Solid Carbide Corner Radius End Mill for high efficient machining

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Recommended Cutting Conditions 5 Types

Standard condition (Low revolution, High feed)	General purpose condition for low-speed use. Provides stable high efficiency cutting with the longest tool-life.
High speed condition (High revolution, High feed)	Condition for use with high-performance high-speed machines capable of high feed rates. Enables ultra-high-efficiency cutting by enabling higher feed rates due to higher rotation speed.
High depth of cut condition (Low revolution, High depth of cut)	Conditions for machines which are not capable of the feed rates of the standard condition, but which have sufficient rigidity. The reduced feed rate is compensated for by setting a large cutting depth, minimizing reductions in work efficiency.
Low load condition (Medium revolution, High feed)	Condition which reduces cutting load by reducing the per-flute feed rate. Since cutting resistance can be reduced, it enables use even on machines with low rigidity.
Finish condition (Condition for finish cutting)	High-accuracy finishing is possible (Tolerance on dia. is 0 to -0.015 mm and tolerance on R is +/- 0.015 mm)

Standard-Schnittwerte (Niedrige Umdrehungen, hoher Vorschub)	Schnittwerte für generelle Bearbeitungen bei niedrigen Geschwindigkeiten. Sie bieten Ihnen eine stabile effiziente Bearbeitung bei langer Werkzeuglebensdauer.
Hochgeschwindigkeits-Schnittwerte (Hohe Drehzahlen, Hoher Vorschub)	Schnittwerte für den Einsatz auf HSC-Bearbeitungszentren mit der Möglichkeit für hohe Vorschubraten. Ermöglicht erheblich effizientere Bearbeitungen durch höhere Vorschubwerte aufgrund der höheren Drehzahlen.
Schnittwerte für Bearbeitungen mit großen Eingriffstiefen (Geringe Drehzahlen, Hohe Eingriffstiefe)	Diese Schnittwerte eignen sich speziell für Bearbeitungszentren welche die Standard-Bedingungen nicht erreichen können, jedoch über eine ausreichende Stabilität verfügen. Die reduzierten Vorschubwerte werden hier durch eine hohe Eingriffstiefe kompensiert, wobei die Effizienz der Bearbeitung nur minimal eingeschränkt wird.
Schnittwerte für Maschinen mit geringer Antriebsleistung (Mittlere Drehzahlen, Hoher Vorschub)	Schnittwerte für verringerten Schnittdruck durch die Reduzierung des Vorschubs pro Zahn. Durch die Verringerung des Schnittwiderstandes, eignet sich der Epoch Turbo Mill auch für den Einsatz auf Maschinen mit geringer Stabilität
Schlicht-Bearbeitungen (Schnittwerte für die Schlicht-Bearbeitung)	Hochgenaues Schlichten ist möglich (Durchmesser-Toleranz: 0 bis -0,015 mm, Radius-Toleranz: +/- 0,015 mm)

Condizioni base (basso numero di giri, alto avanzamento)	Condizioni di lavoro generali per lavorazioni lente. Consente lavorazioni ad alto rendimento con lunga durata del tagliente
Condizioni per alta velocità (alto numero di giri, alto avanzamento)	Condizioni d'uso per alte prestazioni con macchine ad alta velocità e in grado di fresare con alti avanzamenti. Consenti di avere alti rendimenti di lavorazione incrementando l'avanzamento in funzione dell'aumento del numero di giri del mandrino.
Condizioni in caso di alta profondità di passata (basso numero di giri, alta profondità di taglio)	Condizioni per macchine che non sono in grado di avere alti avanzamenti in condizioni normali, ma che hanno sufficiente rigidità. La riduzione degli avanzamenti e compensate settando una maggiore profondità di passata, minimizzando la riduzione dell' efficienza di lavoro.
Basse condizioni di sforzo (numero di giri medio, alti avanzamenti)	Condizioni in cui si reduce lo sforzo di lavoro riducendo l'avanzamento al dente. Siccome la resistenza penetrante può essere ridotta, è possibile utilizzare queste condizioni anche su macchine con rigidità bassa
Condizioni di finitura (Condizioni per lavorazioni di finitura)	E' possible ottenere una super finitura (la tolleranza sul diametro è 0/-0,015 mm quella sul R è +/- 0,015 mm)

Condiciones de desbaste Condiciones estándar (Pocas revoluciones, Alto avance)	Condiciones generales para pocas revoluciones. Nos proporciona un mecanizado eficaz y estable con una inmejorable vida de herramienta.
Condiciones de alta velocidad (Altas revoluciones, Muy Alto Avance)	Condiciones para máquinas de alta velocidad capaces de trabajar a altos avances. Permite mecanizados increíblemente eficientes. El disponer de más revoluciones permite la utilización de avances aún mayores.
Condiciones de gran a_p (Pocas revoluciones, Gran pasada axial)	Condiciones para máquinas que no pueden trabajar en los niveles de avance que requieren las condiciones estándar pero si disponen de suficiente rigidez. El menor nivel de avance se compensa con una mayor pasada axial (Ap), minimizando la reducción de eficiencia.
Condiciones de bajo esfuerzo (Revoluciones medias, Alto avance)	Estas condiciones disminuyen el esfuerzo mediante la reducción del avance por diente. El poder reducir el esfuerzo, permite utilizar la herramienta en máquinas poco rígidas.
Condiciones de acabado (Condiciones de corte para acabado)	Permite acabados de alta precisión (La tolerancia diametral es de 0 a -0,015 mm y la tolerancia de radio es de +/- 0,015 mm)

Conditions standard (Faible rotation, Hautes avances)	Conditions d'usage général pour utilisation à basse vitesse. Permet un usinage stable très efficace avec la durée de vie la plus longue.
Conditions Haute vitesse (Hautes rotations, Hautes avances)	Conditions à utiliser avec des machines UGV hautes performances capables de hautes avances. Obtention de Ultra Hautes Efficacité rendue possible par de hautes avances dues à une vitesse de rotation plus importante.
Conditions pour usinages hautes profondeurs (Faible rotation, Haute profondeur de coupe)	Conditions pour des machines incapables d'atteindre les conditions d'avances des conditions standard, mais qui sont rigides. L'avance réduite est compensée par une grande profondeur de passe, minimisant ainsi les réductions d'efficacité de travail.
Conditions pour faible charge (Rotation moyenne, Hautes avances)	Conditions qui réduisent les efforts de coupe en réduisant l'avance par dent. Puisque les efforts de coupe sont réduits, on peut utiliser ces conditions sur des machines moins rigides.
Conditions de finition (Conditions pour usinage de finition)	Les finitions Hautes tolérances sont possibles (La tolérance sur le dia. est de 0 à -0,015 mm et la tolérance sur le R est de +/- 0,015 mm).

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How to find Cutting Conditions

Example: ① **Material** **HRC 50**
② **End Mill** **Ø10 R2**
③ **Overhang** **80 mm = 8 x Ø**

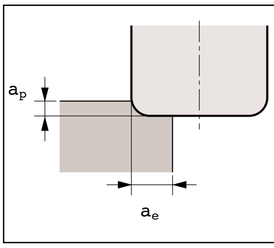
Material	Ratio to standard depth of cut	Cutting Condition	Ø2 CR 0.5	Ø3 CR 0.8	Ø4 CR 1	Ø5 CR 1.2	Ø6 CR 1.5	Ø8 CR 2	Ø10 CR 2	Ø12 CR 2
Cast Iron, Carbon Steels, Alloy Steels HB150~250	1	n	12,000	8,000	6,000	4,800	4,000	3,000	2,400	2,000
		f_z	0.11	0.19	0.27	0.33	0.42	0.56	0.70	0.80
		V_f	5,380	6,050	6,380	6,380	6,720	6,720	6,720	6,380
Tool Steels HRC25~35	1	n	11,000	7,400	5,600	4,500	3,700	2,800	2,200	1,900
		f_z	0.10	0.17	0.24	0.30	0.38	0.51	0.64	0.73
		V_f	4,510	5,110	5,450	5,470	5,680	5,730	5,630	5,540
Pre-hardened Steels HRC35~45	1	n	10,000	6,900	5,200	4,100	3,400	2,600	2,100	1,700
		f_z	0.08	0.14	0.19	0.24	0.30	0.40	0.50	0.57
		V_f	3,200	3,730	3,950	3,900	4,080	4,160	4,200	3,880
① Hardened Steels HRC45~55	0.7	n	8,000	5,300	4,000	3,200	2,700	2,0 **n =**	1,600	1,300
		f_z	0.08	0.14	0.19	0.24	0.30	0. **f_z =**	0.50	0.57
		V_f	2,560	2,860	3,040	3,040	3,240	3,2 **V_f =**	3,200	2,960
Hardened Steels HRC55~60	0.5	n	8,000	5,300	4,000	3,200	2,700	2,000	1,600	1,300
		f_z	0.03	0.05	0.08	0.10	0.12	0.16	0.20	0.23
		V_f	1,020	1,140	1,220	1,220	1,300	1,280	1,280	1,190

Ratio of Cutting Depth / ØD x L

Material	Ratio	Overhang (OH, ØD)	Factor	Ø2 CR 0.5 a_p	a_e	Ø3 CR 0.8 a_p	a_e	Ø4 CR 1 a_p	a_e	Ø5 CR 1.2 a_p	a_e	Ø6 CR 1.5 a_p	a_e	Ø8 CR 2 a_p	a_e	Ø10 CR 2 a_p	a_e	Ø12 CR 2 a_p	a_e
Cast Iron, Carbon Steels, Alloy Steels HB150~250	1	5 x Dia	0.3	0.150		0.240		0.300		0.360		0.450		0.600		0.600		0.600	
		8 x Dia	0.23	0.115	0.5	0.184	0.7	0.230	1	0.276	1.3	0.345	1.5	0.460	2	0.460	3	0.460	4
		10 x Dia	0.15	0.075		0.120		0.150		0.180		0.225		0.300		0.300		0.300	
Tool Steels HRC25~35	1	5 x Dia	0.3	0.150		0.240		0.300		0.360		0.450		0.600		0.600		0.600	
		8 x Dia	0.23	0.115	0.5	0.184	0.7	0.230	1	0.276	1.3	0.345	1.5	0.460	2	0.460	3	0.460	4
		10 x Dia	0.15	0.075		0.120		0.150		0.180		0.225		0.300		0.300		0.300	
Pre-hardened Steels HRC35~45	1	5 x Dia	0.3	0.150		0.240		0.300		0.360		0.450		0.600		0.600		0.600	
		8 x Dia	0.23	0.115	0.5	0.184	0.7	0.230	1	0.276	1.3	0.345	1.5	0.460	2	0.460	3	0.460	4
		10 x Dia	0.15	0.075		0.120		0.150		0.180		0.225		0.300		0.300		0.300	
Hardened Steels HRC45~55	0.7	5 x Dia	0.3	0.105		0.168		0.210		0.252		0.315		0.420		**a_p =**	**a_e =**	0.420	
		③ 8 x Dia	0.23	0.081	0.5	0.129	0.7	0.161	1	0.193	1.3	0.242	1.5	0.322	2	0.322	3	0.322	4
		10 x Dia	0.15	0.053		0.084		0.105		0.126		0.158		0.210		0.210		0.210	
Hardened Steels HRC55~60	0.5	5 x Dia	0.3	0.075		0.120		0.150		0.180		0.225		0.300		0.300		0.300	
		8 x Dia	0.23	0.058	0.5	0.092	0.7	0.115	1	0.138	1.3	0.173	1.5	0.230	2	0.230	3	0.230	4
		10 x Dia	0.15	0.038		0.060		0.075		0.090		0.113		0.150		0.150		0.150	

Overhangfactor

Overhang	factor
5D	0.30
6D	0.27
7D	0.25
8D	0.23
9D	0.19
10D	0.15



Calculation of a_e

a_e = (Ø/2)-R

Example:

Ø10 R2.0 = 3 mm

Calculation of a_p

Overhangfactor x Ratio x Corner Radius (CR)

Example:

8D (= 0.23) x Ratio (= 0.7) x CR (=2.0) = a_p (0.32 mm)

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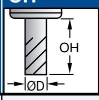
Standard Conditions · Low revolution, High feed

Material	Ratio to standard depth of cut	Cutting Condition	Ø2 CR 0.5	Ø3 CR 0.8	Ø4 CR 1	Ø5 CR 1.2	Ø6 CR 1.5	Ø8 CR 2	Ø10 CR 2	Ø12 CR 2
Cast Iron, Carbon Steels, Alloy Steels HB150~250	1	n	12,000	8,000	6,000	4,800	4,000	3,000	2,400	2,000
		f_z	0.11	0.19	0.27	0.33	0.42	0.56	0.70	0.80
		V_f	5,380	6,050	6,380	6,380	6,720	6,720	6,720	6,380
Tool Steels HRC25~35	1	n	11,000	7,400	5,600	4,500	3,700	2,800	2,200	1,900
		f_z	0.10	0.17	0.24	0.30	0.38	0.51	0.64	0.73
		V_f	4,510	5,110	5,450	5,470	5,680	5,730	5,630	5,540
Pre-hardened Steels HRC35~45	1	n	10,000	6,900	5,200	4,100	3,400	2,600	2,100	1,700
		f_z	0.08	0.14	0.19	0.24	0.30	0.40	0.50	0.57
		V_f	3,200	3,730	3,950	3,900	4,080	4,160	4,200	3,880
Hardened Steels HRC45~55	0.7	n	8,000	5,300	4,000	3,200	2,700	2,000	1,600	1,300
		f_z	0.08	0.14	0.19	0.24	0.30	0.40	0.50	0.57
		V_f	2,560	2,860	3,040	3,040	3,240	3,200	3,200	2,960
Hardened Steels HRC55~60	0.5	n	8,000	5,300	4,000	3,200	2,700	2,000	1,600	1,300
		f_z	0.03	0.05	0.08	0.10	0.12	0.16	0.20	0.23
		V_f	1,020	1,140	1,220	1,220	1,300	1,280	1,280	1,190

Ratio of Cutting Depth / ØD x L



Material	Ratio	OH	Factor	Ø2 CR 0.5		Ø3 CR 0.8		Ø4 CR 1		Ø5 CR 1.2		Ø6 CR 1.5		Ø8 CR 2		Ø10 CR 2		Ø12 CR 2	
				a_p	a_e	a_p	a_e	a_p	a_e	a_p	a_e	a_p	a_e	a_p	a_e	a_p	a_e	a_p	a_e
Cast Iron, Carbon Steels, Alloy Steels HB150~250	1	5 x Dia	0.3	0.150		0.240		0.300		0.360		0.450		0.600		0.600		0.600	
		8 x Dia	0.23	0.115	0.5	0.184	0.7	0.230	1	0.276	1.3	0.345	1.5	0.460	2	0.460	3	0.460	4
		10 x Dia	0.15	0.075		0.120		0.150		0.180		0.225		0.300		0.300		0.300	
Tool Steels HRC25~35	1	5 x Dia	0.3	0.150		0.240		0.300		0.360		0.450		0.600		0.600		0.600	
		8 x Dia	0.23	0.115	0.5	0.184	0.7	0.230	1	0.276	1.3	0.345	1.5	0.460	2	0.460	3	0.460	4
		10 x Dia	0.15	0.075		0.120		0.150		0.180		0.225		0.300		0.300		0.300	
Pre-hardened Steels HRC35~45	1	5 x Dia	0.3	0.150		0.240		0.300		0.360		0.450		0.600		0.600		0.600	
		8 x Dia	0.23	0.115	0.5	0.184	0.7	0.230	1	0.276	1.3	0.345	1.5	0.460	2	0.460	3	0.460	4
		10 x Dia	0.15	0.075		0.120		0.150		0.180		0.225		0.300		0.300		0.300	
Hardened Steels HRC45~55	0.7	5 x Dia	0.3	0.105		0.168		0.210		0.252		0.315		0.420		0.420		0.420	
		8 x Dia	0.23	0.081	0.5	0.129	0.7	0.161	1	0.193	1.3	0.242	1.5	0.322	2	0.322	3	0.322	4
		10 x Dia	0.15	0.053		0.084		0.105		0.126		0.158		0.210		0.210		0.210	
Hardened Steels HRC55~60	0.5	5 x Dia	0.3	0.075		0.120		0.150		0.180		0.225		0.300		0.300		0.300	
		8 x Dia	0.23	0.058	0.5	0.092	0.7	0.115	1	0.138	1.3	0.173	1.5	0.230	2	0.230	3	0.230	4
		10 x Dia	0.15	0.038		0.060		0.075		0.090		0.113		0.150		0.150		0.150	

NOTE

1. Use a highly rigid and accurate machine possible.
2. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
3. If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

BEMERKUNG

1. Nutzen Sie für die Bearbeitungen die Maschine mit der höchsten Genauigkeit und der höchsten Steifigkeit.
2. Die in der Tabelle angegebenen Schnittbedingungen stellen eine generelle Empfehlung dar. Die Werte sollten immer an die jeweilige Bearbeitung, deren Form und die verwendete Maschine angepasst werden.
3. Sollte die Ihnen verfügbare Drehzahl niedriger als der in der Tabelle angegebene Wert sein, sollte der Vorschub im gleichen Verhältnis reduziert werden.

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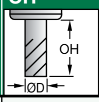
High Speed Conditions · High revolution, High feed

Material	Ratio to standard depth of cut	Cutting Condition	Ø2 CR 0.5	Ø3 CR 0.8	Ø4 CR 1	Ø5 CR 1.2	Ø6 CR 1.5	Ø8 CR 2	Ø10 CR 2	Ø12 CR 2
Cast Iron, Carbon Steels, Alloy Steels HB150~250	0.8	n	20,000	13,300	9,900	8,000	6,600	5,000	4,000	3,300
		f_z	0.11	0.19	0.27	0.33	0.42	0.56	0.70	0.80
		V_f	8,960	10,050	10,530	10,640	11,090	11,200	11,200	10,530
Tool Steels HRC25~35	0.8	n	18,000	11,700	8,800	7,000	5,800	4,400	3,500	2,900
		f_z	0.10	0.17	0.24	0.30	0.38	0.51	0.64	0.73
		V_f	7,370	8,090	8,560	8,510	8,910	9,010	8,960	8,460
Pre-hardened Steels HRC35~45	0.7	n	16,000	10,600	8,000	6,400	5,300	4,000	3,200	2,700
		f_z	0.08	0.14	0.19	0.24	0.30	0.40	0.50	0.57
		V_f	5,120	5,720	6,080	6,080	6,360	6,400	6,400	6,160
Hardened Steels HRC45~55	0.6	n	12,700	8,500	6,400	5,100	4,200	3,200	2,500	2,100
		f_z	0.08	0.14	0.19	0.24	0.30	0.40	0.50	0.57
		V_f	4,060	4,590	4,860	4,850	5,040	5,120	5,000	4,790
Hardened Steels HRC55~60	0.4	n	11,100	7,400	5,600	4,500	3,700	2,800	2,200	1,900
		f_z	0.03	0.05	0.08	0.10	0.12	0.16	0.20	0.23
		V_f	1,420	1,600	1,700	1,710	1,780	1,790	1,760	1,730

Ratio of Cutting Depth / ØD x L



Material	Ratio	OH	Factor	Ø2 CR 0.5 a_p	Ø2 CR 0.5 a_e	Ø3 CR 0.8 a_p	Ø3 CR 0.8 a_e	Ø4 CR 1 a_p	Ø4 CR 1 a_e	Ø5 CR 1.2 a_p	Ø5 CR 1.2 a_e	Ø6 CR 1.5 a_p	Ø6 CR 1.5 a_e	Ø8 CR 2 a_p	Ø8 CR 2 a_e	Ø10 CR 2 a_p	Ø10 CR 2 a_e	Ø12 CR 2 a_p	Ø12 CR 2 a_e
Cast Iron, Carbon Steels, Alloy Steels HB150~250	0.8	5 x Dia	0.3	0.120		0.192		0.240		0.288		0.360		0.480		0.480		0.480	
		8 x Dia	0.23	0.092	0.5	0.147	0.7	0.184	1	0.221	1.3	0.276	1.5	0.368	2	0.368	3	0.368	4
		10 x Dia	0.15	0.060		0.096		0.120		0.144		0.180		0.240		0.240		0.240	
Tool Steels HRC25~35	0.8	5 x Dia	0.3	0.120		0.192		0.240		0.288		0.360		0.480		0.480		0.480	
		8 x Dia	0.23	0.092	0.5	0.147	0.7	0.184	1	0.221	1.3	0.276	1.5	0.368	2	0.368	3	0.368	4
		10 x Dia	0.15	0.060		0.096		0.120		0.144		0.180		0.240		0.240		0.240	
Pre-hardened Steels HRC35~45	0.7	5 x Dia	0.3	0.105		0.168		0.210		0.252		0.315		0.420		0.420		0.420	
		8 x Dia	0.23	0.081	0.5	0.129	0.7	0.161	1	0.193	1.3	0.242	1.5	0.322	2	0.322	3	0.322	4
		10 x Dia	0.15	0.053		0.084		0.105		0.126		0.158		0.210		0.210		0.210	
Hardened Steels HRC45~55	0.6	5 x Dia	0.3	0.090		0.144		0.180		0.216		0.270		0.360		0.360		0.360	
		8 x Dia	0.23	0.069	0.5	0.110	0.7	0.138	1	0.166	1.3	0.207	1.5	0.276	2	0.276	3	0.276	4
		10 x Dia	0.15	0.045		0.072		0.090		0.108		0.135		0.180		0.180		0.180	
Hardened Steels HRC55~60	0.4	5 x Dia	0.3	0.060		0.096		0.120		0.144		0.180		0.240		0.240		0.240	
		8 x Dia	0.23	0.046	0.5	0.074	0.7	0.092	1	0.110	1.3	0.138	1.5	0.184	2	0.184	3	0.184	4
		10 x Dia	0.15	0.030		0.048		0.060		0.072		0.090		0.120		0.120		0.120	

NOTE

1. Usare macchine più rigide e precise possibili.
2. Queste condizioni sono per un uso generale; le condizioni di uso vanno calcolate tenendo in considerazione la macchina e le condizioni di lavoro.
3. Se il numero di giri a disposizione è più basso di quello richiesto si raccomanda di adeguare l'avanzamento di conseguenza.

OBSERVACIÓN

1. Usar la máquina mas rígida y precisa posible.
2. Estas condiciones son una indicación general y deben adaptarse de acuerdo a las características de la máquina y la geometría y amarre de la pieza en concreto.
3. Si las revoluciones disponibles son menores que las recomendadas ajustar también el avance proporcionalmente.

REMARQUES:

1. Utilisez une machine la plus rigide et précise possible.
2. Ces conditions sont indicatives; en conditions d'usinage réelles ajustez les paramètres selon l'état réel de vos machines et du travail à effectuer.
3. Si le nombre de tour par minute disponible est inférieur à celui recommandé, veuillez utiliser ce rapport pour réduire l'avance du même ratio.

Solid Carbide Corner Radius End Mill for high efficient machining

4

High depth of cut Conditions · Low revolution, High depth of cut

Material	Ratio to standard depth of cut	Cutting Condition	Ø2 CR 0.5	Ø3 CR 0.8	Ø4 CR 1	Ø5 CR 1.2	Ø6 CR 1.5	Ø8 CR 2	Ø10 CR 2	Ø12 CR 2
Cast Iron, Carbon Steels, Alloy Steels HB150~250	2	n	12,000	8,000	6,000	4,800	4,000	3,000	2,400	2,000
		f_z	0.05	0.09	0.12	0.15	0.19	0.26	0.32	0.36
		V_f	2,460	2,760	2,920	2,920	3,070	3,070	3,070	2,920
Tool Steels HRC25~35	1.8	n	11,000	7,400	5,600	4,500	3,700	2,800	2,200	1,900
		f_z	0.05	0.08	0.11	0.14	0.18	0.24	0.30	0.34
		V_f	2,110	2,400	2,550	2,570	2,660	2,690	2,640	2,600
Pre-hardened Steels HRC35~45	1.6	n	10,000	6,900	5,200	4,100	3,400	2,600	2,100	1,700
		f_z	0.04	0.07	0.10	0.12	0.15	0.20	0.25	0.29
		V_f	1,600	1,860	1,980	1,950	2,040	2,080	2,100	1,940
Hardened Steels HRC45~55	1.2	n	8,000	5,300	4,000	3,200	2,700	2,000	1,600	1,300
		f_z	0.04	0.07	0.10	0.12	0.15	0.20	0.25	0.29
		V_f	1,280	1,430	1,520	1,520	1,620	1,600	1,600	1,480
Hardened Steels HRC55~60	0.7	n	8,000	5,300	4,000	3,200	2,700	2,000	1,600	1,300
		f_z	0.02	0.03	0.05	0.06	0.07	0.10	0.12	0.14
		V_f	610	690	730	730	780	770	770	710

Ratio of Cutting Depth / ØD x L

Material	Ratio	OH (ØD)	Factor	Ø2 CR 0.5 a_p	a_e	Ø3 CR 0.8 a_p	a_e	Ø4 CR 1 a_p	a_e	Ø5 CR 1.2 a_p	a_e	Ø6 CR 1.5 a_p	a_e	Ø8 CR 2 a_p	a_e	Ø10 CR 2 a_p	a_e	Ø12 CR 2 a_p	a_e
Cast Iron, Carbon Steels, Alloy Steels HB150~250	2	5 x Dia	0.3	0.300		0.480		0.600		0.720		0.900		1.200		1.200		1.200	
		8 x Dia	0.23	0.230	0.5	0.368	0.7	0.460	1	0.552	1.3	0.690	1.5	0.920	2	0.920	3	0.920	4
		10 x Dia	0.15	0.150		0.240		0.300		0.360		0.450		0.600		0.600		0.600	
Tool Steels HRC25~35	1.8	5 x Dia	0.3	0.270		0.432		0.540		0.648		0.810		1.080		1.080		1.080	
		8 x Dia	0.23	0.207	0.5	0.331	0.7	0.414	1	0.497	1.3	0.621	1.5	0.828	2	0.828	3	0.828	4
		10 x Dia	0.15	0.135		0.216		0.270		0.324		0.405		0.540		0.540		0.540	
Pre-hardened Steels HRC35~45	1.6	5 x Dia	0.3	0.240		0.384		0.480		0.576		0.720		0.960		0.960		0.960	
		8 x Dia	0.23	0.184	0.5	0.294	0.7	0.368	1	0.442	1.3	0.552	1.5	0.736	2	0.736	3	0.736	4
		10 x Dia	0.15	0.120		0.192		0.240		0.288		0.360		0.480		0.480		0.480	
Hardened Steels HRC45~55	1.2	5 x Dia	0.3	0.180		0.288		0.360		0.432		0.540		0.720		0.720		0.720	
		8 x Dia	0.23	0.138	0.5	0.221	0.7	0.276	1	0.331	1.3	0.414	1.5	0.552	2	0.552	3	0.552	4
		10 x Dia	0.15	0.090		0.144		0.180		0.216		0.270		0.360		0.360		0.360	
Hardened Steels HRC55~60	0.7	5 x Dia	0.3	0.105		0.168		0.210		0.252		0.315		0.420		0.420		0.420	
		8 x Dia	0.23	0.081	0.5	0.129	0.7	0.161	1	0.193	1.3	0.242	1.5	0.322	2	0.322	3	0.322	4
		10 x Dia	0.15	0.053		0.084		0.105		0.126		0.158		0.210		0.210		0.210	

NOTE

1. Use a highly rigid and accurate machine possible.
2. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
3. If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

BEMERKUNG

1. Nutzen Sie für die Bearbeitungen die Maschine mit der höchsten Genauigkeit und der höchsten Steifigkeit.
2. Die in der Tabelle angegebenen Schnittbedingungen stellen eine generelle Empfehlung dar. Die Werte sollten immer an die jeweilige Bearbeitung, deren Form und die verwendete Maschine angepasst werden.
3. Sollte die Ihnen verfügbare Drehzahl niedriger als der in der Tabelle angegebene Wert sein, sollte der Vorschub im gleichen Verhältnis reduziert werden.

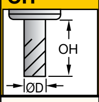
Solid Carbide Corner Radius End Mill for high efficient machining

4

Low load Conditions · Medium revolution, high feed

Material	Ratio to standard depth of cut	Cutting Condition	Ø2 CR 0.5	Ø3 CR 0.8	Ø4 CR 1	Ø5 CR 1.2	Ø6 CR 1.5	Ø8 CR 2	Ø10 CR 2	Ø12 CR 2
Cast Iron, Carbon Steels, Alloy Steels HB150~250	1	n	15,000	10,100	7,600	6,000	5,000	3,800	3,000	2,500
		f_z	0.09	0.15	0.21	0.26	0.32	0.43	0.54	0.62
		V_f	5,180	5,890	6,240	6,160	6,480	6,570	6,480	6,160
Tool Steels HRC25~35	1	n	14,000	9,500	7,200	5,700	4,800	3,600	2,900	2,400
		f_z	0.08	0.13	0.18	0.23	0.29	0.38	0.48	0.55
		V_f	4,300	4,920	5,250	5,200	5,530	5,530	5,570	5,250
Pre-hardened Steels HRC35~45	1	n	14,000	9,000	6,800	5,400	4,500	3,400	2,700	2,300
		f_z	0.06	0.10	0.14	0.18	0.23	0.30	0.38	0.43
		V_f	3,400	3,690	3,930	3,900	4,100	4,130	4,100	3,990
Hardened Steels HRC45~55	0.7	n	10,300	6,900	5,200	4,100	3,400	2,600	2,100	1,700
		f_z	0.06	0.09	0.13	0.17	0.21	0.28	0.35	0.40
		V_f	2,310	2,610	2,770	2,730	2,860	2,910	2,940	2,710
Hardened Steels HRC55~60	0.5	n	9,500	6,400	4,800	3,800	3,200	2,400	1,900	1,600
		f_z	0.02	0.04	0.06	0.07	0.09	0.12	0.15	0.17
		V_f	910	1,040	1,090	1,080	1,150	1,150	1,140	1,090

Ratio of Cutting Depth / ØD x L

Material	Ratio	OH	Factor	Ø2 CR 0.5		Ø3 CR 0.8		Ø4 CR 1		Ø5 CR 1.2		Ø6 CR 1.5		Ø8 CR 2		Ø10 CR 2		Ø12 CR 2	
				a_p	a_e	a_p	a_e	a_p	a_e	a_p	a_e	a_p	a_e	a_p	a_e	a_p	a_e	a_p	a_e
Cast Iron, Carbon Steels, Alloy Steels HB150~250	1	5 x Dia	0.3	0.150		0.240		0.300		0.360		0.450		0.600		0.600		0.600	
		8 x Dia	0.23	0.115	0.5	0.184	0.7	0.230	1	0.276	1.3	0.345	1.5	0.460	2	0.460	3	0.460	4
		10 x Dia	0.15	0.075		0.120		0.150		0.180		0.225		0.300		0.300		0.300	
Tool Steels HRC25~35	1	5 x Dia	0.3	0.150		0.240		0.300		0.360		0.450		0.600		0.600		0.600	
		8 x Dia	0.23	0.115	0.5	0.184	0.7	0.230	1	0.276	1.3	0.345	1.5	0.460	2	0.460	3	0.460	4
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Pre-hardened Steels HRC35~45	1	5 x Dia	0.3	0.150		0.240		0.300		0.360		0.450		0.600		0.600		0.600	
		8 x Dia	0.23	0.115	0.5	0.184	0.7	0.230	1	0.276	1.3	0.345	1.5	0.460	2	0.460	3	0.460	4
		10 x Dia	0.15	0.075		0.120		0.150		0.180		0.225		0.300		0.300		0.300	
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		8 x Dia	0.23	0.081	0.5	0.129	0.7	0.161	1	0.193	1.3	0.242	1.5	0.322	2	0.322	3	0.322	4
		10 x Dia	0.15	0.053		0.084		0.105		0.126		0.158		0.210		0.210		0.210	
Hardened Steels HRC55~60	0.5	5 x Dia	0.3	0.075		0.120		0.150		0.180		0.225		0.300		0.300		0.300	
		8 x Dia	0.23	0.058	0.5	0.092	0.7	0.115	1	0.138	1.3	0.173	1.5	0.230	2	0.230	3	0.230	4
		10 x Dia	0.15	0.038		0.060		0.075		0.090		0.113		0.150		0.150		0.150	

NOTE

1. Usare macchine più rigide e precise possibili.
2. Queste condizioni sono per un uso generale; le condizioni di uso vanno calcolate tenendo in considerazione la macchina e le condizioni di lavoro.
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OBSERVACIÓN

1. Usar la máquina mas rígida y precisa posible.
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2. Ces conditions sont indicatives; en conditions d'usinage réelles ajustez les paramètres selon l'état réel de vos machines et du travail à effectuer.
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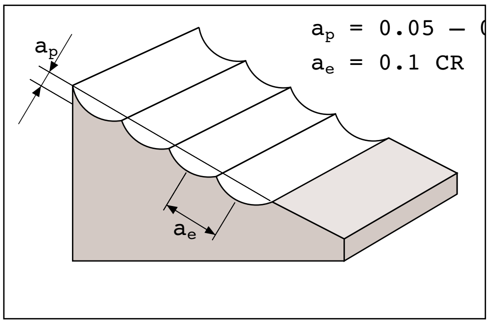
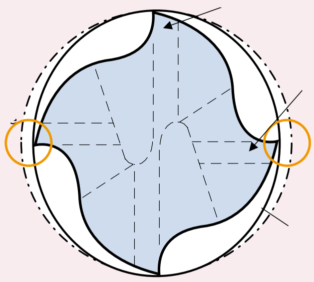
4

Finish Conditions

Material	Cutting Condition	Ø2 CR 0.5	Ø3 CR 0.8	Ø4 CR 1	Ø5 CR 1.2	Ø6 CR 1.5	Ø8 CR 2	Ø10 CR 2	Ø12 CR 2
Cast Iron, Carbon Steels, Alloy Steels HB150~250	n	29,000	19,100	14,300	11,500	9,500	7,200	5,700	4,800
	f_z	0.02	0.03	0.04	0.05	0.06	0.08	0.10	0.11
	V_f	1,860	2,060	2,170	2,190	2,280	2,300	2,280	2,190
Tool Steels HRC25~35	n	24,000	15,900	11,900	9,500	8,000	6,000	4,800	4,000
	f_z	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09
	V_f	1,230	1,370	1,450	1,440	1,540	1,540	1,540	1,460
Pre-hardened Steels HRC35~45	n	19,000	12,700	9,500	7,600	6,400	4,800	3,800	3,200
	f_z	0.01	0.02	0.02	0.03	0.04	0.05	0.06	0.07
	V_f	730	820	870	870	920	920	910	880
Hardened Steels HRC45~55	n	14,300	9,500	7,200	5,700	4,800	3,600	2,900	2,400
	f_z	0.01	0.01	0.02	0.02	0.03	0.04	0.05	0.06
	V_f	460	510	550	540	580	580	580	550
Hardened Steels HRC55~60	n	11,100	7,400	5,600	4,500	3,700	2,800	2,200	1,900
	f_z	0.01	0.01	0.02	0.02	0.02	0.03	0.04	0.05
	V_f	280	320	340	340	360	360	350	350

Depth of cut Finishing





ATTENTION

- Be careful of the newly developed flute shape when measuring tool diameter or oscillation.
- The bit is designed with a smaller outer diameter connected to end slave flutes.
- When measuring tool diameter or oscillation, measure the main flutes.

Product Range

Solid Carbide End Mills — microEndMill, Epoch21, CBN Cubic Boron Nitride, MINIATURE, HD COATING, 3D-Cut

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