

VQ END MILLS

VQSVR **NEW**

Roughing end mill, Short cut length, 4 flute, Irregular helix flutes

CARBIDE

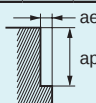
RECOMMENDED CUTTING CONDITIONS

Shoulder milling

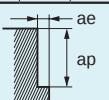
When machine and work material rigidity and chip discharge properties are sufficient, please select the high efficiency cutting conditions.

When machine rigidity, work material rigidity or chip discharge properties are insufficient, please select general-purpose cutting conditions.

High efficiency cutting conditions

Work material	Carbon steel, Alloy steel, Mild steel					Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel					Austenitic, Ferritic and Martensitic stainless steels, Titanium alloys					Hardened stainless steels, Cobalt chromium alloy					Copper, Copper alloy					
	Ck45, 41CrMo4, St44-2, Ck10					NAK, X36CrMo17, 40CrNiMoA, X210Cr12, SKT					X5CrNi189, X8CrNiMo173, Ti6Al4V					X5CrNiCuNb16-4, X7CrNiAl17-7										
Dia. (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Hole Depth ae (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Hole Depth ae (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Hole Depth ae (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Hole Depth ae (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Hole Depth ae (mm)	
3	150	16000	960	4.5	1.5	120	13000	640	4.5	1.5	100	11000	450	4.5	1.5	75	8000	330	4.5	0.9	180	19000	1100	4.5	1.5	
4	150	12000	960	6	2	120	9500	640	6	2	100	8000	430	6	2	75	6000	330	6	1.2	180	14000	1100	6	2	
5	150	9500	960	7.5	2.5	120	7600	640	7.5	2.5	100	6400	440	7.5	2.5	75	4800	330	7.5	1.5	180	11000	1100	7.5	2.5	
6	150	8000	960	9	3	120	6400	680	9	3	100	5300	480	9	3	75	4000	360	9	1.8	180	9500	1100	9	3	
7	150	6800	950	10.5	3.5	120	5500	730	10.5	3.5	100	4500	500	10.5	3.5	75	3400	380	10.5	2.1	180	8200	1100	10.5	3.5	
8	150	6000	1100	12	4	120	4800	760	12	4	100	4000	570	12	4	75	3000	430	12	2.4	180	7200	1300	12	4	
9	150	5300	1100	13.5	4.5	120	4200	760	13.5	4.5	100	3500	560	13.5	4.5	75	2700	430	13.5	2.7	180	6400	1300	13.5	4.5	
10	150	4800	1100	15	5	120	3800	760	15	5	100	3200	570	15	5	75	2400	430	15	3	180	5700	1200	15	5	
12	150	4000	960	18	6	120	3200	700	18	6	100	2700	540	18	6	75	2000	400	18	3.6	180	4800	1200	18	6	
14	150	3400	880	21	7	120	2700	650	21	7	100	2300	510	21	7	75	1700	370	21	4.2	180	4100	1100	21	7	
16	150	3000	840	24	8	120	2400	620	24	8	100	2000	500	24	8	75	1500	380	24	4.8	180	3600	1000	24	8	
18	150	2700	810	27	9	120	2100	590	27	9	100	1800	500	27	9	75	1300	360	27	5.4	180	3200	960	27	9	
20	150	2400	760	30	10	120	1900	560	30	10	100	1600	510	30	10	75	1200	380	30	6	180	2900	920	30	10	
Depth of cut																										

General purpose cutting conditions

Work material	Carbon steel, Alloy steel, Mild steel					Pre-hardened steel, Carbon steel, Alloy steel, Alloy tool steel					Austenitic, Ferritic and Martensitic stainless steels, Titanium alloys					Hardened stainless steels, Cobalt chromium alloy					Copper, Copper alloy					
	Ck45, 41CrMo4, St44-2, Ck10					NAK, X36CrMo17, 40CrNiMoA, X210Cr12, SKT					X5CrNi189, X8CrNiMo173, Ti6Al4V					X5CrNiCuNb16-4, X7CrNiAl17-7										
Dia. (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Hole Depth ae (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Hole Depth ae (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Hole Depth ae (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Hole Depth ae (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Hole Depth ae (mm)	
3	120	13000	620	4.5	1.5	100	11000	430	4.5	1.5	80	8500	280	4.5	1.5	70	7400	240	4.5	0.9	140	15000	720	4.5	1.5	
4	120	9500	610	6	2	100	8000	430	6	2	80	6400	280	6	2	70	5600	240	6	1.2	140	11000	700	6	2	
5	120	7600	610	7.5	2.5	100	6400	430	7.5	2.5	80	5100	280	7.5	2.5	70	4500	250	7.5	1.5	140	8900	720	7.5	2.5	
6	120	6400	610	9	3	100	5300	450	9	3	80	4200	300	9	3	70	3700	270	9	1.8	140	7400	710	9	3	
7	120	5500	620	10.5	3.5	100	4500	480	10.5	3.5	80	3600	320	10.5	3.5	70	3200	290	10.5	2.1	140	6400	720	10.5	3.5	
8	120	4800	670	12	4	100	4000	510	12	4	80	3200	360	12	4	70	2800	320	12	2.4	140	5600	780	12	4	
9	120	4200	670	13.5	4.5	100	3500	500	13.5	4.5	80	2800	360	13.5	4.5	70	2500	320	13.5	2.7	140	5000	800	13.5	4.5	
10	120	3800	670	15	5	100	3200	510	15	5	80	2500	360	15	5	70	2200	310	15	3	140	4500	790	15	5	
12	120	3200	610	18	6	100	2700	470	18	6	80	2100	340	18	6	70	1900	300	18	3.6	140	3700	710	18	6	
14	120	2700	560	21	7	100	2300	440	21	7	80	1800	320	21	7	70	1600	280	21	4.2	140	3200	670	21	7	
16	120	2400	540	24	8	100	2000	410	24	8	80	1600	320	24	8	70	1400	280	24	4.8	140	2800	630	24	8	
18	120	2100	500	27	9	100	1800	400	27	9	80	1400	310	27	9	70	1200	270	27	5.4	140	2500	600	27	9	
20	120	1900	480	30	10	100	1600	380	30	10	80	1300	330	30	10	70	1100	280	30	6	140	2200	560	30	10	
Depth of cut																										

1) VQ coating has less electrical conductivity; therefore an external contact type (electrically transmitted) tool setter may not work.

When measuring the tool length, please use an internal contact type (non-electrical type) tool setter or a laser type tool setter.

2) Effective cutting of stainless steel, titanium alloys and heat-resistant alloys etc. can be achieved with the use of emulsion coolant.

3) Chattering can still occur if the machine rigidity and clamping method are insufficient.

In these cases the feed and speed should be reduced proportionately.

4) When the depth of cut is smaller than shown the revolution and feed rate can be increased.