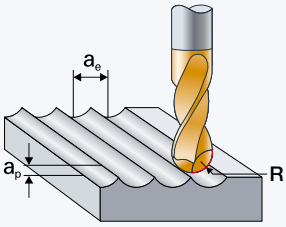
HGOB-2

			D1/R 0.5		D2/R 1.0		D3/R 1.5		D4/R 2.0		D5/R 2.5	
			∇	∇∇∇	∇	∇∇∇	∇	∇∇∇	∇	∇∇∇	∇	∇∇∇
			Roughing	Finishing	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing	Roughing	Finishing
D 1 – 5	Mild steel, Carbon Steel & Alloy steel (HB180 ~ HRC30)	V_c (m/min)	140	120	160	140	180	160	200	180	200	180
		n (min^{-1})	44,580	38,210	25,470	22,300	19,100	16,980	15,920	14,330	12,740	11,470
		f_z (mm/tooth)	0.04	0.025	0.06	0.04	0.08	0.055	0.1	0.07	0.12	0.08
		V_f (mm/min)	3,570	1,910	3,060	1,780	3,060	1,870	3,190	2,000	3,060	1,840
		a_p (mm)	0.05	0.025	0.1	0.05	0.15	0.075	0.2	0.1	0.25	0.125
		a_e (mm)	0.3	0.025	0.6	0.05	0.9	0.075	1.2	0.1	1.5	0.125
	Pre-Hardened & Hardened tool steel (HRC30 ~ 50)	V_c (m/min)	120	100	140	120	160	140	180	160	180	160
		n (min^{-1})	38,220	31,850	22,290	19,100	16,990	14,860	14,330	12,740	11,460	10,200
		f_z (mm/tooth)	0.04	0.025	0.06	0.04	0.08	0.055	0.1	0.07	0.12	0.08
		V_f (mm/min)	3,060	1,600	2,670	1,530	2,720	1,630	2,870	1,780	2,750	1,630
		a_p (mm)	0.05	0.025	0.1	0.05	0.15	0.075	0.2	0.1	0.25	0.125
		a_e (mm)	0.3	0.025	0.6	0.05	0.9	0.075	1.2	0.1	1.5	0.125
	Copper, Aluminium & Cast Iron	V_c (m/min)	180	160	200	180	220	200	240	220	240	220
		n (min^{-1})	57,330	51,000	31,850	28,670	23,350	21,230	19,100	17,520	15,300	14,000
		f_z (mm/tooth)	0.04	0.025	0.06	0.04	0.08	0.055	0.1	0.07	0.12	0.08
		V_f (mm/min)	4,590	2,550	3,820	2,300	3,740	2,330	3,820	2,450	3,670	2,240
		a_p (mm)	0.05	0.025	0.1	0.05	0.15	0.075	0.2	0.1	0.25	0.125
		a_e (mm)	0.3	0.025	0.6	0.05	0.9	0.075	1.2	0.1	1.5	0.125

			D6/R 3.0		D8/R 4.0		D10/R 5.0		D12/R 6.0	
D 6 – 12	Mild steel, Carbon Steel & Alloy steel (HB180 ~ HRC30)	V_c (m/min)	220	220	220	220	260	240	260	240
		n (min^{-1})	11,680	11,680	8,760	8,760	8,280	7,640	6,900	6,370
		f_z (mm/tooth)	0.14	0.09	0.16	0.11	0.18	0.13	0.2	0.15
		V_f (mm/min)	3,270	2,100	2,800	1,930	2,980	1,990	2,760	1,910
		a_p (mm)	0.3	0.15	0.4	0.2	0.5	0.25	0.6	0.3
		a_e (mm)	1.8	0.15	2.4	0.2	3.0	0.25	3.6	0.3
	Pre-Hardened & Hardened tool steel (HRC30 ~ 50)	V_c (m/min)	200	180	200	180	220	200	220	200
		n (min^{-1})	10,620	9,550	7,960	7,170	7,000	6,370	5,840	5,300
		f_z (mm/tooth)	0.14	0.09	0.16	0.11	0.18	0.13	0.2	0.15
		V_f (mm/min)	2,970	1,720	2,550	1,580	2,520	1,660	2,340	1,590
		a_p (mm)	0.3	0.15	0.4	0.2	0.5	0.25	0.6	0.3
		a_e (mm)	1.8	0.15	2.4	0.2	3.0	0.25	3.6	0.3
	Copper, Aluminium & Cast Iron	V_c (m/min)	260	270	260	270	320	300	320	300
		n (min^{-1})	13,800	14,330	10,350	10,750	10,200	9,550	8,500	7,960
		f_z (mm/tooth)	0.14	0.09	0.16	0.11	0.18	0.13	0.2	0.15
		V_f (mm/min)	3,870	2,580	3,300	2,360	3,670	2,480	3,400	2,390
		a_p (mm)	0.3	0.15	0.4	0.2	0.5	0.25	0.6	0.3
		a_e (mm)	1.8	0.15	2.4	0.2	3.0	0.25	3.6	0.3

Theoretical cusp height in end milling (µm)
Die theoretische Rautiefe in der Fräsbearbeitung (µm)
Cresta teorica di fresatura (µm)
Cálculo de altura de la cresta teórica en fresado (mm)
Hauteur de crête théorique en fraisage (µm)
Altura da crista teórica em fresagem (µm)



Feed pitch and cusp height
a_e (mm) Zeilensprung
Passo di avanzamento / Cresta
Paso y altura de cresta
Pas et hauteur de crête
Passo lateral x/ Altura da crista

$$h = R - \sqrt{\frac{(2 \cdot R)^2 - a_{p,e}{}^2}{4}} \qquad h = \frac{a_e^2}{8 \cdot R}$$

		a_e (mm)							
		0.05	0.075	0.1	0.15	0.2	0.3	0.4	0.5
R (mm)	0.5	0.63	1.41	2.51	5.66	10.10	23.03	41.74	66.99
	1.0	0.31	0.70	1.25	2.82	5.01	11.31	20.20	31.75
	2.0	0.16	0.35	0.63	1.41	2.50	5.63	10.03	15.69
	3.0	0.10	0.23	0.42	0.94	1.67	3.75	6.67	10.43
	4.0	0.08	0.18	0.31	0.70	1.25	2.81	5.00	7.82
	5.0	0.06	0.14	0.25	0.56	1.00	2.25	4.00	6.25
	6.0	0.05	0.12	0.21	0.47	0.83	1.88	3.33	5.21
	8.0	0.04	0.09	0.16	0.35	0.63	1.41	2.50	3.91
	10.0	0.03	0.07	0.13	0.28	0.50	1.13	2.0	3.13

NOTE

1. Use a highly rigid and accurate machine as available.
2. The radial step over (Pf, pick feed) in the above table is for general information. Please select the conditions to suit your actual surface finish requirements, according to the cusp height stated.
3. The cutting conditions in the above table are a general guide. For your actual work piece adjust the conditions according to the machining shape, purpose and the machine tool to be used.
4. If the rpm speed available is lower, adjust the feed rate to the same ratio with the rpm.

ANMERKUNG

1. Nutzen Sie für die Bearbeitungen die Maschine mit der höchsten Genauigkeit und der höchsten Steifigkeit.
2. Der in der Tabelle angegebene Zeilensprung ist eine generelle Empfehlung. Um die jeweiligen Anforderungen an die Oberflächengüte zu erreichen wählen Sie die Bedingungen entsprechend der angegebenen Rautiefe.
3. 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.
4. Sollte die Ihnen verfügbare Drehzahl niedriger als der in der Tabelle angegebene Wert sein, sollte der Vorschub im gleichen Verhältnis reduziert werden.

NOTA

1. Usate centri di lavoro più precisi e rigidi possibile.
2. Gli indicazioni sul passo laterale (a_e) espresso nella tabella sopra riportata sono valori generali. Per ottimizzare il processo di lavoro usate le relazioni cresta/raggio più vicine alle Vostre esigenze.
3. Le condizioni di taglio indicate sono valori generali. Per ottimizzare il Vostro processo di lavoro analizzate i parametri in funzione delle geometrie che dovete generare e del centro di lavoro a disposizione.
4. Se i giri del mandrino della macchina disponibili sono più bassi rispetto al valore espresso regolate l´avanzamento con lo stesso rapporto.

OBSERVACIONES

1. Utilizar la máquina más rígida y precisa posible.
2. El paso radial (Pf, paso) de la tabla es una información general. Hay que utilizar el paso adecuado en función del acabado superficial que se pretenda obtener según la rugosidad máxima prevista (Altura de cresta).
3. Las condiciones de corte de la tabla son una orientación general. Para un trabajo específico hay que ajustar las condiciones en función de la geometría de la pieza, el resultado esperado y el tipo de máquina que vamos a utilizar.
4. Si las rpm de la maquina son inferiores, hay que ajustar el avance en proporción a las mismas.

NOTE

1. Utiliser une machine aussi fiable et rigide que possible .
2. SVP choisissez vos conditions en fonction de l'état de surface requis .
3. Les conditions de coupe du tableau sont indicatives. Pour votre application, ajuster cette base en fonction de votre machine .
4. Si le nombre de tours est insuffisant ajuster les avances dans la même proportion que la rotation disponible .

NOTA

1. Use a máquina disponível mais rígida e precisa possível.
2. O passo lateral (Pf, incremento lateral) na tabela acima é para informação geral. Por favor seleccione as condições para atender às suas exigências de acabamento de superfície real, de acordo com a altura da crista pretendida.
3. As condições de corte no quadro acima são uma informação geral. Para o seu trabalho real ajuste as condições de acordo com a forma da peça, máquina e ferramenta a ser usada para objectivo pretendido.
4. Se a sua rpm disponível é menor do que o recomendado, ajuste o avanço para a mesma relação com a rpm.

HGOR-4

			D6/CR 0.3, 1.0			D8/CR 0.3, 1.0			D10/CR 0.3, 1.0		
			Slotting	Side	2D/3D HSC	Slotting	Side	2D/3D HSC	Slotting	Side	2D/3D HSC
D 6 – 10	Mild steel, Carbon Steel & Alloy steel (HB180 ~ HRC30)	V_c (m/min)	90	110	200	90	110	200	90	110	200
		n (min^{-1})	4,780	5,840	10,620	3,580	4,380	7,960	2,870	3,500	6,370
		f_z (mm/tooth)	0.04	0.04	0.09	0.05	0.05	0.12	0.06	0.06	0.15
		V_f (mm/min)	760	930	3,820	710	880	3,820	690	840	3,820
		a_p (mm)	3.0	6.0	0.2 – 0.5	4.0	8.0	0.2 – 0.5	5.0	10.0	0.2 – 0.5
		a_e (mm)	6.0	0.6	0.2 – 0.5	8.0	0.8	0.2 – 0.5	10.0	1.0	0.2 – 0.5
	Pre-Hardened & Hardened tool steel (HRC30 ~ 50)	V_c (m/min)	60	80	150	60	80	150	60	80	150
		n (min^{-1})	3,190	4,250	7,960	2,390	3,190	5,970	1,910	2,550	4,780
		f_z (mm/tooth)	0.03	0.03	0.09	0.04	0.04	0.12	0.05	0.05	0.15
		V_f (mm/min)	380	510	2,870	380	510	2,870	380	510	2,870
		a_p (mm)	1.5	3.0	0.1 – 0.3	2.0	4.0	0.1 – 0.3	2.5	5.0	0.1 – 0.3
		a_e (mm)	6.0	0.3	0.1 – 0.3	8.0	0.4	0.1 – 0.3	10.0	0.5	0.1 – 0.3
	Copper, Aluminium & Cast Iron	V_c (m/min)	180	200	250	180	200	250	180	200	250
		n (min^{-1})	9,550	10,620	13,270	7,170	7,960	9,950	5,730	6,370	7,960
		f_z (mm/tooth)	0.06	0.06	0.09	0.07	0.07	0.12	0.08	0.08	0.15
		V_f (mm/min)	2,290	2,550	4,780	2,000	2,230	4,780	1,830	2,040	4,780
		a_p (mm)	3.0	6.0	0.2 – 0.5	4.0	8.0	0.2 – 0.5	5.0	10.0	0.2 – 0.5
		a_e (mm)	6.0	0.6	0.2 – 0.5	8.0	0.8	0.2 – 0.5	10.0	1.0	0.2 – 0.5

			D12/CR 0.3, 1.0			D16/CR 0.5, 2.0			D20/CR 0.5, 2.0		
D 12 – 20	Mild steel, Carbon Steel & Alloy steel (HB180 ~ HRC30)	V_c (m/min)	90	110	200	90	110	200	90	110	200
		n (min^{-1})	2,390	2,920	5,300	1,790	2,190	3,980	1,430	1,750	3,190
		f_z (mm/tooth)	0.07	0.07	0.18	0.09	0.09	0.22	0.11	0.11	0.25
		V_f (mm/min)	670	820	3,820	640	790	3,500	630	770	3,190
		a_p (mm)	6.0	12.0	0.2 – 0.5	8.0	16.0	0.2 – 0.5	10.0	20.0	0.2 – 0.5
		a_e (mm)	12.0	1.2	0.2 – 0.5	16.0	1.6	0.2 – 0.5	20.0	2.0	0.2 – 0.5
	Pre-Hardened & Hardened tool steel (HRC30 ~ 50)	V_c (m/min)	60	80	150	60	80	150	60	80	150
		n (min^{-1})	1,590	2,120	3,980	1,200	1,590	2,990	950	1,270	2,390
		f_z (mm/tooth)	0.06	0.06	0.18	0.08	0.08	0.22	0.09	0.09	0.25
		V_f (mm/min)	380	510	2,870	380	510	2,630	340	460	2,390
		a_p (mm)	3.0	6.0	0.1 – 0.3	4.0	8.0	0.1 – 0.3	5.0	10.0	0.1 – 0.3
		a_e (mm)	12.0	0.6	0.1 – 0.3	16.0	0.8	0.1 – 0.3	20.0	1.0	0.1 – 0.3
	Copper, Aluminium & Cast Iron	V_c (m/min)	180	200	250	180	200	250	180	200	250
		n (min^{-1})	4,780	5,300	6,640	3,580	3,980	4,980	2,870	3,190	3,980
		f_z (mm/tooth)	0.09	0.09	0.18	0.1	0.1	0.22	0.12	0.12	0.25
		V_f (mm/min)	1,720	1,900	4,780	1,430	1,590	4,380	1,380	1,530	3,980
		a_p (mm)	6.0	12.0	0.2 – 0.5	8.0	16.0	0.2 – 0.5	10.0	20.0	0.2 – 0.5
		a_e (mm)	12.0	1.2	0.2 – 0.5	16.0	1.6	0.2 – 0.5	20.0	2.0	0.2 – 0.5

HGOH-6

			D6/CR 0.5			D8/CR 0.5			D10/CR 0.5		
			Side	Side HSC	2D/3D HSC	Side	Side HSC	2D/3D HSC	Side	Side HSC	2D/3D HSC
D 6 – 10	Mild steel, Carbon steel & Alloy steel (HB180 ~ HRC30)	V_c (m/min)	110	200	200	110	200	200	110	200	200
		n (min^{-1})	5,800	10,600	10,600	4,400	8,000	8,000	3,500	6,400	6,400
		f_z (mm/tooth)	0.06	0.06	0.09	0.07	0.07	0.12	0.08	0.08	0.15
		V_f (mm/min)	2,090	3,820	5,720	1,850	3,360	5,760	1,680	3,070	5,760
		a_p (mm)	9.0	9.0	0.2 – 0.5	12.0	12.0	0.2 – 0.5	15.0	15.0	0.2 – 0.5
		a_e (mm)	0.3	0.3	0.2 – 0.5	0.4	0.4	0.2 – 0.5	0.5	0.5	0.2 – 0.5
	Pre-Hardened & Hardened tool steel (HRC30~50)	V_c (m/min)	80	180	180	80	180	180	80	180	180
		n (min^{-1})	4,200	9,500	9,500	3,200	7,200	7,200	2,500	5,700	5,700
		f_z (mm/tooth)	0.06	0.06	0.09	0.07	0.07	0.12	0.08	0.08	0.15
		V_f (mm/min)	1,510	3,420	5,130	1,340	3,020	5,180	1,200	2,740	5,130
		a_p (mm)	9.0	9.0	0.1 – 0.3	12.0	12.0	0.1 – 0.3	15.0	15.0	0.1 – 0.3
		a_e (mm)	0.06	0.06	0.1 – 0.3	0.08	0.08	0.1 – 0.3	0.1	0.1	0.1 – 0.3
	Cast Iron (HB150 ~ 200) GG, GGG	V_c (m/min)	160	250	250	160	250	250	160	250	250
		n (min^{-1})	8,500	13,200	13,200	6,400	9,900	9,900	5,100	8,000	8,000
		f_z (mm/tooth)	0.08	0.08	0.09	0.1	0.1	0.12	0.12	0.12	0.15
		V_f (mm/min)	4,080	6,340	7,130	3,840	5,940	7,130	3,670	5,760	7,200
		a_p (mm)	9.0	9.0	0.2 – 0.5	12.0	12.0	0.2 – 0.5	15.0	15.0	0.2 – 0.5
		a_e (mm)	0.6	0.6	0.2 – 0.5	0.8	0.8	0.2 – 0.5	1.0	1.0	0.2 – 0.5

			D12/CR 1.0			D16/CR 1.0			D20/CR 1.0		
D 12 – 20	Mild steel, Carbon steel & Alloy steel (HB180 ~ HRC30)	V_c (m/min)	110	200	200	110	200	200	110	200	200
		n (min^{-1})	2,900	5.300	5,300	2,200	4,000	4,000	1,800	3,200	3,200
		f_z (mm/tooth)	0.1	0.1	0.18	0.12	0.12	0.22	0.13	0.13	0.25
		V_f (mm/min)	1,740	3,180	5,720	1,580	2,880	5,280	1,400	2,500	4,800
		a_p (mm)	18.0	18.0	0.2 – 0.5	24.0	24.0	0.2 – 0.5	30.0	30.0	0.2 – 0.5
		a_e (mm)	0.6	0.6	0.2 – 0.5	0.8	0.8	0.2 – 0.5	1.0	1.0	0.2 – 0.5
	Pre-Hardened & Hardened tool steel (HRC30~50)	V_c (m/min)	80	180	180	80	180	180	80	180	180
		n (min^{-1})	2,100	4,800	4,800	1,600	3,600	3,600	1,300	2,900	2,900
		f_z (mm/tooth)	0.1	0.1	0.18	0.12	0.12	0.22	0.13	0.13	0.25
		V_f (mm/min)	1,260	2,880	5,180	1,150	2,590	4,750	1,010	2,260	4,350
		a_p (mm)	18.0	18.0	0.1 – 0.3	24.0	24.0	0.1 – 0.3	30.0	30.0	0.1 – 0.3
		a_e (mm)	0.12	0.12	0.1 – 0.3	0.16	0.16	0.1 – 0.3	0.2	0.2	0.1 – 0.3
	Cast Iron (HB150 ~ 200) GG, GGG	V_c (m/min)	160	250	250	160	250	250	160	250	250
		n (min^{-1})	4,200	6,600	6,600	3,200	5,000	5,000	2,500	4,000	4,000
		f_z (mm/tooth)	0.13	0.13	0.18	0.13	0.13	0.22	0.14	0.14	0.25
		V_f (mm/min)	3,280	5,150	7,130	2,500	3,900	6,600	2,100	3,360	6,000
		a_p (mm)	18.0	18.0	0.2 – 0.5	24.0	24.0	0.2 – 0.5	30.0	30.0	0.2 – 0.5
		a_e (mm)	1.2	1.2	0.2 – 0.5	1.6	1.6	0.2 – 0.5	2.0	2.0	0.2 – 0.5

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Achtung: Bitte laden Sie sich für die Schlichtbearbeitung und die präzise Definition der Werkzeuge die DXF Daten herunter (QuickFinder) oder wenden Sie sich an Ihren Hitachi Anwendungstechniker.

Nota: Per lavorazioni di finitura e per una precisa e corretta definizione del profilo dell'utensile per l'utilizzo CAM si prega di richiedere file DXF tramite QuickFinder o rivolgendosi al personale Hitachi Tool.

Nota: En procesos de acabado y para una más precisa definición de la herramienta en el sistema de CAM por favor solicite los ficheros DXF (QuickFinder), o póngase en contacto con Hitachi Tool para obtener más detalles.

Remarque : Pour les opérations de finition et une définition précise de l'outil dans votre système FAO, demandez nous le fichier DXF des outils, téléchargez les via notre logiciel QuickFinder, ou contactez votre interlocuteur commercial pour plus de détails.

Nota: Para o acabamento e precisão assim como melhor definição da ferramenta para o sistema CAM por favor solicitar dados DXF (QuickFinder), ou entre em contato com sua equipe de ferramentas Hitachi local para obter mais detalhes.

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