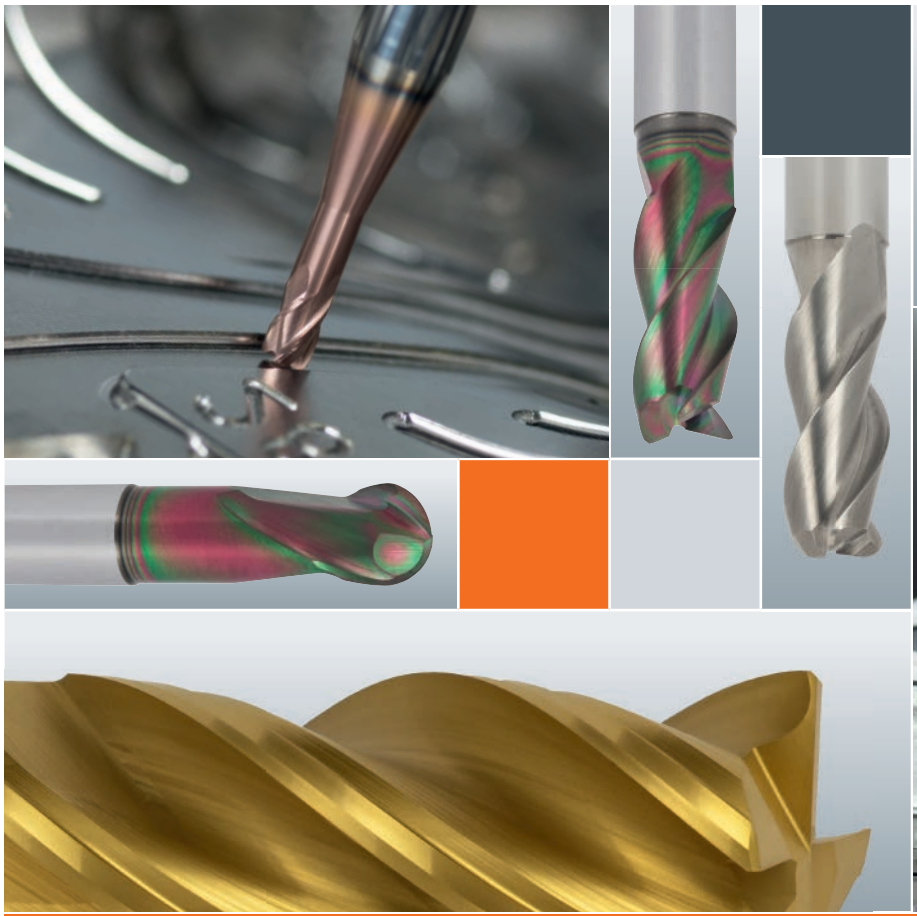
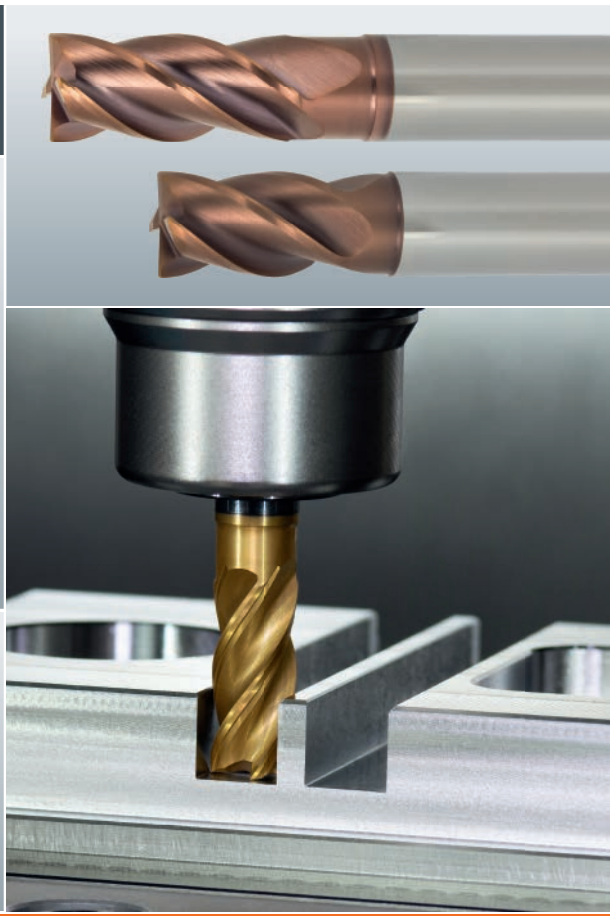
EMUGE FRANKEN

1920-2020

Made in Germany



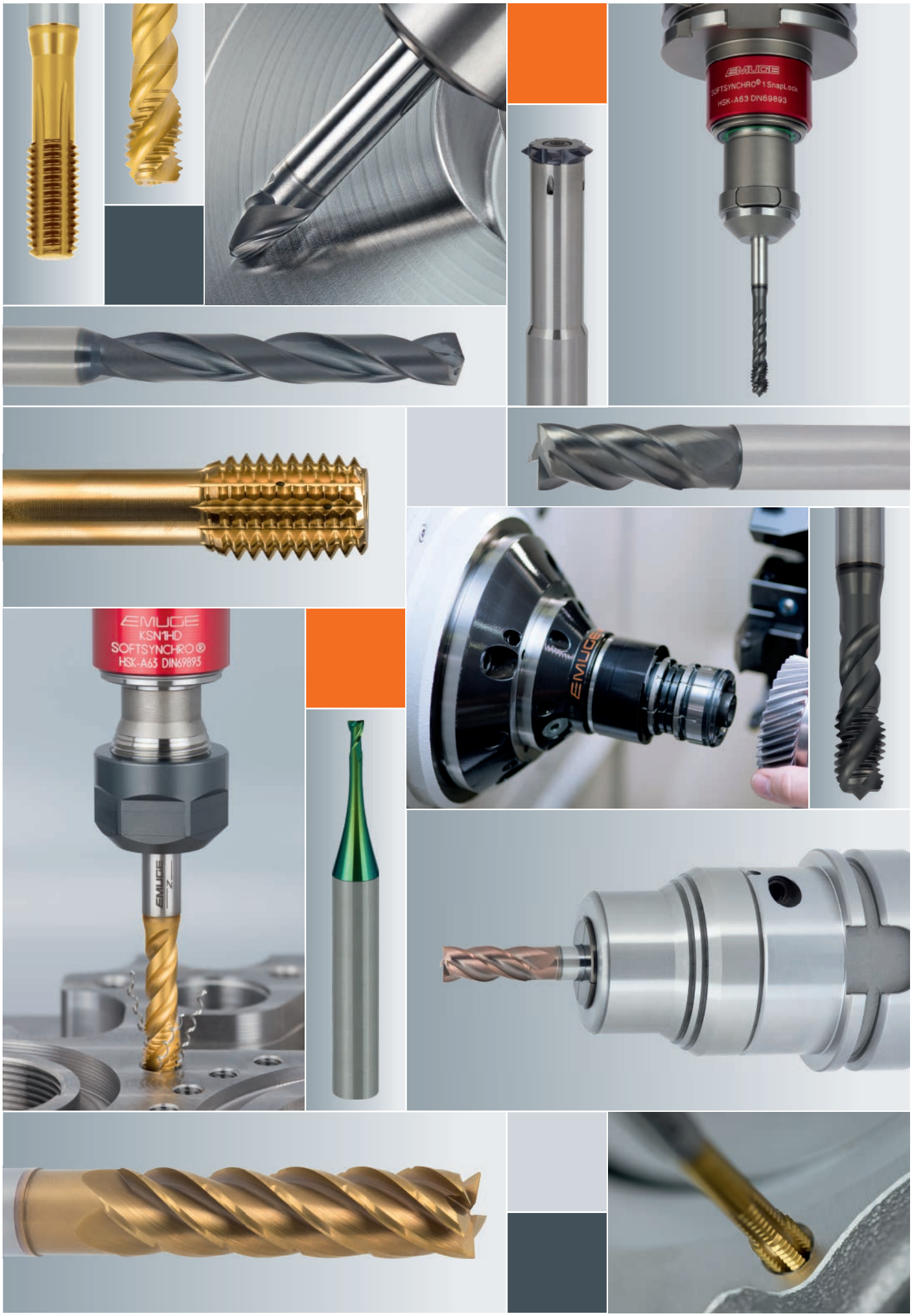


SELECTION Milling F04

valid until 31.03.2021

FRANKEN

Economical Tools for Milling


EMUGE
SOFTSYNCHRO® 1 SnapLock
HSK-A63 DIN69893
EMUGE
KSN1HD
SOFTSYNCHRO®
HSK-A63 DIN69893
EMUGE

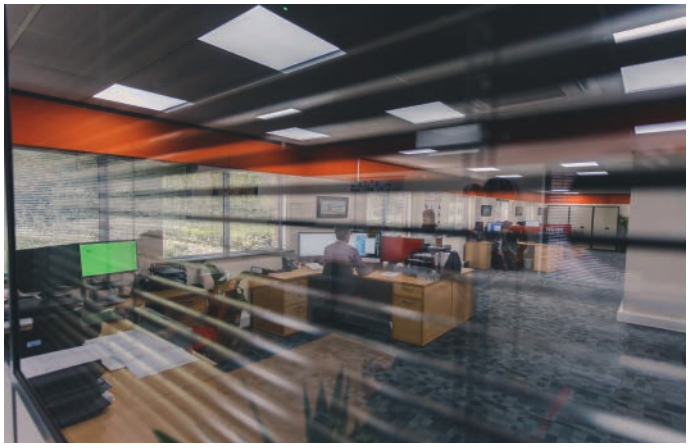
EMUGE-FRANKEN UK Ltd.

EMUGE-FRANKEN UK are the UK subsidiary of EMUGE-FRANKEN Germany. We have ben established in Rotherham for over 30 years.
Part of the EMUGE-FRANKEN group, which has 100 years' experience in the development and production of precision tools for the machining industry.

We particularly specialise in threading technology, thread milling technology, gauging technology, milling technology, tool clamping / holding and work piece clamping.

- We have a full UK distributor network, who will be happy to deal with your enquiries.
- We have a full range of literature available including electronic content for all your tooling requirements.
- We can offer sales / product training on our range both in house in Rotherham and Germany, and also if required, at your premises.
- We attend trade fairs / exhibitions throughout the world and look forward to welcoming you on our stand.
- We offer a full next day delivery service of goods direct from Germany by DHL to either you or your customers direct.
- We also have a small selection of standard items in stock in Rotherham for collection or for next day delivery.

Please call us or email us for full details.



EMUGE-FRANKEN in GERMANY – A company association with 100 years of experience

EMUGE develops and produces precision tools for the machining industry. Custom-made solutions in the thread cutting and in the thread milling technology form the center of our business.

The most modern production facilities and an extensive checking and testing system guarantee the high quality of our products.

This, of course, goes also for our programme of precision clamping tools. Only the right choice of a high-precision tap holder or tapping attachment makes it possible to maximise the efficiency of our machining tools.

Our newly developed twist drills and a comprehensive programme of thread gauges complete our product range.

Ever since its foundation, **FRANKEN** has been developing and manufacturing milling tools. As a result, the company today offers a very wide range of solid carbide and HSS end mills as well as milling cutters with inserts.

Our products include end mills, slot drills, die-sinking end mills, shell end mills, gear cutters, and even the most sophisticated special profile milling cutters.

With this large variety of tool types and cutting materials, consistently high standards and uncompromising precision, our product range of milling cutters meets even the highest quality requirements.

In addition to our selection of cutting tools, we also offer a comprehensive range of clamping systems, tool holders and accessories.

Our Technical Service Department provides application-based consulting services and we also offer support to customers in developing modern milling strategies using our own machines in the R&D Department.

Please note:
The suitability of the milling cutters is indicated as follows:

- ■ = Milling cutter is very suitable
- □ = Milling cutter is suitable

Please find the cutting conditions on pages 32 - 43.

FRANKEN TOP-Cut

Solid carbide end mills

				Allround	**Allround**	**Allround**	**Allround**	**Allround**
				N	**N**	**N**	**N**	**N**
				1.5 - 20 mm	2 - 20 mm	3 - 20 mm	3 - 25 mm	3 - 20 mm
			Flutes	3	3	4	4 - 6	4 - 5
				2516A	**2518A**	**1916A**	**1998A**	**2526A**
				2517A	**2519A**	**1917A**	**1999A**	**2527A**
			Page	10	10	11	11	12
			v_c / f_z	32	33	32	33	34
P		**Steel materials**								
	1.1	Cold-extrusion steels, Construction steels, Free-cutting steels, etc.	≤ 600 N/mm²	■	■	■	■	■
	2.1	Construction steels, Cementation steels, Steel castings, etc.	≤ 800 N/mm²	■	■	■	■	■
	3.1	Cementation steels, Heat-treatable steels, Cold work steels, etc.	≤ 1000 N/mm²	■	■	■	■	■
	4.1	Heat-treatable steels, Cold work steels, Nitriding steels, etc.	≤ 1200 N/mm²	■	■	■	■	■
	5.1	High-alloyed steels, Cold work steels, Hot work steels, etc.	≤ 1400 N/mm²	■	■	■	■	■
M		**Stainless steel materials**						
	1.1	Ferritic, martensitic	≤ 950 N/mm²	■	■	■	■	■
	2.1	Austenitic	≤ 950 N/mm²	■	■	■	■	■
	3.1	Austenitic-ferritic (Duplex)	≤ 1100 N/mm²	■	■	■	■	■
	4.1	Austenitic-ferritic heat-resistant (Super Duplex)	≤ 1250 N/mm²	■	■	■	■	■
K		**Cast materials**						
	1.1	Cast iron with lamellar graphite (GJL)	100-250 N/mm²	■	■	■	■	■
	1.2		250-450 N/mm²	■	■	■	■	■
	2.1	Cast iron with nodular graphite (GJS)	350-500 N/mm²	■	■	■	■	■
	2.2		500-900 N/mm²	■	■	■	■	■
	3.1	Cast iron with vermicular graphite (GJV)	300-400 N/mm²	■	■	■	■	■
	3.2		400-500 N/mm²	■	■	■	■	■
	4.1	Malleable cast iron (GTMW, GTMB)	250-500 N/mm²	■	■	■	■	■
	4.2		500-800 N/mm²	■	■	■	■	■
N		**Non-ferrous materials**						
		Aluminium alloys						
	1.1	Aluminium wrought alloys	≤ 200 N/mm²	■	■			■
	1.2		≤ 350 N/mm²	■	■	■	■	■
	1.3		≤ 550 N/mm²	■	■	■	■	■
	1.4	Aluminium cast alloys	Si ≤ 7%	■	■	■	■	■
	1.5		7% < Si ≤ 12%					□
	1.6		12% < Si ≤ 17%					□
		Copper alloys						
	2.1	Pure copper, low-alloyed copper	≤ 400 N/mm²	■	■	■	■	■
	2.2	Copper-zinc alloys (brass, long-chipping)	≤ 550 N/mm²	■	■	■	■	■
	2.3	Copper-zinc alloys (brass, short-chipping)	≤ 550 N/mm²	■	■	■	■	■
	2.4	Copper-aluminium alloys (alu bronze, long-chipping)	≤ 800 N/mm²	■	■	■	■	■
	2.5	Copper-tin alloys (tin bronze, long-chipping)	≤ 700 N/mm²	■	■	■	■	■
	2.6	Copper-tin alloys (tin bronze, short-chipping)	≤ 400 N/mm²	■	■	■	■	■
	2.7	Special copper alloys	≤ 600 N/mm²	■	■	■	■	■
	2.8		≤ 1400 N/mm²	■	■	■	■	■
		Magnesium alloys						
	3.1	Magnesium wrought alloys	≤ 500 N/mm²			■	■	
	3.2	Magnesium cast alloys	≤ 500 N/mm²			■	■	
		Synthetics						
	4.1	Duroplastics (short-chipping)		□	□	■	■	
	4.2	Thermoplastics (long-chipping)		□	□			
	4.3	Fibre-reinforced synthetics (fibre content ≤ 30%)						
	4.4	Fibre-reinforced synthetics (fibre content > 30%)						
		Special materialsv						
	5.1	Graphite						
	5.2	Tungsten-copper alloys		■	■	■	■	■
	5.3	Composite materials						
S		**Special materials**						
		Titanium alloys						
	1.1	Pure titanium	≤ 450 N/mm²	■	■	■	■	■
	1.2	Titanium alloys	≤ 900 N/mm²	□	□	■	■	■
	1.3		≤ 1250 N/mm²	□	□	■	■	■
		Nickel alloys, cobalt alloys and iron alloys						
	2.1	Pure nickel	≤ 600 N/mm²	■	■	■	■	□
	2.2	Nickel-base alloys	≤ 1000 N/mm²	□	□	■	■	□
	2.3		≤ 1600 N/mm²	□	□	■	■	□
	2.4	Cobalt-base alloys	≤ 1000 N/mm²	□	□	■	■	□
	2.5		≤ 1600 N/mm²	□	□	■	■	□
	2.6	Iron-base alloys	≤ 1500 N/mm²	□	□	■	■	□
H		**Hard materials**						
	1.1	High strength steels, hardened steels, hard castings	44 - 50 HRC	■	■	■	■	
	1.2		50 - 55 HRC	■	■	□	□	
	1.3		55 - 60 HRC			□	□	
	1.4		60 - 63 HRC					
	1.5		63 - 66 HRC					

FRANKEN TOP-Cut

Solid carbide end mills



FRANKEN TOP-Cut

Solid carbide ball nose end mills




	Allround	**Allround**	**Allround**	**Allround**	**Allround**	**Allround**	**Allround**	**Allround**	
	N	**N**	**N**	**N**	**N**	**N**	**N**	**N**	
	6 - 20 mm	3 - 20 mm	5 - 20 mm	6 - 20 mm	0.5 - 12 mm	1 - 12 mm	2 - 16 mm	6 - 16 mm	
	4 - 5	4	6 - 8	6 - 8	2	2	3 - 4	4	Flutes
	2528A	**2698A**	**2522A**	**2524A**	**2550A**	**2551A**	**2502A**	**2504A**	
	2529A	**2699A**	**2523A**	**2525A**	**–**	**–**	**–**	**–**	
	12	13 - 14	15	15	16	16	17	17	Page
	34	33	33	34	35	35	36	36	v_c / f_z
	■	■	■	■	■	■	■	■	1.1 P
	■	■	■	■	■	■	■	■	2.1 P
	■	■	■	■	■	■	■	■	3.1 P
	■	■	■	■	■	■	■	■	4.1 P
	■	■	■	■	■	■	■	■	5.1 P
	■	■	■	■	■	■	■	■	1.1 M
	■	■	■	■	■	■	■	■	2.1 M
	■	■	□	□	■	■	□	□	3.1 M
	■	■	□	□	■	■	□	□	4.1 M
	■	■	■	■	■	■	■	■	1.1 K
	■	■	■	■	■	■	■	■	1.2 K
	■	■	■	■	■	■	■	■	2.1 K
	■	■	□	□	■	■	■	■	2.2 K
	■	■	■	■	■	■	□	□	3.1 K
	■	■	■	■	■	■	□	□	3.2 K
	■	■	■	■	■	■	□	□	4.1 K
	■	■	□	□	■	■	□	□	4.2 K
	■		■	■					1.1 N
	■	■	■	■	□	□			1.2 N
	■	■	■	■	□	□			1.3 N
	■	■	■	■	□	□			1.4 N
	□			□					1.5 N
	□			□					1.6 N
	■	■	■	■	■	■	■	■	2.1 N
	■	■	■	■	■	■	■	■	2.2 N
	■	■	■	■	■	■	■	■	2.3 N
	■	■	■	■	■	■	■	■	2.4 N
	■	■	■	■	■	■	■	■	2.5 N
	■	■	■	■	■	■	■	■	2.6 N
	■	■	■	■	■	■	■	■	2.7 N
	■	■	■	■	■	■	■	■	2.8 N
		■	■						3.1 N
		■	■						3.2 N
		■	□				■	■	4.1 N
			□				■	■	4.2 N
									4.3 N
									4.4 N
									5.1 N
	■	■	□	□	■	■	■	■	5.2 N
							■	■	5.3 N
	■	■	■	■			□	□	1.1 S
	■	■	■	■			□	□	1.2 S
	■	■	■	■			□	□	1.3 S
	□	■	■	■	■	■	□	□	2.1 S
	□	■	■	■	■	■	□	□	2.2 S
	□	■	□	□	■	■	□	□	2.3 S
	□	■	■	■	□	□	□	□	2.4 S
	□	■	□	□	□	□	□	□	2.5 S
	□	■	□	□	□	□	□	□	2.6 S
		■	□		■	■			1.1 H
		□			■	■			1.2 H
		□							1.3 H
									1.4 H
									1.5 H

■ = very suitable
□ = suitable

Please note:
The suitability of the milling cutters is indicated as follows:

- ■ = Milling cutter is very suitable
- □ = Milling cutter is suitable

Please find the cutting conditions on pages 34 - 39.

				FRANKEN TOP-Cut Solid carbide torus end mills				FRANKEN TOP-Cut HSS End mills	
									
				Allround	Allround	Allround	Allround	Allround	Allround
				N	N	N	N	HR	HR
				0.5 - 12 mm	1 - 12 mm	3 - 12 mm	3 - 12 mm	6 - 20 mm	4 - 50 mm
			Flutes	2	2	4	4	4	3 - 8
				2552A	2553A	2554A	2555A	–	–
				–	–	–	–	1351C	1381C
			Page	18	19	20	21	22	22
			v_c / f_z	37	37	38	38	39	39
P		**Steel materials**							
	1.1	Cold-extrusion steels, Construction steels, Free-cutting steels, etc.	≤ 600 N/mm²	■	■	■	■	■	■
	2.1	Construction steels, Cementation steels, Steel castings, etc.	≤ 800 N/mm²	■	■	■	■	■	■
	3.1	Cementation steels, Heat-treatable steels, Cold work steels, etc.	≤ 1000 N/mm²	■	■	■	■	■	■
	4.1	Heat-treatable steels, Cold work steels, Nitriding steels, etc.	≤ 1200 N/mm²	■	■	■	■	□	□
	5.1	High-alloyed steels, Cold work steels, Hot work steels, etc.	≤ 1400 N/mm²	■	■	■	■	□	□
M		**Stainless steel materials**							
	1.1	Ferritic, martensitic	≤ 950 N/mm²	■	■	■	■	■	■
	2.1	Austenitic	≤ 950 N/mm²	■	■	■	■	□	□
	3.1	Austenitic-ferritic (Duplex)	≤ 1100 N/mm²	■	■			□	□
	4.1	Austenitic-ferritic heat-resistant (Super Duplex)	≤ 1250 N/mm²	■	■			□	□
K		**Cast materials**							
	1.1	Cast iron with lamellar graphite (GJL)	100-250 N/mm²	■	■	■	■	■	■
	1.2		250-450 N/mm²	■	■	■	■	■	■
	2.1	Cast iron with nodular graphite (GJS)	350-500 N/mm²	■	■	■	■	■	■
	2.2		500-900 N/mm²	■	■	■	■	□	□
	3.1	Cast iron with vermicular graphite (GJV)	300-400 N/mm²	■	■	■	■	□	□
	3.2		400-500 N/mm²	■	■	■	■	□	□
	4.1	Malleable cast iron (GTMW, GTMB)	250-500 N/mm²	■	■	■	■	■	■
	4.2		500-800 N/mm²	■	■	■	■	□	□
N		**Non-ferrous materials**							
		Aluminium alloys							
	1.1	Aluminium wrought alloys	≤ 200 N/mm²						
	1.2		≤ 350 N/mm²	□	□				
	1.3		≤ 550 N/mm²	□	□				
	1.4	Aluminium cast alloys	Si ≤ 7%	□	□				
	1.5		7% < Si ≤ 12%						
	1.6		12% < Si ≤ 17%						
		Copper alloys							
	2.1	Pure copper, low-alloyed copper	≤ 400 N/mm²	■	■	□	□	■	■
	2.2	Copper-zinc alloys (brass, long-chipping)	≤ 550 N/mm²	■	■	■	■	□	□
	2.3	Copper-zinc alloys (brass, short-chipping)	≤ 550 N/mm²	■	■	■	■	□	□
	2.4	Copper-aluminium alloys (alu bronze, long-chipping)	≤ 800 N/mm²	■	■	■	■	□	□
	2.5	Copper-tin alloys (tin bronze, long-chipping)	≤ 700 N/mm²	■	■	■	■	□	□
	2.6	Copper-tin alloys (tin bronze, short-chipping)	≤ 400 N/mm²	■	■	■	■	□	□
	2.7	Special copper alloys	≤ 600 N/mm²	■	■	■	■		
	2.8		≤ 1400 N/mm²	■	■	■	■		
		Magnesium alloys							
	3.1	Magnesium wrought alloys	≤ 500 N/mm²						
	3.2	Magnesium cast alloys	≤ 500 N/mm²						
		Synthetics							
	4.1	Duroplastics (short-chipping)							
	4.2	Thermoplastics (long-chipping)							
	4.3	Fibre-reinforced synthetics (fibre content ≤ 30%)							
	4.4	Fibre-reinforced synthetics (fibre content > 30%)							
		Special materialsv							
	5.1	Graphite							
	5.2	Tungsten-copper alloys		■	■	■	■	□	□
	5.3	Composite materials							
S		**Special materials**							
		Titanium alloys							
	1.1	Pure titanium	≤ 450 N/mm²			■	■	□	□
	1.2	Titanium alloys	≤ 900 N/mm²			■	■	□	□
	1.3		≤ 1250 N/mm²			■	■		
		Nickel alloys, cobalt alloys and iron alloys							
	2.1	Pure nickel	≤ 600 N/mm²	■	■	■	■	□	□
	2.2	Nickel-base alloys	≤ 1000 N/mm²	■	■	■	■	□	□
	2.3		≤ 1600 N/mm²	■	■	■	■		
	2.4	Cobalt-base alloys	≤ 1000 N/mm²	□	□	■	■		
	2.5		≤ 1600 N/mm²	□	□	■	■		
	2.6	Iron-base alloys	≤ 1500 N/mm²	□	□	■	■		
H		**Hard materials**							
	1.1	High strength steels, hardened steels, hard castings	44 - 50 HRC	■	■	■	■		
	1.2		50 - 55 HRC	■	■	■	■		
	1.3		55 - 60 HRC						
	1.4		60 - 63 HRC						
	1.5		63 - 66 HRC						

FRANKEN

	FRANKEN Alu-Cut Solid carbide end mills				FRANKEN Alu-Cut Solid carbide ball nose end mills	FRANKEN TiNox-Cut Solid carbide end mills		
								
	Al	**Al/Cu**	**Al**	**Al/Cu**	**Al/Cu**	**Inox**	**Inox**	
	W	**W**	**W**	**W**	**W**	**N**	**N**	
	2 - 20 mm	2 - 20 mm	6 - 20 mm	6 - 20 mm	0.5 - 12 mm	3 - 20 mm	3 - 20 mm	
	2 - 3	2 - 3	3	3	2	4	4	Flutes
	2544	**2544K**	**2546**	**2546K**	**2452K**	**2566T**	**2568T**	
	2545	**2545K**	**2547**	**2547K**	**–**	**2567T**	**2569T**	
	24	24	25	25	26	28	29	Page
	40	40	40	40	41	42	43	v_c / f_z
						■	■	1.1 P
						■	■	2.1
						■	■	3.1
						□	□	4.1
						□	□	5.1
						■	■	1.1 M
						■	■	2.1
						■	■	3.1
						■	■	4.1
						■	■	1.1 K
						■	■	1.2
						■	■	2.1
						■	■	2.2
						□	□	3.1
						□	□	3.2
						□	□	4.1
						□	□	4.2
	■	■	■	■	■	■	■	1.1 N
	■	■	■	■	■	■	■	1.2
	■	■	■	■	■	■	■	1.3
	□	■	□	■	■			1.4
								1.5
								1.6
		□		□	■	■	■	2.1
		□		□	■	■	■	2.2
		□		□	■	■	■	2.3
		□		□	□	■	■	2.4
		□		□	□	■	■	2.5
		□		□	□	■	■	2.6
		□		□	□	■	■	2.7
					□	■	■	2.8
					■			3.1
					■			3.2
					■			4.1
					■			4.2
					■			4.3
					■			4.4
								5.1
						□	□	5.2
					■			5.3
					■	■	■	1.1 S
					■	□	□	1.2
					■	□	□	1.3
					■	■	■	2.1
					□	□	□	2.2
					□	□	□	2.3
						□	□	2.4
						□	□	2.5
						□	□	2.6
						■	■	1.1 H
						□	□	1.2
								1.3
								1.4
								1.5

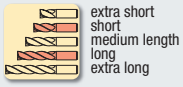
■ = very suitable
□ = suitable

The FRANKEN Catalogue 250 provides an overview of the following product groups including all related technical information

- Solid carbide end mills and slot drills
- Solid carbide ball nose and torus end mills
- PCD, CBN and diamond coated end mills
- Circle segment and solid carbide tapered end mills
- Indexable milling cutters and end mills
- HSS end mills and slot drills
- HSS and solid carbide form end mills
- Milling cutters with bore
- Clamping systems, tool holders and accessories

Description of the symbols

Constructional length



The relevant length is marked in red.

Shank design

The shank designs to be found on the respective page are marked in grey.

Shank design for metric tools

Helix angle

The helix angle of these tools is shown. If there are variable helix angles, these are all shown.

Chip breaker

Depending on form (e.g. round or flat) and size (coarse, medium, fine) of the chip breakers these end mills generate appropriate milling marks.

Cutting material

Solid carbide

High speed steel

Cutting conditions

The cutting conditions and work parameters for these tools are to be found on the page number given in the symbol.

Cutting edge design and face geometry

Bevelled edge

Corner radius

Ball nose

Torus

Coolant and lubrication

Dry machining

Cold-air nozzle

Minimum-quantity lubrication

Emulsion

Feed direction

The red arrows mark the recommended feed directions of the respective cutters.

Ramping angle

The specified angle is the recommended angle for ramping applications.

Hard milling

These tools are suitable for hard milling. The hardness range or the maximum hardness of the material to be machined is indicated in Rockwell (HRC).

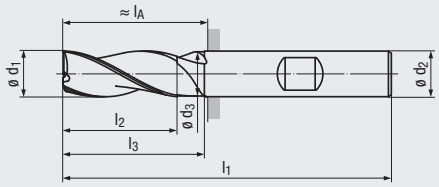
FRANKEN TOP-Cut

TOP-Cut tools are versatile end mills made from solid carbide or HSS which can be used in nearly all materials and milling strategies due to their special geometry properties.

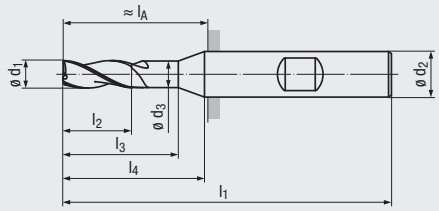
Characteristics:
- Patented neck design
- Short, stable cutting part
- High-performance coating
- Available from cutting diameter 0.2 mm

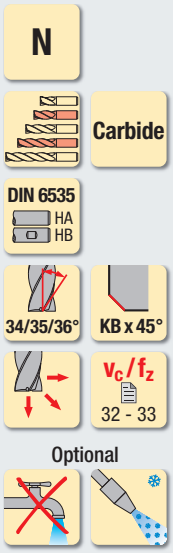
Main feature:
Versatile use.

Available tools:
- Solid carbide end mills
- Solid carbide ball nose end mills
- Solid carbide torus end mills
- CBN ball nose end mills
- CBN torus end mills



Design l_4:





Allround | **Allround**

Coating: TIALN | TIALN

P	1.1-5.1	
M	1.1-4.1	
K	1.1-4.2	
N	1.1-1.4	
N	2.1-2.8, 5.2	4.1-4.2
S	1.1	1.2-1.3
S	2.1	2.2-2.6
H	1.1-1.2	

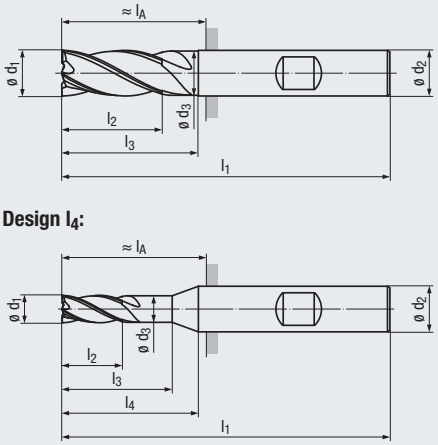
- Multi-functional. high performance tool
- Newly developed geometry
- Low-vibration machining
- Centre cutting
- For almost all materials
- Suitable for roughing and finishing

DIN 6527 – Short design

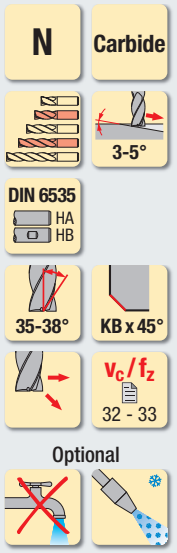
Order code											2516A	2517A		
ø d_1 h10	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h5	l_A	KB	Flutes	Dimens. Code	£	£		
1.5	3	–	50	–	14	6	14	0.04	**3**	**.0015**	18.36	18.38		
2	3	5	50	1.9	14	6	14	0.04	**3**	**.002**	16.35	16.35		
2.5	3	5	50	2.4	14	6	14	0.07	**3**	**.0025**	17.82	17.82		
2.8	4	7	50	2.7	14	6	14	0.07	**3**	**.0028**	19.18	19.18		
3	4	7	50	2.9	14	6	14	0.07	**3**	**.003**	15.90	15.90		
3.5	4	7	50	3.3	14	6	14	0.07	**3**	**.0035**	17.82	17.82		
3.8	5	9	54	3.6	18	6	18	0.07	**3**	**.0038**	18.73	18.73		
4	5	9	54	3.8	18	6	18	0.07	**3**	**.004**	15.90	15.90		
4.5	5	9	54	4.3	18	6	18	0.12	**3**	**.0045**	17.82	17.82		
4.8	6	11	54	4.6	18	6	18	0.12	**3**	**.0048**	18.73	18.73		
5	6	11	54	4.8	18	6	18	0.12	**3**	**.005**	15.57	15.57		
5.5	7	12	54	5.3	18	6	18	0.12	**3**	**.0055**	15.57	15.57		
5.75	7	16	54	5.55	18	6	18	0.12	**3**	**.00575**	17.03	17.03		
6	7	16	54	5.8	–	6	18	0.12	**3**	**.006**	14.78	15.57		
7.75	9	18	58	7.45	20	8	22	0.12	**3**	**.00775**	24.92	24.92		
8	9	20	58	7.7	–	8	22	0.12	**3**	**.008**	21.44	21.44		
9.7	11	22	66	9.4	24	10	26	0.2	**3**	**.0097**	32.04	32.04		
10	11	24	66	9.5	–	10	26	0.2	**3**	**.010**	27.98	27.98		
11.7	12	24	73	11.2	26	12	28	0.2	**3**	**.0117**	45.91	45.91		
12	12	26	73	11.5	–	12	28	0.2	**3**	**.012**	39.70	39.70		
16	16	32	82	15.5	–	16	34	0.2	**3**	**.016**	72.75	72.75		
20	20	40	92	19.5	–	20	42	0.3	**3**	**.020**	121.15	121.15		

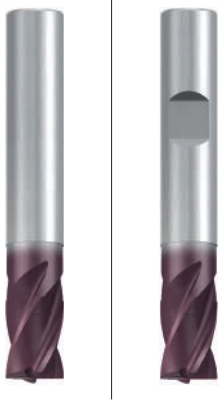
DIN 6527 – Long design

Order code													2518A	2519A
ø d_1 h10	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h5	l_A	KB	Flutes	Dimens. Code			£	£
2	6	8	57	1.9	20	6	21	0.04	**3**	**.002**			19.18	19.18
3	7	10	57	2.9	20	6	21	0.07	**3**	**.003**			18.73	18.73
4	8	12	57	3.8	20	6	21	0.07	**3**	**.004**			18.73	18.73
5	10	15	57	4.8	20	6	21	0.12	**3**	**.005**			18.73	18.73
6	10	20	57	5.8	–	6	21	0.12	**3**	**.006**			16.70	16.70
7	13	23	63	6.7	25	8	27	0.12	**3**	**.007**			27.98	27.98
8	16	25	63	7.7	–	8	27	0.12	**3**	**.008**			24.92	24.92
10	19	30	72	9.5	–	10	32	0.2	**3**	**.010**			31.69	31.69
12	22	35	83	11.5	–	12	38	0.2	**3**	**.012**			45.46	45.46
16	26	40	92	15.5	–	16	44	0.2	**3**	**.016**			83.14	83.14
20	32	50	104	19.5	–	20	54	0.3	**3**	**.020**			139.42	139.42



Design l_4:





Allround

Allround

Coating

TIALN

P	1.1-5.1	
M	1.1-4.1	
K	1.1-4.2	
N	1.2-1.4	
N	2.1-4.1, 5.2	
S	1.1-2.6	
H	1.1	1.2-1.3

TIALN

P	1.1-5.1	
M	1.1-4.1	
K	1.1-4.2	
N	1.2-1.4	
N	2.1-4.1, 5.2	
S	1.1-2.6	
H	1.1	1.2-1.3

- Multi-functional, high performance tool
- With Enorm geometry
- Low-vibration machining
- Centre cutting
- 3 lengths available

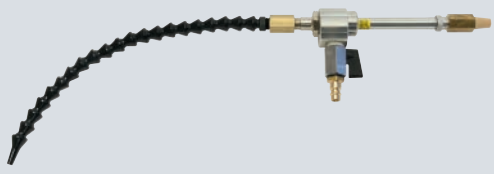
- For almost all materials
- Suitable for roughing and finishing

DIN 6527 – Short design

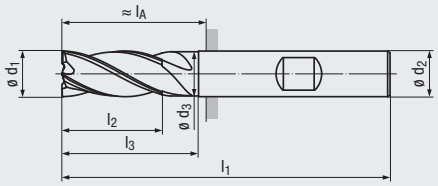
Order code											1916A	1917A		
ø d_1 h10	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h6	l_A	KB	Flutes	Dimens. Code	£	£		
3	5	9	50	2.9	14	6	14	0.07	**4**	**.003**	19.85	19.85		
4	8	12	54	3.8	18	6	18	0.07	**4**	**.004**	19.52	19.52		
5	9	16	54	4.8	18	6	18	0.07	**4**	**.005**	19.52	19.52		
6	10	16	54	5.8	–	6	18	0.12	**4**	**.006**	18.38	18.38		
8	12	20	58	7.7	–	8	22	0.12	**4**	**.008**	27.53	27.53		
10	15	24	66	9.5	–	10	26	0.2	**4**	**.010**	36.32	36.32		
12	18	26	73	11.5	–	12	28	0.2	**4**	**.012**	49.30	49.30		
16	24	32	82	15.5	–	16	34	0.2	**4**	**.016**	78.05	78.05		
18	27	34	84	17.5	–	18	36	0.2	**4**	**.018**	101.86	101.86		
20	30	40	92	19.5	–	20	42	0.3	**4**	**.020**	121.15	121.15		

DIN 6527 – Long design

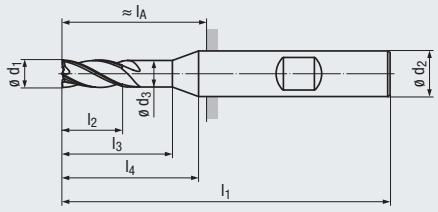
Order code													1998A	1999A
ø d_1 h10	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h6	l_A	KB	Flutes	Dimens. Code			£	£
3	8	14	57	2.9	20	6	21	0.07	**4**	**.003**			21.77	21.77
4	11	18	57	3.8	20	6	21	0.07	**4**	**.004**			21.44	21.44
5	13	19	57	4.8	20	6	21	0.12	**4**	**.005**			20.64	20.64
6	13	20	57	5.8	–	6	21	0.12	**4**	**.006**			19.85	19.85
7	19	23	63	6.8	25	8	27	0.12	**4**	**.007**			30.90	30.90
8	19	25	63	7.7	–	8	27	0.12	**4**	**.008**			30.90	30.90
9	22	28	72	8.7	30	10	32	0.2	**4**	**.009**			40.50	40.50
10	22	30	72	9.5	–	10	32	0.2	**4**	**.010**			40.50	40.50
11	26	32	83	10.5	35	12	38	0.2	**4**	**.011**			55.84	52.23
12	26	35	83	11.5	–	12	38	0.2	**4**	**.012**			50.09	50.09
14	26	35	83	13.5	–	14	38	0.2	**4**	**.014**			67.23	67.23
15	32	38	92	14.5	40	16	44	0.2	**4**	**.015**			82.79	82.79
16	32	40	92	15.5	–	16	44	0.2	**4**	**.016**			82.79	82.79
18	32	50	100	17.5	–	18	52	0.2	**4**	**.018**			110.09	110.09
20	38	50	104	19.5	–	20	54	0.3	**4**	**.020**			130.85	130.85
25	45	65	125	24.5	–	25	69	0.3	**6**	**.025**			205.45	205.45

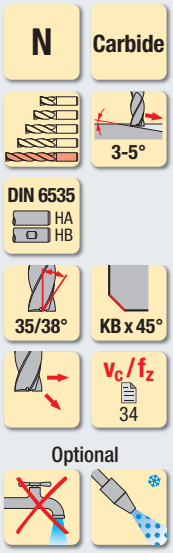


Cold-air nozzle and socket with magnetic shoe, see page 30 - 31



Design l_4:





Allround | **Allround**

Coating | TIALN | TIALN

- Multi-functional, high performance tool
- With Enorm geometry
- Low-vibration machining
- Centre cutting
- 3 lengths available
- For almost all materials
- Suitable for roughing and finishing

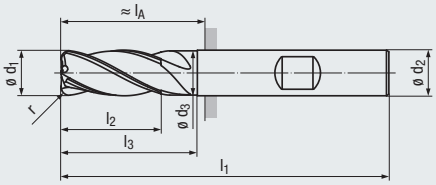
P	1.1-5.1	
M	1.1-4.1	
K	1.1-4.2	
N	1.1-1.4	1.5-1.6
N	2.1-2.8, 5.2	
S	1.1-1.3	2.1-2.6

3 x d_1 – Extra long design

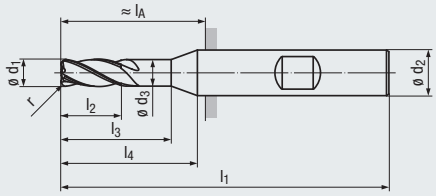
Order code											2526A	2527A		
ø d_1 h10	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h6	l_A	KB	Flutes	Dimens. Code	£	£		
3	9	12	62	2.9	23	6	26	0.07	**4**	**.003**	27.95	28.14		
4	12	16	62	3.8	25	6	26	0.07	**4**	**.004**	29.44	29.44		
5	15	20	62	4.8	25	6	26	0.12	**4**	**.005**	31.93	31.93		
6	18	25	62	5.8	–	6	26	0.12	**4**	**.006**	27.42	27.42		
8	24	30	68	7.7	–	8	32	0.12	**5**	**.008**	41.85	41.85		
10	30	35	80	9.5	–	10	40	0.2	**5**	**.010**	55.84	55.84		
12	36	45	93	11.5	–	12	48	0.2	**5**	**.012**	80.20	80.20		
16	48	60	112	15.5	–	16	64	0.2	**5**	**.016**	147.78	147.78		
20	60	75	130	19.5	–	20	80	0.3	**5**	**.020**	235.87	235.87		

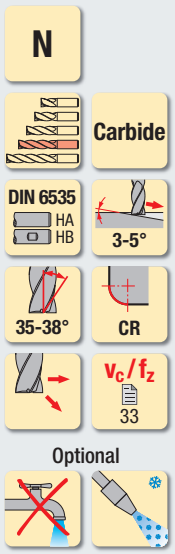
4 x d_1 – Extra long design

Order code													2528A	2529A
ø d_1 h10	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h6	l_A	KB	Flutes	Dimens. Code				
6	24	30	68	5.8	–	6	32	0.12	**4**	**.006**			37.67	37.67
8	32	40	80	7.7	–	8	44	0.12	**5**	**.008**			59.38	59.38
10	40	50	95	9.5	–	10	55	0.2	**5**	**.010**			80.46	80.46
12	48	60	107	11.5	–	12	62	0.2	**5**	**.012**			99.46	99.46
16	64	75	128	15.5	–	16	80	0.2	**5**	**.016**			172.63	172.63
20	80	90	150	19.5	–	20	100	0.3	**5**	**.020**			276.00	276.00



Design l_4:





Allround

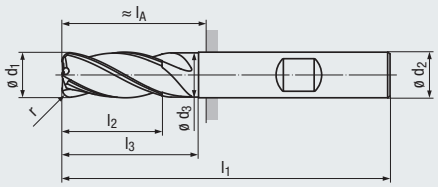
Coating — TiAlN

- Multi-functional, high performance tool
- With Enorm geometry
- Low-vibration machining
- Several corner radii per cutting diameter
- Centre cutting
- For almost all materials. including tough materials
- Very suitable for roughing and finishing

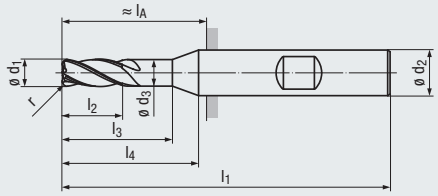
P	1.1-5.1	
M	1.1-4.1	
K	1.1-4.2	
N	1.2-1.4	
N	2.1-4.1, 5.2	
S	1.1-2.6	
H	1.1	1.2-1.3

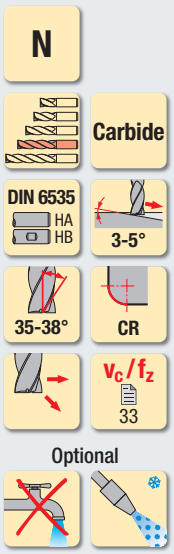
DIN 6527 – Long design

Order code											Corner radius 2698A	Corner radius 2699A
ø d_1 h10	r ±0.02	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h6	l_A	Flutes	Dimens. Code	£	£
3	0.1	8	14	57	2.9	20	6	21	**4**	**.003001**	27.18	27.42
3	0.3	8	14	57	2.9	20	6	21	**4**	**.003003**	26.39	26.39
3	0.5	8	14	57	2.9	20	6	21	**4**	**.003005**	26.39	26.39
4	0.1	11	18	57	3.8	20	6	21	**4**	**.004001**	26.85	26.85
4	0.3	11	18	57	3.8	20	6	21	**4**	**.004003**	26.06	26.06
4	0.4	11	18	57	3.8	20	6	21	**4**	**.004004**	26.06	26.06
4	0.5	11	18	57	3.8	20	6	21	**4**	**.004005**	26.06	26.06
5	0.1	13	19	57	4.8	20	6	21	**4**	**.005001**	26.39	26.39
5	0.3	13	19	57	4.8	20	6	21	**4**	**.005003**	25.72	25.72
5	0.5	13	19	57	4.8	20	6	21	**4**	**.005005**	25.72	25.72
5	1	13	19	57	4.8	20	6	21	**4**	**.005010**	25.72	25.72
6	0.1	13	20	57	5.8	–	6	21	**4**	**.006001**	24.92	24.92
6	0.5	13	20	57	5.8	–	6	21	**4**	**.006005**	23.69	23.69
6	1.0	13	20	57	5.8	–	6	21	**4**	**.006010**	23.69	23.69
6	1.5	13	20	57	5.8	–	6	21	**4**	**.006015**	25.72	25.72
8	0.15	19	25	63	7.7	–	8	27	**4**	**.008001**	35.99	35.99
8	0.5	19	25	63	7.7	–	8	27	**4**	**.008005**	34.86	34.86
8	1	19	25	63	7.7	–	8	27	**4**	**.008010**	34.86	34.86
8	1.5	19	25	63	7.7	–	8	27	**4**	**.008015**	36.32	36.32
8	2	19	25	63	7.7	–	8	27	**4**	**.008020**	36.32	36.32
10	0.15	22	30	72	9.5	–	10	32	**4**	**.010001**	45.46	45.46
10	0.5	22	30	72	9.5	–	10	32	**4**	**.010005**	44.79	44.79
10	1	22	30	72	9.5	–	10	32	**4**	**.010010**	44.79	44.79
10	1.5	22	30	72	9.5	–	10	32	**4**	**.010015**	45.46	45.46
10	2	22	30	72	9.5	–	10	32	**4**	**.010020**	45.46	45.46
10	2.5	22	30	72	9.5	–	10	32	**4**	**.010025**	45.46	45.11
10	3	22	30	72	9.5	–	10	32	**4**	**.010030**	46.63	45.11
12	0.2	26	35	83	11.5	–	12	38	**4**	**.012002**	60.35	60.35
12	0.5	26	35	83	11.5	–	12	38	**4**	**.012005**	59.56	59.56
12	1	26	35	83	11.5	–	12	38	**4**	**.012010**	59.56	59.56
12	1.5	26	35	83	11.5	–	12	38	**4**	**.012015**	60.35	60.35
12	2	26	35	83	11.5	–	12	38	**4**	**.012020**	60.35	60.35
12	2.5	26	35	83	11.5	–	12	38	**4**	**.012025**	60.35	72.17
12	3	26	35	83	11.5	–	12	38	**4**	**.012030**	61.14	61.14
12	4	26	35	83	11.5	–	12	38	**4**	**.012040**	61.14	72.17
14	1	26	35	83	13.5	–	14	38	**4**	**.014010**	72.65	72.65
16	0.3	32	40	92	15.5	–	16	44	**4**	**.016003**	95.54	95.54
16	0.5	32	40	92	15.5	–	16	44	**4**	**.016005**	94.30	94.30
16	1	32	40	92	15.5	–	16	44	**4**	**.016010**	94.30	94.30
16	1.5	32	40	92	15.5	–	16	44	**4**	**.016015**	95.09	95.09
16	2	32	40	92	15.5	–	16	44	**4**	**.016020**	95.09	95.09
16	2.5	32	40	92	15.5	–	16	44	**4**	**.016025**	95.09	95.09
16	3	32	40	92	15.5	–	16	44	**4**	**.016030**	95.89	95.89
16	4	32	40	92	15.5	–	16	44	**4**	**.016040**	97.57	97.57



Design l_4:





Allround

Coating	TIALN

- Multi-functional, high performance tool
- With Enorm geometry
- Low-vibration machining
- Several corner radii per cutting diameter
- Centre cutting

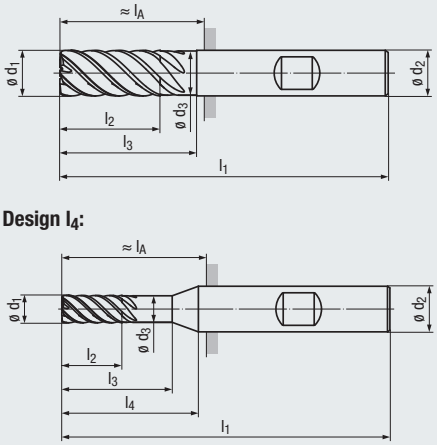
- For almost all materials. including tough materials
- Very suitable for roughing and finishing

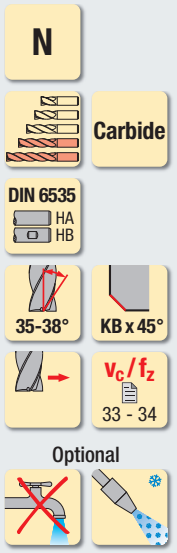
P	1.1-5.1	
M	1.1-4.1	
K	1.1-4.2	
N	1.2-1.4	
N	2.1-4.1, 5.2	
S	1.1-2.6	
H	1.1	1.2-1.3

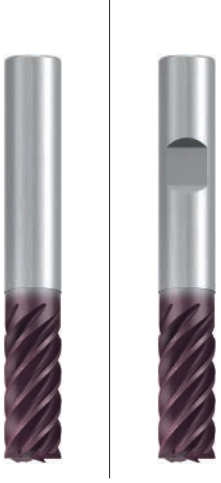
DIN 6527 – Long design

Order code											Corner radius	
											2698A	2699A
ø d_1 h10	r ±0.02	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h6	l_A	Flutes	Dimens. Code	£	£
20	0.3	38	50	104	19.5	–	20	54	**4**	**.020003**	141.68	141.68
20	0.5	38	50	104	19.5	–	20	54	**4**	**.020005**	140.33	140.33
20	1	38	50	104	19.5	–	20	54	**4**	**.020010**	140.33	140.33
20	1.5	38	50	104	19.5	–	20	54	**4**	**.020015**	141.22	141.22
20	2	38	50	104	19.5	–	20	54	**4**	**.020020**	141.22	141.22
20	2.5	38	50	104	19.5	–	20	54	**4**	**.020025**	141.22	141.22
20	3	38	50	104	19.5	–	20	54	**4**	**.020030**	143.48	143.48
20	4	38	50	104	19.5	–	20	54	**4**	**.020040**	143.48	143.48

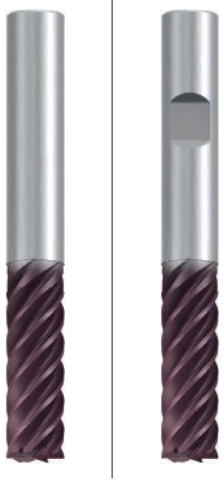
Other corner radii available on request







Allround



Allround

Coating

TIALN

TIALN

- Multi-functional, high performance tool
- With Enorm geometry
- Low-vibration machining
- Flute length up to 3 x d_1
- 2 lengths available

- For almost all materials
- Suitable for HSC finishing

P	1.1-5.1		
M	1.1-2.1	3.1-4.1	
K	1.1-2.1	2.2	
K	3.1-4.1	4.2	
N	1.1-1.4		
N	2.1-3.2	4.1-4.2, 5.2	
S	1.1-2.2	2.3	
S	2.4	2.5-2.6	
H		1.1	

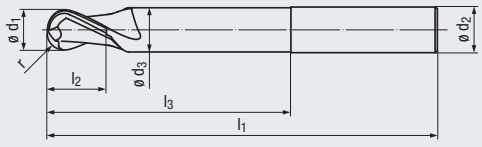
P	1.1-5.1		
M	1.1-2.1	3.1-4.1	
K	1.1-2.1	2.2	
K	3.1-4.1	4.2	
N	1.2-1.4	1.5-1.6	
N	2.1-2.8	5.2	
S	1.1-2.2	2.3	
S	2.4	2.5-2.6	

DIN 6527 – Long design

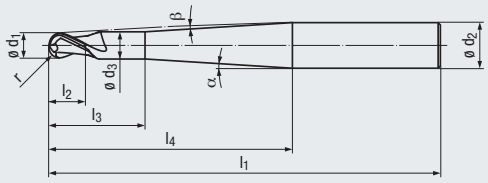
Order code											2522A	2523A		
ø d_1 f8	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h5	l_A	KB	Flutes	Dimens. Code	£	£		
5	13	18	57	4.8	20	6	21	0.12	**6**	**.005**	33.84	33.84		
6	13	20	57	5.8	–	6	21	0.12	**6**	**.006**	26.41	26.41		
8	19	25	63	7.7	–	8	27	0.12	**6**	**.008**	31.50	31.50		
10	22	30	72	9.7	–	10	32	0.2	**6**	**.010**	47.68	47.68		
12	26	35	83	11.6	–	12	38	0.2	**6**	**.012**	72.39	72.39		
16	32	40	92	15.5	–	16	44	0.2	**6**	**.016**	110.63	110.63		
20	38	50	104	19.5	–	20	54	0.3	**8**	**.020**	156.99	156.99		

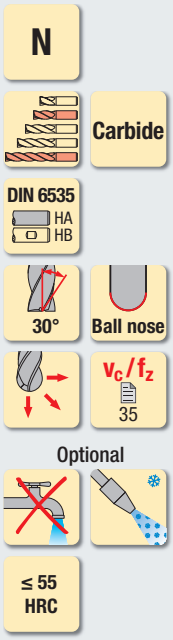
Extra long design

Order code													2524A	2525A
ø d_1 h10	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h6	l_A	KB	Flutes	Dimens. Code			£	£
6	18	25	62	5.8	–	6	26	0.12	**6**	**.006**			31.49	31.49
8	24	30	68	7.7	–	8	32	0.12	**6**	**.008**			36.48	36.48
10	30	35	80	9.7	–	10	40	0.2	**6**	**.010**			52.90	52.90
12	36	45	93	11.6	–	12	48	0.2	**6**	**.012**			73.44	73.44
16	48	55	108	15.5	–	16	60	0.2	**6**	**.016**			129.02	129.02
20	60	70	126	19.5	–	20	76	0.3	**8**	**.020**			191.08	191.08



Design l_4:





Allround | **Allround**

Coating | TIALN | TIALN

P	1.1-5.1		1.1-5.1	
M	1.1-4.1		1.1-4.1	
K	1.1-4.2		1.1-4.2	
N	2.1-2.8, 5.2	1.2-1.4	2.1-2.8, 5.2	1.2-1.4
S	2.1-2.3	2.4-2.6	2.1-2.3	2.4-2.6
H	1.1-1.2		1.1-1.2	

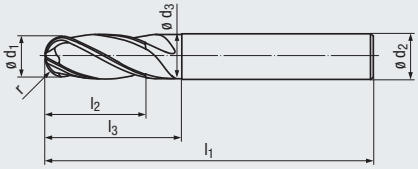
- Multi-functional, high performance tool
- Patented chisel edge
- 2 lengths available
- For almost all materials
- Suitable for roughing, finishing and HSC finishing

Short design

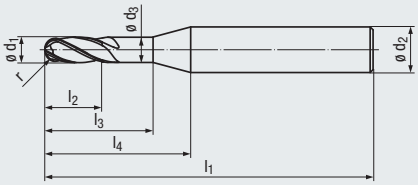
Order code												2550A			
ø d_1 ±0.01	r ±0.005	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h5	α	β	Flutes	Dimens. Code	£			
0.5	0.25	1	2	57	0.45	20	6	10°	8.5°	**2**	**.0005**	54.11			
1	0.5	2	4	57	0.95	20	6	10°	8°	**2**	**.001**	48.84			
1.5	0.75	2.5	7.5	57	1.4	20	6	12.5°	7°	**2**	**.0015**	42.62			
2	1	3	8	57	1.8	20	6	12°	6.5°	**2**	**.002**	35.91			
3	1.5	3.5	10	57	2.8	20	6	11.5°	5°	**2**	**.003**	34.00			
4	2	4	12	57	3.8	20	6	11°	3.5°	**2**	**.004**	33.04			
5	2.5	5	14	57	4.7	20	6	10°	2°	**2**	**.005**	33.04			
6	3	6	20	57	5.6	–	6	–	–	**2**	**.006**	30.17			
8	4	7	25	63	7.6	–	8	–	–	**2**	**.008**	41.67			
10	5	8	30	72	9.6	–	10	–	–	**2**	**.010**	61.30			
12	6	10	35	83	11.5	–	12	–	–	**2**	**.012**	75.67			

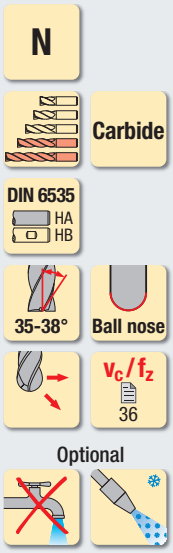
Extra long design

Order code														2551A	
ø d_1 ±0.01	r ±0.005	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h5	α	β	Flutes	Dimens. Code			£	
1	0.5	2	4	80	0.95	40	6	4.5°	4°	**2**	**.001**			54.11	
1.5	0.75	2.5	7.5	80	1.4	40	6	4.5°	3.5°	**2**	**.0015**			48.84	
2	1	3	8	80	1.8	40	6	4°	3°	**2**	**.002**			42.14	
3	1.5	3.5	12	80	2.8	40	6	3.5°	2.5°	**2**	**.003**			41.18	
4	2	4	20	80	3.8	40	6	4°	1.5°	**2**	**.004**			39.74	
5	2.5	5	25	80	4.7	40	6	3°	1°	**2**	**.005**			39.27	
6	3	6	40	80	5.6	–	6	–	–	**2**	**.006**			37.35	
8	4	7	60	100	7.6	–	8	–	–	**2**	**.008**			49.32	
10	5	8	50	100	9.6	–	10	–	–	**2**	**.110**			58.42	
10	5	8	75	120	9.6	–	10	–	–	**2**	**.010**			67.52	
12	6	10	70	120	11.5	–	12	–	–	**2**	**.112**			93.86	
12	6	10	70	160	11.5	–	12	–	–	**2**	**.012**			99.61	



Design l_4:





Allround

Allround

Coating

TIALN

TIALN

P	1.1-5.1	
M	1.1-2.1	3.1-4.1
K	1.1-2.2	3.1-4.2
N	2.1-2.8, 4.1-4.2	
N	5.2-5.3	
S		1.1-2.6

- Multi-functional, high performance tool
- 2 centre cutting edges
- 2 lengths available

- For almost all materials
- Suitable for HSC finishing

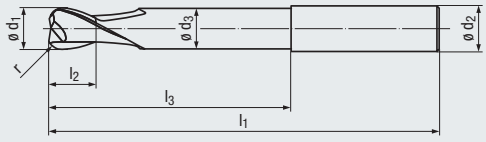
Long design

Order code										2502A			
ø d_1 h10	r	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h6	Flutes	Dimens. Code	£			
2	1	6	10	57	1.9	20	6	**3**	**.002**	28.77			
3	1.5	8	14	57	2.9	20	6	**3**	**.003**	28.77			
4	2	11	18	57	3.8	20	6	**3**	**.004**	28.21			
5	2.5	13	19	57	4.8	20	6	**3**	**.005**	27.59			
6	3	13	20	57	5.8	–	6	**4**	**.006**	27.30			
8	4	19	25	63	7.7	–	8	**4**	**.008**	33.84			
10	5	22	30	72	9.5	–	10	**4**	**.010**	53.13			
12	6	26	35	83	11.5	–	12	**4**	**.012**	72.42			
16	8	32	40	92	15.5	–	16	**4**	**.016**	129.30			

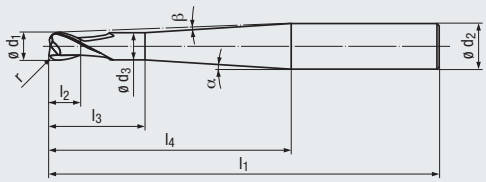
Extra long design

Order code												2504A	
ø d_1 h10	r	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h6	Flutes	Dimens. Code			£	
6	3	40	60	100	5.8	–	6	**4**	**.006**			39.00	
8	4	40	60	100	7.7	–	8	**4**	**.008**			40.50	
10	5	40	55	100	9.5	–	10	**4**	**.010**			66.33	
12	6	45	50	100	11.5	–	12	**4**	**.012**			90.80	
16	8	65	90	150	15.5	–	16	**4**	**.016**			171.44	

Cold-air nozzle and socket with magnetic shoe, see page 30 - 31



Design l_4:



N

Carbide

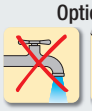
DIN 6535 HA HB

30°

Torus

v_c / f_z 37

Optional



≤ 55 HRC

Allround

Coating

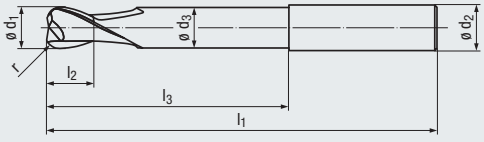
TIALN

- Multi-functional, high performance tool
- High-precision corner radius
- 2 lengths available
- For almost all materials
- Suitable for roughing, finishing and HSC finishing

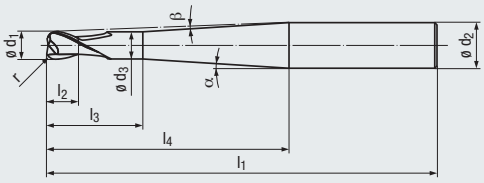
P	1.1-5.1					
M	1.1-4.1					
K	1.1-4.2					
N	2.1-2.8, 5.2	1.2-1.4				
S	2.1-2.3	2.4-2.6				
H	1.1-1.2					

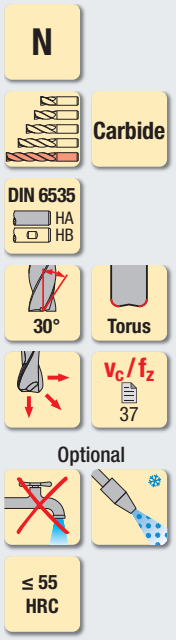
Short design

Order code												2552A			
ø d_1 ±0.01	r ±0.005	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h5	α	β	Flutes	Dimens. Code	£			
0.5	0.1	1	2	57	0.45	20	6	10°	8.5°	**2**	**.0005**	57.94			
1	0.2	2	4	57	0.95	20	6	10°	8°	**2**	**.101**	53.64			
1	0.25	2	4	57	0.95	20	6	10°	8°	**2**	**.001**	53.64			
1.5	0.2	2.5	7.5	57	1.4	20	6	12.5°	7°	**2**	**.1015**	47.88			
1.5	0.3	2.5	7.5	57	1.4	20	6	12.5°	7°	**2**	**.0015**	47.88			
2	0.2	3	8	57	1.8	20	6	12°	6.5°	**2**	**.102**	38.31			
2	0.5	3	8	57	1.8	20	6	12°	6.5°	**2**	**.002**	38.31			
3	0.2	3.5	10	57	2.8	20	6	11.5°	5°	**2**	**.103**	36.87			
3	0.5	3.5	10	57	2.8	20	6	11.5°	5°	**2**	**.003**	36.87			
4	0.3	4	12	57	3.8	20	6	11°	3.5°	**2**	**.204**	36.40			
4	0.5	4	12	57	3.8	20	6	11°	3.5°	**2**	**.104**	36.40			
4	1	4	12	57	3.8	20	6	11°	3.5°	**2**	**.004**	36.40			
5	0.3	5	14	57	4.7	20	6	10°	2°	**2**	**.305**	35.91			
5	0.5	5	14	57	4.7	20	6	10°	2°	**2**	**.205**	35.91			
5	1	5	14	57	4.7	20	6	10°	2°	**2**	**.105**	35.91			
5	1.5	5	14	57	4.7	20	6	10°	2°	**2**	**.005**	35.91			
6	0.3	6	20	57	5.6	–	6	–	–	**2**	**.306**	33.04			
6	0.5	6	20	57	5.6	–	6	–	–	**2**	**.206**	33.04			
6	1	6	20	57	5.6	–	6	–	–	**2**	**.106**	33.04			
6	2	6	20	57	5.6	–	6	–	–	**2**	**.006**	33.04			
8	0.3	7	25	63	7.6	–	8	–	–	**2**	**.408**	43.58			
8	0.5	7	25	63	7.6	–	8	–	–	**2**	**.308**	43.58			
8	1	7	25	63	7.6	–	8	–	–	**2**	**.208**	43.58			
8	2	7	25	63	7.6	–	8	–	–	**2**	**.008**	43.58			
10	0.5	8	30	72	9.6	–	10	–	–	**2**	**.710**	67.04			
10	1	8	30	72	9.6	–	10	–	–	**2**	**.610**	67.04			
10	1.5	8	30	72	9.6	–	10	–	–	**2**	**.210**	67.04			
10	2	8	30	72	9.6	–	10	–	–	**2**	**.410**	67.04			
10	3	8	30	72	9.6	–	10	–	–	**2**	**.010**	67.04			
12	0.5	10	35	83	11.5	–	12	–	–	**2**	**.612**	81.41			
12	1	10	35	83	11.5	–	12	–	–	**2**	**.512**	81.41			
12	1.5	10	35	83	11.5	–	12	–	–	**2**	**.112**	81.41			
12	2	10	35	83	11.5	–	12	–	–	**2**	**.312**	81.41			
12	4	10	35	83	11.5	–	12	–	–	**2**	**.012**	81.41			



Design l_4:





Allround

Coating: **TIALN**

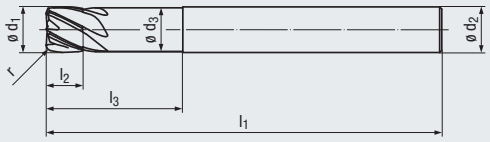
- Multi-functional, high performance tool
- High-precision corner radius
- 2 lengths available
- For almost all materials
- Suitable for roughing, finishing and HSC finishing

P	1.1-5.1			
M	1.1-4.1			
K	1.1-4.2			
N	2.1-2.8, 5.2	1.2-1.4		
S	2.1-2.3	2.4-2.6		
H	1.1-1.2			

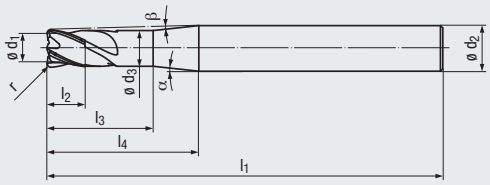
Extra long design

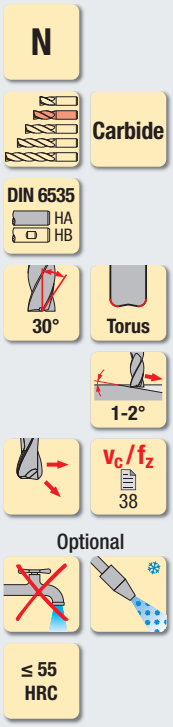
Order code — **2553A**

ø d_1 ±0.01	r ±0.005	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h6	α	β	Flutes	Dimens. Code	
1	0.2	2	4	80	0.95	40	6	4.5°	4°	**2**	**.101**	56.98
1	0.25	2	4	80	0.95	40	6	4.5°	4°	**2**	**.001**	56.98
1.5	0.2	2.5	7.5	80	1.4	40	6	4.5°	3.5°	**2**	**.1015**	53.64
1.5	0.3	2.5	7.5	80	1.4	40	6	4.5°	3.5°	**2**	**.0015**	53.64
2	0.2	3	8	80	1.8	40	6	4°	3°	**2**	**.102**	44.54
2	0.5	3	8	80	1.8	40	6	4°	3°	**2**	**.002**	44.54
3	0.2	3.5	12	80	2.8	40	6	3.5°	2.5°	**2**	**.103**	43.10
3	0.5	3.5	12	80	2.8	40	6	3.5°	2.5°	**2**	**.003**	43.10
4	0.3	4	20	80	3.8	40	6	4°	1.5°	**2**	**.204**	41.67
4	0.5	4	20	80	3.8	40	6	4°	1.5°	**2**	**.104**	41.67
4	1	4	20	80	3.8	40	6	4°	1.5°	**2**	**.004**	41.67
5	0.3	5	25	80	4.7	40	6	3°	1°	**2**	**.305**	41.18
5	0.5	5	25	80	4.7	40	6	3°	1°	**2**	**.205**	41.18
5	1	5	25	80	4.7	40	6	3°	1°	**2**	**.105**	41.18
5	1.5	5	25	80	4.7	40	6	3°	1°	**2**	**.005**	41.18
6	0.3	6	40	80	5.6	–	6	–	–	**2**	**.306**	39.74
6	0.5	6	40	80	5.6	–	6	–	–	**2**	**.206**	39.74
6	1	6	40	80	5.6	–	6	–	–	**2**	**.106**	39.74
6	2	6	40	80	5.6	–	6	–	–	**2**	**.006**	39.74
8	0.3	7	60	100	7.6	–	8	–	–	**2**	**.408**	52.68
8	0.5	7	60	100	7.6	–	8	–	–	**2**	**.308**	52.68
8	1	7	60	100	7.6	–	8	–	–	**2**	**.208**	52.68
8	2	7	60	100	7.6	–	8	–	–	**2**	**.008**	52.68
8	2.5	7	60	100	7.6	–	8	–	–	**2**	**.108**	52.68
10	0.5	8	50	100	9.6	–	10	–	–	**2**	**.710**	67.52
10	1	8	50	100	9.6	–	10	–	–	**2**	**.610**	67.52
10	1.5	8	50	100	9.6	–	10	–	–	**2**	**.510**	67.52
10	1.5	8	75	120	9.6	–	10	–	–	**2**	**.210**	73.27
10	2	8	50	100	9.6	–	10	–	–	**2**	**.410**	67.52
10	2.5	8	75	120	9.6	–	10	–	–	**2**	**.110**	73.27
10	3	8	50	100	9.6	–	10	–	–	**2**	**.310**	67.52
10	3	8	75	120	9.6	–	10	–	–	**2**	**.010**	73.27
12	0.5	10	70	120	11.5	–	12	–	–	**2**	**.612**	99.61
12	1	10	70	120	11.5	–	12	–	–	**2**	**.512**	99.61
12	1.5	10	70	120	11.5	–	12	–	–	**2**	**.412**	99.61
12	1.5	10	70	160	11.5	–	12	–	–	**2**	**.112**	106.31
12	2	10	70	120	11.5	–	12	–	–	**2**	**.312**	99.61
12	4	8	70	120	11.5	–	12	–	–	**2**	**.212**	106.05
12	4	10	70	160	11.5	–	12	–	–	**2**	**.012**	106.31



Design l_4:





Allround

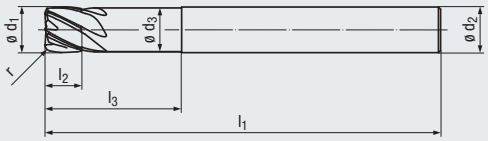
Coating: **TIALN**

- Multi-functional, high performance tool
- High-precision corner radius
- 2 lengths available
- For difficult to cut materials
- Suitable for roughing, finishing and HSC finishing

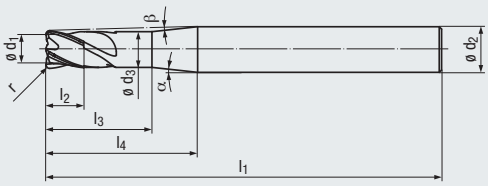
P	1.1-5.1	
M	1.1-2.1	
K	1.1-4.2	
N	2.2-2.8, 5.2	2.1
S	1.1-2.6	
H	1.1-1.2	

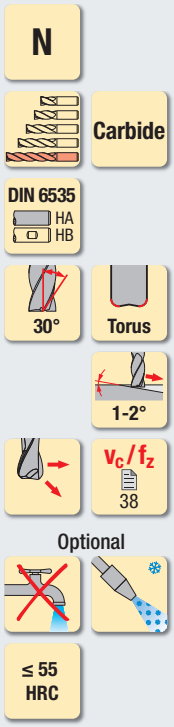
Short design

Order code												2554A			
ø d_1 ±0.01	r ±0.005	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h6	α	β	Flutes	Dimens. Code	£			
3	0.2	3.5	10	57	2.8	20	6	11.5°	5°	**4**	**.103**	42.62			
3	0.5	3.5	10	57	2.8	20	6	11.5°	5°	**4**	**.003**	42.62			
4	0.3	4	12	57	3.8	20	6	11°	3.5°	**4**	**.104**	41.67			
4	0.5	4	12	57	3.8	20	6	11°	3.5°	**4**	**.004**	41.67			
4	1	4	12	57	3.8	20	6	11°	3.5°	**4**	**.204**	41.67			
5	0.3	5	14	57	4.7	20	6	10°	1.5°	**4**	**.105**	40.71			
5	0.5	5	14	57	4.7	20	6	10°	1.5°	**4**	**.005**	40.71			
5	1	5	14	57	4.7	20	6	10°	1.5°	**4**	**.205**	40.71			
6	0.3	6	20	57	5.6	–	6	–	–	**4**	**.406**	41.18			
6	0.5	6	20	57	5.6	–	6	–	–	**4**	**.506**	41.18			
6	0.8	6	20	57	5.6	–	6	–	–	**4**	**.006004**	41.18			
6	1	6	20	57	5.6	–	6	–	–	**4**	**.606**	41.18			
8	0.3	7	25	63	7.6	–	8	–	–	**4**	**.408**	58.42			
8	0.5	7	25	63	7.6	–	8	–	–	**4**	**.508**	58.42			
8	1	7	25	63	7.6	–	8	–	–	**4**	**.008004**	58.42			
10	0.5	8	30	72	9.6	–	10	–	–	**4**	**.410**	63.21			
10	1	8	30	72	9.6	–	10	–	–	**4**	**.010004**	63.21			
10	1.5	8	30	72	9.6	–	10	–	–	**4**	**.510**	73.27			
10	2	8	30	72	9.6	–	10	–	–	**4**	**.610**	73.27			
12	0.5	10	35	83	11.5	–	12	–	–	**4**	**.312**	83.32			
12	1	10	35	83	11.5	–	12	–	–	**4**	**.412**	83.32			
12	1.5	10	35	83	11.5	–	12	–	–	**4**	**.012004**	83.32			
12	2	10	35	83	11.5	–	12	–	–	**4**	**.512**	95.78			



Design l_4:





Allround

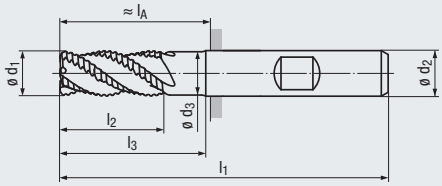
Coating: **TIALN**

- Multi-functional, high performance tool
- High-precision corner radius
- 2 lengths available
- For difficult to cut materials
- Suitable for roughing, finishing and HSC finishing

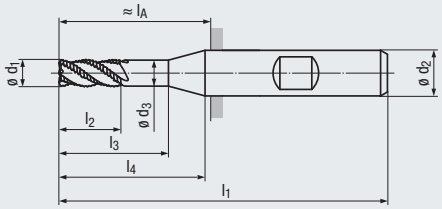
P	1.1-5.1	
M	1.1-2.1	
K	1.1-4.2	
N	2.2-2.8, 5.2	2.1
S	1.1-2.6	
H	1.1-1.2	

Extra long design

Order code												2555A
ø d_1 ±0.01	r ±0.005	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h6	α	β	Flutes	Dimens. Code	
3	0.2	3.5	12	80	2.8	40	6	3.5°	2.5°	**4**	**.103**	95.78
3	0.5	3.5	12	80	2.8	40	6	3.5°	2.5°	**4**	**.003**	45.01
4	0.3	4	20	80	3.8	40	6	4°	3.5°	**4**	**.104**	43.58
4	0.5	4	20	80	3.8	40	6	4°	3.5°	**4**	**.004**	43.58
4	1	4	20	80	3.8	40	6	4°	3.5°	**4**	**.204**	43.58
5	0.3	5	25	80	4.7	40	6	3°	1°	**4**	**.105**	42.62
5	0.5	5	25	80	4.7	40	6	3°	1°	**4**	**.005**	42.62
5	1	5	25	80	4.7	40	6	3°	1°	**4**	**.205**	42.62
6	0.3	6	40	80	5.6	–	6	–	–	**4**	**.406**	42.14
6	0.5	6	40	80	5.6	–	6	–	–	**4**	**.506**	42.14
6	0.8	6	40	80	5.6	–	6	–	–	**4**	**.006**	42.14
6	1	6	40	80	5.6	–	6	–	–	**4**	**.606**	42.14
8	0.3	7	40	80	7.6	–	8	–	–	**4**	**.408**	63.69
8	0.5	7	40	80	7.6	–	8	–	–	**4**	**.508**	63.69
8	1	7	40	80	7.6	–	8	–	–	**4**	**.008**	63.69
10	0.5	8	55	100	9.6	–	10	–	–	**4**	**.410**	78.54
10	1	8	55	100	9.6	–	10	–	–	**4**	**.010**	78.54
10	1.5	8	55	100	9.6	–	10	–	–	**4**	**.510**	78.54
10	2	8	55	100	9.6	–	10	–	–	**4**	**.610**	78.54
12	0.5	10	70	120	11.5	–	12	–	–	**4**	**.312**	100.09
12	1	10	70	120	11.5	–	12	–	–	**4**	**.412**	100.09
12	1.5	10	70	120	11.5	–	12	–	–	**4**	**.012**	100.09
12	2	10	70	120	11.5	–	12	–	–	**4**	**.512**	100.09



Design l_4:



HR | fine

HSSE

DIN 1835 A B

30° | 45°

ø4 - 28 | ø 30 - 50

v_c/f_z 39

Allround | **Allround**

Coating | TIALN | TIALN

- Roughing end mill with fine, round chip breakers
- Generates milling marks
- Centre cutting of up to 28 mm dia.
- Wide range of diameters
- 5 lengths available
- Highly versatile

- For almost all ferrous materials and non-ferrous metals
- For materials with a tensile strength of up to 1400 N/mm²

			TIALN	TIALN
P	1.1-3.1	4.1-5.1	P 1.1-3.1 4.1-5.1	P 1.1-3.1 4.1-5.1
M	1.1	2.1-4.1	M 1.1 2.1-4.1	M 1.1 2.1-4.1
K	1.1-2.1	2.2-3.2	K 1.1-2.1 2.2-3.2	K 1.1-2.1 2.2-3.2
K	4.1	4.2	K 4.1 4.2	K 4.1 4.2
N	2.1	2.2-2.6, 5.2	N 2.1 2.2-2.6, 5.2	N 2.1 2.2-2.6, 5.2
S		1.1-1.2, 2.1-2.2	S 1.1-1.2, 2.1-2.2	S 1.1-1.2, 2.1-2.2

Extra short design

Order code										1351C			
ø d_1 k12	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h6	l_A	Flutes	Dimens. Code	£			
6	8	14	52	5.5	–	6	16	**4**	**.006**	20.01			
8	11	17	61	7.5	19	10	21	**4**	**.008**	26.79			
10	13	21	63	9.5	–	10	23	**4**	**.010**	28.69			
12	16	26	73	11.5	–	12	28	**4**	**.012**	31.69			
14	16	26	73	11.5	–	12	28	**4**	**.014**	42.28			
16	19	29	79	15	–	16	31	**4**	**.016**	43.78			
18	19	29	79	15	–	16	31	**4**	**.018**	58.12			
20	22	36	88	19	–	20	38	**4**	**.020**	59.64			

DIN 844 – Short design

Order code												1381C	
ø d_1 k12	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h6	l_A	Flutes	Dimens. Code			£	
4	11	17	55	–	–	6	19	**3**	**.004**			22.14	
5	13	19	57	–	–	6	21	**3**	**.005**			22.14	
6	13	19	57	5.5	–	6	21	**4**	**.006**			17.91	
8	19	25	69	7.5	27	10	29	**4**	**.008**			24.74	
10	22	30	72	9.5	–	10	32	**4**	**.010**			26.71	
12	26	36	83	11.5	–	12	38	**4**	**.012**			28.00	
14	26	36	83	11.5	–	12	38	**4**	**.014**			34.83	
16	32	42	92	15	–	16	44	**4**	**.016**			39.72	
18	32	42	92	15	–	16	44	**4**	**.018**			51.45	
20	38	52	104	19	–	20	54	**4**	**.020**			52.77	
22	38	52	104	19	–	20	54	**4**	**.022**			65.44	
24	45	61	121	23	63	25	65	**4**	**.024**			80.75	
25	45	63	121	24	–	25	65	**4**	**.025**			76.85	
28	45	63	121	24	–	25	65	**5**	**.028**			94.75	
30	45	63	121	24	–	25	65	**5**	**.030**			103.87	
32	53	70	133	31	–	32	73	**6**	**.032**			98.01	
36	53	70	133	31	–	32	73	**6**	**.036**			144.58	
40	63	80	155	38	–	40	85	**6**	**.040**			223.78	
45	63	80	155	38	–	40	85	**6**	**.045**			227.95	
50	75	95	177	48	–	50	97	**8**	**.050**			404.91	

Ordering example: **1351C.006**

FRANKEN Alu-Cut

The Alu-Cut series includes tools made from solid carbide and HSS particularly developed for the process-reliable volume machining of wrought aluminum alloys with up to 5% silicon content.
Materials with higher silicon content should preferably be machined with coated tools.

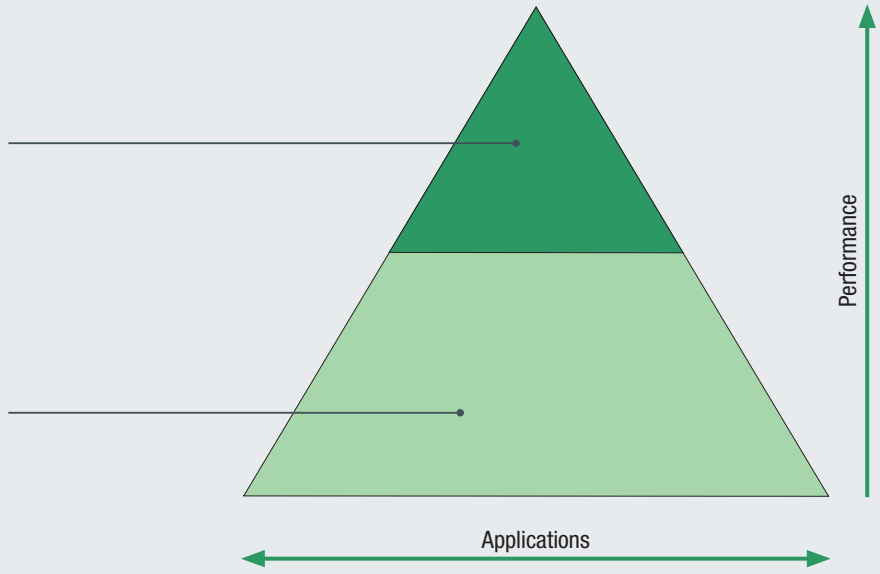
Characteristics:
- Variable spacing
- Available with WR profile for roughing
- Special geometry for machining aluminum
- Optionally available with internal coolant supply, radial and axial exit (ICRA)

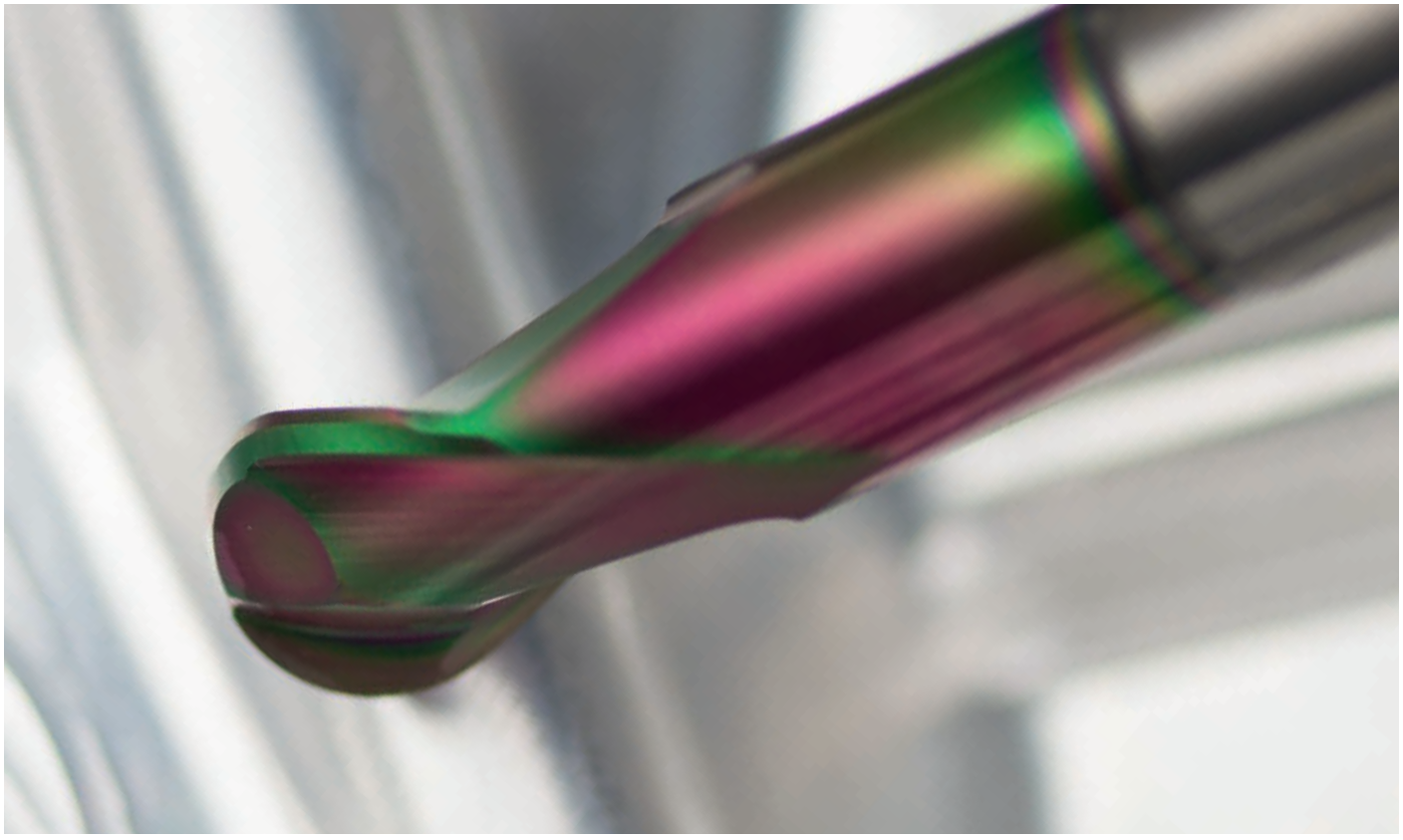
Main feature:
Highest metal removal rate.

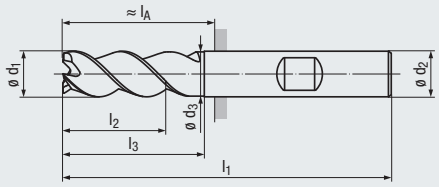
Available tools:
- Solid carbide end mills
- Solid carbide end mills with corner radius
- Solid carbide ball nose end mills
- Solid carbide torus end mills
- HSS end mills with corner radius

Alu-Cut "Aerospace"
For volume machining

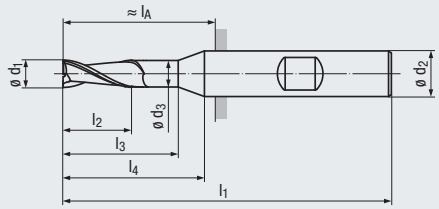
Alu-Cut
The versatile solution for machining aluminium

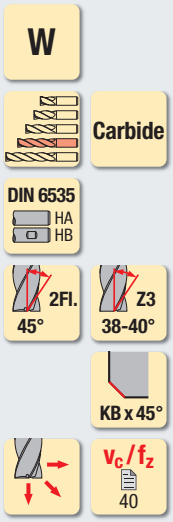


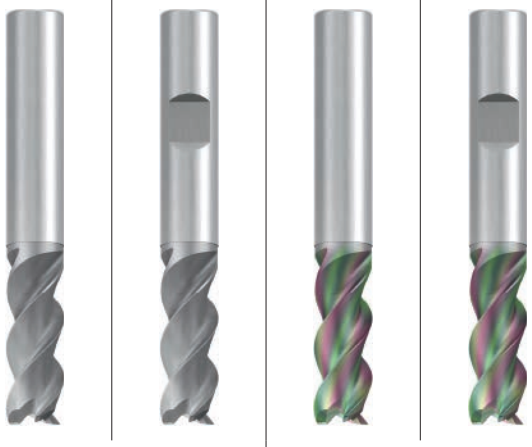




Design l_4:







Al | **Al/Cu**

Coating — GLT

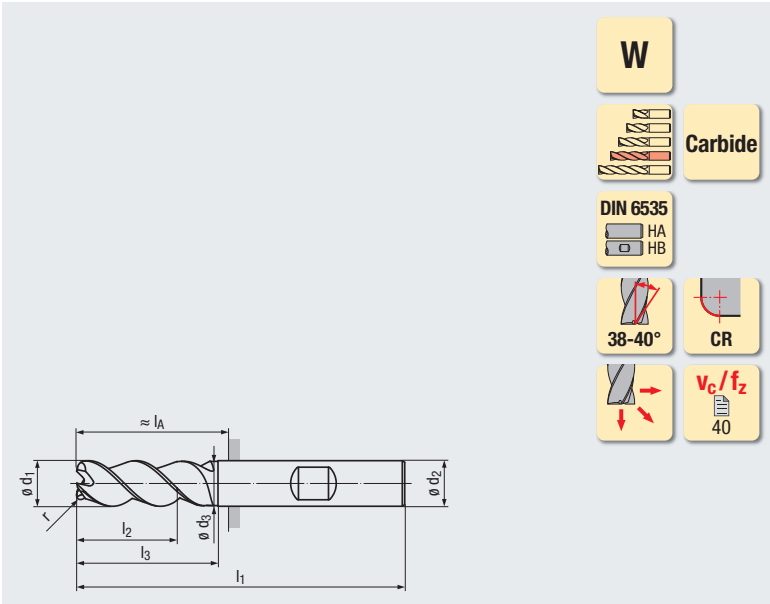
- High performance tool
- Special geometry for the machining of aluminium
- Low-vibration machining
- With 2 and 3 flutes
- Centre cutting

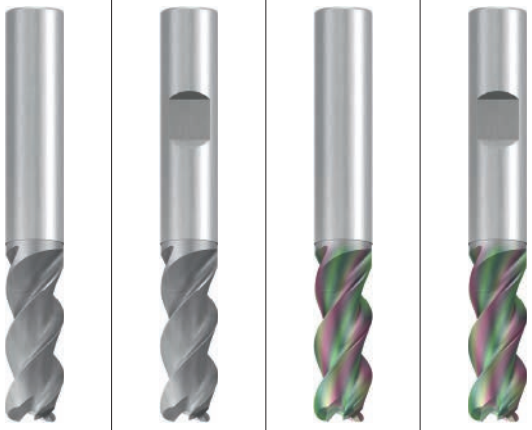
- For wrought aluminium alloys
- For aluminium alloys with a silicon content of up to 7%
- With GLT coating also for copper alloys
- Suitable for z-axis milling
- Suitable for roughing and finishing

N 1.1-1.3 1.4 | N 1.1-1.4 2.1-2.7

DIN 6527 – Long design

Order code											2544	2545	2544K	2545K
ø d_1 h10	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h6	l_A	KB	Flutes	Dimens. Code	£	£	£	£
2	6	10	57	1.9	20	6	21	0.06	**2**	**.002**	25.04	25.04	33.61	33.61
3	7	14	57	2.9	20	6	21	0.1	**2**	**.003**	27.63	27.63	37.23	37.23
4	8	18	57	3.8	20	6	21	0.1	**2**	**.004**	27.63	27.63	37.23	37.23
5	10	19	57	4.8	20	6	21	0.15	**2**	**.005**	27.63	27.63	37.23	37.23
6	13	20	57	5.8	–	6	21	0.125	**3**	**.006**	29.10	29.10	39.49	39.49
8	19	25	63	7.7	–	8	34	0.125	**3**	**.008**	36.55	36.55	46.25	46.25
10	22	30	72	9.5	–	10	32	0.2	**3**	**.010**	44.33	44.33	56.96	56.96
12	26	35	83	11.5	–	12	38	0.2	**3**	**.012**	55.72	55.72	69.26	69.26
16	32	40	92	15.5	–	16	44	0.2	**3**	**.016**	97.92	97.92	116.53	116.53
20	38	50	104	19.5	–	20	54	0.3	**3**	**.020**	132.77	132.77	154.76	154.76





Al

Al/Cu

Coating

GLT

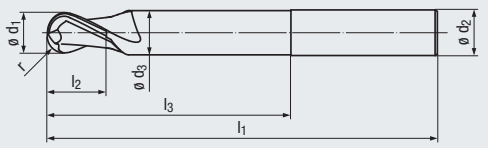
- High performance tool
- Special geometry for the machining of aluminium
- Low-vibration machining
- Several corner radii per cutting diameter
- Centre cutting
- For wrought aluminium alloys
- For aluminium alloys with a silicon content of up to 7%
- With GLT coating also for copper alloys
- Suitable for z-axis milling
- Suitable for roughing and finishing

N 1.1-1.3 1.4

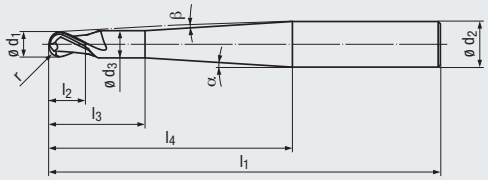
N 1.1-1.4 2.1-2.7

DIN 6527 – Long design

Order code										Corner radius			
										2546	2547	2546K	2547K
ø d_1 h10	r ±0.02	l_2	l_3	l_1	ø d_3	ø d_2 h6	l_A	Flutes	Dimens. Code	£	£	£	£
6	0.5	13	20	57	5.8	6	21	**3**	**.006005**	26.96	26.96	35.54	35.54
6	1	13	20	57	5.8	6	21	**3**	**.006010**	26.96	26.96	35.54	35.54
8	1	19	25	63	7.7	8	27	**3**	**.008010**	40.84	40.84	50.54	50.54
8	1.5	19	25	63	7.7	8	27	**3**	**.008015**	41.96	41.96	51.55	51.55
8	2	19	25	63	7.7	8	27	**3**	**.008020**	41.96	41.96	51.55	51.55
10	1	22	30	72	9.5	10	32	**3**	**.010010**	50.54	50.54	63.40	63.40
10	1.5	22	30	72	9.5	10	32	**3**	**.010015**	51.66	51.66	64.52	64.52
10	2	22	30	72	9.5	10	32	**3**	**.010020**	51.66	51.66	64.52	64.52
12	1	26	35	83	11.5	12	38	**3**	**.012010**	63.50	63.50	77.84	77.84
12	1.5	26	35	83	11.5	12	38	**3**	**.012015**	64.52	63.50	78.85	78.85
12	2	26	35	83	11.5	12	38	**3**	**.012020**	64.52	64.52	78.85	78.85
12	2.5	26	35	83	11.5	12	38	**3**	**.012025**	65.42	65.42	79.75	79.75
12	3	26	35	83	11.5	12	38	**3**	**.012030**	65.42	65.42	79.75	79.75
12	4	26	35	83	11.5	12	38	**3**	**.012040**	67.35	67.35	81.67	81.67
16	1	32	40	92	15.5	16	44	**3**	**.016010**	103.67	103.67	122.28	122.28
16	1.5	32	40	92	15.5	16	44	**3**	**.016015**	104.57	104.57	123.29	123.29
16	2	32	40	92	15.5	16	44	**3**	**.016020**	104.57	104.57	123.29	123.29
16	2.5	32	40	92	15.5	16	44	**3**	**.016025**	104.91	104.91	123.17	121.37
16	3	32	40	92	15.5	16	44	**3**	**.016030**	104.91	104.91	123.17	121.37
16	4	32	40	92	15.5	16	44	**3**	**.016040**	108.97	108.97	127.58	127.58
20	1	38	50	104	19.5	20	54	**3**	**.020010**	147.55	147.55	171.12	171.12
20	1.5	38	50	104	19.5	20	54	**3**	**.020015**	149.23	149.23	172.93	172.93
20	2	38	50	104	19.5	20	54	**3**	**.020020**	149.23	149.23	172.93	172.93
20	2.5	38	50	104	19.5	20	54	**3**	**.020025**	150.25	150.25	173.82	173.82
20	3	38	50	104	19.5	20	54	**3**	**.020030**	150.25	150.25	173.82	173.82
20	4	38	50	104	19.5	20	54	**3**	**.020040**	153.64	153.64	177.55	177.55



Design l_4:



W

Carbide

DIN 6535 HA HB

30°

Ball nose

v_c / f_z 41

Al/Cu

Coating: GLT

- High performance tool
- Patented chisel edge
- Sharp cutting edges
- Very smooth CRN coating
- 3 lengths available

- For wrought aluminium alloys
- For aluminium alloys with a silicon content of up to 7%
- With CRN coating also for copper alloys

N 1.1-1.4
N 2.1-2.3 2.4-2.8
N 3.1-4.4, 5.3
S 1.1-2.1 2.2-2.3

Short design

Order code												2452K
ø d_1 ±0.01	r ±0.005	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h5	α	β	Flutes	Dimens. Code	£
0.5	0.25	1	2	38	0.45	9	3	10°	8°	**2**	**.0005**	29.44
1	0.5	2	4	38	0.95	9	3	12.5°	6.5°	**2**	**.001**	29.56
1.5	0.75	2.5	7.5	38	1.4	9	3	32°	5°	**2**	**.0015**	30.06
2	1	3	8	38	1.8	9	3	31°	3.5°	**2**	**.002**	31.92
3	1.5	3.5	10	57	2.8	20	6	11.5°	5°	**2**	**.003**	31.92
4	2	4	12	57	3.8	20	6	11°	3.5°	**2**	**.004**	33.05
5	2.5	5	14	57	4.7	20	6	10°	2°	**2**	**.005**	33.05
6	3	6	20	57	5.6	–	6	–	–	**2**	**.006**	34.52
8	4	7	25	63	7.6	–	8	–	–	**2**	**.008**	39.26
10	5	8	30	72	9.6	–	10	–	–	**2**	**.010**	53.81
12	6	10	35	83	11.5	–	12	–	–	**2**	**.012**	85.39

FRANKEN TiNox-Cut

The TiNox-Cut series was especially developed for machining titanium alloys, nickel base alloys and stainless steel. This product range consists of both solid carbide and HSS-PM end mills. Long finisher with a flute length/diameter ratio of max. 5:1 are available for finishing of these difficult to cut materials.

Characteristics:
- Variable spacing
- High heat-resistant coating
- Roughing and semi-finishing profiles are available
- Optionally available with internal coolant supply, axial exit (ICA) or radial and axial exit (ICRA)

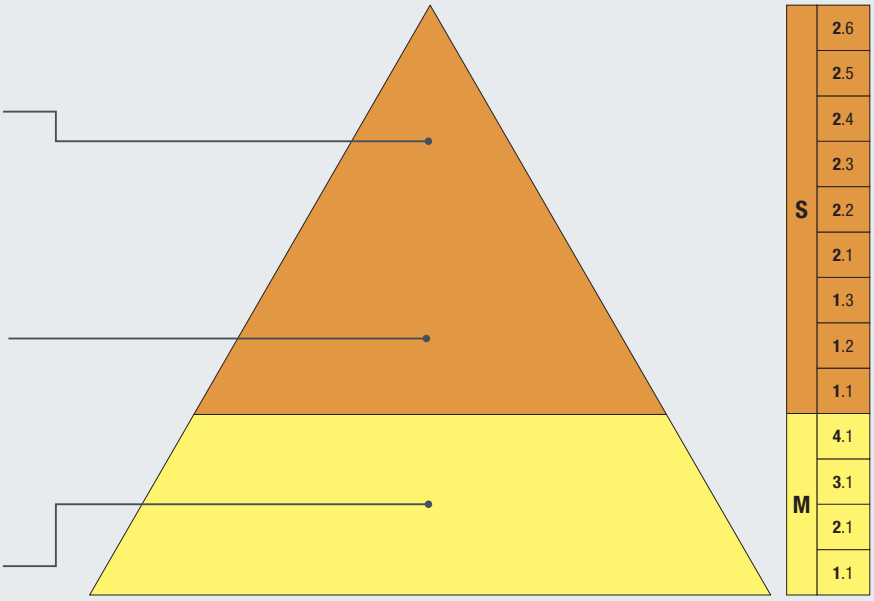
Main feature:
Machining of difficult to cut materials.

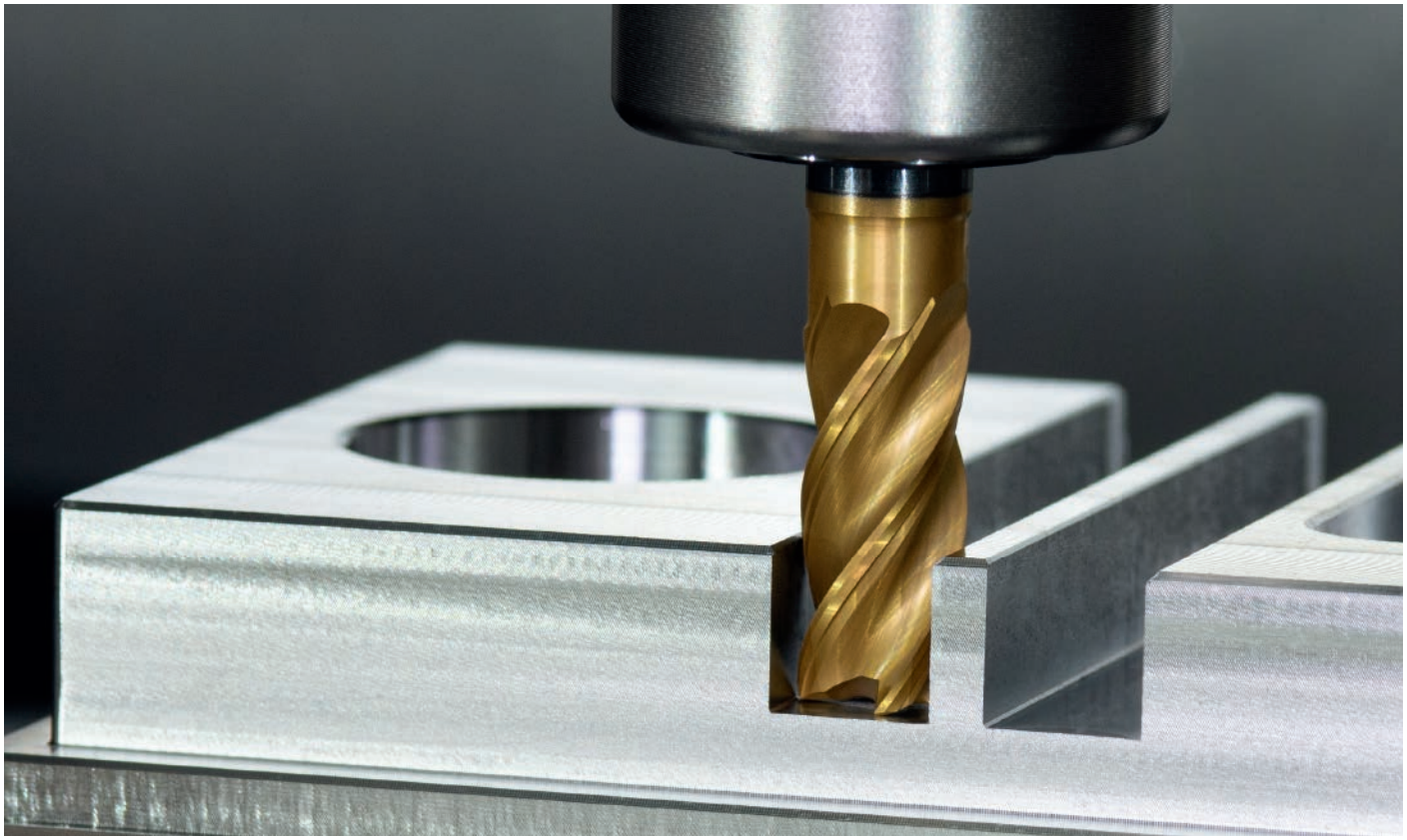
Available tools:
- Solid carbide end mills
- Solid carbide end mills with corner radius
- HSS end mills with corner radius

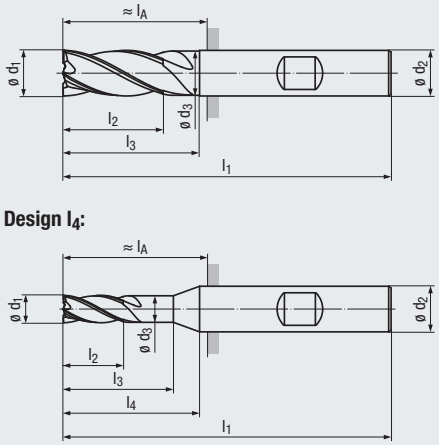
TiNox-Cut NF
High performance roughing tool for all materials that are difficult to machine

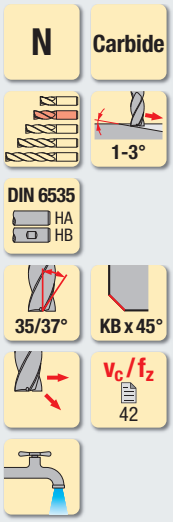
TiNox-Cut N
High performance tool specially designed for machining of titanium and titanium alloys

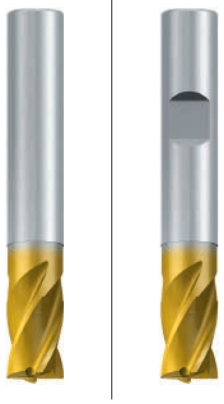
TiNox-Cut "Base"
Universal tool for machining of stainless- and acid-resistant steels











Inox

Coating: TIN/TIALN

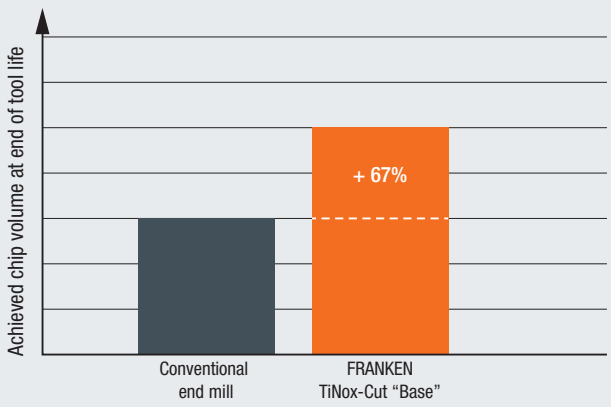
- High performance tool
- Finishing end mill for tough materials
- Special geometry prevents vibration
- Variable spacing
- Especially suitable for stainless steel materials
- Suitable for HPC roughing and finishing

P	1.1-3.1	4.1-5.1			
M	1.1-4.1				
K	1.1-2.2	3.1-4.2			
N	1.1-1.3				
N	2.1-2.8	5.2			
S	1.1	1.2-1.3			
S	2.1	2.2-2.6			
H	1.1	1.2			

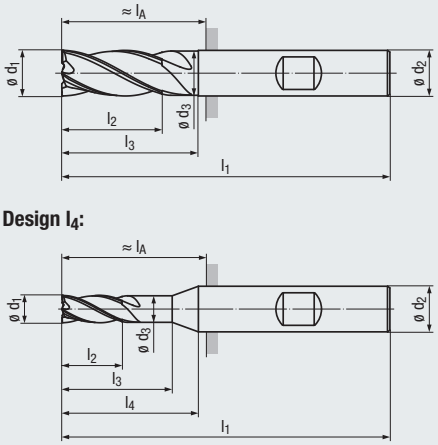
DIN 6527 – Short design

Order code											2566T	2567T		
ø d_1 h10	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h6	l_A	KB	Flutes	Dimens. Code	£	£		
3	5	9	50	2.9	14	6	14	0.07	**4**	**.003**	22.25	22.25		
4	8	12	54	3.8	18	6	18	0.07	**4**	**.004**	21.84	21.84		
5	9	16	54	4.8	18	6	18	0.12	**4**	**.005**	21.84	21.84		
6	10	16	54	5.8	–	6	18	0.12	**4**	**.006**	20.60	20.60		
8	12	20	58	7.7	–	8	22	0.12	**4**	**.008**	31.31	31.31		
10	15	24	66	9.5	–	10	26	0.2	**4**	**.010**	40.80	40.80		
12	18	26	73	11.5	–	12	28	0.2	**4**	**.012**	55.63	55.63		
16	24	32	82	15.5	–	16	34	0.2	**4**	**.016**	88.67	88.67		
20	30	40	92	19.5	–	20	42	0.3	**4**	**.020**	137.36	137.36		

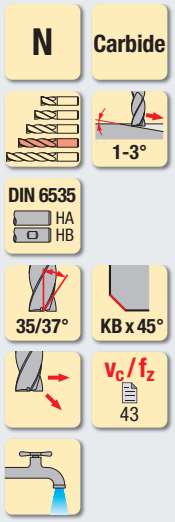
Machining example – 1.4404, with coolant



Article no.:		2569T.012
Tool diameter:	[d_1]	12 mm
Cutting speed:	[v_c]	170 m/min
Feed per tooth:	[f_z]	0,066 mm
Axial depth of cut:	[a_p]	25 mm
Radial depth of cut:	[a_e]	2 mm
Speed:	[n]	4 500 rev./min
Feed speed:	[v_f]	1 200 mm/min



Design l_4:



Inox

Coating — **TIN/TIALN**

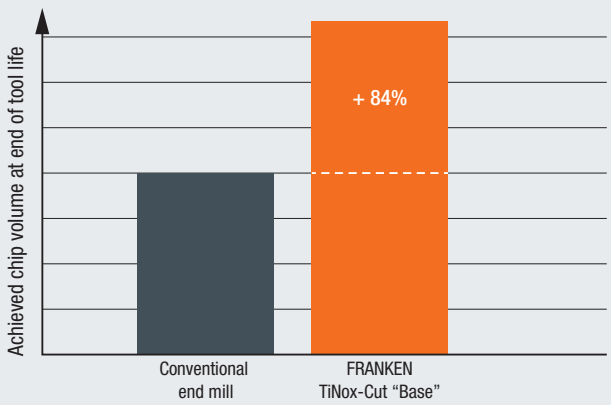
P	1.1-3.1	4.1-5.1
M	1.1-4.1	
K	1.1-2.2	3.1-4.2
N	1.1-1.3	
N	2.1-2.8	5.2
S	1.1	1.2-1.3
S	2.1	2.2-2.6
H	1.1	1.2

- High performance tool
- Finishing end mill for tough materials
- Special geometry prevents vibration
- Variable spacing
- Especially suitable for stainless steel materials
- Suitable for HPC roughing and finishing

Long design

Order code											2568T	2569T		
ø d_1 h10	l_2	l_3	l_1	ø d_3	l_4	ø d_2 h6	l_A	KB	Flutes	Dimens. Code	£	£		
3	8	14	57	2.9	20	6	21	0.07	**4**	**.003**	24.32	24.32		
4	11	18	57	3.8	20	6	21	0.07	**4**	**.004**	23.91	23.91		
5	13	19	57	4.8	20	6	21	0.12	**4**	**.005**	23.07	23.07		
6	13	20	57	5.8	–	6	21	0.12	**4**	**.006**	22.25	22.25		
8	21	25	63	7.7	–	8	27	0.12	**4**	**.008**	35.03	35.03		
10	22	30	72	9.5	–	10	32	0.2	**4**	**.010**	46.16	46.16		
12	26	35	83	11.5	–	12	38	0.2	**4**	**.012**	61.72	61.72		
14	26	35	83	13.5	–	16	38	0.2	**4**	**.014**	83.85	83.85		
16	36	42	92	15.5	–	16	44	0.2	**4**	**.016**	94.58	94.58		
20	41	52	104	19.5	–	20	54	0.3	**4**	**.020**	149.53	149.53		

Machining example – 1.4301, dry machining

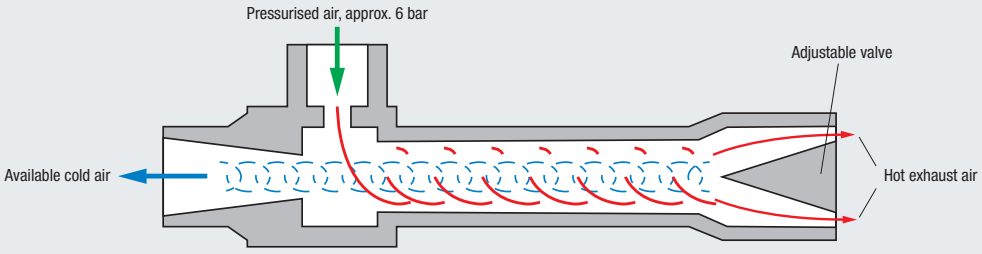


Article no.:		2569T.020
Tool diameter:	[d_1]	20 mm
Cutting speed:	[v_c]	80 m/min
Feed per tooth:	[f_z]	0.075 mm
Axial depth of cut:	[a_p]	24 mm
Radial depth of cut:	[a_e]	2-18 mm
Speed:	[n]	1 273 rev./min
Feed speed:	[v_f]	382 mm/min

Cooled air reduces temperatures in the cutting area, which in turn permits higher cutting speeds and longer tool life. This type of cooling enables modern coatings to achieve their full potential, as damage to the cutting edge resulting from thermal shock is avoided.

Moreover, the cold-air nozzle helps to remove the tiny chips produced in copy milling even from deep recesses or cavities.

The function of the cold-air nozzle is based on the principle of the vortex tube, in which two opposed, rotating air streams are generated (without any moving parts). The internal air stream exits from one end, in the form of useable cold air with a temperature as low as -40 °C. All that is required is a normal pressurised air connection.



Temperature, measured at the effective exit of the vortex tube (not the end of the nozzle)

Supply air pressure	Temperature of usable air in °C, with a cold air percentage of		
bar	25%	50%	75%
3	-31	-22	- 6
4	-35	-35	- 8
5	-39	-28	-10
6	-42	-31	-11
7	-46	-34	-13

Air consumption, with supply air temperature of 21 °C

Input pressure	Air consumption	Capacity
bar		
6.9	7.08 l/s ≙ 25.5 m^3/h	226 kcal/h ≙ 263 W

Application example: Increased tool life using the cold-air nozzle

Workpiece: **Hardened mould, material hot work tool steel 1.2343 (X38CrMoV5-1) with 46-48 HRC**

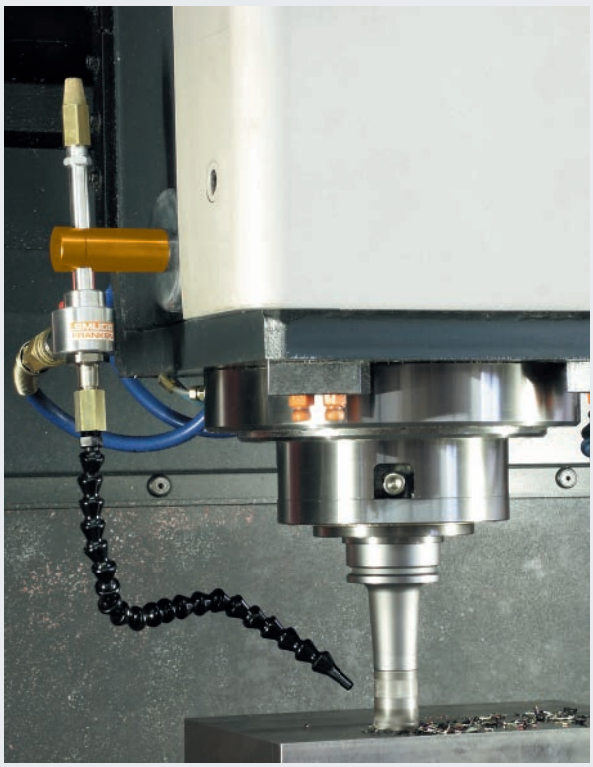
Operation: Roughing the mould

Tool: Time-S-Cut screw-in end mill 9130.350524 (Catalogue 250, page 218) with inserts 9585A.08015 (Catalogue 250, page 216)

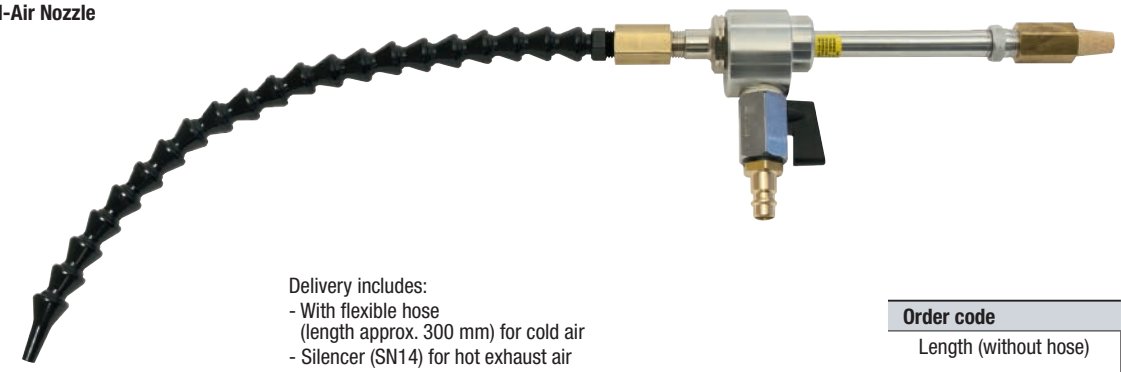
Cutting conditions: v_c = 150 m/min · n = 1364 rpm
f_z = 1.11 mm · v_f = 6057 mm/min
a_p = 0.4 mm · a_e = 20 mm

Tool life without coolant	**Tool life with cold-air nozzle**
50 minutes	**68 minutes**

By using the cold-air nozzle, it was possible to increase the tool life by 36%.



Cold-Air Nozzle



Delivery includes:
- With flexible hose (length approx. 300 mm) for cold air
- Silencer (SN14) for hot exhaust air
- Ball-valve with fitting (1/4") for inlet hose (6 mm) with quick-change attachment (7.2 mm)

Order code		6910
Length (without hose)	Dimens. Code	£
225 mm	.15	333.44

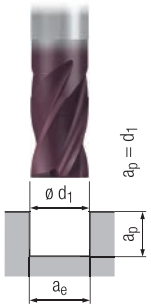
Socket with Magnetic Shoe

Order code		6910
Dimensions	Dimens. Code	£
dia. 80 x 80 mm	.25	132.32

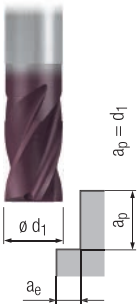
Solid carbide end mills – short design

N

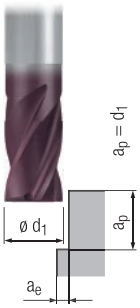
Valid for
1916A
1917A
2516A
2517A



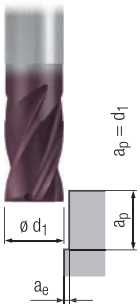
$a_e = d_1$



$a_e = 0.4 \times d_1$



$a_e = 0.2 \times d_1$



$a_e = 0.02 \times d_1$

		v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]			MMS MQL	
P	1.1	170	0.005 x d_1	190	0.006 x d_1	200	0.007 x d_1	240	0.008 x d_1	□	■	□	■
	2.1	150	0.004 x d_1	170	0.005 x d_1	180	0.006 x d_1	210	0.007 x d_1	□	■	□	■
	3.1	130	0.004 x d_1	140	0.005 x d_1	160	0.005 x d_1	180	0.006 x d_1	□	■	□	■
	4.1	120	0.003 x d_1	130	0.004 x d_1	140	0.004 x d_1	170	0.005 x d_1	□	■		
	5.1	100	0.003 x d_1	110	0.003 x d_1	120	0.004 x d_1	140	0.004 x d_1	□	■		
M	1.1	80	0.003 x d_1	90	0.004 x d_1	100	0.004 x d_1	110	0.005 x d_1			□	■
	2.1	70	0.003 x d_1	80	0.004 x d_1	80	0.004 x d_1	100	0.005 x d_1			□	■
	3.1	50	0.002 x d_1	60	0.003 x d_1	60	0.003 x d_1	70	0.004 x d_1			□	■
	4.1	30	0.002 x d_1	30	0.003 x d_1	40	0.003 x d_1	40	0.004 x d_1			□	■
K	1.1	170	0.005 x d_1	190	0.006 x d_1	200	0.007 x d_1	240	0.008 x d_1	□	■		
	1.2	170	0.005 x d_1	190	0.006 x d_1	200	0.007 x d_1	240	0.008 x d_1	□	■		
	2.1	150	0.004 x d_1	170	0.005 x d_1	180	0.006 x d_1	210	0.006 x d_1	□	■		
	2.2	150	0.004 x d_1	170	0.005 x d_1	180	0.006 x d_1	210	0.006 x d_1	□	■		
	3.1	130	0.004 x d_1	140	0.005 x d_1	160	0.006 x d_1	180	0.006 x d_1	□	■		
	3.2	130	0.004 x d_1	140	0.005 x d_1	160	0.006 x d_1	180	0.006 x d_1	□	■		
	4.1	100	0.003 x d_1	110	0.004 x d_1	120	0.004 x d_1	140	0.005 x d_1	□	■		
	4.2	80	0.003 x d_1	90	0.004 x d_1	100	0.004 x d_1	110	0.005 x d_1	□	■		
N	1.1	220	0.009 x d_1	250	0.010 x d_1	280	0.011 x d_1	300	0.013 x d_1			□	■
	1.2	220	0.008 x d_1	250	0.009 x d_1	280	0.010 x d_1	300	0.011 x d_1			□	■
	1.3	220	0.007 x d_1	250	0.008 x d_1	280	0.009 x d_1	300	0.010 x d_1			□	■
	1.4	200	0.008 x d_1	250	0.009 x d_1	280	0.010 x d_1	300	0.011 x d_1			□	■
	1.5												
	1.6												
	2.1	150	0.005 x d_1	170	0.006 x d_1	180	0.007 x d_1	210	0.008 x d_1			□	■
	2.2	150	0.005 x d_1	170	0.006 x d_1	180	0.007 x d_1	210	0.008 x d_1			□	■
	2.3	150	0.005 x d_1	170	0.006 x d_1	180	0.007 x d_1	210	0.008 x d_1		□	□	■
	2.4	130	0.004 x d_1	140	0.005 x d_1	160	0.006 x d_1	180	0.006 x d_1			□	■
	2.5	130	0.004 x d_1	140	0.005 x d_1	160	0.006 x d_1	180	0.006 x d_1			□	■
	2.6	130	0.004 x d_1	140	0.005 x d_1	160	0.006 x d_1	180	0.006 x d_1		□	□	■
	2.7	80	0.003 x d_1	90	0.004 x d_1	100	0.004 x d_1	110	0.005 x d_1			□	■
	2.8	80	0.003 x d_1	90	0.004 x d_1	100	0.004 x d_1	110	0.005 x d_1			□	■
	3.1	340	0.009 x d_1	370	0.011 x d_1	410	0.013 x d_1	480	0.014 x d_1			□	■
	3.2	340	0.007 x d_1	370	0.008 x d_1	410	0.010 x d_1	480	0.011 x d_1			□	■
	4.1	340	0.008 x d_1	370	0.009 x d_1	410	0.011 x d_1	480	0.012 x d_1		□	□	■
	4.2	500	0.008 x d_1	550	0.009 x d_1	600	0.011 x d_1	700	0.012 x d_1			□	■
	4.3												
	4.4												
	5.1												
	5.2	80	0.003 x d_1	90	0.004 x d_1	100	0.004 x d_1	110	0.005 x d_1				■
	5.3												
S	1.1	80	0.004 x d_1	90	0.004 x d_1	100	0.005 x d_1	110	0.006 x d_1				■
	1.2	70	0.003 x d_1	80	0.004 x d_1	80	0.004 x d_1	100	0.005 x d_1				■
	1.3	40	0.003 x d_1	40	0.003 x d_1	50	0.004 x d_1	60	0.004 x d_1				■
	2.1	70	0.002 x d_1	80	0.002 x d_1	80	0.003 x d_1	100	0.003 x d_1				■
	2.2	30	0.002 x d_1	30	0.002 x d_1	35	0.003 x d_1	40	0.003 x d_1				■
	2.3	20	0.002 x d_1	25	0.002 x d_1	25	0.003 x d_1	30	0.003 x d_1				■
	2.4	20	0.002 x d_1	25	0.002 x d_1	25	0.003 x d_1	30	0.003 x d_1				■
	2.5	20	0.002 x d_1	20	0.002 x d_1	20	0.003 x d_1	30	0.003 x d_1				■
	2.6	20	0.002 x d_1	20	0.002 x d_1	20	0.003 x d_1	30	0.003 x d_1				■
H	1.1	100	0.003 x d_1	110	0.003 x d_1	120	0.004 x d_1	140	0.004 x d_1	□	■		
	1.2	80	0.003 x d_1	90	0.003 x d_1	100	0.004 x d_1	110	0.004 x d_1	□	■		
	1.3			90	0.003 x d_1	100	0.003 x d_1	110	0.004 x d_1	□	■		
	1.4												
	1.5												

■ = very suitable □ = suitable

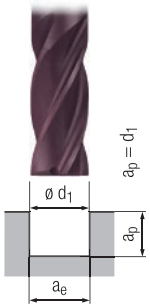
FRANKEN TOP-Cut

Solid carbide end mills – long design

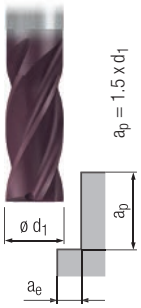
N

Valid for

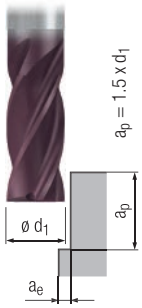
1998A 2519A 2698A
1999A 2522A 2699A
2518A 2523A



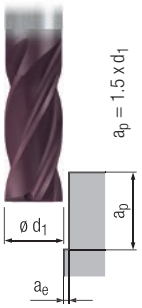
$a_e = d_1$



$a_e = 0.4 \times d_1$



$a_e = 0.2 \times d_1$



$a_e = 0.02 \times d_1$

		v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]			MMS MQL	
P	1.1	140	0.005 x d_1	150	0.005 x d_1	170	0.006 x d_1	200	0.007 x d_1	□	■	□	■
	2.1	130	0.004 x d_1	140	0.005 x d_1	160	0.005 x d_1	180	0.006 x d_1	□	■	□	■
	3.1	110	0.004 x d_1	120	0.004 x d_1	130	0.005 x d_1	150	0.005 x d_1	□	■	□	■
	4.1	100	0.003 x d_1	110	0.003 x d_1	120	0.004 x d_1	140	0.004 x d_1	□	■		
	5.1	90	0.003 x d_1	100	0.003 x d_1	110	0.003 x d_1	130	0.004 x d_1	□	■		
M	1.1	70	0.003 x d_1	80	0.003 x d_1	80	0.004 x d_1	100	0.004 x d_1			□	■
	2.1	60	0.003 x d_1	70	0.003 x d_1	70	0.004 x d_1	80	0.004 x d_1			□	■
	3.1	40	0.002 x d_1	40	0.003 x d_1	50	0.003 x d_1	60	0.003 x d_1			□	■
	4.1	30	0.002 x d_1	30	0.003 x d_1	40	0.003 x d_1	40	0.003 x d_1			□	■
K	1.1	140	0.005 x d_1	150	0.006 x d_1	170	0.006 x d_1	200	0.007 x d_1	□	■		
	1.2	140	0.005 x d_1	150	0.006 x d_1	170	0.006 x d_1	200	0.007 x d_1	□	■		
	2.1	130	0.004 x d_1	140	0.005 x d_1	160	0.005 x d_1	180	0.006 x d_1	□	■		
	2.2	130	0.004 x d_1	140	0.005 x d_1	160	0.005 x d_1	180	0.006 x d_1	□	■		
	3.1	110	0.004 x d_1	120	0.005 x d_1	130	0.005 x d_1	150	0.006 x d_1	□	■		
	3.2	110	0.004 x d_1	120	0.005 x d_1	130	0.005 x d_1	150	0.006 x d_1	□	■		
	4.1	90	0.003 x d_1	100	0.003 x d_1	110	0.004 x d_1	130	0.004 x d_1	□	■		
	4.2	70	0.003 x d_1	80	0.003 x d_1	80	0.004 x d_1	100	0.004 x d_1	□	■		
N	1.1	220	0.009 x d_1	250	0.010 x d_1	280	0.011 x d_1	300	0.013 x d_1			□	■
	1.2	220	0.008 x d_1	250	0.009 x d_1	280	0.010 x d_1	300	0.011 x d_1			□	■
	1.3	220	0.007 x d_1	250	0.008 x d_1	280	0.009 x d_1	300	0.010 x d_1			□	■
	1.4	200	0.008 x d_1	250	0.009 x d_1	280	0.010 x d_1	300	0.011 x d_1			□	■
	1.5												
	1.6												
	2.1	130	0.005 x d_1	140	0.006 x d_1	160	0.006 x d_1	180	0.007 x d_1			□	■
	2.2	130	0.005 x d_1	140	0.006 x d_1	160	0.006 x d_1	180	0.007 x d_1			□	■
	2.3	130	0.005 x d_1	140	0.006 x d_1	160	0.006 x d_1	180	0.007 x d_1		□	□	■
	2.4	120	0.004 x d_1	130	0.005 x d_1	140	0.005 x d_1	170	0.006 x d_1			□	■
	2.5	120	0.004 x d_1	130	0.005 x d_1	140	0.005 x d_1	170	0.006 x d_1			□	■
	2.6	120	0.004 x d_1	130	0.005 x d_1	140	0.005 x d_1	170	0.006 x d_1		□	□	■
	2.7	70	0.003 x d_1	80	0.003 x d_1	80	0.004 x d_1	100	0.004 x d_1			□	■
	2.8	70	0.003 x d_1	80	0.003 x d_1	80	0.004 x d_1	100	0.004 x d_1			□	■
	3.1	290	0.009 x d_1	320	0.010 x d_1	350	0.011 x d_1	410	0.013 x d_1			□	■
	3.2	290	0.007 x d_1	320	0.008 x d_1	350	0.009 x d_1	410	0.010 x d_1			□	■
	4.1	290	0.008 x d_1	320	0.009 x d_1	350	0.009 x d_1	410	0.011 x d_1		□	□	■
	4.2	430	0.008 x d_1	470	0.009 x d_1	520	0.009 x d_1	600	0.011 x d_1			□	■
	4.3												
	4.4												
	5.1												
	5.2	70	0.003 x d_1	80	0.003 x d_1	80	0.004 x d_1	100	0.004 x d_1				■
	5.3												
S	1.1	70	0.004 x d_1	80	0.004 x d_1	80	0.004 x d_1	100	0.005 x d_1				■
	1.2	60	0.003 x d_1	70	0.003 x d_1	70	0.004 x d_1	80	0.004 x d_1				■
	1.3	40	0.003 x d_1	40	0.003 x d_1	50	0.003 x d_1	60	0.004 x d_1				■
	2.1	60	0.002 x d_1	70	0.002 x d_1	70	0.003 x d_1	80	0.003 x d_1				■
	2.2	20	0.002 x d_1	20	0.002 x d_1	15	0.003 x d_1	30	0.003 x d_1				■
	2.3	20	0.002 x d_1	25	0.002 x d_1	25	0.003 x d_1	30	0.003 x d_1				■
	2.4	20	0.002 x d_1	25	0.002 x d_1	25	0.003 x d_1	30	0.003 x d_1				■
	2.5	20	0.002 x d_1	20	0.002 x d_1	20	0.003 x d_1	30	0.003 x d_1				■
	2.6	20	0.002 x d_1	20	0.002 x d_1	20	0.003 x d_1	30	0.003 x d_1				■
H	1.1	90	0.003 x d_1	100	0.003 x d_1	110	0.003 x d_1	130	0.004 x d_1	□	■		
	1.2	70	0.003 x d_1	80	0.003 x d_1	80	0.003 x d_1	100	0.004 x d_1	□	■		
	1.3			70	0.003 x d_1	70	0.003 x d_1	80	0.003 x d_1	□	■		
	1.4												
	1.5												

v_c = Cutting speed f_z = Feed per tooth

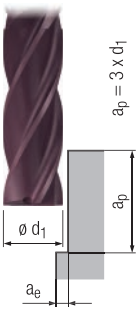
Solid carbide end mills – extra long design

N

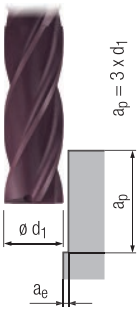
Valid for

2524A 2526A 2528A
2525A 2527A 2529A

3 x d_1

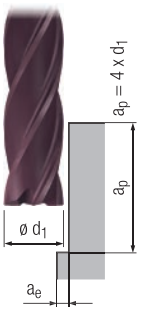


$a_e = 0.1 \times d_1$

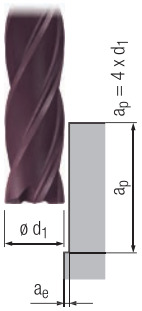


$a_e = 0.02 \times d_1$

4 x d_1



$a_e = 0.05 \times d_1$



$a_e = 0.02 \times d_1$

		v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]			MMS MQL	
P	1.1	120	0.005 x d_1	140	0.006 x d_1	100	0.005 x d_1	120	0.005 x d_1	□	■	□	■
	2.1	110	0.004 x d_1	130	0.005 x d_1	90	0.004 x d_1	110	0.005 x d_1	□	■	□	■
	3.1	90	0.004 x d_1	110	0.005 x d_1	70	0.004 x d_1	90	0.004 x d_1	□	■	□	■
	4.1	70	0.003 x d_1	80	0.004 x d_1	60	0.003 x d_1	70	0.003 x d_1	□	■		
	5.1	60	0.003 x d_1	70	0.003 x d_1	50	0.003 x d_1	60	0.003 x d_1	□	■		
M	1.1	120	0.003 x d_1	140	0.004 x d_1	100	0.003 x d_1	120	0.003 x d_1			□	■
	2.1	100	0.003 x d_1	120	0.004 x d_1	80	0.003 x d_1	100	0.003 x d_1			□	■
	3.1	70	0.003 x d_1	80	0.003 x d_1	60	0.003 x d_1	70	0.003 x d_1			□	■
	4.1	50	0.003 x d_1	60	0.003 x d_1	40	0.003 x d_1	50	0.003 x d_1			□	■
K	1.1	120	0.005 x d_1	140	0.006 x d_1	100	0.005 x d_1	120	0.006 x d_1	□	■		
	1.2	120	0.005 x d_1	140	0.006 x d_1	100	0.005 x d_1	120	0.006 x d_1	□	■		
	2.1	110	0.004 x d_1	130	0.005 x d_1	90	0.004 x d_1	110	0.004 x d_1	□	■		
	2.2	110	0.004 x d_1	130	0.005 x d_1	90	0.004 x d_1	110	0.004 x d_1	□	■		
	3.1	90	0.004 x d_1	110	0.005 x d_1	70	0.004 x d_1	90	0.004 x d_1	□	■		
	3.2	90	0.004 x d_1	110	0.005 x d_1	70	0.004 x d_1	90	0.004 x d_1	□	■		
	4.1	70	0.003 x d_1	80	0.004 x d_1	60	0.003 x d_1	70	0.003 x d_1	□	■		
	4.2	60	0.003 x d_1	70	0.004 x d_1	50	0.003 x d_1	60	0.003 x d_1	□	■		
N	1.1	360	0.009 x d_1	430	0.011 x d_1	300	0.009 x d_1	430	0.009 x d_1			□	■
	1.2	360	0.008 x d_1	430	0.010 x d_1	300	0.008 x d_1	430	0.009 x d_1			□	■
	1.3	360	0.007 x d_1	430	0.008 x d_1	300	0.007 x d_1	430	0.008 x d_1			□	■
	1.4	240	0.008 x d_1	290	0.010 x d_1	200	0.008 x d_1	290	0.009 x d_1			□	■
	1.5	230	0.007 x d_1	280	0.008 x d_1	180	0.007 x d_1	280	0.008 x d_1			□	■
	1.6	160	0.006 x d_1	190	0.007 x d_1	130	0.006 x d_1	190	0.007 x d_1			□	■
	2.1	110	0.005 x d_1	130	0.006 x d_1	90	0.005 x d_1	110	0.006 x d_1			□	■
	2.2	110	0.005 x d_1	130	0.006 x d_1	90	0.005 x d_1	110	0.006 x d_1			□	■
	2.3	110	0.005 x d_1	130	0.006 x d_1	90	0.005 x d_1	110	0.006 x d_1		□	□	■
	2.4	100	0.004 x d_1	120	0.005 x d_1	80	0.004 x d_1	100	0.004 x d_1			□	■
	2.5	100	0.004 x d_1	120	0.005 x d_1	80	0.004 x d_1	100	0.004 x d_1			□	■
	2.6	100	0.004 x d_1	120	0.005 x d_1	80	0.004 x d_1	100	0.004 x d_1		□	□	■
	2.7	60	0.003 x d_1	70	0.004 x d_1	50	0.003 x d_1	60	0.003 x d_1			□	■
	2.8	60	0.003 x d_1	70	0.004 x d_1	50	0.003 x d_1	60	0.003 x d_1			□	■
	3.1												
	3.2												
	4.1												
	4.2												
	4.3												
	4.4												
	5.1												
	5.2	60	0.003 x d_1	70	0.004 x d_1	50	0.003 x d_1	60	0.003 x d_1				■
	5.3												
S	1.1	90	0.004 x d_1	100	0.005 x d_1	70	0.004 x d_1	80	0.004 x d_1				■
	1.2	70	0.003 x d_1	80	0.004 x d_1	60	0.003 x d_1	70	0.003 x d_1				■
	1.3	70	0.003 x d_1	80	0.003 x d_1	60	0.003 x d_1	70	0.003 x d_1				■
	2.1	70	0.004 x d_1	80	0.004 x d_1	60	0.004 x d_1	70	0.004 x d_1				■
	2.2	30	0.003 x d_1	40	0.004 x d_1	15	0.003 x d_1	30	0.003 x d_1				■
	2.3	20	0.002 x d_1	25	0.002 x d_1	25	0.002 x d_1	20	0.002 x d_1				■
	2.4	30	0.003 x d_1	45	0.003 x d_1	25	0.003 x d_1	30	0.003 x d_1				■
	2.5	20	0.002 x d_1	20	0.002 x d_1	20	0.002 x d_1	20	0.002 x d_1				■
	2.6	20	0.003 x d_1	20	0.003 x d_1	20	0.003 x d_1	20	0.003 x d_1				■
H	1.1												
	1.2												
	1.3												
	1.4												
	1.5												

■ = very suitable □ = suitable

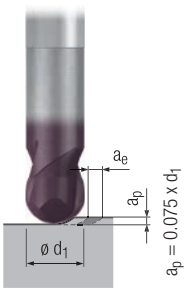
FRANKEN TOP-Cut

Solid carbide ball nose end mills – short and extra long design

N

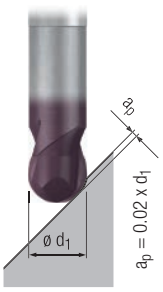
Valid for
2550A
2551A

Roughing



$a_e = 0.2 \times d_1$

Finishing



Please note:
For uncoated design, please reduce cutting speed v_c by 30%!

		v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]			MMS MQL	
P	1.1	220	0.014 x d_1	300	0.010 x d_1	□	■	□	■
	2.1	190	0.013 x d_1	260	0.009 x d_1	□	■	□	■
	3.1	160	0.011 x d_1	220	0.008 x d_1	□	■	□	
	4.1	130	0.010 x d_1	180	0.007 x d_1	□	■	□	
	5.1	110	0.008 x d_1	150	0.006 x d_1	□	■	□	
M	1.1	110	0.008 x d_1	150	0.006 x d_1			□	■
	2.1	90	0.008 x d_1	120	0.006 x d_1			□	■
	3.1	70	0.006 x d_1	90	0.005 x d_1			□	■
	4.1	50	0.006 x d_1	70	0.005 x d_1			□	■
K	1.1	220	0.014 x d_1	300	0.010 x d_1	□	■		□
	1.2	220	0.014 x d_1	300	0.010 x d_1	□	■		□
	2.1	200	0.011 x d_1	260	0.008 x d_1	□	■		□
	2.2	200	0.011 x d_1	260	0.008 x d_1	□	■		□
	3.1	160	0.011 x d_1	220	0.008 x d_1	□	■		
	3.2	160	0.011 x d_1	220	0.008 x d_1	□	■		
	4.1	130	0.008 x d_1	180	0.006 x d_1	□	■		
	4.2	110	0.008 x d_1	150	0.006 x d_1	□	■		
N	1.1								
	1.2	900	0.020 x d_1	1200	0.014 x d_1			□	■
	1.3	900	0.017 x d_1	1200	0.012 x d_1			□	■
	1.4	600	0.020 x d_1	800	0.014 x d_1			□	■
	1.5								
	1.6								
	2.1	200	0.014 x d_1	260	0.010 x d_1			□	■
	2.2	200	0.014 x d_1	260	0.010 x d_1			□	■
	2.3	200	0.014 x d_1	260	0.010 x d_1	□	□	□	■
	2.4	160	0.011 x d_1	220	0.008 x d_1			□	■
	2.5	160	0.011 x d_1	220	0.008 x d_1			□	■
	2.6	160	0.011 x d_1	220	0.008 x d_1	□	□	□	■
	2.7	100	0.008 x d_1	130	0.006 x d_1			□	■
	2.8	100	0.008 x d_1	130	0.006 x d_1			□	■
	3.1								
	3.2								
	4.1								
	4.2								
	4.3								
	4.4								
	5.1								
	5.2	110	0.008 x d_1	150	0.006 x d_1			□	■
	5.3								
S	1.1								
	1.2								
	1.3								
	2.1	80	0.008 x d_1	110	0.006 x d_1			□	■
	2.2	30	0.006 x d_1	50	0.004 x d_1			□	■
	2.3	30	0.006 x d_1	40	0.004 x d_1			□	■
	2.4	30	0.006 x d_1	40	0.004 x d_1			□	■
	2.5	20	0.006 x d_1	30	0.004 x d_1			□	■
	2.6	30	0.006 x d_1	40	0.004 x d_1			□	■
H	1.1			150	0.006 x d_1	□	■		
	1.2			130	0.005 x d_1	□	■		
	1.3								
	1.4								
	1.5								

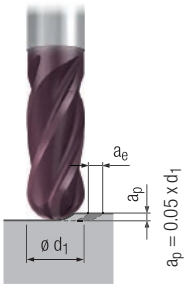
v_c = Cutting speed f_z = Feed per tooth

Solid carbide ball nose end mills – long and extra long design

N

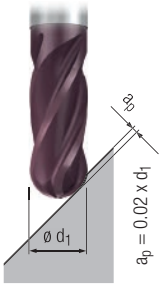
Valid for
2502A
2504A

Roughing



$a_e = 0.2 \times d_1$

Finishing



		v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]			MMS MQL	
P	**1.1**	200	$0.014 \times d_1$	270	$0.010 \times d_1$	□	■	□	■
	2.1	170	$0.013 \times d_1$	230	$0.009 \times d_1$	□	■	□	■
	3.1	140	$0.011 \times d_1$	200	$0.008 \times d_1$	□	■	□	
	4.1	110	$0.010 \times d_1$	160	$0.007 \times d_1$	□	■	□	
	5.1	100	$0.008 \times d_1$	130	$0.006 \times d_1$	□	■	□	
M	**1.1**	100	$0.008 \times d_1$	130	$0.006 \times d_1$			□	■
	2.1	80	$0.008 \times d_1$	110	$0.006 \times d_1$			□	■
	3.1	60	$0.006 \times d_1$	80	$0.005 \times d_1$			□	■
	4.1	40	$0.006 \times d_1$	60	$0.005 \times d_1$			□	■
K	**1.1**	200	$0.014 \times d_1$	270	$0.010 \times d_1$	□	■		□
	1.2	200	$0.014 \times d_1$	270	$0.010 \times d_1$	□	■		□
	2.1	180	$0.011 \times d_1$	230	$0.008 \times d_1$	□	■		□
	2.2	180	$0.011 \times d_1$	230	$0.008 \times d_1$	□	■		□
	3.1	140	$0.011 \times d_1$	200	$0.008 \times d_1$	□	■		
	3.2	140	$0.011 \times d_1$	200	$0.008 \times d_1$	□	■		
	4.1	110	$0.008 \times d_1$	160	$0.006 \times d_1$	□	■		
	4.2	100	$0.008 \times d_1$	130	$0.006 \times d_1$	□	■		
N	**1.1**								
	1.2								
	1.3								
	1.4								
	1.5								
	1.6								
	2.1	180	$0.014 \times d_1$	230	$0.010 \times d_1$			□	■
	2.2	180	$0.014 \times d_1$	230	$0.010 \times d_1$			□	■
	2.3	180	$0.014 \times d_1$	230	$0.010 \times d_1$	□	□	□	■
	2.4	140	$0.011 \times d_1$	200	$0.008 \times d_1$			□	■
	2.5	140	$0.011 \times d_1$	200	$0.008 \times d_1$			□	■
	2.6	140	$0.011 \times d_1$	200	$0.008 \times d_1$	□	□	□	■
	2.7	90	$0.008 \times d_1$	120	$0.006 \times d_1$			□	■
	2.8	90	$0.008 \times d_1$	120	$0.006 \times d_1$			□	■
	3.1								
	3.2								
	4.1	290	$0.020 \times d_1$	400	$0.015 \times d_1$		□	□	■
	4.2	430	$0.020 \times d_1$	580	$0.015 \times d_1$		□	□	■
	4.3								
	4.4								
	5.1								
	5.2	100	$0.008 \times d_1$	130	$0.006 \times d_1$			□	■
	5.3	180	$0.017 \times d_1$	270	$0.012 \times d_1$	□	■		■
S	**1.1**	100	$0.010 \times d_1$	130	$0.007 \times d_1$			□	■
	1.2	80	$0.008 \times d_1$	110	$0.006 \times d_1$			□	■
	1.3	40	$0.007 \times d_1$	60	$0.005 \times d_1$			□	■
	2.1	70	$0.008 \times d_1$	100	$0.006 \times d_1$			□	■
	2.2	25	$0.006 \times d_1$	40	$0.004 \times d_1$			□	■
	2.3	25	$0.006 \times d_1$	30	$0.004 \times d_1$			□	■
	2.4	25	$0.006 \times d_1$	30	$0.004 \times d_1$			□	■
	2.5	15	$0.006 \times d_1$	25	$0.004 \times d_1$			□	■
	2.6	25	$0.006 \times d_1$	30	$0.004 \times d_1$			□	■
H	**1.1**								
	1.2								
	1.3								
	1.4								
	1.5								

■ = very suitable □ = suitable

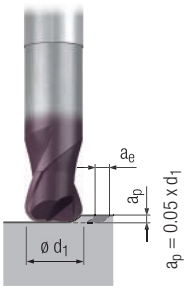
FRANKEN TOP-Cut

Solid carbide torus end mills – short and extra long design

N

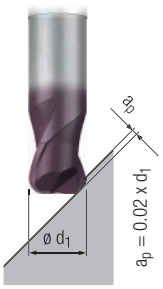
Valid for
2552A
2553A

Roughing



a_e = 0.4 x d_1

Finishing



Please note:
For uncoated design, please reduce cutting speed v_c by 30%!

		v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]			MMS MQL	
P	1.1	220	0.014 x d1	300	0.010 x d_1	□	■	□	■
	2.1	190	0.013 x d1	260	0.009 x d_1	□	■	□	■
	3.1	160	0.011 x d1	220	0.008 x d_1	□	■	□	
	4.1	130	0.010 x d1	180	0.007 x d_1	□	■	□	
	5.1	110	0.008 x d1	150	0.006 x d_1	□	■	□	
M	1.1	110	0.008 x d1	150	0.006 x d_1			□	■
	2.1	90	0.008 x d1	120	0.006 x d_1			□	■
	3.1	70	0.006 x d1	90	0.005 x d_1			□	■
	4.1	50	0.006 x d1	70	0.005 x d_1			□	■
K	1.1	220	0.014 x d1	300	0.010 x d_1	□	■		□
	1.2	220	0.014 x d1	300	0.010 x d_1	□	■		□
	2.1	200	0.011 x d1	260	0.008 x d_1	□	■		□
	2.2	200	0.011 x d1	260	0.008 x d_1	□	■		□
	3.1	160	0.011 x d1	220	0.008 x d_1	□	■		
	3.2	160	0.011 x d1	220	0.008 x d_1	□	■		
	4.1	130	0.008 x d1	180	0.006 x d_1	□	■		
	4.2	110	0.008 x d1	150	0.006 x d_1	□	■		
N	1.1								
	1.2	1000	0.020 x d1	1350	0.014 x d_1			□	■
	1.3	1000	0.017 x d1	1350	0.012 x d_1			□	■
	1.4	600	0.020 x d1	800	0.014 x d_1			□	■
	1.5								
	1.6								
	2.1	200	0.014 x d1	260	0.010 x d_1			□	■
	2.2	200	0.014 x d1	260	0.010 x d_1			□	■
	2.3	200	0.014 x d1	260	0.010 x d_1	□	□	□	■
	2.4	160	0.011 x d1	220	0.008 x d_1			□	■
	2.5	160	0.011 x d1	220	0.008 x d_1			□	■
	2.6	160	0.011 x d1	220	0.008 x d_1	□	□	□	■
	2.7	100	0.008 x d1	130	0.006 x d_1			□	■
	2.8	100	0.008 x d1	130	0.006 x d_1			□	■
	3.1								
	3.2								
	4.1								
	4.2								
	4.3								
	4.4								
	5.1								
	5.2	110	0.008 x d1	150	0.006 x d_1			□	■
	5.3								
S	1.1								
	1.2								
	1.3								
	2.1	80	0.008 x d1	110	0.006 x d_1			□	■
	2.2	30	0.006 x d1	50	0.004 x d_1			□	■
	2.3	30	0.006 x d1	40	0.004 x d_1			□	■
	2.4	30	0.006 x d1	40	0.004 x d_1			□	■
	2.5	20	0.006 x d1	30	0.004 x d_1			□	■
	2.6	30	0.006 x d1	40	0.004 x d_1			□	■
H	1.1			150	0.006 x d_1	□	■		
	1.2			130	0.005 x d_1	□	■		
	1.3								
	1.4								
	1.5								

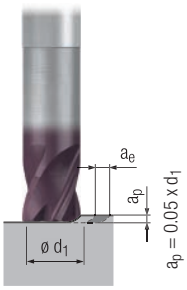
v_c = Cutting speed f_z = Feed per tooth

Solid carbide torus end mills – short and extra long design

N

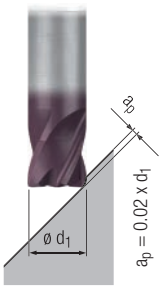
Valid for
2554A
2555A

Roughing



$a_e = 0.4 \times d_1$

Finishing



		v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]			MMS MQL	
P	**1.1**	220	0.014 x d_1	300	0.010 x d_1	□	■	□	■
	2.1	190	0.013 x d_1	260	0.009 x d_1	□	■	□	■
	3.1	160	0.011 x d_1	220	0.008 x d_1	□	■	□	
	4.1	130	0.010 x d_1	180	0.007 x d_1	□	■	□	
	5.1	110	0.008 x d_1	150	0.006 x d_1	□	■	□	
M	**1.1**	110	0.008 x d_1	150	0.006 x d_1			□	■
	2.1	90	0.008 x d_1	120	0.006 x d_1			□	■
	3.1								
	4.1								
K	**1.1**	220	0.014 x d_1	300	0.010 x d_1	□	■		□
	1.2	220	0.014 x d_1	300	0.010 x d_1	□	■		□
	2.1	200	0.011 x d_1	260	0.008 x d_1	□	■		□
	2.2	200	0.011 x d_1	260	0.008 x d_1	□	■		□
	3.1	160	0.011 x d_1	220	0.008 x d_1	□	■		
	3.2	160	0.011 x d_1	220	0.008 x d_1	□	■		
	4.1	130	0.008 x d_1	180	0.006 x d_1	□	■		
	4.2	110	0.008 x d_1	150	0.006 x d_1	□	■		
N	**1.1**								
	1.2								
	1.3								
	1.4								
	1.5								
	1.6								
	2.1	200	0.014 x d_1	260	0.010 x d_1			□	■
	2.2	200	0.014 x d_1	260	0.010 x d_1			□	■
	2.3	200	0.014 x d_1	260	0.010 x d_1	□	□	□	■
	2.4	160	0.011 x d_1	220	0.008 x d_1			□	■
	2.5	160	0.011 x d_1	220	0.008 x d_1			□	■
	2.6	160	0.011 x d_1	220	0.008 x d_1	□	□	□	■
	2.7	100	0.008 x d_1	130	0.006 x d_1			□	■
	2.8	100	0.008 x d_1	130	0.006 x d_1			□	■
	3.1								
	3.2								
	4.1								
	4.2								
	4.3								
	4.4								
	5.1								
	5.2	110	0.008 x d_1	150	0.006 x d_1			□	■
	5.3								
S	**1.1**	110	0.010 x d_1	150	0.007 x d_1			□	■
	1.2	90	0.008 x d_1	120	0.006 x d_1			□	■
	1.3	50	0.007 x d_1	70	0.005 x d_1			□	■
	2.1	80	0.008 x d_1	110	0.006 x d_1			□	■
	2.2	30	0.006 x d_1	50	0.004 x d_1			□	■
	2.3	30	0.006 x d_1	40	0.004 x d_1			□	■
	2.4	30	0.006 x d_1	40	0.004 x d_1			□	■
	2.5	20	0.006 x d_1	30	0.004 x d_1			□	■
	2.6	30	0.006 x d_1	40	0.004 x d_1			□	■
H	**1.1**			150	0.006 x d_1	□	■		
	1.2			130	0.005 x d_1	□	■		
	1.3								
	1.4								
	1.5								

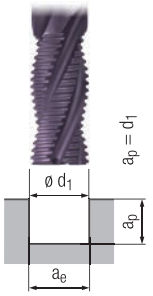
■ = very suitable □ = suitable

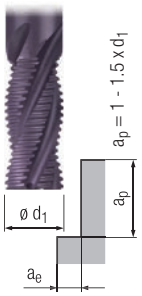
FRANKEN TOP-Cut

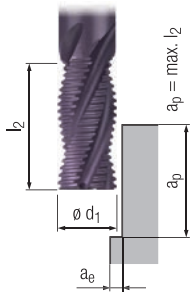
HSS end mills – extra short and short design

HR

Valid for
1351C
1381C



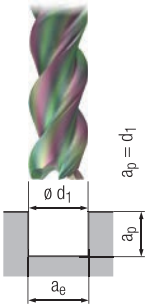




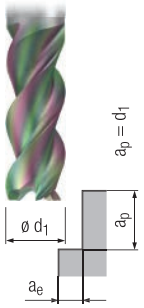
		v_c [m/min]	$a_e = d_1$ f_z [mm]		$a_e = 0.5 \times d_1$ f_z [mm]		$a_e = 0.25 \times d_1$ f_z [mm]					
		TICN	$d_1 < 32$ mm	$d_1 \geq 32$ mm	$d_1 < 32$ mm	$d_1 \geq 32$ mm	$d_1 < 32$ mm	$d_1 \geq 32$ mm			MMS MQL	
P	1.1	60	0.0035 x d_1	0.0034 x d_1	0.0046 x d_1	0.0036 x d_1	0.0056 x d_1	0.0044 x d_1			□	■
	2.1	55	0.0032 x d_1	0.0031 x d_1	0.0042 x d_1	0.0033 x d_1	0.0052 x d_1	0.0041 x d_1				■
	3.1	40	0.0029 x d_1	0.0028 x d_1	0.0038 x d_1	0.0030 x d_1	0.0047 x d_1	0.0037 x d_1				■
	4.1	38	0.0026 x d_1	0.0025 x d_1	0.0034 x d_1	0.0027 x d_1	0.0042 x d_1	0.0033 x d_1				■
	5.1	30	0.0026 x d_1	0.0025 x d_1	0.0034 x d_1	0.0027 x d_1	0.0042 x d_1	0.0033 x d_1				■
M	1.1	28	0.0029 x d_1	0.0028 x d_1	0.0038 x d_1	0.0030 x d_1	0.0047 x d_1	0.0037 x d_1				■
	2.1	24	0.0026 x d_1	0.0025 x d_1	0.0034 x d_1	0.0027 x d_1	0.0042 x d_1	0.0033 x d_1				■
	3.1	20	0.0023 x d_1	0.0022 x d_1	0.0030 x d_1	0.0024 x d_1	0.0038 x d_1	0.0030 x d_1				■
	4.1	18	0.0020 x d_1	0.0020 x d_1	0.0027 x d_1	0.0021 x d_1	0.0033 x d_1	0.0026 x d_1				■
K	1.1	48	0.0035 x d_1	0.0034 x d_1	0.0046 x d_1	0.0036 x d_1	0.0056 x d_1	0.0044 x d_1	□	□	□	■
	1.2	42	0.0032 x d_1	0.0031 x d_1	0.0042 x d_1	0.0033 x d_1	0.0052 x d_1	0.0041 x d_1	□	□	□	■
	2.1	38	0.0032 x d_1	0.0031 x d_1	0.0042 x d_1	0.0033 x d_1	0.0052 x d_1	0.0041 x d_1			□	■
	2.2	34	0.0029 x d_1	0.0028 x d_1	0.0038 x d_1	0.0030 x d_1	0.0047 x d_1	0.0037 x d_1			□	■
	3.1	29	0.0026 x d_1	0.0025 x d_1	0.0034 x d_1	0.0027 x d_1	0.0042 x d_1	0.0033 x d_1				■
	3.2	25	0.0026 x d_1	0.0025 x d_1	0.0034 x d_1	0.0027 x d_1	0.0042 x d_1	0.0033 x d_1				■
	4.1	40	0.0032 x d_1	0.0031 x d_1	0.0042 x d_1	0.0033 x d_1	0.0052 x d_1	0.0041 x d_1			□	■
	4.2	27	0.0029 x d_1	0.0028 x d_1	0.0038 x d_1	0.0030 x d_1	0.0047 x d_1	0.0037 x d_1			□	■
N	1.1											
	1.2											
	1.3											
	1.4											
	1.5											
	1.6											
	2.1	43	0.0035 x d_1	0.0034 x d_1	0.0046 x d_1	0.0036 x d_1	0.0056 x d_1	0.0044 x d_1				■
	2.2	47	0.0032 x d_1	0.0031 x d_1	0.0042 x d_1	0.0033 x d_1	0.0052 x d_1	0.0041 x d_1				■
	2.3	85	0.0035 x d_1	0.0034 x d_1	0.0046 x d_1	0.0036 x d_1	0.0056 x d_1	0.0044 x d_1			□	■
	2.4	44	0.0026 x d_1	0.0025 x d_1	0.0034 x d_1	0.0027 x d_1	0.0042 x d_1	0.0033 x d_1				■
	2.5	67	0.0029 x d_1	0.0028 x d_1	0.0038 x d_1	0.0030 x d_1	0.0047 x d_1	0.0037 x d_1			□	■
	2.6	77	0.0035 x d_1	0.0034 x d_1	0.0046 x d_1	0.0036 x d_1	0.0056 x d_1	0.0044 x d_1				■
	2.7											
	2.8											
	3.1											
	3.2											
	4.1		0.0058 x d_1	0.0056 x d_1	0.0076 x d_1	0.0060 x d_1	0.0094 x d_1	0.0074 x d_1				■
	4.2		0.0058 x d_1	0.0056 x d_1	0.0076 x d_1	0.0060 x d_1	0.0094 x d_1	0.0074 x d_1				■
	4.3											
	4.4											
	5.1											
	5.2	28	0.0026 x d_1	0.0025 x d_1	0.0034 x d_1	0.0027 x d_1	0.0042 x d_1	0.0033 x d_1				■
	5.3											
S	1.1	40	0.0029 x d_1	0.0028 x d_1	0.0038 x d_1	0.0030 x d_1	0.0047 x d_1	0.0037 x d_1				■
	1.2	28	0.0026 x d_1	0.0025 x d_1	0.0034 x d_1	0.0027 x d_1	0.0042 x d_1	0.0033 x d_1				■
	1.3											
	2.1	26	0.0029 x d_1	0.0028 x d_1	0.0038 x d_1	0.0030 x d_1	0.0047 x d_1	0.0037 x d_1				■
	2.2	12	0.0023 x d_1	0.0022 x d_1	0.0030 x d_1	0.0024 x d_1	0.0038 x d_1	0.0030 x d_1				■
	2.3											
	2.4											
	2.5											
	2.6											
H	1.1											
	1.2											
	1.3											
	1.4											
	1.5											

v_c = Cutting speed f_z = Feed per tooth

W



$a_e = d_1$



$a_e = 0.4 \times d_1$

Valid for

2544	2545K	2547
2544K	2546	2547K
2545	2546K	

Please note:
For uncoated design, please reduce cutting speed v_c by 30%!

		v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]			MMS MQL	
P	1.1								
	2.1								
	3.1								
	4.1								
	5.1								
M	1.1								
	2.1								
	3.1								
	4.1								
K	1.1								
	1.2								
	2.1								
	2.2								
	3.1								
	3.2								
	4.1								
	4.2								
N	1.1	300	0.006 x d_1	420	0.011 x d_1			□	■
	1.2	430	0.005 x d_1	620	0.010 x d_1			□	■
	1.3	385	0.005 x d_1	550	0.008 x d_1			□	■
	1.4	270	0.005 x d_1	380	0.010 x d_1			□	■
	1.5								
	1.6								
	2.1	100	0.005 x d_1	160	0.006 x d_1		□	□	■
	2.2	100	0.005 x d_1	160	0.006 x d_1		□	□	■
	2.3	100	0.005 x d_1	160	0.006 x d_1		□	□	■
	2.4	80	0.004 x d_1	140	0.005 x d_1		□	□	■
	2.5	80	0.004 x d_1	140	0.005 x d_1		□	□	■
	2.6	80	0.004 x d_1	140	0.005 x d_1		□	□	■
	2.7	60	0.003 x d_1	100	0.004 x d_1				■
	2.8								
	3.1								
	3.2								
	4.1								
	4.2								
	4.3								
	4.4								
	5.1								
	5.2								
	5.3								
S	1.1								
	1.2								
	1.3								
	2.1								
	2.2								
	2.3								
	2.4								
	2.5								
	2.6								
H	1.1								
	1.2								
	1.3								
	1.4								
	1.5								

■ = very suitable □ = suitable

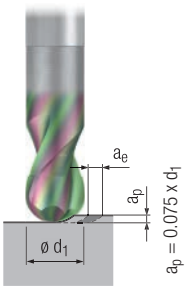
FRANKEN Alu-Cut

Solid carbide ball nose end mills – short design

W

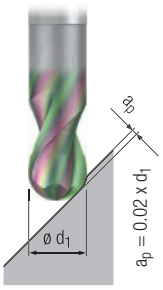
Valid for
2452K

Roughing



a_e = 0.2 x d_1

Finishing



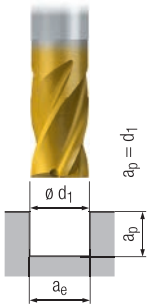
		v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]			MMS MQL	
P	1.1								
	2.1								
	3.1								
	4.1								
	5.1								
M	1.1								
	2.1								
	3.1								
	4.1								
K	1.1								
	1.2								
	2.1								
	2.2								
	3.1								
	3.2								
	4.1								
	4.2								
N	1.1	900	0.022 x d_1	1200	0.016 x d_1			□	■
	1.2	900	0.020 x d_1	1200	0.014 x d_1			□	■
	1.3	900	0.017 x d_1	1200	0.012 x d_1			□	■
	1.4	600	0.020 x d_1	800	0.014 x d_1			□	■
	1.5								
	1.6								
	2.1	200	0.014 x d_1	260	0.010 x d_1			□	■
	2.2	200	0.014 x d_1	260	0.010 x d_1			□	■
	2.3	200	0.014 x d_1	260	0.010 x d_1	□	□	□	■
	2.4	160	0.011 x d_1	220	0.008 x d_1			□	■
	2.5	160	0.011 x d_1	220	0.008 x d_1			□	■
	2.6	160	0.011 x d_1	220	0.008 x d_1	□	□	□	■
	2.7	100	0.008 x d_1	140	0.006 x d_1			□	■
	2.8	100	0.008 x d_1	140	0.006 x d_1			□	■
	3.1	450	0.025 x d_1	600	0.018 x d_1			□	■
	3.2	450	0.020 x d_1	600	0.014 x d_1			□	■
	4.1	350	0.021 x d_1	450	0.015 x d_1		□	□	■
	4.2	500	0.021 x d_1	650	0.015 x d_1		□	□	■
	4.3	200	0.017 x d_1	250	0.012 x d_1		□	□	■
	4.4	140	0.017 x d_1	180	0.012 x d_1		□	□	■
	5.1								
	5.2								
	5.3	220	0.017 x d_1	300	0.012 x d_1	□	■		■
S	1.1	110	0.010 x d_1	150	0.007 x d_1			□	■
	1.2	90	0.010 x d_1	120	0.006 x d_1			□	■
	1.3	50	0.008 x d_1	70	0.005 x d_1			□	■
	2.1	80	0.008 x d_1	110	0.006 x d_1			□	■
	2.2	30	0.006 x d_1	50	0.004 x d_1			□	■
	2.3	20	0.006 x d_1	40	0.004 x d_1			□	■
	2.4								
	2.5								
	2.6								
H	1.1								
	1.2								
	1.3								
	1.4								
	1.5								

v_c = Cutting speed f_z = Feed per tooth

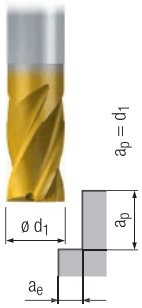
Solid carbide end mills "Base" – short design

N

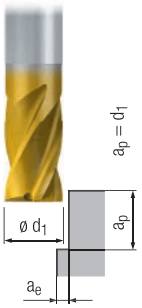
Valid for
2566T
2567T



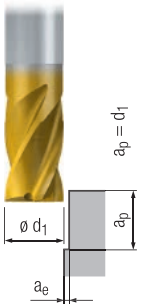
$a_e = d_1$



$a_e = 0.4 \times d_1$



$a_e = 0.2 \times d_1$



$a_e = 0.02 \times d_1$

		v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]			MMS MQL	
P	1.1	170	0.005 xd_1	190	0.006 xd_1	200	0.007 xd_1	240	0.007 xd_1	□	□	□	■
	2.1	150	0.004 xd_1	170	0.005 xd_1	180	0.006 xd_1	210	0.006 xd_1	□	□	□	■
	3.1	130	0.004 xd_1	140	0.004 xd_1	160	0.005 xd_1	180	0.005 xd_1	□	■	□	■
	4.1	120	0.003 xd_1	130	0.004 xd_1	140	0.004 xd_1	170	0.004 xd_1	□	■		
	5.1	100	0.003 xd_1	110	0.003 xd_1	120	0.004 xd_1	140	0.004 xd_1	□	■		
M	1.1	90	0.004 xd_1	110	0.005 xd_1	120	0.005 xd_1	130	0.005 xd_1	□	□	□	■
	2.1	80	0.003 xd_1	90	0.004 xd_1	100	0.005 xd_1	110	0.005 xd_1	□	□	□	■
	3.1	70	0.003 xd_1	80	0.003 xd_1	90	0.004 xd_1	100	0.004 xd_1			□	■
	4.1	60	0.002 xd_1	70	0.002 xd_1	80	0.003 xd_1	90	0.004 xd_1			□	■
K	1.1	150	0.005 xd_1	160	0.006 xd_1	180	0.006 xd_1	200	0.007 xd_1	□	■		□
	1.2	150	0.005 xd_1	160	0.006 xd_1	180	0.006 xd_1	200	0.007 xd_1	□	■		□
	2.1	140	0.004 xd_1	150	0.005 xd_1	170	0.005 xd_1	180	0.006 xd_1	□	■		□
	2.2	140	0.004 xd_1	150	0.005 xd_1	170	0.005 xd_1	180	0.006 xd_1	□	■		□
	3.1	120	0.004 xd_1	130	0.005 xd_1	140	0.005 xd_1	150	0.006 xd_1	□	■		□
	3.2	120	0.004 xd_1	130	0.005 xd_1	140	0.005 xd_1	150	0.006 xd_1	□	■		□
	4.1	100	0.003 xd_1	110	0.003 xd_1	120	0.004 xd_1	130	0.004 xd_1	□	■		□
	4.2	80	0.003 xd_1	90	0.003 xd_1	90	0.004 xd_1	100	0.004 xd_1	□	■		□
N	1.1	220	0.009 x d_1	250	0.010 x d_1	280	0.011 x d_1	300	0.008 x d_1				■
	1.2	220	0.008 x d_1	250	0.009 x d_1	280	0.010 x d_1	300	0.008 x d_1				■
	1.3	220	0.007 x d_1	250	0.008 x d_1	280	0.009 x d_1	300	0.007 x d_1				■
	1.4												
	1.5												
	1.6												
	2.1	170	0.007 xd_1	180	0.007 xd_1	200	0.008 xd_1	220	0.008 xd_1			□	■
	2.2	170	0.007 xd_1	180	0.007 xd_1	200	0.008 xd_1	220	0.008 xd_1			□	■
	2.3	170	0.007 xd_1	180	0.007 xd_1	200	0.008 xd_1	220	0.008 xd_1		□	□	■
	2.4	160	0.006 xd_1	170	0.006 xd_1	180	0.007 xd_1	200	0.007 xd_1			□	■
	2.5	160	0.006 xd_1	170	0.006 xd_1	180	0.007 xd_1	200	0.007 xd_1			□	■
	2.6	160	0.006 xd_1	170	0.006 xd_1	180	0.007 xd_1	200	0.007 xd_1		□	□	■
	2.7	120	0.004 xd_1	130	0.004 xd_1	140	0.005 xd_1	160	0.005 xd_1			□	■
	2.8	100	0.003 xd_1	110	0.003 xd_1	120	0.004 xd_1	140	0.004 xd_1			□	■
	3.1												
	3.2												
	4.1												
	4.2												
	4.3												
	4.4												
	5.1												
	5.2	70	0.003 xd_1	80	0.004 xd_1	80	0.005 xd_1	100	0.005 xd_1			□	■
	5.3												
S	1.1	70	0.005 xd_1	90	0.005 xd_1	100	0.006 xd_1	100	0.005 xd_1				■
	1.2	60	0.003 xd_1	70	0.003 xd_1	80	0.004 xd_1	90	0.004 xd_1				■
	1.3	50	0.002 xd_1	60	0.002 xd_1	70	0.003 xd_1	80	0.003 xd_1				■
	2.1	60	0.003 xd_1	70	0.003 xd_1	80	0.004 xd_1	90	0.004 xd_1				■
	2.2	20	0.002 xd_1	25	0.002 xd_1	30	0.003 xd_1	35	0.003 xd_1				■
	2.3	15	0.002 xd_1	20	0.002 xd_1	25	0.003 xd_1	30	0.003 xd_1				■
	2.4	20	0.002 xd_1	25	0.002 xd_1	30	0.003 xd_1	35	0.003 xd_1				■
	2.5	15	0.002 xd_1	20	0.002 xd_1	25	0.003 xd_1	30	0.003 xd_1				■
	2.6	15	0.002 xd_1	20	0.002 xd_1	25	0.003 xd_1	30	0.003 xd_1				■
H	1.1	90	0.003 xd_1	100	0.003 xd_1	110	0.003 xd_1	130	0.004 xd_1	□	■		
	1.2	70	0.002 xd_1	80	0.003 xd_1	90	0.003 xd_1	110	0.004 xd_1	□	■		
	1.3												
	1.4												
	1.5												

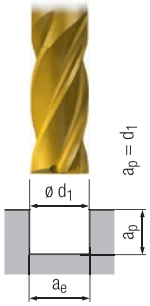
■ = very suitable □ = suitable

FRANKEN TiNox-Cut

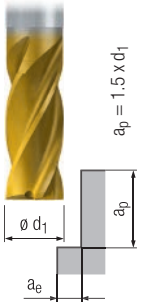
Solid carbide end mills "Base" – long design

N

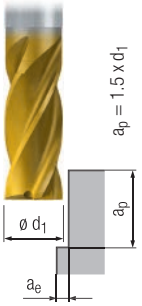
Valid for
2568T
2569T



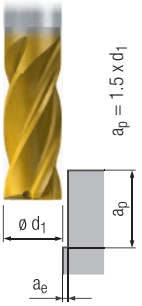
$a_e = d_1$



$a_e = 0.4 \times d_1$



$a_e = 0.2 \times d_1$



$a_e = 0.02 \times d_1$

		v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]	v_c [m/min]	f_z [mm]			MMS MQL	
P	1.1	140	0.005 xd_1	150	0.006 xd_1	170	0.007 xd_1	200	0.007 xd_1	□	□	□	■
	2.1	130	0.004 xd_1	140	0.005 xd_1	160	0.006 xd_1	180	0.006 xd_1	□	□	□	■
	3.1	110	0.004 xd_1	120	0.004 xd_1	130	0.005 xd_1	150	0.005 xd_1	□	■	□	■
	4.1	100	0.003 xd_1	110	0.004 xd_1	120	0.004 xd_1	140	0.004 xd_1	□	■		
	5.1	90	0.003 xd_1	100	0.003 xd_1	110	0.004 xd_1	130	0.004 xd_1	□	■		
M	1.1	80	0.004 xd_1	100	0.005 xd_1	110	0.005 xd_1	120	0.005 xd_1	□	□	□	■
	2.1	70	0.003 xd_1	80	0.004 xd_1	90	0.005 xd_1	100	0.005 xd_1	□	□	□	■
	3.1	60	0.003 xd_1	70	0.004 xd_1	80	0.004 xd_1	90	0.004 xd_1			□	■
	4.1	50	0.002 xd_1	60	0.003 xd_1	70	0.003 xd_1	80	0.004 xd_1			□	■
K	1.1	140	0.005 xd_1	150	0.006 xd_1	170	0.006 xd_1	200	0.007 xd_1	□	■		□
	1.2	140	0.005 xd_1	150	0.006 xd_1	170	0.006 xd_1	200	0.007 xd_1	□	■		□
	2.1	130	0.004 xd_1	140	0.005 xd_1	160	0.005 xd_1	180	0.006 xd_1	□	■		□
	2.2	130	0.004 xd_1	140	0.005 xd_1	160	0.005 xd_1	180	0.006 xd_1	□	■		□
	3.1	110	0.004 xd_1	120	0.005 xd_1	130	0.005 xd_1	150	0.006 xd_1	□	■		□
	3.2	110	0.004 xd_1	120	0.005 xd_1	130	0.005 xd_1	150	0.006 xd_1	□	■		□
	4.1	90	0.003 xd_1	100	0.003 xd_1	110	0.004 xd_1	130	0.004 xd_1	□	■		□
	4.2	70	0.003 xd_1	80	0.003 xd_1	80	0.004 xd_1	100	0.004 xd_1	□	■		□
N	1.1	220	0.009 x d_1	250	0.010 x d_1	280	0.011 x d_1	300	0.008 x d_1				■
	1.2	220	0.008 x d_1	250	0.009 x d_1	280	0.010 x d_1	300	0.008 x d_1				■
	1.3	220	0.007 x d_1	250	0.008 x d_1	280	0.009 x d_1	300	0.007 x d_1				■
	1.4												
	1.5												
	1.6												
	2.1	170	0.007 xd_1	180	0.007 xd_1	200	0.008 xd_1	220	0.008 xd_1			□	■
	2.2	170	0.007 xd_1	180	0.007 xd_1	200	0.008 xd_1	220	0.008 xd_1			□	■
	2.3	170	0.007 xd_1	180	0.007 xd_1	200	0.008 xd_1	220	0.008 xd_1		□	□	■
	2.4	160	0.006 xd_1	170	0.006 xd_1	180	0.007 xd_1	200	0.007 xd_1			□	■
	2.5	160	0.006 xd_1	170	0.006 xd_1	180	0.007 xd_1	200	0.007 xd_1			□	■
	2.6	160	0.006 xd_1	170	0.006 xd_1	180	0.007 xd_1	200	0.007 xd_1		□	□	■
	2.7	120	0.004 xd_1	130	0.004 xd_1	140	0.005 xd_1	160	0.005 xd_1			□	■
	2.8	100	0.003 xd_1	110	0.003 xd_1	120	0.004 xd_1	140	0.004 xd_1			□	■
	3.1												
	3.2												
	4.1												
	4.2												
	4.3												
	4.4												
	5.1												
	5.2	70	0.003 xd_1	80	0.004 xd_1	80	0.005 xd_1	100	0.005 xd_1			□	■
	5.3												
S	1.1	70	0.005 xd_1	90	0.005 xd_1	100	0.006 xd_1	100	0.005 xd_1				■
	1.2	60	0.003 xd_1	70	0.003 xd_1	80	0.004 xd_1	90	0.004 xd_1				■
	1.3	50	0.002 xd_1	60	0.002 xd_1	70	0.003 xd_1	80	0.003 xd_1				■
	2.1	60	0.003 xd_1	70	0.003 xd_1	80	0.004 xd_1	90	0.004 xd_1				■
	2.2	20	0.002 xd_1	25	0.002 xd_1	30	0.003 xd_1	35	0.003 xd_1				■
	2.3	15	0.002 xd_1	20	0.002 xd_1	25	0.003 xd_1	30	0.003 xd_1				■
	2.4	20	0.002 xd_1	25	0.002 xd_1	30	0.003 xd_1	35	0.003 xd_1				■
	2.5	15	0.002 xd_1	20	0.002 xd_1	25	0.003 xd_1	30	0.003 xd_1				■
	2.6	15	0.002 xd_1	20	0.002 xd_1	25	0.003 xd_1	30	0.003 xd_1				■
H	1.1	90	0.003 xd_1	100	0.003 xd_1	110	0.003 xd_1	130	0.004 xd_1	□	■		
	1.2	70	0.002 xd_1	80	0.003 xd_1	90	0.003 xd_1	110	0.004 xd_1	□	■		
	1.3												
	1.4												
	1.5												

v_c = Cutting speed f_z = Feed per tooth

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