



2022

THE PROFESSIONAL ENDMILL

Represented by

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VHM HARD-STAR Line





TOWA End Mill?

TOWA ist ein weltweit bekannter Leader im ultrapräzisions Formenbau.

Es ist keine Übertreibung zu behaupten, dass die Herstellung der Ultrapräzisionsformen von TOWA nur durch die Verwendung von TOWA's eigenem TOWA Schafffräser erreicht wird.

TOWA Schafffräser sind für hohe Genauigkeit geschaffen, sowie mit ausgezeichneter Verschleissfestigkeit, excellenter Schärfe und langer Lebensdauer ausgestattet.

Die Überlegenheit des TOWA Schafffräasers zeigt sich kontinuierlich durch den Einsatz bei seinem Hauptkunden TOWA. Da TOWA sowohl Hersteller als auch Anwender ist, kann TOWA Produkte liefern, die die Bedürfnisse jedes Kunden voll erfüllen. Darüber hinaus können wir aus Sicht des Anwenders unsere langjährige Erfahrung bei Empfehlungen zum Bearbeitungsprozess des Bauteils voll ausspielen.

Als umfassender Hersteller von Zerspanungswerkzeugen in den Sektionen CBN sowie auch Vollhartmetall (ultra micrograin) sind diese Werkzeugserien als neuer Stern am Werkzeughimmel zu werten. TOWA wird auch weiterhin nach einem noch besseren Preis-Leistungs-Verhältnis im effizienten Metallbearbeitungs-Sektor streben.

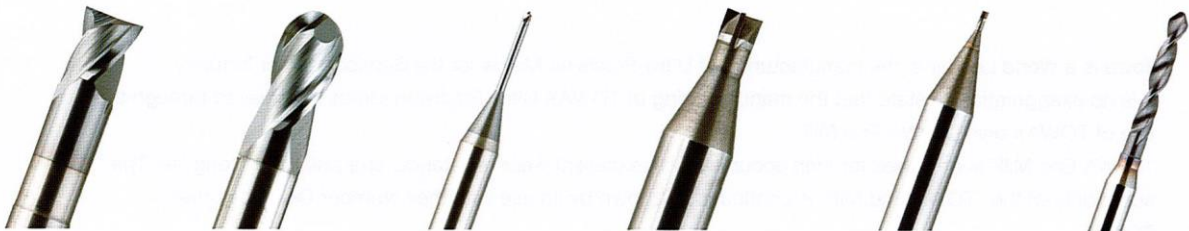


Schafffräser von TOWA für die Ultra-Präzisionsbearbeitung

CBN & Vollhartmetall

Unsere Schafffräser sind aus unseren internen Anforderungen für die ultrapräzise Formbearbeitung entstanden. Damit können wir die stetig strenger werdenden Formspezifikationen der Kunden erstklassig erfüllen. Das bewährte Design und die entwickelten Geometrien aus eigener Fertigung entsprechen den Anforderungen nach höherer Präzision und Langlebigkeit excellent.

längere Standzeiten - reduzierte Anzahl benötigter Werkzeuge = reduzierte Kosten



Höchste Präzisions-Ausführung

- Anfertigung nach Ihren Angaben werden in Toleranz von 0.003mm gefertigt
- R $\pm 2\mu\text{m}$
Radius-Toleranz +/- 0.002mm

Mehrere Schneiden

- Durch die Mehrschneiden-Ausführung von 3 - 6 Lippen wird die Bearbeitungszeit erheblich verkürzt

lange Lebensdauer

- lange Standzeiten und Lebensdauer mit den originalen Beschichtungen ebenfalls von TOWA entwickelt

Nachschleifen

- Wir können CBN Schafffräser bis zu 8 Mal nachschleifen. Dies ergibt eine Gesamtkostenreduktion von bis zu 50%
- Wir entfernen die Beschichtung vollständig und schleifen das neutrale CBN entsprechend nach und beschichten die Werkzeuge danach neu. Diese Arbeiten werden zu einem vernünftigen Preis geboten.

Schnellste Lieferung

- Katalogprodukte können meist am Tag der Bestellung oder am Folgetag versendet werden.
- Sonderanfertigungen und Nachschleifen können meist innerhalb von 10-14 Tagen versendet werden

CBN & Vollhartmetall
Schafffräser

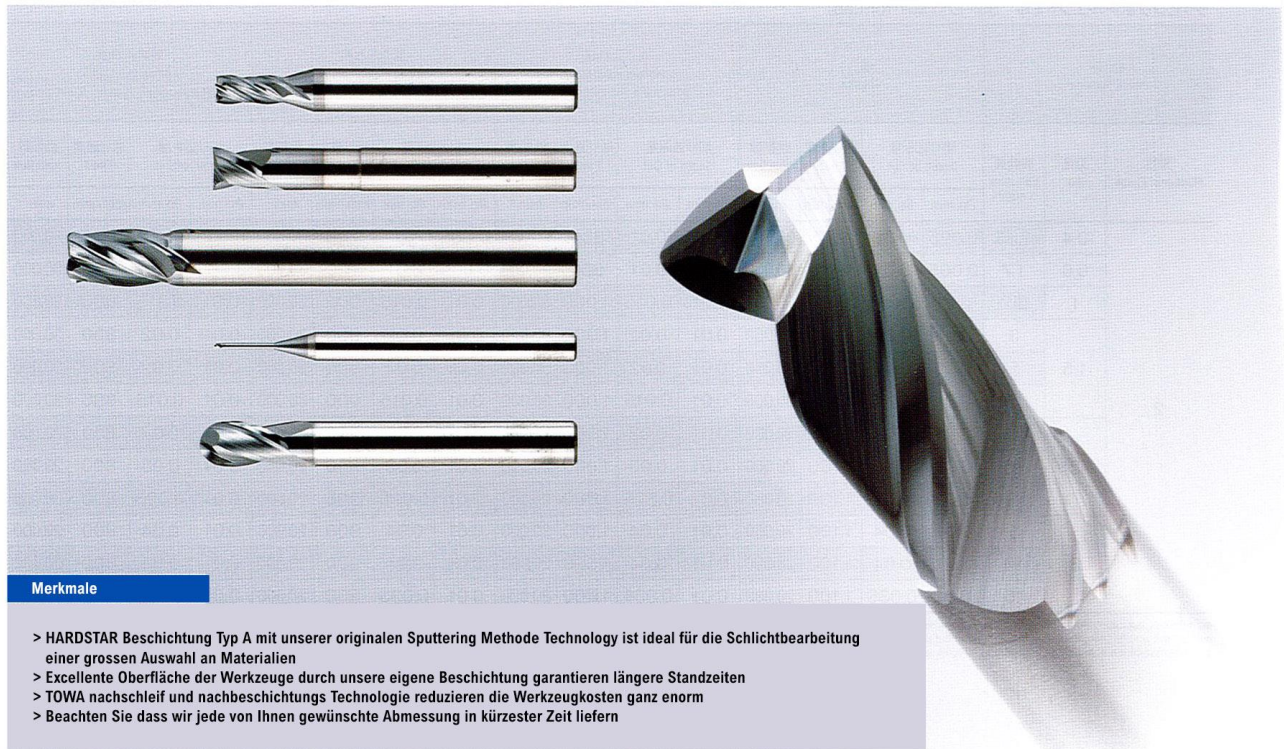
Category				
Hardness	Mark	Classification	Material	HARD STAR Type A
Hardness ~HRC50	K	Gusseisen	FCD	
		Carbon Stahl	S50C/SS400 Stahl 44	
	P	vorgehärtete Stähle	PX5/NAK80 1.2083 / 1.2312	
		Stähle	SKD11·SKD61 1.2379 / 1.2344	
		HSS Stähle	HAP5R·HAP72/ASP23	
	M	Rostfreie Stähle	SUS304 1.4301	
HPM/STAVAX 1.2083				
~HRC55	H	Rostfreie Stähle	HPM	○ Finishing
			STAVAX 1.2083	○ Finishing
Stähle		SKD61 1.2344	○ Finishing	
~HRC60		Stähle	SKD11 1.2379	○ Finishing
		HSS Stähle	SKH51 1.3343	○ Finishing
HRC60 over		HSS Stähle	ASP23	○ Finishing
			○ Finishing	
	HAP72 PM Stahl		○ Finishing	
Non-ferrous Metal	N	Kupferlegierungen	Kupfer Copper	
			Kupfer Wolfram Copper Tungsten	
	Alulegierungen	A5000 Series	○ Finishing	
		A7000 Series	○ Finishing	
	Graphite	Graphite		
	S	hitzebeständige Legierungen	Inconel	
Kovar			○ Finishing	
Titanlegierungen Titanium Alloy				
3D Printer	P	Eisenlegierungen	Martensitische Stähle Maraging Steels	
	M		rostfreie Stähle Stainless Steels	

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HARD STAR Type A Series

Carbide End Mill



Merkmale

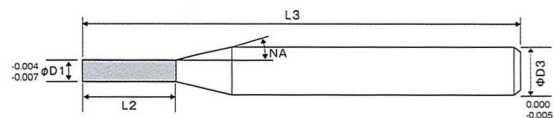
- > HARDSTAR Beschichtung Typ A mit unserer originalen Sputtering Methode Technology ist ideal für die Schlichtbearbeitung einer grossen Auswahl an Materialien
- > Excellente Oberfläche der Werkzeuge durch unsere eigene Beschichtung garantieren längere Standzeiten
- > TOWA nachschleif und nachbeschichtungs Technologie reduzieren die Werkzeugkosten ganz enorm
- > Beachten Sie dass wir jede von Ihnen gewünschte Abmessung in kürzester Zeit liefern

Features

- Hard Star Type A coating with our original Sputtering Method Coating Technology is ideal for finishing a wide range of work materials.
- Smooth surface of the coating creates uniformed wear achieving greater tool life.
- TOWA re-polishing and re-coating technology enhances cutting tool life and reduces overall tooling cost.
- Non-standard custom-made products available.

Carbide Square End Mill

HAS230 Model number: HAS230



Der Hinterschliffwinkel NA ist ein Referenzwert.
Er basiert auf dem entsprechenden zu bearbeitenden Material
bitte beachten Sie das aktuelle Massblatt

HARD STAR Type A Series

VHM Schaftfräser Typ A HAS 230

Bestell-Code Code No.	WZ-Ø Tool Diameter	Schneidenlänge Length of Cut	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length
HAS230-0010-00020	0.1	0.2	15	4	50
HAS230-0020-00040	0.2	0.4	15	4	50
HAS230-0030-00060	0.3	0.6	15	4	50
HAS230-0040-00080	0.4	0.8	15	4	50
HAS230-0050-00100	0.5	1	15	4	50
HAS230-0060-00120	0.6	1.2	15	4	50
HAS230-0070-00140	0.7	1.4	15	4	50
HAS230-0080-00160	0.8	1.6	15	4	50
HAS230-0090-00180	0.9	1.8	15	4	50
HAS230-0100-00200	1	2	15	4	50
HAS230-0110-00220	1.1	2.2	15	4	50
HAS230-0120-00240	1.2	2.4	15	4	50
HAS230-0130-00260	1.3	2.6	15	4	50
HAS230-0140-00280	1.4	2.8	15	4	50
HAS230-0150-00300	1.5	3	15	4	50
HAS230-0160-00320	1.6	3.2	15	4	50
HAS230-0170-00340	1.7	3.4	15	4	50
HAS230-0180-00360	1.8	3.6	15	4	50
HAS230-0190-00380	1.9	3.8	15	4	50
HAS230-0200-00400	2	4	15	4	50
HAS230-0210-00420	2.1	4.2	15	4	50
HAS230-0220-00440	2.2	4.4	15	4	50
HAS230-0230-00460	2.3	4.6	15	4	50
HAS230-0240-00480	2.4	4.8	15	4	50
HAS230-0250-00500	2.5	5	15	4	50
HAS230-0260-00520	2.6	5.2	15	4	50
HAS230-0270-00540	2.7	5.4	15	4	50
HAS230-0280-00560	2.8	5.6	15	4	50
HAS230-0290-00580	2.9	5.8	15	4	50
HAS230-0300-00600	3	6	15	4	50
HAS230-0350-00700	3.5	7	15	6	50
HAS230-0400-00800	4	8	15	6	50
HAS230-0450-00900	4.5	9	15	6	50
HAS230-0500-01000	5	10	15	6	50
HAS230-0550-01100	5.5	11	15	6	50
HAS230-0600-01200	6	12	—	6	50

HARD STAR Type A Series

HARD STAR Type A
Recommended Milling Conditions

■ **:HAS230**
Model number:HAS230

Empfohlene Parameter Schafffräser HAS 230

Work Material			Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Length of Cut	Depth of Cut		Feed mm/min	Spindle Speed min ⁻¹	Depth of Cut		Feed mm/min	Spindle Speed min ⁻¹	Depth of Cut		Feed mm/min	Spindle Speed min ⁻¹
			∅p mm	∅e mm			∅p mm	∅e mm			∅p mm	∅e mm		
2	0.1	0.2	0.1	0.002	130	40,000	0.1	0.002	100	40,000	0.1	0.002	70	40,000
	0.2	0.4	0.2	0.004	200	30,000	0.2	0.004	160	30,000	0.2	0.004	120	30,000
	0.3	0.6	0.3	0.006	300	30,000	0.3	0.006	250	30,000	0.3	0.006	200	30,000
	0.4	0.8	0.4	0.008	370	30,000	0.4	0.008	340	30,000	0.4	0.008	260	25,000
	0.5	1	0.5	0.01	450	25,000	0.5	0.01	400	23,000	0.5	0.01	360	20,000
	0.6	1.2	0.6	0.012	530	25,000	0.6	0.012	430	23,000	0.6	0.012	380	20,000
	0.7	1.4	0.7	0.014	650	25,000	0.7	0.014	500	23,000	0.7	0.014	450	20,000
	0.8	1.6	0.8	0.016	780	25,000	0.8	0.016	650	23,000	0.8	0.016	550	20,000
	0.9	1.8	0.9	0.018	800	25,000	0.9	0.018	700	23,000	0.9	0.018	600	20,000
	1	2	1	0.02	1,000	23,000	1	0.02	900	18,000	1	0.02	600	14,000
	1.1	2.2	1.1	0.022	1,000	23,000	1.1	0.022	900	18,000	1.1	0.022	600	14,000
	1.2	2.4	1.2	0.024	1,000	23,000	1.2	0.024	900	18,000	1.2	0.024	600	14,000
	1.3	2.6	1.3	0.026	1,000	23,000	1.3	0.026	900	18,000	1.3	0.026	600	14,000
	1.4	2.8	1.4	0.028	1,000	23,000	1.4	0.028	900	18,000	1.4	0.028	600	14,000
	1.5	3	1.5	0.03	900	20,000	1.5	0.03	800	18,000	1.5	0.03	600	14,000
	1.6	3.2	1.6	0.032	900	20,000	1.6	0.032	800	18,000	1.6	0.032	600	14,000
	1.7	3.4	1.7	0.034	900	20,000	1.7	0.034	800	18,000	1.7	0.034	600	14,000
	1.8	3.6	1.8	0.036	900	20,000	1.8	0.036	800	18,000	1.8	0.036	600	14,000
	1.9	3.8	1.9	0.038	900	20,000	1.9	0.038	800	18,000	1.9	0.038	600	14,000
	2	4	2	0.04	900	18,000	2	0.04	750	15,000	2	0.04	550	12,000
	2.1	4.2	2.1	0.042	900	18,000	2.1	0.042	750	15,000	2.1	0.042	550	12,000
	2.2	4.4	2.2	0.044	900	18,000	2.2	0.044	750	15,000	2.2	0.044	550	12,000
	2.3	4.6	2.3	0.046	900	18,000	2.3	0.046	750	15,000	2.3	0.046	550	12,000
	2.4	4.8	2.4	0.048	900	18,000	2.4	0.048	750	15,000	2.4	0.048	550	12,000
	2.5	5	2.5	0.05	800	14,000	2.5	0.05	700	10,000	2.5	0.05	500	8,000
	2.6	5.2	2.6	0.052	800	14,000	2.6	0.052	700	10,000	2.6	0.052	500	8,000
	2.7	5.4	2.7	0.054	800	14,000	2.7	0.054	700	10,000	2.7	0.054	500	8,000
	2.8	5.6	2.8	0.056	800	14,000	2.8	0.056	700	10,000	2.8	0.056	500	8,000
	2.9	5.8	2.9	0.058	800	14,000	2.9	0.058	700	10,000	2.9	0.058	500	8,000
	3	6	3	0.06	850	14,000	3	0.06	750	10,000	3	0.06	550	8,000
3.5	7	3.5	0.07	850	14,000	3.5	0.07	750	10,000	3.5	0.07	550	8,000	
4	8	4	0.08	850	10,000	4	0.08	750	9,000	4	0.08	650	9,000	
4.5	9	4.5	0.09	850	10,000	4.5	0.09	750	9,000	4.5	0.09	650	9,000	
5	10	5	0.1	800	6,000	5	0.1	700	5,000	5	0.1	600	4,500	
5.5	11	5.5	0.11	800	6,000	5.5	0.11	700	5,000	5.5	0.11	600	4,500	
6	12	6	0.12	800	5,000	6	0.12	700	4,000	6	0.12	700	3,500	

Schrumpfen des Werkzeuges vermindert Werkzeugdurchbiegung
Schnitttiefe zeigt max. Wert für schlichten
Ap = Axial / Ae = Radial

Ölnebel-Kühlung oder wasserlose Schneidemulsion empfohlen
Auskräglänge soll so kurz wie möglich sein
Anpassung der Parameter an die tatsächlichen Begebenheiten empfohlen

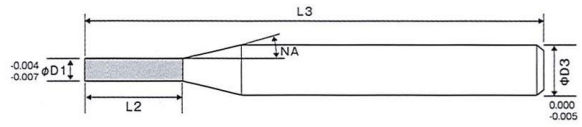
HARD STAR Type A Series

Work Material			Aluminum Alloy A5000				Aluminum Alloy A7000				Heat Resistant Alloy (Kovar)			
Number of Flutes	Dia.	Length of Cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			ϕp mm	ϕe mm	mm/min	min ⁻¹	ϕp mm	ϕe mm	mm/min	min ⁻¹	ϕp mm	ϕe mm	mm/min	min ⁻¹
2	0.1	0.2	0.1	0.02	60	50,000	0.1	0.02	60	50,000	0.1	0.003	60	50,000
	0.2	0.4	0.2	0.04	90	50,000	0.2	0.04	90	50,000	0.2	0.006	90	50,000
	0.3	0.6	0.3	0.06	150	50,000	0.3	0.06	150	50,000	0.3	0.009	150	50,000
	0.4	0.8	0.4	0.08	200	50,000	0.4	0.08	200	50,000	0.4	0.012	200	50,000
	0.5	1	0.5	0.1	250	50,000	0.5	0.1	250	50,000	0.5	0.015	250	50,000
	0.6	1.2	0.6	0.12	250	50,000	0.6	0.12	250	50,000	0.6	0.018	250	50,000
	0.7	1.4	0.7	0.14	250	50,000	0.7	0.14	250	50,000	0.7	0.021	250	50,000
	0.8	1.6	0.8	0.16	450	50,000	0.8	0.16	450	50,000	0.8	0.024	450	50,000
	0.9	1.8	0.9	0.18	450	50,000	0.9	0.18	450	50,000	0.9	0.027	450	50,000
	1	2	1	0.2	550	48,000	1	0.2	550	48,000	0.2	0.03	550	48,000
	1.1	2.2	1.1	0.22	550	48,000	1.1	0.22	550	48,000	1.1	0.033	550	48,000
	1.2	2.4	1.2	0.24	550	48,000	1.2	0.24	550	48,000	1.2	0.036	550	48,000
	1.3	2.6	1.3	0.26	550	48,000	1.3	0.26	550	48,000	1.3	0.039	550	48,000
	1.4	2.8	1.4	0.28	550	48,000	1.4	0.28	550	48,000	1.4	0.042	550	48,000
	1.5	3	1.5	0.3	640	32,000	1	0.2	640	32,000	1	0.045	640	32,000
	1.6	3.2	1.6	0.32	640	32,000	1.6	0.32	640	32,000	1.6	0.048	640	32,000
	1.7	3.4	1.7	0.34	640	32,000	1.7	0.34	640	32,000	1.7	0.051	640	32,000
	1.8	3.6	1.8	0.36	640	32,000	1.8	0.36	640	32,000	1.8	0.054	640	32,000
	1.9	3.8	1.9	0.38	640	32,000	1.9	0.38	640	32,000	1.9	0.057	640	32,000
	2	4	2	0.4	720	24,000	2	0.4	720	24,000	2	0.06	720	24,000
	2.1	4.2	2.1	0.42	720	24,000	2.1	0.42	720	24,000	2.1	0.063	720	24,000
	2.2	4.4	2.2	0.44	720	24,000	2.2	0.44	720	24,000	2.2	0.066	720	24,000
	2.3	4.6	2.3	0.46	720	24,000	2.3	0.46	720	24,000	2.3	0.069	720	24,000
	2.4	4.8	2.4	0.48	720	24,000	2.4	0.48	720	24,000	2.4	0.072	720	24,000
	2.5	5	2.5	0.5	760	20,000	2.5	0.5	760	20,000	2.5	0.075	760	20,000
	2.6	5.2	2.6	0.52	760	20,000	2.6	0.52	760	20,000	2.6	0.078	760	20,000
	2.7	5.4	2.7	0.54	760	20,000	2.7	0.54	760	20,000	2.7	0.081	760	20,000
	2.8	5.6	2.8	0.56	760	20,000	2.8	0.56	760	20,000	2.8	0.084	760	20,000
	2.9	5.8	2.9	0.58	760	20,000	2.9	0.58	760	20,000	2.9	0.087	760	20,000
	3	6	3	0.6	800	16,000	3	0.6	800	16,000	3	0.09	800	16,000
3.5	7	3.5	0.7	800	16,000	3.5	0.7	800	16,000	3.5	0.105	800	16,000	
4	8	4	0.8	830	12,000	4	0.8	830	12,000	4	0.12	830	12,000	
4.5	9	4.5	0.9	830	12,000	4.5	0.9	830	12,000	4.5	0.135	830	12,000	
5	10	5	1	830	9,500	5	1	830	9,500	5	0.15	830	9,500	
5.5	11	5.5	1.1	860	9,500	5.5	1.1	860	9,500	5.5	0.165	860	9,500	
6	12	6	1.2	850	8,000	6	1.2	850	8,000	6	0.18	850	8,000	

HARD STAR Type A Series

Carbide Square End Mill

HAS430 Model number: HAS430



Der Hinterschliffwinkel NA ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
bitte checken Sie das aktuelle Massblatt

Bestell-Code Code No.	WZ-Ø Tool Diameter	Schneidenlänge Length of Cut	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length
HAS430-0100-00200	1	2	15	4	50
HAS430-0150-00300	1.5	3	15	4	50
HAS430-0200-00400	2	4	15	4	50
HAS430-0300-00600	3	6	15	4	50
HAS430-0400-00800	4	8	15	6	50
HAS430-0600-01200	6	12	—	6	60
HAS430-0600-01800		18	—	6	60
HAS430-0800-01600	8	16	—	8	70
HAS430-0800-02400		24	—	8	70
HAS430-1000-02000	10	20	—	10	80
HAS430-1000-03000		30	—	10	80
HAS430-1200-02400	12	24	—	12	110
HAS430-1200-03600		36	—	12	110

HARD STAR Type A Series

HARD STAR Type A
Recommended Milling Conditions

■ :HAS430
Model number:HAS430

Empfohlene Schnittparameter

Work Material			Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Length of Cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
4	1	2	1	0.02	280	6,400	1	0.015	240	5,400	1	0.01	200	4,800
	1.5	3	1.5	0.03	300	4,200	1.5	0.02	230	3,600	1.5	0.01	180	3,200
	2	4	2	0.04	320	3,200	2	0.03	230	2,700	2	0.02	180	2,400
	3	6	3	0.06	520	3,700	3	0.05	380	3,200	3	0.05	260	2,600
	4	8	4	0.08	450	2,800	4	0.07	380	2,400	4	0.06	260	2,000
	6	12	6	0.12	500	2,300	6	0.1	400	2,000	6	0.08	300	1,900
		18	9	0.06	480	2,300	9	0.05	380	2,000	9	0.04	280	1,900
	8	16	8	0.16	300	1,800	8	0.13	250	1,700	8	0.1	200	1,600
		24	12	0.08	280	1,800	12	0.05	230	1,700	12	0.04	180	1,600
	10	20	10	0.2	250	1,600	10	0.17	200	1,500	10	0.13	200	1,400
		30	15	0.2	230	1,600	15	0.17	180	1,500	15	0.13	180	1,400
	12	24	12	0.24	240	1,500	12	0.2	200	1,400	12	0.15	200	1,300
36		18	0.12	220	1,500	18	0.09	180	1,400	18	0.06	180	1,300	

Work Material			Aluminum Alloy A5000				Aluminum Alloy A7000				Heat Resistant Alloy (Kovar)			
Number of Flutes	Dia.	Length of Cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
4	1	2	1	0.2	840	6,400	1	0.2	840	6,400	1	0.02	280	6,400
	1.5	3	1.5	0.3	900	4,200	1.5	0.3	900	4,200	1.5	0.03	300	4,200
	2	4	2	0.4	960	3,200	2	0.4	960	3,200	2	0.04	320	3,200
	3	6	3	0.6	1,560	3,700	3	0.6	1,560	3,700	3	0.06	520	3,700
	4	8	4	0.8	1,350	2,800	4	0.8	1,350	2,800	4	0.08	450	2,800
	6	12	6	1.2	1,500	2,500	6	1.2	1,500	2,500	6	0.12	400	2,300
		18	9	1.2	1,440	2,500	9	1.2	1,440	2,500	9	0.06	350	2,300
	8	16	8	1.6	900	1,800	8	1.6	900	1,800	8	0.16	300	1,800
		24	12	1.6	840	1,800	12	1.6	840	1,800	12	0.08	280	1,800
	10	20	10	2	750	1,600	10	2	750	1,600	10	0.2	250	1,600
		30	15	2	690	1,600	15	2	690	1,600	15	0.2	230	1,600
	12	24	12	2.4	720	1,500	12	2.4	720	1,500	12	0.24	240	1,500
36		18	2.4	660	1,500	18	2.4	660	1,500	18	0.12	220	1,500	

Schrumpfen des Werkzeuges vermindert Werkzeugdurchbiegung
Schnitttiefe zeigt max. Wert für Schichten
Ap = Axial / Ae = Radial

Ölnebel-Kühlung oder wasserlose Schneidemulsion empfohlen
Auskräglänge soll so kurz wie möglich sein
Anpassung der Parameter an die tatsächlichen Begebenheiten empfohlen

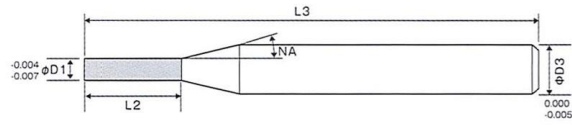
HARD STAR Type A Series

Carbide Square End Mill

HAS630 Model number: HAS630



Schafffräser lang



Der Hinterschliffwinkel ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
Bitte checken Sie das aktuelle Massblatt

Bestell-Code Code No.	WT-Ø Tool Diameter	Schneidenlänge Length of Cut	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length
HAS630-0500-01000	5	10	15	6	50
HAS630-0500-01500		15	15	6	60
HAS630-0600-01200	6	12	—	6	60
HAS630-0600-01800		18	—	6	60
HAS630-0800-01600	8	16	—	8	70
HAS630-0800-02400		24	—	8	80
HAS630-1000-02000	10	20	—	10	80
HAS630-1000-03000		30	—	10	90
HAS630-1200-02400	12	24	—	12	110
HAS630-1200-03600		36	—	12	110

HARD STAR Type A Series

HARD STAR Type A
Recommended Milling Conditions

■ :HAS630
Model number:HAS630

Empfohlene Schnittparameter

Square End Mill

Work Material			Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Length of Cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
6	5	10	5	0.1	1,200	5,100	5	0.1	1,000	4,500	5	0.05	800	3,800
		15	7.5	0.08	1,200	5,100	7.5	0.08	1,000	4,500	7.5	0.04	800	3,800
	6	12	6	0.12	1,300	4,200	6	0.12	1,100	3,700	6	0.06	680	3,200
		18	9	0.1	1,300	4,200	9	0.1	1,100	3,700	9	0.05	680	3,200
	8	16	8	0.16	1,500	3,200	8	0.16	1,300	2,800	8	0.08	750	2,400
		24	12	0.15	1,500	3,200	12	0.15	1,300	2,800	12	0.07	750	2,400
	10	20	10	0.2	1,500	2,600	10	0.2	1,300	2,200	10	0.1	900	1,900
		30	15	0.17	1,500	2,600	15	0.17	1,300	2,200	15	0.08	900	1,900
	12	24	12	0.24	1,300	2,100	12	0.24	1,100	1,900	12	0.12	960	1,600
		36	18	0.2	1,300	2,100	18	0.2	1,100	1,900	18	0.1	960	1,600

Square End Mill

Work Material			Aluminum Alloy A5000				Aluminum Alloy A7000				Heat Resistant Alloy Kovar			
Number of Flutes	Dia.	Length of Cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
6	5	10	5	0.1	1,000	5,100	5	0.1	1,000	5,100	5	0.1	1,200	5,100
		15	7.5	0.08	1,100	5,100	7.5	0.08	1,100	5,100	7.5	0.08	1,200	5,100
	6	12	6	0.12	1,200	4,200	6	0.12	1,200	4,200	6	0.12	1,300	4,200
		18	9	0.1	1,800	4,200	9	0.1	1,800	4,200	9	0.1	1,300	4,200
	8	16	8	0.16	1,600	3,200	8	0.16	1,600	3,200	8	0.16	1,500	3,200
		24	12	0.15	1,100	3,200	12	0.15	1,100	3,200	12	0.15	1,500	3,200
	10	20	10	0.2	1,000	2,600	10	0.2	1,000	2,600	10	0.2	1,500	2,600
		30	15	0.17	900	2,600	15	0.17	900	2,600	15	0.17	1,500	2,600
	12	24	12	0.24	800	2,100	12	0.24	800	2,100	12	0.24	1,300	2,100
		36	18	0.2	850	2,100	18	0.2	850	2,100	18	0.2	1,300	2,100

Schrumpfen des Werkzeuges vermindert Werkzeugdurchbiegung
Schnitttiefe zeigt max. Wert für schlichten
Ap = Axial / Ae = Radial

Ölnebel Kühlung oder wasserlose Schneidemulsion empfohlen
Auskrüglänge soll so kurz wie möglich sein
Anpassung der Parameter an die tatsächlichen Begebenheiten empfohlen

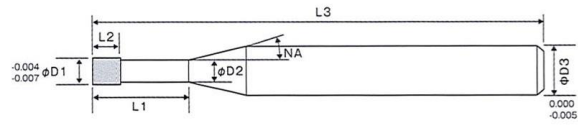
HARD STAR Type A Series

Carbide Long Neck Square End Mill

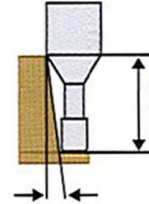
■ :HALS230 Model number:HALS230



Schafffräser mit langem Hinterschliff

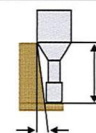


Der Hinterschliffwinkel ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
Bitte checken Sie das aktuelle Massblatt



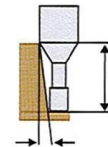
Bestell-Code Code No.	WZ-Ø Tool Diameter	Nutzlänge Effective Length	Schneid-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Actual effective length by inclined angle of workpiece.				
								30°	1°	1°30'	2°	3°
HALS230-0010-0030	0.1	0.3	0.08	0.08	15	4	50	0.35	0.36	0.37	0.39	0.42
HALS230-0010-0050		0.5	0.08	0.08	15	4	50	0.56	0.57	0.60	0.62	0.67
HALS230-0015-0030	0.15	0.3	0.12	0.13	15	4	50	0.35	0.36	0.37	0.39	0.42
HALS230-0015-0050		0.5	0.12	0.13	15	4	50	0.56	0.57	0.60	0.62	0.67
HALS230-0020-0050	0.2	0.5	0.15	0.18	15	4	50	0.56	0.57	0.60	0.62	0.67
HALS230-0020-0075		0.75	0.15	0.18	15	4	50	0.81	0.84	0.87	0.91	0.98
HALS230-0020-0100	0.3	1	0.15	0.18	15	4	50	1.07	1.11	1.15	1.19	1.29
HALS230-0030-0100		1	0.25	0.27	15	4	50	1.09	1.13	1.17	1.21	1.31
HALS230-0030-0150		1.5	0.25	0.27	15	4	50	1.61	1.66	1.72	1.79	1.93
HALS230-0030-0200		2	0.25	0.27	15	4	50	2.13	2.20	2.28	2.36	2.56
HALS230-0030-0250		2.5	0.25	0.27	15	4	50	2.64	2.73	2.83	2.94	3.18
HALS230-0030-0300	3	0.25	0.27	15	4	50	3.16	3.27	3.39	3.51	3.80	
HALS230-0040-0100	0.4	1	0.3	0.37	15	4	50	1.09	1.13	1.17	1.21	1.31
HALS230-0040-0150		1.5	0.3	0.37	15	4	50	1.61	1.66	1.72	1.79	1.93
HALS230-0040-0200		2	0.3	0.37	15	4	50	2.13	2.20	2.28	2.36	2.56
HALS230-0040-0250		2.5	0.3	0.37	15	4	50	2.64	2.73	2.83	2.94	3.18
HALS230-0040-0300		3	0.3	0.37	15	4	50	3.16	3.27	3.39	3.51	3.80
HALS230-0050-0100	0.5	1	0.4	0.47	15	4	50	1.09	1.13	1.17	1.21	1.31
HALS230-0050-0150		1.5	0.4	0.47	15	4	50	1.61	1.66	1.72	1.79	1.93
HALS230-0050-0200		2	0.4	0.47	15	4	50	2.13	2.20	2.28	2.36	2.56
HALS230-0050-0250		2.5	0.4	0.47	15	4	50	2.64	2.73	2.83	2.94	3.18
HALS230-0050-0300		3	0.4	0.47	15	4	50	3.16	3.27	3.39	3.51	3.80
HALS230-0050-0350		3.5	0.4	0.47	15	4	50	3.68	3.80	3.94	4.09	4.42
HALS230-0050-0400	4	0.4	0.47	15	4	50	4.19	4.34	4.50	4.66	5.04	
HALS230-0060-0150	0.6	1.5	0.5	0.57	15	4	50	1.61	1.66	1.72	1.79	1.93
HALS230-0060-0200		2	0.5	0.57	15	4	50	2.13	2.20	2.28	2.36	2.56
HALS230-0060-0300		3	0.5	0.57	15	4	50	3.16	3.27	3.39	3.51	3.80
HALS230-0060-0400		4	0.5	0.57	15	4	50	4.19	4.34	4.50	4.66	5.04
HALS230-0060-0500		5	0.5	0.57	15	4	50	5.23	5.41	5.60	5.81	6.29
HALS230-0060-0600	6	0.5	0.57	15	4	50	6.26	6.48	6.71	6.96	7.53	

HARD STAR Type A Series



Bestell-Code Code No.	WZ-Ø Tool Diameter	Nutzlänge Effective Length	Schneid-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Actual effective length by inclined angle of workpiece.				
								30°	1°	1°30'	2°	3°
								HALS230-0070-0200	0.7	2	0.55	0.67
HALS230-0070-0400	4	0.55	0.67	15	4	50	4.19	4.34		4.50	4.66	5.04
HALS230-0070-0600	6	0.55	0.67	15	4	50	6.26	6.48		6.71	6.96	7.53
HALS230-0080-0300	0.8	3	0.65	0.77	15	4	50	3.16	3.27	3.39	3.51	3.80
HALS230-0080-0400		4	0.65	0.77	15	4	50	4.19	4.34	4.50	4.66	5.04
HALS230-0080-0500		5	0.65	0.77	15	4	50	5.23	5.41	5.60	5.81	6.29
HALS230-0080-0600		6	0.65	0.77	15	4	50	6.26	6.48	6.71	6.96	7.53
HALS230-0080-0800	1	8	0.65	0.77	15	4	50	8.33	8.62	8.93	9.26	10.01
HALS230-0100-0200		2	0.8	0.95	15	4	50	2.16	2.24	2.32	2.41	2.60
HALS230-0100-0300		3	0.8	0.95	15	4	50	3.20	3.31	3.43	3.56	3.85
HALS230-0100-0400		4	0.8	0.95	15	4	50	4.23	4.38	4.54	4.71	5.09
HALS230-0100-0500		5	0.8	0.95	15	4	50	5.26	5.45	5.64	5.86	6.33
HALS230-0100-0600		6	0.8	0.95	15	4	50	6.30	6.52	6.75	7.01	7.57
HALS230-0100-0700		7	0.8	0.95	15	4	50	7.33	7.59	7.86	8.16	8.82
HALS230-0100-0800		8	0.8	0.95	15	4	50	8.37	8.66	8.97	9.31	10.06
HALS230-0100-0900		9	0.8	0.95	15	4	50	9.40	9.73	10.08	10.46	11.30
HALS230-0100-1000		10	0.8	0.95	15	4	50	10.43	10.80	11.19	11.61	12.55
HALS230-0100-1200		12	0.8	0.95	15	4	50	12.50	12.94	13.40	13.91	15.03
HALS230-0120-0600		1.2	6	1	1.15	15	4	50	6.30	6.52	6.75	7.01
HALS230-0120-0800	8		1	1.15	15	4	50	8.37	8.66	8.97	9.31	10.06
HALS230-0120-1000	10		1	1.15	15	4	50	10.43	10.80	11.19	11.61	12.55
HALS230-0120-1200	12		1	1.15	15	4	50	12.50	12.94	13.40	13.91	15.03
HALS230-0120-1600	1.4	16	1	1.15	15	4	50	16.64	17.21	17.84	18.50	20.01
HALS230-0140-0600		6	1.1	1.35	15	4	50	6.30	6.52	6.75	7.01	7.57
HALS230-0140-1200	1.5	12	1.1	1.35	15	4	50	12.50	12.94	13.40	13.91	15.03
HALS230-0150-0400		4	1.2	1.45	15	4	50	4.23	4.38	4.54	4.71	5.09
HALS230-0150-0600		6	1.2	1.45	15	4	50	6.30	6.52	6.75	7.01	7.57
HALS230-0150-0800		8	1.2	1.45	15	4	50	8.37	8.66	8.97	9.31	10.06
HALS230-0150-1000		10	1.2	1.45	15	4	50	10.43	10.80	11.19	11.61	12.55
HALS230-0150-1200		12	1.2	1.45	15	4	50	12.50	12.94	13.40	13.91	15.03
HALS230-0150-1400		14	1.2	1.45	15	4	50	14.57	15.08	15.62	16.21	17.52
HALS230-0150-1600		16	1.2	1.45	15	4	50	16.64	17.21	17.84	18.50	20.01
HALS230-0160-0600	1.6	6	1.3	1.55	15	4	50	6.30	6.52	6.75	7.01	7.57
HALS230-0160-0800		8	1.3	1.55	15	4	50	8.37	8.66	8.97	9.31	10.06
HALS230-0180-0600	1.8	6	1.4	1.75	15	4	50	6.30	6.52	6.75	7.01	7.57
HALS230-0180-0800		8	1.4	1.75	15	4	50	8.37	8.66	8.97	9.31	10.06
HALS230-0180-1000		10	1.4	1.75	15	4	50	10.43	10.80	11.19	11.61	12.55
HALS230-0180-1200		12	1.4	1.75	15	4	50	12.50	12.94	13.40	13.91	15.03
HALS230-0180-1400		14	1.4	1.75	15	4	50	14.57	15.08	15.62	16.21	17.52
HALS230-0180-1600		16	1.4	1.75	15	4	50	16.64	17.21	17.84	18.50	20.01
HALS230-0200-0400	2	4	1.6	1.94	15	4	50	4.25	4.40	4.56	4.73	5.11
HALS230-0200-0600		6	1.6	1.94	15	4	50	6.32	6.54	6.77	7.03	7.60
HALS230-0200-0800		8	1.6	1.94	15	4	50	8.39	8.68	8.99	9.33	10.08
HALS230-0200-1000		10	1.6	1.94	15	4	50	10.45	10.82	11.21	11.63	12.57
HALS230-0200-1200		12	1.6	1.94	15	4	50	12.52	12.96	13.42	13.93	15.06

HARD STAR Type A Series



Bestell-Code Code No.	WZ-Ø Tool Diameter	Nutzlänge Effective Length	Schneid-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Actual effective length by inclined angle of workpiece.				
								30°	1°	1°30'	2°	3°
HALS230-0200-1400	2	14	1.6	1.94	15	4	50	14.59	15.10	15.64	16.23	17.54
HALS230-0200-1600		16	1.6	1.94	15	4	50	16.65	17.23	17.86	18.53	FREE
HALS230-0200-1800		18	1.6	1.94	15	4	50	18.72	19.37	20.07	20.83	FREE
HALS230-0200-2000		20	1.6	1.94	15	4	50	20.79	21.51	22.29	23.13	FREE
HALS230-0250-0800	2.5	8	2	2.44	15	4	50	8.39	8.68	8.99	9.33	10.08
HALS230-0250-1200		12	2	2.44	15	4	50	12.52	12.96	13.42	13.93	FREE
HALS230-0250-1600		16	2	2.44	15	4	50	16.65	17.23	17.86	18.53	FREE
HALS230-0250-2000		20	2	2.44	15	4	50	20.79	21.51	22.29	FREE	FREE
HALS230-0300-0800	3	8	4.5	2.85	15	4	50	8.56	8.86	9.18	9.52	FREE
HALS230-0300-1200		12	4.5	2.85	15	4	50	12.69	13.14	13.61	14.12	FREE
HALS230-0300-1600		16	4.5	2.85	15	4	50	16.83	17.41	18.04	FREE	FREE
HALS230-0300-2000		20	4.5	2.85	15	4	50	20.96	21.69	FREE	FREE	FREE
HALS230-0300-2500		25	4.5	2.85	15	4	60	26.13	27.04	FREE	FREE	FREE
HALS230-0300-3000		30	4.5	2.85	15	4	60	31.30	FREE	FREE	FREE	FREE
HALS230-0400-1000	4	10	3	3.8	15	6	50	10.72	11.10	11.50	11.93	12.89
HALS230-0400-1500		15	3	3.8	15	6	50	15.89	16.44	17.04	17.68	FREE
HALS230-0400-2000		20	3	3.8	15	6	50	21.06	21.79	22.58	23.43	FREE
HALS230-0500-1500	5	15	3.5	4.8	15	6	50	15.89	16.44	17.04	FREE	FREE
HALS230-0500-2000		20	3.5	4.8	15	6	50	21.06	21.79	FREE	FREE	FREE
HALS230-0600-1500	6	15	6	5.8	15	6	50	FREE	FREE	FREE	FREE	FREE
HALS230-0600-2000		20	6	5.8	15	6	50	FREE	FREE	FREE	FREE	FREE
HALS230-0600-3000		30	6	5.8	15	6	60	FREE	FREE	FREE	FREE	FREE

HARD STAR Type A Series

HARD STAR Type A
Recommended Milling Conditions

■ :HALS230
Model number:HALS230

Empfohlene Schnittparameter

Long Neck Square End Mill

Work Material			Hardened Steels STAVAX/HPM (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm	mm/min	min ⁻¹	∅p mm	∅e mm	mm/min	min ⁻¹	∅p mm	∅e mm	mm/min	min ⁻¹
2	0.1	0.3	0.003	0.05	120	40,000	0.002	0.04	100	40,000	0.002	0.03	70	40,000
		0.5	0.003	0.05	80	40,000	0.002	0.04	60	40,000	0.002	0.03	50	40,000
	0.15	0.3	0.003	0.07	150	40,000	0.002	0.06	120	40,000	0.002	0.04	100	40,000
		0.5	0.003	0.07	120	40,000	0.002	0.06	100	40,000	0.002	0.04	80	40,000
	0.2	0.5	0.003	0.1	200	30,000	0.003	0.08	160	30,000	0.003	0.06	120	30,000
		0.75	0.003	0.1	180	30,000	0.003	0.08	140	30,000	0.003	0.06	100	30,000
		1	0.003	0.1	150	30,000	0.003	0.08	120	30,000	0.003	0.06	80	30,000
	0.3	1	0.003	0.15	300	30,000	0.003	0.12	250	30,000	0.003	0.09	200	30,000
		1.5	0.003	0.15	200	30,000	0.003	0.12	160	30,000	0.003	0.09	120	30,000
		2	0.003	0.15	150	30,000	0.003	0.12	120	30,000	0.003	0.09	100	25,000
		2.5	0.002	0.15	100	25,000	0.002	0.12	80	25,000	0.002	0.09	60	20,000
	0.4	3	0.002	0.15	50	25,000	0.002	0.12	40	25,000	0.002	0.09	30	20,000
		1	0.005	0.2	400	30,000	0.005	0.16	350	30,000	0.005	0.12	300	25,000
		1.5	0.005	0.2	360	30,000	0.005	0.16	330	30,000	0.005	0.12	250	25,000
		2	0.005	0.2	320	30,000	0.005	0.16	280	25,000	0.005	0.12	220	25,000
		2.5	0.005	0.2	280	25,000	0.004	0.16	250	25,000	0.004	0.12	200	20,000
	0.5	3	0.004	0.2	260	25,000	0.003	0.16	220	20,000	0.003	0.12	180	18,000
		1	0.01	0.25	500	25,000	0.007	0.2	450	23,000	0.005	0.15	400	20,000
		1.5	0.01	0.25	450	25,000	0.007	0.2	400	23,000	0.005	0.15	360	20,000
		2	0.01	0.25	420	25,000	0.007	0.2	380	23,000	0.005	0.15	320	20,000
		2.5	0.008	0.25	400	25,000	0.006	0.2	360	23,000	0.004	0.15	300	20,000
		3	0.007	0.25	350	25,000	0.005	0.2	320	23,000	0.003	0.15	280	20,000
		3.5	0.006	0.25	320	25,000	0.003	0.2	280	23,000	0.003	0.15	240	20,000
	0.6	4	0.005	0.25	280	25,000	0.003	0.2	240	23,000	0.002	0.15	200	20,000
1.5		0.01	0.3	550	25,000	0.007	0.25	450	23,000	0.005	0.18	400	20,000	
2		0.01	0.3	500	25,000	0.007	0.25	400	23,000	0.005	0.18	350	20,000	
3		0.007	0.3	450	25,000	0.005	0.25	350	23,000	0.003	0.18	300	20,000	
4		0.005	0.3	400	25,000	0.003	0.25	300	23,000	0.002	0.18	250	20,000	
5		0.003	0.3	350	20,000	0.003	0.25	250	18,000	0.002	0.18	200	16,000	
0.7	6	0.002	0.3	300	20,000	0.002	0.25	200	18,000	0.001	0.18	150	16,000	
	2	0.03	0.35	600	25,000	0.02	0.28	450	23,000	0.012	0.21	400	20,000	
	4	0.02	0.35	560	25,000	0.015	0.28	400	23,000	0.007	0.21	320	20,000	
0.8	6	0.015	0.35	410	20,000	0.012	0.28	300	18,000	0.007	0.21	240	16,000	
	3	0.03	0.4	780	25,000	0.02	0.32	650	23,000	0.012	0.24	550	20,000	
	4	0.025	0.4	700	25,000	0.015	0.32	600	23,000	0.007	0.24	500	20,000	
	5	0.02	0.4	630	23,000	0.012	0.32	530	20,000	0.006	0.24	450	18,000	
	6	0.02	0.4	550	20,000	0.01	0.32	450	18,000	0.005	0.24	350	16,000	
1	8	0.007	0.4	400	16,000	0.005	0.32	300	14,000	0.003	0.24	200	12,000	
	2	0.06	0.5	1,000	23,000	0.05	0.4	900	18,000	0.035	0.3	600	14,000	
	3	0.05	0.5	1,000	23,000	0.04	0.4	900	18,000	0.03	0.3	600	14,000	
	4	0.04	0.5	900	23,000	0.03	0.4	800	18,000	0.02	0.3	500	14,000	
		5	0.03	0.5	800	20,000	0.02	0.4	700	16,000	0.012	0.3	450	12,000

HARD STAR Type A Series

Empfohlene Schnittparameter

Long Neck Square End Mill

Work Material		Hardened Steels STAVAX/HPM (~55HRC)					Hardened Steels SKD11/SKH51 (~60HRC)					Hardened Steels ASP23/HAP5R/HAP72(60HRC~)				
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed		
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹		
2	1	6	0.02	0.5	700	18,000	0.01	0.4	600	14,000	0.007	0.3	400	10,000		
		7	0.02	0.5	650	18,000	0.01	0.4	550	14,000	0.006	0.3	370	10,000		
		8	0.02	0.5	600	16,000	0.01	0.4	500	12,000	0.005	0.3	340	8,000		
		9	0.015	0.5	550	16,000	0.007	0.4	450	12,000	0.005	0.3	300	8,000		
		10	0.01	0.5	500	14,000	0.007	0.4	400	10,000	0.005	0.3	250	6,000		
		12	0.01	0.5	400	13,000	0.005	0.4	300	10,000	0.004	0.3	180	6,000		
	1.2	6	0.03	0.6	700	18,000	0.02	0.5	600	14,000	0.01	0.4	400	10,000		
		8	0.02	0.6	600	16,000	0.01	0.5	500	12,000	0.007	0.4	340	8,000		
		10	0.02	0.6	500	12,000	0.01	0.5	430	10,000	0.005	0.4	300	8,000		
		12	0.01	0.6	500	10,000	0.007	0.5	400	9,000	0.005	0.4	250	7,000		
		16	0.01	0.6	300	9,000	0.005	0.5	260	8,000	0.003	0.4	180	6,000		
	1.4	6	0.04	0.7	800	20,000	0.03	0.56	700	18,000	0.02	0.42	450	12,000		
		12	0.01	0.7	500	13,000	0.007	0.56	400	11,000	0.005	0.42	280	8,000		
	1.5	4	0.05	0.75	900	20,000	0.04	0.6	800	18,000	0.03	0.45	600	14,000		
		6	0.04	0.75	800	20,000	0.03	0.6	700	18,000	0.02	0.45	500	14,000		
		8	0.03	0.75	600	18,000	0.03	0.6	600	14,000	0.01	0.45	380	10,000		
		10	0.03	0.75	500	16,000	0.02	0.6	500	14,000	0.01	0.45	350	10,000		
		12	0.02	0.75	500	14,000	0.02	0.6	430	12,000	0.007	0.45	310	8,000		
		14	0.02	0.75	400	12,000	0.01	0.6	380	10,000	0.007	0.45	250	7,500		
	1.6	6	0.04	0.8	850	19,000	0.03	0.64	750	17,000	0.025	0.48	600	13,000		
		8	0.03	0.8	750	17,000	0.03	0.64	600	14,000	0.015	0.48	430	10,000		
	1.8	6	0.05	0.9	900	18,000	0.04	0.7	750	15,000	0.03	0.5	600	12,000		
		8	0.04	0.9	800	16,000	0.03	0.7	600	12,000	0.02	0.5	500	9,500		
		10	0.04	0.9	700	14,000	0.03	0.7	500	12,000	0.02	0.5	450	9,500		
		12	0.03	0.9	600	12,000	0.02	0.7	500	10,000	0.01	0.5	400	8,200		
		14	0.03	0.9	600	12,000	0.02	0.7	430	10,000	0.01	0.5	360	8,200		
		16	0.02	0.9	500	10,000	0.01	0.7	400	9,200	0.007	0.5	340	7,500		
	2	4	0.08	1	1,000	18,000	0.06	0.8	800	15,000	0.04	0.6	600	12,000		
6		0.06	1	900	18,000	0.05	0.8	750	15,000	0.03	0.6	600	12,000			
8		0.05	1	800	16,000	0.04	0.8	600	12,000	0.02	0.6	500	9,500			
10		0.05	1	700	14,000	0.04	0.8	500	12,000	0.02	0.6	450	9,500			
12		0.04	1	600	12,000	0.03	0.8	500	10,000	0.01	0.6	400	8,200			
14		0.03	1	600	12,000	0.02	0.8	430	10,000	0.007	0.6	360	8,200			
16		0.03	1	500	10,000	0.02	0.8	400	9,200	0.007	0.6	340	7,500			
18		0.02	1	410	9,200	0.01	0.8	370	8,500	0.005	0.6	320	6,000			
2.5	8	0.07	1.25	800	14,000	0.05	1	700	10,000	0.03	0.75	500	8,000			
	12	0.06	1.25	700	12,000	0.04	1	600	9,600	0.02	0.75	480	7,500			
	16	0.05	1.25	600	10,000	0.02	1	500	8,500	0.01	0.75	400	7,000			
	20	0.05	1.25	500	8,200	0.02	1	500	7,500	0.01	0.75	400	5,000			

HARD STAR Type A Series

Empfohlene Schnittparameter

Long Neck Square End Mill

Work Material		Hardened Steels STAVAX/HPM (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)				
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			$\varnothing p$ mm	$\varnothing e$ mm	mm/min	min ⁻¹	$\varnothing p$ mm	$\varnothing e$ mm	mm/min	min ⁻¹	$\varnothing p$ mm	$\varnothing e$ mm	mm/min	min ⁻¹
2	3	8	0.1	1.5	900	14,000	0.07	1.2	800	10,000	0.05	0.9	600	8,000
		12	0.08	1.5	800	12,000	0.06	1.2	700	9,200	0.04	0.9	500	7,200
		16	0.07	1.5	700	10,000	0.05	1.2	600	8,500	0.03	0.9	400	6,500
		20	0.07	1.5	700	9,000	0.04	1.2	600	7,800	0.02	0.9	400	5,800
		25	0.06	1.5	600	8,200	0.03	1.2	500	7,000	0.01	0.9	360	5,000
		30	0.03	1.5	600	7,000	0.02	1.2	500	6,500	0.007	0.9	330	4,500
	4	10	0.1	2	900	10,000	0.07	1.8	800	9,000	0.05	1.5	700	9,000
		15	0.07	2	800	8,000	0.05	1.8	700	7,000	0.04	1.5	600	6,500
		20	0.06	2	750	7,000	0.04	1.8	650	6,000	0.03	1.5	550	5,500
	5	15	0.1	2.5	850	6,000	0.07	2.3	750	5,000	0.06	2	650	4,500
		20	0.08	2.5	800	5,000	0.06	2.3	700	4,000	0.05	2	600	3,500
	6	15	0.12	3	850	5,000	0.09	2.8	750	4,000	0.08	2.5	650	3,500
		20	0.1	3	800	4,000	0.07	2.8	700	3,000	0.06	2.5	600	2,500
		30	0.08	3	700	3,000	0.06	2.8	600	2,000	0.05	2.5	500	1,500

HARD STAR Type A Series

Empfohlene Schnittparameter

Long Neck Square End Mill

Work Material		Aluminum Alloy A5000					Aluminum Alloy A7000 ²					Heat Resistant Alloy (Kovar)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹	
2	0.1	0.3	0.012	0.05	120	40,000	0.012	0.05	120	40,000	0.003	0.05	120	40,000	
		0.5	0.012	0.05	80	40,000	0.012	0.05	80	40,000	0.003	0.05	80	40,000	
	0.15	0.3	0.012	0.07	150	40,000	0.012	0.07	150	40,000	0.003	0.07	150	40,000	
		0.5	0.012	0.07	120	40,000	0.012	0.07	120	40,000	0.003	0.07	120	40,000	
	0.2	0.5	0.012	0.1	200	30,000	0.012	0.1	200	30,000	0.003	0.1	200	30,000	
		0.75	0.012	0.1	180	30,000	0.012	0.1	180	30,000	0.003	0.1	180	30,000	
		1	0.012	0.1	150	30,000	0.012	0.1	150	30,000	0.003	0.1	150	30,000	
	0.3	1	0.012	0.15	300	30,000	0.012	0.15	300	30,000	0.003	0.15	300	30,000	
		1.5	0.012	0.15	200	30,000	0.012	0.15	200	30,000	0.003	0.15	200	30,000	
		2	0.012	0.15	150	30,000	0.012	0.15	150	30,000	0.003	0.15	150	30,000	
		2.5	0.008	0.15	100	25,000	0.008	0.15	100	25,000	0.002	0.15	100	25,000	
	0.4	3	0.008	0.15	50	25,000	0.008	0.15	50	25,000	0.002	0.15	50	25,000	
		1	0.02	0.2	400	30,000	0.02	0.2	400	30,000	0.005	0.2	400	30,000	
		1.5	0.02	0.2	360	30,000	0.02	0.2	360	30,000	0.005	0.2	360	30,000	
		2	0.02	0.2	320	30,000	0.02	0.2	320	30,000	0.005	0.2	320	30,000	
		2.5	0.02	0.2	280	25,000	0.02	0.2	280	25,000	0.005	0.2	280	25,000	
	0.5	3	0.016	0.2	260	25,000	0.016	0.2	260	25,000	0.004	0.2	260	25,000	
		1	0.04	0.25	500	25,000	0.04	0.25	500	25,000	0.01	0.25	500	25,000	
		1.5	0.04	0.25	450	25,000	0.04	0.25	450	25,000	0.01	0.25	450	25,000	
		2	0.04	0.25	420	25,000	0.04	0.25	420	25,000	0.01	0.25	420	25,000	
2.5		0.032	0.25	400	25,000	0.032	0.25	400	25,000	0.008	0.25	400	25,000		
3		0.028	0.25	350	25,000	0.028	0.25	350	25,000	0.007	0.25	350	25,000		
3.5		0.024	0.25	320	25,000	0.024	0.25	320	25,000	0.006	0.25	320	25,000		
0.6	4	0.02	0.25	280	25,000	0.02	0.25	280	25,000	0.005	0.25	280	25,000		
	1.5	0.04	0.3	550	25,000	0.04	0.3	550	25,000	0.01	0.3	550	25,000		
	2	0.04	0.3	500	25,000	0.04	0.3	500	25,000	0.01	0.3	500	25,000		
	3	0.028	0.3	450	25,000	0.028	0.3	450	25,000	0.007	0.3	450	25,000		
	4	0.02	0.3	400	25,000	0.02	0.3	400	25,000	0.005	0.3	400	25,000		
	5	0.012	0.3	350	20,000	0.012	0.3	350	20,000	0.003	0.3	350	20,000		
0.7	6	0.008	0.3	300	20,000	0.008	0.3	300	20,000	0.002	0.3	300	20,000		
	2	0.12	0.35	600	25,000	0.12	0.35	600	25,000	0.03	0.35	600	25,000		
	4	0.08	0.35	560	25,000	0.08	0.35	560	25,000	0.02	0.35	560	25,000		
0.8	6	0.06	0.35	410	20,000	0.06	0.35	410	20,000	0.015	0.35	410	20,000		
	3	0.12	0.4	780	25,000	0.12	0.4	780	25,000	0.03	0.4	780	25,000		
	4	0.1	0.4	700	25,000	0.1	0.4	700	25,000	0.025	0.4	700	25,000		
	5	0.08	0.4	630	23,000	0.08	0.4	630	23,000	0.02	0.4	630	23,000		
	6	0.08	0.4	550	20,000	0.08	0.4	550	20,000	0.02	0.4	550	20,000		
1	8	0.028	0.4	400	16,000	0.028	0.4	400	16,000	0.007	0.4	400	16,000		
	2	0.24	0.5	1,000	23,000	0.24	0.5	1,000	23,000	0.06	0.5	1,000	23,000		
	3	0.2	0.5	1,000	23,000	0.2	0.5	1,000	23,000	0.05	0.5	1,000	23,000		
	4	0.16	0.5	900	23,000	0.16	0.5	900	23,000	0.04	0.5	900	23,000		
		5	0.12	0.5	800	20,000	0.12	0.5	800	20,000	0.03	0.5	800	20,000	

HARD STAR Type A Series

Empfohlene Schnittparameter

Long Neck Square End Mill

Work Material		Aluminum Alloy A5000					Aluminum Alloy A7000					Heat Resistant Alloy (Kovar)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	
2	1	6	0.08	0.5	700	18,000	0.08	0.5	700	18,000	0.02	0.5	700	18,000	
		7	0.08	0.5	650	18,000	0.08	0.5	650	18,000	0.02	0.5	650	18,000	
		8	0.08	0.5	600	16,000	0.08	0.5	600	16,000	0.02	0.5	600	16,000	
		9	0.06	0.5	550	16,000	0.06	0.5	550	16,000	0.015	0.5	550	16,000	
		10	0.04	0.5	500	14,000	0.04	0.5	500	14,000	0.01	0.5	500	14,000	
		12	0.04	0.5	400	13,000	0.04	0.5	400	13,000	0.01	0.5	400	13,000	
	1.2	6	0.12	0.6	700	18,000	0.12	0.6	700	18,000	0.03	0.6	700	18,000	
		8	0.08	0.6	600	16,000	0.08	0.6	600	16,000	0.02	0.6	600	16,000	
		10	0.08	0.6	500	12,000	0.08	0.6	500	12,000	0.02	0.6	500	12,000	
		12	0.04	0.6	500	10,000	0.04	0.6	500	10,000	0.01	0.6	500	10,000	
		16	0.04	0.6	300	9,000	0.04	0.6	300	9,000	0.01	0.6	300	9,000	
	1.4	6	0.16	0.7	800	20,000	0.16	0.7	800	20,000	0.04	0.7	800	20,000	
		12	0.04	0.7	500	13,000	0.04	0.7	500	13,000	0.01	0.7	500	13,000	
	1.5	4	0.2	0.75	900	20,000	0.2	0.75	900	20,000	0.05	0.75	900	20,000	
		6	0.16	0.75	800	20,000	0.16	0.75	800	20,000	0.04	0.75	800	20,000	
		8	0.12	0.75	600	18,000	0.12	0.75	600	18,000	0.03	0.75	600	18,000	
		10	0.12	0.75	500	16,000	0.12	0.75	500	16,000	0.03	0.75	500	16,000	
		12	0.08	0.75	500	14,000	0.08	0.75	500	14,000	0.02	0.75	500	14,000	
		14	0.08	0.75	400	12,000	0.08	0.75	400	12,000	0.02	0.75	400	12,000	
	1.6	6	0.04	0.75	360	10,000	0.04	0.75	360	10,000	0.01	0.75	360	10,000	
		6	0.16	0.8	850	19,000	0.16	0.8	850	19,000	0.04	0.8	850	19,000	
	1.8	8	0.12	0.8	750	17,000	0.12	0.8	750	17,000	0.03	0.8	750	17,000	
		6	0.2	0.9	900	18,000	0.2	0.9	900	18,000	0.05	0.9	900	18,000	
	1.8	8	0.16	0.9	800	16,000	0.16	0.9	800	16,000	0.04	0.9	800	16,000	
		10	0.16	0.9	700	14,000	0.16	0.9	700	14,000	0.04	0.9	700	14,000	
		12	0.12	0.9	600	12,000	0.12	0.9	600	12,000	0.03	0.9	600	12,000	
		14	0.12	0.9	600	12,000	0.12	0.9	600	12,000	0.03	0.9	600	12,000	
		16	0.08	0.9	500	10,000	0.08	0.9	500	10,000	0.02	0.9	500	10,000	
16		0.08	0.9	500	10,000	0.08	0.9	500	10,000	0.02	0.9	500	10,000		
2	4	0.32	1	1,000	18,000	0.32	1	1,000	18,000	0.08	1	1,000	18,000		
	6	0.24	1	900	18,000	0.24	1	900	18,000	0.06	1	900	18,000		
	8	0.2	1	800	16,000	0.2	1	800	16,000	0.05	1	800	16,000		
	10	0.2	1	700	14,000	0.2	1	700	14,000	0.05	1	700	14,000		
	12	0.16	1	600	12,000	0.16	1	600	12,000	0.04	1	600	12,000		
	14	0.12	1	600	12,000	0.12	1	600	12,000	0.03	1	600	12,000		
	16	0.12	1	500	10,000	0.12	1	500	10,000	0.03	1	500	10,000		
	18	0.08	1	410	9,200	0.08	1	410	9,200	0.02	1	410	9,200		
	20	0.08	1	380	9,200	0.08	1	380	9,200	0.02	1	380	9,200		
2.5	8	0.28	1.25	800	14,000	0.28	1.25	800	14,000	0.07	1.25	800	14,000		
	12	0.24	1.25	700	12,000	0.24	1.25	700	12,000	0.06	1.25	700	12,000		
	16	0.2	1.25	600	10,000	0.2	1.25	600	10,000	0.05	1.25	600	10,000		
	20	0.2	1.25	500	8,200	0.2	1.25	500	8,200	0.05	1.25	500	8,200		

HARD STAR Type A Series

Empfohlene Schnittparameter

Long Neck Square End Mill

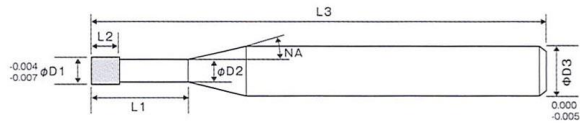
Work Material		Aluminum Alloy A5000					Aluminum Alloy A7000					Heat Resistant Alloy (Kovar)				
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed		
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹		
2	3	8	0.4	1.5	900	14,000	0.4	1.5	900	14,000	0.1	1.5	900	14,000		
		12	0.32	1.5	800	12,000	0.32	1.5	800	12,000	0.08	1.5	800	12,000		
		16	0.28	1.5	700	10,000	0.28	1.5	700	10,000	0.07	1.5	700	10,000		
		20	0.28	1.5	700	9,000	0.28	1.5	700	9,000	0.07	1.5	700	9,000		
		25	0.24	1.5	600	8,200	0.24	1.5	600	8,200	0.06	1.5	600	8,200		
		30	0.12	1.5	600	7,000	0.12	1.5	600	7,000	0.03	1.5	600	7,000		
	4	10	0.4	2	900	10,000	0.4	2	900	10,000	0.1	2	900	10,000		
		15	0.28	2	800	8,000	0.28	2	800	8,000	0.07	2	800	8,000		
		20	0.24	2	750	7,000	0.24	2	750	7,000	0.06	2	750	7,000		
	5	15	0.4	2.5	850	6,000	0.4	2.5	850	6,000	0.1	2.5	850	6,000		
		20	0.32	2.5	800	5,000	0.32	2.5	800	5,000	0.08	2.5	800	5,000		
	6	15	0.48	3	850	5,000	0.48	3	850	5,000	0.12	3	850	5,000		
		20	0.4	3	800	4,000	0.4	3	800	4,000	0.1	3	800	4,000		
		30	0.32	3	700	3,000	0.32	3	700	3,000	0.08	3	700	3,000		

HARD STAR Type A Series

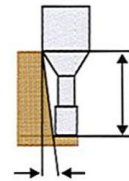
Carbide Long Neck Square End Mill

■ :HALS430 Model number:HALS430

VHM Schafffräser lang



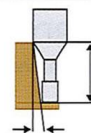
Der Hinterschleifwinkel ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
Bitte checken Sie das aktuelle Massblatt



Bestell-Code Code No.	WZ-Ø Tool Diameter	Nutzlänge Effective Length	Schneiden-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Actual effective length by inclined angle of workpiece.				
								30°	1°	1°30'	2°	3°
HALS430-0100-0400	1	4	0.8	0.95	15	4	50	4.23	4.38	4.54	4.71	5.09
HALS430-0100-0600		6	0.8	0.95	15	4	50	6.30	6.52	6.75	7.01	7.57
HALS430-0100-0800		8	0.8	0.95	15	4	50	8.37	8.66	8.97	9.31	10.06
HALS430-0100-1000		10	0.8	0.95	15	4	50	10.43	10.80	11.19	11.61	12.55
HALS430-0120-0600	1.2	6	1	1.15	15	4	50	6.30	6.52	6.75	7.01	7.57
HALS430-0120-0800		8	1	1.15	15	4	50	8.37	8.66	8.97	9.31	10.06
HALS430-0120-1000		10	1	1.15	15	4	50	10.43	10.80	11.19	11.61	12.55
HALS430-0120-1200		12	1	1.15	15	4	50	12.50	12.94	13.40	13.91	15.03
HALS430-0150-0800	1.5	8	1.2	1.45	15	4	50	8.37	8.66	8.97	9.31	10.06
HALS430-0150-1000		10	1.2	1.45	15	4	50	10.43	10.80	11.19	11.61	12.55
HALS430-0150-1200		12	1.2	1.45	15	4	50	12.50	12.94	13.40	13.91	15.03
HALS430-0150-1400		14	1.2	1.45	15	4	50	14.57	15.08	15.62	16.21	17.52
HALS430-0150-1600		16	1.2	1.45	15	4	50	16.64	17.21	17.84	18.50	20.01
HALS430-0180-0600	1.8	6	1.4	1.75	15	4	50	6.30	6.52	6.75	7.01	7.57
HALS430-0180-0800		8	1.4	1.75	15	4	50	8.37	8.66	8.97	9.31	10.06
HALS430-0180-1000		10	1.4	1.75	15	4	50	10.43	10.80	11.19	11.61	12.55
HALS430-0180-1200		12	1.4	1.75	15	4	50	12.50	12.94	13.40	13.91	15.03
HALS430-0180-1400		14	1.4	1.75	15	4	50	14.57	15.08	15.62	16.21	17.52
HALS430-0180-1600		16	1.4	1.75	15	4	50	16.64	17.21	17.84	18.50	20.01
HALS430-0200-0600	2	6	1.6	1.94	15	4	50	6.32	6.54	6.77	7.03	7.60
HALS430-0200-0800		8	1.6	1.94	15	4	50	8.39	8.68	8.99	9.33	10.08
HALS430-0200-1000		10	1.6	1.94	15	4	50	10.45	10.82	11.21	11.63	12.57
HALS430-0200-1200		12	1.6	1.94	15	4	50	12.52	12.96	13.42	13.93	15.06
HALS430-0200-1400		14	1.6	1.94	15	4	50	14.59	15.10	15.64	16.23	17.54
HALS430-0200-1600		16	1.6	1.94	15	4	50	16.65	17.23	17.86	18.53	FREE
HALS430-0200-1800		18	1.6	1.94	15	4	50	18.72	19.37	20.07	20.83	FREE
HALS430-0200-2000		20	1.6	1.94	15	4	50	20.79	21.51	22.29	23.13	FREE
HALS430-0250-0800	2.5	8	2	2.44	15	4	50	8.39	8.68	8.99	9.33	10.08
HALS430-0250-1200		12	2	2.44	15	4	50	12.52	12.96	13.42	13.93	FREE
HALS430-0250-1600		16	2	2.44	15	4	50	16.65	17.23	17.86	18.53	FREE

HARD STAR Type A Series

VHM Schafffräser lang



Bestell-Code Code No.	WZ-Ø Tool Diameter	Nutzlänge Effective Length	Schneid-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	Eff. Nutzlänge bei Neigungswinkel Actual effective length by inclined angle of workpiece.				
								30°	1°	1°30'	2°	3°
								HALS430-0250-2000	2.5	20	2	2.44
HALS430-0300-0800	3	8	4.5	2.85	15	4	50	8.56	8.86	9.18	9.52	FREE
HALS430-0300-1200		12	4.5	2.85	15	4	50	12.69	13.14	13.61	14.12	FREE
HALS430-0300-1600		16	4.5	2.85	15	4	50	16.83	17.41	18.04	FREE	FREE
HALS430-0300-2000		20	4.5	2.85	15	4	50	20.96	21.69	FREE	FREE	FREE
HALS430-0300-2500		25	4.5	2.85	15	4	60	26.13	27.04	FREE	FREE	FREE
HALS430-0300-3000		30	4.5	2.85	15	4	60	31.30	FREE	FREE	FREE	FREE
HALS430-0400-1200	4	12	6	3.8	15	6	50	12.79	13.24	13.71	14.23	15.38
HALS430-0400-1600		16	6	3.8	15	6	50	16.92	17.51	18.15	18.83	FREE
HALS430-0400-2000		20	6	3.8	15	6	50	21.06	21.79	22.58	23.43	FREE
HALS430-0400-2500		25	6	3.8	15	6	60	26.23	27.14	28.12	FREE	FREE
HALS430-0400-3000		30	6	3.8	15	6	60	31.40	32.49	33.66	FREE	FREE
HALS430-0400-3500		35	6	3.8	15	6	70	36.56	37.84	FREE	FREE	FREE
HALS430-0500-1600	5	16	7.5	4.8	15	6	50	16.92	17.51	18.15	FREE	FREE
HALS430-0500-2500		25	7.5	4.8	15	6	60	26.23	27.14	FREE	FREE	FREE
HALS430-0500-3500		35	7.5	4.8	15	6	70	36.56	FREE	FREE	FREE	FREE
HALS430-0600-2000	6	20	9	5.8	15	6	50	FREE	FREE	FREE	FREE	FREE
HALS430-0600-3000		30	9	5.8	15	6	60	FREE	FREE	FREE	FREE	FREE
HALS430-0600-4000		40	9	5.8	15	6	70	FREE	FREE	FREE	FREE	FREE
HALS430-0600-5000		50	9	5.8	15	6	80	FREE	FREE	FREE	FREE	FREE

HARD STAR Type A Series

HARD STAR Type A
Recommended Milling Conditions

■ :HALS430
Model number:HALS430

Empfohlene Schnittparameter

Long Neck Square End Mill

Work Material		Hardened Steels STAVAX/HPM (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)				
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
4	1	4	0.04	0.5	1,800	23,000	0.03	0.4	1,600	18,000	0.02	0.3	1,000	14,000
		6	0.02	0.5	1,400	18,000	0.01	0.4	1,200	14,000	0.007	0.3	800	10,000
		8	0.02	0.5	1,200	16,000	0.01	0.4	1,000	12,000	0.005	0.3	680	8,000
		10	0.01	0.5	1,000	14,000	0.007	0.4	800	10,000	0.005	0.3	500	6,000
	1.2	6	0.03	0.6	1,400	18,000	0.02	0.5	1,200	14,000	0.01	0.4	800	10,000
		8	0.02	0.6	1,200	16,000	0.01	0.5	1,000	12,000	0.007	0.4	680	8,000
		10	0.02	0.6	1,000	12,000	0.01	0.5	850	10,000	0.005	0.4	600	8,000
		12	0.01	0.6	1,000	10,000	0.007	0.5	800	9,000	0.005	0.4	500	7,000
	1.5	8	0.03	0.75	1,200	18,000	0.03	0.6	1,200	14,000	0.01	0.45	750	10,000
		10	0.03	0.75	1,000	16,000	0.02	0.6	1,000	14,000	0.01	0.45	700	10,000
		12	0.02	0.75	1,000	14,000	0.02	0.6	850	12,000	0.007	0.45	620	8,000
		14	0.02	0.75	800	12,000	0.01	0.6	750	10,000	0.007	0.45	500	7,500
		16	0.01	0.75	720	10,000	0.007	0.6	600	9,000	0.005	0.45	400	6,800
	1.8	6	0.05	0.9	1,800	18,000	0.04	0.7	1,500	15,000	0.03	0.5	1,200	12,000
		8	0.04	0.9	1,600	16,000	0.03	0.7	1,200	12,000	0.02	0.5	1,000	9,500
		10	0.04	0.9	1,400	14,000	0.03	0.7	1,000	12,000	0.02	0.5	900	9,500
		12	0.03	0.9	1,200	12,000	0.02	0.7	1,000	10,000	0.01	0.5	800	8,200
		14	0.03	0.9	1,200	12,000	0.02	0.7	860	10,000	0.01	0.5	720	8,200
		16	0.02	0.9	1,000	10,000	0.01	0.7	800	9,200	0.007	0.5	680	7,500
	2	6	0.06	1	1,800	18,000	0.05	0.8	1,500	15,000	0.03	0.6	1,200	12,000
		8	0.05	1	1,600	16,000	0.04	0.8	1,200	12,000	0.02	0.6	1,000	9,500
		10	0.05	1	1,400	14,000	0.04	0.8	1,000	12,000	0.02	0.6	900	9,500
		12	0.04	1	1,200	12,000	0.03	0.8	1,000	10,000	0.01	0.6	800	8,200
		14	0.03	1	1,200	12,000	0.02	0.8	860	10,000	0.007	0.6	720	8,200
		16	0.03	1	1,000	10,000	0.02	0.8	800	9,200	0.007	0.6	680	7,500
		18	0.02	1	820	9,200	0.01	0.8	740	8,500	0.005	0.6	640	6,000
		20	0.02	1	760	9,200	0.01	0.8	680	8,500	0.005	0.6	520	6,000
	2.5	8	0.07	1.25	1,600	14,000	0.05	1	1,400	10,000	0.03	0.75	1,000	8,000
12		0.06	1.25	1,400	12,000	0.04	1	1,200	9,600	0.02	0.75	960	7,500	
16		0.05	1.25	1,200	10,000	0.02	1	1,000	8,500	0.01	0.75	800	7,000	
20		0.05	1.25	1,000	8,200	0.02	1	1,000	7,500	0.01	0.75	800	5,000	
3	8	0.1	1.5	1,800	14,000	0.07	1.2	1,600	10,000	0.05	0.9	1,200	8,000	
	12	0.08	1.5	1,600	12,000	0.06	1.2	1,400	9,200	0.04	0.9	1,000	7,200	
	16	0.07	1.5	1,400	10,000	0.05	1.2	1,200	8,500	0.03	0.9	800	6,500	
	20	0.07	1.5	1,400	9,000	0.04	1.2	1,200	7,800	0.02	0.9	800	5,800	
	25	0.06	1.5	1,200	8,200	0.03	1.2	1,000	7,000	0.01	0.9	720	5,000	
	30	0.03	1.5	1,200	7,000	0.02	1.2	1,000	6,500	0.007	0.9	650	4,500	
4	12	0.15	2	2,000	9,500	0.08	1.6	1,600	8,000	0.06	1.2	1,000	7,000	
	16	0.1	2	1,800	8,000	0.06	1.6	1,400	7,000	0.05	1.2	1,200	6,000	
	20	0.08	2	1,600	7,000	0.05	1.6	1,200	6,500	0.04	1.2	1,000	5,500	
	25	0.07	2	1,400	6,000	0.04	1.6	1,200	5,200	0.03	1.2	1,000	4,500	

HARD STAR Type A Series

Empfohlene Schnittparameter

Long Neck Square End Mill

Work Material			Hardened Steels STAVAX/HPM (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			$\varnothing p$ mm	$\varnothing e$ mm	mm/min	min ⁻¹	$\varnothing p$ mm	$\varnothing e$ mm	mm/min	min ⁻¹	$\varnothing p$ mm	$\varnothing e$ mm	mm/min	min ⁻¹
4	5	30	0.05	2	1,000	4,800	0.03	1.6	850	4,200	0.02	1.2	620	3,500
		35	0.04	2	880	4,200	0.02	1.6	720	3,800	0.01	1.2	550	3,000
		16	0.12	2.5	1,800	7,000	0.08	2	1,600	5,500	0.06	1.5	1,000	4,500
	6	25	0.07	2.5	1,400	5,800	0.05	2	1,200	4,200	0.03	1.5	800	3,000
		35	0.05	2.5	900	4,200	0.03	2	800	3,500	0.02	1.5	600	2,500
		20	0.18	3	1,600	6,500	0.08	2.4	1,400	4,500	0.06	1.8	920	3,500
		30	0.12	3	1,200	4,500	0.06	2.4	1,000	3,500	0.04	1.8	660	2,500
		40	0.08	3	1,000	3,000	0.03	2.4	800	2,500	0.02	1.8	550	2,000
50	0.05	3	700	2,500	0.02	2.4	500	2,000	0.01	1.8	380	1,500		

HARD STAR Type A Series

HARD STAR Type A
Recommended Milling Conditions

■ :HALS430
Model number:HALS430

Empfohlene Schnittparameter

Long Neck Square End Mill

Work Material		Aluminum Alloy A5000 ^①					Aluminum Alloy A7000 ^②					Heat Resistant Alloy (Kovar)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm	mm/min	min ⁻¹	∅p mm	∅e mm	mm/min	min ⁻¹	∅p mm	∅e mm	mm/min	min ⁻¹	
4	1	4	0.16	0.5	1,800	23,000	0.16	0.5	1,800	23,000	0.04	0.5	1,800	23,000	
		6	0.08	0.5	1,400	18,000	0.08	0.5	1,400	18,000	0.02	0.5	1,400	18,000	
		8	0.08	0.5	1,200	16,000	0.08	0.5	1,200	16,000	0.02	0.5	1,200	16,000	
		10	0.04	0.5	1,000	14,000	0.04	0.5	1,000	14,000	0.01	0.5	1,000	14,000	
	1.2	6	0.12	0.6	1,400	18,000	0.12	0.6	1,400	18,000	0.03	0.6	1,400	18,000	
		8	0.08	0.6	1,200	16,000	0.08	0.6	1,200	16,000	0.02	0.6	1,200	16,000	
		10	0.08	0.6	1,000	12,000	0.08	0.6	1,000	12,000	0.02	0.6	1,000	12,000	
		12	0.04	0.6	1,000	10,000	0.04	0.6	1,000	10,000	0.01	0.6	1,000	10,000	
	1.5	8	0.12	0.75	1,200	18,000	0.12	0.75	1,200	18,000	0.03	0.75	1,200	18,000	
		10	0.12	0.75	1,000	16,000	0.12	0.75	1,000	16,000	0.03	0.75	1,000	16,000	
		12	0.08	0.75	1,000	14,000	0.08	0.75	1,000	14,000	0.02	0.75	1,000	14,000	
		14	0.08	0.75	800	12,000	0.08	0.75	800	12,000	0.02	0.75	800	12,000	
		16	0.04	0.75	720	10,000	0.04	0.75	720	10,000	0.01	0.75	720	10,000	
	1.8	6	0.2	0.9	1,800	18,000	0.2	0.9	1,800	18,000	0.05	0.9	1,800	18,000	
		8	0.16	0.9	1,600	16,000	0.16	0.9	1,600	16,000	0.04	0.9	1,600	16,000	
		10	0.16	0.9	1,400	14,000	0.16	0.9	1,400	14,000	0.04	0.9	1,400	14,000	
		12	0.12	0.9	1,200	12,000	0.12	0.9	1,200	12,000	0.03	0.9	1,200	12,000	
		14	0.12	0.9	1,200	12,000	0.12	0.9	1,200	12,000	0.03	0.9	1,200	12,000	
		16	0.08	0.9	1,000	10,000	0.08	0.9	1,000	10,000	0.02	0.9	1,000	10,000	
	2	6	0.24	1	1,800	18,000	0.24	1	1,800	18,000	0.06	1	1,800	18,000	
		8	0.2	1	1,600	16,000	0.2	1	1,600	16,000	0.05	1	1,600	16,000	
		10	0.2	1	1,400	14,000	0.2	1	1,400	14,000	0.05	1	1,400	14,000	
		12	0.16	1	1,200	12,000	0.16	1	1,200	12,000	0.04	1	1,200	12,000	
		14	0.12	1	1,200	12,000	0.12	1	1,200	12,000	0.03	1	1,200	12,000	
		16	0.12	1	1,000	10,000	0.12	1	1,000	10,000	0.03	1	1,000	10,000	
		18	0.08	1	820	9,200	0.08	1	820	9,200	0.02	1	820	9,200	
		20	0.08	1	760	9,200	0.08	1	760	9,200	0.02	1	760	9,200	
	2.5	8	0.28	1.25	1,600	14,000	0.28	1.25	1,600	14,000	0.07	1.25	1,600	14,000	
12		0.24	1.25	1,400	12,000	0.24	1.25	1,400	12,000	0.06	1.25	1,400	12,000		
16		0.2	1.25	1,200	10,000	0.2	1.25	1,200	10,000	0.05	1.25	1,200	10,000		
20		0.2	1.25	1,000	8,200	0.2	1.25	1,000	8,200	0.05	1.25	1,000	8,200		
3	8	0.4	1.5	1,800	14,000	0.4	1.5	1,800	14,000	0.1	1.5	1,800	14,000		
	12	0.32	1.5	1,600	12,000	0.32	1.5	1,600	12,000	0.08	1.5	1,600	12,000		
	16	0.28	1.5	1,400	10,000	0.28	1.5	1,400	10,000	0.07	1.5	1,400	10,000		
	20	0.28	1.5	1,400	9,000	0.28	1.5	1,400	9,000	0.07	1.5	1,400	9,000		
	25	0.24	1.5	1,200	8,200	0.24	1.5	1,200	8,200	0.06	1.5	1,200	8,200		
	30	0.12	1.5	1,200	7,000	0.12	1.5	1,200	7,000	0.03	1.5	1,200	7,000		
4	12	0.6	2	2,000	9,500	0.6	2	2,000	9,500	0.15	2	2,000	9,500		
	16	0.4	2	1,800	8,000	0.4	2	1,800	8,000	0.1	2	1,800	8,000		
	20	0.32	2	1,600	7,000	0.32	2	1,600	7,000	0.08	2	1,600	7,000		
	25	0.28	2	1,400	6,000	0.28	2	1,400	6,000	0.07	2	1,400	6,000		

HARD STAR Type A Series

Empfohlene Schnittparameter

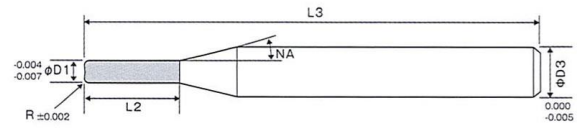
Long Neck Square End Mill

Work Material		Aluminum Alloy A5000					Aluminum Alloy A7000					Heat Resistant Alloy (Kovar)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	
4	4	30	0.2	2	1,000	4,800	0.2	2	1,000	4,800	0.05	2	1,000	4,800	
		35	0.16	2	880	4,200	0.16	2	880	4,200	0.04	2	880	4,200	
	5	16	0.48	2.5	1,800	7,000	0.48	2.5	1,800	7,000	0.12	2.5	1,800	7,000	
		25	0.28	2.5	1,400	5,800	0.28	2.5	1,400	5,800	0.07	2.5	1,400	5,800	
		35	0.2	2.5	900	4,200	0.2	2.5	900	4,200	0.05	2.5	900	4,200	
	6	20	0.72	3	1,600	6,500	0.72	3	1,600	6,500	0.18	3	1,600	6,500	
		30	0.48	3	1,200	4,500	0.48	3	1,200	4,500	0.12	3	1,200	4,500	
		40	0.32	3	1,000	3,000	0.32	3	1,000	3,000	0.08	3	1,000	3,000	
		50	0.2	3	700	2,500	0.2	3	700	2,500	0.05	3	700	2,500	

HARD STAR Type A Series

Carbide Radius End Mill

■ :HAR430 Model number:HAR430



VHM Eckradiusfräser

Der Hinterschliffwinkel ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
Bitte checken Sie das aktuelle Massblatt

Bestell-Code Code No.	WT-Ø Tool Diameter	Eckradius Corner Radius	Schneid-L Length of Cut	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length
HAR430-0300-0200-00600	3	0.2	6	15	4	50
HAR430-0300-0300-00600		0.3	6	15	4	50
HAR430-0300-0500-00600		0.5	6	15	4	50
HAR430-0400-0200-00800	4	0.2	8	15	6	50
HAR430-0400-0300-00800		0.3	8	15	6	50
HAR430-0400-0500-00800		0.5	8	15	6	50
HAR430-0600-0200-01200	6	0.2	12	—	6	60
HAR430-0600-0300-01200		0.3	12	—	6	60
HAR430-0600-0500-01200		0.5	12	—	6	60
HAR430-0600-1000-01200		1	12	—	6	60
HAR430-0800-0300-01600	8	0.3	16	—	8	70
HAR430-0800-0500-01600		0.5	16	—	8	70
HAR430-0800-1000-01600		1	16	—	8	70
HAR430-1000-0300-02000	10	0.3	20	—	10	80
HAR430-1000-0500-02000		0.5	20	—	10	80
HAR430-1000-1000-02000		1	20	—	10	80
HAR430-1200-0500-02400	12	0.5	24	—	12	110
HAR430-1200-1000-02400		1	24	—	12	110
HAR430-1200-2000-02400		2	24	—	12	110

HARD STAR Type A Series

HARD STAR Type A
Recommended Milling Conditions

■ :HAR430
Model number:HAR430

Empfohlene Schnittparameter

Radius End Mill

Work Material			Hardened Steels STAVAX/HPM (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Length of Cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
4	3	6	4.5	0.09	1,000	10,000	4.5	0.06	700	8,000	4.5	0.06	560	7,000
	4	8	6	0.12	1,200	8,500	6	0.08	800	7,000	6	0.08	600	6,000
	6	12	9	0.18	1,200	5,600	9	0.12	800	4,700	9	0.12	600	4,000
	8	16	12	0.23	1,400	4,800	12	0.16	800	4,000	12	0.16	500	3,400
	10	20	15	0.3	1,500	3,800	15	0.2	900	3,200	15	0.2	600	2,600
	12	24	18	0.35	1,600	3,200	18	0.24	1,000	2,600	18	0.24	700	2,200

Radius End Mill

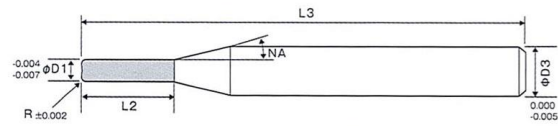
Work Material			Aluminum Alloy A5000				Aluminum Alloy A7000				Heat Resistant Alloy (Kovar)			
Number of Flutes	Dia.	Length of Cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
4	3	6	4.5	0.25	1,000	10,000	4.5	0.25	1,000	10,000	4.5	0.08	1,000	10,000
	4	8	6	0.35	1,200	8,500	6	0.35	1,200	8,500	6	0.12	1,200	8,500
	6	12	9	0.55	1,200	5,600	9	0.55	1,200	5,600	9	0.18	1,200	5,600
	8	16	12	0.69	1,400	4,800	12	0.69	1,400	4,800	12	0.23	1,400	4,800
	10	20	15	0.9	1,500	3,800	15	0.9	1,500	3,800	15	0.3	1,500	3,800
	12	24	18	1.05	1,600	3,200	18	1.05	1,600	3,200	18	0.35	1,600	3,200

HARD STAR Type A Series

Carbide Radius End Mill

■ :HAR630 Model number:HAR630

VHM Eckradiusfräser 6-Lp.



Der Hinterschliffwinkel ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
bitte checken Sie das aktuelle Massblatt

Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Schneiden-L Length of Cut	Neck-Ø Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length
HAR630-0500-0200-01000	5	0.2	10	15	6	50
HAR630-0500-0300-01000		0.3	10	15	6	50
HAR630-0500-0500-01000		0.5	10	15	6	50
HAR630-0500-1000-01000		1	10	15	6	50
HAR630-0600-0200-01200	6	0.2	12	—	6	60
HAR630-0600-0300-01200		0.3	12	—	6	60
HAR630-0600-0500-01200		0.5	12	—	6	60
HAR630-0600-1000-01200		1	12	—	6	60
HAR630-0800-0300-01600	8	0.3	16	—	8	70
HAR630-0800-0500-01600		0.5	16	—	8	70
HAR630-0800-1000-01600		1	16	—	8	70
HAR630-0800-1500-01600		1.5	16	—	8	70
HAR630-1000-0300-02000	10	0.3	20	—	10	80
HAR630-1000-0500-02000		0.5	20	—	10	80
HAR630-1000-1000-02000		1	20	—	10	80
HAR630-1000-1500-02000		1.5	20	—	10	80
HAR630-1000-2000-02000		2	20	—	10	80
HAR630-1200-0500-02400	12	0.5	24	—	12	110
HAR630-1200-1000-02400		1	24	—	12	110
HAR630-1200-1500-02400		1.5	24	—	12	110
HAR630-1200-2000-02400		2	24	—	12	110

HARD STAR Type A Series

HARD STAR Type A
Recommended Milling Conditions

■ :HAR630
Model number:HAR630

Empfohlene Schnittparameter

Radius End Mill

Work Material			Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Length of Cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
6	5	10	7.5	0.15	1,600	7,600	7.5	0.1	1,200	6,200	7.5	0.1	800	5,300
	6	12	9	0.18	1,800	6,400	9	0.12	1,200	5,300	9	0.12	800	4,600
	8	16	12	0.23	2,000	4,800	12	0.16	1,400	4,000	12	0.16	1,000	3,400
	10	20	15	0.3	2,000	3,800	15	0.2	1,600	3,200	15	0.2	1,000	2,600
	12	24	18	0.35	2,000	3,200	18	0.24	1,600	2,600	18	0.24	1,000	2,200

Radius End Mill

Work Material			Aluminum Alloy A5000				Aluminum Alloy A7000				Heat Resistant Alloy (Kovar)			
Number of Flutes	Dia.	Length of Cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
6	5	10	7.5	0.45	1,600	7,600	7.5	0.45	1,600	7,600	7.5	0.15	1,600	7,600
	6	12	9	0.54	1,800	6,400	9	0.54	1,800	6,400	9	0.18	1,800	6,400
	8	16	12	0.69	2,000	4,800	12	0.69	2,000	4,800	12	0.23	2,000	4,800
	10	20	15	0.9	2,000	3,800	15	0.9	2,000	3,800	15	0.3	2,000	3,800
	12	24	18	1.05	2,000	3,200	18	1.05	2,000	3,200	18	0.35	2,000	3,200

HARD STAR Type A Series

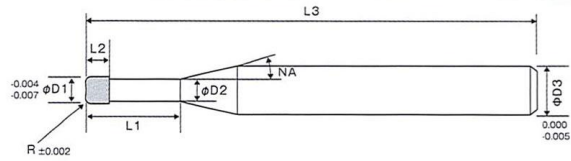
Carbide Long Neck Radius End Mill

■ :HALR230 Model number:HALR230

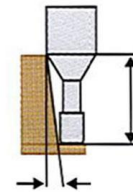
VHM Eckradiusfräser lang



Hard A
super MG
Lippen 2
Helix 30°
Winkel NA 15°
Schaft 0/-0.005

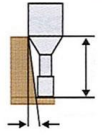


Der Hinterschliffwinkel ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
bitte checken Sie das aktuelle Massblatt



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneid-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	eff. Nutzlänge bei Neigungswinkel Actual effective length by inclined angle of workpiece.					
									30°	1°	1°30'	2°	3°	
HALR230-0020-0020-0050	0.2	0.02	0.5	0.15	0.18	15	4	50	0.55	0.57	0.59	0.61	0.66	
HALR230-0020-0020-0100		0.02	1	0.15	0.18	15	4	50	1.07	1.11	1.15	1.19	1.28	
HALR230-0020-0050-0050		0.05	0.5	0.15	0.18	15	4	50	0.55	0.57	0.59	0.61	0.66	
HALR230-0020-0050-0100		0.05	1	0.15	0.18	15	4	50	1.07	1.11	1.14	1.19	1.28	
HALR230-0030-0020-0100	0.3	0.02	1	0.25	0.27	15	4	50	1.09	1.13	1.17	1.21	1.31	
HALR230-0030-0020-0150		0.02	1.5	0.25	0.27	15	4	50	1.61	1.66	1.72	1.79	1.93	
HALR230-0030-0020-0200		0.02	2	0.25	0.27	15	4	50	2.12	2.20	2.28	2.36	2.55	
HALR230-0030-0020-0250		0.02	2.5	0.25	0.27	15	4	50	2.64	2.73	2.83	2.94	3.17	
HALR230-0030-0020-0300		0.02	3	0.25	0.27	15	4	50	3.16	3.27	3.38	3.51	3.79	
HALR230-0030-0050-0100		0.05	1	0.25	0.27	15	4	50	1.09	1.13	1.17	1.21	1.30	
HALR230-0030-0050-0150		0.05	1.5	0.25	0.27	15	4	50	1.61	1.66	1.72	1.78	1.92	
HALR230-0030-0050-0200		0.05	2	0.25	0.27	15	4	50	2.12	2.20	2.27	2.36	2.54	
HALR230-0030-0050-0250		0.05	2.5	0.25	0.27	15	4	50	2.64	2.73	2.83	2.93	3.17	
HALR230-0030-0050-0300		0.05	3	0.25	0.27	15	4	50	3.16	3.27	3.38	3.51	3.79	
HALR230-0040-0020-0100		0.4	0.02	1	0.3	0.37	15	4	50	1.09	1.13	1.17	1.21	1.31
HALR230-0040-0020-0150			0.02	1.5	0.3	0.37	15	4	50	1.61	1.66	1.72	1.79	1.93
HALR230-0040-0020-0200	0.02		2	0.3	0.37	15	4	50	2.12	2.20	2.28	2.36	2.55	
HALR230-0040-0020-0250	0.02		2.5	0.3	0.37	15	4	50	2.64	2.73	2.83	2.94	3.17	
HALR230-0040-0020-0300	0.02		3	0.3	0.37	15	4	50	3.16	3.27	3.38	3.51	3.79	
HALR230-0040-0050-0100	0.05		1	0.3	0.37	15	4	50	1.09	1.13	1.17	1.21	1.30	
HALR230-0040-0050-0150	0.05		1.5	0.3	0.37	15	4	50	1.61	1.66	1.72	1.78	1.92	
HALR230-0040-0050-0200	0.05		2	0.3	0.37	15	4	50	2.12	2.20	2.27	2.36	2.54	
HALR230-0040-0050-0250	0.05		2.5	0.3	0.37	15	4	50	2.64	2.73	2.83	2.93	3.17	
HALR230-0040-0050-0300	0.05		3	0.3	0.37	15	4	50	3.16	3.27	3.38	3.51	3.79	
HALR230-0040-0100-0100	0.1		1	0.3	0.37	15	4	50	1.09	1.12	1.16	1.20	1.29	
HALR230-0040-0100-0200	0.1		2	0.3	0.37	15	4	50	2.12	2.19	2.27	2.35	2.53	
HALR230-0040-0100-0300	0.1	3	0.3	0.37	15	4	50	3.16	3.26	3.38	3.50	3.78		
HALR230-0050-0020-0100	0.5	0.02	1	0.4	0.47	15	4	50	1.09	1.13	1.17	1.21	1.31	
HALR230-0050-0020-0200		0.02	2	0.4	0.47	15	4	50	2.12	2.20	2.28	2.36	2.55	
HALR230-0050-0020-0300		0.02	3	0.4	0.47	15	4	50	3.16	3.27	3.38	3.51	3.79	

HARD STAR Type A Series



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneid-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	eff. Nutzlänge bei Neigungswinkel Actual effective length by inclined angle of workpiece.					
									30'	1°	1°30'	2°	3°	
									HALR230-0050-0020-0400	0.5	0.02	4	0.4	0.47
HALR230-0050-0050-0100	0.05	1	0.4	0.47	15	4	50	1.09	1.13		1.17	1.21	1.30	
HALR230-0050-0050-0200	0.05	2	0.4	0.47	15	4	50	2.12	2.20		2.27	2.36	2.54	
HALR230-0050-0050-0300	0.05	3	0.4	0.47	15	4	50	3.16	3.27		3.38	3.51	3.79	
HALR230-0050-0050-0400	0.05	4	0.4	0.47	15	4	50	4.19	4.34		4.49	4.66	5.03	
HALR230-0050-0100-0100	0.1	1	0.4	0.47	15	4	50	1.09	1.12		1.16	1.20	1.29	
HALR230-0050-0100-0200	0.1	2	0.4	0.47	15	4	50	2.12	2.19		2.27	2.35	2.53	
HALR230-0050-0100-0300	0.1	3	0.4	0.47	15	4	50	3.16	3.26		3.38	3.50	3.78	
HALR230-0050-0100-0400	0.1	4	0.4	0.47	15	4	50	4.19	4.33		4.48	4.65	5.02	
HALR230-0060-0020-0200	0.6	0.02	2	0.5	0.57	15	4	50	2.12	2.20	2.28	2.36	2.55	
HALR230-0060-0020-0400		0.02	4	0.5	0.57	15	4	50	4.19	4.34	4.49	4.66	5.04	
HALR230-0060-0020-0600		0.02	6	0.5	0.57	15	4	50	6.26	6.48	6.71	6.96	7.52	
HALR230-0060-0050-0200		0.05	2	0.5	0.57	15	4	50	2.12	2.20	2.27	2.36	2.54	
HALR230-0060-0050-0400		0.05	4	0.5	0.57	15	4	50	4.19	4.34	4.49	4.66	5.03	
HALR230-0060-0050-0600		0.05	6	0.5	0.57	15	4	50	6.26	6.47	6.71	6.96	7.52	
HALR230-0060-0100-0200		0.1	2	0.5	0.57	15	4	50	2.12	2.19	2.27	2.35	2.53	
HALR230-0060-0100-0400		0.1	4	0.5	0.57	15	4	50	4.19	4.33	4.48	4.65	5.02	
HALR230-0060-0100-0600		0.1	6	0.5	0.57	15	4	50	6.26	6.47	6.70	6.95	7.51	
HALR230-0070-0020-0200	0.7	0.02	2	0.55	0.67	15	4	50	2.12	2.20	2.28	2.36	2.55	
HALR230-0070-0020-0400		0.02	4	0.55	0.67	15	4	50	4.19	4.34	4.49	4.66	5.04	
HALR230-0070-0020-0600		0.02	6	0.55	0.67	15	4	50	6.26	6.48	6.71	6.96	7.52	
HALR230-0070-0050-0200		0.05	2	0.55	0.67	15	4	50	2.12	2.20	2.27	2.36	2.54	
HALR230-0070-0050-0400		0.05	4	0.55	0.67	15	4	50	4.19	4.34	4.49	4.66	5.03	
HALR230-0070-0050-0600		0.05	6	0.55	0.67	15	4	50	6.26	6.47	6.71	6.96	7.52	
HALR230-0070-0100-0200		0.1	2	0.55	0.67	15	4	50	2.12	2.19	2.27	2.35	2.53	
HALR230-0070-0100-0400		0.1	4	0.55	0.67	15	4	50	4.19	4.33	4.48	4.65	5.02	
HALR230-0070-0100-0600		0.1	6	0.55	0.67	15	4	50	6.26	6.47	6.70	6.95	7.51	
HALR230-0080-0020-0200	0.8	0.02	2	0.65	0.77	15	4	50	2.12	2.20	2.28	2.36	2.55	
HALR230-0080-0020-0400		0.02	4	0.65	0.77	15	4	50	4.19	4.34	4.49	4.66	5.04	
HALR230-0080-0020-0600		0.02	6	0.65	0.77	15	4	50	6.26	6.48	6.71	6.96	7.52	
HALR230-0080-0020-0800		0.02	8	0.65	0.77	15	4	50	8.33	8.62	8.93	9.26	10.01	
HALR230-0080-0050-0200		0.05	2	0.65	0.77	15	4	50	2.12	2.20	2.27	2.36	2.54	
HALR230-0080-0050-0400		0.05	4	0.65	0.77	15	4	50	4.19	4.34	4.49	4.66	5.03	
HALR230-0080-0050-0600		0.05	6	0.65	0.77	15	4	50	6.26	6.47	6.71	6.96	7.52	
HALR230-0080-0050-0800		0.05	8	0.65	0.77	15	4	50	8.33	8.61	8.92	9.26	10.00	
HALR230-0080-0100-0200		0.1	2	0.65	0.77	15	4	50	2.12	2.19	2.27	2.35	2.53	
HALR230-0080-0100-0400		0.1	4	0.65	0.77	15	4	50	4.19	4.33	4.48	4.65	5.02	
HALR230-0080-0100-0600		0.1	6	0.65	0.77	15	4	50	6.26	6.47	6.70	6.95	7.51	
HALR230-0080-0100-0800		0.1	8	0.65	0.77	15	4	50	8.32	8.61	8.92	9.25	9.99	
HALR230-0080-0200-0200		0.2	2	0.65	0.77	15	4	50	2.12	2.19	2.26	2.33	2.51	
HALR230-0080-0200-0400		0.2	4	0.65	0.77	15	4	50	4.19	4.32	4.47	4.63	5.00	
HALR230-0080-0200-0600		0.2	6	0.65	0.77	15	4	50	6.25	6.46	6.69	6.93	7.48	
HALR230-0080-0200-0800		0.2	8	0.65	0.77	15	4	50	8.32	8.60	8.91	9.23	9.97	
HALR230-0090-0100-0400		0.9	0.1	4	0.7	0.87	15	4	50	4.19	4.33	4.48	4.65	5.02
HALR230-0090-0100-0800			0.1	8	0.7	0.87	15	4	50	8.32	8.61	8.92	9.25	9.99

HARD STAR Type A Series

HARD STAR type A
Recommended Milling Conditions

■ :HALR230
Model number:HALR230

Empfohlene Schnittparameter

Long Neck Radius End Mill

Work Material			Hardened Steels STAVAX/HPM (~55HRC)				Hardened Steels SKD11/SKH51(~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
2	0.2	0.5	0.003	0.04	200	30,000	0.003	0.02	160	30,000	0.003	0.01	120	30,000
		1	0.003	0.04	150	30,000	0.002	0.02	120	30,000	0.002	0.01	80	30,000
	0.3	1	0.003	0.08	300	30,000	0.003	0.04	250	30,000	0.003	0.03	200	30,000
		1.5	0.003	0.08	200	30,000	0.003	0.04	160	30,000	0.003	0.03	120	30,000
		2	0.003	0.08	150	30,000	0.003	0.04	120	30,000	0.003	0.03	100	25,000
		2.5	0.002	0.08	100	25,000	0.002	0.04	80	25,000	0.002	0.03	60	20,000
		3	0.002	0.08	50	25,000	0.002	0.04	40	25,000	0.002	0.03	30	20,000
	0.4	1	0.005	0.1	400	30,000	0.005	0.05	350	28,000	0.004	0.04	300	25,000
		1.5	0.005	0.1	350	30,000	0.005	0.05	300	28,000	0.004	0.04	260	25,000
		2	0.005	0.1	300	30,000	0.005	0.05	250	25,000	0.003	0.04	220	25,000
		2.5	0.004	0.1	280	28,000	0.004	0.05	240	25,000	0.003	0.04	180	20,000
		3	0.004	0.1	250	25,000	0.003	0.05	220	23,000	0.002	0.04	160	18,000
	0.5	1	0.008	0.15	500	25,000	0.006	0.1	450	23,000	0.004	0.08	400	20,000
		2	0.007	0.15	420	25,000	0.005	0.1	360	23,000	0.003	0.08	300	20,000
		3	0.006	0.15	350	25,000	0.004	0.1	320	23,000	0.003	0.08	280	20,000
		4	0.004	0.15	300	25,000	0.002	0.1	240	23,000	0.002	0.08	180	20,000
	0.6	2	0.012	0.2	500	25,000	0.006	0.15	400	23,000	0.004	0.1	320	20,000
		4	0.007	0.2	400	23,000	0.004	0.15	300	20,000	0.003	0.1	200	18,000
		6	0.005	0.2	200	20,000	0.003	0.15	150	18,000	0.002	0.1	100	12,000
	0.7	2	0.012	0.25	700	25,000	0.006	0.15	600	23,000	0.003	0.12	450	20,000
		4	0.008	0.25	600	25,000	0.005	0.15	500	23,000	0.002	0.12	350	20,000
		6	0.005	0.25	350	20,000	0.003	0.15	250	18,000	0.002	0.12	200	16,000
	0.8	2	0.014	0.25	800	25,000	0.006	0.16	700	23,000	0.005	0.14	500	20,000
		4	0.008	0.25	700	25,000	0.005	0.16	600	23,000	0.003	0.14	400	20,000
		6	0.006	0.25	550	20,000	0.004	0.16	450	18,000	0.002	0.14	320	16,000
		8	0.003	0.25	400	16,000	0.002	0.16	300	14,000	0.002	0.14	200	12,000
	0.9	4	0.03	0.3	850	25,000	0.02	0.2	700	20,000	0.01	0.15	600	18,000
		8	0.01	0.3	400	16,000	0.008	0.2	350	14,000	0.005	0.15	250	10,000

HARD STAR Type A Series

Empfohlene Schnittparameter

Long Neck Radius End Mill

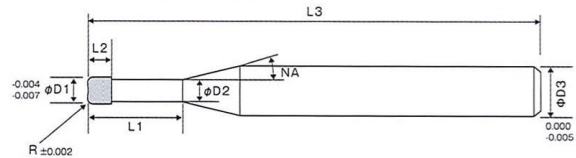
Work Material		Aluminum Alloy A5000					Aluminum Alloy A7000					Heat Resistant Alloy (Kovar)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	
2	0.2	0.5	0.012	0.05	250	30,000	0.012	0.05	250	30,000	0.003	0.04	150	30,000	
		1	0.008	0.05	200	30,000	0.008	0.05	200	30,000	0.003	0.04	100	30,000	
	0.3	1	0.024	0.1	300	30,000	0.024	0.1	300	30,000	0.003	0.08	180	30,000	
		1.5	0.018	0.1	260	30,000	0.018	0.1	260	30,000	0.003	0.08	130	30,000	
		2	0.012	0.1	250	30,000	0.012	0.1	250	30,000	0.003	0.08	100	30,000	
		2.5	0.008	0.1	240	30,000	0.008	0.1	240	30,000	0.002	0.08	80	25,000	
		3	0.006	0.1	220	30,000	0.006	0.1	220	30,000	0.002	0.08	50	25,000	
	0.4	1	0.03	0.12	450	30,000	0.03	0.12	450	30,000	0.005	0.1	300	30,000	
		1.5	0.027	0.12	400	30,000	0.027	0.12	400	30,000	0.005	0.1	270	30,000	
		2	0.024	0.12	360	30,000	0.024	0.12	360	30,000	0.005	0.1	180	25,000	
		2.5	0.024	0.12	360	30,000	0.024	0.12	360	30,000	0.005	0.1	180	25,000	
		3	0.018	0.12	300	30,000	0.018	0.12	300	30,000	0.004	0.1	150	25,000	
	0.5	1	0.036	0.14	650	30,000	0.036	0.14	650	30,000	0.01	0.12	400	25,000	
		2	0.03	0.14	600	30,000	0.03	0.14	600	30,000	0.01	0.12	300	25,000	
		3	0.024	0.14	480	30,000	0.024	0.14	480	30,000	0.008	0.12	250	25,000	
		4	0.018	0.14	430	30,000	0.018	0.14	430	30,000	0.005	0.12	180	20,000	
	0.6	2	0.04	0.16	800	30,000	0.04	0.16	800	30,000	0.02	0.13	400	25,000	
		4	0.03	0.16	650	30,000	0.03	0.16	650	30,000	0.015	0.13	250	20,000	
		6	0.018	0.16	400	25,000	0.018	0.16	400	25,000	0.008	0.13	150	16,000	
	0.7	2	0.04	0.2	1,000	30,000	0.04	0.2	1,000	30,000	0.02	0.16	400	20,000	
		4	0.04	0.2	1,000	30,000	0.04	0.2	1,000	30,000	0.02	0.16	400	20,000	
		6	0.025	0.2	700	25,000	0.025	0.2	700	25,000	0.01	0.16	250	16,000	
	0.8	2	0.055	0.25	1,400	30,000	0.055	0.25	1,400	30,000	0.025	0.2	600	20,000	
		4	0.055	0.25	1,400	30,000	0.055	0.25	1,400	30,000	0.025	0.2	600	20,000	
		6	0.04	0.25	1,000	25,000	0.04	0.25	1,000	25,000	0.02	0.2	400	16,000	
		8	0.025	0.25	600	22,000	0.025	0.25	600	22,000	0.01	0.2	250	14,000	
	0.9	4	0.06	0.3	1,500	30,000	0.06	0.3	1,500	30,000	0.03	0.24	700	20,000	
		8	0.04	0.3	800	22,000	0.04	0.3	800	22,000	0.01	0.24	350	14,000	

HARD STAR Type A Series

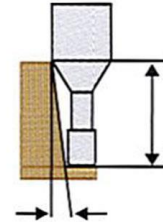
Carbide Long Neck Radius End Mill

■ :HALR330 Model number:HALR330

VHM Eckradiusfräser lang



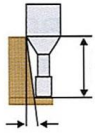
Der Hinterschliffwinkel ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
bitte checken Sie das aktuelle Massblatt



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneid-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	eff. Nutzläng bei Neigungswinkel Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
HALR330-0060-0020-0200	0.6	0.02	2	0.5	0.57	15	4	50	2.12	2.20	2.28	2.36	2.55
HALR330-0060-0020-0400		0.02	4	0.5	0.57	15	4	50	4.19	4.34	4.49	4.66	5.04
HALR330-0060-0020-0600		0.02	6	0.5	0.57	15	4	50	6.26	6.48	6.71	6.96	7.52
HALR330-0060-0050-0200		0.05	2	0.5	0.57	15	4	50	2.12	2.20	2.27	2.36	2.54
HALR330-0060-0050-0400		0.05	4	0.5	0.57	15	4	50	4.19	4.34	4.49	4.66	5.03
HALR330-0060-0050-0600		0.05	6	0.5	0.57	15	4	50	6.26	6.47	6.71	6.96	7.52
HALR330-0060-0100-0200		0.1	2	0.5	0.57	15	4	50	2.12	2.19	2.27	2.35	2.53
HALR330-0060-0100-0400		0.1	4	0.5	0.57	15	4	50	4.19	4.33	4.48	4.65	5.02
HALR330-0060-0100-0600		0.1	6	0.5	0.57	15	4	50	6.26	6.47	6.70	6.95	7.51
HALR330-0070-0020-0200	0.7	0.02	2	0.55	0.67	15	4	50	2.12	2.20	2.28	2.36	2.55
HALR330-0070-0020-0400		0.02	4	0.55	0.67	15	4	50	4.19	4.34	4.49	4.66	5.04
HALR330-0070-0020-0600		0.02	6	0.55	0.67	15	4	50	6.26	6.48	6.71	6.96	7.52
HALR330-0070-0050-0200		0.05	2	0.55	0.67	15	4	50	2.12	2.20	2.27	2.36	2.54
HALR330-0070-0050-0400		0.05	4	0.55	0.67	15	4	50	4.19	4.34	4.49	4.66	5.03
HALR330-0070-0050-0600		0.05	6	0.55	0.67	15	4	50	6.26	6.47	6.71	6.96	7.52
HALR330-0070-0100-0200		0.1	2	0.55	0.67	15	4	50	2.12	2.19	2.27	2.35	2.53
HALR330-0070-0100-0400		0.1	4	0.55	0.67	15	4	50	4.19	4.33	4.48	4.65	5.02
HALR330-0070-0100-0600		0.1	6	0.55	0.67	15	4	50	6.26	6.47	6.70	6.95	7.51
HALR330-0080-0020-0200	0.8	0.02	2	0.65	0.77	15	4	50	2.12	2.20	2.28	2.36	2.55
HALR330-0080-0020-0400		0.02	4	0.65	0.77	15	4	50	4.19	4.34	4.49	4.66	5.04
HALR330-0080-0020-0600		0.02	6	0.65	0.77	15	4	50	6.26	6.48	6.71	6.96	7.52
HALR330-0080-0020-0800		0.02	8	0.65	0.77	15	4	50	8.33	8.62	8.93	9.26	10.01
HALR330-0080-0050-0200		0.05	2	0.65	0.77	15	4	50	2.12	2.20	2.27	2.36	2.54
HALR330-0080-0050-0400		0.05	4	0.65	0.77	15	4	50	4.19	4.34	4.49	4.66	5.03
HALR330-0080-0050-0600		0.05	6	0.65	0.77	15	4	50	6.26	6.47	6.71	6.96	7.52
HALR330-0080-0050-0800		0.05	8	0.65	0.77	15	4	50	8.33	8.61	8.92	9.26	10.00
HALR330-0080-0100-0200		0.1	2	0.65	0.77	15	4	50	2.12	2.19	2.27	2.35	2.53
HALR330-0080-0100-0400		0.1	4	0.65	0.77	15	4	50	4.19	4.33	4.48	4.65	5.02
HALR330-0080-0100-0600		0.1	6	0.65	0.77	15	4	50	6.26	6.47	6.70	6.95	7.51
HALR330-0080-0100-0800		0.1	8	0.65	0.77	15	4	50	8.32	8.61	8.92	9.25	9.99

HARD STAR Type A Series

VHM Eckradiusfräser lang



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneid-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total Overall Length	eff. Nutzlänge bei Neigungswinkel Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
HALR330-0080-0200-0200	0.8	0.2	2	0.65	0.77	15	4	50	2.12	2.19	2.26	2.33	2.51
HALR330-0080-0200-0400		0.2	4	0.65	0.77	15	4	50	4.19	4.32	4.47	4.63	5.00
HALR330-0080-0200-0600		0.2	6	0.65	0.77	15	4	50	6.25	6.46	6.69	6.93	7.48
HALR330-0080-0200-0800		0.2	8	0.65	0.77	15	4	50	8.32	8.60	8.91	9.23	9.97

HARD STAR Type A Series

HARD STAR Type A
Recommended Milling Conditions

■ :HALR330
Model number:HALR330

Empfohlene Schnittparameter

Long Neck Radius End Mill

Work Material			Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)				
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	
3	0.6	2	0.012	0.2	750	25,000	0.006	0.15	600	23,000	0.004	0.1	480	20,000	
		4	0.007	0.2	600	23,000	0.004	0.15	450	20,000	0.003	0.1	300	18,000	
		6	0.005	0.2	300	20,000	0.003	0.15	225	18,000	0.002	0.1	150	12,000	
	0.7	2	0.012	0.25	1,050	25,000	0.006	0.15	900	23,000	0.003	0.12	675	20,000	
		4	0.008	0.25	900	25,000	0.005	0.15	750	23,000	0.002	0.12	525	20,000	
		6	0.005	0.25	525	20,000	0.003	0.15	375	18,000	0.002	0.12	300	16,000	
	0.8	2	0.014	0.25	1,200	25,000	0.006	0.16	1,050	23,000	0.005	0.14	750	20,000	
		4	0.008	0.25	1,050	25,000	0.005	0.16	900	23,000	0.003	0.14	600	20,000	
		6	0.006	0.25	825	20,000	0.004	0.16	675	18,000	0.002	0.14	480	16,000	
			8	0.003	0.25	600	16,000	0.002	0.16	450	14,000	0.002	0.14	300	12,000

Long Neck Radius End Mill

Work Material			Aluminum Alloy A5000番				Aluminum Alloy A7000番				Heat Resistant Alloy コバルト(Kovar)				
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	
3	0.6	2	0.04	0.16	1,200	30,000	0.04	0.16	1,200	30,000	0.02	0.13	600	25,000	
		4	0.03	0.16	975	30,000	0.03	0.16	975	30,000	0.015	0.13	375	20,000	
		6	0.018	0.16	600	25,000	0.018	0.16	600	25,000	0.008	0.13	225	16,000	
	0.7	2	0.04	0.2	1,500	30,000	0.04	0.2	1,500	30,000	0.02	0.16	600	20,000	
		4	0.04	0.2	1,500	30,000	0.04	0.2	1,500	30,000	0.02	0.16	600	20,000	
		6	0.025	0.2	1,050	25,000	0.025	0.2	1,050	25,000	0.01	0.16	375	16,000	
	0.8	2	0.055	0.25	2,100	30,000	0.055	0.25	2,100	30,000	0.025	0.2	900	20,000	
		4	0.04	0.25	1,500	25,000	0.04	0.25	1,500	25,000	0.02	0.2	600	16,000	
		6	0.04	0.25	1,500	25,000	0.04	0.25	1,500	25,000	0.02	0.2	600	16,000	
			8	0.025	0.25	900	22,000	0.025	0.25	900	22,000	0.01	0.2	375	14,000

HARD STAR Type A Series

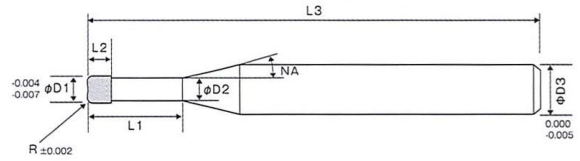
Carbide Long Neck Radius End Mill

■ :HALR430 Model number:HALR430

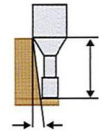
VHM Eckradiusfräser lang



Hard A
super MG
Lippen 4
Helix 30°
Winkel NA 15°
Schaft 0/-0.005



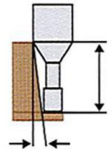
Der Hinterschliffwinkel ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
bitte checken Sie das aktuelle Massblatt



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneid-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	eff. Nutzlänge bei Neigungswinkel Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
									HALR430-0090-0100-0400	0.9	0.1	4	0.7
HALR430-0090-0100-0800	0.1	8	0.7	0.87	15	4	50	8.32	8.61		8.92	9.25	9.99
HALR430-0100-0020-0200	0.02	2	0.8	0.95	15	4	50	2.16	2.24		2.32	2.40	2.60
HALR430-0100-0020-0300	0.02	3	0.8	0.95	15	4	50	3.20	3.31		3.43	3.55	3.84
HALR430-0100-0020-0400	0.02	4	0.8	0.95	15	4	50	4.23	4.38		4.53	4.70	5.08
HALR430-0100-0020-0500	0.02	5	0.8	0.95	15	4	50	5.26	5.45		5.64	5.85	6.33
HALR430-0100-0020-0600	0.02	6	0.8	0.95	15	4	50	6.30	6.52		6.75	7.00	7.57
HALR430-0100-0020-0800	0.02	8	0.8	0.95	15	4	50	8.37	8.66		8.97	9.30	10.06
HALR430-0100-0020-1000	0.02	10	0.8	0.95	15	4	50	10.43	10.80		11.18	11.60	12.54
HALR430-0100-0050-0200	0.05	2	0.8	0.95	15	4	50	2.16	2.24		2.31	2.40	2.59
HALR430-0100-0050-0300	0.05	3	0.8	0.95	15	4	50	3.20	3.31	3.42	3.55	3.83	
HALR430-0100-0050-0400	0.05	4	0.8	0.95	15	4	50	4.23	4.38	4.53	4.70	5.08	
HALR430-0100-0050-0500	0.05	5	0.8	0.95	15	4	50	5.26	5.44	5.64	5.85	6.32	
HALR430-0100-0050-0600	0.05	6	0.8	0.95	15	4	50	6.30	6.51	6.75	7.00	7.56	
HALR430-0100-0050-0800	0.05	8	0.8	0.95	15	4	50	8.36	8.65	8.96	9.30	10.05	
HALR430-0100-0050-1000	0.05	10	0.8	0.95	15	4	50	10.43	10.79	11.18	11.60	12.54	
HALR430-0100-0100-0200	1	0.1	2	0.8	0.95	15	4	50	2.16	2.23	2.31	2.39	2.58
HALR430-0100-0100-0300		0.1	3	0.8	0.95	15	4	50	3.19	3.30	3.42	3.54	3.82
HALR430-0100-0100-0400		0.1	4	0.8	0.95	15	4	50	4.23	4.37	4.53	4.69	5.07
HALR430-0100-0100-0500		0.1	5	0.8	0.95	15	4	50	5.26	5.44	5.63	5.84	6.31
HALR430-0100-0100-0600		0.1	6	0.8	0.95	15	4	50	6.30	6.51	6.74	6.99	7.55
HALR430-0100-0100-0800		0.1	8	0.8	0.95	15	4	50	8.36	8.65	8.96	9.29	10.04
HALR430-0100-0100-1000		0.1	10	0.8	0.95	15	4	50	10.43	10.79	11.18	11.59	12.52
HALR430-0100-0200-0200		0.2	2	0.8	0.95	15	4	50	2.16	2.23	2.30	2.38	2.56
HALR430-0100-0200-0300		0.2	3	0.8	0.95	15	4	50	3.19	3.30	3.41	3.53	3.80
HALR430-0100-0200-0400		0.2	4	0.8	0.95	15	4	50	4.22	4.36	4.52	4.68	5.04
HALR430-0100-0200-0500	0.2	5	0.8	0.95	15	4	50	5.26	5.43	5.62	5.83	6.29	
HALR430-0100-0200-0600	0.2	6	0.8	0.95	15	4	50	6.29	6.50	6.73	6.98	7.53	
HALR430-0100-0200-0800	0.2	8	0.8	0.95	15	4	50	8.36	8.64	8.95	9.28	10.01	
HALR430-0100-0200-1000	0.2	10	0.8	0.95	15	4	50	10.43	10.78	11.17	11.58	12.50	

HARD STAR Type A Series

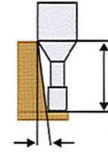
VHM Eckradiusfräser lang



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneid-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	eff. Nutzlänge bei Neigungswinkel Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
HALR430-0100-0300-0200	1	0.3	2	0.8	0.95	15	4	50	2.15	2.22	2.29	2.36	2.53
HALR430-0100-0300-0300		0.3	3	0.8	0.95	15	4	50	3.19	3.29	3.40	3.51	3.78
HALR430-0100-0300-0400		0.3	4	0.8	0.95	15	4	50	4.22	4.36	4.50	4.66	5.02
HALR430-0100-0300-0500		0.3	5	0.8	0.95	15	4	50	5.25	5.43	5.61	5.81	6.26
HALR430-0100-0300-0600		0.3	6	0.8	0.95	15	4	50	6.29	6.50	6.72	6.96	7.51
HALR430-0100-0300-0800		0.3	8	0.8	0.95	15	4	50	8.36	8.64	8.94	9.26	9.99
HALR430-0100-0300-1000		0.3	10	0.8	0.95	15	4	50	10.42	10.78	11.15	11.56	12.48
HALR430-0120-0100-0500	1.2	0.1	5	1	1.15	15	4	50	5.26	5.44	5.63	5.84	6.31
HALR430-0120-0100-1000		0.1	10	1	1.15	15	4	50	10.43	10.79	11.18	11.59	12.52
HALR430-0120-0200-0500		0.2	5	1	1.15	15	4	50	5.26	5.43	5.62	5.83	6.29
HALR430-0120-0200-1000		0.2	10	1	1.15	15	4	50	10.43	10.78	11.17	11.58	12.50
HALR430-0120-0300-0500		0.3	5	1	1.15	15	4	50	5.25	5.43	5.61	5.81	6.26
HALR430-0120-0300-1000		0.3	10	1	1.15	15	4	50	10.42	10.78	11.15	11.56	12.48
HALR430-0150-0020-0300	1.5	0.02	3	1.2	1.45	15	4	50	3.20	3.31	3.43	3.55	3.84
HALR430-0150-0020-0400		0.02	4	1.2	1.45	15	4	50	4.23	4.38	4.53	4.70	5.08
HALR430-0150-0020-0600		0.02	6	1.2	1.45	15	4	50	6.30	6.52	6.75	7.00	7.57
HALR430-0150-0020-0800		0.02	8	1.2	1.45	15	4	50	8.37	8.66	8.97	9.30	10.06
HALR430-0150-0020-1200		0.02	12	1.2	1.45	15	4	50	12.50	12.93	13.40	13.90	15.03
HALR430-0150-0020-1500		0.02	15	1.2	1.45	15	4	50	15.60	16.14	16.73	17.35	18.76
HALR430-0150-0050-0300		0.05	3	1.2	1.45	15	4	50	3.20	3.31	3.42	3.55	3.83
HALR430-0150-0050-0400		0.05	4	1.2	1.45	15	4	50	4.23	4.38	4.53	4.70	5.08
HALR430-0150-0050-0600		0.05	6	1.2	1.45	15	4	50	6.30	6.51	6.75	7.00	7.56
HALR430-0150-0050-0800		0.05	8	1.2	1.45	15	4	50	8.36	8.65	8.96	9.30	10.05
HALR430-0150-0050-1200		0.05	12	1.2	1.45	15	4	50	12.50	12.93	13.40	13.90	15.02
HALR430-0150-0050-1500		0.05	15	1.2	1.45	15	4	50	15.60	16.14	16.72	17.35	18.75
HALR430-0150-0100-0300		0.1	3	1.2	1.45	15	4	50	3.19	3.30	3.42	3.54	3.82
HALR430-0150-0100-0400		0.1	4	1.2	1.45	15	4	50	4.23	4.37	4.53	4.69	5.07
HALR430-0150-0100-0600		0.1	6	1.2	1.45	15	4	50	6.30	6.51	6.74	6.99	7.55
HALR430-0150-0100-0800		0.1	8	1.2	1.45	15	4	50	8.36	8.65	8.96	9.29	10.04
HALR430-0150-0100-1200		0.1	12	1.2	1.45	15	4	50	12.50	12.93	13.39	13.89	15.01
HALR430-0150-0100-1500		0.1	15	1.2	1.45	15	4	50	15.60	16.14	16.72	17.34	18.74
HALR430-0150-0200-0300		0.2	3	1.2	1.45	15	4	50	3.19	3.30	3.41	3.53	3.80
HALR430-0150-0200-0400		0.2	4	1.2	1.45	15	4	50	4.22	4.36	4.52	4.68	5.04
HALR430-0150-0200-0600		0.2	6	1.2	1.45	15	4	50	6.29	6.50	6.73	6.98	7.53
HALR430-0150-0200-0800		0.2	8	1.2	1.45	15	4	50	8.36	8.64	8.95	9.28	10.01
HALR430-0150-0200-1200		0.2	12	1.2	1.45	15	4	50	12.49	12.92	13.38	13.88	14.99
HALR430-0150-0200-1500		0.2	15	1.2	1.45	15	4	50	15.59	16.13	16.71	17.33	18.72
HALR430-0150-0300-0300		0.3	3	1.2	1.45	15	4	50	3.19	3.29	3.40	3.51	3.78
HALR430-0150-0300-0400		0.3	4	1.2	1.45	15	4	50	4.22	4.36	4.50	4.66	5.02
HALR430-0150-0300-0600		0.3	6	1.2	1.45	15	4	50	6.29	6.50	6.72	6.96	7.51
HALR430-0150-0300-0800		0.3	8	1.2	1.45	15	4	50	8.36	8.64	8.94	9.26	9.99
HALR430-0150-0300-1200		0.3	12	1.2	1.45	15	4	50	12.49	12.92	13.37	13.86	14.96
HALR430-0150-0300-1500		0.3	15	1.2	1.45	15	4	50	15.59	16.12	16.70	17.31	18.69
HALR430-0150-0500-0300		0.5	3	1.2	1.45	15	4	50	3.18	3.27	3.37	3.48	3.73
HALR430-0150-0500-0400		0.5	4	1.2	1.45	15	4	50	4.21	4.34	4.48	4.63	4.97

HARD STAR Type A Series

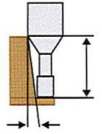
VHM Eckradiusfräser lang



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneid-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	eff. Nutzlänge bei Neigungswinkel Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
									HALR430-0150-0500-0600	1.5	0.5	6	1.2
HALR430-0150-0500-0800	0.5	8	1.2	1.45	15	4	50	8.35	8.62		8.92	9.23	9.95
HALR430-0150-0500-1200	0.5	12	1.2	1.45	15	4	50	12.48	12.90		13.35	13.83	14.92
HALR430-0150-0500-1500	0.5	15	1.2	1.45	15	4	50	15.58	16.11		16.67	17.28	18.65
HALR430-0200-0020-0400	2	0.02	4	1.6	1.94	15	4	50	4.25	4.40	4.56	4.73	5.11
HALR430-0200-0020-0600		0.02	6	1.6	1.94	15	4	50	6.32	6.54	6.77	7.02	7.59
HALR430-0200-0020-0800		0.02	8	1.6	1.94	15	4	50	8.38	8.68	8.99	9.32	10.08
HALR430-0200-0020-1200		0.02	12	1.6	1.94	15	4	50	12.52	12.95	13.42	13.92	15.05
HALR430-0200-0020-1600		0.02	16	1.6	1.94	15	4	50	16.65	17.23	17.85	18.52	FREE
HALR430-0200-0020-2000		0.02	20	1.6	1.94	15	4	50	20.79	21.51	22.29	23.12	FREE
HALR430-0200-0050-0400		0.05	4	1.6	1.94	15	4	50	4.25	4.40	4.55	4.72	5.10
HALR430-0200-0050-0600		0.05	6	1.6	1.94	15	4	50	6.32	6.53	6.77	7.02	7.59
HALR430-0200-0050-0800		0.05	8	1.6	1.94	15	4	50	8.38	8.67	8.99	9.32	10.07
HALR430-0200-0050-1200		0.05	12	1.6	1.94	15	4	50	12.52	12.95	13.42	13.92	15.05
HALR430-0200-0050-1600		0.05	16	1.6	1.94	15	4	50	16.65	17.23	17.85	18.52	FREE
HALR430-0200-0050-2000		0.05	20	1.6	1.94	15	4	50	20.79	21.51	22.28	23.12	FREE
HALR430-0200-0100-0400		0.1	4	1.6	1.94	15	4	50	4.25	4.39	4.55	4.71	5.09
HALR430-0200-0100-0600		0.1	6	1.6	1.94	15	4	50	6.31	6.53	6.76	7.01	7.57
HALR430-0200-0100-0800		0.1	8	1.6	1.94	15	4	50	8.38	8.67	8.98	9.31	10.06
HALR430-0200-0100-1200		0.1	12	1.6	1.94	15	4	50	12.52	12.95	13.41	13.91	15.03
HALR430-0200-0100-1600		0.1	16	1.6	1.94	15	4	50	16.65	17.23	17.85	18.51	FREE
HALR430-0200-0100-2000		0.1	20	1.6	1.94	15	4	50	20.79	21.51	22.28	23.11	FREE
HALR430-0200-0200-0400		0.2	4	1.6	1.94	15	4	50	4.24	4.38	4.54	4.70	5.07
HALR430-0200-0200-0600		0.2	6	1.6	1.94	15	4	50	6.31	6.52	6.75	7.00	7.55
HALR430-0200-0200-0800		0.2	8	1.6	1.94	15	4	50	8.38	8.66	8.97	9.30	10.04
HALR430-0200-0200-1200		0.2	12	1.6	1.94	15	4	50	12.51	12.94	13.40	13.90	15.01
HALR430-0200-0200-1600		0.2	16	1.6	1.94	15	4	50	16.65	17.22	17.84	18.50	FREE
HALR430-0200-0200-2000		0.2	20	1.6	1.94	15	4	50	20.78	21.50	22.27	23.10	FREE
HALR430-0200-0300-0400		0.3	4	1.6	1.94	15	4	50	4.24	4.38	4.53	4.68	5.04
HALR430-0200-0300-0600		0.3	6	1.6	1.94	15	4	50	6.31	6.52	6.74	6.98	7.53
HALR430-0200-0300-0800		0.3	8	1.6	1.94	15	4	50	8.37	8.66	8.96	9.28	10.02
HALR430-0200-0300-1200		0.3	12	1.6	1.94	15	4	50	12.51	12.94	13.39	13.88	14.99
HALR430-0200-0300-1600		0.3	16	1.6	1.94	15	4	50	16.64	17.21	17.83	18.48	FREE
HALR430-0200-0300-2000		0.3	20	1.6	1.94	15	4	50	20.78	21.49	22.26	23.08	FREE
HALR430-0200-0500-0400		0.5	4	1.6	1.94	15	4	50	4.23	4.36	4.50	4.65	5.00
HALR430-0200-0500-0600		0.5	6	1.6	1.94	15	4	50	6.30	6.50	6.72	6.95	7.48
HALR430-0200-0500-0800	0.5	8	1.6	1.94	15	4	50	8.37	8.64	8.94	9.25	9.97	
HALR430-0200-0500-1200	0.5	12	1.6	1.94	15	4	50	12.50	12.92	13.37	13.85	14.94	
HALR430-0200-0500-1600	0.5	16	1.6	1.94	15	4	50	16.64	17.20	17.80	18.45	FREE	
HALR430-0200-0500-2000	0.5	20	1.6	1.94	15	4	50	20.77	21.48	22.24	23.05	FREE	
HALR430-0250-0100-1000	2.5	0.1	10	2	2.44	15	4	50	10.45	10.81	11.20	11.61	12.55
HALR430-0250-0100-2000		0.1	20	2	2.44	15	4	50	20.79	21.51	22.28	FREE	FREE
HALR430-0250-0200-1000		0.2	10	2	2.44	15	4	50	10.45	10.80	11.19	11.60	12.52
HALR430-0250-0200-2000		0.2	20	2	2.44	15	4	50	20.78	21.50	22.27	FREE	FREE
HALR430-0250-0300-1000		0.3	10	2	2.44	15	4	50	10.44	10.80	11.18	11.58	12.50

HARD STAR Type A Series

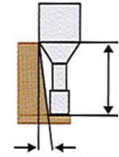
VHM Eckradiusfräser lang



Bestell-Code Code No.	WZ-Ø Tool Diameter	ckradius Corner Radius	Nutzlänge Effective Length	Schneid-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	eff. Nutzlänge bei Neigungswinkel Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
									HALR430-0250-0300-2000	2.5	0.3	20	2
HALR430-0250-0500-1000	0.5	10	2	2.44	15	4	50	10.44	10.78		11.15	11.55	12.46
HALR430-0250-0500-2000	0.5	20	2	2.44	15	4	50	20.77	21.48		22.24	FREE	FREE
HALR430-0300-0050-0400	3	0.05	4	2.5	2.85	15	4	50	4.42	4.57	4.74	4.91	5.31
HALR430-0300-0050-0600		0.05	6	2.5	2.85	15	4	50	6.49	6.71	6.95	7.21	7.79
HALR430-0300-0050-0800		0.05	8	2.5	2.85	15	4	50	8.56	8.85	9.17	9.51	FREE
HALR430-0300-0050-1200		0.05	12	2.5	2.85	15	4	50	12.69	13.13	13.60	14.11	FREE
HALR430-0300-0050-1600		0.05	16	2.5	2.85	15	4	50	16.83	17.41	18.04	FREE	FREE
HALR430-0300-0050-2000		0.05	20	2.5	2.85	15	4	50	20.96	21.69	FREE	FREE	FREE
HALR430-0300-0100-0400		0.1	4	2.5	2.85	15	4	50	4.42	4.57	4.73	4.91	5.30
HALR430-0300-0100-0600		0.1	6	2.5	2.85	15	4	50	6.49	6.71	6.95	7.21	7.78
HALR430-0300-0100-0800		0.1	8	2.5	2.85	15	4	50	8.56	8.85	9.17	9.51	FREE
HALR430-0300-0100-1200		0.1	12	2.5	2.85	15	4	50	12.69	13.13	13.60	14.11	FREE
HALR430-0300-0100-1600		0.1	16	2.5	2.85	15	4	50	16.82	17.41	18.03	FREE	FREE
HALR430-0300-0100-2000		0.1	20	2.5	2.85	15	4	50	20.96	21.69	FREE	FREE	FREE
HALR430-0300-0100-2500		0.1	25	2.5	2.85	15	4	60	26.13	27.03	FREE	FREE	FREE
HALR430-0300-0100-3000		0.1	30	2.5	2.85	15	4	60	31.30	FREE	FREE	FREE	FREE
HALR430-0300-0200-0400		0.2	4	2.5	2.85	15	4	50	4.42	4.56	4.72	4.89	5.27
HALR430-0300-0200-0600		0.2	6	2.5	2.85	15	4	50	6.48	6.70	6.94	7.19	7.76
HALR430-0300-0200-0800		0.2	8	2.5	2.85	15	4	50	8.55	8.84	9.16	9.49	FREE
HALR430-0300-0200-1200		0.2	12	2.5	2.85	15	4	50	12.69	13.12	13.59	14.09	FREE
HALR430-0300-0200-1600		0.2	16	2.5	2.85	15	4	50	16.82	17.40	18.02	FREE	FREE
HALR430-0300-0200-2000		0.2	20	2.5	2.85	15	4	50	20.96	21.68	FREE	FREE	FREE
HALR430-0300-0200-2500		0.2	25	2.5	2.85	15	4	60	26.12	27.03	FREE	FREE	FREE
HALR430-0300-0200-3000		0.2	30	2.5	2.85	15	4	60	31.29	FREE	FREE	FREE	FREE
HALR430-0300-0300-0400		0.3	4	2.5	2.85	15	4	50	4.41	4.56	4.71	4.88	5.25
HALR430-0300-0300-0600		0.3	6	2.5	2.85	15	4	50	6.48	6.70	6.93	7.18	7.74
HALR430-0300-0300-0800		0.3	8	2.5	2.85	15	4	50	8.55	8.84	9.14	9.48	FREE
HALR430-0300-0300-1200		0.3	12	2.5	2.85	15	4	50	12.68	13.11	13.58	14.08	FREE
HALR430-0300-0300-1600		0.3	16	2.5	2.85	15	4	50	16.82	17.39	18.01	FREE	FREE
HALR430-0300-0300-2000		0.3	20	2.5	2.85	15	4	50	20.95	21.67	FREE	FREE	FREE
HALR430-0300-0300-2500		0.3	25	2.5	2.85	15	4	60	26.12	27.02	FREE	FREE	FREE
HALR430-0300-0300-3000		0.3	30	2.5	2.85	15	4	60	31.29	FREE	FREE	FREE	FREE
HALR430-0300-0500-0400	0.5	4	2.5	2.85	15	4	50	4.41	4.54	4.69	4.85	5.20	
HALR430-0300-0500-0600	0.5	6	2.5	2.85	15	4	50	6.47	6.68	6.91	7.15	7.69	
HALR430-0300-0500-0800	0.5	8	2.5	2.85	15	4	50	8.54	8.82	9.12	9.45	FREE	
HALR430-0300-0500-1200	0.5	12	2.5	2.85	15	4	50	12.68	13.10	13.56	14.05	FREE	
HALR430-0300-0500-1600	0.5	16	2.5	2.85	15	4	50	16.81	17.38	17.99	FREE	FREE	
HALR430-0300-0500-2000	0.5	20	2.5	2.85	15	4	50	20.95	21.66	FREE	FREE	FREE	
HALR430-0300-0500-2500	0.5	25	2.5	2.85	15	4	60	26.11	27.01	FREE	FREE	FREE	
HALR430-0300-0500-3000	0.5	30	2.5	2.85	15	4	60	31.28	FREE	FREE	FREE	FREE	
HALR430-0300-1000-0800	1	8	2.5	2.85	15	4	50	8.53	8.79	9.07	9.37	10.06	
HALR430-0300-1000-1200	1	12	2.5	2.85	15	4	50	12.66	13.07	13.50	13.97	FREE	
HALR430-0300-1000-1600	1	16	2.5	2.85	15	4	50	16.79	17.35	17.94	FREE	FREE	
HALR430-0300-1000-2000	1	20	2.5	2.85	15	4	50	20.93	21.62	FREE	FREE	FREE	

HARD STAR Type A Series

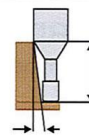
VHM Eckradiusfräser lang



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneid-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	eff. Nutzlänge bei Neigungswinkel Actual effective length by inclined angle of workpiece.					
									30°	1°	1°30'	2°	3°	
									HALR430-0300-1000-2500	3	1	25	2.5	2.85
HALR430-0300-1000-3000	1	30	2.5	2.85	15	4	60	31.27	FREE		FREE	FREE	FREE	
HALR430-0400-0100-0800	4	0.1	8	3.2	3.8	15	6	50	8.65	8.95	9.27	9.61	10.39	
HALR430-0400-0100-1200		0.1	12	3.2	3.8	15	6	50	12.79	13.23	13.70	14.21	15.36	
HALR430-0400-0100-1600		0.1	16	3.2	3.8	15	6	50	16.92	17.51	18.14	18.81	FREE	
HALR430-0400-0100-2400		0.1	24	3.2	3.8	15	6	60	25.19	26.06	27.00	28.01	FREE	
HALR430-0400-0100-3200		0.1	32	3.2	3.8	15	6	70	33.46	34.62	35.87	FREE	FREE	
HALR430-0400-0200-0800		0.2	8	3.2	3.8	15	6	50	8.65	8.94	9.26	9.60	10.36	
HALR430-0400-0200-1200		0.2	12	3.2	3.8	15	6	50	12.78	13.22	13.69	14.20	15.33	
HALR430-0400-0200-1600		0.2	16	3.2	3.8	15	6	50	16.92	17.50	18.13	18.80	FREE	
HALR430-0400-0200-2400		0.2	24	3.2	3.8	15	6	60	25.19	26.06	26.99	28.00	FREE	
HALR430-0400-0200-3200		0.2	32	3.2	3.8	15	6	70	33.46	34.62	35.86	FREE	FREE	
HALR430-0400-0300-0800		0.3	8	3.2	3.8	15	6	50	8.65	8.94	9.25	9.58	10.34	
HALR430-0400-0300-1200		0.3	12	3.2	3.8	15	6	50	12.78	13.21	13.68	14.18	15.31	
HALR430-0400-0300-1600		0.3	16	3.2	3.8	15	6	50	16.91	17.49	18.11	18.78	FREE	
HALR430-0400-0300-2400		0.3	24	3.2	3.8	15	6	60	25.18	26.05	26.98	27.98	FREE	
HALR430-0400-0300-3200		0.3	32	3.2	3.8	15	6	70	33.45	34.61	35.85	FREE	FREE	
HALR430-0400-0500-0800		0.5	8	3.2	3.8	15	6	50	8.64	8.92	9.23	9.55	10.29	
HALR430-0400-0500-1200	0.5	12	3.2	3.8	15	6	50	12.77	13.20	13.66	14.15	15.27		
HALR430-0400-0500-1600	0.5	16	3.2	3.8	15	6	50	16.91	17.48	18.09	18.75	FREE		
HALR430-0400-0500-2400	0.5	24	3.2	3.8	15	6	60	25.18	26.04	26.96	27.95	FREE		
HALR430-0400-0500-3200	0.5	32	3.2	3.8	15	6	70	33.45	34.59	35.83	FREE	FREE		
HALR430-0400-1000-0800	5	1	8	3.2	3.8	15	6	50	8.62	8.89	9.17	9.48	10.18	
HALR430-0400-1000-1200		1	12	3.2	3.8	15	6	50	12.76	13.17	13.61	14.08	15.15	
HALR430-0400-1000-1600		1	16	3.2	3.8	15	6	50	16.89	17.45	18.04	18.68	FREE	
HALR430-0400-1000-2400		1	24	3.2	3.8	15	6	60	25.16	26.00	26.91	27.88	FREE	
HALR430-0400-1000-3200		1	32	3.2	3.8	15	6	70	33.43	34.56	35.77	FREE	FREE	
HALR430-0500-0100-1500		5	0.1	15	4	4.8	15	6	50	15.89	16.44	17.03	FREE	FREE
HALR430-0500-0100-2000			0.1	20	4	4.8	15	6	50	21.06	21.79	FREE	FREE	FREE
HALR430-0500-0100-4000			0.1	40	4	4.8	15	6	70	41.73	FREE	FREE	FREE	FREE
HALR430-0500-0200-1500			0.2	15	4	4.8	15	6	50	15.88	16.43	17.02	FREE	FREE
HALR430-0500-0200-2000			0.2	20	4	4.8	15	6	50	21.05	21.78	FREE	FREE	FREE
HALR430-0500-0200-4000			0.2	40	4	4.8	15	6	70	41.73	FREE	FREE	FREE	FREE
HALR430-0500-0300-1500			0.3	15	4	4.8	15	6	50	15.88	16.42	17.01	FREE	FREE
HALR430-0500-0300-2000			0.3	20	4	4.8	15	6	50	21.05	21.77	FREE	FREE	FREE
HALR430-0500-0300-4000			0.3	40	4	4.8	15	6	70	41.72	FREE	FREE	FREE	FREE
HALR430-0500-0500-1500			0.5	15	4	4.8	15	6	50	15.87	16.41	16.98	FREE	FREE
HALR430-0500-0500-2000			0.5	20	4	4.8	15	6	50	21.04	21.76	FREE	FREE	FREE
HALR430-0500-0500-4000	0.5		40	4	4.8	15	6	70	41.72	FREE	FREE	FREE	FREE	
HALR430-0500-1000-1500	1		15	4	4.8	15	6	50	15.86	16.38	16.93	FREE	FREE	
HALR430-0500-1000-2000	1		20	4	4.8	15	6	50	21.03	21.72	FREE	FREE	FREE	
HALR430-0500-1000-4000	1		40	4	4.8	15	6	70	41.70	FREE	FREE	FREE	FREE	
HALR430-0600-0100-1200	6		0.1	12	5	5.8	15	6	50	FREE	FREE	FREE	FREE	FREE
HALR430-0600-0100-1800		0.1	18	5	5.8	15	6	50	FREE	FREE	FREE	FREE	FREE	
HALR430-0600-0100-2400		0.1	24	5	5.8	15	6	60	FREE	FREE	FREE	FREE	FREE	

HARD STAR Type A Series

VHM Eckradiusfräser lang



Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Nutzlänge Effective Length	Schneid-L Length of Cut	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	eff. Nutzlänge bei Neigungswinkel Actual effective length by inclined angle of workpiece.				
									30'	1°	1°30'	2°	3°
									HALR430-0600-0100-4800	6	0.1	48	5
HALR430-0600-0200-1200	0.2	12	5	5.8	15	6	50	FREE	FREE		FREE	FREE	FREE
HALR430-0600-0200-1800	0.2	18	5	5.8	15	6	50	FREE	FREE		FREE	FREE	FREE
HALR430-0600-0200-2400	0.2	24	5	5.8	15	6	60	FREE	FREE		FREE	FREE	FREE
HALR430-0600-0200-4800	0.2	48	5	5.8	15	6	80	FREE	FREE		FREE	FREE	FREE
HALR430-0600-0300-1200	0.3	12	5	5.8	15	6	50	FREE	FREE		FREE	FREE	FREE
HALR430-0600-0300-1800	0.3	18	5	5.8	15	6	50	FREE	FREE		FREE	FREE	FREE
HALR430-0600-0300-2400	0.3	24	5	5.8	15	6	60	FREE	FREE		FREE	FREE	FREE
HALR430-0600-0300-4800	0.3	48	5	5.8	15	6	80	FREE	FREE		FREE	FREE	FREE
HALR430-0600-0500-1200	0.5	12	5	5.8	15	6	50	FREE	FREE		FREE	FREE	FREE
HALR430-0600-0500-1800	0.5	18	5	5.8	15	6	50	FREE	FREE		FREE	FREE	FREE
HALR430-0600-0500-2400	0.5	24	5	5.8	15	6	60	FREE	FREE		FREE	FREE	FREE
HALR430-0600-0500-4800	0.5	48	5	5.8	15	6	80	FREE	FREE		FREE	FREE	FREE
HALR430-0600-1000-1200	1	12	5	5.8	15	6	50	FREE	FREE		FREE	FREE	FREE
HALR430-0600-1000-1800	1	18	5	5.8	15	6	50	FREE	FREE		FREE	FREE	FREE
HALR430-0600-1000-2400	1	24	5	5.8	15	6	60	FREE	FREE		FREE	FREE	FREE
HALR430-0600-1000-4800	1	48	5	5.8	15	6	80	FREE	FREE		FREE	FREE	FREE

HARD STAR Type A Series

HARD STAR Type A
Recommended Milling Conditions

■ :HALR430
Model number:HALR430

Empfohlene Schnittparameter

Long Neck Radius End Mill

Work Material		Hardened Steels STAVAX/HPM/SKD61 (~55HRC)					Hardened Steels SKD11/SKH51 (~60HRC)					Hardened Steels ASP23/HAP5R/HAP72(60HRC~)				
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed		
			ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹		
4	0.9	4	0.03	0.3	1,700	25,000	0.02	0.2	1,400	20,000	0.01	0.15	1,200	18,000		
		8	0.01	0.3	800	16,000	0.008	0.2	700	14,000	0.005	0.15	500	10,000		
	1.0	2	0.012	0.3	2,300	25,000	0.01	0.25	2,000	21,000	0.008	0.2	1,400	17,000		
		3	0.012	0.3	2,100	23,000	0.01	0.25	1,800	20,000	0.008	0.2	1,300	16,000		
		4	0.01	0.3	1,800	21,000	0.008	0.25	1,500	18,000	0.005	0.2	1,100	14,000		
		5	0.008	0.3	1,600	19,000	0.005	0.25	1,400	16,000	0.003	0.2	1,000	13,000		
		6	0.008	0.3	1,400	16,000	0.005	0.25	1,200	14,000	0.003	0.2	850	11,000		
		8	0.006	0.3	1,100	15,000	0.005	0.25	900	13,000	0.002	0.2	650	10,000		
	1.2	10	0.004	0.3	800	13,000	0.003	0.25	700	11,000	0.002	0.2	500	9,000		
		5	0.045	0.4	1,800	20,000	0.03	0.3	1,500	17,000	0.02	0.2	1,100	14,000		
	1.5	10	0.03	0.4	1,100	13,000	0.01	0.3	950	11,000	0.005	0.2	700	9,000		
		3	0.012	0.5	2,300	23,000	0.01	0.4	2,000	20,000	0.008	0.3	1,400	16,000		
		4	0.012	0.5	2,000	21,000	0.01	0.4	1,700	18,000	0.008	0.3	1,200	14,000		
		6	0.01	0.5	1,800	19,000	0.008	0.4	1,500	16,000	0.005	0.3	1,100	13,000		
		8	0.01	0.5	1,500	16,000	0.008	0.4	1,300	14,000	0.003	0.3	900	11,000		
		12	0.008	0.5	1,100	13,000	0.005	0.4	950	11,000	0.002	0.3	650	9,000		
	2	15	0.005	0.5	800	11,000	0.003	0.4	700	9,000	0.002	0.3	500	7,000		
		4	0.015	0.6	2,300	20,000	0.012	0.5	2,000	17,000	0.008	0.35	1,400	14,000		
		6	0.015	0.6	2,100	18,000	0.012	0.5	1,800	15,000	0.008	0.35	1,300	12,000		
		8	0.012	0.6	1,800	16,000	0.01	0.5	1,500	14,000	0.005	0.35	1,100	11,000		
		12	0.01	0.6	1,400	13,000	0.008	0.5	1,200	11,000	0.003	0.35	850	9,000		
		16	0.008	0.6	1,100	11,000	0.005	0.5	950	9,500	0.002	0.35	650	7,500		
	2.5	20	0.005	0.6	650	8,000	0.003	0.5	550	7,000	0.002	0.35	400	5,500		
		10	0.07	0.7	1,800	13,000	0.05	0.5	1,500	11,000	0.03	0.5	1,100	9,000		
	3	20	0.04	0.7	1,100	9,000	0.02	0.5	950	7,500	0.01	0.5	650	6,000		
		4	0.1	0.8	2,300	15,000	0.07	0.7	550	13,000	0.05	0.6	1,400	10,000		
		6	0.1	0.8	2,100	13,000	0.07	0.7	2,000	11,000	0.05	0.6	1,300	9,000		
		8	0.1	0.8	1,800	11,000	0.07	0.7	1,800	9,500	0.05	0.6	1,100	7,500		
		12	0.08	0.8	1,600	11,000	0.06	0.7	1,400	9,500	0.04	0.6	1,000	7,500		
		16	0.07	0.8	1,500	10,000	0.05	0.7	1,200	8,500	0.03	0.6	900	7,000		
		20	0.05	0.8	1,100	8,000	0.04	0.7	950	7,000	0.02	0.6	700	5,500		
		25	0.04	0.8	1,000	7,500	0.02	0.7	850	6,500	0.01	0.6	600	5,000		
	4	30	0.03	0.8	650	6,500	0.02	0.7	550	5,500	0.007	0.6	400	4,500		
		8	0.15	1.2	2,100	10,000	0.08	1	1,800	8,500	0.06	0.8	1,300	7,000		
		12	0.15	1.2	2,100	10,000	0.08	1	1,800	8,500	0.06	0.8	1,300	7,000		
		16	0.1	1.2	1,800	8,000	0.06	1	1,500	7,000	0.05	0.8	1,100	5,500		
		24	0.08	1.2	1,300	6,500	0.05	1	1,100	5,500	0.03	0.8	750	4,500		
	5	32	0.04	1.2	1,100	5,500	0.02	1	950	4,500	0.01	0.8	650	3,500		
		15	0.15	2	2,000	8,000	0.08	1.6	1,700	7,000	0.06	1.2	1,200	5,500		
		20	0.1	2	1,600	6,500	0.07	1.6	1,400	5,500	0.05	1.2	1,000	4,500		
		40	0.05	2	1,000	4,000	0.02	1.6	850	3,500	0.01	1.2	600	3,000		

HARD STAR Type A Series

Empfohlene Schnittparameter

Long Neck Radius End Mill

Work Material			Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
4	6	12	0.18	2.5	2,100	6,500	0.08	2	1,800	5,500	0.06	1.5	1,300	4,500
		18	0.18	2.5	1,800	5,500	0.08	2	1,500	4,500	0.06	1.5	1,100	3,500
		24	0.15	2.5	1,500	5,000	0.07	2	1,300	4,000	0.05	1.5	900	3,000
		48	0.05	2.5	750	2,500	0.03	2	650	2,000	0.02	1.5	450	2,000

HARD STAR Type A Series

HARD STAR Type A
Recommended Milling Conditions

■ :HALR430
Model number:HALR430

Empfohlene Schnittparameter

Long Neck Radius End Mill

Work Material		Aluminum Alloy A5000					Aluminum Alloy A700C					Heat Resistant Alloy (Kovar)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	
4	0.9	4	0.18	0.2	1,000	17,000	0.18	0.2	1,000	17,000	0.18	0.2	800	13,000	
		8	0.15	0.2	1,000	17,000	0.15	0.2	1,000	17,000	0.15	0.2	700	13,000	
	1.0	2	0.2	0.23	1,800	16,000	0.2	0.23	1,800	16,000	0.045	0.3	1,260	12,800	
		3	0.15	0.23	1,500	16,000	0.15	0.23	1,500	16,000	0.04	0.3	1,050	12,800	
		4	0.13	0.23	1,410	16,000	0.13	0.23	1,410	16,000	0.035	0.25	990	12,800	
		5	0.12	0.2	1,200	14,500	0.12	0.2	1,200	14,500	0.03	0.25	840	11,600	
		6	0.09	0.2	870	14,500	0.09	0.2	870	14,500	0.02	0.2	620	11,600	
		8	0.075	0.15	660	11,100	0.075	0.15	660	11,100	0.015	0.1	470	8,900	
		10	0.06	0.15	300	11,100	0.06	0.15	300	11,100	0.01	0.08	210	8,900	
	1.2	5	0.18	0.28	1,740	15,500	0.18	0.28	1,740	15,500	0.045	0.35	1,220	12,400	
		10	0.12	0.28	1,290	12,000	0.12	0.28	1,290	12,000	0.03	0.25	900	9,600	
	1.5	3	0.24	0.35	1,910	14,000	0.24	0.35	1,910	14,000	0.05	0.4	1,340	11,200	
		4	0.24	0.35	1,910	14,000	0.24	0.35	1,910	14,000	0.05	0.4	1,340	11,200	
		6	0.24	0.35	1,910	14,000	0.24	0.35	1,910	14,000	0.05	0.4	1,340	11,200	
		8	0.18	0.3	1,250	11,500	0.18	0.3	1,250	11,500	0.04	0.3	870	9,000	
		12	0.18	0.3	1,250	11,500	0.18	0.3	1,250	11,500	0.04	0.3	870	9,000	
		15	0.08	0.25	560	8,500	0.08	0.25	560	8,500	0.01	0.15	390	6,800	
	2	4	0.24	0.45	2,150	11,100	0.24	0.45	2,150	11,100	0.05	0.5	1,500	8,800	
		6	0.24	0.45	2,150	11,100	0.24	0.45	2,150	11,100	0.05	0.5	1,500	8,800	
		8	0.24	0.45	2,150	11,100	0.24	0.45	2,150	11,100	0.05	0.5	1,500	8,800	
		12	0.2	0.43	1,800	11,100	0.2	0.43	1,800	11,100	0.045	0.5	1,260	8,800	
		16	0.15	0.39	1,500	9,600	0.15	0.39	1,500	9,600	0.04	0.35	1,050	7,700	
		20	0.12	0.35	900	9,600	0.12	0.35	900	9,600	0.015	0.25	630	7,700	
	2.5	10	0.3	0.5	2,280	9,200	0.3	0.5	2,280	9,200	0.07	0.7	1,590	7,400	
		20	0.24	0.43	1,580	8,300	0.24	0.43	1,580	8,300	0.05	0.4	1,110	6,600	
	3	4	0.38	0.55	2,400	8,000	0.38	0.55	2,400	8,000	0.1	0.8	1,680	6,400	
		6	0.37	0.55	2,400	8,000	0.37	0.55	2,400	8,000	0.09	0.8	1,680	6,400	
		8	0.36	0.55	2,400	8,000	0.36	0.55	2,400	8,000	0.08	0.8	1,680	6,400	
		12	0.36	0.55	2,400	8,000	0.36	0.55	2,400	8,000	0.08	0.8	1,680	6,400	
		16	0.3	0.5	1,850	7,700	0.3	0.5	1,850	7,700	0.06	0.6	1,250	6,200	
		20	0.3	0.5	1,850	7,700	0.3	0.5	1,850	7,700	0.06	0.6	1,250	6,200	
		25	0.3	0.45	1,620	7,500	0.3	0.45	1,620	7,500	0.06	0.5	1,140	6,000	
		30	0.15	0.4	1,050	6,000	0.15	0.4	1,050	6,000	0.03	0.4	740	4,800	
	4	8	0.45	0.75	2,520	6,000	0.45	0.75	2,520	6,000	0.1	1	1,770	4,800	
		12	0.45	0.75	2,520	6,000	0.45	0.75	2,520	6,000	0.1	1	1,770	4,800	
		16	0.45	0.75	2,520	6,000	0.45	0.75	2,520	6,000	0.1	1	1,770	4,800	
		24	0.39	0.7	2,030	5,400	0.39	0.7	2,030	5,400	0.085	0.8	1,430	4,300	
		32	0.25	0.6	1,350	4,800	0.25	0.6	1,350	4,800	0.04	0.7	950	3,800	
	5	15	0.52	1	2,300	5,100	0.52	1	2,300	5,100	0.12	1.2	1,610	4,100	
		20	0.52	1	2,300	5,100	0.52	1	2,300	5,100	0.12	1.2	1,610	4,100	
40		0.25	0.8	1,020	3,200	0.25	0.8	1,020	3,200	0.05	0.9	720	2,600		

HARD STAR Type A Series

Long Neck Radius End Mill

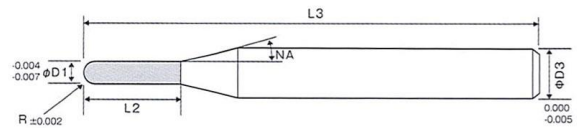
Work Material			Aluminum Alloy A5000 ¹				Aluminum Alloy A7000 ²				Heat Resistant Alloy (Kovar)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			ϕp mm	ϕe mm	mm/min	min ⁻¹	ϕp mm	ϕe mm	mm/min	min ⁻¹	ϕp mm	ϕe mm	mm/min	min ⁻¹
4	6	12	0.65	1.2	2,100	3,700	0.65	1.2	2,100	3,700	0.15	1.5	1,470	3,000
		18	0.62	1.2	2,100	3,700	0.62	1.2	2,100	3,700	0.13	1.5	1,470	3,000
		24	0.32	0.9	950	2,600	0.32	0.9	950	2,600	0.05	1.2	660	2,100
		48	0.32	0.9	950	2,600	0.32	0.9	950	2,600	0.05	1.2	660	2,100

HARD STAR Type A Series

Carbide Ball End Mill

■ :HAB230 Model number:HAB230

VHM Vollradius/Kugelfräser



Der Hinterschliffwinkel NA ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
bitte checken Sie das aktuelle Massblatt

Bestell-Code Code No.	Vollradius Ball R	Schneiden-Länge Length of Cut	WZ-Ø Tool Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length
HAB230-0010-0050-00010	0.05	0.1	0.1	15	4	50
HAB230-0015-0075-00015	0.075	0.15	0.15	15	4	50
HAB230-0020-0100-00020	0.1	0.2	0.2	15	4	50
HAB230-0030-0150-00030	0.15	0.3	0.3	15	4	50
HAB230-0040-0200-00060	0.2	0.6	0.4	15	4	50
HAB230-0050-0250-00080	0.25	0.8	0.5	15	4	50
HAB230-0060-0300-00090	0.3	0.9	0.6	15	4	50
HAB230-0080-0400-00120	0.4	1.2	0.8	15	4	50
HAB230-0100-0500-00150	0.5	1.5	1	15	4	50
HAB230-0150-0750-00230	0.75	2.3	1.5	15	4	50
HAB230-0200-1000-00300	1	3	2	15	4	50
HAB230-0250-1250-00380	1.25	3.8	2.5	15	4	50
HAB230-0300-1500-00500	1.5	5	3	15	4	50
HAB230-0400-2000-00600	2	6	4	15	6	50
HAB230-0500-2500-00800	2.5	8	5	15	6	50
HAB230-0600-3000-01000	3	10	6	—	6	50
HAB230-0800-4000-01200	4	12	8	—	8	70
HAB230-1000-5000-01500	5	15	10	—	10	80
HAB230-1200-6000-02000	6	20	12	—	12	110

HARD STAR Type A Series

HARD STAR Type A
Recommended Milling Conditions

■ :HAB230
Model number:HAB230

Empfohlene Schnittparameter

Ball End Mill

Work Material			Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
2	0.1	0.1	0.003	0.005	120	40,000	0.002	0.005	100	40,000	0.002	0.003	70	40,000
	0.15	0.15	0.003	0.005	180	40,000	0.002	0.005	150	40,000	0.002	0.003	100	40,000
	0.2	0.2	0.005	0.005	350	40,000	0.003	0.0025	300	40,000	0.0015	0.0015	200	40,000
	0.3	0.3	0.005	0.0075	350	40,000	0.0035	0.005	300	40,000	0.0015	0.0025	280	40,000
	0.4	0.6	0.015	0.025	800	40,000	0.015	0.015	720	40,000	0.0045	0.01	580	40,000
	0.5	0.8	0.015	0.025	1,000	40,000	0.01	0.015	860	40,000	0.005	0.01	650	40,000
	0.6	0.9	0.025	0.05	1,400	40,000	0.015	0.03	1,000	40,000	0.01	0.025	720	30,000
	0.8	1.2	0.05	0.075	2,000	40,000	0.035	0.05	1,600	40,000	0.025	0.05	1,200	30,000
	1	1.5	0.05	0.15	2,500	40,000	0.05	0.1	2,000	30,000	0.04	0.05	1,400	25,000
	1.5	2.3	0.075	0.15	3,000	30,000	0.05	0.15	2,500	30,000	0.05	0.1	2,000	25,000
	2	3	0.1	0.25	3,000	25,000	0.1	0.25	2,500	25,000	0.075	0.15	2,000	20,000
	2.5	3.8	0.15	0.2	2,800	20,000	0.1	0.25	2,300	20,000	0.075	0.2	2,000	18,000
	3	5	0.1	0.4	3,000	20,000	0.1	0.3	2,500	18,000	0.1	0.25	2,000	14,000
	4	6	0.15	0.75	3,000	20,000	0.1	0.4	2,500	16,000	0.1	0.3	2,000	12,000
	5	8	0.15	0.75	3,000	18,000	0.1	0.6	2,500	12,000	0.1	0.35	2,000	9,200
	6	10	0.15	1	3,000	16,000	0.15	0.6	2,500	8,000	0.1	0.5	2,000	7,000
8	12	0.2	1.2	450	3,600	0.175	0.9	400	2,600	0.175	0.9	350	2,600	
10	15	0.25	1	450	2,900	0.225	0.75	400	1,900	0.225	0.75	350	1,900	
12	20	0.3	1.5	450	2,400	0.275	1	400	1,400	0.275	1	350	1,400	

HARD STAR Type A Series

HARD STAR Type A
Recommended Milling Conditions

HAB230
Model number:HAB230

Empfohlene Schnittparameter

Ball End Mill

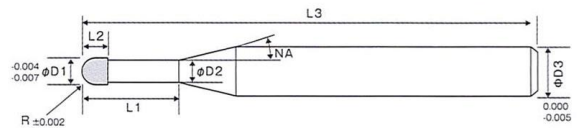
Work Material			Aluminum Alloy A5000				Aluminum Alloy A7000_				Heat Resistant Alloy (Kovar)			
Number of Flutes	Dia.	Length of Cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			øp mm	øe mm	mm/min	min ⁻¹	øp mm	øe mm	mm/min	min ⁻¹	øp mm	øe mm	mm/min	min ⁻¹
2	0.1	0.1	0.008	0.0012	500	50,000	0.008	0.0012	500	50,000	0.003	0.005	120	40,000
	0.15	0.15	0.012	0.0018	500	50,000	0.012	0.0018	500	50,000	0.003	0.005	180	40,000
	0.2	0.2	0.016	0.0024	600	50,000	0.016	0.0024	600	50,000	0.005	0.005	350	40,000
	0.3	0.3	0.024	0.0036	600	50,000	0.024	0.0036	600	50,000	0.005	0.0075	350	40,000
	0.4	0.6	0.032	0.0048	600	50,000	0.032	0.0048	600	50,000	0.015	0.025	800	40,000
	0.5	0.8	0.04	0.006	600	50,000	0.04	0.006	600	50,000	0.015	0.025	1,000	40,000
	0.6	0.9	0.048	0.0144	750	50,000	0.048	0.0144	750	50,000	0.025	0.05	1,400	40,000
	0.8	1.2	0.064	0.0192	1,000	50,000	0.064	0.0192	1,000	50,000	0.05	0.075	2,000	40,000
	1	1.5	0.08	0.024	1,250	50,000	0.08	0.024	1,250	50,000	0.05	0.15	2,500	40,000
	1.5	2.3	0.12	0.036	1,250	50,000	0.12	0.036	1,250	50,000	0.075	0.15	3,000	30,000
	2	3	0.16	0.048	2,400	48,000	0.16	0.048	2,400	48,000	0.1	0.25	3,000	25,000
	2.5	3.8	0.2	0.06	2,400	48,000	0.2	0.06	2,400	48,000	0.15	0.2	2,800	20,000
	3	5	0.375	0.1125	2,400	32,000	0.375	0.1125	2,400	32,000	0.1	0.4	3,000	20,000
	4	6	0.6	0.18	2,400	24,000	0.6	0.18	2,400	24,000	0.15	0.75	3,000	20,000
	5	8	0.75	0.225	2,400	19,000	0.75	0.225	2,400	19,000	0.15	0.75	3,000	18,000
	6	10	0.9	0.27	2,400	16,000	0.9	0.27	2,400	16,000	0.15	1	3,000	16,000
8	12	1.2	0.36	2,400	12,000	1.2	0.36	2,400	12,000	0.2	1.2	450	3,600	
10	15	1.5	0.45	2,300	9,600	1.5	0.45	2,300	9,600	0.25	1	450	2,900	
12	20	1.8	0.54	2,100	8,000	1.8	0.54	2,100	8,000	0.3	1.5	450	2,400	

HARD STAR Type A Series

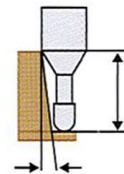
Carbide Long Neck Ball End Mill

■ :HALB230 Model number:HALB230

VHM Vollradiusfräser lang



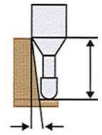
Der Hinterschliffwinkel ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
bitte checken Sie das aktuelle Massblatt



Bestell-Code Code No.	Vollradius Ball R	Nutzlänge Effective Length	Schneid-L Length of Cut	WZ-Ø Tool Diameter	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	eff. Nutzlänge Neigungswinkel Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
									HALB230-0010-0050-0020	0.05	0.2	0.07	0.1
HALB230-0010-0050-0030	0.3	0.07	0.1	0.08	15	4	50	0.35	0.36		0.37	0.38	0.41
HALB230-0010-0050-0050	0.5	0.07	0.1	0.08	15	4	50	0.55	0.57		0.59	0.61	0.66
HALB230-0015-0075-0030	0.075	0.3	0.1	0.15	0.13	15	4	50	0.35	0.36	0.37	0.38	0.40
HALB230-0015-0075-0050		0.5	0.1	0.15	0.13	15	4	50	0.55	0.57	0.59	0.61	0.65
HALB230-0020-0100-0030		0.1	0.3	0.15	0.2	0.18	15	4	50	0.35	0.35	0.36	0.37
HALB230-0020-0100-0050	0.5		0.15	0.2	0.18	15	4	50	0.55	0.57	0.58	0.60	0.64
HALB230-0020-0100-0075	0.75		0.15	0.2	0.18	15	4	50	0.81	0.84	0.86	0.89	0.96
HALB230-0020-0100-0100	1		0.15	0.2	0.18	15	4	50	1.07	1.10	1.14	1.18	1.27
HALB230-0030-0150-0050	0.15	0.5	0.2	0.3	0.27	15	4	50	0.57	0.58	0.60	0.62	0.66
HALB230-0030-0150-0060		0.6	0.2	0.3	0.27	15	4	50	0.67	0.69	0.71	0.73	0.78
HALB230-0030-0150-0075		0.75	0.2	0.3	0.27	15	4	50	0.83	0.85	0.88	0.90	0.97
HALB230-0030-0150-0100		1	0.2	0.3	0.27	15	4	50	1.09	1.12	1.15	1.19	1.28
HALB230-0030-0150-0125		1.25	0.2	0.3	0.27	15	4	50	1.34	1.39	1.43	1.48	1.59
HALB230-0030-0150-0150		1.5	0.2	0.3	0.27	15	4	50	1.60	1.65	1.71	1.77	1.90
HALB230-0030-0150-0175		1.75	0.2	0.3	0.27	15	4	50	1.86	1.92	1.99	2.05	2.21
HALB230-0030-0150-0200		2	0.2	0.3	0.27	15	4	50	2.12	2.19	2.26	2.34	2.52
HALB230-0030-0150-0225		2.25	0.2	0.3	0.27	15	4	50	2.38	2.46	2.54	2.63	2.83
HALB230-0030-0150-0250		2.5	0.2	0.3	0.27	15	4	50	2.64	2.72	2.82	2.92	3.14
HALB230-0040-0200-0050	0.2	0.5	0.3	0.4	0.37	15	4	50	0.57	0.58	0.59	0.61	0.64
HALB230-0040-0200-0080		0.8	0.3	0.4	0.37	15	4	50	0.88	0.90	0.93	0.95	1.02
HALB230-0040-0200-0100		1	0.3	0.4	0.37	15	4	50	1.08	1.12	1.15	1.18	1.27
HALB230-0040-0200-0150		1.5	0.3	0.4	0.37	15	4	50	1.60	1.65	1.70	1.76	1.89
HALB230-0040-0200-0200		2	0.3	0.4	0.37	15	4	50	2.12	2.19	2.26	2.33	2.51
HALB230-0040-0200-0250		2.5	0.3	0.4	0.37	15	4	50	2.64	2.72	2.81	2.91	3.13
HALB230-0040-0200-0300		3	0.3	0.4	0.37	15	4	50	3.15	3.26	3.37	3.48	3.75
HALB230-0050-0250-0100	0.25	1	0.35	0.5	0.47	15	4	50	1.08	1.11	1.14	1.18	1.26
HALB230-0050-0250-0150		1.5	0.35	0.5	0.47	15	4	50	1.60	1.65	1.70	1.75	1.88
HALB230-0050-0250-0200		2	0.35	0.5	0.47	15	4	50	2.12	2.18	2.25	2.33	2.50

HARD STAR Type A Series

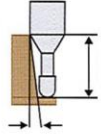
VHM Vollradiusfräser lang



Bestell-Code Code No.	Vollradius Ball R	Nutzlänge Effective Length	Schneid-L Length of Cut	WZ-Ø Tool Diameter	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	eff. Nutzlänge bei Neigungswinkel Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
									HALB230-0050-0250-0250	0.25	2.5	0.35	0.5
HALB230-0050-0250-0300	3	0.35	0.5	0.47	15	4	50	3.15	3.25		3.36	3.48	3.74
HALB230-0050-0250-0350	3.5	0.35	0.5	0.47	15	4	50	3.67	3.79		3.91	4.05	4.36
HALB230-0050-0250-0400	4	0.35	0.5	0.47	15	4	50	4.18	4.32		4.47	4.63	4.98
HALB230-0060-0300-0100	0.3	1	0.45	0.6	0.57	15	4	50	1.08	1.11	1.14	1.17	1.24
HALB230-0060-0300-0150		1.5	0.45	0.6	0.57	15	4	50	1.60	1.64	1.69	1.74	1.87
HALB230-0060-0300-0200		2	0.45	0.6	0.57	15	4	50	2.12	2.18	2.25	2.32	2.49
HALB230-0060-0300-0250		2.5	0.45	0.6	0.57	15	4	50	2.63	2.71	2.80	2.89	3.11
HALB230-0060-0300-0300		3	0.45	0.6	0.57	15	4	50	3.15	3.25	3.35	3.47	3.73
HALB230-0060-0300-0350		3.5	0.45	0.6	0.57	15	4	50	3.67	3.78	3.91	4.04	4.35
HALB230-0060-0300-0400		4	0.45	0.6	0.57	15	4	50	4.18	4.32	4.46	4.62	4.97
HALB230-0060-0300-0450		4.5	0.45	0.6	0.57	15	4	50	4.70	4.85	5.02	5.19	5.59
HALB230-0060-0300-0500		5	0.45	0.6	0.57	15	4	50	5.22	5.39	5.57	5.77	6.22
HALB230-0060-0300-0550		5.5	0.45	0.6	0.57	15	4	50	5.73	5.92	6.13	6.34	6.84
HALB230-0060-0300-0600		6	0.45	0.6	0.57	15	4	50	6.25	6.46	6.68	6.92	7.46
HALB230-0070-0350-0200		0.35	2	0.5	0.7	0.67	15	4	50	2.11	2.18	2.24	2.31
HALB230-0070-0350-0400	4		0.5	0.7	0.67	15	4	50	4.18	4.31	4.46	4.61	4.96
HALB230-0070-0350-0600	6		0.5	0.7	0.67	15	4	50	6.25	6.45	6.67	6.91	7.45
HALB230-0080-0400-0200	0.4	2	0.6	0.8	0.77	15	4	50	2.11	2.17	2.24	2.31	2.46
HALB230-0080-0400-0300		3	0.6	0.8	0.77	15	4	50	3.15	3.24	3.34	3.46	3.71
HALB230-0080-0400-0400		4	0.6	0.8	0.77	15	4	50	4.18	4.31	4.45	4.60	4.95
HALB230-0080-0400-0500		5	0.6	0.8	0.77	15	4	50	5.21	5.38	5.56	5.75	6.19
HALB230-0080-0400-0600		6	0.6	0.8	0.77	15	4	50	6.25	6.45	6.67	6.90	7.44
HALB230-0080-0400-0700		7	0.6	0.8	0.77	15	4	50	7.28	7.52	7.78	8.05	8.68
HALB230-0080-0400-0800	8	0.6	0.8	0.77	15	4	50	8.31	8.59	8.89	9.20	9.92	
HALB230-0090-0450-0200	0.45	2	0.65	0.9	0.87	15	4	50	2.11	2.17	2.23	2.30	2.45
HALB230-0090-0450-0400		4	0.65	0.9	0.87	15	4	50	4.18	4.31	4.45	4.60	4.94
HALB230-0090-0450-0600		6	0.65	0.9	0.87	15	4	50	6.24	6.45	6.66	6.90	7.42
HALB230-0090-0450-0800		8	0.65	0.9	0.87	15	4	50	8.31	8.59	8.88	9.20	9.91
HALB230-0100-0500-0200	0.5	2	0.75	1	0.95	15	4	50	2.15	2.20	2.27	2.33	2.49
HALB230-0100-0500-0250		2.5	0.75	1	0.95	15	4	50	2.66	2.74	2.82	2.91	3.11
HALB230-0100-0500-0300		3	0.75	1	0.95	15	4	50	3.18	3.27	3.37	3.48	3.73
HALB230-0100-0500-0400		4	0.75	1	0.95	15	4	50	4.21	4.34	4.48	4.63	4.97
HALB230-0100-0500-0500		5	0.75	1	0.95	15	4	50	5.25	5.41	5.59	5.78	6.22
HALB230-0100-0500-0600		6	0.75	1	0.95	15	4	50	6.28	6.48	6.70	6.93	7.46
HALB230-0100-0500-0700		7	0.75	1	0.95	15	4	50	7.32	7.55	7.81	8.08	8.70
HALB230-0100-0500-0800		8	0.75	1	0.95	15	4	50	8.35	8.62	8.92	9.23	9.95
HALB230-0100-0500-0900		9	0.75	1	0.95	15	4	50	9.38	9.69	10.02	10.38	11.19
HALB230-0100-0500-1000		10	0.75	1	0.95	15	4	50	10.42	10.76	11.13	11.53	12.43
HALB230-0100-0500-1200	12	0.75	1	0.95	15	4	50	12.48	12.90	13.35	13.83	14.92	
HALB230-0120-0600-0240	0.6	2.4	0.9	1.2	1.15	15	4	50	2.56	2.63	2.70	2.78	2.96
HALB230-0120-0600-0400		4	0.9	1.2	1.15	15	4	50	4.21	4.34	4.47	4.62	4.95
HALB230-0120-0600-0600		6	0.9	1.2	1.15	15	4	50	6.28	6.48	6.69	6.92	7.44
HALB230-0120-0600-0800		8	0.9	1.2	1.15	15	4	50	8.35	8.62	8.91	9.22	9.92
HALB230-0120-0600-1000		10	0.9	1.2	1.15	15	4	50	10.41	10.76	11.12	11.52	12.41

HARD STAR Type A Series

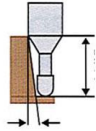
VHM Vollradiusfräser lang



Bestell-Code Code No.	Vollradius Ball R	Nutzlänge Effective Length	Schneid-L Length of Cut	WZ-Ø Tool Diameter	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	eff. Nutzlänge bei Neigungswinkel Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
									HALB230-0120-0600-1200	0.6	12	0.9	1.2
HALB230-0140-0700-0800	0.7	8	1	1.4	1.35	15	4	50	8.34	8.61	8.90	9.20	9.90
HALB230-0140-0700-1200		12	1	1.4	1.35	15	4	50	12.48	12.89	13.33	13.80	14.87
HALB230-0140-0700-1600		16	1	1.4	1.35	15	4	50	16.61	17.17	17.76	18.40	19.84
HALB230-0150-0750-0300		3	1.1	1.5	1.45	15	4	50	3.17	3.26	3.35	3.45	3.67
HALB230-0150-0750-0400	0.75	4	1.1	1.5	1.45	15	4	50	4.21	4.33	4.46	4.60	4.92
HALB230-0150-0750-0600		6	1.1	1.5	1.45	15	4	50	6.27	6.47	6.67	6.90	7.40
HALB230-0150-0750-0800		8	1.1	1.5	1.45	15	4	50	8.34	8.61	8.89	9.20	9.89
HALB230-0150-0750-1000		10	1.1	1.5	1.45	15	4	50	10.41	10.74	11.11	11.50	12.37
HALB230-0150-0750-1200		12	1.1	1.5	1.45	15	4	50	12.48	12.88	13.32	13.80	14.86
HALB230-0150-0750-1400		14	1.1	1.5	1.45	15	4	50	14.54	15.02	15.54	16.09	17.35
HALB230-0150-0750-1600		16	1.1	1.5	1.45	15	4	50	16.61	17.16	17.76	18.39	19.83
HALB230-0160-0800-0800		0.8	8	1.2	1.6	1.55	15	4	50	8.34	8.60	8.88	9.19
HALB230-0160-0800-1200	12		1.2	1.6	1.55	15	4	50	12.47	12.88	13.32	13.79	14.85
HALB230-0160-0800-1600	16		1.2	1.6	1.55	15	4	50	16.61	17.16	17.75	18.39	19.82
HALB230-0200-1000-0300	1	3	1.5	2	1.94	15	4	50	3.18	3.26	3.34	3.43	3.64
HALB230-0200-1000-0400		4	1.5	2	1.94	15	4	50	4.22	4.33	4.45	4.58	4.88
HALB230-0200-1000-0600		6	1.5	2	1.94	15	4	50	6.28	6.47	6.67	6.88	7.37
HALB230-0200-1000-0800		8	1.5	2	1.94	15	4	50	8.35	8.61	8.88	9.18	9.85
HALB230-0200-1000-1000		10	1.5	2	1.94	15	4	50	10.42	10.75	11.10	11.48	12.34
HALB230-0200-1000-1200		12	1.5	2	1.94	15	4	50	12.49	12.89	13.32	13.78	14.83
HALB230-0200-1000-1300		13	1.5	2	1.94	15	4	50	13.52	13.96	14.43	14.93	16.07
HALB230-0200-1000-1400		14	1.5	2	1.94	15	4	50	14.55	15.03	15.53	16.08	17.31
HALB230-0200-1000-1600		16	1.5	2	1.94	15	4	50	16.62	17.17	17.75	18.38	19.80
HALB230-0200-1000-1800		18	1.5	2	1.94	15	4	50	18.69	19.30	19.97	20.68	FREE
HALB230-0200-1000-2000	20	1.5	2	1.94	15	4	50	20.76	21.44	22.18	22.98	FREE	
HALB230-0250-1250-0600	1.25	6	2.3	2.5	2.44	15	4	50	6.28	6.45	6.64	6.84	7.31
HALB230-0250-1250-0800		8	2.3	2.5	2.44	15	4	50	8.34	8.59	8.86	9.14	9.80
HALB230-0250-1250-1000		10	2.3	2.5	2.44	15	4	50	10.41	10.73	11.07	11.44	12.28
HALB230-0250-1250-1500		15	2.3	2.5	2.44	15	4	50	15.58	16.08	16.62	17.19	FREE
HALB230-0250-1250-2000		20	2.3	2.5	2.44	15	4	50	20.75	21.43	22.16	FREE	FREE
HALB230-0300-1500-0600	1.5	6	2.5	3	2.85	15	4	50	6.44	6.61	6.80	7.00	7.46
HALB230-0300-1500-0800		8	2.5	3	2.85	15	4	50	8.51	8.75	9.02	9.30	9.95
HALB230-0300-1500-1000		10	2.5	3	2.85	15	4	50	10.58	10.89	11.23	11.60	FREE
HALB230-0300-1500-1200		12	2.5	3	2.85	15	4	50	12.64	13.03	13.45	13.90	FREE
HALB230-0300-1500-1400		14	2.5	3	2.85	15	4	50	14.71	15.17	15.67	FREE	FREE
HALB230-0300-1500-1600		16	2.5	3	2.85	15	4	50	16.78	17.31	17.88	FREE	FREE
HALB230-0300-1500-2000		20	2.5	3	2.85	15	4	50	20.91	21.59	FREE	FREE	FREE
HALB230-0300-1500-2500		25	2.5	3	2.85	15	4	60	26.08	26.94	FREE	FREE	FREE
HALB230-0300-1500-3000		30	2.5	3	2.85	15	4	60	31.25	FREE	FREE	FREE	FREE
HALB230-0350-1750-1500		1.75	15	2.8	3.5	3.35	15	6	50	15.74	16.22	16.75	17.31
HALB230-0350-1750-2000	20		2.8	3.5	3.35	15	6	50	20.90	21.57	22.29	23.06	24.81
HALB230-0350-1750-2500	25		2.8	3.5	3.35	15	6	60	26.07	26.92	27.83	28.81	FREE
HALB230-0350-1750-3000	30		2.8	3.5	3.35	15	6	60	31.24	32.27	33.37	34.56	FREE
HALB230-0350-1750-3500	35		2.8	3.5	3.35	15	6	70	36.41	37.62	38.91	FREE	FREE

HARD STAR Type A Series

VHM Vollradiusfräser lang



Bestell-Code Code No.	Vollradius Ball R	Nutzlänge Effective Length	Schneid-L Length of Cut	WZ-Ø Tool Diameter	Neck-Ø Neck Diameter	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length	eff. Nutzlänge bei Neigungswinkel Actual effective length by inclined angle of workpiece.				
									30°	1°	1°30'	2°	3°
									HALB230-0400-2000-0800	2	8	3	4
HALB230-0400-2000-1000	10	3	4	3.8	15	6	50	10.66	10.96		11.28	11.63	12.43
HALB230-0400-2000-1200	12	3	4	3.8	15	6	50	12.72	13.10		13.50	13.93	14.92
HALB230-0400-2000-1400	14	3	4	3.8	15	6	50	14.79	15.24		15.72	16.23	17.41
HALB230-0400-2000-1500	15	3	4	3.8	15	6	50	15.82	16.31		16.82	17.38	18.65
HALB230-0400-2000-2000	20	3	4	3.8	15	6	50	20.99	21.65		22.37	23.13	FREE
HALB230-0400-2000-2500	25	3	4	3.8	15	6	60	26.16	27.00		27.91	28.88	FREE
HALB230-0400-2000-3000	30	3	4	3.8	15	6	60	31.33	32.35		33.45	FREE	FREE
HALB230-0400-2000-3500	35	3	4	3.8	15	6	70	36.50	37.70		38.99	FREE	FREE
HALB230-0500-2500-1500	2.5	15	3.5	5	4.8	15	6	50	15.81		16.27	16.77	FREE
HALB230-0500-2500-2000		20	3.5	5	4.8	15	6	50	20.98	21.62	FREE	FREE	FREE
HALB230-0500-2500-2500		25	3.5	5	4.8	15	6	60	26.14	26.97	FREE	FREE	FREE
HALB230-0500-2500-3000		30	3.5	5	4.8	15	6	60	31.31	FREE	FREE	FREE	FREE
HALB230-0500-2500-4000		40	3.5	5	4.8	15	6	90	41.65	FREE	FREE	FREE	FREE
HALB230-0600-3000-1000	3	10	6	6	5.8	15	6	50	FREE	FREE	FREE	FREE	FREE
HALB230-0600-3000-1500		15	6	6	5.8	15	6	50	FREE	FREE	FREE	FREE	FREE
HALB230-0600-3000-2000		20	6	6	5.8	15	6	50	FREE	FREE	FREE	FREE	FREE
HALB230-0600-3000-2500		25	6	6	5.8	15	6	60	FREE	FREE	FREE	FREE	FREE
HALB230-0600-3000-3000		30	6	6	5.8	15	6	60	FREE	FREE	FREE	FREE	FREE
HALB230-0600-3000-3500		35	6	6	5.8	15	6	70	FREE	FREE	FREE	FREE	FREE
HALB230-0600-3000-4000		40	6	6	5.8	15	6	90	FREE	FREE	FREE	FREE	FREE
HALB230-0600-3000-5000		50	6	6	5.8	15	6	120	FREE	FREE	FREE	FREE	FREE
HALB230-0600-3000-6000		60	6	6	5.8	15	6	120	FREE	FREE	FREE	FREE	FREE

HARD STAR Type A Series

HARD STAR Type A
Recommended Milling Conditions

■ :HALB230
Model number:HALB230

Empfohlene Schnittparameter

Long Neck Ball End Mill

Work Material			Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∅p mm	∅e mm	mm/min	min ⁻¹	∅p mm	∅e mm	mm/min	min ⁻¹	∅p mm	∅e mm	mm/min	min ⁻¹
2	0.1	0.2	0.003	0.005	120	40,000	0.002	0.005	100	40,000	0.002	0.003	70	40,000
		0.3	0.003	0.005	100	40,000	0.002	0.005	70	40,000	0.002	0.003	50	40,000
		0.5	0.002	0.003	70	40,000	0.001	0.003	50	40,000	0.001	0.002	30	40,000
	0.15	0.3	0.003	0.005	180	40,000	0.002	0.005	150	40,000	0.002	0.003	100	40,000
		0.5	0.003	0.005	150	40,000	0.002	0.005	120	40,000	0.002	0.003	70	40,000
	0.2	0.3	0.01	0.01	350	40,000	0.006	0.005	300	40,000	0.003	0.003	200	40,000
		0.5	0.008	0.01	320	40,000	0.005	0.005	280	40,000	0.003	0.003	180	40,000
		0.75	0.005	0.01	280	40,000	0.003	0.005	200	40,000	0.002	0.003	150	40,000
		1	0.003	0.005	250	40,000	0.002	0.003	160	40,000	0.001	0.002	120	40,000
	0.3	0.5	0.01	0.015	350	40,000	0.007	0.01	300	40,000	0.003	0.005	280	40,000
		0.6	0.007	0.01	350	40,000	0.005	0.007	300	40,000	0.003	0.005	250	40,000
		0.75	0.007	0.01	330	40,000	0.005	0.007	280	40,000	0.003	0.005	230	40,000
		1	0.007	0.01	320	40,000	0.005	0.007	250	40,000	0.003	0.005	200	40,000
		1.25	0.005	0.007	280	40,000	0.003	0.005	200	40,000	0.002	0.003	160	40,000
		1.5	0.005	0.007	230	40,000	0.003	0.005	180	40,000	0.002	0.003	120	40,000
		1.75	0.003	0.005	180	40,000	0.002	0.003	150	40,000	0.002	0.002	100	40,000
		2	0.003	0.005	150	40,000	0.002	0.003	120	40,000	0.002	0.002	90	40,000
		2.25	0.002	0.003	120	40,000	0.001	0.002	100	40,000	0.001	0.001	80	40,000
	2.5	0.002	0.003	100	40,000	0.001	0.002	80	40,000	0.001	0.001	70	40,000	
	0.4	3	0.001	0.003	80	40,000	0.001	0.002	70	40,000	0.001	0.001	60	40,000
		0.5	0.03	0.05	800	40,000	0.03	0.03	720	40,000	0.009	0.02	580	40,000
		0.8	0.02	0.05	800	40,000	0.02	0.03	720	40,000	0.008	0.02	580	40,000
		1	0.02	0.05	800	40,000	0.02	0.03	720	40,000	0.008	0.02	580	40,000
		1.5	0.01	0.03	620	40,000	0.01	0.02	500	40,000	0.005	0.01	400	40,000
		2	0.01	0.02	500	40,000	0.01	0.01	380	40,000	0.005	0.007	300	40,000
		2.5	0.007	0.01	420	40,000	0.005	0.007	300	40,000	0.003	0.005	260	40,000
	0.5	3	0.007	0.01	300	40,000	0.005	0.007	240	40,000	0.003	0.005	200	40,000
		1	0.03	0.05	1,000	40,000	0.02	0.03	860	40,000	0.01	0.02	650	40,000
		1.5	0.02	0.05	850	40,000	0.01	0.03	720	40,000	0.007	0.02	520	40,000
		2	0.02	0.03	720	40,000	0.01	0.02	650	40,000	0.007	0.01	400	40,000
2.5		0.01	0.02	600	40,000	0.007	0.01	530	40,000	0.005	0.007	360	40,000	
3		0.01	0.02	500	40,000	0.007	0.01	420	40,000	0.005	0.007	320	40,000	
3.5		0.007	0.01	420	40,000	0.005	0.007	360	40,000	0.003	0.005	280	40,000	
0.6	4	0.007	0.01	350	40,000	0.005	0.007	300	40,000	0.003	0.005	260	40,000	
	1	0.05	0.1	1,400	40,000	0.03	0.06	1,000	40,000	0.02	0.05	720	30,000	
	1.5	0.05	0.1	1,400	40,000	0.03	0.06	1,000	40,000	0.02	0.05	720	30,000	
	2	0.05	0.1	1,400	40,000	0.03	0.06	1,000	40,000	0.02	0.05	720	30,000	
	2.5	0.03	0.05	1,200	40,000	0.02	0.04	840	40,000	0.02	0.03	640	30,000	
	3	0.03	0.05	1,200	40,000	0.02	0.04	840	40,000	0.02	0.03	640	30,000	
0.6	3.5	0.02	0.03	1,000	40,000	0.01	0.03	620	40,000	0.01	0.02	480	30,000	
	4	0.02	0.03	1,000	40,000	0.01	0.03	620	40,000	0.01	0.02	480	30,000	

HARD STAR Type A Series

Empfohlene Schnittparameter

Long Neck Ball End Mill

Work Material		Hardened Steels STAVAX/HPM/SKD61 (~55HRC)					Hardened Steels SKD11/SKH51 (~60HRC)					Hardened Steels ASP23/HAP5R/HAP72(60HRC~)				
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed		
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹		
2	0.6	4.5	0.02	0.03	900	35,000	0.01	0.02	580	35,000	0.008	0.015	430	30,000		
		5	0.01	0.02	720	30,000	0.007	0.015	500	30,000	0.007	0.01	400	30,000		
		5.5	0.01	0.015	700	30,000	0.007	0.01	450	30,000	0.005	0.008	360	30,000		
		6	0.007	0.01	500	30,000	0.005	0.007	380	30,000	0.004	0.006	320	30,000		
	0.7	2	0.07	0.1	1,600	40,000	0.05	0.08	1,300	40,000	0.03	0.07	1,000	30,000		
		4	0.04	0.06	1,300	40,000	0.03	0.04	820	40,000	0.015	0.02	600	30,000		
		6	0.01	0.03	800	30,000	0.01	0.015	500	30,000	0.006	0.01	420	25,000		
	0.8	2	0.1	0.15	2,000	40,000	0.07	0.1	1,600	40,000	0.05	0.1	1,200	30,000		
		3	0.1	0.15	2,000	40,000	0.07	0.1	1,600	40,000	0.05	0.05	1,200	30,000		
		4	0.05	0.1	1,600	40,000	0.05	0.05	1,200	40,000	0.03	0.05	860	30,000		
		5	0.05	0.05	1,600	40,000	0.03	0.05	1,000	40,000	0.02	0.03	620	30,000		
		6	0.03	0.05	1,200	30,000	0.02	0.03	760	30,000	0.01	0.02	560	25,000		
		7	0.02	0.03	1,000	30,000	0.01	0.02	680	30,000	0.007	0.01	520	25,000		
	0.9	8	0.01	0.02	820	30,000	0.007	0.01	600	30,000	0.005	0.01	480	25,000		
		2	0.1	0.2	2,200	40,000	0.08	0.15	1,800	30,000	0.06	0.1	1,300	30,000		
		4	0.05	0.12	1,800	40,000	0.04	0.08	1,400	30,000	0.03	0.05	900	25,000		
		6	0.035	0.05	1,200	30,000	0.025	0.035	800	25,000	0.015	0.025	600	20,000		
	1	8	0.025	0.04	1,000	30,000	0.015	0.025	700	23,000	0.008	0.015	500	20,000		
		2	0.1	0.3	2,500	40,000	0.1	0.2	2,000	30,000	0.08	0.1	1,400	25,000		
		2.5	0.1	0.3	2,500	40,000	0.1	0.2	2,000	30,000	0.08	0.1	1,400	25,000		
		3	0.1	0.3	2,500	40,000	0.1	0.2	2,000	30,000	0.08	0.1	1,400	25,000		
		4	0.1	0.2	2,500	40,000	0.05	0.15	1,800	30,000	0.05	0.1	1,200	25,000		
		5	0.05	0.15	2,000	30,000	0.04	0.1	1,600	25,000	0.03	0.05	920	20,000		
		6	0.05	0.1	1,800	30,000	0.04	0.05	1,200	25,000	0.02	0.05	740	20,000		
		7	0.04	0.06	1,200	30,000	0.03	0.04	950	25,000	0.02	0.03	680	20,000		
		8	0.04	0.06	1,000	30,000	0.03	0.04	860	25,000	0.02	0.03	560	20,000		
		9	0.03	0.05	820	25,000	0.02	0.03	750	20,000	0.01	0.02	500	18,000		
	1.2	10	0.03	0.05	750	25,000	0.02	0.03	620	20,000	0.01	0.02	450	18,000		
		12	0.01	0.03	600	20,000	0.007	0.02	520	18,000	0.005	0.01	400	16,000		
		2.4	0.1	0.3	2,500	30,000	0.1	0.2	2,000	30,000	0.05	0.1	1,600	25,000		
		4	0.1	0.2	2,500	30,000	0.07	0.2	2,000	30,000	0.05	0.1	1,600	25,000		
		6	0.07	0.1	2,000	30,000	0.05	0.1	1,600	25,000	0.03	0.07	1,200	20,000		
		8	0.05	0.1	1,600	30,000	0.03	0.07	1,200	25,000	0.02	0.05	920	20,000		
	1.4	10	0.03	0.07	1,200	20,000	0.02	0.05	860	20,000	0.01	0.03	680	18,000		
		12	0.02	0.05	860	20,000	0.01	0.03	620	20,000	0.007	0.02	480	18,000		
		8	0.12	0.2	2,500	30,000	0.08	0.15	1,800	20,000	0.03	0.08	1,000	20,000		
1.5	12	0.07	0.12	1,400	20,000	0.04	0.08	1,100	18,000	0.015	0.05	700	18,000			
	16	0.02	0.05	700	17,000	0.01	0.03	600	17,000	0.008	0.02	450	16,000			
	3	0.15	0.3	3,000	30,000	0.1	0.3	2,500	30,000	0.1	0.2	2,000	25,000			
1.5	4	0.15	0.3	3,000	30,000	0.1	0.3	2,500	30,000	0.1	0.2	2,000	25,000			
	6	0.15	0.2	3,000	30,000	0.1	0.2	2,000	30,000	0.1	0.1	1,600	25,000			

HARD STAR Type A Series

HARD STAR Type A
Recommended Milling Conditions

■ :HALB230
Model number:HALB230

Empfohlene Schnittparameter

Long Neck Ball End Mill

Work Material			Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
2	1.5	8	0.1	0.2	2,500	25,000	0.05	0.2	1,600	25,000	0.05	0.1	1,200	20,000
		10	0.1	0.1	2,500	25,000	0.05	0.1	1,200	25,000	0.05	0.05	860	20,000
		12	0.05	0.1	1,800	20,000	0.03	0.1	920	20,000	0.02	0.05	780	18,000
		14	0.05	0.07	1,200	20,000	0.03	0.05	820	20,000	0.02	0.03	650	18,000
		16	0.03	0.05	720	18,000	0.02	0.03	650	18,000	0.01	0.02	580	16,000
	1.6	8	0.1	0.2	2,500	25,000	0.07	0.15	2,000	20,000	0.05	0.1	1,600	18,000
		12	0.07	0.1	1,800	20,000	0.05	0.07	1,500	16,000	0.03	0.05	1,200	14,000
		16	0.03	0.05	720	16,000	0.02	0.03	600	14,000	0.015	0.02	480	12,000
	2	3	0.2	0.5	3,000	25,000	0.2	0.5	2,500	25,000	0.15	0.3	2,000	20,000
		4	0.2	0.5	3,000	25,000	0.2	0.5	2,500	25,000	0.15	0.3	2,000	20,000
		6	0.2	0.5	2,500	25,000	0.2	0.3	2,000	25,000	0.15	0.3	1,600	20,000
		8	0.2	0.3	2,000	20,000	0.1	0.2	1,600	18,000	0.1	0.2	1,200	16,000
		10	0.1	0.3	2,000	18,000	0.1	0.2	1,600	16,000	0.1	0.1	1,200	14,000
		12	0.1	0.2	1,600	16,000	0.1	0.1	1,200	14,000	0.05	0.1	940	12,000
		13	0.08	0.2	1,600	16,000	0.06	0.1	1,200	14,000	0.04	0.08	940	12,000
		14	0.07	0.15	1,600	16,000	0.05	0.08	1,200	14,000	0.03	0.07	940	12,000
		16	0.07	0.15	1,600	16,000	0.05	0.08	1,200	14,000	0.03	0.07	940	12,000
		18	0.05	0.1	1,400	14,000	0.03	0.05	1,000	12,000	0.02	0.03	850	10,000
	2.5	20	0.05	0.1	1,000	14,000	0.03	0.05	820	12,000	0.02	0.03	720	10,000
		6	0.3	0.4	2,800	20,000	0.2	0.5	2,300	20,000	0.15	0.4	2,000	18,000
		8	0.25	0.3	2,600	20,000	0.15	0.3	2,100	20,000	0.12	0.25	1,800	18,000
		10	0.2	0.3	2,500	20,000	0.15	0.2	2,000	20,000	0.1	0.15	1,600	18,000
		15	0.1	0.2	2,000	18,000	0.07	0.15	1,600	16,000	0.05	0.1	1,200	14,000
	3	20	0.07	0.15	1,500	16,000	0.05	0.1	1,200	14,000	0.03	0.05	1,000	10,000
		6	0.2	0.8	3,000	20,000	0.2	0.6	2,500	18,000	0.2	0.5	2,000	14,000
		8	0.2	0.8	3,000	20,000	0.2	0.6	2,500	18,000	0.2	0.5	2,000	14,000
		10	0.2	0.6	2,500	20,000	0.2	0.4	2,000	18,000	0.1	0.3	1,500	14,000
		12	0.2	0.6	2,500	20,000	0.2	0.4	2,000	18,000	0.1	0.3	1,500	14,000
		14	0.1	0.4	2,000	18,000	0.1	0.3	1,600	16,000	0.1	0.2	1,200	12,000
		16	0.1	0.4	2,000	18,000	0.1	0.3	1,600	16,000	0.1	0.2	1,200	12,000
		20	0.1	0.3	1,600	18,000	0.1	0.2	1,200	16,000	0.1	0.1	960	12,000
	3.5	25	0.1	0.2	1,200	16,000	0.07	0.15	920	14,000	0.05	0.07	800	10,000
		30	0.07	0.1	750	14,000	0.05	0.07	640	12,000	0.03	0.05	600	8,600
		15	0.25	1	3,000	20,000	0.15	0.5	2,300	16,000	0.13	0.4	1,500	14,000
		20	0.18	0.6	2,500	18,000	0.1	0.3	1,800	15,000	0.1	0.2	1,200	12,000
		25	0.12	0.35	1,800	16,000	0.1	0.2	1,600	14,000	0.06	0.12	1,000	10,000
	4	30	0.1	0.25	1,500	14,000	0.07	0.15	950	11,000	0.05	0.08	800	9,000
		35	0.08	0.2	1,200	13,000	0.07	0.12	800	10,000	0.03	0.06	650	7,500
		8	0.3	1.5	3,000	20,000	0.2	0.8	2,500	16,000	0.2	0.6	2,000	12,000
	4	10	0.3	1.5	3,000	20,000	0.2	0.8	2,500	16,000	0.2	0.6	2,000	12,000
		12	0.3	1.5	3,000	20,000	0.2	0.8	2,500	16,000	0.2	0.6	2,000	12,000

HARD STAR Type A Series

Empfohlene Schnittparameter

Long Neck Ball End Mill

Work Material		Hardened Steels STAVAX/HPM/SKD61 (~55HRC)				Hardened Steels SKD11/SKH51 (~60HRC)				Hardened Steels ASP23/HAP5R/HAP72(60HRC~)				
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
2	4	14	0.3	1.5	3,000	20,000	0.2	0.8	2,000	16,000	0.2	0.6	1,600	12,000
		15	0.3	1.5	3,000	20,000	0.2	0.8	2,000	16,000	0.2	0.6	1,600	12,000
		20	0.2	1	2,400	16,000	0.1	0.6	1,800	14,000	0.1	0.4	1,400	10,000
		25	0.2	0.8	1,600	16,000	0.1	0.4	1,200	14,000	0.1	0.2	1,000	10,000
		30	0.1	0.3	1,600	14,000	0.07	0.2	1,200	10,000	0.05	0.15	1,000	8,200
		35	0.1	0.2	1,200	14,000	0.07	0.15	1,000	10,000	0.05	0.1	820	8,200
	5	15	0.3	1.5	3,000	18,000	0.2	1.2	2,500	12,000	0.2	0.7	2,000	9,200
		20	0.3	1.5	3,000	18,000	0.2	1.2	2,500	12,000	0.2	0.7	2,000	9,200
		25	0.3	1.2	3,000	15,000	0.2	1	2,000	10,000	0.15	0.5	1,600	8,000
		30	0.2	1	2,500	15,000	0.15	0.8	1,800	8,600	0.1	0.3	1,200	7,200
		40	0.2	0.8	2,000	12,000	0.15	0.5	1,500	7,600	0.1	0.2	860	6,400
	6	10	0.3	2	3,000	16,000	0.3	1.2	2,500	8,000	0.2	1	2,000	7,000
		15	0.3	2	3,000	16,000	0.3	1.2	2,500	8,000	0.2	1	2,000	7,000
		20	0.3	2	3,000	16,000	0.3	1.2	2,500	8,000	0.2	1	2,000	7,000
		25	0.3	1.5	3,000	16,000	0.2	1	2,000	8,000	0.15	0.7	1,500	7,000
		30	0.2	1.5	3,000	14,000	0.2	1	2,000	7,200	0.15	0.7	1,500	6,500
		35	0.2	1.2	2,400	13,000	0.17	0.8	1,600	6,800	0.12	0.5	1,200	5,800
		40	0.2	1	1,800	12,000	0.15	0.6	1,200	6,400	0.1	0.4	1,000	5,200
		50	0.1	0.6	1,200	8,200	0.1	0.3	860	4,800	0.05	0.2	620	4,000
	60	0.07	0.3	600	6,000	0.05	0.15	450	3,200	0.03	0.07	300	2,500	

HARD STAR Type A Series

HARD STAR Type A
Recommended Milling Conditions

■ :HALB230
Model number:HALB230

Empfohlene Schnittparameter

Long Neck Ball End Mill

Work Material		Aluminum Alloy A5000					Aluminum Alloy A7000					Heat Resistant Alloy (Kovar)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm	mm/min	min ⁻¹	∅p mm	∅e mm	mm/min	min ⁻¹	∅p mm	∅e mm	mm/min	min ⁻¹	
2	0.1	0.2	0.005	0.005	80	50,000	0.005	0.005	80	50,000	0.003	0.005	120	40,000	
		0.3	0.005	0.005	80	50,000	0.005	0.005	80	50,000	0.003	0.005	100	40,000	
		0.5	0.005	0.005	70	50,000	0.005	0.005	70	50,000	0.002	0.003	70	40,000	
	0.15	0.3	0.008	0.01	150	50,000	0.008	0.01	150	50,000	0.003	0.005	180	40,000	
		0.5	0.007	0.008	150	50,000	0.007	0.008	150	50,000	0.003	0.005	150	40,000	
	0.2	0.3	0.01	0.02	250	50,000	0.01	0.02	250	50,000	0.01	0.01	350	40,000	
		0.5	0.01	0.02	250	50,000	0.01	0.02	250	50,000	0.008	0.01	320	40,000	
		0.75	0.01	0.015	250	50,000	0.01	0.015	250	50,000	0.005	0.01	280	40,000	
		1	0.008	0.015	250	50,000	0.008	0.015	250	50,000	0.003	0.005	250	40,000	
	0.3	0.5	0.012	0.025	250	50,000	0.012	0.025	250	50,000	0.01	0.015	350	40,000	
		0.6	0.012	0.025	250	50,000	0.012	0.025	250	50,000	0.007	0.01	350	40,000	
		0.75	0.01	0.02	250	50,000	0.01	0.02	250	50,000	0.007	0.01	330	40,000	
		1	0.01	0.02	250	50,000	0.01	0.02	250	50,000	0.007	0.01	320	40,000	
		1.25	0.008	0.015	250	50,000	0.008	0.015	250	50,000	0.005	0.007	280	40,000	
		1.5	0.008	0.015	200	50,000	0.008	0.015	200	50,000	0.005	0.007	230	40,000	
		1.75	0.008	0.015	200	50,000	0.008	0.015	200	50,000	0.003	0.005	180	40,000	
		2	0.005	0.012	150	50,000	0.005	0.012	150	50,000	0.003	0.005	150	40,000	
		2.25	0.005	0.012	150	50,000	0.005	0.012	150	50,000	0.002	0.003	120	40,000	
		2.5	0.005	0.01	150	50,000	0.005	0.01	150	50,000	0.002	0.003	100	40,000	
	3	0.005	0.007	150	50,000	0.005	0.007	150	50,000	0.001	0.003	80	40,000		
	0.4	0.5	0.03	0.07	800	50,000	0.03	0.07	800	50,000	0.03	0.05	800	40,000	
		0.8	0.03	0.07	800	50,000	0.03	0.07	800	50,000	0.02	0.05	800	40,000	
		1	0.03	0.07	800	50,000	0.03	0.07	800	50,000	0.02	0.05	800	40,000	
		1.5	0.03	0.05	700	50,000	0.03	0.05	700	50,000	0.01	0.03	620	40,000	
2		0.02	0.03	600	50,000	0.02	0.03	600	50,000	0.01	0.02	500	40,000		
2.5		0.02	0.03	450	50,000	0.02	0.03	450	50,000	0.007	0.01	420	40,000		
3		0.015	0.03	400	50,000	0.015	0.03	400	50,000	0.007	0.01	300	40,000		
0.5	1	0.045	0.07	800	50,000	0.045	0.07	800	50,000	0.03	0.05	1,000	40,000		
	1.5	0.04	0.07	700	50,000	0.04	0.07	700	50,000	0.02	0.05	850	40,000		
	2	0.03	0.06	600	50,000	0.03	0.06	600	50,000	0.02	0.03	720	40,000		
	2.5	0.02	0.06	600	50,000	0.02	0.06	600	50,000	0.01	0.02	600	40,000		
	3	0.02	0.05	500	50,000	0.02	0.05	500	50,000	0.01	0.02	500	40,000		
	3.5	0.02	0.045	400	50,000	0.02	0.045	400	50,000	0.007	0.01	420	40,000		
	4	0.018	0.03	400	50,000	0.018	0.03	400	50,000	0.007	0.01	350	40,000		
0.6	1	0.07	0.12	1,200	50,000	0.07	0.12	1,200	50,000	0.05	0.1	1,400	40,000		
	1.5	0.07	0.12	1,200	50,000	0.07	0.12	1,200	50,000	0.05	0.1	1,400	40,000		
	2	0.07	0.12	1,200	50,000	0.07	0.12	1,200	50,000	0.05	0.1	1,400	40,000		
	2.5	0.05	0.12	1,200	50,000	0.05	0.12	1,200	50,000	0.03	0.05	1,200	40,000		
	3	0.04	0.1	1,000	50,000	0.04	0.1	1,000	50,000	0.03	0.05	1,200	40,000		
	3.5	0.04	0.1	1,000	50,000	0.04	0.1	1,000	50,000	0.02	0.03	1,000	40,000		
4	0.035	0.08	800	50,000	0.035	0.08	800	50,000	0.02	0.03	1,000	40,000			

HARD STAR Type A Series

Empfohlene Schnittparameter

Long Neck Ball End Mill														
Work Material		Aluminum Alloy A5000				Aluminum Alloy A7000				Heat Resistant Alloy (Kovar)				
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			$\varnothing p$ mm	$\varnothing e$ mm	mm/min	min ⁻¹	$\varnothing p$ mm	$\varnothing e$ mm	mm/min	min ⁻¹	$\varnothing p$ mm	$\varnothing e$ mm	mm/min	min ⁻¹
2	0.6	4.5	0.035	0.08	750	50,000	0.035	0.08	750	50,000	0.02	0.03	900	35,000
		5	0.03	0.06	500	30,000	0.03	0.06	500	30,000	0.01	0.02	720	30,000
		5.5	0.02	0.03	500	30,000	0.02	0.03	500	30,000	0.01	0.015	700	30,000
		6	0.015	0.03	450	30,000	0.015	0.03	450	30,000	0.007	0.01	500	30,000
	0.7	2	0.1	0.15	1,500	30,000	0.1	0.15	1,500	30,000	0.07	0.1	1,600	40,000
		4	0.06	0.12	1,200	30,000	0.06	0.12	1,200	30,000	0.04	0.06	1,300	40,000
		6	0.04	0.07	600	30,000	0.04	0.07	600	30,000	0.01	0.03	800	30,000
	0.8	2	0.15	0.2	2,000	50,000	0.15	0.2	2,000	50,000	0.1	0.15	2,000	40,000
		3	0.12	0.2	1,800	50,000	0.12	0.2	1,800	50,000	0.1	0.15	2,000	40,000
		4	0.1	0.2	1,500	50,000	0.1	0.2	1,500	50,000	0.05	0.1	1,600	40,000
		5	0.08	0.15	1,200	50,000	0.08	0.15	1,200	50,000	0.05	0.05	1,600	40,000
		6	0.07	0.12	900	30,000	0.07	0.12	900	30,000	0.03	0.05	1,200	30,000
		7	0.05	0.08	700	30,000	0.05	0.08	700	30,000	0.02	0.03	1,000	30,000
	0.9	8	0.02	0.05	500	24,000	0.02	0.05	500	24,000	0.01	0.02	820	30,000
		2	0.2	0.3	2,800	50,000	0.2	0.3	2,800	50,000	0.1	0.2	2,200	40,000
		4	0.15	0.25	2,000	50,000	0.15	0.25	2,000	50,000	0.05	0.12	1,800	40,000
		6	0.1	0.2	1,300	30,000	0.1	0.2	1,300	30,000	0.035	0.05	1,200	30,000
	1	8	0.055	0.08	800	24,000	0.055	0.08	800	24,000	0.025	0.04	1,000	30,000
		2	0.25	0.4	3,500	50,000	0.25	0.4	3,500	50,000	0.1	0.3	2,500	40,000
		2.5	0.25	0.4	3,200	50,000	0.25	0.4	3,200	50,000	0.1	0.3	2,500	40,000
		3	0.25	0.4	3,000	50,000	0.25	0.4	3,000	50,000	0.1	0.3	2,500	40,000
		4	0.2	0.4	2,500	50,000	0.2	0.4	2,500	50,000	0.1	0.2	2,500	40,000
		5	0.15	0.35	2,000	50,000	0.15	0.35	2,000	50,000	0.05	0.15	2,000	30,000
		6	0.15	0.3	1,500	50,000	0.15	0.3	1,500	50,000	0.05	0.1	1,800	30,000
7		0.12	0.3	1,300	30,000	0.12	0.3	1,300	30,000	0.04	0.06	1,200	30,000	
8		0.08	0.15	1,200	30,000	0.08	0.15	1,200	30,000	0.04	0.06	1,000	30,000	
9		0.06	0.1	1,000	30,000	0.06	0.1	1,000	30,000	0.03	0.05	820	25,000	
1.2	10	0.05	0.08	800	30,000	0.05	0.08	800	30,000	0.03	0.05	750	25,000	
	12	0.02	0.04	600	20,000	0.02	0.04	600	20,000	0.01	0.03	600	20,000	
	2.4	0.3	0.45	3,400	30,000	0.3	0.45	3,400	30,000	0.1	0.3	2,500	30,000	
	4	0.28	0.45	3,000	30,000	0.28	0.45	3,000	30,000	0.1	0.2	2,500	30,000	
	6	0.15	0.4	2,000	30,000	0.15	0.4	2,000	30,000	0.07	0.1	2,000	30,000	
	8	0.12	0.3	1,300	30,000	0.12	0.3	1,300	30,000	0.05	0.1	1,600	30,000	
1.4	10	0.08	0.15	1,200	20,000	0.08	0.15	1,200	20,000	0.03	0.07	1,200	20,000	
	12	0.05	0.08	800	20,000	0.05	0.08	800	20,000	0.02	0.05	860	20,000	
	8	0.15	0.45	2,500	30,000	0.15	0.45	2,500	30,000	0.12	0.2	2,500	30,000	
1.5	12	0.1	0.18	1,200	20,000	0.1	0.18	1,200	20,000	0.07	0.12	1,400	20,000	
	16	0.05	0.08	600	20,000	0.05	0.08	600	20,000	0.02	0.05	700	17,000	
	3	0.3	0.5	4,000	30,000	0.3	0.5	4,000	30,000	0.15	0.3	3,000	30,000	
	4	0.3	0.45	4,000	30,000	0.3	0.45	4,000	30,000	0.15	0.3	3,000	30,000	
1.5	6	0.2	0.45	3,000	30,000	0.2	0.45	3,000	30,000	0.15	0.2	3,000	30,000	

HARD STAR Type A Series

HARD STAR Type A
Recommended Milling Conditions

■ :HALB230
Model number:HALB230

Empfohlene Schnittparameter

Long Neck Ball End Mill

Work Material		Aluminum Alloy A5000					Aluminum Alloy A7000					Heat Resistant Alloy (Kovar)			
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	
			∅p mm	∅e mm	mm/min	min ⁻¹	∅p mm	∅e mm	mm/min	min ⁻¹	∅p mm	∅e mm	mm/min	min ⁻¹	
2	1.5	8	0.15	0.4	2,400	30,000	0.15	0.4	2,400	30,000	0.1	0.2	2,500	25,000	
		10	0.12	0.3	1,800	30,000	0.12	0.3	1,800	30,000	0.1	0.1	2,500	25,000	
		12	0.1	0.2	1,200	24,000	0.1	0.2	1,200	24,000	0.05	0.1	1,800	20,000	
		14	0.1	0.15	1,200	24,000	0.1	0.15	1,200	24,000	0.05	0.07	1,200	20,000	
		16	0.07	0.12	800	18,000	0.07	0.12	800	18,000	0.03	0.05	720	18,000	
	1.6	8	0.15	0.45	3,000	24,000	0.15	0.45	3,000	24,000	0.1	0.2	2,500	25,000	
		12	0.1	0.25	1,800	24,000	0.1	0.25	1,800	24,000	0.07	0.1	1,800	20,000	
		16	0.08	0.15	650	18,000	0.08	0.15	650	18,000	0.03	0.05	720	16,000	
	2	3	0.45	0.7	4,000	30,000	0.45	0.7	4,000	30,000	0.2	0.5	3,000	25,000	
		4	0.45	0.7	4,000	30,000	0.45	0.7	4,000	30,000	0.2	0.5	3,000	25,000	
		6	0.38	0.7	3,000	30,000	0.38	0.7	3,000	30,000	0.2	0.5	2,500	25,000	
		8	0.3	0.45	2,500	20,000	0.3	0.45	2,500	20,000	0.2	0.3	2,000	20,000	
		10	0.23	0.45	2,500	20,000	0.23	0.45	2,500	20,000	0.1	0.3	2,000	18,000	
		12	0.2	0.3	1,800	16,000	0.2	0.3	1,800	16,000	0.1	0.2	1,600	16,000	
		13	0.2	0.3	1,800	16,000	0.2	0.3	1,800	16,000	0.08	0.2	1,600	16,000	
		14	0.15	0.3	1,800	16,000	0.15	0.3	1,800	16,000	0.07	0.15	1,600	16,000	
		16	0.15	0.25	1,600	14,000	0.15	0.25	1,600	14,000	0.07	0.15	1,600	16,000	
		18	0.1	0.2	1,600	14,000	0.1	0.2	1,600	14,000	0.05	0.1	1,400	14,000	
	2.5	6	0.5	0.8	4,000	20,000	0.5	0.8	4,000	20,000	0.3	0.4	2,800	20,000	
		8	0.3	0.8	3,000	20,000	0.3	0.8	3,000	20,000	0.25	0.3	2,600	20,000	
		10	0.3	0.8	3,000	20,000	0.3	0.8	3,000	20,000	0.2	0.3	2,500	20,000	
		15	0.25	0.45	2,500	20,000	0.25	0.45	2,500	20,000	0.1	0.2	2,000	18,000	
		20	0.15	0.3	1,800	16,000	0.15	0.3	1,800	16,000	0.07	0.15	1,500	16,000	
	3	6	0.5	1	4,000	20,000	0.5	1	4,000	20,000	0.2	0.8	3,000	20,000	
		8	0.45	0.8	4,000	20,000	0.45	0.8	4,000	20,000	0.2	0.8	3,000	20,000	
		10	0.45	0.8	4,000	20,000	0.45	0.8	4,000	20,000	0.2	0.6	2,500	20,000	
		12	0.3	0.6	3,000	20,000	0.3	0.6	3,000	20,000	0.2	0.6	2,500	20,000	
		14	0.3	0.6	3,000	20,000	0.3	0.6	3,000	20,000	0.1	0.4	2,000	18,000	
		16	0.23	0.5	3,000	20,000	0.23	0.5	3,000	20,000	0.1	0.4	2,000	18,000	
		20	0.23	0.45	1,800	16,000	0.23	0.45	1,800	16,000	0.1	0.3	1,600	18,000	
		25	0.2	0.4	1,200	16,000	0.2	0.4	1,200	16,000	0.1	0.2	1,200	16,000	
	3.5	30	0.15	0.3	800	12,000	0.15	0.3	800	12,000	0.07	0.1	750	14,000	
		15	0.45	0.6	4,000	20,000	0.45	0.6	4,000	20,000	0.25	1	3,000	20,000	
		20	0.3	0.45	2,400	18,000	0.3	0.45	2,400	18,000	0.18	0.6	2,500	18,000	
		25	0.25	0.42	2,000	18,000	0.25	0.42	2,000	18,000	0.12	0.35	1,800	16,000	
		30	0.23	0.4	1,600	12,000	0.23	0.4	1,600	12,000	0.1	0.25	1,500	14,000	
	4	35	0.15	0.3	1,200	12,000	0.15	0.3	1,200	12,000	0.08	0.2	1,200	13,000	
		8	0.55	1.2	4,000	20,000	0.55	1.2	4,000	20,000	0.3	1.5	3,000	20,000	
		10	0.55	1.2	4,000	20,000	0.55	1.2	4,000	20,000	0.3	1.5	3,000	20,000	
	4	12	0.53	1	4,000	20,000	0.53	1	4,000	20,000	0.3	1.5	3,000	20,000	

HARD STAR Type A Series

Empfohlene Schnittparameter

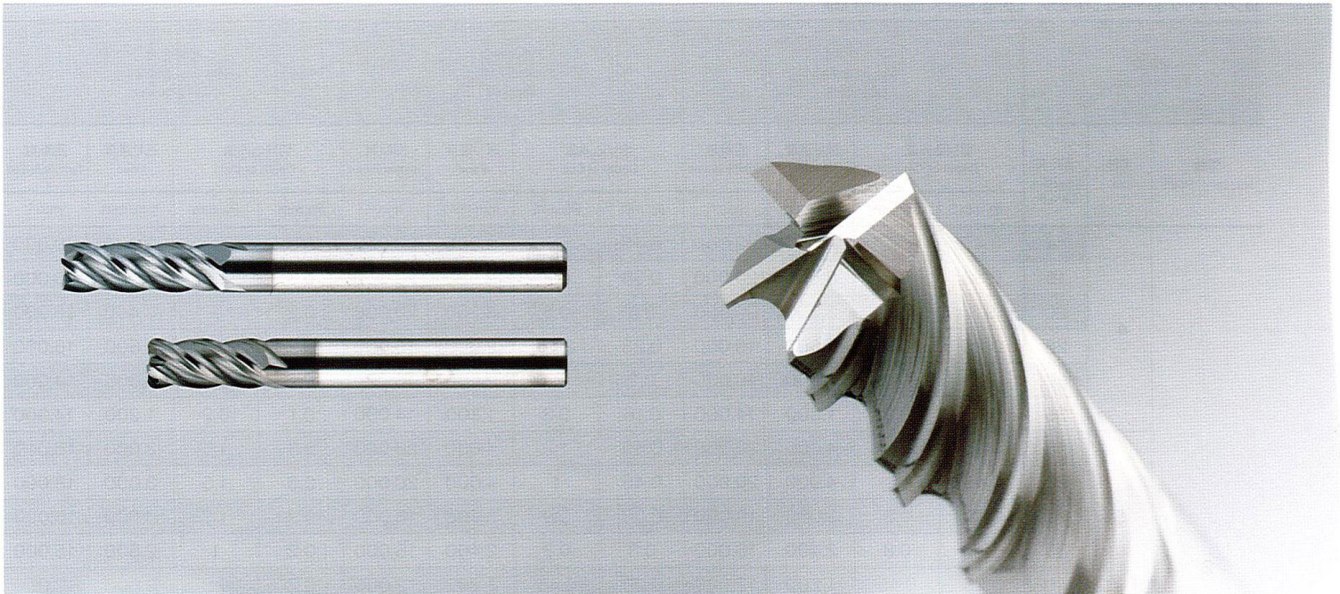
Long Neck Ball End Mill

Work Material		Aluminum Alloy A5000					Aluminum Alloy A7000					Heat Resistant Alloy (Kovar)				
Number of Flutes	Dia.	Effective Length	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed		
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹		
2	4	14	0.45	1	4,000	20,000	0.45	1	4,000	20,000	0.3	1.5	3,000	20,000		
		15	0.38	0.8	3,500	20,000	0.38	0.8	3,500	20,000	0.3	1.5	3,000	20,000		
		20	0.3	0.5	3,300	20,000	0.3	0.5	3,300	20,000	0.2	1	2,400	16,000		
		25	0.23	0.45	2,600	16,000	0.23	0.45	2,600	16,000	0.2	0.8	1,600	16,000		
		30	0.2	0.4	2,600	16,000	0.2	0.4	2,600	16,000	0.1	0.3	1,600	14,000		
		35	0.18	0.3	1,800	14,000	0.18	0.3	1,800	14,000	0.1	0.2	1,200	14,000		
	5	15	0.55	1.5	4,000	20,000	0.55	1.5	4,000	20,000	0.3	1.5	3,000	18,000		
		20	0.45	1	4,000	20,000	0.45	1	4,000	20,000	0.3	1.5	3,000	18,000		
		25	0.38	0.9	3,000	16,000	0.38	0.9	3,000	16,000	0.3	1.2	3,000	15,000		
		30	0.3	0.8	2,400	16,000	0.3	0.8	2,400	16,000	0.2	1	2,500	15,000		
	6	40	0.23	0.45	1,200	12,000	0.23	0.45	1,200	12,000	0.2	0.8	2,000	12,000		
		10	0.75	2.3	4,000	18,000	0.75	2.3	4,000	18,000	0.3	2	3,000	16,000		
		15	0.75	2	4,000	18,000	0.75	2	4,000	18,000	0.3	2	3,000	16,000		
		20	0.75	1.8	4,000	18,000	0.75	1.8	4,000	18,000	0.3	2	3,000	16,000		
		25	0.6	1.5	4,000	12,000	0.6	1.5	4,000	12,000	0.3	1.5	3,000	16,000		
		30	0.53	1	3,000	12,000	0.53	1	3,000	12,000	0.2	1.5	3,000	14,000		
		35	0.53	0.8	2,500	12,000	0.53	0.8	2,500	12,000	0.2	1.2	2,400	13,000		
		40	0.38	0.6	1,500	8,000	0.38	0.6	1,500	8,000	0.2	1	1,800	12,000		
	50	0.3	0.6	1,500	8,000	0.3	0.6	1,500	8,000	0.1	0.6	1,200	8,200			
	60	0.3	0.6	1,500	8,000	0.3	0.6	1,500	8,000	0.07	0.3	600	6,000			

HARD STAR Type TI Series

Carbide End Mill

Hard TI	super MG	Lippen 4	Helix 40°/42°	Winkel NA 15°	Schaft 0/-0.005
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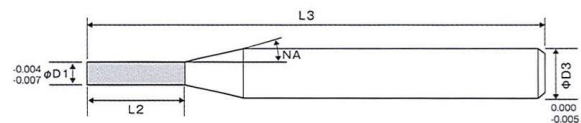


Hard Star Typ TI mit original Sputtering Beschichtung Nano-Level, ultra feine Oberfläche für lange Standzeiten
Exzellente Hitzebeständigkeit, Ideal für den Einsatz in schwer zu bearbeitenden Materialien, inkl. Inconel

Carbide Square End Mill

■ :HTIS499 Model number:HTIS499

Hard TI	super MG	Lippen 4	Helix 40°/42°	Winkel NA 15°	Schaft 0/-0.005
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Der Hinterschliffwinkel NA ist ein Referenzwert
Er basiert auf dem entsprechend zu bearbeitendem Material
bitte beachten Sie das aktuelle Massblatt

HARD STAR Type TI Series

Code No.	Tool Diameter	Length of Cut	Neck Taper Angle	Shank Diameter	Overall Length
HTIS499-0100-00200	1	2	15	4	50
HTIS499-0100-00300		3	15	4	50
HTIS499-0150-00300	1.5	3	15	4	50
HTIS499-0150-00450		4.5	15	4	50
HTIS499-0200-00400	2	4	15	4	50
HTIS499-0200-00600		6	15	4	50
HTIS499-0250-00500	2.5	5	15	4	50
HTIS499-0250-00750		7.5	15	4	50
HTIS499-0300-00600	3	6	15	4	50
HTIS499-0300-00900		9	15	4	50
HTIS499-0400-00800	4	8	15	6	50
HTIS499-0400-01200		12	15	6	50
HTIS499-0500-01000	5	10	15	6	50
HTIS499-0500-01500		15	15	6	50
HTIS499-0600-01200	6	12	—	6	50
HTIS499-0600-01800		18	—	6	60

Recommended Milling Conditions

Model number:HTIS499

Empfohlene Schnittparameter

Work Material			Heat resistant alloy Inconel			
Number of Flutes	Dia.	Length of cut	Depth of Cut		Feed mm/min	Spindle Speed min ⁻¹
			Δp mm	Δe mm		
4	1	2	1	0.05	150	12,000
		3	1	0.025	100	11,000
	1.5	3	1.5	0.07	200	9,000
		4.5	1.5	0.035	150	8,000
	2	4	2	0.1	200	6,500
		6	2	0.05	150	6,000
	2.5	5	2.5	0.12	250	5,500
		7.5	2.5	0.6	200	5,000
	3	6	3	0.15	250	3,400
		9	3	0.075	200	3,200
	4	8	4	0.2	250	3,000
		12	4	0.1	200	2,700
	5	10	5	0.25	300	2,500
		15	5	0.12	250	2,200
	6	12	6	0.3	300	2,000
		18	6	0.15	250	1,800

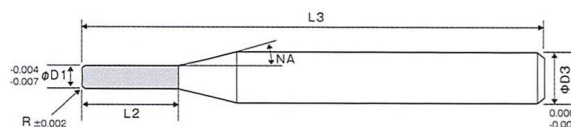
HARD STAR Type TI Series

Carbide Radius End Mill

HTIR499 Model number:HTIR499



VHM Eckradiusfräser



Der Hinterschliffwinkel NA ist ein Referenzwert
Er basiert auf dem entsprechenden zu bearbeitenden Material
bitte beachten Sie das aktuelle Massblatt

Bestell-Code Code No.	WZ-Ø Tool Diameter	Eckradius Corner Radius	Schneiden-L Length of Cut	Winkel NA Neck Taper Angle	Schaft-Ø Shank Diameter	Total-L Overall Length
HTIR499-0300-0300-00800	3	0.3	8	15	4	50
HTIR499-0300-0500-00800		0.5	8	15	4	50
HTIR499-0400-0300-01100	4	0.3	11	15	6	50
HTIR499-0400-0500-01100		0.5	11	15	6	50
HTIR499-0400-1000-01100		1	11	15	6	50
HTIR499-0500-0300-01300	5	0.3	13	15	6	50
HTIR499-0500-0500-01300		0.5	13	15	6	50
HTIR499-0500-1000-01300		1	13	15	6	50
HTIR499-0600-0500-01300	6	0.5	13	—	6	50
HTIR499-0600-1000-01300		1	13	—	6	50
HTIR499-0800-0500-01900	8	0.5	19	—	8	70
HTIR499-0800-1000-01900		1	19	—	8	70
HTIR499-1000-0500-02200	10	0.5	22	—	10	80
HTIR499-1000-1000-02200		1	22	—	10	80
HTIR499-1000-2000-02200		2	22	—	10	80
HTIR499-1000-3000-02200		3	22	—	10	80
HTIR499-1200-0500-02600	12	0.5	26	—	12	110
HTIR499-1200-1000-02600		1	26	—	12	110
HTIR499-1200-2000-02600		2	26	—	12	110

HARD STAR Type TI Series

HARD STAR Type TI
Recommended Milling Conditions

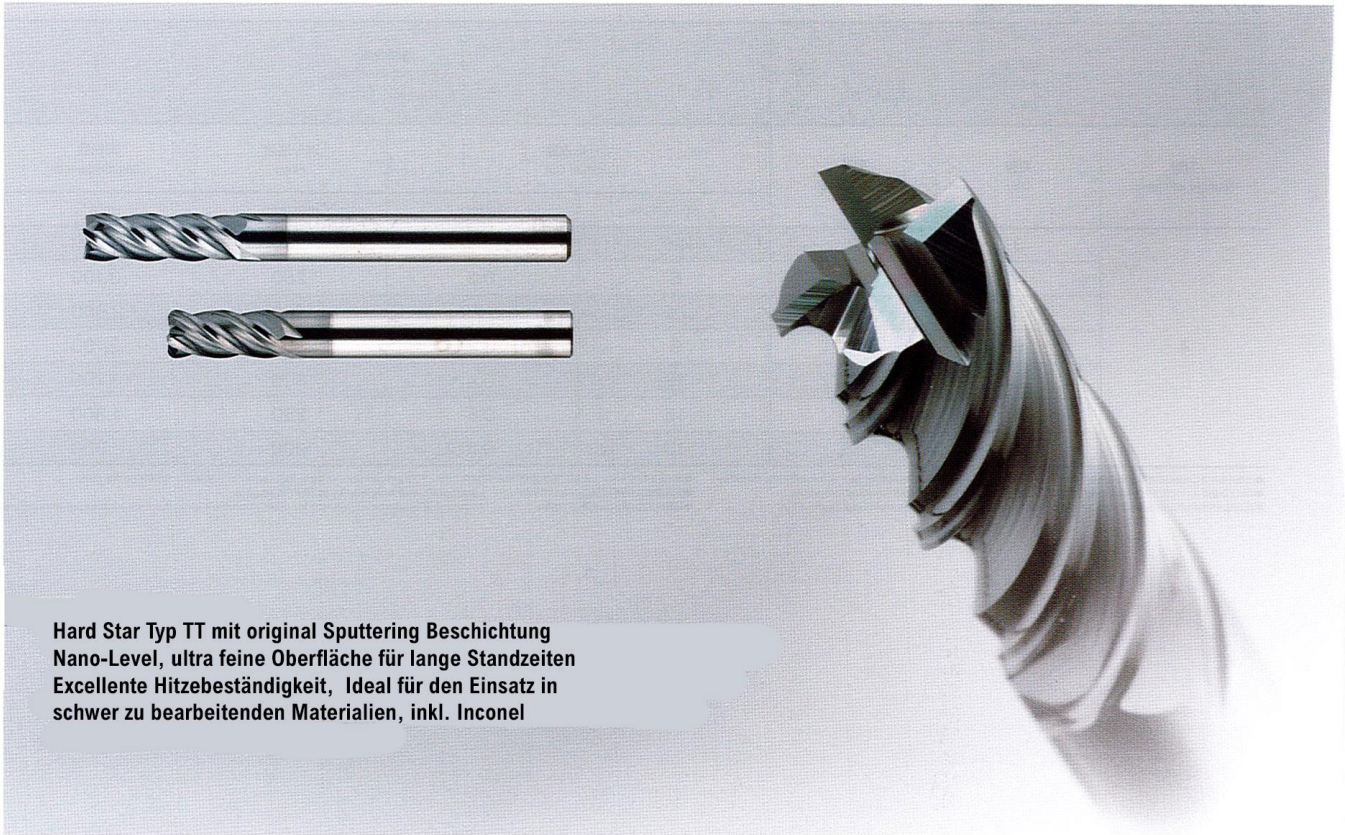
■ :HTIR499
Model number:HTIR499

Empfohlene Schnittparameter

Work Material			Heat resistant alloy Inconel			
Number of Flutes	Dia.	Length of cut	Depth of Cut		Feed	Spindle Speed
			$\varnothing p$ mm	$\varnothing e$ mm	mm/min	min ⁻¹
4	3	8	4.5	0.15	250	3,600
	4	11	6	0.2	250	3,100
	5	13	7.5	0.25	300	2,600
	6	13	9	0.3	300	2,100
	8	19	12	0.4	300	1,700
	10	22	15	0.5	250	1,300
	12	26	18	0.6	200	900

HARD STAR Type TT Series

Carbide End Mill

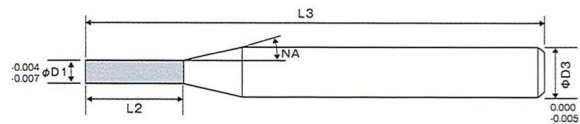


Hard Star Typ TT mit original Sputtering Beschichtung Nano-Level, ultra feine Oberfläche für lange Standzeiten
Exzellente Hitzebeständigkeit, Ideal für den Einsatz in schwer zu bearbeitenden Materialien, inkl. Inconel

Carbide Square End Mill

■ :HTTS499 Model number:HTTS499

VHM Schafffräser



Der Hinterschliffwinkel NA ist ein Referenzwert
Erbasiert auf dem entsprechend zu bearbeitenden Material
bitte beachten Sie das aktuelle Massblatt

HARD STAR Type TT Series

VHM Schafffräser

Code No.	Tool Diameter	Length of Cut	Neck Taper Angle	Shank Diameter	Overall Length
HTTS499-0100-0000-00200	1	2	15	4	50
HTTS499-0100-0000-00300		3	15	4	50
HTTS499-0150-0000-00300	1.5	3	15	4	50
HTTS499-0150-0000-00450		4.5	15	4	50
HTTS499-0200-0000-00400	2	4	15	4	50
HTTS499-0200-0000-00600		6	15	4	50
HTTS499-0250-0000-00500	2.5	5	15	4	50
HTTS499-0250-0000-00750		7.5	15	4	50
HTTS499-0300-0000-00600	3	6	15	4	50
HTTS499-0300-0000-00900		9	15	4	50
HTTS499-0400-0000-00800	4	8	15	6	50
HTTS499-0400-0000-01200		12	15	6	50
HTTS499-0500-0000-01000	5	10	15	6	50
HTTS499-0500-0000-01500		15	15	6	50
HTTS499-0600-0000-01200	6	12	—	6	50
HTTS499-0600-0000-01800		18	—	6	60

HARD STAR Type TT Series

HARD STAR Type TT
Recommended Milling Conditions

■ :HTTS499
Model number:HTTS499

Empfohlene Schnittparameter

Square End Mill

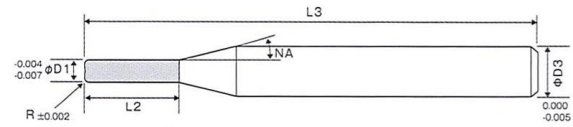
Work Material			Stainless Steel SUS304				Titanium alloy			
Number of Flutes	Dia.	Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			θp mm	θe mm	mm/min	min ⁻¹	θp mm	θe mm	mm/min	min ⁻¹
4	1	2	1	0.2	600	18,000	1	0.2	600	16,800
		3	1	0.1	500	16,000	1	0.1	500	14,900
	1.5	3	1.5	0.3	700	12,500	1.5	0.3	700	11,700
		4.5	1.5	0.15	550	11,000	1.5	0.15	550	10,300
	2	4	2	0.4	850	10,000	2	0.4	850	9,300
		6	2	0.2	650	8,500	2	0.2	650	7,900
	2.5	5	2.5	5	1,000	8,200	2.5	5	1,000	7,600
		7.5	2.5	0.25	750	7,100	2.5	0.25	750	6,600
	3	6	3	0.6	1,100	7,200	3	0.6	1,100	6,700
		9	3	0.3	800	6,000	3	0.3	800	5,600
	4	8	4	0.8	1,200	6,400	4	0.8	1,200	6,000
		12	4	0.4	920	5,400	4	0.4	920	5,000
	5	10	5	1	1,200	5,600	5	1	1,200	5,200
		15	5	0.5	1,000	5,000	5	0.5	1,000	4,700
	6	12	6	1.2	1,200	5,000	6	1.2	1,200	4,600
		18	6	0.6	1,000	4,500	6	0.6	1,000	4,200

HARD STAR Type TT Series

Carbide Radius End Mill

■ :HTTR499 Model number:HTTR499

VHM Eckradiusfräser



Der Hinterschliffwinkel NA ist ein Referenzwert
Er basiert auf dem entsprechend zu bearbeitenden Material
bitte beachten Sie das aktuelle Massblatt

Code No.	Tool Diameter	Corner Radius	Length of Cut	Neck Taper Angle	Shank Diameter	Overall Length
HTTR499-0300-0300-00800	3	0.3	8	15	4	50
HTTR499-0300-0500-00800		0.5	8	15	4	50
HTTR499-0400-0300-01100	4	0.3	11	15	6	50
HTTR499-0400-0500-01100		0.5	11	15	6	50
HTTR499-0400-1000-01100		1	11	15	6	50
HTTR499-0500-0300-01300	5	0.3	13	15	6	50
HTTR499-0500-0500-01300		0.5	13	15	6	50
HTTR499-0500-1000-01300		1	13	15	6	50
HTTR499-0600-0500-01300	6	0.5	13	—	6	50
HTTR499-0600-1000-01300		1	13	—	6	50
HTTR499-0800-0500-01900	8	0.5	19	—	8	70
HTTR499-0800-1000-01900		1	19	—	8	70
HTTR499-1000-0500-02200	10	0.5	22	—	10	80
HTTR499-1000-1000-02200		1	22	—	10	80
HTTR499-1000-2000-02200		2	22	—	10	80
HTTR499-1000-3000-02200		3	22	—	10	80
HTTR499-1200-0500-02600	12	0.5	26	—	12	110
HTTR499-1200-1000-02600		1	26	—	12	110
HTTR499-1200-2000-02600		2	26	—	12	110

HARD STAR Type TT Series

HARD STAR Type TT
Recommended Milling Conditions

■ :HTTR499
Model number:HTTR499

Empfohlene Schnittparameter

Radius End Mill

Work Material			Stainless Steel SUS304				Titanium alloy			
Number of Flutes	Dia.	Length of cut	Depth of Cut		Feed	Spindle Speed	Depth of Cut		Feed	Spindle Speed
			∂p mm	∂e mm	mm/min	min ⁻¹	∂p mm	∂e mm	mm/min	min ⁻¹
4	3	8	4.5	0.6	750	6,000	4.5	0.6	750	5,600
	4	11	6	0.8	800	5,200	6	0.8	800	4,800
	5	13	7.5	1	900	4,600	7.5	1	900	4,200
	6	13	9	1.2	1000	4,200	9	1.2	1000	3,800
	8	19	12	1.6	850	3,600	12	1.6	850	3,200
	10	22	15	2	600	3,000	15	2	600	2,600
	12	26	18	2.4	500	2,500	18	2.4	500	2,100