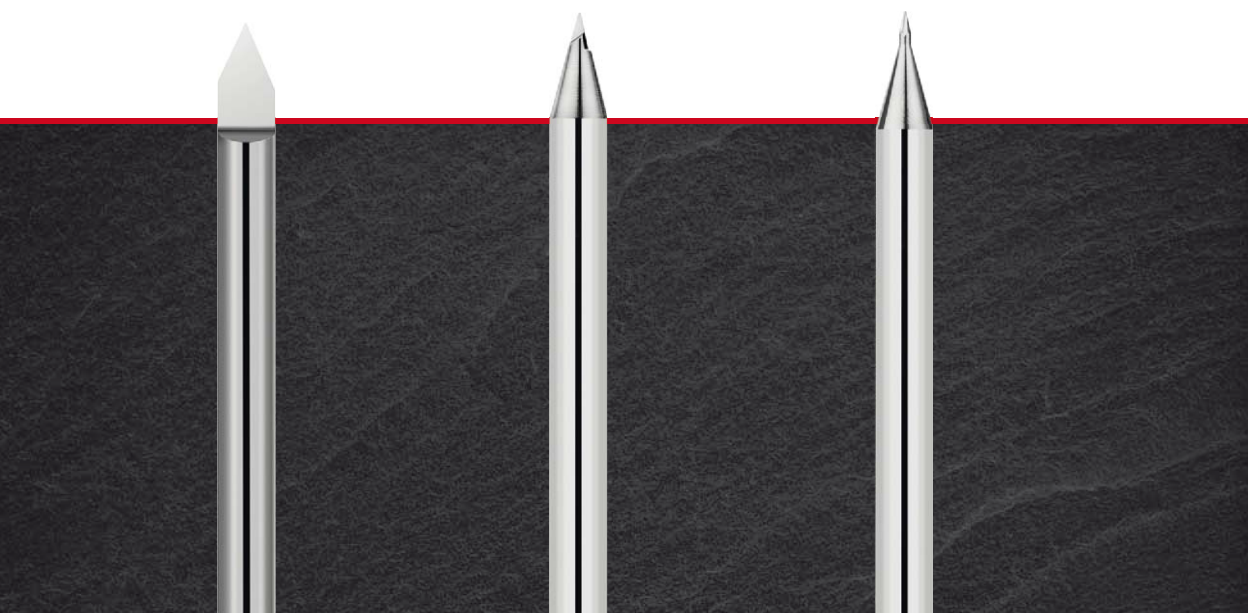


2000



Répertoire **Fraises à graver**
 Verzeichnis **Gravierfräser**
 Index **Engraving mills**

Paramètres de coupe indicatifs
 Empfohlene Schnittwerte
 Standard machining data

1.02

	Fraises à graver Gravierfräser Engraving mills				
	Type	A	Flat[E] / Radius [r]	D2	page
	2100-P	20° / 30° / 35° / 40° 45° / 50° / 55° / 60° 65° / 70° / 90° / 120°	0.05-0.30 0.05-0.10 / every 0.01 0.10-0.30 / every 0.05	Ø3h4 Ø6h5	1.03
	2300-P	20° / 30° / 35° / 40° 45° / 50° / 55° / 60° 65° / 70° / 90°	0.02-0.30 0.02-0.10 / every 0.01 0.10-0.30 / every 0.05	Ø3h4	1.04
	2300-R	20° / 30° / 35° / 40° 45° / 50° / 55° / 60° 65° / 70° / 90°	0.04-0.30 0.04-0.10 / every 0.01 0.10-0.30 / every 0.05	Ø3h4	1.05
	2900-P	20° / 30° / 35° / 40° 45° / 50° / 55° / 60° 65° / 70° / 90°	0.04-0.30 0.04-0.10 / every 0.01 0.10-0.30 / every 0.05	Ø3h4	1.06
	2900-R	20° / 30° / 35° / 40° 45° / 50° / 55° / 60° 65° / 70° / 90°	0.04-0.30 0.04-0.10 / every 0.01 0.10-0.30 / every 0.05	Ø3h4	1.07

Paramètres de coupe indicatifs **Fraises à graver**
 Empfohlene Schnittwerte **Gravierfräser**
 Standard machining data **Engraving mills**

Matière Werkstoff Material	n (tr/min)	Vf (mm/min)	N	TiAlN*	STF*	TiCN*	ALFA- TOP*
Acier de décolletage Automatenstahl Free-cutting steel	P 20 - 50'000	100 - 180	-	+++	+++	++	-
Acier Stahl Steel < 600 N/mm²	P 20 - 50'000	100 - 180	-	+++	+++	++	-
Acier Stahl Steel < 800 N/mm²	P 20 - 50'000	100 - 180	-	+++	+++	++	-
Acier Stahl Steel > 800 N/mm²	P 20 - 50'000	100 - 150	-	+++	+++	++	-
Acier trempé Gehärteter Stahl Hardened steel -55HRC	H 20 - 50'000	-	-	+++	+++	+	-
Acier trempé Gehärteter Stahl Hardened steel +55HRC	H 20 - 50'000	-	-	+++	+++	+	-
Inox Rostfreistahl Stainless steel	M 20 - 50'000	100 - 170	-	+++	+++	++	-
Aluminium	N 20 - 50'000	100 - 250	+++	++	++	+	+++
Cuivre, laiton, bronze Kupfer, Messing, Bronze Copper, brass, bronze	N 20 - 50'000	70 - 150	+++	++	++	++	+++
Matière synthétique Synthetisches Material Synthetic material	N 20 - 50'000	100 - 200	+++	++	++	++	+++
Métaux précieux Edelmetalle Precious metals	N 20 - 50'000	100 - 200	+++	++	++	++	+++
Titane Titan Titanium	S 20 - 50'000	70 - 150	-	+++	+++	++	-
Alliage de nickel Nickel-Legierung Nickel alloy	S 20 - 50'000	80 - 180	-	+++	+++	++	-
Matière exotique Exotisches material Exotic material	O 20 - 50'000	80 - 180	+	+++	+++	++	+++

* Avec revêtement, augmenter les valeurs de 20 %
 Mit Beschichtung, Daten um 20 % erhöhen
 With coating, increase data by 20 %

+ Bien / Gut / Good
 ++ Très bien / Sehr gut / Very good
 +++ Excellent / Ausgezeichnet / Excellent

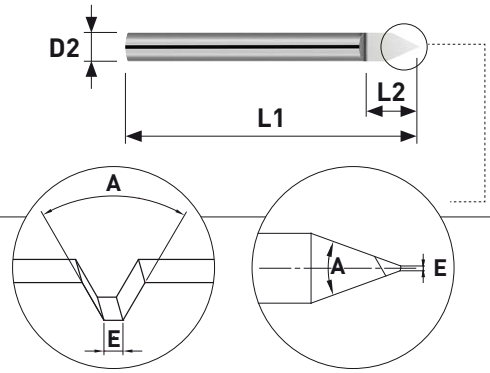
Avance conseillée pour des vitesses de rotation entre 20'000 et 30'000 tours/min
 Empfohlener Vorschub für Drehgeschwindigkeiten zwischen 20'000 und 30'000 U/Min
 Recommended feed rate for rotation speeds between 20'000 and 30'000 RPM

Fraises à graver avec plat

Gravierfräser mit Fläche

Engraving mills with flat

MD
VHM
HM



Art. N°	A	E	L2	D2 Ø3h4 Ø6h5	L1	N	TiAlN	STF	TiCN	ALFA- TOP
2120-P-_(E)	20°	0.05-0.10* / 0.10-0.30 **	5.20	3.00	33	●	●	●	●	●
2130-P-_(E)	30°	0.05-0.10* / 0.10-0.30 **	5.20	3.00	33	●	●	●	●	●
2135-P-_(E)	35°	0.05-0.10* / 0.10-0.30 **	5.20	3.00	33	●	●	●	●	●
2140-P-_(E)	40°	0.05-0.10* / 0.10-0.30 **	6.00	3.00	33	●	●	●	●	●
2145-P-_(E)	45°	0.05-0.10* / 0.10-0.30 **	6.00	3.00	33	●	●	●	●	●
2150-P-_(E)	50°	0.05-0.10* / 0.10-0.30 **	6.00	3.00	33	●	●	●	●	●
2155-P-_(E)	55°	0.05-0.10* / 0.10-0.30 **	6.00	3.00	33	●	●	●	●	●
2160-P-_(E)	60°	0.05-0.10* / 0.10-0.30 **	8.00	3.00	33	●	●	●	●	●
2165-P-_(E)	65°	0.05-0.10* / 0.10-0.30 **	8.00	3.00	33	●	●	●	●	●
2170-P-_(E)	70°	0.05-0.10* / 0.10-0.30 **	8.00	3.00	33	●	●	●	●	●
2190-P-_(E)	90°	0.05-0.10* / 0.10-0.30 **	8.00	3.00	33	●	●	●	●	●
21120-P-_(E)	120°	0.05-0.10* / 0.10-0.30 **	8.00	3.00	33	●	●	●	●	●
2130-6-P-_(E)	30°	0.05-0.10* / 0.10-0.30 **	12.00	6.00	40	●	●	●	●	●
2140-6-P-_(E)	40°	0.05-0.10* / 0.10-0.30 **	12.00	6.00	40	●	●	●	●	●

* tous les 0.01 mm
alle 0.01 mm
every 0.01 mm

** tous les 0.05 mm
alle 0.05 mm
every 0.05 mm

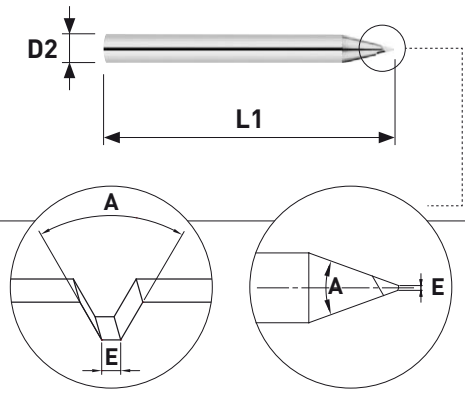


Fraises à graver avec plat

Gravierfräser mit Fläche

Engraving mills with flat

MD
VHM
HM



Art. N°	A	E	D2 _{h4}	L1	N	TiAlN	STF	TiCN	ALFA-TOP
2320-P-_(E)	20°	0.02-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2330-P-_(E)	30°	0.02-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2335-P-_(E)	35°	0.02-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2340-P-_(E)	40°	0.02-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2345-P-_(E)	45°	0.02-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2350-P-_(E)	50°	0.02-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2355-P-_(E)	55°	0.02-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2360-P-_(E)	60°	0.02-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2365-P-_(E)	65°	0.02-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2370-P-_(E)	70°	0.02-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2390-P-_(E)	90°	0.02-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●

* tous les 0.01 mm
alle 0.01 mm
every 0.01 mm

** tous les 0.05 mm
alle 0.05 mm
every 0.05 mm

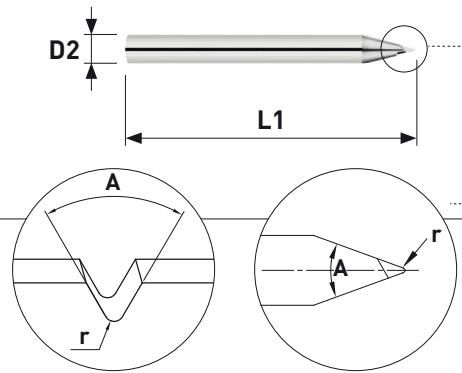


Fraises à graver à rayon

Gravierfräser mit Radius

Engraving mills with radius

MD
VHM
HM



Art. N°	A	r	D2 h4	L1	N	TiAlN	STF	TiCN	ALFA-TOP
2320-R-_(r)	20°	0.04-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2330-R-_(r)	30°	0.04-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2335-R-_(r)	35°	0.04-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2340-R-_(r)	40°	0.04-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2345-R-_(r)	45°	0.04-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2350-R-_(r)	50°	0.04-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2355-R-_(r)	55°	0.04-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2360-R-_(r)	60°	0.04-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2365-R-_(r)	65°	0.04-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2370-R-_(r)	70°	0.04-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●
2390-R-_(r)	90°	0.04-0.10* / 0.10-0.30**	3.00	33	●	●	●	●	●

* tous les 0.01 mm
alle 0.01 mm
every 0.01 mm

** tous les 0.05 mm
alle 0.05 mm
every 0.05 mm

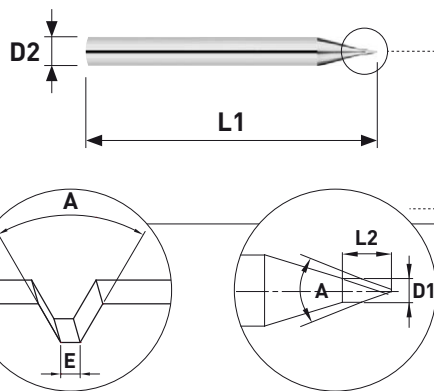


Fraises à graver renforcées

Verstärkte Gravierfräser

Reinforced engraving mills

MD
VHM
HM



Art. N°	A	E	D1	L2	D2 _{h4}	L1	N	TiAlN	STF	TiCN	ALFA-TOP
2920-P_(E)	20°	0.04-0.10* / 0.10-0.30**	0.60	1.80	3.00	33	●	●	●	●	●
2930-P_(E)	30°	0.04-0.10* / 0.10-0.30**	0.60	1.80	3.00	33	●	●	●	●	●
2935-P_(E)	35°	0.04-0.10* / 0.10-0.30**	0.60	1.80	3.00	33	●	●	●	●	●
2940-P_(E)	40°	0.04-0.10* / 0.10-0.30**	0.60	1.80	3.00	33	●	●	●	●	●
2945-P_(E)	45°	0.04-0.10* / 0.10-0.30**	1.00	1.80	3.00	33	●	●	●	●	●
2950-P_(E)	50°	0.04-0.10* / 0.10-0.30**	1.00	2.00	3.00	33	●	●	●	●	●
2955-P_(E)	55°	0.04-0.10* / 0.10-0.30**	1.00	2.00	3.00	33	●	●	●	●	●
2960-P_(E)	60°	0.04-0.10* / 0.10-0.30**	1.20	2.00	3.00	33	●	●	●	●	●
2965-P_(E)	65°	0.04-0.10* / 0.10-0.30**	1.20	2.00	3.00	33	●	●	●	●	●
2970-P_(E)	70°	0.04-0.10* / 0.10-0.30**	1.20	2.00	3.00	33	●	●	●	●	●
2990-P_(E)	90°	0.04-0.10* / 0.10-0.30**	1.20	2.00	3.00	33	●	●	●	●	●

* tous les 0.01 mm
alle 0.01 mm
every 0.01 mm

** tous les 0.05 mm
alle 0.05 mm
every 0.05 mm

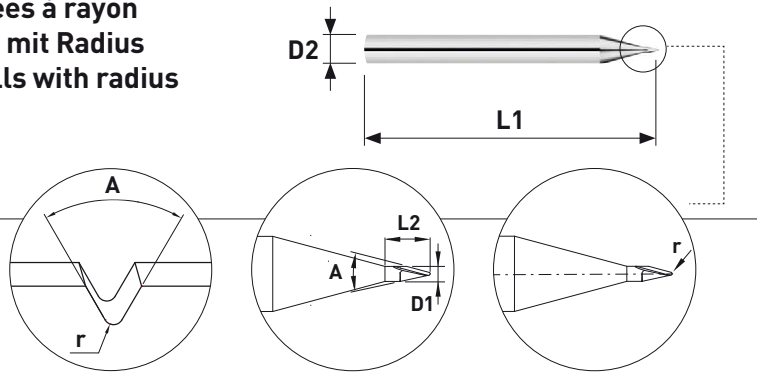


Fraises à graver renforcées à rayon

Verstärkte Gravierfräser mit Radius

Reinforced engraving mills with radius

MD
VHM
HM



Art. N°	A	r	D1	L2	D2 _{h4}	L1	N	TiAlN	STF	TiCN	ALFA-TOP
2920-R-_(r)	20°	0.04-0.10* / 0.10-0.20**	0.60	1.80	3.00	33	●	●	●	●	●
2930-R-_(r)	30°	0.04-0.10* / 0.10-0.20**	0.60	1.80	3.00	33	●	●	●	●	●
2935-R-_(r)	35°	0.04-0.10* / 0.10-0.20**	0.60	1.80	3.00	33	●	●	●	●	●
2940-R-_(r)	40°	0.04-0.10* / 0.10-0.20**	0.60	1.80	3.00	33	●	●	●	●	●
2945-R-_(r)	45°	0.04-0.10* / 0.10-0.30**	1.00	1.80	3.00	33	●	●	●	●	●
2950-R-_(r)	50°	0.04-0.10* / 0.10-0.30**	1.00	2.00	3.00	33	●	●	●	●	●
2955-R-_(r)	55°	0.04-0.10* / 0.10-0.30**	1.00	2.00	3.00	33	●	●	●	●	●
2960-R-_(r)	60°	0.04-0.10* / 0.10-0.30**	1.20	2.00	3.00	33	●	●	●	●	●
2965-R-_(r)	65°	0.04-0.10* / 0.10-0.30**	1.20	2.00	3.00	33	●	●	●	●	●
2970-R-_(r)	70°	0.04-0.10* / 0.10-0.30**	1.20	2.00	3.00	33	●	●	●	●	●
2990-R-_(r)	90°	0.04-0.10* / 0.10-0.30**	1.20	2.00	3.00	33	●	●	●	●	●

* tous les 0.01 mm
alle 0.01 mm
every 0.01 mm

** tous les 0.05 mm
alle 0.05 mm
every 0.05 mm

