

edition 05/2018










# toolholders with indexable inserts

milling, turning, grooving



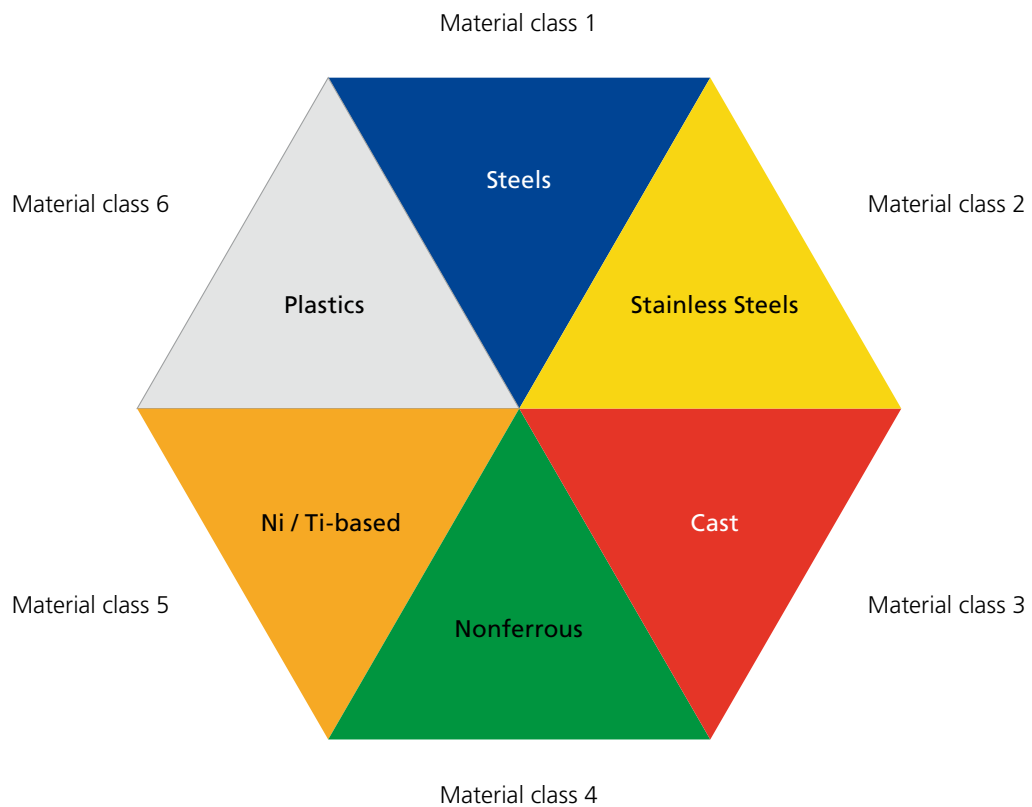
# Symbols in this catalog

To facilitate the use of the ALESA catalog we have created the following overview of symbols.

 Wet Processing	 Dry machining	 Internal coolant supply
 Number of teeth	 Rotation	 Cutting direction
 Recommended use	 Conditionally recommended application	 Cutting insert matching type

# Color mapping for classes of materials

Individual classes of materials as referred to with different colors in this catalog.  
The allocation of individual materials in the classes of materials can be found throughout the catalog.





# Overview

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# Grüezi and welcome!

## An innovative family company since 80 years

Within the manufacturing unit in Switzerland, ALES A employs highly motivated, well trained staff, sharing a wealth of experience and knowledge gained within the cutting tool industry. We are proud that we are one of the few remaining family owned businesses within our sector.

At all times we supply market leading products, offer the highest possible technical support, deliver on time at competitive prices. This is achieved via a network of some 60 global distributors ensuring continuity of supply of both products and services.

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Production plant and administration building of ALES A Ltd

## Precision tool factory

### Precision.

We specialise in the manufacture of highly positive, sharply ground, precision cutting tools produced from HSS and carbide.

These offer the highest possible performance figures particularly on difficult materials and extraordinary applications.

We can offer engineering solutions to the most demanding machining problems reducing cycle times, vibration and tooling costs whilst improving surface finishes and chip formation.

Call us now and realise the potential of ALES A!

### Metal cutting with creativity.

**Milling:** The ALES A TWIST helical indexable insert which was developed and patented by us in 1996 is distinguished by a high-tech cutting geometry and is being used to great success all over the world.

The extensive range of ISO standard indexable inserts is of course also equipped with our highly positive, extremely sharp ground cutting edge. ALES A indexable inserts are available in HSS-E and finest grain metal carbide. Various hard material coatings ensure a long tool life.

It goes without saying that almost all our toolholders are prepared for internal coolant supply.

**Turning/parting:** In this area, too, we have an extensive range of toolholders for external and internal turning with the matching indexable inserts in HSS-E to ISO standard.

Our ALES A GOLD high-precision ISO toolbits and cutting tools are also world-renowned. Similarly, the Minicut and Duocut parting inserts and cutting-

off tools in HSS-E are a byword in the trade.

**Sawing:** The ALES A metal-cutting circular saws in HSS and carbide give top performance all around. Our circular saws with steam-tempered surface or hard-material coating achieve even better life expectancy.

**Nutex:** The extraordinary combination of circular saw blade and holder in one tool indicates the system Nutex, Nutex Mini and Nutex Plus. With this tool it is possible to machine on CNC centres without fixings protruding out of the tool face.

**Custom-made products:** If you have any processing problems, we consider it our duty to be able to offer a solution. Our development department welcomes the challenge of producing special tools to individual requirements or customer drawings.

With you as partner we aim to develop visions and pursue new methods.

**Our general delivery and sales conditions apply, see [www.alesa.ch](http://www.alesa.ch)**

# Guide-line for ALESAs Catalog

How do I get the best cutting value for my application?



1. **Allocation of the materials and material strength** - page 143

Based on the materials table on pages 143f, the assigned class of the material may be obtained by material number, material grade DIN, Euro standard EN, AFNOR (French Standards), B.S. (British Standard), AISI SAE (USA). This class of materials is for HSS and carbide tools.  
In addition, the ultimate tensile strength of the material needs to be retained.



2. **Machining method** - page 4 (milling)

Choose the appropriate tool from the ALESAs catalog according to your machining method, such as plan, profile, or high-feed cutting.  
An overview, arranged by application, or machining method respectively, can be found on page 4.  
If you need assistance, please do not hesitate to contact us.



3. **Dimensions of the tool and type of indexable inserts** - page 129 and 130

Based on consideration of machine performance, part size, and required cutting depth, select the tool diameter and the size of the inserts.  
For the selection of cutting insert quality (cutting geometry and coating), you will find help in the overviews on page 129 and 130 in the catalog.



4. **Cutting speed  $v_c$**  - page 140

Based on the material class, the meshing conditions, and the coating the recommended speed can be obtained from the corresponding data table (pages 140 - 142). The resulting tool speed can be calculated with the selected tool diameter (page 136).  
Please note the kappa angle.



5. **Calculation through average chip thickness «hm» and feed per tooth «fz»** - page 132/133

With the permissible «hm» value for the average chip thickness (page 132) and the involvement of «ae in % of the tool diameter,» the feed per tooth can be obtained through the hm-fz table (90°, 45° or 15°) on page 133.  
With the available data, the feed rate (Vf) can now be calculated (page 136f).



6. **Calculation of the chip removal rate «Q»** - page 136

The chip removal rate is a reliable factor to be able to compare the effectiveness of the processing.  
The chip removal rate is calculated with:  
 $Q = \text{cutting depth «ap»} \times \text{width of cut ae} \times \text{feed «Vf»} / 1000$   
This formula also can again be found on page 136.



7. **Inspection and process corrections** - page 135

After the working process has been started, conclusions about the processing time and tool life can be made. This way the processing cost and tool cost per part can be calculated.  
Corrective action according to page 135 can be made with the assessment of wear of the cutting tool.

Basic processing recommendations:

- Tool overhang as long as necessary but as briefly as possible
- Provide stable expansion operations, avoid vibrations
- Radial and axial run-out of the tools according to the manufacturer's instructions
- Large depth of cut, small cutting width (cutting insert length advantage,  $ae < 35\%$ )
- hm values and Vc conditions according to manufacturer
- climb milling cutting only

# Milling tools

## Profile milling

					
<b>AO 10 Twist</b>	<b>AO 10 Twist</b>	<b>AO 15 Twist</b>	<b>AO 15 Twist</b>	<b>AO 15 Coollex</b>	<b>AO 20 Twist</b>
Ø 16 – 32	Ø 32 – 50	Ø 25 – 40	Ø 40 – 80	Ø 40 – 63	Ø 50 – 100
No 1347, 1348	No 1311	No 1347, 1348	No 1311	No 1340	No 1312
p. 8	p. 10	p. 12	p. 14	p. 16	p. 18
					
<b>TN 11 DELTA</b>	<b>TN 11/18 DELTA</b>	<b>AP 16</b>	<b>AP 16</b>		
Ø 25 – 32	Ø 43 – 83	Ø 25 – 40	Ø 40 – 160		
No 1306, 1308	No 1303, 1304	No 1345	No 1310		
p. 20	p. 22	p. 24	p. 26		

## Hobbing

				
<b>AO 10 Twist</b>	<b>AO 15 Twist</b>	<b>AO 15 Twist</b>	<b>AO 20 Twist</b>	<b>TN 18 DELTA</b>
Ø 25	Ø 32	Ø 40 – 53	Ø 50 – 83	Ø 43 – 83
No 1355	No 1355	No 1355	No 1355	No. 1356
p. 30	p. 32	p. 34	p. 36	p. 38

## Fine finish milling


<b>AO 15 e Twist</b>
Ø 40 – 125
No 1311
p. 42

## Face milling 45°



SD 09

Ø 16 – 40

No 1349

p. 46



SD 09

Ø 40 – 100

No 1316

p. 48



SD 12

Ø 50 – 160

No 1319

p. 50

## High feed milling



SD 09 SPEED 15°

Ø 12 – 25

No 1352, 1353

p. 54



SD 09 SPEED 15°

Ø 32 – 50

No 1318

p. 56



SD 12 SPEED 15°

Ø 50 – 83

No 1322

p. 58

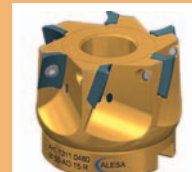


TWIST 481/581

Ø 16 – 40

No 1347, 1348

p. 60



TWIST 481/581

Ø 32 – 80

No 1311

p. 62

## Milling with button inserts



RP 06 / 08 / 10

Ø 16 – 32

No 1326, 1327

p. 66



RP 12

Ø 40 – 160

No 1301

p. 68

# Profile milling 90°

## ALESA TWIST and DELTA

### The characteristics

- THE original of the high-positive, sharp-ground indexable inserts milling cutters
- .. us de Schwiiz! The milling head and cutting inserts are completely manufactured in Switzerland.
- Unique with 20° helix angle
- The peeling cutting process is very spindle and machine-friendly
- The sharp edges require less spindle power and the cutting forces are much lower
- The ALESA TWIST and DELTA tools are optimized for modern 5-axis milling cutters
- All tools are provided with cooling holes. The cooling medium is exactly there where it is needed
- The best PVD coatings are available
- There are HSS and carbide inserts available from the warehouse with different radii



### The benefits and options for you

- Fast delivery from the Seengen warehouse
- There are HSS and carbide inserts available
- From Ø 16 mm to Ø 50 mm on AOFT 10
- From Ø 25 mm to Ø 80 mm on AOFT 15
- From Ø 50 mm to Ø 100 mm on AOFT 20
- From Ø 25 mm to Ø 43 mm on TNFU 11
- From Ø 43 mm to Ø 83 mm on TNFU 18
- Carbide grades are available for dry and wet machining
- HSS is more reliable and powerful for many applications
- High removal rate (Q) with a relatively small machine load
- Good tool life with high productivity
- With the high feed cutting insert type 481/581 it can also be used for 6xD - 10xD tool extensions
- Outstanding machining characteristics, also with the most difficult Ni-, Ti- and Co- alloys
- Manufactured according to ISO certified processes
- For special tools, our construction with great experience is available



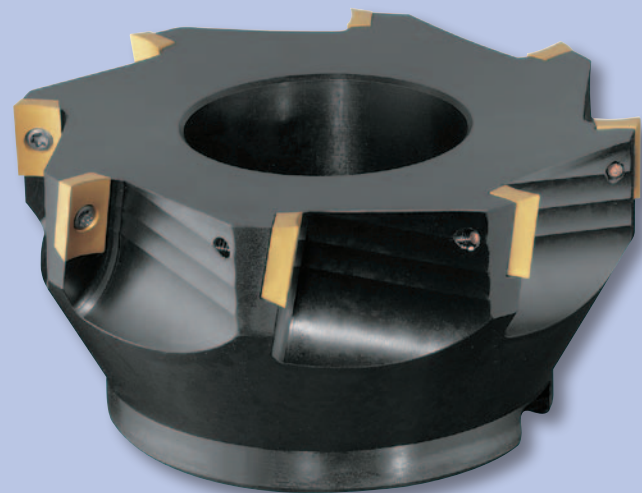


# Profile milling 90°

## ALESA AP 16

### The characteristics

- THE classic of the screw-in 90° corner cutting insert tools
- From ALESA with high positive, sharp-ground inserts
- SWISS Precision Tool. The milling head and cutting inserts are completely manufactured in Switzerland
- Robust solution with 5° helix angle
- The sharp edges require less spindle performance than sintered cutting inserts
- The sharp-cutting inserts are optimized for modern 5-axis centers
- AP16 tools are provided with cooling holes to Ø 100 mm. The cooling medium is exactly there where it is needed  
There is a coolant distribution ring for the larger diameters
- The best PVD coatings are available
- HSS and carbide cutting inserts are available from the warehouse



### The benefits and options for you

- Fast delivery from the Seengen warehouse
- Weldon type from Ø 25 mm to Ø 40 mm
- Arbor type from Ø 40 mm to Ø 160 mm
- With 2 cutting geometries a very large range of materials can be processed
- Carbide qualities are present for dry and wet milling processes
- HSS cutting inserts with TiN and TiAlN coatings are safe and efficient for the processing of many applications
- High removal rate (Q) with a relatively small machine load
- Good tool life and high productivity
- Excellent cutting processes also with the most difficult Ni-, Ti- and Co- alloys
- Manufactured according to ISO certified processes
- For special tools, our construction with great experience is available





# ALESA TWIST end mill and threaded type cutter

## AO 10 R 90° / Ø 16 – 32

1347 – 10 / 1348 – 10

Pat. no. 686 235

Profile milling



Part No	Type	D mm	l2 mm	d2 mm	G	l1 mm				Accessories kit No	WSP
1347.0300	16-AO 10 R	16	25	16.0		75	✓	2	r	1494.0550	AOFT 10 03
1348.0300	16-AO 10 R	16	25	8.5	M8	41	✓	2	r	1494.0550	AOFT 10 03
1347.0338	20-AO 10 R Z2	20	30	20.0		82	✓	2	r	1494.0560	AOFT 10 03
1347.0340	20-AO 10 R Z3	20	30	20.0		82	✓	3	r	1494.0561	AOFT 10 03
1348.0340	20-AO 10 R	20	30	10.5	M10	48	✓	3	r	1494.0561	AOFT 10 03
1347.0382	25-AO 10 R	25	38	25.0		96	✓	4	r	1494.0562	AOFT 10 03
1348.0382	25-AO 10 R	25	35	12.5	M12	55	✓	4	r	1494.0562	AOFT 10 03
1348.0422	32-AO 10 R	32	42	17.0	M16	64	✓	5	r	1494.0563	AOFT 10 03

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver	
	Qty	Article	Type	Torque	Article	Type
1494.0550	2	1491.0210	M2.5x4	0.95 Nm	1493.0300	TP7 IP
1494.0560	2	1491.0220	M2.5x5	0.95 Nm	1493.0300	TP7 IP
1494.0561	3	1491.0220	M2.5x5	0.95 Nm	1493.0300	TP7 IP
1494.0562	4	1491.0220	M2.5x5	0.95 Nm	1493.0300	TP7 IP
1494.0563	5	1491.0220	M2.5x5	0.95 Nm	1493.0300	TP7 IP



ALESA TWIST: the patented spiral ground indexable insert for a smooth and vibration-free chip removal for any metals. The full cutting edge is useable (ap).



The high performance tool with 2 cutting edges allows slot milling in one process step.



Slot milling: for slot depths > 40% ap, use only tools with 2 cutting edges.



Stainless steels (V2A) can be machined dry with AlCrN coated inserts.



Profile milling



Slot milling

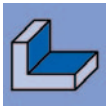


Face milling



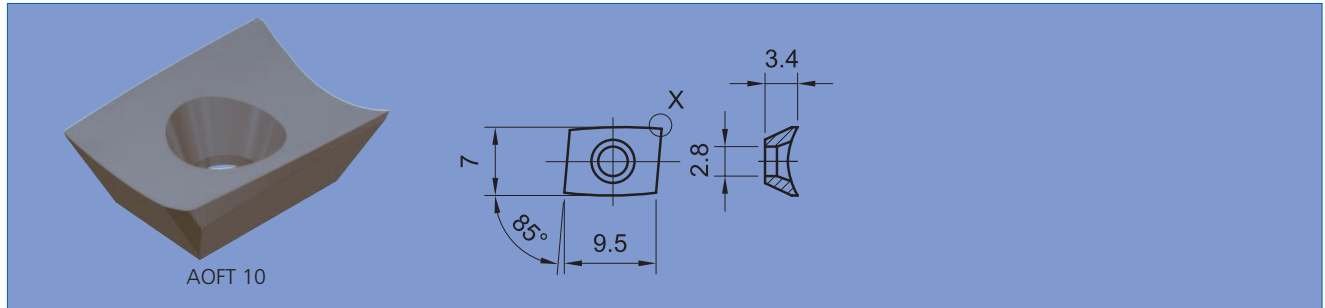
Circular interpolation





# ALESA TWIST end mill and threaded type cutter AO 10 R 90° / Ø 16 – 32

ap = 8 mm

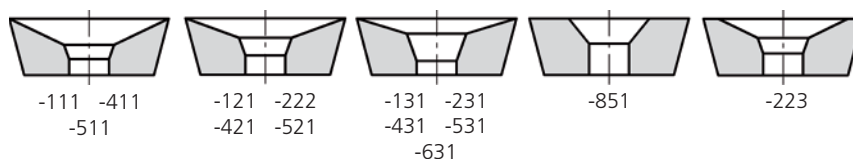


Profile milling

Cutting material	Coating	Part No	ISO Code	Detail X				Mat. classification					
								1	2	3	4	5	6
HSS-E	TiN	1087.0170	AOFT 10 03 PF FR	0.2x45°	r	●		○	○		●		●
		1087.0180	AOFT 10 03 04 FR	R 0.4	r	●		○	○		●		●
	TiAlN	1162.0170	AOFT 10 03 PF FR	0.2x45°	r	●		○	●		●	○	●
		1162.0180	AOFT 10 03 04 FR	R 0.4	r	●		○	●		●	○	●
Carbide HM	TiN	1287.0200	AOFT 10 03 PF FR-411	0.2x45°	r	●	○	○	○	●	●		●
		1287.0205	AOFT 10 03 04 FR-411	R 0.4	r	●	○	○	○	●	●		●
	TiAlN	1287.0300	AOFT 10 03 PF FR-411	0.2x45°	r	●	○	○	○	●	●	○	●
		1287.0305	AOFT 10 03 04 FR-411	R 0.4	r	●	○	○	○	●	●	○	●
	AlCrN	1287.0651	AOFT 10 03 PF FR-421	0.2x45°	r	●	○	●	●	●	●	●	●
		1287.0656	AOFT 10 03 04 FR-421	R 0.4	r	●	○	●	●	●	●	●	●
		1287.0657	AOFT 10 03 04 FR-431	R 0.4	r	●	○	●	●	●	○	●	○
		1287.0757	AOFT 10 03 04 FR-431	R 0.4	r	●	○	●	○		●		
Carbide HM-F	TiAlN	1287.0500*	AOFT 10 03 PF FR-511	0.2x45°	r		●	○	○	●			●
		1287.0505*	AOFT 10 03 04 FR-511	R 0.4	r		●	○	○	●			●
	AlCrN	1287.0701	AOFT 10 03 PF FR-521	0.2x45°	r		●	●	●	●	●		●
		1287.0706	AOFT 10 03 04 FR-521	R 0.4	r		●	●	●	●	●		●
		1287.0707	AOFT 10 03 04 FR-531	R 0.4	r		●	●	●	○			○
AlCrN-VA	1287.0807	AOFT 10 03 04 FR-531	R 0.4	r		●	●	○					
Carbide HA	AlCrN-VA	1289.0202	AOFT 10 03 04 FR-631	R 0.4	r	●	○	○	●	○		●	

\* while stocks last  
Fitting instructions for inserts see page 139

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
Additional number indexable inserts ISO-code (cutting geometry)  
Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.



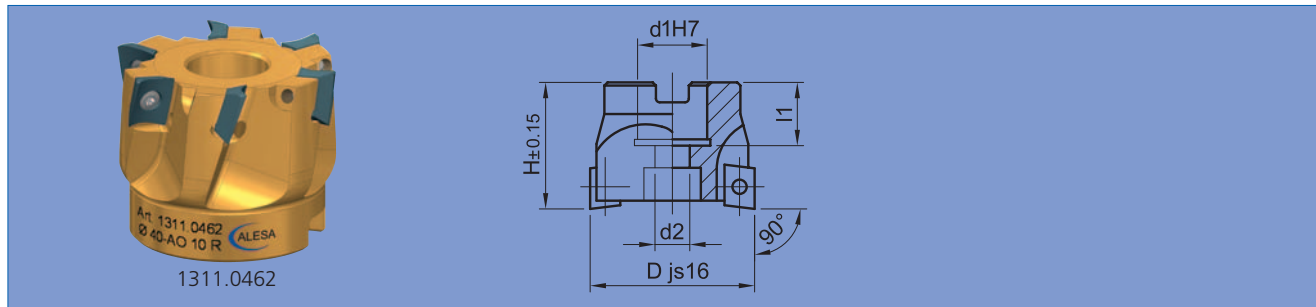
# ALESA TWIST milling cutter

## AO 10 R 90° / Ø 32 – 50

1311 – 10

Pat. no. 686 235

Profile milling



Part No	Type	D mm	H mm	d1 mm	d2 mm	l1 mm				Accessories kit No	<b>WSP</b>
1311.0422	32-AO 10 R	32	28	13.0	6.5	15	✓	5	r	1494.0564	AOFT 10 03
1311.0462	40-AO 10 R	40	32	16.0	8.5	18	✓	6	r	1494.0565	AOFT 10 03
1311.0482	50-AO 10 R	50	40	22.0	11	20	✓	8	r	1494.0566	AOFT 10 03

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver		Hex socket head screw		
	Qty	Article	Type	Torque	Article	Type	Article	Type	Torque
1494.0564	5	1491.0220	M2.5x5	0.95 Nm	1493.0300	TP7 IP	1490.0750	M 6 x 20	10 Nm
1494.0565	6	1491.0220	M2.5x5	0.95 Nm	1493.0300	TP7 IP	1490.0759	M 8 x 20	30 Nm
1494.0566	8	1491.0220	M2.5x5	0.95 Nm	1493.0300	TP7 IP	1490.0770	M 10 x 25	50 Nm



ALESA TWIST: the patented spiral ground indexable insert for a smooth and vibration-free chip removal for any metals. The full cutting edge is useable (ap).



Highly positive, extremely sharp cutting edge of HSS-E and carbide.



Stainless steels (V2A) can be machined dry with AlCrN coated inserts.



Profile milling



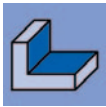
Slot milling



Face milling



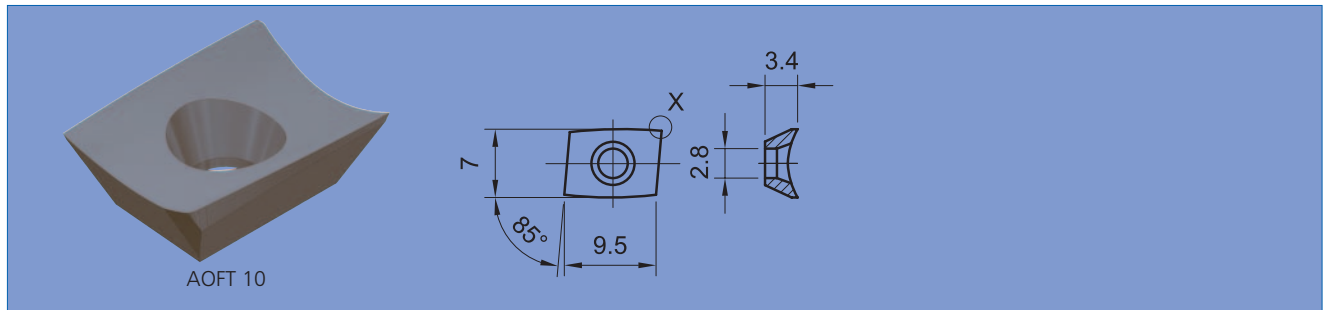
Circular interpolation



# ALESA TWIST milling cutter

## AO 10 R 90° / Ø 32 – 50

ap = 8 mm

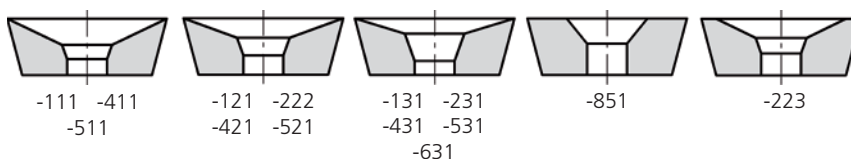


Profile milling

Cutting material	Coating	Part No	ISO Code	Detail X				Mat. classification					
								1	2	3	4	5	6
HSS-E	TiN	1087.0170	AOFT 10 03 PF FR	0.2x45°	r	●		○	○		●		●
		1087.0180	AOFT 10 03 04 FR	R 0.4	r	●		○	○		●		●
	TiAlN	1162.0170	AOFT 10 03 PF FR	0.2x45°	r	●		○	●		●	○	●
		1162.0180	AOFT 10 03 04 FR	R 0.4	r	●		○	●		●	○	●
Carbide HM	TiN	1287.0200	AOFT 10 03 PF FR-411	0.2x45°	r	●	○	○	○	●	●		●
		1287.0205	AOFT 10 03 04 FR-411	R 0.4	r	●	○	○	○	●	●		●
	TiAlN	1287.0300	AOFT 10 03 PF FR-411	0.2x45°	r	●	○	○	○	●	●	○	●
		1287.0305	AOFT 10 03 04 FR-411	R 0.4	r	●	○	○	○	●	●	○	●
	AlCrN	1287.0651	AOFT 10 03 PF FR-421	0.2x45°	r	●	○	●	●	●	●	●	●
		1287.0656	AOFT 10 03 04 FR-421	R 0.4	r	●	○	●	●	●	●	●	●
		1287.0657	AOFT 10 03 04 FR-431	R 0.4	r	●	○	●	●	●	○	●	○
		1287.0757	AOFT 10 03 04 FR-431	R 0.4	r	●	○	●	○		●		
Carbide HM-F	TiAlN	1287.0500*	AOFT 10 03 PF FR-511	0.2x45°	r		●	○	○	●			●
		1287.0505*	AOFT 10 03 04 FR-511	R 0.4	r		●	○	○	●			●
	AlCrN	1287.0701	AOFT 10 03 PF FR-521	0.2x45°	r		●	●	●	●	●		●
		1287.0706	AOFT 10 03 04 FR-521	R 0.4	r		●	●	●	●	●		●
		1287.0707	AOFT 10 03 04 FR-531	R 0.4	r		●	●	●	○			○
AlCrN-VA	1287.0807	AOFT 10 03 04 FR-531	R 0.4	r		●	●	○					
Carbide HA	AlCrN-VA	1289.0202	AOFT 10 03 04 FR-631	R 0.4	r	●	○	○	●	○		●	

\* while stocks last  
Fitting instructions for inserts see page 139

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
Additional number indexable inserts ISO-code (cutting geometry)  
Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.



# ALESA TWIST end mill and threaded type cutter

AO 15 R 90° / Ø 25 – 40

1347 – 15 / 1348 – 15

Pat. no. 686 235

Profile milling



Part No	Type	D mm	l2 mm	d2 mm	G	l1 mm				Accessories kit No	WSP
1347.0378	25-AO 15 R	25	38	20.0		90	✓	2	r	1494.0650	AOFT 15 T3
1347.0380	25-AO 15 R	25	38	25.0		96	✓	2	r	1494.0650	AOFT 15 T3
1348.0380	25-AO 15 R	25	40	12.5	M12	60	✓	2	r	1494.0650	AOFT 15 T3
1347.0408*	32-AO 15 R Z2	32	38	25.0		96	✓	2	r	1494.0650	AOFT 15 T3
1347.0410	32-AO 15 R Z3	32	38	25.0		96	✓	3	r	1494.0651	AOFT 15 T3
1347.0418*	32-AO 15 R Z2	32	38	32.0		100	✓	2	r	1494.0650	AOFT 15 T3
1347.0420	32-AO 15 R Z3	32	38	32.0		100	✓	3	r	1494.0651	AOFT 15 T3
1348.0418	32-AO 15 R Z2	32	44	17.0	M16	66	✓	2	r	1494.0650	AOFT 15 T3
1348.0420	32-AO 15 R Z3	32	44	17.0	M16	66	✓	3	r	1494.0651	AOFT 15 T3
1347.0458*	40-AO 15 R Z2	40	48	32.0		110	✓	2	r	1494.0650	AOFT 15 T3
1347.0460	40-AO 15 R Z4	40	48	32.0		110	✓	4	r	1494.0652	AOFT 15 T3

\*while stocks last

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

## Accessories / spare parts

Part No	Torx screw				Screw-driver	
	Qty	Article	Type	Torque	Article	Type
1494.0650	2	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15
1494.0651	3	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15
1494.0652	4	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15



ALESA TWIST: the patented spiral ground indexable insert for a smooth and vibration-free chip removal for any metals. The full cutting edge is useable (ap).



The high performance tool with 2 cutting edges allows slot milling in one process step.



Slot milling: for slot depths > 40% ap, use only tools with 2 cutting edges.



Stainless steels (V2A) can be machined dry with AlCrN coated inserts.



Profile milling



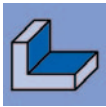
Slot milling



Face milling



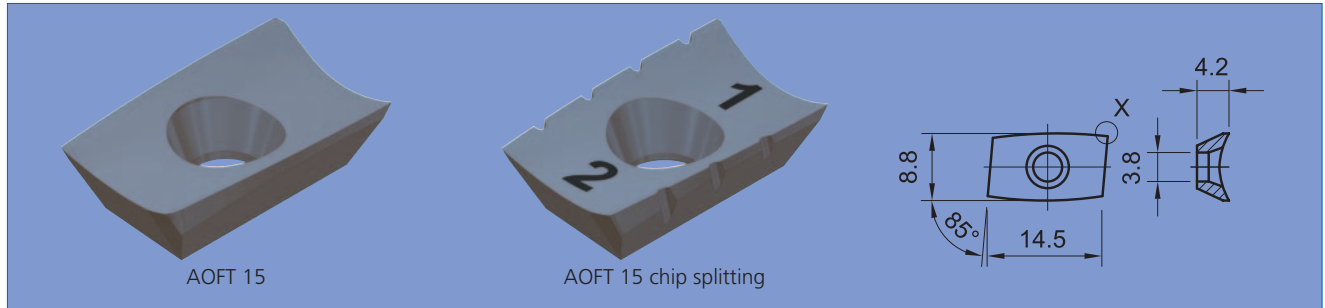
Circular interpolation



# ALESA TWIST end mill and threaded type cutter

## AO 15 R 90° / Ø 25 – 40

ap = 13 mm

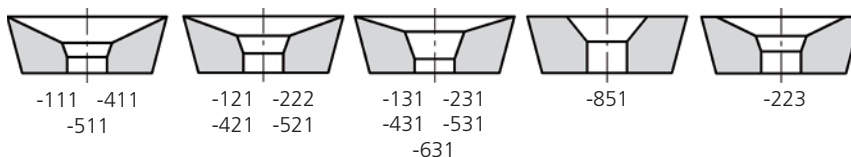


Profile milling

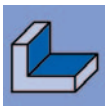
Cutting material	Coating	Part No	ISO Code	Detail X				Mat. classification					
								1	2	3	4	5	6
HSS-E	TiN	1087.0190	AOFT 15 T3 PF FR	0.2x45°	r	●		○	○		●		●
		1087.0210	AOFT 15 T3 08 FR	R 0.8	r	●		○	○		●		●
	TiAlN	1162.0190	AOFT 15 T3 PF FR	0.2x45°	r	●		○	●		●	○	●
		1162.0210	AOFT 15 T3 08 FR	R 0.8	r	●		○	●		●	○	●
HSS-E chip splitting <sup>o)</sup>	TiN	1087.0505	AOFT 15 T3 PF FR (No 1/2)	0.2x45°	r	●		○	○		●		●
		1087.0508	AOFT 15 T3 PF FR (No 3)	0.2x45°	r	●		○	○		●		●
Carbide HM	TiN	1287.0210	AOFT 15 T3 PF FR-411	0.2x45°	r	●	○	○	○	●	●		●
		1287.0215	AOFT 15 T3 08 FR-411	R 0.8	r	●	○	○	○	●	●		●
	TiAlN	1287.0310	AOFT 15 T3 PF FR-411	0.2x45°	r	●	○	○	○	●	●	○	●
		1287.0315	AOFT 15 T3 08 FR-411	R 0.8	r	●	○	○	○	●	●	○	●
	AlCrN	1287.0661	AOFT 15 T3 PF FR-421	0.2x45°	r	●	○	○	○	●	●	●	●
		1287.0666	AOFT 15 T3 08 FR-421	R 0.8	r	●	○	○	○	●	●	●	●
	AlCrN-VA	1287.0667	AOFT 15 T3 08 FR-431	R 0.8	r	●	○	○	○	●	●	○	○
		1287.0669	AOFT 15 T3 12 FR-421	R 1.2	r	●	○	○	○	●	●	●	●
	DLC-H	1287.0671	AOFT 15 T3 16 FR-421	R 1.6	r	●	○	○	○	●	●	●	●
		1287.0673	AOFT 15 T3 20 FR-421	R 2.0	r	●	○	○	○	●	●	●	●
Carbide HM-F	TiAlN	1287.0510	AOFT 15 T3 PF FR-511	0.2x45°	r		●	○	○	●			●
		1287.0515	AOFT 15 T3 08 FR-511	R 0.8	r		●	○	○	●			●
	AlCrN	1287.0711	AOFT 15 T3 PF FR-521	0.2x45°	r		●		○				●
		1287.0716	AOFT 15 T3 08 FR-521	R 0.8	r		●		○				●
	AlCrN-VA	1287.0717	AOFT 15 T3 08 FR-531	R 0.8	r		●		○				○
		1287.0817	AOFT 15 T3 08 FR-531	R 0.8	r		●		○				○
DLC-H	1287.0967	AOFT 15 T3 08 FR-531	R 0.8	r		●		○				●	
Carbide HA	AlCrN-VA	1289.0232	AOFT 15 T3 08 FR-631	R 0.8	r	●	○	○	○	○		●	

<sup>o)</sup> Order of inserts with chip splitting see page 139  
Fitting instructions for inserts see page 139

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
Additional number indexable inserts ISO-code (cutting geometry)  
Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.



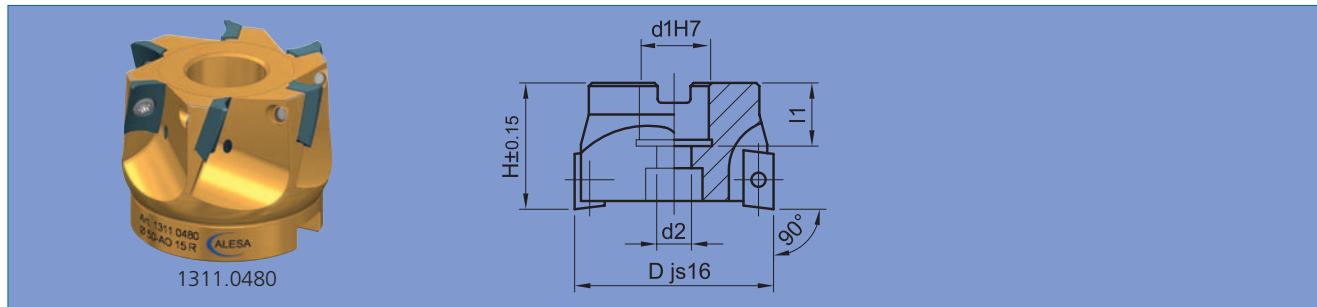
# ALESA TWIST milling cutter

## AO 15 R 90° / Ø 40 – 80

1311 – 15

Pat. no. 686 235

Profile milling



Part No	Type	D mm	H mm	d1 mm	d2 mm	l1 mm				Accessories kit No	<b>WSP</b>
1311.0460	40-AO 15 R	40	32	16.0	8.5	18	✓	4	r	1494.0653	AOFT 15 T3
1311.0480	50-AO 15 R	50	40	22.0	11	20	✓	6	r	1494.0655	AOFT 15 T3
1311.0500	63-AO 15 R	63	40	22.0	11	20	✓	7	r	1494.0657	AOFT 15 T3
1311.0520	80-AO 15 R	80	50	27.0	14	22	✓	9	r	1494.0660	AOFT 15 T3

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver		Hex socket head screw		
	Qty	Article	Type	Torque	Article	Type	Article	Type	Torque
1494.0653	4	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0759	M 8 x 20	30 Nm
1494.0655	6	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0770	M 10 x 25	50 Nm
1494.0657	7	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0770	M 10 x 25	50 Nm
1494.0660	9	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0780	M 12 x 30	90 Nm



ALESA TWIST: the patented spiral ground indexable insert for a smooth and vibration-free chip removal for any metals. The full cutting edge is useable (ap).



Highly positive, extremely sharp cutting edge of HSS-E and carbide.



When milling slots with an internal cooling system set operating pressure above 20 bar. Ensure clear chip removal.



Stainless steels (V2A) can be machined dry with AlCrN coated inserts.



Profile milling



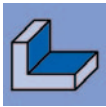
Slot milling



Face milling



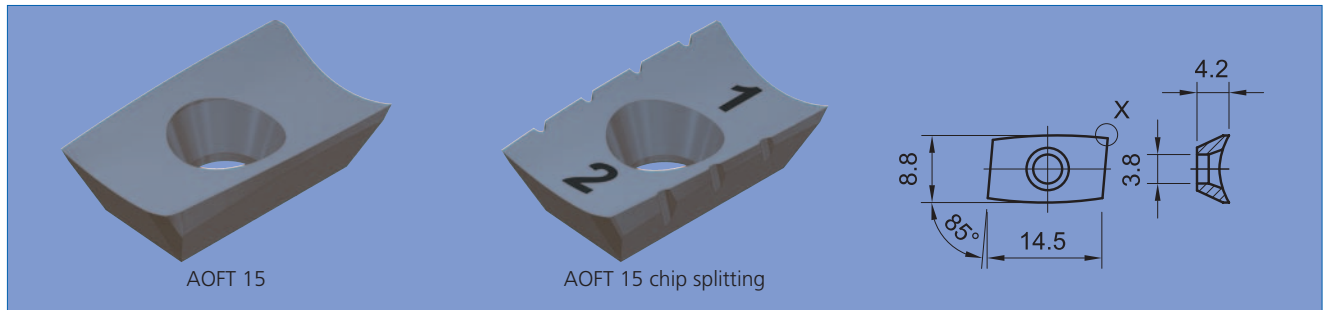
Circular interpolation



# ALESA TWIST milling cutter

## AO 15 R 90° / Ø 40 – 80

ap = 13 mm

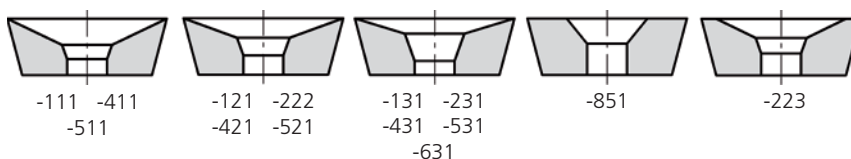


Profile milling

Cutting material	Coating	Part No	ISO Code	Detail X				Mat. classification					
								1	2	3	4	5	6
HSS-E	TiN	1087.0190	AOFT 15 T3 PF FR	0.2x45°	r	●		○	○		●		●
		1087.0210	AOFT 15 T3 08 FR	R 0.8	r	●		○	○		●		●
	TiAlN	1162.0190	AOFT 15 T3 PF FR	0.2x45°	r	●		○	●		●	○	●
		1162.0210	AOFT 15 T3 08 FR	R 0.8	r	●		○	●		●	○	●
HSS-E chip splitting °)	TiN	1087.0505	AOFT 15 T3 PF FR (No 1/2)	0.2x45°	r	●		○	○		●		●
		1087.0508	AOFT 15 T3 PF FR (No 3)	0.2x45°	r	●		○	○		●		●
Carbide HM	TiN	1287.0210	AOFT 15 T3 PF FR-411	0.2x45°	r	●	○	○	○	●	●		●
		1287.0215	AOFT 15 T3 08 FR-411	R 0.8	r	●	○	○	○	●	●		●
	TiAlN	1287.0310	AOFT 15 T3 PF FR-411	0.2x45°	r	●	○	○	○	●	●	○	●
		1287.0315	AOFT 15 T3 08 FR-411	R 0.8	r	●	○	○	○	●	●	○	●
	AlCrN	1287.0661	AOFT 15 T3 PF FR-421	0.2x45°	r	●	○	○	○	●	●	●	●
		1287.0666	AOFT 15 T3 08 FR-421	R 0.8	r	●	○	○	○	●	●	●	●
		1287.0667	AOFT 15 T3 08 FR-431	R 0.8	r	●	○	○	○	●	●	○	○
		1287.0669	AOFT 15 T3 12 FR-421	R 1.2	r	●	○	○	○	●	●	●	●
	AlCrN-VA	1287.0671	AOFT 15 T3 16 FR-421	R 1.6	r	●	○	○	○	●	●	●	●
		1287.0673	AOFT 15 T3 20 FR-421	R 2.0	r	●	○	○	○	●	●	●	●
	DLC-H	1287.0767	AOFT 15 T3 08 FR-431	R 0.8	r	●	○	○	○	●	○		●
		1287.0916	AOFT 15 T3 08 FR-421	R 0.8	r	●	○	○	○	○	●		●
Carbide HM-F	TiAlN	1287.0510	AOFT 15 T3 PF FR-511	0.2x45°	r		●	○	○	●			●
		1287.0515	AOFT 15 T3 08 FR-511	R 0.8	r		●	○	○	●			●
	AlCrN	1287.0711	AOFT 15 T3 PF FR-521	0.2x45°	r		●		○	○			●
		1287.0716	AOFT 15 T3 08 FR-521	R 0.8	r		●		○	○			●
	AlCrN-VA	1287.0717	AOFT 15 T3 08 FR-531	R 0.8	r		●		○	○			○
		1287.0817	AOFT 15 T3 08 FR-531	R 0.8	r		●		○	○			○
DLC-H	1287.0967	AOFT 15 T3 08 FR-531	R 0.8	r		●		○	○			●	
Carbide HA	AlCrN-VA	1289.0232	AOFT 15 T3 08 FR-631	R 0.8	r	●	○	○	○	○		●	

°) Order of inserts with chip splitting see page 139  
Fitting instructions for inserts see page 139

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
Additional number indexable inserts ISO-code (cutting geometry)  
Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.



# ALESA TWIST Coolex milling cutter

## AO 15 R 90° / Ø 40 – 63

1340 – 15

Pat. no. 708 238

Profile milling



Part No	Type	D mm	H mm	d1 mm	d2 mm	l1 mm				Accessories kit No	<b>WSP</b>
<b>1340.0462</b>	40-AO 15 Coolex	40	32	16.0	8.5	18	✓	4	r	1494.0653	AOFT 15 T3
<b>1340.0482</b>	50-AO 15 Coolex	50	40	22.0	11	20	✓	5	r	1494.0655	AOFT 15 T3
<b>1340.0502</b>	63-AO 15 Coolex	63	40	22.0	11	20	✓	6	r	1494.0655	AOFT 15 T3

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

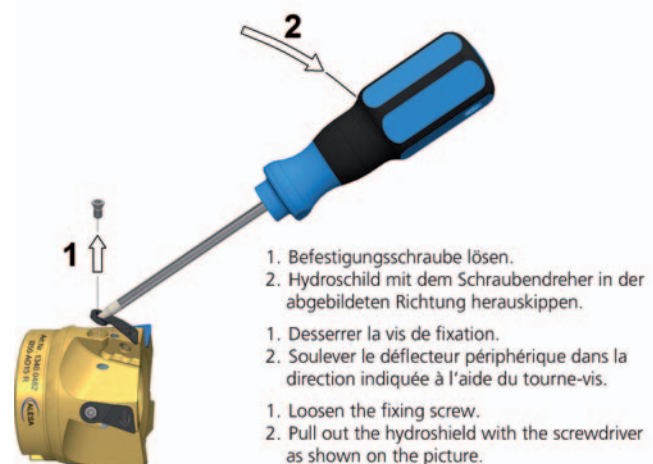
### Special spare parts for ALESA TWIST Coolex AO15:

No 1489.0462 Hydroschild

No 1491.0220 Screw M2.5x5 for hydroschild

No 1493.0300 Screw-driver TP 7 IP

### How to remove the hydroschild



### Accessories / spare parts

Part No	Torx screw				Screw-driver			Hex socket head screw		
	Qty	Article	Type	Torque	Article	Type	Article	Type	Torque	
<b>1494.0653</b>	4	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0759	M 8 x 20	30 Nm	
<b>1494.0655</b>	6	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0770	M 10 x 25	50 Nm	



Innovative cooling / lubricating solution over the relive face. ALESA recommendation for material classification 5 together with "631" inserts. Internal coolant pressure up to 70 bar.



ALESA TWIST: the patented spiral ground indexable insert for a smooth and vibration-free chip removal for any metals. The full cutting edge is useable (ap).



When milling slots with an internal cooling system set operating pressure above 20 bar. Ensure clear chip removal.



Profile milling



Slot milling

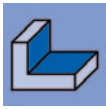


Face milling



Circular interpolation

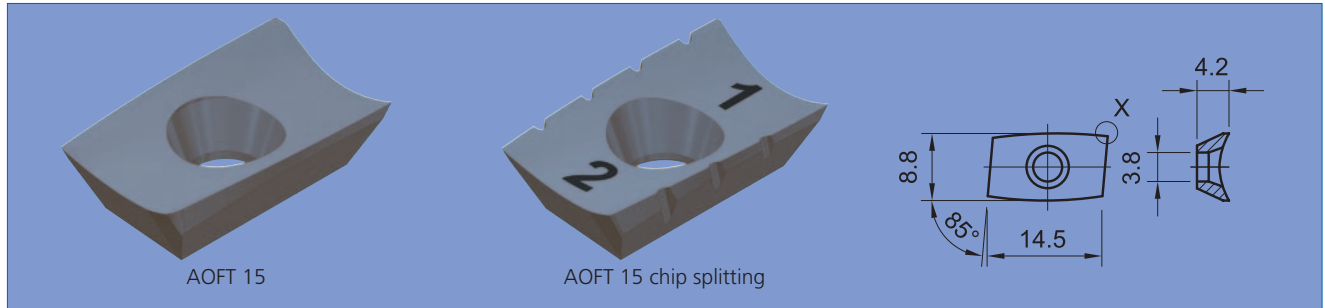




# ALESA TWIST Coolex milling cutter

## AO 15 R 90° / Ø 40 – 63

ap = 13 mm



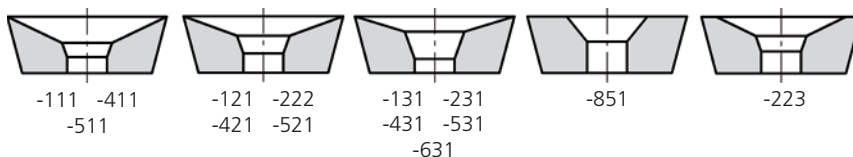
Profile milling

Cutting material	Coating	Part No	ISO Code	Detail X				Mat. classification					
								1	2	3	4	5	6
HSS-E	TiN	1087.0190	AOFT 15 T3 PF FR	0.2x45°	r	●		○	○		●		●
		1087.0210	AOFT 15 T3 08 FR	R 0.8	r	●		○	○		●		●
	TiAlN	1162.0190	AOFT 15 T3 PF FR	0.2x45°	r	●		○	●		●	○	●
		1162.0210	AOFT 15 T3 08 FR	R 0.8	r	●		○	●		●	○	●
HSS-E chip splitting <sup>o)</sup>	TiN	1087.0505	AOFT 15 T3 PF FR (No 1/2)	0.2x45°	r	●		○	○		●		●
		1087.0508	AOFT 15 T3 PF FR (No 3)	0.2x45°	r	●		○	○		●		●
Carbide HM	TiN	1287.0210	AOFT 15 T3 PF FR-411	0.2x45°	r	●	○	○	○	●	●		●
		1287.0215	AOFT 15 T3 08 FR-411	R 0.8	r	●	○	○	○	●	●		●
	TiAlN	1287.0310	AOFT 15 T3 PF FR-411	0.2x45°	r	●	○	○	○	●	●	○	●
		1287.0315	AOFT 15 T3 08 FR-411	R 0.8	r	●	○	○	○	●	●	○	●
	AlCrN	1287.0661	AOFT 15 T3 PF FR-421	0.2x45°	r	●	○	○	○	●	●	●	●
		1287.0666	AOFT 15 T3 08 FR-421	R 0.8	r	●	○	○	○	●	●	●	●
		1287.0667	AOFT 15 T3 08 FR-431	R 0.8	r	●	○	○	○	●	●	○	●
		1287.0669	AOFT 15 T3 12 FR-421	R 1.2	r	●	○	○	○	●	●	●	●
	AlCrN-VA	1287.0671	AOFT 15 T3 16 FR-421	R 1.6	r	●	○	○	○	●	●	●	●
		1287.0673	AOFT 15 T3 20 FR-421	R 2.0	r	●	○	○	○	●	●	●	●
	DLC-H	1287.0767	AOFT 15 T3 08 FR-431	R 0.8	r	●	○	○		●	○		●
		1287.0916	AOFT 15 T3 08 FR-421	R 0.8	r	●	○	○		○	●		●
Carbide HA	AlCrN-VA	1289.0232	AOFT 15 T3 08 FR-631	R 0.8	r	●	○	○	●	○		●	

<sup>o)</sup> Order of inserts with chip splitting see page 139

Fitting instructions for inserts and 'how to remove the hydroshield' see page 139

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
Additional number indexable inserts ISO-code (cutting geometry)  
Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.



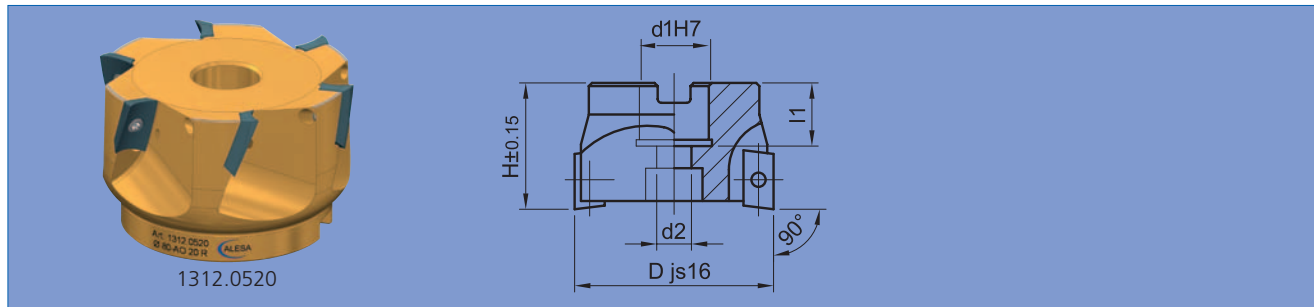
# ALESA TWIST milling cutter

## AO 20 R 90° / Ø 50 – 100

1312

Pat. no. 686 235

Profile milling



Part No	Type	D mm	H mm	d1 mm	d2 mm	l1 mm				Accessories kit No	<b>WSP</b>
1312.0480	50-AO 20 R	50	40	22.0	11	20	✓	4	r	1494.0713	AOFT 20 04
1312.0500	63-AO 20 R	63	40	22.0	11	20	✓	5	r	1494.0714	AOFT 20 04
1312.0520	80-AO 20 R	80	50	27.0	14	22	✓	6	r	1494.0715	AOFT 20 04
1312.0540	100-AO 20 R	100	50	32.0	18	25	✓	7	r	1494.0716	AOFT 20 04

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver		Hex socket head screw		
	Qty	Article	Type	Torque	Article	Type	Article	Type	Torque
1494.0713	4	1490.0360	M4x10	3.85 Nm	1492.0500	T 15	1490.0770	M 10 x 25	50 Nm
1494.0714	5	1490.0360	M4x10	3.85 Nm	1492.0500	T 15	1490.0770	M 10 x 25	50 Nm
1494.0715	6	1490.0360	M4x10	3.85 Nm	1492.0500	T 15	1490.0780	M 12 x 30	90 Nm
1494.0716	7	1490.0360	M4x10	3.85 Nm	1492.0500	T 15	1490.0789	M 16 x 30	160 Nm



ALESA TWIST: the patented spiral ground indexable insert for a smooth and vibration-free chip removal for any metals. The full cutting edge is useable (ap).



Highly positive, extremely sharp cutting edge of HSS-E and carbide.



When milling slots with an internal cooling system set operating pressure above 20 bar. Ensure clear chip removal.



Stainless steels (V2A) can be machined dry with AlCrN coated inserts.



Profile milling



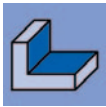
Slot milling



Face milling



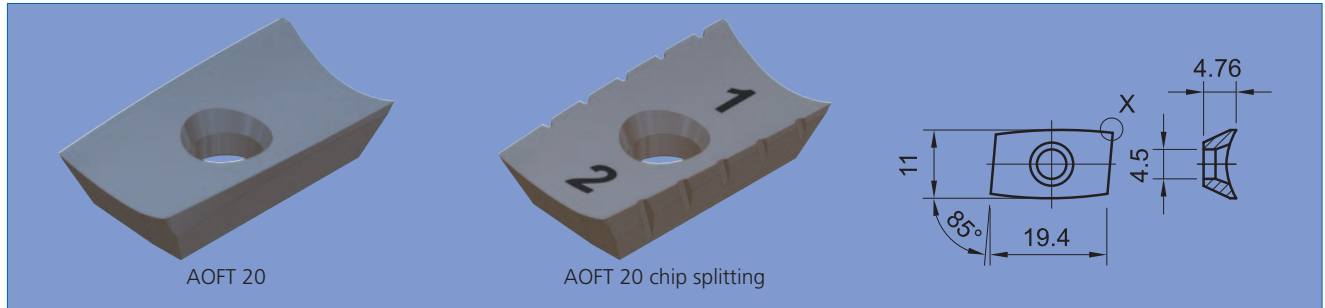
Circular interpolation



# ALESA TWIST milling cutter

## AO 20 R 90° / Ø 50 – 100

ap = 17.5 mm



Profile milling

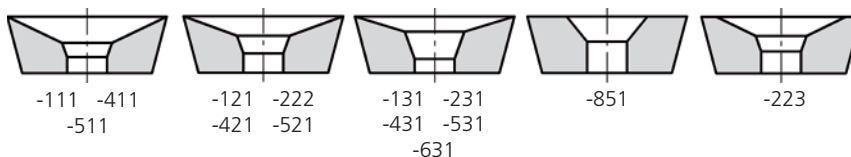
Cutting material	Coating	Part No	ISO Code	Detail X				Mat. classification					
								1	2	3	4	5	6
HSS-E	TiN	1087.0215	AOFT 20 04 PF FR	0.2x45°	r	●		○	○		●		●
		1087.0315	AOFT 20 04 08 FR	R 0.8	r	●		○	○		●		●
	TiAlN	1162.0215	AOFT 20 04 PF FR	0.2x45°	r	●		○	●		●	○	●
		1162.0315	AOFT 20 04 08 FR	R 0.8	r	●		○	●		●	○	●
HSS-E chip splitting °)	TiN	1087.0515	AOFT 20 04 PF FR (No 1/2)	0.2x45°	r	●		○	○		●		●
		1087.0518	AOFT 20 04 PF FR (No 3)	0.2x45°	r	●		○	○		●		●
Carbide HM	TiN	1287.0225	AOFT 20 04 PF FR-411	0.2x45°	r	●	○	○	○	●	●		●
		1287.0230	AOFT 20 04 08 FR-411	R 0.8	r	●	○	○	○	●	●		●
		TiAlN	1287.0325	AOFT 20 04 PF FR-411	0.2x45°	r	●	○	○	○	●	●	○
	1287.0330		AOFT 20 04 08 FR-411	R 0.8	r	●	○	○	○	●	●	○	●
	AlCrN		1287.0676	AOFT 20 04 PF FR-421	0.2x45°	r	●	○	●	●	●	●	●
		1287.0681	AOFT 20 04 08 FR-421	R 0.8	r	●	○	●	●	●	●	●	●
		1287.0682	AOFT 20 04 08 FR-431	R 0.8	r	●	○	●	●	●	○	●	○
	AlCrN-VA	1287.0691*	AOFT 20 04 24 FR-421	R 2.4	r	●	○	●	●	●	●	●	●
		1287.0693*	AOFT 20 04 32 FR-421	R 3.2	r	●	○	●	●	●	●	●	●
1287.0782		AOFT 20 04 08 FR-431	R 0.8	r	●	○		●	○		●		
Carbide HM-F	TiAlN	1287.0525	AOFT 20 04 PF FR-511	0.2x45°	r		●	○	○	●			●
		1287.0530	AOFT 20 04 08 FR-511	R 0.8	r		●	○	○	●			●
	AlCrN	1287.0726	AOFT 20 04 PF FR-521	0.2x45°	r		●	●	●	●	●		●
		1287.0731	AOFT 20 04 08 FR-521	R 0.8	r		●	●	●	●	●		●
		1287.0735	AOFT 20 04 08 FR-531	R 0.8	r		●	●	●	○			○
AlCrN-VA	1287.0835	AOFT 20 04 08 FR-531	R 0.8	r		●		●	○				
Carbide HA	AlCrN-VA	1289.0262	AOFT 20 04 08 FR-631	R 0.8	r	●	○	○	●	○		●	

°) Order of inserts with chip splitting see page 139

Fitting instructions for inserts see page 139

\* while stocks last

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
Additional number indexable inserts ISO-code (cutting geometry)  
Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.



# ALESA DELTA end mill and threaded type cutter

TN 11 R 90° / Ø 25 – 32

1306 / 1308

Profile milling



Part No	Type	D mm	l2 mm	d2 mm	G	l1 mm				Accessories kit No	<b>WSP</b>
<b>1306.0382</b>	25-TN 11 R	25	38	20.0		90	✓	4	r	1494.0630	TNFU 11 S4
<b>1308.0382</b>	25-TN 11 R	25	35	12.5	M12	55	✓	4	r	1494.0630	TNFU 11 S4
<b>1306.0422</b>	32-TN 11 R	32	38	25.0		96	✓	5	r	1494.0635	TNFU 11 S4
<b>1308.0422</b>	32-TN 11 R	32	42	17.0	M16	64	✓	5	r	1494.0635	TNFU 11 S4

Tool will be delivered with holder, all screws and torque wrench, but without indexable inserts.

## Accessories / spare parts

Part No	Torx screw				Screw-driver	
	Qty	Article	Type	Torque	Article	Type
<b>1494.0630</b>	4	1490.0275	M 3 x 8.2	1.8 Nm	1492.0450	T9 / 1.8Nm
<b>1494.0635</b>	5	1490.0275	M 3 x 8.2	1.8 Nm	1492.0450	T9 / 1.8Nm



ALESA DELTA: the spiral ground indexable insert for a smooth and vibration-free chip removal for any metals.



Highly positive, extremely sharp cutting edge of carbide.



When milling slots with an internal cooling system set operating pressure above 20 bar. Ensure clear chip removal.



Stainless steels (V2A) can be machined dry with AlCrN-VA coated inserts.



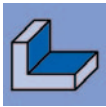
Profile milling



Slot milling



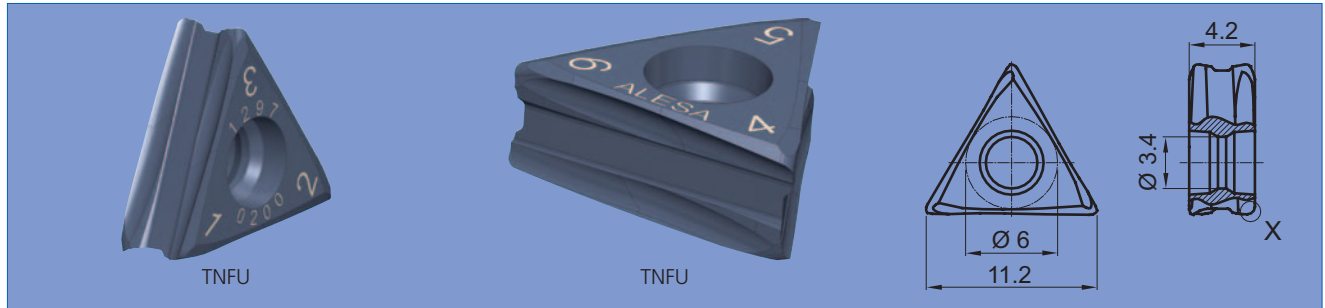
Face milling



# ALESA DELTA end mill and threaded type cutter

## TN 11 R 90° / Ø 25 – 32

ap = 8 mm



Profile milling

Cutting material	Coating	Part No	ISO Code	Detail X				Mat. classification					
								1	2	3	4	5	6
Carbide CTS	AlCrN-VA	1297.0200	TNFU 11 S4 04 FR-321	R 0.4	r	●	○	●	●	○	○	○	○
		1297.0650	TNFU 11 S4 PF FR-321	0.2x45°	r	●	○	●	●	○	●	○	○
	DLC-H	1297.0201	TNFU 11 S4 04 FR-321	R 0.4	r	○	●	○	○	●	○	○	●
		1297.0651	TNFU 11 S4 PF FR-321	0.2x45°	r	○	●	○	○	●	○	○	●

Fitting instructions for inserts see page 139

Overview of all indexable inserts see page 108 and following.



# ALESA DELTA milling cutter

## TN 11 / 18 – R 90° / Ø 43 – 83

1303 / 1304

Profile milling



Part No	Type	D mm	H mm	d1 mm	d2 mm	l1 mm	ap mm				Accessories kit No	WSP
1303.0463	43-TN 11 R	43	32	16.0	8.5	18	8	✓	6	r	1494.0640	TN 11 S4
1304.0463	43-TN 18 R	43	32	16.0	8.5	18	13	✓	4	r	1494.0800	TN 18 07
1304.0483	53-TN 18 R	53	40	22.0	11	20	13	✓	6	r	1494.0801	TN 18 07
1304.0503	66-TN 18 R	66	40	22.0	11	20	13	✓	7	r	1494.0802	TN 18 07
1304.0523	83-TN 18 R	83	50	27.0	14	22	13	✓	9	r	1494.0803	TN 18 07

Tool will be delivered with holder, all screws and torque wrench, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver		Hex socket head screw		
	Qty	Article	Type	Torque	Article	Type	Article	Type	Torque
1494.0640	6	1490.0275	M 3 x 8.2	1.8 Nm	1492.0450	T9 / 1.8Nm	1490.0759	M 8 x 20	30 Nm
1494.0800	4	1490.0385	M 5 x 11.5	5 Nm	1492.0650	T20 / 5Nm	1490.0759	M 8 x 20	30 Nm
1494.0801	6	1490.0395	M 5 x 14.5	5 Nm	1492.0650	T20 / 5Nm	1490.0770	M 10 x 25	50 Nm
1494.0802	7	1490.0395	M 5 x 14.5	5 Nm	1492.0650	T20 / 5Nm	1490.0770	M 10 x 25	50 Nm
1494.0803	9	1490.0395	M 5 x 14.5	5 Nm	1492.0650	T20 / 5Nm	1490.0780	M 12 x 30	90 Nm



ALESA DELTA: the spiral ground indexable insert for a smooth and vibration-free chip removal for any metals.



Highly positive, extremely sharp cutting edge of carbide.



When milling slots with an internal cooling system set operating pressure above 20 bar. Ensure clear chip removal.



Stainless steels (V2A) can be machined dry with AlCrN-VA coated inserts.



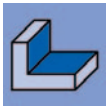
Profile milling



Slot milling



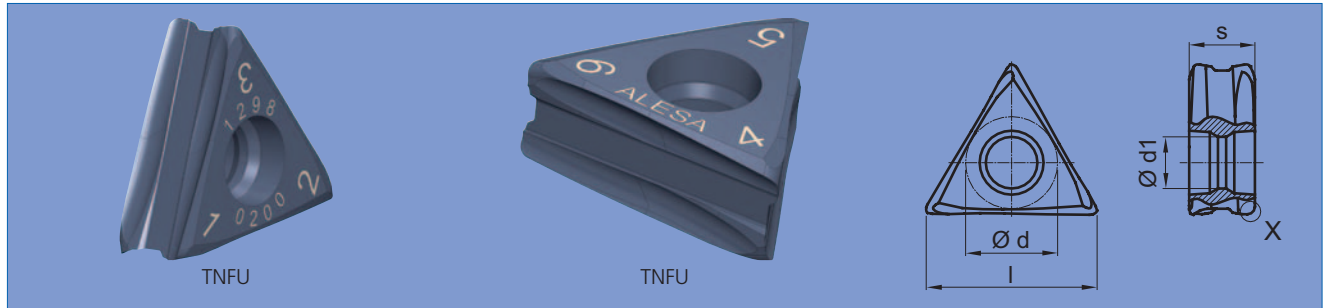
Face milling



# ALESA DELTA milling cutter

## TN 11 / 18 – R 90° / Ø 43 – 83

ap = {



Profile milling

Cutting material	Coating	Part No	ISO Code	l mm	s mm	d mm	d1 mm	Detail X	🔥	✂️	Mat. classification					
											1	2	3	4	5	6
Carbide CTS	AlCrN-VA	1297.0200	TNFU 11 S4 04 FR-321	11.2	4.2	6	3.4	R 0.4	●	○	●	●	○	●	○	
		1297.0650	TNFU 11 S4 PF FR-321	11.2	4.2	6	3.4	0.2x45°	●	○	●	●	○	●	○	
		1298.0200	TNFU 18 07 08 FR-321	18.3	7	9.8	5.5	R 0.8	●	○	●	●	○	●	○	
		1298.0650	TNFU 18 07 PF FR-321	18.3	7	9.8	5.5	0.2x45°	●	○	●	●	○	●	○	
	DLC-H	1297.0201	TNFU 11 S4 04 FR-321	11.2	4.2	6	3.4	R 0.4	○	●		○	●		●	
		1297.0651	TNFU 11 S4 PF FR-321	11.2	4.2	6	3.4	0.2x45°	○	●		○	●		●	
		1298.0201	TNFU 18 07 08 FR-321	18.3	7	9.8	5.5	R 0.8	○	●		○	●		●	
		1298.0651	TNFU 18 07 PF FR-321	18.3	7	9.8	5.5	0.2x45°	○	●		○	●		●	

Fitting instructions for inserts see page 139

Overview of all indexable inserts see page 108 and following.

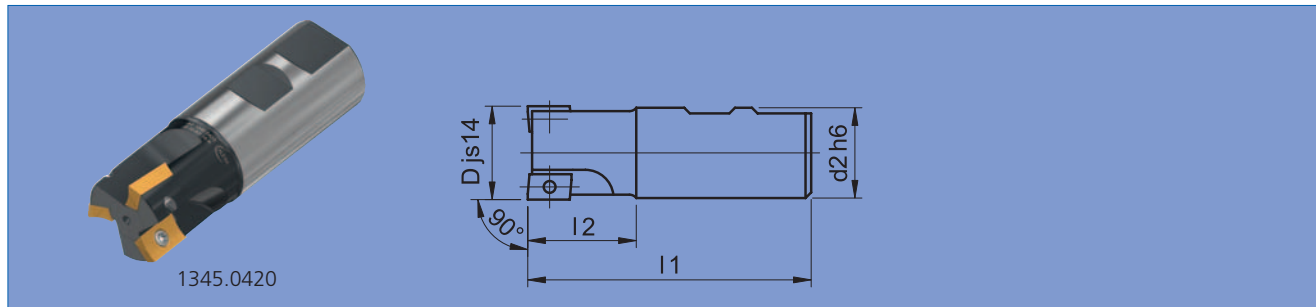


# ALESA end mill AP

## AP 16 R 90° / Ø 25 – 40

1345

Profile milling



Part No	Type	D mm	l2 mm	d2 mm	l1 mm				Accessories kit No	<b>WSP</b>
1345.0380	25-AP 16 R	25	38	25.0	96	✓	2	r	1494.0700	APT 16 04
1345.0420	32-AP 16 R	32	38	32.0	100	✓	3	r	1494.0710	APT 16 04
1345.0460	40-AP 16 R	40	48	32.0	110	✓	4	r	1494.0712	APT 16 04

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver	
	Qty	Article	Type	Torque	Article	Type
1494.0700	2	1490.0320	M4x6	3.85 Nm	1492.0500	T 15
1494.0710	3	1490.0360	M4x10	3.85 Nm	1492.0500	T 15
1494.0712	4	1490.0360	M4x10	3.85 Nm	1492.0500	T 15



Highly positive, extremely sharp cutting edge of HSS-E and carbide.



Holes for internal coolant supply guarantee ideal cooling.



Stainless steels (V2A) can be machined dry with AlCrN coated inserts.



Profile milling



Slot milling

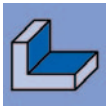


Face milling



Circular interpolation

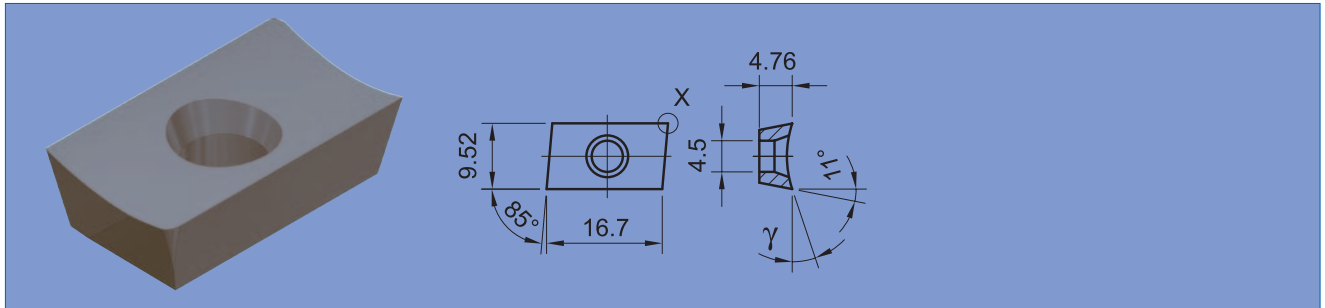




# ALESA end mill AP

## AP 16 R 90° / Ø 25 – 40

ap = 16 mm

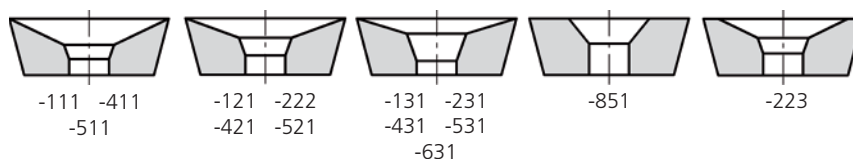


Profile milling

Cutting material	Coating	Part No	ISO Code	$\gamma$	Detail X				Mat. classification					
									1	2	3	4	5	6
HSS-E	TiN	1085.0200	APFT 16 04 PD FR	18°	0.2x45°	r	●		○	○		●	●	
		1085.0230	APFT 16 04 PD FR	25°	0.2x45°	r	●		○	○		●	●	
		1085.0250	APFT 16 04 04 FR	18°	R 0.4	r	●		○	○		●	●	
		1085.0300	APFT 16 04 08 FR	18°	R 0.8	r	●		○	○		●	●	
		1085.0350	APFT 16 04 12 FR	18°	R 1.2	r	●		○	○		●	●	
	TiAlN	1160.0200	APFT 16 04 PD FR	18°	0.2x45°	r	●		○	●		●	○	●
		1160.0230	APFT 16 04 PD FR	25°	0.2x45°	r	●		○	●		●	○	●
		1160.0250	APFT 16 04 04 FR	18°	R 0.4	r	●		○	●		●	○	●
		1160.0300	APFT 16 04 08 FR	18°	R 0.8	r	●		○	●		●	○	●
		1160.0350	APFT 16 04 12 FR	18°	R 1.2	r	●		○	●		●	○	●
		Carbide MG20	TiN	1285.0200	APFT 16 04 PD FR-111	18°	0.2x45°	r	○	●	●	○	●	●
1285.0250	APFT 16 04 04 FR-111			18°	R 0.4	r	○	●	●	●	●	●	●	
1285.0300	APFT 16 04 08 FR-111			18°	R 0.8	r	○	●	●	●	●	●	●	
TiAlN	1285.0205		APFT 16 04 PD FR-111	18°	0.2x45°	r	○	●	●	●	○	●	●	
	1285.0255		APFT 16 04 04 FR-111	18°	R 0.4	r	○	●	●	●	○	●	●	
AlCrN	1285.0305		APFT 16 04 08 FR-111	18°	R 0.8	r	○	●	●	●	○	●	●	
	1285.0215		APFT 16 04 PD FR-111	18°	0.2x45°	r	○	●	●	●	●	●	●	
	1285.0265		APFT 16 04 04 FR-111	18°	R 0.4	r	○	●	●	●	●	●	●	
	1285.0315		APFT 16 04 08 FR-111	18°	R 0.8	r	○	●	●	●	●	●	●	
	1285.0515		APFT 16 04 PD FR-121	10°	0.2x45°	r	○	●	●	●	●	●	●	
AlCrN-VA	1285.0615		APFT 16 04 08 FR-121	10°	R 0.8	r	○	●	●	●	●	●	●	
	1285.0520		APFT 16 04 PD FR-121	10°	0.2x45°	r	○	●	●	●	○	●	●	
	1285.0620		APFT 16 04 08 FR-121	10°	R 0.8	r	○	●	●	●	○	●	●	
Carbide 12CR	TiAlN	1285.0400	APHT 16 04 PD FR-222	16°		r	●	●	●	○	●	○	●	
	AlCrN	1285.0410	APHT 16 04 PD FR-222	16°		r	●	●	●	○	●	○	●	

Fitting instructions for inserts see page 139

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
Additional number indexable inserts ISO-code (cutting geometry)  
Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.



# ALESA milling cutter AP

## AP 16 R 90° / Ø 40 – 160

1310

Profile milling



Part No	Type	D mm	H mm	d1 mm	d2 mm	l1 mm				Accessories kit No	Ring No	<b>WSP</b>
1310.0460	40-AP 16 R	40	32	16.0	8.5	18	✓	3	r	1494.0711		APT 16 04
1310.0480	50-AP 16 R	50	40	22.0	11	20	✓	4	r	1494.0713		APT 16 04
1310.0500	63-AP 16 R	63	40	22.0	11	20	✓	5	r	1494.0714		APT 16 04
1310.0520	80-AP 16 R	80	50	27.0	14	22	✓	6	r	1494.0715		APT 16 04
1310.0540	100-AP 16 R	100	50	32.0	18	25	✓	7	r	1494.0716		APT 16 04
1310.0560	125-AP 16 R	125	63	40.0	56	28	✓	8	r	1494.0717	1320.0135	APT 16 04
1310.0580	160-AP 16 R	160	63	40.0	56	28	✓	10	r	1494.0719	1320.0145	APT 16 04

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

Ring for the lubricant distribution on the tool face (KSSV)

Nr. / No. / No	Dimension	
1320.0135	Ø 56 x 31.5 x 28	1320.0215 M20x60 230 Nm
1320.0145	Ø 56 x 31.5 x 28	1320.0215 M20x60 230 Nm

### Accessories / spare parts

Part No	Torx screw				Screw-driver		Hex socket head screw		
	Qty	Article	Type	Torque	Article	Type	Article	Type	Torque
1494.0711	3	1490.0360	M4x10	3.85 Nm	1492.0500	T 15	1490.0759	M 8 x 20	30 Nm
1494.0713	4	1490.0360	M4x10	3.85 Nm	1492.0500	T 15	1490.0770	M 10 x 25	50 Nm
1494.0714	5	1490.0360	M4x10	3.85 Nm	1492.0500	T 15	1490.0770	M 10 x 25	50 Nm
1494.0715	6	1490.0360	M4x10	3.85 Nm	1492.0500	T 15	1490.0780	M 12 x 30	90 Nm
1494.0716	7	1490.0360	M4x10	3.85 Nm	1492.0500	T 15	1490.0789	M 16 x 30	160 Nm
1494.0717	8	1490.0360	M4x10	3.85 Nm	1492.0500	T 15			
1494.0719	10	1490.0360	M4x10	3.85 Nm	1492.0500	T 15			

Holes for internal coolant supply guarantee ideal cooling.

**Info** Stainless steels (V2A) can be machined dry with AlCrN coated inserts.

**WSP** All ALESA indexable inserts are ground in the high ISO standard tolerance classification F.

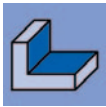
Highly positive, extremely sharp cutting edge of HSS-E and carbide.

Profile milling

Slot milling

Face milling

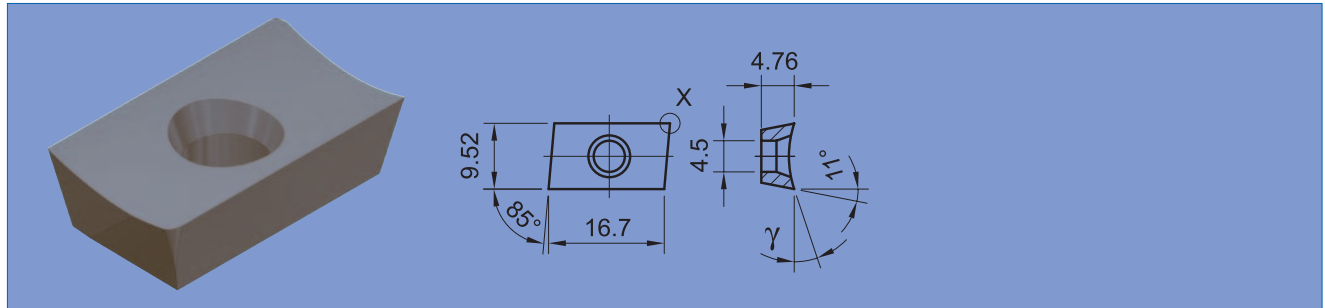
Circular interpolation



# ALESA milling cutter AP

## AP 16 R 90° / Ø 40 – 160

ap = 16 mm

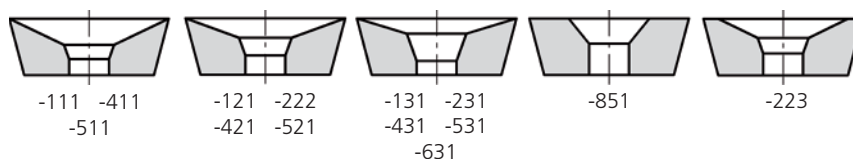


Profile milling

Cutting material	Coating	Part No	ISO Code	$\gamma$	Detail X				Mat. classification					
									1	2	3	4	5	6
HSS-E	TiN	1085.0200	APFT 16 04 PD FR	18°	0.2x45°	r	●		○	○		●		●
		1085.0230	APFT 16 04 PD FR	25°	0.2x45°	r	●		○	○		●		●
		1085.0250	APFT 16 04 04 FR	18°	R 0.4	r	●		○	○		●		●
		1085.0300	APFT 16 04 08 FR	18°	R 0.8	r	●		○	○		●		●
		1085.0350	APFT 16 04 12 FR	18°	R 1.2	r	●		○	○		●		●
	TiAlN	1160.0200	APFT 16 04 PD FR	18°	0.2x45°	r	●		○	●		●	○	●
		1160.0230	APFT 16 04 PD FR	25°	0.2x45°	r	●		○	●		●	○	●
		1160.0250	APFT 16 04 04 FR	18°	R 0.4	r	●		○	●		●	○	●
		1160.0300	APFT 16 04 08 FR	18°	R 0.8	r	●		○	●		●	○	●
		1160.0350	APFT 16 04 12 FR	18°	R 1.2	r	●		○	●		●	○	●
		Carbide MG20	TiN	1285.0200	APFT 16 04 PD FR-111	18°	0.2x45°	r	○	●	●	○	●	●
1285.0250	APFT 16 04 04 FR-111			18°	R 0.4	r	○	●	●	●	●	●	●	
1285.0300	APFT 16 04 08 FR-111			18°	R 0.8	r	○	●	●	●	●	●	●	
TiAlN	1285.0205		APFT 16 04 PD FR-111	18°	0.2x45°	r	○	●	●	●	○	●	●	
	1285.0255		APFT 16 04 04 FR-111	18°	R 0.4	r	○	●	●	●	○	●	●	
AlCrN	1285.0305		APFT 16 04 08 FR-111	18°	R 0.8	r	○	●	●	●	○	●	●	
	1285.0215		APFT 16 04 PD FR-111	18°	0.2x45°	r	○	●	●	●	●	●	●	
	1285.0265		APFT 16 04 04 FR-111	18°	R 0.4	r	○	●	●	●	●	●	●	
	1285.0315		APFT 16 04 08 FR-111	18°	R 0.8	r	○	●	●	●	●	●	●	
	1285.0515		APFT 16 04 PD FR-121	10°	0.2x45°	r	○	●	●	●	●	●	●	
AlCrN-VA	1285.0615		APFT 16 04 08 FR-121	10°	R 0.8	r	○	●	●	●	●	●	●	
	1285.0520		APFT 16 04 PD FR-121	10°	0.2x45°	r	○	●	●	●	○	●	●	
	1285.0620		APFT 16 04 08 FR-121	10°	R 0.8	r	○	●	●	●	○	●	●	
Carbide 12CR	TiAlN	1285.0400	APHT 16 04 PD FR-222	16°		r	●	●	●	○	●	○	●	
		1285.0410	APHT 16 04 PD FR-222	16°		r	●	●	●	○	●	○	●	

Fitting instructions for inserts see page 139

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
Additional number indexable inserts ISO-code (cutting geometry)  
Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.

# Hobbing

## ALESA TWIST and DELTA

Hobbing

### The characteristics

- THE original of the high-positive, sharp-ground shell end-indexable insert cutters
- SWISS Precision Tool. The milling head and cutting inserts are manufactured in Switzerland
- Unique with 20° helix angle
- The peeling of the cutting process is very spindle and machine-friendly
- The sharp blades require less spindle power and the cutting forces are much smaller
- The ALESA tools are optimized for modern 5-axis milling centers
- All tools are provided with cooling holes. Optimum cooling, optimal evacuation of chips
- HSS (TWIST) and carbide cutting inserts have the best available PVD coatings



### The benefits and options for you

- Fast delivery from the Seengen warehouse
- There are different Ø ranges available
- Ø 25 mm and Ø 32 mm Weldon, Ø 32 mm also with M16 screw head
- Ø 43 mm to Ø 83 mm as arbor milling cutter
- With various cutting-geometries a very large range of materials can be processed
- There are carbide qualities for the dry and wet machining
- HSS is very reliable and powerful for many applications
- High removal rate (Q) and large depth of cut with a relatively small machine load
- Good tool life and high productivity
- Excellent machining properties with the most difficult Ni-, Ti- and Co- alloys
- Manufactured according to ISO certified processes
- For special tools, our construction with great experience is available



# Hobbing

## ALESA TWIST and DELTA

### Comments on the application of shell-end mills

- Shell-end mills put heavy demands on spindle performance as well as on the stability of the tool holder and the clamping condition of parts
- Processing with vibration should be avoided
- The unequal division and the special ALESA spiral position of the cutting edges have a large influence on the cutting forces that occur
- Machine-friendly processes without oscillations and vibrations are the rule
- Choose tool holder to be as long as necessary and as short as possible
- In case of extensions, preferably select the tools with  $\varnothing 43$  mm,  $\varnothing 53$  mm,  $\varnothing 66$  mm or  $\varnothing 83$  mm, so that a potentially larger extension diameter can be used
- Preferably, use accurate holders! Circular and axial run-out errors have a much larger effect with shell end mills than with normal cutting tools
- Shell-end mills produce the best performance if  $ae < 20\%$  of the tool diameter is used
- Watch out for adequate and stable pressure coolant supply when using cooling  
The cooling demand is much higher than with normal cutting tools
- To tighten the center screw use torque wrenches!



### Cutting and process data for shell-end mills

- Cutting speed and average chip thickness  $h_m$  can be found in the ALESA catalog
- For shell-end mills, the  $V_{c_{max}}$  in the slotting / face milling field « $ae = 50\% - 100\%$ » has to match the class of materials
- Calculate  $N_{max}$  and  $V_{f_{max}}$  in advance
- IMPORTANT:  
If vibrations did occur, check the cutting insert bolts and if necessary tighten them again with the proper torque
- If cutting insert rows are not required, the cutting insert screws must be removed also
- For outer or inner circular processing the correct track speed « $V_f$ » at the center of the milling machine must be calculated
- With outer and inner circular milling, several factors influence the actual cutting width "ae"  
The large depth of cut with the shell-end mills causes large radial forces, which can also go up excessively in case of strong increase of the width of the cut:  
The actual «ae» must therefore be calculated



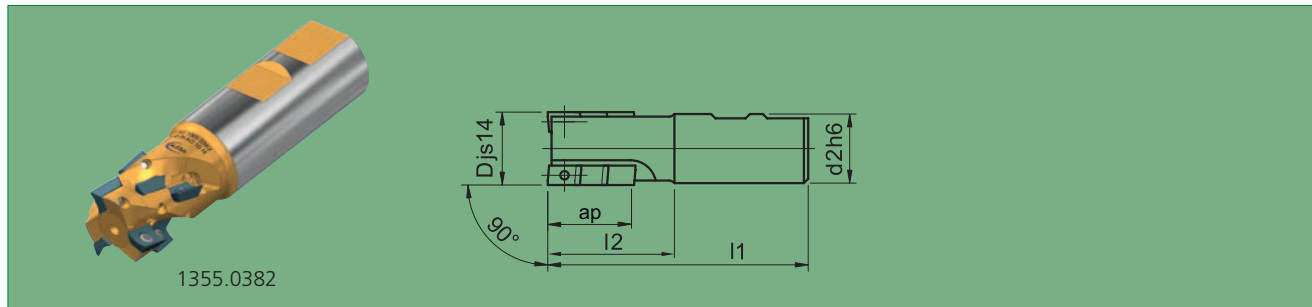
# ALESA TWIST shell end mill

## AO 10 R 90° / Ø 25

1355 – 10

Pat. no. 686 235

Hobbing



Part No	Type	D mm	l2 mm	d2 mm	l1 mm	ap mm				Accessories kit No	<b>WSP</b>
<b>1355.0382</b>	25-AO 10 R Z3x3	25	40	25.0	96	25	✓	3 x 3	r	1494.0567	AOFT 10 03

Tool will be delivered with holder, screws and screw-driver, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver	
	Qty	Article	Type	Torque	Article	Type
<b>1494.0567</b>	9	1491.0220	M2.5x5	0.95 Nm	1493.0300	TP7 IP



ALESA TWIST: the patented spiral ground indexable insert for a smooth and vibration-free chip removal for any metals. The full cutting edge is useable (ap).



Best results at ae > 10-20% of the diameter.



Profile milling



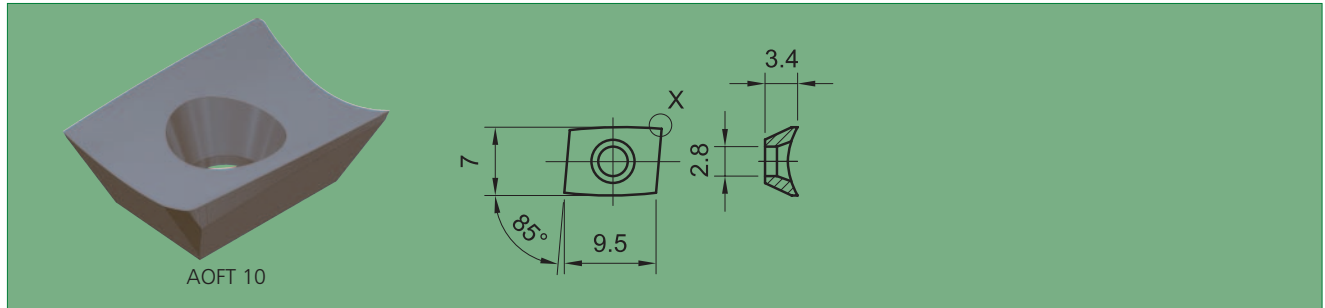
Slot milling



# ALESA TWIST shell end mill

## AO 10 R 90° / Ø 25

ap = 8 mm

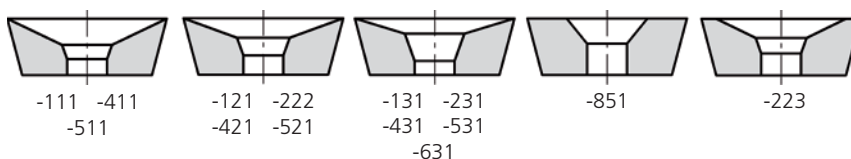


Hobbing

Cutting material	Coating	Part No	ISO Code	Detail X				Mat. classification					
								1	2	3	4	5	6
HSS-E	TiN	1087.0170	AOFT 10 03 PF FR	0.2x45°	r	●		○	○		●		●
		1087.0180	AOFT 10 03 04 FR	R 0.4	r	●		○	○		●		●
	TiAlN	1162.0170	AOFT 10 03 PF FR	0.2x45°	r	●		○	●		●	○	●
		1162.0180	AOFT 10 03 04 FR	R 0.4	r	●		○	●		●	○	●
Carbide HM	TiN	1287.0200	AOFT 10 03 PF FR-411	0.2x45°	r	●	○	○	○	●	●		●
		1287.0205	AOFT 10 03 04 FR-411	R 0.4	r	●	○	○	○	●	●		●
	TiAlN	1287.0300	AOFT 10 03 PF FR-411	0.2x45°	r	●	○	○	○	●	●	○	●
		1287.0305	AOFT 10 03 04 FR-411	R 0.4	r	●	○	○	○	●	●	○	●
	AlCrN	1287.0651	AOFT 10 03 PF FR-421	0.2x45°	r	●	○	○	●	●	●	●	●
		1287.0656	AOFT 10 03 04 FR-421	R 0.4	r	●	○	○	●	●	●	●	●
		1287.0657	AOFT 10 03 04 FR-431	R 0.4	r	●	○	○	●	●	●	○	○
		1287.0757	AOFT 10 03 04 FR-431	R 0.4	r	●	○	○	●	●	○	○	○
Carbide HM-F	TiAlN	1287.0500*	AOFT 10 03 PF FR-511	0.2x45°	r		●	○	○	●			●
		1287.0505*	AOFT 10 03 04 FR-511	R 0.4	r		●	○	○	●			●
	AlCrN	1287.0701	AOFT 10 03 PF FR-521	0.2x45°	r		●	○	○	●	●		●
		1287.0706	AOFT 10 03 04 FR-521	R 0.4	r		●	○	○	●	●		●
		1287.0707	AOFT 10 03 04 FR-531	R 0.4	r		●	○	○	●	○		○
AlCrN-VA	1287.0807	AOFT 10 03 04 FR-531	R 0.4	r		●	○	○	●			○	
Carbide HA	AlCrN-VA	1289.0202	AOFT 10 03 04 FR-631	R 0.4	r	●	○	○	●	○		●	

\* while stocks last  
Fitting instructions for inserts see page 139

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
Additional number indexable inserts ISO-code (cutting geometry)  
Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.



# ALESA TWIST shell end mill and threaded type cutter

## AO 15 R 90° / Ø 32

1355 – 15

Pat. no. 686 235

Hobbing



Part No	Type	D mm	l2 mm	d2 mm	G	l1 mm	ap mm				Accessories kit No	<b>WSP</b>
<b>1355.0418</b>	32-AO 15 R Z2x3	32	60	32.0		120	38	✓	2 x 3	r	1494.0655	AOFT 15 T3
<b>1355.0420</b>	32-AO 15 R Z2x3	32	64	17.0	M16	86	38	✓	2 x 3	r	1494.0655	AOFT 15 T3

Tool will be delivered with holder, screws and screw-driver, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver	
	Qty	Article	Type	Torque	Article	Type
<b>1494.0655</b>	6	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15



ALESA TWIST: the patented spiral ground indexable insert for a smooth and vibration-free chip removal for any metals. The full cutting edge is useable (ap).



Best results at ae > 10-20% of the diameter.



The inserts with radius R > 0.8 mm must only be mounted in the first row.



Profile milling



Slot milling





# ALESA TWIST shell end mill and threaded type cutter

## AO 15 R 90° / Ø 32

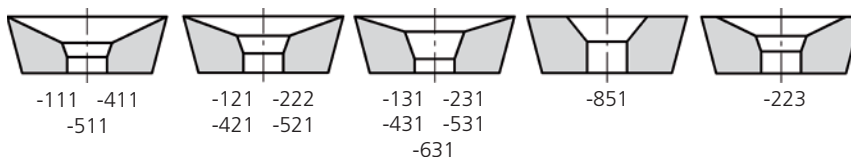
ap = 13 mm



Cutting material	Coating	Part No	ISO Code	Detail X				Mat. classification					
								1	2	3	4	5	6
HSS-E	TiN	1087.0190	AOFT 15 T3 PF FR	0.2x45°	r	●		○	○		●		●
		1087.0210	AOFT 15 T3 08 FR	R 0.8	r	●		○	○		●		●
	TiAlN	1162.0190	AOFT 15 T3 PF FR	0.2x45°	r	●		○	●		●	○	●
		1162.0210	AOFT 15 T3 08 FR	R 0.8	r	●		○	●		●	○	●
HSS-E chip splitting <sup>o)</sup>	TiN	1087.0505	AOFT 15 T3 PF FR (No 1/2)	0.2x45°	r	●		○	○		●		●
		1087.0508	AOFT 15 T3 PF FR (No 3)	0.2x45°	r	●		○	○		●		●
Carbide HM	TiN	1287.0210	AOFT 15 T3 PF FR-411	0.2x45°	r	●	○	○	○	●	●		●
		1287.0215	AOFT 15 T3 08 FR-411	R 0.8	r	●	○	○	○	●	●		●
	TiAlN	1287.0310	AOFT 15 T3 PF FR-411	0.2x45°	r	●	○	○	○	●	●	○	●
		1287.0315	AOFT 15 T3 08 FR-411	R 0.8	r	●	○	○	○	●	●	○	●
	AlCrN	1287.0661	AOFT 15 T3 PF FR-421	0.2x45°	r	●	○	○	●	●	●	●	●
		1287.0666	AOFT 15 T3 08 FR-421	R 0.8	r	●	○	○	●	●	●	●	●
		1287.0667	AOFT 15 T3 08 FR-431	R 0.8	r	●	○	○	●	●	○	●	○
		1287.0669	AOFT 15 T3 12 FR-421	R 1.2	r	●	○	○	●	●	●	●	●
	AlCrN-VA	1287.0671	AOFT 15 T3 16 FR-421	R 1.6	r	●	○	○	●	●	●	●	●
		1287.0673	AOFT 15 T3 20 FR-421	R 2.0	r	●	○	○	●	●	●	●	●
	DLC-H	1287.0767	AOFT 15 T3 08 FR-431	R 0.8	r	●	○	○		●	○		●
		1287.0916	AOFT 15 T3 08 FR-421	R 0.8	r	●	○	○		○	●		●
Carbide HM-F	TiAlN	1287.0510	AOFT 15 T3 PF FR-511	0.2x45°	r		●	○	○	●			●
		1287.0515	AOFT 15 T3 08 FR-511	R 0.8	r		●	○	○	●			●
	AlCrN	1287.0711	AOFT 15 T3 PF FR-521	0.2x45°	r		●		●	●	○		●
		1287.0716	AOFT 15 T3 08 FR-521	R 0.8	r		●		●	●	○		●
	AlCrN-VA	1287.0717	AOFT 15 T3 08 FR-531	R 0.8	r		●		●	●	○		○
		1287.0817	AOFT 15 T3 08 FR-531	R 0.8	r		●		●	○			○
DLC-H	1287.0967	AOFT 15 T3 08 FR-531	R 0.8	r		●		○	●			●	
Carbide HA	AlCrN-VA	1289.0232	AOFT 15 T3 08 FR-631	R 0.8	r	●	○	○	●	○		●	

<sup>o)</sup> Order of inserts with chip splitting see page 139  
Fitting instructions for inserts see page 139

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
Additional number indexable inserts ISO-code (cutting geometry)  
Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.



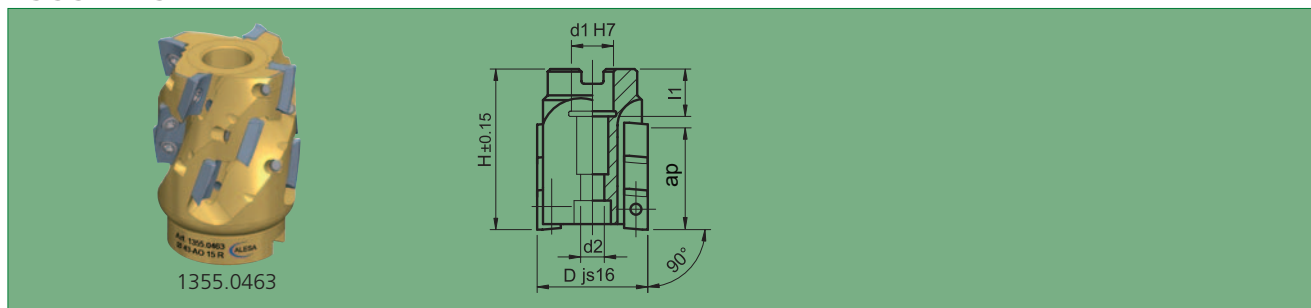
# ALESA TWIST shell end mill

## AO 15 R 90° / Ø 40 – 53

1355 – 15

Pat. no. 686 235

Hobbing



Part No	Type	D mm	H mm	d1 mm	d2 mm	l1 mm	ap mm				Accessories kit No	<b>WSP</b>
<b>1355.0460*</b>	40-AO 15 R Z3x3	40	60	16.0	8.5	18	38	✓	3 x 3	r	1494.0659	AOFT 15 T3
<b>1355.0463*</b>	43-AO 15 R Z4x3	43	60	16.0	8.5	18	38	✓	4 x 3	r	1494.0665	AOFT 15 T3
<b>1355.0473*</b>	53-AO 15 R Z4x4	53	72	22.0	11	20	50	✓	4 x 4	r	1494.0663	AOFT 15 T3

\*while stocks last

Tool will be delivered with holder, screws and screw-driver, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver		Hex socket head screw		
	Qty	Article	Type	Torque	Article	Type	Article	Type	Torque
<b>1494.0659</b>	9	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0700	M 8 x 50	30 Nm
<b>1494.0663</b>	16	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0710	M 10 x 60	50 Nm
<b>1494.0665</b>	12	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0700	M 8 x 50	30 Nm



ALESA TWIST: the patented spiral ground indexable insert for a smooth and vibration-free chip removal for any metals. The full cutting edge is useable (ap).



The inserts with radius R > 0.8 mm must only be mounted in the first row.



Best results at ap > 10-20% of the diameter.



Profile milling



Slot milling



# ALESA TWIST shell end mill

## AO 15 R 90° / Ø 40 – 53

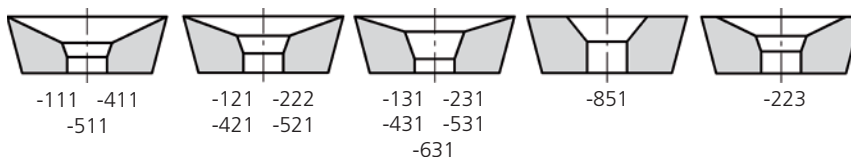
ap = 13 mm



Cutting material	Coating	Part No	ISO Code	Detail X				Mat. classification					
								1	2	3	4	5	6
HSS-E	TiN	1087.0190	AOFT 15 T3 PF FR	0.2x45°	r	●		○	○		●		●
		1087.0210	AOFT 15 T3 08 FR	R 0.8	r	●		○	○		●		●
	TiAlN	1162.0190	AOFT 15 T3 PF FR	0.2x45°	r	●		○	●		●	○	●
		1162.0210	AOFT 15 T3 08 FR	R 0.8	r	●		○	●		●	○	●
HSS-E chip splitting <sup>o)</sup>	TiN	1087.0505	AOFT 15 T3 PF FR (No 1/2)	0.2x45°	r	●		○	○		●		●
		1087.0508	AOFT 15 T3 PF FR (No 3)	0.2x45°	r	●		○	○		●		●
Carbide HM	TiN	1287.0210	AOFT 15 T3 PF FR-411	0.2x45°	r	●	○	○	○	●	●		●
		1287.0215	AOFT 15 T3 08 FR-411	R 0.8	r	●	○	○	○	●	●		●
	TiAlN	1287.0310	AOFT 15 T3 PF FR-411	0.2x45°	r	●	○	○	○	●	●	○	●
		1287.0315	AOFT 15 T3 08 FR-411	R 0.8	r	●	○	○	○	●	●	○	●
	AlCrN	1287.0661	AOFT 15 T3 PF FR-421	0.2x45°	r	●	○	○	○	●	●	●	●
		1287.0666	AOFT 15 T3 08 FR-421	R 0.8	r	●	○	○	○	●	●	●	●
		1287.0667	AOFT 15 T3 08 FR-431	R 0.8	r	●	○	○	○	●	●	○	○
		1287.0669	AOFT 15 T3 12 FR-421	R 1.2	r	●	○	○	○	●	●	●	●
	AlCrN-VA	1287.0671	AOFT 15 T3 16 FR-421	R 1.6	r	●	○	○	○	●	●	●	●
		1287.0673	AOFT 15 T3 20 FR-421	R 2.0	r	●	○	○	○	●	●	●	●
	DLC-H	1287.0767	AOFT 15 T3 08 FR-431	R 0.8	r	●	○	○	○	●	○		●
		1287.0916	AOFT 15 T3 08 FR-421	R 0.8	r	●	○	○	○	○	●		●
Carbide HM-F	TiAlN	1287.0510	AOFT 15 T3 PF FR-511	0.2x45°	r		●	○	○	●			●
		1287.0515	AOFT 15 T3 08 FR-511	R 0.8	r		●	○	○	●			●
	AlCrN	1287.0711	AOFT 15 T3 PF FR-521	0.2x45°	r		●		○	○			●
		1287.0716	AOFT 15 T3 08 FR-521	R 0.8	r		●		○	○			●
	AlCrN-VA	1287.0717	AOFT 15 T3 08 FR-531	R 0.8	r		●		○	○			○
		1287.0817	AOFT 15 T3 08 FR-531	R 0.8	r		●		○	○			○
DLC-H	1287.0967	AOFT 15 T3 08 FR-531	R 0.8	r		●		○	○			●	
Carbide HA	AlCrN-VA	1289.0232	AOFT 15 T3 08 FR-631	R 0.8	r	●	○	○	○	○		●	

<sup>o)</sup> Order of inserts with chip splitting see page 139  
Fitting instructions for inserts see page 139

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
Additional number indexable inserts ISO-code (cutting geometry)  
Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.



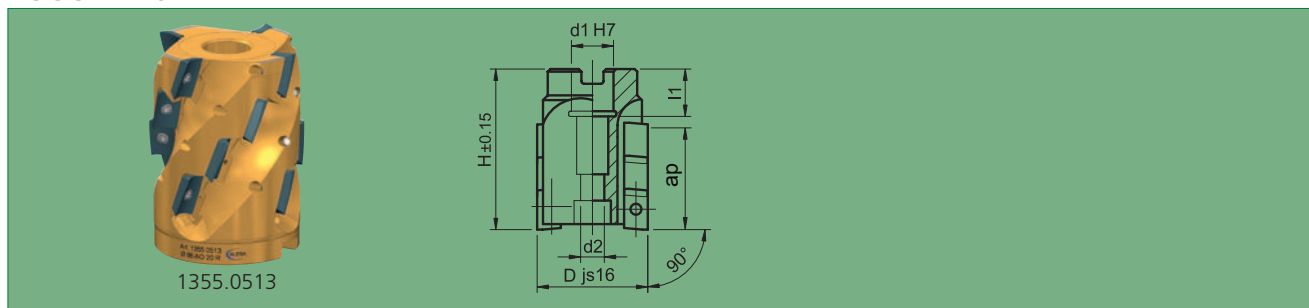
# ALESA TWIST shell end mill

## AO 20 R 90° / Ø 53 – 83

1355 – 20

Pat. no. 686 235

Hobbing



Part No	Type	D mm	H mm	d1 mm	d2 mm	l1 mm	ap mm				Accessories kit No	<b>WSP</b>
1355.0483*	53-AO 20 R Z3x3	53	72	22.0	11	20	50	✓	3 x 3	r	1494.0718	AOFT 20 04
1355.0503*	66-AO 20 R Z4x3	66	72	27.0	14	22	50	✓	4 x 3	r	1494.0720	AOFT 20 04
1355.0513*	66-AO 20 R Z4x4	66	90	27.0	14	22	68	✓	4 x 4	r	1494.0721	AOFT 20 04
1355.0523*	83-AO 20 R Z5x5	83	108	32.0	18	25	85	✓	5 x 5	r	1494.0722	AOFT 20 04

\*while stocks last

Tool will be delivered with holder, screws and screw-driver, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver		Hex socket head screw		
	Qty	Article	Type	Torque	Article	Type	Article	Type	Torque
1494.0718	9	1490.0360	M4x10	3.85 Nm	1492.0500	T 15	1490.0710	M 10 x 60	50 Nm
1494.0720	12	1490.0360	M4x10	3.85 Nm	1492.0500	T 15	1490.0720	M 12 x 60	90 Nm
1494.0721	16	1490.0360	M4x10	3.85 Nm	1492.0500	T 15	1490.0729	M 12 x 75	90 Nm
1494.0722	25	1490.0360	M4x10	3.85 Nm	1492.0500	T 15	1490.0740	M 16 x 90	160 Nm



ALESA TWIST: the patented spiral ground indexable insert for a smooth and vibration-free chip removal for any metals. The full cutting edge is useable (ap).



The inserts with radius R > 0.8 mm must only be mounted in the first row.



Best results at ap > 10-20% of the diameter.



Profile milling



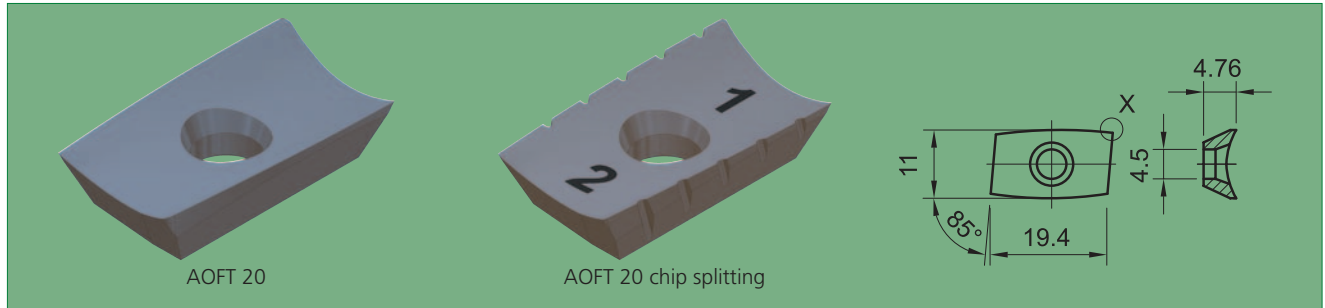
Slot milling



# ALESA TWIST shell end mill

## AO 20 R 90° / Ø 53 – 83

ap = 17.5 mm



Hobbing

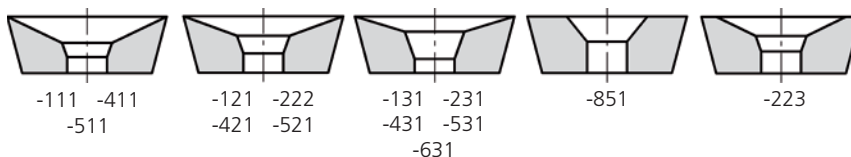
Cutting material	Coating	Part No	ISO Code	Detail X				Mat. classification					
								1	2	3	4	5	6
HSS-E	TiN	1087.0215	AOFT 20 04 PF FR	0.2x45°	r	●		○	○		●		●
		1087.0315	AOFT 20 04 08 FR	R 0.8	r	●		○	○		●		●
	TiAlN	1162.0215	AOFT 20 04 PF FR	0.2x45°	r	●		○	●		●	○	●
		1162.0315	AOFT 20 04 08 FR	R 0.8	r	●		○	●		●	○	●
HSS-E chip splitting °)	TiN	1087.0515	AOFT 20 04 PF FR (No 1/2)	0.2x45°	r	●		○	○		●		●
		1087.0518	AOFT 20 04 PF FR (No 3)	0.2x45°	r	●		○	○		●		●
Carbide HM	TiN	1287.0225	AOFT 20 04 PF FR-411	0.2x45°	r	●	○	○	○	●	●		●
		1287.0230	AOFT 20 04 08 FR-411	R 0.8	r	●	○	○	○	●	●		●
		TiAlN	1287.0325	AOFT 20 04 PF FR-411	0.2x45°	r	●	○	○	○	●	●	○
	1287.0330		AOFT 20 04 08 FR-411	R 0.8	r	●	○	○	○	●	●	○	●
	AlCrN		1287.0676	AOFT 20 04 PF FR-421	0.2x45°	r	●	○	●	●	●	●	●
		1287.0681	AOFT 20 04 08 FR-421	R 0.8	r	●	○	●	●	●	●	●	●
		1287.0682	AOFT 20 04 08 FR-431	R 0.8	r	●	○	●	●	●	○	●	○
	AlCrN-VA	1287.0691*	AOFT 20 04 24 FR-421	R 2.4	r	●	○	●	●	●	●	●	●
		1287.0693*	AOFT 20 04 32 FR-421	R 3.2	r	●	○	●	●	●	●	●	●
1287.0782		AOFT 20 04 08 FR-431	R 0.8	r	●	○		●	○		●		
Carbide HM-F	TiAlN	1287.0525	AOFT 20 04 PF FR-511	0.2x45°	r		●	○	○	●			●
		1287.0530	AOFT 20 04 08 FR-511	R 0.8	r		●	○	○	●			●
	AlCrN	1287.0726	AOFT 20 04 PF FR-521	0.2x45°	r		●	●	●	●	●		●
		1287.0731	AOFT 20 04 08 FR-521	R 0.8	r		●	●	●	●	●		●
		1287.0735	AOFT 20 04 08 FR-531	R 0.8	r		●	●	●	○			○
AlCrN-VA	1287.0835	AOFT 20 04 08 FR-531	R 0.8	r		●		●	○				
Carbide HA	AlCrN-VA	1289.0262	AOFT 20 04 08 FR-631	R 0.8	r	●	○	○	●	○		●	

°) Order of inserts with chip splitting see page 139

Fitting instructions for inserts see page 139

\* while stocks last

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
Additional number indexable inserts ISO-code (cutting geometry)  
Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.

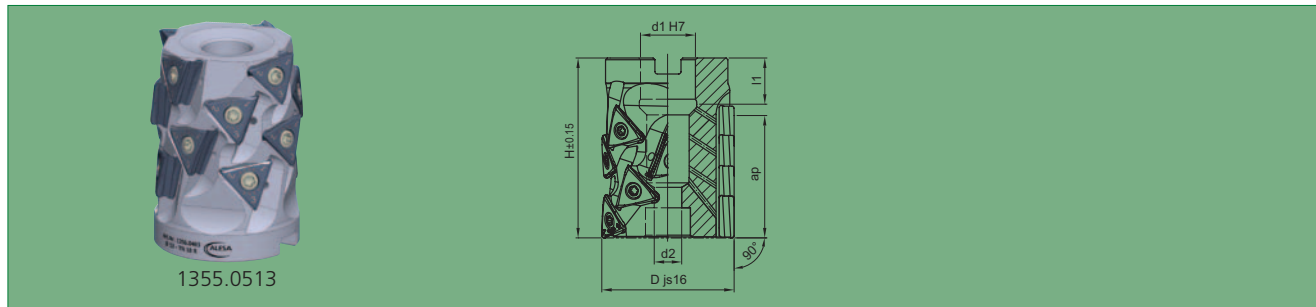


# ALESA DELTA shell end mill

## TN 18 R 90° / Ø 43 – 83

1356

Hobbing



Part No	Type	D mm	H mm	d1 mm	d2 mm	l1 mm	ap mm				Accessories kit No	<b>WSP</b>
1356.0463	43-TN 18 R 3x3	43	60	16.0	8.5	18	36	✓	3 x 3	r	1494.0820	TNFU 18 07
1356.0483	53-TN 18 R 4x4	53	72	22.0	11	20	48	✓	4 x 4	r	1494.0821	TNFU 18 07
1356.0503	66-TN 18 R 5x5	66	85	27.0	14	22	60	✓	5 x 5	r	1494.0822	TNFU 18 07
1356.0523	83-TN 18 R 6x6	83	100	32.0	18	25	72	✓	6 x 6	r	1494.0823	TNFU 18 07

Tool will be delivered with holder, all screws and torque wrench, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver		Hex socket head screw		
	Qty	Article	Type	Torque	Article	Type	Article	Type	Torque
1494.0820	9	1490.0385	M 5 x 11.5	5 Nm	1492.0650	T20 / 5Nm	1490.0700	M 8 x 50	30 Nm
1494.0821	16	1490.0395	M 5 x 14.5	5 Nm	1492.0650	T20 / 5Nm	1490.0710	M 10 x 60	50 Nm
1494.0822	25	1490.0395	M 5 x 14.5	5 Nm	1492.0650	T20 / 5Nm	1490.0728	M 12 x 70	90 Nm
1494.0823	36	1490.0395	M 5 x 14.5	5 Nm	1492.0650	T20 / 5Nm	1490.0738	M 16 x 80	160 Nm



ALESA DELTA: the spiral ground indexable insert for a smooth and vibration-free chip removal for any metals.



Best results at ae > 10-20% of the diameter.



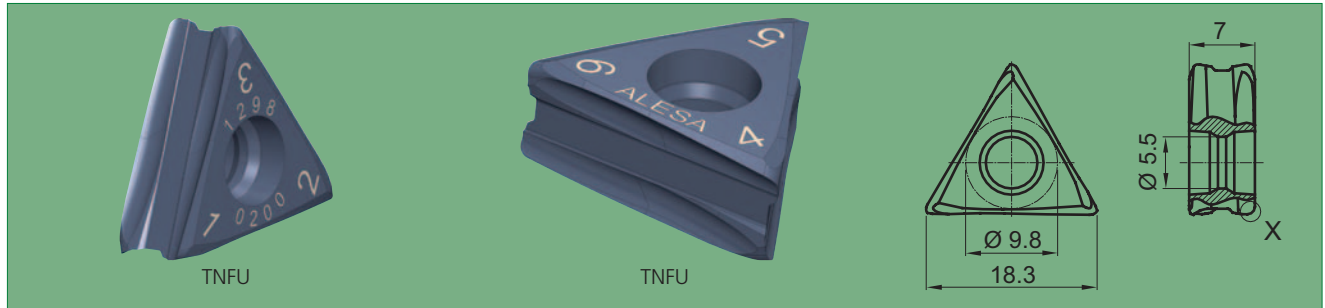
Profile milling



# ALESA DELTA shell end mill

## TN 18 R 90° / Ø 43 – 83

ap = 13 mm



Hobbing

Cutting material	Coating	Part No	ISO Code	Detail X				Mat. classification					
								1	2	3	4	5	6
Carbide CTS	AlCrN-VA	1298.0200	TNFU 18 07 08 FR-321	R 0.8	r	●	○	●	●	○	○	○	○
		1298.0650	TNFU 18 07 PF FR-321	0.2x45°	r	●	○	●	●	○	●	○	○
	DLC-H	1298.0201	TNFU 18 07 08 FR-321	R 0.8	r	○	●	○	○	●	○	○	●
		1298.0651	TNFU 18 07 PF FR-321	0.2x45°	r	○	●	○	○	●	○	○	●

Fitting instructions for inserts see page 139

Overview of all indexable inserts see page 108 and following.

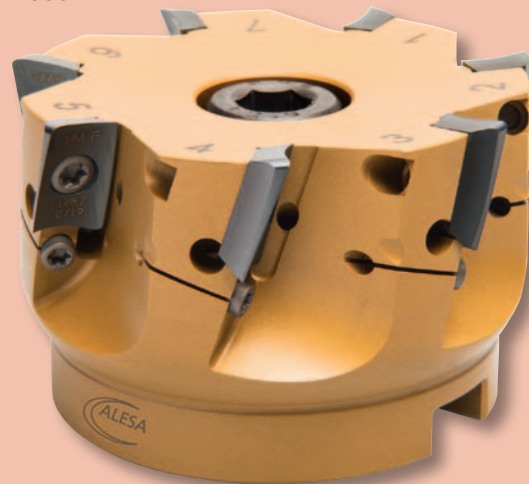
# Fine finish milling

## ALESA TWIST adjustable

Fine finish milling

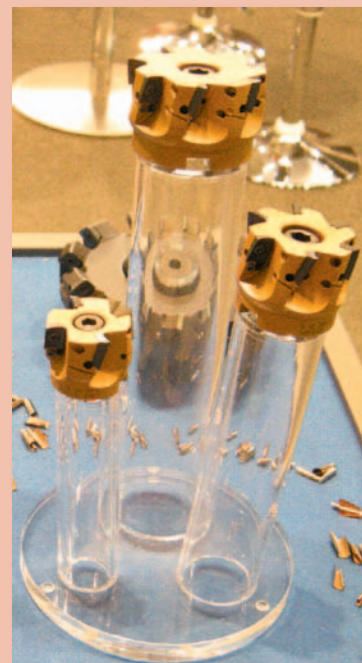
### The characteristics

- Fine finishing tool based on the ALESA TWIST AOFT 15
- SWISS Precision Tool. The milling head and cutting inserts are manufactured in Switzerland
- Brilliantly simple setting system for adjusting the axial run-out
- Each insert can be set to 0.002 mm axially
- The fine finishing cutting inserts have a finishing edge
- The spiral angle of 20° means that the tools have a positive axial rake angle
- The sharp cutting produces a very small cutting force  
Prerequisite for accuracy
- The unequal division is minimizing vibrations
- All tools are provided with cooling holes. During finishing, the cooling affects the surface quality significantly
- The best PVD coatings are available



### The benefits and options for you

- Fast delivery from the Seengen warehouse
- Arbor milling cutter Ø 40 mm to Ø 125 mm
- The optimized cutting geometries with fine finishing edge produce surfaces with Ra 0.3 - 0.4 (N5)
- High surface accuracy even when interrupted cutting
- Good tool life and high productivity
- Adjustability of the cutting inserts is also helpful to correct deviations for extensions
- Highest accuracy for guide and support surfaces
- Manufactured according to ISO certified processes
- For special tools, our construction with large experience is available





# Fine finish milling

## ALESA NUTEX PLAN

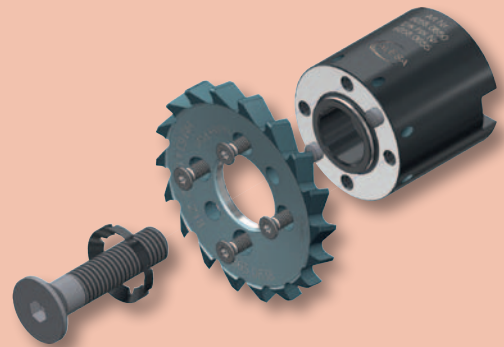
see ALESA catalog "NUTEX"

### The characteristics

- Fine finishing tool based on the carbide Nutex Plus tool system
- All the teeth are ground in one setting, resulting in high accuracy
- Sharp ground cutting edges, with small cutting forces and good chip formation
- Positive cutting geometry in the axial direction also
- AlCrN PVD coating of the latest technology
- Very stable holders, based on the Nutex Plus System
- Internal coolant supply from both sides

### The benefits and options for you

- Fast delivery from the Seengen warehouse
- Level finishing tools are available in the  $\varnothing$  50 mm  $\varnothing$  63 mm with a width of 6 mm
- Large numbers of teeth  $Z=16$  and  $Z=18$ , relatively high feed rates, short finish times
- Nutex finishing tools can be re-sharpened



## ALESA NUTEX FASET

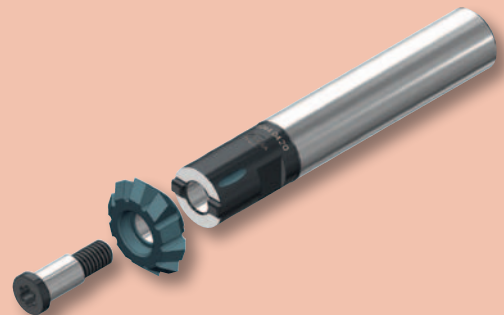
see ALESA catalog "NUTEX"

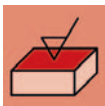
### The characteristics

- 45° deburring tool based on the carbide Nutex Mini tool system
- The work of deburring can be improved significantly with the ALESA Nutex Faset

### The benefits and options for you

- Fast delivery from the Seengen warehouse
- Two holders are available (M6 and shaft)
- The small prism tool fits the Nutex mini holders
- Available  $\varnothing$  16 x 4.5 with  $Z = 10$ , coating AlCrN
- It can be manufactured up to 2 x 45° chamfering





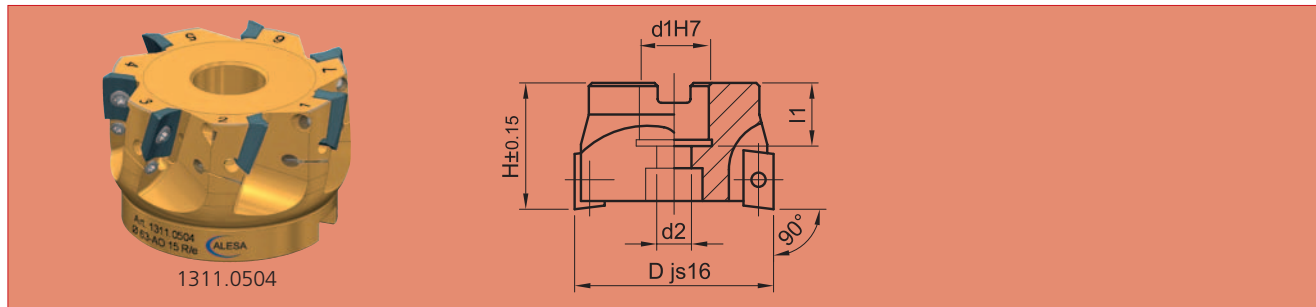
# ALESA TWIST milling cutter adjustable

## AO 15 R/e 90° / Ø 40 – 125

1311e

Pat. no. 686 235

Fine finish milling



Part No	Type	D mm	H mm	d1 mm	d2 mm	l1 mm				Accessories kit No	WSP
1311.0464	40-AO 15 R/e	40	32	16.0	8.5	18	✓	4	r	1494.0654	1287.0718
1311.0484	50-AO 15 R/e	50	40	22.0	11	20	✓	6	r	1494.0656	1287.0719
1311.0504	63-AO 15 R/e	63	40	22.0	11	20	✓	7	r	1494.0658	1287.0719
1311.0524	80-AO 15 R/e	80	50	27.0	14	22	✓	9	r	1494.0661	1287.0720
1311.0544	100-AO 15 R/e	100	50	32.0	18	25	✓	10	r	1494.0662	1287.0720
1311.0564	125-AO 15 R/e	125	63	40	22	29	✓	12	r	1494.0664	1287.0720

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

### Accessories

No 1490.0270 Adjusting screw  
No 1492.0400 Screw-driver

### Accessories / spare parts

Part No	Torx screw				Screw-driver		Hex socket head screw		
	Qty	Article	Type	Torque	Article	Type	Article	Type	Torque
1494.0654	4	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0759	M 8 x 20	30 Nm
1494.0656	6	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0770	M 10 x 25	50 Nm
1494.0658	7	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0770	M 10 x 25	50 Nm
1494.0661	9	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0780	M 12 x 30	90 Nm
1494.0662	10	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0789	M 16 x 30	160 Nm
1494.0664	12	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0800	M 20 x 40	230 Nm



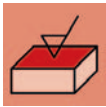
For a surface quality of N5 (Ra < 0.4 µm) when finishing.



Highly positive, extremely sharp ground cutting tool with level finishing edge.



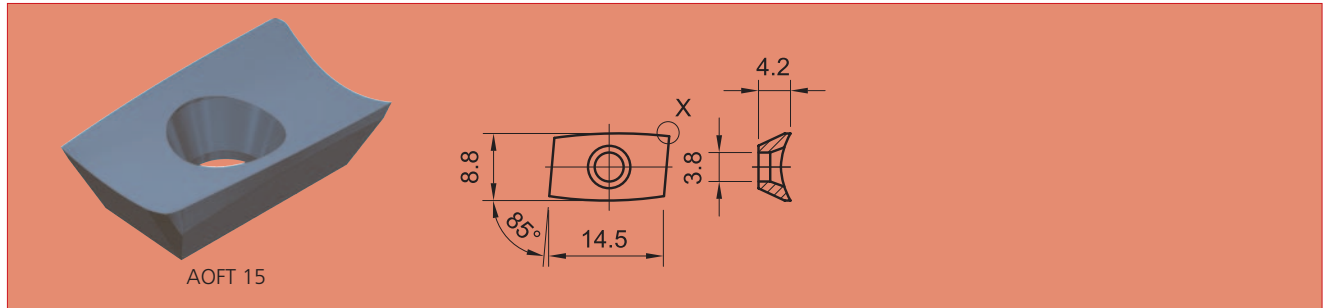
Face milling



# ALESA TWIST milling cutter adjustable

## AO 15 R/e 90° / Ø 40 – 125

ap = 0.02 - 0.5 mm



Fine finish milling

Cutting material	Coating	Part No	ISO Code	Detail X				Mat. classification					
								1	2	3	4	5	6
Carbide HM-F	AlCrN	1287.0718	AOFT 15 T3 08 FR-521/40	R 0.8	r	○	●	●	●	●	○	○	
		1287.0719	AOFT 15 T3 08 FR-521/50/63	R 0.8	r	○	●	●	●	●	○	○	
		1287.0720	AOFT 15 T3 08 FR-521/80-125	R 0.8	r	○	●	●	●	●	○	○	

Fitting instructions for inserts see page 139

Overview of all indexable inserts see page 108 and following.

# Face milling 45°

## ALESA SD 12

Face milling 45°

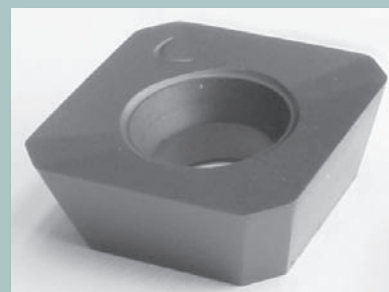
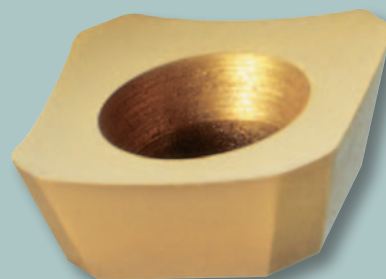
### The characteristics

- THE classic of the 45° face cutting insert tools with SD 12 screw-in cutting inserts
- High positive ALESA sharp-ground inserts
- SWISS Precision Tool. The milling head and cutting inserts are manufactured in Switzerland
- Robust and proven solution according to DIN
- The sharp edges require less spindle power than pure sintered cutting inserts
- The sharp-ground cutting inserts are optimized for modern 5-axis milling centers
- There are face cutters with wide pitch (larger chip spaces) or with narrower pitch from Ø 50 mm to Ø 160 mm available
- The SD 12 tools Ø 50 mm to Ø 160 mm can be provided with a distribution ring, which enables an inner coolant supply
- The best PVD coatings are available
- HSS and several carbide cutting inserts are available from the warehouse



### The benefits and options for you

- Fast delivery from the Seengen warehouse
- Arbor types Ø 50 mm to Ø 160 mm
- With 3 cutting geometries a very large range of materials can be processed
- HSS cutting inserts with TiN and TiAlN coatings are safe and efficient for the processing of many applications
- High removal rate (Q) with a relatively small machine load
- Good tool life and high productivity
- The same cutting inserts can also be used on the ALESA SPEED
- The latest developments show excellent cutting processes also with the most difficult Ni-, Ti- and Co- alloys
- Manufactured according to ISO certified processes
- For special tools, our construction with great experience is available



# Face milling 45°

## ALESA SD 09

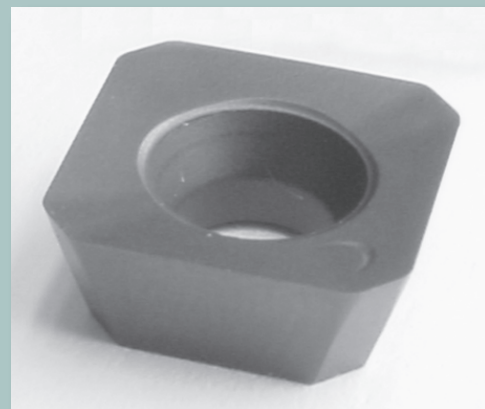
### The characteristics

- THE classic of the 45° face cutting insert tools with SD 09 screw-in cutting inserts
- From ALESA with high positive, sharp-ground inserts
- SWISS Precision Tool. The milling head and cutting inserts are manufactured in Switzerland
- Robust and proven solution according to DIN
- The sharp blades require less spindle power than pure sintered cutting inserts
- The sharp-ground cutting inserts are optimized for modern 5-axis milling centers
- SD 09 tools Ø 16 mm to Ø 100 mm are provided with coolant holes, which enable an inner coolant supply
- The best PVD coatings are available
- HSS and several carbide cutting inserts are available from the warehouse



### The benefits and options for you

- Fast delivery from the Seengen warehouse
- Weldon type Ø 16 mm to Ø 40 mm
- Arbor type Ø 40 mm to Ø 160 mm
- With 3 cutting geometries a very large range of materials can be processed
- HSS cutting insert with TiN and TiAlN coatings are safe and efficient for the processing of many applications
- High removal rate (Q) with a relatively small machine load
- Good tool life and high productivity
- The same cutting inserts can also be used on the ALESA SPEED
- The latest developments show excellent cutting processes also with the most difficult Ni-, Ti- and Co- alloys
- Manufactured according to ISO certified processes
- For special tools, our construction with great experience is available



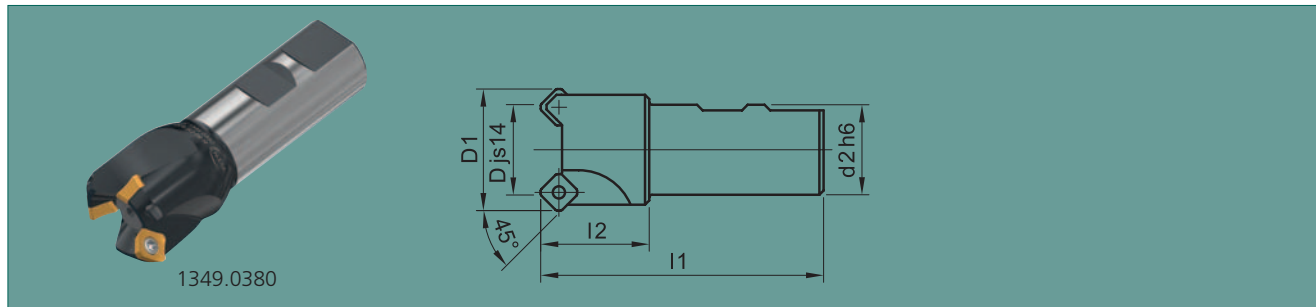


# ALESA end mill SD 09

## SD 09 R 45° / Ø 16 – 40

1349

Face milling 45°



Part No	Type	D mm	D1 mm	I2 mm	d2 mm	I1 mm				Accessories kit No	<b>WSP</b>
1349.0300	16-SD 09 R	16	26	22	16.0	75	✓	2	r	1494.0650	SD.T 09 T3
1349.0340	20-SD 09 R	20	30	28	20.0	82	✓	2	r	1494.0675	SD.T 09 T3
1349.0380	25-SD 09 R	25	35	35	25.0	96	✓	3	r	1494.0676	SD.T 09 T3
1349.0420	32-SD 09 R	32	42	35	32.0	100	✓	4	r	1494.0677	SD.T 09 T3

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver	
	Qty	Article	Type	Torque	Article	Type
1494.0650	2	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15
1494.0675	2	1490.0290	M3.5x8	2.55 Nm	1492.0500	T 15
1494.0676	3	1490.0290	M3.5x8	2.55 Nm	1492.0500	T 15
1494.0677	4	1490.0290	M3.5x8	2.55 Nm	1492.0500	T 15
1494.0679	5	1490.0290	M3.5x8	2.55 Nm	1492.0500	T 15



When operating circular motion full slot and dip milling ap is max = 3 mm.



Highly positive, extremely sharp cutting edge of HSS-E and carbide.



ALESA tools are distinguished by their very precise concentricity.



Face milling



Chamfering



Circular plunge milling



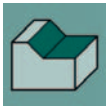
Circular interpolation



Profile milling



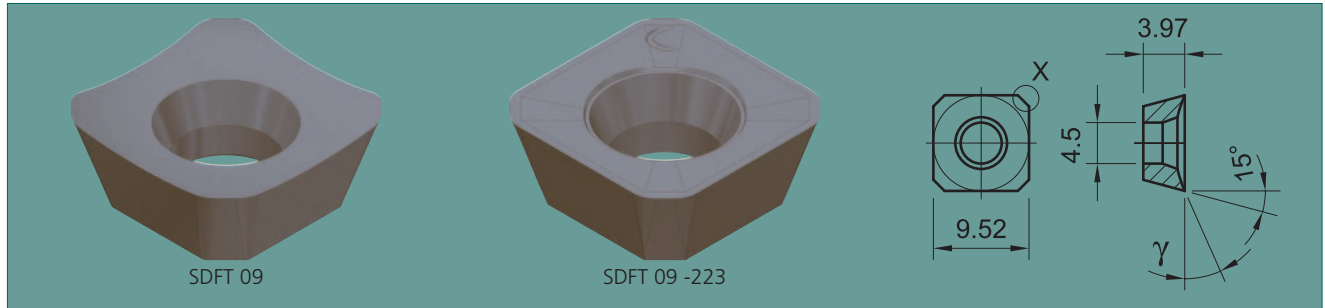
Ramping



# ALESA end mill SD 09

## SD 09 R 45° / Ø 16 – 40

ap = 4.7 mm

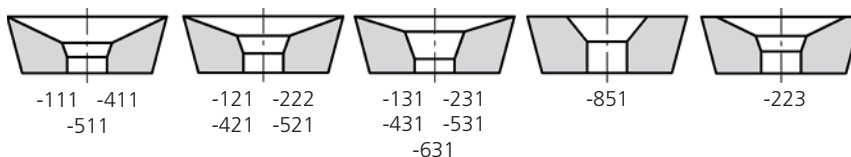


Face milling 45°

Cutting material	Coating	Part No	ISO Code	γ	Detail X				Mat. classification					
									1	2	3	4	5	6
HSS-E	TiN	1091.0400	SDFT 09 T3 AE FN	17°	1.2x45° R1.2	r/l	●		○	○		●		●
	TiAlN	1166.0400	SDFT 09 T3 AE FN	17°	1.2x45° R1.2	r/l	●		○	●		●	○	●
Carbide MG20	TiN	1291.0400	SDFT 09 T3 AE FN-111	17°	1.2x45° R1.2	r/l	○	●	●	○	●	●		●
	TiAlN	1291.0405	SDFT 09 T3 AE FN-111	17°	1.2x45° R1.2	r/l	○	●	●	○	●	○	●	
	AlCrN	1291.0415	SDFT 09 T3 AE FN-111	17°	1.2x45° R1.2	r/l	○	●	●	●	●	●	●	
Carbide 12CR	TiAlN	1291.0420	SDHT 09 T3 AE FN-222	11°	1.2x45° R1.2	r/l	○	●	●	○	●	○	●	
	AlCrN	1291.0430	SDHT 09 T3 AE FN-222	11°	1.2x45° R1.2	r/l	○	●	●	○	●	○	●	
		1291.0630	SDFT 09 T3 AE FN-223	5°	1.2x45° R1.2	r/l	○	●	●	○	●	○	●	
	AlCrN-VA	1291.0635	SDFT 09 T3 AE FN-223	5°	1.2x45° R1.2	r/l	○	●	●	○	●	○	●	
	DLC-H	1291.0640	SDFT 09 T3 AE FN-223	5°	1.2x45° R1.2	r/l	○	●	●	○	●	○	●	
Ceramic KG14	AlCrN-K	1292.0200	SDFT 09 T3 AE FN-851	0°	1.2x45° R1.2	r/l		●			●			

Fitting instructions for inserts see page 139

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
 Additional number indexable inserts ISO-code (cutting geometry)  
 Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.



# ALESA milling cutter SD 09

## SD 09 R/L 45° / Ø 40 – 100

1316

Face milling 45°



Part No	Type	D mm	D1 mm	H mm	d1 mm	d2 mm	l1 mm				Accessories kit No	WSP
1316.0460	40-SD 09 R	40	50	40	16.0	8.5	18	✓	5	r	1494.0680	SD.T 09 T3
1316.0461	40-SD 09 L	40	50	40	16.0	8.5	18	✓	5	l	1494.0680	SD.T 09 T3
1316.0480	50-SD 09 R	50	60	42	22.0	11	20	✓	6	r	1494.0681	SD.T 09 T3
1316.0481	50-SD 09 L	50	60	42	22.0	11	20	✓	6	l	1494.0681	SD.T 09 T3
1316.0500	63-SD 09 R	63	73	42	22.0	11	20	✓	7	r	1494.0682	SD.T 09 T3
1316.0520	80-SD 09 R	80	90	50	27.0	14	22	✓	9	r	1494.0683	SD.T 09 T3
1316.0540	100-SD 09 R	100	110	54	32.0	18	25	✓	11	r	1494.0684	SD.T 09 T3

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver			Hex socket head screw		
	Qty	Article	Type	Torque	Article	Type	Article	Type	Torque	
1494.0680	5	1490.0290	M3.5x8	2.55 Nm	1492.0500	T 15	1490.0759	M 8 x 20	30 Nm	
1494.0681	6	1490.0290	M3.5x8	2.55 Nm	1492.0500	T 15	1490.0770	M 10 x 25	50 Nm	
1494.0682	7	1490.0290	M3.5x8	2.55 Nm	1492.0500	T 15	1490.0770	M 10 x 25	50 Nm	
1494.0683	9	1490.0290	M3.5x8	2.55 Nm	1492.0500	T 15	1490.0780	M 12 x 30	90 Nm	
1494.0684	11	1490.0290	M3.5x8	2.55 Nm	1492.0500	T 15	1490.0789	M 16 x 30	160 Nm	

### Info

Excellent tool for face milling.



Highly positive, extremely sharp cutting edge of HSS-E and carbide.



ALESA tools are distinguished by their very precise concentricity.



When operating circular motion full slot and dip milling ap is max = 3 mm.



Face milling



Chamfering



Circular plunge milling



Circular interpolation

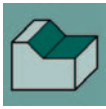


Profile milling



Ramping

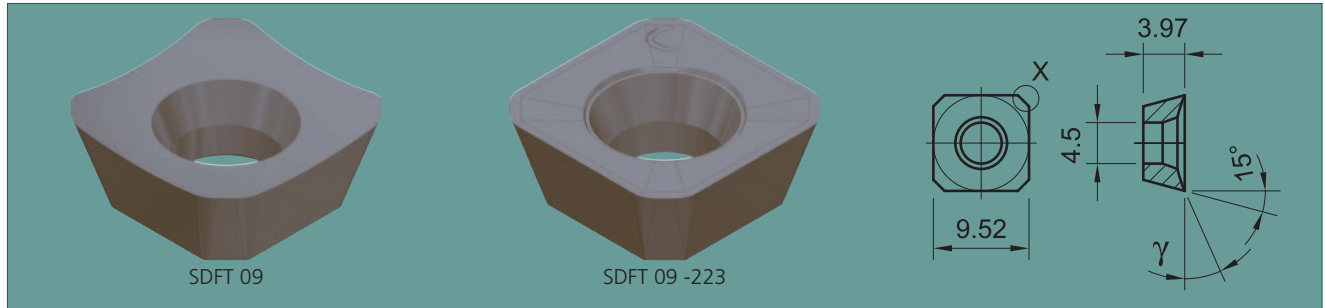




# ALESA milling cutter SD 09

## SD 09 R/L 45° / Ø 40 – 100

ap = 4.7 mm

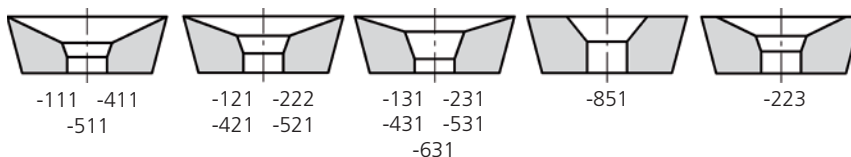


Face milling 45°

Cutting material	Coating	Part No	ISO Code	γ	Detail X				Mat. classification					
									1	2	3	4	5	6
HSS-E	TiN	1091.0400	SDFT 09 T3 AE FN	17°	1.2x45° R1.2	r/l	●		○	○		●		●
	TiAlN	1166.0400	SDFT 09 T3 AE FN	17°	1.2x45° R1.2	r/l	●		○	●		●	○	●
Carbide MG20	TiN	1291.0400	SDFT 09 T3 AE FN-111	17°	1.2x45° R1.2	r/l	○	●	●	○	●	●		●
	TiAlN	1291.0405	SDFT 09 T3 AE FN-111	17°	1.2x45° R1.2	r/l	○	●	●	○	●	○	●	
	AlCrN	1291.0415	SDFT 09 T3 AE FN-111	17°	1.2x45° R1.2	r/l	○	●	●	●	●	●	●	
Carbide 12CR	TiAlN	1291.0420	SDHT 09 T3 AE FN-222	11°	1.2x45° R1.2	r/l	○	●	●	○	●	○	●	
	AlCrN	1291.0430	SDHT 09 T3 AE FN-222	11°	1.2x45° R1.2	r/l	○	●	●	○	●	○	●	
		1291.0630	SDFT 09 T3 AE FN-223	5°	1.2x45° R1.2	r/l	○	●	●	○	●	○	●	
	AlCrN-VA	1291.0635	SDFT 09 T3 AE FN-223	5°	1.2x45° R1.2	r/l	○	●	●	○	●	○	●	
	DLC-H	1291.0640	SDFT 09 T3 AE FN-223	5°	1.2x45° R1.2	r/l	○	●	●	○	●	○	●	
Ceramic KG14	AlCrN-K	1292.0200	SDFT 09 T3 AE FN-851	0°	1.2x45° R1.2	r/l		●			●			

Fitting instructions for inserts see page 139

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
Additional number indexable inserts ISO-code (cutting geometry)  
Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.



# ALESA milling cutter SD 12

## SD 12 R/L 45° / Ø 50 – 160

1319

Face milling 45°



Part No	Type	D mm	D1 mm	H mm	d1 mm	d2 mm	l1 mm				Accessories kit No	Ring No	<b>WSP</b>
1319.0480	50-SD 12 R Z4	50	64	40	22.0	30	20	✓	4	r	1494.0744	1320.0100	SD.T 12 04
1319.0482	50-SD 12 R Z5	50	64	40	22.0	30	20	✓	5	r	1494.0745	1320.0105	SD.T 12 04
1319.0483	50-SD 12 L Z5	50	64	40	22.0	30	20	✓	5	l	1494.0745	1320.0106	SD.T 12 04
1319.0500	63-SD 12 R Z5	63	77	40	22.0	30	20	✓	5	r	1494.0745	1320.0105	SD.T 12 04
1319.0502	63-SD 12 R Z7	63	77	40	22.0	30	20	✓	7	r	1494.0735	1320.0110	SD.T 12 04
1319.0503	63-SD 12 L Z7	63	77	40	22.0	30	20	✓	7	l	1494.0735	1320.0111	SD.T 12 04
1319.0520	80-SD 12 R Z6	80	94	50	27.0	38	22	✓	6	r	1494.0746	1320.0115	SD.T 12 04
1319.0522	80-SD 12 R Z8	80	94	50	27.0	38	22	✓	8	r	1494.0738	1320.0120	SD.T 12 04
1319.0523	80-SD 12 L Z8	80	94	50	27.0	38	22	✓	8	l	1494.0738	1320.0121	SD.T 12 04
1319.0540	100-SD 12 R Z7	100	114	50	32.0	45	25	✓	7	r	1494.0735	1320.0125	SD.T 12 04
1319.0542	100-SD 12 R Z10	100	114	50	32.0	45	25	✓	10	r	1494.0740	1320.0130	SD.T 12 04
1319.0543	100-SD 12 L Z10	100	114	50	32.0	45	25	✓	10	l	1494.0740	1320.0131	SD.T 12 04
1319.0560	125-SD 12 R Z8	125	139	63	40.0	56	28	✓	8	r	1494.0738	1320.0135	SD.T 12 04
1319.0562	125-SD 12 R Z11	125	139	63	40.0	56	28	✓	11	r	1494.0742	1320.0140	SD.T 12 04
1319.0580	160-SD 12 R Z10	160	174	63	40.0	56	28	✓	10	r	1494.0740	1320.0145	SD.T 12 04
1319.0582	160-SD 12 R Z14	160	174	63	40.0	56	28	✓	14	r	1494.0743	1320.0150	SD.T 12 04

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver	
	Qty	Article	Type	Torque	Article	Type
1494.0735	7	1490.0380	M4x11	3.85 Nm	1492.0600	T 20
1494.0738	8	1490.0380	M4x11	3.85 Nm	1492.0600	T 20
1494.0740	10	1490.0380	M4x11	3.85 Nm	1492.0600	T 20
1494.0742	11	1490.0380	M4x11	3.85 Nm	1492.0600	T 20
1494.0743	14	1490.0380	M4x11	3.85 Nm	1492.0600	T 20
1494.0744	4	1490.0380	M4x11	3.85 Nm	1492.0600	T 20
1494.0745	5	1490.0380	M4x11	3.85 Nm	1492.0600	T 20
1494.0746	6	1490.0380	M4x11	3.85 Nm	1492.0600	T 20

### Info

Excellent tool for face milling.



When operating circular motion full slot and dip milling ap is max = 4 mm.



Face milling



Chamfering



Circular plunge milling



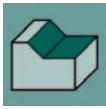
Circular interpolation



Profile milling



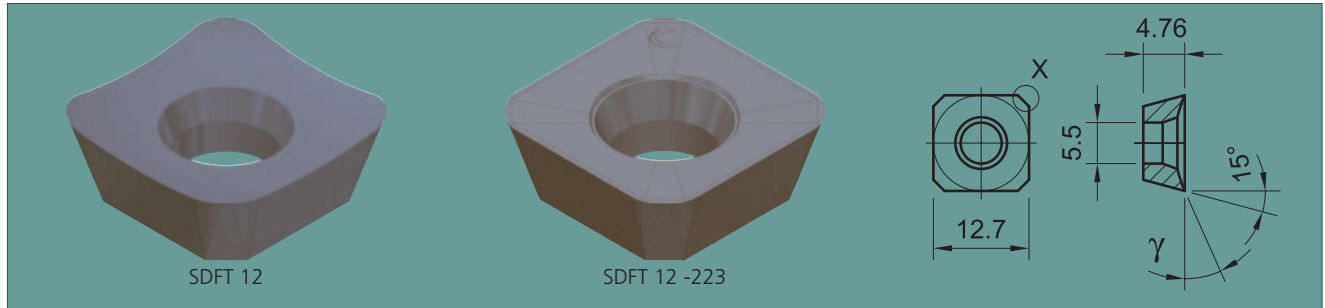
Ramping



## ALESA milling cutter SD 12

### SD 12 R/L 45° / Ø 50 – 160

ap = 6.5 mm



Face milling 45°

Cutting material	Coating	Part No	ISO Code	γ	Detail X				Mat. classification					
									1	2	3	4	5	6
HSS-E	TiN	1091.0450	SDFT 12 04 AE FN	17°	1.5x45° R2	r/l	●		○	○		●		●
	TiAlN	1166.0450	SDFT 12 04 AE FN	17°	1.5x45° R2	r/l	●		○	●		●	○	●
Carbide MG20	TiN	1291.0450	SDFT 12 04 AE FN-111	17°	1.5x45° R2	r/l	○	●	●	○	●	●		●
	TiAlN	1291.0455	SDFT 12 04 AE FN-111	17°	1.5x45° R2	r/l	○	●	●	○	●	○	●	
	AlCrN	1291.0465	SDFT 12 04 AE FN-111	17°	1.5x45° R2	r/l	○	●	●	○	●	○	●	
Carbide 12CR	TiAlN	1291.0470	SDHT 12 04 AE FN-222	11°	1.5x45° R2	r/l	○	●	●	○	●	○	●	
	AlCrN	1291.0480	SDHT 12 04 AE FN-222	11°	1.5x45° R2	r/l	○	●	●	○	●	○	●	
		1291.0680	SDFT 12 04 AE FN-223	5°	1.5x45° R2	r/l	○	●	●	○	●	○	●	
	AlCrN-VA	1291.0685	SDFT 12 04 AE FN-223	5°	1.5x45° R2	r/l	○	●	●	○	●	○	●	
	DLC-H	1291.0690	SDFT 12 04 AE FN-223	5°	1.5x45° R2	r/l	○	●	●	○	●	○	●	
Ceramic KG14	AlCrN-K	1292.0225	SDFT 12 04 AE FN-851	0°	1.5x45° R2	r/l		●						

Fitting instructions for inserts see page 139

#### Kühl-Schmierstoff-Verteilung (KSSV)

Ring for the lubricant distribution on the tool face (KSSV)

Bague de serrage qui distribue également le lubrifiant (KSSV)

Nr. / No. / No	Dimension	
1320.0100 - 1320.0111	Ø 30 x 17 x 14	1320.0200 M10x35 50 Nm
1320.0115 - 1320.0120	Ø 38 x 25 x 16	1320.0205 M12x45 90 Nm
1320.0125 - 1320.0130	Ø 44 x 22 x 20	1320.0210 M16x50 160 Nm
1320.0135 - 1320.0150	Ø 56 x 31.5 x 28	1320.0215 M20x60 230 Nm



Overview of all indexable inserts see page 108 and following.

# High feed milling

## ALESA SPEED

High feed milling

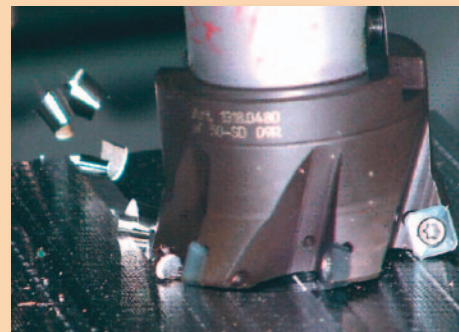
### The characteristics

- High Performance Cutting for modern 5-axis machines
- SWISS Precision Tool. The milling head and cutting inserts are manufactured in Switzerland
- Kappa angle 15°, high rough performance
- The peeling cutting process is very spindle and machine-friendly
- The sharp edges and the arrangement of the cutting inserts generate spindle-friendly cutting forces, which work mainly axially
- All tools are provided with cooling holes  
With center cooling in addition
- The best PVD coatings are available
- HSS and carbide cutting inserts with various cutting geometries available from the warehouse



### The benefits and options for you

- Fast delivery from the Seengen warehouse
- The proved and tested SD 09 or SD 12 cutting insert can be used. 4 cutting edges per cutting insert are very effective
- Ø 12 mm to Ø 25 mm are available as Weldon and a screw-in toolholder
- Arbor milling cutters in the range Ø 32 mm to Ø 83 mm
- For the large range of materials, the economical cutting inserts with 3 available cutting geometries can be chosen
- Carbide grades are available for dry and wet processing  
Unique to ALESA Ltd., the HSS cutting inserts are also available
- HSS is reliable and efficient with many applications
- Process-safe and high removal rate (Q) with a relatively small machine load
- Good tool life and high productivity
- The high-feed tools are used in applications with large 6xD - 10xD tool extensions
- Suitable for circular plunging into solid material for holes from Ø 27 mm (SD 09) to Ø 206 mm (SD 12)
- Excellent for pockets and free-form shapes
- Excellent machining properties also with the most difficult Duplex, Ni-, and Ti- alloys
- Manufactured according to ISO certified processes
- For special tools, our construction with great experience is available

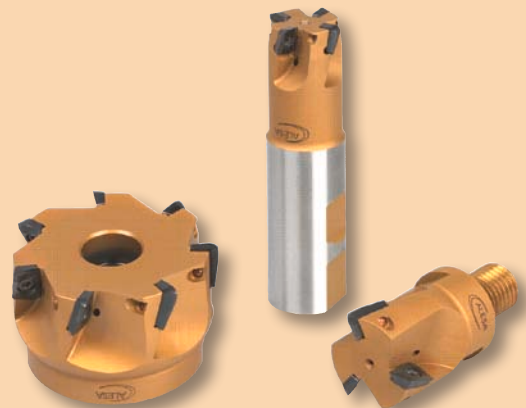


# High feed milling

## ALESA TWIST with inserts type 481/581

### The characteristics

- Additional benefits of the ALESA TWIST tool holder family
- SWISS Precision Tool. The milling head and cutting inserts are manufactured in Switzerland
- In addition to the profile cutting inserts, high feed cutting inserts type 481/581 are also available
- New milling strategy: small cutting depth (ap) and high-tooth feed
- The sharpened cutting edges require less power than pure sintered high-feed cutting inserts
- The small cutting forces cause less vibrations and are spindle-friendly
- The sharp-ground cutting inserts are optimized for modern 5-axis milling centers
- All ALESA TWIST tools are provided with cooling holes. The cooling medium is exactly there where it is needed
- The best PVD coatings are available



High feed milling

### The benefits and options for you

- Fast delivery from the Seengen warehouse
- Ø 16 mm to Ø 40 mm as Weldon
- Ø 16 mm to Ø 32 mm screw-in tools
- Arbor milling cutter Ø 40 mm to Ø 100 mm
- Carbide qualities are present for dry and wet machining processes
- High removal rate (Q) with a relatively small machine load and very good process safety
- The high-feed tools are used in applications with large 6xD - 10xD tool extensions
- Suitable for circular plunging into solid material for holes from Ø 19 mm (AO10) to Ø 200 mm (AO20)
- Excellent for pockets and free-form shapes
- Good tool life and high productivity
- Excellent metal cutting properties with the most difficult Ni-, Ti- and Co- alloys
- Manufactured according to ISO certified processes
- For special tools, our construction with great experience is available





# ALESA SPEED end mill and threaded type cutter

## SD 09 R 15° / Ø 12 – 25

1352 / 1353

High feed milling



Part No	Type	D mm	D1 mm	l2 mm	G	d2 mm	l1 mm				Accessories kit No	<b>WSP</b>
1352.0240	12-SD 09 SPEED	12	27	26		16.0	75	✓	2	r	1494.0675	SD.T 09 T3
1353.0240	12-SD 09 SPEED	12	27	32	M10	10.5	50	✓	2	r	1494.0675	SD.T 09 T3
1352.0300	16-SD 09 SPEED Z2	16	31	31		20.0	82	✓	2	r	1494.0675	SD.T 09 T3
1352.0305	16-SD 09 SPEED Z3	16	31	33		25.0	90	✓	3	r	1494.0676	SD.T 09 T3
1353.0300	16-SD 09 SPEED Z2	16	31	32	M12	12.5	52	✓	2	r	1494.0675	SD.T 09 T3
1353.0305	16-SD 09 SPEED Z3	16	31	32	M12	12.5	52	✓	3	r	1494.0676	SD.T 09 T3
1352.0380	25-SD 09 SPEED	25	40	39		25.0	96	✓	3	r	1494.0676	SD.T 09 T3
1353.0380	25-SD 09 SPEED	25	40	40	M16	17.0	62	✓	3	r	1494.0676	SD.T 09 T3

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

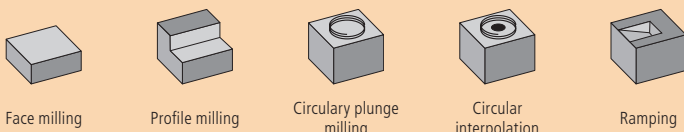
### Accessories / spare parts

Part No	Torx screw				Screw-driver	
	Qty	Article	Type	Torque	Article	Type
1494.0675	2	1490.0290	M3.5x8	2.55 Nm	1492.0500	T 15
1494.0676	3	1490.0290	M3.5x8	2.55 Nm	1492.0500	T 15

**Info** The flat Kappa angle of around 15° allows a very high feed per tooth.

**Info** This tool mainly generates forces in axial direction, which allows big protrudings and preserves the spindle.

**Info** Due to the wide range of SD indexable inserts, the entire material range can also be machined with the SPEED milling cutter.

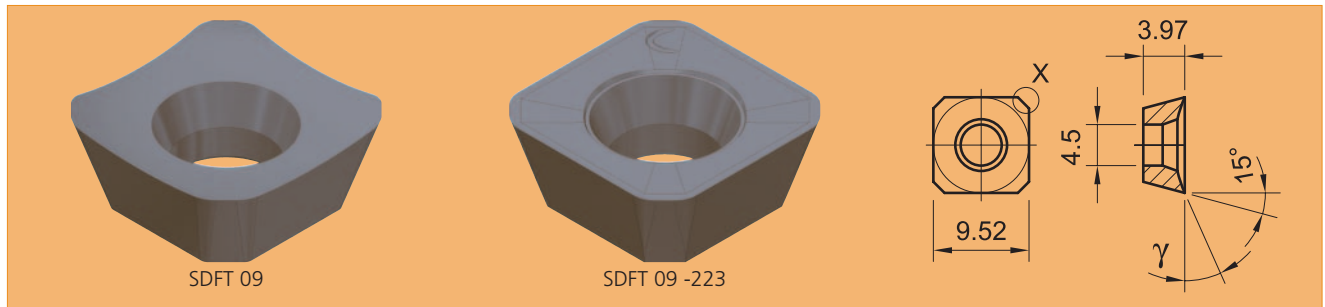




# ALESA SPEED end mill and threaded type cutter

## SD 09 R 15° / Ø 12 – 25

ap = 1.75 mm



High feed milling

Cutting material	Coating	Part No	ISO Code	γ	Detail X				Mat. classification					
									1	2	3	4	5	6
HSS-E	TiN	1091.0400	SDFT 09 T3 AE FN	17°	1.2x45° R1.2	r/l	●		○	○		●	●	
	TiAlN	1166.0400	SDFT 09 T3 AE FN	17°	1.2x45° R1.2	r/l	●		○	●		●	○	
Carbide MG20	TiN	1291.0400	SDFT 09 T3 AE FN-111	17°	1.2x45° R1.2	r/l	○	●	●	○	●		●	
	TiAlN	1291.0405	SDFT 09 T3 AE FN-111	17°	1.2x45° R1.2	r/l	○	●	●	○	●		●	
	AlCrN	1291.0415	SDFT 09 T3 AE FN-111	17°	1.2x45° R1.2	r/l	○	●	●	○	●		●	
Carbide 12CR	TiAlN	1291.0420	SDHT 09 T3 AE FN-222	11°	1.2x45° R1.2	r/l	○	●	●	○	●		●	
	AlCrN	1291.0430	SDHT 09 T3 AE FN-222	11°	1.2x45° R1.2	r/l	○	●	●	○	●		○	
		1291.0630	SDFT 09 T3 AE FN-223	5°	1.2x45° R1.2	r/l	○	●	●	○	●		○	
	AlCrN-VA	1291.0635	SDFT 09 T3 AE FN-223	5°	1.2x45° R1.2	r/l	○	●	●	○	●		○	
		1291.0720	SDFT 09 T3 AE FR-223-S	5°	1.2x45° R1.2	r	○	●	●	○	●		○	
Ceramic KG14	DLC-H	1291.0640	SDFT 09 T3 AE FN-223	5°	1.2x45° R1.2	r/l	○	●	○	●		●		
	AlCrN-K	1292.0200	SDFT 09 T3 AE FN-851	0°	1.2x45° R1.2	r/l		●						

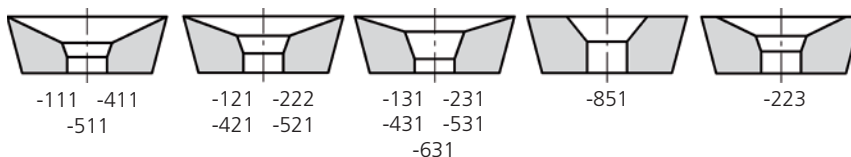
Fitting instructions for inserts see page 139.

The additional specification -S of the inserts ISO-code means "finishing insert".

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)

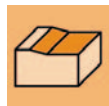
Additional number indexable inserts ISO-code (cutting geometry)

Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.



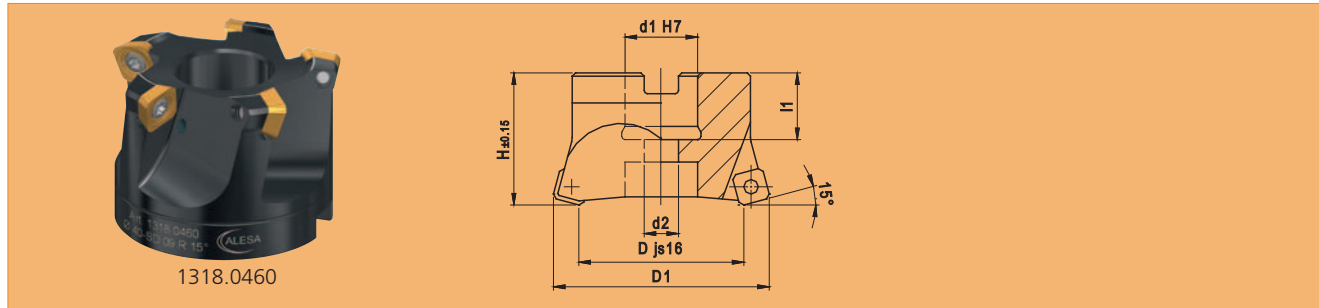


# ALESA SPEED milling cutter SD 09

## SD 09 R 15° / Ø 32 – 50

1318

High feed milling



Part No	Type	D mm	D1 mm	H mm	d1 mm	d2 mm	l1 mm				Accessories kit No	<b>WSP</b>
1318.0420	32-SD 09 SPEED	32	47	32	16.0	8.5	18	✓	4	r	1494.0678	SD.T 09 T3
1318.0460	40-SD 09 SPEED	40	55	40	22.0	11	20	✓	5	r	1494.0685	SD.T 09 T3
1318.0480	50-SD 09 SPEED	50	65	40	22.0	11	20	✓	6	r	1494.0681	SD.T 09 T3

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

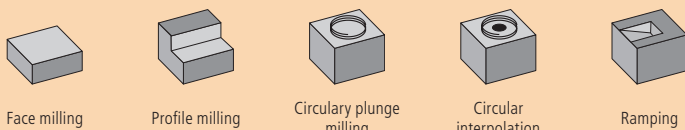
### Accessories / spare parts

Part No	Torx screw				Screw-driver		Hex socket head screw		
	Qty	Article	Type	Torque	Article	Type	Article	Type	Torque
1494.0678	4	1490.0290	M3.5x8	2.55 Nm	1492.0500	T 15	1490.0759	8 x 20	30 Nm
1494.0681	6	1490.0290	M3.5x8	2.55 Nm	1492.0500	T 15	1490.0770	M 10 x 25	50 Nm
1494.0685	5	1490.0290	M3.5x8	2.55 Nm	1492.0500	T 15	1490.0770	M 10 x 25	50 Nm

**Info** The flat Kappa angle of around 15° allows a very high feed per tooth.

**Info** This tool mainly generates forces in axial direction, which allows big protrudings and preserves the spindle.

**Info** Due to the wide range of SD indexable inserts, the entire material range can also be machined with the SPEED milling cutter.



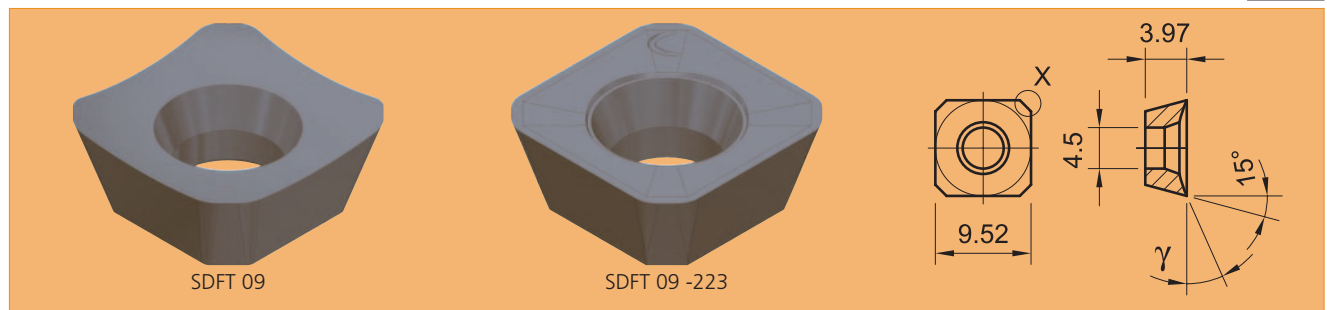




# ALESA SPEED milling cutter SD 09

## SD 09 R 15° / Ø 32 – 50

ap = 1.75 mm



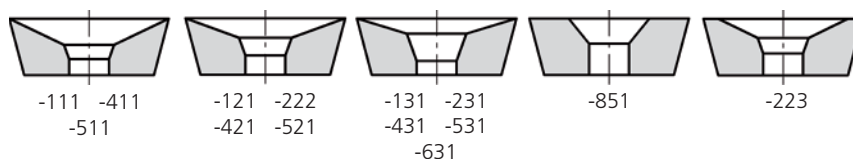
High feed milling

Cutting material	Coating	Part No	ISO Code	γ	Detail X				Mat. classification					
									1	2	3	4	5	6
HSS-E	TiN	1091.0400	SDFT 09 T3 AE FN	17°	1.2x45° R1.2	r/l	●		○	○		●	●	
	TiAlN	1166.0400	SDFT 09 T3 AE FN	17°	1.2x45° R1.2	r/l	●		○	●		●	●	
Carbide MG20	TiN	1291.0400	SDFT 09 T3 AE FN-111	17°	1.2x45° R1.2	r/l	○	●	●	○	●		●	
	TiAlN	1291.0405	SDFT 09 T3 AE FN-111	17°	1.2x45° R1.2	r/l	○	●	●	○	●		●	
	AlCrN	1291.0415	SDFT 09 T3 AE FN-111	17°	1.2x45° R1.2	r/l	○	●	●	○	●		●	
Carbide 12CR	TiAlN	1291.0420	SDHT 09 T3 AE FN-222	11°	1.2x45° R1.2	r/l	○	●	●	○	●		●	
	AlCrN	1291.0430	SDHT 09 T3 AE FN-222	11°	1.2x45° R1.2	r/l	○	●	●	○	●		○	
		1291.0630	SDFT 09 T3 AE FN-223	5°	1.2x45° R1.2	r/l	○	●	●	○	●		○	
	AlCrN-VA	1291.0635	SDFT 09 T3 AE FN-223	5°	1.2x45° R1.2	r/l	○	●	●	○	●		○	
		1291.0720	SDFT 09 T3 AE FR-223-S	5°	1.2x45° R1.2	r	○	●	●	○	●		○	
	DLC-H	1291.0640	SDFT 09 T3 AE FN-223	5°	1.2x45° R1.2	r/l	○	●	●	○	●		●	
Ceramic KG14	AlCrN-K	1292.0200	SDFT 09 T3 AE FN-851	0°	1.2x45° R1.2	r/l		●						

Fitting instructions for inserts see page 139.

The additional specification -S of the inserts ISO-code means "finishing insert".

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
Additional number indexable inserts ISO-code (cutting geometry)  
Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.

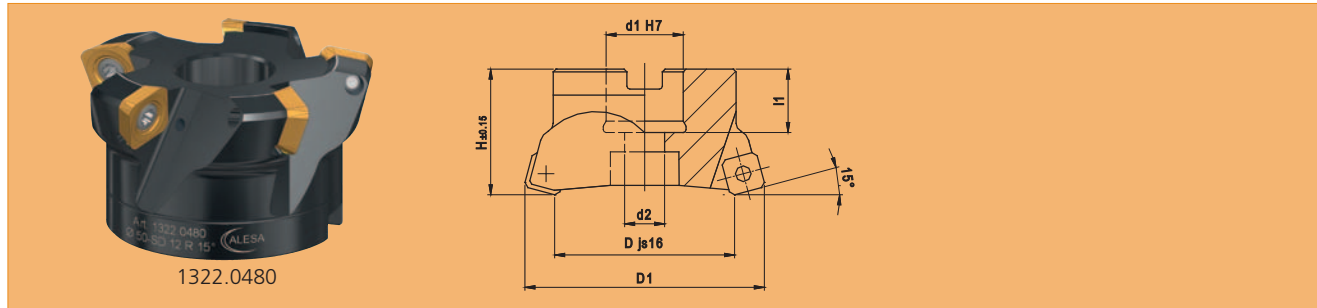


# ALESA SPEED milling cutter SD 12

## SD 12 R 15° / Ø 50 – 83

1322

High feed milling



Part No	Type	D mm	D1 mm	H mm	d1 mm	d2 mm	l1 mm				Accessories kit No	<b>WSP</b>
1322.0480	D50-SD 12 SPEED	50	70	40	22.0	11	20	✓	5	r	1494.0732	SD.T 12 04
1322.0500	D63-SD 12 SPEED	63	83	45	27.0	14	22	✓	6	r	1494.0734	SD.T 12 04
1322.0530	D83-SD 12 SPEED	83	103	50	32.0	18	25	✓	7	r	1494.0737	SD.T 12 04

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver		Hex socket head screw		
	Qty	Article	Type	Torque	Article	Type	Article	Type	Torque
1494.0732	5	1490.0380	M4x11	3.85 Nm	1492.0600	T 20	1490.0770	M 10 x 25	50 Nm
1494.0734	6	1490.0380	M4x11	3.85 Nm	1492.0600	T 20	1490.0780	M 12 x 30	90 Nm
1494.0737	7	1490.0380	M4x11	3.85 Nm	1492.0600	T 20	1490.0789	M 16 x 30	160 Nm

**Info** The flat Kappa angle of around 15° allows a very high feed per tooth.

**Info** This tool mainly generates forces in axial direction, which allows big protrudings and preserves the spindle.

**Info** Due to the wide range of SD indexable inserts, the entire material range can also be machined with the SPEED milling cutter.



Face milling



Profile milling



Circular plunge milling



Circular interpolation



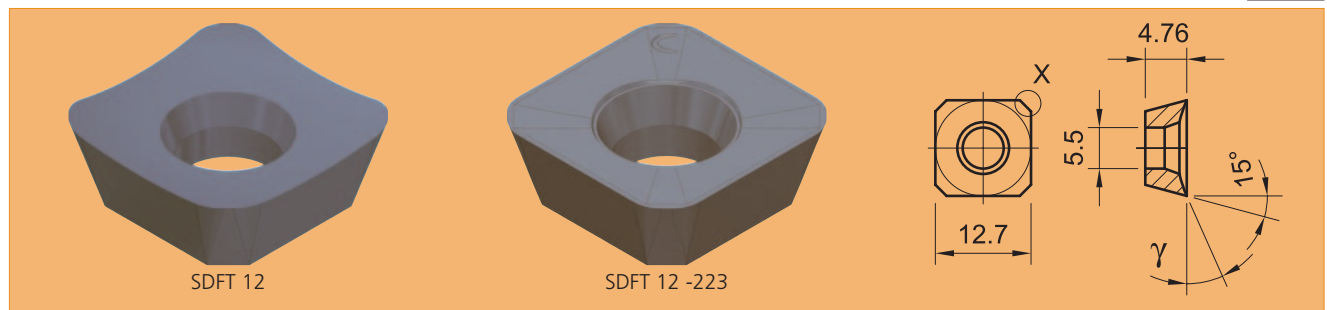
Ramping



# ALESA SPEED milling cutter SD 12

## SD 12 R 15° / Ø 50 – 83

ap = 2.5 mm



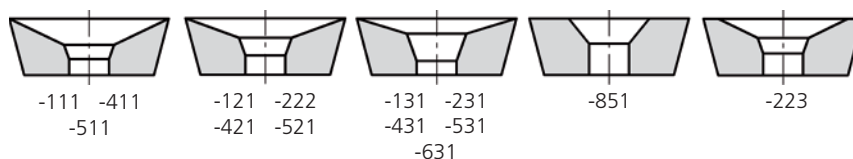
High feed milling

Cutting material	Coating	Part No	ISO Code	γ	Detail X				Mat. classification					
									1	2	3	4	5	6
HSS-E	TiN	1091.0450	SDFT 12 04 AE FN	17°	1.5x45° R2	r/l	●		○	○		●	●	
	TiAlN	1166.0450	SDFT 12 04 AE FN	17°	1.5x45° R2	r/l	●		○	●		●	●	
Carbide MG20	TiN	1291.0450	SDFT 12 04 AE FN-111	17°	1.5x45° R2	r/l	○	●	●	○	●		●	
	TiAlN	1291.0455	SDFT 12 04 AE FN-111	17°	1.5x45° R2	r/l	○	●	●	○	●		●	
	AlCrN	1291.0465	SDFT 12 04 AE FN-111	17°	1.5x45° R2	r/l	○	●	●	○	●		●	
Carbide 12CR	TiAlN	1291.0470	SDHT 12 04 AE FN-222	11°	1.5x45° R2	r/l	○	●	●	○	●		●	
	AlCrN	1291.0480	SDHT 12 04 AE FN-222	11°	1.5x45° R2	r/l	○	●	●	○	●		○	
		1291.0680	SDFT 12 04 AE FN-223	5°	1.5x45° R2	r/l	○	●	●	○	●		○	
	AlCrN-VA	1291.0685	SDFT 12 04 AE FN-223	5°	1.5x45° R2	r/l	○	●	●	○	●		○	
		1291.0770	SDFT 12 04 AE FR-223-S	5°	1.5x45° R2	r	○	●	●	○	●		○	
Ceramic KG14	AlCrN-K	1292.0225	SDFT 12 04 AE FN-851	0°	1.5x45° R2	r/l		●		○	●		●	

Fitting instructions for inserts see page 139.

The additional specification -S of the inserts ISO-code means "finishing insert".

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
Additional number indexable inserts ISO-code (cutting geometry)  
Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.



# ALESA TWIST high feed cutter

## AO 10 / 15 / Ø 16 – 40

1347 / 1348

Pat. no. 686 235

High feed milling



Part No	Type	D mm	l2 mm	d2 mm	G	l1 mm				Accessories kit No	<b>WSP</b>
1347.0300	16-AO 10 R	16	25	16.0		75	✓	2	r	1494.0550	AOFT 10 03
1348.0300	16-AO 10 R	16	25	8.5	M8	41	✓	2	r	1494.0550	AOFT 10 03
1347.0338	20-AO 10 R Z2	20	30	20.0		82	✓	2	r	1494.0560	AOFT 10 03
1347.0340	20-AO 10 R Z3	20	30	20.0		82	✓	3	r	1494.0561	AOFT 10 03
1348.0340	20-AO 10 R	20	30	10.5	M10	48	✓	3	r	1494.0561	AOFT 10 03
1347.0382	25-AO 10 R	25	38	25.0		96	✓	4	r	1494.0562	AOFT 10 03
1348.0382	25-AO 10 R	25	35	12.5	M12	55	✓	4	r	1494.0562	AOFT 10 03
1347.0378	25-AO 15 R	25	38	20.0		90	✓	2	r	1494.0650	AOFT 15 T3
1347.0380	25-AO 15 R	25	38	25.0		96	✓	2	r	1494.0650	AOFT 15 T3
1348.0380	25-AO 15 R	25	40	12.5	M12	60	✓	2	r	1494.0650	AOFT 15 T3
1348.0422	32-AO 10 R	32	42	17.0	M16	64	✓	5	r	1494.0563	AOFT 10 03
1347.0410	32-AO 15 R Z3	32	38	25.0		96	✓	3	r	1494.0651	AOFT 15 T3
1347.0420	32-AO 15 R Z3	32	38	32.0		100	✓	3	r	1494.0651	AOFT 15 T3
1348.0418	32-AO 15 R Z2	32	44	17.0	M16	66	✓	2	r	1494.0650	AOFT 15 T3
1348.0420	32-AO 15 R Z3	32	44	17.0	M16	66	✓	3	r	1494.0651	AOFT 15 T3
1347.0460	40-AO 15 R Z4	40	48	32.0		110	✓	4	r	1494.0652	AOFT 15 T3

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver	
	Qty	Article	Type	Torque	Article	Type
1494.0550	2	1491.0210	M2.5x4	0.95 Nm	1493.0300	TP7 IP
1494.0560	2	1491.0220	M2.5x5	0.95 Nm	1493.0300	TP7 IP
1494.0561	3	1491.0220	M2.5x5	0.95 Nm	1493.0300	TP7 IP
1494.0562	4	1491.0220	M2.5x5	0.95 Nm	1493.0300	TP7 IP
1494.0563	5	1491.0220	M2.5x5	0.95 Nm	1493.0300	TP7 IP
1494.0650	2	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15
1494.0651	3	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15
1494.0652	4	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15

**Info** The flat Kappa angle of around 15° allows a very high feed per tooth.

**Info** By exchanging the indexable inserts, this milling tool can also be used as a step milling cutter.

**Info** This tool mainly generates forces in axial direction, which allows big protrudings and preserves the spindle.

**Info** The same TWIST milling bodies as for profile milling 90° can be used with 481/581 inserts.



Face milling



Profile milling



Circular plunge milling



Circular interpolation

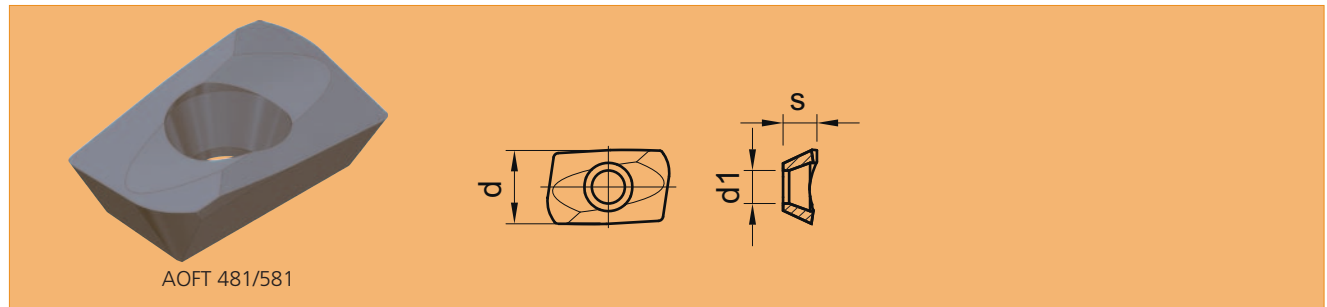


Ramping





# ALESA TWIST high feed cutter

## AO 10 / 15 / Ø 16 – 40



High feed milling

Cutting material	Coating	Part No	ISO Code	d mm	s mm	d1 mm			Mat. classification					
									1	2	3	4	5	6
Carbide HM	AlCrN	1288.0300	AOFT 10 03 ZZ FR-481	7.00	3.35	2.8	●	○	●	●	●	●	●	●
		1288.0310	AOFT 15 T3 ZZ FR-481	9.07	4.00	3.8	●	○	●	●	●	●	●	●
Carbide HM-F	AlCrN	1288.0500	AOFT 10 03 ZZ FR-581	7.00	3.35	2.8		●	○	○	○			
		1288.0510	AOFT 15 T3 ZZ FR-581	9.07	4.00	3.8		●	○	○	○			

Fitting instructions for inserts see page 139

### Winkel KAPPA für Wendeschneidplatten Typ 481 und 581

### Angle KAPPA for indexable inserts type 481 and 581

### Angle KAPPA pour plaquettes amovibles type 481 et 581

ap	AOFT 10	AOFT 15
0.1 mm	7.50°	-
0.2 mm	10.50°	9.10°
0.3 mm	<b>13.00°</b>	11.20°
0.4 mm	<b>15.00°</b>	<b>13.00°</b>
0.5 mm	<b>16.80°</b>	<b>14.50°</b>
0.6 mm	<b>18.50°</b>	<b>15.90°</b>
0.7 mm	20.00°	<b>17.20°</b>
0.8 mm	-	<b>18.50°</b>
0.9 mm	-	19.60°
Programmierhinweis Recommendation for programming Recommandation de programmation	R 1.5	R 2.0

Overview of all indexable inserts see page 108 and following.



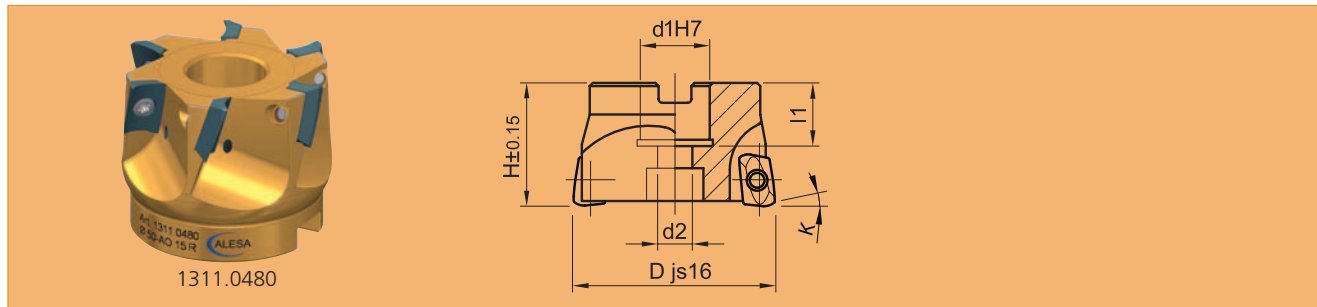
# ALESA TWIST high feed cutter

## AO 10 / 15 / Ø 32 – 80

1311

Pat. no. 686 235

High feed milling



Part No	Type	D mm	H mm	d1 mm	d2 mm	l1 mm				Accessories kit No	<b>WSP</b>
1311.0422	32-AO 10 R	32	28	13.0	6.5	15	✓	5	r	1494.0564	AOFT 10 03
1311.0462	40-AO 10 R	40	32	16.0	8.5	18	✓	6	r	1494.0565	AOFT 10 03
1311.0460	40-AO 15 R	40	32	16.0	8.5	18	✓	4	r	1494.0653	AOFT 15 T3
1311.0482	50-AO 10 R	50	40	22.0	11	20	✓	8	r	1494.0566	AOFT 10 03
1311.0480	50-AO 15 R	50	40	22.0	11	20	✓	6	r	1494.0655	AOFT 15 T3
1311.0500	63-AO 15 R	63	40	22.0	11	20	✓	7	r	1494.0657	AOFT 15 T3
1311.0520	80-AO 15 R	80	50	27.0	14	22	✓	9	r	1494.0660	AOFT 15 T3

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver		Hex socket head screw		
	Qty	Article	Type	Torque	Article	Type	Article	Type	Torque
1494.0564	5	1491.0220	M2.5x5	0.95 Nm	1493.0300	TP7 IP	1490.0750	M 6 x 20	10 Nm
1494.0565	6	1491.0220	M2.5x5	0.95 Nm	1493.0300	TP7 IP	1490.0759	M 8 x 20	30 Nm
1494.0566	8	1491.0220	M2.5x5	0.95 Nm	1493.0300	TP7 IP	1490.0770	M 10 x 25	50 Nm
1494.0653	4	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0759	M 8 x 20	30 Nm
1494.0655	6	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0770	M 10 x 25	50 Nm
1494.0657	7	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0770	M 10 x 25	50 Nm
1494.0660	9	1490.0280	M3.5x7	2.55 Nm	1492.0500	T 15	1490.0780	M 12 x 30	90 Nm

**Info** The flat Kappa angle of around 15° allows a very high feed per tooth.

**Info** By exchanging the indexable inserts, this milling tool can also be used as a step milling cutter.

**Info** This tool mainly generates forces in axial direction, which allows big protrudings and preserves the spindle.

**Info** The same TWIST milling bodies as for profile milling 90° can be used with 481/581 inserts.



Face milling



Profile milling



Circular plunge milling



Circular interpolation

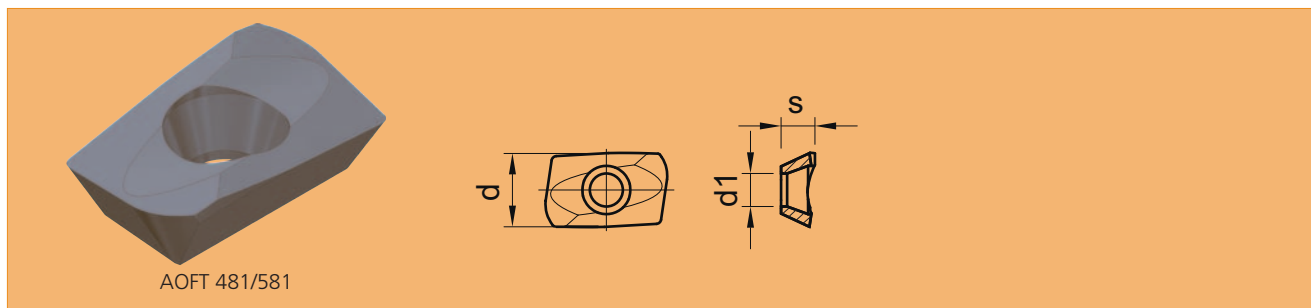


Ramping





# ALESA TWIST high feed cutter

## AO 10 / 15 / Ø 32 – 80



High feed milling

Cutting material	Coating	Part No	ISO Code	d mm	s mm	d1 mm			Mat. classification					
									1	2	3	4	5	6
Carbide HM	AlCrN	1288.0300	AOFT 10 03 ZZ FR-481	7.00	3.35	2.8	●	○	●	●	●	●	●	●
		1288.0310	AOFT 15 T3 ZZ FR-481	9.07	4.00	3.8	●	○	●	●	●	●	●	●
Carbide HM-F	AlCrN	1288.0500	AOFT 10 03 ZZ FR-581	7.00	3.35	2.8		●	●	○	○			
		1288.0510	AOFT 15 T3 ZZ FR-581	9.07	4.00	3.8		●	●	○	○			

Fitting instructions for inserts see page 139

### Winkel KAPPA für Wendeschneidplatten Typ 481 und 581

Angle KAPPA for indexable inserts type 481 and 581

Angle KAPPA pour plaquettes amovibles type 481 et 581

ap	AOFT 10	AOFT 15
0.1 mm	7.50°	-
0.2 mm	10.50°	9.10°
0.3 mm	<b>13.00°</b>	11.20°
0.4 mm	<b>15.00°</b>	<b>13.00°</b>
0.5 mm	<b>16.80°</b>	<b>14.50°</b>
0.6 mm	<b>18.50°</b>	<b>15.90°</b>
0.7 mm	20.00°	<b>17.20°</b>
0.8 mm	-	<b>18.50°</b>
0.9 mm	-	19.60°
Programmierhinweis Recommendation for programming Recommandation de programmation	R 1.5	R 2.0

Overview of all indexable inserts see page 108 and following.

# Milling with button inserts

## ALESA RP 12

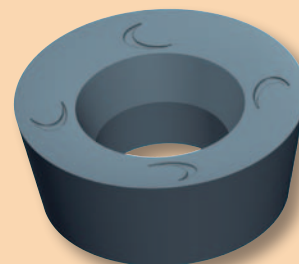
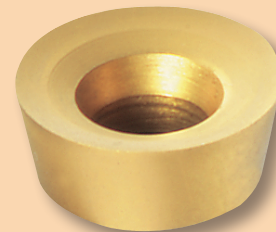
### The characteristics

- THE classic of bolted button insert tools with RP 12 cutting inserts
- High positive ALESA sharp-ground inserts
- SWISS Precision Tool. The milling head and cutting inserts are manufactured in Switzerland
- Robust and proven solution according to DIN
- The sharp edges require less spindle power than pure sintered cutting insert
- The sharp-ground cutting inserts are optimized for modern 5-axis milling centers
- The RP 12 tools  $\varnothing$  40 mm to  $\varnothing$ 100 mm are equipped with cooling holes for internal coolant supply
- The RP 12 tools with  $\varnothing$  125 mm and  $\varnothing$  160 mm can be provided with coolant distribution rings, which contain an internal coolant supply
- The best PVD coatings are available
- HSS and carbide cutting inserts are available from the warehouse



### The benefits and options for you

- Fast delivery from the Seengen warehouse
- Arbor type from  $\varnothing$  40 mm to  $\varnothing$  160 mm
- With 3 cutting geometries a very large range of materials can be processed
- HSS cutting inserts with TiN and TiAlN coatings are safe and efficient for the processing of many applications
- High chip removal rate (Q) with a relatively small machine load
- Good tool life and high productivity
- RP 12 cutting inserts are very efficient for face milling at cutting depths ( $a_p$ ) up to 2 mm
- The latest developments show excellent cutting processes with the most difficult Ni-, Ti- and Co- alloys
- Manufactured according to ISO certified processes
- For special tools, our construction with large experience is available





# Milling with button inserts

## ALESA RP 06/08/10

### ALESA threaded type cutter RP 06/08/10

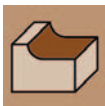
- Like the RP round insert cutter, the threaded type cutters are also available for inserts 06 / 08 and 10
- All ALESA's cutting inserts are high positive and sharp ground
- SWISS Precision Tool. The heads and cutting inserts are manufactured in Switzerland
- The sharp edges create less cutting forces and require less spindle performance than pure sintered cutting inserts
- The sharp ground cutting inserts are optimized for modern 5-axis milling centers
- The RD threaded type cutters are available from the warehouse in Ø 12 mm with RD 06, in Ø 16 mm with RD 08 and in Ø 20 mm with RD 10
- For the carbide RD cutting inserts, different powerful PVD coatings are available
- Fast delivery from the Seengen warehouse
- Manufactured according to ISO certified processes
- For special tools, our construction with great experience is available



### ALESA RP 06/08/10

- Based on the classic button inserts, ALESA also delivers RP cutting inserts in sizes 06 / 08 and 10
- All ALESA's cutting inserts are high positive and sharp ground
- SWISS Precision Tool. The milling heads and cutting inserts are manufactured in Switzerland
- The sharp edges create less cutting forces and require less spindle power than pure sintered milling inserts
- The sharp ground cutting inserts are optimized for modern 5-axis milling centers
- The RP Weldon end mills are available from the warehouse in the Ø 16 mm and Ø 20 mm with RP 06, in Ø 25 mm with RP 08 and in Ø 32 mm with RP 10
- All RP tools are provided with coolant holes for internal coolant supply
- The best PVD coatings are available
- The RP cutting inserts are available in HSS and carbide





# ALESA end mill and threaded type cutter RP

## RP 06 / 08 / 10 R / Ø 16 – 32

1326 / 1327

Milling with button inserts



Part No	Type	D mm	D1 mm	l2 mm	G	d2 mm	l1 mm				Accessories kit No	<b>WSP</b>
1326.0240	12-RP 06 R	6	12	20	M6	6.5	33	✓	2	r	1494.0550	RPFT 06 02
1327.0300	16-RP 06 R	10	16	58		16.0	108	✓	2	r	1494.0560	RPFT 06 02
1326.0300	16-RP 08 R	8	16	25	M8	8.5	41	✓	2	r	1494.0620	RPFT 08 03
1327.0340	20-RP 06 R	14	20	58		20.0	110	✓	3	r	1494.0561	RPFT 06 02
1326.0340	20-RP 10 R	10	20	30	M10	10.5	48	✓	2	r	1494.0700	RPFT 10 T3
1327.0380	25-RP 08 R	17	25	68		25.0	126	✓	3	r	1494.0620	RPFT 08 03
1327.0420	32-RP 10 R	22	32	68		32.0	130	✓	3	r	1494.0705	RPFT 10 T3

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

### Accessories / spare parts

Part No	Torx screw				Screw-driver	
	Qty	Article	Type	Torque	Article	Type
1494.0550	2	1491.0210	M2.5x4	0.95 Nm	1493.0300	TP7 IP
1494.0560	2	1491.0220	M2.5x5	0.95 Nm	1493.0300	TP7 IP
1494.0561	3	1491.0220	M2.5x5	0.95 Nm	1493.0300	TP7 IP
1494.0620	3	1490.0240	M3x6	1.65 Nm	1492.0400	T 9
1494.0700	2	1490.0320	M4x6	3.85 Nm	1492.0500	T 15
1494.0705	3	1490.0340	M4x8	3.85 Nm	1492.0500	T 15



All ALESA indexable inserts are ground in the high ISO standard tolerance classification F.



Holes for internal coolant supply guarantee ideal cooling.



Highly positive, extremely sharp cutting edge of HSS-E and carbide.



Face milling



Circular plunge milling



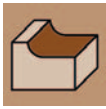
Circular interpolation



Ramping



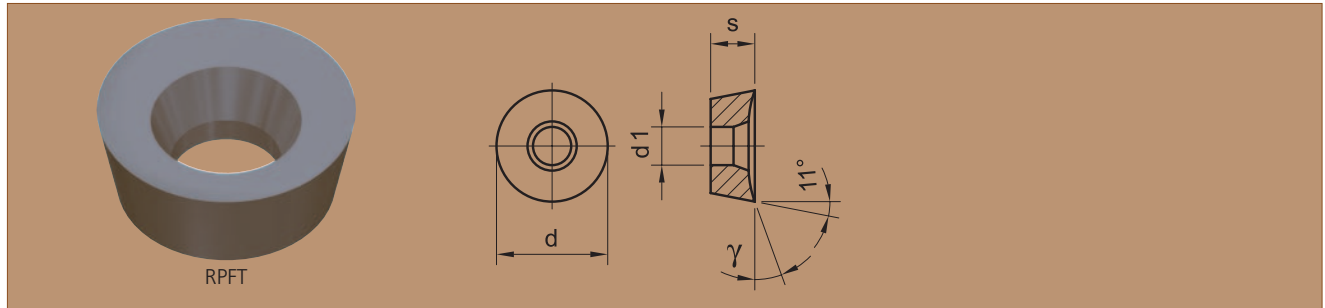
Profiling



# ALESA end mill and threaded type cutter RP

## RP 06 / 08 / 10 R / Ø 16 – 32

ap = 3/4/5 mm

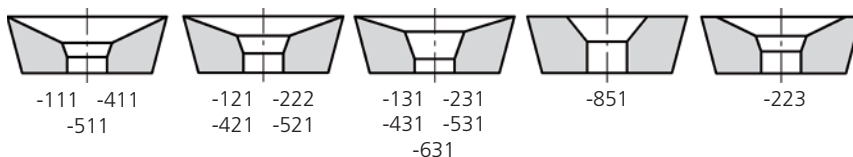


Milling with button inserts

Cutting material	Coating	Part No	ISO Code	d mm	s mm	d1 mm	γ				Mat. classification					
											1	2	3	4	5	6
HSS-E	TiN	1076.0200	RPFT 06 02 M0	6.00	2.38	3.0	20°	r/l	●			○	○		●	●
		1076.0240	RPFT 08 03 M0	8.00	3.18	3.6	20°	r/l	●			○	○		●	●
		1076.0300	RPFT 10 T3 M0	10.00	3.97	4.5	20°	r/l	●			○	○		●	●
	TiAlN	1151.0200	RPFT 06 02 M0	6.00	2.38	3.0	20°	r/l	●			○	●		●	○
		1151.0240	RPFT 08 03 M0	8.00	3.18	3.6	20°	r/l	●			○	●		●	○
		1151.0300	RPFT 10 T3 M0	10.00	3.97	4.5	20°	r/l	●			○	●		●	○
Carbide MG20	TiN	1276.0200	RPFT 06 02 M0-111	6.00	2.38	3.0	20°	r/l	○	●		●	○	●	●	●
		1276.0240	RPFT 08 03 M0-111	8.00	3.18	3.6	20°	r/l	○	●		●	○	●	●	●
		1276.0300	RPFT 10 T3 M0-111	10.00	3.97	4.5	20°	r/l	○	●		●	○	●	●	●
	TiAlN	1276.0205	RPFT 06 02 M0-111	6.00	2.38	3.0	20°	r/l	○	●		●	○	●	○	●
		1276.0245	RPFT 08 03 M0-111	8.00	3.18	3.6	20°	r/l	○	●		●	○	●	○	●
		1276.0305	RPFT 10 T3 M0-111	10.00	3.97	4.5	20°	r/l	○	●		●	○	●	○	●
	AlCrN	1276.0215	RPFT 06 02 M0-111	6.00	2.38	3.0	20°	r/l	○	●		●	○	●	○	●
		1276.0217	RPFT 06 02 M0-131	6.00	2.38	3.0	8°	r/l	○	●		●	○	●	○	●
		1276.0255	RPFT 08 03 M0-111	8.00	3.18	3.6	20°	r/l	○	●		●	○	●	○	●
	AlCrN-VA	1276.0257	RPFT 08 03 M0-131	8.00	3.18	3.6	8°	r/l	○	●		●	○	●	○	●
		1276.0315	RPFT 10 T3 M0-111	10.00	3.97	4.5	20°	r/l	○	●		●	○	●	○	●
		1276.0317	RPFT 10 T3 M0-131	10.00	3.97	4.5	8°	r/l	○	●		●	○	●	○	●
		1276.0222	RPFT 06 02 M0-131	6.00	2.38	3.0	8°	r/l	○	●		●	○	●	○	●
		1276.0262	RPFT 08 03 M0-131	8.00	3.18	3.6	8°	r/l	○	●		●	○	●	○	●
		1276.0322	RPFT 10 T3 M0-131	10.00	3.97	4.5	8°	r/l	○	●		●	○	●	○	●

Fitting instructions for inserts see page 139

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
Additional number indexable inserts ISO-code (cutting geometry)  
Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.



# ALESA milling cutter RP

## RP 12 R / Ø 40 – 160

1301

Milling with button inserts



Part No	Type	D mm	D1 mm	H mm	d1 mm	d2 mm	l1 mm				Accessories kit No	Ring No	<b>WSP</b>
1301.0460	40-RP 12 R	40	52	32	16.0	8.5	18	✓	4	r	1494.0730		RP.T 12 04
1301.0480	50-RP 12 R	50	62	40	22.0	11	20	✓	4	r	1494.0731		RP.T 12 04
1301.0500	63-RP 12 R	63	75	40	22.0	11	20	✓	5	r	1494.0732		RP.T 12 04
1301.0520	80-RP 12 R	80	92	50	27.0	14	22	✓	6	r	1494.0734		RP.T 12 04
1301.0540	100-RP 12 R	100	112	50	32.0	18	25	✓	7	r	1494.0737		RP.T 12 04
1301.0560	125-RP 12 R	125	137	63	40.0	56	28	✓	8	r	1494.0738	1320.0135	RP.T 12 04
1301.0580	160-RP 12 R	160	172	63	40.0	56	28	✓	10	r	1494.0740	1320.0145	RP.T 12 04

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

Ring for the lubricant distribution on the tool face (KSSV)

Nr. / No. / No	Dimension	
1320.0135	Ø 56 x 31.5 x 28	1320.0215 M20x60 230 Nm
1320.0145	Ø 56 x 31.5 x 28	1320.0215 M20x60 230 Nm

### Accessories / spare parts

Part No	Torx screw				Screw-driver		Hex socket head screw		
	Qty	Article	Type	Torque	Article	Type	Article	Type	Torque
1494.0730	4	1490.0380	M4x11	3.85 Nm	1492.0600	T 20	1490.0759	M 8 x 20	30 Nm
1494.0731	4	1490.0380	M4x11	3.85 Nm	1492.0600	T 20	1490.0770	M 10 x 25	50 Nm
1494.0732	5	1490.0380	M4x11	3.85 Nm	1492.0600	T 20	1490.0770	M 10 x 25	50 Nm
1494.0734	6	1490.0380	M4x11	3.85 Nm	1492.0600	T 20	1490.0780	M 12 x 30	90 Nm
1494.0737	7	1490.0380	M4x11	3.85 Nm	1492.0600	T 20	1490.0789	M 16 x 30	160 Nm
1494.0738	8	1490.0380	M4x11	3.85 Nm	1492.0600	T 20			
1494.0740	10	1490.0380	M4x11	3.85 Nm	1492.0600	T 20			

**WSP**

All ALESA indexable inserts are ground in the high ISO standard tolerance classification F.



Holes for internal coolant supply guarantee ideal cooling.



Face milling



Circular plunge milling



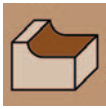
Circular interpolation



Ramping



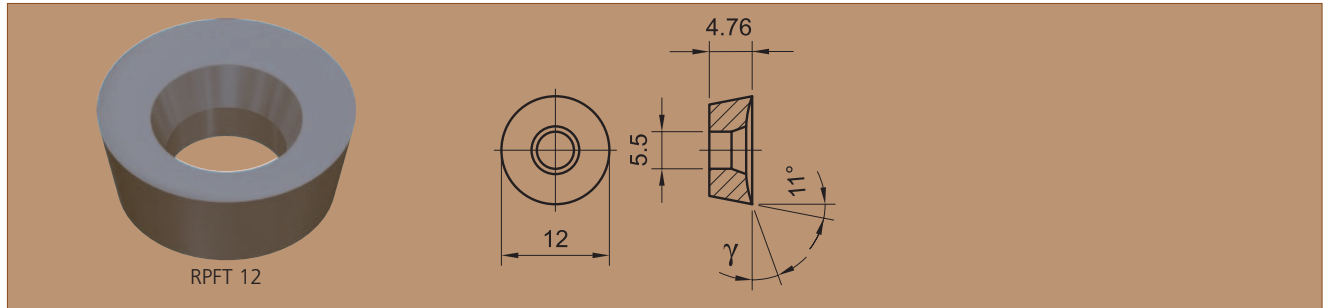
Profiling



# ALESA milling cutter RP

## RP 12 R / Ø 40 – 160

ap = 6 mm

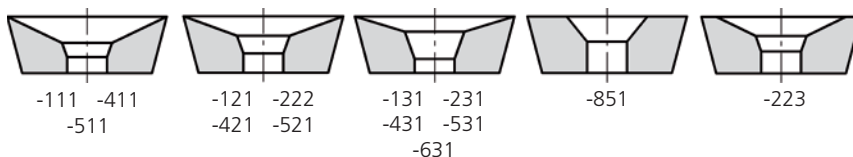


Milling with button inserts

Cutting material	Coating	Part No	ISO Code	γ				Mat. classification					
								1	2	3	4	5	6
HSS-E	TiN	1076.0400	RPFT 12 04 M0	20°	r/l	●		○	○		●		●
		1076.0410	RPFT 12 04 M0	30°	r/l	●		○	○		●		●
	TiAlN	1151.0400	RPFT 12 04 M0	20°	r/l	●		○	●		●	○	●
		1151.0410	RPFT 12 04 M0	30°	r/l	●		○	●		●	○	●
Carbide MG20	TiN	1276.0400	RPFT 12 04 M0-111	20°	r/l	○	●	●	○	●	●		●
	TiAlN	1276.0405	RPFT 12 04 M0-111	20°	r/l	○	●	●	○	●	○	●	
	AlCrN	1276.0415	RPFT 12 04 M0-111	20°	r/l	○	●	●	●	●	●	●	
Carbide 12CR	TiAlN	1276.0420	RPHT 12 04 M0-222	16°	r/l	○	●	●	○	●	○	●	
		1276.0430	RPHT 12 04 M0-222	16°	r/l	○	●	●	●	○	●	○	
	AlCrN-VA	1276.0530	RPFT 12 04 M0-231	6°	r/l	○	●	●	●	○	●	○	
		1276.0535	RPFT 12 04 M0-231	6°	r/l	○	●	●	○	●	○	●	

Fitting instructions for inserts see page 139

Zusatznummer Wendeschneidplatten ISO-Code (Schneidengeometrie)  
Additional number indexable inserts ISO-code (cutting geometry)  
Numéro supplémentaire plaquettes amovibles code ISO (géométrie de coupe)



Overview of all indexable inserts see page 108 and following.

# Notes

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## Turning tools

### Turning



SR

16 – 32

No 1905

p. 72

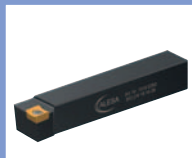


SC 06

8 – 10

No 1910

p. 74



SC 09

12 – 16

No 1910

p. 76

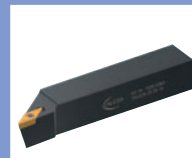


SD

10 – 20

No 1920

p. 78



SV 16

25

No 1935

p. 80



SA

12 – 25

No 1940

p. 82



SS

12 – 25

No 1945

p. 84

### Turning inside



SC 06 / 09

Ø 8 – 20

No 1917

p. 86



SM

Ø 6 – 8

No 1918

p. 88



SD

Ø 12 – 20

No 1927

p. 90

### Toolbits



round

Ø 2 – 30

No 4120

p. 92



square

4x4 – 32x32

No 4140

p. 93



rectangular

6x4 – 32x20

No 4160

p. 94

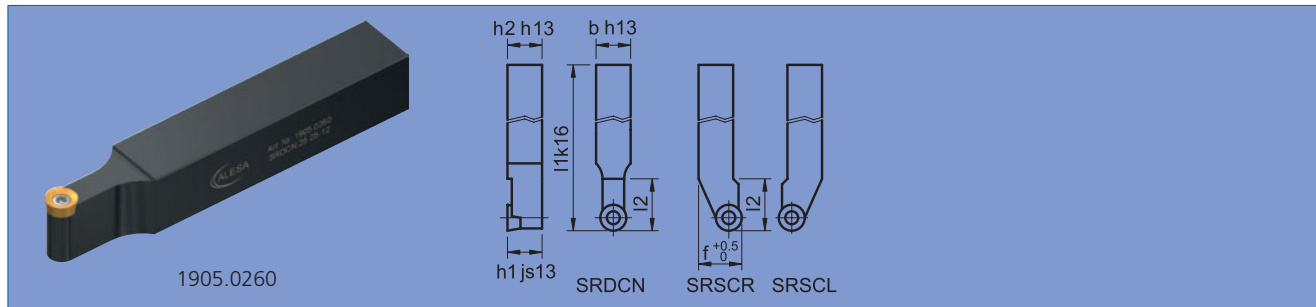


# ALESA toolholder SR for turning

## RCFT / 16 – 32

1905

Turning



Part No	Type	h2 mm	b mm	l1 mm	h1 mm	f mm	l2 mm	↻	Article	Type	Article	Type	WSP
1905.0200	SRDCN 16 16 06	16	16	100	16		12	n	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	RCFT 06
1905.0300	SRSCR 16 16 06	16	16	100	16	20	16	r	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	RCFT 06
1905.0305	SRSCl 16 16 06	16	16	100	16	20	16	l	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	RCFT 06
1905.0220	SRDCN 20 20 08	20	20	125	20		16	n	1490.0240	M3x6 / 1.65Nm	1492.0400	T 9	RCFT 08
1905.0320	SRSCR 20 20 08	20	20	125	20	25	20	r	1490.0240	M3x6 / 1.65Nm	1492.0400	T 9	RCFT 08
1905.0325	SRSCl 20 20 08	20	20	125	20	25	20	l	1490.0240	M3x6 / 1.65Nm	1492.0400	T 9	RCFT 08
1905.0240	SRDCN 20 20 10	20	20	125	20		22	n	1490.0360	M4x10 / 3.85Nm	1492.0500	T 15	RCFT 10
1905.0340	SRSCR 20 20 10	20	20	125	20	25	20	r	1490.0360	M4x10 / 3.85Nm	1492.0500	T 15	RCFT 10
1905.0345	SRSCl 20 20 10	20	20	125	20	25	20	l	1490.0360	M4x10 / 3.85Nm	1492.0500	T 15	RCFT 10
1905.0260	SRDCN 25 25 12	25	25	150	25		24	n	1490.0400	M5x16 / 5.00Nm	1492.0600	T 20	RCFT 12
1905.0360	SRSCR 25 25 12	25	25	150	25	32	25	r	1490.0400	M5x16 / 5.00Nm	1492.0600	T 20	RCFT 12
1905.0365	SRSCl 25 25 12	25	25	150	25	32	25	l	1490.0400	M5x16 / 5.00Nm	1492.0600	T 20	RCFT 12
1905.0280	SRDCN 32 25 16	32	25	170	32		28	n	1490.0400	M5x16 / 5.00Nm	1492.0600	T 20	RCFT 16
1905.0290	SRDCN 32 32 20	32	32	170	32		32	n	1490.0420	M6x18 / 6.00Nm	4390.0540	SW 4	RCFT 20
1905.0400*	SRSCR 32 32 20	32	32	170	32	40	32	r	1490.0420	M6x18 / 6.00Nm	4390.0540	SW 4	RCFT 20
1905.0405*	SRSCl 32 32 20	32	32	170	32	40	32	l	1490.0420	M6x18 / 6.00Nm	4390.0540	SW 4	RCFT 20

\*while stocks last

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.



Rigid roughing tool with a strong insert for turning.



Good cooling increases tool life.



All ALESA indexable inserts are ground in the high ISO standard tolerance classification F.



Turning



Face turning



Turning a shoulder

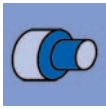


Profile turning

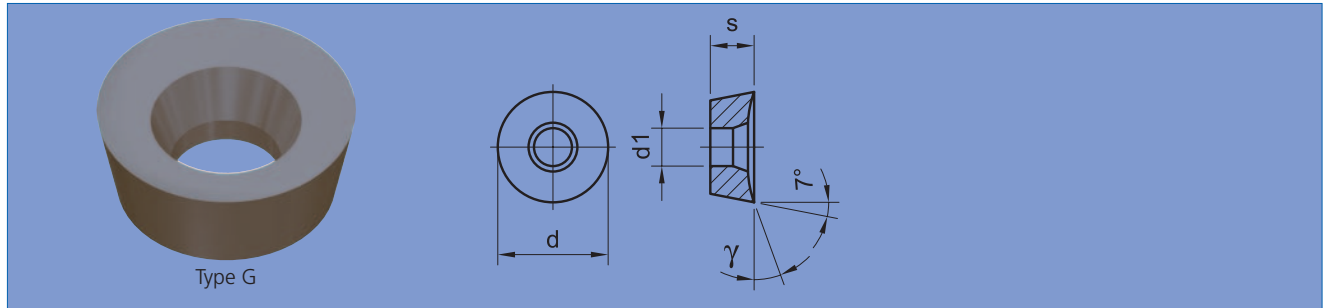


Relieving





## ALESA toolholder SR for turning RCFT / 16 – 32



Turning

Cutting material	Coating	Part No	ISO Code	Type G/K	d mm	s mm	d1 mm	γ				Mat. classification					
												1	2	3	4	5	6
HSS-E	TiN	1576.0200	RCFT 06 02 M0	G	6.00	2.38	3.0	25°	r/l	●		○	○		●	●	
		1576.0240	RCFT 08 03 M0	G	8.00	3.18	3.6	25°	r/l	●		○	○		●	●	
		1576.0300	RCFT 10 T3 M0	G	10.00	3.97	4.5	25°	r/l	●		○	○		●	●	
		1576.0400	RCFT 12 04 M0	G	12.00	4.76	5.5	25°	r/l	●		○	○		●	●	
		1576.0500	RCFT 16 06 M0	G	16.00	6.35	5.5	25°	r/l	●		○	○		●	●	
		1576.0600	RCFT 20 06 M0	G	20.00	6.35	6.5	25°	r/l	●		○	○		●	●	
	TiAlN	1651.0200	RCFT 06 02 M0	G	6.00	2.38	3.0	25°	r/l	●		○	●		●	○	●
		1651.0240	RCFT 08 03 M0	G	8.00	3.18	3.6	25°	r/l	●		○	●		●	○	●
		1651.0250	RCFT 08 03 M0	G	8.00	3.18	4.5	25°	r/l	●		○	●		●	○	●
		1651.0300	RCFT 10 T3 M0	G	10.00	3.97	4.5	25°	r/l	●		○	●		●	○	●
		1651.0400	RCFT 12 04 M0	G	12.00	4.76	5.5	25°	r/l	●		○	●		●	○	●
		1651.0500	RCFT 16 06 M0	G	16.00	6.35	5.5	25°	r/l	●		○	●		●	○	●
		1651.0600	RCFT 20 06 M0	G	20.00	6.35	6.5	25°	r/l	●		○	●		●	○	●

Overview of all indexable inserts see page 108 and following.

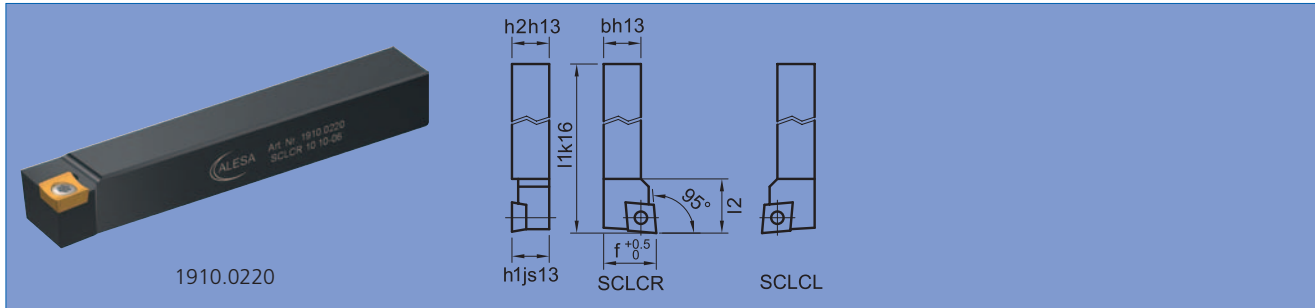


# ALESA toolholder SC 06 for turning

## CCFT 06 / 08 – 10

1910 – 06

Turning



Part No	Type	h2 mm	b mm	l1 mm	h1 mm	f mm	l2 mm	↻	Article	Type	Article	Type	WSP
1910.0200	SCLCR 08 08 06	8	8	60	8	10	9	r	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	CCFT 06
1910.0205	SCLCL 08 08 06	8	8	60	8	10	9	l	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	CCFT 06
1910.0220	SCLCR 10 10 06	10	10	70	10	12	9	r	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	CCFT 06
1910.0225	SCLCL 10 10 06	10	10	70	10	12	9	l	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	CCFT 06

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

**Info**

The all purpose turning tool

**WSP**

Indexable insert type K for a controlled chip or as chip-breaker.

**Info**

The highly positive cutting geometries reduce the cutting forces considerably.

**Info**

On a holder right: for longitudinal turning use inserts right, for face turning use inserts left. Holder left vice versa.



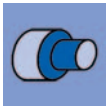
Turning



Face turning

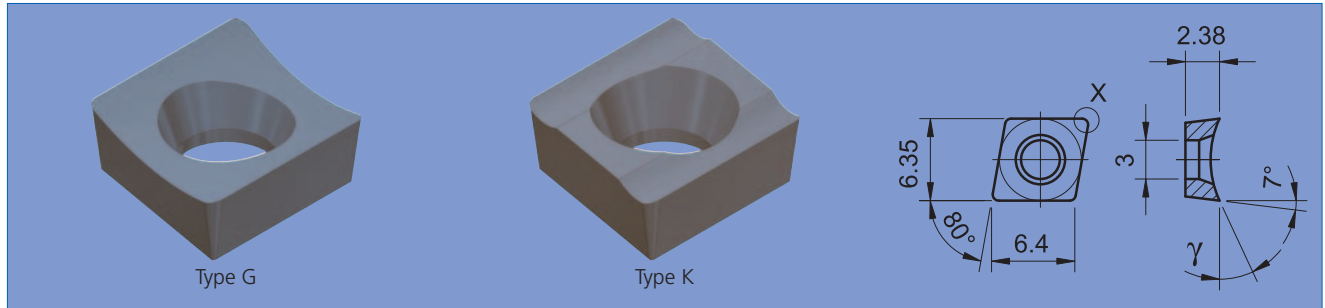


Turning a shoulder



# ALESA toolholder SC 06 for turning

## CCFT 06 / 08 – 10



Turning

Cutting material	Coating	Part No	ISO Code	Type G/K	γ	Detail X				Mat. classification					
										1	2	3	4	5	6
HSS-E	TiN	1578.0245	CCFT 06 02 01 FR	G	20°	R 0.1	r	●		○	○		●		●
		1578.0247	CCFT 06 02 01 FL	G	20°	R 0.1	l	●		○	○		●		●
		1578.0250	CCFT 06 02 02 FR	G	20°	R 0.2	r	●		○	○		●		●
		1578.0252	CCFT 06 02 02 FL	G	20°	R 0.2	l	●		○	○		●		●
		1578.0255	CCFT 06 02 04 FR	G	20°	R 0.4	r	●		○	○		●		●
		1578.0257	CCFT 06 02 04 FL	G	20°	R 0.4	l	●		○	○		●		●
		1578.0750	CCFT 06 02 02 FR	K	30°	R 0.2	r	●		○	○		●		●
		1578.0752	CCFT 06 02 02 FL	K	30°	R 0.2	l	●		○	○		●		●
		1578.0755	CCFT 06 02 04 FR	K	30°	R 0.4	r	●		○	○		●		●
		1578.0757	CCFT 06 02 04 FL	K	30°	R 0.4	l	●		○	○		●		●
		1653.0245	CCFT 06 02 01 FR	G	20°	R 0.1	r	●		○	●		●	○	●
		1653.0247	CCFT 06 02 01 FL	G	20°	R 0.1	l	●		○	●		●	○	●
		1653.0250	CCFT 06 02 02 FR	G	20°	R 0.2	r	●		○	●		●	○	●
		1653.0252	CCFT 06 02 02 FL	G	20°	R 0.2	l	●		○	●		●	○	●
	1653.0255	CCFT 06 02 04 FR	G	20°	R 0.4	r	●		○	●		●	○	●	
	1653.0257	CCFT 06 02 04 FL	G	20°	R 0.4	l	●		○	●		●	○	●	
	1653.0750	CCFT 06 02 02 FR	K	30°	R 0.2	r	●		○	●		●	○	●	
	1653.0752	CCFT 06 02 02 FL	K	30°	R 0.2	l	●		○	●		●	○	●	
	1653.0755	CCFT 06 02 04 FR	K	30°	R 0.4	r	●		○	●		●	○	●	
	1653.0757	CCFT 06 02 04 FL	K	30°	R 0.4	l	●		○	●		●	○	●	
		TiAlN													

Overview of all indexable inserts see page 108 and following.

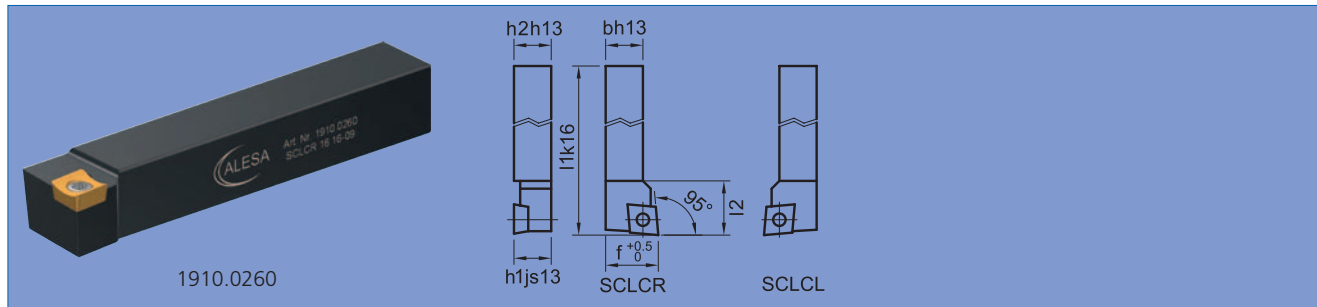


# ALESA toolholder SC 09 for turning

## CCFT 09 / 12 -16

1910 – 09

Turning



Part No	Type	h2 mm	b mm	l1 mm	h1 mm	f mm	l2 mm	↻	Article	Type	Article	Type	WSP
1910.0240	SCLCR 12 12 09	12	12	80	12	16	15	r	1490.0340	M4x8 / 3.85Nm	1492.0500	T 15	CCFT 09
1910.0245	SCLCL 12 12 09	12	12	80	12	16	15	l	1490.0340	M4x8 / 3.85Nm	1492.0500	T 15	CCFT 09
1910.0260	SCLCR 16 16 09	16	16	100	16	20	15	r	1490.0340	M4x8 / 3.85Nm	1492.0500	T 15	CCFT 09
1910.0265	SCLCL 16 16 09	16	16	100	16	20	15	l	1490.0340	M4x8 / 3.85Nm	1492.0500	T 15	CCFT 09

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

**Info** The all purpose turning tool

**WSP** Indexable insert type K for a controlled chip or as chip-breaker.

**Info** The highly positive cutting geometries reduce the cutting forces considerably.

**Info** On a holder right: for longitudinal turning use inserts right, for face turning use inserts left. Holder left vice versa.



Turning

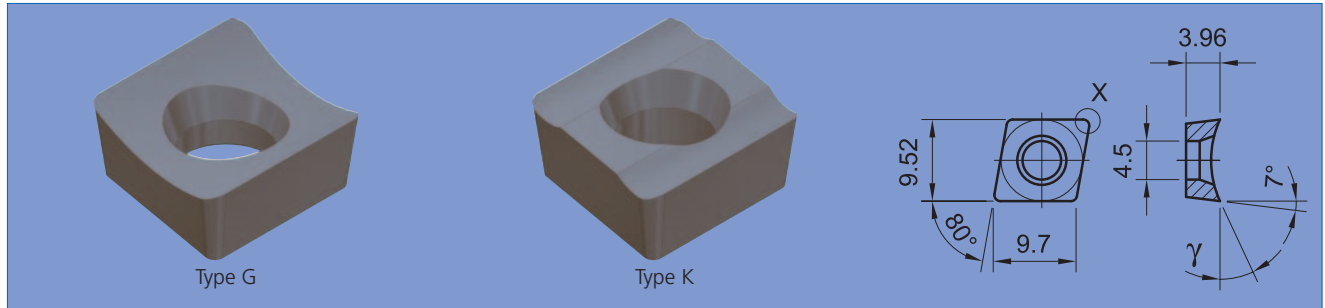


Turning a shoulder



# ALESA toolholder SC 09 for turning

## CCFT 09 / 12 -16



Turning

Cutting material	Coating	Part No	ISO Code	Type G/K	γ	Detail X				Mat. classification					
										1	2	3	4	5	6
HSS-E	TiN	1578.0350	CCFT 09 T3 02 FR	G	25°	R 0.2	r	●		○	○		●	●	
		1578.0352	CCFT 09 T3 02 FL	G	25°	R 0.2	l	●		○	○		●	●	
		1578.0355	CCFT 09 T3 04 FR	G	25°	R 0.4	r	●		○	○		●	●	
		1578.0357	CCFT 09 T3 04 FL	G	25°	R 0.4	l	●		○	○		●	●	
		1578.0360	CCFT 09 T3 08 FR	G	25°	R 0.8	r	●		○	○		●	●	
		1578.0362	CCFT 09 T3 08 FL	G	25°	R 0.8	l	●		○	○		●	●	
		1578.0855	CCFT 09 T3 04 FR	K	30°	R 0.4	r	●		○	○		●	●	
		1578.0857	CCFT 09 T3 04 FL	K	30°	R 0.4	l	●		○	○		●	●	
		1578.0860	CCFT 09 T3 08 FR	K	30°	R 0.8	r	●		○	○		●	●	
		1578.0862	CCFT 09 T3 08 FL	K	30°	R 0.8	l	●		○	○		●	●	
	TiAlN	1653.0350	CCFT 09 T3 02 FR	G	25°	R 0.2	r	●		○	●		●	○	●
		1653.0352	CCFT 09 T3 02 FL	G	25°	R 0.2	l	●		○	●		●	○	●
		1653.0355	CCFT 09 T3 04 FR	G	25°	R 0.4	r	●		○	●		●	○	●
		1653.0357	CCFT 09 T3 04 FL	G	25°	R 0.4	l	●		○	●		●	○	●
		1653.0360	CCFT 09 T3 08 FR	G	25°	R 0.8	r	●		○	●		●	○	●
		1653.0362	CCFT 09 T3 08 FL	G	25°	R 0.8	l	●		○	●		●	○	●
		1653.0855	CCFT 09 T3 04 FR	K	30°	R 0.4	r	●		○	●		●	○	●
		1653.0857	CCFT 09 T3 04 FL	K	30°	R 0.4	l	●		○	●		●	○	●
		1653.0860	CCFT 09 T3 08 FR	K	30°	R 0.8	r	●		○	●		●	○	●
		1653.0862	CCFT 09 T3 08 FL	K	30°	R 0.8	l	●		○	●		●	○	●

Overview of all indexable inserts see page 108 and following.

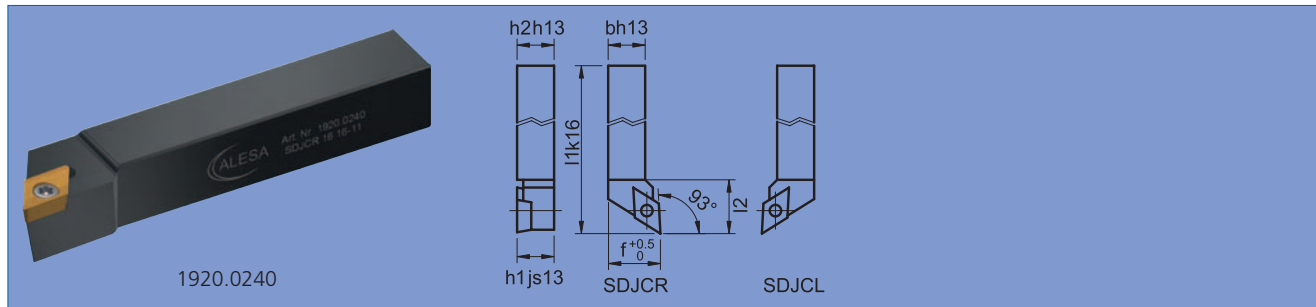


# ALESA toolholder SD for turning

## DCFT / 10 – 20

1920

Turning



Part No	Type	h2 mm	b mm	l1 mm	h1 mm	f mm	l2 mm	↻	Article	Type	Article	Type	WSP
1920.0200	SDJCR 10 10 07	10	10	70	10	12	13	r	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	DCFT 07
1920.0205	SDJCL 10 10 07	10	10	70	10	12	13	l	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	DCFT 07
1920.0220	SDJCR 12 12 11	12	12	80	12	16	22	r	1490.0360	M4x10 / 3.85Nm	1492.0500	T 15	DCFT 11
1920.0225	SDJCL 12 12 11	12	12	80	12	16	22	l	1490.0360	M4x10 / 3.85Nm	1492.0500	T 15	DCFT 11
1920.0240	SDJCR 16 16 11	16	16	100	16	20	25	r	1490.0360	M4x10 / 3.85Nm	1492.0500	T 15	DCFT 11
1920.0245	SDJCL 16 16 11	16	16	100	16	20	25	l	1490.0360	M4x10 / 3.85Nm	1492.0500	T 15	DCFT 11
1920.0260	SDJCR 20 20 11	20	20	125	20	25	25	r	1490.0360	M4x10 / 3.85Nm	1492.0500	T 15	DCFT 11
1920.0265	SDJCL 20 20 11	20	20	125	20	25	25	l	1490.0360	M4x10 / 3.85Nm	1492.0500	T 15	DCFT 11

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

### Info

Ideal cutting geometries and coating for stainless and acidproof steels with a high nickel and chrome content.



Good cooling increases tool life.

### Info

The perfect tool for profile turning and finishing.

### WSP

Indexable insert type K for a controlled chip or as chip-breaker.



Turning



Turning a shoulder



Profile turning

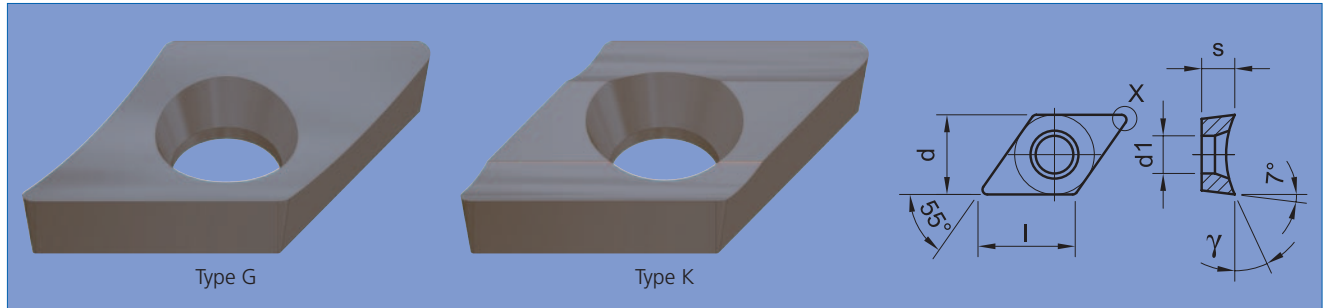


Relieving



# ALESA toolholder SD for turning

## DCFT / 10 – 20



Turning

Cutting material	Coating	Part No	ISO Code	Type G/K	d mm	s mm	l mm	d1 mm	γ	Detail X		Mat. classification					
												1	2	3	4	5	6
HSS-E	TiN	1579.0245	DCFT 07 02 01 FR	G	6.35	2.38	7.75	3.0	20°	R 0.1	r	○	○		●	●	
		1579.0247	DCFT 07 02 01 FL	G	6.35	2.38	7.75	3.0	20°	R 0.1	l	○	○		●	●	
		1579.0250	DCFT 07 02 02 FR	G	6.35	2.38	7.75	3.0	20°	R 0.2	r	○	○		●	●	
		1579.0252	DCFT 07 02 02 FL	G	6.35	2.38	7.75	3.0	20°	R 0.2	l	○	○		●	●	
		1579.0255	DCFT 07 02 04 FR	G	6.35	2.38	7.75	3.0	20°	R 0.4	r	○	○		●	●	
		1579.0257	DCFT 07 02 04 FL	G	6.35	2.38	7.75	3.0	20°	R 0.4	l	○	○		●	●	
		1579.0355	DCFT 11 T3 04 FR	G	9.52	3.96	11.60	4.5	25°	R 0.4	r	○	○		●	●	
		1579.0357	DCFT 11 T3 04 FL	G	9.52	3.96	11.60	4.5	25°	R 0.4	l	○	○		●	●	
		1579.0360	DCFT 11 T3 08 FR	G	9.52	3.96	11.60	4.5	25°	R 0.8	r	○	○		●	●	
		1579.0362	DCFT 11 T3 08 FL	G	9.52	3.96	11.60	4.5	25°	R 0.8	l	○	○		●	●	
		1579.0750	DCFT 07 02 02 FR	K	6.35	2.38	7.75	3.0	30°	R 0.2	r	○	○		●	●	
		1579.0752	DCFT 07 02 02 FL	K	6.35	2.38	7.75	3.0	30°	R 0.2	l	○	○		●	●	
		1579.0755	DCFT 07 02 04 FR	K	6.35	2.38	7.75	3.0	30°	R 0.4	r	○	○		●	●	
		1579.0757	DCFT 07 02 04 FL	K	6.35	2.38	7.75	3.0	30°	R 0.4	l	○	○		●	●	
		1579.0855	DCFT 11 T3 04 FR	K	9.52	3.96	11.60	4.5	30°	R 0.4	r	○	○		●	●	
		1579.0857	DCFT 11 T3 04 FL	K	9.52	3.96	11.60	4.5	30°	R 0.4	l	○	○		●	●	
		1579.0860	DCFT 11 T3 08 FR	K	9.52	3.96	11.60	4.5	30°	R 0.8	r	○	○		●	●	
		1579.0862	DCFT 11 T3 08 FL	K	9.52	3.96	11.60	4.5	30°	R 0.8	l	○	○		●	●	
	TiAlN	1654.0245	DCFT 07 02 01 FR	G	6.35	2.38	7.75	3.0	20°	R 0.1	r	○	●		●	○	●
		1654.0247	DCFT 07 02 01 FL	G	6.35	2.38	7.75	3.0	20°	R 0.1	l	○	●		●	○	●
		1654.0250	DCFT 07 02 02 FR	G	6.35	2.38	7.75	3.0	20°	R 0.2	r	○	●		●	○	●
		1654.0252	DCFT 07 02 02 FL	G	6.35	2.38	7.75	3.0	20°	R 0.2	l	○	●		●	○	●
		1654.0255	DCFT 07 02 04 FR	G	6.35	2.38	7.75	3.0	20°	R 0.4	r	○	●		●	○	●
		1654.0257	DCFT 07 02 04 FL	G	6.35	2.38	7.75	3.0	20°	R 0.4	l	○	●		●	○	●
		1654.0355	DCFT 11 T3 04 FR	G	9.52	3.96	11.60	4.5	25°	R 0.4	r	○	●		●	○	●
		1654.0357	DCFT 11 T3 04 FL	G	9.52	3.96	11.60	4.5	25°	R 0.4	l	○	●		●	○	●
		1654.0360	DCFT 11 T3 08 FR	G	9.52	3.96	11.60	4.5	25°	R 0.8	r	○	●		●	○	●
		1654.0362	DCFT 11 T3 08 FL	G	9.52	3.96	11.60	4.5	25°	R 0.8	l	○	●		●	○	●
		1654.0750	DCFT 07 02 02 FR	K	6.35	2.38	7.75	3.0	30°	R 0.2	r	○	●		●	○	●
		1654.0752	DCFT 07 02 02 FL	K	6.35	2.38	7.75	3.0	30°	R 0.2	l	○	●		●	○	●
		1654.0755	DCFT 07 02 04 FR	K	6.35	2.38	7.75	3.0	30°	R 0.4	r	○	●		●	○	●
		1654.0757	DCFT 07 02 04 FL	K	6.35	2.38	7.75	3.0	30°	R 0.4	l	○	●		●	○	●
		1654.0855	DCFT 11 T3 04 FR	K	9.52	3.96	11.60	4.5	30°	R 0.4	r	○	●		●	○	●
		1654.0857	DCFT 11 T3 04 FL	K	9.52	3.96	11.60	4.5	30°	R 0.4	l	○	●		●	○	●
1654.0860	DCFT 11 T3 08 FR	K	9.52	3.96	11.60	4.5	30°	R 0.8	r	○	●		●	○	●		
1654.0862	DCFT 11 T3 08 FL	K	9.52	3.96	11.60	4.5	30°	R 0.8	l	○	●		●	○	●		

Overview of all indexable inserts see page 108 and following.

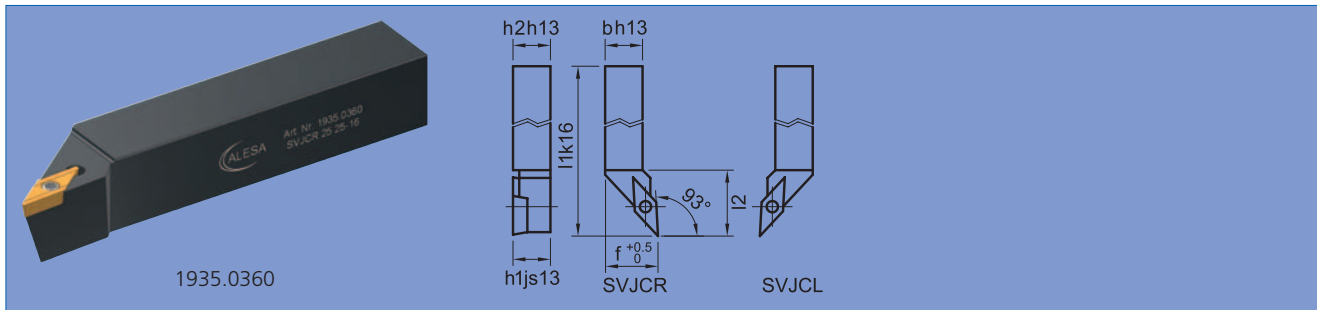


# ALESA toolholder SV 16 for turning

## VCFT 16 / 25

1935

Turning



Part No	Type	h2 mm	b mm	l1 mm	h1 mm	f mm	l2 mm	↻	Article	Type	Article	Type	WSP
1935.0360	SVJCR 25 25 16	25	25	150	25	32	36	r	1490.0360	M4x10 / 3.85Nm	1492.0500	T 15	VCFT 16
1935.0365	SVJCL 25 25 16	25	25	150	25	32	36	l	1490.0360	M4x10 / 3.85Nm	1492.0500	T 15	VCFT 16

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.

**Info**

The classical finishing tool.



Good cooling increases tool life.

**WSP**

Indexable insert type K for a controlled chip or as chip-breaker.

**Info**

The highly positive cutting geometries reduce the cutting forces considerably.



Turning



Turning a shoulder

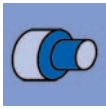


Profile turning



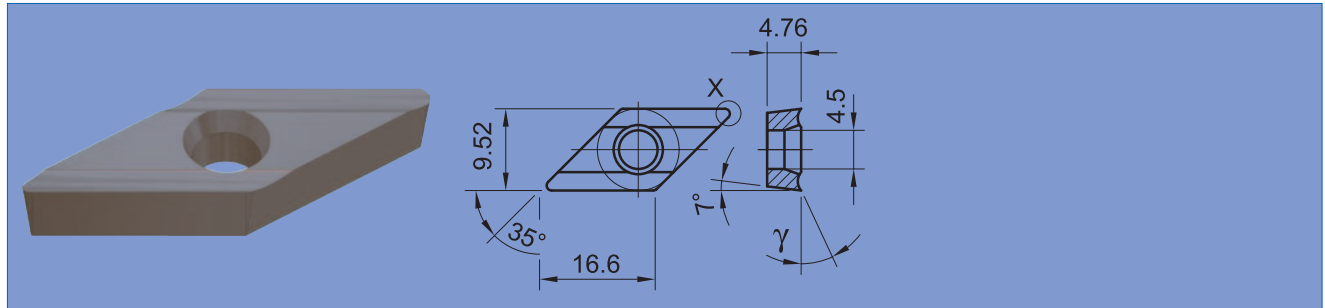
Relieving





# ALESA toolholder SV 16 for turning

## VCFT 16 / 25



Turning

Cutting material	Coating	Part No	ISO Code	Type G/K	$\gamma$	Detail X				Mat. classification						
										1	2	3	4	5	6	
HSS-E	TiN	1582.0855	VCFT 16 04 04 FR	K	30°	R 0.4	r	●			○	○		●	●	
		1582.0857	VCFT 16 04 04 FL	K	30°	R 0.4	l	●			○	○		●	●	
		1582.0860	VCFT 16 04 08 FR	K	30°	R 0.8	r	●			○	○		●	●	
		1582.0862	VCFT 16 04 08 FL	K	30°	R 0.8	l	●			○	○		●	●	
	TiAlN	1657.0855	VCFT 16 04 04 FR	K	30°	R 0.4	r	●			○	●		●	○	●
		1657.0857	VCFT 16 04 04 FL	K	30°	R 0.4	l	●			○	●		●	○	●
		1657.0860	VCFT 16 04 08 FR	K	30°	R 0.8	r	●			○	●		●	○	●
		1657.0862	VCFT 16 04 08 FL	K	30°	R 0.8	l	●			○	●		●	○	●

Overview of all indexable inserts see page 108 and following.

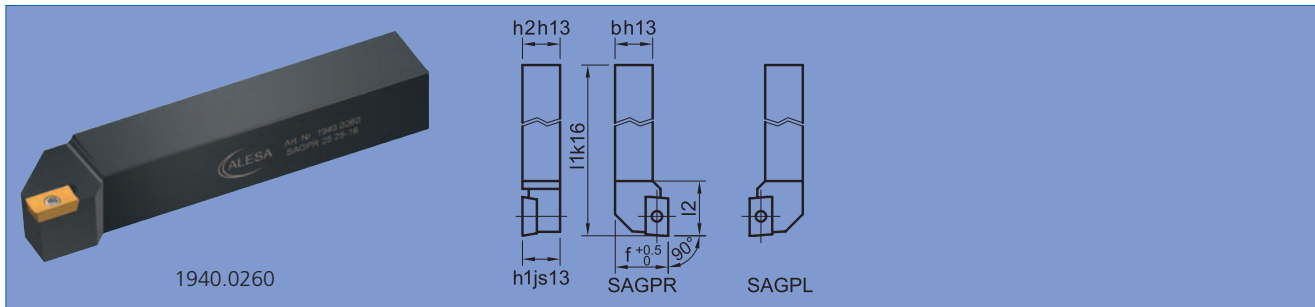


# ALESA toolholder SA 16 for turning

## APFT 16 / 12 – 25

1940

Turning



Part No	Type	h2 mm	b mm	l1 mm	h1 mm	f mm	l2 mm	↻	Article	Type	Article	Type	WSP
1940.0200	SAGPR 12 12 16	12	12	100	12	15	23	r	1490.0340	M4x8 / 3.85Nm	1492.0500	T 15	A.P.T 16
1940.0205	SAGPL 12 12 16	12	12	100	12	15	23	l	1490.0340	M4x8 / 3.85Nm	1492.0500	T 15	A.P.T 16
1940.0220	SAGPR 16 16 16	16	16	110	16	20	24	r	1490.0340	M4x8 / 3.85Nm	1492.0500	T 15	A.P.T 16
1940.0225	SAGPL 16 16 16	16	16	110	16	20	24	l	1490.0340	M4x8 / 3.85Nm	1492.0500	T 15	A.P.T 16
1940.0240	SAGPR 20 20 16	20	20	125	20	25	26	r	1490.0340	M4x8 / 3.85Nm	1492.0500	T 15	A.P.T 16
1940.0245	SAGPL 20 20 16	20	20	125	20	25	26	l	1490.0340	M4x8 / 3.85Nm	1492.0500	T 15	A.P.T 16
1940.0260	SAGPR 25 25 16	25	25	150	25	32	29	r	1490.0340	M4x8 / 3.85Nm	1492.0500	T 15	A.P.T 16
1940.0265	SAGPL 25 25 16	25	25	150	25	32	29	l	1490.0340	M4x8 / 3.85Nm	1492.0500	T 15	A.P.T 16

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.



Rigid roughing tool with a strong insert for turning.



Indexable insert type K for a controlled chip or as chip-breaker.



The tool for an excellent metal removal rate (cutting depth 16 mm).



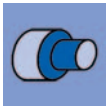
Rectangular shoulder (90°) through the full length of cutting edge.



Turning

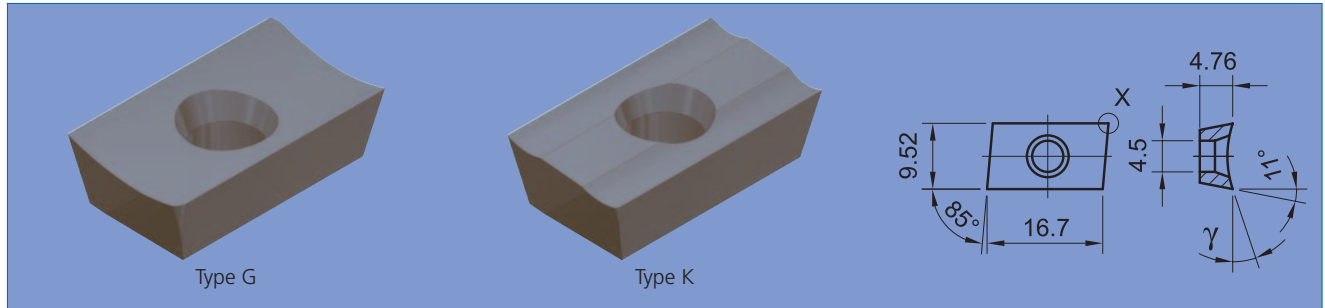


Turning a shoulder



# ALESA toolholder SA 16 for turning

## APFT 16 / 12 – 25



Turning

Cutting material	Coating	Part No	ISO Code	Type G/K	γ	Detail X				Mat. classification					
										1	2	3	4	5	6
HSS-E	TiN	1085.0200	APFT 16 04 PD FR	G	18°	0.2x45°	r	●		○	○		●	●	
		1085.0210	APFT 16 04 PD FL	G	18°	0.2x45°	l	●		○	○		●	●	
		1085.0230	APFT 16 04 PD FR	G	25°	0.2x45°	r	●		○	○		●	●	
		1085.0250	APFT 16 04 04 FR	G	18°	R 0.4	r	●		○	○		●	●	
		1085.0260	APFT 16 04 04 FL	G	18°	R 0.4	l	●		○	○		●	●	
		1085.0300	APFT 16 04 08 FR	G	18°	R 0.8	r	●		○	○		●	●	
		1085.0310	APFT 16 04 08 FL	G	18°	R 0.8	l	●		○	○		●	●	
		1085.0350	APFT 16 04 12 FR	G	18°	R 1.2	r	●		○	○		●	●	
		1085.0360	APFT 16 04 12 FL	G	18°	R 1.2	l	●		○	○		●	●	
		1585.0700	APFT 16 04 PD FR	K	26°	0.2x45°	r	●		○	○		●	●	
	1585.0710*	APFT 16 04 PD FL	K	26°	0.2x45°	l	●		○	○		●	●		
	1585.0750	APFT 16 04 04 FR	K	26°	R 0.4	r	●		○	○		●	●		
	1585.0760*	APFT 16 04 04 FL	K	26°	R 0.4	l	●		○	○		●	●		
	TiAlN	1160.0200	APFT 16 04 PD FR	G	18°	0.2x45°	r	●		○	●		●	○	●
		1160.0230	APFT 16 04 PD FR	G	25°	0.2x45°	r	●		○	●		●	○	●
		1160.0250	APFT 16 04 04 FR	G	18°	R 0.4	r	●		○	●		●	○	●
		1160.0300	APFT 16 04 08 FR	G	18°	R 0.8	r	●		○	●		●	○	●
		1160.0350	APFT 16 04 12 FR	G	18°	R 1.2	r	●		○	●		●	○	●
		1660.0700	APFT 16 04 PD FR	K	26°	0.2x45°	r	●		○	●		●	○	●
		1660.0710*	APFT 16 04 PD FL	K	26°	0.2x45°	l	●		○	●		●	○	●
1660.0750		APFT 16 04 04 FR	K	26°	R 0.4	r	●		○	●		●	○	●	
1660.0760*	APFT 16 04 04 FL	K	26°	R 0.4	l	●		○	●		●	○	●		
Carbide MG20	TiN	1285.0200	APFT 16 04 PD FR-111	G	18°	0.2x45°	r	○	●	●	○	●	●	○	●
		1285.0205	APFT 16 04 PD FR-111	G	18°	0.2x45°	r	○	●	●	○	●	●	○	●
		1285.0230	APFT 16 04 PD FL-111	G	18°	0.2x45°	l	○	●	●	○	●	●	○	●
		1285.0255	APFT 16 04 04 FR-111	G	18°	R 0.4	r	○	●	●	○	●	●	○	●
	AlCrN	1285.0280	APFT 16 04 04 FL-111	G	18°	R 0.4	l	○	●	●	○	●	●	○	●
		1285.0305	APFT 16 04 08 FR-111	G	18°	R 0.8	r	○	●	●	○	●	●	○	●
		1285.0330	APFT 16 04 08 FL-111	G	18°	R 0.8	l	○	●	●	○	●	●	○	●
		1285.0215	APFT 16 04 PD FR-111	G	18°	0.2x45°	r	○	●	●	○	●	●	○	●
		1285.0238	APFT 16 04 PD FL-111	G	18°	0.2x45°	l	○	●	●	○	●	●	○	●
		1285.0265	APFT 16 04 04 FR-111	G	18°	R 0.4	r	○	●	●	○	●	●	○	●
		1285.0290	APFT 16 04 04 FL-111	G	18°	R 0.4	l	○	●	●	○	●	●	○	●
		1285.0315	APFT 16 04 08 FR-111	G	18°	R 0.8	r	○	●	●	○	●	●	○	●
		1285.0338	APFT 16 04 08 FL-111	G	18°	R 0.8	l	○	●	●	○	●	●	○	●
		1285.0515	APFT 16 04 PD FR-121	G	10°	0.2x45°	r	○	●	●	○	●	●	○	●
		1285.0540*	APFT 16 04 PD FL-121	G	10°	0.2x45°	l	○	●	●	○	●	●	○	●
		1285.0615	APFT 16 04 08 FR-121	G	10°	R 0.8	r	○	●	●	○	●	●	○	●
1285.0640*	APFT 16 04 08 FL-121	G	10°	R 0.8	l	○	●	●	○	●	●	○	●		
Carbide 12CR	AlCrN	1285.0410	APHT 16 04 PD FR-222	G	16°		r	●	●	●	○	●	○	●	
	TiAlN	1285.0400	APHT 16 04 PD FR-222	G	16°		r	●	●	●	○	●	○	●	

\* while stocks last

Overview of all indexable inserts see page 108 and following.

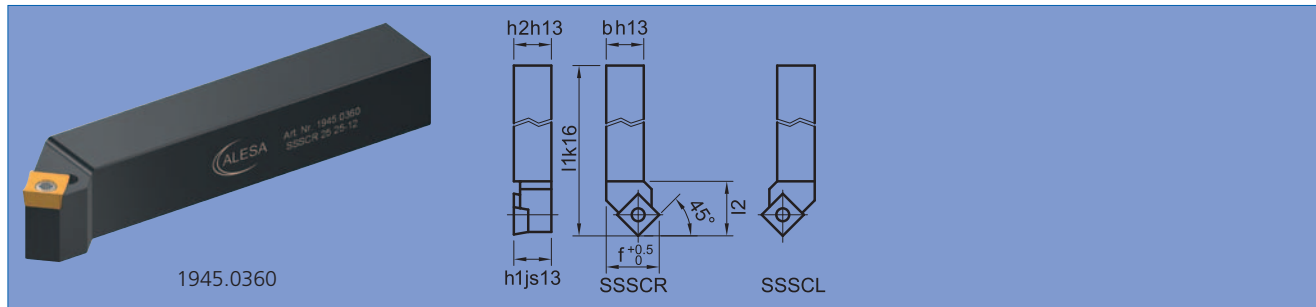


# ALESA toolholder SS for turning

## SCFT / 12 – 25

1945

Turning



Part No	Type	h2 mm	b mm	l1 mm	h1 mm	f mm	l2 mm	↻	Article	Type	Article	Type	WSP
1945.0300	SSSCR 12 12 09	12	12	80	12	16	18	r	1490.0300	M3.5x10/2.55Nm	1492.0500	T 15	SCFT 09
1945.0305	SSSCL 12 12 09	12	12	80	12	16	18	l	1490.0300	M3.5x10/2.55Nm	1492.0500	T 15	SCFT 09
1945.0320	SSSCR 16 16 09	16	16	100	16	20	18	r	1490.0300	M3.5x10/2.55Nm	1492.0500	T 15	SCFT 09
1945.0325	SSSCL 16 16 09	16	16	100	16	20	18	l	1490.0300	M3.5x10/2.55Nm	1492.0500	T 15	SCFT 09
1945.0340	SSSCR 20 20 12	20	20	125	20	25	25	r	1490.0400	M5x16 / 5.00Nm	1492.0600	T 20	SCFT 12
1945.0345	SSSCL 20 20 12	20	20	125	20	25	25	l	1490.0400	M5x16 / 5.00Nm	1492.0600	T 20	SCFT 12
1945.0360	SSSCR 25 25 12	25	25	150	25	32	25	r	1490.0400	M5x16 / 5.00Nm	1492.0600	T 20	SCFT 12
1945.0365	SSSCL 25 25 12	25	25	150	25	32	25	l	1490.0400	M5x16 / 5.00Nm	1492.0600	T 20	SCFT 12

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.



Rigid roughing tool with a strong insert for turning.



Indexable insert type K for a controlled chip or as chip-breaker.



The all purpose turning tool



Good cooling increases tool life.



Turning

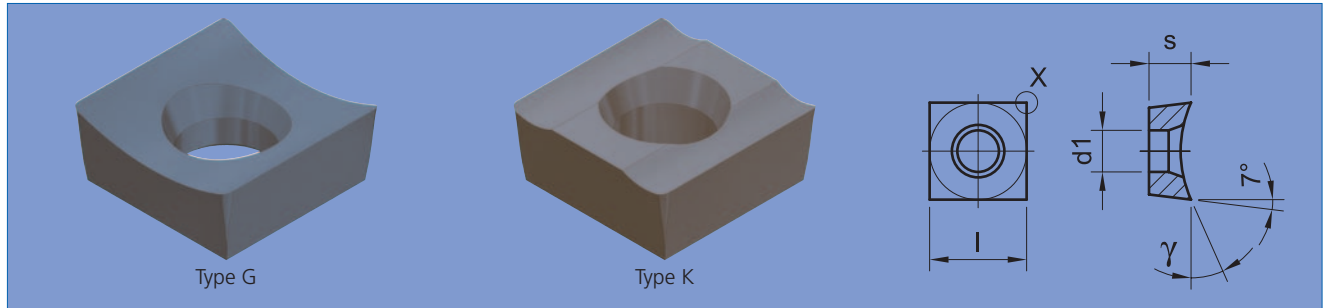


Turning a shoulder



# ALESA toolholder SS for turning

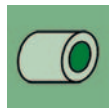
## SCFT / 12 – 25



Turning

Cutting material	Coating	Part No	ISO Code	Type G/K	l mm	s mm	d1 mm	$\gamma$	Detail X		Mat. classification					
											1	2	3	4	5	6
HSS-E	TiN	1591.0200	SCFT 09 04 04 FN	G	9.52	4.00	4.5	25°	R 0.4	r/l	○	○	●	●	●	●
		1591.0220	SCFT 09 04 08 FN	G	9.52	4.00	4.5	25°	R 0.8	r/l	○	○	●	●	●	●
		1591.0250	SCFT 12 05 AC FN	G	12.83	5.56	5.5	24°	0.2x45°	r/l	○	○	●	●	●	●
		1591.0270	SCFT 12 05 04 FN	G	12.83	5.56	5.5	24°	R 0.4	r/l	○	○	●	●	●	●
		1591.0290	SCFT 12 05 08 FN	G	12.83	5.56	5.5	24°	R 0.8	r/l	○	○	●	●	●	●
		1591.0310	SCFT 12 05 12 FN	G	12.83	5.56	5.5	24°	R 1.2	r/l	○	○	●	●	●	●
		1591.0700	SCFT 09 04 04 FN	K	9.52	4.00	4.5	30°	R 0.4	r/l	○	○	●	●	●	●
		1591.0720	SCFT 09 04 08 FN	K	9.52	4.00	4.5	30°	R 0.8	r/l	○	○	●	●	●	●
		1591.0770	SCFT 12 05 04 FN	K	12.83	5.56	5.5	30°	R 0.4	r/l	○	○	●	●	●	●
		1591.0790	SCFT 12 05 08 FN	K	12.83	5.56	5.5	30°	R 0.8	r/l	○	○	●	●	●	●
	1591.0810	SCFT 12 05 12 FN	K	12.83	5.56	5.5	30°	R 1.2	r/l	○	○	●	●	●	●	
	TiAlN	1666.0200	SCFT 09 04 04 FN	G	9.52	4.00	4.5	25°	R 0.4	r/l	○	○	●	●	○	●
		1666.0220	SCFT 09 04 08 FN	G	9.52	4.00	4.5	25°	R 0.8	r/l	○	○	●	●	○	●
		1666.0250	SCFT 12 05 AC FN	G	12.83	5.56	5.5	24°	0.2x45°	r/l	○	●	●	●	○	●
		1666.0270	SCFT 12 05 04 FN	G	12.83	5.56	5.5	24°	R 0.4	r/l	○	●	●	●	○	●
		1666.0290	SCFT 12 05 08 FN	G	12.83	5.56	5.5	24°	R 0.8	r/l	○	●	●	●	○	●
		1666.0310	SCFT 12 05 12 FN	G	12.83	5.56	5.5	24°	R 1.2	r/l	○	●	●	●	○	●
		1666.0700	SCFT 09 04 04 FN	K	9.52	4.00	4.5	30°	R 0.4	r/l	○	●	●	●	○	●
		1666.0720	SCFT 09 04 08 FN	K	9.52	4.00	4.5	30°	R 0.8	r/l	○	●	●	●	○	●
		1666.0770	SCFT 12 05 04 FN	K	12.83	5.56	5.5	30°	R 0.4	r/l	○	●	●	●	○	●
1666.0790		SCFT 12 05 08 FN	K	12.83	5.56	5.5	30°	R 0.8	r/l	○	●	●	●	○	●	
1666.0810	SCFT 12 05 12 FN	K	12.83	5.56	5.5	30°	R 1.2	r/l	○	●	●	●	○	●		
Carbide MG20	TiAlN	1791.0255	SCFT 12 05 AC FN-111	G	12.83	5.56	5.5	24°	0.2x45°	r/l	●	○	●	●	○	●
		1791.0295	SCFT 12 05 08 FN-111	G	12.83	5.56	5.5	24°	R 0.8	r/l	●	○	●	●	○	●
	AlCrN	1791.0265	SCFT 12 05 AC FN-111	G	12.83	5.56	5.5	24°	0.2x45°	r/l	●	●	●	○	●	●
		1791.0305	SCFT 12 05 08 FN-111	G	12.83	5.56	5.5	24°	R 0.8	r/l	●	●	●	○	●	●
		1791.0325	SCFT 12 05 08 FN-121	G	12.83	5.56	5.5	14°	R 0.8	r/l	●	●	●	○	●	○

Overview of all indexable inserts see page 108 and following.

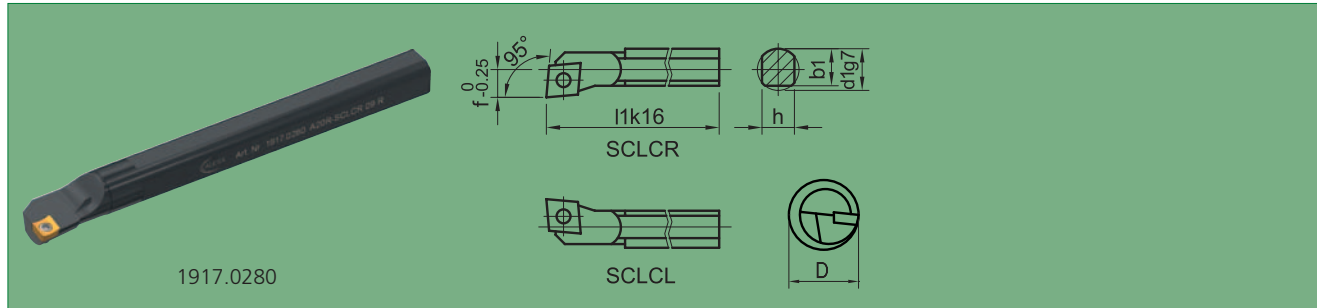


# ALESA toolholder SC for turning inside

## CCFT / 06 – 09

1917

Turning inside



Part No	Type	d1 mm	b1 mm	h mm	l1 mm	f mm	D min			Article	Type	Article	Type	<b>WSP</b>
1917.0190	A08H SCLCR 06	8.0	7.6	7.2	100	5	10	✓	r	1491.0210	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	CCFT 06
1917.0195	A08H SCLCL 06	8.0	7.6	7.2	100	5	10	✓	l	1491.0210	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	CCFT 06
1917.0200	A08H SCLCR 06	8.0	7.6	7.2	100	6	12	✓	r	1491.0210	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	CCFT 06
1917.0205	A08H SCLCL 06	8.0	7.6	7.2	100	6	12	✓	l	1491.0210	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	CCFT 06
1917.0220	A10K SCLCR 06	10.0	9.5	9.0	125	7	14	✓	r	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	CCFT 06
1917.0225	A10K SCLCL 06	10.0	9.5	9.0	125	7	14	✓	l	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	CCFT 06
1917.0240	A12L SCLCR 06	12.0	11.5	11.0	140	9	18	✓	r	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	CCFT 06
1917.0245	A12L SCLCL 06	12.0	11.5	11.0	140	9	18	✓	l	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	CCFT 06
1917.0260	A16Q SCLCR 09	16.0	15.0	14.5	180	11	22	✓	r	1490.0320	M4x8 / 3.85Nm	1492.0500	T 15	CCFT 09
1917.0265	A16Q SCLCL 09	16.0	15.0	14.5	180	11	22	✓	l	1490.0320	M4x8 / 3.85Nm	1492.0500	T 15	CCFT 09
1917.0280	A20R SCLCR 09	20.0	18.5	18.0	200	13	26	✓	r	1490.0340	M4x8 / 3.85Nm	1492.0500	T 15	CCFT 09
1917.0285	A20R SCLCL 09	20.0	18.5	18.0	200	13	26	✓	l	1490.0340	M4x8 / 3.85Nm	1492.0500	T 15	CCFT 09

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.



The right execution of toolholders for boring need a left hand insert, and vice versa.



Indexable insert type K for a controlled chip or as chip-breaker.



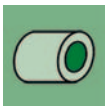
Holes for internal coolant supply guarantee ideal cooling.



Good cooling increases tool life.

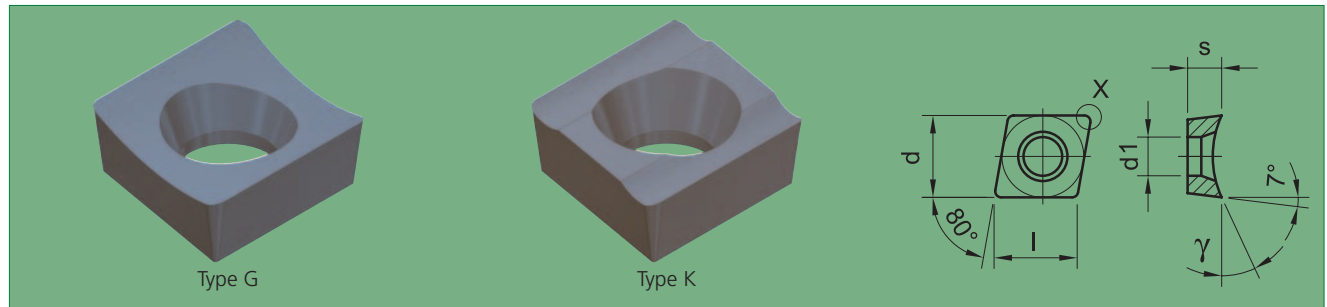


Boring



# ALESA toolholder SC for turning inside

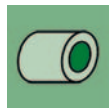
## CCFT / 06 – 09



Turning inside

Cutting material	Coating	Part No	ISO Code	Type G/K	d mm	s mm	l mm	d1 mm	$\gamma$	Detail X		Mat. classification					
												1	2	3	4	5	6
HSS-E	TiN	1578.0245	CCFT 06 02 01 FR	G	6.35	2.38	6.40	3.0	20°	R 0.1	r	○	○		●	●	
		1578.0247	CCFT 06 02 01 FL	G	6.35	2.38	6.40	3.0	20°	R 0.1	l	○	○		●	●	
		1578.0250	CCFT 06 02 02 FR	G	6.35	2.38	6.40	3.0	20°	R 0.2	r	○	○		●	●	
		1578.0252	CCFT 06 02 02 FL	G	6.35	2.38	6.40	3.0	20°	R 0.2	l	○	○		●	●	
		1578.0255	CCFT 06 02 04 FR	G	6.35	2.38	6.40	3.0	20°	R 0.4	r	○	○		●	●	
		1578.0257	CCFT 06 02 04 FL	G	6.35	2.38	6.40	3.0	20°	R 0.4	l	○	○		●	●	
		1578.0350	CCFT 09 T3 02 FR	G	9.52	3.96	9.70	4.5	25°	R 0.2	r	○	○		●	●	
		1578.0352	CCFT 09 T3 02 FL	G	9.52	3.96	9.70	4.5	25°	R 0.2	l	○	○		●	●	
		1578.0355	CCFT 09 T3 04 FR	G	9.52	3.96	9.70	4.5	25°	R 0.4	r	○	○		●	●	
		1578.0357	CCFT 09 T3 04 FL	G	9.52	3.96	9.70	4.5	25°	R 0.4	l	○	○		●	●	
		1578.0360	CCFT 09 T3 08 FR	G	9.52	3.96	9.70	4.5	25°	R 0.8	r	○	○		●	●	
		1578.0362	CCFT 09 T3 08 FL	G	9.52	3.96	9.70	4.5	25°	R 0.8	l	○	○		●	●	
		1578.0750	CCFT 06 02 02 FR	K	6.35	2.38	6.40	3.0	30°	R 0.2	r	○	○		●	●	
		1578.0752	CCFT 06 02 02 FL	K	6.35	2.38	6.40	3.0	30°	R 0.2	l	○	○		●	●	
		1578.0755	CCFT 06 02 04 FR	K	6.35	2.38	6.40	3.0	30°	R 0.4	r	○	○		●	●	
		1578.0757	CCFT 06 02 04 FL	K	6.35	2.38	6.40	3.0	30°	R 0.4	l	○	○		●	●	
		1578.0855	CCFT 09 T3 04 FR	K	9.52	3.96	9.70	4.5	30°	R 0.4	r	○	○		●	●	
		1578.0857	CCFT 09 T3 04 FL	K	9.52	3.96	9.70	4.5	30°	R 0.4	l	○	○		●	●	
		1578.0860	CCFT 09 T3 08 FR	K	9.52	3.96	9.70	4.5	30°	R 0.8	r	○	○		●	●	
		1578.0862	CCFT 09 T3 08 FL	K	9.52	3.96	9.70	4.5	30°	R 0.8	l	○	○		●	●	
	TiAlN	1653.0245	CCFT 06 02 01 FR	G	6.35	2.38	6.40	3.0	20°	R 0.1	r	○	●		●	○	●
		1653.0247	CCFT 06 02 01 FL	G	6.35	2.38	6.40	3.0	20°	R 0.1	l	○	●		●	○	●
		1653.0250	CCFT 06 02 02 FR	G	6.35	2.38	6.40	3.0	20°	R 0.2	r	○	●		●	○	●
		1653.0252	CCFT 06 02 02 FL	G	6.35	2.38	6.40	3.0	20°	R 0.2	l	○	●		●	○	●
		1653.0255	CCFT 06 02 04 FR	G	6.35	2.38	6.40	3.0	20°	R 0.4	r	○	●		●	○	●
		1653.0257	CCFT 06 02 04 FL	G	6.35	2.38	6.40	3.0	20°	R 0.4	l	○	●		●	○	●
		1653.0350	CCFT 09 T3 02 FR	G	9.52	3.96	9.70	4.5	25°	R 0.2	r	○	●		●	○	●
		1653.0352	CCFT 09 T3 02 FL	G	9.52	3.96	9.70	4.5	25°	R 0.2	l	○	●		●	○	●
		1653.0355	CCFT 09 T3 04 FR	G	9.52	3.96	9.70	4.5	25°	R 0.4	r	○	●		●	○	●
		1653.0357	CCFT 09 T3 04 FL	G	9.52	3.96	9.70	4.5	25°	R 0.4	l	○	●		●	○	●
		1653.0360	CCFT 09 T3 08 FR	G	9.52	3.96	9.70	4.5	25°	R 0.8	r	○	●		●	○	●
		1653.0362	CCFT 09 T3 08 FL	G	9.52	3.96	9.70	4.5	25°	R 0.8	l	○	●		●	○	●
		1653.0750	CCFT 06 02 02 FR	K	6.35	2.38	6.40	3.0	30°	R 0.2	r	○	●		●	○	●
1653.0752	CCFT 06 02 02 FL	K	6.35	2.38	6.40	3.0	30°	R 0.2	l	○	●		●	○	●		
1653.0755	CCFT 06 02 04 FR	K	6.35	2.38	6.40	3.0	30°	R 0.4	r	○	●		●	○	●		
1653.0757	CCFT 06 02 04 FL	K	6.35	2.38	6.40	3.0	30°	R 0.4	l	○	●		●	○	●		
1653.0855	CCFT 09 T3 04 FR	K	9.52	3.96	9.70	4.5	30°	R 0.4	r	○	●		●	○	●		
1653.0857	CCFT 09 T3 04 FL	K	9.52	3.96	9.70	4.5	30°	R 0.4	l	○	●		●	○	●		
1653.0860	CCFT 09 T3 08 FR	K	9.52	3.96	9.70	4.5	30°	R 0.8	r	○	●		●	○	●		
1653.0862	CCFT 09 T3 08 FL	K	9.52	3.96	9.70	4.5	30°	R 0.8	l	○	●		●	○	●		

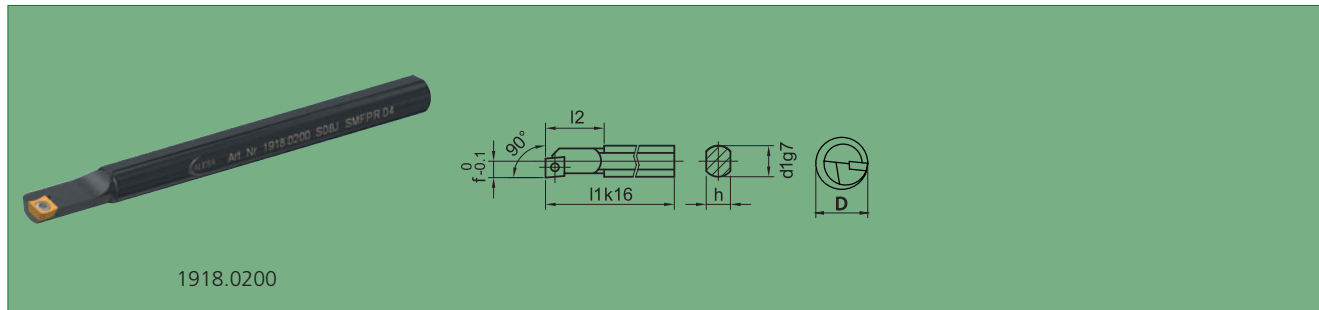
Overview of all indexable inserts see page 108 and following.



## ALESA toolholder SM for turning inside MPFT 04 / 06 – 08

1918

Turning inside



Part No	Type	d1 mm	h mm	l1 mm	l2 mm	f mm	D min	↻	Article	Type	Article	Type	<b>WSP</b>
<b>1918.0180</b>	S06J SMFPR 04	6.0	5.5	90	15	3	6	r	1490.0180	M2x3.5 / 0.4Nm	1492.0200	T 6	MPFT 04
<b>1918.0200</b>	S08J SMFPR 04	8.0	7.2	100	20	4	8	r	1490.0190	M2x4 / 0.4Nm	1492.0200	T 6	MPFT 04

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.



The right execution of toolholders for boring need a left hand insert, and vice versa.



All ALESA indexable inserts are ground in the high ISO standard tolerance classification F.



The highly positive cutting geometries reduce the cutting forces considerably.

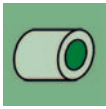


Good cooling increases tool life.



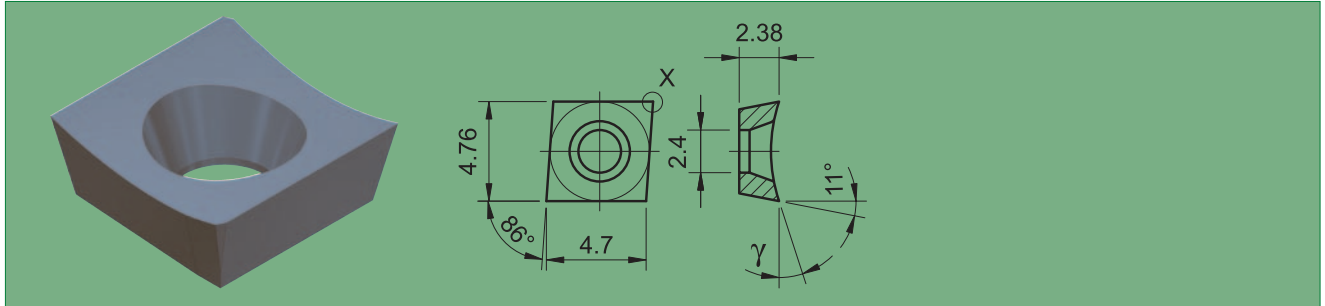
Boring





## ALESA toolholder SM for turning inside

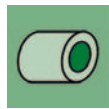
### MPFT 04 / 06 – 08



Turning inside

Cutting material	Coating	Part No	ISO Code	Type G/K	$\gamma$	Detail X				Mat. classification					
										1	2	3	4	5	6
HSS-E	TiN	1581.0210	MPFT 04 02 PP FL	G	18°	0.2x45°		●			○	○	●	○	●
	TiAlN	1656.0210	MPFT 04 02 PP FL	G	18°	0.2x45°		●			○	●	○	●	○

Overview of all indexable inserts see page 108 and following.

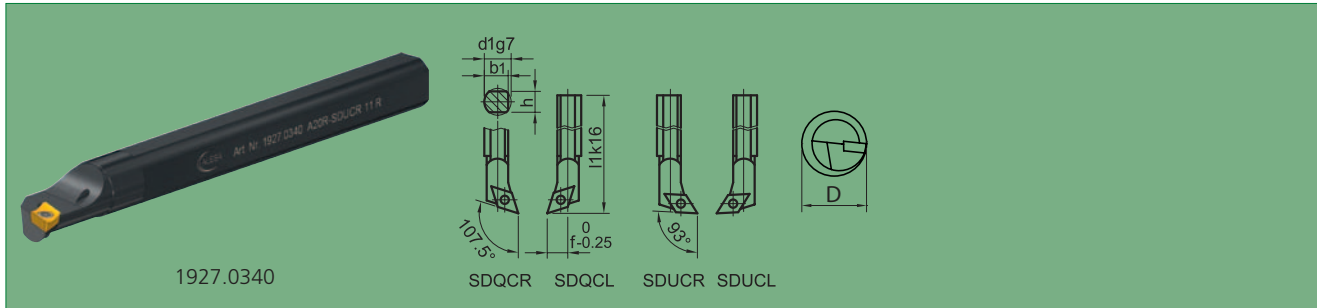


# ALESA toolholder SD for turning inside

## DCFT / 12 – 20

1927

Turning inside



Part No	Type	d1 mm	b1 mm	h mm	l1 mm	f mm	D min			Article	Type	Article	Type	<b>WSP</b>
1927.0200	A12L SDQCR 07	12.0	11.5	11.0	140	9	18	✓	r	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	DCFT 07
1927.0205	A12L SDQCL 07	12.0	11.5	11.0	140	9	18	✓	l	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	DCFT 07
1927.0220	A16Q SDQCR 07	16.0	15.0	14.5	180	11	22	✓	r	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	DCFT 07
1927.0225	A16Q SDQCL 07	16.0	15.0	14.5	180	11	22	✓	l	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	DCFT 07
1927.0240	A20R SDQCR 11	20.0	18.5	18.0	200	13	26	✓	r	1490.0340	M4x8.5 / 3.85Nm	1492.0500	T 15	DCFT 11
1927.0245	A20R SDQCL 11	20.0	18.5	18.0	200	13	26	✓	l	1490.0340	M4x8.5 / 3.85Nm	1492.0500	T 15	DCFT 11
1927.0300	A12L SDUCR 07	12.0	11.5	11.0	140	9	18	✓	r	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	DCFT 07
1927.0305	A12L SDUCL 07	12.0	11.5	11.0	140	9	18	✓	l	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	DCFT 07
1927.0320	A16Q SDUCR 07	16.0	15.0	14.5	180	11	22	✓	r	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	DCFT 07
1927.0325	A16Q SDUCL 07	16.0	15.0	14.5	180	11	22	✓	l	1491.0220	M2.5x5 / 0.95Nm	1493.0300	TP7 IP	DCFT 07
1927.0340	A20R SDUCR 11	20.0	18.5	18.0	200	13	26	✓	r	1490.0340	M4x8.5 / 3.85Nm	1492.0500	T 15	DCFT 11
1927.0345	A20R SDUCL 11	20.0	18.5	18.0	200	13	26	✓	l	1490.0340	M4x8.5 / 3.85Nm	1492.0500	T 15	DCFT 11

Tool will be delivered with holder, all screws and screw-driver, but without indexable inserts.



The right execution of toolholders for boring need a left hand insert, and vice versa.



Indexable insert type K for a controlled chip or as chip-breaker.



Holes for internal coolant supply guarantee ideal cooling.



Good cooling increases tool life.

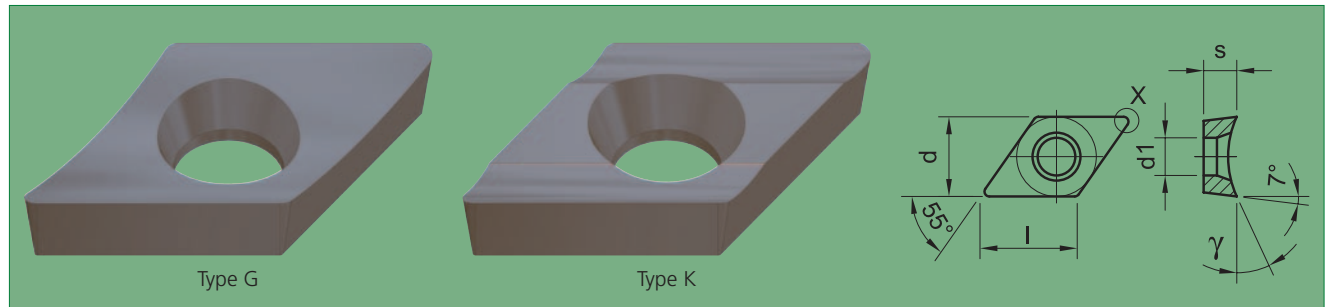


Boring



# ALESA toolholder SD for turning inside

## DCFT / 12 – 20



Turning inside

Cutting material	Coating	Part No	ISO Code	Type G/K	d mm	s mm	l mm	d1 mm	γ	Detail X		Mat. classification					
												1	2	3	4	5	6
HSS-E	TiN	1579.0245	DCFT 07 02 01 FR	G	6.35	2.38	7.75	3.0	20°	R 0.1	r	○	○		●	●	
		1579.0247	DCFT 07 02 01 FL	G	6.35	2.38	7.75	3.0	20°	R 0.1	l	○	○		●	●	
		1579.0250	DCFT 07 02 02 FR	G	6.35	2.38	7.75	3.0	20°	R 0.2	r	○	○		●	●	
		1579.0252	DCFT 07 02 02 FL	G	6.35	2.38	7.75	3.0	20°	R 0.2	l	○	○		●	●	
		1579.0255	DCFT 07 02 04 FR	G	6.35	2.38	7.75	3.0	20°	R 0.4	r	○	○		●	●	
		1579.0257	DCFT 07 02 04 FL	G	6.35	2.38	7.75	3.0	20°	R 0.4	l	○	○		●	●	
		1579.0355	DCFT 11 T3 04 FR	G	9.52	3.96	11.60	4.5	25°	R 0.4	r	○	○		●	●	
		1579.0357	DCFT 11 T3 04 FL	G	9.52	3.96	11.60	4.5	25°	R 0.4	l	○	○		●	●	
		1579.0360	DCFT 11 T3 08 FR	G	9.52	3.96	11.60	4.5	25°	R 0.8	r	○	○		●	●	
		1579.0362	DCFT 11 T3 08 FL	G	9.52	3.96	11.60	4.5	25°	R 0.8	l	○	○		●	●	
		1579.0750	DCFT 07 02 02 FR	K	6.35	2.38	7.75	3.0	30°	R 0.2	r	○	○		●	●	
		1579.0752	DCFT 07 02 02 FL	K	6.35	2.38	7.75	3.0	30°	R 0.2	l	○	○		●	●	
		1579.0755	DCFT 07 02 04 FR	K	6.35	2.38	7.75	3.0	30°	R 0.4	r	○	○		●	●	
		1579.0757	DCFT 07 02 04 FL	K	6.35	2.38	7.75	3.0	30°	R 0.4	l	○	○		●	●	
		1579.0855	DCFT 11 T3 04 FR	K	9.52	3.96	11.60	4.5	30°	R 0.4	r	○	○		●	●	
		1579.0857	DCFT 11 T3 04 FL	K	9.52	3.96	11.60	4.5	30°	R 0.4	l	○	○		●	●	
		1579.0860	DCFT 11 T3 08 FR	K	9.52	3.96	11.60	4.5	30°	R 0.8	r	○	○		●	●	
		1579.0862	DCFT 11 T3 08 FL	K	9.52	3.96	11.60	4.5	30°	R 0.8	l	○	○		●	●	
	TiAlN	1654.0245	DCFT 07 02 01 FR	G	6.35	2.38	7.75	3.0	20°	R 0.1	r	○	●		●	○	●
		1654.0247	DCFT 07 02 01 FL	G	6.35	2.38	7.75	3.0	20°	R 0.1	l	○	●		●	○	●
		1654.0250	DCFT 07 02 02 FR	G	6.35	2.38	7.75	3.0	20°	R 0.2	r	○	●		●	○	●
		1654.0252	DCFT 07 02 02 FL	G	6.35	2.38	7.75	3.0	20°	R 0.2	l	○	●		●	○	●
		1654.0255	DCFT 07 02 04 FR	G	6.35	2.38	7.75	3.0	20°	R 0.4	r	○	●		●	○	●
		1654.0257	DCFT 07 02 04 FL	G	6.35	2.38	7.75	3.0	20°	R 0.4	l	○	●		●	○	●
		1654.0355	DCFT 11 T3 04 FR	G	9.52	3.96	11.60	4.5	25°	R 0.4	r	○	●		●	○	●
		1654.0357	DCFT 11 T3 04 FL	G	9.52	3.96	11.60	4.5	25°	R 0.4	l	○	●		●	○	●
		1654.0360	DCFT 11 T3 08 FR	G	9.52	3.96	11.60	4.5	25°	R 0.8	r	○	●		●	○	●
		1654.0362	DCFT 11 T3 08 FL	G	9.52	3.96	11.60	4.5	25°	R 0.8	l	○	●		●	○	●
		1654.0750	DCFT 07 02 02 FR	K	6.35	2.38	7.75	3.0	30°	R 0.2	r	○	●		●	○	●
		1654.0752	DCFT 07 02 02 FL	K	6.35	2.38	7.75	3.0	30°	R 0.2	l	○	●		●	○	●
		1654.0755	DCFT 07 02 04 FR	K	6.35	2.38	7.75	3.0	30°	R 0.4	r	○	●		●	○	●
		1654.0757	DCFT 07 02 04 FL	K	6.35	2.38	7.75	3.0	30°	R 0.4	l	○	●		●	○	●
		1654.0855	DCFT 11 T3 04 FR	K	9.52	3.96	11.60	4.5	30°	R 0.4	r	○	●		●	○	●
		1654.0857	DCFT 11 T3 04 FL	K	9.52	3.96	11.60	4.5	30°	R 0.4	l	○	●		●	○	●
1654.0860	DCFT 11 T3 08 FR	K	9.52	3.96	11.60	4.5	30°	R 0.8	r	○	●		●	○	●		
1654.0862	DCFT 11 T3 08 FL	K	9.52	3.96	11.60	4.5	30°	R 0.8	l	○	●		●	○	●		

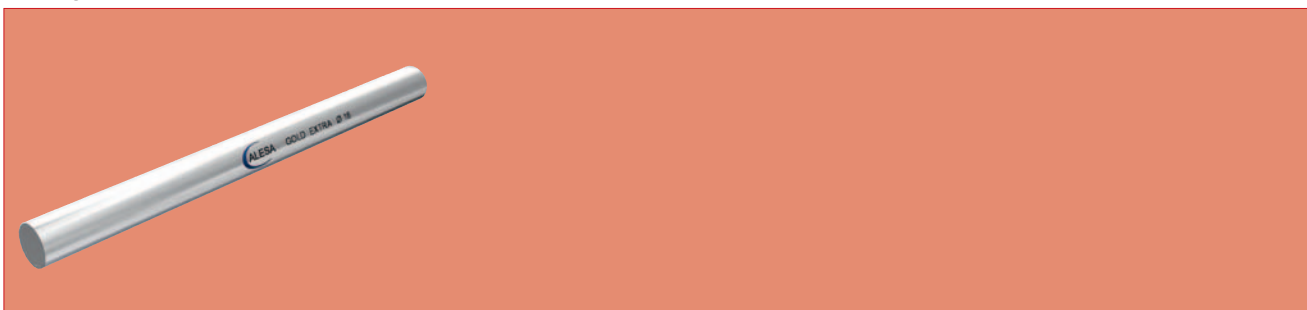
Overview of all indexable inserts see page 108 and following.



## ALESA GOLD EXTRA toolbits round hardened and ground – ISO 5421 / 77

4120

Toolbits



Part No	d mm	L mm
4120.0357	2.00	50
4120.0361	2.00	100
4120.0387	2.50	50
4120.0391	2.50	100
4120.0406	3.00	100
4120.0421	3.50	100
4120.0433	4.00	63
4120.0436	4.00	100
4120.0646	5.00	100
4120.0676	6.00	100
4120.0680	6.00	160
4120.0695	7.00	160
4120.0706	8.00	100
4120.0710	8.00	160
4120.0711	8.00	200
4120.0736	10.00	100
4120.0740	10.00	160
4120.0741	10.00	200
4120.0766	12.00	100
4120.0771	12.00	200
4120.0801	14.00	200
4120.0831	16.00	200
4120.0846	18.00	200
4120.0861	20.00	200
4120.0876	22.00	200
4120.0891	25.00	200
4120.0906	30.00	200

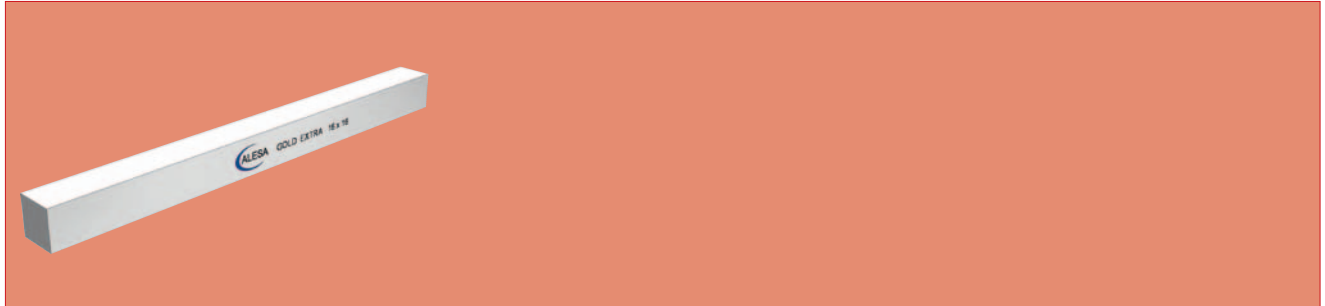
Tolerance (d): h6

Hardness: 66 – 68 HRC



## ALESA GOLD EXTRA toolbits square hardened and ground – ISO 5421 / 77

4140



Part No	b mm	b1 mm	L mm
4140.0102	4.00	4.00	63
4140.0122	5.00	5.00	63
4140.0142	6.00	6.00	63
4140.0145	6.00	6.00	100
4140.0148	6.00	6.00	160
4140.0149	6.00	6.00	200
4140.0169	7.00	7.00	200
4140.0182	8.00	8.00	63
4140.0185	8.00	8.00	100
4140.0188	8.00	8.00	160
4140.0189	8.00	8.00	200
4140.0222	10.00	10.00	63
4140.0225	10.00	10.00	100
4140.0228	10.00	10.00	160
4140.0229	10.00	10.00	200
4140.0265	12.00	12.00	100
4140.0268	12.00	12.00	160
4140.0269	12.00	12.00	200
4140.0309	14.00	14.00	200
4140.0349	16.00	16.00	200
4140.0369	18.00	18.00	200
4140.0389	20.00	20.00	200
4140.0449	25.00	25.00	200
4140.0529	32.00	32.00	200

Tolerance (d): h13

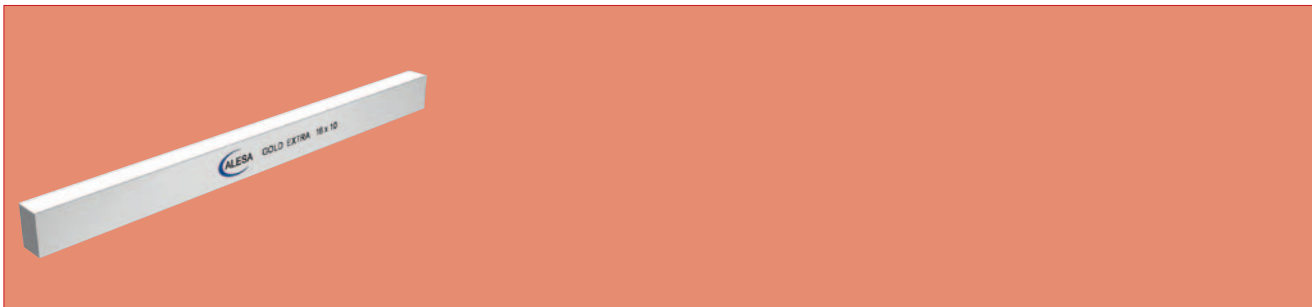
Hardness: 66 – 68 HRC



## ALESA GOLD EXTRA toolbits rectangular hardened and ground – ISO 5421 / 77

4160

Toolbits



Part No	h mm	b mm	L mm
4160.0135	6.00	4.00	100
4160.0165	8.00	2.00	100
4160.0180	8.00	4.00	100
4160.0210	10.00	3.00	100
4160.0233	10.00	4.00	100
4160.0240	10.00	5.00	100
4160.0258	10.00	6.00	160
4160.0259	10.00	6.00	200
4160.0274	10.00	8.00	200
4160.0285	12.00	3.00	100
4160.0300	12.00	5.00	100
4160.0318	12.00	6.00	160
4160.0319	12.00	6.00	200
4160.0334	12.00	8.00	200
4160.0349	12.00	10.00	200
4160.0364	14.00	6.00	200
4160.0379	14.00	8.00	200
4160.0454	15.00	10.00	200
4160.0469	16.00	8.00	200
4160.0484	16.00	10.00	200
4160.0649	20.00	6.00	200
4160.0679	20.00	10.00	200
4160.0694	20.00	12.00	200
4160.0709	20.00	15.00	200
4160.0784	25.00	10.00	200
4160.0799	25.00	12.00	200
4160.0814	25.00	20.00	200
4160.0889	32.00	20.00	200

Tolerance (d): h13

Hardness: 66 – 68 HRC

## Grooving and parting-off tools

### Duocut



Duocut

12 – 25

No 4390

p. 96

### Minicut



Minicut

10 – 20

No 4395

p. 98

### Grooving and parting-off



KLH

20 – 25

No 1982

p. 100



KLS

20 – 25

No 1986

p. 102



Toolholder

10 – 100

No 1988

p. 104



Toolholder

25 – 60

No 4370

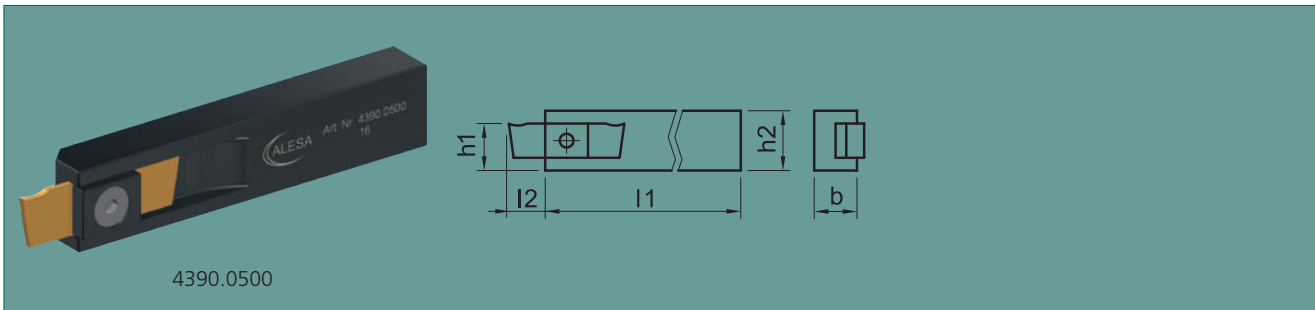
p. 106



# ALESA toolholder Duocut and parting-off blades

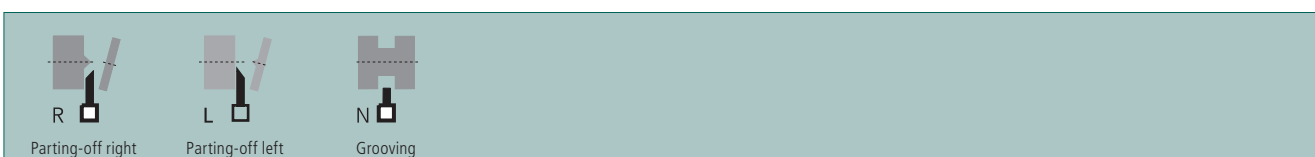
4390

Duocut



Part No	h2 mm	b mm	h1 mm	l1 mm	l2 mm	Plate	Article	Type	Article	Type	<b>WSP</b>
<b>4390.0200</b>	12	10	9.8	80	10	4390.0220	4390.0230	M4x10	4390.0240	SW 2.5	4350 8 x 40
<b>4390.0300</b>	16	10	12.8	90	12	4390.0320	4390.0330	M4x12	4390.0240	SW 2.5	4350 10 x 44
<b>4390.0400</b>	20	12	15.8	110	14	4390.0420	4390.0430	M5x14	4390.0440	SW 3	4350 12 x 48
<b>4390.0500</b>	25	16	20.3	120	17	4390.0520	4390.0530	M6x16	4390.0540	SW 4	4350 16 x 54

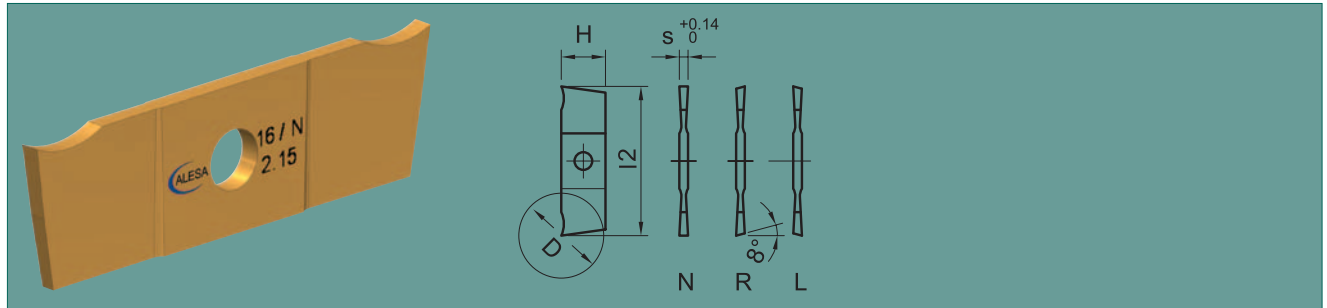
Tool will be delivered with holder, screws and screw-driver, but without parting-off blades.







## ALESA toolholder Duocut and parting-off blades



Duocut

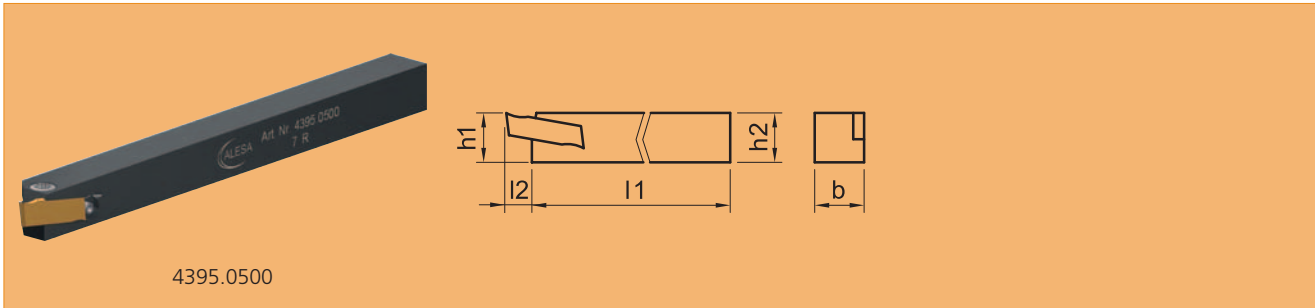
Cutting material	Coating	Part No	H mm	I2 mm	s mm	D max mm			
HSS-E	TiN	4350.0210	8.00	40	0.50	18	N	●	
		4350.0220	8.00	40	0.70	18	N	●	
		4350.0230	8.00	40	0.80	18	N	●	
		4350.0240	8.00	40	0.90	18	N	●	
		4350.0250	8.00	40	1.10	18	N	●	
		4350.0260	8.00	40	1.30	18	N	●	
		4350.0270	8.00	40	1.60	18	N	●	
		4350.0272	8.00	40	1.60	18	r	●	
		4350.0274	8.00	40	1.60	18	l	●	
		4350.0280	8.00	40	1.85	18	N	●	
		4350.0310	10.00	44	0.50	22	N	●	
		4350.0320	10.00	44	0.70	22	N	●	
		4350.0330	10.00	44	0.80	22	N	●	
		4350.0340	10.00	44	0.90	22	N	●	
		4350.0350	10.00	44	1.10	22	N	●	
		4350.0360	10.00	44	1.30	22	N	●	
		4350.0370	10.00	44	1.60	22	N	●	
		4350.0372	10.00	44	1.60	22	r	●	
		4350.0374	10.00	44	1.60	22	l	●	
		4350.0380	10.00	44	1.85	22	N	●	
		4350.0420	12.00	48	1.10	26	N	●	
		4350.0430	12.00	48	1.30	26	N	●	
		4350.0440	12.00	48	1.60	26	N	●	
		4350.0442	12.00	48	1.60	26	r	●	
		4350.0444	12.00	48	1.60	26	l	●	
		4350.0450	12.00	48	1.85	26	N	●	
		4350.0460	12.00	48	2.15	26	N	●	
		4350.0462	12.00	48	2.15	26	r	●	
		4350.0464	12.00	48	2.15	26	l	●	
		4350.0470	12.00	48	2.65	26	N	●	
		4350.0520	16.00	54	1.60	32	N	●	
		4350.0522	16.00	54	1.60	32	r	●	
		4350.0524	16.00	54	1.60	32	l	●	
		4350.0530	16.00	54	1.85	32	N	●	
		4350.0540	16.00	54	2.15	32	N	●	
		4350.0550	16.00	54	3.15	32	N	●	
		4350.0552	16.00	54	3.15	32	r	●	
		4350.0554	16.00	54	3.15	32	l	●	
		4350.0560	16.00	54	4.15	32	N	●	



# ALESA toolholder Minicut and parting-off blades

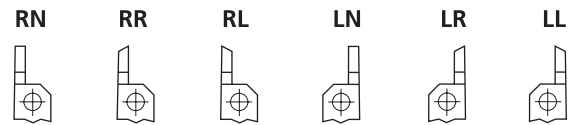
4395

Minicut



Part No	Type	h2 mm	b mm	h1 mm	l1 mm	l2 mm	Rollpin	Article	Type	Article	Type	WSP
4395.0400	Typ R	10	10	10	140	5	4395.0420	1490.0370	M4x9	1492.0600	T 20	4360 6 x 20
4395.0405	Typ L	10	10	10	140	5	4395.0420	1490.0370	M4x9	1492.0600	T 20	4360 6 x 20
4395.0500	Typ R	12	12	12	140	8	4395.0520	1490.0380	M4x11	1492.0600	T 20	4360 7 x 25
4395.0505	Typ L	12	12	12	140	8	4395.0520	1490.0380	M4x11	1492.0600	T 20	4360 7 x 25
4395.0530	Typ R	16	16	16	140	8	4395.0550	1490.0380	M4x11	1492.0600	T 20	4360 7 x 25
4395.0535	Typ L	16	16	16	140	8	4395.0550	1490.0380	M4x11	1492.0600	T 20	4360 7 x 25
4395.0560	Typ R	20	20	20	140	8	4395.0580	1490.0380	M4x11	1492.0600	T 20	4360 7 x 25
4395.0565	Typ L	20	20	20	140	8	4395.0580	1490.0380	M4x11	1492.0600	T 20	4360 7 x 25

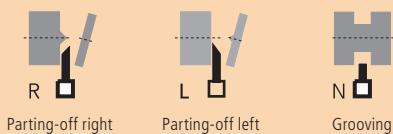
Tool will be delivered with holder, screws and screw-driver, but without parting-off blades.



**Info** Exact positioning due to a perfect clamping device.

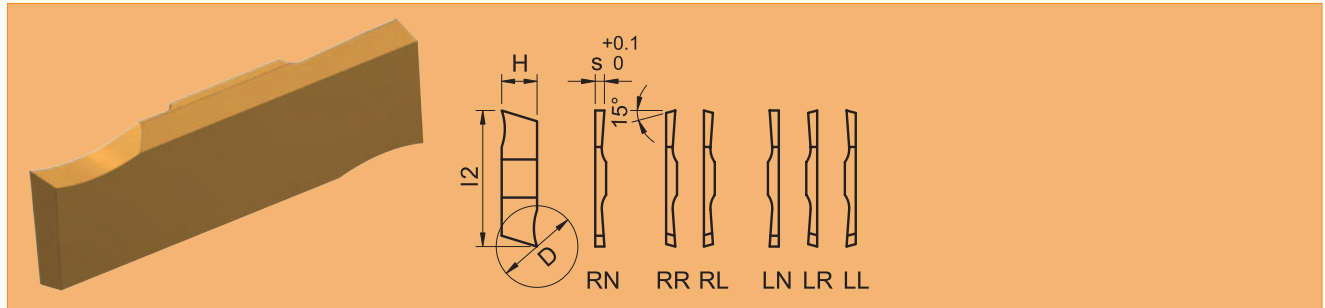
**Info** Correct center height and constant cutting speed for cutting off.

**Info** HSS-E is a shock-resistant cutting material ideal for interrupted cuts.





## ALESA toolholder Minicut and parting-off blades



Minicut

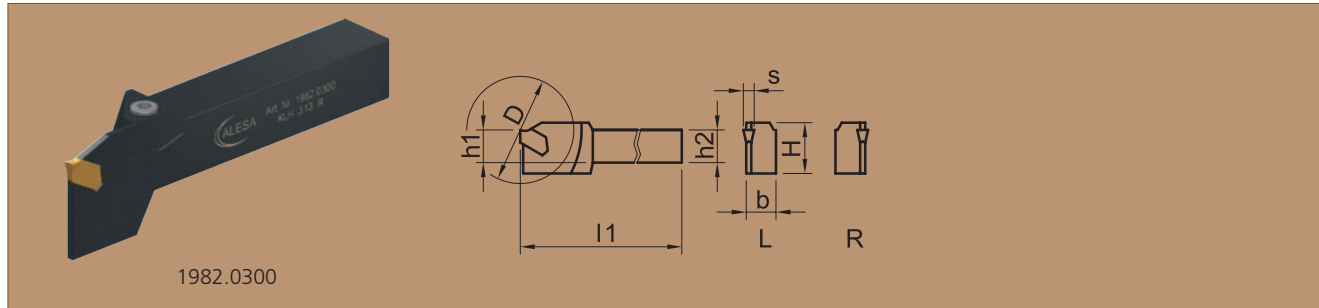
Cutting material	Coating	Part No	H mm	l2 mm	s mm	D max mm			
HSS-E	TiN	4360.0410	6.00	20	0.50	10	RN	●	
		4360.0415	6.00	20	0.50	10	LN	●	
		4360.0430	6.00	20	0.80	10	RN	●	
		4360.0435	6.00	20	0.80	10	LN	●	
		4360.0450	6.00	20	1.10	10	RN	●	
		4360.0455	6.00	20	1.10	10	LN	●	
		4360.0550	7.00	25	1.10	16	RN	●	
		4360.0555	7.00	25	1.10	16	LN	●	
		4360.0560	7.00	25	1.30	16	RN	●	
		4360.0565	7.00	25	1.30	16	LN	●	
		4360.0570	7.00	25	1.60	16	RN	●	
		4360.0572	7.00	25	1.60	16	RR	●	
		4360.0574	7.00	25	1.60	16	RL	●	
		4360.0575	7.00	25	1.60	16	LN	●	
		4360.0577	7.00	25	1.60	16	LR	●	
4360.0579	7.00	25	1.60	16	LL	●			



# ALESA grooving tools KLH and grooving inserts

1982

Grooving and parting-off



Part No	Type	h1 mm	h2 mm	b mm	s mm	l1 mm	H mm	D max mm	<b>WSP</b>
1982.0300	KLH 313 R	20	20	20	3.1	130	36	55	KLN/R/L 3
1982.0305	KLH 313 L	20	20	20	3.1	130	36	55	KLN/R/L 3
1982.0320	KLH 317 R	25	25	25	3.1	170	36	72	KLN/R/L 3
1982.0325	KLH 317 L	25	25	25	3.1	170	36	72	KLN/R/L 3

Tool will be delivered with holder, screws and screw-driver, but without grooving inserts.

**Info**

Exact positioning due to a perfect clamping device.

**Info**

Correct center height and constant cutting speed for cutting off.

**Info**

HSS-E is a shock-resistant cutting material ideal for interrupted cuts.



R  
Parting-off right



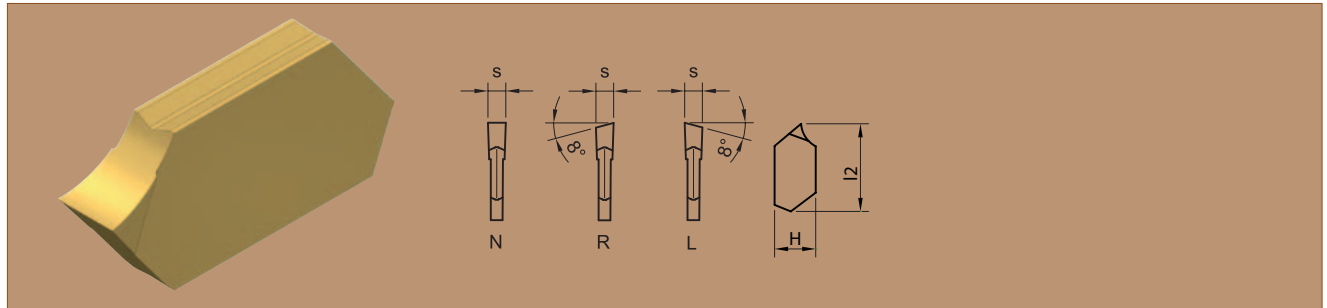
L  
Parting-off left



N  
Grooving



## ALESA grooving tools KLH and grooving inserts



Grooving and parting-off

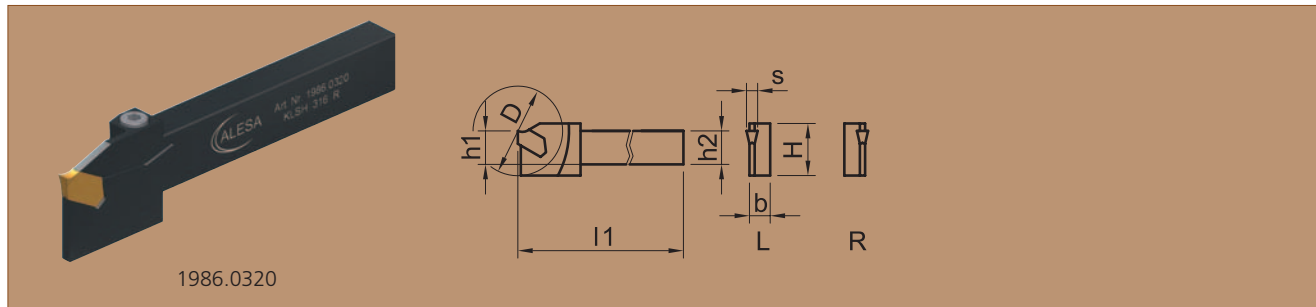
Cutting material	Coating	Part No	Type	s mm	H mm	l2 mm			
HSS-E	TiN	1598.0120	KLN 2	2.20	6.35	12	N	●	
		1598.0122	KLR 2	2.20	6.35	12	R	●	
		1598.0124	KLL 2	2.20	6.35	12	L	●	
		1598.0130	KLN 3	3.10	7.60	16	N	●	
		1598.0132	KLR 3	3.10	7.60	16	R	●	
		1598.0134	KLL 3	3.10	7.60	16	L	●	



# ALESA grooving tools KLS and grooving inserts

1986

Grooving and parting-off



Part No	Type	h1 mm	h2 mm	b mm	s mm	l1 mm	H mm	D max mm	<b>WSP</b>
1986.0200	KLSH 210 R	10	10	10	2.2	110	24	30	KLN/R/L 2
1986.0205	KLSH 210 L	10	10	10	2.2	110	24	30	KLN/R/L 2
1986.0220	KLSH 212 R	12	12	10	2.2	110	24	44	KLN/R/L 2
1986.0225	KLSH 212 L	12	12	10	2.2	110	24	44	KLN/R/L 2
1986.0240	KLSH 216 R	16	16	10	2.2	110	24	44	KLN/R/L 2
1986.0245	KLSH 216 L	16	16	10	2.2	110	24	44	KLN/R/L 2
1986.0260	KLSH 220 R	20	20	10	2.2	110	24	44	KLN/R/L 2
1986.0265	KLSH 220 L	20	20	10	2.2	110	24	44	KLN/R/L 2
1986.0300	KLSH 312 R	12	12	10	3.1	110	28	44	KLN/R/L 3
1986.0305	KLSH 312 L	12	12	10	3.1	110	28	44	KLN/R/L 3
1986.0320	KLSH 316 R	16	16	10	3.1	110	28	44	KLN/R/L 3
1986.0325	KLSH 316 L	16	16	10	3.1	110	28	44	KLN/R/L 3
1986.0340	KLSH 320 R	20	20	10	3.1	110	28	44	KLN/R/L 3
1986.0345	KLSH 320 L	20	20	10	3.1	110	28	44	KLN/R/L 3

Tool will be delivered with holder, screws and screw-driver, but without grooving inserts.

**Info** Exact positioning due to a perfect clamping device.

**Info** Correct center height and constant cutting speed for cutting off.

**Info** HSS-E is a shock-resistant cutting material ideal for interrupted cuts.



Parting-off right



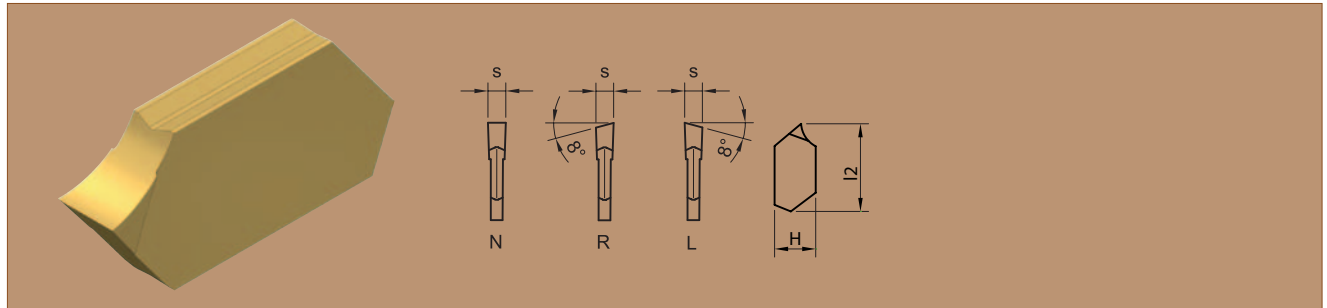
Parting-off left



Grooving



## ALESA grooving tools KLS and grooving inserts



Grooving and parting-off

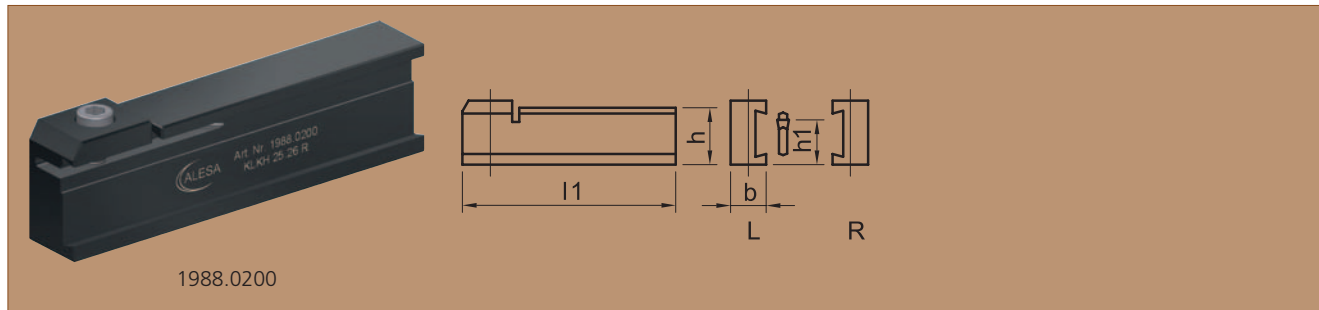
Cutting material	Coating	Part No	Type	s mm	H mm	l2 mm			
HSS-E	TiN	1598.0120	KLN 2	2.20	6.35	12	N	●	
		1598.0122	KLR 2	2.20	6.35	12	R	●	
		1598.0124	KLL 2	2.20	6.35	12	L	●	
		1598.0130	KLN 3	3.10	7.60	16	N	●	
		1598.0132	KLR 3	3.10	7.60	16	R	●	
		1598.0134	KLL 3	3.10	7.60	16	L	●	



# ALESA toolholder for blades and grooving inserts

1988

Grooving and parting-off



Part No	Type	h1 mm	b mm	l1 mm	h mm	<b>WSP</b>
<b>1988.0200</b>	KLKH 25.26 R	25	20	120	32	KLK 311
<b>1988.0205</b>	KLKH 25.26 L	25	20	120	32	KLK 311

**Info** Exact positioning due to a perfect clamping device.

**Info** Correct center height and constant cutting speed for cutting off.

**Info** HSS-E is a shock-resistant cutting material ideal for interrupted cuts.



R  
Parting-off right



L  
Parting-off left

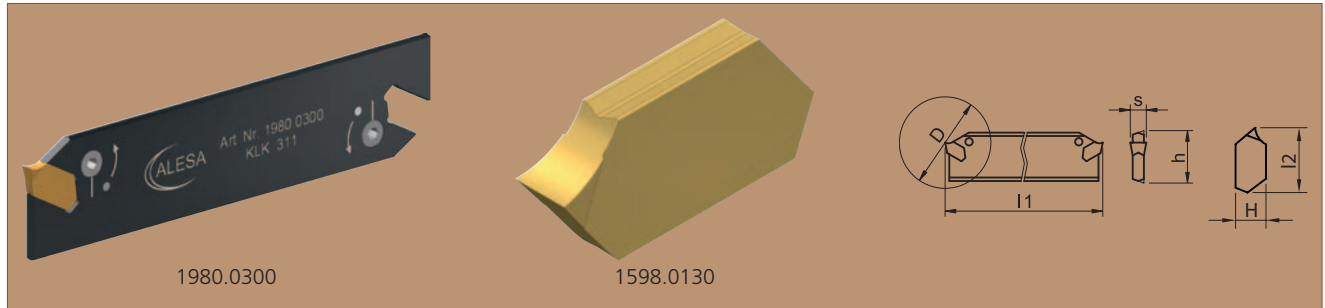


N  
Grooving





## ALESA toolholder for blades and grooving inserts



Grooving and parting-off

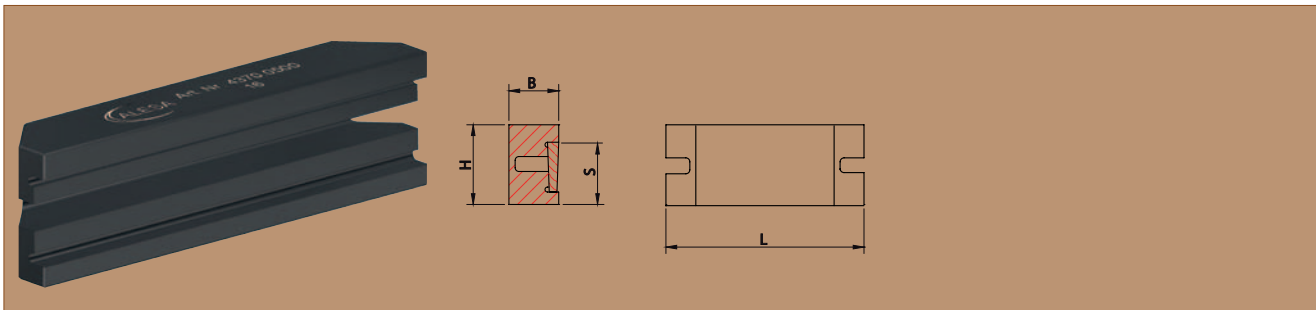
Part No	Type	s mm	h mm	H mm	l1 mm	l2 mm	D max mm			
<b>1598.0130</b>	KLN 3	3.10		7.60		16		N	●	
<b>1598.0132</b>	KLR 3	3.10		7.60		16		R	●	
<b>1598.0134</b>	KLL 3	3.10		7.60		16		L	●	
<b>1980.0300</b>	KLK 311	3.10	26.0		110		80			
<b>1980.0320</b>	KLK 315	3.10	32.0		150		100			



## ALESA toolholder and trapezoidal blades

4370

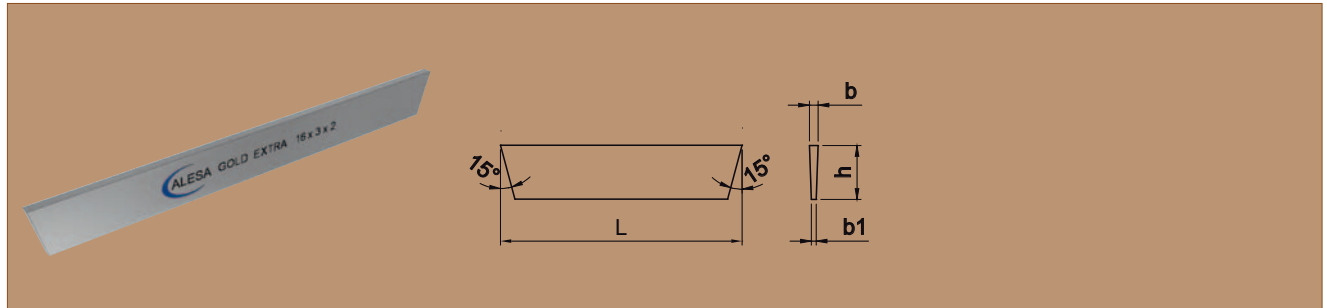
Grooving and parting-off



Part No	L mm	S mm	H mm	B mm	<b>WSP</b>
4370.0300	70	13	16	10	10 x 2.5 x 1.9 mm
4370.0400	70	16	20	12	12 x 2.5 x 1.8 mm
4370.0500	90	20	25	16	16 x 3.0 x 2.0 mm
4370.0700	120	25	32	20	20 x 4.0 x 2.8 mm
4370.0800	150	32	40	25	25 x 4.8 x 3.3 mm



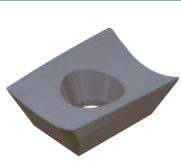
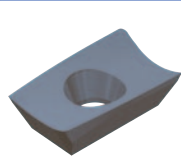
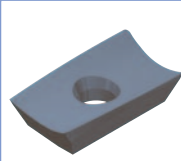
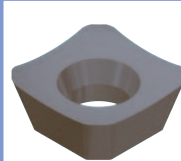
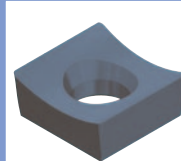
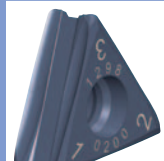
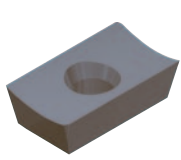
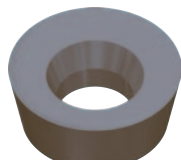
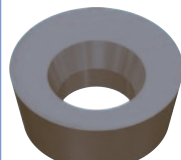
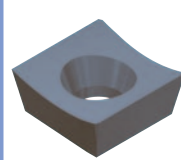
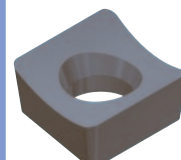
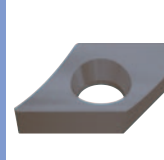
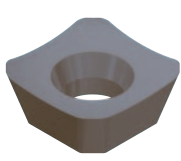
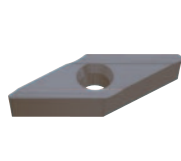
## ALESA toolholder and trapezoidal blades



Grooving and parting-off

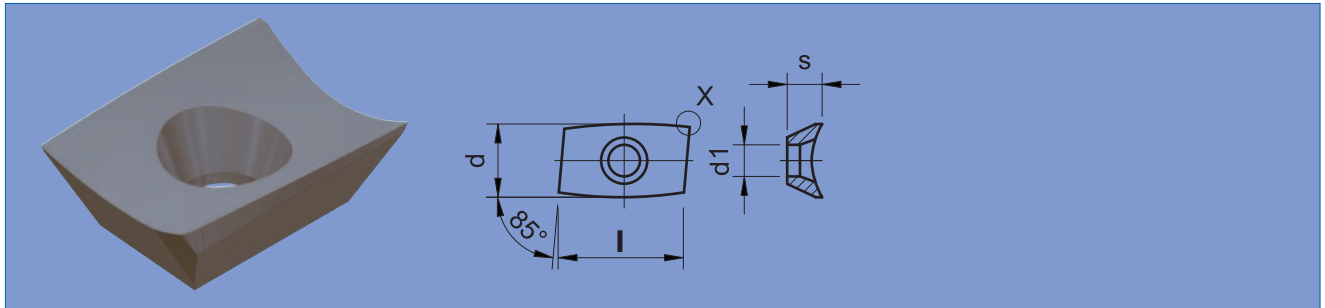
Part No	b mm	b1 mm	h mm	L mm
4310.0310	2.50	1.90	10.00	150
4310.0410	2.50	1.80	12.00	150
4310.0510	3.00	2.00	16.00	150
4310.0710	4.00	2.80	20.00	150
4310.0810	4.80	3.30	25.00	150
4310.0820	4.80	3.30	25.00	200

# Indexable inserts

Indexable inserts					
					
<b>TWIST AOFT 10</b>	<b>TWIST AOFT 15</b>	<b>TWIST AOFT 20</b>	<b>SDFT / SDHT</b>	<b>SCFT</b>	<b>TNFU</b>
HSS & Carbide	HSS & Carbide	HSS & Carbide	HSS & Carbide	HSS & Carbide	Carbide
p. 109	p. 110	p. 111	p. 112	p. 113	p. 114
					
<b>APFT / APHT</b>	<b>RPFT / RCFT</b>	<b>RPFT / RPHT</b>	<b>MPFT</b>	<b>CCFT</b>	<b>DCFT</b>
HSS & Carbide	HSS	Carbide	HSS & Carbide	HSS	HSS
Milling					
p. 115	p. 116	p. 117	p. 118	p. 119	p. 120
					
<b>SEFT</b>	<b>VCFT</b>				
HSS & Carbide	HSS				
p. 121	p. 122				



## Indexable inserts TWIST AOFT 10 HSS and carbide



Cutting material	Coating	Part No	ISO Code	d mm	s mm	l mm	d1 mm	Detail X			
HSS-E	TiN	1087.0170	AOFT 10 03 PF FR	7.00	3.40	9.50	2.8	0.2x45°	r	●	○
		1087.0180	AOFT 10 03 04 FR	7.00	3.40	9.50	2.8	R 0.4	r	●	○
	TiAlN	1162.0170	AOFT 10 03 PF FR	7.00	3.40	9.50	2.8	0.2x45°	r	●	○
		1162.0180	AOFT 10 03 04 FR	7.00	3.40	9.50	2.8	R 0.4	r	●	○
Carbide HM	TiN	1287.0200	AOFT 10 03 PF FR-411	7.00	3.40	9.50	2.8	0.2x45°	r	●	○
		1287.0205	AOFT 10 03 04 FR-411	7.00	3.40	9.50	2.8	R 0.4	r	●	○
	TiAlN	1287.0300	AOFT 10 03 PF FR-411	7.00	3.40	9.50	2.8	0.2x45°	r	●	○
		1287.0305	AOFT 10 03 04 FR-411	7.00	3.40	9.50	2.8	R 0.4	r	●	○
	AlCrN	1287.0651	AOFT 10 03 PF FR-421	7.00	3.40	9.50	2.8	0.2x45°	r	●	○
		1287.0656	AOFT 10 03 04 FR-421	7.00	3.40	9.50	2.8	R 0.4	r	●	○
		1287.0657	AOFT 10 03 04 FR-431	7.00	3.40	9.50	2.8	R 0.4	r	●	○
		1288.0300	AOFT 10 03 ZZ FR-481	7.00	3.35		2.8		r	●	○
AlCrN-VA	1287.0757	AOFT 10 03 04 FR-431	7.00	3.40	9.50	2.8	R 0.4	r	●	○	
Carbide HM-F	TiAlN	1287.0500*	AOFT 10 03 PF FR-511	7.00	3.40	9.50	2.8	0.2x45°	r		●
		1287.0505*	AOFT 10 03 04 FR-511	7.00	3.40	9.50	2.8	R 0.4	r		●
	AlCrN	1287.0701	AOFT 10 03 PF FR-521	7.00	3.40	9.50	2.8	0.2x45°	r		●
		1287.0706	AOFT 10 03 04 FR-521	7.00	3.40	9.50	2.8	R 0.4	r		●
		1287.0707	AOFT 10 03 04 FR-531	7.00	3.40	9.50	2.8	R 0.4	r		●
		1288.0500	AOFT 10 03 ZZ FR-581	7.00	3.35		2.8		r		●
AlCrN-VA	1287.0807	AOFT 10 03 04 FR-531	7.00	3.40	9.50	2.8	R 0.4	r		●	
Carbide HA	AlCrN-VA	1289.0202	AOFT 10 03 04 FR-631	7.00	3.40	9.50	2.8	R 0.4	r	●	○

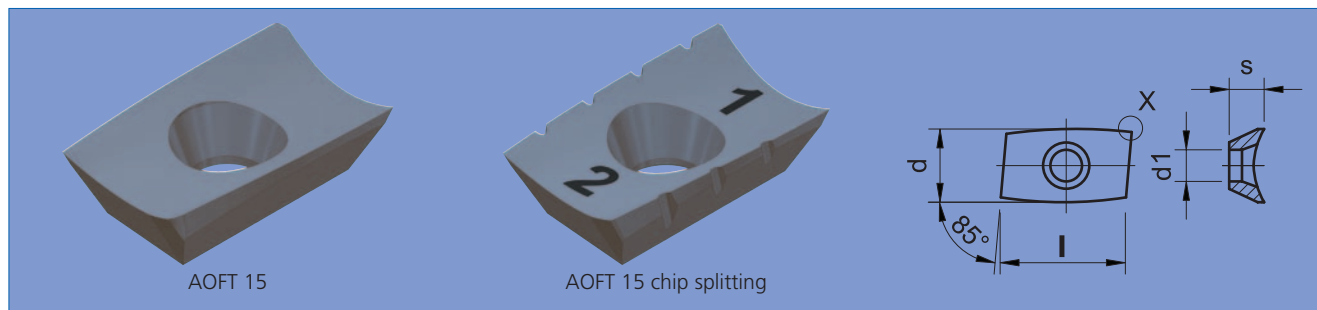
\*while stocks last






# Indexable inserts TWIST AOFT 15

## HSS and carbide

Indexable inserts

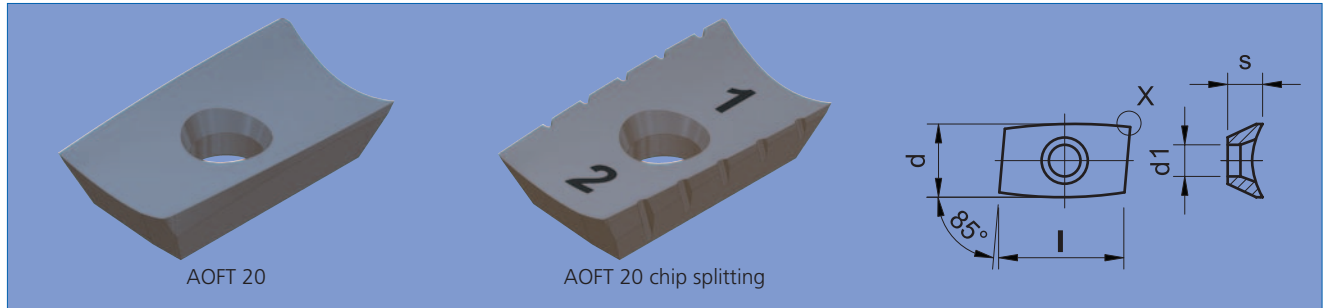


Cutting material	Coating	Part No	ISO Code	d mm	s mm	l mm	d1 mm	Detail X			
HSS-E	TiN	1087.0190	AOFT 15 T3 PF FR	8.80	4.20	14.50	3.8	0.2x45°	r	●	
		1087.0210	AOFT 15 T3 08 FR	8.80	4.20	14.50	3.8	R 0.8	r	●	
	TiAlN	1162.0190	AOFT 15 T3 PF FR	8.80	4.20	14.50	3.8	0.2x45°	r	●	
		1162.0210	AOFT 15 T3 08 FR	8.80	4.20	14.50	3.8	R 0.8	r	●	
HSS-E chip splitting <sup>o)</sup>	TiN	1087.0505	AOFT 15 T3 PF FR (No 1/2)	8.80	4.20	14.50	3.8	0.2x45°	r	●	
		1087.0508	AOFT 15 T3 PF FR (No 3)	8.80	4.20	14.50	3.8	0.2x45°	r	●	
Carbide HM	TiN	1287.0210	AOFT 15 T3 PF FR-411	8.80	4.20	14.50	3.8	0.2x45°	r	●	○
		1287.0215	AOFT 15 T3 08 FR-411	8.80	4.20	14.50	3.8	R 0.8	r	●	○
	TiAlN	1287.0310	AOFT 15 T3 PF FR-411	8.80	4.20	14.50	3.8	0.2x45°	r	●	○
		1287.0315	AOFT 15 T3 08 FR-411	8.80	4.20	14.50	3.8	R 0.8	r	●	○
	AlCrN	1287.0661	AOFT 15 T3 PF FR-421	8.80	4.20	14.50	3.8	0.2x45°	r	●	○
		1287.0666	AOFT 15 T3 08 FR-421	8.80	4.20	14.50	3.8	R 0.8	r	●	○
		1287.0667	AOFT 15 T3 08 FR-431	8.80	4.20	14.50	3.8	R 0.8	r	●	○
		1287.0669	AOFT 15 T3 12 FR-421	8.80	4.20	14.50	3.8	R 1.2	r	●	○
		1287.0671	AOFT 15 T3 16 FR-421	8.80	4.20	14.50	3.8	R 1.6	r	●	○
		1287.0673	AOFT 15 T3 20 FR-421	8.80	4.20	14.50	3.8	R 2.0	r	●	○
	AlCrN-VA	1288.0310	AOFT 15 T3 ZZ FR-481	9.07	4.00		3.8		r	●	○
		1287.0767	AOFT 15 T3 08 FR-431	8.80	4.20	14.50	3.8	R 0.8	r	●	○
	DLC-H	1287.0916	AOFT 15 T3 08 FR-421	8.80	4.20	14.50	3.8	R 0.8	r	●	○
	Carbide HM-F	TiAlN	1287.0510	AOFT 15 T3 PF FR-511	8.80	4.20	14.50	3.8	0.2x45°	r	
1287.0515			AOFT 15 T3 08 FR-511	8.80	4.20	14.50	3.8	R 0.8	r		●
AlCrN		1287.0711	AOFT 15 T3 PF FR-521	8.80	4.20	14.50	3.8	0.2x45°	r		●
		1287.0716	AOFT 15 T3 08 FR-521	8.80	4.20	14.50	3.8	R 0.8	r		●
		1287.0717	AOFT 15 T3 08 FR-531	8.80	4.20	14.50	3.8	R 0.8	r		●
		1287.0718	AOFT 15 T3 08 FR-521/40	8.80	4.20	14.50	3.8	R 0.8	r	○	●
		1287.0719	AOFT 15 T3 08 FR-521/50/63	8.80	4.20	14.50	3.8	R 0.8	r	○	●
		1287.0720	AOFT 15 T3 08 FR-521/80-125	8.80	4.20	14.50	3.8	R 0.8	r	○	●
AlCrN-VA		1288.0510	AOFT 15 T3 ZZ FR-581	9.07	4.00		3.8		r		●
		1287.0817	AOFT 15 T3 08 FR-531	8.80	4.20	14.50	3.8	R 0.8	r		●
DLC-H	1287.0967	AOFT 15 T3 08 FR-531	8.80	4.20	14.50	3.8	R 0.8	r		●	
Carbide HA	AlCrN-VA	1289.0232	AOFT 15 T3 08 FR-631	8.80	4.20	14.50	3.8	R 0.8	r	●	○

<sup>o)</sup> Order of inserts with chip splitting see page 139



## Indexable inserts TWIST AOFT 20 HSS and carbide



Cutting material	Coating	Part No	ISO Code	d mm	s mm	l mm	d1 mm	Detail X				
HSS-E	TiN	1087.0215	AOFT 20 04 PF FR	11.00	4.76	19.40	4.5	0.2x45°	r	●	○	
		1087.0315	AOFT 20 04 08 FR	11.00	4.76	19.40	4.5	R 0.8	r	●	○	
	TiAlN	1162.0215	AOFT 20 04 PF FR	11.00	4.76	19.40	4.5	0.2x45°	r	●	○	
		1162.0315	AOFT 20 04 08 FR	11.00	4.76	19.40	4.5	R 0.8	r	●	○	
HSS-E chip splitting <sup>o)</sup>	TiN	1087.0515	AOFT 20 04 PF FR (No 1/2)	11.00	4.76	19.40	4.5	0.2x45°	r	●	○	
Carbide HM	TiN	1087.0518	AOFT 20 04 PF FR (No 3)	11.00	4.76	19.40	4.5	0.2x45°	r	●	○	
		1287.0225	AOFT 20 04 PF FR-411	11.00	4.76	19.40	4.5	0.2x45°	r	●	○	
	TiAlN	1287.0230	AOFT 20 04 08 FR-411	11.00	4.76	19.40	4.5	R 0.8	r	●	○	
		1287.0325	AOFT 20 04 PF FR-411	11.00	4.76	19.40	4.5	0.2x45°	r	●	○	
	AlCrN	1287.0330	AOFT 20 04 08 FR-411	11.00	4.76	19.40	4.5	R 0.8	r	●	○	
		1287.0676	AOFT 20 04 PF FR-421	11.00	4.76	19.40	4.5	0.2x45°	r	●	○	
	AlCrN-VA	1287.0681	AOFT 20 04 08 FR-421	11.00	4.76	19.40	4.5	R 0.8	r	●	○	
		1287.0682	AOFT 20 04 08 FR-431	11.00	4.76	19.40	4.5	R 0.8	r	●	○	
	Carbide HM-F	TiAlN	1287.0691*	AOFT 20 04 24 FR-421	11.00	4.76	19.40	4.5	R 2.4	r	●	○
			1287.0693*	AOFT 20 04 32 FR-421	11.00	4.76	19.40	4.5	R 3.2	r	●	○
Carbide HA	AlCrN-VA	1287.0782	AOFT 20 04 08 FR-431	11.00	4.76	19.40	4.5	R 0.8	r	●	○	
		1287.0525	AOFT 20 04 PF FR-511	11.00	4.76	19.40	4.5	0.2x45°	r	●	○	
		1287.0530	AOFT 20 04 08 FR-511	11.00	4.76	19.40	4.5	R 0.8	r	●	○	
		1287.0726	AOFT 20 04 PF FR-521	11.00	4.76	19.40	4.5	0.2x45°	r	●	○	
Carbide HA	AlCrN-VA	1287.0731	AOFT 20 04 08 FR-521	11.00	4.76	19.40	4.5	R 0.8	r	●	○	
		1287.0735	AOFT 20 04 08 FR-531	11.00	4.76	19.40	4.5	R 0.8	r	●	○	
Carbide HA	AlCrN-VA	1287.0835	AOFT 20 04 08 FR-531	11.00	4.76	19.40	4.5	R 0.8	r	●	○	
Carbide HA	AlCrN-VA	1289.0262	AOFT 20 04 08 FR-631	11.00	4.76	19.40	4.5	R 0.8	r	●	○	

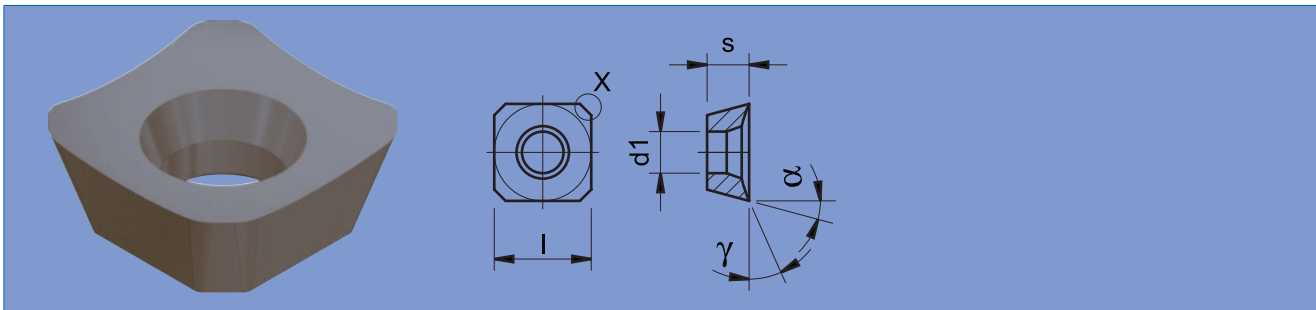
\*while stocks last

<sup>o)</sup> Order of inserts with chip splitting see page 139



## Indexable inserts SDFT / SDHT HSS and carbide

Indexable inserts



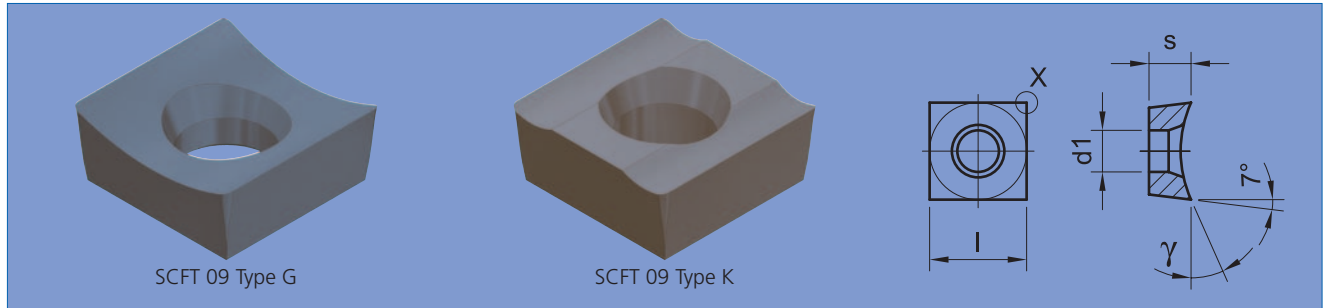
Cutting material	Coating	Part No	ISO Code	l mm	s mm	d1 mm	$\alpha$	$\gamma$	Detail X			
HSS-E	TiN	1091.0400	SDFT 09 T3 AE FN	9.52	3.97	4.5	15°	17°	1.2x45° R1.2	r/l	●	
		1091.0450	SDFT 12 04 AE FN	12.70	4.76	5.5	15°	17°	1.5x45° R2	r/l	●	
	TiAlN	1166.0400	SDFT 09 T3 AE FN	9.52	3.97	4.5	15°	17°	1.2x45° R1.2	r/l	●	
		1166.0450	SDFT 12 04 AE FN	12.70	4.76	5.5	15°	17°	1.5x45° R2	r/l	●	
Carbide MG20	TiN	1291.0400	SDFT 09 T3 AE FN-111	9.52	3.97	4.5	15°	17°	1.2x45° R1.2	r/l	○	●
		1291.0450	SDFT 12 04 AE FN-111	12.70	4.76	5.5	15°	17°	1.5x45° R2	r/l	○	●
	TiAlN	1291.0405	SDFT 09 T3 AE FN-111	9.52	3.97	4.5	15°	17°	1.2x45° R1.2	r/l	○	●
		1291.0455	SDFT 12 04 AE FN-111	12.70	4.76	5.5	15°	17°	1.5x45° R2	r/l	○	●
	AlCrN	1291.0415	SDFT 09 T3 AE FN-111	9.52	3.97	4.5	15°	17°	1.2x45° R1.2	r/l	○	●
		1291.0465	SDFT 12 04 AE FN-111	12.70	4.76	5.5	15°	17°	1.5x45° R2	r/l	○	●
Carbide 12CR	TiAlN	1291.0420	SDHT 09 T3 AE FN-222	9.52	3.97	4.5	15°	11°	1.2x45° R1.2	r/l	○	●
		1291.0470	SDHT 12 04 AE FN-222	12.70	4.76	5.5	15°	11°	1.5x45° R2	r/l	○	●
	AlCrN	1291.0430	SDHT 09 T3 AE FN-222	9.52	3.97	4.5	15°	11°	1.2x45° R1.2	r/l	○	●
		1291.0480	SDHT 12 04 AE FN-222	12.70	4.76	5.5	15°	11°	1.5x45° R2	r/l	○	●
	AlCrN-VA	1291.0630	SDFT 09 T3 AE FN-223	9.52	3.97	4.5	15°	5°	1.2x45° R1.2	r/l	○	●
		1291.0680	SDFT 12 04 AE FN-223	12.70	4.76	5.5	15°	5°	1.5x45° R2	r/l	○	●
		1291.0635	SDFT 09 T3 AE FN-223	9.52	3.97	4.5	15°	5°	1.2x45° R1.2	r/l	○	●
		1291.0685	SDFT 12 04 AE FN-223	12.70	4.76	5.5	15°	5°	1.5x45° R2	r/l	○	●
	DLC-H	1291.0720	SDFT 09 T3 AE FR-223-S	9.52	3.97	4.5	15°	5°	1.2x45° R1.2	r	○	●
		1291.0770	SDFT 12 04 AE FR-223-S	12.70	4.76	5.5	15°	5°	1.5x45° R2	r	○	●
Ceramic KG14	AlCrN-K	1291.0640	SDFT 09 T3 AE FN-223	9.52	3.97	4.5	15°	5°	1.2x45° R1.2	r/l	○	●
		1291.0690	SDFT 12 04 AE FN-223	12.70	4.76	5.5	15°	5°	1.5x45° R2	r/l	○	●
Ceramic KG14	AlCrN-K	1292.0200	SDFT 09 T3 AE FN-851	9.52	3.97	4.4	15°	0°	1.2x45° R1.2	r/l		●
		1292.0225	SDFT 12 04 AE FN-851	12.70	4.76	5.5	15°	0°	1.5x45° R2	r/l		●





## Indexable inserts SCFT

### HSS and carbide



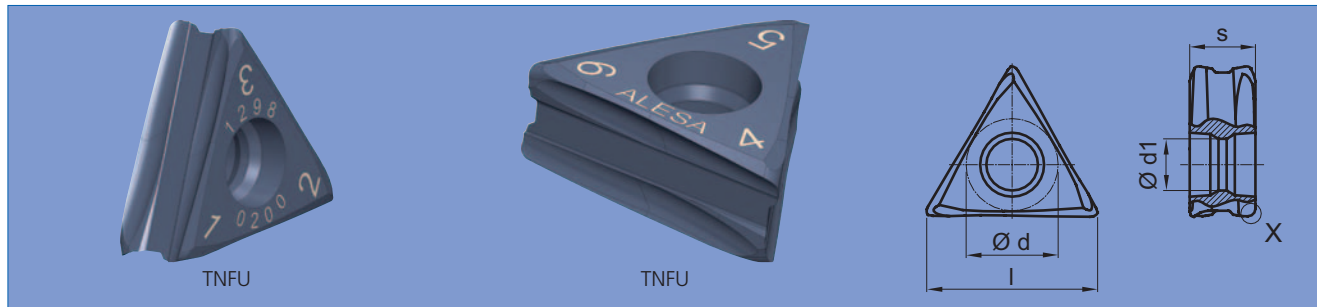
Cutting material	Coating	Part No	ISO Code	Type G/K	l mm	s mm	d1 mm	$\gamma$	Detail X				
HSS-E	TiN	1591.0200	SCFT 09 04 04 FN	G	9.52	4.00	4.5	25°	R 0.4	r/l	●		
		1591.0220	SCFT 09 04 08 FN	G	9.52	4.00	4.5	25°	R 0.8	r/l	●		
		1591.0250	SCFT 12 05 AC FN	G	12.83	5.56	5.5	24°	0.2x45°	r/l	●		
		1591.0270	SCFT 12 05 04 FN	G	12.83	5.56	5.5	24°	R 0.4	r/l	●		
		1591.0290	SCFT 12 05 08 FN	G	12.83	5.56	5.5	24°	R 0.8	r/l	●		
		1591.0310	SCFT 12 05 12 FN	G	12.83	5.56	5.5	24°	R 1.2	r/l	●		
		1591.0700	SCFT 09 04 04 FN	K	9.52	4.00	4.5	30°	R 0.4	r/l	●		
		1591.0720	SCFT 09 04 08 FN	K	9.52	4.00	4.5	30°	R 0.8	r/l	●		
		1591.0770	SCFT 12 05 04 FN	K	12.83	5.56	5.5	30°	R 0.4	r/l	●		
	TiAlN	1591.0790	SCFT 12 05 08 FN	K	12.83	5.56	5.5	30°	R 0.8	r/l	●		
		1591.0810	SCFT 12 05 12 FN	K	12.83	5.56	5.5	30°	R 1.2	r/l	●		
		1666.0200	SCFT 09 04 04 FN	G	9.52	4.00	4.5	25°	R 0.4	r/l	●		
		1666.0220	SCFT 09 04 08 FN	G	9.52	4.00	4.5	25°	R 0.8	r/l	●		
		1666.0250	SCFT 12 05 AC FN	G	12.83	5.56	5.5	24°	0.2x45°	r/l	●		
		1666.0270	SCFT 12 05 04 FN	G	12.83	5.56	5.5	24°	R 0.4	r/l	●		
		1666.0290	SCFT 12 05 08 FN	G	12.83	5.56	5.5	24°	R 0.8	r/l	●		
		1666.0310	SCFT 12 05 12 FN	G	12.83	5.56	5.5	24°	R 1.2	r/l	●		
		1666.0700	SCFT 09 04 04 FN	K	9.52	4.00	4.5	30°	R 0.4	r/l	●		
Carbide MG20	TiAlN	1791.0255	SCFT 12 05 AC FN-111	G	12.83	5.56	5.5	24°	0.2x45°	r/l	○	●	
		1791.0295	SCFT 12 05 08 FN-111	G	12.83	5.56	5.5	24°	R 0.8	r/l	○	●	
		1791.0265	SCFT 12 05 AC FN-111	G	12.83	5.56	5.5	24°	0.2x45°	r/l	○	●	
		1791.0305	SCFT 12 05 08 FN-111	G	12.83	5.56	5.5	24°	R 0.8	r/l	○	●	
		AlCrN	1791.0325	SCFT 12 05 08 FN-121	G	12.83	5.56	5.5	14°	R 0.8	r/l	○	●



## Indexable inserts DELTA TNFU

### Carbide

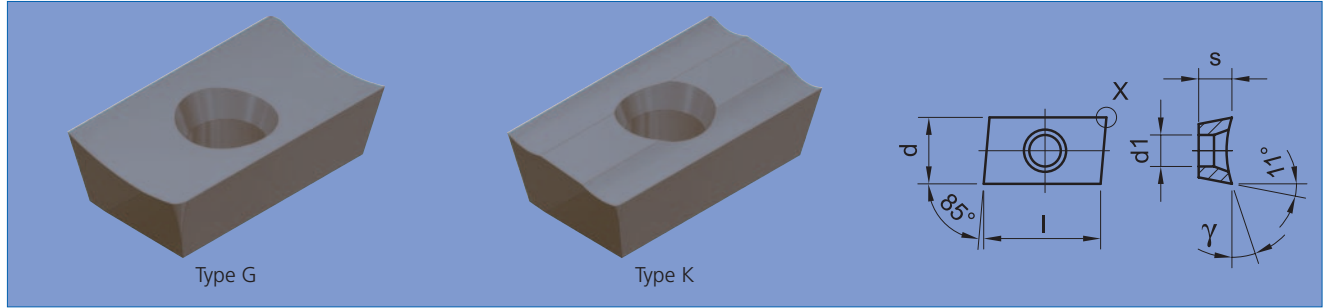
Indexable inserts






Cutting material	Coating	Part No	ISO Code	l mm	s mm	d mm	d1 mm	Detail X			
Carbide CTS	AlCrN-VA	1297.0200	TNFU 11 S4 04 FR-321	11.2	4.2	6	3.4	R 0.4	r	●	○
		1297.0650	TNFU 11 S4 PF FR-321	11.2	4.2	6	3.4	0.2x45°	r	●	○
		1298.0200	TNFU 18 07 08 FR-321	18.3	7	9.8	5.5	R 0.8	r	●	○
		1298.0650	TNFU 18 07 PF FR-321	18.3	7	9.8	5.5	0.2x45°	r	●	○
	DLC-H	1297.0201	TNFU 11 S4 04 FR-321	11.2	4.2	6	3.4	R 0.4	r	○	●
		1297.0651	TNFU 11 S4 PF FR-321	11.2	4.2	6	3.4	0.2x45°	r	○	●
		1298.0201	TNFU 18 07 08 FR-321	18.3	7	9.8	5.5	R 0.8	r	○	●
		1298.0651	TNFU 18 07 PF FR-321	18.3	7	9.8	5.5	0.2x45°	r	○	●



## Indexable inserts APFT / APHT HSS and carbide



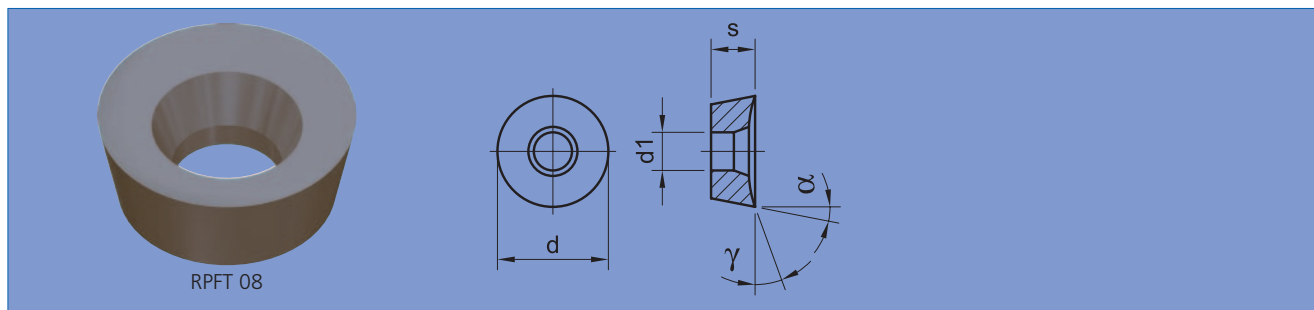
Cutting material	Coating	Part No	ISO Code	Type G/K	d mm	s mm	l mm	d1 mm	γ	Detail X			
HSS-E	TiN	1085.0200	APFT 16 04 PD FR	G	9.52	4.76	16.70	4.5	18°	0.2x45°	r	●	●
		1085.0210	APFT 16 04 PD FL	G	9.52	4.76	16.70	4.5	18°	0.2x45°	l	●	●
		1085.0230	APFT 16 04 PD FR	G	9.52	4.76	16.70	4.5	25°	0.2x45°	r	●	●
		1085.0250	APFT 16 04 04 FR	G	9.52	4.76	16.70	4.5	18°	R 0.4	r	●	●
		1085.0260	APFT 16 04 04 FL	G	9.52	4.76	16.70	4.5	18°	R 0.4	l	●	●
		1085.0300	APFT 16 04 08 FR	G	9.52	4.76	16.70	4.5	18°	R 0.8	r	●	●
		1085.0310	APFT 16 04 08 FL	G	9.52	4.76	16.70	4.5	18°	R 0.8	l	●	●
		1085.0350	APFT 16 04 12 FR	G	9.52	4.76	16.70	4.5	18°	R 1.2	r	●	●
		1085.0360	APFT 16 04 12 FL	G	9.52	4.76	16.70	4.5	18°	R 1.2	l	●	●
		1585.0700	APFT 16 04 PD FR	K	9.52	4.76	16.70	4.5	26°	0.2x45°	r	●	●
	1585.0710*	APFT 16 04 PD FL	K	9.52	4.76	16.70	4.5	26°	0.2x45°	l	●	●	
	1585.0750	APFT 16 04 04 FR	K	9.52	4.76	16.70	4.5	26°	R 0.4	r	●	●	
	1585.0760*	APFT 16 04 04 FL	K	9.52	4.76	16.70	4.5	26°	R 0.4	l	●	●	
	1160.0200	APFT 16 04 PD FR	G	9.52	4.76	16.70	4.5	18°	0.2x45°	r	●	●	
	1160.0230	APFT 16 04 PD FR	G	9.52	4.76	16.70	4.5	25°	0.2x45°	r	●	●	
	1160.0250	APFT 16 04 04 FR	G	9.52	4.76	16.70	4.5	18°	R 0.4	r	●	●	
	1160.0300	APFT 16 04 08 FR	G	9.52	4.76	16.70	4.5	18°	R 0.8	r	●	●	
	1160.0350	APFT 16 04 12 FR	G	9.52	4.76	16.70	4.5	18°	R 1.2	r	●	●	
	1660.0700	APFT 16 04 PD FR	K	9.52	4.76	16.70	4.5	26°	0.2x45°	r	●	●	
	1660.0710*	APFT 16 04 PD FL	K	9.52	4.76	16.70	4.5	26°	0.2x45°	l	●	●	
1660.0750	APFT 16 04 04 FR	K	9.52	4.76	16.70	4.5	26°	R 0.4	r	●	●		
1660.0760*	APFT 16 04 04 FL	K	9.52	4.76	16.70	4.5	26°	R 0.4	l	●	●		
Carbide MG20	TiN	1285.0200	APFT 16 04 PD FR-111	G	9.52	4.76	16.70	4.5	18°	0.2x45°	r	○	●
		1285.0225	APFT 16 04 PD FL-111	G	9.52	4.76	16.70	4.5	18°	0.2x45°	l	○	●
		1285.0250	APFT 16 04 04 FR-111	G	9.52	4.76	16.70	4.5	18°	R 0.4	r	○	●
		1285.0275	APFT 16 04 04 FL-111	G	9.52	4.76	16.70	4.5	18°	R 0.4	l	○	●
		1285.0300	APFT 16 04 08 FR-111	G	9.52	4.76	16.70	4.5	18°	R 0.8	r	○	●
		1285.0325	APFT 16 04 08 FL-111	G	9.52	4.76	16.70	4.5	18°	R 0.8	l	○	●
	TiAlN	1285.0205	APFT 16 04 PD FR-111	G	9.52	4.76	16.70	4.5	18°	0.2x45°	r	○	●
		1285.0230	APFT 16 04 PD FL-111	G	9.52	4.76	16.70	4.5	18°	0.2x45°	l	○	●
		1285.0255	APFT 16 04 04 FR-111	G	9.52	4.76	16.70	4.5	18°	R 0.4	r	○	●
		1285.0280	APFT 16 04 04 FL-111	G	9.52	4.76	16.70	4.5	18°	R 0.4	l	○	●
		1285.0305	APFT 16 04 08 FR-111	G	9.52	4.76	16.70	4.5	18°	R 0.8	r	○	●
		1285.0330	APFT 16 04 08 FL-111	G	9.52	4.76	16.70	4.5	18°	R 0.8	l	○	●
	AlCrN	1285.0215	APFT 16 04 PD FR-111	G	9.52	4.76	16.70	4.5	18°	0.2x45°	r	○	●
		1285.0238	APFT 16 04 PD FL-111	G	9.52	4.76	16.70	4.5	18°	0.2x45°	l	○	●
		1285.0265	APFT 16 04 04 FR-111	G	9.52	4.76	16.70	4.5	18°	R 0.4	r	○	●
		1285.0290	APFT 16 04 04 FL-111	G	9.52	4.76	16.70	4.5	18°	R 0.4	l	○	●
		1285.0315	APFT 16 04 08 FR-111	G	9.52	4.76	16.70	4.5	18°	R 0.8	r	○	●
		1285.0338	APFT 16 04 08 FL-111	G	9.52	4.76	16.70	4.5	18°	R 0.8	l	○	●
	AlCrN-VA	1285.0515	APFT 16 04 PD FR-121	G	9.52	4.76	16.70	4.5	10°	0.2x45°	r	○	●
		1285.0540*	APFT 16 04 PD FL-121	G	9.52	4.76	16.70	4.5	10°	0.2x45°	l	○	●
		1285.0615	APFT 16 04 08 FR-121	G	9.52	4.76	16.70	4.5	10°	R 0.8	r	○	●
		1285.0640*	APFT 16 04 08 FL-121	G	9.52	4.76	16.70	4.5	10°	R 0.8	l	○	●
		1285.0520	APFT 16 04 PD FR-121	G	9.52	4.76	16.70	4.5	10°	0.2x45°	r	○	●
		1285.0545*	APFT 16 04 PD FL-121	G	9.52	4.76	16.70	4.5	10°	0.2x45°	l	○	●
1285.0620	APFT 16 04 08 FR-121	G	9.52	4.76	16.70	4.5	10°	R 0.8	r	○	●		
1285.0645*	APFT 16 04 08 FL-121	G	9.52	4.76	16.70	4.5	10°	R 0.8	l	○	●		
Carbide 12CR	AlCrN	1285.0410	APHT 16 04 PD FR-222	G	9.52	4.76	16.70	4.5	16°		r	●	●
	TiAlN	1285.0400	APHT 16 04 PD FR-222	G	9.52	4.76	16.70	4.5	16°		r	●	●

\*while stocks last



# Indexable inserts RPFT / RCFT HSS

Indexable inserts

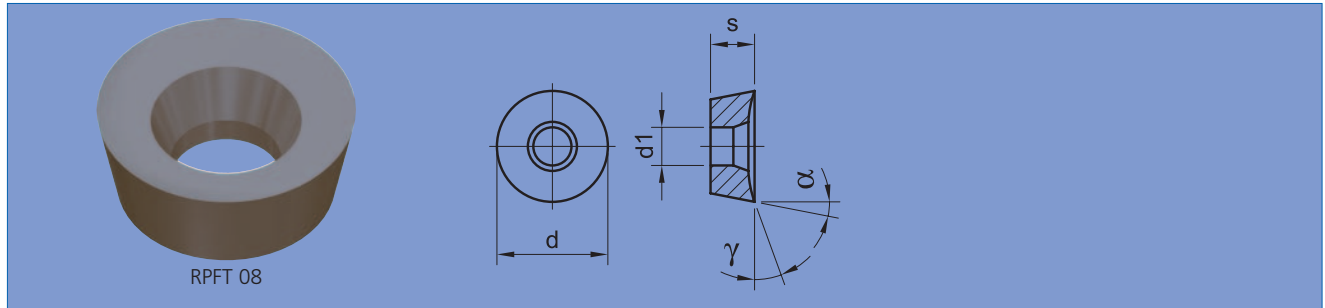


Cutting material	Coating	Part No	ISO Code	d mm	s mm	d1 mm	α	γ				
HSS-E	TiN	1076.0200	RPFT 06 02 M0	6.00	2.38	3.0	11°	20°	r/l	●		
		1076.0240	RPFT 08 03 M0	8.00	3.18	3.6	11°	20°	r/l	●		
		1076.0300	RPFT 10 T3 M0	10.00	3.97	4.5	11°	20°	r/l	●		
		1076.0400	RPFT 12 04 M0	12.00	4.76	5.5	11°	20°	r/l	●		
		1076.0410	RPFT 12 04 M0	12.00	4.76	5.5	11°	30°	r/l	●		
		1076.0450	RPFT 12 04 00	12.70	4.76	5.5	11°	20°	r/l	●		
		1576.0200	RCFT 06 02 M0	6.00	2.38	3.0	7°	25°	r/l	●		
		1576.0240	RCFT 08 03 M0	8.00	3.18	3.6	7°	25°	r/l	●		
		1576.0250	RCFT 08 03 M0	8.00	3.18	4.5	7°	25°	r/l	●		
		1576.0300	RCFT 10 T3 M0	10.00	3.97	4.5	7°	25°	r/l	●		
		1576.0400	RCFT 12 04 M0	12.00	4.76	5.5	7°	25°	r/l	●		
		1576.0500	RCFT 16 06 M0	16.00	6.35	5.5	7°	25°	r/l	●		
		1576.0600	RCFT 20 06 M0	20.00	6.35	6.5	7°	25°	r/l	●		
		1151.0200	TiAlN	RPFT 06 02 M0	6.00	2.38	3.0	11°	20°	r/l	●	
		1151.0240		RPFT 08 03 M0	8.00	3.18	3.6	11°	20°	r/l	●	
	1151.0300	RPFT 10 T3 M0		10.00	3.97	4.5	11°	20°	r/l	●		
	1151.0400	RPFT 12 04 M0		12.00	4.76	5.5	11°	20°	r/l	●		
	1151.0410	RPFT 12 04 M0		12.00	4.76	5.5	11°	30°	r/l	●		
	1151.0450	RPFT 12 04 00		12.70	4.76	5.5	11°	20°	r/l	●		
	1651.0200	RCFT 06 02 M0		6.00	2.38	3.0	7°	25°	r/l	●		
	1651.0240	RCFT 08 03 M0		8.00	3.18	3.6	7°	25°	r/l	●		
	1651.0250	RCFT 08 03 M0		8.00	3.18	4.5	7°	25°	r/l	●		
	1651.0300	RCFT 10 T3 M0		10.00	3.97	4.5	7°	25°	r/l	●		
	1651.0400	RCFT 12 04 M0		12.00	4.76	5.5	7°	25°	r/l	●		
	1651.0500	RCFT 16 06 M0		16.00	6.35	5.5	7°	25°	r/l	●		
	1651.0600	RCFT 20 06 M0		20.00	6.35	6.5	7°	25°	r/l	●		



## Indexable inserts RPFT / RPHT

### Carbide



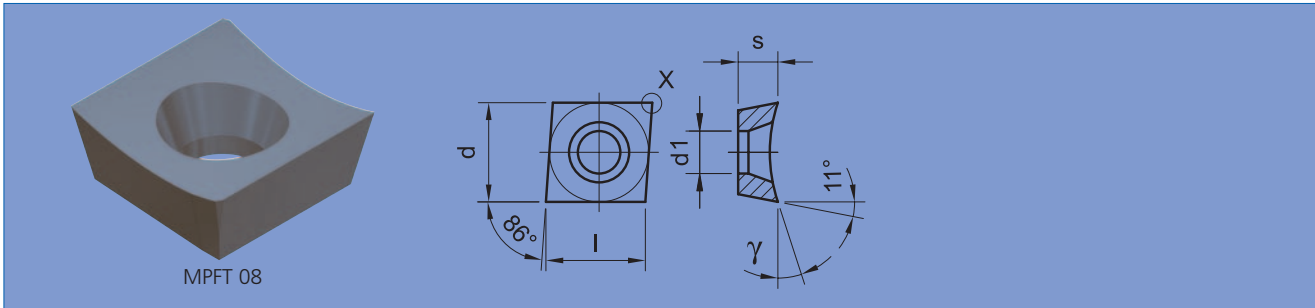
Cutting material	Coating	Part No	ISO Code	d mm	s mm	d1 mm	$\alpha$	$\gamma$			
Carbide MG20	TiN	1276.0200	RPFT 06 02 M0-111	6.00	2.38	3.0	11°	20°	r/l	○	●
		1276.0240	RPFT 08 03 M0-111	8.00	3.18	3.6	11°	20°	r/l	○	●
		1276.0300	RPFT 10 T3 M0-111	10.00	3.97	4.5	11°	20°	r/l	○	●
	TiAlN	1276.0400	RPFT 12 04 M0-111	12.00	4.76	5.5	11°	20°	r/l	○	●
		1276.0205	RPFT 06 02 M0-111	6.00	2.38	3.0	11°	20°	r/l	○	●
		1276.0245	RPFT 08 03 M0-111	8.00	3.18	3.6	11°	20°	r/l	○	●
		1276.0305	RPFT 10 T3 M0-111	10.00	3.97	4.5	11°	20°	r/l	○	●
	AlCrN	1276.0405	RPFT 12 04 M0-111	12.00	4.76	5.5	11°	20°	r/l	○	●
		1276.0215	RPFT 06 02 M0-111	6.00	2.38	3.0	11°	20°	r/l	○	●
		1276.0217	RPFT 06 02 M0-131	6.00	2.38	3.0	11°	8°	r/l	○	●
		1276.0255	RPFT 08 03 M0-111	8.00	3.18	3.6	11°	20°	r/l	○	●
		1276.0257	RPFT 08 03 M0-131	8.00	3.18	3.6	11°	8°	r/l	○	●
	AlCrN-VA	1276.0315	RPFT 10 T3 M0-111	10.00	3.97	4.5	11°	20°	r/l	○	●
		1276.0317	RPFT 10 T3 M0-131	10.00	3.97	4.5	11°	8°	r/l	○	●
		1276.0415	RPFT 12 04 M0-111	12.00	4.76	5.5	11°	20°	r/l	○	●
		1276.0222	RPFT 06 02 M0-131	6.00	2.38	3.0	11°	8°	r/l	○	●
		1276.0262	RPFT 08 03 M0-131	8.00	3.18	3.6	11°	8°	r/l	○	●
1276.0322		RPFT 10 T3 M0-131	10.00	3.97	4.5	11°	8°	r/l	○	●	
Carbide 12CR	TiAlN	1276.0420	RPHT 12 04 M0-222	12.00	4.76	5.5	11°	16°	r/l	○	●
	AlCrN	1276.0430	RPHT 12 04 M0-222	12.00	4.76	5.5	11°	16°	r/l	○	●
	AlCrN-VA	1276.0530	RPFT 12 04 M0-231	11.94	4.60	5.5	11°	6°	r/l	○	●
		1276.0535	RPFT 12 04 M0-231	11.94	4.60	5.5	11°	6°	r/l	○	●



# Indexable inserts MPFT

## HSS and carbide

Indexable inserts

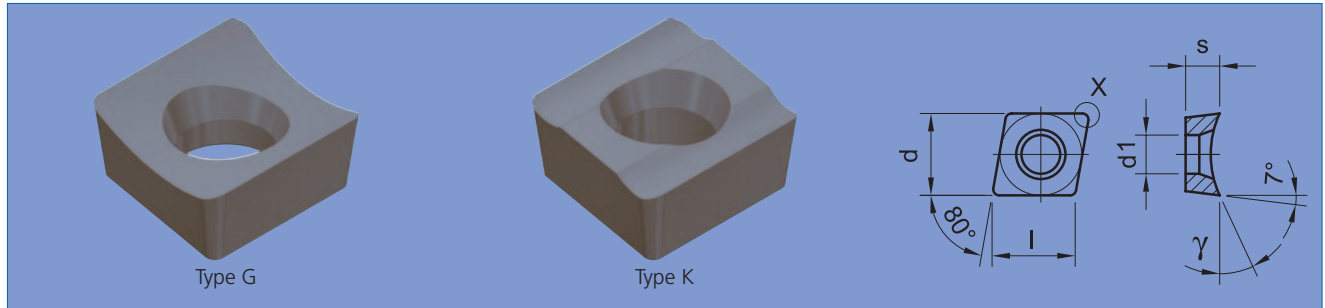


Cutting material	Coating	Part No	ISO Code	d mm	s mm	l mm	d1 mm	γ	Detail X			
HSS-E	TiN	1081.0200	MPFT 04 02 PP FR	4.76	2.38	4.70	2.4	18°	0.2x45°	r	●	
		1081.0210	MPFT 04 02 PP FL	4.76	2.38	4.70	2.4	18°	0.2x45°	l	●	
		1081.0250	MPFT 06 02 PP FR	6.35	2.38	6.30	3.0	18°	0.2x45°	r	●	
		1081.0260	MPFT 06 02 PP FL	6.35	2.38	6.30	3.0	18°	0.2x45°	l	●	
		1081.0300	MPFT 08 03 PP FR	7.94	3.18	8.00	3.4	18°	0.2x45°	r	●	
		1081.0310	MPFT 08 03 PP FL	7.94	3.18	8.00	3.4	18°	0.2x45°	l	●	
		1081.0330*	MPFT 08 03 08 FR	7.94	3.18	8.00	3.4	18°	R 0.8	r	●	
		1081.0335*	MPFT 08 03 08 FL	7.94	3.18	8.00	3.4	18°	R 0.8	l	●	
		1581.0210	MPFT 04 02 PP FL	4.76	2.38	4.70	2.4	18°	0.2x45°	l	●	
		1156.0200	MPFT 04 02 PP FR	4.76	2.38	4.70	2.4	18°	0.2x45°	r	●	
		1156.0250	MPFT 06 02 PP FR	6.35	2.38	6.30	3.0	18°	0.2x45°	r	●	
		1156.0300	MPFT 08 03 PP FR	7.94	3.18	8.00	3.4	18°	0.2x45°	r	●	
		1156.0330*	MPFT 08 03 08 FR	7.94	3.18	8.00	3.4	18°	R 0.8	r	●	
		1656.0210	MPFT 04 02 PP FL	4.76	2.38	4.70	2.4	18°	0.2x45°	l	●	
		Carbide MG20	TiN	1281.0425	MPFT 06 02 PP FL-111	6.35	2.38	6.30	3.0	18°	0.2x45°	l
1281.0400	MPFT 06 02 PP FR-111			6.35	2.38	6.30	3.0	18°	0.2x45°	r	○	●
1281.0600	MPFT 08 03 PP FR-111			7.94	3.18	8.00	3.4	18°	0.2x45°	r	○	●
TiAlN	1281.0625		MPFT 08 03 PP FL-111	7.94	3.18	8.00	3.4	18°	0.2x45°	l	○	●
	1281.0405		MPFT 06 02 PP FR-111	6.35	2.38	6.30	3.0	18°	0.2x45°	r	○	●
	1281.0430		MPFT 06 02 PP FL-111	6.35	2.38	6.30	3.0	18°	0.2x45°	l	○	●
AlCrN	1281.0605		MPFT 08 03 PP FR-111	7.94	3.18	8.00	3.4	18°	0.2x45°	r	○	●
	1281.0630		MPFT 08 03 PP FL-111	7.94	3.18	8.00	3.4	18°	0.2x45°	l	○	●
	1281.0415		MPFT 06 02 PP FR-111	6.35	2.38	6.30	3.0	18°	0.2x45°	r	○	●
	1281.0440		MPFT 06 02 PP FL-111	6.35	2.38	6.30	3.0	18°	0.2x45°	l	○	●
	1281.0615		MPFT 08 03 PP FR-111	7.94	3.18	8.00	3.4	18°	0.2x45°	r	○	●
	1281.0640		MPFT 08 03 PP FL-111	7.94	3.18	8.00	3.4	18°	0.2x45°	l	○	●

\*while stocks last



# Indexable inserts CCFT HSS



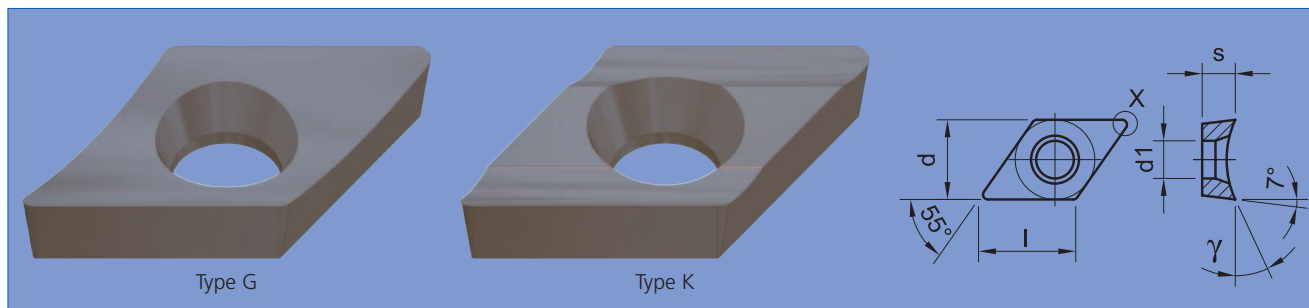
Cutting material	Coating	Part No	ISO Code	Type G/K	d mm	s mm	l mm	d1 mm	γ	Detail X			
HSS-E	TiN	1578.0245	CCFT 06 02 01 FR	G	6.35	2.38	6.40	3.0	20°	R 0.1	r	●	
		1578.0247	CCFT 06 02 01 FL	G	6.35	2.38	6.40	3.0	20°	R 0.1	l	●	
		1578.0250	CCFT 06 02 02 FR	G	6.35	2.38	6.40	3.0	20°	R 0.2	r	●	
		1578.0252	CCFT 06 02 02 FL	G	6.35	2.38	6.40	3.0	20°	R 0.2	l	●	
		1578.0255	CCFT 06 02 04 FR	G	6.35	2.38	6.40	3.0	20°	R 0.4	r	●	
		1578.0257	CCFT 06 02 04 FL	G	6.35	2.38	6.40	3.0	20°	R 0.4	l	●	
		1578.0350	CCFT 09 T3 02 FR	G	9.52	3.96	9.70	4.5	25°	R 0.2	r	●	
		1578.0352	CCFT 09 T3 02 FL	G	9.52	3.96	9.70	4.5	25°	R 0.2	l	●	
		1578.0355	CCFT 09 T3 04 FR	G	9.52	3.96	9.70	4.5	25°	R 0.4	r	●	
		1578.0357	CCFT 09 T3 04 FL	G	9.52	3.96	9.70	4.5	25°	R 0.4	l	●	
		1578.0360	CCFT 09 T3 08 FR	G	9.52	3.96	9.70	4.5	25°	R 0.8	r	●	
		1578.0362	CCFT 09 T3 08 FL	G	9.52	3.96	9.70	4.5	25°	R 0.8	l	●	
		1578.0750	CCFT 06 02 02 FR	K	6.35	2.38	6.40	3.0	30°	R 0.2	r	●	
		1578.0752	CCFT 06 02 02 FL	K	6.35	2.38	6.40	3.0	30°	R 0.2	l	●	
		1578.0755	CCFT 06 02 04 FR	K	6.35	2.38	6.40	3.0	30°	R 0.4	r	●	
		1578.0757	CCFT 06 02 04 FL	K	6.35	2.38	6.40	3.0	30°	R 0.4	l	●	
		1578.0855	CCFT 09 T3 04 FR	K	9.52	3.96	9.70	4.5	30°	R 0.4	r	●	
		1578.0857	CCFT 09 T3 04 FL	K	9.52	3.96	9.70	4.5	30°	R 0.4	l	●	
		1578.0860	CCFT 09 T3 08 FR	K	9.52	3.96	9.70	4.5	30°	R 0.8	r	●	
		1578.0862	CCFT 09 T3 08 FL	K	9.52	3.96	9.70	4.5	30°	R 0.8	l	●	
		TiAlN	1653.0245	CCFT 06 02 01 FR	G	6.35	2.38	6.40	3.0	20°	R 0.1	r	●
	1653.0247		CCFT 06 02 01 FL	G	6.35	2.38	6.40	3.0	20°	R 0.1	l	●	
	1653.0250		CCFT 06 02 02 FR	G	6.35	2.38	6.40	3.0	20°	R 0.2	r	●	
	1653.0252		CCFT 06 02 02 FL	G	6.35	2.38	6.40	3.0	20°	R 0.2	l	●	
	1653.0255		CCFT 06 02 04 FR	G	6.35	2.38	6.40	3.0	20°	R 0.4	r	●	
	1653.0257		CCFT 06 02 04 FL	G	6.35	2.38	6.40	3.0	20°	R 0.4	l	●	
	1653.0350		CCFT 09 T3 02 FR	G	9.52	3.96	9.70	4.5	25°	R 0.2	r	●	
	1653.0352		CCFT 09 T3 02 FL	G	9.52	3.96	9.70	4.5	25°	R 0.2	l	●	
	1653.0355		CCFT 09 T3 04 FR	G	9.52	3.96	9.70	4.5	25°	R 0.4	r	●	
	1653.0357		CCFT 09 T3 04 FL	G	9.52	3.96	9.70	4.5	25°	R 0.4	l	●	
	1653.0360		CCFT 09 T3 08 FR	G	9.52	3.96	9.70	4.5	25°	R 0.8	r	●	
	1653.0362		CCFT 09 T3 08 FL	G	9.52	3.96	9.70	4.5	25°	R 0.8	l	●	
	1653.0750		CCFT 06 02 02 FR	K	6.35	2.38	6.40	3.0	30°	R 0.2	r	●	
	1653.0752		CCFT 06 02 02 FL	K	6.35	2.38	6.40	3.0	30°	R 0.2	l	●	
	1653.0755		CCFT 06 02 04 FR	K	6.35	2.38	6.40	3.0	30°	R 0.4	r	●	
	1653.0757		CCFT 06 02 04 FL	K	6.35	2.38	6.40	3.0	30°	R 0.4	l	●	
	1653.0855		CCFT 09 T3 04 FR	K	9.52	3.96	9.70	4.5	30°	R 0.4	r	●	
	1653.0857		CCFT 09 T3 04 FL	K	9.52	3.96	9.70	4.5	30°	R 0.4	l	●	
	1653.0860		CCFT 09 T3 08 FR	K	9.52	3.96	9.70	4.5	30°	R 0.8	r	●	
	1653.0862		CCFT 09 T3 08 FL	K	9.52	3.96	9.70	4.5	30°	R 0.8	l	●	



# Indexable inserts DCFT

## HSS

Indexable inserts



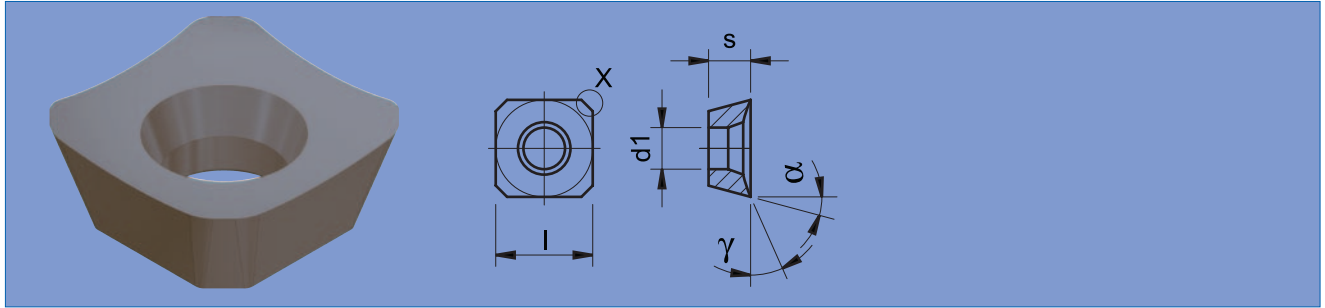
Cutting material	Coating	Part No	ISO Code	Type G/K	d mm	s mm	l mm	d1 mm	γ	Detail X			
HSS-E	TiN	1579.0245	DCFT 07 02 01 FR	G	6.35	2.38	7.75	3.0	20°	R 0.1	r	●	
		1579.0247	DCFT 07 02 01 FL	G	6.35	2.38	7.75	3.0	20°	R 0.1	l	●	
		1579.0250	DCFT 07 02 02 FR	G	6.35	2.38	7.75	3.0	20°	R 0.2	r	●	
		1579.0252	DCFT 07 02 02 FL	G	6.35	2.38	7.75	3.0	20°	R 0.2	l	●	
		1579.0255	DCFT 07 02 04 FR	G	6.35	2.38	7.75	3.0	20°	R 0.4	r	●	
		1579.0257	DCFT 07 02 04 FL	G	6.35	2.38	7.75	3.0	20°	R 0.4	l	●	
		1579.0355	DCFT 11 T3 04 FR	G	9.52	3.96	11.60	4.5	25°	R 0.4	r	●	
		1579.0357	DCFT 11 T3 04 FL	G	9.52	3.96	11.60	4.5	25°	R 0.4	l	●	
		1579.0360	DCFT 11 T3 08 FR	G	9.52	3.96	11.60	4.5	25°	R 0.8	r	●	
		1579.0362	DCFT 11 T3 08 FL	G	9.52	3.96	11.60	4.5	25°	R 0.8	l	●	
		1579.0750	DCFT 07 02 02 FR	K	6.35	2.38	7.75	3.0	30°	R 0.2	r	●	
		1579.0752	DCFT 07 02 02 FL	K	6.35	2.38	7.75	3.0	30°	R 0.2	l	●	
		1579.0755	DCFT 07 02 04 FR	K	6.35	2.38	7.75	3.0	30°	R 0.4	r	●	
		1579.0757	DCFT 07 02 04 FL	K	6.35	2.38	7.75	3.0	30°	R 0.4	l	●	
		1579.0855	DCFT 11 T3 04 FR	K	9.52	3.96	11.60	4.5	30°	R 0.4	r	●	
	1579.0857	DCFT 11 T3 04 FL	K	9.52	3.96	11.60	4.5	30°	R 0.4	l	●		
	1579.0860	DCFT 11 T3 08 FR	K	9.52	3.96	11.60	4.5	30°	R 0.8	r	●		
	1579.0862	DCFT 11 T3 08 FL	K	9.52	3.96	11.60	4.5	30°	R 0.8	l	●		
	TiAlN	1654.0245	DCFT 07 02 01 FR	G	6.35	2.38	7.75	3.0	20°	R 0.1	r	●	
		1654.0247	DCFT 07 02 01 FL	G	6.35	2.38	7.75	3.0	20°	R 0.1	l	●	
		1654.0250	DCFT 07 02 02 FR	G	6.35	2.38	7.75	3.0	20°	R 0.2	r	●	
		1654.0252	DCFT 07 02 02 FL	G	6.35	2.38	7.75	3.0	20°	R 0.2	l	●	
		1654.0255	DCFT 07 02 04 FR	G	6.35	2.38	7.75	3.0	20°	R 0.4	r	●	
		1654.0257	DCFT 07 02 04 FL	G	6.35	2.38	7.75	3.0	20°	R 0.4	l	●	
		1654.0355	DCFT 11 T3 04 FR	G	9.52	3.96	11.60	4.5	25°	R 0.4	r	●	
		1654.0357	DCFT 11 T3 04 FL	G	9.52	3.96	11.60	4.5	25°	R 0.4	l	●	
		1654.0360	DCFT 11 T3 08 FR	G	9.52	3.96	11.60	4.5	25°	R 0.8	r	●	
		1654.0362	DCFT 11 T3 08 FL	G	9.52	3.96	11.60	4.5	25°	R 0.8	l	●	
		1654.0750	DCFT 07 02 02 FR	K	6.35	2.38	7.75	3.0	30°	R 0.2	r	●	
		1654.0752	DCFT 07 02 02 FL	K	6.35	2.38	7.75	3.0	30°	R 0.2	l	●	
		1654.0755	DCFT 07 02 04 FR	K	6.35	2.38	7.75	3.0	30°	R 0.4	r	●	
		1654.0757	DCFT 07 02 04 FL	K	6.35	2.38	7.75	3.0	30°	R 0.4	l	●	
		1654.0855	DCFT 11 T3 04 FR	K	9.52	3.96	11.60	4.5	30°	R 0.4	r	●	
1654.0857		DCFT 11 T3 04 FL	K	9.52	3.96	11.60	4.5	30°	R 0.4	l	●		
1654.0860		DCFT 11 T3 08 FR	K	9.52	3.96	11.60	4.5	30°	R 0.8	r	●		
1654.0862		DCFT 11 T3 08 FL	K	9.52	3.96	11.60	4.5	30°	R 0.8	l	●		





## Indexable inserts SEFT

HSS and carbide



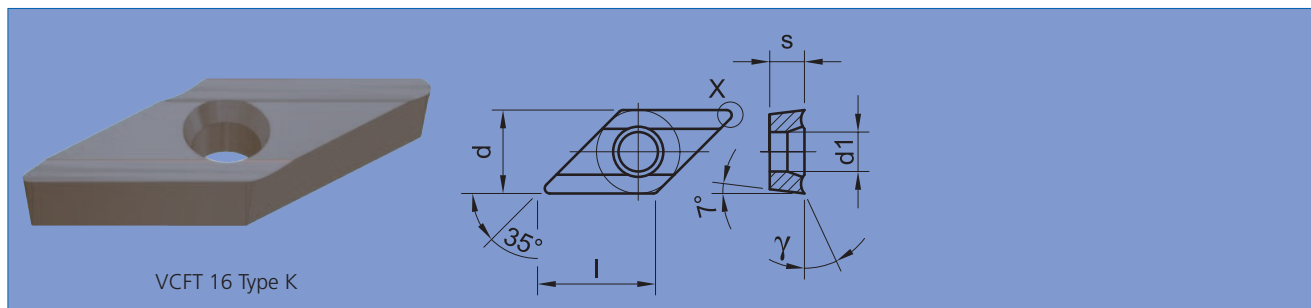
Cutting material	Coating	Part No	ISO Code	l mm	s mm	d1 mm	$\alpha$	$\gamma$	Detail X			
HSS-E	TiN	1091.0500	SEFT 12 04 AF FN	12.70	4.76	5.5	20°	12°	1.5x45° R0.8	r/l	●	
	TiAlN	1166.0500	SEFT 12 04 AF FN	12.70	4.76	5.5	20°	12°	1.5x45° R0.8	r/l	●	
Carbide MG20	TiN	1291.0500	SEFT 12 04 AF FN-111	12.70	4.76	5.5	20°	12°	1.5x45° R0.8	r/l	○	●
	TiAlN	1291.0505	SEFT 12 04 AF FN-111	12.70	4.76	5.5	20°	12°	1.5x45° R0.8	r/l	○	●
	AlCrN	1291.0515	SEFT 12 04 AF FN-111	12.70	4.76	5.5	20°	12°	1.5x45° R0.8	r/l	○	●



# Indexable inserts VCFT

## HSS

Indexable inserts



Cutting material	Coating	Part No	ISO Code	Type G/K	d mm	s mm	l mm	d1 mm	γ	Detail X			
HSS-E	TiN	1582.0855	VCFT 16 04 04 FR	K	9.52	4.76	16.60	4.5	30°	R 0.4	r	●	
		1582.0857	VCFT 16 04 04 FL	K	9.52	4.76	16.60	4.5	30°	R 0.4	l	●	
		1582.0860	VCFT 16 04 08 FR	K	9.52	4.76	16.60	4.5	30°	R 0.8	r	●	
		1582.0862	VCFT 16 04 08 FL	K	9.52	4.76	16.60	4.5	30°	R 0.8	l	●	
	TiAlN	1657.0855	VCFT 16 04 04 FR	K	9.52	4.76	16.60	4.5	30°	R 0.4	r	●	
		1657.0857	VCFT 16 04 04 FL	K	9.52	4.76	16.60	4.5	30°	R 0.4	l	●	
		1657.0860	VCFT 16 04 08 FR	K	9.52	4.76	16.60	4.5	30°	R 0.8	r	●	
		1657.0862	VCFT 16 04 08 FL	K	9.52	4.76	16.60	4.5	30°	R 0.8	l	●	

# Notes

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## Special tools

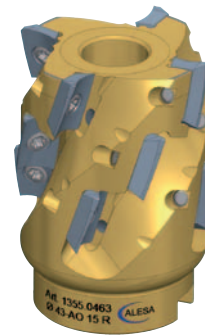
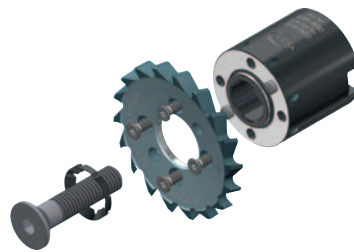
Your partner for customized system solutions!

Special dimensions

You know ALESA Ltd. as the specialists for highly positive and extremely sharply ground cutting inserts of HSS-E and carbide, and for special tools. The competence of ALESA Ltd. covers the entire process from design, engineering, selecting the right cutting materials and coatings, including the application technology.

That is why worldwide ALESA Ltd. is a highly competent partner. The product range includes, in addition to standardized tools, also complete customized system solutions.

Each standard tool can also be adapted to your individual needs.



## HSS tool blanks

According to your drawings and specifications:

Blanks from our main HSS sheet metal camp in Switzerland

- Thickness 0.8 - 6.0 mm
- HSS quality (No. 1.3343) and HSS-E (No. 1.3243 and 1.3247)
- Contour-cut by laser beam
- Raw or flat ground
- Case-hardened and tempered
- Finished ground to thickness
- Suitable, for example, for the manufacturing of flat or circular cutting blades.

We also take over the hardening and tempering of the blanks you have processed.

Sheets in other qualities can also be delivered to us for laser cutting and for possible additional operations.

The blanks that are processed by us are best suited for further processing through wire cutting.

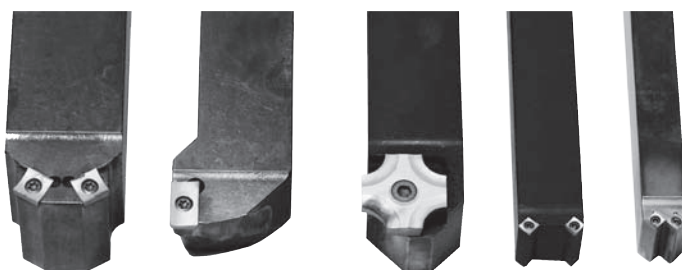
Ask for our non-binding offer.



## Special plane tools

Because of the hardness of HSS-E, the cutting inserts sustain the movements during entry and exit as well as uninterrupted cutting.

Through cutting insert technology always the same cutting edge geometry and repeat accuracy of measuring. No regrinding.



## Special tools – examples

Special tools with indexable inserts



Special tools

Special tools for turning and grooving











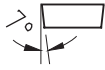




# ISO – Designation system for indexable inserts

Technical information



**A** **O** **F** **T** **15** **T3** **08** **F** **R** - **521**

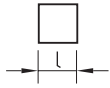
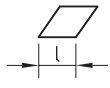


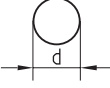
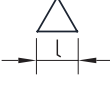
1      2      3      4      5      6      7      8      9      13

1 Basic shape		
<b>S</b>		90°
<b>C</b>		80°
<b>D</b>		55°
<b>M</b>		86°
<b>V</b>		35°
<b>A</b>		85°
<b>R</b>		
<b>T</b>		60°



2 Clearance angle	
<b>C</b>	
<b>D</b>	
<b>E</b>	
<b>N</b>	
<b>P</b>	
<b>O</b>	Symbol for other clearance angles which need more detail.

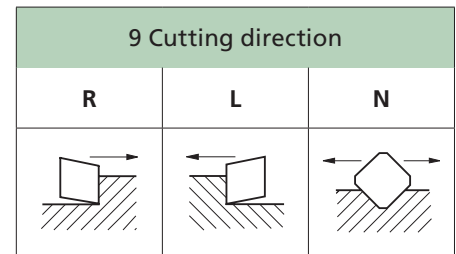
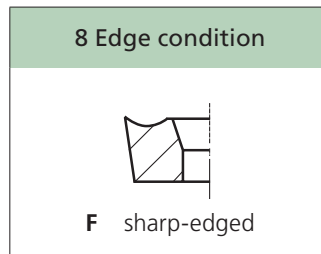
3 Tolerances			
	<b>F</b>	<b>H</b>	<b>E</b>
<b>d</b>	± 0.013	± 0.013	± 0.025
<b>m</b>	± 0.005	± 0.013	± 0.025
<b>s</b>	± 0.025	± 0.025	± 0.025


4 Type of inserts	
<b>T</b>	 for countersunk screws 40°–60° one-side groove for chips
<b>U</b>	 for countersunk screws 40°–60° two-side groove for chips
<b>X</b>	special tools which need more detail

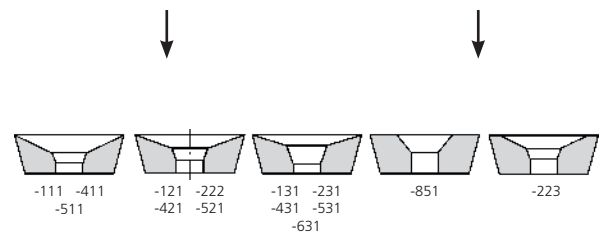
5 Edge length	
<b>S</b>	
<b>C, D, M, V</b>	
<b>L</b>	
<b>A, B</b>	
<b>R</b>	
<b>T</b>	

6 Thickness of inserts	
Index	<b>s</b>
<b>02</b>	2.38
<b>03</b>	3.18
<b>T3</b>	3.97
<b>S4</b>	4.20
<b>04</b>	4.76
<b>05</b>	5.56
<b>06</b>	6.35
<b>07</b>	7.00

7 Corner edge			
<b>Rounded cutting edges</b>			
<b>Index</b>	<b>Radius</b>		
01	0.1 mm		
02	0.2 mm		
04	0.4 mm		
08	0.8 mm		
12	1.2 mm		
16	1.6 mm		
20	2.0 mm		
24	2.4 mm		
32	3.2 mm		
<b>Minor cutting edge</b>			
			
<b>K</b>		<b>α</b>	
A	45°	C	7°
P	90°	D	15°
Z	n. def.	E	20°
		F	25°
		P	11°
		Z	n. def.
<b>Round indexable inserts</b>			
00	For diameter with imperial dimensions in mm		
M0	For diameter in metric dimensions		



13 Additional number						
Substrate		Tool geometry		Features		
0		0	enlarged wedge 	0		
1	MG20	1		1	Completely ground	
2	12 CR	2		2	Peripheral ground	
3	CTS	3		3	Reinforced edge	
4	HM	4		4	Special coatings	
5	HM-F	5		5		
6	HA	6		6		
7		7		7		
8	KG14	8		8	8	
9	Misc.	9		9	9	
			fz plus			
			Misc.			

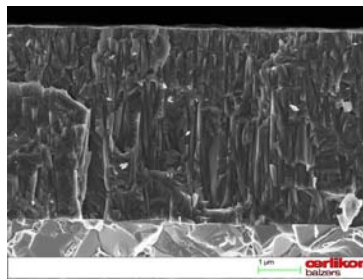


# Overview coatings on ALESA indexable inserts

Technical information

## TiN

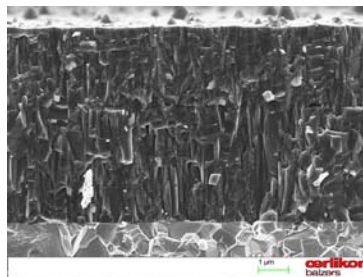
Hardness 2300 HV 0.05  
Coefficient of friction 0.4  
Max. temperature 600 °C  
Colour gold-yellow



The TiN coating is a universal standard, mainly on HSS tools. It is a good protection against abrasive- and adhesive wear. Often applied for decorative reasons or optical wear indicator.

## TiAlN

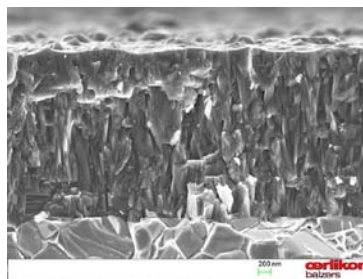
Hardness 3300 HV 0.05  
Coefficient of friction 0.3 - 0.35  
Max. temperature 900 °C  
Colour violet-grey



The perfect balance of hardness and compressive stress of TiAlN result in a very stable cutting edge. The excellent thermo and chemical consistency allow dry machining. The very high hardness of TiAlN protect against erosion and abrasive wear.

## AlCrN

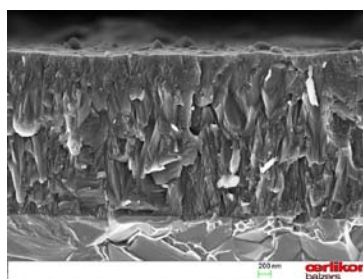
Hardness 3200 HV 0.05  
Coefficient of friction 0.35  
Max. temperature 1100 °C  
Colour light-grey



Excellent wear resistance, thermo-shock stability and warm hardness – those are the strength of AlCrN. It is the new Top – all-rounder for cutting tools, stamping, metal forming and Aluminum - die casting.

## AlCrN-VA

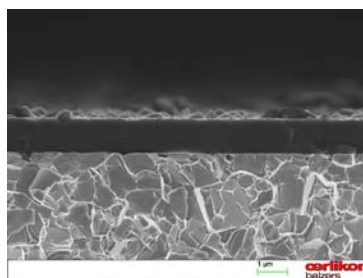
Hardness 3200 HV 0.05  
Coefficient of friction 0.3  
Max. temperature 1100 °C  
Colour light-grey



AlCrN-VA performs with a higher wear resistance, higher oxidation resistance and warm hardness. This results in up to 30% longer tool life in comparison to other high performance coatings. With AlCrN-VA productivity and quality improved cutting processes can be achieved even in difficult materials and alloys.

## DLC-H

Hardness >5000 HV 0.05  
Coefficient of friction 0.15  
Max. temperature 500 °C  
Colour black



Very high wear resistance, excellent coefficient of friction and perfect ply adhesion those are the property of DLC-H. This is the top coating for Aluminum and Aluminum alloys up to 12 % Silicon, non ferrous metals as Copper, Bronze, Silver, Gold, Platinum as well as GFK and CFK composite, organic materials as wood and paper.



# Range of coatings for indexable inserts

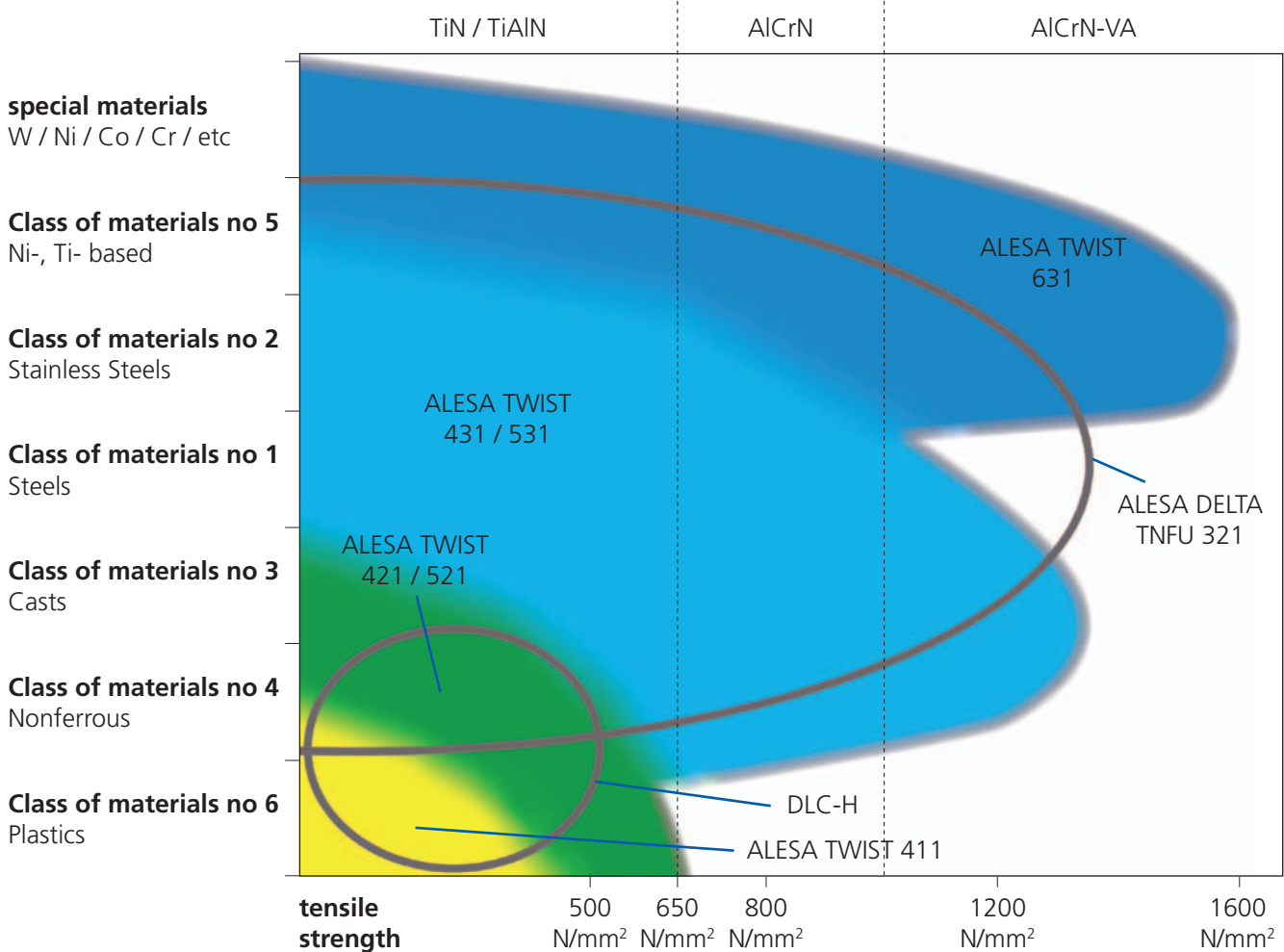
Material classification		HSS		Carbide				special coating
		TiN	TiAlN	TiAlN	AlCrN AlCrN-VA	DLC-H		
1a	<b>Steels &lt; 650 N/mm<sup>2</sup></b> - Construction steels - Fine grain steels - Case hardening steels - Steel castings	●	●	●	●			
1b	<b>Steels &lt; 800 N/mm<sup>2</sup></b> - Construction steels - Fine grain steels - Case hardening steels - Free-cutting steels - Heat-treatable steels - High-temperature constructional steels - Tough at subzero steels - Nitriding steels - Tool steels	●	●	●	●			
1c	<b>Steels 800 - 1200 Nmm<sup>2</sup></b> - Heat-treatable steels - High-temperature constructional steels - Tough at subzero steels - Nitriding steels - Tool steels - High speed steels - Heat-resisting steels		○	●	●			
1d	<b>Steels &gt; 1200 N/mm<sup>2</sup></b> - Heat-treatable steels - Nitriding steels - Tool steels - High speed steels			○	●			
2a	<b>Stainless steels &lt; 800 N/mm<sup>2</sup></b>	●	●	○	●			
2b	<b>Stainless steels &gt; 800 N/mm<sup>2</sup></b>		●	○	●			
3a	<b>Castings 1</b> - Grey cast iron < 150 HB - Cast iron with spheroidal graphite < 200 HB - Malleable cast iron < 200 HB - Magnesium cast alloy			●	●			
3b	<b>Castings 2</b> - Grey cast iron tempered > 150 HB - Cast iron with spheroidal graphite temp. > 200 HB - Malleable cast iron tempered > 200 HB			●	●			
3c	<b>Castings 3:</b> Steel castings < 800 N/mm <sup>2</sup>		○	●	●			
3d	<b>Castings 4:</b> Steel castings 800 - 1200 N/mm <sup>2</sup>		○	○	●			
3e	<b>Aluminium cast material &gt; 6% Si</b>			●	●	●		○
4a	<b>Non-ferrous metal:</b> Copper and copper-tin alloys	●	○	●	○	●		
4b	<b>Non-ferrous metal</b> - Copper-forging alloys - Copper-tin alloys (bronze)	●	●	●	●	●		
4c	<b>Non-ferrous metal</b> - Pure aluminium - Non hardened aluminium	●	●	●	●	●		
4d	<b>Non-ferrous metal:</b> Hardened aluminium	●	●	●	●	●		
4e	<b>Aluminium cast material &lt; 6% Si</b>	●	●	●	●	●		
5a	<b>Non-alloyed Ni / Ti &lt; 650 N/mm<sup>2</sup></b>		●	○	●			●
5b	<b>Ni-/Ti-based alloys &lt; 900 N/mm<sup>2</sup>, Duplex</b>		●	○	●			●
5c	<b>Ni-/Ti-based alloys 900 - 1200 N/mm<sup>2</sup></b>			○	●			●
6a	<b>Synthetic material - Thermoplast</b>	●	●	●	●	●		
6b	<b>Synthetic material - Duroplast</b> - Duroplast non laminated - Duroplast laminated	●	●	●	●	●		

# Substrate, geometry and coating selection for all ALESA TWIST- and DELTA indexable inserts

## Application recommendation for substrate, geometry and coating

Based on the material classification and the tensile strength, the suitable ALESA TWIST indexable insert can be selected by means of the 'cloud' graphics below. The substrate and geometry are defined with a 3 digit number (e.g. 431). You'll find the appropriate coating in the graphics headline.

Technical information



## Information about coatings

For carbide tools: PVD-coatings **based on AlCrN** showed best results. Besides the surface hardness of approx. 3'200 HV AlCrN-coatings have an improved application temperature and a good ply adhesion. AlCrN is perfect for material classification 1, 2 & 3. We recommend AlCrN-VAT for Duplex-materials, Material classification 5 and Cobalt-based alloys.

The **DLC-H** coating is very hard with > 5'000 HV. It is a very smooth coating with a low sticking effect of the chips. It has a very low friction coefficient. As a thin layer coating it maintains the sharp ground cutting edges. This coating is for NON – FERRITIC alloys only, as Copper, Tin, Lead, Silver, Gold, Platinum, Alum-alloys and -cast with up to 12% Silicon, GFK and CFK and organic materials as wood and paper. Recommended for application with characteristic abrasion und adhesion behaviour.

# Hardness scale

Tensile strength	Vickers	Brinell	Rockwell	
			N/mm2	HV10
720	225	214		
740	230	219		
755	235	223		
770	240	228	20.3	19.9
785	245	233	21.3	21.1
800	250	238	22.2	22.2
820	255	242	23.1	23.2
835	260	247	24	24.3
850	265	252	24.8	25.2
865	270	257	25.6	26.2
880	275	261	26.4	27.1
900	280	266	27.1	27.9
915	285	271	27.8	28.7
930	290	276	28.5	29.5
950	295	280	29.2	30.4
965	300	285	29.8	31.1
995	310	295	31	32.5
1030	320	304	32.2	33.9
1060	330	314	33.3	35.2
1095	340	323	34.4	36.5
1125	350	333	35.5	37.8
1155	360	342	36.6	39.1
1190	370	352	37.7	40.4
1220	380	361	38.8	41.7
1255	390	371	39.8	42.9
1290	400	380	40.8	44.1
1320	410	390	41.8	45.3
1350	420	399	42.7	46.4
1385	430	409	43.6	47.4
1420	440	418	44.5	48.4
1455	450	428	45.3	49.4
1485	460	437	46.1	50.4
1520	470	447	46.9	51.3
1555	480	456	47.7	52.2

Tensile strength	Vickers	Brinell	Rockwell	
			N/mm2	HV
1595	490	466	48.4	53.1
1630	500	475	49.1	53.9
1665	510	485	49.8	54.7
1700	520	494	50.5	55.6
1740	530	504	51.1	56.2
1775	540	513	51.7	57
1810	550	523	52.3	57.8
1845	560	532	53	58.6
1880	570	542	53.6	59.3
1920	580	551	54.1	59.9
1955	590	561	54.7	60.5
1995	600	570	55.2	61.2
2030	610	580	55.7	61.7
2070	620	589	56.3	62.4
2105	630	599	56.8	63
2145	640	608	57.3	63.5
2180	650	618	57.8	64.1
	660		58.3	64.7
	670		58.8	65.3
	680		59.2	65.7
	690		59.7	66.2
	700		60.1	66.7
	720		61	67.7
	740		61.8	68.6
	760		62.5	69.4
	780		63.3	70.2
	800		64	71
	820		64.7	71.8
	840		65.3	72.2
	860		65.9	73.1
	880		66.4	73.6
	900		67	74.2
	920		67.5	74.8
	940		68	75.4

Technical information

Extract from DIN 50150 table A.1 / ISO 18265 table A.1.  
Values correspond to non-alloyed steel.

# hm [mm] table

## Average chip thickness hm for milling with ALESA indexable inserts

Technical information

Material classification		Face milling				Profile milling					
		indexable insert cutting material / inserts geometry	SDFT RPFT	SDHT RPHT	SDFT09 SDFT12	AOFT	AOFT10	AOFT 15/20	AOFT TNFU	AOFT	APFT16
		111	222	223	481/581	HSS	HSS	_21	431/531	111	222
1a	<b>Steels &lt; 650 N/mm<sup>2</sup></b> - Construction steels - Fine grain steels - Case hardening steels - Steel castings	0.05 - 0.15	0.05 - 0.175	0.08 - 0.19	0.05 - 0.175	0.02 - 0.07	0.03 - 0.09	0.03 - 0.08	0.04 - 0.10	0.03 - 0.08	
1b	<b>Steels &lt; 800 N/mm<sup>2</sup></b> - Construction steels - Fine grain steels - Case hardening steels - Free-cutting steels - Heat-treatable steels - High-temperature constructional steels - Tough at subzero steels - Nitriding steels - Tool steels	0.04 - 0.10	0.05 - 0.135	0.05 - 0.15	0.05 - 0.135	0.02 - 0.06	0.03 - 0.08	0.03 - 0.065	0.04 - 0.08	0.03 - 0.065	0.04 - 0.075
1c	<b>Steels 800 - 1200 N/mm<sup>2</sup></b> - Heat-treatable steels - High-temperature constructional steels - Tough at subzero steels - Nitriding steels - Tool steels - High speed steels - Heat-resisting steels		0.04 - 0.10	0.05 - 0.12	0.04 - 0.10	0.015 - 0.045	0.03 - 0.06	0.025 - 0.05	0.03 - 0.065	0.025 - 0.05	0.03 - 0.065
1d	<b>Steels &gt; 1200 N/mm<sup>2</sup></b> - Heat-treatable steels - Nitriding steels - Tool steels - High speed steels			0.05 - 0.07					0.03 - 0.055	0.02 - 0.045	
2a	<b>Stainless steels &lt; 800 N/mm<sup>2</sup></b>	0.04-0.10	0.05-0.13	0.05-0.15	0.05-0.13	0.02-0.06	0.03-0.08	0.03-0.06	0.04-0.07	0.03-0.06	0.04-0.07
2b	<b>Stainless steels &gt; 800 N/mm<sup>2</sup></b>		0.04-0.10	0.05-0.12	0.04-0.10	0.01-0.04	0.03-0.06	0.02-0.05	0.03-0.06	0.02-0.05	0.03-0.06
3a	<b>Castings 1</b> - Grey cast iron < 150 HB - Cast iron with spheroidal graphite < 200 HB - Malleable cast iron < 200 HB - Magnesium cast alloy	0.05 - 0.15	0.05 - 0.175	0.08 - 0.20	0.05 - 0.175			0.03 - 0.08	0.05 - 0.12	0.04 - 0.08	0.05 - 0.18
3b	<b>Castings 2</b> - Grey cast iron tempered > 150 HB - Cast iron with spheroidal graphite temp. > 200 HB - Malleable cast iron tempered > 200 HB	0.05 - 0.12	0.05 - 0.135	0.05 - 0.15	0.05 - 0.135			0.03 - 0.065	0.04 - 0.09	0.04 - 0.065	0.04 - 0.09
3c	<b>Castings 3:</b> Steel castings < 800 N/mm <sup>2</sup>	0.04-0.10	0.05-0.13	0.05-0.15	0.05-0.13	0.02-0.06	0.03-0.08	0.03-0.06	0.04-0.08	0.03-0.06	0.04-0.08
3d	<b>Castings 4:</b> Steel castings 800 - 1200 N/mm <sup>2</sup>		0.05-0.10	0.05-0.12	0.05-0.10	0.01-0.04	0.03-0.06	0.03-0.05	0.03-0.06	0.03-0.05	0.03-0.06
3e	<b>Aluminium cast material &gt; 6% Si</b>	0.04-0.10	0.05-0.13	0.05-0.15	0.05-0.13	0.02-0.06	0.02-0.08	0.03-0.06	0.04-0.08	0.03-0.07	0.04-0.08
4a	<b>Non-ferrous metal:</b> Copper and copper-tin alloys	0.05-0.15	0.05-0.17		0.05-0.17	0.02-0.07	0.03-0.09	0.03-0.08	0.04-0.10	0.04-0.08	
4b	<b>Non-ferrous metal</b> - Copper-forging alloys - Copper-tin alloys (bronze)	0.04 - 0.10	0.05 - 0.135	0.05 - 0.15	0.05 - 0.135	0.02 - 0.06	0.03 - 0.08	0.03 - 0.065	0.03 - 0.08	0.03 - 0.065	
4c	<b>Non-ferrous metal</b> - Pure aluminium - Non hardened aluminium	0.05 - 0.20	0.05 - 0.20		0.05 - 0.20	0.04 - 0.10	0.04 - 0.12	0.04 - 0.12		0.05 - 0.15	
4d	<b>Non-ferrous metal:</b> Hardened aluminium	0.05 -0.15	0.05-0.17		0.05-0.17	0.02-0.07	0.03-0.09	0.03-0.08		0.03-0.08	
4e	<b>Aluminium cast material &lt; 6% Si</b>		0.05-0.13	0.05-0.15	0.05-0.13			0.03-0.06	0.04-0.08	0.03-0.06	0.04-0.08
5a	<b>Non-alloyed Ni / Ti &lt; 650 N/mm<sup>2</sup></b>	0.04-0.10	0.05-0.13	0.05-0.15	0.05-0.13	0.01-0.04	0.03-0.06	0.03-0.06	0.03-0.06	0.03-0.05	0.03-0.06
5b	<b>Ni-Ti-based alloys &lt; 900 N/mm<sup>2</sup>, Duplex</b>		0.04-0.10	0.05-0.12	0.04-0.10		0.03-0.05		0.03-0.05	0.03-0.04	
5c	<b>Ni-Ti-based alloys 900 - 1200 N/mm<sup>2</sup></b>		0.03-0.07	0.04-0.10	0.03-0.07				0.03-0.05	0.02-0.04	
6a	<b>Synthetic material - Thermoplast</b>	0.05-0.20	0.05-0.20		0.05-0.20	0.04-0.10	0.04-0.12	0.04-0.12		0.04-0.12	
6b	<b>Synthetic material - Duroplast</b> - Duroplast non laminated - Duroplast laminated	0.05 - 0.20	0.05 - 0.20		0.05 - 0.20	0.02 - 0.07	0.03 - 0.09	0.03 - 0.08		0.03 - 0.08	

# hm → fz table

## Determine the feed per tooth fz by means of the average chip thickness hm

The table shows the feed per tooth fz [mm] to choose for obtaining the required average chip thickness hm.

**Table valid for angle Kappa  $\kappa = 90^\circ$  (e.g. Profile milling)**

		ae in % of the tool diameter														
		5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	60%	70%	80%	90%	100%
average chip thickness hm	0.150 mm	0.677	0.483	0.398	0.348	0.314	0.290	0.271	0.257	0.245	0.236	0.222	0.212	0.208	0.208	0.236
	0.125 mm	0.564	0.402	0.331	0.290	0.262	0.242	0.226	0.214	0.204	0.196	0.185	0.177	0.173	0.173	0.196
	0.100 mm	0.451	0.322	0.265	0.232	0.209	0.193	0.181	0.171	0.163	0.157	0.148	0.142	0.138	0.139	0.157
	0.090 mm	0.406	0.290	0.239	0.209	0.188	0.174	0.163	0.154	0.147	0.141	0.133	0.127	0.125	0.125	0.141
	0.085 mm	0.383	0.273	0.225	0.197	0.178	0.164	0.154	0.146	0.139	0.134	0.126	0.120	0.118	0.118	0.134
	0.080 mm	0.361	0.257	0.212	0.185	0.168	0.155	0.145	0.137	0.131	0.126	0.118	0.113	0.111	0.111	0.126
	0.075 mm	0.338	0.241	0.199	0.174	0.157	0.145	0.136	0.128	0.123	0.118	0.111	0.106	0.104	0.104	0.118
	0.070 mm	0.316	0.225	0.186	0.162	0.147	0.135	0.127	0.120	0.114	0.110	0.103	0.099	0.097	0.097	0.110
	0.065 mm	0.293	0.209	0.172	0.151	0.136	0.126	0.118	0.111	0.106	0.102	0.096	0.092	0.090	0.090	0.102
	0.060 mm	0.271	0.193	0.159	0.139	0.126	0.116	0.109	0.103	0.098	0.094	0.089	0.085	0.083	0.083	0.094
	0.055 mm	0.248	0.177	0.146	0.128	0.115	0.106	0.099	0.094	0.090	0.086	0.081	0.078	0.076	0.076	0.086
	0.050 mm	0.226	0.161	0.133	0.116	0.105	0.097	0.090	0.086	0.082	0.079	0.074	0.071	0.069	0.069	0.079
	0.045 mm	0.203	0.145	0.119	0.104	0.094	0.087	0.081	0.077	0.074	0.071	0.066	0.064	0.062	0.062	0.071
	0.040 mm	0.180	0.129	0.106	0.093	0.084	0.077	0.072	0.068	0.065	0.063	0.059	0.057	0.055	0.056	0.063
	0.035 mm	0.158	0.113	0.093	0.081	0.073	0.068	0.063	0.060	0.057	0.055	0.052	0.050	0.048	0.049	0.055
0.030 mm	0.135	0.097	0.080	0.070	0.063	0.058	0.054	0.051	0.049	0.047	0.044	0.042	0.042	0.042	0.047	
0.020 mm	0.090	0.064	0.053	0.046	0.042	0.039	0.036	0.034	0.033	0.031	0.030	0.028	0.028	0.028	0.031	

**Table valid for angle Kappa  $\kappa = 45^\circ$  (e.g. Face milling)**

		ae in % of the tool diameter														
		5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	60%	70%	80%	90%	100%
average chip thickness hm	0.250 mm	1.595	1.138	0.937	0.820	0.740	0.683	0.639	0.605	0.578	0.555	0.522	0.501	0.489	0.491	0.555
	0.225 mm	1.435	1.024	0.844	0.738	0.666	0.615	0.576	0.545	0.520	0.500	0.470	0.451	0.440	0.442	0.500
	0.200 mm	1.276	0.910	0.750	0.656	0.592	0.546	0.512	0.484	0.462	0.444	0.418	0.400	0.391	0.393	0.444
	0.175 mm	1.116	0.796	0.656	0.574	0.518	0.478	0.448	0.424	0.404	0.389	0.365	0.350	0.343	0.343	0.389
	0.160 mm	1.021	0.728	0.600	0.525	0.474	0.437	0.409	0.387	0.370	0.355	0.334	0.320	0.313	0.314	0.355
	0.150 mm	0.957	0.683	0.562	0.492	0.444	0.410	0.384	0.363	0.347	0.333	0.313	0.300	0.294	0.294	0.333
	0.140 mm	0.893	0.637	0.525	0.459	0.415	0.383	0.358	0.339	0.324	0.311	0.292	0.280	0.274	0.275	0.311
	0.130 mm	0.829	0.592	0.487	0.426	0.385	0.355	0.333	0.315	0.300	0.289	0.272	0.260	0.254	0.255	0.289
	0.120 mm	0.765	0.546	0.450	0.393	0.355	0.328	0.307	0.291	0.277	0.267	0.251	0.240	0.235	0.236	0.267
	0.110 mm	0.702	0.501	0.412	0.361	0.326	0.301	0.281	0.266	0.254	0.244	0.230	0.220	0.215	0.216	0.244
	0.100 mm	0.638	0.455	0.375	0.328	0.296	0.273	0.256	0.242	0.231	0.222	0.209	0.200	0.196	0.196	0.222
	0.090 mm	0.574	0.410	0.337	0.295	0.267	0.246	0.230	0.218	0.208	0.200	0.188	0.180	0.176	0.177	0.200
	0.080 mm	0.510	0.364	0.300	0.262	0.237	0.219	0.205	0.194	0.185	0.178	0.167	0.160	0.157	0.157	0.178
	0.070 mm	0.446	0.319	0.262	0.229	0.207	0.191	0.179	0.169	0.162	0.156	0.146	0.140	0.137	0.137	0.156
	0.060 mm	0.383	0.273	0.225	0.197	0.178	0.164	0.153	0.145	0.139	0.133	0.125	0.120	0.117	0.118	0.133
0.050 mm	0.319	0.228	0.187	0.164	0.148	0.137	0.128	0.121	0.116	0.111	0.104	0.100	0.098	0.098	0.111	
0.040 mm	0.255	0.182	0.150	0.131	0.118	0.109	0.102	0.097	0.092	0.089	0.084	0.080	0.078	0.079	0.089	

**Table valid for angle Kappa  $\kappa = 15^\circ$  (e.g. High feed milling)**

		ae in % of the tool diameter														
		5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	60%	70%	80%	90%	100%
average chip thickness hm	0.250 mm	4.357	3.108	2.561	2.239	2.023	1.866	1.747	1.653	1.578	1.517	1.426	1.368	1.337	1.341	1.517
	0.225 mm	3.921	2.797	2.305	2.015	1.821	1.680	1.572	1.488	1.421	1.366	1.284	1.231	1.203	1.206	1.366
	0.200 mm	3.485	2.486	2.049	1.791	1.618	1.493	1.398	1.323	1.263	1.214	1.141	1.094	1.069	1.072	1.214
	0.175 mm	3.050	2.176	1.793	1.567	1.416	1.306	1.223	1.157	1.105	1.062	0.999	0.957	0.936	0.938	1.062
	0.160 mm	2.788	1.989	1.639	1.433	1.295	1.194	1.118	1.058	1.010	0.971	0.913	0.875	0.856	0.858	0.971
	0.150 mm	2.614	1.865	1.537	1.344	1.214	1.120	1.048	0.992	0.947	0.910	0.856	0.821	0.802	0.804	0.910
	0.140 mm	2.440	1.740	1.434	1.254	1.133	1.045	0.978	0.926	0.884	0.850	0.799	0.766	0.749	0.751	0.850
	0.130 mm	2.265	1.616	1.332	1.164	1.052	0.970	0.908	0.860	0.821	0.789	0.742	0.711	0.695	0.697	0.789
	0.120 mm	2.091	1.492	1.229	1.075	0.971	0.896	0.839	0.794	0.758	0.728	0.685	0.656	0.642	0.643	0.728
	0.110 mm	1.917	1.367	1.127	0.985	0.890	0.821	0.769	0.728	0.694	0.668	0.628	0.602	0.588	0.590	0.668
	0.100 mm	1.743	1.243	1.024	0.896	0.809	0.747	0.699	0.661	0.631	0.607	0.571	0.547	0.535	0.536	0.607
	0.090 mm	1.568	1.119	0.922	0.806	0.728	0.672	0.629	0.595	0.568	0.546	0.514	0.492	0.481	0.483	0.546
	0.080 mm	1.394	0.995	0.820	0.717	0.647	0.597	0.559	0.529	0.505	0.486	0.456	0.438	0.428	0.429	0.486
	0.070 mm	1.220	0.870	0.717	0.627	0.566	0.523	0.489	0.463	0.442	0.425	0.399	0.383	0.374	0.375	0.425
	0.060 mm	1.046	0.746	0.615	0.537	0.486	0.448	0.419	0.397	0.379	0.364	0.342	0.328	0.321	0.322	0.364
0.050 mm	0.871	0.622	0.512	0.448	0.405	0.373	0.349	0.331	0.316	0.303	0.285	0.274	0.267	0.268	0.303	
0.040 mm	0.697	0.497	0.410	0.358	0.324	0.299	0.280	0.265	0.253	0.243	0.228	0.219	0.214	0.214	0.243	

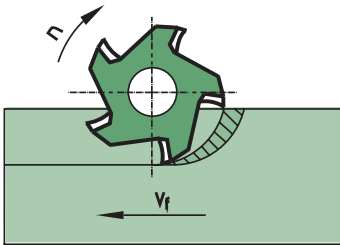
Technical information

# References and hints for problem solving

## Positioning of the milling tool

### favourable

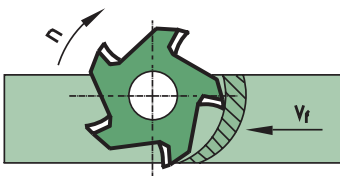
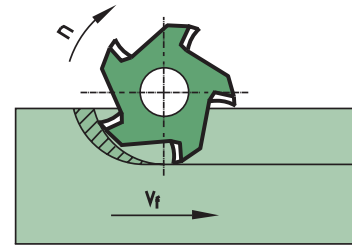
reduced eruption tendency  
improved surface finish  
longer tool life



### Climb milling vs. conventional milling

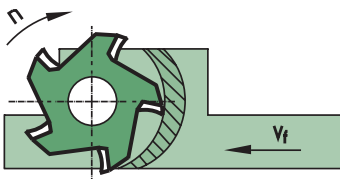
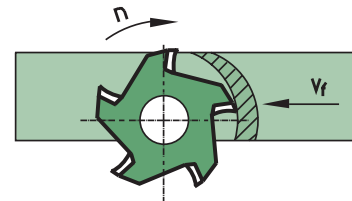
Climb milling should always be used unless the machine, clamping system or workpiece is not rigid enough.

### unfavourable



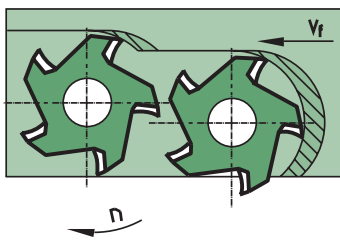
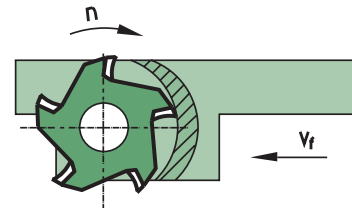
### Positioning of milling tool

Where possible the milling cutter should machine tangentially to the workpiece.



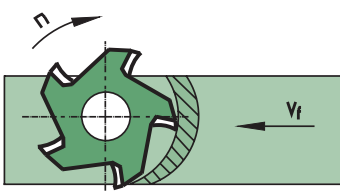
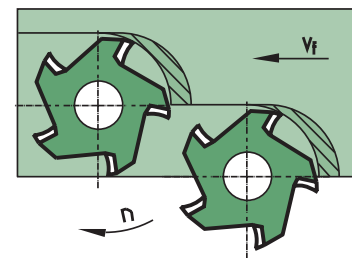
### Positioning of workpiece

Where possible to reduce cutting forces the milling cutter should machine tangentially over the complete length of the workpiece.



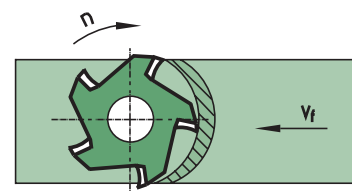
### Overlapping

When overlapping extreme caution should be exercised when exiting with the milling cutter (as shown in the left hand sketch).

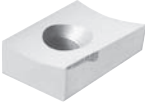
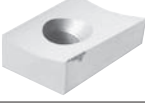
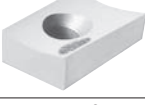
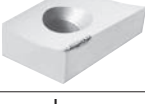






### Size of the milling tool

When face milling the diameter of the milling tool should be 20–30% larger than the width of the workpiece.



# Suggested solutions

Problem	Reason	Cutting speed	Feed	Cutting depth	With coolant	Without coolant	Climb milling	Conventional milling	Coating	Improve chip removal	Change positioning of the cutter	Reduce tool overlapping	Improve stability	Cutting edge angle
 <p>Excessive flank wear</p>	<ul style="list-style-type: none"> <li>Excessive cutting speed</li> <li>Depth of cut too small</li> <li>Feed too low</li> <li>Incorrect milling method</li> </ul>	↓	↑				■		■					
 <p>Excessive wear by indentation</p>	<ul style="list-style-type: none"> <li>Rough surface finish</li> <li>Surface hardening</li> </ul>	↓	↑	↑			■		■		■			■
 <p>Excessive crater wear</p>	<ul style="list-style-type: none"> <li>Increased cutting speed</li> <li>Depth of cut too large</li> <li>Increased cutting temperature</li> </ul>	↓	↓						■					
 <p>Deformation of the cutting edge</p>	<ul style="list-style-type: none"> <li>Increased cutting temperature</li> <li>Too high loading on the face</li> </ul>	↓	↓	↓					■	■	■			■
 <p>Built-up edge</p>	<ul style="list-style-type: none"> <li>Incorrect cutting temperature</li> <li>Feed rate too low</li> <li>Incorrect positioning of the milling cutter</li> <li>Incorrect milling method</li> </ul>	↑	↑			■	■		■		■			
 <p>Cracking</p>	<ul style="list-style-type: none"> <li>Increased feed per tooth</li> <li>Chip compression</li> <li>Chip welding</li> </ul>	↑	↓					■	■	■	■	■	■	
 <p>Thermal cracking</p>	<ul style="list-style-type: none"> <li>Unstable cutting temperature</li> <li>Interrupted cut</li> <li>Poor coolant pressure</li> </ul>	↓	↓			■			■		■			
 <p>Insert breakage</p>	<ul style="list-style-type: none"> <li>Excessive strain on the cutting edge</li> <li>Insert too small</li> <li>Insufficient machine power</li> </ul>	↓	↓	↓							■	■	■	■
<p>Poor surface finish</p>	<ul style="list-style-type: none"> <li>Excessive feed</li> <li>Spindle run out</li> <li>Poor rigidity</li> </ul>	↑	↓	↓	■					■	■	■	■	
<p>Vibration</p>	<ul style="list-style-type: none"> <li>Incorrect cutting data</li> <li>Poor rigidity</li> </ul>	↓	↑	↓				■			■	■	■	
<p>Eruptions at the workpiece edge</p>		↓	↓	↓			■				■			■

↑ = Increase   ↓ = Reduce   ■ = Remedy

# Formulas and calculations

## Symbols and variables

for all ALESA-formula pages

$a_e$	Cutting width	[mm]
$a_p$	Cutting depth	[mm]
$D$	Diameter of milling cutter	[mm]
$R$	Radius of milling cutter	[mm]
$m$	Free diameter of cutter	[mm]
$f_z$	Feed per tooth	[mm]
$h_m$	Average chip thickness	[mm]
$n$	Revolution	[rpm]
$Q$	Metal removal rate	[cm <sup>3</sup> /min]
$v_c$	Cutting speed	[m/min]
$v_f$	Feed rate	[mm/min]
$Z$	No. of teeth	
$\kappa$	Angle <Kappa>	[°]
$\Phi$	Angle <Phi>	[rad]

## General formulas

Cutting speed  
[m/min]

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

Revolution  
[rpm]

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

Feed rate  
[mm/min]

$$v_f = f_z \cdot n \cdot Z$$

Feed per tooth  
[mm]

$$f_z = \frac{v_f}{n \cdot Z}$$

Metal removal rate  
[cm<sup>3</sup>/min]

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

## Circular interpolation (external and internal)

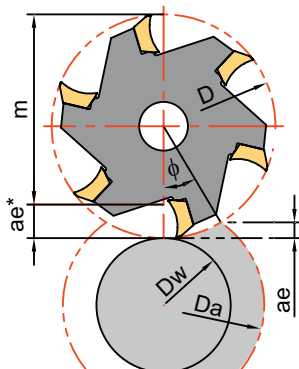
### Circular interpolation (external)

Feed rate  
(path speed to centre of milling tool)

$$v_f = \left(1 + \frac{D}{D_w}\right) \cdot n \cdot f_z \cdot Z$$

Real cutting depth

$$a_e = \frac{D_a^2 - D_w^2}{4 \cdot (D_w + D)}$$



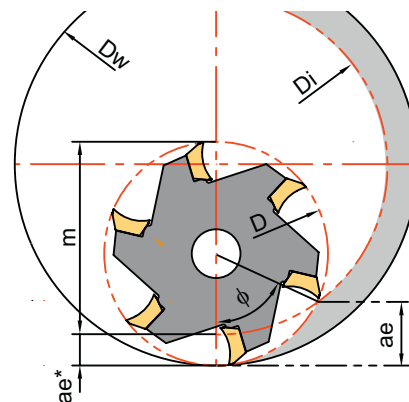
### Circular interpolation (internal)

Feed rate  
(path speed to centre of milling tool)

$$v_f = \left(1 - \frac{D}{D_w}\right) \cdot n \cdot f_z \cdot Z$$

Real cutting depth

$$a_e = \frac{D_w^2 - D_i^2}{4 \cdot (D_w - D)}$$



The average chip thickness  $h_m$  and the feed per tooth  $f_z$  can be calculated by means of the formulas on the following page. Please note that the calculated real cutting depth  $a_e$  and not the value  $a_e^*$  must be introduced in the formula.



# Formulas and calculations

## Minimum feed rate

valid for  $a_e \leq 30\%$  of the tool diameter

To remain above an average chip thickness of **hm = 0.01 mm**, the feed rate should remain above the following values:

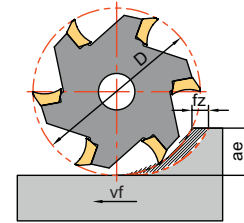
$a_e/D$ :	0.01	0.02	0.04	0.06	0.10	0.30
Min.- $f_z$ :	0.10	0.07	0.05	0.04	0.03	0.02

## Milling cutters and full-side cutters

simplified formula to use up to  $a_e/D \leq 30\%$

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

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



Technical information

## General formula for hm and fz

with angle of engaged cutting  $\Phi$

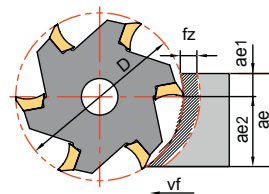
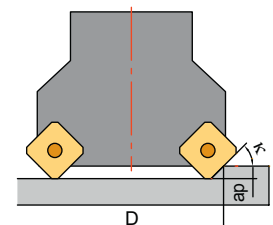
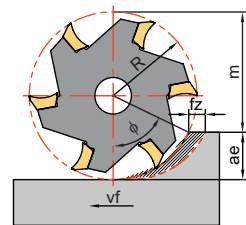
$$\Phi = \arcsin\left(1 - \frac{m}{R}\right) + \arcsin\left(\frac{a_e + m}{R} - 1\right)$$

Average chip thickness

$$h_m = \frac{f_z \cdot a_e}{\Phi \cdot R} \cdot \sin(K)$$

Feed per tooth

$$f_z = \frac{h_m \cdot \Phi \cdot R}{a_e} \cdot \frac{1}{\sin(K)}$$



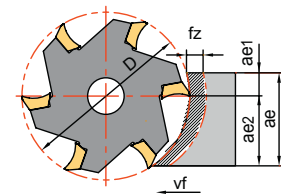
without angle of engaged cutting  $\Phi$

Average chip thickness

$$h_m = \frac{f_z \cdot a_e \cdot 360^\circ \cdot \sin(K)}{\pi \cdot D \cdot \left( \arcsin\left(\frac{2 \cdot a_{e1}}{D}\right) + \arcsin\left(\frac{2 \cdot a_{e2}}{D}\right) \right)}$$

Feed per tooth

$$f_z = \frac{h_m \cdot \pi \cdot D \cdot \left( \arcsin\left(\frac{2 \cdot a_{e1}}{D}\right) + \arcsin\left(\frac{2 \cdot a_{e2}}{D}\right) \right)}{\sin(K) \cdot 360^\circ \cdot a_e}$$



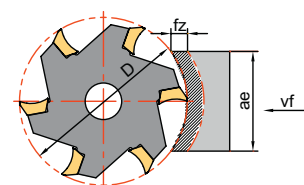
## Face milling – above center of workpiece

Average chip thickness

$$h_m = \frac{f_z \cdot a_e \cdot 180^\circ \cdot \sin(K)}{\pi \cdot D \cdot \arcsin\left(\frac{a_e}{D}\right)}$$

Feed per tooth

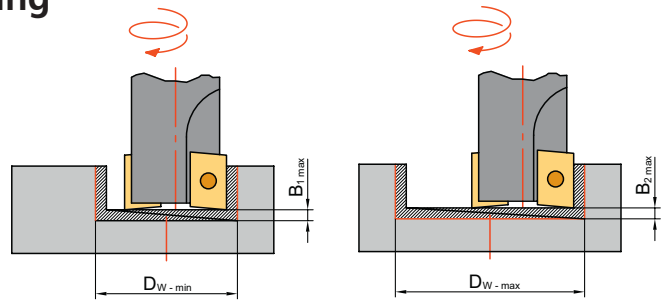
$$f_z = \frac{h_m \cdot \pi \cdot D \cdot \arcsin\left(\frac{a_e}{D}\right)}{\sin(K) \cdot 180^\circ \cdot a_e}$$



# Formulas and calculations

## Circularly interpolation whilst plunging

- $\beta$  Ramp angle
- $B$  Calculated ramp angle up to  $B_{max}$
- $D_w > D_{w-min}$  and  $D_w < D_{w-max}$
- $B_{1max}$  maximum ramp angle within the minimum bore
- $B_{2max}$  maximum ramp angle within the maximum bore
- $D$  Tool diameter
- $D_w$  Bore diameter
- $D_{w-max}$  maximum bore diameter
- $D_{w-min}$  minimum bore diameter



$$B = (D_w - D) \cdot \pi \cdot \tan \beta$$

Technical information

## Plunge milling - recommended bore diameter

### ALESA SPEED SD09

No 1318, 1352, 1353

$B_{max} = 1 \text{ mm}$

$\varnothing D \text{ mm}$	$\varnothing D1 \text{ mm}$	min $\varnothing$	max $\varnothing$	Ramp angle
12	27	39	54	8° 30'
16	31	47	62	6° 10'
25	40	65	80	4° 10'
32	47	79	94	2° 40'
40	55	98	110	2° 10'
50	65	115	130	1° 30'



### ALESA SPEED SD12

No 1322

$B_{max} = 1.5 \text{ mm}$

$\varnothing D \text{ mm}$	$\varnothing D1 \text{ mm}$	min $\varnothing$	max $\varnothing$	Ramp angle
50	70	120	140	2° 10'
63	83	146	166	1° 20'
83	103	186	206	1° 00'



### ALESA TWIST AO10

No 1311, 1347, 1348

$B_{max} = 0.4 \text{ mm}$

$\varnothing D \text{ mm}$	min $\varnothing$	max $\varnothing$	Ramp angle
16	19	32	2° 30'
20	27	40	2° 15'
25	37	50	1° 45'
32	51	64	1° 15'
40	67	80	1° 00'
50	87	100	0° 50'



### ALESA TWIST AO15

No 1311, 1347, 1348

$B_{max} = 0.45 \text{ mm}$

$\varnothing D \text{ mm}$	min $\varnothing$	max $\varnothing$	Ramp angle
25	34	50	1° 50'
32	48	64	1° 20'
40	64	80	1° 00'
50	84	100	0° 50'
63	110	126	0° 40'
80	144	160	0° 30'

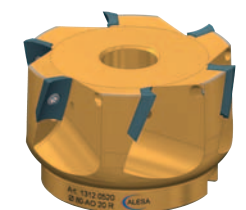


### ALESA TWIST AO20

No 1312

$B_{max} = 0.5 \text{ mm}$

$\varnothing D \text{ mm}$	min $\varnothing$	max $\varnothing$	Ramp angle
50	80	100	1° 00'
63	106	126	0° 50'
80	140	160	0° 40'
100	180	200	0° 30'

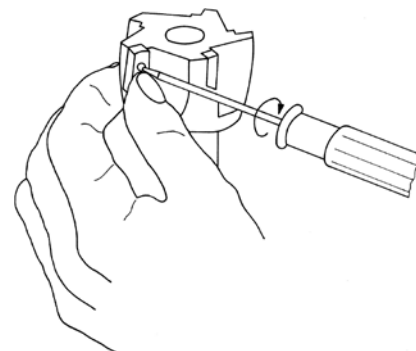


# Indexable Inserts

## Informationen and instructions

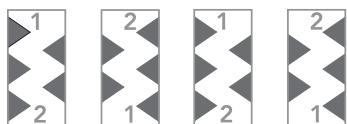
### Fitting instructions for inserts

1. Tool rest and positioning surface of inserts and milling head must be cleaned carefully.
2. Inserts must lie absolutely flat.
3. Before tightening the screw, the insert has to be pressed onto the positioning surface of the milling head.
4. Then, the screw has to be fully tightened.
5. Screws must be tightened again according to our torque table after initial milling operation. To be observed particularly when using screws  $\leq M 2,5$  (settling)!



Technical information

### Order of inserts with chip splitting



Order of even number of teeth



In case of odd number of teeth use indexable insert No 3 once

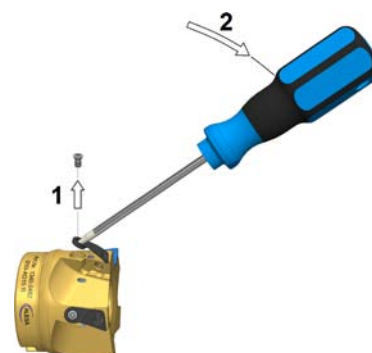
### How to handle the hydroschild on milling head Coolex, No 1340

#### Removal

1. Loosen the fixing screw (Torx 7IP)
2. Pull out the hydroschild with the screwdriver as shown on the picture.

#### Assembly

Attention: Line up pin (bottom) at first into the positioning groove



### Plunging and ramping

RP06 08 10	D	ap	$\beta$
	Ø 12	0.2	2.0°
Ø 16	0.5	5.0°	
Ø 20	0.7	4.0°	
Ø 25	1.5	5.0°	
Ø 32	2.0	5.0°	

RP12	D	ap	$\beta$
	Ø 40	2.0	2.8°
Ø 50	2.0	2.2°	
Ø 63	2.0	1.8°	
Ø 80	2.0	1.4°	
Ø 100	2.0	1.1°	
Ø 125	2.0	0.9°	

SD09	D	ap	$\beta$
	Ø 16	4.0	14°
Ø 20	4.0	11°	
Ø 25	4.0	9°	
Ø 32	4.0	7°	
Ø 40	4.0	5.5°	

SD09	D	ap	$\beta$
	Ø 40	4.0	5.7°
Ø 50	4.0	4.5°	
Ø 63	4.0	3.6°	
Ø 80	4.0	2.8°	
Ø 100	4.0	2.2°	

SD12	D	ap	$\beta$
	Ø 50	6.0	6.8°
Ø 63	6.0	5.4°	
Ø 80	6.0	4.2°	
Ø 100	6.0	3.4°	
Ø 125	6.0	2.7°	
Ø 160	6.0	2.1°	

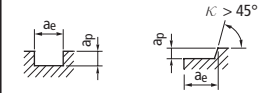
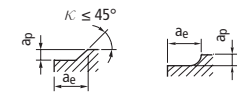

SPEED SD09	D	$\beta$
	Ø 12	8.8°
Ø 16	6.2°	
Ø 25	4.2°	

SPEED SD09	D	$\beta$
	Ø 32	2.7°
Ø 40	2.2°	
Ø 50	1.6°	

SPEED SD12	D	$\beta$
	Ø 50	2.2°
Ø 63	1.4°	
Ø 80	1.0°	

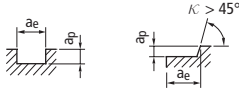

# Cutting speed $v_c$ [m/min] - Carbide

## Milling with ALESA indexable inserts (carbide)

Material classification		ae = 50% up to 100%			ae = 20% up to 50%			ae = less 20%		
		Slot milling / Face milling 			Face milling 			Profile milling 		
Coating		TiN / TiAlN	AlCrN / VA	DLC-H	TiN / TiAlN	AlCrN / VA	DLC-H	TiN / TiAlN	AlCrN / VA	DLC-H
1a	<b>Steels &lt; 650 N/mm<sup>2</sup></b> - Construction steels - Fine grain steels - Case hardening steels - Steel castings	100 - 240	200 - 300		180 - 280	250 - 350		220 - 320	300 - 400	
1b	<b>Steels &lt; 800 N/mm<sup>2</sup></b> - Construction steels - Fine grain steels - Case hardening steels - Free-cutting steels - Heat-treatable steels - High-temperature constructional steels - Tough at subzero steels - Nitriding steels - Tool steels	80 - 200	150 - 280		150 - 250	200 - 320		180 - 280	250 - 350	
1c	<b>Steels 800 - 1200 Nmm<sup>2</sup></b> - Heat-treatable steels - High-temperature constructional steels - Tough at subzero steels - Nitriding steels - Tool steels - High speed steels - Heat-resisting steels	80 - 160	100 - 180		100 - 220	100 - 230		150 - 240	150 - 280	
1d	<b>Steels &gt; 1200 N/mm<sup>2</sup></b> - Heat-treatable steels - Nitriding steels - Tool steels - High speed steels	80 - 125	80 - 125		100 - 150	100 - 150		100 - 200	100 - 200	
2a	<b>Stainless steels &lt; 800 N/mm<sup>2</sup></b>	80 - 160	100 - 180		100 - 220	100 - 230		150 - 240	150 - 280	
2b	<b>Stainless steels &gt; 800 N/mm<sup>2</sup></b>	80 - 125	80 - 125		100 - 150	100 - 150		100 - 200	100 - 200	
3a	<b>Castings 1</b> - Grey cast iron < 150 HB - Cast iron with spheroidal graphite < 200 HB - Malleable cast iron < 200 HB - Magnesium cast alloy	80 - 200	150 - 280		150 - 250	200 - 320		180 - 280	250 - 350	
3b	<b>Castings 2</b> - Grey cast iron tempered > 150 HB - Cast iron with spheroidal graphite temp. > 200 HB - Malleable cast iron tempered > 200 HB	80 - 160	100 - 180		100 - 220	100 - 230		150 - 240	150 - 280	
3c	<b>Castings 3:</b> Steel castings < 800 N/mm <sup>2</sup>	80 - 200	150 - 280		150 - 250	200 - 320		180 - 280	250 - 350	
3d	<b>Castings 4:</b> Steel castings 800 - 1200 N/mm <sup>2</sup>	80 - 160	100 - 180		100 - 220	100 - 230		150 - 240	150 - 280	
3e	<b>Aluminium cast material &gt; 6% Si</b>	100 - 270	100 - 270	250 - 400	100 - 270	120 - 280	400 - 600	180 - 340	200 - 400	600 - 800
4a	<b>Non-ferrous metal:</b> Copper and copper-tin alloys	160 - 300	200 - 400	1000-1500	700-1400	800-1500	1200-1800	800-1500	1000-2000	1500-2000
4b	<b>Non-ferrous metal</b> - Copper-forging alloys - Copper-tin alloys (bronze)	100 - 220	800-1200	1000-1500	110 - 230	800-1500	1200-1800	150 - 275	1000-2000	1500-2200
4c	<b>Non-ferrous metal</b> - Pure aluminium - Non hardened aluminium	600-1200	800-1500	1000-1500	700-1500	1000-2000	1200-1800	1000-2000	1500-2500	1800-2500
4d	<b>Non-ferrous metal:</b> Hardened aluminium	400-1000	600-1200	1000-1500	600-1200	1000-1500	1200-1800	1000-1500	1500-2000	1800-2500
4e	<b>Aluminium cast material &lt; 6% Si</b>	200 - 400	500-1000	1000-1500	300 - 500	700-1200	1000-1500	400 - 800	1000-1500	1500-2000
5a	<b>Non-alloyed Ni / Ti &lt; 650 N/mm<sup>2</sup></b>	80 - 125	80 - 125		100 - 150	100 - 150		100 - 200	100 - 200	
5b	<b>Ni-/Ti-based alloys &lt; 900 N/mm<sup>2</sup>, Duplex</b>	25 - 60	25 - 60		40 - 80	40 - 80		80 - 100	80 - 100	
5c	<b>Ni-/Ti-based alloys 900 - 1200 N/mm<sup>2</sup></b>	20 - 40	20 - 40		30 - 60	30 - 60		40 - 80	40 - 80	
6a	<b>Synthetic material - Thermoplast</b>	800-1200	800-1200	800-1500	800-1500	800-1500	1000-1800	1000-2000	1000-2000	1000-2200
6b	<b>Synthetic material - Duroplast</b> - Duroplast non laminated - Duroplast laminated	80 - 240	100 - 280	200-400	100 - 250	200 - 300	300 - 500	140 - 300	250 - 350	400 - 600

# Cutting speed $v_c$ [m/min] - HSS

## Milling with ALESA indexable inserts (HSS - High Speed Steel)

Material classification		ae = 50% up to 100%		ae = 20% up to 50%		ae = less 20%	
		Slot milling / Face milling 		Face milling 		Profile milling 	
Coating		TiN	TiAlN	TiN	TiAlN	TiN	TiAlN
1a	<b>Steels &lt; 650 N/mm<sup>2</sup></b> - Construction steels - Fine grain steels - Case hardening steels - Steel castings	60 - 80	65 - 90	60 - 90	65 - 100	65 - 100	70 - 110
1b	<b>Steels &lt; 800 N/mm<sup>2</sup></b> - Construction steels - Fine grain steels - Case hardening steels - Free-cutting steels - Heat-treatable steels - High-temperature constructional steels - Tough at subzero steels - Nitriding steels - Tool steels	40 - 60	50 - 70	50 - 70	55 - 75	55 - 75	60 - 80
1c	<b>Steels 800 - 1200 Nmm<sup>2</sup></b> - Heat-treatable steels - High-temperature constructional steels - Tough at subzero steels - Nitriding steels - Tool steels - High speed steels - Heat-resisting steels		35 - 55		40 - 60		40 - 70
1d	<b>Steels &gt; 1200 N/mm<sup>2</sup></b> - Heat-treatable steels - Nitriding steels - Tool steels - High speed steels		15 - 35		20 - 40		25 - 45
2a	<b>Stainless steels &lt; 800 N/mm<sup>2</sup></b>	40 - 60	50 - 70	50 - 70	55 - 75	55 - 75	60 - 80
2b	<b>Stainless steels &gt; 800 N/mm<sup>2</sup></b>		35 - 55		40 - 60		40 - 70
3a	<b>Castings 1</b> - Grey cast iron < 150 HB - Cast iron with spheroidal graphite < 200 HB - Malleable cast iron < 200 HB - Magnesium cast alloy						
3b	<b>Castings 2</b> - Grey cast iron tempered > 150 HB - Cast iron with spheroidal graphite temp. > 200 HB - Malleable cast iron tempered > 200 HB						
3c	<b>Castings 3:</b> Steel castings < 800 N/mm <sup>2</sup>		35 - 55		40 - 60		40 - 70
3d	<b>Castings 4:</b> Steel castings 800 - 1200 N/mm <sup>2</sup>		15 - 35		20 - 40		25 - 45
3e	<b>Aluminium cast material &gt; 6% Si</b>		60 - 130		60 - 150		150 - 300
4a	<b>Non-ferrous metal:</b> Copper and copper-tin alloys	150 - 300	160 - 400	700 - 1300	700 - 1500	800 - 1400	800 - 1600
4b	<b>Non-ferrous metal</b> - Copper-forging alloys - Copper-tin alloys (bronze)	80 - 100	90 - 110	90 - 110	90 - 120	100 - 200	100 - 200
4c	<b>Non-ferrous metal</b> - Pure aluminium - Non hardened aluminium	700 - 1500	700 - 1500	800 - 1600	800 - 1600	1000 - 2000	1000 - 2000
4d	<b>Non-ferrous metal:</b> Hardened aluminium	500 - 1000	500 - 1000	600 - 1200	600 - 1200	800 - 1500	800 - 1500
4e	<b>Aluminium cast material &lt; 6% Si</b>	300 - 500	400 - 600	400 - 600	500 - 700	600 - 800	600 - 1000
5a	<b>Non-alloyed Ni / Ti &lt; 650 N/mm<sup>2</sup></b>		50 - 70		55 - 75		60 - 80
5b	<b>Ni-/Ti-based alloys &lt; 900 N/mm<sup>2</sup>, Duplex</b>		15 - 40		20 - 40		25 - 45
5c	<b>Ni-/Ti-based alloys 900 - 1200 N/mm<sup>2</sup></b>						
6a	<b>Synthetic material - Thermoplast</b>	250 - 500	250 - 500	400 - 800	400 - 800	800 - 1400	800 - 1400
6b	<b>Synthetic material - Duroplast</b> - Duroplast non laminated - Duroplast laminated	70 - 100	70 - 100	80 - 120	80 - 120	100 - 160	100 - 160

# Cutting speed $v_c$ [m/min] - HSS

## Turning, Grooving, Planing and Shaping (guide lines)

Cutting conditions

Material classification		Turning			Grooving		Planing / Shaping	
		$v_c$	f (45°)	f	$v_c$	f	$v_c$	f
1a	<b>Steels &lt; 650 N/mm<sup>2</sup></b> - Construction steels - Fine grain steels - Case hardening steels - Steel castings	65 - 90	0.15 - 0.40	0.10 - 0.25	65 - 90	0.02 - 0.15	20 - 30	0.05 - 0.30
1b	<b>Steels &lt; 800 N/mm<sup>2</sup></b> - Construction steels - Fine grain steels - Case hardening steels - Free-cutting steels - Heat-treatable steels - High-temperature constructional steels - Tough at subzero steels - Nitriding steels - Tool steels	50 - 70	0.10 - 0.30	0.10 - 0.20	50 - 70	0.02 - 0.15	20 - 30	0.05 - 0.50
1c	<b>Steels 800 - 1200 N/mm<sup>2</sup></b> - Heat-treatable steels - High-temperature constructional steels - Tough at subzero steels - Nitriding steels - Tool steels - High speed steels - Heat-resisting steels	35 - 55	0.10 - 0.25	0.08 - 0.15	35 - 55	0.02 - 0.12	10 - 30	0.05 - 0.50
1d	<b>Steels &gt; 1200 N/mm<sup>2</sup></b> - Heat-treatable steels - Nitriding steels - Tool steels - High speed steels	20 - 40	0.10 - 0.20	0.05 - 0.12	20 - 40	0.02 - 0.10	10 - 20	0.05 - 0.30
2a	<b>Stainless steels &lt; 800 N/mm<sup>2</sup></b>	35 - 55	0.10 - 0.25	0.08 - 0.15	35 - 55	0.02 - 0.12	10 - 20	0.05 - 0.30
2b	<b>Stainless steels &gt; 800 N/mm<sup>2</sup></b>	20 - 40	0.10 - 0.20	0.05 - 0.12	20 - 40	0.02 - 0.10	10 - 20	0.05 - 0.30
3a	<b>Castings 1</b> - Grey cast iron < 150 HB - Cast iron with spheroidal graphite < 200 HB - Malleable cast iron < 200 HB - Magnesium cast alloy	50 - 70	0.10 - 0.50	0.10 - 0.25	50 - 70	0.02 - 0.15	20 - 30	0.05 - 0.50
3b	<b>Castings 2</b> - Grey cast iron tempered > 150 HB - Cast iron with spheroidal graphite temp. > 200 HB - Malleable cast iron tempered > 200 HB	20 - 40	0.10 - 0.30	0.08 - 0.18	20 - 40	0.02 - 0.10	10 - 20	0.05 - 0.30
3c	<b>Castings 3:</b> Steel castings < 800 N/mm <sup>2</sup>	35 - 55	0.10 - 0.30	0.10 - 0.20	35 - 55	0.02 - 0.12	10 - 20	0.05 - 0.30
3d	<b>Castings 4:</b> Steel castings 800 - 1200 N/mm <sup>2</sup>	20 - 40	0.10 - 0.25	0.08 - 0.15	20 - 40	0.02 - 0.10	10 - 20	0.05 - 0.30
3e	<b>Aluminium cast material &gt; 6% Si</b>	60 - 130	0.10 - 0.30	0.10 - 0.20	60 - 130	0.02 - 0.15	40 - 80	0.05 - 1.20
4a	<b>Non-ferrous metal:</b> Copper and copper-tin alloys	110 - 180	0.50 - 1.00	0.10 - 0.30	110 - 180	0.02 - 0.15	30 - 45	0.05 - 0.50
4b	<b>Non-ferrous metal</b> - Copper-forging alloys - Copper-tin alloys (bronze)	90 - 110	0.10 - 0.25	0.08 - 0.15	90 - 110	0.02 - 0.15	30 - 45	0.05 - 0.50
4c	<b>Non-ferrous metal</b> - Pure aluminium - Non hardened aluminium	400 - 900	0.50 - 1.50	0.10 - 0.50	400 - 900	0.02 - 0.18	40 - 80	0.05 - 1.20
4d	<b>Non-ferrous metal:</b> Hardened aluminium	140 - 240	0.10 - 0.40	0.10 - 0.25	140 - 240	0.02 - 0.15	40 - 80	0.05 - 1.20
4e	<b>Aluminium cast material &lt; 6% Si</b>	140 - 240	0.10 - 0.30	0.10 - 0.20	140 - 240	0.02 - 0.15	40 - 80	0.05 - 1.20
5a	<b>Non-alloyed Ni / Ti &lt; 650 N/mm<sup>2</sup></b>	50 - 70	0.10 - 0.30	0.10 - 0.20	50 - 70	0.02 - 0.15	20 - 30	0.05 - 0.30
5b	<b>Ni-Ti-based alloys &lt; 900 N/mm<sup>2</sup>, Duplex</b>	20 - 30	0.10 - 0.25	0.08 - 0.15	20 - 30	0.02 - 0.10	8 - 15	0.05 - 0.30
5c	<b>Ni-Ti-based alloys 900 - 1200 N/mm<sup>2</sup></b>	10 - 20	0.10 - 0.20	0.05 - 0.12	10 - 20	0.02 - 0.10	6 - 9	0.05 - 0.30
6a	<b>Synthetic material - Thermoplast</b>	250 - 900	0.10 - 0.50	0.10 - 0.25	250 - 900	0.02 - 0.18	40 - 80	0.05 - 1.50
6b	<b>Synthetic material - Duroplast</b> - Duroplast non laminated - Duroplast laminated	70 - 160	0.10 - 0.25	0.08 - 0.15	70 - 160	0.02 - 0.15	40 - 80	0.05 - 1.50

# Allocation of the materials

Material	Tensile strength	DIN-No.	DIN-Code	Euronorm EN	AFNOR	B.S.	AISI SAE	Material classification
Construction steels	< 650 N/mm <sup>2</sup>	1.0032 1.0035 1.0037 1.0044 1.0570	St34-2 St33 St37-2 St44-2 St52-3	S25GT S185 S 235 JR S 275 JR S 355 J2 G3	A 33 E 24-2 E 28-2	Fe 310-0 Fe 360 B Fe 430 B FN	A283 Gr.A A283 Gr.C, 1015 A570 Gr.40, 1020	1a
	< 800 N/mm <sup>2</sup>	1.0050 1.0060	St50-2 St60-2	E 295 E 335	A 50-2 A 60-2	Fe 490-2, 50C Fe 590-2 FN	A570 Gr.50 A572 Gr.65	1b
Fine grain steels	< 650 N/mm <sup>2</sup>	1.0970 1.0974 1.0978 1.0980	QStE 260 N QStE 340 TM QStE 380 TM QStE 420 TM	S 260 MC S 340 MC S 380 MC S 420 MC				1a
	< 800 N/mm <sup>2</sup>	1.0982 1.0984 1.0986	QStE 460 TM QStE 500 TM QStE 550 TM	S 460 MC S 500 MC S 550 MC				1b
Free-cutting steels	< 800 N/mm <sup>2</sup>	1.0711 1.0715 1.0718 1.0722 1.0726 1.0737	9S20 9SMn28 9SMnPb28 10SPb20 35S20 9SMnPb36	10S20 9SMn28 11SMnPb30 10SPb20 35S20 11SMnPb37	S 250 S 250 Pb 10 Pbf 2 35 MF 6 S 300 Pb	220M07 230M07  212M36	1112 1213 12L13 11L08 1140 12L14	1b
Case hardening steels	< 650 N/mm <sup>2</sup>	1.0301 1.0302 1.0401 1.1121 1.1141 1.7131	C10 C10Pb C15 Ck10 Ck15 16MnCr5	C10 C10 S15R 2C10 E C15E, 32C EN 10084:2008-06	C 10; XC 10 AF34C10 XC18, AF37C12 XC10 XC12	045M10 045M10 080M15 040A10 080M15 527M20	1010 1010 1015 1010 1015 5115	1a
	< 800 N/mm <sup>2</sup>	1.5752 1.5919 1.5920 1.6587	14NCr14 15CrNi6 18CrNi8 17CrNiMo6	ECN 35, 36A 15CrNi6 18CrNi8 18CrNiMo7-6	12NC15; 14NC12 16NC6 20NC6 18NCD6	655M13,655A12  820A16	3415; 3310 3115	1b
Heat-treatable steels	< 800 N/mm <sup>2</sup>	1.1151 1.1181 1.1191 1.1221 1.7218 1.7220 1.7225 1.7228	Ck22 Ck35 Ck45 Ck60 25CrMo4 34CrMo4 42CrMo4 50CrMo4	C22E C35E C45E C60E, 43D 25CrMo4 19B, 34CrMo4 19A, 42CrMo4 50CrMo4	XC25 XC38H2 XC42H1, XC45 C60; XC60 25CD4 35CD4 42CD4 50CrMo4	055M15 080A35 080M46 060A62 708A25 708A37 709M40 708A47	1023 C1034 1045 1060 4130 4137; 4135 4140, 4142 4150	1b
	800-1200 N/mm <sup>2</sup>	1.0601 1.0966 1.7218 1.7220 1.7225 1.7228 1.5864 1.6580 1.6582 1.7361 1.7707 1.8161	C 60 QStE 690 TM 25CrMo4 34CrMo4 42CrMo4 50CrMo4 35NiCr8 30CrNiMo8 34CrNiMo6 32CrMo12 30CrMoV9 58CrV4	C60 S 700 MC 25CrMo4 19B, 34CrMo4 19A, 42CrMo4 50CrMo4 35NiCr18 30CrNiMo8 EN24T, 34CrNiMo6 40B 30CrMoV9 58CrV4	CC55  25CD4 35CD4 42CD4 50 CrMo 4 40NC17 30CND8 35NCD6 30CD12	080A62  708A25 708A37 709M40 708A47  823M30 30CND8 816M40; 817M40 722M24	1060  4130 4137; 4135 4140, 4142 4150  4340, 4337	1c
	> 1200 N/mm <sup>2</sup>	1.7218 1.7220 1.7225 1.7228 1.5864 1.6580 1.6582 1.7361 1.7707 1.8161	25CrMo4 34CrMo4 42CrMo4 50CrMo4 35NiCr8 30CrNiMo8 34CrNiMo6 32CrMo12 30CrMoV9 58CrV4	25CrMo4 19B, 34CrMo4 19A, 42CrMo4 50CrMo4 35NiCr18 30CrNiMo8 EN24T, 34CrNiMo6 40B 30CrMoV9 58CrV4	25CD4 35CD4 42CD4 50 CrMo 4 40NC17 30CND8 35NCD6 30CD12	708A25 708A37 709M40 708A47  823M30 30CND8 816M40; 817M40 722M24	4130 4135; 4137 4140; 4142 4150  4340, 4337	1d
	< 800 N/mm <sup>2</sup>	1.0482 1.4922 1.5406 1.6513 1.8070	19Mn5 X20CrMoV12-1 17MoV8 4 28NiCrMo4 21CrMoV5 11	P 310 GH SEW310 17MoV8-4 110 21CrMoV5-11		762 816M40	416C 9840	1b
	> 800 N/mm <sup>2</sup>	1.0482 1.4922 1.5406 1.6513 1.8070	19Mn5 X20CrMoV12-1 17MoV8 4 28NiCrMo4 21CrMoV5 11	P 310 GH SEW310 17MoV8-4 110 21CrMoV5-11	40NCD3	816M40	416C 9840	1c
	< 800 N/mm <sup>2</sup>	1.6900 1.7219	X12CrNi189 26CrMo4	26CrMo4			4130, 4130H	1b
Tough at subzero steels	> 800 N/mm <sup>2</sup>	1.6900 1.7219	X12CrNi189 26CrMo4	26CrMo4			4130, 4130H	1c
	< 800 N/mm <sup>2</sup>	1.8504 1.8506	34CrAl6 31CrAlSi5					1b
Nitriding steels	800-1200 N/mm <sup>2</sup>	1.8507 1.8515 1.8519 1.8523 1.8550	34CrAlMo5 31CrMo12 31CrMoV9 39CrMoV13-9 34CrAlNi7	34CrAlMo5-10 31CrMo12 31CrMoV9 39CrMoV13-9 34CrAlNi7	30CAD6-12 30CD12	722M24	A355Cl-D	1c
	> 1200 N/mm <sup>2</sup>	1.8523 1.8550	39CrMoV139 34CrAlNi7	39CrMoV13-9 34CrAlNi7	40CDV12	897M39, 3S132		1d
Tool steels	< 800 N/mm <sup>2</sup>	1.2056 1.2162 1.2363 1.2519 1.2823	90Cr3 21MnCr5 X100CrMoV5-1 110WCrV5 70Si7	90Cr3 21MnCr5 X100CrMoV5-1 110WCrV5 70Si7	Z100CDV5	BA2	A2	1b
	800-1200 N/mm <sup>2</sup>	1.2080 1.2311 1.2312 1.2344	X210Cr12 40CrMnMo7 40CrMnMoS86 X40CrMoV5-1	X210Cr12 40CrMnNiMo8-6 40CrMnNiMoS8-6-4 X40CrMoV5-1	Z200C12 40CMD8 40CMD8S Z40CDV5	BD3	D3 H13	1c

Cutting conditions



# Allocation of the materials

Cutting conditions

Material	Tensile strength	DIN-No.	DIN-Code	Euronorm EN	AFNOR	B.S.	AISI SAE	Material classification				
	> 1200 N/mm <sup>2</sup>	1.2379	X155CrVMo12-1	X155CrVMo12-1	32CDV12-28	BD2	D2 D6	1c				
		1.2436	X210CrW12	X210CrW12	X210CW12-01							
		1.2567	X30WCrV5 3	X30WCrV5-3	X32WCRV5							
		1.2678	X45CoCrWV555	X45CoCrWV5-5-5								
		1.2713	55NiCrMoV6	55NiCrMoV6	55NCD7							
		1.2714	56NiCrMoV7	55NiCrMoV7								
		1.2743	60NiCrMo124	60NiCrMoV12-4								
		1.2766	35NiCrMo16	35NiCrMo16	35NCD16							
		1.2080	X210Cr12	X210Cr12	Z200C12				BP30			
	1.2311	40CrMnMo7	40CrMnNiMo8-6	40CMD8	BD3	D3	1d					
	1.2312	40CrMnMoS86	40CrMnNiMoS8-6-4	40CMD8S								
	1.2344	X40CrMoV5-1	X40CrMoV5-1	Z40CDV5								
	1.2379	X155CrVMo12-1	X155CrVMo12-1	32CDV12-28								
	1.2436	X210CrW12	X210CrW12	Z210CW12-01								
	1.2567	X30WCrV5 3	X30WCrV5-3	X32WCRV5								
	1.2678	X45CoCrWV555	X45CoCrWV5-5-5									
	1.2713	55NiCrMoV6	55NiCrMoV6	55NCDV7;								
	1.2714	56NiCrMoV7	55NiCrMoV7									
1.2743	60NiCrMo124	60NiCrMoV12-4										
1.2766	35NiCrMo16	35NiCrMo16	35NCD16									
High speed steels	800-1200 N/mm <sup>2</sup>	1.3207	S10-4-3-10	HS 10-4-3-10	Z130WKCDV	BT42 BM35 BM42 BM2	M42 M2 CLASS 1	1c				
		1.3243	S6-5-2-5	HS 6-5-2-5	Z85WDKCV							
		1.3247	S2-10-1-8	HS 2-10-1-8	Z110DKCWV							
	1.3343	S6-5-2	HS 6-5-2	Z85WDCV								
	> 1200 N/mm <sup>2</sup>	1.3207	S10-4-3-10	HS 10-4-3-10	Z130WKCDV	BT42 BM35 BM42 BM2	M42 M2 CLASS 1	1d				
		1.3243	S6-5-2-5	HS 6-5-2-5	Z85WDKCV							
1.3247		S2-10-1-8	HS 2-10-1-8	Z110DKCWV								
Steel castings	< 700 N/mm <sup>2</sup>	1.0416	GS-38	EN 10016-2:1995-04	Z30-400 M	A1 A2		1a				
		1.0446	GS-45	GE 240	E23-45 M							
		1.0552	GS-52	S355 JRC								
	< 800 N/mm <sup>2</sup>	1.5919	GS-15CrNi6	15CrNi6	16NC6	708A25 708A37 622	3115 4130 4137; 4135	3c				
		1.7218	GS-25CrMo4	25CrMo4	25CD4							
		1.7220	GS-34CrMo4	19B, 34CrMo4	35CD4							
	1.7379	GS-18CrMo910	G17CrMo9-10									
	800-1200 N/mm <sup>2</sup>	1.0416	GS-38	EN 10016-2:1995-04	Z30-400 M	A1 A2	3115 4130 4137; 4135	3d				
		1.0446	GS-45	GE 240	E23-45M							
		1.0552	GS-52	S355 JRC								
		1.5919	GS-15CrNi6	15CrNi6	16NC6							
		1.7218	GS-25CrMo4	25CrMo4	25CD4							
1.7220		GS-34CrMo4	19B, 34CrMo4	35CD4								
1.7379	GS-18CrMo910	G17CrMo9-10										
Grey cast iron	< 150 HB	0.6015	GG-15	EN-GJL-150	Ft 15 D	Grade 150 Grade 220 Grade 260 Grade 300	No 25B No 30B No 35B No 45B	3a				
		0.6020	GG-20	EN-GJL-200	Ft 20 D							
		0.6025	GG-25	EN-GJL-250	Ft 25 D							
		0.6030	GG-30	EN-GJL-300	Ft 30 D							
		0.6015	GG-15	EN-GJL-150	Ft 15 D				Grade 150 Grade 220 Grade 260 Grade 300	No 25B No 30B No 35B No 45B	3b	
0.6020	GG-20	EN-GJL-200	Ft 20 D									
0.6025	GG-25	EN-GJL-250	Ft 25 D									
0.6030	GG-30	EN-GJL-300	Ft 30 D									
0.7040	GGG-40	EN-GJS-400-15	FCS 400-12	SNG 420/12 SNG 500/7 SNG 600/3	60-40-18 65-54-12 80-55-06	3a						
0.7050	GGG-50	EN-GJS-500-7	FGS 500-7									
0.7060	GGG-60	EN-GJS-600-3	FGS 600-3									
Malleable cast iron	< 200 HB	0.8035	GTW-35-04	EN-GJS-800-2		B 340/12 P 440/7 P 510/4 P 570/3	32510 40010 50005 70003	3a				
		0.8040	GTW-40-05	EN-GJS-800-2								
		0.8045	GTW-45-07	EN-GJS-800-2								
		0.8135	GTS-35-10	EN-JM1010	MN 35-10							
		0.8145	GTS-45-06	EN-JM1040	MN 450							
		0.8155	GTS-55-04	EN-JM1050	MP 50-5							
0.8165	GTS-65-02	GJMB 650-2	MP 60-3									
Cast iron with spheroidal graphite tempered	> 200 HB	0.7040	GGG-40	EN-GJS-400-15	FCS 400-12	SNG 420/12 SNG 500/7 SNG 600/3 SNG 700/2	60-40-18 65-54-12 80-55-06 100-70-03	3b				
		0.7050	GGG-50	EN-GJS-500-7	FGS 500-7							
		0.7060	GGG-60	EN-GJS-600-3	FGS 600-3							
		0.7070	GGG-70	EN-GJS-700-2	FGS 700-2							
		0.7080	GGG-80	EN-GJS-800-2								
		0.8035	GTW-35-04	EN-GJS-800-2					B 340/12 P 440/7 P 510/4 P 570/3	32510 40010 50005 70003	3b	
0.8040	GTW-40-05	EN-GJS-800-2										
0.8045	GTW-45-07	EN-GJS-800-2										
0.8135	GTS-35-10	EN-JM1010	MN 35-10									
0.8145	GTS-45-06	EN-JM1040	MN 450									
0.8155	GTS-55-04	EN-JM1050	MP 50-5									
0.8165	GTS-65-02	GJMB 650-2	MP 60-3									
Stainless steels	< 850 N/mm <sup>2</sup>	1.4104	X14CrMoS17	X14CrMoS17-2	Z3CF17	441S29 434S17 304S15 303S21 304S12 316S16 316S12 316S16 316S11 316S16 316S33 904S13 321S31 320S33	430F 434 304 303 304L 316 316L 316LN 316L 316 904L, N08904 321 316Ti	2a				
		1.4113	X 6 CrMo 17	X6CrMo17-1	Z8CD17.01							
		1.4301	X5CrNi1810	58E, X5CrNi18-10	Z4CN18-10FF							
		1.4305	X8CrNiS18-9	58M; X10CrNiS18-9	Z8CNF18-09							
		1.4306	X2CrNi19-11	X2CrNi19-11	Z2CN18-10							
		1.4401	X5CrNiMo17 12 2	G-X6CrNiMo17-12-2	Z6CND17-17-11							
		1.4404	X2CrNiMo17-12-2	X3CrNiMo17122	Z3CND18-12-02							
		1.4406	X2CrNiMoN17-11-2	X2CrNiMoN17-12-2	Z2CND17-12-Az							
		1.4435	X2CrNiMo18-14-3	X2CrNiMo18-14-3	Z2CND18-14-03							
		1.4436	X3CrNiMo17-13-3	X3CrNiMo17-13-3	Z7CND18-12-03;							
		1.4539	X1NiCrMoCuN25-20-5	X1NiCrMoCu25-20-5	Z2NCNDU25-20-5							
		1.4541	X6CrNiTi18-10	58B; X6CrNiTi18-10	Z6CNT18-10							
		1.4573	X10CrNiMoTi18-12	X6CrNiMoTi18-12								
		< 1000 N/mm <sup>2</sup>	1.4002	X6CrAl13	X6CrAl13				Z6CA13	405S17 410S21 430S17 420S37 420S45 420S45 431S29	405 410, AMS 5613 430/1 420 420F 420C/4 431	2b
			1.4006	X10Cr13	56A; X12Cr13				Z10C14			
	1.4016		X6Cr17	60; X6Cr17	Z8C17							



# Allocation of the materials

Material	Tensile strength	DIN-No.	DIN-Code	Euronorm EN	AFNOR	B.S.	AISI SAE	Material classification	
		1.4112 1.4116 1.4125 1.4460 1.4510 1.4512 1.4582	X90CrMoV18 X45CrMoV15 X105CrMo17 X3CrNiMoN27-5-2 X3CrTi17 X6CrTi12 X4CrNiMoNb257	X90CrMoV18 X50CrMoV15 X105CrMo17 X3CrNiMoN27-5-2 X6CrTi17 X5CrTi12 X4CrNiMoNb25-7	A35-572 Z100CD17 Z3CND27-07 AZ Z4CT17, X3CrTi17 Z3CT12, Z6CT12	X105CrMo17 X3CrNiMoN27-5-2 X3CrTi17 409S19	440B UNE 36016-1 440C 329 430Ti 409	2b	
Stainless steel castings	< 850 N/mm <sup>2</sup>	1.4308 1.4340	GX6CrNi18 9 G-X40CrNi274	G-X6CrNi18-9 GX40CrNi27-4	Z6CN18-10M	304C15	304H,CF-8 J92615, A781-05	2a	
	< 1000 N/mm <sup>2</sup>	1.4086 1.4106 1.4138	G-X120Cr29 G-X10CrMo13 G-X120CrMo292	57; X17CrNi16-2 X2CrMoSiS18-2-1	15CN16-02 X2CrMoSiS18-2-1	431S29	431	2b	
Heat-resisting steels	< 1000 N/mm <sup>2</sup>	1.4722	X10CrSi13					1c	
		1.4724	X10CrAl13; X10CrAlSi13	X10CrAl11-3	Z13C13	403S17	405		
		1.4741	X10CrSi18						
		1.4742	X10CrAl18	60; X10CrAl(Si)18	Z10CAS18 Z210CAS24	430S15 X10CrAlSi25	430 446		
		1.4762	X10CrAl24	X10CrAlSi25					
Duplex steels	< 900 N/mm <sup>2</sup>	1.4821	X20CrNiSi254		Z20CNS25-4			5b	
		1.3964	X 2 CrNiMnMoNnb 21 16 5 3		NF 05-159		XM-19		
		1.4429	X 2 CrNiMoN 17 13 3	X2CrNiMoN17-13-3	Z2CND17-13-Az	316S63	316LN		
		1.4462	X 2 CrNiMoN 22 5 3	X2CrNiMoN22-5-3	Z2CNDU21-08-Az	318S13	329A, UNS31803		
		1.4529	X 1 NiCrMoCuN 25 20 7	10088-3	X1CrNiMoCuN25-20-7	X1CrNiMoCuN25-20-7	B649, N08926		
Non-alloyed titanium	< 650 N/mm <sup>2</sup>	1.4547	X 1 CrNiMoCuN 20 18 7	10088-3	X1CrNiMoCuN20-18-7	X1CrNiMoCuN20-18-7	S31254	5a	
		3.7024	Ti 99.5						
		3.7034	Ti 99.7						
		3.7055	Ti 99.4						
Titanium alloys soft-annealed	< 900 N/mm <sup>2</sup>	3.7064	Ti 99.2					5b	
		3.7164	TiAl6V4						
		3.7114	TiAl5Sn2						
		3.7124	TiCu2						
Titanium alloys hardened	900-1250 N/mm <sup>2</sup>	3.7174	TiAl6V6Sn2					5c	
		3.7164	TiAl6V4						
		3.7124	TiCu2						
		3.7144	TiAl6Sn2Zr4Mo2						
		3.7154	TiAl6Zr5						
High temperature nickel-based alloys	< 900 N/mm <sup>2</sup>	3.7174	TiAl6V6Sn2					5a	
		3.7184	TiAl4Mo4Sn2						
		2.4060	Nickel 200						
		2.4360	Monel 400						
		2.4375	Monel K 500	Alloy K500					
		2.4812	Hastelloy C		Ni-Mo28	3072 3076 (NA18) ANC15 HR208	N05500		
		2.4816	Inconel 600				N10665		
	2.4617	Hastelloy B-2							
	900-1200 N/mm <sup>2</sup>	2.4665	Hastelloy X				HR204		
		2.4983	Udimet 500						
		1.4876	Incoloy 800		Z8NC32-21	3076NA15H	B163, N08800		
		2.4631	Nimonic 80A			2HR201 2HR2	NC20TA, HEV5 HEV6		
		2.4632	Nimonic 90						
		2.4634	Nimonic 105						
2.4662		Nimonic 901		Z8NCDT42	HR 53 HR 8	5660, 5661 N07718, 5662, 5663			
2.4668	Inconel 718								
Pure copper	< 350 N/mm <sup>2</sup>	2.4670	Nimocast 713					5c	
		2.4674	Nimocast PK24						
Pure copper	< 350 N/mm <sup>2</sup>	2.4856	Inconel 625	499		NA21	B564/446, 5599, 5666	4a	
		2.6554	Waspaloy						
Copper-zinc alloys (brass)	< 700 N/mm <sup>2</sup>	2.0060	E-Cu57					4a	
		2.0070	SE-Cu						
		2.0090	SF-Cu						
		2.1356	CuMn3	CW107C					C19400
		2.0250	CuZn20						
		2.0265	CuZn30						
		2.0321	CuZn37						
		2.0360	CuZn40						
		2.0380	CuZn39Pb2						
		2.0410	CuZn44Pb2						
Copper-forging alloys hardenable	< 800 N/mm <sup>2</sup>	2.0561	CuZn40Al1	CW713R		CZ135, CZ114	C67400	4b	
		2.0580	CuZn40Mn1Pb	CW713R		CZ135, CZ114	C67400		
Copper-forging alloys non hardenable	< 600 N/mm <sup>2</sup>	2.0771	CuNi7Zn39Mn5Pb3					4b	
		2.1245	CuBe1.7						
		2.1247	CuBe2						
		2.1293	CuCrZr						
		2.1525	CuSi3Mn	CW107C					C19400
Copper-tin alloys (bronze)	< 700 N/mm <sup>2</sup>	2.1201	CuAgo.03	CC491K		CuSn5Pb5Zn5	LG2	4b	
		2.1366	CuMn5	CW107C					
		2.1522	CuSi2Mn	CW107C					
		2.1525	CuSi3Mn	CW107C					
		2.1016	CuSn4	CW450K		CuSn4P	PB101		C51100
2.1020	CuSn6	CW452K		CuSn6P	PB103	C51900			
2.1030	CuSn8	CW453K		CuSn8P, CuSn9	PB104	C52100			
2.1050	G-CuSn10-C	CC480K		CuSn10P	CT1/PB4	C90700			
2.1052	G-CuSn12-C	CC483K		CuSn12P / UE12P	PB2	C90800			
2.1060	G-CuSn12Ni2-C	CC484K		CuSn12Ni2	CT2	C91700			
2.1061	G-CuSn11Pb2-C	CC482K		CuSn12Pb	PB4	C92500			
2.1076	CuSn4Pb4Zn4	CW456K		CuSn4Pb4Zn4		C54400			
2.1080	CuSn6Zn6	CW456K		CuSn4Pb4Zn4		C54400			
2.1086	G-CuSn10Zn	CW456K		CuSn4Pb4Zn4		C54400			
2.1090	G-CuSn7Zn4Pb7-C	CC493K		CuSn7Pb6Zn4		C93200			
2.1093	G-CuSn6ZnNi	CC492K		CuSn7Zn2Pb3	LG4	C91410			
2.1096	G-CuSn5ZnPb	CC491K		CuSn5Pb5Zn5	LG2	C83600			

Cutting conditions

# Allocation of the materials

Cutting conditions

Material	Tensile strength	DIN-No.	DIN-Code	Euronorm EN	AFNOR	B.S.	AISI SAE	Material classification			
Pure aluminium Non hardened aluminium	< 150 N/mm <sup>2</sup> < 400 N/mm <sup>2</sup>	3.0255	Al99.5	EN AW-1050A	A-5	1B	1050A	4c			
		3.0515	AlMn1	EN AW-3003/3103	A-M1/-	N3					
		3.2315	AlMgSi1	EN AW-6082	A-SGM0.7	H30	6082				
		3.3315	AlMg1	EN AW-5005A	A-G0,6	N41	5005A				
		3.3535	AlMg3	EN AW-5754	A-G3M		5754				
		3.3547	AlMg4.5Mn	EN AW-5083	A-G4,5MC	N8	5083				
		3.4365	AlZnMgCu1.5	EN AW-7075	A-Z5GU	2L95/96	7075				
Hardened aluminium	< 650 N/mm <sup>2</sup>	3.0615	AlMgSiPb	EN AW-6012	A-SGPb		6012	4d			
		3.1325	AlCuMg1	EN AW-2017A	A-U4G	H14	2017A				
		3.1355	AlCuMg2	EN AW-2024	A-U4G1	2L97/98	2024				
		3.1655	AlCuBiPb	EN AW-2011	A-U5PbBi	FC1	2011				
		3.4335	AlZn4.5Mg1	EN AW-7020	A-Z5G	H17	7020				
		3.4345	AlZnMgCu5.0	EN AW-7022	A-Z4GU		7022				
		3.4365	AlZnMgCu1.5	EN AW-7075	A-Z5GU	2L95/96	7075				
		Aluminium cast material < 6% Si	< 400 N/mm <sup>2</sup>	3.1841	G-AlCu4Ti	EN AC-AlCu4Ti					4e
				3.2134	G-AlSi5Cu1Mg	EN AC-AlCu4Ti					
3.3241	G-AlMg3Si			EN AW-6061	A-GSUC	H20	6061				
3.3292	GD-AlMg9										
Aluminium cast material > 6% Si	< 400 N/mm <sup>2</sup>	3.2152	GD-AlSi6Cu4	EN AC-AlSi6Cu4				3e			
		3.2162	GD-AlSi8Cu3	EN AC-AlSi6Cu4							
		3.2373	G-AlSi9Mg	EN AC-AlSi9Mg							
		3.2381	G-AlSi10Mg	EN AC-AlSi10Mg							
		3.2383	G-AlSi10Mg (Cu)								
		3.2581	G-AlSi12	EN AC-AlSi12(a)							
		3.2583	G-AlSi12 (12)	EN AC-AlSi12(Cu)							
3.2982	GD-AlSi12 (Cu)	EN AC-AlSi12Cu1(Fe)									
Magnesium cast alloy	< 400 N/mm <sup>2</sup>	3.5106	G-MgAg3SE2Zr1					3e			
		3.5662	G-MgAl6								
		3.5812	G-MgAl8Zn1								
		3.5912	G-MgAl9Zn1								
Thermoplast		PTFE	Teflon, Hostaflon, Lubriflon					6a			
		PVDF	Kynar, Solef								
		PA	Ertalon, Ultramid, Nylon								
		POM	Delrin, Hostaform								
		PETP	Arnite, Ertalyte								
		PVC-hart	Hostalit, Vinoflex, Trovidur								
		PETP	Hostalen, Ertalene, Lupolen								
PP	Hostalen, Ertalen										
PC	Makralon, Lexan										
Duroplast non laminated		PF	Bakelit, Resalit, Luphen					6b			
		MF	Albarnit, Keramin, Resopal								
		UF	Resopal, Basapor								
Duroplast laminated		PF	Ferrozell, Resofil, Canevasit					6b			
		MF	Resopal, Resamin, Textolit								
		UF	Resamin, Basapor								

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.0360	SVJCR 25 25 16	80
.0365	SVJCL 25 25 16	80
<b>1940</b>		
.0200	SAGPR 12 12 16	82
.0205	SAGPL 12 12 16	82
.0220	SAGPR 16 16 16	82
.0225	SAGPL 16 16 16	82
.0240	SAGPR 20 20 16	82
.0245	SAGPL 20 20 16	82
.0260	SAGPR 25 25 16	82
.0265	SAGPL 25 25 16	82
<b>1945</b>		
.0300	SSSCR 12 12 09	84
.0305	SSSCL 12 12 09	84
.0320	SSSCR 16 16 09	84
.0325	SSSCL 16 16 09	84
.0340	SSSCR 20 20 12	84
.0345	SSSCL 20 20 12	84
.0360	SSSCR 25 25 12	84
.0365	SSSCL 25 25 12	84
<b>1980</b>		
.0300	KLK 311	105

No	Type	Page
.0320	KLK 315	105
<b>1982</b>		
.0300	KLH 313 R	100
.0305	KLH 313 L	100
.0320	KLH 317 R	100
.0325	KLH 317 L	100
<b>1986</b>		
.0200	KLSH 210 R	102
.0205	KLSH 210 L	102
.0220	KLSH 212 R	102
.0225	KLSH 212 L	102
.0240	KLSH 216 R	102
.0245	KLSH 216 L	102
.0260	KLSH 220 R	102
.0265	KLSH 220 L	102
.0300	KLSH 312 R	102
.0305	KLSH 312 L	102
.0320	KLSH 316 R	102
.0325	KLSH 316 L	102
.0340	KLSH 320 R	102
.0345	KLSH 320 L	102
<b>1988</b>		
.0200	KLKH 25.26 R	104
.0205	KLKH 25.26 L	104
<b>4310</b>		
.0310	10x2.5 / 1.9x150 mm	107
.0410	12x2.5 / 1.8x150 mm	107
.0510	16x3.0 / 2.0x150 mm	107
.0710	20x4.0 / 2.8x150 mm	107
.0810	25x4.8 / 3.3x150 mm	107
.0820	25x4.8 / 3.3x200 mm	107
<b>4350</b>		
.0210	8 x 40 x 0.50 mm N TiN	97
.0220	8 x 40 x 0.70 mm N TiN	97
.0230	8 x 40 x 0.80 mm N TiN	97
.0240	8 x 40 x 0.90 mm N TiN	97
.0250	8 x 40 x 1.10 mm N TiN	97
.0260	8 x 40 x 1.30 mm N TiN	97
.0270	8 x 40 x 1.60 mm N TiN	97
.0272	8 x 40 x 1.60 mm R TiN	97
.0274	8 x 40 x 1.60 mm L TiN	97
.0280	8 x 40 x 1.85 mm N TiN	97
.0310	10 x 44 x 0.50 mm N TiN	97
.0320	10 x 44 x 0.70 mm N TiN	97
.0330	10 x 44 x 0.80 mm N TiN	97
.0340	10 x 44 x 0.90 mm N TiN	97
.0350	10 x 44 x 1.10 mm N TiN	97
.0360	10 x 44 x 1.30 mm N TiN	97
.0370	10 x 44 x 1.60 mm N TiN	97
.0372	10 x 44 x 1.60 mm R TiN	97
.0374	10 x 44 x 1.60 mm L TiN	97
.0380	10 x 44 x 1.85 mm N TiN	97
.0420	12 x 48 x 1.10 mm N TiN	97
.0430	12 x 48 x 1.30 mm N TiN	97
.0440	12 x 48 x 1.60 mm N TiN	97
.0442	12 x 48 x 1.60 mm R TiN	97
.0444	12 x 48 x 1.60 mm L TiN	97
.0450	12 x 48 x 1.85 mm N TiN	97
.0460	12 x 48 x 2.15 mm N TiN	97
.0462	12 x 48 x 2.15 mm R TiN	97
.0464	12 x 48 x 2.15 mm L TiN	97
.0470	12 x 48 x 2.65 mm N TiN	97
.0520	16 x 54 x 1.60 mm N TiN	97
.0522	16 x 54 x 1.60 mm R TiN	97
.0524	16 x 54 x 1.60 mm L TiN	97
.0530	16 x 54 x 1.85 mm N TiN	97
.0540	16 x 54 x 2.15 mm N TiN	97
.0550	16 x 54 x 3.15 mm N TiN	97
.0552	16 x 54 x 3.15 mm R TiN	97
.0554	16 x 54 x 3.15 mm L TiN	97
.0560	16 x 54 x 4.15 mm N TiN	97
<b>4360</b>		
.0410	6 x 20 x 0.5 mm RN TiN	99
.0415	6 x 20 x 0.5 mm LN TiN	99
.0430	6 x 20 x 0.8 mm RN TiN	99
.0435	6 x 20 x 0.8 mm LN TiN	99
.0450	6 x 20 x 1.1 mm RN TiN	99
.0455	6 x 20 x 1.1 mm LN TiN	99
.0550	7 x 25 x 1.1 mm RN TiN	99
.0555	7 x 25 x 1.1 mm LN TiN	99
.0560	7 x 25 x 1.3 mm RN TiN	99
.0565	7 x 25 x 1.3 mm LN TiN	99
.0570	7 x 25 x 1.6 mm RN TiN	99

No	Type	Page
.0572	7 x 25 x 1.6 mm RR TiN	99
.0574	7 x 25 x 1.6 mm RL TiN	99
.0575	7 x 25 x 1.6 mm LN TiN	99
.0577	7 x 25 x 1.6 mm LR TiN	99
.0579	7 x 25 x 1.6 mm LL TiN	99
<b>4370</b>		
.0300	16 x 10 mm	106
.0400	20 x 12 mm	106
.0500	25 x 16 mm	106
.0700	32 x 20 mm	106
.0800	40 x 25 mm	106
<b>4390</b>		
.0200	Klemmhalter (8 mm)	96
.0300	Klemmhalter (10 mm)	96
.0400	Klemmhalter (12 mm)	96
.0500	Klemmhalter (16 mm)	96
<b>4395</b>		
.0400	10 x 10 x 140 mm R	98
.0405	10 x 10 x 140 mm L	98
.0500	12 x 12 x 140 mm R	98
.0505	12 x 12 x 140 mm L	98
.0530	16 x 16 x 140 mm R	98
.0535	16 x 16 x 140 mm L	98
.0560	20 x 20 x 140 mm R	98
.0565	20 x 20 x 140 mm L	98