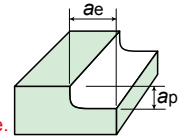


Recommended Cutting Conditions (Inch)



※Red indicates primary recommended insert grade.

Work material	Insert Grade		Cutting Conditions	φ.375			φ.5			φ.75			φ1		
	SG-SW (helical cutting edge inserts)	General Edge Shape		Semi Finishing		Finishing	Semi Finishing		Finishing	Semi Finishing		Finishing	Semi Finishing		Finishing
				General purpose	High-speed		General purpose	High-speed		General purpose	High-speed		General purpose	High-speed	
Carbon steel Alloy steel (30HRC or less)	※PN215 TH308	ATH08M (PCA12M)	n (min ⁻¹)	5,348	10,028	10,028	4,011	7,521	7,521	2,550	5,014	5,014	2,006	3,820	3,820
			SFM	525	984	984	525	984	984	525	984	984	525	984	984
			IPM	84.2	118.4	118.4	63.2	88.8	88.8	52.6	79.0	79.0	39.5	59.2	59.2
			IPT	.0079	.0059	.0059	.0079	.0059	.0059	.0098	.0079	.0079	.0098	.0079	.0079
			ap (inch)	.0098	.0098	.0039	.0118	.0118	.0039	.0394	.0394	.0079	.0492	.0492	.0079
			ae (inch)	.0394	.0197	.0079	.0472	.0236	.0079	.0787	.0787	.0079	.0984	.0492	.0079
Carbon steel Alloy steel (30~45HRC)	TH308 PN215	ATH08M (PCA12M)	n (min ⁻¹)	3,820	9,359	9,359	3,008	7,020	7,020	2,006	4,680	4,680	1,530	3,510	3,510
			SFM	397	918	918	397	918	918	397	918	918	397	918	918
			IPM	63.2	110.5	110.5	47.4	82.9	82.9	39.5	73.7	73.7	29.6	55.3	55.3
			IPT	.0079	.0059	.0059	.0079	.0059	.0059	.0098	.0079	.0079	.0098	.0079	.0079
			ap (inch)	.0098	.0098	.0039	.0118	.0118	.0039	.0394	.0394	.0079	.0492	.0492	.0079
			ae (inch)	.0394	.0197	.0079	.0472	.0236	.0079	.0787	.0787	.0079	.0984	.0492	.0079
Cast Iron	TH308 PN215	ATH08M (PCA12M)	n (min ⁻¹)	5,090	12,100	12,100	4,011	10,080	10,080	2,674	6,351	6,351	2,006	4,763	4,763
			SFM	525	1,246	1,246	525	1,246	1,246	525	1,246	1,246	525	1,246	1,246
			IPM	126.3	200.0	200.0	94.8	150.0	150.0	73.7	150.0	150.0	55.3	112.5	112.5
			IPT	.0118	.0079	.0079	.0118	.0079	.0079	.0138	.0118	.0118	.0138	.0118	.0118
			ap (inch)	.0098	.0079	.0039	.0098	.0079	.0039	.0394	.0394	.0079	.0492	.049	.0079
			ae (inch)	.0394	.0154	.0079	.0472	.0236	.0079	.0787	.787	.0079	.0984	.0984	.0079
Graphite	TH308		n (min ⁻¹)	10,028	13,371	13,371	7,521	10,028	10,028	5,014	6,685	6,685	3,760	5,012	5,012
			SFM	984	1,312	1,312	984	1,312	1,312	984	1,312	1,312	984	1,312	1,312
			IPM	157.9	315.8	210.6	118.4	236.9	157.9	98.7	157.9	131.6	73.7	118.3	98.2
			IPT	.0079	.0118	.0079	.0079	.0118	.0079	.0098	.0118	.0098	.0098	.0118	.0098
			ap (inch)	.0197	.0118	.0079	.0236	.0157	.0079	.0394	.0276	.0079	.0492	.0492	.0079
			ae (inch)	.0394	.0315	.0098	.0472	.0354	.0118	.0787	.0591	.0157	.0984	.0984	.0157
Cast aluminum alloy AC4A, ADC12 etc	PN215		n (min ⁻¹)	10,028	15,920	15,920	7,521	13,270	13,270	5,014	7,960	7,960	3,760	6,265	6,265
			SFM	984	1,640	1,640	984	1,640	1,640	984	1,640	1,640	984	1,640	1,640
			IPM	157.9	526.4	263.2	118.4	394.8	197.4	98.7	263.2	131.6	73.7	147.8	122.8
			IPT	.0079	.0157	.0079	.0079	.0157	.0079	.0098	.0157	.0098	.0098	.0157	.0098
			ap (inch)	.0197	.0118	.0079	.0236	.0157	.0079	.0394	.0276	.0079	.0492	.0492	.0079
			ae (inch)	.0394	.0315	.0098	.0472	.0354	.0118	.0787	.0591	.0157	.0984	.0984	.0157
Hardened Steel 45~55HRC	TH308 PN215	ATH08M (PCA12M)	n (min ⁻¹)	3,343	9,359	9,359	2,507	7,020	7,020	1,590	4,680	4,680	1,254	3,510	3,510
			SFM	328	918	918	328	918	918	328	918	918	328	918	918
			IPM	26.3	36.8	36.8	19.7	27.6	27.6	15.8	22.1	22.1	11.8	16.6	16.6
			IPT	.0039	.002	.002	.0039	.002	.002	.0047	.0024	.0024	.0047	.0024	.0024
			ap (inch)	.0098	.0098	.0039	.0118	.0118	.0039	.0394	.0394	.0787	.0492	.0492	.0079
			ae (inch)	.0394	.0098	.0078	.0472	.0118	.0078	.0787	.0394	.0079	.0984	.0492	.0079
Hardened Steel 55~62HRC	TH308	ATH08M	n (min ⁻¹)	2,674	7,354	7,354	2,006	5,515	5,515	1,337	3,677	3,677	1,003	2,758	2,758
			SFM	262	721	721	262	721	721	262	721	721	262	721	721
			IPM	21.1	29.0	29.0	15.8	21.7	21.7	12.6	17.4	17.4	9.5	13.0	13.0
			IPT	.0039	.002	.002	.0039	.002	.002	.0047	.0024	.0024	.0047	.0024	.0024
			ap (inch)	.0098	.0098	.0039	.0118	.0118	.0039	.0394	.0394	.0787	.0492	.0492	.0079
			ae (inch)	.0394	.0098	.0078	.0472	.0118	.0078	.0787	.0394	.0079	.0984	.0492	.0079
Maximum fz (inch/t)				<0.0197			<0.0197			<0.0236			<0.0236		
Maximum ap (inch)				<0.118			<0.1575			<0.236			<0.236		

[Note]

- Use the appropriate coolant for the work material and machining shape.
- These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
- Be sure to practice safety instructions and precautions such as wearing glasses and safety shoes, and placing safety covers when you use this tool. Because this tool can be broken during machining so failure to follow these instructions may cause personal injury.
- Never attempt to modify the carbide shank holder. Use the value for the depth of cut (ap) when the carbide shank holder is used.

Mill diameters $Dc \leq .5$ " : $ap \leq .008$ ". Mill diameters $Dc \geq .75$ " : $ap \leq 0.012$ ".

※with overhang of more than 3Dc, please modify parameter using the chart below

Overhang ratio	SFM	IPM
<3DC	100%	100%
3DC~5DC	70%	70%
5DC~8DC	60%	60%
8DC~10DC	50%	50%

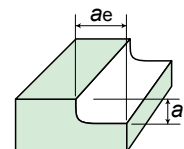
Recommended Cutting Conditions (Metric)

※Red indicates primary recommended insert grade.

Work material	Insert Grade		Cutting Conditions	φ6			φ8			φ10			φ12		
	SG·SW (helical cutting edge inserts)	General edge shape		Semi Finishing		Finishing	Semi Finishing		Finishing	Semi Finishing		Finishing	Semi Finishing		Finishing
				General purpose	High-speed		General purpose	High-speed		General purpose	High-speed		General purpose	High-speed	
Carbon steel Alloy steel (30HRC or less)	※ PN215 TH308	PTH08M (PCA12M)	n (min ⁻¹)	8,490	16,450	16,450	6,370	11,940	11,940	5,090	9,550	9,550	4,240	7,960	7,960
			V_c (m/min)	160	310	310	160	300	300	160	300	300	160	300	300
			V_f (mm/min)	1,700	2,300	2,300	2,550	3,580	3,580	2,040	2,870	2,870	1,700	2,390	2,390
			f_z (mm/t)	0.1	0.07	0.07	0.2	0.15	0.15	0.2	0.15	0.15	0.2	0.15	0.15
			a_p (mm)	0.1	0.1	0.05	0.2	0.2	0.1	0.25	0.25	0.1	0.3	0.3	0.1
			a_e (mm)	0.6	0.3	0.2	0.8	0.4	0.2	1	0.5	0.2	1.2	0.6	0.2
Carbon steel Alloy steel (30~45HRC)	TH308 PN215	PTH08M (PCA12M)	n (min ⁻¹)	6,370	14,850	14,850	4,770	11,150	11,150	3,820	8,920	8,920	3,180	7,430	7,430
			V_c (m/min)	120	280	280	120	280	280	120	280	280	120	280	280
			V_f (mm/min)	1,270	2,080	2,080	1,910	3,350	3,350	1,530	2,680	2,680	1,270	2,230	2,230
			f_z (mm/t)	0.1	0.07	0.07	0.2	0.15	0.15	0.2	0.15	0.15	0.2	0.15	0.15
			a_p (mm)	0.1	0.1	0.05	0.2	0.2	0.1	0.25	0.25	0.1	0.3	0.3	0.1
			a_e (mm)	0.6	0.3	0.2	0.8	0.4	0.2	1	0.5	0.2	1.2	0.6	0.2
Cast Iron	TH308 PN215	PTH08M (PCA12M)	n (min ⁻¹)	8,490	20,160	20,160	6,370	15,120	15,120	5,090	12,100	12,100	4,240	10,080	10,080
			V_c (m/min)	160	380	380	160	380	380	160	380	380	160	380	380
			V_f (mm/min)	2,550	4,030	4,030	3,820	6,050	6,050	3,050	4,840	4,840	2,550	4,030	4,030
			f_z (mm/t)	0.15	0.1	0.1	0.3	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.2
			a_p (mm)	0.1	0.1	0.05	0.2	0.2	0.1	0.25	0.2	0.1	0.3	0.3	0.1
			a_e (mm)	0.6	0.3	0.2	0.8	0.4	0.2	1	0.4	0.2	1.2	0.6	0.2
Graphite	TH308	HD7010	n (min ⁻¹)	15,920	21,220	21,220	11,940	15,920	15,920	9,550	12,740	12,740	7,960	10,620	10,620
			V_c (m/min)	300	400	400	300	400	400	300	400	400	300	400	400
			V_f (mm/min)	3,180	6,370	4,240	4,780	9,550	6,370	3,820	7,640	5,100	3,190	6,370	4,240
			f_z (mm/t)	0.1	0.15	0.1	0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.3	0.2
			a_p (mm)	0.3	0.15	0.15	0.4	0.2	0.2	0.5	0.3	0.2	0.6	0.4	0.2
			a_e (mm)	0.6	0.6	0.2	0.8	0.8	0.25	1.0	0.8	0.25	1.2	0.9	0.3
Cast aluminum alloy AC4A, ADC12 etc	PN215	HD7010	n (min ⁻¹)	15,920	26,530	26,530	11,940	19,900	19,900	9,550	15,920	15,920	7,960	13,270	13,270
			V_c (m/min)	300	500	500	300	500	500	300	500	500	300	500	500
			V_f (mm/min)	3,180	10,610	5,310	4,780	15,920	7,960	3,820	12,740	6,370	3,190	10,620	5,310
			f_z (mm/t)	0.1	0.2	0.1	0.2	0.4	0.2	0.2	0.4	0.2	0.2	0.4	0.2
			a_p (mm)	0.3	0.15	0.15	0.4	0.2	0.2	0.5	0.3	0.2	0.6	0.4	0.2
			a_e (mm)	0.6	0.6	0.2	0.8	0.8	0.25	1.0	0.8	0.25	1.2	0.9	0.3
Hardened Steel 45~55HRC	TH308 PN215	PTH08M (PCA12M)	n (min ⁻¹)	5,310	14,850	14,850	3,980	11,150	11,150	3,180	8,920	8,920	2,650	7,430	7,430
			V_c (m/min)	100	280	280	100	280	280	100	280	280	100	280	280
			V_f (mm/min)	850	1,190	1,190	800	1,120	1,120	640	890	890	530	740	740
			f_z (mm/t)	0.08	0.04	0.04	0.1	0.05	0.05	0.1	0.05	0.05	0.1	0.05	0.05
			a_p (mm)	0.1	0.1	0.05	0.2	0.2	0.1	0.25	0.25	0.1	0.3	0.3	0.1
			a_e (mm)	0.6	0.2	0.2	0.8	0.2	0.2	1	0.25	0.2	1.2	0.3	0.2
Hardened Steel 55~62HRC	TH308	PTH08M	n (min ⁻¹)	4,240	11,670	11,670	3,180	8,760	8,760	2,550	7,000	7,000	2,120	5,840	5,840
			V_c (m/min)	80	220	220	80	220	220	80	220	220	80	220	220
			V_f (mm/min)	680	930	930	640	880	880	510	700	700	420	580	580
			f_z (mm/t)	0.08	0.04	0.04	0.1	0.05	0.05	0.1	0.05	0.05	0.1	0.05	0.05
			a_p (mm)	0.1	0.1	0.05	0.2	0.2	0.1	0.25	0.25	0.1	0.3	0.3	0.1
			a_e (mm)	0.6	0.2	0.2	0.8	0.2	0.2	1	0.25	0.2	1.2	0.3	0.2
Maximum f_z (mm/t)				<0.2			<0.5			<0.5			<0.5		
Maximum a_p (mm)				<0.6			<2.5			<3.0			<4.0		

[Note]

1. Use the appropriate coolant for the work material and machining shape.
2. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
3. Be sure to practice safety instructions and precautions such as wearing glasses and safety shoes, and placing safety covers when you use this tool. Because this tool can be broken during machining so failure to follow these instructions may cause personal injury.
4. Never attempt to modify the carbide shank holder. Use the value for the depth of cut (a_p) when the carbide shank holder is used.
Mill diameters $D_c \leq 12\text{mm}$: $a_p \leq 0.2\text{mm}$. Mill diameters $D_c \geq 16\text{mm}$: $a_p \leq 0.3\text{mm}$.



※Red indicates primary recommended insert grade.

Work material	Insert Grade		Cutting Conditions	φ16			φ20			φ25			φ30			φ32		
	SG·SW (helical cutting edge inserts)	General edge shape		Semi Finishing		Finishing	Semi Finishing		Finishing	Semi Finishing		Finishing	Semi Finishing		Finishing	Semi Finishing		Finishing
				General purpose	High-speed		General purpose	High-speed		General purpose	High-speed		General purpose	High-speed		General purpose	High-speed	
Carbon steel Alloy steel (30HRC or less)	※ PN215 TH308	PTH08M (PCA12M)	n (min ⁻¹)	3,190	5,970	5,970	2,550	4,780	4,780	2,040	3,820	3,820	1,700	3,180	3,180	1,590	2,990	2,990
			V_c (m/min)	160	300	300	160	300	300	160	300	300	160	300	300	160	300	300
			V_f (mm/min)	1,600	2,390	2,390	1,280	1,910	1,910	1,020	1,530	1,530	850	1,270	1,270	800	1,200	1,200
			f_z (mm/t)	0.25	0.2	0.2	0.25	0.2	0.2	0.25	0.2	0.2	0.25	0.2	0.2	0.25	0.2	0.2
			a_p (mm)	0.8	0.8	0.2	1	1	0.2	1.25	1.25	0.2	1.6	1.6	0.2	1.6	1.6	0.2
			a_e (mm)	1.6	1.6	0.2	2	2	0.2	2.5	2.5	0.2	3.2	3.2	0.2	3.2	3.2	0.2
Carbon steel Alloy steel (30~45HRC)	TH308 PN215	PTH08M (PCA12M)	n (min ⁻¹)	2,390	5,570	5,570	1,910	4,460	4,460	1,530	3,570	3,570	1,270	2,970	2,970	1,190	2,790	2,790
			V_c (m/min)	120	280	280	120	280	280	120	280	280	120	280	280	120	280	280
			V_f (mm/min)	1,200	2,230	2,230	960	1,780	1,780	760	1,430	1,430	640	1,190	1,190	600	1,120	1,120
			f_z (mm/t)	0.25	0.2	0.2	0.25	0.2	0.2	0.25	0.2	0.2	0.25	0.2	0.2	0.25	0.2	0.2
			a_p (mm)	0.8	0.8	0.2	1	1	0.2	1.25	1.25	0.2	1.6	1.6	0.2	1.6	1.6	0.2
			a_e (mm)	1.6	1.6	0.2	2	2	0.2	2.5	2.5	0.2	3.2	3.2	0.2	3.2	3.2	0.2
Cast Iron	TH308 PN215	PTH08M (PCA12M)	n (min ⁻¹)	3,190	7,560	7,560	2,550	6,050	6,050	2,040	4,840	4,840	1,700	4,030	4,030	1,590	3,780	3,780
			V_c (m/min)	160	380	380	160	380	380	160	380	380	160	380	380	160	380	380
			V_f (mm/min)	2,240	4,540	4,540	1,790	3,630	3,630	1,430	2,900	2,900	1,190	2,420	2,420	1,110	2,270	2,270
			f_z (mm/t)	0.35	0.3	0.3	0.35	0.3	0.3	0.35	0.3	0.3	0.35	0.3	0.3	0.35	0.3	0.3
			a_p (mm)	0.8	0.8	0.2	1	1	0.2	1.25	1.25	0.2	1.6	1.6	0.2	1.6	1.6	0.2
			a_e (mm)	1.6	1.6	0.2	2	2	0.2	2.5	2.5	0.2	3.2	3.2	0.2	3.2	3.2	0.2
Graphite	TH308	HD7010	n (min ⁻¹)	5,970	7,960	7,960	4,780	6,370	6,370	3,830	5,100	5,100	3,190	4,250	4,250	3,190	4,250	4,250
			V_c (m/min)	300	400	400	300	400	400	300	400	400	300	400	400	300	400	400
			V_f (mm/min)	2,990	4,780	3,980	2,390	3,820	3,190	1,920	3,060	2,550	1,600	2,550	2,130	1,600	2,550	2,130
			f_z (mm/t)	0.25	0.3	0.25	0.25	0.3	0.25	0.25	0.3	0.25	0.25	0.3	0.25	0.25	0.3	0.25
			a_p (mm)	0.8	0.6	0.2	1	0.7	0.2	1.25	1.25	0.2	1.6	1.6	0.2	1.6	1.6	0.2
			a_e (mm)	1.6	1.1	0.3	2	1.5	0.4	2.5	2.5	0.4	3.2	3.2	0.4	3.2	3.2	0.4
Cast aluminum alloy AC4A, ADC12 etc	PN215	HD7010	n (min ⁻¹)	5,970	9,950	9,950	4,780	7,960	7,960	3,830	6,370	6,370	3,190	5,310	5,310	3,190	5,310	5,310
			V_c (m/min)	300	500	500	300	500	500	300	500	500	300	500	500	300	500	500
			V_f (mm/min)	2,990	7,960	4,980	2,390	6,370	3,980	1,920	5,100	3,190	1,600	4,250	2,660	1,600	4,250	2,660
			f_z (mm/t)	0.25	0.4	0.25	0.25	0.4	0.25	0.25	0.4	0.25	0.25	0.4	0.25	0.25	0.4	0.25
			a_p (mm)	0.8	0.6	0.2	1	0.7	0.2	1.25	1.25	0.2	1.6	1.6	0.2	1.6	1.6	0.2
			a_e (mm)	1.6	1.1	0.3	2	1.5	0.4	2.5	2.5	0.4	3.2	3.2	0.4	3.2	3.2	0.4
Hardened Steel 45~55HRC	TH308 PN215	PTH08M (PCA12M)	n (min ⁻¹)	1,990	5,570	5,570	1,590	4,460	4,460	1,270	3,570	3,570	1,060	2,970	2,970	1,000	2,790	2,790
			V_c (m/min)	100	280	280	100	280	280	100	280	280	100	280	280	100	280	280
			V_f (mm/min)	480	670	670	380	530	530	310	430	430	250	360	360	240	330	330
			f_z (mm/t)	0.12	0.06	0.06	0.12	0.06	0.06	0.12	0.06	0.06	0.12	0.06	0.06	0.12	0.06	0.06
			a_p (mm)	0.8	0.8	0.2	1	1	0.2	1.25	1.25	0.2	1.6	1.6	0.2	1.6	1.6	0.2
			a_e (mm)	1.6	0.8	0.2	2	1	0.2	2.5	1.25	0.2	3.2	1.6	0.2	3.2	1.6	0.2
Hardened Steel 55~62HRC	TH308	PTH08M	n (min ⁻¹)	1,590	4,380	4,380	1,270	3,500	3,500	1,020	2,800	2,800	850	2,330	2,330	800	2,190	2,190
			V_c (m/min)	80	220	220	80	220	220	80	220	220	80	220	220	80	220	220
			V_f (mm/min)	380	530	530	300	420	420	240	340	340	200	280	280	190	260	260
			f_z (mm/t)	0.12	0.06	0.06	0.12	0.06	0.06	0.12	0.06	0.06	0.12	0.06	0.06	0.12	0.06	0.06
			a_p (mm)	0.8	0.8	0.2	1	1	0.2	1.25	1.25	0.2	1.6	1.6	0.2	1.6	1.6	0.2
			a_e (mm)	1.6	0.8	0.2	2	1	0.2	2.5	1.25	0.2	3.2	1.6	0.2	3.2	1.6	0.2
Maximum f_z (mm/t)				<0.6			<0.6			<0.6			<0.6			<0.6		
Maximum a_p (mm)				<5.0			<6.0			<8.0			<10.0			<10.0		

※with overhang of more than 3Dc, please modify parameter using the chart below

Overhang ratio	V_c (m/min)	V_f (mm/min)
<3DC	100%	100%
3DC~5DC	70%	70%
5DC~8DC	60%	60%
8DC~10DC	50%	50%