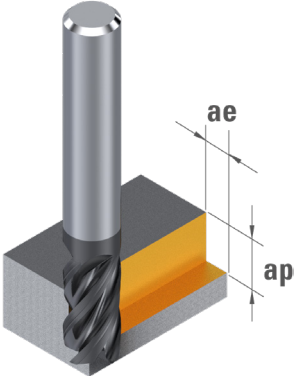


ROUTING

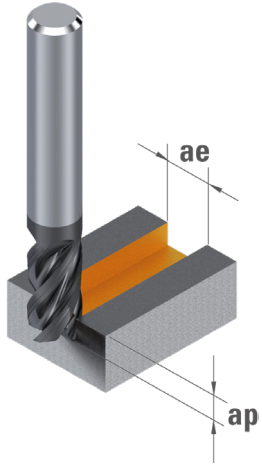
		VDI 3323		CARBIDE Vc [m/min]	C-TOP Vc [m/min]	ae (mm)	ap (mm)
P	Unalloyed steel, leaded steel	1 - 5			150	<0.40×ØD1	<1.50×ØD1
	Low alloyed steel < 800 N/mm2	6 - 9			125	<0.30×ØD1	<1.50×ØD1
	High-alloy steel > 800 N/mm2, stainless steel ferr.- marten.	10 - 13			85	<0.30×ØD1	<1.50×ØD1
M	Austenitic stainless steel < 700 N/mm2	14.1-14.2			95	<0.30×ØD1	<1.50×ØD1
	Nickel-free stainless steel / DUPLEX > 700 N/mm2	14.3-14.4			65	<0.25×ØD1	<1.50×ØD1
K	Grey cast iron < 250 HB	15 - 16		170	180	<0.40×ØD1	<1.50×ØD1
	Ductile, malleable, nodular cast iron > 250 HB	17 - 20		105	130	<0.30×ØD1	<1.50×ØD1
N	Wrought aluminium alloy < 12% Si	21 - 22		185		<0.40×ØD1	<1.50×ØD1
	Cast aluminium alloy >12% Si	23 - 25		145		<0.40×ØD1	<1.50×ØD1
	Copper alloy good machinability with Pb	26		110		<0.40×ØD1	<1.50×ØD1
	Copper alloy with difficult machinability	27 - 28		95		<0.40×ØD1	<1.50×ØD1
	Gold, silver	-		165		<0.40×ØD1	<1.50×ØD1
	Refractory alloy, Fe, Ni, Co base	31 - 35		30	40	<0.15×ØD1	<1.50×ØD1
S	Titanium, titanium alloy	36 - 37		60	70	<0.30×ØD1	<1.50×ØD1

$$n \text{ [rpm]} = \frac{V_c \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$V_f \text{ [mm/min]} = n \text{ [rpm]} \times f_z \text{ [mm]} \times Z$$

Feed per tooth							fz [mm]
Ø D ₁ 0.10 - 0.60	Ø D ₁ 0.70 - 1.00	Ø D ₁ 1.10 - 1.50	Ø D ₁ 1.60 - 2.50	Ø D ₁ 3.00 - 5.00	Ø D ₁ 6.00 - 8.00	Ø D ₁ 10.00 - 12.00	
0.0036 - 0.009	0.011 - 0.016	0.017 - 0.023	0.025 - 0.039	0.046 - 0.080	0.090 - 0.110	0.120 - 0.130	
0.0033 - 0.008	0.010 - 0.014	0.016 - 0.021	0.023 - 0.036	0.042 - 0.070	0.080 - 0.100	0.110 - 0.120	
0.0030 - 0.007	0.009 - 0.013	0.014 - 0.020	0.021 - 0.033	0.040 - 0.065	0.070 - 0.090	0.100 - 0.110	
0.0030 - 0.007	0.009 - 0.013	0.014 - 0.020	0.021 - 0.033	0.040 - 0.065	0.070 - 0.090	0.100 - 0.110	
0.0027 - 0.006	0.008 - 0.012	0.013 - 0.018	0.019 - 0.029	0.036 - 0.060	0.060 - 0.080	0.090 - 0.100	
0.0042 - 0.010	0.013 - 0.018	0.020 - 0.027	0.029 - 0.046	0.054 - 0.090	0.100 - 0.120	0.140 - 0.150	
0.0036 - 0.009	0.011 - 0.016	0.017 - 0.023	0.025 - 0.039	0.046 - 0.080	0.090 - 0.110	0.120 - 0.130	
0.0051 - 0.012	0.015 - 0.022	0.024 - 0.033	0.035 - 0.055	0.066 - 0.110	0.120 - 0.150	0.170 - 0.180	
0.0045 - 0.011	0.014 - 0.020	0.021 - 0.029	0.031 - 0.049	0.058 - 0.100	0.110 - 0.130	0.150 - 0.160	
0.0051 - 0.012	0.015 - 0.022	0.024 - 0.033	0.015 - 0.023	0.066 - 0.110	0.120 - 0.150	0.170 - 0.180	
0.0042 - 0.010	0.013 - 0.018	0.020 - 0.027	0.025 - 0.039	0.054 - 0.090	0.100 - 0.120	0.140 - 0.150	
0.0036 - 0.009	0.011 - 0.016	0.017 - 0.023	0.035 - 0.055	0.046 - 0.080	0.090 - 0.110	0.120 - 0.130	
0.0021 - 0.005	0.006 - 0.009	0.010 - 0.014	0.029 - 0.046	0.028 - 0.045	0.050 - 0.060	0.070 - 0.080	
0.0036 - 0.009	0.011 - 0.016	0.017 - 0.023	0.025 - 0.039	0.046 - 0.080	0.090 - 0.110	0.120 - 0.130	

SLOTTING

		VDI 3323		CARBIDE Vc [m/min]	C-TOP Vc [m/min]	ae (mm)	ap (mm)
P	Unalloyed steel, leaded steel	1 - 5			115	1×ØD1	<1.00×ØD1
	Low alloyed steel < 800 N/mm2	6 - 9			95	1×ØD1	<1.00×ØD1
	High-alloy steel > 800 N/mm2, stainless steel ferr.- marten.	10 - 13			65	1×ØD1	<1.00×ØD1
M	Austenitic stainless steel < 700 N/mm2	14.1-14.2			70	1×ØD1	<1.00×ØD1
	Nickel-free stainless steel / DUPLEX > 700 N/mm2	14.3-14.4			50	1×ØD1	<1.00×ØD1
K	Grey cast iron < 250 HB	15 - 16		100	135	1×ØD1	<1.00×ØD1
	Ductile, malleable, nodular cast iron > 250 HB	17 - 20		85	95	1×ØD1	<1.00×ØD1
N	Wrought aluminium alloy < 12% Si	21 - 22		140		1×ØD1	<1.25×ØD1
	Cast aluminium alloy >12% Si	23 - 25		105		1×ØD1	<1.00×ØD1
	Copper alloy good machinability with Pb	26		85		1×ØD1	<1.25×ØD1
	Copper alloy with difficult machinability	27 - 28		70		1×ØD1	<1.00×ØD1
	Gold, silver	-		125		1×ØD1	<1.00×ØD1
	Refractory alloy, Fe, Ni, Co base	31 - 35		25	30	1×ØD1	<0.20×ØD1
S	Titanium, titanium alloy	36 - 37		55	55	1×ØD1	<1.00×ØD1

Feed per tooth							fz [mm]
Ø D ₁ 0.10 - 0.60	Ø D ₁ 0.70 - 1.00	Ø D ₁ 1.10 - 1.50	Ø D ₁ 1.60 - 2.50	Ø D ₁ 3.00 - 5.00	Ø D ₁ 6.00 - 8.00	Ø D ₁ 10.00 - 12.00	
0.0022 - 0.005	0.007 - 0.010	0.010 - 0.014	0.015 - 0.023	0.028 - 0.050	0.050 - 0.070	0.070 - 0.080	
0.0020 - 0.005	0.006 - 0.009	0.009 - 0.013	0.014 - 0.021	0.026 - 0.040	0.050 - 0.060	0.070 - 0.070	
0.0018 - 0.004	0.005 - 0.008	0.009 - 0.012	0.012 - 0.020	0.024 - 0.040	0.040 - 0.050	0.060 - 0.070	
0.0018 - 0.004	0.005 - 0.008	0.009 - 0.012	0.012 - 0.020	0.024 - 0.040	0.040 - 0.050	0.060 - 0.070	
0.0016 - 0.004	0.005 - 0.007	0.008 - 0.011	0.011 - 0.018	0.022 - 0.035	0.040 - 0.050	0.050 - 0.060	
0.0025 - 0.006	0.008 - 0.011	0.012 - 0.016	0.017 - 0.027	0.032 - 0.055	0.060 - 0.070	0.080 - 0.090	
0.0022 - 0.005	0.007 - 0.009	0.010 - 0.014	0.015 - 0.023	0.028 - 0.050	0.050 - 0.070	0.070 - 0.080	
0.0031 - 0.007	0.009 - 0.013	0.014 - 0.020	0.021 - 0.033	0.040 - 0.065	0.070 - 0.090	0.100 - 0.110	
0.0027 - 0.007	0.008 - 0.012	0.013 - 0.017	0.019 - 0.029	0.035 - 0.060	0.070 - 0.080	0.090 - 0.100	
0.0031 - 0.007	0.009 - 0.013	0.015 - 0.020	0.021 - 0.033	0.040 - 0.065	0.070 - 0.090	0.100 - 0.110	
0.0025 - 0.006	0.008 - 0.011	0.012 - 0.016	0.017 - 0.027	0.032 - 0.055	0.060 - 0.070	0.080 - 0.090	
0.0022 - 0.005	0.007 - 0.009	0.010 - 0.014	0.015 - 0.023	0.028 - 0.050	0.050 - 0.070	0.070 - 0.080	
0.0013 - 0.003	0.004 - 0.005	0.006 - 0.008	0.009 - 0.014	0.016 - 0.025	0.030 - 0.040	0.040 - 0.050	
0.0022 - 0.005	0.007 - 0.009	0.010 - 0.014	0.015 - 0.023	0.028 - 0.050	0.050 - 0.070	0.070 - 0.080	



DRILLING

		VDI 3323		CARBIDE Vc [m/min]	C-TOP Vc [m/min]	Max Depth (mm)
P	Unalloyed steel, leaded steel	1 - 5			85	<1.25xØD1
	Low alloyed steel < 800 N/mm2	6 - 9			70	<1.00xØD1
	High-alloy steel > 800 N/mm2, stainless steel ferr.- marten.	10 - 13			50	<0.80xØD1
M	Austenitic stainless steel < 700 N/mm2	14.1-14.2			55	<0.40xØD1
	Nickel-free stainless steel / DUPLEX > 700 N/mm2	14.3-14.4			40	<0.20xØD1
K	Grey cast iron < 250 HB	15 - 16		75	100	<1.25xØD1
	Ductile, malleable, nodular cast iron > 250 HB	17 - 20		65	70	<1.00xØD1
N	Wrought aluminium alloy < 12% Si	21 - 22		105		<1.25xØD1
	Cast aluminium alloy >12% Si	23 - 25		80		<1.25xØD1
	Copper alloy good machinability with Pb	26		65		<1.25xØD1
	Copper alloy with difficult machinability	27 - 28		55		<1.00xØD1
	Gold, silver	-		95		<1.00xØD1
S	Refractory alloy, Fe, Ni, Co base	31 - 35		20	25	<0.20xØD1
	Titanium, titanium alloy	36 - 37		40	40	<0.60xØD1

$$n \text{ [rpm]} = \frac{Vc \text{ [m/min]} \times 1000}{\pi \times D_1 \text{ [mm]}}$$

$$Vf \text{ [mm/min]} = n \text{ [rpm]} \times fz \text{ [mm]} \times Z$$

Feed per tooth fz [mm]							
Ø D ₁ 0.10 - 0.60	Ø D ₁ 0.70 - 1.00	Ø D ₁ 1.10 - 1.50	Ø D ₁ 1.60 - 2.50	Ø D ₁ 3.00 - 5.00	Ø D ₁ 6.00 - 8.00	Ø D ₁ 10.00 - 12.00	
0.0014 - 0.003	0.007 - 0.010	0.010 - 0.014	0.015 - 0.023	0.028 - 0.050	0.050 - 0.070	0.070 - 0.080	
0.0013 - 0.003	0.006 - 0.009	0.009 - 0.013	0.014 - 0.021	0.026 - 0.040	0.050 - 0.060	0.070 - 0.070	
0.0012 - 0.003	0.005 - 0.008	0.009 - 0.012	0.012 - 0.020	0.024 - 0.040	0.040 - 0.050	0.060 - 0.070	
0.0012 - 0.003	0.005 - 0.008	0.009 - 0.012	0.012 - 0.020	0.024 - 0.040	0.040 - 0.050	0.060 - 0.070	
0.0010 - 0.003	0.005 - 0.007	0.008 - 0.011	0.011 - 0.018	0.022 - 0.035	0.040 - 0.050	0.050 - 0.060	
0.0016 - 0.004	0.008 - 0.011	0.012 - 0.016	0.017 - 0.027	0.032 - 0.055	0.060 - 0.070	0.080 - 0.090	
0.0014 - 0.003	0.007 - 0.009	0.010 - 0.014	0.015 - 0.023	0.028 - 0.050	0.050 - 0.070	0.070 - 0.080	
0.0020 - 0.005	0.009 - 0.013	0.014 - 0.020	0.021 - 0.033	0.040 - 0.065	0.070 - 0.090	0.100 - 0.110	
0.0018 - 0.005	0.008 - 0.012	0.013 - 0.017	0.019 - 0.029	0.035 - 0.060	0.070 - 0.080	0.090 - 0.100	
0.0020 - 0.005	0.009 - 0.013	0.015 - 0.020	0.021 - 0.033	0.040 - 0.065	0.070 - 0.090	0.100 - 0.110	
0.0016 - 0.004	0.008 - 0.011	0.012 - 0.016	0.017 - 0.027	0.032 - 0.055	0.060 - 0.070	0.080 - 0.090	
0.0014 - 0.003	0.007 - 0.009	0.010 - 0.014	0.015 - 0.023	0.028 - 0.050	0.050 - 0.070	0.070 - 0.080	
0.0008 - 0.002	0.004 - 0.005	0.006 - 0.008	0.009 - 0.014	0.016 - 0.025	0.030 - 0.040	0.040 - 0.050	
0.0014 - 0.003	0.007 - 0.009	0.010 - 0.014	0.015 - 0.023	0.028 - 0.050	0.050 - 0.070	0.070 - 0.080	

Values based on cutting oil use. The cutting parameters are very strongly influenced by external parameters, such as tool and workpiece stability, etc.
The cutting conditions must be adapted to the operating conditions !