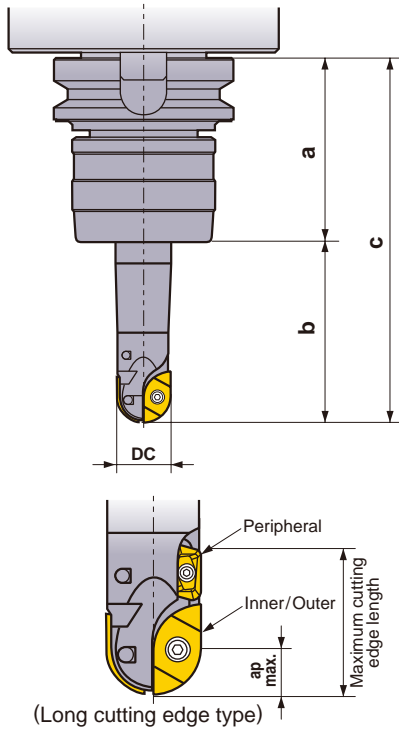


## RECOMMENDED CUTTING CONDITIONS



### Tool Overhang

Recommended cutting conditions on this literature are chosen based on deflection, vibration and machined surface when using a CAT50 arbor. Conditions-"a" is the length from a gage line to the arbor end face, and "b" is the neck length (tool overhang from the arbor).

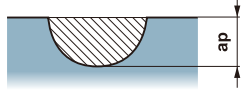
(Inch)				
Cutting Diameter : DC	Type	a	b	c
.625"	Short	4	1.5	5.5
	Medium		2.5	6.5
	Long		3.5	7.5
.750"	Short		1.5	5.5
	Medium		2.5	6.5
	Long		3.5	7.5
1.000"	Short		2.0	6.0
	Medium		3.0	7.0
	Long		4.0	8.0
1.250"	Short		2.0	6.0
	Medium		3.5	7.5
	Long		5.0	9.0

### Recommended Depth of Cut for Long Cutting Edge Type

The maximum cutting edge length of the long cutting edge type with a peripheral insert is 1.4-1.5DC. The peripheral insert is for light machining only.

## SLOT MILLING

Cutting Mode



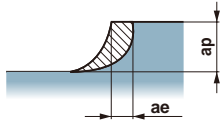
N : Spindle Speed (RPM)  
F : Table Feed (IPM)

Work Material	Hardness	Cutting Speed (SFM)	Grade	Type	φ.625"			φ.750"			φ1.000"			φ1.250"			
					RPM	IPM	ap	RPM	IPM	ap	RPM	IPM	ap	RPM	IPM	ap	
P Carbon Steel Alloy Steel	180-280HB	525	MP6120 VP15TF	Short	3183	15	.236	2546	12	.315	2037	19	.492	1698	16	.591	
		395		Medium	3183	15	.236	2546	12	.315	2037	19	.492	1698	16	.591	
		655		Long	3183	15	.157	2546	12	.157	2037	19	.236	1698	16	.295	
	280-350HB	460	MP6120 VP15TF	Short	2785	13	.236	2228	11	.315	1783	17	.492	1485	14	.591	
		395		Medium	2785	13	.236	2228	11	.315	1783	17	.492	1485	14	.591	
		525		Long	2785	13	.157	2228	11	.157	1783	17	.236	1485	14	.295	
	Pre-Hardened Steel	35-45HRC	395	MP6120 VP15TF	Short	2387	11	.236	1910	9	.315	1528	14	.492	1273	12	.472
			330		Medium	2387	11	.236	1910	9	.315	1528	14	.492	1273	12	.472
			525		Long	2387	11	.157	1910	9	.157	1528	14	.236	1273	12	.177
Alloy Tool Steel	≤350HB	460	MP6120 VP15TF	Short	2785	13	.236	2228	11	.315	1783	21	.394	1485	23	.295	
		395		Medium	2785	13	.236	2228	11	.315	1783	21	.394	1485	23	.295	
		525		Long	2785	13	.157	2228	11	.157	1783	21	.197	1485	23	.177	
M Stainless Steel	≤270HB	655	VP15TF	Short	3979	19	.157	3183	15	.197	2546	30	.236	2122	33	.591	
		330		Medium	3979	19	.157	3183	15	.197	2546	30	.236	2122	33	.591	
		820		Long	3979	19	.118	3183	15	.118	2546	24	.157	2122	25	.177	
K Gray Cast Iron	≤350MPa	655	VP15TF	Short	3979	31	.236	3183	25	.315	2546	40	.492	2122	33	.591	
		490		Medium	3979	31	.236	3183	25	.315	2546	40	.492	2122	33	.591	
		985		Long	3979	31	.157	3183	25	.157	2546	40	.295	2122	33	.177	
Ductile Cast Iron	≤500MPa	590	VP15TF	Short	3581	28	.236	2865	23	.315	2292	36	.492	1910	30	.591	
		490		Medium	3581	28	.236	2865	23	.315	2292	36	.492	1910	30	.591	
		785		Long	3581	28	.157	2865	23	.157	2292	36	.295	1910	30	.177	
	≤800MPa	525	VP15TF	Short	3183	25	.236	2546	20	.315	2037	32	.492	1698	27	.591	
		490		Medium	3183	25	.236	2546	20	.315	2037	32	.492	1698	27	.591	
		820		Long	3183	25	.157	2546	20	.157	2037	32	.295	1698	27	.177	
S Titanium Alloy	≤350HB	165	MP9120	Short	995	4	.157	796	3	.157	637	3	.236	531	2	.295	
		100		Medium	995	4	.157	796	3	.157	637	3	.236	531	2	.295	
		195		Long	995	4	.079	796	3	.079	637	3	.157	531	2	.118	
Heat-resistant Alloy	-	165	MP9120	Short	995	4	.157	796	3	.157	637	3	.236	531	2	.295	
		100		Medium	995	4	.157	796	3	.157	637	3	.236	531	2	.295	
		195		Long	995	4	.079	796	3	.079	637	3	.157	531	2	.118	
H Heat Treated Steel	45-50HRC	330	VP15TF	Short	1989	9	.157	1591	8	.157	1273	10	.236	1061	8	.295	
		195		Medium	1989	9	.157	1591	8	.157	1273	10	.236	1061	8	.295	
		395		Long	1989	9	.079	1591	8	.079	1273	10	.157	1061	8	.118	
	50-60HRC	195	VP15TF	Short	1194	6	.157	955	5	.157	764	6	.236	637	5	.295	
		130		Medium	1194	6	.157	955	5	.157	764	6	.236	637	5	.295	
		330		Long	1194	6	.079	955	5	.079	764	6	.157	637	5	.118	

# RECOMMENDED CUTTING CONDITIONS

## SHOULDER MILLING (Cutting Depth : Small)

Cutting Mode

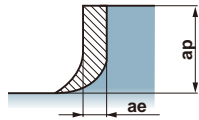


N : Spindle Speed (RPM)  
F : Table Feed (IPM)

Work Material	Hardness	Cutting Speed (SFM)	Grade	Type	φ.625"				φ.750"				φ1.000"				φ1.250"				
					RPM	IPM	ap	ae	RPM	IPM	ap	ae	RPM	IPM	ap	ae	RPM	IPM	ap	ae	
P Carbon Steel Alloy Steel	180-280HB	655	MP6120 VP15TF	Short	3979	31	.157	.236	3183	38	.197	.315	2546	50	.236	.394	2122	50	.295	.394	
		525		Medium	3979	31	.157	.236	3183	38	.197	.315	2546	50	.236	.394	2122	50	.295	.394	
		820		Long	3979	25	.157	.157	3183	25	.197	.236	2546	50	.236	.295	2122	50	.295	.295	
	280-350HB	525	MP6120 VP15TF	Short	3183	20	.157	.236	2546	20	.197	.315	2037	32	.236	.394	1698	33	.295	.394	
		395		Medium	3183	20	.157	.236	2546	20	.197	.315	2037	32	.236	.394	1698	33	.295	.394	
		655		Long	3183	15	.157	.157	2546	16	.197	.236	2037	24	.236	.295	1698	20	.295	.295	
	Pre-Hardened Steel	35-45HRC	525	MP6120 VP15TF	Short	3183	20	.157	.236	2546	20	.197	.315	2037	32	.236	.394	1698	33	.295	.394
			395		Medium	3183	20	.157	.236	2546	20	.197	.315	2037	32	.236	.394	1698	33	.295	.394
			655		Long	3183	15	.157	.157	2546	16	.197	.236	2037	24	.236	.295	1698	27	.295	.295
Alloy Tool Steel	≤350HB	525	MP6120 VP15TF	Short	3183	20	.157	.236	2546	20	.197	.315	2037	32	.236	.394	1698	33	.295	.394	
		395		Medium	3183	20	.157	.236	2546	20	.197	.315	2037	32	.236	.394	1698	33	.295	.394	
		655		Long	3183	15	.157	.157	2546	16	.197	.236	2037	24	.236	.295	1698	20	.295	.295	
M Stainless Steel	≤270HB	655	VP15TF	Short	3979	19	.157	.236	3183	20	.197	.315	2546	30	.236	.394	2122	33	.295	.394	
		330		Medium	3979	19	.157	.236	3183	20	.197	.315	2546	30	.236	.394	2122	33	.295	.394	
		820		Long	3979	19	.157	.157	3183	15	.197	.236	2546	24	.236	.295	2122	33	.295	.295	
K Gray Cast Iron	≤350MPa	655	VP15TF	Short	3979	63	.157	.315	3183	63	.197	.394	2546	60	.236	.394	2122	58	.295	.394	
		490		Medium	3979	63	.157	.315	3183	63	.197	.394	2546	60	.236	.394	2122	58	.295	.394	
		985		Long	3979	47	.157	.236	3183	50	.197	.315	2546	60	.236	.394	2122	58	.295	.236	
	Ductile Cast Iron	≤500MPa	655	VP15TF	Short	3979	63	.157	.315	3183	63	.197	.394	2546	60	.236	.394	2122	50	.295	.394
			490		Medium	3979	63	.157	.315	3183	63	.197	.394	2546	60	.236	.394	2122	50	.295	.394
			920		Long	3979	47	.157	.236	3183	50	.197	.315	2546	60	.236	.394	2122	50	.295	.236
	≤800MPa	590	VP15TF	Short	3581	56	.157	.315	2865	56	.197	.394	2292	54	.236	.394	1910	45	.295	.394	
		490		Medium	3581	56	.157	.315	2865	56	.197	.394	2292	54	.236	.394	1910	45	.295	.394	
		820		Long	3581	42	.157	.236	2865	45	.197	.315	2292	54	.236	.394	1910	45	.295	.236	
S Titanium Alloy	≤350HB	165	MP9120	Short	995	12	.157	.157	796	9	.157	.197	637	8	.236	.236	531	6	.295	.118	
		100		Medium	995	12	.157	.157	796	9	.157	.197	637	8	.236	.236	531	6	.295	.118	
		195		Long	995	12	.079	.079	796	9	.079	.118	637	8	.157	.157	531	6	.118	.059	
Heat-resistant Alloy	-	165	MP9120	Short	995	12	.157	.157	796	9	.157	.197	637	8	.236	.236	531	6	.295	.118	
		100		Medium	995	12	.157	.157	796	9	.157	.197	637	8	.236	.236	531	6	.295	.118	
		195		Long	995	12	.079	.079	796	9	.079	.118	637	8	.157	.157	531	6	.118	.059	
H Heat Treated Steel	45-50HRC	330	VP15TF	Short	1989	9	.157	.157	1591	8	.197	.197	1273	10	.236	.295	1061	8	.295	.118	
		195		Medium	1989	9	.157	.157	1591	8	.197	.197	1273	10	.236	.295	1061	8	.295	.118	
		395		Long	1989	9	.157	.079	1591	8	.197	.118	1273	10	.236	.157	1061	8	.295	.059	
	50-60HRC	195	VP15TF	Short	1194	6	.157	.157	955	5	.197	.197	764	6	.236	.295	637	5	.295	.118	
		130		Medium	1194	6	.157	.157	955	5	.197	.197	764	6	.236	.295	637	5	.295	.118	
		330		Long	1194	6	.157	.079	955	5	.197	.118	764	6	.236	.157	637	5	.295	.059	

## SHOULDER MILLING (Cutting Depth : Large)

Cutting Mode



N : Spindle Speed (RPM)  
F : Table Feed (IPM)

### \*Machining Stainless Steels

Down cutting (Climb milling) is preferred.

Work Material	Hardness	Cutting Speed (SFM)	Grade	Type	φ .625"				φ .750"				φ 1.000"				φ 1.250"				
					RPM	IPM	ap	ae	RPM	IPM	ap	ae	RPM	IPM	ap	ae	RPM	IPM	ap	ae	
P Carbon Steel Alloy Steel	180-280HB	655	MP6120 VP15TF	Short	3979	25	.315	.157	3183	30	.394	.157	2546	50	.492	.197	2122	50	.591	.177	
		525		Medium	3979	25	.315	.157	3183	30	.394	.157	2546	50	.492	.197	2122	50	.591	.177	
		820		Long	3979	19	.315	.118	3183	20	.394	.118	2546	40	.492	.157	2122	33	.591	.118	
	280-350HB	525	MP6120 VP15TF	Short	3183	15	.315	.157	2546	20	.394	.157	2037	32	.492	.197	1698	33	.591	.177	
		395		Medium	3183	15	.315	.157	2546	20	.394	.157	2037	32	.492	.197	1698	33	.591	.177	
		655		Long	3183	15	.315	.118	2546	12	.394	.118	2037	24	.492	.157	1698	20	.591	.118	
	Pre-Hardened Steel	35-45HRC	525	MP6120 VP15TF	Short	3183	15	.315	.157	2546	20	.394	.157	2037	32	.492	.197	1698	33	.591	.177
			395		Medium	3183	15	.315	.157	2546	20	.394	.157	2037	32	.492	.197	1698	33	.591	.177
			655		Long	3183	15	.315	.118	2546	12	.394	.118	2037	24	.492	.157	1698	20	.591	.118
Alloy Tool Steel	≤350HB	525	MP6120 VP15TF	Short	3183	15	.315	.157	2546	20	.394	.157	2037	32	.492	.197	1698	33	.591	.177	
		395		Medium	3183	15	.315	.157	2546	20	.394	.157	2037	32	.492	.197	1698	33	.591	.177	
		655		Long	3183	15	.315	.118	2546	12	.394	.118	2037	24	.492	.098	1698	20	.591	.118	
M Stainless Steel	≤270HB	655	VP15TF	Short	3979	19	.315	.157	3183	20	.394	.157	2546	30	.492	.394	2122	33	.591	.394	
		330		Medium	3979	19	.315	.157	3183	20	.394	.157	2546	30	.492	.394	2122	33	.591	.394	
		820		Long	3979	19	.315	.118	3183	15	.394	.118	2546	24	.492	.157	2122	20	.591	.177	
K Gray Cast Iron	≤350MPa	655	VP15TF	Short	3979	47	.315	.315	3183	50	.394	.315	2546	50	.492	.394	2122	58	.591	.394	
		490		Medium	3979	47	.315	.315	3183	50	.394	.315	2546	50	.492	.394	2122	58	.591	.394	
		985		Long	3979	38	.315	.197	3183	38	.394	.157	2546	50	.492	.295	2122	42	.591	.177	
	Ductile Cast Iron	≤500MPa	655	VP15TF	Short	3979	47	.315	.315	3183	50	.394	.315	2546	50	.492	.394	2122	50	.591	.394
			490		Medium	3979	47	.315	.315	3183	50	.394	.315	2546	50	.492	.394	2122	50	.591	.394
			920		Long	3979	38	.315	.197	3183	38	.394	.157	2546	50	.492	.295	2122	33	.591	.177
≤800MPa	590	VP15TF	Short	3581	42	.315	.315	2865	45	.394	.315	2292	45	.492	.394	1910	45	.591	.394		
	490		Medium	3581	42	.315	.315	2865	45	.394	.315	2292	45	.492	.394	1910	45	.591	.394		
	820		Long	3581	34	.315	.197	2865	34	.394	.157	2292	45	.492	.295	1910	30	.591	.177		
S Titanium Alloy	≤350HB	165	MP9120	Short	995	8	.157	.079	796	6	.157	.118	637	5	.236	.157	531	4	.295	.118	
		100		Medium	995	8	.157	.079	796	6	.157	.118	637	5	.236	.157	531	4	.295	.118	
		195		Long	995	8	.079	.039	796	6	.079	.079	637	5	.157	.059	531	4	.118	.059	
	Heat-resistant Alloy	—	165	MP9120	Short	995	8	.157	.079	796	6	.157	.118	637	5	.236	.157	531	4	.295	.118
			100		Medium	995	8	.157	.079	796	6	.157	.118	637	5	.236	.157	531	4	.295	.118
			195		Long	995	8	.079	.039	796	6	.079	.079	637	5	.157	.059	531	4	.118	.059
H Heat Treated Steel	45-50HRC	330	VP15TF	Short	1989	9	.315	.079	1591	8	.394	.118	1273	10	.492	.157	1061	8	.591	.118	
		195		Medium	1989	9	.315	.079	1591	8	.394	.118	1273	10	.492	.157	1061	8	.591	.118	
		395		Long	1989	9	.315	.039	1591	8	.394	.079	1273	8	.492	.059	1061	4	.591	.059	
	50-60HRC	195	VP15TF	Short	1194	6	.315	.079	955	5	.394	.118	764	6	.492	.157	637	5	.591	.118	
		130		Medium	1194	6	.315	.079	955	5	.394	.118	764	6	.492	.157	637	5	.591	.118	
		330		Long	1194	6	.315	.039	955	5	.394	.079	764	5	.492	.059	637	3	.591	.059	