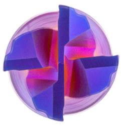
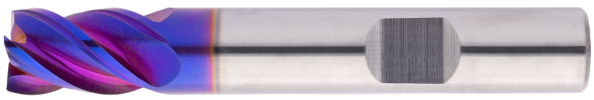
Cooling		Strategy	ETC, HPC
Tolerance	e8	Application	
Coating	AlphaFusion Violet X	Features	HB, ≠, 1,5xD, R

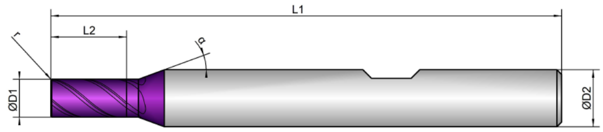
Expert

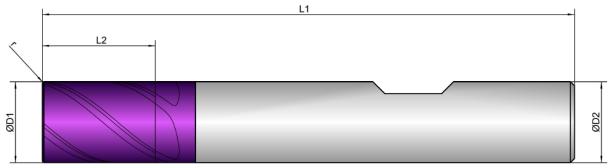
- Unequal tooth pitch combined with variable helical pitch for smooth running
- Highly polished chip space for safe chip evacuation
- Reinforced face for process reliable, helical diving

- For roughing and finishing, up to 1xD full slot









Roughing

inappropriate — optimal

Finishing

inappropriate — optimal

K201688	D1 mm ø	L2 mm	L1 mm	D2 mm ø	z #	r mm	°	α °
4	4.0	8.0	54.0	6.0	4	0.10	40	12
5	5.0	9.0	54.0	6.0	4	0.20	40	12
6	6.0	10.0	54.0	6.0	4	0.20	40	
8	8.0	12.0	58.0	8.0	4	0.20	40	
10	10.0	14.0	66.0	10.0	4	0.20	40	
12	12.0	16.0	73.0	12.0	4	0.20	40	
16	16.0	22.0	82.0	16.0	4	0.30	40	
20	20.0	26.0	92.0	20.0	4	0.30	40	

	Material	Strength (N/mm²)	Dimension	Ø4		Ø5		Ø6		Ø8		Ø10		Ø12	
			Infeed in mm	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD
				ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD
			Application												
			Feed (mm/Z)	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz	fz
T	TITANIUM		Vc (m/min)												
2.1-2.2	pure; alloyed	<1000	80	0.018	0.025	0.022	0.029	0.026	0.037	0.032	0.047	0.039	0.059	0.045	0.07
2.3	alloyed	<1400	60	0.015	0.02	0.018	0.024	0.022	0.032	0.028	0.042	0.034	0.054	0.04	0.065

	Material	Strength (N/mm²)	Dimension	Ø16		Ø20	
			Infeed in mm	ae= 1xD	ae= 0.3xD	ae= 1xD	ae= 0.3xD
				ap= 1xD	ap= 1xD	ap= 1xD	ap= 1xD
			Application				
			Feed (mm/Z)	fz	fz	fz	fz
T	TITANIUM		Vc (m/min)				
2.1-2.2	pure; alloyed	<1000	80	0.055	0.08	0.065	0.1
2.3	alloyed	<1400	60	0.05	0.075	0.06	0.09

EXPLANATION

APPLICATIONS

Multipass milling	Trimming	Deburring	Engraving
Corner rounding	Full slot milling	Forward and backward deburring	

COOLINGS

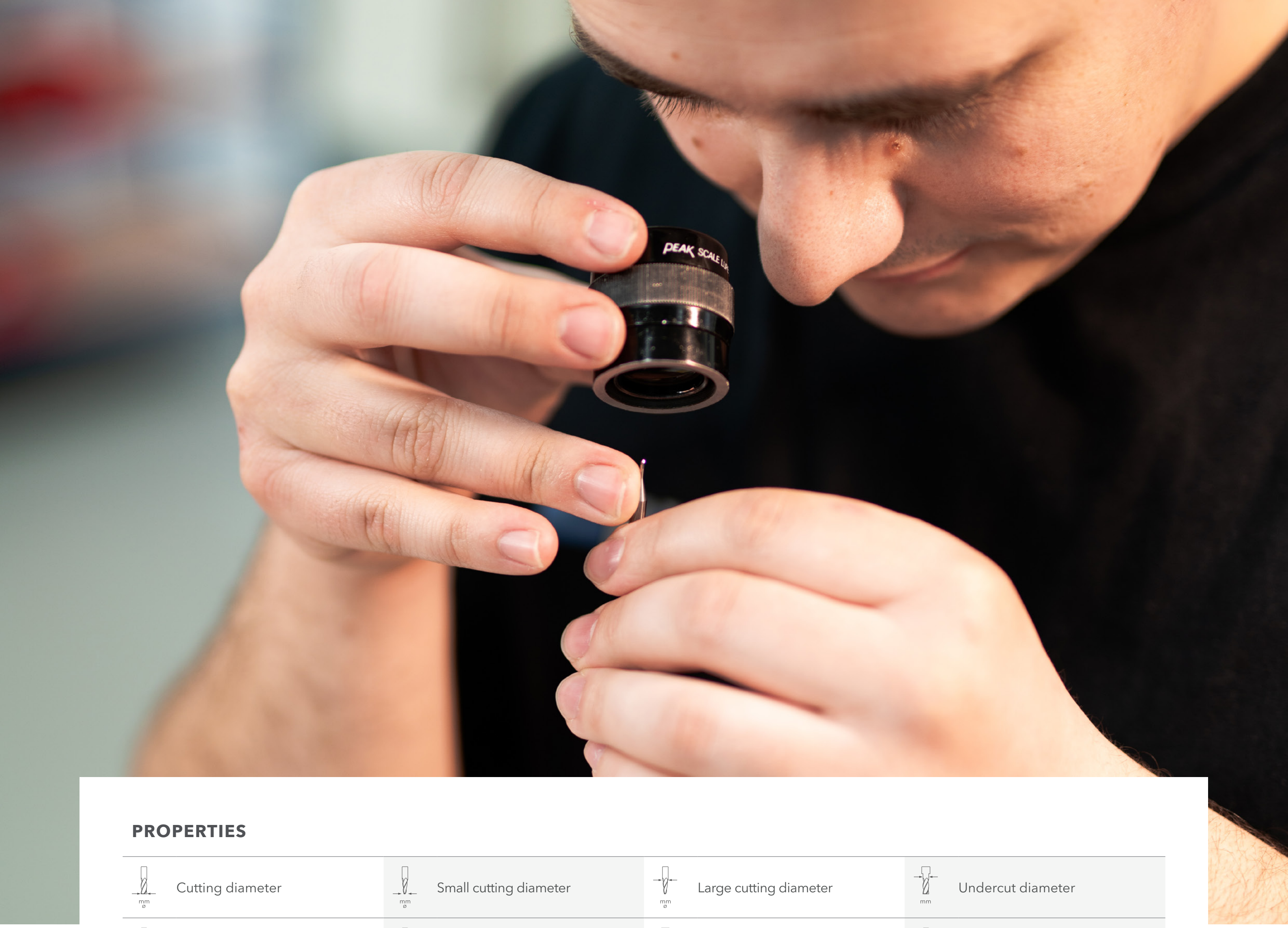
Air-cooling	Dry machining	Oil cooling	Cooling Lubricant
Minimum quantity lubrication			

FEATURES

0,5xD 0,5xD	1xD 1xD	1,5xD 1,5xD	2xD 2xD
2,5xD 2,5xD	3xD 3xD	3,5xD 3,5xD	4xD 4xD
5xD 5xD	Center cutting	Non-center cutting	HA Without Weldon
HB With Weldon	Internal cooling	Dynamic helical pitch	Chip breaker
≠ Unequal tooth pitch	Roughing teeth	Helical immersion	Feed directions x,y
Feed directions x, y, z	Feed directions x, y, (z)	R Corner radius	45° Corner bevel
90° Sharp edged			

STRATEGY

ETC Extended Trochoidal Cutting	HPC High Performance Cutting	HSC High Speed Cutting	MTC Multi Task Cutting
UNI Universal Machining			



PROPERTIES

Cutting diameter	Small cutting diameter	Large cutting diameter	Undercut diameter
Cutting length	Total bevel length	Undercut length	Total length
Shank diameter	Number of teeth	Corner radius	Corner bevel
Programming radius	Maximum cutting depth	Helical angle	Alpha angle

APPLICATION TABLE

The values given in the application table are only guidelines. These values are largely dependent on the machining situation and application.

FIGURES

All technical drawings and photographs are given as an example. The product may deviate from the original in terms of colour and dimensions.

S 2.1 TITANIUM | commercially pure <600 N/mm²

Materialnumber	Germany | DIN	Europe | EN	France | AFNOR	Great Britain | BS	Italy | UNI	Sweden | SIS	Spain | UNE	Japan | JIS	USA | AISI
3.7024	Ti 99,8								
3.7025	Ti 99,8	Titan Grade 1	AIR:9182T35	2 TA 1					R 50250
3.7034	TI 99,7								
3.7035	Ti 99,7	Titan Grade 2	AIR:9182T40	2 TA 2-1					R 50400
3.7036	SG-Ti 2								
3.7054	Ti 99,6								
3.7055	Ti-99,6	Titan Grade 3	AIR:9182T50	TA 3					R 50550
3.7064									
3.7065	Ti-99,5	Titan Grade 4	AIR:9182T60	2 TA 6-9					R 50700

S 2.2 TITANIUM | alloyed <1000 N/mm²

Materialnumber	Germany | DIN	Europe | EN	France | AFNOR	Great Britain | BS	Italy | UNI	Sweden | SIS	Spain | UNE	Japan | JIS	USA | AISI
3.7105	TiNi 0,8 Mo 0,3	Titan Grade 12							
3.7114	TiAl 5 Sn 2								
3.7115	TiAl 5 Sn 2,5	Titan Grade 6	T-A 5 E						Ti 5 Al-2,5 Sn
3.7124	Ti Cu 2								
3.7195	TiAl 3 V 2,5	Titan Grade 9							
3.7225	Ti 1 Pd	Titan Grade 11		TP 1					R 52250
3.7235	Ti 2 Pd	Titan Grade 7							T 52400
3.7255	Ti 3 Pd								

S 2.3 TITANIUM | alloyed <1400 N/mm²

Materialnumber	Germany | DIN	Europe | EN	France | AFNOR	Great Britain | BS	Italy | UNI	Sweden | SIS	Spain | UNE	Japan | JIS	USA | AISI
3.7110	TiAl 5 Fe 2,5								
3.7144	TiAl 6 Sn 2 Zr 4 Mo 2								
3.7145	TiAl 6 Sn2 Zr4 Mo2 Si								R 54620
3.7154	TiAl 6 Zr 5								
3.7155	TiAl 6 ZrMo 0,5			TA 43				TC 4	
3.7164	TiAl 6 V 4-LN	Titan Grade 5							R 56400
3.7165	TiAl 6 V4	Titan Grade 5	T-A 6 V	TA 10-13					
3.7174	TiAl 6 V 6 Sn 2-LN								
3.7175	TiAl 6 V 6 Sn 2								R 56620
3.7184	TiAl 4 Mo 4 Sn 2-LN								
3.7185	TiAl 4 Mo 4 Sn 2			TA 45-51					
3.7194	TiAl 5 V2,5								

Technical formulas

Calculate cutting speed (m/min)	$Vc = \frac{D * \pi * n}{1000}$
Calculate rotational speed (rpm)	$n = \frac{Vc * 1000}{D * \pi}$
Calculate feed rate (mm/min)	$Vf = n * z * fz$
Calculate feed per tooth (mm/number of teeth)	$fz = \frac{Vf}{n * z}$
Calculate chip removal rate (cm³/min)	$Q = \frac{ap * ae * Vf}{1000}$
Calculate average chip thickness (mm)	$hm = fz * \frac{\sqrt{ae}}{D}$

Explanation of terms

Vc	Cutting speed	in m/min
n	Rotational speed	in rpm
Vf	Feed rate	in mm/min
Fz	Feed per tooth	in mm/number of teeth
z	Number of teeth (cutting)	
ap	Depth of cut	in mm
ae	Width of cut	in mm
hm	Average chip thickness	in mm
Q	Chip removal rate	in cm^3/min
D	Diameter of tool	in mm