DOFEED
TUNGALOY

STANDARD CUTTING CONDITIONS TXN03 / EXN03 / HXN03

ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth: *fz* (mm/t) Tool dia.: DCX (mm) ø16 ~ ø22	ø25 ~ ø50	Plunging	ø16, CICT = 2 *n*	*Vf*	ø18, CICT = 2 *n*	*Vf*	ø20 *n*	*Vf* CICT = 3	CICT = 4
P	Carbon steels (S45C / C45, S55C / C55, etc.)	- 300HB	First choice	AH3225	MJ	100 - 300	0.5 -1.2	0.5 - 1.5	0.1	3,980	6,370	3,540	5,660	3,180	7,630	10,180
										Vc = 200 m/min, *fz* = 0.8 mm/t						
	Alloy steels (SCM440 / 42CrMo4, etc.)	- 300HB	First choice	AH3225	MJ	100 - 300	0.5 -1.2	0.5 - 1.5	0.1	3,980	6,370	3,540	5,660	3,180	7,630	10,180
										Vc = 200 m/min, *fz* = 0.8 mm/t						
	Prehardened steels (NAK80, PX5, etc.)	30 - 40HRC	First choice	AH3225	MJ	100 - 200	0.5 - 1.0	0.5 - 1.0	0.1	2,980	4,170	2,650	3,710	2,390	5,020	6,690
										Vc = 150 m/min, *fz* = 0.7 mm/t						
		30 - 40HRC	for wear resistance	AH8015	MJ	100 - 200	0.5 - 1.0	0.5 - 1.0	0.1	2,980	4,170	2,650	3,710	2,390	5,020	6,690
										Vc = 150 m/min, *fz* = 0.7 mm/t						
M	Austenitic stainless steels (SUS304 / X5CrNi18-9, etc.)	- 200HB	First choice	AH130	MS	80 - 150	0.3 - 0.8	0.3 - 0.8	0.1	2,390	2,390	2,120	2,120	1,910	2,860	3,820
										Vc = 120 m/min, *fz* = 0.5 mm/t						
	Precipitation hardening stainless steels (SUS630 / X5CrNiCuNb16-4)	28HRC - (H1150)	First choice	AH130	MS	80 - 150	0.2 - 0.5	0.2 - 0.5	0.1	2,390	1,430	2,120	1,270	1,910	1,720	2,290
			for wear resistance	AH3225	MS					*Vc* = 120 m/min, *fz* = 0.3 mm/t						
		40HRC - (H900)	First choice	AH3035	ML	80 - 120	0.1 - 0.3	0.1 - 0.3	0.1	1,990	800	1,770	710	1,590	950	1,270
			for impact resistance	AH3035	MJ					*Vc* = 100 m/min, *fz* = 0.2 mm/t						
K	Gray cast irons (FC250 / GG25 / 250, etc.)	150 - 250HB	First choice	AH725	MJ	100 - 300	0.5 - 1.2	0.5 - 1.5	0.1	3,980	6,370	3,540	5,660	3,180	7,630	10,180
										Vc = 200 m/min, *fz* = 0.8 mm/t						
	Ductile cast irons (FCD400, etc.)	150 - 250HB	First choice	AH725	MJ	80 - 200	0.5 - 1.2	0.5 - 1.5	0.1	2,980	4,770	2,650	4,240	2,390	5,740	7,650
										Vc = 150 m/min, *fz* = 0.8 mm/t						
S	Titanium alloy (Ti-6Al-4V, etc.)	- 40HRC	First choice	AH130	ML	30 - 60	0.3 - 0.7	0.3 - 0.7	0.08	800	640	710	570	640	770	1,020
			for impact resistance	AH130	MJ					*Vc* = 40 m/min, *fz* = 0.4 mm/t						
	Heat-resistance alloy (Inconel, Hasteroy, etc.)	- 40HRC	First choice	AH8015	ML	20 - 50	0.1 - 0.3	0.1 - 0.3	0.05	600	240	530	210	480	290	380
			for impact resistance	AH725	ML					*Vc* = 30 m/min, *fz* = 0.2 mm/t						
H	Hot mold steel (SKD61 / X40CrMoV5-1, etc.)	40 - 55HRC	First choice	AH8015	MH	80 - 150	0.1 - 0.5	0.1 - 0.5	0.05	2,390	1,430	2,120	1,270	1,910	1,720	2,290
			Low resistance	AH8015	MJ		0.1 - 0.3	0.1 - 0.3		*Vc* = 120 m/min, *fz* = 0.3 mm/t						
	Hot mold steel of D.T.C materials (DAC**, DH**, DIEVER, etc)	40 - 55HRC	First choice	AH8015	MJ	50-100	0.1 - 0.3	0.1 - 0.3	0.05	1,590	640	1,420	570	1,270	760	1,020
			for impact resistance	AH8015	MH		0.1 - 0.5	0.1 - 0.5		*Vc* = 80 m/min, *fz* = 0.2mm/t						
	Cold mold steels (SKD11 / X153CrMoV12, etc.)	55 - 60HRC	First choice	AH8005	MH	50 - 70	0.05 - 0.2	0.03 - 0.1	0.03	1,190	290	1,060	250	950	340	450
										Vc = 60 m/min, *fz* = 0.12 mm/t						
		55 - 60HRC	for impact resistance	AH8015	MH	50 - 70	0.03 - 0.1	0.05 - 0.2	0.03	1,190	150	1,060	130	950	170	230
										Vc = 60 m/min, *fz* = 0.06 mm/t						

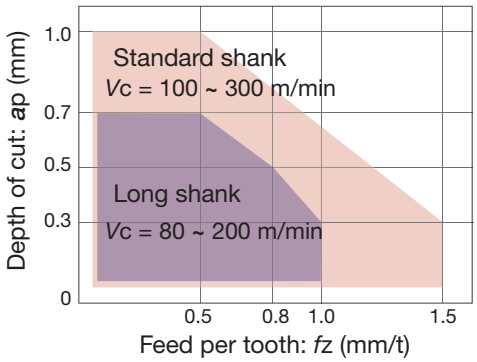
- When chips stay in the cutting zone during slotting or pocketing, use air blast to remove chips from the work area.

- Tool overhang length must be as short as possible to avoid chatter. When the tool overhang length is long, decrease the number of revolutions and feed.

Cautionary points in use

The use of a standard or long shank

When using a long shank, please lower the cutting conditions (Vc, fz, ap) to 70% of the maximum conditions for the standard shank.

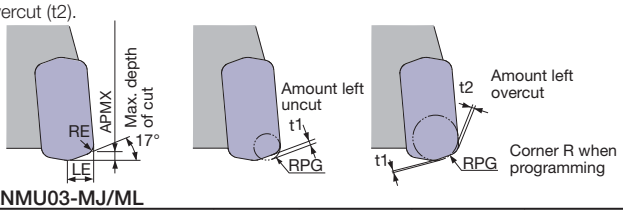


Tool dia.: DCX = ø16 ~ 35 mm
Workpeice: S55C / C55 (200HB)

L/D ratio of overhang
Standard shank: L/D ≤ 3
Long shank: L/D = 4

Tool geometry on programming

When programming for CAM, the tool should be considered as a radius cutter. Usually, the corner radius should be set as R = 1.5 mm. If a larger radius is used, overcutting will occur. The following table shows the amount left uncut (t1) and overcut (t2).



LNMU03-MJ/ML

Max. depth of cut APMX (mm)	Corner radius RE (mm)	LE (mm)	Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.0	1.2	3.0	1.0	0.6	-
1.0	1.2	3.0	1.5	0.5	-
1.0	1.2	3.0	2.0	0.25	0.08
1.0	1.2	3.0	2.5	0.14	0.26

LNGU03-MH

Max. depth of cut APMX (mm)	Corner radius RE (mm)	LE (mm)	Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.0	1.2	3.0	1.0	0.45	-
1.0	1.2	3.0	1.5	0.35	-
1.0	1.2	3.0	2.0	0.2	0.1
1.0	1.2	3.0	2.5	0.08	0.29

Each value in table is calculated theoretically at the maximum condition.

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STANDARD CUTTING CONDITIONS TXN06 / EXN06

ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed Vc (m/min)	Feed per tooth: fz (mm/t) Tool dia.: DCX (mm) ø32 ~ ø200	Plunging	ø32, CICT = 2 n	ø32, CICT = 2 Vf	ø35, CICT = 2 n	ø35, CICT = 2 Vf	ø40, CICT = 3 n	ø40, CICT = 3 Vf
P	Carbon steels (S45C / C45, S55C / C55, etc.)	- 300HB	First choice	AH3225	MJ	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
									Vc = 200 m/min, fz = 1.0 mm/t					
	Alloy steels (SCM440 / 42CrMo4, etc.)	- 300HB	First choice	AH3225	MJ	100 - 200	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
									Vc = 200 m/min, fz = 1.0 mm/t					
	Prehardened steels (NAK80, PX5, etc.)	30 - 40HRC	First choice	AH3225	MJ	100 - 200	0.5 - 1.2	0.15	1,490	2,380	1,360	2,180	1,190	2,860
									Vc = 150 m/min, fz = 0.8 mm/t					
		30 - 40HRC	for wear resistance	AH8015	MJ	100 - 200	0.5 - 1.5	0.15	1,490	2,980	1,360	2,720	1,190	3,570
									Vc = 150 m/min, fz = 1.0 mm/t					
M	Stainless steels (SUS304 / X5CrNi18-9, etc.)	- 200HB	First choice	AH130	ML	80 - 150	0.3 - 0.8	0.1	1,190	1,430	1,090	1,310	950	1,710
									Vc = 120 m/min, fz = 0.6 mm/t					
	Precipitation hardening stainless steels (SUS630 / X5CrNiCuNb16-4)	28HRC - (H1150)	First choice	AH130	MS	80 - 150	0.2 - 0.5	0.1	1,190	710	1,090	650	960	860
			for wear resistance	AH3225	MS				Vc = 120 m/min, fz = 0.3 mm/t					
		40HRC - (H900)	First choice	AH3035	ML	80 - 120	0.1 - 0.3	0.1	1,000	400	910	360	800	480
			for impact resistance	AH3035	MJ				Vc = 100 m/min, fz = 0.2 mm/t					
K	Gray cast irons (FC250 / GG25 / 250, etc.)	150 - 250HB	First choice	AH120	MJ	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
									Vc = 200 m/min, fz = 1.0 mm/t					
		150 - 250HB	First choice	AH120	MJ	80 - 200	0.5 - 1.5	0.15	1,490	2,980	1,360	2,720	1,190	3,570
									Vc = 150 m/min, fz = 1.0 mm/t					
S	Titanium alloy (Ti-6Al-4V, etc.)	- 40HRC	First choice	AH130	ML	30 - 60	0.3 - 0.7	0.08	400	400	360	360	320	480
			for impact resistance	AH130	MJ				Vc = 40 m/min, fz = 0.5 mm/t					
	Heat-resistance alloy (Inconel, Hasteroy, etc.)	- 40HRC	First choice	AH8015	ML	20 - 50	0.1 - 0.3	0.05	300	120	270	110	240	140
			for impact resistance	AH725	ML				Vc = 30 m/min, fz = 0.2 mm/t					
H	Hot mold steel (SKD61 / X40CrMoV5-1, etc.)	40 - 55HRC	First choice	AH8015	MH	80 - 150	0.1 - 0.5	0.05	1,190	710	1,090	650	950	850
			Low resistance	AH8015	MJ		0.1 - 0.3		Vc = 120 m/min, fz = 0.3mm/t					
	Hot mold steel of D.T.C materials (DAC**, DH**, DIEVER, etc)	40 - 55HRC	First choice	AH8015	MJ	50-100	0.1 - 0.3	0.05	800	320	730	290	640	380
			for impact resistance	AH8015	MH		0.1 - 0.5		Vc = 80 m/min, fz = 0.2mm/t					
	Cold mold steels (SKD11 / X153CrMoV12, etc.)	55 - 60HRC	First choice	AH8005	MH	50 - 70	0.05 - 0.3	0.03	600	120	550	110	480	140
									Vc = 60 m/min, fz = 0.1 mm/t					
		55 - 60HRC	for impact resistance	AH8015	MH	50 - 70	0.05 - 0.3	0.03	600	60	550	55	480	70
									Vc = 60 m/min, fz = 0.05 mm/t					

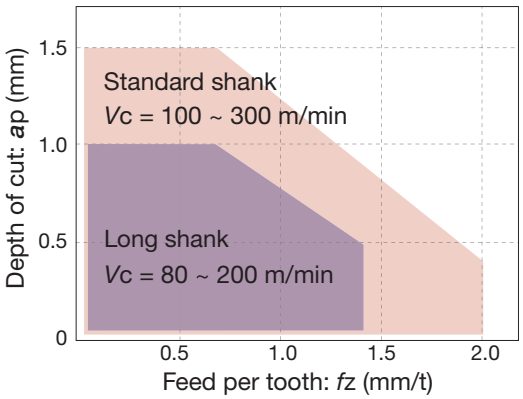
· The above table shows the conditions for standard shank type cutters. When using long shank type cutters, the number of teeth may be different. In this case, the cutting conditions should be changed by referring to: "The usage of standard and long shanks" shown in previous page.

· Cutting conditions are generally limited by the rigidity and power of the machine and the rigidity of the workpiece. When setting the conditions, start from half of the values of the standard cutting conditions and then increase the value gradually while making sure the machine is running normally.

Cautionary points in use

The use of a standard or long shank

When using a long shank, please lower the cutting conditions (Vc, fz, ap) to 70% of the maximum conditions for the standard shank.

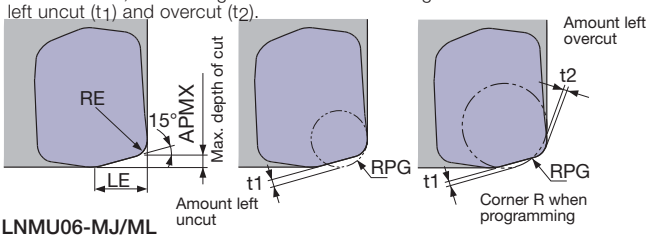


Tool dia.: øDc = ø32 ~ 40 mm
Workpiece: S55C / C55 (200HB)

L/D ratio of overhang
Standard shank: L/D ≤ 3
Long shank: L/D = 4

Tool geometry on programming

When programming for CAM, the tool should be considered as a radius cutter. Usually, the corner radius should be set as R = 3.0 mm. If a larger radius is used, overcutting will occur. The following table shows the amount left uncut (t_1) and overcut (t_2).



LNMU06-MJ/ML

Max. depth of cut APMX (mm)	Corner radius RE (mm)	LE (mm)	Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.5	2.0	6.0	2.0	1.0	-
			3.0	0.77	-
			4.0	0.54	0.26

LNGU06-MH

Max. depth of cut APMX (mm)	Corner radius RE (mm)	LE (mm)	Corner R when programming: RPG	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.5	2.0	6.0	2.0	0.9	-
			3.0	0.66	-
			4.0	0.41	0.26

Each value in table is calculated theoretically at the maximum condition.