

Cooling



Tolerance

e8

Coating

AlphaFusion Violet X

Strategy

ETC

HPC

Application



Features

HB

≠

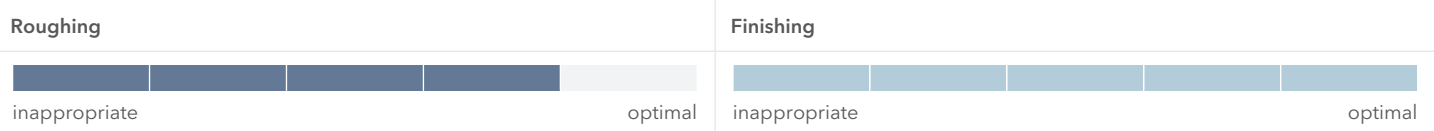
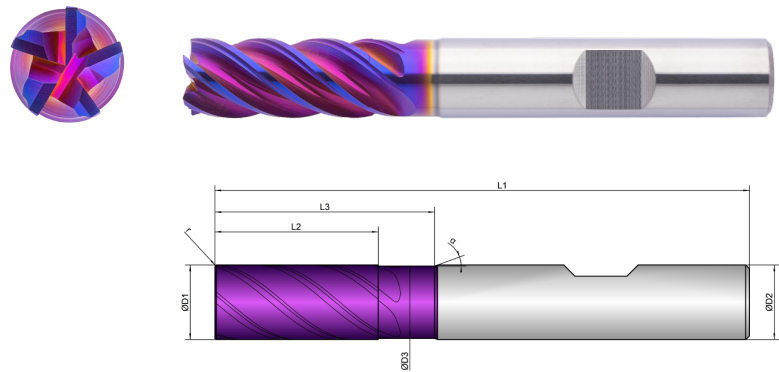
2xD







- 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



	D1	D3	L2	L3	L1	D2	z	r		α
K201693	 mm Ø	 mm Ø	 mm	 mm	 mm	 mm Ø	 #	 mm	 °	 °
6	6.0	5.8	13.0	19.0	57.0	6.0	5	0.10	40	20
8	8.0	7.7	19.0	25.0	63.0	8.0	5	0.20	40	20
10	10.0	9.7	22.0	30.0	72.0	10.0	5	0.20	40	20
12	12.0	11.6	26.0	36.0	83.0	12.0	5	0.20	40	20
16	16.0	15.5	36.0	42.0	92.0	16.0	5	0.30	40	20
20	20.0	19.5	41.0	52.0	104.0	20.0	5	0.30	40	20

			Dimension	Ø 6		Ø 8		Ø 10		Ø 12		Ø 16		Ø 20	
			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= 2xD	ap= 1xD	ap= 2xD	ap= 1xD	ap= 2xD	ap= 1xD	ap= 2xD	ap= 1xD	ap= 2xD	ap= 1xD	ap= 2xD
			Application												
Material	Strength (N/mm²)	Feed (mm/Z)	fz	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	0.026	0.037	0.032	0.047	0.039	0.059	0.045	0.07	0.055	0.08	0.065	0.1
2.3	alloyed	<1400	60	0.022	0.032	0.028	0.042	0.034	0.054	0.04	0.065	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

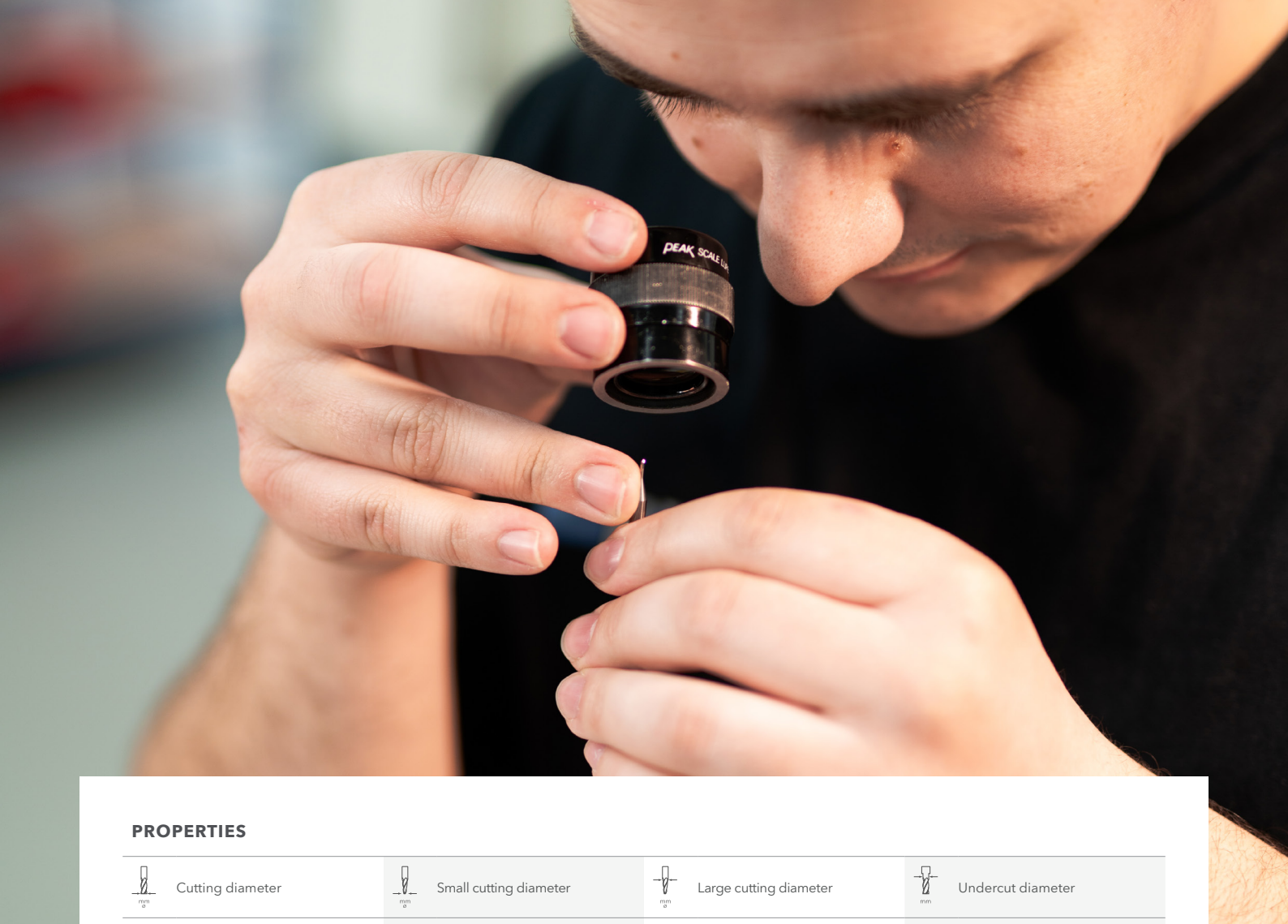
 Air-cooling	 Dry machining	 Oil cooling	 Cooling Lubricant
 Minimum quantity lubrication			

FEATURES

 0,5xD	 1xD	 1,5xD	 2xD
 2,5xD	 3xD	 3,5xD	 4xD
 5xD	 Center cutting	 Non-center cutting	 Without Weldon
 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)	 Corner radius	 Corner bevel
 Sharp edged			

STRATEGY

 Extended Trochoidal Cutting	 High Performance Cutting	 High Speed Cutting	 Multi Task Cutting
 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.

§ 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

§ 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								

§ 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)

$$V_c = \frac{D \cdot \pi \cdot n}{1000}$$

Calculate
rotational speed (rpm)

$$n = \frac{V_c \cdot 1000}{D \cdot \pi}$$

Calculate feed rate
(mm/min)

$$V_f = n \cdot z \cdot f_z$$

Calculate feed per tooth
(mm/number of teeth)

$$f_z = \frac{V_f}{n \cdot z}$$

Calculate chip removal rate
(cm³/min)

$$Q = \frac{a_p \cdot a_e \cdot V_f}{1000}$$

Calculate average
chip thickness (mm)

$$h_m = f_z \cdot \frac{\sqrt{a_e}}{D}$$

Explanation of terms

V_c	Cutting speed	in m/min
n	Rotational speed	in rpm
V_f	Feed rate	in mm/min
F_z	Feed per tooth	in mm/number of teeth
z	Number of teeth (cutting)	
a_p	Depth of cut	in mm
a_e	Width of cut	in mm
h_m	Average chip thickness	in mm
Q	Chip removal rate	in cm³/min
D	Diameter of tool	in mm