

VQ END MILLS

VQMHZV

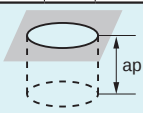
End mill, Medium cut length, 3 flute for plunging and slotting

CARBIDE

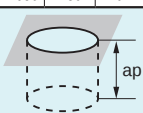
Plunging

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, 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)	Step (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Step (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Step (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Step (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Step (mm)
1	65	20000	160	0.5	0.1	50	16000	100	0.5	0.1	50	16000	50	0.5	0.05	30	9500	30	0.5	0.05	75	24000	190	0.5	0.1
1.5	85	18000	270	0.7	0.3	61	13000	120	0.7	0.3	61	13000	80	0.7	0.1	35	7400	40	0.7	0.1	99	21000	320	0.7	0.3
2	100	16000	480	2	0.5	69	11000	200	2	0.4	60	9500	90	1	0.1	40	6400	60	1	0.1	119	19000	570	2	0.5
3	100	11000	660	3	1	70	7400	270	3	0.6	60	6400	100	1.5	0.2	40	4200	60	1.5	0.2	123	13000	780	3	0.9
4	100	8000	800	4	2	70	5600	340	4	0.8	60	4800	100	2	0.4	40	3200	60	2	0.4	119	9500	950	4	2
5	100	6400	960	5	2.5	71	4500	410	5	1	60	3800	100	2.5	0.5	39	2500	60	2.5	0.5	119	7600	1100	5	2.5
6	100	5300	950	6	3	70	3700	440	6	1.2	60	3200	100	3	0.6	40	2100	60	3	0.6	121	6400	1200	6	3
8	100	4000	720	8	4	70	2800	340	8	1.6	60	2400	70	4	0.6	40	1600	50	4	0.6	121	4800	860	8	4
10	100	3200	580	10	5	69	2200	260	10	2.5	60	1900	60	5	0.6	41	1300	40	5	0.6	119	3800	680	10	5
12	100	2700	490	12	5	72	1900	230	12	3	60	1600	50	6	0.6	41	1100	30	6	0.6	121	3200	580	12	5
16	100	2000	360	16	5	70	1400	170	16	4	60	1200	40	8	0.6	40	800	20	8	0.6	121	2400	430	16	5
20	100	1600	290	20	5	69	1100	130	20	5	60	950	30	10	0.6	40	640	20	10	0.6	119	1900	340	20	5
Depth of cut																									

General purpose cutting conditions

Work material	Carbon steel, Alloy steel, Mild steel					Pre-hardened 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)	Step (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Step (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Step (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Step (mm)	Cutting speed (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Hole Depth ap (mm)	Step (mm)
1	65	20000	160	0.5	0.05	50	16000	100	0.5	0.05	50	16000	50	0.5	0.05	30	9500	30	0.5	0.05	75	24000	190	0.5	0.05
1.5	85	18000	270	0.7	0.1	60	13000	120	0.7	0.1	60	13000	80	0.7	0.05	35	7400	40	0.7	0.05	100	21000	320	0.7	0.1
2	100	16000	480	2	0.2	70	11000	200	2	0.2	60	9500	90	1	0.05	40	6400	60	1	0.05	120	19000	570	2	0.2
3	100	11000	660	3	0.3	70	7400	270	3	0.3	60	6400	100	1.5	0.1	40	4200	60	1.5	0.1	120	13000	780	3	0.3
4	100	8000	800	4	0.4	70	5600	340	4	0.4	60	4800	100	2	0.2	40	3200	60	2	0.2	120	9500	950	4	0.4
5	100	6400	960	5	0.5	70	4500	410	5	0.5	60	3800	100	2.5	0.2	40	2500	60	2.5	0.2	120	7600	1100	5	0.5
6	100	5300	950	6	0.6	70	3700	440	6	0.6	60	3200	100	3	0.3	40	2100	60	3	0.3	120	6400	1200	6	0.6
8	100	4000	720	8	0.7	70	2800	340	8	0.7	60	2400	70	4	0.3	40	1600	50	4	0.3	120	4800	860	8	0.7
10	100	3200	580	10	0.7	70	2200	260	10	0.7	60	1900	60	5	0.3	40	1300	40	5	0.3	120	3800	680	10	0.7
12	100	2700	490	12	0.7	70	1900	230	12	0.7	60	1600	50	6	0.3	40	1100	30	6	0.3	120	3200	580	12	0.7
16	100	2000	360	16	0.7	70	1400	170	16	0.7	60	1200	40	8	0.3	40	800	20	8	0.3	120	2400	430	16	0.7
20	100	1600	290	20	0.7	70	1100	130	20	0.7	60	950	30	10	0.3	40	640	20	10	0.3	120	1900	340	20	0.7
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.