Alloy Steel				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness	30 ~ 40HRC				40 ~ 50HRC				50 ~ 52HRC			
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
Ø1	40,000	720	1.5	0.05	40,000	660	1.5	0.05	40,000	308	0.5	0.03
Ø1.5	40,000	900	2.25	0.075	40,000	750	2.25	0.075	38,500	350	0.75	0.045
Ø2	40,000	1,200	3	0.1	38,000	1,080	3	0.1	36,500	504	1	0.06
Ø3	38,400	2,736	4.5	0.15	34,560	2,462	4.5	0.15	27,648	1,149	1.5	0.09
Ø4	28,800	3,168	6	0.2	25,920	2,851	6	0.2	20,736	1,331	2	0.12
Ø5	24,000	3,600	7.5	0.25	21,600	3,240	7.5	0.25	17,280	1,512	2.5	0.15
Ø6	19,200	4,176	9	0.3	17,280	3,758	9	0.3	13,824	1,754	3	0.18
Ø8	14,400	4,176	12	0.4	12,960	3,758	12	0.4	10,368	1,754	4	0.24
Ø10	11,520	4,176	15	0.5	10,368	3,758	15	0.5	8,294	1,754	5	0.3
Ø12	9,600	3,456	18	0.6	8,640	3,110	18	0.6	6,912	1,452	6	0.36
Ø16	7,200	2,592	24	0.8	6,480	2,333	24	0.8	5,184	1,089	8	0.48
Ø20	5,760	2,088	30	1	5,184	1,879	30	1	4,147	877	10	0.6

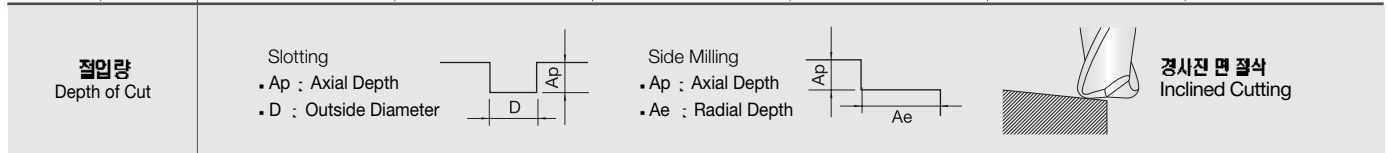
절삭량  
Depth of Cut

~ 50HRC

50HRC ~

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- 유효장이 길게 체결할시 회전수와 피드를 같은 비율로 DOWN 해주십시오.
- 상기 절삭조건의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과 하거나 버 및 적열 현상이 발생할때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 에어브로, 절삭유, 오일 미스트 콜런트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- 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 workpiece HRC over 52 hardened steel, reduce 20% of the RPM and feed compared to the same diameter.
- If you clamp the endmill with long overhang of effective length, reduce the RPM and feed in the same proportion.
- 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.
- Air blow or oil mist is recommended for smooth chip emission, and dry milling is recommended for copper material.

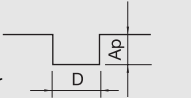
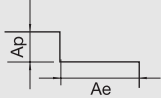
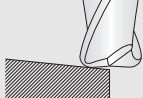
피삭재 Material		동 Copper				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness						40 ~ 50HRC				50 ~ 52HRC			
외경 Outside Diameter	유효장 Effective Length	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø0.2	1	50,000	352	0.264	0.020	50,000	196	0.006	0.020	34,500	150	0.004	0.020
-	1.5	50,000	311	0.017	0.010	50,000	173	0.005	0.010	26,450	104	0.003	0.010
Ø0.3	1	50,000	890	0.029	0.020	50,000	495	0.007	0.020	34,500	345	0.005	0.015
-	3	50,000	393	0.029	0.015	50,000	219	0.006	0.015	24,150	81	0.003	0.010
Ø0.4	1	47,150	890	0.047	0.062	50,000	495	0.013	0.070	39,675	368	0.011	0.070
-	3	33,350	683	0.026	0.053	26,450	380	0.008	0.026	26,450	276	0.007	0.026
Ø0.5	1	48,300	2,008	0.079	0.114	48,300	1,116	0.033	0.119	39,100	840	0.029	0.119
-	3	31,050	1,118	0.056	0.088	31,050	621	0.022	0.110	25,415	460	0.020	0.110
-	5	25,760	827	0.026	0.044	25,760	459	0.011	0.010	20,700	345	0.010	0.010
Ø0.6	2	27,945	890	0.111	0.158	27,945	495	0.010	0.214	23,000	380	0.010	0.214
-	6	16,445	435	0.035	0.044	16,445	242	0.003	0.010	13,570	184	0.003	0.010
Ø0.8	4	17,250	787	0.129	0.194	17,020	437	0.014	0.114	14,720	345	0.015	0.114
-	8	12,650	475	0.029	0.098	12,650	264	0.005	0.088	10,695	184	0.004	0.088
Ø1	4	13,800	1,449	0.196	0.396	13,800	805	0.029	0.264	11,730	655	0.034	0.264
-	10	8,625	559	0.047	0.308	8,625	311	0.011	0.123	7,475	264	0.013	0.123
-	16	6,900	331	0.018	0.220	6,900	184	0.004	0.026	5,980	161	0.005	0.026
Ø1.2	6	9,200	1,035	0.182	0.457	9,200	575	0.018	0.088	8,165	483	0.0215	0.088
-	12	6,670	662	0.053	0.396	6,670	368	0.007	0.070	5,980	299	0.008	0.070
Ø1.5	4	12,880	1,925	0.293	0.660	12,880	1,070	0.044	0.440	11,730	920	0.059	0.440
-	10	8,280	1,325	0.147	0.554	8,280	736	0.031	0.282	7,590	633	0.041	0.282
-	20	5,865	725	0.041	0.352	6,350	403	0.005	0.106	4,160	345	0.006	0.106
Ø2	6	12,535	1,801	0.314	0.836	12,535	1,001	0.042	0.792	11,730	909	0.059	0.792
-	12	9,200	1,449	0.182	0.704	9,200	805	0.030	0.440	8,280	725	0.043	0.440
-	20	6,900	1,139	0.091	0.651	6,200	633	0.017	0.194	3,520	564	0.023	0.194
-	30	5,865	973	0.049	0.440	3,300	541	0.005	0.132	2,860	495	0.005	0.132
Ø2.5	10	10,350	1,801	0.331	0.836	10,350	1,001	0.051	0.528	9,775	943	0.073	0.528
-	30	6,210	787	0.067	0.616	6,210	437	0.011	0.176	5,865	414	0.016	0.176
Ø3	12	10,350	2,029	0.381	0.831	10,350	1,127	0.103	0.616	9,775	874	0.103	0.655
-	20	8,165	1,553	0.254	0.762	6,050	863	0.071	0.567	3,420	667	0.071	0.567
-	30	6,900	1,263	0.137	0.674	3,300	702	0.049	0.371	2,890	541	0.049	0.371
Ø4	12	8,740	1,904	0.401	1.525	8,740	1,058	0.081	1.124	7,360	920	0.117	1.124
-	20	6,785	1,458	0.375	1.325	5,880	810	0.053	0.880	5,750	840	0.078	0.880
-	30	5,750	752	0.196	1.210	2,950	418	0.028	0.671	2,540	656	0.041	0.671
-	45	4,715	500	0.096	1.118	2,300	278	0.007	0.326	2,015	322	0.010	0.326
Ø5	15	7,705	3,064	0.697	2.277	7,705	1,702	0.106	1.346	5,520	1,139	0.150	1.346
-	30	5,290	1,470	0.342	1.760	2,780	817	0.053	1.035	3,795	541	0.075	1.035
Ø6	20	5,980	2,194	0.600	2.194	5,460	1,219	0.476	1.356	3,565	1,035	0.186	1.356
-	40	4,600	1,635	0.565	2.049	2,380	909	0.410	1.304	2,160	759	0.164	1.304
Ø8	22	5,520	1,946	0.528	2.542	5,520	1,081	0.419	1.518	3,220	909	0.164	1.518
-	40	4,140	1,449	0.497	2.277	2,120	805	0.361	1.323	2,080	667	0.144	1.323
Ø10	24	4,600	1,656	0.449	2.887	4,485	920	0.356	1.645	2,760	771	0.139	1.645
-	45	3,450	1,221	0.423	2.438	3,450	679	0.307	1.334	1,955	564	0.122	1.334
Ø12	26	3,795	1,387	0.377	3.013	3,795	771	0.299	2.024	2,300	644	0.117	2.024
-	50	2,875	1,035	0.355	2.415	2,875	575	0.258	1.403	1,725	483	0.103	1.403
Ø16	35	2,990	1,097	0.302	2.921	2,990	610	0.239	2.162	1,725	518	0.094	2.162



- HRC52 이상인 경우 같은 직경의 같은 비율로 20% DOWN 시켜 주십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30% 이하로 줄어십시오.
- Ae 값 설정시 코너R 치수를 고려해 주십시오.
- 곡면 절삭시 날경의 코너R 보다 낮은 이동 PITCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도 내에서 피드를 최대 30%까지 UP 해주십시오.
- 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%.
- Consider the corner radius value when you set up the Ae value.
- 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.

파삭재 Material		탄소강/ 합금강 Carbon Steel/ Alloy Steels				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness		~ 35HRC				40 ~ 50HRC				50 ~ 52HRC			
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
ø1	4	13,110	1,884	0.216	0.435	13,110	1,047	0.032	0.290	11,144	851	0.038	0.290
	10	8,194	727	0.052	0.339	8,194	404	0.012	0.135	7,101	343	0.014	0.135
ø1.2	4	8,740	1,346	0.200	0.503	8,740	748	0.019	0.097	7,757	628	0.237	0.097
	10	6,337	861	0.058	0.435	6,337	478	0.008	0.077	5,681	389	0.009	0.077
ø1.5	6	12,236	2,503	0.323	0.726	12,236	1,390	0.048	0.484	11,144	1,196	0.065	0.484
	12	7,866	1,722	0.161	0.610	7,866	957	0.034	0.310	7,211	822	0.045	0.310
ø2	6	11,908	2,341	0.345	0.919	11,908	1,301	0.046	0.871	11,144	1,181	0.065	0.871
	12	8,740	1,884	0.200	0.774	8,740	1,047	0.033	0.484	7,866	942	0.047	0.484
ø2.5	10	9,833	2,341	0.365	0.919	9,833	1,301	0.056	0.581	9,286	1,226	0.081	0.581
	20	5,900	1,023	0.074	0.677	5,900	568	0.012	0.194	5,572	538	0.017	0.194
ø3	10	9,833	2,637	0.419	0.914	9,833	1,465	0.113	0.678	9,286	1,136	0.113	0.720
	20	7,757	2,018	0.280	0.839	5,748	1,121	0.078	0.624	3,249	867	0.078	0.624
ø4	12	8,303	2,476	0.441	1.677	8,303	1,375	0.089	1.237	6,992	1,196	0.129	1.237
	20	6,446	1,895	0.413	1.457	5,586	1,053	0.058	0.968	5,463	1,091	0.086	0.968
	30	5,463	978	0.215	1.331	2,803	543	0.031	0.738	2,413	852	0.046	0.738
ø6	20	5,681	2,852	0.660	2.414	5,187	1,585	0.524	1.491	3,387	1,346	0.205	1.491
	40	4,370	2,126	0.622	2.254	2,261	1,181	0.451	1.435	2,052	987	0.180	1.435
ø8	22	5,244	2,530	0.581	2.796	5,244	1,405	0.461	1.670	3,059	1,181	0.180	1.670
ø10	24	4,370	2,153	0.494	3.175	4,261	1,196	0.392	1.809	2,622	1,002	0.153	1.809
ø12	26	3,605	1,803	0.415	3.314	3,605	1,002	0.329	2.226	2,185	837	0.129	2.226

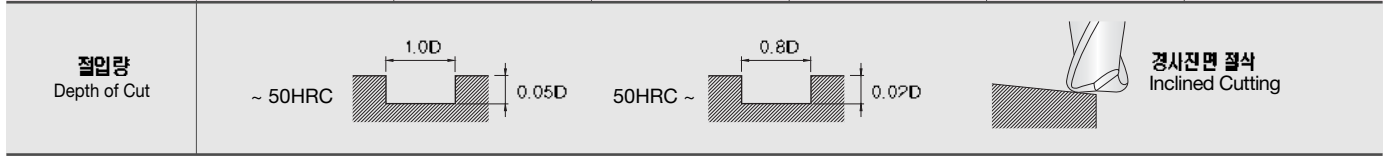
  

절입량 Depth of Cut	Slotting		Side Milling			경사진 면 절삭 Inclined Cutting
	• Ap : Axial Depth • D : Outside Diameter	• Ap : Axial Depth • Ae : Radial Depth				

- HRC52 이상인 경우 같은 직경의 같은 비율로 20% DOWN 시켜 주십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30% 이하로 줄이십시오.
- Ae 값 설정시 코너R 치수를 고려해 주십시오.
- 곡면 절삭시 날경의 코너R 보다 낮은 이동 PITCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도 내에서 피드를 최대 30%까지 UP 해주십시오.
- 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%.
- Consider the corner radius value when you set up the Ae value.
- 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.

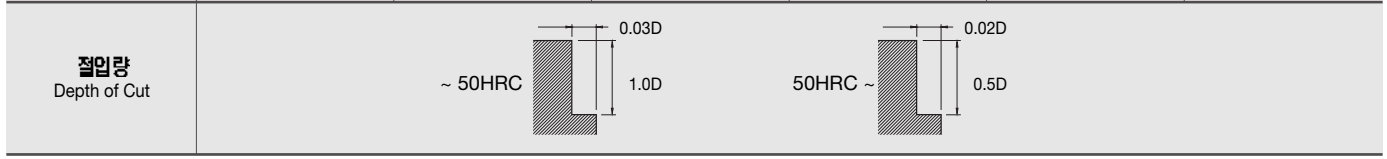
**홈 절삭 Slotting**

피삭재 Material	탄소강/합금강 Carbon Steel/ Alloy Steels				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
	경도 Hardness				경도 Hardness				경도 Hardness			
외경 Outside Diameter	~ 35HRC		40 ~ 50HRC		50 ~ 52HRC		~ 35HRC		40 ~ 50HRC		50 ~ 52HRC	
	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
ø0.4	42,500	562	0.020	0.4	38,250	268	0.020	0.4	34,000	107	0.008	0.32
ø0.5	42,500	643	0.025	0.5	38,250	306	0.025	0.5	34,000	122	0.01	0.4
ø0.6	42,500	723	0.03	0.6	38,250	344	0.03	0.6	34,000	138	0.012	0.48
ø0.8	42,500	803	0.04	0.8	38,250	383	0.04	0.8	25,500	153	0.016	0.64
ø1	40,800	1,992	0.05	1	32,300	949	0.05	1	21,675	379	0.02	0.8
ø2	28,305	2,378	0.1	2	22,100	1,132	0.1	2	14,875	453	0.04	1.6
ø3	18,530	2,410	0.15	3	14,705	1,148	0.15	3	9,775	459	0.06	2.4
ø4	14,195	2,474	0.2	4	11,220	1,178	0.2	4	7,480	471	0.08	3.2
ø5	13,345	2,635	0.25	5	10,625	1,255	0.25	5	7,055	502	0.1	4
ø6	11,135	2,570	0.3	6	8,798	1,224	0.3	6	5,865	490	0.12	4.8
ø8	8,398	2,345	0.4	8	6,630	1,117	0.4	8	4,420	447	0.16	6.4
ø10	6,630	2,185	0.5	10	5,228	1,040	0.5	10	3,485	416	0.2	8
ø12	5,653	2,185	0.6	12	4,463	1,040	0.6	12	2,975	416	0.24	9.6



**측면 절삭 Side Cutting**

피삭재 Material	탄소강/합금강 Carbon Steel/ Alloy Steels				프리하든강 Prehardened Steels				고경도강 Hardened Steels			
	경도 Hardness				경도 Hardness				경도 Hardness			
외경 Outside Diameter	~ 35HRC		40 ~ 50HRC		50 ~ 52HRC		~ 35HRC		40 ~ 50HRC		50 ~ 52HRC	
	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
ø0.4	42,500	236	0.4	0.01	38,250	212	0.4	0.01	34,000	127	0.20	0.01
ø0.5	42,500	261	0.5	0.015	38,250	235	0.5	0.015	34,000	141	0.25	0.01
ø0.6	42,500	263	0.6	0.018	38,250	236	0.6	0.018	34,000	142	0.30	0.012
ø0.8	42,500	427	0.8	0.024	34,000	384	0.8	0.024	25,500	231	0.40	0.016
ø1	40,800	833	1	0.03	32,300	750	1	0.03	21,675	450	0.50	0.02
ø2	28,305	1,224	2	0.06	22,100	1,102	2	0.06	14,875	661	1.00	0.04
ø3	18,530	1,250	3	0.09	14,705	1,125	3	0.09	9,775	675	1.50	0.06
ø4	14,195	1,275	4	0.12	11,220	1,148	4	0.12	7,480	689	2.00	0.08
ø5	13,345	1,479	5	0.15	10,625	1,331	5	0.15	7,055	799	2.50	0.1
ø6	11,135	1,377	6	0.18	8,798	1,239	6	0.18	5,865	744	3.00	0.12
ø8	8,398	1,346	8	0.24	6,630	1,212	8	0.24	4,420	727	4.00	0.16
ø10	6,630	1,224	10	0.3	5,228	1,102	10	0.3	3,485	661	5.00	0.2
ø12	5,653	1,200	12	0.36	4,463	1,100	12	0.36	2,975	635	6.00	0.24



- HRC52 이상인 경우, 같은 직경의 같은 비율로 20% DOWN 시켜 주십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30% 이하로 줄이십시오.
- 곡면 절삭시 날경의 코너 R 보다 낮은 이동 PITCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도 내에서 피드를 최대 30%까지 UP 해주십시오.
- 상기 절삭조건표는 2날 기준이며, 4날시 회전수는 유지하고, 피드는 안정적인 속도 내에서 최대 30%까지 UP 해주십시오.
- 홈 절삭시 날경의 코너R 대비 Ae 값을 설정 하십시오.
- 상기 절삭조건표의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 피삭재와 절삭형상을 위한 적절한 클러트 사용과 가공시 발열, 발화에 주의 하십시오.
- When milling workpiece is over HRC 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.
- 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.
- 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.

## 홈 절삭 Slotting

파삭재 Material	일반구조강/ 탄소강 Mild Steels/ Carbon Steels				합금강/ 공구강 Alloy Steels/ Tool Steels				공구강/ 프리하트강 Tool Steels/ Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness	~ 750N/mm <sup>2</sup>				~ 30HRC				30 ~ 38HRC				38 ~ 45HRC			
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	RPM	FEED	Ap Axial Depth	Ae Radial Depth
ø4	3,870	395	4	4	3,251	201	4	4	2,786	139	4	4	2,167	101	3.2	4
ø5	3,870	395	5	5	3,251	209	5	5	2,477	155	5	5	1,858	116	4	5
ø6	3,251	395	6	6	2,786	224	6	6	2,167	170	6	6	1,625	132	4.8	6
ø8	2,477	395	8	8	2,090	255	8	8	1,625	194	8	8	1,238	147	6.4	8
ø10	2,012	395	10	10	1,703	267	10	10	1,238	201	10	10	1,006	163	8	10
ø12	1,625	395	12	12	1,393	279	12	12	1,084	209	12	12	851	166	9.6	12
ø16	1,238	395	16	16	1,084	298	16	16	774	224	16	16	619	170	12.8	16
ø20	1,006	372	20	20	851	290	20	20	619	217	20	20	495	163	16	20

절입량  
Depth of Cut

~ 38HRC

38HRC ~

## 측면 절삭 Side Cutting

파삭재 Material	일반구조강/ 탄소강 Mild Steels/ Carbon Steels				합금강/ 공구강 Alloy Steels/ Tool Steels				공구강/ 프리하트강 Tool Steels/ Prehardened Steels				고경도강 Hardened Steels			
경도 Hardness	~ 750N/mm <sup>2</sup>				~ 30HRC				30 ~ 38HRC				38 ~ 45HRC			
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	RPM	FEED	Ap Axial Depth	Ae Radial Depth
ø4	4,300	439	6	2	3,612	224	6	2	3,096	155	6	2	2,408	112	4	1.2
ø5	4,300	439	7.5	2.5	3,612	232	7.5	2.5	2,752	172	7.5	2.5	2,064	129	5	1.5
ø6	3,612	439	9	3	3,096	249	9	3	2,408	189	9	3	1,806	146	6	1.8
ø8	2,752	439	12	4	2,322	284	12	4	1,806	215	12	4	1,376	163	8	2.4
ø10	2,236	439	15	5	1,892	297	15	5	1,376	224	15	5	1,118	181	10	3
ø12	1,806	439	18	6	1,548	310	18	6	1,204	232	18	6	946	185	12	3.6
ø16	1,376	439	24	8	1,204	331	24	8	860	249	24	8	688	189	16	4.8
ø20	1,118	413	30	10	946	323	30	10	688	241	30	10	550	181	20	6

절입량  
Depth of Cut

~ 38HRC

38HRC ~

- 가능한 공구 길이 측정시 유압식 측정이 아닌 레이저식 도구 세터를 사용 하십시오.
- 가공 진입시 가능한 파삭재 밖에서 진입 하십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30% 이하로 줄이십시오.
- 상기 절삭조건외의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 공작기계와 가공물의 강성이 없는 경우, 진동이 발생할시 조건표에 회전속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- 파삭재와 가공 모양에 따라 적절한 클런트를 사용 하십시오.
- 스테인레스, 내열합금강 등의 절단 가공시 수용성 절삭유가 가장 효과적 입니다.
- Use laser tool measurement instead of hydraulic measurement when measuring tool length as possible.
- When entering the tool to the workpiece, enter the tool from outside to the workpiece.
- If the effective length is long, reduce the RPM and feed maximum 30%.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- In case of workpiece and machine do not have enough rigidity and make vibration, reduce the RPM and feed in same proportion.
- Depending on the workpiece and shape, use adequate coolant.
- For stainless and heat resistant alloy, water-soluble oil is the most effective.

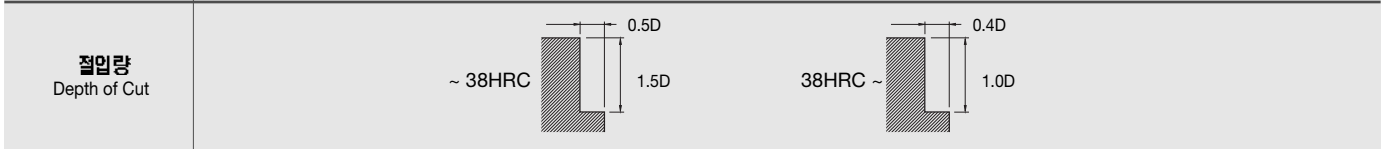
## 홈 절삭 Slotting

피삭재 Material	일반구조강/ 탄소강 Mild Steels/ Carbon Steels				합금강/ 공구강 Alloy Steels/ Tool Steels				공구강/ 프리하드강 Tool Steels/ Prehardened Steels				공구강/ 스테인레스강 Tool Steels/ Stainless Steels						
	경도 Hardness				~ 750N/mm <sup>2</sup>				~ 30HRC				30 ~ 38HRC				38 ~ 45HRC		
외경 Outside Diameter	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae			
			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			
ø4	4,698	486	4	4	3,888	243	4	4	3,321	162	4	4	2,592	122	3.2	4			
ø5	4,698	486	5	5	3,888	251	5	5	2,997	186	5	5	2,268	138	4	5			
ø6	3,888	486	6	6	3,402	267	6	6	2,592	203	6	6	1,944	162	4.8	6			
ø8	2,997	486	8	8	2,511	307	8	8	1,944	235	8	8	1,458	178	6.4	8			
ø10	2,430	486	10	10	2,025	324	10	10	1,458	243	10	10	1,215	203	8	10			
ø12	1,944	486	12	12	1,701	332	12	12	1,296	251	12	12	1,053	203	9.6	12			
ø16	1,499	486	16	16	1,296	356	16	16	972	267	16	16	810	203	12.8	16			
ø20	1,215	446	20	20	1,053	348	20	20	729	259	20	20	608	194	16	20			



## 측면 절삭 Side Cutting

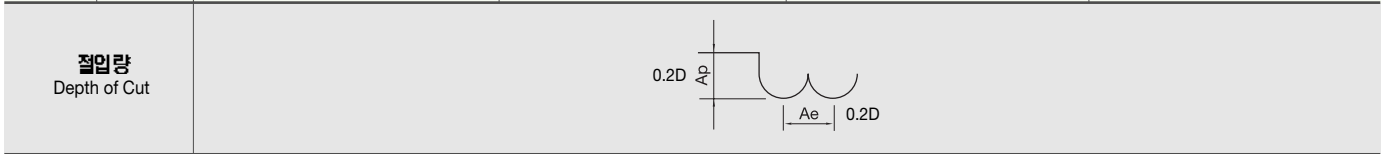
피삭재 Material	일반구조강/ 탄소강 Mild Steels/ Carbon Steels				합금강/ 공구강 Alloy Steels/ Tool Steels				공구강/ 프리하드강 Tool Steels/ Prehardened Steels				공구강/ 스테인레스강 Tool Steels/ Stainless Steels						
	경도 Hardness				~ 750N/mm <sup>2</sup>				~ 30HRC				30 ~ 38HRC				38 ~ 45HRC		
외경 Outside Diameter	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae			
			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			
ø4	5,220	540	6	2	4,320	270	6	2	3,690	180	6	2	2,880	135	4	1.6			
ø5	5,220	540	7.5	2.5	4,320	279	7.5	2.5	3,330	207	7.5	2.5	2,520	153	5	2			
ø6	4,320	540	9	3	3,780	297	9	3	2,880	225	9	3	2,160	180	6	2.4			
ø8	3,330	540	12	4	2,790	342	12	4	2,160	261	12	4	1,620	198	8	3.2			
ø10	2,700	540	15	5	2,250	360	15	5	1,620	270	15	5	1,350	225	10	4			
ø12	2,160	540	18	6	1,890	369	18	6	1,440	279	18	6	1,170	225	12	4.8			
ø16	1,665	540	24	8	1,440	396	24	8	1,080	297	24	8	900	225	16	6.4			
ø20	1,350	495	30	10	1,170	387	30	10	810	288	30	10	675	216	20	8			



- 가능한 공구 길이 측정시 유압식 측정이 아닌 레이저식 도구 세터를 사용 하십시오.
- 가공 진입시 가능한 피삭재 밖에서 진입 하십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30% 이하로 줄이십시오.
- 상기 절삭조건외의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 공작기계와 가공물의 강성이 없는 경우, 진동이 발생할시 조건표에 회전속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- 피삭재와 가공 모양에 따라 적절한 클린트를 사용 하십시오.
- 스테인레스, 내열합금강 등의 절단 가공시 수용성 절삭유가 가장 효과적 입니다.
- Use laser tool measurement instead of hydraulic measurement when measuring tool length as possible.
- When entering the tool to the workpiece, enter the tool from outside to the workpiece.
- If the effective length is long, reduce the RPM and feed maximum 30%.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- In case of workpiece and machine do not have enough rigidity and make vibration, reduce the RPM and feed in same proportion.
- Depending on the workpiece and shape, use adequate coolant.
- For stainless and heat resistant alloy, water-soluble oil is the most effective.



파삭재 Material		흑연 Graphite			
반경 Radius	유효장 Effective Length	RPM	FEED	Ap Axial Depth	Ae Radial Depth
R 0.25	5	25,000	320	0.05	0.05
R 0.5	10	21,850	380	0.10	0.10
-	20	19,665	342	0.09	0.09
-	30	18,682	325	0.08	0.08
R 0.75	10	21,850	646	0.15	0.15
-	20	19,665	630	0.14	0.14
-	30	18,682	580	0.11	0.11
R 1	15	19,950	760	0.20	0.20
-	20	17,955	684	0.18	0.18
-	30	16,160	616	0.16	0.16
-	40	13,736	523	0.13	0.13
-	50	10,988	419	0.10	0.10
R 1.5	20	17,575	1,378	0.30	0.30
-	30	15,818	1,240	0.27	0.27
-	40	14,236	1,116	0.24	0.24
-	50	12,100	948	0.22	0.22
R 2	20	15,200	1,995	0.40	0.40
-	35	13,680	1,796	0.36	0.36
-	45	12,312	1,616	0.31	0.31
R 2.5	25	14,725	2,423	0.50	0.50
-	50	11,780	1,938	0.40	0.40
R 3	25	14,250	2,803	0.60	0.60
R 4	30	12,350	2,850	0.80	0.80
R 5	-	10,925	2,898	1.00	1.00
R 6	-	9,975	2,993	1.20	1.20
R 8	-	7,600	2,375	1.60	1.60
R 10	-	6,175	1,900	2.00	2.00



- 유효장이 긴 경우에는 회전수와 이송속도를 최대 20% 이하로 줄이십시오.
- 절삭 조건표에 없는 유효장은 같은 직경과 비례하여 DOWN 시켜주십시오.
- 상기 절삭조건에 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 공작기계와 가공물의 강성이 없는 경우, 진동이 발생할시 조건표에 회전속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- In case of long effective length, reduce the RPM and feed by 20% or less.
- 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.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- In case of workpiece and machine do not have enough rigidity and make vibration, reduce the RPM and feed in same proportion.

피삭재 Material		흑연 Graphite				
반경 Radius	유효장 Effective Length	Angle #	RPM	FEED	Ap Axial Depth	Ae Radial Depth
R 0.5	20	0°30	18,000	300	0.10	0.10
-	30	0°30	17,100	285	0.10	0.10
-	40	0°30	16,245	271	0.09	0.09
-	25	1°	16,740	279	0.10	0.10
-	35	1°	15,903	265	0.09	0.09
-	50	1°	15,108	252	0.08	0.08
R 0.75	30	0°30	17,000	320	0.15	0.15
-	40	0°30	16,150	304	0.14	0.14
-	50	0°30	15,343	289	0.12	0.12
-	30	1°	15,300	288	0.14	0.14
-	50	1°	14,229	268	0.13	0.13
-	60	1°	13,233	249	0.12	0.12
R 1	40	0°30	16,500	600	0.20	0.20
-	50	0°30	14,850	540	0.19	0.19
-	70	0°30	13,365	486	0.18	0.18
-	60	1°	12,029	437	0.20	0.20
-	90	1°	10,224	372	0.19	0.19
R 2	70	0°30	13,500	1,600	0.40	0.40
-	80	1°	12,825	1,520	0.36	0.36
R 3	100	0°30	11,000	2,200	0.60	0.60
-	100	1°	10,780	2,156	0.59	0.59
R 5	83	0°30	9,600	2,250	1.00	1.00
R 6	110	0°30	7,500	2,300	1.20	1.20

**절입량**  
Depth of Cut

피삭재 Material		흑연 Graphite				
반경 Radius	유효장 Effective Length	Angle #	RPM	FEED	Ap Axial Depth	Ae Radial Depth
R 0.5	20	0°30	18,900	360	0.10	0.10
-	30	0°30	17,955	342	0.10	0.10
-	40	0°30	17,057	325	0.09	0.09
-	25	1°	17,577	335	0.10	0.10
-	35	1°	16,698	318	0.09	0.09
-	50	1°	15,863	302	0.08	0.08
R 0.75	30	0°30	17,850	384	0.15	0.15
-	40	0°30	16,958	365	0.14	0.14
-	50	0°30	16,110	347	0.12	0.12
-	40	1°	16,065	346	0.14	0.14
-	50	1°	14,940	321	0.13	0.13
-	60	1°	13,895	299	0.12	0.12
R 1	40	0°30	17,325	720	0.20	0.20
-	50	0°30	15,593	648	0.19	0.19
-	60	0°30	14,702	559	0.19	0.19
-	50	1°	14,524	588	0.20	0.20
-	60	1°	12,630	525	0.20	0.20
-	70	1°	11,367	472	0.19	0.19
R 2	80	0°30	13,466	1,824	0.40	0.40
-	100	1°	12,120	1,642	0.36	0.36

**절입량**  
Depth of Cut

- 유효장이 긴 경우에는 회전수와 이송속도를 최대 20% 이하로 줄이십시오.
- 절삭조건표에 없는 유효장은 같은 직경과 비례하여 DOWN 시켜주십시오.
- 절삭조건에 없는 각도는 같은 직경에 이전 각도와 비례하여 사용 하십시오.
- 이송속도 및 축 방향의 절입 깊이는 리브창과 테이퍼각에 따라 고려하시고, 절삭 상황에 맞추어 조정 하십시오.
- 상기 절삭조건에의 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 동작기계와 가공물의 강성이 없는 경우, 진동이 발생할시 조건표에 회전속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- In case of long effective length, reduce the RPM and feed by 20% or less.
- 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.
- If there is no parameter for the angle of your tool, refer to the previous angle, and adjust compare to it.
- Adjust the value of the feed and Ap based on the effective length and taper angle, and adjust the milling condition.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- In case of workpiece and machine do not have enough rigidity and make vibration, reduce the RPM and feed in same proportion.

# 2GEM/4GEM/6GEM Cutting Condition

•RPM : rev./min •Feed : mm/min

	2GEM				4GEM				6GEM			
피삭재 Material	흑연 Graphite				흑연 Graphite				흑연 Graphite			
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
Ø1	8,000	160	1.00	0.10	-	-	1.00	0.10	-	-	1.00	0.10
Ø2	8,000	250	2.00	0.20	-	-	2.00	0.20	-	-	2.00	0.20
Ø3	8,000	380	3.00	0.30	8,000	430	3.00	0.30	-	-	3.00	0.30
Ø4	8,000	510	4.00	0.40	8,000	570	4.00	0.40	-	-	4.00	0.40
Ø5	8,000	640	5.00	0.50	8,000	720	5.00	0.50	-	-	5.00	0.50
Ø6	8,000	770	6.00	0.60	8,000	860	6.00	0.60	8,000	960	6.00	0.60
Ø8	8,000	1,000	8.00	0.80	8,000	1,100	8.00	0.80	8,000	1,300	8.00	0.80
Ø10	8,000	1,250	10.00	1.00	8,000	1,400	10.00	1.00	8,000	1,600	10.00	1.00
Ø12	8,000	1,500	12.00	1.20	7,000	1,400	12.00	1.20	7,000	1,600	12.00	1.20
Ø16	8,000	1,600	16.00	1.60	7,000	1,500	16.00	1.60	7,000	1,800	16.00	1.60
Ø20	8,000	1,600	20.00	2.00	7,000	1,500	20.00	2.00	7,000	1,800	20.00	2.00

**절입량**  
Depth of Cut

- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰 주세요.
- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- 상기 절삭조건외의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과 하거나 버 및 적열 현상이 발생할때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (Ø1이하 사용시 진동 허용 관리 5µm이하 일것.)
- 흑연 가공시 에어브로를 추천 합니다.
- If the effective length is long, reduce the RPM and feed in the same proportion.
- 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.
- 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 (Ø1 or less, the vibration tolerance management should be within 5µm).
- For graphite milling, air blow method is recommended.

# 2DCR/4DCR Cutting Condition

•RPM : rev./min •Feed : mm/min

	2DCR				4DCR			
피삭재 Material	흑연 Graphite				흑연 Graphite			
외경 Outside Diameter	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø0.2	40,000	100	0.06	0.06	-	-	-	-
Ø0.4	40,000	200	0.12	0.12	-	-	-	-
Ø0.5	40,000	300	0.15	0.15	-	-	-	-
Ø0.6	40,000	400	0.18	0.18	-	-	-	-
Ø0.8	40,000	500	0.24	0.24	-	-	-	-
Ø1	40,000	900	0.30	0.30	-	-	-	-
Ø2	36,000	900	0.60	0.60	40,000	2,800	0.60	0.60
Ø3	32,000	1,300	0.90	0.90	40,000	3,150	0.90	0.90
Ø4	26,000	1,500	1.20	1.20	40,000	3,500	1.2	1.2
Ø5	24,000	1,100	1.50	1.50	-	-	-	-
Ø6	21,000	1,100	1.80	1.80	40,000	5,600	1.8	1.8
Ø8	-	-	-	-	32,000	5,600	2.4	2.4
Ø10	-	-	-	-	26,000	5,700	3.0	3.0
Ø12	-	-	-	-	21,000	5,500	3.6	3.6
Ø16	-	-	-	-	15,800	5,500	4.8	4.8

**절입량**  
Depth of Cut

**경사진 면 절삭**  
Inclined Cutting

- 유효장이 긴 경우에는 회전수와 이송속도를 최대 20% 이하로 줄이십시오.
- 곡면 절삭시 날경의 코너R 보다 낮은 이송 PITCH를 설정 하십시오.
- 곡면 절삭시 안정적인 속도 내에서 피드를 최대 50%까지 UP 해주십시오.
- 홈 절삭시 날경의 코너R 대비 Ae 값을 설정 하십시오.
- 상기 절삭조건외의 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 적절한 클린트 사용과 가공시 발열, 발화에 주의 하십시오.
- If the effective length is long, reduce the RPM and feed in the same proportion.
- 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 50% 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.

# 2DBE/3DBE/4DBE Cutting Condition

• RPM : rev./min • Feed : mm/min

피삭재 Material	2DBE				3DBE				4DBE			
	흑연 Graphite				흑연 Graphite				흑연 Graphite			
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
Ø1	16,000	400	0.20	0.20	16,000	480	0.20	0.20	16,000	700	0.20	0.20
Ø2	16,000	800	0.40	0.40	16,000	960	0.40	0.40	16,000	1,200	0.40	0.40
Ø3	16,000	1,450	0.60	0.60	16,000	1,740	0.60	0.60	16,000	2,000	0.60	0.60
Ø4	16,000	2,100	0.80	0.80	16,000	2,520	0.80	0.80	16,000	3,100	0.80	0.80
Ø5	15,500	2,550	1.00	1.00	15,500	3,060	1.00	1.00	15,000	3,800	1.00	1.00
Ø6	15,000	2,950	1.20	1.20	15,000	3,540	1.20	1.20	15,000	4,400	1.20	1.20
Ø8	13,000	3,000	1.60	1.60	13,000	3,600	1.60	1.60	13,000	4,500	1.60	1.60
Ø10	11,500	3,000	2.00	2.00	12,000	3,600	2.00	2.00	12,000	4,600	2.00	2.00
Ø12	10,700	3,200	2.40	2.40	10,000	3,840	2.40	2.40	10,000	4,700	2.40	2.40

**절입량**  
Depth of Cut

- 유효장이 긴 경우에는 회전수와 이송속도를 최대 20% 이하로 줄이십시오.
- 절삭 조건표에 없는 유효장은 같은 직경과 비례하여 DOWN 시켜주십시오.
- 상기 절삭조건외의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 공작기계와 가공물의 강성이 없는 경우 진동이 발생할 시 조건표에 회전 속도와 이송속도를 같은 비율로 줄여서 적용합니다.
- If the effective length is long, reduce the RPM and feed maximum 20%.
- 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.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- In case of workpiece and machine do not have enough rigidity and make vibration, reduce the RPM and feed in same proportion.

# 2DEM/3DEM/4&6DEM Cutting Condition

• RPM : rev./min • Feed : mm/min

피삭재 Material	2DEM				4DEM				6DEM			
	흑연 Graphite				흑연 Graphite				흑연 Graphite			
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
Ø0.2	40,000	100	0.3	0.02	-	-	-	-	-	-	-	-
Ø0.4	40,000	200	0.6	0.04	-	-	-	-	-	-	-	-
Ø0.6	40,000	350	0.9	0.06	-	-	-	-	-	-	-	-
Ø0.8	40,000	550	1.2	0.08	-	-	-	-	-	-	-	-
Ø1	40,000	700	1.5	0.10	-	-	-	-	-	-	-	-
Ø2	25,000	800	3.0	0.20	-	-	-	-	-	-	-	-
Ø3	20,000	800	4.5	0.30	20,000	1,600	4.5	0.3	-	-	-	-
Ø4	18,000	950	6.0	0.40	18,000	1,900	6.0	0.4	-	-	-	-
Ø5	14,000	1,200	7.5	0.50	14,000	2,400	7.5	0.5	-	-	-	-
Ø6	11,000	1,400	9.0	0.60	11,000	2,800	9.0	0.6	22,200	8,000	9	0.6
Ø8	8,000	1,300	12.0	0.80	8,000	2,600	12.0	0.8	16,800	8,000	12	0.8
Ø10	6,500	1,200	15.0	1.00	6,500	2,400	15.0	1.0	13,400	8,000	15	1.0
Ø12	5,500	1,200	18.0	1.20	5,500	2,400	18.0	1.2	11,350	6,700	18	1.2
Ø16	5,500	1,200	24.0	1.60	-	-	-	-	8,400	5,000	24	1.6

**절입량**  
Depth of Cut

- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰 주세요.
- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- 상기 절삭조건외의 참고는 수치 이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피드 속도를 초과 하거나 버 및 적열 현상이 발생할때 스피드 속도와 이송 속도를 비례적으로 조정 하십시오.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (Ø1이하 사용시 진동 허용 관리 5µm이내 일것.)
- 흑연 가공시 에어브로를 추천 합니다.
- If the effective length is long, reduce the RPM and feed in the same proportion.
- 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.
- 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 (Ø1 or less, the vibration tolerance management should be within 5µm).
- For graphite milling, air blow method is recommended.

# 2CPB Cutting Condition

•RPM : rev./min •Feed : mm/min

궤삭재 Material	CFRP				GFRP			
	반경 Radius	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth
R 0.25	28,000	273	0.05	0.05	13,720	112	0.05	0.05
R 0.3	25,760	315	0.06	0.06	12,622	129	0.06	0.06
R 0.4	18,816	399	0.08	0.08	9,220	164	0.08	0.08
R 0.5	17,920	420	0.1	0.1	8,781	172	0.1	0.1
R 1	17,920	840	0.2	0.2	8,781	344	0.2	0.2
R 2	17,920	2,205	0.4	0.4	8,781	904	0.4	0.4
R 3	16,800	3,098	0.6	0.6	8,232	1,270	0.6	0.6
R 4	14,560	3,150	0.8	0.8	7,134	1,292	0.8	0.8
R 5	12,880	3,360	1	1	6,311	1,378	1	1
R 6	11,200	3,308	1.2	1.2	5,488	1,356	1.2	1.2

**절입량**  
Depth of Cut

- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰 최대 20% 이하로 줄어십시오.
- 유효장에 따라 같은 직경에 비례하여 회전수와 이송속도를 DOWN 시켜주십시오.
- 상기 절삭 가공조건외의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 공작기계와 가공물의 강성이 없는 경우, 진동이 발생할시 조건표에 회전속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- If the effective length is long, reduce the RPM and feed in the same proportion.
- 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.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- In case of workpiece and machine do not have enough rigidity and make vibration, reduce the RPM and feed in same proportion.

# 8 ~ 12CPE Cutting Condition

•RPM : rev./min •Feed : mm/min

궤삭재 Material	CFRP				GFRP			
	외경 Outside Diameter	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth
ø6	8,400	840	6	2.1	4116	378	6	2.1
ø8	6,200	860	8	2.8	3038	387	8	2.8
ø10	5,100	780	10	3.5	2499	351	10	3.5
ø12	4,150	750	12	4.2	2034	338	12	4.2

**절입량**  
Depth of Cut

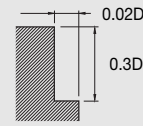
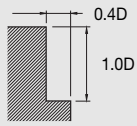
- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰 최대 20% 이하로 줄어십시오.
- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- 상기 조건은 8날 기준이며 날 수가 증가시 같은 직경에 비례하여 회전수와 이송속도를 UP 시켜주십시오.
- 상기 절삭 가공조건외의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할때 스피들 속도와 이송 속도를 비례적으로 조정하십시오.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- In case of long effective length, reduce the RPM and feed by 20% or less.
- 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.
- Above the value of the table is based on 8 flutes. If you use more than 8 flutes of endmill, raise up the RPM and Feed in a same proportion 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

외경 Outside Diameter	RPM	FEED	Ap Axial Depth	Ae Radial Depth
ø6	8,000	600	6	2.4
ø8	6,000	600	8	3.2
ø10	4,800	540	10	4.0
ø12	4,000	540	12	4.8

## 4&6CPR DIA Coating

외경 Outside Diameter	4CPR				6CPR											
	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth				
ø6	7,900	1,100	6	2.4	4,200	430	6	2.4	10,500	1,950	1.8	0.12	5,300	7,400	1.8	0.12
ø8	5,960	1,600	8	3.2	3,200	590	8	3.2	7,970	2,950	2.4	0.16	3,900	950	2.4	0.16
ø10	4,750	1,500	10	4.0	2,550	560	10	4.0	6,350	2,930	3	0.20	3,120	850	3	0.20
ø12	3,950	2,060	12	4.8	2,120	725	12	4.8	5,300	3,900	3.6	0.24	2,600	1,050	3.6	0.24

절입량  
Depth of Cut

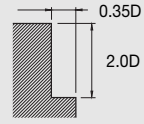


- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰 최대 20% 이하로 줄어십시오.
- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정하십시오.
- 상기 절삭 가공조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피들 속도와 이송 속도를 비례 적으로 조정하십시오.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공 시의 발열과 발화에 주의하십시오
- In case of long effective length, reduce the RPM and feed by 20% or less.
- 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.
- 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

## 6 ~ 16CPO Cutting Condition

외경 Outside Diameter	CFRP				GFRP			
	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
ø4	15,900	1,400	8	1.4	15,900	1,400	8	1.4
ø5	13,000	1,900	10	1.8	13,000	1,900	10	1.8
ø6	10,600	2,200	12	2.1	10,600	2,200	12	2.1
ø8	7,950	2,600	16	2.8	7,950	2,600	16	2.8
ø10	6300	3050	20	3.5	6300	3050	20	3.5
ø12	5300	3300	24	4.2	5300	3300	24	4.2

절입량  
Depth of Cut



- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰 최대 20% 이하로 줄어십시오.
- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- 상기 조건은 8날 기준이며 날 수가 증가시 같은 직경에 비례하여 회전수와 이송속도를 UP 시켜주십시오.
- 상기 절삭 가공조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할때 스피들 속도와 이송 속도를 비례적으로 조정하십시오.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- In case of long effective length, reduce the RPM and feed by 20% or less.
- 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.
- Above the value of the table is based on 8 flutes. If you use more than 8 flutes of endmill, raise up the RPM and Feed in a same proportion 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

피삭재 Material	CFRP			
외경 Outside Diameter	RPM	FEED	V/C	Fz
Ø2	15,900	960	100 ~ 150	0.03 ~ 0.07
Ø2.5	12,700	760	-	-
Ø3	10,600	630	-	-
Ø4	7,960	480	-	-
Ø5	6,370	380	-	-
Ø6	5,300	320	-	-
Ø8	3,980	240	-	-
Ø9	3,540	210	-	-
Ø10	3,180	190	-	-
Ø11	2,890	175	-	-
Ø12	2,650	160	-	-

- 상기 조건은 V/C 100, Fz 0.03 기준이며, 실 가공시 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과할시 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오.
- Above the parameters are based on V/C 100 with Fz 0.03. Actual machining can be changed depending on your machining purpose and condition of your machine.
- 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

# 3SUE Cutting Condition

피삭재 Material	스테인리스강/ 티탄합금 Stainless Steels / Titanium Alloy Steels				고경도강 Hardened Steels				초내열합금/ 인코넬 Heat Resistant Alloy / Inconel			
경도 Hardness	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
Ø0.8	6,400	60	1.2	0.16	3,900	30	0.8	0.04	2,000	10	0.8	0.04
Ø1	5,600	70	1.5	0.20	3,500	30	1.0	0.05	1,700	15	1.0	0.05
Ø2	4,800	80	3.0	0.40	2,900	34	1.5	0.08	1,400	20	1.5	0.08
Ø3	4,000	90	4.5	0.60	2,200	45	2.5	0.13	1,400	25	2.5	0.13
Ø4	3,300	140	6.0	0.80	1,800	70	3.0	0.15	1,200	35	3.0	0.15
Ø5	2,700	170	7.5	1.00	1,500	90	4.0	0.20	1,000	45	4.0	0.20
Ø6	2,400	180	9.0	1.20	1,400	90	5.0	0.25	900	45	5.0	0.25
Ø8	1,800	190	12.0	1.50	1,000	100	7.0	0.35	720	40	7.0	0.35
Ø10	1,400	190	14.0	1.80	900	110	9.0	0.45	600	40	9.0	0.45
Ø12	1,200	150	17.0	2.00	700	90	10.0	0.50	500	35	10.0	0.50
Ø16	900	120	23.0	2.50	550	60	15.0	0.75	360	30	15.0	0.75

절입량 Depth of Cut		
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- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 절삭 조건이 없는 직경 및 유효장은 비슷한 직경 및 유효장에 비례하여 UP&DOWN 하여 설정 하십시오.
- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- 상기 절삭조건에 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (Ø1이하 사용시 진동 허용 관리 5 $\mu$ m이내 일것.)
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오.
- If the effective length is long, reduce the RPM and feed in the same proportion.
- If the diameter or effective length of your tool are not on the table, adjust it compared similarity value on the table.
- 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.
- 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 ( $\phi 1$  or less, the vibration tolerance management should be within 5 $\mu$ m).
- 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.

# 3SUB Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	합금강/ 주철 Alloy Steels/ Cast iron				스테인레스강 Stainless steels				고경도강 Hardened Steels			
경도 Hardness	30 ~ 40HRC								45 ~ 55HRC			
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
R0.5	45000	1300	0.05	0.15	34600	800	0.05	0.15	9000	130	0.025	0.05
R0.75	38000	1850	0.075	0.225	29200	1135	0.075	0.225	7600	185	0.0375	0.075
R1	32000	2250	0.1	0.3	24600	1380	0.1	0.3	6400	225	0.05	0.1
R1.5	27300	2560	0.15	0.45	20800	1520	0.15	0.45	5460	272	0.075	0.15
R2	20800	2240	0.2	0.6	15600	1360	0.2	0.6	4160	208	0.1	0.2
R3	13780	1680	0.3	0.9	10400	1120	0.3	0.9	2730	168	0.15	0.3
R4	10400	1520	0.4	1.2	7800	1120	0.4	1.2	2080	152	0.2	0.4
R5	8320	1440	0.5	1.5	6240	1040	0.5	1.5	1690	144	0.25	0.5
R6	6890	1400	0.6	1.8	5200	1000	0.6	1.8	1430	100	0.3	0.6

절입량  
Depth of Cut

절입량  
Depth of Cut

# 4SUB Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	합금강/ 주철 Alloy Steels/ Cast iron				스테인레스강 Stainless steels				고경도강 Hardened Steels			
경도 Hardness	30 ~ 40HRC								45 ~ 55HRC			
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
R1.5	21,000	3,200	0.3	0.75	16,000	1,900	0.25	0.75	4200	340	0.12	0.3
R2	16,000	2,800	0.4	1	12,000	1,700	0.33	1	3200	260	0.16	0.4
R2.5	12,700	2,600	0.5	1.25	9,600	1,500	0.42	1.25	2500	250	0.2	0.5
R3	10,600	2,100	0.6	1.5	8,000	1,400	0.5	1.5	2100	210	0.24	0.6
R4	8,000	1,900	0.8	2	6,000	1,400	0.8	2	1600	190	0.32	0.8
R5	6,400	1,800	1	2.5	4,800	1,300	1	2.5	1300	180	0.4	1
R6	5,300	1,800	1.2	3	4,000	1,300	1.2	3	1100	150	0.48	1.2

절입량  
Depth of Cut

절입량  
Depth of Cut

- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 절삭 조건이 없는 직경 및 유효장은 비슷한 직경 및 유효장에 비례하여 UP&DOWN 하여 설정 하십시오.
- HRC55 이상 고경도강 가공시 55HRC 조건의 같은 직경 대비 상기 절삭 조건의 20% DOWN 해주십시오.
- 상기 절삭조건의 참고는 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 적용 기계의 회전속도가 부족한 경우에는 회전 속도와 이송속도를 같은 비율로 줄여서 적용합니다.
- 원활한 칩배출을 위하여 에어브로 혹은 미스트 클린트 사용을 추천 합니다.
- If the effective length is long, reduce the RPM and feed in the same proportion.
- If the diameter or effective length of your tool are not on the table, adjust it compared similarity value on the table.
- When milling workpiece, HRC over 55 hardened steel , reduce 20% of the 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, reduce the RPM and feed in the same proportion.
- Air blow or oil mist is recommended for smooth chip emission.



# 4SURE Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	합금강 / 공구강 Alloy Steels / Tools Steel				스테인리스강 / 티탄합금 Stainless Steels / Titanium Alloy Steels				고경도강 Hardened Steels			
	SKD61 / NAK				SUS304 / SUS 316 / Ti6A				Inconel 718			
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	13760	496	1	1	12600	464	0.5	1	6000	80	0.2	1
∅2	11740	720	2	2	10920	464	1	2	4990	112	0.4	2
∅3	8390	816	3	3	8270	704	1.5	3	4370	160	0.6	3
∅4	6150	912	4	4	6240	800	2	4	3330	184	0.8	4
∅5	5370	1232	5	5	4990	832	2.5	5	2600	208	1	5
∅6	4480	1440	6	6	4130	832	3	6	2180	208	1.2	6
∅8	3350	1040	8	8	3120	784	4	8	1660	208	1.6	8
∅10	2680	912	10	10	2500	640	5	10	1350	176	2	10
∅12	2240	800	12	12	2100	640	6	12	1140	144	2.4	12
∅16	1680	752	16	16	1560	464	8	16	830	112	3.2	16
∅20	1340	561	20	20	1250	416	10	20	620	80	4	20

절입량 Depth of Cut			
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- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 절삭 조건이 없는 직경 및 유효장은 비슷한 직경 및 유효장에 비례하여 UP&DOWN 하여 설정 하십시오.
- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- 상기 절삭조건에 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피드 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피드 속도와 이송 속도를 비례적으로 조정 하십시오.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (∅1이하 사용시 진동 허용 관리 5 $\mu$ m이내 일것.)
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- If the effective length is long, reduce the RPM and feed in the same proportion.
- If the diameter or effective length of your tool are not on the table, adjust it compared similarity value on the table.
- 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.
- 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 ( $\phi 1$  or less, the vibration tolerance management should be within 5 $\mu$ m).
- 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.

# 4SLE Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	합금강 / 공구강 Alloy Steels / Tools Steel				스테인리스강 / 티탄합금 Stainless Steels / Titanium Alloy Steels				고경도강 Hardened Steels			
	SKD61 / NAK				SUS304 / SUS 316 / Ti6A				Inconel 718			
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
∅3	13,270	740	2.4	3.0	5,840	260	2.4	3.0	3,185	115	2.4	3.0
∅4	9,950	710	3.2	4.0	4,380	245	3.2	4.0	2,390	115	3.2	4.0
∅6	6,630	720	4.8	6.0	2,920	245	4.8	6.0	1,590	115	4.8	6.0
∅8	4,970	800	6.4	8.0	2,190	245	6.4	8.0	1,190	115	6.4	8.0
∅10	3,980	800	8.0	10.0	1,750	245	8.0	10.0	955	115	8.0	10.0
∅12	3,320	800	9.6	12.0	1,460	245	9.6	12.0	796	115	9.6	12.0
∅16	2,490	800	12.8	16.0	1,095	245	12.8	16.0	597	115	12.8	16.0
∅20	1,990	800	16.0	20.0	880	245	16.0	20.0	480	115	16.0	20.0

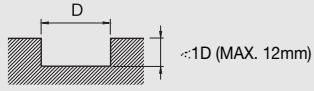
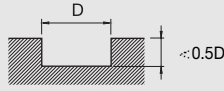
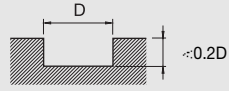
절입량 Depth of Cut	
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- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 가공 진입시 가능한 피삭재 밖에서 진입 하십시오.
- 절삭 조건이 없는 직경 및 유효장은 비슷한 직경 및 유효장에 비례하여 UP&DOWN 하여 설정 하십시오.
- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- 상기 절삭조건에 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피드 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피드 속도와 이송 속도를 비례적으로 조정 하십시오.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- If the effective length is long, reduce the RPM and feed in the same proportion.
- When entering the tool to the workpiece, enter the tool from outside to the workpiece.
- If the diameter or effective length of your tool are not on the table, adjust it compared similarity value on the table.
- 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.
- 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

## 홈 절삭 Slotting

피삭재 Material	합금강 / 공구강 Alloy Steels / Tools Steel				스테인리스강 / 티탄합금 Stainless Steels / Titanium Alloy Steels				고경도강 Hardened Steels			
	SKD61 / NAK				SUS304 / SUS 316 / Ti6A				Inconel 718			
	외경 Outside Diameter	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth
ø2	10,000	400	2	2	9,600	310	1	2	3,200	80	0.4	2
ø3	6,900	410	3	3	7,400	380	1.5	3	2,700	110	0.6	3
ø4	5,600	490	4	4	5,600	400	2	4	2,000	120	0.8	4
ø5	4,500	630	5	5	4,500	410	2.5	5	1,600	130	1	5
ø6	3,700	740	6	6	3,700	440	3	6	1,300	160	1.2	6
ø7	3,200	700	7	7	3,200	410	3.5	7	1,100	140	1.4	7
ø8	2,800	670	8	8	2,800	390	4	8	1,000	130	1.6	8
ø9	2,500	600	9	9	2,500	350	4.5	9	900	130	1.8	9
ø10	2,200	530	10	10	2,200	350	5	10	800	130	2	10
ø11	2,000	530	11	11	2,000	320	5.5	11	720	120	2.2	11
ø12	1,900	530	12	12	1,900	300	6	12	660	110	2.4	12
ø16	1,400	390	16	16	1,400	280	8	16	500	80	3.2	16
ø20	1,100	350	20	20	1,100	260	10	20	400	60	4	20

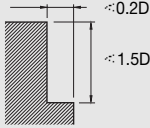
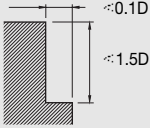
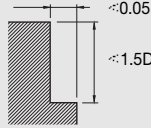
  

절입량 Depth of Cut			
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## 측면 절삭 Side Cutting

피삭재 Material	합금강 / 공구강 Alloy Steels / Tools Steel				스테인리스강 / 티탄합금 Stainless Steels / Titanium Alloy Steels				고경도강 Hardened Steels			
	SKD61 / NAK				SUS304 / SUS 316 / Ti6A				Inconel 718			
	외경 Outside Diameter	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth
ø2	21,000	1,100	3	0.4	14,000	560	3	0.2	4,800	130	3	0.1
ø3	15,000	1,250	4.5	0.6	10,600	850	4.5	0.3	4,200	200	4.5	0.15
ø4	11,000	1,400	6	0.8	8,000	960	6	0.4	3,200	220	6	0.2
ø5	9,600	1,900	7.5	1	6,400	1,000	7.5	0.5	2,500	250	7.5	0.25
ø6	8,000	2,200	9	1.2	5,300	1,000	9	0.6	2,100	250	9	0.3
ø7	6,800	1,900	10.5	1.4	4,500	1,000	10.5	0.7	1,800	260	10.5	0.35
ø8	6,000	1,600	12	1.6	4,000	960	12	0.8	1,600	260	12	0.4
ø9	5,300	1,480	13.5	1.8	3,500	840	13.5	0.9	1,400	220	13.5	0.45
ø10	4,800	1,440	15	2	3,200	770	15	1	1,300	210	15	0.5
ø11	4,400	1,350	16.5	2.2	2,900	760	16.5	1.1	1,200	190	16.5	0.55
ø12	4,000	1,250	18	2.4	2,700	760	18	1.2	1,100	180	18	0.6
ø16	3,000	1,140	24	3.2	2,000	560	24	1.6	800	130	24	0.8
ø20	2,400	860	30	4	1,600	510	30	2	600	100	30	1

절입량 Depth of Cut			
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- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 가공 진입시 가능한 피삭재 밖에서 진입 하십시오.
- 절삭 조건이 없는 직경 및 유효장은 비슷한 직경 및 유효장에 비례하여 UP&DOWN 하여 설정 하십시오.
- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 에어브로, 절삭유, 오일 미스트 콜러트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오

- If the effective length is long, reduce the RPM and feed in the same proportion.
- When entering the tool to the workpiece, enter the tool from outside to the workpiece.
- If the diameter or effective length of your tool are not on the table, adjust it compared similarity value on the table.
- 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.
- 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

# 4SUCR Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	합금강/공구강 Alloy Steels / Tools Steel				스테인리스강/티타늄합금 Stainless Steels / Titanium Alloy Steels				고경도강 Hardened Steels			
	SKD61 / NAK				SUS304 / SUS 316 / Ti6A				Inconel 718			
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
ø1	13,210	476	0.5	0.8	10,836	399	0.3	0.5	5,820	78	0.1	0.3
ø2	11,270	691	1.0	1.6	9,391	399	0.6	1.0	4,840	109	0.2	0.6
ø3	8,054	783	1.5	2.4	7,112	605	0.9	1.5	4,239	155	0.3	0.9
ø4	5,904	876	2.0	3.2	5,366	688	1.2	2.0	3,230	178	0.4	1.2
ø5	5,155	1183	2.5	4.0	4,291	716	1.5	2.5	2,522	202	0.5	1.5
ø6	4,301	1382	3.0	4.8	3,552	716	1.8	3.0	2,115	202	0.6	1.8
ø8	3,216	998	4.0	6.4	2,683	674	2.4	4.0	1,610	202	0.8	2.4
ø10	2,573	876	5.0	8.0	2,150	550	3.0	5.0	1,310	171	1.0	3.0
ø12	2,150	768	6.0	9.6	1,806	550	3.6	6.0	1,106	140	1.2	3.6
ø16	1,613	722	8.0	12.8	1,342	399	4.8	8.0	805	109	1.6	4.8
ø20	1,286	538	10.0	16.0	1,075	358	6.0	10.0	601	78	2.0	6.0
절입량 Depth of Cut												

- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 절삭 조건이 없는 직경 및 유효장은 비슷한 직경 및 유효장에 비례하여 UP&DOWN 하여 설정 하십시오.
- 날 경의 코너R 대비 Ae 값을 설정 하십시오.
- 상기 절삭조건외의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (ø10이하 사용시 진동 허용 관리 5µm이내 일것)
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- If the effective length is long, reduce the RPM and feed in the same proportion.
- If the diameter or effective length of your tool are not on the table, adjust it compared similarity value on the table.
- Consider the corner radius value when you set up the Ae value.
- 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 (ø1 or less, the vibration tolerance management should be within 5µm).
- 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.

# 5&6TROE Cutting Condition

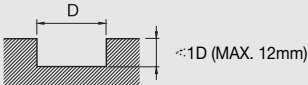
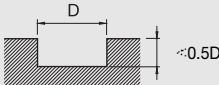
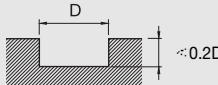
•RPM : rev./min •Feed : mm/min

피삭재 Material	합금강/공구강 Alloy Steels / Tools Steel				스테인리스강/티타늄합금 Stainless Steels / Titanium Alloy Steels				고경도강 Hardened Steels			
	SKD61 / NAK				SUS304 / SUS 316 / Ti6A				Inconel 718			
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
ø6	3,700	450	6	0.3	3,200	380	6	0.3	1,100	65	6	0.3
ø8	2,800	400	8	0.4	2,350	420	8	0.4	950	60	8	0.4
ø10	2,250	325	10	0.5	1,990	350	10	0.5	750	60	10	0.5
ø12	1,990	300	12	0.6	1,550	270	12	0.6	600	55	12	0.6
ø16	1,550	250	16	0.8	1,250	250	16	0.8	500	50	16	0.8
ø20	1,200	180	20	1	900	150	20	1	350	50	20	1
절입량 Depth of Cut												

- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 가공 진입시 가능한 피삭재 밖에서 진입 하십시오.
- 절삭 조건이 없는 직경 및 유효장은 비슷한 직경 및 유효장에 비례하여 UP&DOWN 하여 설정 하십시오.
- 상기 절삭조건외의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- If the effective length is long, reduce the RPM and feed in the same proportion.
- When entering the tool to the workpiece, enter the tool from outside to the workpiece.
- If the diameter or effective length of your tool are not on the table, adjust it compared similarity value on the table.
- 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

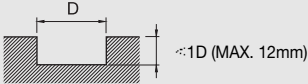
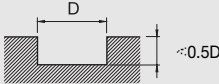
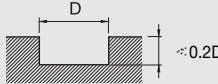
# 4LSUC Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	합금강 / 공구강 Alloy Steels / Tools Steel				스테인리스강 / 티탄합금 Stainless Steels / Titanium Alloy Steels				고경도강 Hardened Steels			
	SKD61 / NAK				SUS304 / SUS 316 / Ti6A				Inconel 718			
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
Ø1	10,000	400	1	1	9,600	310	0.5	1	3,200	80	0.2	1
Ø2	10,000	400	2	2	9,600	310	1	2	3,200	80	0.4	2
Ø3	6,900	410	3	3	7,400	380	1.5	3	2,700	110	0.6	3
Ø4	5,600	490	4	4	5,600	400	2	4	2,000	120	0.8	4
Ø5	4,500	630	5	5	4,500	410	2.5	5	1,600	130	1	5
Ø6	3,700	740	6	6	3,700	440	3	6	1,300	160	1.2	6
Ø7	3,200	700	7	7	3,200	410	3.5	7	1,100	140	1.4	7
Ø8	2,800	670	8	8	2,800	390	4	8	1,000	130	1.6	8
Ø10	2,200	530	10	10	2,200	350	5	10	800	130	2	10
Ø11	2,000	530	11	11	2,000	320	5.5	11	720	120	2.2	11
Ø12	1,900	530	12	12	1,900	300	6	12	660	110	2.4	12
Ø16	1,400	390	16	16	1,400	280	8	16	500	80	3.2	16
Ø20	1,100	350	20	20	1,100	260	10	20	400	60	4	20
절입량 Depth of Cut												

# 7SUC Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	합금강 / 공구강 Alloy Steels / Tools Steel				스테인리스강 / 티탄합금 Stainless Steels / Titanium Alloy Steels				고경도강 Hardened Steels			
	SKD61 / NAK				SUS304 / SUS 316 / Ti6A				Inconel 718			
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
Ø6	4,070	925	6	6	4,070	550	3	6	1,430	200	1.2	6
Ø8	3,080	838	8	8	3,080	488	4	8	1,100	163	1.6	8
Ø10	2,420	663	10	10	2,420	438	5	10	880	163	2	10
Ø12	2,090	663	12	12	2,090	375	6	12	726	138	2.4	12
Ø16	1,540	488	16	16	1,540	350	8	16	550	100	3.2	16
Ø20	1,210	438	20	20	1,210	325	10	20	440	75	4	20
절입량 Depth of Cut												

- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 가공 진입시 가능한 피삭재 밖에서 진입 하십시오.
- 절삭 조건이 없는 직경 및 유효장은 비슷한 직경 및 유효장에 비례하여 UP&DOWN 하여 설정 하십시오.
- 상기 절삭조건이 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 에어브로, 절삭유, 오일 미스트 콜러트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- If the effective length is long, reduce the RPM and feed in the same proportion.
- When entering the tool to the workpiece, enter the tool from outside to the workpiece.
- If the diameter or effective length of your tool are not on the table, adjust it compared similarity value on the table.
- 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

# 3&4&5SUR Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	스테인리스강/ 티탄합금 Stainless Steels / Titanium Alloy Steels			
	SUS304 / SUS 316 / Ti6A			
외경 Outside Diameter	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø3	5,000	380	0.9	3
Ø4	4,800	350	1.2	4
Ø5	4,700	350	1.5	5
Ø6	4,400	340	1.5	6
Ø7	3,800	340	1.75	7
Ø8	3,300	340	2	8
Ø9	3,000	340	2.25	9
Ø10	2,700	330	2.5	10
Ø12	2,200	330	1.8	12
Ø14	2,000	310	2.1	14
Ø16	1,750	300	2.4	16
Ø20	1,300	210	2	20

<p><b>절입량</b> Depth of Cut</p>		<p>A :</p> <ul style="list-style-type: none"> <li>Ø3 ~ 5 = 0.3 × D</li> <li>Ø6 ~ 10 = 0.25 × D</li> <li>Ø12 ~ 16 = 0.15 × D</li> <li>Ø18 ~ 20 = 0.1 × D</li> </ul>
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- 가공 진입시 가능한 피삭재 밖에서 진입 하십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 30% 이하로 줄이십시오.
- 상기 절삭 가공 조건의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 공작기계와 가공물의 강성이 없는 경우 진동이 발생할시 조건표에 회전 속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- 피삭재와 가공 모양에 따라 적절한 쿨란트를 사용 하십시오.
- 스테인레스, 내열합금강 등의 절단 가공시 수용성 절삭유가 가장 효과적입니다.
- When entering the tool to the workpiece, enter the tool from outside to the workpiece.
- If the effective length is long, reduce the RPM and feed maximum 30%.
- 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.
- In case of workpiece and machine do not have enough rigidity and make vibration, reduce the RPM and feed in same proportion.
- Depending on the workpiece and shape, use adequate coolant.
- For parting off stainless or hear resistant alloy, using water-soluble oil is the most effective way.

# 2COB Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	동 합금 Copper Alloys							
	$\alpha \leq 15^\circ$				$\alpha > 15^\circ$			
반경 Corner Radius	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
R 0.5	40,000	8,000	0.06	0.1	40,000	3,200	0.06	0.1
R 0.75	40,000	9,600	0.09	0.15	40,000	4,000	0.09	0.15
R 1	40,000	9,600	0.11	0.2	39,000	4,700	0.11	0.2
R 1.5	40,000	12,000	0.12	0.3	30,000	4,500	0.12	0.3
R 2	40,000	12,000	0.13	0.4	27,000	4,300	0.13	0.4
R 2.5	32,000	11,000	0.15	0.5	20,000	3,600	0.15	0.5
R 3	25,000	9,000	0.2	0.6	16,000	2,900	0.2	0.6
R 4	21,000	8,400	0.25	0.8	13,000	2,600	0.25	0.8
R 5	16,000	6,400	0.3	1	10,000	2,000	0.3	1
R 6	13,000	5,200	0.5	1.2	8,000	1,700	0.5	1.2
R 8	9,000	3,600	0.5	1.6	6,000	1,300	0.5	1.6

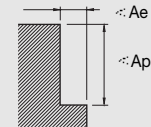
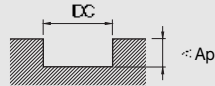
  

<p><b>절입량</b> Depth of Cut</p>	
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- $\alpha$ 란 가공면의 경사각입니다.
- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 원활한 칩배출을 위하여 수용성 절삭유제의 사용을 추천합니다.
- 적용 기계의 회전속도가 부족한 경우에는 회전속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- $\alpha$  value represents a slope of workpiece.
- If the effective length is long, reduce the RPM and feed in the same proportion.
- Using Water-soluble oil is recommended for smooth chip emission.
- If the parameters exceed the maximum RPM and feed of your machine, reduce the RPM and feed in the same proportion.

피삭재 Material			홈절삭 Slotting				측면 절삭 Side Cutting			
외경 Outside Diameter			동 / 동 합금 Copper / Copper Alloys				동 / 동 합금 Copper / Copper Alloys			
외경 Outside Diameter	반경 Corner Radius	유효장 Effective Length	RPM	FEED	Ap Axial Depth	Ap Radial Depth	RPM	FEED	Ap Axial Depth	Ap Radial Depth
ø1	R0.1, R0.2	3	45,000	2,500	0.036	1	45,000	4,500	0.036	0.2
		6	40,000	2,000	0.03	1	40,000	3,000	0.03	0.2
		10	35,000	1,600	0.025	1	35,000	2,000	0.025	0.2
ø1.5	R0.1, R0.2	5	23,000	1,800	0.08	1.5	50,000	6,000	0.08	0.3
		8	26,000	1,600	0.06	1.5	45,000	5,500	0.06	0.3
		12	30,000	1,500	0.05	1.5	40,000	4,500	0.04	0.3
ø2	R0.1, R0.2	6	35,000	1,800	0.14	2	45,000	5,000	0.12	0.8
		10	30,000	1,600	0.12	2	40,000	4,700	0.1	0.6
		14	30,000	1,200	0.08	2	30,000	3,800	0.06	0.4
ø3	R0.2, R0.3	10	30,000	2,200	0.14	3	40,000	6,500	0.12	1
		16	20,000	2,000	0.12	3	35,000	6,000	0.1	0.6
		20	20,000	2,000	0.12	3	35,000	6,000	0.1	0.6
	R0.5	10	20,000	2,600	0.14	3	38,000	10,000	0.12	0.8
		16	20,000	2,200	0.12	3	35,000	8,000	0.1	0.6
ø4	R0.2, R0.3	12	20,000	2,600	0.5	4	40,000	8,000	0.18	0.12
		16	15,000	2,400	0.3	4	32,000	5,000	0.16	0.1
		20	15,000	2,000	0.25	4	32,000	5,000	0.15	0.8
	R0.5	12	20,000	2,400	0.5	4	35,000	10,000	0.3	0.1
		16	15,000	2,200	0.25	4	32,000	7,000	0.15	0.8
		20	15,000	2,200	0.25	4	32,000	7,000	0.15	0.8
			15,000	2,200	0.25	4	32,000	7,000	0.15	0.8

절입량  
Depth of Cut

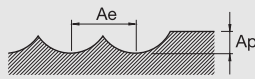


- 상기 조건은 V/C 100, Fz 0.03 기준이며, 실 가공시 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과할시 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- Above the parameters are based on V/C 100 with Fz 0.03. Actual machining can be changed depending on your machining purpose and condition of your machine.
- 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

# 2DRB Cutting Condition

•RPM : rev./min •Feed : mm/min

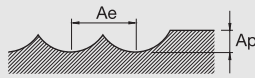
피삭재 Material	알루미늄 합금재 Aluminum Alloy Expanding Material A7075				알루미늄 합금 주물 / 다이캐스팅 Aluminum Alloys Casting / Die Casting Si1 3%				탄소섬유 / 동합금 Magnesium Alloy / Copper Alloy / CFRP AZ91 / AZ80A / C1100		동합금 Copper Alloy C1100	
	일반가공 Regular Milling		고속가공 High Speed Milling		일반가공 Regular Milling		고속가공 High Speed Milling		일반가공 Regular Milling		고속가공 High Speed Milling	
반경 Radius	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
R0.1	32,000	220	45,000	290	32,000	220	45,000	290	32,000	220	45,000	290
R0.3	32,000	480	45,000	660	32,000	480	45,000	660	32,000	480	45,000	660
R0.5	28,800	760	45,000	1,100	28,800	760	45,000	1,100	28,800	760	45,000	1,100
R0.8	28,800	850	45,000	1,400	28,800	850	45,000	1,400	25,200	850	35,900	1,300
R1	28,600	1,400	45,000	2,000	28,600	1,400	43,000	1,900	21,500	1,000	35,900	1,600
R1.5	19,100	1,400	45,000	3,000	19,100	1,400	28,600	1,900	14,300	1,000	23,900	1,600
R2	14,300	1,400	35,900	3,200	14,300	1,400	21,400	1,900	10,700	1,000	17,900	1,600
R3	9,500	1,400	23,900	3,200	9,500	1,400	14,300	1,900	7,200	1,000	12,000	1,600
R4	7,200	1,800	17,600	4,100	7,200	1,800	10,700	2,400	5,400	1,300	8,900	2,000
R5	5,700	1,600	14,000	3,600	5,700	1,600	8,600	2,200	4,300	1,200	7,200	1,800
R6	4,800	1,500	11,700	3,400	4,800	1,500	7,200	2,000	3,600	1,100	5,900	1,700
절입량 Depth of Cut	Ap	Ae	Ap	Ae	Ap	Ae	Ap	Ae	Ap	Ae	Ap	Ae
	0.1D	0.2D	0.05D	0.1D	0.1D	0.2D	0.05D	0.1D	0.1D	0.2D	0.02D	0.05D



# 2DLB Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	알루미늄 합금재 Aluminum Alloy Expanding Material A7075				알루미늄 합금 주물 / 다이캐스팅 Aluminum Alloys Casting / Die Casting Si1 3%				탄소섬유 / 동합금 Magnesium Alloy / Copper Alloy / CFRP AZ91 / AZ80A / C1100		동합금 Copper Alloy C1100	
	일반가공 Regular Milling		고속가공 High Speed Milling		일반가공 Regular Milling		고속가공 High Speed Milling		일반가공 Regular Milling		고속가공 High Speed Milling	
반경 Radius	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
R0.3	28,800	350	40,000	490	28,800	350	36,100	480	28,800	350	31,600	420
R0.5	23,400	720	31,500	950	23,400	720	25,200	900	23,400	720	20,700	800
R0.8	23,400	760	35,900	1,120	23,400	760	25,200	1,000	22,500	720	20,700	800
R1	22,500	950	31,500	1,260	22,500	950	25,200	1,100	17,100	720	20,700	800
R1.5	15,300	950	20,700	1,260	15,300	950	16,700	1,100	11,300	720	13,500	800
R2	11,300	950	15,800	1,260	11,300	950	12,600	1,100	8,600	720	10,400	800
R3	9,000	950	13,200	1,260	9,000	950	12,600	1,100	5,900	720	8,900	800
R4	6,400	1,150	11,600	1,260	6,400	1,150	9,800	1,000	4,800	880	6,400	950
R5	5,200	1,050	9,400	1,120	5,200	1,050	7,800	860	3,900	760	5,300	880
R6	4,100	1,000	6,700	950	4,100	1,000	5,400	520	3,000	740	4,600	840
절입량 Depth of Cut	Ap	Ae	Ap	Ae	Ap	Ae	Ap	Ae	Ap	Ae	Ap	Ae
	0.1D	0.2D	0.05D	0.1D	0.1D	0.2D	0.05D	0.1D	0.1D	0.2D	0.02D	0.05D



- 상기 절삭 조건의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피드 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피드 속도와 이송 속도를 비례적으로 조정 하십시오.
- 에어브로 혹은 미스트 쿨란트를 추천 합니다.
- 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.
- Air blow or mist coolant is recommended.

# 2DRE/3DRE Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	알루미늄 합금재 Aluminum Alloy Expanding Material A7075				알루미늄 합금 주물 / 다이캐스팅 Aluminum Alloys Casting / Die Casting Si1 3%				탄소섬유 / 동합금 Magnesium Alloy / Copper Alloy / CFRP AZ91 / AZ80A / C1100		동합금 Copper Alloy C1100	
	일반가공 Regular Milling		고속가공 High Speed Milling		일반가공 Regular Milling		고속가공 High Speed Milling		일반가공 Regular Milling		고속가공 High Speed Milling	
외경 Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
ø0.5	28,800	160	45,000	500	28,800	160	45,000	450	28,800	140	45,000	410
ø0.6	28,800	180	45,000	590	28,800	180	45,000	540	28,800	160	45,000	500
ø0.8	28,800	200	45,000	770	28,800	200	45,000	720	26,100	180	45,000	590
ø1	28,800	200	45,000	900	28,800	200	45,000	960	20,700	200	37,800	630
ø1.2	28,800	210	45,000	1,100	28,800	210	45,000	1,000	17,100	200	32,400	630
ø1.5	28,800	250	45,000	1,400	28,800	250	45,000	1,100	14,000	200	26,600	630
ø2	28,800	400	45,000	1,800	28,800	380	45,000	1,100	13,000	200	25,200	680
ø2.5	22,500	540	43,200	1,900	22,500	540	27,900	1,100	8,600	230	18,000	680
ø3	18,900	630	36,000	1,900	18,900	630	23,400	1,100	7,200	230	15,300	680
ø4	14,000	650	29,700	2,000	14,000	650	18,000	1,200	5,400	250	12,600	720
ø5	11,300	680	27,900	2,500	11,300	680	17,280	1,500	4,300	270	11,300	860
ø6	9,500	750	23,400	2,500	9,500	750	14,310	1,500	3,600	280	9,500	900
ø8	7,200	800	17,550	2,600	7,200	800	10,800	1,600	2,600	270	7,100	900
ø10	5,700	900	13,950	2,900	5,700	900	8,640	1,700	2,100	330	5,700	1,000
ø12	4,800	950	11,700	2,900	4,800	950	7,200	1,700	1,800	350	4,800	1,000
측면 절삭 Side Cutting	Ap	Ae	Ap	Ae	Ap	Ae	Ap	Ae	Ap	Ae	Ap	Ae
	1.5D	0.1D	1D	0.1D	1.5D	0.1D	1D	0.1D	1.5D	0.1D	1D	0.05D
홈 절삭 Slotting	Ap		Ap		Ap		Ap		Ap		Ap	
	0.3D < ø1 < 0.5D		0.15D		0.3D < ø1 < 0.5D		0.15D		0.3D < ø1 < 0.5D		0.1D	
절입량 Depth of Cut												

# 2DLE Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	알루미늄 합금재 Aluminum Alloy Expanding Material A7075				알루미늄 합금 주물 / 다이캐스팅 Aluminum Alloys Casting / Die Casting Si1 3%				탄소섬유 / 동합금 Magnesium Alloy / Copper Alloy / CFRP AZ91 / AZ80A / C1100		동합금 Copper Alloy C1100	
	일반가공 Regular Milling		고속가공 High Speed Milling		일반가공 Regular Milling		고속가공 High Speed Milling		일반가공 Regular Milling		고속가공 High Speed Milling	
외경 Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
ø0.1	32,000	35	45,000	120	32,000	35	45,000	120	32,000	35	45,000	100
ø0.3	32,000	60	45,000	300	32,000	60	45,000	300	32,000	60	45,000	210
ø0.5	28,800	90	45,000	500	28,800	90	45,000	500	28,800	90	45,000	390
ø0.8	28,800	120	45,000	700	28,800	130	45,000	700	23,000	110	45,000	500
ø1	28,800	170	45,000	900	28,800	170	45,000	900	20,700	125	37,800	630
ø1.5	28,800	230	40,500	1,100	28,800	230	40,500	1,100	14,000	130	26,700	630
ø2	23,000	270	30,600	1,100	23,000	270	30,600	1,100	10,400	135	21,600	675
ø3	15,300	460	20,700	1,100	15,300	460	20,700	1,100	7,200	200	15,300	675
ø4	11,300	470	15,300	1,100	11,300	470	15,300	1,100	5,400	210	11,700	675
ø5	9,000	490	12,200	1,100	9,000	490	12,200	1,100	4,300	225	9,000	675
ø6	7,700	540	10,000	1,100	7,700	540	10,000	1,100	3,600	225	7,200	675
ø8	6,000	600	8,200	1,200	6,000	600	8,200	1,200	2,600	300	5,900	720
ø10	4,500	650	6,000	1,400	4,500	650	6,000	1,400	2,100	300	4,300	800
ø12	3,100	690	4,500	1,500	3,100	690	4,500	1,500	1,600	320	3,200	850
측면 절삭 Side Cutting	Ap	Ae	Ap	Ae	Ap	Ae	Ap	Ae	Ap	Ae	Ap	Ae
	1.2D	0.1D	1D	0.1D	1.2D	0.1D	1D	0.1D	1D	0.1D	1D	0.05D
홈 절삭 Slotting	Ap		Ap		Ap		Ap		Ap		Ap	
	0.3D		0.15D		0.3D		0.15D		0.3D		0.1D	
절입량 Depth of Cut												

- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- 상기 절삭 조건의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 진동이 적고 강성이 좋은 공작기계 사용 요망 합니다 (ø1이하 사용시 진동 허용 관리 5µm이내 일것.)
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오.
- 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.
- 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 (ø1 or less, the vibration tolerance management should be within 5µm).
- Air blow or mist coolant is recommended and note for chip emission, heat, or ignition.



# 2DLC Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	알루미늄 합금재 Aluminum Alloy Expanding Material A7075				알루미늄 합금 주물 / 다이캐스팅 Aluminum Alloys Casting / Die Casting Si1 3%				탄소섬유 / 동합금 Magnesium Alloy / Copper Alloy / CFRP AZ91 / AZ80A / C1100		동합금 Copper Alloy C1100	
	일반가공 Regular Milling		고속가공 High Speed Milling		일반가공 Regular Milling		고속가공 High Speed Milling		일반가공 Regular Milling		고속가공 High Speed Milling	
외경 Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
Ø1	37,500	220	50,000	1,170	37,400	220	50,000	1,170	27,000	160	49,000	820
Ø1.5	37,500	300	50,000	1,430	37,400	300	50,000	1,430	18,000	170	34,700	820
Ø2	30,000	350	40,000	1,430	30,000	350	40,000	1,430	13,500	180	28,000	880
Ø3	20,000	600	27,000	1,430	20,000	600	27,000	1,430	9,400	260	20,000	880
Ø4	15,000	610	20,000	1,430	14,700	610	20,000	1,430	7,000	270	15,200	880
Ø6	10,000	700	13,000	1,430	10,000	700	13,000	1,430	4,700	290	9,400	880
Ø8	7,800	780	11,000	1,560	7,800	780	10,700	1,560	3,400	390	7,700	940
Ø10	5,900	850	7,800	1,820	5,900	850	7,800	1,820	2,700	390	5,600	1,000
Ø12	4,000	900	5,900	1,950	4,000	900	5,900	1,950	2,100	410	4,200	1,100
측면 절삭 Side Cutting	Ap	Ae	Ap	Ae	Ap	Ae	Ap	Ae	Ap	Ae	Ap	Ae
	1.2D	0.1D	1D	0.1D	1.2D	0.1D	1D	0.1D	1D	0.1D	1D	0.05D
홈 절삭 Slotting	Ap		Ap		Ap		Ap		Ap		Ap	
	0.3D		0.15D		0.3D		0.15D		0.3D		0.1D	
절입량 Depth of Cut												

- 유효장이 긴 경우에는 회전수와 이송속도를 최대 20% 이하로 줄이십시오.
- 측면 절삭시 코너 R 부분을 참고하여 절삭하시기 바랍니다.
- 홈 절삭시 날경의 코너 R 대비 Ae 값을 설정하십시오.
- 상기 절삭 조건의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 에어브로 혹은 미스트 클린트를 추천하며 칩 제거 주의 및 가공시 발열, 발화에 주의 하십시오.
- In case of long effective length, reduce the RPM and feed by 20% or less.
- Refer to the corner radius value for side milling
- Consider the corner radius value when you set up the Ae value.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- Air blow or mist coolant is recommended and note for chip emission, heat, or ignition.

# 3FALE Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	홈절삭 Slotting				측면 절삭 Side Cutting			
	알루미늄 합금 Aluminum Alloys				알루미늄 합금 Aluminum Alloys			
외경 Outside Diameter	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø6	8,000	1,000	6	6	8,000	1,200	15	1.8
Ø8	6,000	1,000	8	8	6,000	1,200	20	2.4
Ø10	4,800	1,000	10	10	4,800	1,200	25	3
Ø12	4,000	1,000	12	12	4,000	1,200	30	3.6
Ø16	3,000	1,000	16	16	3,000	1,200	40	4.8
절입량 Depth of Cut								

- 가공 진입시 가능한 피삭재 밖에서 진입 하십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 20%이하로 줄이십시오.
- 상기 절삭 가공 조건의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 공작기계와 가공물의 강성이 없는 경우 진동이 발생할시 조건표에 회전 속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- 피삭재와 가공 모양에 따라 적절한 클린트를 사용 하십시오.
- When entering the tool to the workpiece, enter the tool from outside to the workpiece.
- In case of long effective length, reduce the RPM and feed by 20% or less.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- In case of workpiece and machine do not have enough rigidity and make vibration, reduce the RPM and feed in same proportion.
- Depending on the workpiece and shape, use adequate coolant.

피삭재 Material		알루미늄 합금 Aluminum Alloys etc.						
외경 Outside Diameter	RPM	3ALR			3ALE			
		FEED			RPM	FEED		
		수직 Vertical	홀절삭 Soltting	측면 절삭 Side Milling		수직 Vertical	홀절삭 Soltting	측면 절삭 Side Milling
Ø1	30,000	150	900	1,100	25,500	130	770	930
Ø2	30,000	225	1,800	2,150	25,500	190	1,530	1,800
Ø3	21,600	225	2,000	2,400	18,400	190	1,700	2,000
Ø4	16,200	300	2,000	2,400	14,000	255	1,700	2,000
Ø5	13,000	300	2,000	2,400	11,000	255	1,700	2,000
Ø6	10,800	300	2,000	2,400	9,200	255	1,700	2,000
Ø8	8,100	300	2,000	2,400	7,000	255	1,700	2,000
Ø10	6,480	250	2,000	2,400	5,500	210	1,700	2,000
Ø12	5,400	200	2,000	2,400	4,400	170	1,700	2,000
Ø16	-	-	-	-	3,200	130	1,530	1,900
Ø20	-	-	-	-	2,000	85	1,360	1,700
Milling Amount (mm)		Ap=0.75D	Ap=0.75D	Ap=0.75D/ Ae=0.3D		Ap=0.75D	Ap=0.75D	Ap=0.75D/ Ae=0.3D
절입량 Depth of Cut								

# 2ALE

피삭재 Material	알루미늄 합금 Aluminum Alloys				알루미늄 합금 주물 Aluminum Alloys			
	측면 가공 Side Milling		홀가공 Soltting		측면 가공 Side Milling		홀가공 Soltting	
	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
Ø1	34,000	500	34,000	400	34,000	400	34,000	300
Ø2	34,000	950	32,300	720	32,300	720	27,200	470
Ø3	27,200	1,200	21,300	800	21,300	800	18,000	510
Ø4	20,400	1,300	16,000	850	16,000	850	14,000	550
Ø5	16,200	1,400	13,000	850	13,000	850	11,000	600
Ø6	13,600	1,600	11,000	940	11,000	940	9,400	640
Ø8	10,200	1,600	8,000	1,000	8,000	1,000	6,800	680
Ø10	8,100	1,600	6,500	1,000	6,500	1,000	5,400	680
Ø12	6,800	1,600	5,400	1,000	5,400	1,000	4,500	680
Ø16	5,100	1,600	4,100	1,000	4,100	1,000	3,400	610
Ø20	4,100	1,300	3,200	850	3,200	850	2,700	560
절입량 Depth of Cut								

- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오.
- 상기 절삭 조건의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- 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.
- 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

# 3ALC Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	홈절삭 Slotting				측면 절삭 Side Cutting			
	알루미늄 합금 Aluminum Alloys				알루미늄 합금 Aluminum Alloys			
외경 Outside Diameter	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
ø6	20,000	6,600	6	6	20,000	8,400	4.8	1.8
ø8	18,000	5,400	8	8	18,000	7,500	6.4	2.4
ø10	15,000	4,000	10	10	15,000	6,000	8	3
ø12	13,000	3,200	12	12	13,000	5,400	9.6	3.6
ø16	10,000	3,200	16	16	10,000	5,400	12.8	4.8
ø20	8,000	3,000	10	10	8,000	5,000	16	6

절입량 Depth of Cut		
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- 유효장이 긴 경우에는 회전수와 이송속도를 최대 20%이하로 줄어십시오.
- 측면 절삭시 코너 R 부분을 참고하여 절삭 하시기 바랍니다.
- 홈 절삭시 날경의 코너 R 대비 Ae 값을 설정 하십시오.
- 상기 절삭 가공 조건의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 에어브로 혹은 미스트 쿨런트를 추천하며 칩 제거 주의 및 가공시 발열, 발화에 주의 하십시오.

- In case of long effective length, reduce the RPM and feed by 20% or less.
- Refer to the corner radius value for side milling.
- Consider the corner radius value when you set up the Ae value.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

# 3ARE/3ARC Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	동 Copper						알루미늄 Aluminum					
			홈절삭 Slotting		측면 절삭 Side Cutting				홈절삭 Slotting		측면 절삭 Side Cutting	
외경 Outside Diameter	RPM	FEED	Ap Axial Depth	Ae Radial Depth	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	Ap Axial Depth	Ae Radial Depth
ø6	4,200	1,500	6	6	15	1.8	8,000	1,800	6	6	15	1.8
ø8	3,200	1,500	8	8	20	2.4	6,000	1,800	8	8	20	2.4
ø10	2,600	1,500	10	10	25	3	4,800	1,800	10	10	25	3
ø12	2,100	1,500	12	12	30	3.6	4,000	1,800	12	12	30	3.6
ø16	1,600	1,500	16	16	40	4.8	3,000	1,800	16	16	40	4.8
ø20	1,300	1,500	20	20	50	6	2,400	1,800	20	20	50	6

절입량 Depth of Cut		
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- 가공 진입시 가능한 피삭재 밖에서 진입 하십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 20% 이하로 줄어십시오.
- 상기 절삭 가공 조건의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 공작기계와 가공물의 강성이 없는 경우 진동이 발생할시 조건표에 회전 속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- 피삭재와 가공 모양에 따라 적절한 쿨런트를 사용 하십시오.

- When entering the tool to the workpiece, enter the tool from outside to the workpiece.
- In case of long effective length, reduce the RPM and feed by 20% or less.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- In case of workpiece and machine do not have enough rigidity and make vibration, reduce the RPM and feed in same proportion.
- Depending on the workpiece and shape, use adequate coolant.

측면 절삭 Side Cutting								
피삭재 Material	알루미늄 합금 Aluminum Alloys				알루미늄 합금 Aluminum Alloys			
외경 Outside Diameter	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
ø4	30,000	4,200	6	1	16,000	1,800	6	1
ø5	27,000	4,900	7.5	1.25	14,400	2,000	7.5	1.25
ø6	24,300	5,500	9	1.5	11,700	2,100	9	1.5
ø8	18,000	5,400	12	2	9,000	2,200	12	2
ø10	14,400	5,200	15	2.5	7,200	2,100	15	2.5
ø12	11,700	4,800	18	3	5,900	1,900	18	3
ø16	9,000	4,600	24	4	4,500	1,800	24	4
ø20	7,200	4,300	30	5	3,600	1,700	30	5

**절입량**  
Depth of Cut

- 가공 진입시 가능한 피삭재 밖에서 진입 하십시오.
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 20% 이하로 줄이십시오.
- 상기 절삭 가공 조건의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 공작기계와 가공물의 강성이 없는 경우 진동이 발생할시 조건표에 회전 속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- 피삭재와 가공 모양에 따라 적절한 클린트를 사용 하십시오.
- When entering the tool to the workpiece, enter the tool from outside to the workpiece.
- In case of long effective length, reduce the RPM and feed by 20% or less.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- In case of workpiece and machine do not have enough rigidity and make vibration, reduce the RPM and feed in same proportion.
- Depending on the workpiece and shape, use adequate coolant.

## 4&6CTDB

• 6CTDB는 RPM 동일 FEED만 최대 30% Up 적용.  
• Use the same RPM and raise up the feed up to 30% for 6CTDB.

피삭재 Material		흑연 Graphite				고경도강 Hardened Steels			
경도 Hardness		< 35HRC							
반경 Radius	a/2	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
R 0.5	10	35,000	4,200	0.22	0.05	42,000	3,000	0.09	0.3
R 0.75	10	33,000	5,250	0.27	0.05	39,000	4,400	0.10	0.3
R 1	10	32,000	6,300	0.32	0.10	38,500	5,400	0.20	0.6
R 1	15	25,000	6,000	1.18	0.10	30,000	4,200	0.20	0.6
R 1.5	10	25,000	6,000	0.39	0.10	30,000	4,800	0.30	0.8
R 2	10	16,000	4,500	0.45	0.10	20,000	3,500	0.40	1.1
R 2	30	14,500	3,700	1.18	0.10	18,000	3,000	0.40	1.1
R 3	10	12,000	4,250	0.49	0.10	14,000	3,400	0.60	1.4
R 3	20	10,500	4,000	1.18	0.10	13,200	3,100	0.60	1.4
R 4	5	9,500	4,100	0.45	0.10	11,000	3,200	0.80	1.6
R 4	10	8,000	3,850	0.45	0.10	10,000	3,000	0.80	1.6

**절입량**  
Depth of Cut

Ap : Axial Depth 축 방향의 절입 길이 (mm)  
 Ae : Radial Depth 반경 방향의 절입 길이 (mm)  
 D : Outside Diameter 외경 (mm)  
 n : Speed 회전속도 (min<sup>-1</sup>)  
 Vf : Feed 이송속도 (mm/min)

- 절삭 조건표는 4날 기준이며, 6날시에는 회전수는 유지하고, 피드는 안정적인 속도 내에서 최대 30%까지 UP 해주세요.
- 절삭 조건에 없는 각도는 같은 직경에 이전 각도와 비례하여 사용 하십시오.
- 이송속도 및 축 방향의 절입 깊이는 테이블각에 따라 고려하시고, 절삭 상황에 맞추어 조정 하십시오.
- 5축 가공시 유효장 부분을 확인 하여 주십시오.
- 절삭량이 작은 경우, Feed를 최대 20% 까지 UP 시켜 주십시오.
- 칩 제거 주의 및 가공시 발열, 발화에 주의 하십시오.
- The parameters on the table is based on 4 flutes. For using 6 flutes, use the same RPM and raise up the feed up to 30% in stable milling condition.
- If there is no parameter for the angle of your tool, refer to the previous angle, and adjust compare to it.
- Consider the RPM and feed based on the taper angle and adjust it with milling condition.
- For 5-axis milling, check the length of the effective length before milling.
- If you want to increase metal removal rates, raise up the feed up to 20%.
- During the chip evacuation, note for heat and ignition.

피삭재 Material			프리하든강/경도강 Prehardened Steels/ Hardened Steels				경도강 Hardened Steels				경도강 Hardened Steels			
경도 Hardness			30 ~ 45HRC				45 ~ 55HRC				55~ 62HRC			
반경 Radius	유효장 Effective Length	각도 Taper Angle	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 0.5	12	1°	38,000	2,500	0.110	0.16	35,000	1,600	0.080	0.13	25,000	800	0.050	0.08
-	20	1°	38,000	2,500	0.060	0.09	35,000	1,600	0.050	0.07	25,000	800	0.030	0.05
-	15	2°	38,000	2,500	0.090	0.14	35,000	1,600	0.070	0.11	25,000	800	0.050	0.07
-	20	2°	38,000	2,500	0.060	0.09	35,000	1,600	0.050	0.07	25,000	800	0.030	0.05
-	15	3°	38,000	2,500	0.090	0.14	35,000	1,600	0.070	0.11	25,000	800	0.050	0.07
-	20	3°	38,000	2,500	0.060	0.09	35,000	1,600	0.050	0.07	25,000	800	0.030	0.05
-	20	4°	38,000	2,500	0.070	0.1	35,000	1,600	0.060	0.08	25,000	800	0.030	0.05
-	20	5°	38,000	2,500	0.080	0.11	35,000	1,600	0.060	0.09	25,000	800	0.040	0.06
-	20	7°	38,000	2,500	0.080	0.11	35,000	1,600	0.060	0.09	25,000	800	0.040	0.06
R 1	12	1°	35,000	2,800	0.180	0.27	30,000	1,800	0.140	0.22	15,000	1,000	0.090	0.14
-	20	1°	35,000	2,800	0.400	0.21	30,000	1,800	0.110	0.17	15,000	1,000	0.070	0.11
-	15	2°	35,000	2,800	0.160	0.24	30,000	1,800	0.130	0.19	15,000	1,000	0.080	0.12
-	20	2°	35,000	2,800	0.400	0.21	30,000	1,800	0.110	0.17	15,000	1,000	0.070	0.11
-	15	3°	35,000	2,800	0.160	0.24	30,000	1,800	0.130	0.19	15,000	1,000	0.080	0.12
-	20	3°	35,000	2,800	0.400	0.21	30,000	1,800	0.110	0.17	15,000	1,000	0.070	0.11
-	30	3°	35,000	2,800	0.3	0.2	30,000	1,800	0.12	0.18	15,000	1,000	0.08	0.12
-	20	4°	35,000	2,800	0.400	0.21	30,000	1,800	0.110	0.17	15,000	1,000	0.070	0.11
-	20	5°	35,000	2,800	0.15	0.22	30,000	1,800	0.12	0.18	15,000	1,000	0.08	0.12
-	30	5°	35,000	2,800	0.13	0.2	30,000	1,800	0.11	0.18	15,000	1,000	0.07	0.12
-	29	6°	35,000	2,800	0.14	0.2	30,000	1,800	0.1	0.18	15,000	1,000	0.07	0.12
-	25	7°	35,000	2,800	0.15	0.25	30,000	1,800	0.12	0.18	15,000	1,000	0.07	0.11
R 2	20	1°	24,000	3,500	0.23	0.34	20,000	2,500	0.18	0.27	12,000	1,500	0.11	0.17
-	20	2°	24,000	3,500	0.23	0.34	20,000	2,500	0.18	0.27	12,000	1,500	0.11	0.17
-	21	3°	24,000	3,500	0.23	0.34	20,000	2,500	0.18	0.27	12,000	1,500	0.11	0.17
-	20	4°	24,000	3,500	0.23	0.34	20,000	2,500	0.18	0.27	12,000	1,500	0.11	0.17
-	20	5°	24,000	3,500	0.24	0.37	20,000	2,500	0.19	0.29	12,000	1,500	0.12	0.18
-	20	6°	24,000	3,500	0.22	0.32	20,000	2,500	0.17	0.25	12,000	1,500	0.1	0.16
-	18	7°	24,000	3,500	0.23	0.34	20,000	2,500	0.18	0.27	12,000	1,500	0.11	0.17
R 3	32	1°	16,000	3,500	0.23	0.41	13,500	2,500	0.23	0.35	8,000	1,500	0.14	0.21
-	30	2°	16,000	3,500	0.25	0.42	13,500	2,500	0.23	0.35	8,000	1,500	0.14	0.21
-	22	3°	16,000	3,500	0.3	0.45	13,500	2,500	0.24	0.36	8,000	1,500	0.15	0.23
-	40	3°	16,000	3,500	0.2	0.4	13,500	2,500	0.2	0.35	8,000	1,500	0.13	0.19
-	25	4°	16,000	3,500	0.22	0.43	13,500	2,500	0.22	0.36	8,000	1,500	0.14	0.2
-	21	5°	16,000	3,500	0.25	0.45	13,500	2,500	0.23	0.36	8,000	1,500	0.14	0.23
-	21	6°	16,000	3,500	0.25	0.45	13,500	2,500	0.23	0.36	8,000	1,500	0.14	0.23
-	19	7°	16,000	3,500	0.21	0.43	13,500	2,500	0.25	0.36	8,000	1,500	0.15	0.25

**절입량**  
Depth of Cut

Ap : Axial Depth 축 방향의 절입 깊이 (mm)  
 Ae : Radial Depth 반경 방향의 절입 깊이 (mm)  
 D : Outside Diameter 외경 (mm)  
 n : Speed 회전속도 (rpm)  
 Vf : Feed 이송속도 (mm/rpm)

- 절삭 조건에 없는 각도는 같은 직경에 이전 각도와 비례하여 사용 하십시오.
- 이송속도 및 축 방향의 절입 깊이는 테이퍼각에 따라 고려하시고, 절삭 상황에 맞추어 조정 하십시오.
- 상기 절삭 가공 조건의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 절삭 양이 작은 경우, Feed를 최대 20% 까지 UP 시켜 주십시오.
- 칩 제거 주의 및 가공시 발열, 발화에 주의 하십시오.
- If there is no parameter for the angle of your tool, refer to the previous angle, and adjust compare to it.
- Consider the RPM and feed based on the taper angle and adjust it with milling condition.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- If you want to increase metal removal rates, raise up the feed up to 20%.
- During the chip evacuation, note for heat and ignition.

# 2CTB Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	합금강/ 주철/ 합금강/ 프리하든강 Alloy / Tools Steels/ Prehardened Steels						고경도강 Hardened Steels					
	30 ~ 45HRC						45~ 55HRC					
경도 Hardness	$\alpha \leq 15^\circ$		$\alpha > 15^\circ$		Ap Axial Depth	Ae Radial Depth	$\alpha \leq 15^\circ$		$\alpha > 15^\circ$		Ap Axial Depth	Ae Radial Depth
	RPM	FEED	RPM	FEED			RPM	FEED	RPM	FEED		
R0.5	40,000	5,600	40,000	3,200	0.06	0.1	40,000	5,600	40,000	3,000	0.05	0.1
R0.75	40,000	6,500	40,000	4,000	0.09	0.15	40,000	6,500	32,000	3,200	0.08	0.15
R1	40,000	6,500	39,000	4,700	0.11	0.2	40,000	6,500	31,000	3,500	0.11	0.2
R1.25	40,000	7,000	30,000	4,500	0.12	0.25	36,000	6,500	26,000	3,500	0.12	0.25
R1.5	40,000	7,500	27,000	4,300	0.13	0.3	32,000	6,000	22,000	3,400	0.13	0.3
R2	32,000	7,500	20,000	3,600	0.15	0.4	25,000	6,000	16,000	2,700	0.15	0.4
R2.5	25,000	6,000	16,000	2,900	0.2	0.5	20,000	5,400	13,000	2,300	0.2	0.5
R3	21,000	5,800	13,000	2,600	0.25	0.6	17,000	4,700	10,000	2,000	0.25	0.6
R4	16,000	4,500	10,000	2,000	0.3	0.8	13,000	3,600	8,000	1,500	0.3	0.8
R5	13,000	3,600	8,000	1,700	0.5	1	10,000	2,900	6,400	1,200	0.5	1
R6	9,000	2,500	6,000	1,300	0.5	1.2	7,200	2,000	4,800	1,000	0.5	1.2

절입량  
Depth of Cut

- $\alpha$  란 가공면의 경사각입니다.
- 이송속도 및 축 방향의 절입 깊이는 테이퍼각에 따라 고려하시고, 절삭 상황에 맞추어 조정하십시오.
- 에어브로 혹은 미스트 클린트를 추천합니다.
- 상기 절삭 조건의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 칩 제거 주의 및 가공시 발열, 발화에 주의 하십시오.
- $\alpha$  value represents the inclined angle.
- Consider the RPM and feed based on the taper angle and adjust it with milling condition.
- Air blow or mist coolant is recommended.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- During the chip evacuation, note for heat and ignition.

# 4RTE Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	합금강 / 공구강 Alloy Steels / Tool Steels SCM / SKT / SKS / SKD			고경도강/ 프리하든강 Prehardened Steels / Hardened Steels SKT / SKD / NAK55 / HPM1			고경도강/ 스테인레스강 Hardened Steels / Stainless Steels SUS304 / SKD			고경도강 Hardened Steels		
	~ 30HRc			30HRc ~ 38HRc			38HRc ~ 45HRc			45HRc ~ 55HRc		
외경 Outside Diameter	RPM	FEED	Ap	RPM	FEED	Ap	RPM	FEED	Ap	RPM	FEED	Ap
$\phi 0.5$	31,500	565	0.01~0.025	31,500	475	0.01~0.025	31,500	440	0.01~0.025	19,000	250	0.005~0.01
$\phi 0.6$	31,500	680	0.012~0.03	29,500	530	0.012~0.03	26,500	445	0.012~0.03	15,500	260	0.006~0.012
$\phi 0.7$	27,000	680	0.014~0.035	25,000	530	0.014~0.035	22,500	445	0.014~0.035	13,500	260	0.007~0.014
$\phi 0.8$	23,500	680	0.016~0.04	22,000	630	0.016~0.04	19,500	445	0.016~0.04	11,500	260	0.008~0.016
$\phi 0.9$	21,000	680	0.018~0.045	19,500	530	0.018~0.045	17,500	445	0.018~0.045	10,500	260	0.009~0.018
$\phi 1$	19,000	680	0.02~0.05	17,500	530	0.02~0.05	15,500	445	0.02~0.05	9,500	260	0.01~0.02
$\phi 1.2$	15,500	680	0.024~0.06	14,500	530	0.024~0.06	13,000	445	0.024~0.06	7,950	260	0.012~0.024
$\phi 1.5$	12,500	680	0.03~0.075	11,500	530	0.03~0.075	10,500	445	0.03~0.075	6,350	260	0.015~0.03
$\phi 2$	9,500	680	0.04~0.1	8,900	530	0.04~0.1	7,950	445	0.04~0.1	4,750	260	0.02~0.04
$\phi 2.5$	7,600	680	0.05~0.125	7,100	530	0.05~0.125	7,950	445	0.04~0.1	4,750	260	0.02~0.04

절입량  
Depth of Cut

- 날 깊이를 얻기 위해서는, 순차적으로 하나씩 목부깊이를 맞추는 것이 가장 효과적 입니다.
- 이송속도 및 축 방향의 절입 깊이는 테이퍼각에 따라 고려하시고, 절삭 상황에 맞추어 조정 하십시오.
- 코너 작업시에는 피드값을 50% 줄여 주십시오.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의하십시오
- Consider the RPM and feed based on the taper angle and adjust it with milling condition.
- Reduce the feed by 50% for corner milling.
- 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

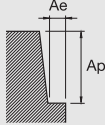
# 2CTE Cutting Condition

•RPM : rev./min •Feed : mm/min

파삭재 Material	일반구조용강/ 탄소강 Mild Steels / Carbon Steels		합금강 / 공구강 Alloy Steels / Tool Steels		고경도강 / 프리하트강 Hardened Steels / Prehardened Steels		고경도강 / 스테인리스강 Hardened Steels / Stainless Steels		고경도강 Hardened Steels	
	SS400 / S55C		SCM / SKT / SKS / SKD		SKT / SKD / NAK55 / HPM1		SUS304 / SKD			
경도 Hardness	~750HN/mm <sup>2</sup>		~ 30HRC		30 ~ 38HRC		38 ~ 45HRC		45 ~ 55HRC	
외경 Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
Ø1	15,500	155	15,500	130	13,000	90	12,000	90	10,500	40
Ø1.5	10,500	155	10,500	130	8,900	90	8,250	90	7,000	40
Ø2	7,950	155	7,950	130	6,650	90	6,200	90	5,250	40
Ø2.5	6,200	145	6,200	125	5,300	90	4,950	90	4,200	40
Ø3	5,150	145	5,150	125	4,450	90	4,100	90	3,500	40
Ø4	3,850	145	3,850	125	3,300	90	3,100	85	2,600	40
Ø5	3,100	145	3,100	125	2,650	90	2,450	85	2,100	40
Ø6	2,600	145	2,600	125	2,200	90	2,050	85	1,750	40
Ø8	1,950	145	1,950	125	1,650	90	1,550	85	1,300	40
Ø10	1,550	145	1,550	120	1,300	90	1,200	85	1,050	40

**절입량**  
Depth of Cut

Ap	Ae
2.5D	0.02D



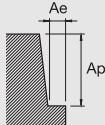
# 4CTE

•RPM : rev./min •Feed : mm/min

파삭재 Material	일반구조용강/ 탄소강 Mild Steels / Carbon Steels		합금강 / 공구강 Alloy Steels / Tool Steels		고경도강 / 프리하트강 Hardened Steels / Prehardened Steels		고경도강 / 스테인리스강 Hardened Steels / Stainless Steels		고경도강 Hardened Steels	
	SS400 / S55C		SCM / SKT / SKS / SKD		SKT / SKD / NAK55 / HPM1		SUS304 / SKD			
경도 Hardness	~750HN/mm <sup>2</sup>		~ 30HRc		30 ~ 38HRc		38 ~ 45HRc		45 ~ 55HRc	
외경 Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED	RPM	FEED
Ø3	5,300	225	4,450	225	4,450	180	4,100	130	3,500	130
Ø4	3,950	245	3,300	245	3,300	195	3,100	150	2,600	150
Ø5	3,150	275	2,650	275	2,650	225	2,450	160	2,100	160
Ø6	2,200	275	2,200	275	2,200	225	2,050	175	1,750	175
Ø8	1,950	270	1,650	270	1,650	225	1,550	190	1,300	190
Ø10	1,550	270	1,300	270	1,300	225	1,200	180	1,050	180

**절입량**  
Depth of Cut

Ap	Ae
2.5D	0.02D



- 절입기준은 2CTE, 4CTE 동일 합니다.
- 이송속도 및 축 방향의 절입 깊이는 테이퍼각에 따라 고려하시고, 절삭 상황에 맞추어 조정 하십시오.
- 가급적 열박음 칩을 사용하여 주십시오.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의하십시오
- 2CTE and 4CTE type can be used the same depth of cut.
- Consider the RPM and feed based on the taper angle and adjust it with milling condition.
- Using shrink-fit chuck is recommended.
- 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

# 2CRC Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	탄소강 Carbon Steels		합금강 Alloy Steels		고경도강 Hardened Steels	
경도 Hardness					35~ 40HRC	
외경 Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED
Ø1.9	3,200	60	2,300	50	2,500	40
Ø2.9	2,500	60	1,800	50	1,800	40
Ø3.9	1,850	60	1,400	50	1,400	40
Ø4.9	1,600	60	1,100	50	1,200	40
Ø5.9	1,400	60	900	50	1,000	40

# 4CRC

•RPM : rev./min •Feed : mm/min

피삭재 Material	탄소강 Carbon Steels		합금강 Alloy Steels		고경도강 Hardened Steels	
경도 Hardness					35~ 40HRC	
외경 Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED
Ø1.9	5,940	1,260	4,950	1,050	3,960	840
Ø2.9	5,280	1,130	4,400	940	3,520	750
Ø3.9	4,700	1,010	3,910	840	3,100	670
Ø4.9	4,200	910	3,400	750	2,800	600
Ø5.9	3,700	820	3,000	670	2,400	540

- 가공 진입시 가능한 피삭재 밖에서 진입 하십시오.
- R 게이지를 통해 절삭 후 측정 바랍니다.
- 상기 절삭 가공 조건의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- When entering the tool to the workpiece, enter the tool from outside to the workpiece.
- Measure after cutting through the R gauge.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.

# 1STE/2STE/4STE

•RPM : rev./min •Feed : mm/min

피삭재 Material	기계구조용 탄소강 S45C - S55C		합금강 SKD/ SUS/ SCM		고경도강 NAK/HPM	
외경 Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED
Ø2	5,500	85	4,000	75	3,000	50
Ø3	4,000	70	3,000	55	2,000	40
Ø4	3,000	60	2,500	45	1,800	35
Ø5	2,500	50	2,000	40	1,500	30
Ø6	2,000	45	1,600	35	1,200	25
Ø7	1,800	40	1,300	30	1,150	25
Ø8	1,500	35	1,250	30	900	23
Ø9	1,350	35	1,100	30	850	20
Ø10	1,200	35	900	25	800	20
Ø11	1,100	35	850	25	750	20
Ø12	1,000	30	800	25	600	15

<b>절입량</b> Depth of Cut	Ad : 0.05D이하		
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- 상기 조건은 2날 기준이며 날수의 변경시 같은 직경에 비례하여 회전수와 이송속도를 UP/DOWN 시켜주십시오.
- 조각 가공시 엔드밀의 날 끝을 확인해 주십시오.
- 상기 절삭 가공 조건의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- The parameters on the table is based on 2 flutes. To change the number of flutes, refer to the same diameter of other parameters and then adjust it.
- For engrave machining, check the edge of the flutes.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.



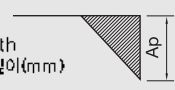
# 2CHA/3CHA Cutting Condition

•RPM : rev./min •Feed : mm/min

파삭재 Material	탄소강 Carbon Steels		합금강 Alloy Steels		고경도강 Hardened Steels	
경도 Hardness	~ 225 HB		225 ~ 325 HB		35~ 40HRC	
외경 Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED
ø3	4,200	70	3,000	55	2,500	40
ø4	3,000	60	2,500	45	1,800	35
ø6	2,000	40	1,500	35	1,200	25
ø8	1,500	35	1,200	30	900	25
ø10	1,200	35	1,000	25	900	20
ø12	1,000	30	850	25	600	20

**절입량**  
Depth of Cut

Ap : 0.1d  
Ap : Ax a Depth  
축 방향의 절입 깊이(mm)

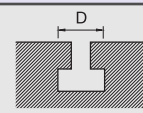


- 상기 조건은 2날 기준이며 날 수의 변경시 같은 직경에 비례하여 회전수와 이송속도를 UP/DOWN 시켜주십시오.
- 상기 절삭 가공 조건의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 에어브로 혹은 수용성 절삭유 또는 유성 절삭유를 추천합니다.
- The parameters on the table is based on 2 flutes. To change the number of flutes, refer to the same diameter of other parameters and then adjust it.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- Air blow, water-soluble oil, or oil mist is recommended.

# 4TES/4TRS/3TRC/4&6TDA/4&6TAC : 3TRC는 RPM 동일, FEED만 최대 30% Down 적용. Use the same RPM and reduce the feed by 30% for 3TRC.

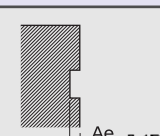
홈절삭 Slotting						
파삭재 Material	일반구조용강/ 탄소강 Mild Steels / Carbon Steels		합금강 Alloy Steels		프리하든강 Prehardened Steels	
외경 Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED
ø1.5	3,050	117	1,890	77	1,530	59
ø2	2,850	110	1,790	72	1,440	55
ø2.5	2,680	99	1,700	66	1,350	50
ø3	2,500	92	1,610	60	1,260	45
ø4	2,150	81	1,430	54	1,080	41
ø5	1,800	70	1,200	47	900	35
ø6	1,430	59	950	39	720	30
ø8	1,070	44	720	30	540	22
ø10	860	35	580	23	430	17
ø12	720	30	480	20	360	14

**절입량**  
Depth of Cut



측면 절삭 Side Cutting						
파삭재 Material	일반구조용강/ 탄소강 Mild Steels / Carbon Steels		합금강 Alloy Steels		프리하든강 Prehardened Steels	
외경 Outside Diameter	RPM	FEED	RPM	FEED	RPM	FEED
ø1.5	3,050	162	1,890	94	1,530	76
ø2	2,850	149	1,790	88	1,440	70
ø2.5	2,680	135	1,700	83	1,350	65
ø3	2,500	122	1,610	79	1,260	59
ø4	2,150	108	1,430	72	1,080	54
ø5	1,800	95	1,200	65	900	49
ø6	1,430	86	950	58	720	43
ø8	1,070	64	720	43	540	32
ø10	860	52	580	34	430	26
ø12	720	43	480	29	360	22

**절입량**  
Depth of Cut




- 공구 진입 시 파삭재 밖에서 진입하십시오. • 상기 절삭 조건은 4날 기준이며, 3TRC의 경우 회전수는 유지하고 Feed를 30% 줄여서 사용하십시오.
- 상기 절삭 가공 조건의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피드 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피드 속도와 이송 속도를 비례 적으로 조정하십시오.
- 측면절삭 시 떨림이 발생한 경우 절삭조건의 Feed를 줄여주십시오.
- When entering the tool to the workpiece, enter the tool from outside to the workpiece.
- The parameters on the table is based on 4 flutes. For using 3TRC , use the same RPM and reduce the feed by 30%.
- 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.
- If a vibration is occurred while side milling, reduce the feed.

# 2CEN Cutting Condition

•RPM : rev./min •Feed : mm/min

외경 Outside Diameter	일반구조용강/ 탄소강 Mild Steels/ Carbon Steels			합금강/ 공구강 Alloy Steels/ Tool Steels			프리하든강 Prehardened Steels (30~45HRC)			알루미늄 합금 Aluminum Alloys		
	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth
Ø2	1,400	100	2	800	50	2	650	40	1	4,800	280	2
Ø3	1,400	100	3	800	50	3	650	40	1.5	4,800	280	3
Ø4	1,280	100	4	690	50	4	580	40	2	4,200	280	4
Ø5	1,300	100	5	640	50	5	520	40	2.5	3,300	280	5
Ø6	1,150	100	6	600	50	6	480	40	3	2,900	280	6
Ø8	1,000	100	8	530	50	8	420	40	4	2,600	280	8
Ø10	850	90	10	490	40	10	390	30	5	2,400	260	10
Ø12	720	90	12	410	40	12	310	30	6	1,900	260	12
Ø14	610	90	14	340	40	14	270	30	7	1,700	240	14
Ø16	550	90	16	310	40	16	250	30	8	1,500	230	16

**절입량**  
Depth of Cut



# 2CENE/2CCMC

•RPM : rev./min •Feed : mm/min

외경 Outside Diameter	일반구조용강/ 탄소강 Mild Steels/ Carbon Steels				합금강 Alloy Steels				프리하든강 Prehardened Steels (30~45HRC)				동 Copper				알루미늄 Aluminum			
	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae
Ø1	28,000	230	1.5	0.05	24,500	180	1.5	0.05	17,500	120	1.5	0.05	23,000	150	1.5	0.1	50,000	400	1.5	0.2
Ø1.5	18,700	340	2.0	0.10	16,300	180	2.0	0.10	11,700	120	2.0	0.10	13,000	150	2.0	0.3	40,900	400	2.0	0.3
Ø2	14,000	360	2.5	0.15	12,300	220	2.5	0.15	8,800	170	2.5	0.15	11,500	150	2.5	0.4	31,800	400	2.5	0.4
Ø3	9,300	390	4.0	0.30	8,200	240	4.0	0.30	5,800	170	4.0	0.30	8,000	200	4.0	0.6	21,200	400	4.0	0.6
Ø4	7,000	390	5.0	0.40	6,100	240	5.0	0.40	4,400	180	5.0	0.40	6,000	200	5.0	0.8	15,900	500	5.0	0.8
Ø5	5,600	470	6.0	0.50	4,900	260	6.0	0.50	3,500	200	6.0	0.50	5,000	200	6.0	1	12,700	500	6.0	1
Ø6	4,700	480	8.0	0.60	4,100	270	8.0	0.60	2,900	200	8.0	0.60	4,000	200	8.0	1.2	10,600	500	8.0	1.2
Ø8	3,500	470	10.0	1.00	3,100	270	10.0	1.00	2,200	200	10.0	1.00	3,000	200	10.0	1.6	8,000	600	10.0	1.6
Ø10	2,800	480	12.0	1.20	2,500	280	12.0	1.20	1,800	200	12.0	1.20	2,400	200	12.0	2	6,400	600	12.0	2
Ø12	2,300	470	15.0	1.50	2,000	260	15.0	1.50	1,500	200	15.0	1.50	2,000	200	15.0	2.4	5,300	700	15.0	2.4

**절입량**  
Depth of Cut

Side Milling

- Ap : Axial Depth
- Ae : Radial Depth



- 2CENE는 홈 절삭이 불가능하며, 2CCMC는 홈 절삭을 추천하지 않습니다.
- 상기 절삭 조건은 측면 절삭조건입니다.
- 상기 절삭 가공 조건의 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 에어브로 혹은 수용성 절삭유 또는 유성 절삭유를 추천합니다.
- Grooving with 2CENE is not possible and 2CCMC is also not recommended.
- Above parameters are for side 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.
- If a vibration is occurred while side milling, reduce the feed.

피삭재 Material		알루미늄 합금 Aluminum Alloys				플라스틱 Plastic			
반경 Corner Radius	유효장 Effective Length	RPM	FEED	Ap Axial Depth	Ap Radial Depth	RPM	FEED	Ap Axial Depth	Ap Radial Depth
R 0.1	1	35,000	420	0.003	0.03	35,000	1,000	0.05	0.03
R 0.15	2	35,000	490	0.004	0.04	35,000	1,050	0.06	0.04
R 0.2	3	35,000	560	0.005	0.06	35,000	1,100	0.07	0.06
R 0.25	4	35,000	700	0.006	0.07	28,000	1,200	0.08	0.07
-	10	27,300	504	0.004	0.05	21,840	864	0.06	0.04
R 0.3	4	35,000	910	0.007	0.09	24,000	1,200	0.1	0.09
-	10	27,300	655	0.005	0.07	18,720	864	0.07	0.05
R 0.4	4	26,000	940	0.008	0.12	18,000	900	0.13	0.12
-	10	19,500	658	0.006	0.1	13,500	576	0.11	0.1
R 0.5	6	21,000	970	0.008	0.15	14,000	700	0.17	0.15
-	16	14,700	631	0.006	0.1	9,800	455	0.1	0.09
R 0.6	6	18,000	1,010	0.009	0.18	12,000	600	0.2	0.18
-	16	12,780	616	0.007	0.11	8,520	366	0.13	0.12
R 0.7	6	15,000	1,020	0.01	0.21	10,000	500	0.23	0.21
-	16	10,800	622	0.008	0.16	7,200	305	0.17	0.15
R 0.75	6	14,000	1,010	0.012	0.24	9,500	480	0.25	0.24
-	16	10,220	636	0.01	0.19	6,935	302	0.19	0.17
-	25	8,483	477	0.08	0.14	5,756	227	0.13	0.11
R 1	8	11,000	1,100	0.18	0.35	7,000	350	0.4	0.35
-	20	8,140	704	0.16	0.3	5,180	224	0.35	0.33
-	30	6,919	528	0.14	0.25	4,403	168	0.3	0.28
R 1.5	8	6,900	760	0.2	0.5	4,800	240	0.5	0.5
-	20	5,313	486	0.18	0.45	4,080	151	0.45	0.45
-	30	4,516	365	0.16	0.4	3,142	113	0.4	0.4
R 2	16	5,200	690	0.25	0.65	3,600	180	0.6	0.65
-	25	4,056	449	0.22	0.6	3,060	113	0.56	0.61
-	35	3,488	336	0.2	0.55	2,356	85	0.54	0.57
R 2.5	16	4,200	590	0.3	0.8	2,900	150	0.8	0.85
-	25	3,234	401	0.27	0.75	2,233	102	0.76	0.81
-	35	2,652	309	0.24	0.7	1,831	79	0.72	0.75
R 3	25	3,500	550	0.35	0.9	2,400	120	1	1.2
-	35	2,940	468	0.33	0.8	2,016	102	0.95	1.1
-	50	2,323	355	0.3	0.7	1,593	78	0.9	1

**절입량**  
Depth of Cut

Ap : Axial Depth 축 방향의 절입 깊이 (mm)  
 Ae : Radial Depth 반경 방향의 절입 깊이 (mm)  
 D : Outside Diameter 외경 (mm)  
 n : Speed 회전속도 (min<sup>-1</sup>)  
 Vf : Feed 이송속도 (mm/min)

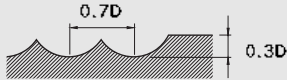
- 상기 절삭조건은 2날 기준이며, 3날 가공시 회전수와 Feed를 10% UP 시켜주시시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 적용 기계의 회전속도가 부족한 경우에는 회전 속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- The parameters on the table is based on 2 flutes. For using 3 flutes, use the same RPM and raise up the feed up to 10% in stable milling condition.
- 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, adjust RPM and feed in the same proportion.

# 2MLB

• RPM : rev./min • Feed : mm/min

피삭재 Material	ABS 수지 / Acrylic			
반경 Radius	RPM	FEED	Ap Axial Depth	Ap Radial Depth
R 0.1	37,000	50	0.06	0.14
R 0.2	37,000	100	0.12	0.28
R 0.3	37,000	140	0.18	0.42
R 0.4	37,000	190	0.24	0.56
R 0.5	32,000	210	0.30	0.7
R 1	16,000	210	0.60	1.4
R 1.5	11,000	210	0.90	2.1
R 2	8,200	210	1.20	2.8
R 2.5	6,000	250	1.50	3.5
R 3	5,500	250	1.80	4.2
R 4	4,100	280	2.40	5.6
R 5	3,200	280	3.00	7.0
R 6	2,700	330	3.60	8.4
R 8	2,200	330	4.80	11.2

절입량 Depth of Cut	
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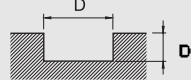
- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공형상, 가공목적, 적용기계에 따라 조건변경 요망 합니다.
- 적용 기계의 회전속도가 부족한 경우에는 회전 속도와 이송속도를 같은 비율로 줄여서 적용합니다.
- If the effective length is long, reduce the RPM and feed in the same proportion.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- If the table over the maximum RPM and feed of your machine, adjust RPM and feed in the same proportion.

# 2MLE

• RPM : rev./min • Feed : mm/min

피삭재 Material	ABS 수지 / Acrylic			
외경 Outside Diameter	RPM	FEED	Ap Axial Depth	Ap Radial Depth
Ø 0.2	50,000	100	0.2	0.2
Ø 0.4	50,000	200	0.4	0.4
Ø 0.5	50,000	240	0.5	0.5
Ø 0.6	40,000	240	0.6	0.6
Ø 0.8	30,000	240	0.8	0.8
Ø 1	24,000	240	1	1
Ø 2	12,000	240	2	2
Ø 3	8,000	240	3	3
Ø 4	6,000	240	4	4
Ø 5	4,800	240	5	5
Ø 6	4,000	260	6	6
Ø 8	3,000	260	8	8
Ø 10	3,000	260	10	10
Ø 12	2,000	260	12	12
Ø 16	1,400	260	16	16

절입량 Depth of Cut	
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- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정하십시오.
- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공형상, 가공목적, 적용기계에 따라 조건변경 요망 합니다.
- 적용 기계의 회전속도가 부족한 경우에는 회전 속도와 이송속도를 같은 비율로 줄여서 적용합니다.
- 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.
- If the effective length is long, reduce the RPM and feed in the same proportion.
- 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, adjust RPM and feed in the same proportion.

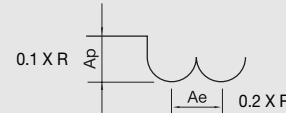
# 2MBE/3MBE

■ 3MBE는 RPM과 FEED를 10% Up 적용  
 ■ Raise up the RPM and feed by 10% for 3MBE.

• RPM : rev./min • Feed : mm/min

피삭재 Material	탄소강 Carbon Steels				합금강 Alloy Steels				프리하든강 Prehardened Steels			
	반경 Corner Radius	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth
R 0.2	36,000	630	0.02	0.04	34,200	520	0.02	0.04	33,174	400	0.02	0.04
R 0.3	24,300	630	0.03	0.06	23,085	520	0.03	0.06	22,392	400	0.03	0.06
R 0.4	21,000	630	0.04	0.08	19,950	520	0.04	0.08	19,352	400	0.04	0.08
R 0.5	12,000	630	0.05	0.10	12,300	520	0.1	0.10	10,179	400	0.05	0.10
R 1	11,400	630	0.10	0.20	10,000	520	0.1	0.20	8,700	400	0.10	0.20
R 1.5	7,700	630	0.15	0.30	6,700	520	0.2	0.30	5,800	400	0.15	0.30
R 2	5,800	630	0.20	0.40	5,000	520	0.2	0.40	4,300	400	0.20	0.40
R 3	3,800	630	0.30	0.60	3,300	520	0.3	0.60	2,900	400	0.30	0.60
R 4	2,900	630	0.40	0.80	2,500	520	0.4	0.80	2,200	400	0.40	0.80
R 5	2,300	630	0.50	1.00	2,000	520	0.5	1.00	1,700	400	0.50	1.00
R 6	1,900	630	0.60	1.20	1,700	520	0.6	1.20	1,400	400	0.60	1.20

절입량 Depth of Cut	
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- 상기 절삭조건은 2날 기준이며 3날 가공시 회전수와 Feed를 10% UP 시켜주세요.
- R0.5 이하 제품은 절삭조건인 Feed 보다 낮게 시작하여 점차 올려 주십시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망합니다.
- 적용 기계의 회전속도가 부족한 경우에는 회전 속도와 이송속도를 같은 비율로 줄여서 적용합니다.
- The parameters on the table is based on 2 flutes. For using 3 flutes, use the same RPM and raise up the feed up to 10% in stable milling condition.
- Below 0.5mm of front diameter tool, set up the lower RPM
- 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, adjust RPM and feed in the same proportion.

# 1MEM/1REM

•RPM : rev./min •Feed : mm/min

피삭재 Material	아크릴 Acrylic			합금강 Alloy Steels		
외경 Outside Diameter	RPM	FEED	Ap (Axial Depth)	RPM	FEED	Ap (Axial Depth)
Ø1	32,000	2,000	2.5	23,000	1,300	2.5
Ø2	32,000	2,200	5	23,000	1,500	5
Ø3	25,000	2,400	7.5	18,000	1,700	7.5
Ø4	20,000	2,400	10	15,000	1,800	10
Ø5	15,000	2,200	12.5	12,000	1,800	12.5
Ø6	13,500	2,300	15	10,000	1,800	15
Ø8	10,000	2,400	20	7,800	1,900	20
Ø10	8,000	2,400	25	6,000	2,000	25
Ø12	7,000	2,200	30	5,000	1,900	30

**절입량**  
Depth of Cut

- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오
- 공구 진입시 피삭재 밖에서 진입 하십시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망합니다.
- 조건표가 기계의 최대 스피드 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피드 속도와 이송 속도를 비례적으로 조정 하십시오.
- 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 entering the tool to the workpiece, enter the tool from outside to the workpiece.
- 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.

# 3MRE

•RPM : rev./min •Feed : mm/min

피삭재 Material		ABS ; MC Nylon				Acrylic ; Polyacetal				Polycarbonate			
외경 Outside Diameter	유효장 Effective Length	RPM	FEED	Ap Ae		RPM	FEED	Ap Ae		RPM	FEED	Ap Ae	
				Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth
Ø1	10	6,360	560	0.30	0.03	10,812	264	0.30	0.03	8,250	1,568	0.30	0.03
	15	6,360	560	0.30	0.02	9,328	172	0.30	0.02	7,360	1,120	0.30	0.02
	20	6,360	560	0.30	0.01	8,056	103	0.30	0.01	6,750	840	0.30	0.01
Ø1.5	10	6,360	851	0.50	0.05	10,812	370	0.50	0.05	7,950	1,568	0.50	0.05
	15	6,360	818	0.50	0.03	9,328	280	0.50	0.03	7,102	1,120	0.50	0.03
	20	6,254	784	0.50	0.02	8,056	202	0.50	0.02	6,466	840	0.50	0.02
Ø2	10	6,330	1,100	1.00	0.10	10,339	471	1.00	0.10	8,124	1,795	1.00	0.10
	15	6,225	1,043	1.00	0.05	9,284	404	1.00	0.05	7,491	1,571	1.00	0.05
	20	6,014	999	1.00	0.03	8,440	337	1.00	0.03	6,858	1,346	1.00	0.03
	25	5,908	954	1.00	0.03	7,596	281	1.00	0.03	6,330	1,234	1.00	0.03
Ø3	20	5,863	1,466	1.50	0.20	6,701	496	1.50	0.20	6,596	2,030	1.50	0.20
	30	5,444	1,241	1.50	0.10	4,712	327	1.50	0.10	5,026	1,354	1.50	0.10
Ø4	20	5,026	1,579	2.00	0.30	6,282	496	2.00	0.30	5,340	1,466	2.00	0.30
	30	4,712	1,466	2.00	0.20	4,921	384	2.00	0.20	4,607	1,241	2.00	0.20
Ø6	30	3,186	1,224	3.00	0.40	3,451	306	3.00	0.40	2,522	969	3.00	0.40
	40	2,791	1,093	3.00	0.30	2,411	209	3.00	0.30	2,157	823	3.00	0.30
Ø8	40	2,568	1,028	4.00	0.50	2,218	196	4.00	0.50	1,984	774	4.00	0.50
	50	1,977	863	4.00	0.40	1,708	165	4.00	0.40	1,528	650	4.00	0.40
Ø10	50	1,740	803	5.00	0.60	1,503	153	5.00	0.60	1,345	604	5.00	0.60
	60	1,305	337	5.00	0.50	1,127	64	5.00	0.50	1,008	254	5.00	0.50
Ø12	60	1,109	307	6.00	0.60	958	59	6.00	0.60	857	231	6.00	0.60

**절입량**  
Depth of Cut

Slotting

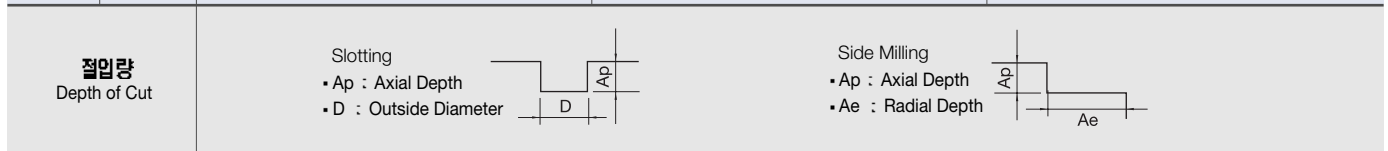
- Ap : Axial Depth
- D : Outside Diameter

Side Milling

- Ap : Axial Depth
- Ae : Radial Depth

- 날 끝이 정밀하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오
- 가공 진입시 가능한 피삭재 밖에서 진입 하십시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망합니다.
- 조건표가 기계의 최대 스피드 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피드 속도와 이송 속도를 비례적으로 조정 하십시오.
- 진동이 적고 강성이 좋은 공작기계 사용 요망합니다 (Ø1 이하 사용시 진동 허용 관리 5µm 이내 일것.)
- 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 entering the tool to the workpiece, enter the tool from outside to the workpiece.
- 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 (Ø1 or less, the vibration tolerance management should be within 5µm).

피삭재 Material		ABS / MC Nylon				Acrylic / Polyacetal				Polycarbonate			
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
ø0.5	2	6,000	300	0.20	0.005	15,000	300	0.20	0.005	9,000	300	0.20	0.005
-	4	6,000	300	0.20	0.003	15,000	300	0.20	0.003	9,000	300	0.20	0.003
-	6	6,000	300	0.20	0.001	15,000	300	0.20	0.001	9,000	300	0.20	0.001
ø0.6	4	6,000	340	0.20	0.005	14,400	300	0.20	0.005	8,800	540	0.20	0.005
-	6	6,000	340	0.20	0.003	14,400	300	0.20	0.003	8,800	540	0.20	0.003
ø0.7	4	6,000	380	0.20	0.01	13,800	300	0.20	0.01	8,600	780	0.20	0.01
-	6	6,000	380	0.20	0.008	13,800	300	0.20	0.008	8,600	780	0.20	0.008
ø0.8	6	6,000	420	0.20	0.008	13,200	300	0.20	0.008	8,400	1,000	0.20	0.008
-	8	6,000	420	0.20	0.005	12,900	280	0.20	0.005	8,200	960	0.20	0.005
ø0.9	6	6,000	460	0.20	0.08	12,600	300	0.20	0.08	8,200	1,300	0.20	0.08
-	10	6,000	460	0.20	0.03	11,800	260	0.20	0.03	7,800	1,000	0.20	0.03
ø1	6	6,000	500	0.30	0.05	12,000	300	0.30	0.05	8,000	1,500	0.30	0.05
-	8	6,000	500	0.30	0.05	11,500	270	0.30	0.05	7,700	1,400	0.30	0.05
-	10	6,000	500	0.30	0.03	11,000	240	0.30	0.03	7,500	1,200	0.30	0.03
-	12	6,000	500	0.30	0.03	10,400	220	0.30	0.03	7,200	1,100	0.30	0.03
-	16	6,000	500	0.30	0.02	9,300	160	0.30	0.02	6,700	830	0.30	0.02
-	20	6,000	500	0.30	0.01	8,000	90	0.30	0.01	6,000	500	0.30	0.01
ø1.2	6	6,000	610	0.40	0.05	11,700	330	0.40	0.05	8,000	1,500	0.40	0.05
-	8	6,000	610	0.40	0.05	11,200	300	0.40	0.05	7,700	1,400	0.40	0.05
-	10	6,000	600	0.40	0.03	10,700	280	0.40	0.03	7,500	1,300	0.40	0.03
-	12	6,000	600	0.40	0.03	10,200	250	0.40	0.03	7,200	1,200	0.40	0.03
ø1.4	6	6,000	720	0.40	0.05	11,340	360	0.40	0.05	8,000	1,600	0.40	0.05
-	10	6,000	700	0.40	0.03	10,700	310	0.40	0.03	7,700	1,400	0.40	0.03
-	16	6,000	680	0.40	0.01	9,800	230	0.40	0.01	7,200	1,000	0.40	0.01
ø1.5	6	6,100	780	0.50	0.05	11,200	380	0.50	0.05	8,000	1,600	0.50	0.05
-	10	6,000	760	0.50	0.05	10,200	330	0.50	0.05	7,500	1,400	0.50	0.05
-	14	6,000	730	0.50	0.03	9,600	270	0.50	0.03	7,000	1,100	0.50	0.03
-	16	6,000	730	0.50	0.03	8,800	250	0.50	0.03	6,700	1,000	0.50	0.03
-	20	5,900	700	0.50	0.02	7,600	180	0.50	0.02	6,100	750	0.50	0.02
ø1.6	6	6,100	830	0.80	0.05	11,000	390	0.80	0.05	8,000	1,600	0.80	0.05
ø2	8	6,100	1,000	1.00	0.10	10,100	440	1.00	0.10	7,900	1,700	1.00	0.10
-	10	6,000	980	1.00	0.10	9,800	420	1.00	0.10	7,700	1,600	1.00	0.10
-	12	6,000	970	1.00	0.08	9,500	400	1.00	0.08	7,500	1,600	1.00	0.08
-	14	5,900	950	1.00	0.08	9,100	380	1.00	0.08	7,300	1,500	1.00	0.08
-	16	5,900	930	1.00	0.05	8,800	360	1.00	0.05	7,100	1,400	1.00	0.05
-	18	5,800	920	1.00	0.05	8,500	340	1.00	0.05	6,900	1,300	1.00	0.05
-	20	5,700	890	1.00	0.03	8,000	300	1.00	0.03	6,500	1,200	1.00	0.03
-	25	5,600	850	1.00	0.03	7,200	250	1.00	0.03	6,000	1,100	1.00	0.03
-	30	5,400	800	1.00	0.02	6,200	190	1.00	0.02	5,400	850	1.00	0.02
ø2.5	12	6,000	1,300	1.20	0.20	8,600	480	1.20	0.20	7,400	1,600	1.20	0.20
-	20	5,700	1,100	1.00	0.10	6,800	350	1.00	0.10	6,200	1,300	1.00	0.10
ø3	8	6,200	1,600	1.50	0.30	8,700	610	1.50	0.30	8,000	1,900	1.50	0.30
-	12	6,000	1,500	1.50	0.25	8,000	560	1.50	0.25	7,500	1,800	1.50	0.25
-	16	5,800	1,400	1.50	0.20	7,300	510	1.50	0.20	7,000	1,700	1.50	0.20
-	20	5,600	1,300	1.50	0.20	6,400	440	1.50	0.20	6,300	1,800	1.50	0.20
-	25	5,400	1,200	1.50	0.15	5,500	370	1.50	0.15	5,600	1,400	1.50	0.15
-	30	5,200	1,100	1.50	0.10	4,500	290	1.50	0.10	4,800	1,200	1.50	0.10
-	40	4,800	960	1.50	0.10	2,700	160	1.50	0.10	3,500	840	1.50	0.10
ø4	12	5,000	1,400	2.00	0.35	7,000	520	2.00	0.35	5,800	1,500	2.00	0.35
-	16	4,900	1,400	2.00	0.30	6,500	480	2.00	0.30	5,500	1,400	2.00	0.30
-	18	4,800	1,400	2.00	0.30	6,300	470	2.00	0.30	5,400	1,400	2.00	0.30
-	20	4,800	1,400	2.00	0.30	6,000	440	2.00	0.30	5,100	1,300	2.00	0.30
-	25	4,700	1,300	2.00	0.25	5,600	410	2.00	0.25	4,900	1,300	2.00	0.25
-	30	4,500	1,300	2.00	0.20	4,700	340	2.00	0.20	4,400	1,100	2.00	0.20
-	35	4,300	1,300	2.00	0.20	4,200	300	2.00	0.20	4,100	1,100	2.00	0.20
-	40	4,200	1,300	2.00	0.10	3,600	250	2.00	0.10	3,600	960	2.00	0.10
-	50	3,900	1,200	2.00	0.10	2,400	160	2.00	0.10	2,900	780	2.00	0.10
ø5	16	3,400	1,200	2.50	0.50	5,800	470	2.50	0.50	4,000	1,200	2.50	0.50
-	35	3,200	1,100	2.50	0.30	3,900	260	2.50	0.30	2,900	910	2.50	0.30
ø6	35	2,400	960	3.00	0.40	2,600	240	3.00	0.40	1,900	760	3.00	0.40
-	50	2,200	890	3.00	0.30	1,900	170	3.00	0.30	1,700	670	3.00	0.30
-	60	2,000	800	3.00	0.20	1,000	90	3.00	0.20	1,500	600	3.00	0.20



피삭재 Material	탄소강 Carbon Steels				합금강 Alloy Steels				알루미늄 Aluminum			
	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
외경 Outside Diameter												
Ø1	12,900	125	0.15	0.07	11,400	90	0.15	0.07	43,000	510	0.15	0.07
Ø1.5	8,600	125	0.75	0.11	7,700	90	0.75	0.11	29,000	580	0.75	0.11
Ø2	6,500	125	1.00	0.14	5,800	110	1.00	0.14	22,000	650	1.00	0.14
Ø2.5	5,100	150	1.25	0.18	4,600	110	1.25	0.18	17,200	680	1.25	0.18
Ø3	4,300	170	1.50	0.45	3,800	120	1.50	0.45	14,300	720	1.50	0.45
Ø4	3,200	200	3.00	0.60	2,900	120	3.00	0.60	10,700	750	3.00	0.60
Ø5	2,600	210	3.75	0.75	2,300	135	3.75	0.75	8,600	775	3.75	0.75
Ø6	2,200	220	4.50	0.90	1,900	150	4.50	0.90	7,200	790	4.50	0.90
Ø8	1,600	200	6.00	1.20	1,400	145	6.00	1.20	5,400	700	6.00	1.20
Ø10	1,300	180	7.50	1.50	1,200	145	7.50	1.50	4,300	650	7.50	1.50
Ø12	1,100	170	9.00	1.80	1,000	135	9.00	1.80	3,600	610	9.00	1.80

# 3MEM

피삭재 Material	탄소강 Carbon Steels				합금강 Alloy Steels				알루미늄 Aluminum			
	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
외경 Outside Diameter												
Ø1	13,674	141	0.15	0.07	12,084	101	0.15	0.07	45,580	566	0.15	0.07
Ø1.5	9,116	141	0.75	0.11	8,162	101	0.75	0.11	30,740	644	0.75	0.11
Ø2	6,890	141	1.00	0.14	6,148	123	1.00	0.14	23,320	722	1.00	0.14
Ø2.5	5,406	170	1.25	0.18	4,876	123	1.25	0.18	18,232	769	1.25	0.18
Ø3	4,558	192	1.50	0.45	4,028	134	1.50	0.45	15,158	799	1.50	0.45
Ø4	3,392	226	3.00	0.60	3,074	134	3.00	0.60	11,342	833	3.00	0.60
Ø6	2,332	249	4.50	0.90	2,014	168	4.50	0.90	7,632	877	4.50	0.90

# 4MEM

피삭재 Material	탄소강 Carbon Steels				합금강 Alloy Steels				프리하든강 Prehardened Steels			
	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth	RPM	FEED	Ap Axial Depth	Ae Radial Depth
외경 Outside Diameter												
Ø1	14,084	153	0.15	0.07	12,483	107	0.15	0.07	46,583	594	0.15	0.07
Ø1.5	9,389	153	0.75	0.11	8,431	107	0.75	0.11	31,416	676	0.75	0.11
Ø2	7,097	153	1.00	0.14	6,351	131	1.00	0.14	23,833	758	1.00	0.14
Ø2.5	5,568	183	1.25	0.18	5,037	131	1.25	0.18	18,633	808	1.25	0.18
Ø3	4,695	207	1.50	0.45	4,161	142	1.50	0.45	15,491	839	1.50	0.45
Ø4	3,494	244	3.00	0.60	3,175	142	3.00	0.60	11,592	874	3.00	0.60
Ø6	2,402	268	4.50	0.90	2,080	178	4.50	0.90	7,800	921	4.50	0.90
Ø8	2,509	258	6.00	1.20	1,957	156	6.00	1.20	6,006	889	6.00	1.20
Ø10	1,720	234	7.50	1.50	1,342	133	7.50	1.50	4,625	826	7.50	1.50
Ø12	1,279	210	9.00	1.80	998	116	9.00	1.80	3,561	744	9.00	1.80

**절입량**  
Depth of Cut

$Ae$   
 $2D$   
 $Ae$   
 $\varnothing 1 \sim 2.9 = 0.07D$   
 $\varnothing 3 \sim = 0.15D$

$D$   
 $Ap$   
 $Ap$   
 $\varnothing 1 \sim 1.2 = 0.15D$   
 $\varnothing 1.5 \sim 3.5 = 0.5D$   
 $\varnothing 4 \sim = 0.75D$

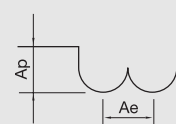
- 날 끝이 정확하게 연삭되어 있습니다. 파손을 피하기 위해 가능하면 비접촉 방식으로 측정 하십시오
- 공구 진입시 피삭재 밖에서 진입 하십시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할 때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- The edge of the flute precisely grinded. If you want to measure the tool, and to avoid damaging on the flutes, use non-contact measuring method.
- When entering the tool to the workpiece, enter the tool from outside to the workpiece.
- 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.

# 2HHINB / 2JJINB Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	프리하든강 Prehardened Steels				고경도강 Hardened Steels				고경도강 Hardened Steels						
	경도 Hardness				30 ~ 40HRC				40 ~ 50HRC				50 ~ 60HRC		
반경 Corner Radius	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae			
			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			
R 5	7320	2930	0.2	0.8	6700	2000	0.1	0.8	5400	2170	0.1	0.8			
R 5.5	6660	2660	0.2	0.8	6000	1800	0.1	0.8	4900	2000	0.1	0.8			
R 6	6100	2440	0.2	0.9	5570	1670	0.2	0.9	4500	1800	0.1	0.9			
R 6.5	5630	2250	0.2	0.9	5150	1550	0.2	0.9	4160	1660	0.1	0.9			
R 8	4580	1800	0.6	1.1	4180	1250	0.5	1.1	3380	1350	0.4	1.1			
R 8.5	4300	1720	0.6	1.1	3900	1180	0.5	1.1	3180	1270	0.4	1.1			
R 10	3660	1460	0.7	1.5	3340	1000	0.6	1.5	2700	1080	0.4	1.5			
R 10.5	3500	1390	0.7	1.5	3180	950	0.6	1.5	2580	1030	0.4	1.5			
R 12.5	2930	1170	0.9	1.8	2670	800	0.7	1.8	2170	870	0.6	1.8			
R 13	2800	1130	0.9	1.8	2600	770	0.7	1.8	2080	830	0.6	1.8			
R 15	2440	1000	1.1	2.4	2230	700	0.9	2.4	1800	720	0.7	2.4			

**절입량**  
Depth of Cut



Ap : Axial Depth 축 방향의 절입 깊이 (mm)  
 Ae : Radial Depth 반경 방향의 절입 깊이 (mm)  
 D : Outside Diameter 외경 (mm)  
 n : Speed 회전속도 (rpm)  
 Vf : Feed 이송속도 (mm/min)

- 유효장이 긴 경우에는 회전수와 이송속도를 최대 20% 이하로 줄어십시오.
- 인서트 체결 및 볼트의 조임을 확인 후 가공 하십시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 공작기계와 가공물의 강성이 없는 경우 진동이 발생할시 조건표에 회전속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- In case of long effective length, reduce the RPM and feed by 20% or less.
- After the heat the shrink-fit, check the clamping and bolt status, and then use.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- In case of workpiece and machine do not have enough rigidity and make vibration, reduce the RPM and feed in same proportion.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

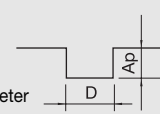
# 2HHINC / 2JJINC Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	프리하든강 Prehardened Steels				고경도강 Hardened Steels				고경도강 Hardened Steels						
	경도 Hardness				30 ~ 40HRC				40 ~ 50HRC				50 ~ 60HRC		
외경 Outside Diameter	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae	RPM	FEED	Ap	Ae			
			Axial Depth	Radial Depth			Axial Depth	Radial Depth			Axial Depth	Radial Depth			
Ø10	9550	950	0.3	10	8900	890	0.1	10	7000	700	0.125	10			
Ø11	8690	870	0.3	11	8100	810	0.1	11	6370	640	0.125	11			
Ø12	7960	800	0.3	12	7430	740	0.2	12	5840	580	0.15	12			
Ø13	7350	730	0.3	13	6860	690	0.2	13	5390	540	0.15	13			
Ø16	5970	600	0.8	16	5570	550	0.4	16	4380	440	0.4	16			
Ø17	5620	560	0.8	17	5240	520	0.4	17	4120	410	0.4	17			
Ø20	4780	480	1.0	20	4460	450	0.5	20	3500	350	0.5	20			
Ø21	4550	450	1.0	21	4250	425	0.5	21	3340	330	0.5	21			
Ø25	3800	380	1.3	25	3670	350	0.6	25	2800	280	0.625	25			
Ø26	3670	360	1.3	26	3400	340	0.6	26	2700	270	0.625	26			
Ø30	3200	320	1.6	30	2980	290	0.8	30	2330	230	0.8	30			

**절입량**  
Depth of Cut

Slotting  
 • Ap : Axial Depth  
 • D : Outside Diameter

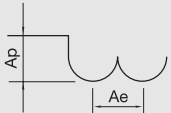


- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 인서트 체결 및 볼트의 조임을 확인 후 가공 하십시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생 시 스피들 속도와 이송 속도를 비례 적으로 조정하십시오.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- If the effective length is long, reduce the RPM and feed in the same proportion.
- After the heat the shrink-fit, check the clamping and bolt status, and then use.
- 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.



피삭재 Material	프리하든강 Prehardened Steels				고경도강 Hardened Steels				고경도강 Hardened Steels						
	경도 Hardness				30 ~ 40HRC				40 ~ 50HRC				50 ~ 52HRC		
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			
R 5	6,220	2,500	0.2	0.8	5,700	1,700	0.1	0.8	4,590	1,840	0.1	0.8			
R 5.5	5,660	2,260	0.2	0.8	5,100	1,530	0.1	0.8	4,160	1,700	0.1	0.8			
R 6	5,180	2,070	0.2	0.9	4,740	1,420	0.2	0.9	3,800	1,530	0.1	0.9			
R 6.5	4,800	1,900	0.2	0.9	4,380	1,320	0.2	0.9	3,530	1,400	0.1	0.9			
R 8	3,900	1,530	0.6	1.1	3,550	1,060	0.5	1.1	2,870	1,150	0.4	1.1			
R 8.5	3,660	1,460	0.6	1.1	3,300	1,000	0.5	1.1	2,700	1,080	0.4	1.1			
R 10	3,120	1,240	0.7	1.5	2,840	850	0.6	1.5	2,300	920	0.4	1.5			
R 10.5	3,000	1,180	0.7	1.5	2,700	800	0.6	1.5	2,200	880	0.4	1.5			
R 12.5	2,500	990	0.9	1.8	2,270	680	0.7	1.8	1,830	740	0.6	1.8			
R 13	2,380	960	0.9	1.8	2,210	650	0.7	1.8	1,760	700	0.6	1.8			
R 15	2,080	850	1.1	2.4	1,990	600	0.9	2.4	1,530	610	0.7	2.4			

**절입량**  
Depth of Cut



Ap : Axial Depth 축 방향의 절입 깊이 (mm)  
 Ae : Radial Depth 반경 방향의 절입 깊이 (mm)  
 D : Outside Diameter 외경 (mm)  
 n : Speed 회전속도 (rpm)  
 Vf : Feed 이송속도 (mm/min)

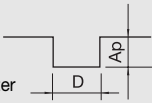
- 유효장이 긴 경우에는 회전수와 이송속도를 최대 20% 이하로 줄이십시오.
- 인서트 체결 및 볼트의 조임을 확인 후 가공 하십시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 공작기계와 가공물의 강성이 없는 경우 진동이 발생할시 조건표에 회전속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- In case of long effective length, reduce the RPM and feed by 20% or less.
- After the heat the shrink-fit, check the clamping and bolt status, and then use.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- In case of workpiece and machine do not have enough rigidity and make vibration, reduce the RPM and feed in same proportion.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

피삭재 Material	프리하든강 Prehardened Steels				고경도강 Hardened Steels				고경도강 Hardened Steels						
	경도 Hardness				30 ~ 40HRC				40 ~ 50HRC				50 ~ 52HRC		
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			
Ø10	8,200	800	0.3	10	7,560	760	0.1	10	5,950	590	0.125	10			
Ø11	7,400	740	0.3	11	6,900	690	0.1	11	5,410	540	0.125	11			
Ø12	6,770	680	0.3	12	6,320	630	0.2	12	4,960	490	0.15	12			
Ø13	6,250	620	0.3	13	5,830	590	0.2	13	4,580	460	0.15	13			
Ø16	5,070	510	0.8	16	4,740	470	0.4	16	3,720	370	0.4	16			
Ø17	4,780	480	0.8	17	4,450	440	0.4	17	3,500	350	0.4	17			
Ø20	4,060	400	1.0	20	3,790	380	0.5	20	2,970	300	0.5	20			
Ø21	3,870	380	1.0	21	3,610	360	0.5	21	2,840	280	0.5	21			
Ø25	3,230	320	1.3	25	3,120	300	0.6	25	2,380	240	0.625	25			
Ø26	3,120	300	1.3	26	2,890	290	0.6	26	2,300	230	0.625	26			
Ø30	2,720	270	1.6	30	2,530	250	0.8	30	1,980	200	0.8	30			

**절입량**  
Depth of Cut

Slotting

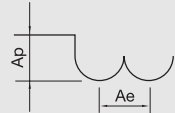
- Ap : Axial Depth
- D : Outside Diameter



- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 인서트 체결 및 볼트의 조임을 확인 후 가공 하십시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피드 속도를 초과하거나 버 및 적열 현상이 발생 시 스피드 속도와 이송 속도를 비례 적으로 조정하십시오.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- If the effective length is long, reduce the RPM and feed in the same proportion.
- After the heat the shrink-fit, check the clamping and bolt status, and then use.
- 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

피삭재 Material	흑연 Graphite			
반경 Radius	RPM	FEED	Ap Axial Depth	Ae Radial Depth
R 5	12740	3000	0.3	0.8
R 5.5	11580	2780	0.33	0.8
R 6	10600	2550	0.36	0.9
R 6.5	9800	2350	0.39	0.9
R 8	7960	1900	0.48	1.1
R 8.5	7490	1800	0.51	1.1
R 10	6370	1530	0.6	1.5
R 10.5	6000	1450	0.63	1.5
R 12.5	5100	1220	0.75	1.8
R 13	4900	1180	0.78	1.8
R 15	4250	1000	0.9	2.4

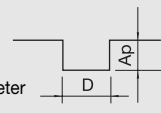
**절입량**  
Depth of Cut



Ap : Axial Depth  
Ae : Radial Depth  
D : Outside Diameter  
 $\gamma$  : Speed (mm<sup>-1</sup>)  
Vf : Feed (mm/min)

피삭재 Material	흑연 Graphite			
외경 Outside Diameter	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø10	16560	1440	1	10
Ø11	15000	1330	1.1	11
Ø12	13780	1220	1.2	12
Ø13	12740	1130	1.3	13
Ø16	10350	910	1.6	16
Ø17	9740	860	1.7	17
Ø20	8280	730	2	20
Ø21	7800	700	2.1	21
Ø25	6630	590	2.5	25
Ø26	6370	570	2.6	26
Ø30	5520	480	3	30

**절입량**  
Depth of Cut



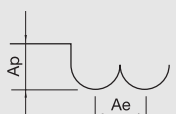
Slotting  
• Ap : Axial Depth  
• D : Outside Diameter

- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 인서트 체결 및 볼트의 조임을 확인 후 가공 하십시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생 시 스피들 속도와 이송 속도를 비례 적으로 조정하십시오.
- 흑연 가공 에어브로를 추천합니다.
- If the effective length is long, reduce the RPM and feed in the same proportion.
- After the heat the shrink-fit, check the clamping and bolt status, and then use.
- 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.
- Air blow is recommended for graphite milling.

## 4SFJB Cutting Condition

피삭재 Material	프리하든강 Prehardened Steels				고경도강 Hardened Steels				고경도강 Hardened Steels			
	경도 Hardness 30 ~ 40HRC				40 ~ 50HRC				50 ~ 60HRC			
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
R 5	6370	2800	0.3	0.1	4750	1700	0.3	0.1	3100	620	0.3	0.1
R 5.5	5800	2500	0.3	0.1	4300	1550	0.3	0.1	2840	570	0.3	0.1
R 6	5300	2330	0.3	0.1	3950	1420	0.3	0.1	2600	520	0.3	0.1
R 6.5	4900	2160	0.3	0.1	3650	1300	0.3	0.1	2400	480	0.3	0.1
R 8	4000	1750	0.4	0.2	3000	1070	0.4	0.2	1950	390	0.4	0.2
R 8.5	3750	1650	0.4	0.2	2800	1000	0.4	0.2	1800	370	0.4	0.2
R 10	3180	1400	0.5	0.2	2370	850	0.5	0.2	1560	300	0.5	0.2
R 10.5	3000	1330	0.5	0.2	2260	800	0.5	0.2	1500	300	0.5	0.2

**절입량**  
Depth of Cut



Ap : Axial Depth 축 방향의 절입 깊이 (mm)  
Ae : Radial Depth 반경 방향의 절입 깊이 (mm)  
D : Outside Diameter 외경 (mm)  
 $\gamma$  : Speed 회전속도 (mm<sup>-1</sup>)  
Vf : Feed 이송속도 (mm/min)

- 유효장이 긴 경우에는 회전수와 이송속도를 최대 20% 이하로 줄이십시오.
- 열박음 후 완전히 밀착되었는지 확인 후 가공 하십시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 공작기계와 가공물의 강성이 없는 경우 진동이 발생할시 조건표에 회전속도와 이송속도를 같은 비율로 줄여서 적용 합니다.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- In case of long effective length, reduce the RPM and feed by 20% or less.
- After the heat the shrink-fit, check the clamping and bolt status, and then use.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- In case of workpiece and machine do not have enough rigidity and make vibration, reduce the RPM and feed in same proportion.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

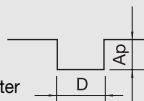
## 홈절삭 Slotting

피삭재 Material	프리하든강 Prehardened Steels			고경도강 Hardened Steels			고경도강 Hardened Steels		
경도 Hardness	30 ~ 40HRC			40 ~ 50HRC			50 ~ 60HRC		
외경 Outside Diameter	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth	RPM	FEED	Ap Axial Depth
Ø10	1600	320	3	1440	288	2	800	130	1
Ø11	1450	290	3.3	1305	261	2.2	725	120	1.1
Ø12	1330	265	3.6	1197	239	2.4	660	100	1.2
Ø13	1225	245	3.9	1103	221	2.6	610	100	1.3
Ø16	1000	200	4.8	900	180	3.2	500	80	1.6
Ø17	940	190	5.1	846	171	3.4	470	75	1.7
Ø20	800	160	6	720	144	4	400	65	2
Ø21	760	150	6.3	684	135	4.2	380	60	2.1

**절입량**  
Depth of Cut

Slotting

- Ap : Axial Depth
- D : Outside Diameter



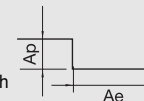
## 측면 절삭 Side Cutting

피삭재 Material	프리하든강 Prehardened Steels				고경도강 Hardened Steels				고경도강 Hardened Steels			
경도 Hardness	30 ~ 40HRC				40 ~ 50HRC				50 ~ 60HRC			
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
Ø10	2050	500	5	1	2050	480	5	0.5	800	130	3	0.5
Ø11	1880	450	5.5	1.1	1880	420	5.5	0.6	730	120	3.3	0.6
Ø12	1720	410	6	1.2	1720	380	6	0.6	660	100	3.6	0.6
Ø13	1600	380	6.5	1.3	1600	350	6.5	0.7	610	100	3.9	0.7
Ø16	1300	310	8	1.6	1300	300	8	0.8	500	80	4.8	0.8
Ø17	1220	300	8.5	1.7	1220	285	8.5	0.9	470	75	5.1	0.9
Ø20	1000	250	10	2	1000	240	10	1.0	400	65	6	1.0
Ø21	980	230	10.5	2.1	980	220	10.5	1.1	380	60	6.3	1.1

**절입량**  
Depth of Cut

Side Milling

- Ap : Axial Depth
- Ae : Radial Depth



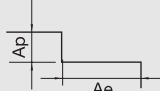
- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 열박음 후 완전히 밀착되었는지 확인 후 가공 하십시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피드 속도를 초과하거나 버 및 적열 현상이 발생 시 스피드 속도와 이송 속도를 비례 적으로 조정하십시오.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- If the effective length is long, reduce the RPM and feed in the same proportion.
- After the heat the shrink-fit, check the clamping and bolt status, and then use.
- 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

측면 절삭 Side Cutting												
피삭재 Material	프리하든강 Prehardened Steels				고경도강 Hardened Steels				고경도강 Hardened Steels			
경도 Hardness	30 ~ 40HRC				40 ~ 50HRC				50 ~ 60HRC			
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
Ø10	3075	1150	5	0.2	3075	1104	3	0.2	1200	299	3	0.2
Ø11	2820	1035	5.5	0.2	2820	966	3.3	0.2	1095	276	3.3	0.2
Ø12	2580	943	6	0.2	2580	874	3.6	0.2	990	230	3.6	0.2
Ø13	2400	874	6.5	0.3	2400	805	3.9	0.3	915	230	3.9	0.3
Ø16	1950	713	8	0.3	1950	690	4.8	0.3	750	184	4.8	0.3
Ø17	1830	690	8.5	0.3	1830	656	5.1	0.3	705	173	5.1	0.3
Ø20	1500	575	10	0.4	1500	552	6	0.4	600	150	6	0.4
Ø21	1470	529	10.5	0.4	1470	506	6.3	0.4	570	138	6.3	0.4

**절입량**  
Depth of Cut

Side Milling

- Ap : Axial Depth
- Ae : Radial Depth



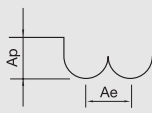
- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 열박음 후 완전히 밀착되었는지 확인 후 가공 하십시오.
- 상기 절삭 조건은 6날 기준이며 날 수 증가시 안정적인 속도 내에서 FEED를 UP 해주십시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생 시 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 에어브로, 절삭유, 오일 미스트 클린트를 추천하며, 칩을 잘 제거하고 가공시의 발열과 발화에 주의 하십시오
- If the effective length is long, reduce the RPM and feed in the same proportion.
- After the heat the shrink-fit, check the clamping and bolt status, and then use.
- Above the table value is based on 6 flutes. If you use more than 6 flutes of endmill, raise up the feed in stable milling condition.
- 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.
- Air blow or mist coolants are recommended and note for chip emission, heat, or ignition.

## 4SFDB

피삭재 Material	흑연 Graphite			
반경 Corner Radius	RPM	FEED	Ap Axial Depth	Ae Radial Depth
R 5	9550	3050	2	1
R 5.5	8700	2800	2.2	1.1
R 6	7960	2550	2.4	1.2
R 6.5	7350	2350	2.6	1.3
R 8	5970	1900	3.2	1.6
R 8.5	5620	1800	3.4	1.7
R 10	4780	1530	4	2
R 10.5	4550	1460	4.2	2.1

**절입량**  
Depth of Cut

Ap : Axial Depth  
Ae : Radial Depth  
D : Outside Diameter  
n : Speed (r/min)  
Vf : Feed (mm/r)



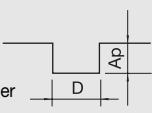
## 4SFDC

피삭재 Material	흑연 Graphite			
외경 Outside Diameter	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø10	5100	1600	1.6	10
Ø11	4630	1480	1.8	11
Ø12	4250	1360	1.9	12
Ø13	3920	1250	2.1	13
Ø16	3180	1020	2.6	16
Ø17	3000	960	2.7	17
Ø20	2550	800	3.2	20
Ø21	2430	780	3.4	21

**절입량**  
Depth of Cut

Slotting

- Ap : Axial Depth
- D : Outside Diameter



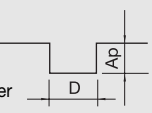
## 6~12SFDC

피삭재 Material	흑연 Graphite			
외경 Outside Diameter	RPM	FEED	Ap Axial Depth	Ae Radial Depth
Ø10	5400	2600	1.3	10
Ø11	4900	1770	1.4	11
Ø12	4500	1620	1.5	12
Ø13	4160	1500	1.7	13
Ø16	3380	1220	2.0	16
Ø17	3180	1150	2.2	17
Ø20	2700	970	2.6	20
Ø21	2580	930	2.7	21

**절입량**  
Depth of Cut

Slotting

- Ap : Axial Depth
- D : Outside Diameter



- 유효장 길이가 긴 경우, RPM과 FEED를 동일 비율로 낮춰주세요.
- 열박음 후 완전히 밀착되었는지 확인 후 가공 하십시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생 시 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- 흑연 가공 에어브로를 추천합니다.
- If the effective length is long, reduce the RPM and feed in the same proportion.
- After the heat the shrink-fit, check the clamping and bolt status, and then use.
- 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.
- Air blow is recommended for graphite milling.

# PCD End Mill Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	VC m/min	FEED RATE (fz)			
		2 ~ 3mm	4 ~ 6mm	7 ~ 11mm	12 ~ 20mm
AL-alloy Si <1%	150 ~ 6,000	0.007 ~ 0.05	0.02 ~ 0.150	0.02 ~ 0.20	0.04 ~ 0.3
AL-alloy Si <12%	150 ~ 4,000	0.007 ~ 0.05	0.02 ~ 0.150	0.02 ~ 0.20	0.04 ~ 0.3
AL-alloy Si >12%	150 ~ 2,000	0.007 ~ 0.05	0.02 ~ 0.150	0.02 ~ 0.20	0.04 ~ 0.3
Magnesium alloy	150 ~ 6,000	0.007 ~ 0.05	0.02 ~ 0.150	0.02 ~ 0.20	0.04 ~ 0.3
Cooper alloy	150 ~ 5,000	0.007 ~ 0.05	0.02 ~ 0.150	0.02 ~ 0.20	0.04 ~ 0.3
Brass ally	150 ~ 5,001	0.007 ~ 0.05	0.02 ~ 0.150	0.02 ~ 0.20	0.04 ~ 0.3
GFRP	150 ~ 3,000	0.007 ~ 0.05	0.02 ~ 0.150	0.02 ~ 0.20	0.04 ~ 0.3
CFRP	150 ~ 4,000	0.007 ~ 0.05	0.02 ~ 0.150	0.02 ~ 0.20	0.04 ~ 0.3
Graphite	150 ~ 3,000	0.007 ~ 0.05	0.02 ~ 0.150	0.02 ~ 0.20	0.04 ~ 0.3

# 2SPO Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	구조용강 / 탄소강 / 회주철 SS / SC / FC	합금강 / 프리하튼강 SCM / NAK / HPM	금형강 / 열처리강 SKD			
경도 Hardness	~ 200 HB	20~ 30HRC	30~ 40HRC			
외경 Outside Diameter	절삭속도 (V/C)	이송량 (f)	절삭속도 (V/C)	이송량 (f)	절삭속도 (V/C)	이송량 (f)
Ø1	23,800	500	2,000	400	19,100	380
Ø2	12,000	700	10,350	400	9,550	380
Ø3	8,000	800	6,900	550	6,400	510
Ø4	5,900	800	5,200	620	4,800	570
Ø6	3,980	700	3,450	550	3,180	510
Ø8	3,000	600	2,600	520	2,400	480
Ø10	2,400	580	2,070	500	2,000	460
Ø12	2,000	560	1,720	480	1,600	450
Ø16	1,500	500	1,300	400	1,200	380

# 2STD Cutting Condition

•RPM : min<sup>-1</sup> •Feed : mm/min

피삭재 Material	구조용강/탄소강/회주철 SS / SC / FC ~200HB	합금강/프리하튼강 SCM / NAK / HPM 20 ~30HRC	금형강/열처리강 SKD 30 ~ 40HRC	덕타일 주철 FCD	스테인레스강 SUS304	알루미늄 합금 A7075	인코넬 Inconel							
직경 Diameter	절삭속도 V/C	이송량 f	절삭속도 V/C	이송량 f	절삭속도 V/C	이송량 f	절삭속도 V/C	이송량 f	절삭속도 V/C	이송량 f	절삭속도 V/C	이송량 f		
Ø3.4	60~100	0.1 ~ 0.2	60~100	0.1 ~ 0.2	20~60	0.05 ~ 0.1	40~70	0.07 ~ 0.2	20~60	0.05 ~ 0.2	80~120	0.1 ~ 0.2	10~30	0.05 ~ 0.15
Ø4.3	60~100	0.1 ~ 0.2	60~100	0.1 ~ 0.2	20~60	0.05 ~ 0.1	40~70	0.07 ~ 0.2	20~60	0.05 ~ 0.2	80~120	0.1 ~ 0.2	10~30	0.05 ~ 0.15
Ø5.1	60~100	0.1 ~ 0.2	60~100	0.1 ~ 0.2	20~60	0.05 ~ 0.1	40~70	0.07 ~ 0.2	20~60	0.05 ~ 0.2	80~120	0.1 ~ 0.2	10~30	0.05 ~ 0.15
Ø6.9	60~100	0.15 ~ 0.3	60~100	0.15 ~ 0.3	20~60	0.08 ~ 0.2	40~70	0.1 ~ 0.2	20~60	0.1 ~ 0.2	80~120	0.15 ~ 0.2	10~30	0.05 ~ 0.15
Ø8.6	60~100	0.15 ~ 0.3	60~100	0.15 ~ 0.3	20~60	0.08 ~ 0.2	40~70	0.1 ~ 0.2	20~60	0.1 ~ 0.2	80~120	0.15 ~ 0.2	10~30	0.05 ~ 0.15
Ø10.3	60~100	0.2 ~ 0.4	60~100	0.2 ~ 0.4	20~60	0.1 ~ 0.2	40~70	0.2 ~ 0.4	20~60	0.15 ~ 0.3	80~120	0.2 ~ 0.4	10~30	0.1 ~ 0.2

# 2DED Cutting Condition

•RPM : rev./min •Feed : mm/min

피삭재 Material	알루미늄 합금 Aluminum Alloys		수지 Resin	
직경 Diameter	RPM	이송량 (f)	RPM	이송량 (f)
Ø0.1 ~ 0.3	25,000	0.001 ~ 0.003	22,000	0.001 ~ 0.003
Ø0.3 ~ 0.5	20,000	0.005 ~ 0.02	22,000	0.005 ~ 0.01
Ø0.5 ~ 0.8	18,000	0.01 ~ 0.03	15,000	0.01 ~ 0.03
Ø0.8 ~ 1	15,000	0.02 ~ 0.04	13,000	0.02 ~ 0.05
Ø1~1.5	12,000	0.03 ~ 0.05	8,000	0.02 ~ 0.05
Ø1.5 ~ 2	9,000	0.03 ~ 0.05	6,000	0.02 ~ 0.05
Ø2 ~ 3	7,000	0.03 ~ 0.05	4,500	0.05
Ø3 ~ 4	3,500	0.03 ~ 0.05	3,200	0.05
Ø4 ~ 5	2,800	0.03 ~ 0.05	2,500	0.05
Ø5 ~ 6	2,200	0.03 ~ 0.05	2,000	0.05

- 진동이 적고 강성이 좋은 공작기계 사용 요망합니다 (Ø1 이하 사용시 진동 허용 관리 3µm 이내 일것.)
- 가급적 열박음 척을 추천합니다.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 조건표가 기계의 최대 스피들 속도를 초과하거나 버 및 적열 현상이 발생할때 스피들 속도와 이송 속도를 비례적으로 조정 하십시오.
- Use a machine with low vibration and good rigidity (Ø1 or less, the vibration tolerance management should be within 3µm).
- Using shrink-fit chuck is recommended.
- 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.

# 2FDR Cutting Condition

• RPM : min<sup>-1</sup> • Feed : mm/min

피삭재 Material	구조용강/탄소강/회주철 SS / SC / FC ~200HB		합금강/모하든강 SCM / NAK / HPM 20 ~30HRC		금형강/열처리강 SKD 30 ~ 40HRC		고경도강 Hardened steels 40 ~ 50HRC		덕타일 주철 FCD		스테인레스강 SUS304		알루미늄 합금 A7075		알루미늄 합금 주물 AC / ADC	
	직경 Diameter	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM
Ø0.2	33000	35	29500	40	16500	25	14000	15	29500	30	16200	15	59500	130	55000	110
Ø0.3	31500	55	25000	40	15500	30	12500	15	26500	35	15300	15	59000	200	52500	120
Ø0.4	27500	75	23800	50	14500	35	11500	20	23200	40	14500	20	58500	230	50000	165
Ø0.5	25800	85	22000	60	13200	40	11000	25	21500	45	13200	20	58300	280	48500	190
Ø0.6	24600	115	20500	85	12000	55	10000	25	20000	60	12000	25	55000	320	45000	230
Ø0.7	22500	135	19500	115	11000	70	9000	30	18500	90	11500	30	51000	400	41000	280
Ø0.8	21000	180	18000	150	10500	80	8000	35	17000	120	10000	35	46000	500	35000	330
Ø0.9	20500	240	16800	190	9500	95	7500	35	16000	145	9850	40	43000	630	31500	380
Ø1	19500	300	16000	230	9450	110	6800	35	15700	180	9600	50	40000	710	27500	430
Ø2	12000	340	10000	290	5800	150	4100	60	10000	230	-	-	24500	750	18000	510
Ø3	8000	410	7100	330	3800	165	2700	70	7100	280	-	-	18000	950	13000	650
Ø4	6100	425	5200	380	2700	170	2100	80	5250	300	-	-	13000	1000	10000	680
Ø5	4900	425	4200	280	2350	175	1650	80	4250	300	-	-	10000	1000	7800	680
Ø6	4150	425	3550	330	1800	175	1350	80	3550	300	-	-	8600	1000	6500	680
Ø8	3100	430	2700	350	1500	175	1000	80	2700	300	-	-	6500	1000	4850	680
Ø10	2600	430	2200	360	1100	175	850	80	2000	300	-	-	5200	1000	3850	680
Ø12	2100	430	1750	360	950	175	630	80	1800	310	-	-	4300	1000	3300	680
Ø18	1600	430	1400	360	750	175	520	80	1350	310	-	-	3300	1000	2550	680
Ø20	1250	430	1100	360	600	175	430	80	1000	310	-	-	2600	1000	2000	680

- 절삭 조건표 참조는 수용성 절삭유 사용이 전제입니다. 절삭유를 사용하지 않을 시, 회전과 속도를 20% 줄여 사용하십시오.
- 드릴링의 깊이가 직경의 2배나 그 이하일 때, 드릴링을 직경의 2배 이상 가공하는 것을 추천하지 않습니다.
- 스테인레스 드릴링 시(SUS304, 316 등등) 직경 1.9mm나 그 이하 직경을 사용하십시오.
- 경사 드릴 가공시, 경사진 각도에 따라 (절삭 조건을) 조절하십시오. 경사각이 30도 이하일 때, 피드를 50% 낮추십시오. 경사각이 30도 이상일 때, 회전을 70% 이하, 피드를 30% 이하로 줄이십시오.
- 측면 가공용으로는 사용하지 마십시오.
- 절삭 조건을 기계 강성이나 클램프 상태에 따라 조절하십시오.
- Use the water soluble cutting oil. In case if you do not use water soluble cutting oil, reduce the RPM and the feed by 20%.
- Drilling for the depth of 2 x Dc or Less than 2 x Dc is recommended.
- For stainless drilling, we recommend that the tool diameter is 1.9mm or less.
- If you use for inclined angle as slope drilling, reduce the feed by 50% for inclined angle less than 30°, and reduce below 70% of the RPM and 30% of the feed for inclined angle over 30°.
- Do not use for side milling.
- Change cutting conditions depending on work variables; rigidity of machine, work clamp or material shape.

# 2FDRL Cutting Condition

• RPM : min<sup>-1</sup> • Feed : mm/min

피삭재 Material	구조용강/탄소강/회주철 SS / SC / FC ~200HB		합금강/모하든강 SCM / NAK / HPM 20 ~30HRC		금형강/뜨리하든강 SKD 30 ~ 40HRC		고경도강 Hardened steels 40 ~ 50HRC		덕타일 주철 FCD		알루미늄 합금 A7075	
	직경 Diameter	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM
Ø3	11000	800	9500	580	7500	320	5000	220	9300	400	13000	1000
Ø4	8000	800	7200	580	5600	320	4100	220	7300	400	10000	1000
Ø5	6500	800	5550	580	4500	320	3300	220	6000	400	7800	1000
Ø6	5500	810	4800	590	3550	320	2700	220	5000	400	6600	1000
Ø8	4100	810	3600	590	2850	320	2000	220	3800	400	4650	1050
Ø10	3300	810	3000	590	2350	320	1650	220	3000	410	3900	1050
Ø12	2750	820	2450	600	2000	320	1480	220	2480	410	3250	1050
Ø16	2100	820	1800	600	1550	330	1000	220	1850	410	2450	1100
Ø20	1650	820	1550	600	1250	330	850	220	1550	410	2000	1100

- 절삭 조건표 참조는 수용성 절삭유 사용이 전제입니다. 절삭유를 사용하지 않을 시, 회전과 이송속도를 20% 줄여 사용하십시오.
- 드릴링 깊이가 직경의 2배 이하가 되게 절삭조건표를 사용하십시오.
- 스테인레스 소재에는 사용하지 마십시오. 스테인레스 소재에는 2FDRW 혹은 2FDRLW 사용을 추천합니다.
- 측면 가공용으로는 사용하지 마십시오.
- 절삭 조건을 기계 강성이나 클램프 상태에 따라 조절하십시오.
- Use the water soluble cutting oil. In case if you do not use water soluble cutting oil, reduce the RPM and the feed by 20%.
- Use the cutting parameters for the depth of 2 x Dc or less.
- Do not use for stainless material. We recommend using 2FDRW or 2FDRLW for stainless material.
- Do not use for side milling.
- Change cutting conditions depending on work variables; rigidity of machine, work clamp or material shape.

# 2FDRW (3D) Cutting Condition

• RPM : min<sup>-1</sup> • Feed : mm/min

피삭재 Material	구조용강 탄소강: 회주철 SS / SC / FC ~200HB		합금강: 프리하든강 SCM / NAK / HPM 20 ~30HRC		금형강: 열처리강 SKD 30 ~ 40HRC		고경도강 Hardened steels 40 ~ 50HRC		다도입 주철 FCD		스테인레스강 SUS304		알루미늄 합금 A7075	
	직경 Diameter	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM
Ø1	16000	120	13000	70	9500	40	8000	40	13000	50	1000	20	22500	200
Ø1.5	10000	130	8500	80	6500	40	5300	40	9000	50	6500	20	15000	200
Ø2	9500	150	8000	95	5500	50	4800	50	8000	70	6500	35	13000	230
Ø2.5	12000	450	9500	300	9600	200	5800	120	9500	220	8800	210	13000	650
Ø3	12500	900	10000	600	7500	300	6500	270	10000	450	10000	600	14500	1200
Ø4	9500	930	8000	620	5500	300	4800	270	8000	450	8000	600	12000	1200
Ø5	7500	930	6500	620	4500	300	3800	270	6300	460	6300	620	9000	1200
Ø6	6500	950	5400	630	3700	330	3200	280	5400	470	5500	620	7500	1300
Ø8	4800	950	4000	630	2900	330	2500	280	4000	470	4000	620	5600	1300
Ø10	3800	950	3300	630	2450	330	2000	280	3200	470	3300	620	4500	1300
Ø12	3300	950	2800	630	2000	330	1600	280	2800	470	2900	620	3900	1300
Ø16	2500	950	2000	630	1500	330	1300	280	2000	470	2000	620	2800	1300

- 절삭 조건표 참조는 수용성 절삭유 사용이 전제입니다. 절삭유를 사용하지 않을 시, 회전과 속도를 20% 줄여 사용하십시오.
- 드릴 깊이는 3xDc를 넘기지 마십시오. 칩 배출 상태가 좋지 않을 경우, 펙드릴링 방식을 사용하십시오.
- 스테인레스 소재에는 펙드릴 방식을 사용하십시오.
- 펙드릴 간격은 0.1Dc ~ 0.5Dc 사이를 권장합니다.
- 측면 가공용으로는 사용하지 마십시오.
- 절삭 조건을 기계 강성이나 클램프 상태에 따라 조절하십시오.

- Use the water soluble cutting oil. In case if you do not use water soluble cutting oil, reduce the RPM and the feed by 20%.
- Do not over the drilling depth of 3 x Dc. If the state of chip emission is not good enough, use peck drilling method.
- For the stainless material, use peck drilling method.
- Peck drill interval is recommended between 0.1 Dc to 0.5 Dc.
- Side milling is not possible.
- Change cutting conditions depending on work variables; rigidity of machine, work clamp or material shape.

# 2FDRLW (5D) Cutting Condition

• RPM : min<sup>-1</sup> • Feed : mm/min

피삭재 Material	구조용강 탄소강: 회주철 SS / SC / FC ~200HB		합금강: 프리하든강 SCM / NAK / HPM 20 ~30HRC		금형강: 열처리강 SKD 30 ~ 40HRC		고경도강 Hardened steels 40 ~ 50HRC		다도입 주철 FCD		스테인레스강 SUS304		알루미늄 합금 A7075	
	직경 Diameter	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM	이송 속도 FEED	회전수 RPM
Ø1	19000	200	16000	100	10000	50	10000	45	15000	75	13000	60	25000	230
Ø1.5	13000	200	10000	100	7600	50	6500	45	10000	75	8500	60	17000	230
Ø2	10000	300	9500	200	6800	95	5600	70	9500	120	8000	100	14500	400
Ø2.5	13000	700	10000	350	7000	180	5800	150	10000	250	9500	300	15500	850
Ø3	15000	1250	10000	600	7300	300	6500	270	10000	460	10000	600	17000	1350
Ø4	11000	1300	8000	600	5500	300	4800	270	8000	460	8000	620	14000	1400
Ø5	9000	1300	6400	600	4500	300	3800	270	6500	460	6500	620	10000	1400
Ø6	7500	1350	5300	630	3700	320	3200	280	5300	480	5300	630	9500	1500
Ø8	5600	1350	4000	630	2800	320	2500	280	4000	480	4000	630	6500	1500
Ø10	4500	1350	3200	630	2300	320	2000	280	3200	480	3300	630	5100	1600
Ø12	3700	1350	2800	630	2000	320	1700	280	2900	480	2800	630	4300	1600
Ø16	2850	1350	2100	630	1500	320	1300	280	2100	480	2100	630	3300	1600

- 절삭 조건표 참조는 수용성 절삭유 사용이 전제입니다. 절삭유를 사용하지 않을 시, 회전과 속도를 20% 줄여 사용하십시오.
- 드릴 깊이는 5xDc를 넘기지 마십시오. 칩 배출 상태가 좋지 않을 경우, 펙드릴링 방식을 사용하십시오.
- 스테인레스 소재에는 펙드릴 방식을 사용하십시오.
- 펙드릴 간격은 0.1Dc ~ 0.5Dc 사이를 권장합니다.
- 측면 가공용으로는 사용하지 마십시오.
- 절삭 조건을 기계 강성이나 클램프 상태에 따라 조절하십시오.

- Use the water soluble cutting oil. In case if you do not use water soluble cutting oil, reduce the RPM and the feed by 20%.
- Do not over the drilling depth of 5 x Dc. If the state of chip emission is not good enough, use peck drilling method.
- For the stainless material, use peck drilling method.
- Peck drill interval is recommended between 0.1 Dc to 0.5 Dc.
- Side milling is not possible.
- Change cutting conditions depending on work variables; rigidity of machine, work clamp or material shape.

## 4ETM Cutting Condition

피삭재 Material	합금강 / 공구강 Alloy Steel / Tool Steel		고경도강 Hardened Steels		알루미늄 Aluminum		스테인레스강 Stainless Steel	
경도 Hardness	~ 30HRC		35 ~ 45HRC					
TAP	V/C	FZ	V/C	FZ	V/C	FZ	V/C	FZ
M3	50 ~ 70	0.01 ~ 0.02	45 ~ 55	0.005 ~ 0.01	100 ~ 130	0.03 ~ 0.04	70 ~ 80	0.015 ~ 0.025
M4	50 ~ 70	0.01 ~ 0.02	45 ~ 55	0.005 ~ 0.01	100 ~ 130	0.03 ~ 0.04	70 ~ 80	0.015 ~ 0.025
M5	50 ~ 70	0.01 ~ 0.02	45 ~ 55	0.005 ~ 0.01	100 ~ 130	0.03 ~ 0.04	70 ~ 80	0.015 ~ 0.025
M6	50 ~ 70	0.02 ~ 0.03	45 ~ 55	0.01 ~ 0.015	100 ~ 130	0.04 ~ 0.05	70 ~ 80	0.025 ~ 0.035
M8	50 ~ 70	0.02 ~ 0.03	45 ~ 55	0.01 ~ 0.015	100 ~ 130	0.04 ~ 0.05	70 ~ 80	0.03 ~ 0.04
M10	50 ~ 70	0.02 ~ 0.03	45 ~ 55	0.015 ~ 0.02	100 ~ 130	0.05 ~ 0.06	70 ~ 80	0.03 ~ 0.04
M12	50 ~ 70	0.03 ~ 0.04	45 ~ 55	0.02 ~ 0.025	100 ~ 130	0.06 ~ 0.07	70 ~ 80	0.03 ~ 0.04
M16	50 ~ 70	0.03 ~ 0.04	45 ~ 55	0.02 ~ 0.025	100 ~ 130	0.06 ~ 0.07	70 ~ 80	0.04 ~ 0.05

## 4MTM Cutting Condition

피삭재 Material	합금강 / 공구강 Alloy Steel / Tool Steel		고경도강 Hardened Steels		알루미늄 Aluminum		스테인레스강 Stainless Steel	
경도 Hardness	~ 30HRC		35 ~ 45HRC					
TAP	V/C	FZ	V/C	FZ	V/C	FZ	V/C	FZ
M1	50 ~ 70	0.005 ~ 0.01	55 ~ 65	0.005 ~ 0.01	100 ~ 130	0.02 ~ 0.34	70 ~ 85	0.005 ~ 0.01
M2	50 ~ 70	0.005 ~ 0.01	55 ~ 65	0.005 ~ 0.01	100 ~ 130	0.02 ~ 0.34	70 ~ 85	0.005 ~ 0.01
M3	50 ~ 70	0.01 ~ 0.02	55 ~ 65	0.01 ~ 0.02	100 ~ 130	0.02 ~ 0.34	70 ~ 85	0.005 ~ 0.01
M4	50 ~ 70	0.01 ~ 0.02	55 ~ 65	0.01 ~ 0.02	100 ~ 130	0.04 ~ 0.05	70 ~ 85	0.01 ~ 0.02
M5	50 ~ 70	0.02 ~ 0.03	55 ~ 65	0.02 ~ 0.03	100 ~ 130	0.04 ~ 0.05	70 ~ 85	0.01 ~ 0.02
M6	50 ~ 70	0.02 ~ 0.03	55 ~ 65	0.02 ~ 0.03	100 ~ 130	0.05 ~ 0.06	70 ~ 85	0.02 ~ 0.03

## 4STM Cutting Condition

피삭재 Material	합금강 / 공구강 Alloy Steel / Tool Steel		고경도강 Hardened Steels		알루미늄 Aluminum		스테인레스강 Stainless Steel	
경도 Hardness	~ 30HRC		35 ~ 45HRC					
TAP	V/C	FZ	V/C	FZ	V/C	FZ	V/C	FZ
M3	50 ~ 70	0.01 ~ 0.02	55 ~ 65	0.008 ~ 0.01	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.01 ~ 0.02
M4	50 ~ 70	0.01 ~ 0.02	55 ~ 65	0.008 ~ 0.01	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.01 ~ 0.02
M5	50 ~ 70	0.01 ~ 0.02	55 ~ 65	0.01 ~ 0.02	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.01 ~ 0.02
M6	50 ~ 70	0.01 ~ 0.02	55 ~ 65	0.01 ~ 0.02	100 ~ 130	0.04 ~ 0.05	70 ~ 85	0.02 ~ 0.03
M8	50 ~ 70	0.02 ~ 0.03	55 ~ 65	0.02 ~ 0.03	100 ~ 130	0.04 ~ 0.05	70 ~ 85	0.02 ~ 0.03
M10	50 ~ 70	0.02 ~ 0.03	55 ~ 65	0.02 ~ 0.03	100 ~ 130	0.05 ~ 0.06	70 ~ 85	0.03 ~ 0.04
M12	50 ~ 70	0.02 ~ 0.03	55 ~ 65	0.02 ~ 0.03	100 ~ 130	0.06 ~ 0.07	70 ~ 85	0.05 ~ 0.06
M16	50 ~ 70	0.03 ~ 0.04	55 ~ 65	0.03 ~ 0.04	100 ~ 130	0.06 ~ 0.07	70 ~ 85	0.05 ~ 0.06

## 4HTM Cutting Condition

피삭재 Material	합금강 / 공구강 Alloy Steel / Tool Steel		고경도강 Hardened Steels		알루미늄 Aluminum		스테인레스강 Stainless Steel	
경도 Hardness	~ 30HRC		35 ~ 45HRC					
TAP	V/C	FZ	V/C	FZ	V/C	FZ	V/C	FZ
M3	50 ~ 70	0.01 ~ 0.02	50 ~ 60	0.005 ~ 0.008	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.01 ~ 0.02
M4	50 ~ 70	0.01 ~ 0.02	50 ~ 60	0.005 ~ 0.008	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.01 ~ 0.02
M5	50 ~ 70	0.01 ~ 0.02	50 ~ 60	0.01 ~ 0.02	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.01 ~ 0.02
M6	50 ~ 70	0.01 ~ 0.02	50 ~ 60	0.01 ~ 0.02	100 ~ 130	0.04 ~ 0.05	70 ~ 85	0.02 ~ 0.03
M8	50 ~ 70	0.02 ~ 0.03	50 ~ 60	0.02 ~ 0.03	100 ~ 130	0.04 ~ 0.05	70 ~ 85	0.02 ~ 0.03
M10	50 ~ 70	0.02 ~ 0.03	50 ~ 60	0.02 ~ 0.03	100 ~ 130	0.05 ~ 0.06	70 ~ 85	0.03 ~ 0.04
M12	50 ~ 70	0.02 ~ 0.03	50 ~ 60	0.02 ~ 0.03	100 ~ 130	0.06 ~ 0.07	70 ~ 85	0.05 ~ 0.06
M16	50 ~ 70	0.03 ~ 0.04	50 ~ 60	0.03 ~ 0.04	100 ~ 130	0.06 ~ 0.07	70 ~ 85	0.05 ~ 0.06

- 가급적 열박음 척을 추천합니다.
- 공구 진입시 이송 f (mm/tooth)를 나사가공 이송 대비 30% 수준으로 낮춰 주십시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 절삭시 내,외부 급유형 쿨런트 사용을 추천 합니다.
- Using shrink-fit chuck is recommended.
- When the tool approaches the work material, reduce the feed by 30%.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- Internal and external coolants are recommended for milling.



## 4NKTM Cutting Condition

피삭재 Material	합금강/공구강 Alloy Steel/ Tool Steel		고경도강 Hardened Steels		알루미늄 Aluminum		스테인레스강 Stainless Steel	
경도 Hardness	~ 30HRC		35 ~ 45HRC					
TAP	V/C	FZ	V/C	FZ	V/C	FZ	V/C	FZ
M3	50 ~ 70	0.01 ~ 0.02	55 ~ 65	0.008 ~ 0.01	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.01 ~ 0.02
M4	50 ~ 70	0.01 ~ 0.02	55 ~ 65	0.008 ~ 0.01	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.01 ~ 0.02
M5	50 ~ 70	0.01 ~ 0.02	55 ~ 65	0.01 ~ 0.02	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.01 ~ 0.02
M6	50 ~ 70	0.01 ~ 0.02	55 ~ 65	0.01 ~ 0.02	100 ~ 130	0.04 ~ 0.05	70 ~ 85	0.02 ~ 0.03
M8	50 ~ 70	0.02 ~ 0.03	55 ~ 65	0.02 ~ 0.03	100 ~ 130	0.04 ~ 0.05	70 ~ 85	0.02 ~ 0.03
M10	50 ~ 70	0.02 ~ 0.03	55 ~ 65	0.02 ~ 0.03	100 ~ 130	0.05 ~ 0.06	70 ~ 85	0.03 ~ 0.04
M12	50 ~ 70	0.02 ~ 0.03	55 ~ 65	0.02 ~ 0.03	100 ~ 130	0.06 ~ 0.07	70 ~ 85	0.05 ~ 0.06
M16	50 ~ 70	0.03 ~ 0.04	55 ~ 65	0.03 ~ 0.04	100 ~ 130	0.06 ~ 0.07	70 ~ 85	0.05 ~ 0.06
M20	50 ~ 70	0.03 ~ 0.04	55 ~ 65	0.03 ~ 0.04	100 ~ 130	0.06 ~ 0.07	70 ~ 85	0.05 ~ 0.06

## 4NPTM Cutting Condition

피삭재 Material	합금강/공구강 Alloy Steel/ Tool Steel		고경도강 Hardened Steels		알루미늄 Aluminum		스테인레스강 Stainless Steel	
경도 Hardness	~ 30HRC		35 ~ 45HRC					
TAP	V/C	FZ	V/C	FZ	V/C	FZ	V/C	FZ
1/16-27C NPT	50 ~ 70	0.01 ~ 0.02	55 ~ 65	0.01 ~ 0.02	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.02 ~ 0.03
1/8-27C NPT	50 ~ 70	0.02 ~ 0.03	55 ~ 65	0.02 ~ 0.03	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.02 ~ 0.03
1/4-18C NPT	50 ~ 70	0.02 ~ 0.03	55 ~ 65	0.02 ~ 0.03	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.03 ~ 0.04
3/8-18C NPT	50 ~ 70	0.02 ~ 0.03	55 ~ 65	0.02 ~ 0.03	100 ~ 130	0.04 ~ 0.05	70 ~ 85	0.05 ~ 0.06
1/2(3/4)-14C NPT	50 ~ 70	0.03 ~ 0.04	55 ~ 65	0.03 ~ 0.04	100 ~ 130	0.04 ~ 0.05	70 ~ 85	0.05 ~ 0.06

## 4BSTM Cutting Condition

피삭재 Material	합금강/공구강 Alloy Steel/ Tool Steel		고경도강 Hardened Steels		알루미늄 Aluminum		스테인레스강 Stainless Steel	
경도 Hardness	~ 30HRC		35 ~ 45HRC					
TAP	V/C	FZ	V/C	FZ	V/C	FZ	V/C	FZ
1/16-28C BSPT	50 ~ 70	0.01 ~ 0.02	55 ~ 65	0.01 ~ 0.02	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.02 ~ 0.03
1/8-28C BSPT	50 ~ 70	0.02 ~ 0.03	55 ~ 65	0.02 ~ 0.03	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.02 ~ 0.03
1/4-19C BSPT	50 ~ 70	0.02 ~ 0.03	55 ~ 65	0.02 ~ 0.03	100 ~ 130	0.03 ~ 0.04	70 ~ 85	0.03 ~ 0.04
3/8-19C BSPT	50 ~ 70	0.02 ~ 0.03	55 ~ 65	0.02 ~ 0.03	100 ~ 130	0.04 ~ 0.05	70 ~ 85	0.05 ~ 0.06
1/2(3/4)-14C BSPT	50 ~ 70	0.03 ~ 0.04	55 ~ 65	0.03 ~ 0.04	100 ~ 130	0.04 ~ 0.05	70 ~ 85	0.05 ~ 0.06

## 2DTM Cutting Condition

피삭재 Material	알루미늄 Aluminum	
TAP	V/C	FZ
M3	90 ~ 130	0.03 ~ 0.04
M4	90 ~ 130	0.03 ~ 0.04
M5	90 ~ 130	0.03 ~ 0.04
M6	90 ~ 130	0.04 ~ 0.05
M8	90 ~ 130	0.04 ~ 0.05
M10	90 ~ 130	0.05 ~ 0.06
M12	90 ~ 130	0.06 ~ 0.07
M16	90 ~ 130	0.06 ~ 0.07

## 4IMTM Cutting Condition

피삭재 Material	티타늄 Titanium Alloys	
TAP	V/C	FZ
M0.8 ~ M1	20 ~ 80	0.005 ~ 0.01
M1 ~ M2	20 ~ 80	0.005 ~ 0.01
M 2.5	20 ~ 80	0.01 ~ 0.02

- 가급적 열박음 척을 추천합니다.
- 공구 진입시 이송 f (mm/tooth)를 나사 가공 이송 대비 30% 수준으로 낮춰 주십시오.
- 상기 절삭조건은 참고 수치이므로, 실 가공시 가공 형상, 가공 목적, 적용 기계에 따라 조건변경 요망 합니다.
- 절삭시 내·외부 급유형 콜러트 사용을 추천 합니다.
- Using shrink-fit chuck is recommended.
- When the tool approaches the work material, reduce the feed by 30%.
- Use this table for your reference. Adjust the parameters depending on your machining geometry, machining purpose and CNC.
- Internal and external coolants are recommended for milling.

# 엔드밀 재연삭가격 안내

## 초경 Ball & Radius 엔드밀

• 부등분할: X1.5 • C작업시: X0.9

날 경		6이하	10이하	12이하	16이하	20이하	25이하
무코팅	2 날	6,100	6,600	7,700	9,900	13,200	16,500
	3, 4, 6 날	8,300	9,400	11,000	12,100	16,500	22,000
TiSiN 코팅	2 날	8,300	9,500	10,900	13,400	19,100	20,900
	3, 4, 6 날	10,300	12,500	13,400	15,200	23,800	26,400

## 초경 엔드밀 절단 & 밀날

• 부등분할: X1.1 • 리핑시: X1.1

날 경		6이하	10이하	12이하	16이하	20이하	25이하
무코팅	2 날	4,200	4,800	6,400	8,500	10,700	13,900
	3, 4, 6 날	5,300	5,900	7,500	10,700	12,300	17,100
TiSiN 코팅	2 날	4,800	5,200	7,100	10,100	12,400	15,200
	3, 4, 6 날	5,800	6,300	8,500	12,400	13,800	18,200

## 초경 다이아 절단 & 밀날

날 경		6이하	10이하	12이하	16이하	20이하	25이하
2 날		9,500	10,750	14,500	19,250	24,250	31,500
3, 4, 6 날		12,000	13,250	17,000	24,250	27,750	38,750

## 초경 Taper 엔드밀 외경연삭

• 30도 미만 제작수리: X2  
• 30도 이상 제작수리: X1.5

생크경 (∅)	6이하	8이하	10이하	12이하	16이하	20이하	25이하	32이하
2° 미만	10,900	12,100	13,400	14,600	18,200	24,200	30,300	36,300
2° 이상	10,900	12,100	14,600	17,000	21,800	29,100	33,900	38,800
30° 이상	7,300	8,500	9,700	10,900	13,400	18,200	23,000	30,300

## HSS Taper 엔드밀

• Long: X1.5 • 제작수리: X2 • 역: X2

생크경 (∅)	16이하	20이하	25이하	32이하	35이하
2° 미만	8,500	9,700	10,900	14,600	18,200
2° 이상	9,700	12,100	14,600	18,200	21,800
30° 이상	7,300	8,500	9,700	12,100	14,600

## 초경 엔드밀 외경연삭

• Long: X1.2 • EX. Long: X1.5

날 경	6이하	12이하	16이하	20이하	25이하	30이하
2 날	4,900	6,100	8,500	12,100	18,200	25,500
4 날	6,100	7,300	9,700	14,600	21,800	30,300

• 공수리(혹연삭): X1.5

## HSS 엔드밀 외경연삭

• Long: X1.5 • EX. Long: X2

날 경	20이하	30이하	40이하	50이하
2 날	3,700	4,900	8,500	14,600
4 날	4,900	6,100	9,700	18,200

• 공수리(혹연삭): X1.5

## 초경 High Helix 엔드밀 외경연삭

• Long: X1.2 • EX. Long: X1.5

날 경	6이하	12이하	16이하	20이하	25이하	32이하
4 날	11,000	13,200	16,500	19,800	30,800	36,300
6 날	12,100	14,600	18,200	21,800	33,900	40,000

• 공수리(혹연삭): X1.5

## HSS Roughing 엔드밀

• Long: X1.5 • EX. Long: X2

날 경	20이하	30이하	40이하	50이하
-	4,900	6,100	8,500	10,900

## 날붙이(BG) 초경 엔드밀 외경연삭

• Long: X1.5 • EX. Long: X2

날 경	20이하	30이하	40이하	50이하
2 날	6,100	9,700	12,100	18,200
4 날	7,300	10,900	14,600	24,200

• 공수리(혹연삭): X1.5

## HITACHI Ball & Radius 인서트

R x D	R6x12,13	R8x16,17	R10x20,21	R12.5x25,26	R15x30
무코팅	6,600	7,700	8,800	9,900	13,200
TiAlN 코팅	11,000	13,200	14,300	15,400	18,700

## 초경 엔드밀 TiSiN 코팅 가격

• Long: X1.5 (전장 150L 이상)

날 경	6이하	8이하	10이하	12이하	16이하	20이하	25이하	32이하
-	2,100	2,600	3,500	4,700	8,800	10,500	15,200	21,100

## 초경 엔드밀 JJ 코팅 가격

• Long: X1.5 (전장 150L 이상)

날 경	6이하	8이하	10이하	12이하	16이하	20이하	25이하	32이하
-	2,500	3,100	4,200	5,600	10,500	12,700	18,300	25,400