

# ROTATING TOOLS

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Dear Customer,

Our goal is to offer you the most cost-effective services and solutions possible with the range of products shown in this catalog.

The new HORN-Catalog **ROTATING TOOLS** presents the most comprehensive range of groove milling tools available worldwide. Our tooling solutions, expertise and technical advice make us your perfect partner when it comes to performing tasks, facing challenges and completing projects.

Standard and Special Tools are available on very short lead times.

We look forward to successful mutual cooperation for the future.

Please don't hesitate to contact us in case of any further queries.

Yours sincerely

Lothar Horn, CEO



[phorn.de](http://phorn.de)



[hornusa.com](http://hornusa.com)



[phorn.com](http://phorn.com)



[youtube.com](http://youtube.com)

# SUMMARY

<b>A</b>	<b>GROOVE MILLING</b>	<b>M306 / M308 / M311 / M116 M313 / M328 / M332 / M335</b>	<b>A</b>
<b>B</b>	<b>GROOVE MILLING</b>	<b>M275 / 380 / 381</b>	<b>B</b>
<b>C</b>	<b>GROOVE and SLOT MILLING</b>	<b>M382 / M383 / M101/ M310</b>	<b>C</b>
<b>D</b>	<b>THREAD MILLING</b>	<b>M306 / M308 / M311 / M313 M116 / SM328 / M275 / 380</b>	<b>D</b>
<b>E</b>	<b>CHAMFERING / DEBURRING</b>	<b>M306 / M308 / M311 / M313 SM328 / 380</b>	<b>E</b>
<b>F</b>	<b>FACE MILLING</b>	<b>M306 / M308 / M311 / M313 SM328 / 380</b>	<b>F</b>
<b>G</b>	<b>MILLING OF T-SLOTS</b>	<b>M311 / M313 / M328</b>	<b>G</b>
<b>H</b>	<b>TECHNICAL INSTRUCTIONS</b>		<b>H</b>
<b>J</b>	<b>POLYGON MILLING</b>	<b>M275 / 381</b>	<b>J</b>
<b>K</b>	<b>THREAD WHIRLING</b>		<b>K</b>
<b>L</b>	<b>SYSTEM DC</b>		<b>L</b>
<b>M</b>	<b>MULTI MILLING SYSTEM DG / DM with replaceable cutting heads</b>		<b>M</b>
<b>N</b>	<b>SYSTEM "DA" / "DAH" Plunge milling cutter / High feed milling cutter</b>		<b>N</b>
<b>O</b>	<b>SYSTEM SYSTEM "DP"/ "DS" Endmill</b>		<b>O</b>
<b>P</b>	<b>CVD Diamond milling tools / High polish milling with MCD</b>		<b>P</b>
<b>Q</b>	<b>SYSTEM "URMA" Boring and Face milling</b>		<b>Q</b>

## QUALITY AND ENVIRONMENT COMMITMENT

Paul Horn GmbH, as a manufacturer of carbide cutting tools, has a very special responsibility.

To exist as a successful company, we must meet the demands for both products and services that are set by the customer as well as those that we set ourselves.

To achieve these goals, Paul Horn GmbH has introduced a modern Quality management System according to DIN EN ISO 9001.



To ensure the future being a company, it depends not only on turnover and profit but the acceptance of the company by both the public and the society.

For the Paul Horn GmbH the environment protection is an important corporate target and indisputable part of the corporate policy.

In 1999 we have adjusted our Management System according to the requirements of the ISO 14001. Already in 1997 we have got the validity according to the EG-ÖG-Audit-VO 1836/93. The Management System is certified since July 2000.



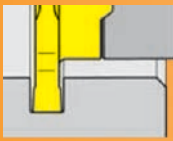
# SUMMARY

**R** SYSTEM "DR" High-performance reaming

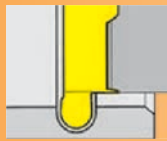
**S** ADDITIONAL EQUIPMENT

**R**

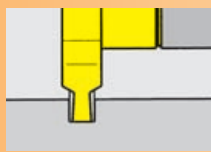
**S**



Groove milling



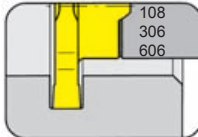
Full radius



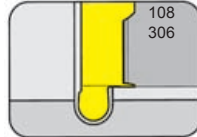
Widths for circlip grooves DIN 471/472

### MU/M306

Ds ≥ Ø .378"/.461"  
(9.6/11.7 mm)  
Milling shank A2-A8



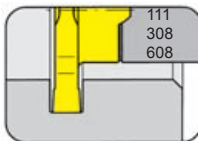
Page A9-A10,  
A12-A19, A21-A22



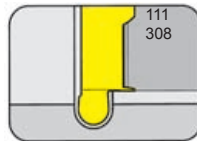
Page A11, A20

### MU/M308

Ds ≥ Ø .528"/.618"  
(13.4/15.7 mm)  
Milling shank A24-A30



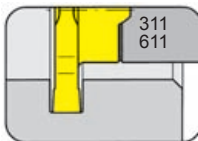
Page A31-A32,  
A34-A37, A39



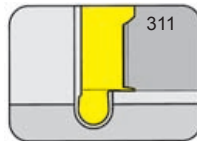
Page A33, A38

### MU/M311

Ds ≥ Ø .591"/.697"  
(15/17.7 mm)  
Milling shank A42-A48



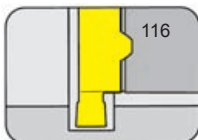
Page A49-A52,  
A54-A55



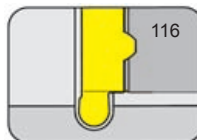
Page A53

### MU/M116

Ds ≥ Ø .803"  
(20.4 mm)  
Milling shank A58-A59



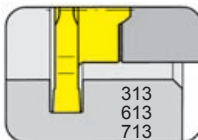
Page A60-A61



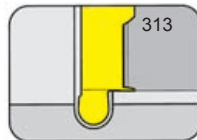
Page A62

### MU/M313

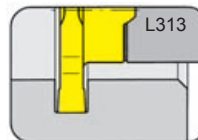
Ds ≥ Ø .854"  
(21.7 mm)  
Milling shank A64-A70



Page A71-A78,  
A82-A84



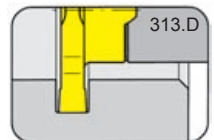
Page A79



Page A80-A81

### Z313

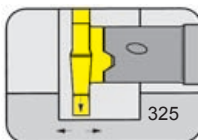
Adaptor A86



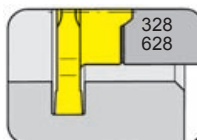
Page A87-A89

### MU/M328

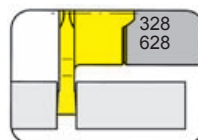
Ds ≥ Ø .961"/1.091"  
(24.4/27.7 mm)  
Milling shank A92-A99



Page A100



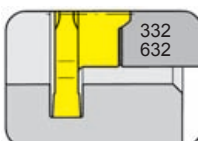
Page A101-A103,  
A105-A106



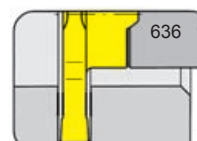
Page A104, A107

### MU/M332

Ds ≥ Ø 1.248"  
(31.7 mm)  
Milling shank A110-A116



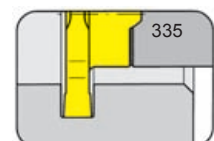
Page A117-A120



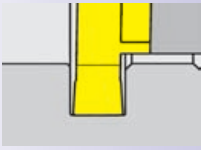
Page A121 -A122

### MU/M335

Ds ≥ Ø 1.366"  
(34.7 mm)  
Milling shank A126-A128



Page A129



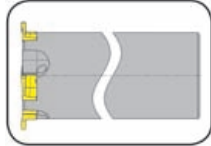
Groove milling



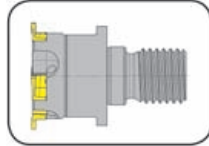
Circlip grooves

**M275**

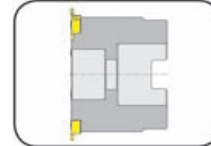
Milling shank  
Ds  $\geq 1.220''$  (31 mm)



Milling shank  
Page B2



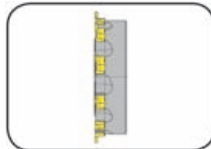
Screw-in cutter  
Page B3



Milling cutter  
Page B4

**R/LM275**

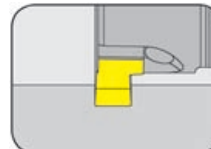
Disc milling cutter  
Ds  $\geq 1.496''$  (38 mm)



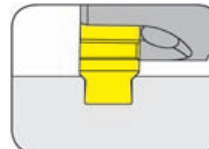
Milling cutter  
Page B5

**S275**

Inserts



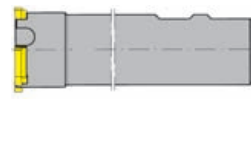
Page B6



Page B7

**U380 / 380**

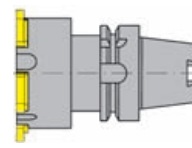
Ds  $\geq 1.732''$  / (44 mm)



Milling shank  
Page B10-B11



Milling cutter  
Page B12-B17



HSK / ABS  
Page B18-B19

**U381 / 381**

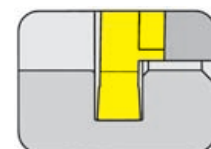
Ds  $\geq 2.480''$  / (63 mm)



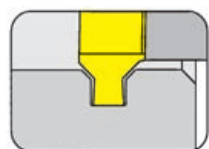
Disc milling cutter  
Page B20-B21

**U314 / 314**

Inserts

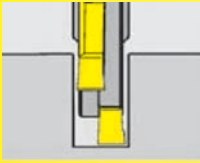


Page B22-B24

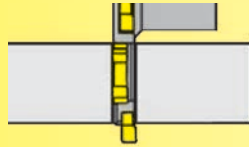


Page B25

# C GROOVE and SLOT MILLING

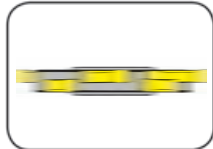


Groove milling

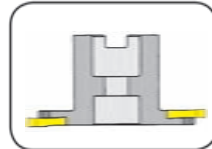


Slot milling

**U382/382, U383/383**  
Ds ≥ Ø 3.150" (80 mm)  
w ≥ .236" (6 mm)

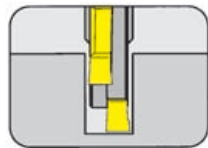


**Disc milling cutter**  
Page C2-C4



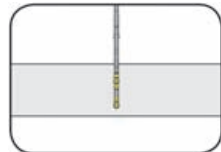
**Arbor mounted Disc milling cutter**  
Page C5-C7

**314**  
Inserts

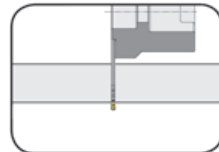


Page C8-C9

**M101**  
Disc milling cutter  
Ds ≥ Ø 80 mm

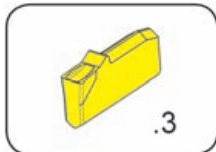


Page C12

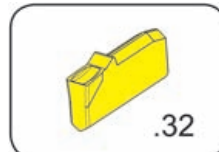


Arbor mounted Page C13

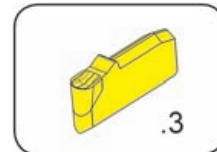
**S101**  
Inserts



Page C14



Page C15

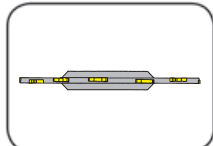


Page C16

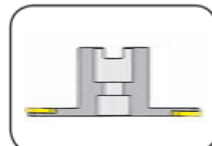
**M101**  
Technical Information

Page C17-C18

**MU310 / M310**  
Ds ≥ Ø 3.150" (80 mm)  
w ≥ .157" (4 mm)

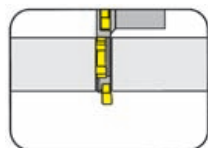


**Slotting cutter**  
Page C20-C21

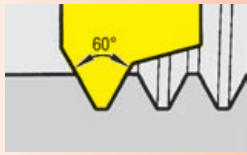


**Arbor mounted Slot milling cutter**  
Page C22-C24

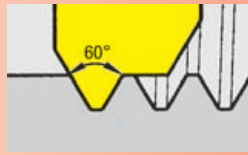
**S310**  
Inserts



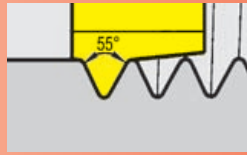
Page C25



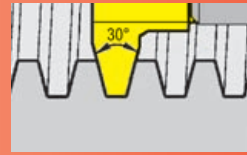
Partial profile



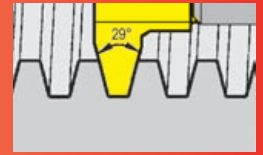
Full profile



Full profile



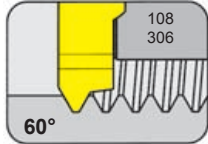
ISO Trapezoidal



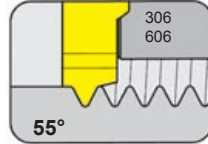
ACME

### M306

$D_s \geq \varnothing .378"/.461"$   
(9,6/11,7 mm)  
Milling shank D2-D3



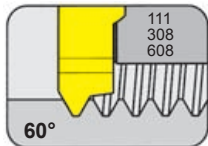
Partial profil  
Page D5-D6



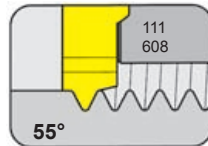
Full profil  
Page D7-D8

### M308

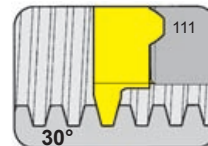
$D_s \geq \varnothing .528"/.618"$   
(13,4/15,7 mm)  
Milling shank D10-D11



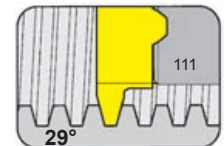
Partial profil  
Page D13-D15



Full profil  
Page D16-D17



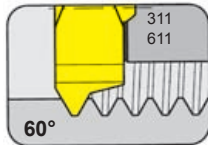
Trapezoidal  
Page D19



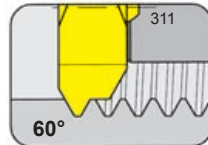
ACME  
Page D18

### M311

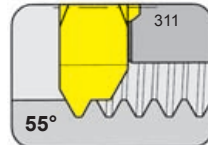
$D_s \geq \varnothing .697"$  (17,7 mm)  
Milling shank D20-D21



Partial profil  
Page D23-D24



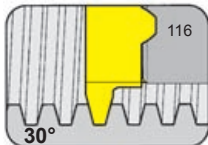
Full profil  
Page D25



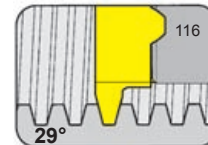
Full profil  
Page D26

### M116

$D_s \geq \varnothing .803"$  (20,4 mm)  
Milling shank D28-D29



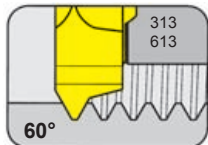
Trapezoidal  
Page D32



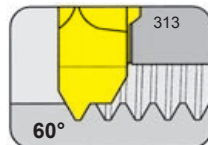
ACME  
Page D31

### M313

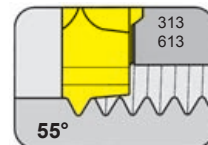
$D_s \geq \varnothing .854"$  (21,7 mm)  
Milling shank D34-D35



Partial profil  
Page D37-D38



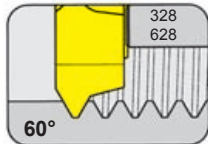
Full profil  
Page D39



Full profil  
Page D40-D41

### M328

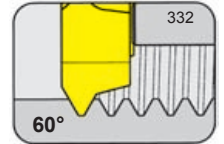
$D_s \geq \varnothing 1.091"$  (27,7 mm)  
Milling shank D42-D43



Partial profil  
Page D46-D47

### M332

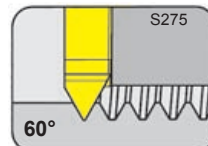
$D_s \geq \varnothing 1.248"$  (31,7 mm)  
Milling shank D48



Partial profil  
Page D50

### M275

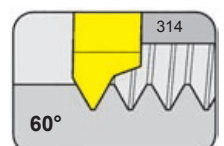
$D_s \geq \varnothing 1.220"$  (31 mm)  
Milling shank D51-D52



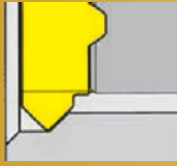
Partial profil  
Page D54

### M380

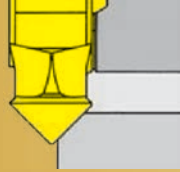
$D_s \geq \varnothing 1.732"/2.480"$   
(44/63 mm)  
Milling shank D55-D58



Partial profil  
Page D60

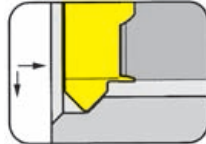


1 Flute

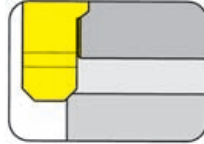


3 Flute

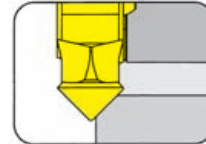
**M306**  
Toolholder page E2



**Type 108**  
Page E3

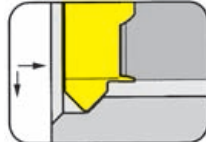


**Type 306**  
Page E4

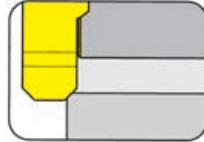


**Type 606**  
Page E5

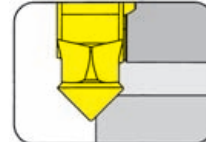
**M308**  
Toolholder page E8



**Type 111**  
Page E9

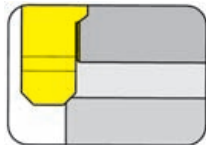


**Type 308**  
Page E10

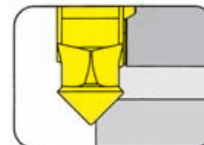


**Type 608**  
Page E11

**MU311**  
Toolholder page E14



**Type 311**  
Page E15

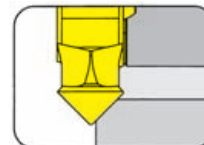


**Type 611**  
Page E16

**MU313**  
Toolholder page E18

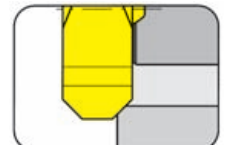


**Type 313**  
Page E19



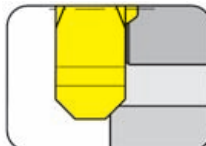
**Type 606**  
Page E20

**Z313**  
Adaptor page E22

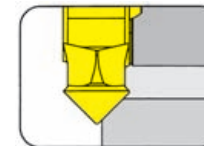


**Type 313.D**  
Page E23

**M328**  
Toolholder page E26

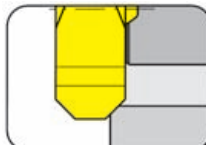


**Type 328**  
Page E27



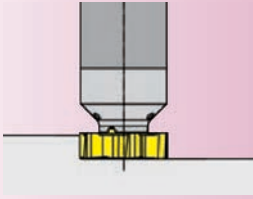
**Type 628**  
Page E28

**MU332**  
Toolholder page E30

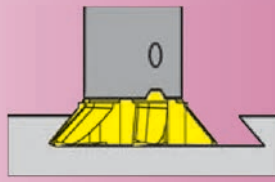


**Type 332**  
Page E31

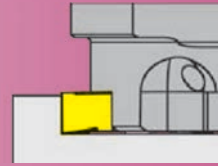
# FACE MILLING



Face Milling  
 $t_{max} \sim .224"$  (5.7mm)



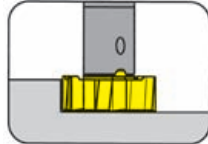
Face Milling  
 $t_{max} \sim .138"$  (3.5mm)



Face Milling  
 $t_{max} \sim .157"$  (4.0 mm)

**M306**

Toolholder page F2-F3  
 $Ds \geq \emptyset .461"$  (11.7mm)



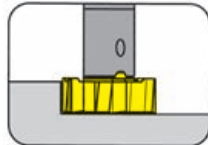
Type 606  
 Page F4



Type 606  
 Page F5

**M311**

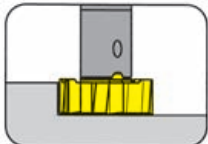
Toolholder page F8-F9  
 $Ds \geq \emptyset .697"$  (17.7mm)



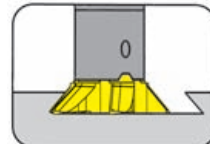
Type 611  
 Page F10

**M313**

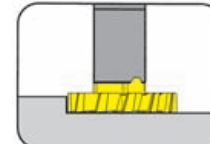
Toolholder page F12-F13  
 $Ds \geq \emptyset .854"$  (21.7mm)



Type 613  
 Page F14-F15



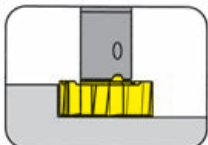
Type 613  
 Page F16



Type 713  
 Page F17

**M328**

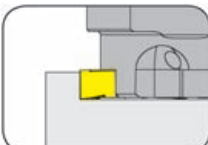
Toolholder page F20-F21  
 $Ds \geq \emptyset 1.091"$  (27.7 mm)



Type 628  
 Page F22

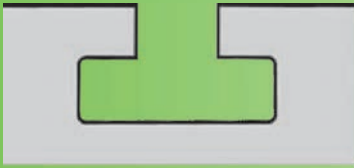
**M275**

Toolholder page F23-F25  
 $Ds \geq \emptyset 1.496"$  (38 mm)

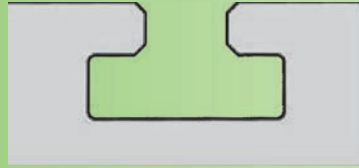


Type S275  
 Page F26

# G MILLING OF T-SLOTS

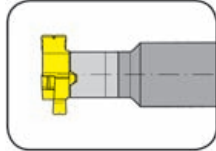


T-Slot

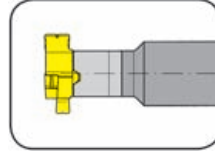


Chamfering

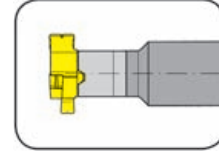
MU311 / M311  
MU313 / M313  
MU328 / M328  
Milling shank



MU/M311  
Page G2-G3

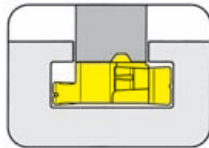


MU/M313  
Page G6-G7



MU/M328  
Page G9-G10

311/313/328  
Inserts



311 / 313 / 328  
T-Slot  
Page G4, G8, G11

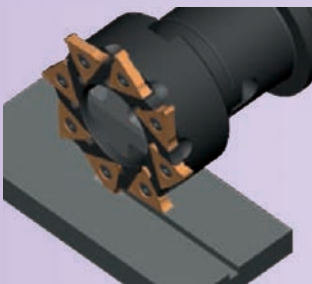


311  
Chamfering  
Page G5

Technical Information

Page G12

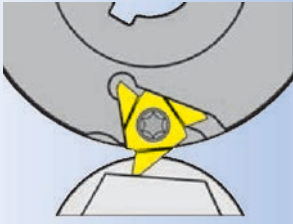
# H TECHNICAL INSTRUCTIONS GROOVE MILLING (by circular interpolation)



Technical Information

Page H1-H10





**Polygon milling head**  
Ds ≥ Ø 2.520" (64 mm)



**Star SR-20J**  
Page J2



**Gildemeister**  
Page J3-J5



**Index ABC**  
Page J6



**Index MS25**  
Page J7-J8



**NAKAMURA**  
Page J9



**A.H. Schütte**  
Page J10-J11



**TORNOS**  
Page J12-J13



**TRAUB TNL18**  
Page J14



**TRAUB TNL 12-7,  
TNL26, TKN36**  
Page J15

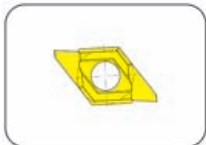


**TRAUB DECO7/10**  
Page J16



**TRAUB TNL 12-7**  
Page J17

**S275 / 314**  
Inserts



**S275**  
Page J18



**314/N314**  
Page J19-J20

**Technical Information**

**Page J21-J25**

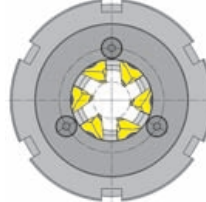


Thread whirling for Swiss type machines

**Whirling Head**  
Ds ≥ Ø 10 mm



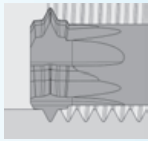
Page K3



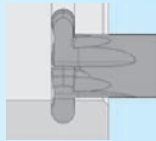
Page K5

**Order guideline**

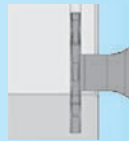
Page K6



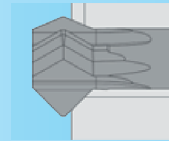
Groove milling



Groove milling Full radius



Groove milling



Chamfer milling

**DCG**  
Thread milling



metrisch/metric M1 - M12  
Page L2 - L4



UN #5 - 40, 7/16" - 20  
Page L5



BS 1/8" - 1/2"  
Page L6



G 1/16" - 3/8"  
Page L7

**DCR**  
Groove milling  
Ds Ø 4 - 10 mm



Page L8

**DCN**  
Groove milling  
Ds Ø 4 - 10 mm



Page L9

**DCX**  
Groove milling  
Ds Ø 20 - 40 mm



Page L10

**DCF**  
Chamfer milling  
Ds Ø 2 - 7,5 mm



Page L11

Technical Information

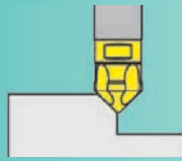
Page L12-L16



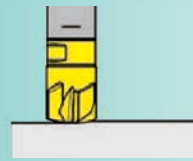
Shoulder milling /  
Groove milling



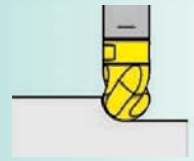
Roughing Endmilling



Chamfering

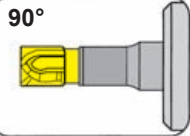


High Feed Milling

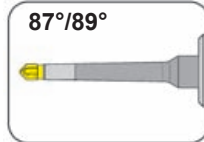


Copy milling

**MDG**  
Milling shank

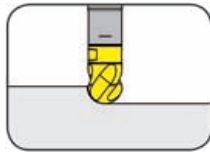


Page M2-M3

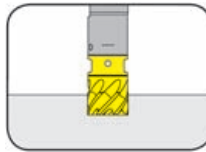


Page M4-M5

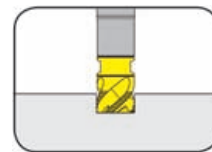
**DG**  
Cutting insert



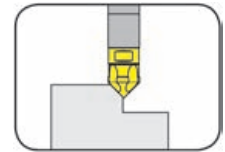
Page M6



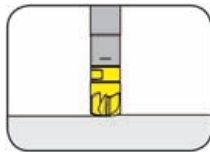
Page M7-M9



Page M10



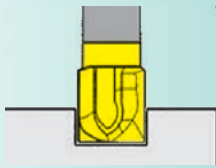
Page M11



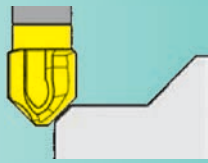
Page M12

Technical Information

Page M13-M16



Shoulder milling  
Groove milling



Chamfering

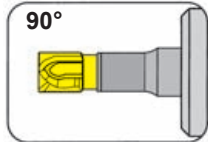


Centering/  
Chamfering

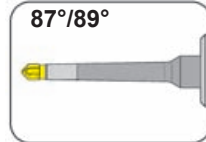


Copy milling

**DMU008 / DM008**  
Milling shank  
Ds Ø .315" (8 mm)

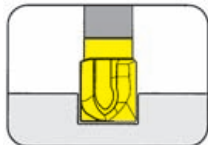


Page M18-M21

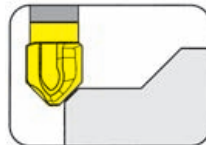


Page M22-M23

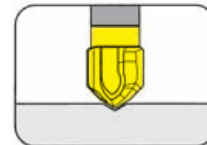
**DM208**  
Cutting insert



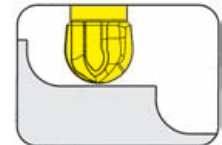
Page M24



Page M25

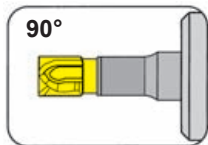


Page M26

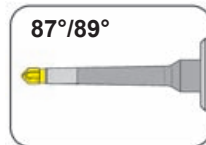


Page M27

**DMU010 / DM010**  
Milling shank  
Ds Ø .394" (10 mm)

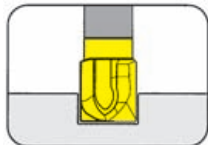


Page M28-M31

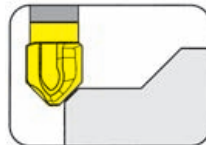


Page M32-M33

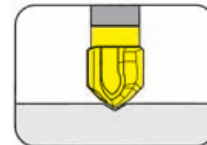
**DM210**  
Cutting insert



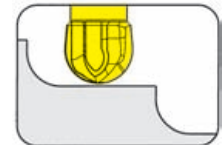
Page M34



Page M35

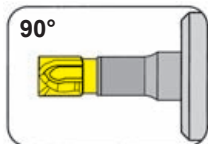


Page M36

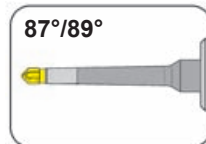


Page M37

**DMU012 / DM012**  
Milling shank  
Ds Ø .472" (12 mm)

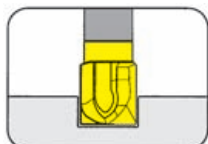


Page M38-M41

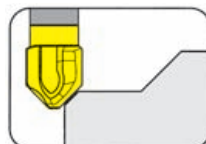


Page M42-M43

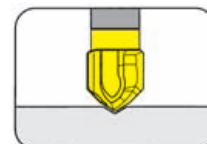
**DM212**  
Cutting insert



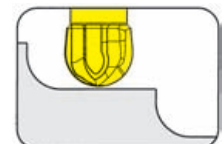
Page M44



Page M45



Page M46



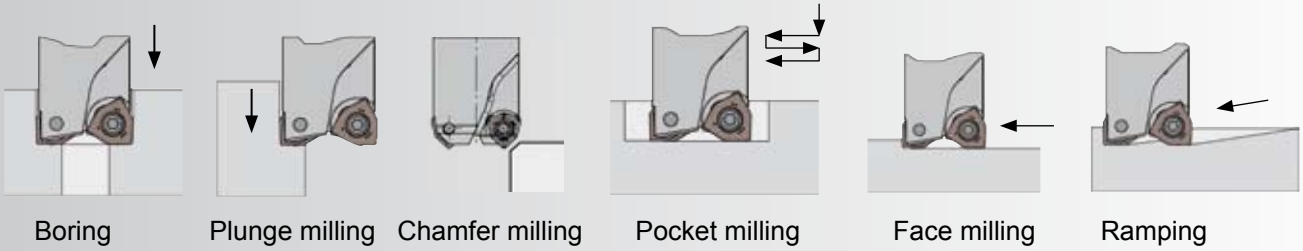
Page M47

Technical Information

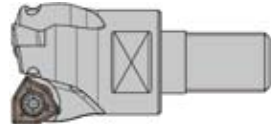
Page M48-M50

Additional equipment

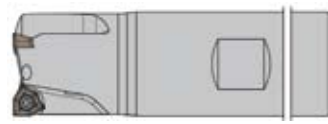
Page M51-M52



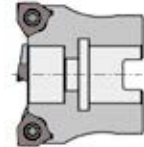
**DAM31/DAM32**  
Milling shank



Page N2-N3, N8-N10



Page N4-N5

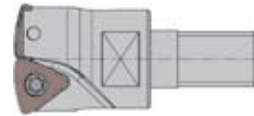


Page N7

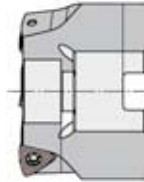
**DAH37**  
Milling shank



Page N20



Page N21



Page N22

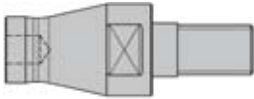
**MD**  
Adaptor



Page N11



Page N12



Reducer  
Page N13



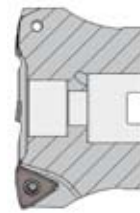
Lengthening  
Page N14

**DA31/DA32**  
Indexable inserts



Page N15-N16

**DAH62**  
Milling cutter



Page N26

**DAH37**  
Indexable inserts



Page N23

**DAH62**  
Indexable inserts



Page N27

Technical Information

Page N17-N19, N24-N25  
N28-N29

# SYSTEM DP / DS Endmill



## SYSTEM DP

for

**P** ordinary steels

Page O4-O18

## SYSTEM DS

for

**P** high tensile steels

Page O19-O49

**S** Cobalt Chromium

Page O50-O57

**C** Copper

Page O58-O65

**N** Graphite

Page O66-O75

**A** Aluminium (Synthetics)

Page O76-O85

## Technical Information

Page O87-O134

# DIAMOND TIPPED MILLING TOOLS

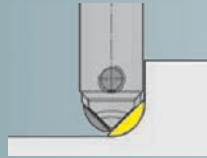
## High Performance and High Polish Milling



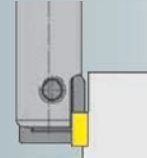
Aluminum and Graphite milling



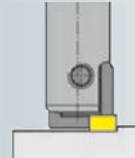
Carbon Fiber / Glass Reinforced Plastic milling



Ballnose milling

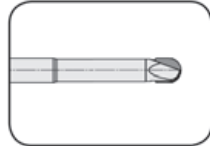


Peripheral milling

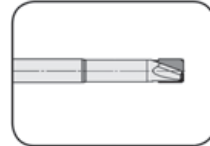


Face milling

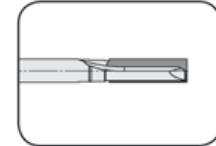
CVD-diamond-tipped milling tools



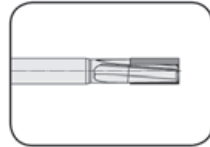
**Type DSK**  
Ballnose Endmill  
Page P4



**Type DST**  
Torus Endmill  
with corner radii  
Page P5-P6



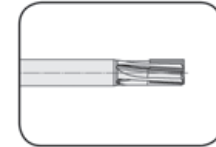
**Type DST**  
Torus Endmill  
with corner chamfers  
Page P7



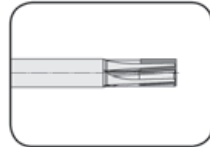
**Type DSUD**  
Up and Down Endmill  
Page P8



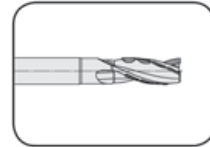
**Type DSFN**  
Finishing Endmill-  
neutral  
Page P9



**Type DSFU**  
Finishing Endmill-  
Pulling  
Page P10



**Type DSFD**  
Finishing Endmill-  
Pushing  
Page P11

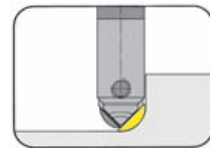


**Type DSHF**  
Helical Endmill  
Page P12

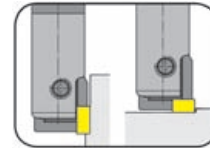
Technical Information

Page P13

M117 Milling shank

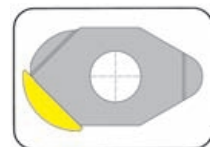


Page P16

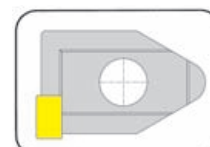


Page P18-P20

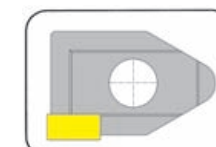
S117 Inserts



Page P17



Page P21

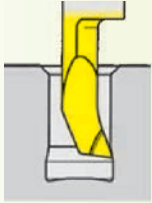


Page P22

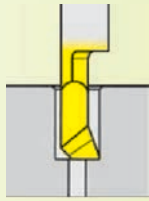
Technical Information

Page P24

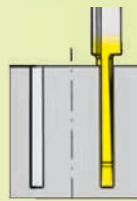




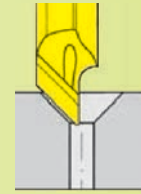
Boring



Boring

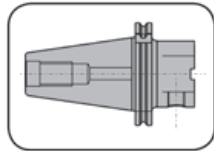


Face Grooving

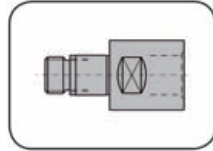


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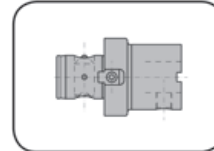
**System URMA**



**URMA Adaptors**  
Page Q4-Q8



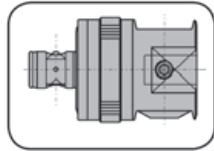
**Extensions**  
Page Q9



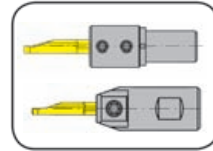
**Reducer**  
Page Q10



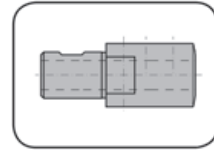
**DAZ-Digital Display**  
Page Q13



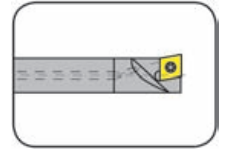
**Fine boring head 05**  
Page Q14



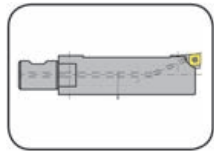
**B105/B110**  
Page Q15-Q17



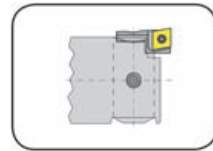
**Reducer B05**  
Page Q29



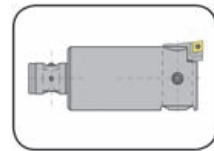
**Boring bar B05.HM**  
Page Q30



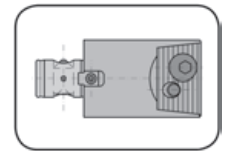
**Boring bar B05.ST**  
Page Q31



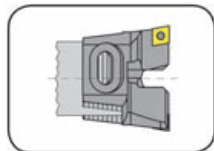
**Insert holder B05**  
Page Q32, Q34



**Fine boring head B02/DB**  
Page Q33

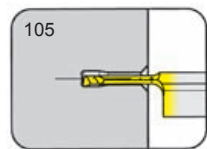


**Double cutter head D02**  
Page Q35

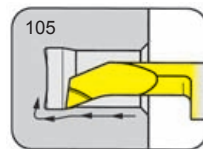


**Insert holder D050**  
Page Q36

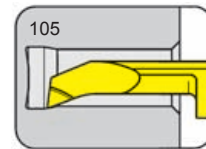
**105 / 110 Inserts**



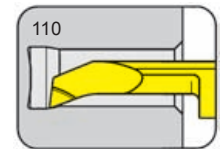
Page Q18-Q20



Page Q21-Q26

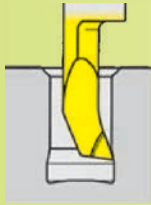


Page Q27

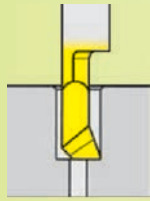


Page Q28

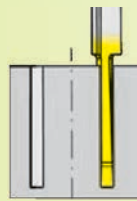
**Fine boring head balancing charts for 105 and 110**  
Page Q37-Q46



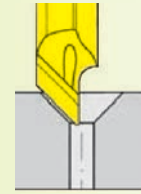
Boring



Boring

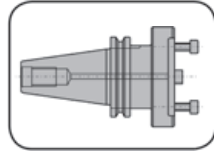


Face Grooving

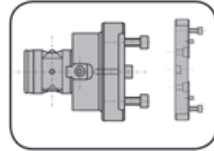


Chamfering

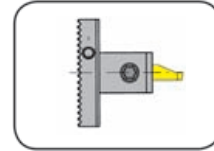
**URMA**  
**IntraMax 49-88**  
Ø .197" - 1.772"



**Basic holder**  
Page Q48



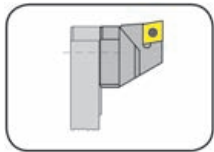
**Adaptors**  
Page Q49



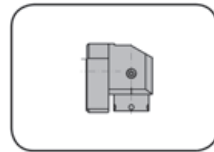
**BKT105**  
Page Q50



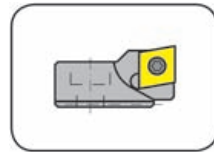
**BKT356**  
Page Q51



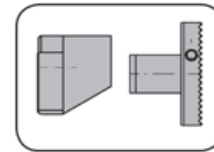
**Holder 050.K**  
Page Q52



**Adaptors**  
Page Q53



**Holder 050.C**  
Page Q54

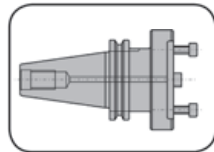


**Balancing weights**  
Page Q55-Q56

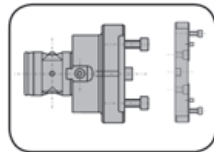


**Ext. machining plates**  
Page Q57

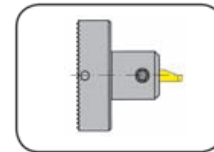
**URMA**  
**IntraMax 87-207**  
Ø 1.220" - 5.984"



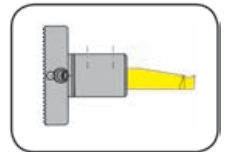
**Basic holder**  
Page Q58



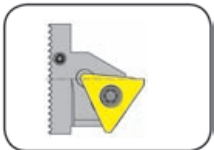
**Adaptors**  
Page Q59



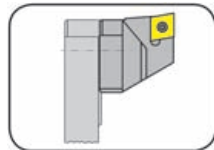
**BKT105**  
Page Q60



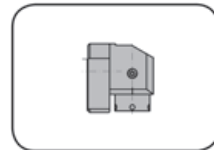
**BKT110**  
Page Q61



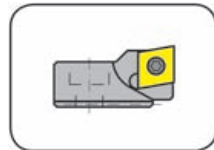
**BKT356**  
Page Q62



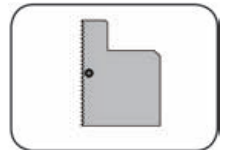
**Holder 050.G**  
Page Q63



**Holder F050.G**  
Page Q64



**Holder 050.C**  
Page Q65

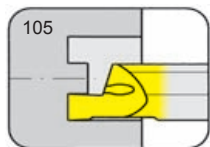


**Balancing weight**  
Page Q66

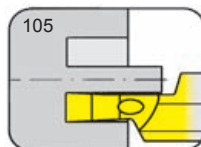


**Ext. machining plates, Page Q67**

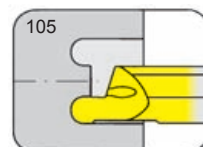
**105 / 110**  
Inserts



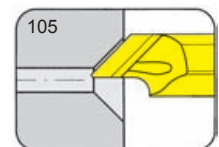
Page Q68-Q70



Page Q71



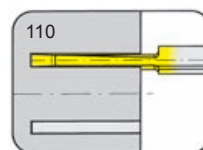
Page Q72



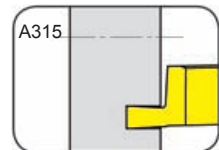
Page Q73

Technical Information

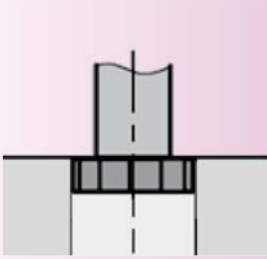
Page Q76-Q79



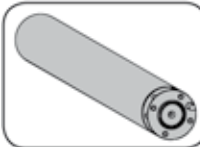
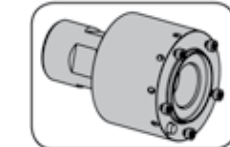
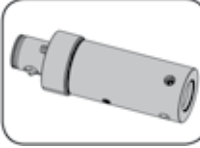
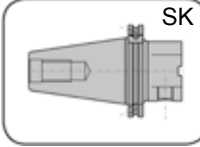
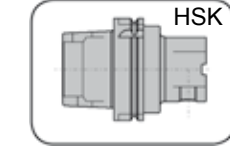
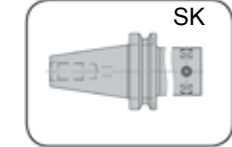
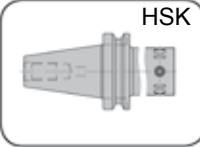
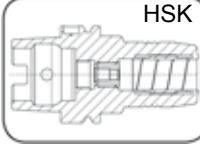
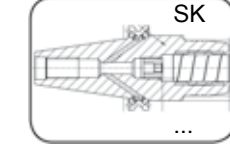
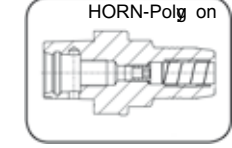
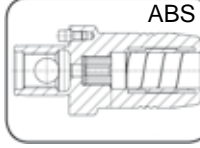
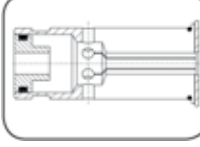


Page Q74



Page Q75



<p><b>DR</b> Inserts</p>	 Page R2	 Page R3		
<p><b>MDR</b> Reaming insert holders</p>	 Page R4	 Page R5		
<p><b>VDR</b> Shanks</p>	 Page R6-R7	<p>Additional equipment</p>	Adaptor <b>VAM/VBM</b>	Page R8
			Reduction <b>RAM/RBM</b>	Page R9
			Adaptor <b>ADR</b>	Page R25
<p><b>URMA</b> Adaptor</p>	 SK Page R10-R13	 HSK Page R14	 SK Page R15-R17	 HSK Page R18
<p><b>DRHD</b> System adaptors</p>	 HSK Page R19	 SK Page R20-R21	 HORN-Polig on Page R22	 ABS Page R23
<p><b>DRZB</b> Intermediate sleeves</p>	 Page R24			
<p>Technical Information</p>	Page R26-R36			

# CHAPTER A

- Step #1: Establish bore diameter  
 Step #2: Find Depth of Cut (DOC) requirements  
 Step #3: Follow column and row to find correct tool type  
 Step #4: Look up tool type to find available widths

		DOC (Depth of cut) $t_{max}$													
Bore Ø	.039 (1.0)	.059 (1.5)	.091 (2.3)	.098 (2.5)	.126 (3.2)	.138 (3.5)	.169 (4.3)	.177 (4.5)	.256 (6.5)	.315 (8.0)	.327 (8.3)	.366 (9.3)	.394 (10)	.402 (10.2)	.472 (12)
.394 (10.0)	108 306	306													
.472 (12.0)	306 606	306 606	306 606	306 606											
.539 (13.7)	111	111	111												
.630 (16.0)	*116 308 608	*116 308 608	*116 308 608	*116 308 608	*116 308 608	*116 308 608	*116 308 608								
.709 (18.0)	311 611	311 611	311 611	311 611	311 611	311 611									
.819 (20.8)	116	116	116	116	116	116	116								
.866 (22.0)	313 313.D 613 713	313 313.D 613 713	313 313.D 613 713	313 313.D 613 713	313 313.D 613 713	313 313.D 613 713	313 313.D 613 713	313 313.D 613 713							
1.102 (28.0)	328 628	328 628	328 628	328 628	328 628	328 628	328 628	328 628	328 628	*328 *628	*328 *628	*328 *628			
1.260 (32)	332 632	332 632	332 632	332 632	332 632	332 632	332 632	332 632	332 632	332 632	332 632	*332 *632	*332 *632		
1.378 (35)	335	335	335	335	335	335	335	335	335	335					
1.417 (36)	636	636	636	636	636	636	636	636	636	636	636	636	636	636	*636

		Tool Type											
	108	306	606	111	308	608	311	611	116	313	313.D	613	713
Max. width as Standard	.079 (2.0)	.098 (2.5)	.098 (2.5)	.125 (3.2)	.125 (3.2)	.098 (2.5)	.125 (3.2)	.118 (3.0)	.157 (4.0)	.250 (6.3)	.128 (3.25)	.157 (4.0)	.118 (3.0)
Max. width as Special	.126 (3.2)	.157 (4.0)	.126 (3.2)	.173 (4.4)	.165 (4.2)	.185 (4.7)	.315 (8.0)	.236 (6.0)	.231 (5.4)	.354 (9.0)	.130 (3.3)	.283 (7.2)	.150 (3.8)
Page number	A9	A12	A21	A31	A34	A39	A49	A54	A60	A71	A87	A82	A84

		Tool Type (continued)					
	328	628	332	632	636	335	
Max. width as Standard	.157 (4.0)	.157 (4.0)	.157 (4.0)	.157 (4.0)	.118 (3.0)	.236 (6.0)	
Max. width as Special	.398 (10.1)	.303 (7.7)	.398 (10.1)	.299 (5.8)	.228 (5.8)	.598 (15.2)	
Page number	A101	A105	A117	A117	A122	A129	

\*116 - With oriented spindle stopped offset of center line (single flute effective, see page A57).

\*328 - Requires holder for increased milling depth from page A95.

\*332 / 632 / 636 - Requires holder for increased milling depth from pages A112-A113.

Dimensions in inch (mm)

MILLING SHANK type **MU / M306**

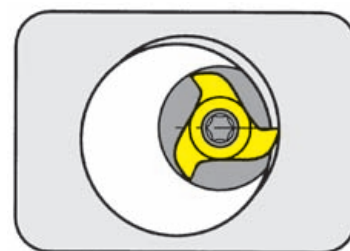
from bore  $\varnothing$  .394" (10.0 mm)



## MILLING SHANK Type

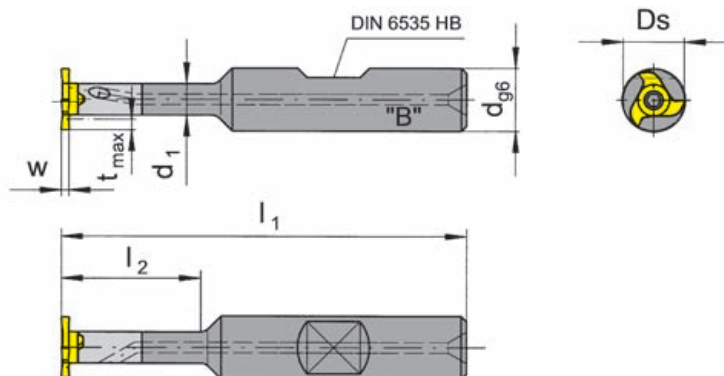
# MU306

with through coolant supply

Cutting edge  $\varnothing$ 

Ds .378 - .461"

Material of shank: Carbide - Giving a good vibration resistance



for use with Insert

Type U108  
U306  
108  
306  
606

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
MU306.0500.01B	3.150	.827		
MU306.0500.02B	3.543	1.181	.236	.500
MU306.0500.03B	3.937	1.654		
MU306.0625.01B	3.937	.984	.287	.625

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in inch

**Ordering note:**All milling cutter shanks can be used for **right** and **left** hand inserts type 108.

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

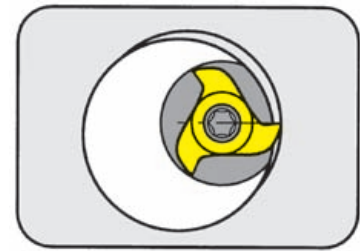
**Spare parts**

Milling shank	Screw	TORX PLUS® Wrench
MU306.0...	2.6.5T8EP	T8PL

## MILLING SHANK Type

# M306

with through coolant supply

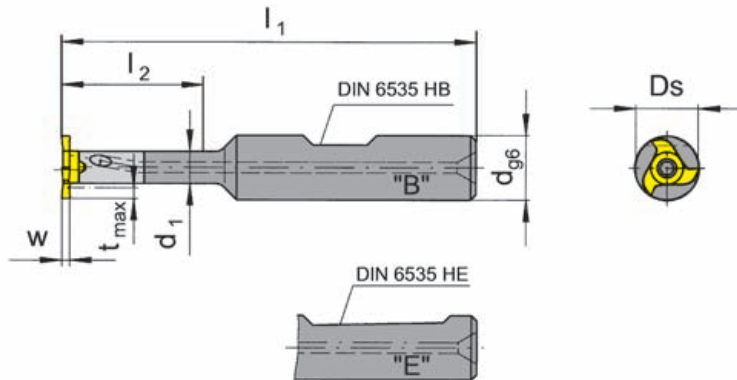


Cutting edge  $\varnothing$

Ds 9.6/11.7 mm

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert



Type U108  
U306  
108  
306  
606

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M306.0012.01B	80	21	6	12	B
M306.0012.02B	90	30			
M306.0012.03B	100	42			
M306.0012.01E	80	21	6	12	E
M306.0012.02E	90	30			
M306.0012.03E	100	42			

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

### Ordering note:

All milling cutter shanks can be used for **right** and **left** hand inserts type 108.

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

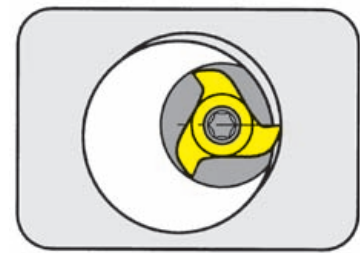
### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M306.0012.0...	2.6.5T8EP	T8PL

## MILLING SHANK Type

## M306

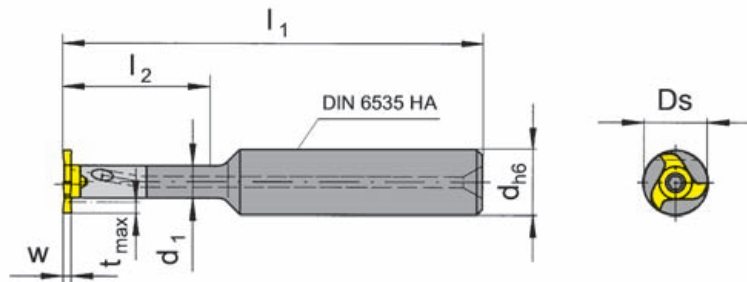
with through coolant supply

Cutting edge  $\varnothing$ 

Ds 9.6/11.7 mm

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert


 Type U108  
 U306  
 108  
 306  
 606

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
M306.0012.01A	80	21	6	12
M306.0012.02A	90	30		
M306.0012.03A	100	42		

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

**Ordering note:**

Milling cutter shanks with damaged seating can be repaired by HORN.

All milling cutter shanks can be used for **right** and **left** hand inserts type 108.

For torque specifications of the screw, please see Technical Instructions.

**Spare parts**

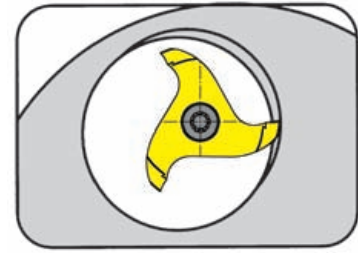
Milling shank	Screw	TORX PLUS® Wrench
M306.0012.0...	2.6.5T8EP	T8PL



## MILLING SHANK Type

# M306.ST

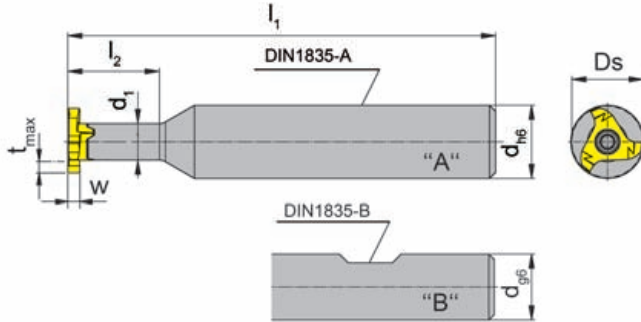
no coolant supply



Cylindrical steel milling shank for collets Ds 9.6 / 11.7 mm

with cylindrical shank for CNC-lathes

for use with Insert



Type U108  
U306  
108  
306  
606

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M306.ST10.01A	60	15	6	10	A
M306.ST12.01A	70	15	6	12	A
M306.ST10.01B	60	15	6	10	B
M306.ST12.01B	70	15	6	12	B

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

### Ordering note:

All milling cutter shanks can be used for **right** and **left** hand inserts type 108.

For torque specifications of the screw, please see Technical Instructions.

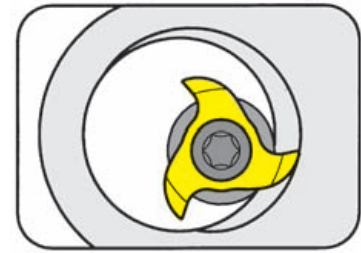
### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M306.ST1...	2.6.5T8EP	T8PL

## SCREW-IN CUTTER Type

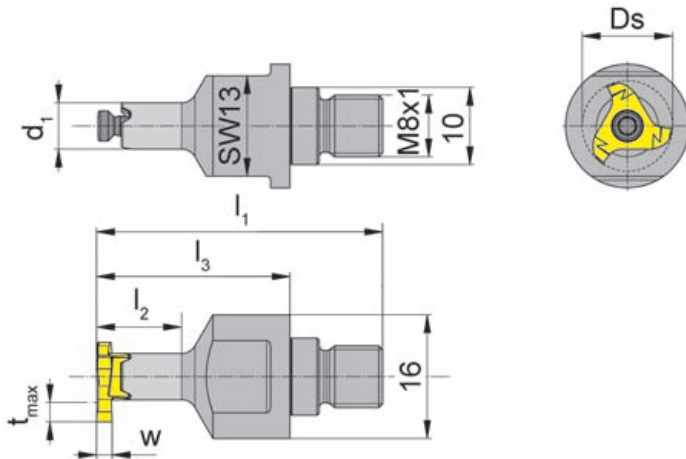
**M306.M**

no coolant supply



Screw-in Cutter for basic holder type WFB.20

for use with Insert

 Type U108  
 U306  
 108  
 306  
 606


Picture = right hand cutting version

Part number	$l_1$	$l_2$	$l_3$	$d_1$
<b>M306.M081.01</b>	37	11	25	6

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

All milling cutter shanks can be used for **right** and **left** hand inserts type 108.

For torque specifications of the screw, please see Technical Instructions.



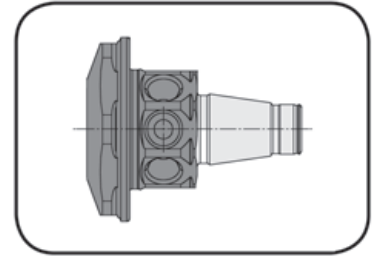
## Spare parts

Screw-in cutter	Screw	TORX PLUS® Wrench
M306.M081.01	<b>2.6.5T8EP</b>	<b>T8PL</b>

## BASIC HOLDER Type

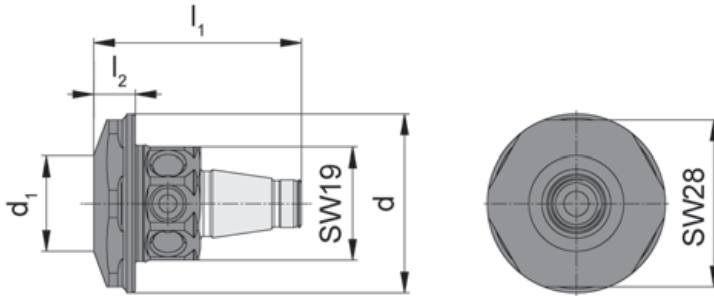
# WFB

Basic holder WFB.20 for screw-in cutter



for use with Screw-in cutter

- Type M306.M081...  
 M308.M081...  
 M311.M081...  
 M313.M081...  
 M328.M081...  
 M332.M081...



Part number	$l_1$	$l_2$	$d_1$	d
WFB.2012.M081.01	35	7	16	30

Further sizes upon request

Dimensions in mm



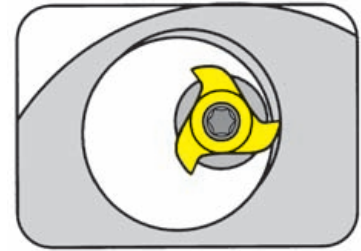
## MILLING SHANK Type

**M306.ER**

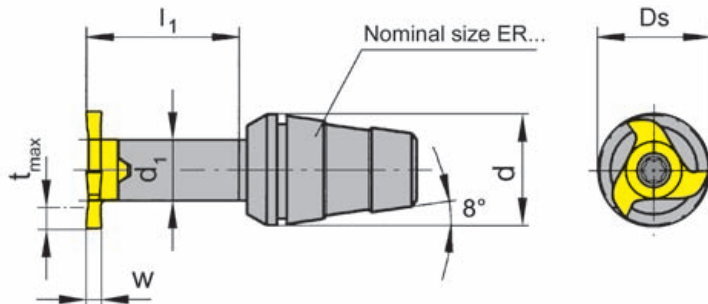
no coolant supply

Milling shanks for collet chucks DIN6499-A (8°) Ds 9.6 / 11.7 mm

with ER taper for CNC-lathes



for use with Insert


 Type U108  
 U306  
 108  
 306  
 606

Picture = right hand cutting version

Part number	$l_1$	$d_1$	d	Clamping nut
<b>M306.ER11.02</b>	16	6	11	ER11.6499

Further sizes upon request

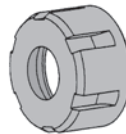
w, Ds,  $t_{max}$  see inserts

Dimensions in mm

**Ordering note:**All milling cutter shanks can be used for **right** and **left** hand inserts type 108.

For torque specifications of the screw, please see Technical Instructions.

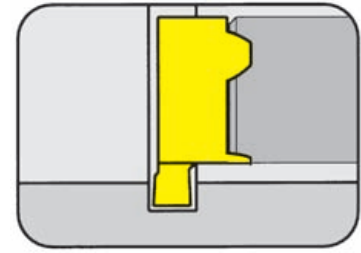
Clamping nut is not combined with milling shank - separate order required!

**Spare parts**

Milling shank	Screw	TORX PLUS® Wrench
M306.ER11.02	<b>2.6.5T8EP</b>	<b>T8PL</b>

## INSERT Type

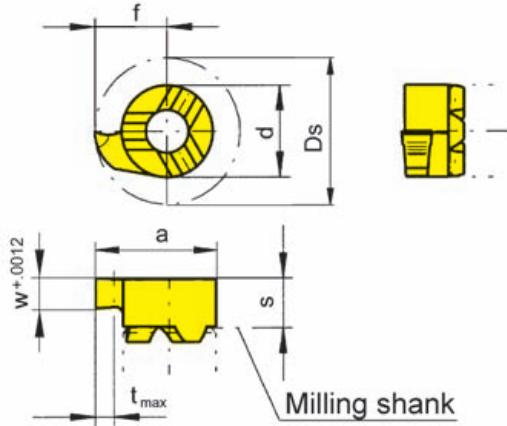
# 108/U108



Depth of groove up to	.039"
Width of circlip Nw	.028 - .063"
Cutting edge Ø	Ds .378"

Widths for circlip grooves DIN 471/472

for use with Milling shank



- Type
- MU306
  - M306
  - M306.ST
  - M306.ER
  - M306.M

R = right hand version shown

L = left hand version

Part number	Nw	w	s	f	a	d	t <sub>max</sub>	Ds	Carbide grades			
									MG12	TN35	T125	TH35
R/LU108.0031.00	-	.031	.142	.189	.307	.236	.039	.378	Δ	▲/▲		
R/LU108.0039.00		.039							▲			
R/L108.0070.00	.028	.029	.142	.189	.307	.236	.039	.378		▲/▲		▲/▲
R/L108.0080.00	.031	.033							▲/▲	▲/▲		
R/L108.0090.00	.035	.037							▲/▲	▲/▲		
R/L108.0110.00	.043	.047	.126	.189	.307	.236	.039	.378	▲/▲	▲/▲		▲/▲
R/L108.0130.00	.051	.055							▲/▲	▲/▲	▲/▲	
R/L108.0160.00	.063	.067							▲/▲	▲/▲	▲/▲	

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	○	●	●	●
M	●	●	●	●
K	●	●	●	●
N	●	●	●	●
S	●	●	●	●
H				

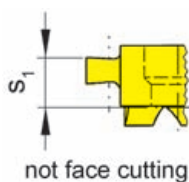
Dimensions in inch

Carbide grades

State R or L version

**Note:**

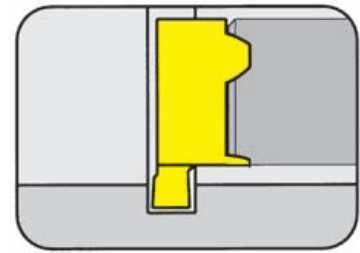
Inserts with width of groove w .029" - .039" are NOT face cutting!



INSERT Type

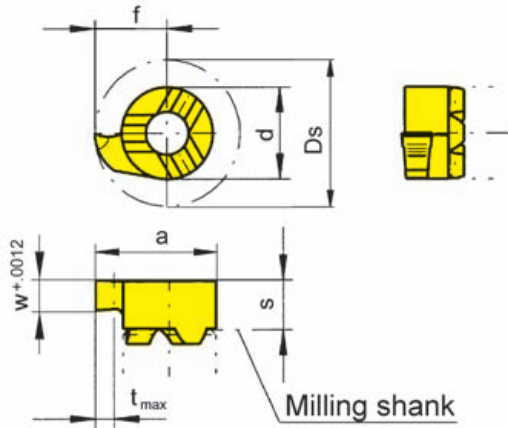
108/U108

Depth of groove up to .039"  
 Width of groove up to .079"  
 Cutting edge  $\emptyset$  Ds .378"



for use with Milling shank

Type MU306  
 M306  
 M306.ST  
 M306.ER  
 M306.M



R = right hand version shown

L = left hand version

Part number	w	s	f	a	d	t <sub>max</sub>	Ds	MG12	TN35	T125	TH35
R/L108.0150.00	.059							▲/▲	▲/▲		▲/▲
R/L108.0200.00	.079	.126	.189	.307	.236	.039	.378	▲/▲	▲/▲		▲/▲
R/LU108.0046.00	.046							▲/	▲/		
R/LU108.0056.00	.056								▲/▲		
R/LU108.0062.00	.062	.126	.189	.307	.236	.039	.378	▲/	▲/▲		
R/LU108.0078.00	.078								▲/▲		
								P	o	.	.
								M	.	.	.
								K	.	.	.
								N	.	.	.
								S	.	.	.
								H			

▲ on stock Δ 4 weeks  
 ● main recommendation  
 o alternative recommendation  
 □ uncoated grades  
 ■ coated grades  
 ■ brazed/Cermet

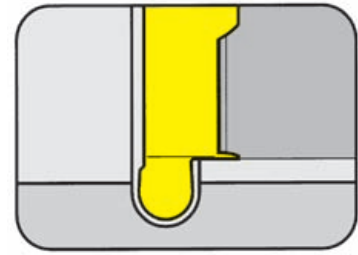
Carbide grades	P	M	K	N	S	H
MG12	o	.	.	.	.	.
TN35	.	.	.	.	.	.
T125	.	.	.	.	.	.
TH35	.	.	.	.	.	.

Dimensions in inch

State R or L version

## INSERT Type

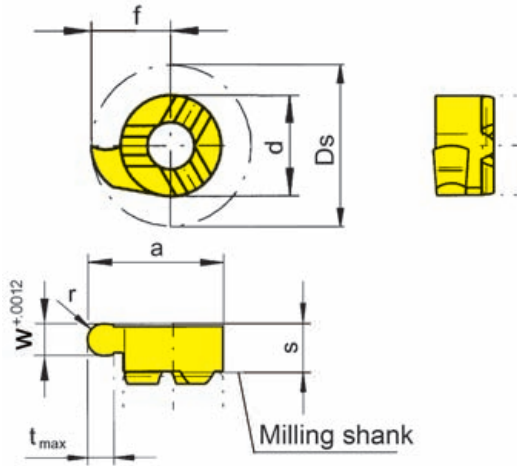
# 108/U108



Depth of groove up to .039"  
 Full radius r .015 - .039"  
 Cutting edge  $\emptyset$  Ds .378"

for use with Milling shank

Type MU306  
 M306  
 M306.ST  
 M306.ER  
 M306.M



R = right hand version shown

L = left hand version

Full radius

Part number	w	r	s	f	a	d	t <sub>max</sub>	Ds	Carbide grades				
									MG12	TN35	T125	TF45	TH35
R/L108.0004.08	.031	.016							▲/Δ	▲/▲			▲/▲
R/L108.0006.12	.047	.024	.126	.189	.307	.236	.039	.378	▲/▲	▲/▲			▲/▲
R/L108.0009.18	.071	.035							▲/▲	▲/▲	▲/Δ		▲/▲
R/LU108.0015.31	.031	.015								▲/▲	Δ/		
R/LU108.0023.46	.046	.023	.126	.189	.307	.236	.039	.378		▲/▲			
R/LU108.0031.62	.062	.031							▲/	▲/▲			▲/
R/LU108.0039.78	.078	.039								▲/▲			▲/

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

State R or L version

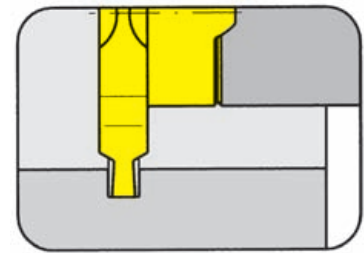
	P	M	K	N	S	H
MG12	○	●	●	●	●	●
TN35	●	●	●	●	●	●
T125	●	●	●	●	●	●
TF45	●	●	●	●	●	●
TH35	●	●	●	●	●	●

Carbide grades

## INSERT Type

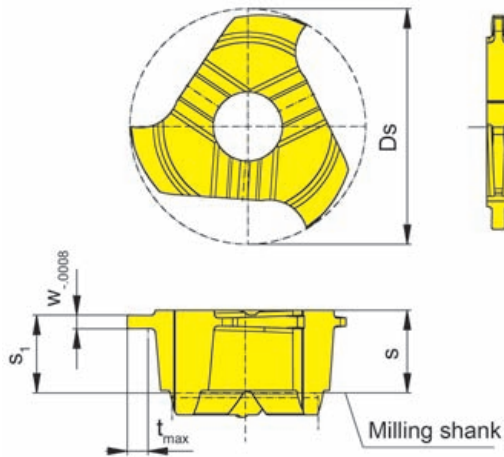
# 306

Depth of groove up to	.045"
Width of circlip Nw	.020 - .028"
Cutting edge Ø	Ds .382"



Widths for circlip grooves DIN 471/472

for use with Milling shank



- Type
- MU306
  - M306
  - M306.ST
  - M306.ER
  - M306.M

not face cutting,  
limited depth of cut

Picture = right hand cutting version

Part number	Nw	w	s <sub>1</sub>	s	t <sub>max</sub>	Ds	Carbide grades			
							MG12	TN35	TA45	AS45
<b>306.0050.10.00</b>	.020	.022	.126	.134	.033	.382			▲	
<b>306.0070.10.00</b>	.028	.030	.126	.134	.045	.382			▲	
							P		•	
							M		•	
							K		•	
							N		•	
							S		•	
							H			

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

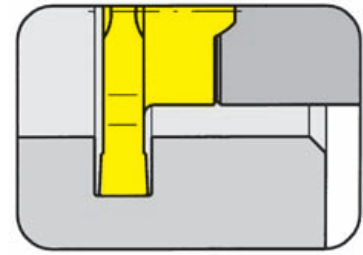
Dimensions in inch



## INSERT Type

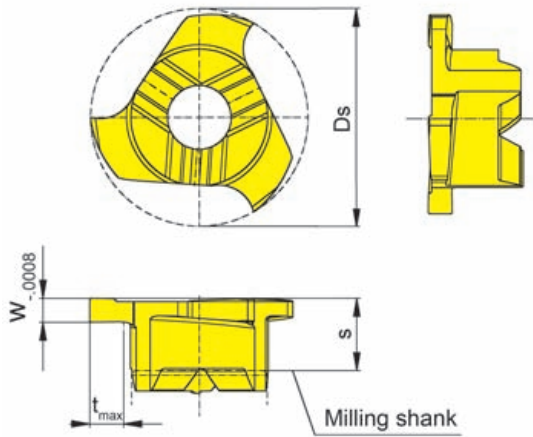
# 306

Depth of groove up to	.059"
Width of circlip Nw	.031 - .063"
Cutting edge Ø	Ds .382"



Widths for circlip grooves DIN 471/472

for use with Milling shank



- Type
- MU306
  - M306
  - M306.ST
  - M306.ER
  - M306.M

Picture = right hand cutting version

Part number	Nw	w	s	t <sub>max</sub>	Ds	Carbide grades			
						MG12	TN35	TA45	AS45
306.0080.10.00	.031	.034						▲	
306.0090.10.00	.035	.038						▲	
306.0100.10.00	.039	.042						▲	
306.0110.10.00	.043	.048	.126	.059	.382			▲	
306.0130.10.00	.051	.056						▲	▲
306.0160.10.00	.063	.067						▲	▲
▲ on stock Δ 4 weeks ● main recommendation ○ alternative recommendation ■ uncoated grades ■ coated grades ■ brazed/Cermet						P		●	●
						M		●	●
						K		●	●
						N		●	○
						S		●	●
						H			

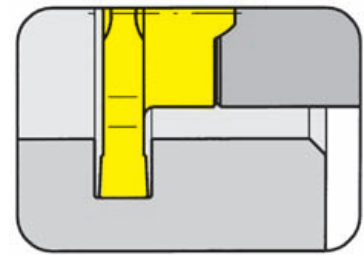
Dimensions in inch

Carbide grades

INSERT Type

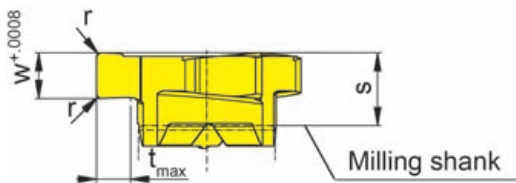
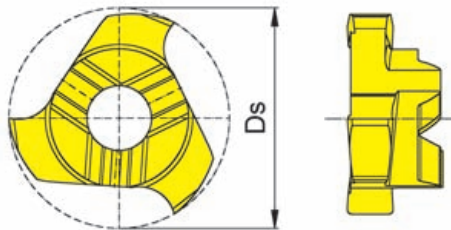
306

Depth of groove up to .059"  
 Width of groove up to .079"  
 Cutting edge  $\emptyset$  Ds .382"



for use with Milling shank

Type MU306  
 M306  
 M306.ST  
 M306.ER  
 M306.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades			
						MG12	TN35	TA45	AS45
306.0150.10.00	.059	-	.126	.059	.382			▲	▲
306.0200.10.00	.079	.008	.126	.059	.382			▲	▲
						P		•	•
						M		•	•
						K		•	•
						N		•	○
						S		•	•
						H			

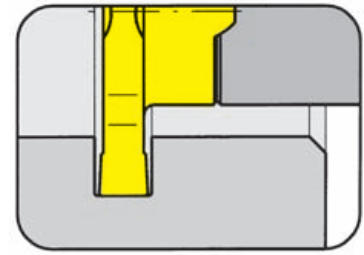
- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

## INSERT Type

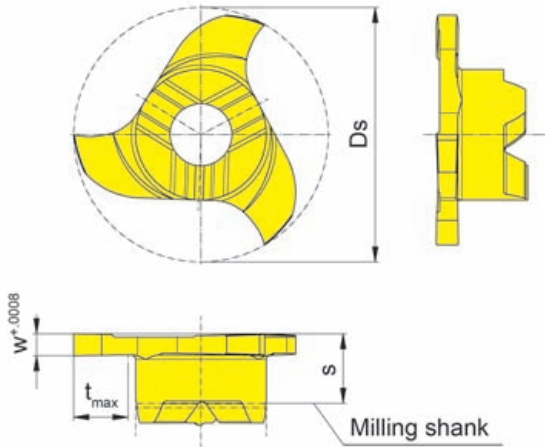
# 306

Depth of groove up to	.098"
Width of groove	.039"
Cutting edge $\emptyset$	Ds .461"



for use with Milling shank

- Type
- MU306
  - M306
  - M306.ST
  - M306.ER
  - M306.M



Picture = right hand cutting version

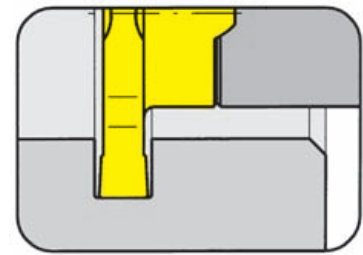
Part number	w	s	t <sub>max</sub>	Ds	Carbide grades		
					MG12	TN35	AS45
<b>306.0100.1.00</b>	.039	.126	.098	.461		▲	
▲ on stock Δ 4 weeks					P	•	
● main recommendation					M	•	
○ alternative recommendation					K	•	
■ uncoated grades					N	•	
■ coated grades					S	•	
■ brazed/Cermet					H		

Dimensions in inch

## INSERT Type

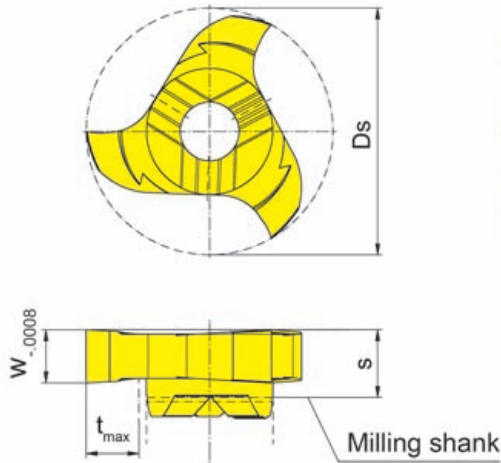
# 306

Depth of groove up to	.098"
Width of circlip Nw	.043 - .063"
Cutting edge Ø	Ds .461"



Widths for circlip grooves DIN 471/472

for use with Milling shank



- Type
- MU306
  - M306
  - M306.ST
  - M306.ER
  - M306.M

Picture = right hand cutting version

Part number	Nw	w	s	t <sub>max</sub>	Ds	Carbide grades			
						MG12	TN35	AS45	TF45
306.0110.00	.043	.048				▲	▲		▲
306.0130.00	.051	.056	.126	.098	.461		▲		
306.0160.00	.063	.067					▲		
						P	o	•	•
						M	•	•	•
						K	•	•	•
						N	•	•	•
						S	•	•	•
						H			

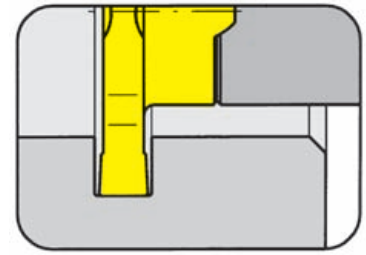
Dimensions in inch

Carbide grades

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

## INSERT Type

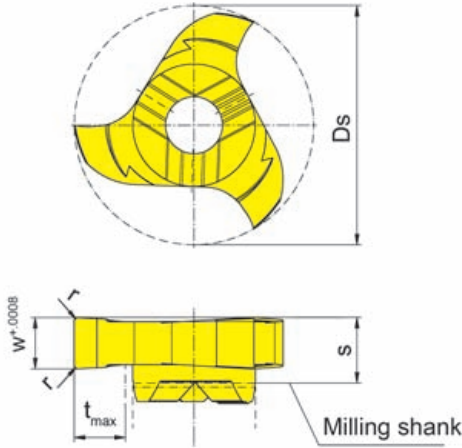
## 306/U306



Depth of groove up to .098"  
 Width of groove up to .118"  
 Cutting edge Ø Ds .461"

for use with Milling shank

Type MU306  
 M306  
 M306.ST  
 M306.ER  
 M306.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades			
						MG12	TN35	AS45	TF45
306.0150.00	.059	-				▲	▲	▲	▲
306.0200.00	.079	.008				▲	▲	▲	▲
306.0250.00	.098	.008	.126	.098	.461	▲	▲	▲	▲
306.0300.00	.118	.008					▲		
U306.0046.00	.046					▲	▲		▲
U306.0056.00	.056						▲		
U306.0062.00	.062	-	.126	.098	.461		▲		
U306.0078.00	.078						▲		
U306.0094.00	.094						▲		△
U306.0046.08	.046						▲		
U306.0062.08	.062						▲		
U306.0078.08	.078	.008	.126	.098	.461		▲		▲
U306.0094.08	.094						▲		△
						P	○	●	●
						M	●	●	●
						K	●	●	●
						N	●	○	●
						S	●	●	●
						H			

▲ on stock    △ 4 weeks  
 ● main recommendation  
 ○ alternative recommendation  
 ■ uncoated grades  
 ■ coated grades  
 ■ brazed/Cermet

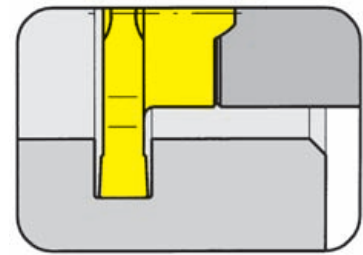
Dimensions in inch

Carbide grades

## INSERT Type

# 306

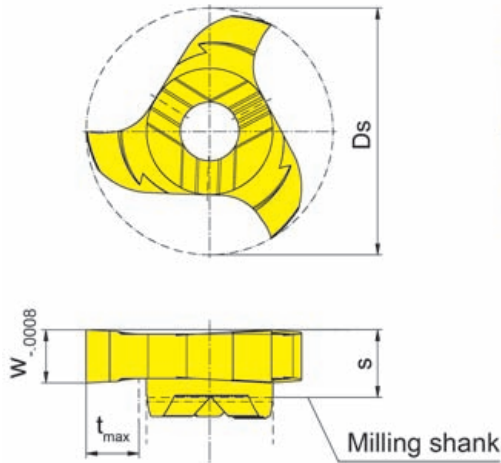
machining of aluminium



Depth of groove up to	.098"
Width of circlip Nw	.043 - .063"
Cutting edge Ø	Ds .461"

Widths for circlip grooves DIN 471/472

for use with Milling shank



- Type
- MU306
  - M306
  - M306.ST
  - M306.ER
  - M306.M

Picture = right hand cutting version

Part number	Nw	w	s	t <sub>max</sub>	Ds	Carbide grades	
						MG12	TI25
306.0110.40	.043	.048	.126	.098	.461		▲
306.0130.40	.051	.056					△
306.0160.40	.063	.067					▲
						P	•
						M	•
						K	•
						N	•
						S	•
						H	

- ▲ on stock    △ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

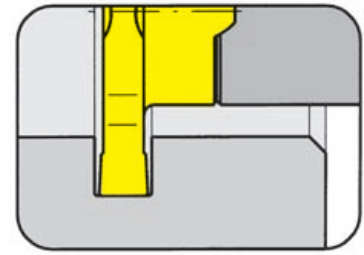
Carbide grades

## INSERT Type

## 306

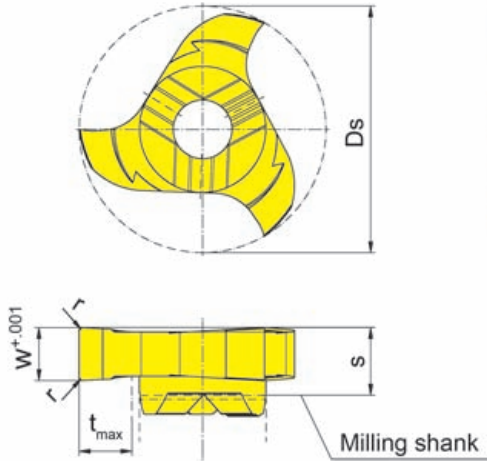
machining of aluminium

Depth of groove up to	.098"
Width of groove up to	.098"
Cutting edge Ø	Ds .461"



for use with Milling shank

- Type
- MU306
  - M306
  - M306.ST
  - M306.ER
  - M306.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades	
						MG12	TI25
306.0150.40	.059	-					▲
306.0200.40	.079	.008	.126	.098	.461		▲
306.0250.40	.098	.008					▲
						P	•
						M	•
						K	•
						N	•
						S	•
						H	•

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

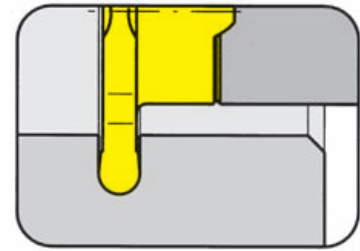
Dimensions in inch

Carbide grades

INSERT Type

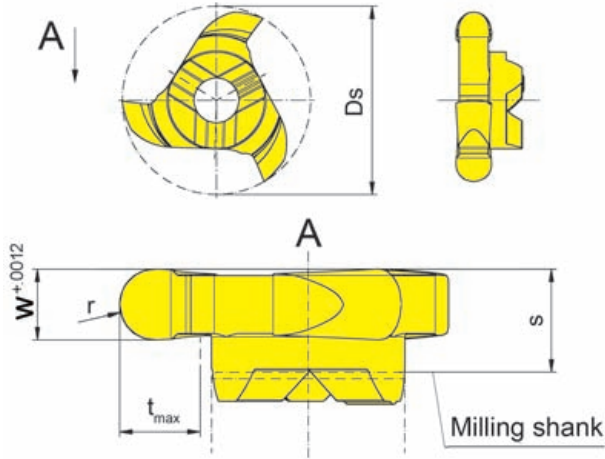
306/U306

Depth of groove up to .098"  
 Full radius r .031 - .047"  
 Cutting edge  $\emptyset$  Ds .461"



for use with Milling shank

- Type MU306  
 M306  
 M306.ST  
 M306.ER  
 M306.M



Picture = right hand cutting version

Full radius

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades				
						MG12	TN35	TI25	AS45	TF45
306.0011.22	.087	.043	.126	.098	.461		▲	▲	▲	
U306.0031.62	.062	.031	.126	.098	.461		▲			▲
U306.0047.94	.094	.047	.126	.098	.461		▲			▲
▲ on stock Δ 4 weeks ● main recommendation ○ alternative recommendation ■ uncoated grades ■ coated grades ■ brazed/Cermet						P	●	●	●	●
						M	●	●	●	●
						K	●	●	●	●
						N	●	●	○	●
						S	●	●	●	●
						H				

Dimensions in inch

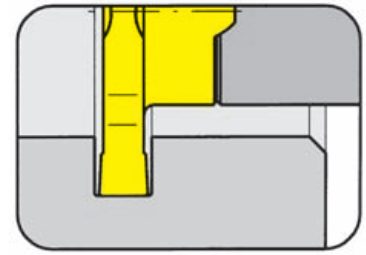
Carbide grades



## INSERT Type

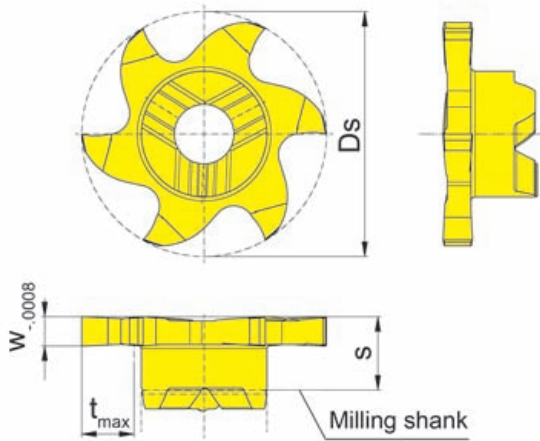
# 606

Depth of groove up to	.098"
Width of circlip Nw	.043 - .063"
Cutting edge Ø	Ds .461"



Widths for circlip grooves DIN 471/472

for use with Milling shank



- Type
- MU306
  - M306
  - M306.ST
  - M306.ER
  - M306.M

Picture = right hand cutting version

Part number	Nw	w	s	t <sub>max</sub>	Ds	Carbide grades			
						MG12	TN35	TA45	AS45
606.0110.00	.043	.048						▲	
606.0130.00	.051	.056	.138	.098	.461			▲	
606.0160.00	.063	.067						▲	▲
						P		•	•
						M		•	•
						K		•	•
						N		•	○
						S		•	•
						H			

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

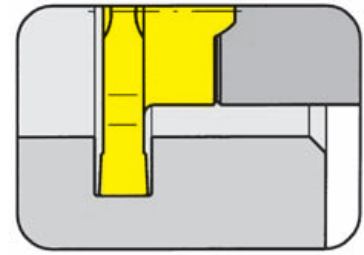
Dimensions in inch

Carbide grades

## INSERT Type

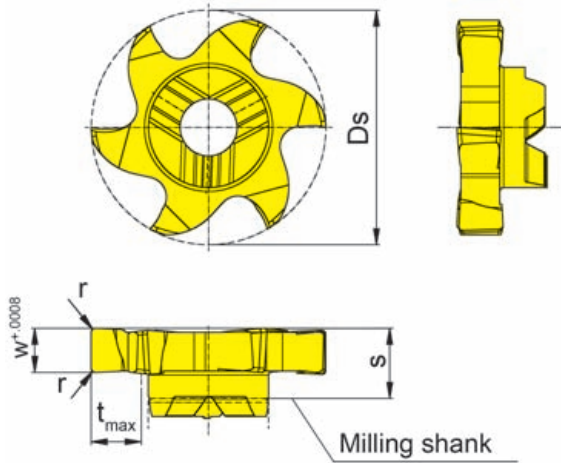
# 606

Depth of groove up to .098"  
 Width of groove up to .098"  
 Cutting edge  $\emptyset$  Ds .461"



for use with Milling shank

Type MU306  
 M306  
 M306.ST  
 M306.ER  
 M306.M



Picture = right hand cutting version

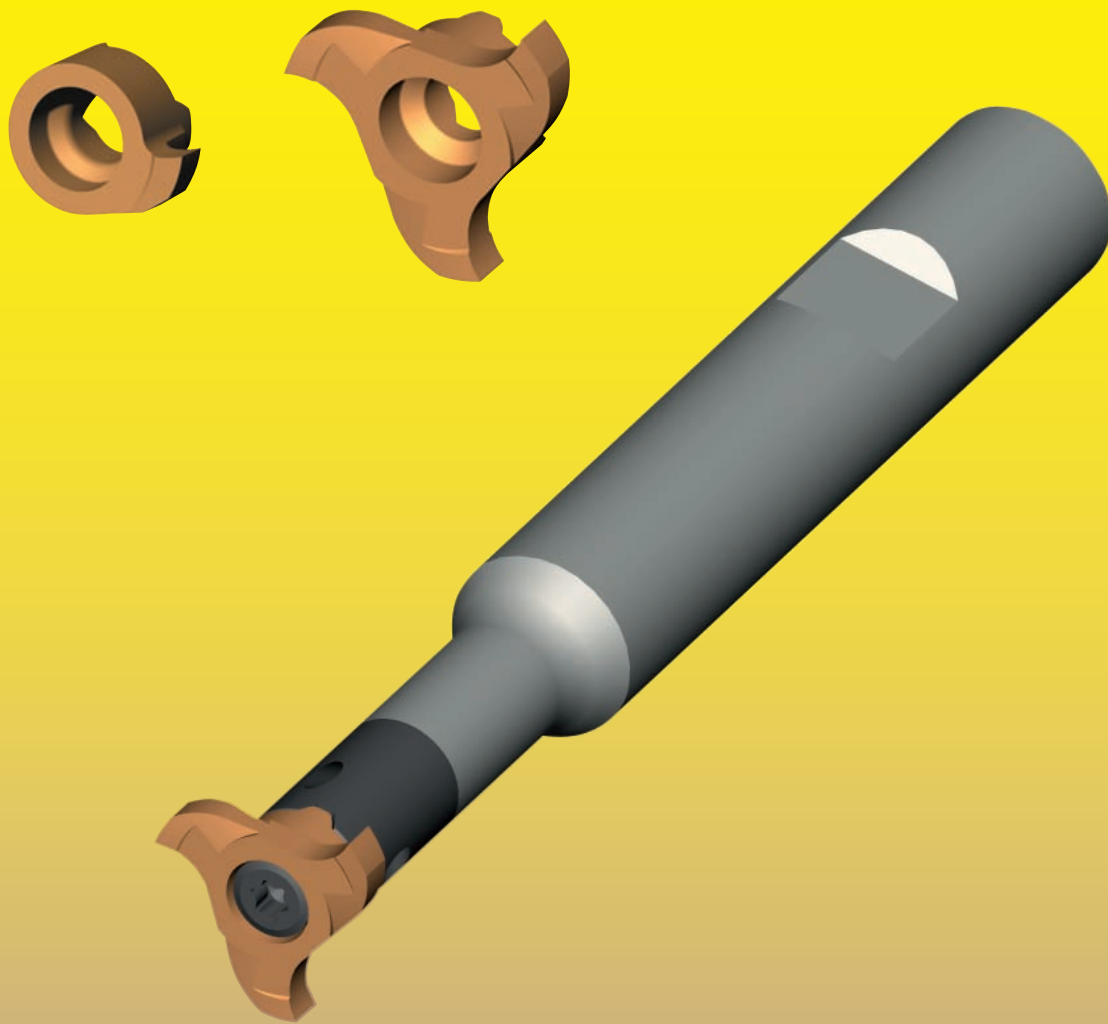
Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades			
						MG12	TN35	TA45	AS45
606.0150.00	.059	-	.126					▲	▲
606.0200.00	.079	.008	.138	.098	.461			▲	▲
606.0250.00	.098	.008	.138					▲	▲
						P		●	●
						M		●	●
						K		●	●
						N		●	○
						S		●	●
						H			

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

Carbide grades

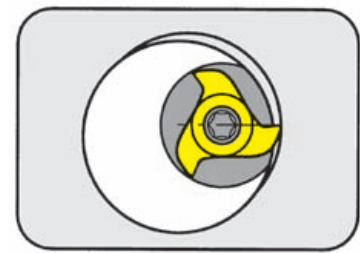
MILLING SHANK type **MU / M308**  
from bore  $\varnothing$  .539" (13.7 mm)



## MILLING SHANK Type

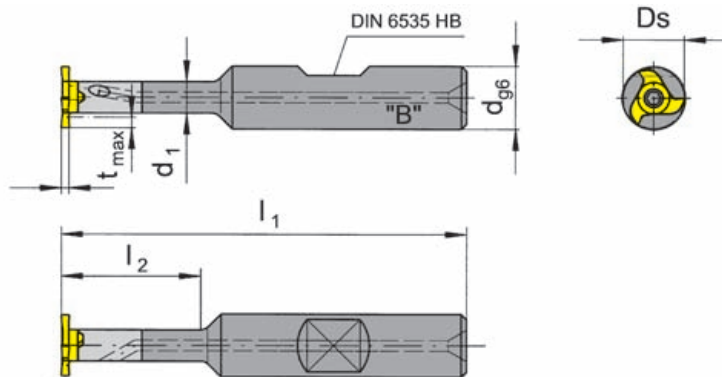
# MU308

with through coolant supply

Cutting edge  $\emptyset$ 

Ds .528 - .618"

Material of shank: Carbide - Giving a good vibration resistance



for use with Insert

Type U11  
U308  
111  
308  
608

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
MU308.0500.01B	3.740	1.142		
MU308.0500.02B	4.331	1.654	.315	.500
MU308.0500.03B	4.724	2.205		
MU308.0625.01B	4.331	1.299	.374	.625

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in inch

**Ordering note:**All milling cutter shanks can be used for **right** and **left** hand inserts type 111.

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

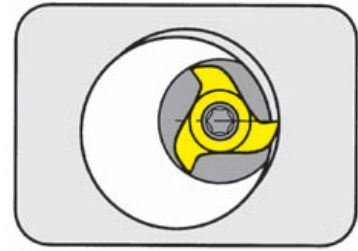
**Spare parts**

Milling shank	Screw	TORX PLUS® Wrench
MU308.0...	3.5.12T10EP	T10PL

## MILLING SHANK Type

# M308

with through coolant supply

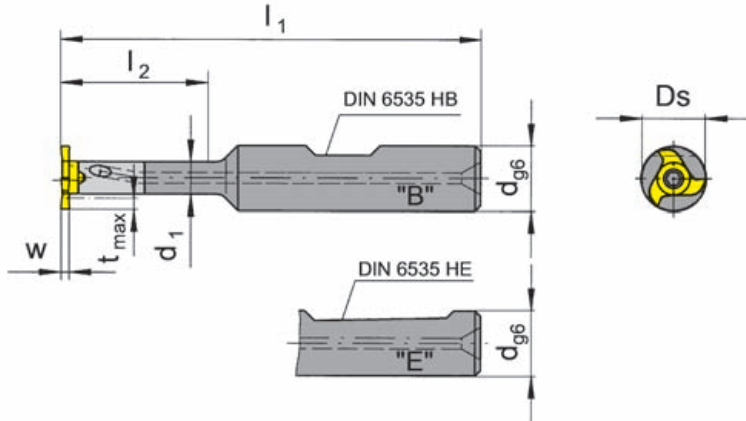


Cutting edge  $\varnothing$

Ds 13.4/15.7 mm

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert



Type U111  
U308  
111  
308  
608

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M308.0012.01B	95	29	8	12	B
M308.0012.02B	110	42			
M308.0012.03B	120	56			
M308.0012.01E	95	29	8	12	E
M308.0012.02E	110	42			
M308.0012.03E	120	56			

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

### Ordering note:

All milling cutter shanks can be used for **right** and **left** hand inserts type 111.

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M308.0012.0...	3.5.12T10EP	T10PL

## MILLING SHANK Type

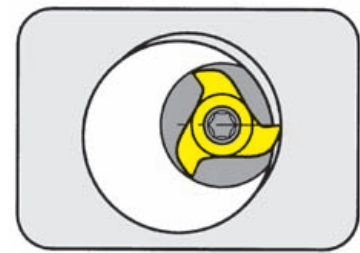
**M308**

with through coolant supply

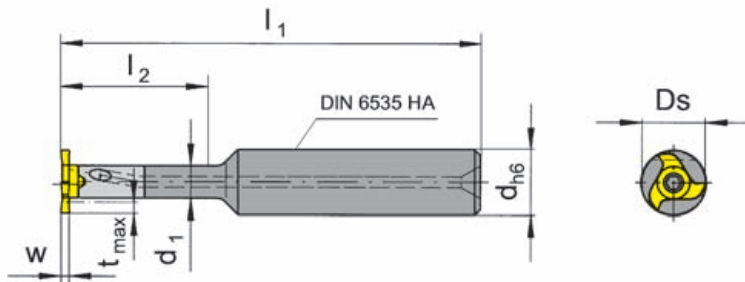
Cutting edge  $\emptyset$ 

Ds 13.4/15.7 mm

Material of shank: Carbide - Giving a good vibration resistance



for use with Insert


 Type U111  
 U308  
 111  
 308  
 608

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
M308.0012.01A	95	29	8	12
M308.0012.02A	110	42		
M308.0012.03A	120	56		

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

**Ordering note:**All milling cutter shanks can be used for **right** and **left** hand inserts type 111.

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

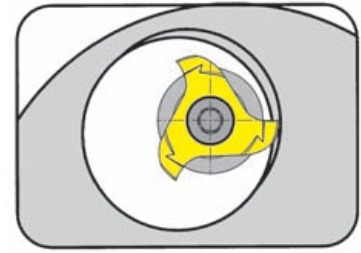
**Spare parts**

Milling shank	Screw	TORX PLUS® Wrench
M308.0012.0...	<b>3.5.12T10EP</b>	<b>T10PL</b>

## MILLING SHANK Type

# M308.ST

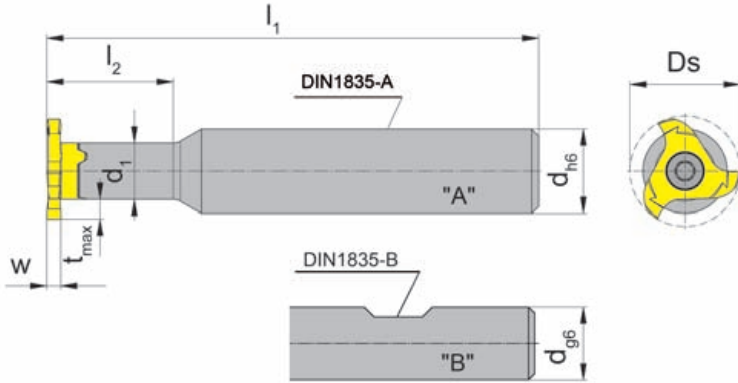
no coolant supply



Cylindrical steel milling shank for collets Ds 13.4 / 15.7 mm

with cylindrical shank for CNC-lathes

for use with Insert



Type U111  
U308  
111  
308  
608

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M308.ST10.01A	60	18		10	A
M308.ST12.01A	70	18	8	12	
M308.ST13.01A	70	26		13	
M308.ST10.01B	60	18	8	10	B
M308.ST12.01B	70			12	

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

### Ordering note:

All milling cutter shanks can be used for **right** and **left** hand inserts type 111.

For torque specifications of the screw, please see Technical Instructions.

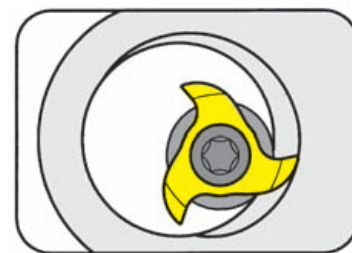
### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M308.ST1...	3.5.12T10EP	T10PL

## SCREW-IN CUTTER Type

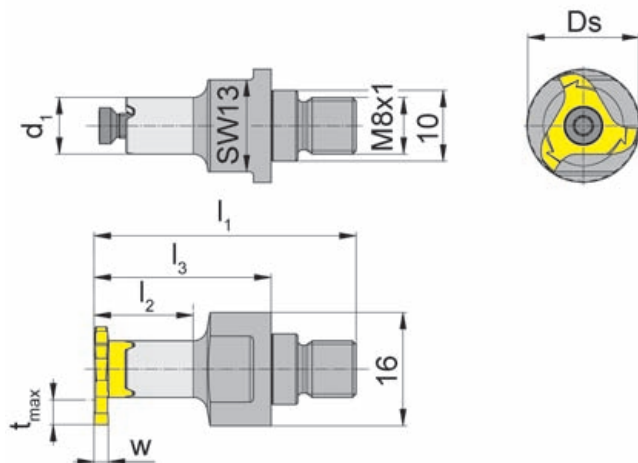
**M308.M**

no coolant supply



Screw-in Cutter for basic holder type WFB.20

for use with Insert

 Type U111  
 U308  
 111  
 308  
 608


Picture = right hand cutting version

Part number	$l_1$	$l_2$	$l_3$	$d_1$
<b>M308.M081.01</b>	37	14	25	8

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

All milling cutter shanks can be used for **right** and **left** hand inserts type 111.

For torque specifications of the screw, please see Technical Instructions.



## Spare parts

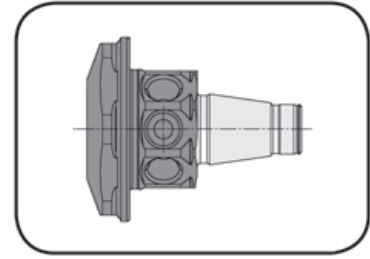
Screw-in cutter	Screw	TORX PLUS® Wrench
M308.M081.01	<b>3.5.12T10EP</b>	<b>T10PL</b>



## BASIC HOLDER Type

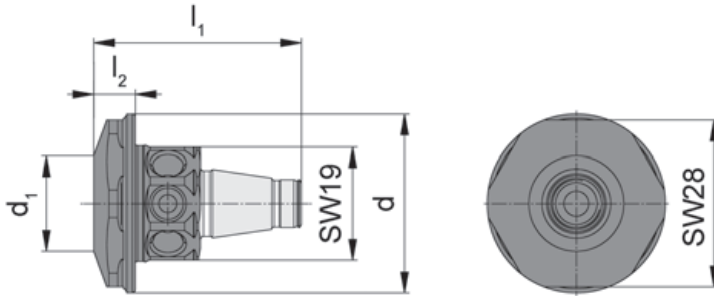
# WFB

Basic shank WFB.20 for screw-in cutter



for use with Screw-in cutter

- Type
- M306.M081...
  - M308.M081...
  - M311.M081...
  - M313.M081...
  - M328.M081...
  - M332.M081...



Part number	$l_1$	$l_2$	$d_1$	d
WFB.2012.M081.01	35	7	16	30

Further sizes upon request

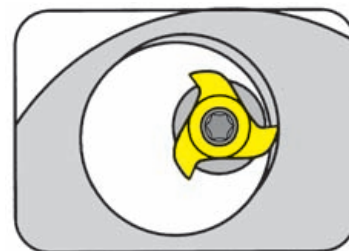
Dimensions in mm



## MILLING SHANK Type

## M308.ER

no coolant supply

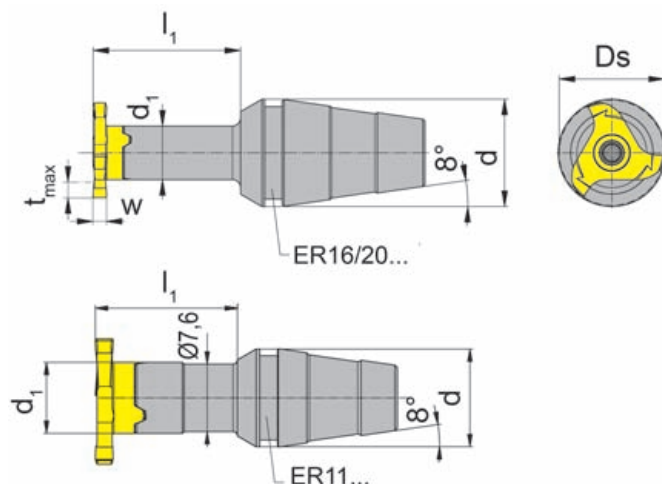


Milling shanks for collet chucks DIN6499-A (8°) Ds 13.4 / 15.7 mm

with ER taper for CNC-lathes

for use with Insert

Type U11  
U308  
111  
308  
608



Picture = right hand cutting version

Part number	$l_1$	$d_1$	d	Clamping nut
M308.ER11.02	16		11	ER11.6499
M308.ER16.02	22	8	16	ER16.6499/ERM...
M308.ER20.02	22		20	ER20.6499/ERM...

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

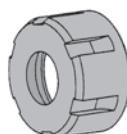
Dimensions in mm

#### Ordering note:

All milling cutter shanks can be used for **right** and **left** hand inserts type 111.

For torque specifications of the screw, please see Technical Instructions.

Clamping nut is not combined with milling shank - separate order required!

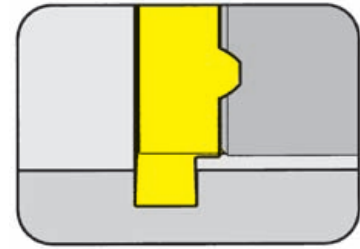


#### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M308.ER...	3.5.12T10EP	T10PL

## INSERT Type

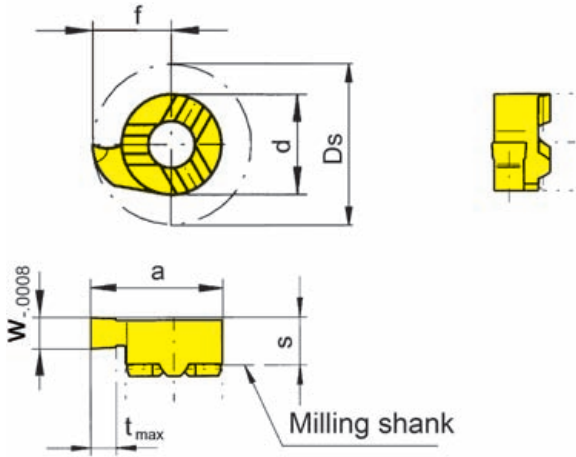
# 111



Depth of groove up to	.091"
Width of circlip Nw	.028 - .063"
Cutting edge Ø	Ds .528"

Widths for circlip grooves DIN 471/472

for use with Milling shank



- Type
- MU308
  - M308
  - M308.ST
  - M308.ER
  - M308.M

R = right hand version shown

L = left hand version

Part number	Nw	w	s	f	a	d	t <sub>max</sub>	Ds	Carbide grades			
									MG12	TN35	T125	TH35
R/L111.0070.00	.028	.029	.163				.047		▲/▲		▲/▲	
R/L111.0080.00	.031	.033	.163				.051		▲/▲		▲/▲	
R/L111.0090.00	.035	.037	.163				.059		▲/▲	▲/▲	▲/▲	▲/▲
R/L111.0110.00	.043	.047	.156	.264	.421	.315	.091	.528	▲/▲	▲/▲	▲/▲	▲/▲
R/L111.0130.00	.051	.055	.156				.091		▲/▲	▲/▲	▲/▲	▲/▲
R/L111.0160.00	.063	.067	.156				.091		▲/▲	▲/▲	▲/▲	▲/▲
									P	○	●	●
									M	●	●	●
									K	●	●	●
									N	●	●	●
									S	●	●	●
									H			

- ▲ on stock    Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

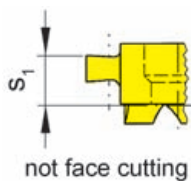
Dimensions in inch

Carbide grades

State R or L version

**Note:**

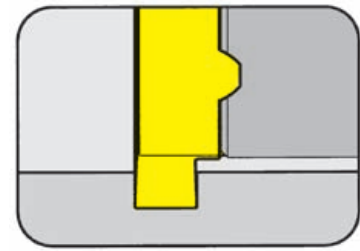
Inserts with width of groove w .029" - .039" are NOT face cutting!



## INSERT Type

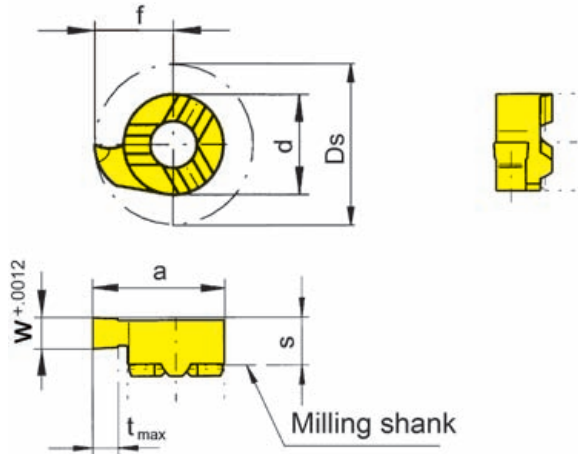
# 111/U111

Depth of groove up to .091"  
 Width of groove up to .125"  
 Cutting edge  $\emptyset$  Ds .528"



for use with Milling shank

Type MU308  
 M308  
 M308.ST  
 M308.ER  
 M308.M



R = right hand version shown

L = left hand version

Part number	w	s	f	a	d	t <sub>max</sub>	Ds	Carbide grades				
								MG12	TN35	T125	TF45	
R/L111.0150.00	.059							▲/▲	▲/▲			
R/L111.0200.00	.079							▲/▲	▲/▲			
R/L111.0250.00	.098	.156	.264	.421	.315	.091	.528	▲/▲	▲/▲			
R/L111.0300.00	.118							▲/▲	▲/▲			
R/LU111.0046.00	.046							▲/	▲/▲	▲/		
R/LU111.0056.00	.056							▲/	▲/▲			
R/LU111.0062.00	.062	.156	.264	.421	.315	.091	.528	▲/	▲/▲	▲/	▲/	
R/LU111.0078.00	.078								▲/▲			
R/LU111.0094.00	.094							▲/	▲/▲			
R/LU111.0125.00	.125								▲/▲			
▲ on stock    ▲ 4 weeks ● main recommendation ○ alternative recommendation ■ uncoated grades ■ coated grades ■ brazed/Cermet								P	○	●	●	●
								M	●	●	●	●
								K	●	●	●	●
								N	●	●	●	●
								S	●	●	●	●
								H				

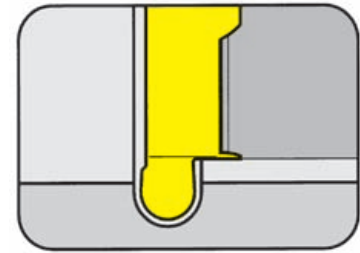
Dimensions in inch

Carbide grades

State R or L version

## INSERT Type

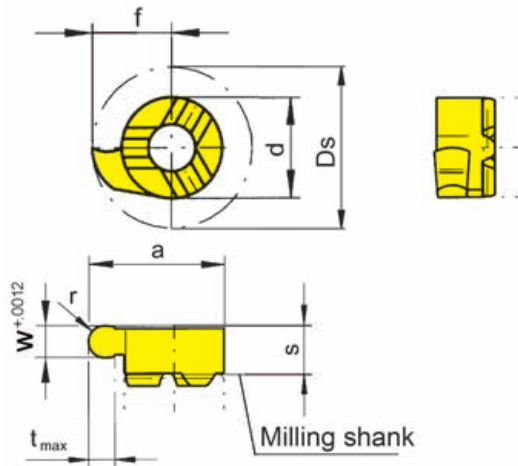
# 111/U111



Depth of groove up to .091"  
 Full radius r .015 - .059"  
 Cutting edge  $\emptyset$  Ds .528"

for use with Milling shank

Type MU308  
 M308  
 M308.ST  
 M308.ER  
 M308.M



R = right hand version shown

L = left hand version

Full radius

Part number	w	r	s	f	a	d	t <sub>max</sub>	Ds	Carbide grades				
									MG12	TN35	T125	TF45	TH35
R/L111.0004.08	.031	.016								▲/▲			▲/▲
R/L111.0006.12	.047	.024							▲/▲	▲/▲			▲/▲
R/L111.0009.18	.071	.035	.156	.264	.421	.315	.091	.528	▲/▲	▲/▲			▲/▲
R/L111.0010.20	.079	.039							▲/▲	▲/▲			▲/▲
R/L111.0015.30	.118	.059							▲/▲	▲/▲			▲/▲
R/LU111.0015.31	.031	.015								▲/▲			
R/LU111.0023.46	.046	.023							▲/▲	▲/▲			
R/LU111.0031.62	.062	.031	.156	.264	.421	.315	.091	.528	▲/▲	▲/▲	▲/▲		
R/LU111.0039.78	.078	.039							▲/▲	▲/▲			
R/LU111.0047.94	.094	.047							▲/▲	▲/▲			

- ▲ on stock    Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

	P	M	K	N	S	H
MG12	○	●	●	●	●	●
TN35	●	●	●	●	●	●
T125	●	●	●	●	●	●
TF45	●	●	●	●	●	●
TH35	●	●	●	●	●	●

Dimensions in inch

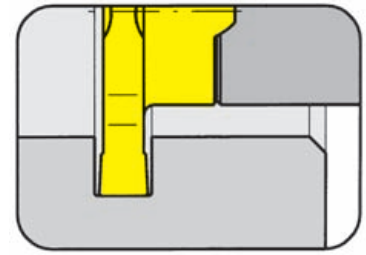
Carbide grades

State R or L version

INSERT Type

308

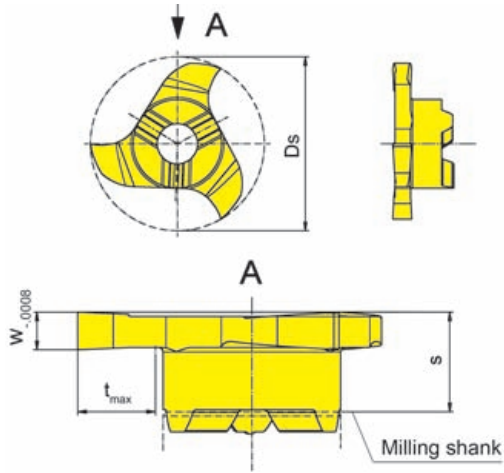
Depth of groove up to	.138"
Width of circlip Nw	.043 - .063"
Cutting edge Ø	Ds .618"



Widths for circlip grooves DIN 471/472

for use with Milling shank

- Type MU308  
 M308  
 M308.ST  
 M308.ER  
 M308.M



Picture = right hand cutting version

Part number	Nw	w	s	t <sub>max</sub>	Ds	Carbide grades				
						MG12	TN35	T125	AS45	TF45
308.0110.00	.043	.048					▲			△
308.0130.00	.051	.056	.177	.138	.618		▲		▲	△
308.0160.00	.063	.067					▲		▲	△
						P	•	•	•	•
						M	•	•	•	•
						K	•	•	•	•
						N	•	•	○	•
						S	•	•	•	•
						H				

- ▲ on stock    △ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

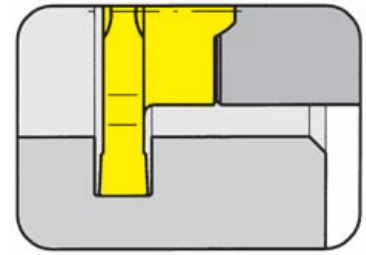
Dimensions in inch

Carbide grades

## INSERT Type

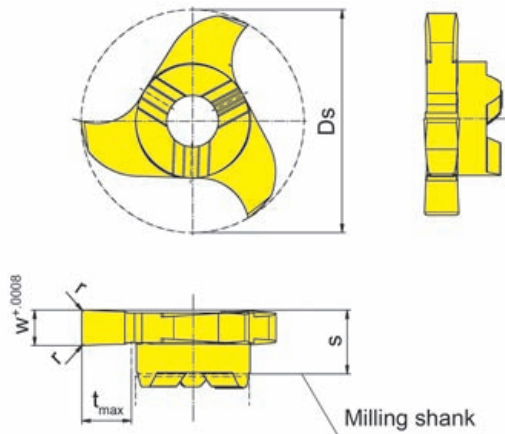
# 308/U308

Depth of groove up to .138"  
 Width of groove up to .125"  
 Cutting edge Ø Ds .618"



for use with Milling shank

Type MU308  
 M308  
 M308.ST  
 M308.ER  
 M308.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades			
						MG12	TN35	AS45	TF45
308.0150.00	.059	-				▲	▲	▲	▲
308.0200.00	.079	.008	.177	.138	.618		▲	▲	
308.0250.00	.098	.008				▲	▲	▲	▲
U308.0046.00	.046	-	.177	.138	.618		▲		
U308.0062.00	.062						▲		
U308.0046.08	.046		.177	.138	.618		▲		▲
U308.0062.08	.062						▲		▲
U308.0094.08	.094	.008	.177	.138	.618		▲		▲
U308.0125.08	.125						▲		▲

- ▲ on stock    Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

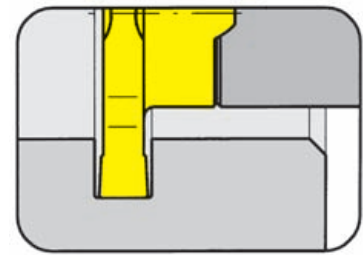
Dimensions in inch

Carbide grades

## INSERT Type

# 308

machining of aluminium

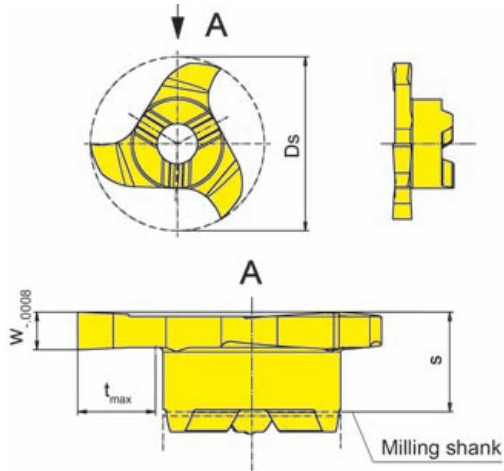


Depth of groove up to	.138"
Width of circlip Nw	.043 - .063"
Cutting edge Ø	Ds .618"

Widths for circlip grooves DIN 471/472

for use with Milling shank

- Type
- MU308
  - M308
  - M308.ST
  - M308.ER
  - M308.M



Picture = right hand cutting version

Part number	Nw	w	s	t <sub>max</sub>	Ds	Carbide grades	
						MG12	TI25
308.0110.40	.043	.048	.177	.138	.618		Δ
308.0130.40	.051	.056					Δ
308.0160.40	.063	.067					Δ
						P	•
						M	•
						K	•
						N	•
						S	•
						H	

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

Carbide grades

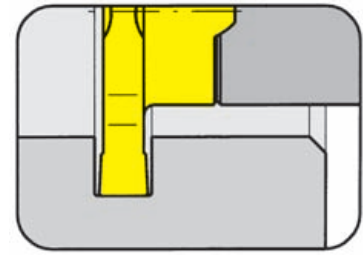


## INSERT Type

# 308

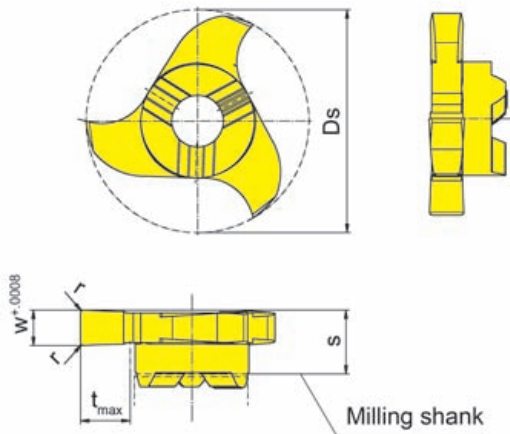
machining of aluminium

Depth of groove up to	.138"
Width of groove up to	.098"
Cutting edge Ø	Ds .618"



for use with Milling shank

- Type
- MU308
  - M308
  - M308.ST
  - M308.ER
  - M308.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades	
						MG12	TI25
308.0150.40	.059	-					▲
308.0200.40	.079	.008	.177	.138	.618		▲
308.0250.40	.098	.008					▲
						P	•
						M	•
						K	•
						N	•
						S	•
						H	•

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

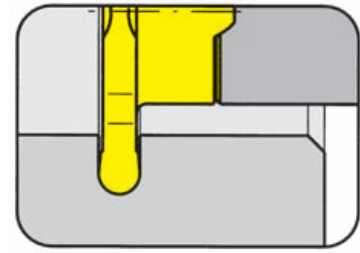
Dimensions in inch

Carbide grades

INSERT Type

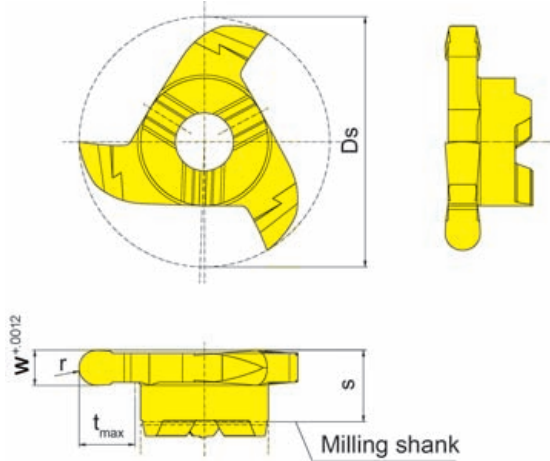
308/U308

Depth of groove up to .138"  
 Full radius r .031 - .047"  
 Cutting edge  $\emptyset$  Ds .618"



for use with Milling shank

Type MU308  
 M308  
 M308.ST  
 M308.ER  
 M308.M



Picture = right hand cutting version

Full radius

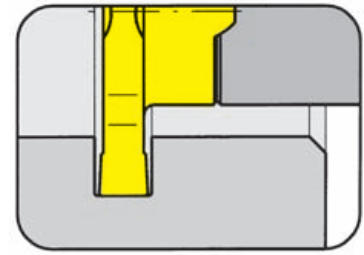
Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades				
						MG12	TN35	TI25	AS45	TF45
308.0011.22	.087	.043	.177	.138	.618		▲		▲	▲
U308.0031.62	.062	.031	.177	.138	.618		▲			
U308.0047.94	.094	.047	.177	.138	.618		▲	Δ		
▲ on stock Δ 4 weeks ● main recommendation ○ alternative recommendation ■ uncoated grades ■ coated grades ■ brazed/Cermet						P	●	●	●	●
						M	●	●	●	●
						K	●	●	●	●
						N	●	●	○	●
						S	●	●	●	●
						H				

Dimensions in inch

## INSERT Type

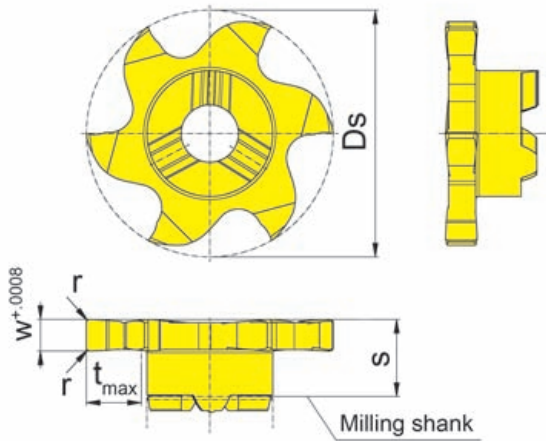
# 608

Depth of groove up to	.138"
Width of groove up to	.098"
Cutting edge Ø	Ds .618"



for use with Milling shank

- Type MU308  
M308  
M308.ST  
M308.ER  
M308.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades			
						MG12	T125	TA45	AS45
608.0150.00	.059	-					▲		▲
608.0200.00	.079	.008	.193	.138	.618		▲		▲
608.0250.00	.098	.008					▲		▲
						P	•	•	•
						M	•	•	•
						K	•	•	•
						N	•	•	○
						S	•	•	•
						H			

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

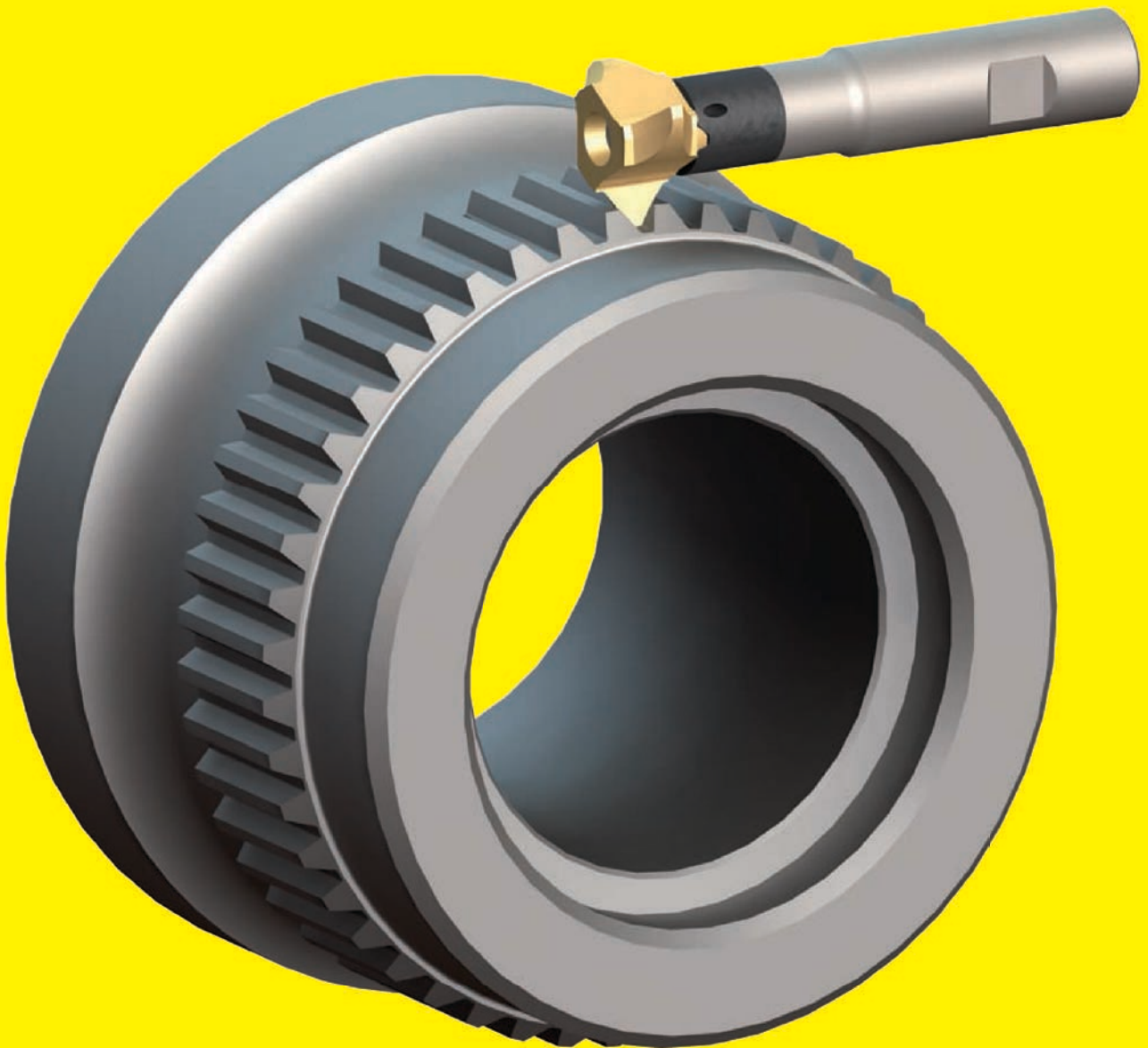
Dimensions in inch

Carbide grades

## Spline Milling

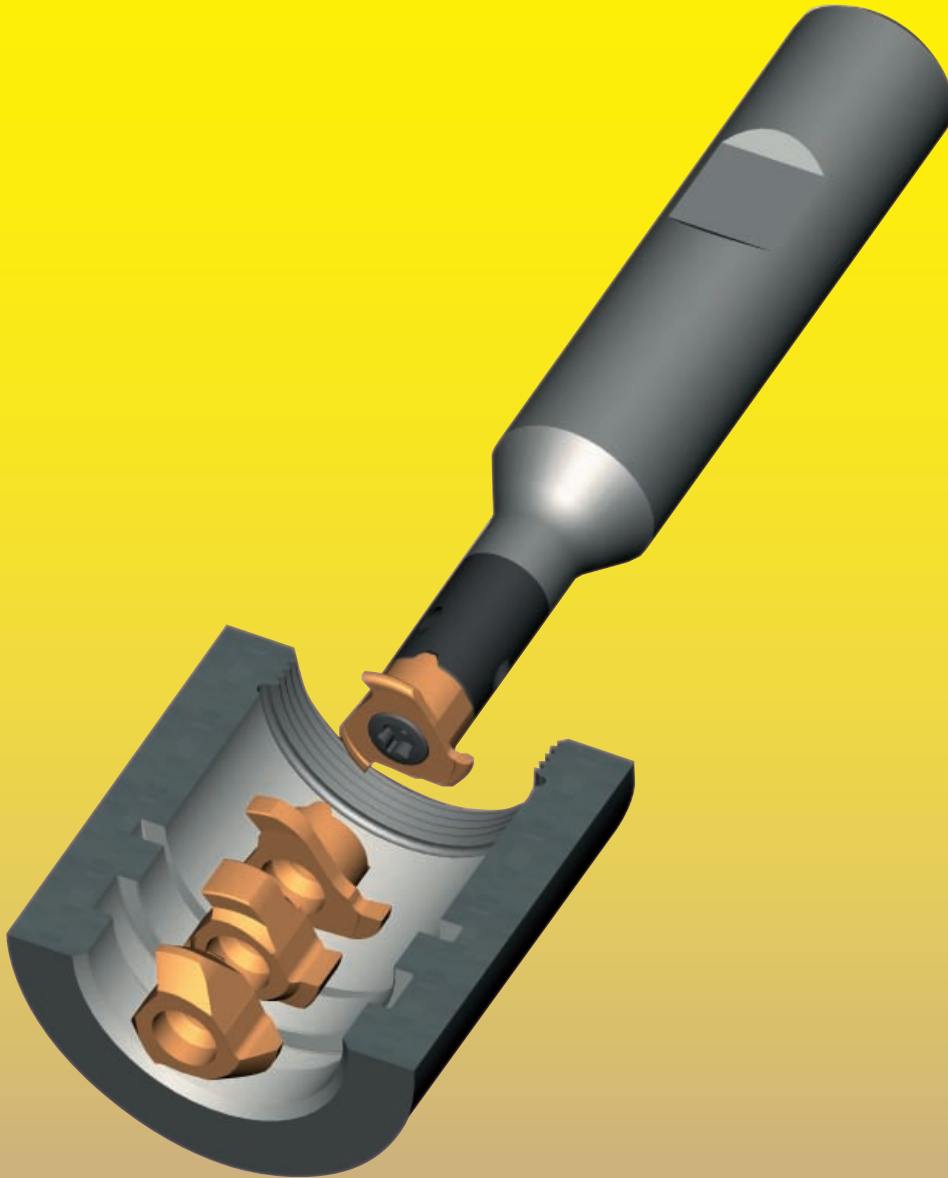
Example:

- Single tooth spline profile
- Carbide shank type M335



For further information, please contact HORN USA.

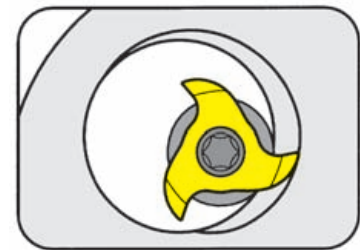
MILLING SHANK type **MU / M311**  
from bore  $\varnothing$  .709" (18.0 mm)



## MILLING SHANK Type

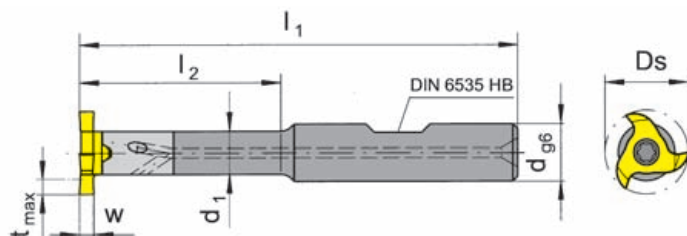
# MU311

with through coolant supply

Cutting edge  $\emptyset$ 

Ds .697"

Material of shank: Carbide - Giving a good vibration resistance



for use with Insert

 Type U311  
 311  
 611

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
MU311.0500.01B	3.937	1.260		
MU311.0500.02B	3.937	1.772	.354	.500
MU311.0500.03B	4.724	2.520		
MU311.0625.01B	3.937	1.260		
MU311.0625.02B	4.331	1.772	.354	.625
MU311.0625.03B	5.118	2.520		

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in inch

**Ordering note:**

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

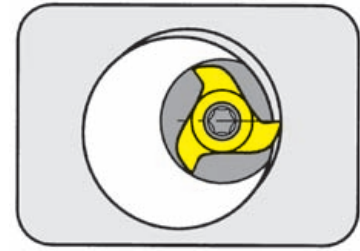
**Spare parts**

Milling shank	Screw	TORX PLUS® Wrench
MU311.0...	4.14T15P	T15PQ

## MILLING SHANK Type

# M311

with through coolant supply



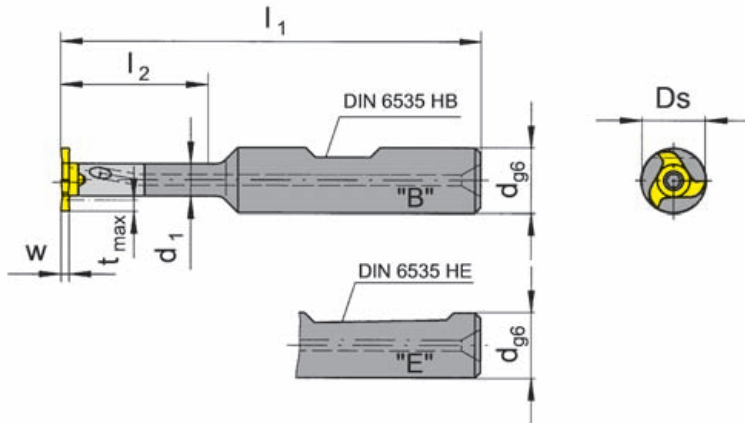
Cutting edge  $\varnothing$

Ds 17.7 mm

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type U311  
311  
611



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M311.0012.01B	100	32	9	12	B
M311.0012.02B	100	45		12	
M311.0012.03B	120	64		12	
M311.0016.01B	100	32		16	
M311.0016.02B	110	45		16	
M311.0016.03B	130	64		16	
M311.0012.01E	100	32	9	12	E
M311.0012.02E	100	45		12	
M311.0012.03E	120	64		12	
M311.0016.01E	100	32		16	
M311.0016.02E	110	45		16	
M311.0016.03E	130	64		16	

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

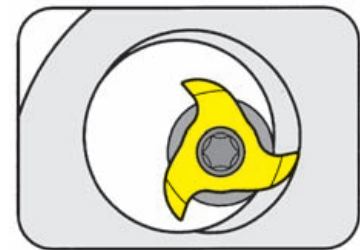
### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M311.001...	4.14T15P	T15PQ

## MILLING SHANK Type

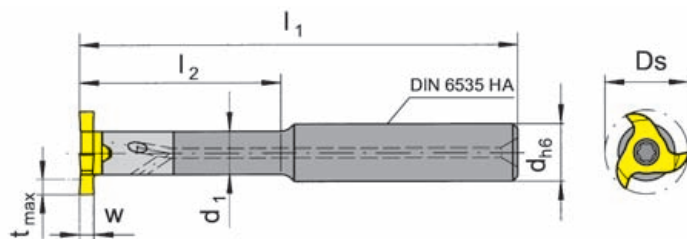
## M311

with through coolant supply

Cutting edge  $\varnothing$ 

Ds 17.7 mm

Material of shank: Carbide - Giving a good vibration resistance



for use with Insert

 Type U311  
 311  
 611

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
M311.0012.01A	100	32		
M311.0012.02A	100	45	9	12
M311.0012.03A	120	64		
M311.0016.01A	100	32		
M311.0016.02A	110	45	9	16
M311.0016.03A	130	64		

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

**Ordering note:**

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

**Spare parts**

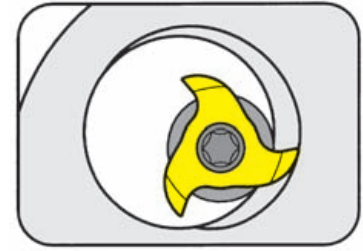
Milling shank	Screw	TORX PLUS® Wrench
M311.001...	4.14T15P	T15PQ



## MILLING SHANK Type

# M311.ST

no coolant supply

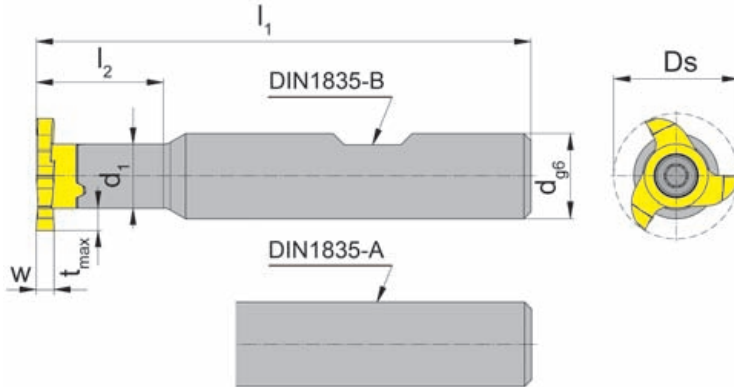


Cylindrical steel milling shank for collets Ds 17.7 mm

with cylindrical shank for CNC-lathes

for use with Insert

Type U311  
311  
611



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M311.ST10.01A	60	18		10	A
M311.ST12.01A	70	18	9	12	
M311.ST13.01A	70	26		13	
M311.ST16.01A	80	26		16	
M311.ST10.01B	60		9	10	B
M311.ST12.01B	70	18		12	

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

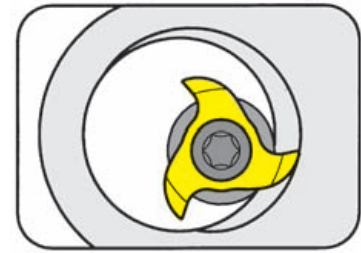
## Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M311.ST1...	4.14T15P	T15PQ

## SCREW-IN CUTTER Type

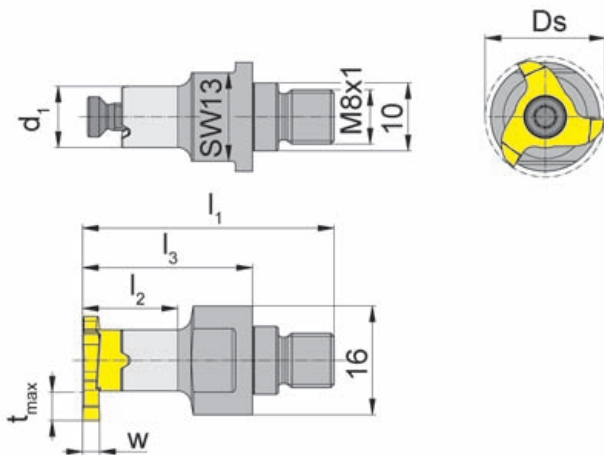
**M311.M**

no coolant supply



Screw-in Cutter for basic holder type WFB.20

for use with Insert

 Type U311  
 311  
 611


Picture = right hand cutting version

Part number	$l_1$	$l_2$	$l_3$	$d_1$
<b>M311.M081.01</b>	37	14	25	9

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.



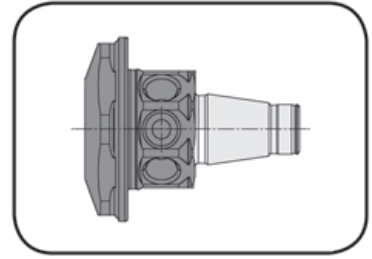
## Spare parts

Screw-in cutter	Screw	TORX PLUS® Wrench
M311.M081.01	<b>4.14T15P</b>	<b>T15PQ</b>

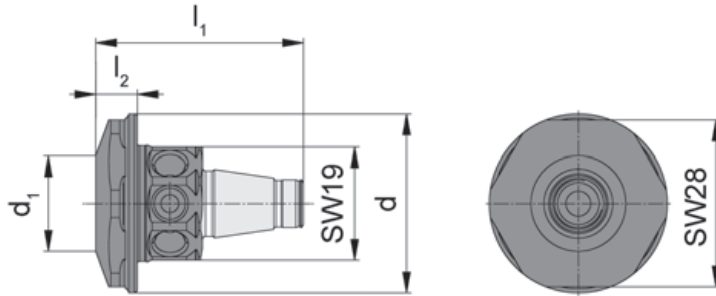
## BASIC HOLDER Type

# WFB

Basic shank WFB.20 for screw-in cutter



for use with Screw-in cutter



- Type
- M306.M081...
  - M308.M081...
  - M311.M081...
  - M313.M081...
  - M328.M081...
  - M332.M081...

Part number	$l_1$	$l_2$	$d_1$	d
WFB.2012.M081.01	35	7	16	30

Further sizes upon request

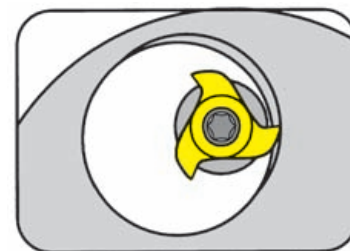
Dimensions in mm



## MILLING SHANK Type

## M311.ER

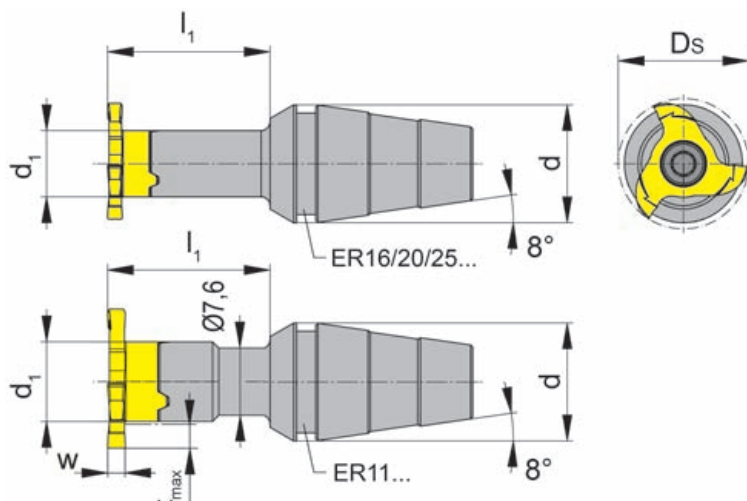
no coolant supply



Milling shanks for collet chucks DIN6499-A (8°) Ds 17.7 mm

with ER taper for CNC-lathes

for use with Insert

 Type U311  
 311  
 611


Picture = right hand cutting version

Part number	$l_1$	$d_1$	d	Clamping nut
M311.ER11.02			11	ER11.6499
M311.ER16.02	22	9	16	ER16.6499/ERM...
M311.ER20.02			20	ER20.6499/ERM...
M311.ER25.02			25	ER25.6499

Further sizes upon request

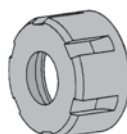
w, Ds,  $t_{max}$  see inserts

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

**Ordering note:**

Clamping nut is not combined with milling shank - separate order required!

**Spare parts**

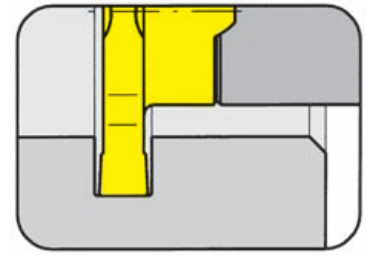
Milling shank	Screw	TORX PLUS® Wrench
M311.ER...	4.14T15P	T15PQ

## INSERT Type

# 311

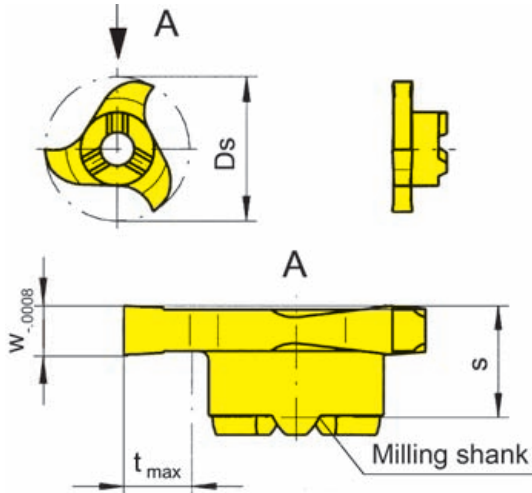
Depth of groove up to	.138"
Width of circlip Nw	.043 - .063"
Cutting edge Ø	Ds .697"

Widths for circlip grooves DIN 471/472



for use with Milling shank

- Type
- MU311
  - M311
  - M311.ST
  - M311.ER
  - M311.M



Picture = right hand cutting version

Part number	Nw	w	s	t <sub>max</sub>	Ds	Carbide grades		
						MG12	TN35	AS45
311.0110.00	.043	.048					▲	
311.0130.00	.051	.056	.226	.138	.697		▲	▲
311.0160.00	.063	.067					▲	▲
						P	•	•
						M	•	•
						K	•	•
						N	•	○
						S	•	•
						H		

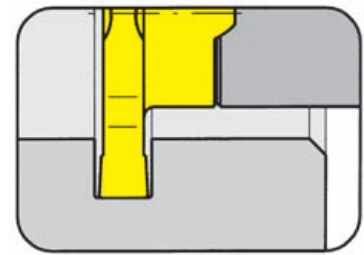
- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

Carbide grades

INSERT Type

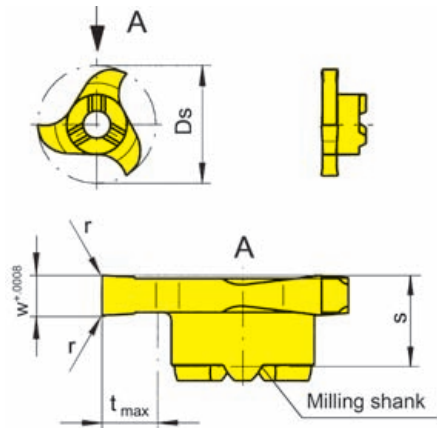
311/U311



Depth of groove up to .138"  
 Width of groove up to .125"  
 Cutting edge  $\varnothing$  Ds .697"

for use with Milling shank

Type MU311  
 M311  
 M311.ST  
 M311.ER  
 M311.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades			
						MG12	TN35	AS45	TF45
311.0150.00	.059	-					▲	▲	
311.0200.00	.079	.008	.226	.138	.697	▲	▲	▲	
311.0250.00	.098	.008					▲	▲	
311.0300.00	.118	.008				▲	▲	▲	
U311.0046.00	.046						▲		
U311.0056.00	.056	-	.226	.138	.697		▲		
U311.0062.00	.062						▲		
U311.0046.08	.046						▲		
U311.0062.08	.062						▲		
U311.0078.08	.078	.008	.226	.138	.697	▲	▲		
U311.0094.08	.094					△	▲		
U311.0125.08	.125					▲	▲		△
						P	○	●	●
						M	●	●	●
						K	●	●	●
						N	○	○	○
						S	●	●	●
						H			

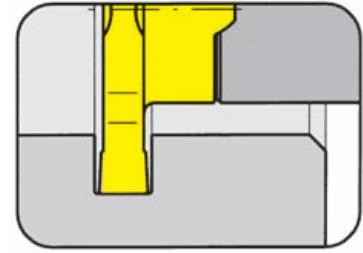
Dimensions in inch

Carbide grades

## INSERT Type

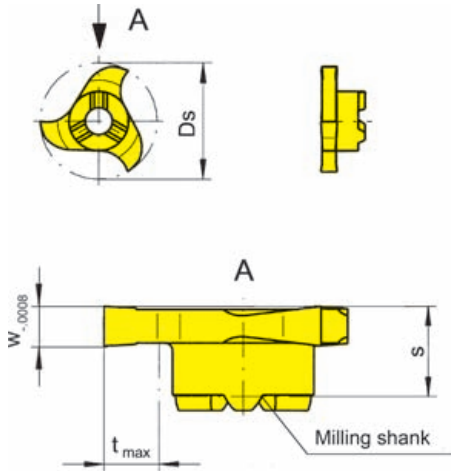
# 311

machining of aluminium



Depth of groove up to	.138"
Width of circlip Nw	.043 - .063"
Cutting edge Ø	Ds .697"

Widths for circlip grooves DIN 471/472



for use with Milling shank

- Type
- MU311
  - M311
  - M311.ST
  - M311.ER
  - M311.M

Picture = right hand cutting version

Part number	Nw	w	s	t <sub>max</sub>	Ds	Carbide grades	
						MG12	TI25
<b>311.0110.40</b>	.043	.048					▲
<b>311.0130.40</b>	.051	.056	.226	.138	.697		▲
<b>311.0160.40</b>	.063	.067					▲
						P	•
						M	•
						K	•
						N	•
						S	•
						H	•

- ▲ on stock    Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

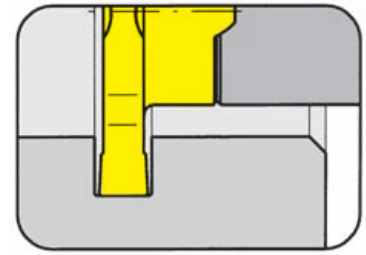
Carbide grades

INSERT Type

311

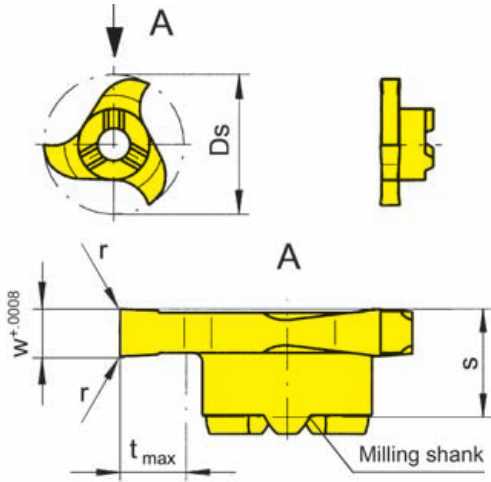
machining of aluminium

Depth of groove up to	.138"
Width of groove up to	.118"
Cutting edge Ø	Ds .697"



for use with Milling shank

- Type MU311  
M311  
M311.ST  
M311.ER  
M311.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades	
						MG12	T125
311.0150.40	.059	-					▲
311.0200.40	.079	.008					▲
311.0250.40	.098	.008	.226	.138	.697		▲
311.0300.40	.118	.008					▲
						P	•
						M	•
						K	•
						N	•
						S	•
						H	•

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

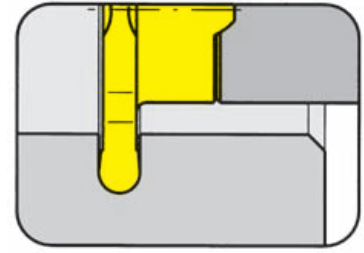
Dimensions in inch

Carbide grades



## INSERT Type

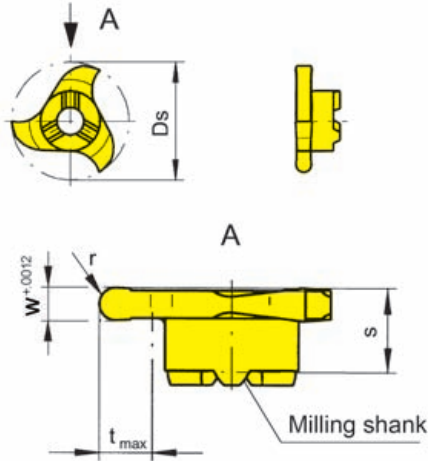
# 311/U311



Depth of groove up to .138"  
 Full radius r .031 - .062"  
 Cutting edge  $\emptyset$  Ds .697"

for use with Milling shank

- Type MU311  
 M311  
 M311.ST  
 M311.ER  
 M311.M



Picture = right hand cutting version

Full radius

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades				
						MG12	TN35	T125	AS45	TF45
311.0011.22	.087	.043	.226	.138	.697		▲		▲	
U311.0031.62	.062	.031					▲			
U311.0047.94	.094	.047	.226	.138	.697		▲			
U311.0062.125	.125	.062					▲			Δ
▲ on stock   Δ 4 weeks ● main recommendation ○ alternative recommendation ■ uncoated grades ■ coated grades ■ brazed/Cermet						P	●	●	●	●
						M	●	●	●	●
						K	●	●	●	●
						N	●	○	●	●
						S	●	●	●	●
						H				

Dimensions in inch

INSERT Type

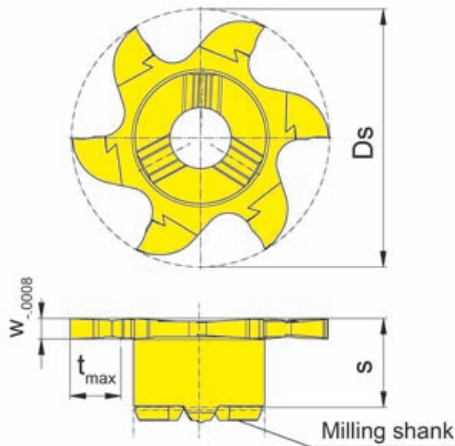
611

Depth of groove up to	.138"
Width of circlip Nw	.043 - .063"
Cutting edge Ø	Ds .697"



Widths for circlip grooves DIN 471/472

for use with Milling shank



- Type
- MU311
  - M311
  - M311.ST
  - M311.ER
  - M311.M

Picture = right hand cutting version

Part number	Nw	w	s	t <sub>max</sub>	Ds	Carbide grades		
						MG12	T125	AS45
611.0110.00	.043	.048	.240	.138	.697		▲	
611.0130.00	.051	.056	.240	.138	.697		▲	▲
611.0160.00	.063	.067	.240	.138	.697		▲	▲
						P	•	•
						M	•	•
						K	•	•
						N	•	○
						S	•	•
						H		

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

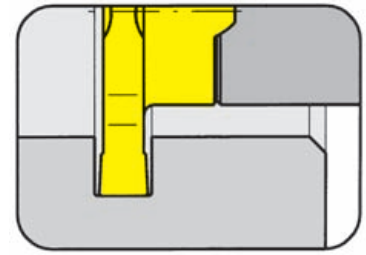
Dimensions in inch

Carbide grades

## INSERT Type

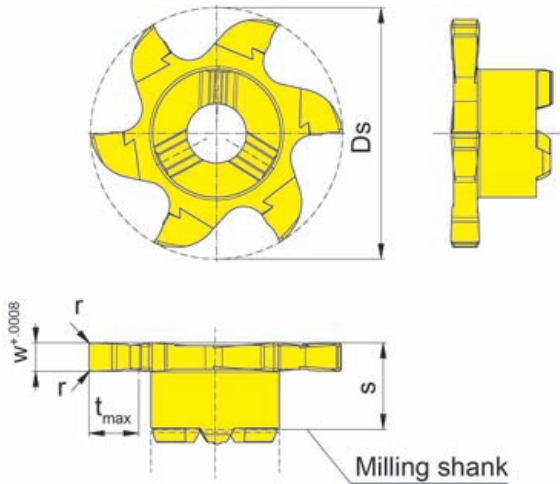
# 611

Depth of groove up to	.138"
Width of groove up to	.118"
Cutting edge Ø	Ds .697"



for use with Milling shank

- Type
- MU311
  - M311
  - M311.ST
  - M311.ER
  - M311.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades		
						MG12	T125	AS45
611.0150.00	.059	-					▲	▲
611.0200.00	.079	.008	.240	.138	.697		▲	▲
611.0250.00	.098	.008					▲	▲
611.0300.00	.118	.008					▲	▲
<ul style="list-style-type: none"> <li>▲ on stock   Δ 4 weeks</li> <li>● main recommendation</li> <li>○ alternative recommendation</li> <li>■ uncoated grades</li> <li>■ coated grades</li> <li>■ brazed/Cermet</li> </ul>						P	●	●
						M	●	●
						K	●	●
						N	●	○
						S	●	●
						H		

Dimensions in inch



## VDI Tool Adaptor and Square shank holder with through coolant

Direct cutting edge coolant



HORN - LEADERS IN GROOVING TECHNOLOGY

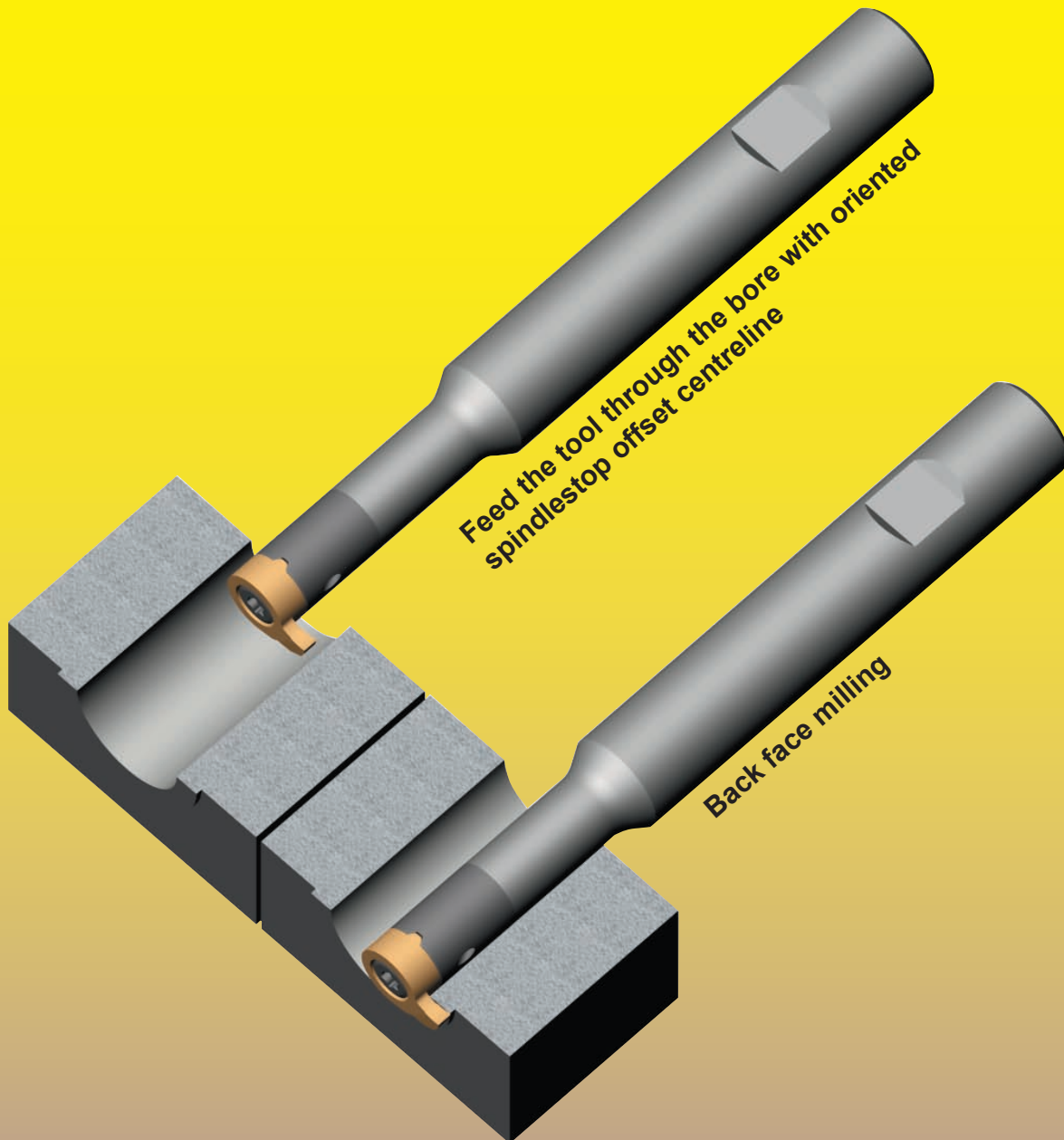
For further information, please contact HORN USA.

**MILLING SHANK type**

**MU / M116**

from bore

non rotating       $\varnothing$  .630" (16.0 mm)  
rotating             $\varnothing$  .803" (20.4 mm)



## MILLING SHANK Type

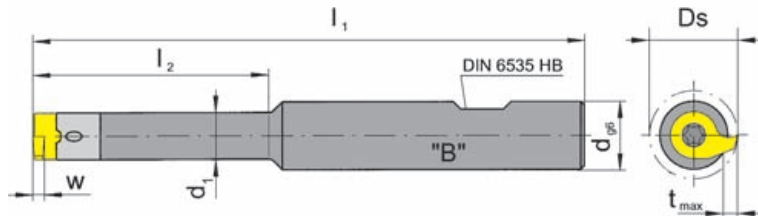
# MU116

with through coolant supply

Cutting edge  $\varnothing$ 

Ds .803"

Material of shank: Carbide - Giving a good vibration resistance



for use with Insert

Type U116  
116

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
MU116.0625.01B	5.118	1.575		
MU116.0625.02B	5.118	2.205	.433	.625
MU116.0625.03B	5.906	3.150		

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in inch

**Note from  $\varnothing$  16 mm:**

Only back face milling with oriented spindlestop offset of centerline.

**Ordering note:**All milling cutter shanks can be used for **right** and **left** hand inserts type 116.

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

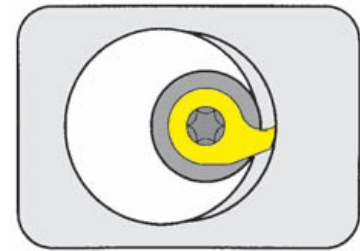
**Spare parts**

Milling shank	Screw	TORX PLUS® Wrench
MU116.0625.0...	5.13T20EP	T20PQ

## MILLING SHANK Type

# M116

with through coolant supply



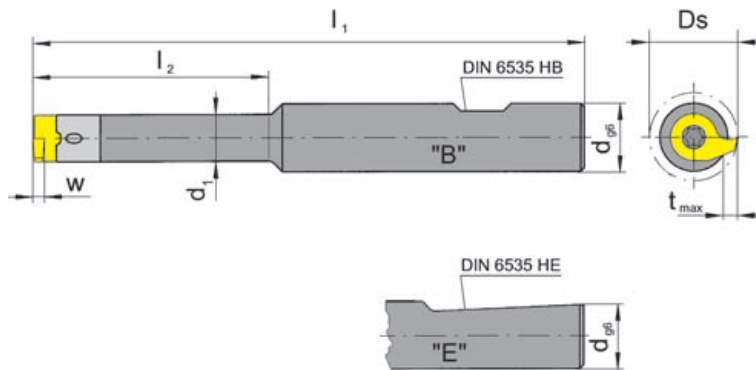
Cutting edge  $\varnothing$

Ds 20.4 mm

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type U116  
116



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M116.0012.01B M116.0012.02B	130	40 56	11	12	B
M116.0016.01B M116.0016.02B M116.0016.03B	130 130 150	40 56 80	11	16	B
M116.0016.01E M116.0016.02E M116.0016.03E	130 130 150	40 56 80	11	16	E

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

### Note from $\varnothing$ 16 mm:

Only back face milling with oriented spindlestop offset of centerline.

### Ordering note:

All milling cutter shanks can be used for **right** and **left** hand inserts type 116.

Milling cutter shanks with damaged seating can be repaired by HORN.

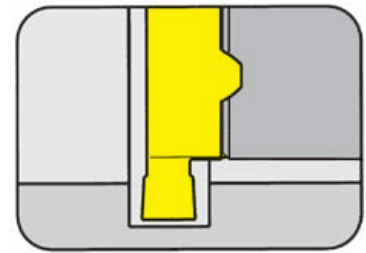
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M116.001...	5.13T20EP	T20PQ

## INSERT Type

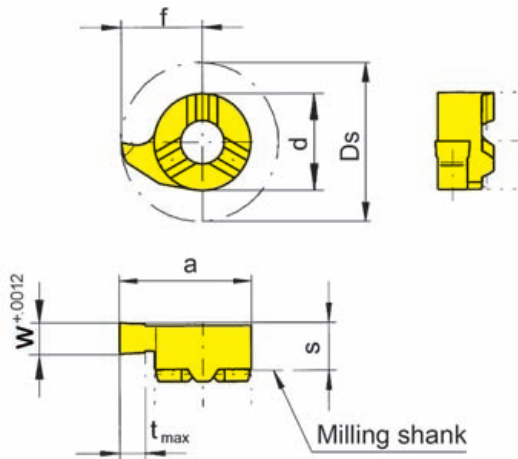
# 116/U116



Depth of groove up to	.169"
Width of groove	.046 - .157"
Cutting edge Ø	Ds .803"

for use with Milling shank

Type MU116  
M116



R = right hand version shown

L = left hand version

Part number	w	s	f	a	d	t <sub>max</sub>	Ds	Carbide grades				
								MG12	TN35	T125	TF45	TH35
R/L116.0200.00	.079							▲/▲	▲/▲			▲/▲
R/L116.0250.00	.098							▲/▲	▲/▲			▲/▲
R/L116.0300.00	.118	.209	.402	.618	.433	.169	.803	▲/▲	▲/▲			▲/▲
R/L116.0350.00	.138							▲/▲	▲/▲			▲/▲
R/L116.0400.00	.157							▲/▲	▲/▲			▲/▲
R/LU116.0046.00	.046								▲/▲			
R/LU116.0056.00	.056								▲/			
R/LU116.0062.00	.062	.209	.402	.618	.433	.169	.803	▲/	▲/▲		▲/	
R/LU116.0078.00	.078								▲/▲			
R/LU116.0094.00	.094							▲/	▲/▲		▲/	
R/LU116.0125.00	.125							▲/	▲/▲		▲/	

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

	P	M	K	N	S	H
MG12	○	●	●	●	●	●
TN35	●	●	●	●	●	●
T125	●	●	●	●	●	●
TF45	●	●	●	●	●	●
TH35	●	●	●	●	●	●

Dimensions in inch

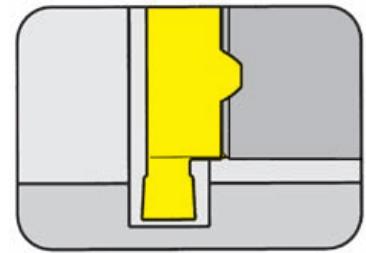
Carbide grades

State R or L version



## INSERT Type

# 116

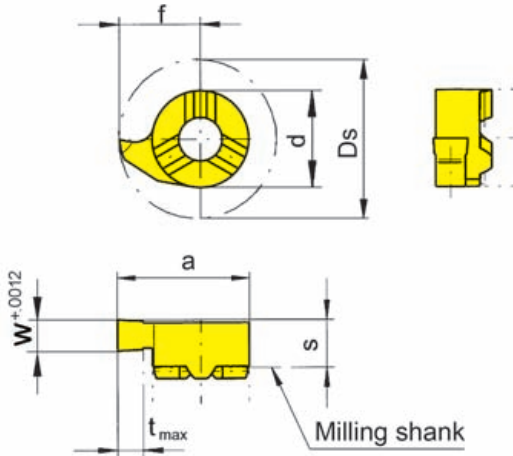


Depth of groove up to	.169"
Width of circlip Nw	.043 - .063"
Cutting edge Ø	Ds .803"

Widths for circlip grooves DIN 471/472

for use with Milling shank

Type MU116  
M116



R = right hand version shown

L = left hand version

Part number	Nw	w	s	f	a	d	t <sub>max</sub>	Ds	MG12	TN35	T125	TH35
									▲/▲	▲/▲	▲/▲	▲/▲
R/L116.0110.00	.043	.047							▲/▲	▲/▲		▲/▲
R/L116.0130.00	.051	.055	.209	.402	.618	.433	.169	.803	▲/▲	▲/▲		▲/▲
R/L116.0160.00	.063	.067							▲/▲	▲/▲		▲/▲
									P	o	•	•
									M	•	•	•
									K	•	•	•
									N	•	•	•
									S	•	•	•
									H			

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	o	•	•
M	•	•	•
K	•	•	•
N	•	•	•
S	•	•	•
H			

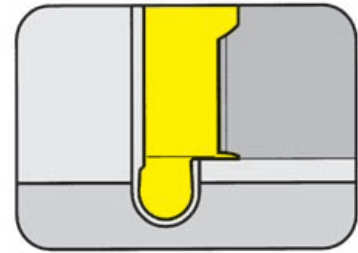
Carbide grades

Dimensions in inch

State R or L version

INSERT Type

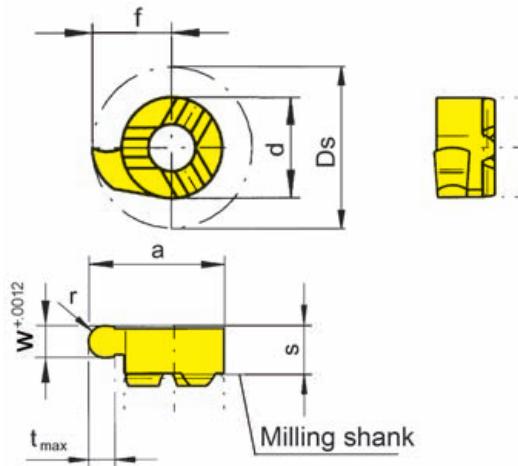
116/U116



Depth of groove up to .169"  
 Full radius r .031 - .079"  
 Cutting edge  $\emptyset$  Ds .803"

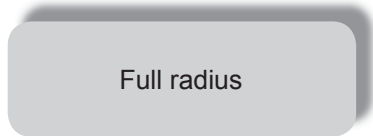
for use with Milling shank

Type MU116  
 M116



R = right hand version shown

L = left hand version



Part number	w	r	s	f	a	d	t <sub>max</sub>	Ds	Carbide grades			
									MG12	TN35	T125	TH35
R/L116.0009.18	.071	.035							▲/▲	▲/▲		▲/▲
R/L116.0011.22	.087	.043		.402	.618	.433	.169	.803	▲/▲	▲/▲		▲/▲
R/L116.0015.30	.118	.059	.209	.402	.618	.433	.169	.803	▲/▲	▲/▲		▲/▲
R/L116.0020.40	.157	.079							▲/▲	▲/▲		▲/▲
R/LU116.0031.62	.062	.031								▲/▲		
R/LU116.0039.78	.078	.039		.402	.618	.433	.169	.803		▲/▲		
R/LU116.0047.94	.094	.047	.209	.402	.618	.433	.169	.803		▲/▲		
R/LU116.0062.12	.125	.062								▲/▲		

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

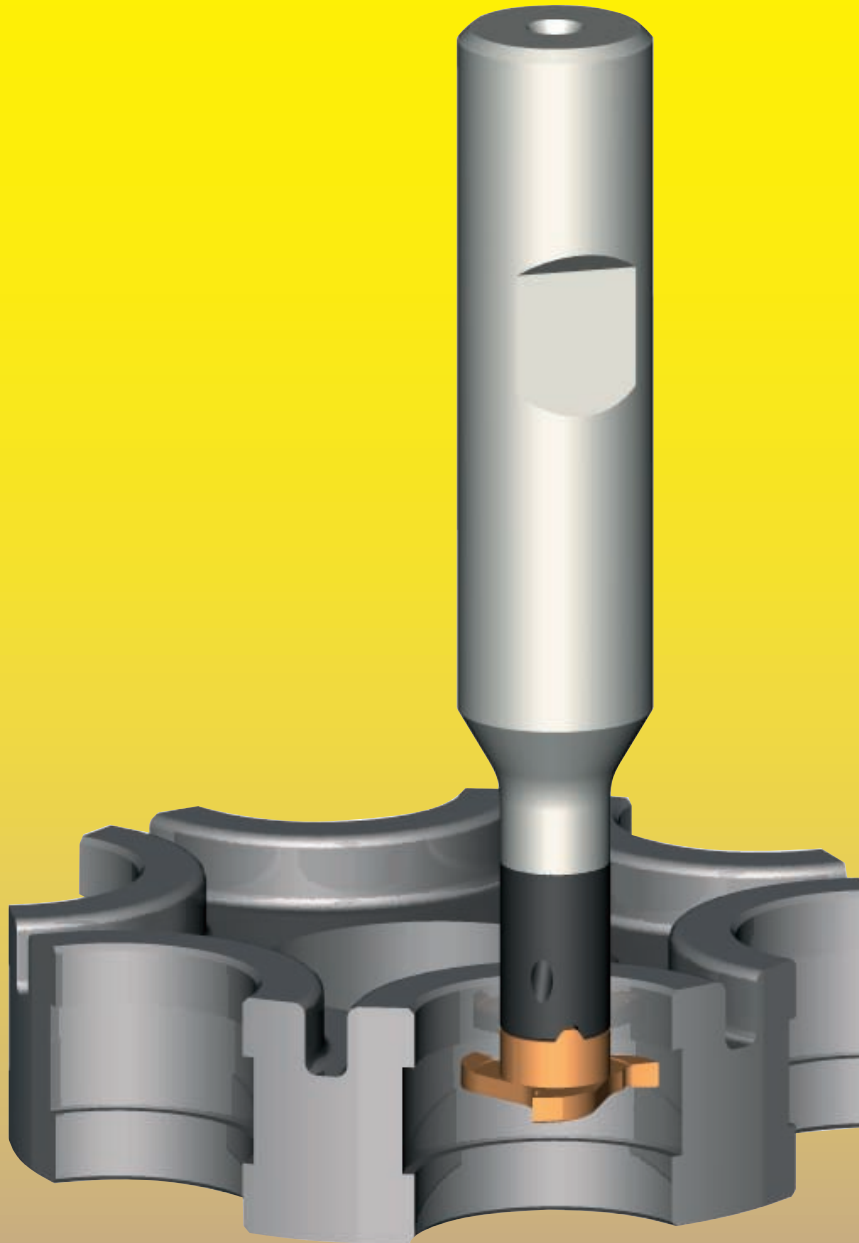
	P	M	K	N	S	H
MG12	○	●	●	●	●	●
TN35	●	●	●	●	●	●
T125	●	●	●	●	●	●
TH35	●	●	●	●	●	●

Dimensions in inch

Carbide grades

State R or L version

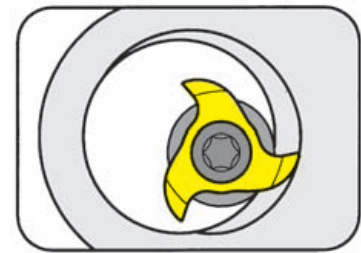
MILLING SHANK type **MU / M313**  
from bore  $\varnothing$  .866" (22.0 mm)



## MILLING SHANK Type

**MU313**

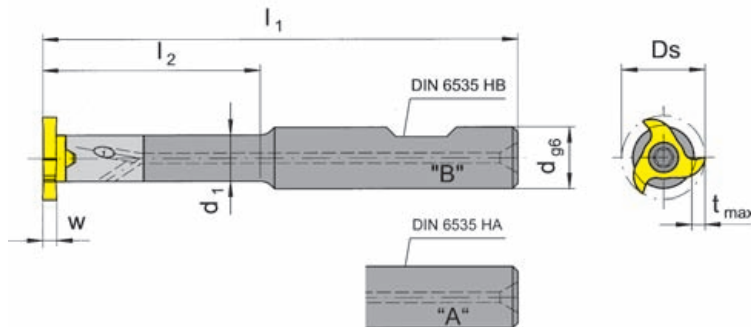
with through coolant supply

Cutting edge  $\varnothing$ 

Ds .854"

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert


 Type U313  
 313  
 313.D  
 613  
 713

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
MU313.0500.01A	3.937	-	-	.500	A
MU313.0500.01B	3.937	-	-	.500	B
MU313.0500.02B	5.118	-	-	.500	B
MU313.0625.01B	3.937	1.654			
MU313.0625.02B	5.118	2.362	.472	.625	B
MU313.0625.03B	6.299	3.346			

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in inch

**Ordering note:**

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

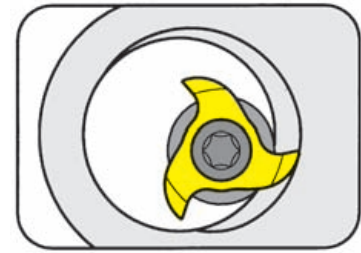
**Spare parts**

Milling shank	Screw	TORX PLUS® Wrench
MU313.0...	5.14T20P	T20PQ

## MILLING SHANK Type

# M313

with through coolant supply

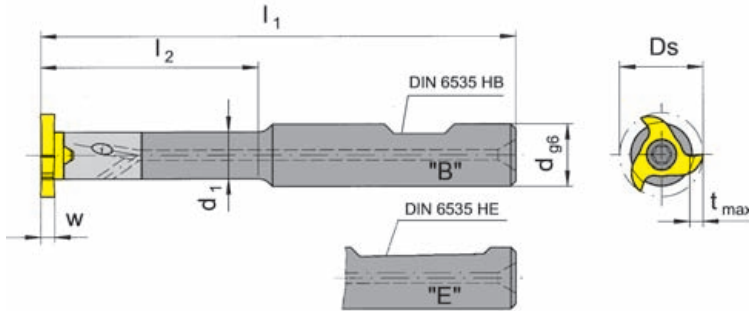


Cutting edge  $\emptyset$

Ds 21.7 mm

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert



Type U313  
313  
313.D  
613  
713

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M313.0012.01B	100	-	-	12	B
M313.0012.02B	130	-	-	12	B
M313.0016.01B	100	42	-	16	B
M313.0016.02B	130	60	12	16	B
M313.0016.03B	160	85	-	16	B
M313.0012.01E	100	-	-	12	E
M313.0012.02E	130	-	-	12	E
M313.0016.01E	100	42	-	16	E
M313.0016.02E	130	60	12	16	E
M313.0016.03E	160	85	-	16	E

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

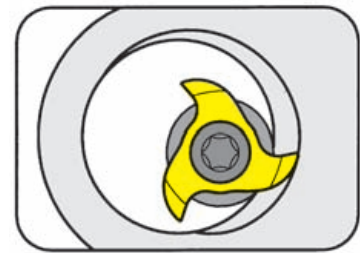
### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M313.001...	5.14T20P	T20PQ

## MILLING SHANK Type

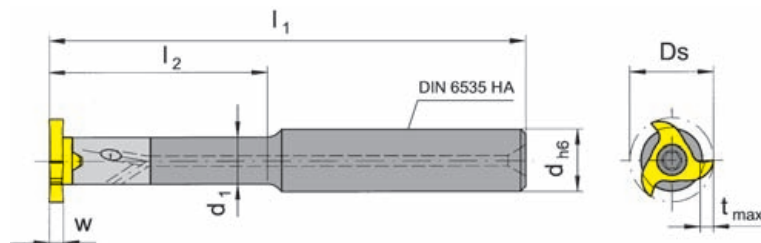
**M313**

with through coolant supply

Cutting edge  $\varnothing$ 

Ds 21.7 mm

Material of shank: Carbide - Giving a good vibration resistance



for use with Insert

Type U313  
313  
313.D  
613  
713

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
M313.0012.01A	100	-	-	12
M313.0012.02A	130	-	-	12
M313.0016.01A	100	42	-	16
M313.0016.02A	130	60	12	16
M313.0016.03A	160	85	-	16

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

**Ordering note:**

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

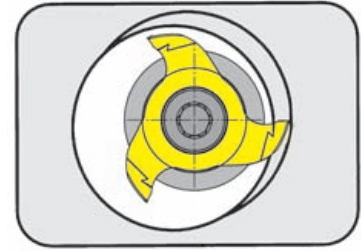
**Spare parts**

Milling shank	Screw	TORX PLUS® Wrench
M313.001...	5.14T20P	T20PQ

## MILLING SHANK Type

# M313.ST

no coolant supply

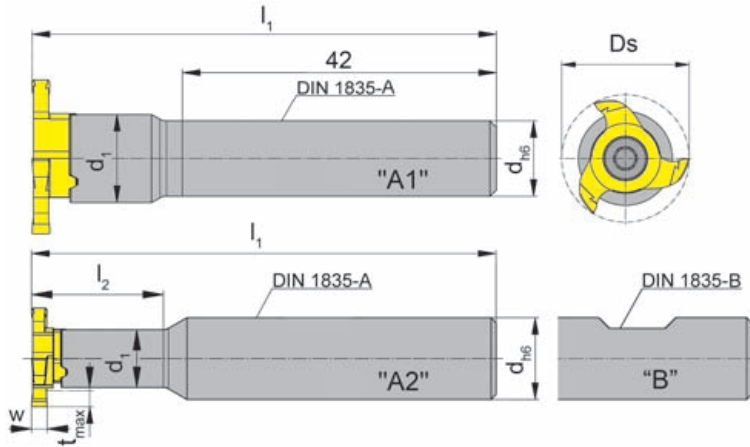


Cylindrical steel milling shank for collets Ds 21.7 mm

with cylindrical shank for CNC-lathes

for use with Insert

- Type U313  
313  
313.D  
613  
713



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M313.ST10.01A	60	-	11.3	10	A1
M313.ST12.01A	70	18	11.3	12	A2
M313.ST13.01A	70	26	11.3	13	
M313.ST16.01A	80	26	11.3	16	
M313.ST12.01B	70	18	11.3	12	B

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

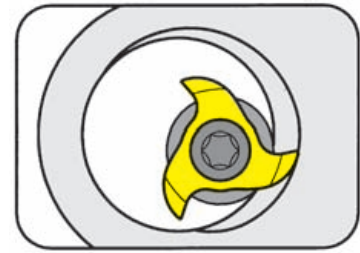
## Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M313.ST1...	5.14T20P	T20PQ

## SCREW-IN CUTTER Type

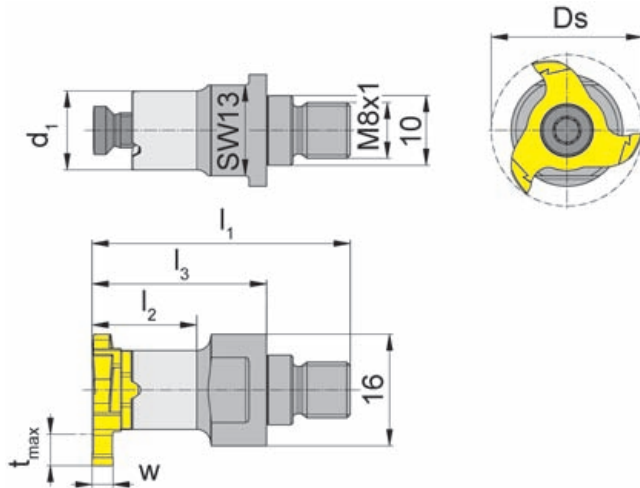
**M313.M**

no coolant supply



Screw-in Cutter for basic holder type WFB.20

for use with Insert

 Type U313  
 313  
 313.D  
 613  
 713


Picture = right hand cutting version

Part number	$l_1$	$l_2$	$l_3$	$d_1$
<b>M313.M081.01</b>	37	15	25	11.3

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.



## Spare parts

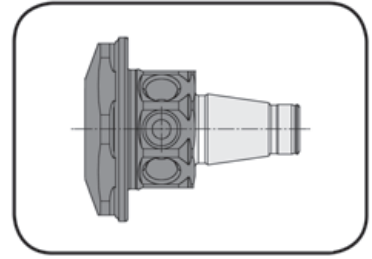
Screw-in cutter	Screw	TORX PLUS® Wrench
M313.M081.01	<b>5.14T20P</b>	<b>T20PQ</b>



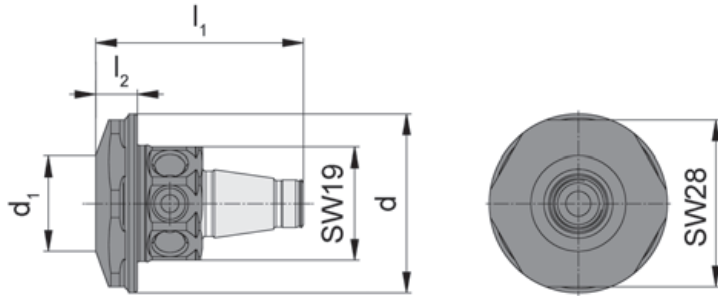
## BASIC HOLDER Type

# WFB

Basic holder WFB.20 for screw-in cutter



for use with Screw-in cutter



- Type
- M306.M081...
  - M308.M081...
  - M311.M081...
  - M313.M081...
  - M328.M081...
  - M332.M081...

Part number	$l_1$	$l_2$	$d_1$	d
WFB.2012.M081.01	35	7	16	30

Further sizes upon request

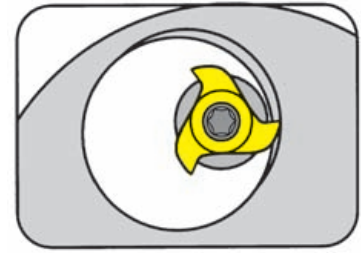
Dimensions in mm



## MILLING SHANK Type

**M313.ER**

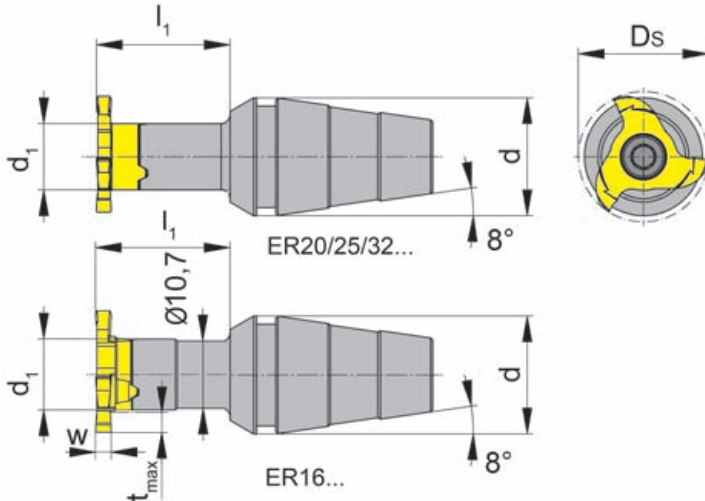
no coolant supply



Milling shanks for collet chucks DIN6499-A (8°) Ds 21.7 mm

with ER taper for CNC-lathes

for use with Insert

 Type U313  
 313  
 313.D  
 613  
 713


Picture = right hand cutting version

Part number	$l_1$	$d_1$	d	Clamping nut
M313.ER16.01	20	11.3	16	ER16.6499/ERM...
M313.ER20.01			20	ER20.6499/ERM...
M313.ER16.02	30	11.3	16	ER16.6499/ERM...
M313.ER20.02			20	ER20.6499/ERM...
M313.ER25.02			25	ER25.6499
M313.ER32.02			32	ER32.6499

Further sizes upon request

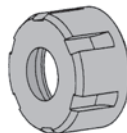
w, Ds,  $t_{max}$  see inserts

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

**Ordering note:**

Clamping nut is not combined with milling shank - separate order required!

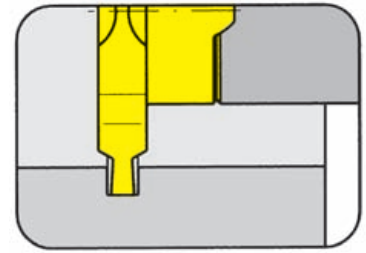
**Spare parts**

Milling shank	Screw	TORX PLUS® Wrench
M313.ER...	5.14T20P	T20PQ

## INSERT Type

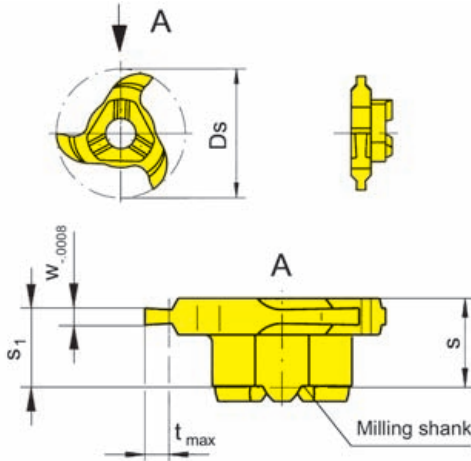
# 313/U313

Depth of groove up to	.098"
Width of circlip Nw	.028 - .043"
Cutting edge Ø	Ds .854"



Widths for circlip grooves DIN 471/472

for use with Milling shank



- Type
- MU313
  - M313
  - M313.ER
  - M313.M
  - Z313

Picture = right hand cutting version

Part number	Nw	w	s <sub>1</sub>	s	t <sub>max</sub>	Ds	MG12	TN35	AS45
*U313.0031.00		.031			.059			▲	
*U313.0039.00	-	.039	.220	.230	.075	.854		▲	
*U313.0046.00		.046			.098		Δ	▲	
313.0070.00	.028	.030			.059			▲	
313.0080.00	.031	.034			.067			▲	
313.0090.00	.035	.038	.220	.232	.075	.854	Δ	▲	
313.0100.00	.039	.042			.087			▲	
313.0110.00	.043	.048			.098			▲	

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	○	●
M	●	●
K	●	●
N	●	●
S	●	●
H		

Carbide grades

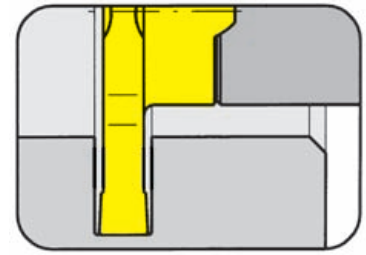
Dimensions in inch

\* For inserts U313... the tolerance w = +.0012

INSERT Type

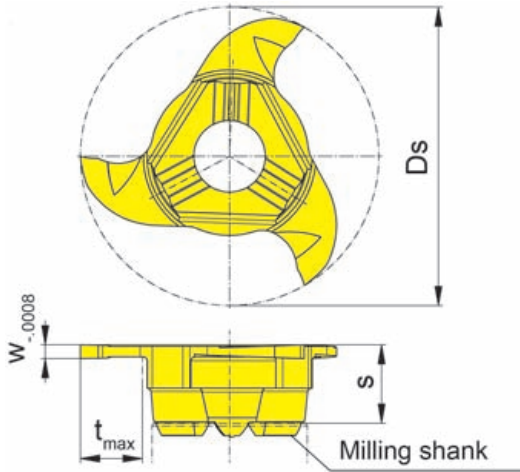
313

Depth of groove up to .177"  
 Width of groove up to .039"  
 Cutting edge  $\emptyset$  Ds .854"



for use with Milling shank

Type MU313  
 M313  
 M313.ER  
 M313.M  
 Z313



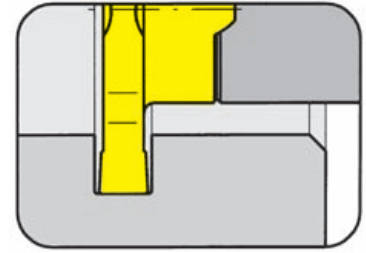
Picture = right hand cutting version

Part number	w	s	t <sub>max</sub>	Ds	Carbide grades			
					MG12	TN35	TI25	AS45
<b>313.0100.1.00</b>	.039	.224	.177	.854		▲	▲	
▲ on stock Δ 4 weeks					P	•	•	
● main recommendation					M	•	•	
○ alternative recommendation					K	•	•	
■ uncoated grades					N	•	•	
■ coated grades					S	•	•	
■ brazed/Cermet					H			

Dimensions in inch

## INSERT Type

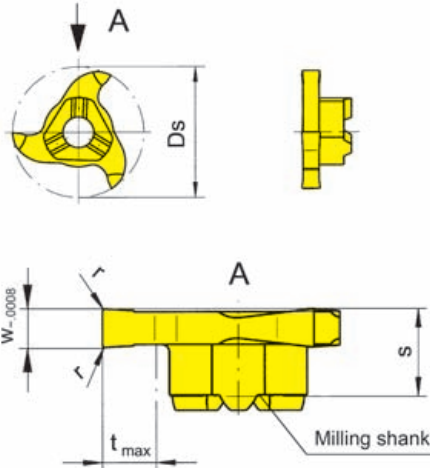
# 313



Depth of groove up to	.177"
Width of circlip Nw	.051 - .203"
Cutting edge Ø	Ds .854"

Widths for circlip grooves DIN 471/472

for use with Milling shank



- Type
- MU313
  - M313
  - M313.ER
  - M313.M
  - Z313

Picture = right hand cutting version

Part number	Nw	w	r	s	t <sub>max</sub>	Ds	MG12	TN35	AS45
313.0130.00	.051	.056	-	.224	.177	.854	▲	▲	▲
313.0160.00	.063	.067	-	.224	.177	.854	▲	▲	▲
313.0185.00	.073	.077	-	.224	.177	.854	▲	▲	▲
313.0215.00	.085	.089	-	.224	.177	.854	▲	▲	▲
313.0265.00	.104	.109	-	.224	.177	.854	▲	▲	▲
313.0315.00	.124	.128	.008	.224	.177	.854	▲	▲	▲
313.0415.00	.163	.168	-	.224	.177	.854	▲	▲	▲
313.0515.00	.203	.207	-	.224	.177	.854	▲	▲	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	○	●	●
M	●	●	●
K	●	●	●
N	●	●	○
S	●	●	●
H			

Carbide grades

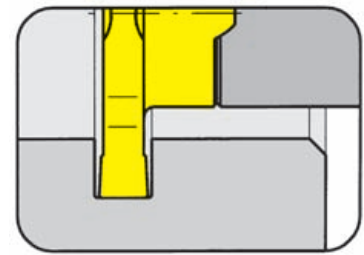
Dimensions in inch

Inserts 313.0415.00 and 313.0515.00 only with toolholder dimension l<sub>2</sub> = max. 1.654"

INSERT Type

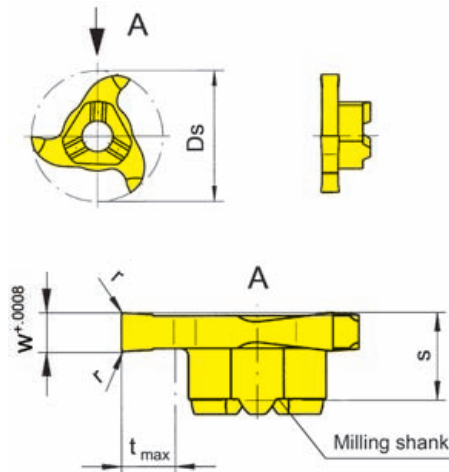
313

Depth of groove up to .177"  
 Width of groove up to .236"  
 Cutting edge Ø Ds .854"



for use with Milling shank

- Type MU313  
 M313  
 M313.ER  
 M313.M  
 Z313



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades			
						MG12	TN35	TI25	AS45
313.0150.00	.059	-	.224	.177	.854	▲	▲		▲
313.0150.01	.059	.004	.224			▲	▲		▲
313.0200.00	.079	.008	.224			▲	▲		▲
313.0250.00	.098	.008	.224			▲	▲	▲	▲
313.0300.00	.118	.008	.224			▲	▲		▲
313.0350.00	.138	.008	.224			△	▲	▲	▲
313.0400.00	.157	.008	.224			▲	▲		▲
313.0500.00	.197	.008	.224			▲	▲		▲
313.0600.00	.236	.008	.272			▲	▲		▲
						P	o	•	•
						M	•	•	•
						K	•	•	•
						N	•	•	o
						S	•	•	•
						H			

▲ on stock △ 4 weeks  
 • main recommendation  
 o alternative recommendation

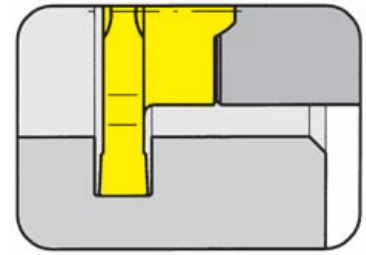
■ uncoated grades  
 ■ coated grades  
 ■ brazed/Cermet

Dimensions in inch  
 Inserts 313.0500.00 and 313.0600.00 only with toolholder dimension l<sub>2</sub> = max 1.654"

## INSERT Type

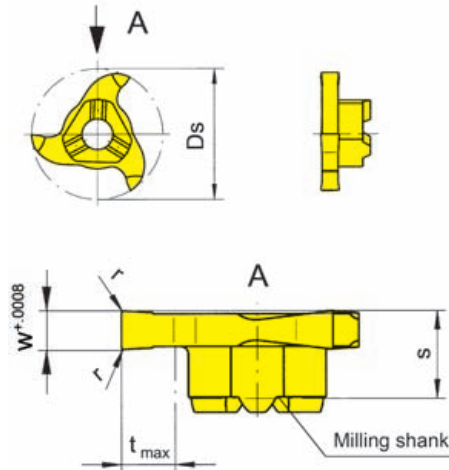
# U313

Depth of groove up to .177"  
 Width of groove up to .250"  
 Cutting edge Ø Ds .854"



for use with Milling shank

Type MU313  
 M313  
 M313.ER  
 M313.M  
 Z313



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades			
						MG12	TN35	AS45	TF45
U313.0056.00	.056	-	.224	.177	.854	Δ	▲		
U313.0062.00	.062	-	.224	.177	.854	Δ	▲		
U313.0062.08	.062		.224				▲		
U313.0078.08	.078		.224				▲		
U313.0094.08	.094		.224				▲		▲
U313.0125.08	.125	.008	.224	.177	.854	▲	▲		
U313.0157.08	.157	.008	.224	.177	.854	Δ	▲		
U313.0172.08	.172		.224				Δ		
U313.0187.08	.187		.224				Δ	▲	
U313.0250.08	.250		.272				▲	▲	

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

	P	M	K	N	S	H
MG12	○	●	●	●	●	●
TN35	●	●	●	●	●	●
AS45	●	●	●	●	●	●
TF45	●	●	●	●	●	●

Dimensions in inch

Carbide grades

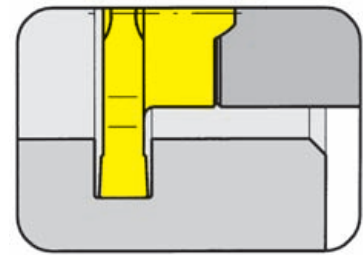
Inserts **U313.0187.08** and **U313.0250.08** only with toolholder dimension  $l_2 = \text{max. } 1.654''$

## INSERT Type

# 313

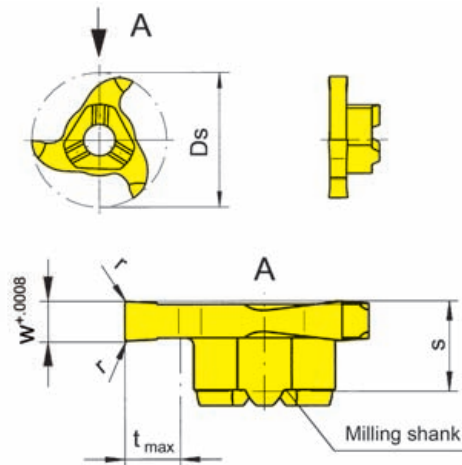
machining of aluminium

Depth of groove up to .177"  
 Width of groove up to .157"  
 Cutting edge  $\varnothing$  Ds .854"



for use with Milling shank

Type MU313  
 M313  
 M313.ER  
 M313.M  
 Z313



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades	
						MG12	TI25
313.0150.40	.059	-				▲	▲
313.0200.40	.079	.008				●	▲
313.0250.40	.098	.008	.224	.177	.854	○	▲
313.0300.40	.118	.008				○	▲
313.0400.40	.157	.008				○	▲
						P	●
						M	●
						K	●
						N	●
						S	●
						H	●

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

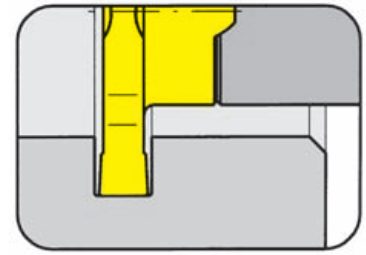
Carbide grades



## INSERT Type

# 313

machining of aluminium

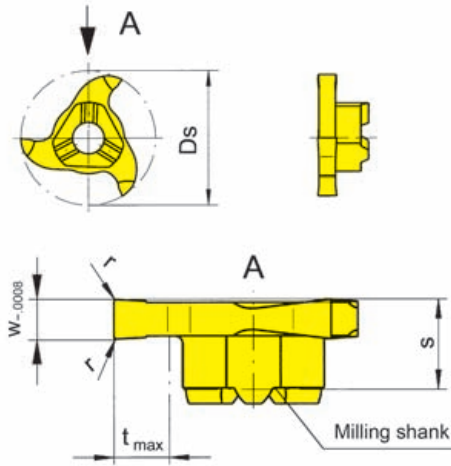


Depth of groove up to	.177"
Width of circlip Nw	.051 - .203"
Cutting edge Ø	Ds .854"

Widths for circlip grooves DIN 471/472

for use with Milling shank

- Type
- MU313
  - M313
  - M313.ER
  - M313.M
  - Z313



Picture = right hand cutting version

Part number	Nw	w	r	s	t <sub>max</sub>	Ds	Carbide grades	
							MG12	T125
313.0130.40	.051	.056	-	.224	.177	.854		▲
313.0160.40	.063	.067	-	.224	.177	.854		▲
313.0185.40	.073	.077	-	.224	.177	.854		▲
313.0215.40	.085	.089	-	.224	.177	.854		▲
313.0265.40	.104	.109	.008	.224	.177	.854		▲
313.0315.40	.124	.128	.008	.224	.177	.854		▲
313.0415.40	.163	.168	.008	.224	.177	.854	▲	▲
313.0515.40	.203	.207	.008	.224	.177	.854	▲	▲
							P	○ ●
							M	● ●
							K	● ●
							N	● ●
							S	● ●
							H	● ●

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

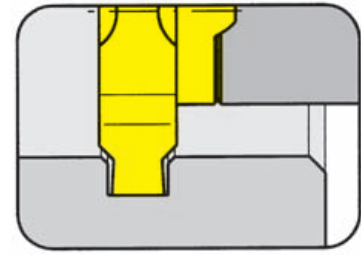
Carbide grades

Inserts 313.0415.40 and 313.0515.40 only with toolholder dimension l<sub>2</sub> = max. 1.654"

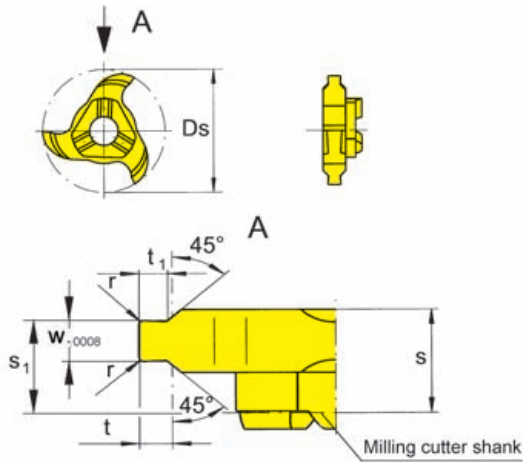
INSERT Type

313

Depth of groove up to .098"  
 Width of circlip Nw .043 - .163"  
 Cutting edge Ø Ds .854"



Widths for circlip grooves DIN 471/472



for use with Milling shank

- Type MU313  
 M313  
 M313.ER  
 M313.M  
 Z313

with chamfering

Picture = right hand cutting version

Part number	Nw	w	r	t <sub>1</sub>	s <sub>1</sub>	s	t <sub>max</sub>	Ds	Carbide grades			
									MG12	TN35	TA45	AS45
313.1105.30	.043	.048		.019	.200		.020			▲		
313.1307.30	.051	.056		.026	.204		.028			▲		
313.1308.30	.051	.056	-	.032	.204	.232	.033	.854		▲		
313.1609.35	.063	.067		.032	.200		.033			▲		
313.1610.35	.063	.067		.037	.200		.039			▲		
313.1812.35	.073	.077		.048	.204		.049			▲		
313.2115.35	.085	.089		.057	.210		.059			▲	▲	
313.2616.45	.104	.109		.057	.200		.059			▲		Δ
313.2617.45	.104	.109	.008	.067	.200	.232	.069	.854		▲		Δ
313.3118.45	.124	.128		.067	.210		.069			▲		Δ
313.4120.55	.163	.168		.077	.210		.079			▲		Δ
313.4125.55	.163	.168		.096	.210		.098			▲		Δ

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

	P	M	K	N	S	H
MG12	●	●	●	●	●	●
TN35	●	●	●	●	●	●
TA45	●	●	●	●	●	○
AS45	●	●	●	●	●	●

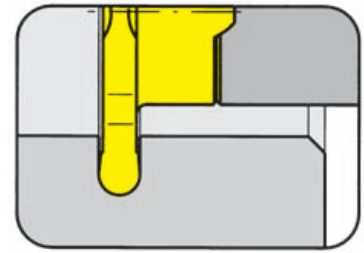
Dimensions in inch

Carbide grades

Inserts 313.4120.55 and 313.4125.55 only with toolholder dimension l<sub>2</sub> = max. 1.654"

## INSERT Type

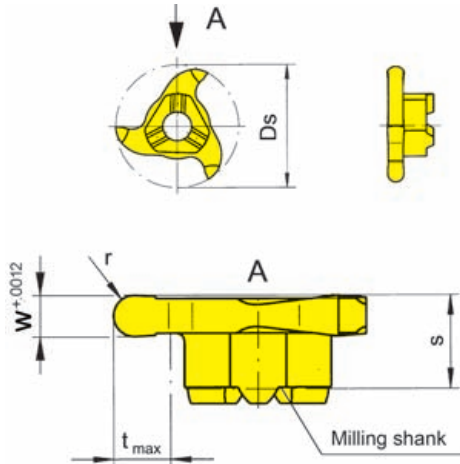
# 313/U313



Depth of groove up to .177"  
 Full radius r .020 - .125"  
 Cutting edge  $\emptyset$  Ds .854"

for use with Milling shank

Type MU313  
 M313  
 M313.ER  
 M313.M  
 Z313



Picture = right hand cutting version

Full radius

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades				
						MG12	TN35	TI25	AS45	TF45
313.0005.10	.039	.020					▲			
313.0010.20	.079	.039					▲		▲	
313.0014.28	.110	.055	.224	.177	.854		▲		▲	
313.0015.30	.118	.059					▲		▲	
313.0020.40	.157	.079					▲		▲	
313.0025.50	.197	.098					▲		▲	
U313.0031.62	.062	.031					▲			▲
U313.0047.94	.094	.047					▲	Δ		
U313.0062.125	.125	.062	.224	.177	.854		▲			Δ
U313.0078.156	.156	.078					▲			
U313.0094.188	.188	.094					▲			Δ
U313.0125.250	.250	.125	.272	.177	.854		▲			
▲ on stock   Δ 4 weeks ● main recommendation ○ alternative recommendation □ uncoated grades ■ coated grades ■ brazed/Cermet						P	●	●	●	●
						M	●	●	●	●
						K	●	●	●	●
						N	●	●	○	●
						S	●	●	●	●
						H				

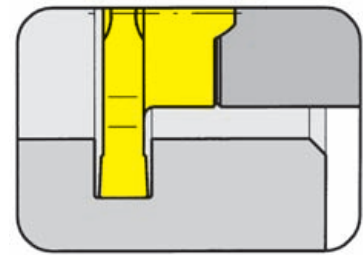
Dimensions in inch

Carbide grades

Inserts 313.0025.50, U313.0094.188 and U313.0125.250 only with toolholder dimension l<sub>2</sub> = max 1.654"

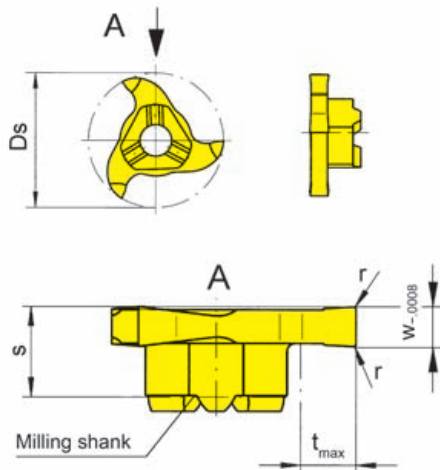
## INSERT Type

# L313



Depth of groove up to .177"  
 Width of circlip Nw .051 - .203"  
 Cutting edge Ø Ds .854"

Widths for circlip grooves DIN 471/472



for use with Milling shank

Type MU313  
 M313  
 M313.ER  
 M313.M

L = left hand version shown

Part number	Nw	w	r	s	t <sub>max</sub>	Ds	Carbide grades			
							MG12	TN35	T125	AS45
L313.0130.00	.051	.056	-						Δ	
L313.0160.00	.063	.067	-						Δ	
L313.0185.00	.073	.077	.008						Δ	
L313.0215.00	.085	.089	.008	.224	.177	.854	Δ		Δ	
L313.0265.00	.104	.109	.008						Δ	
L313.0315.00	.124	.128	.008						Δ	
L313.0415.00	.163	.168	.008						Δ	
L313.0515.00	.203	.207	.008						Δ	
▲ on stock Δ 4 weeks ● main recommendation ○ alternative recommendation ■ uncoated grades ■ coated grades ■ brazed/Cermet							P	○	●	●
							M	●	●	●
							K	●	●	●
							N	●	●	○
							S	●	●	●
							H			

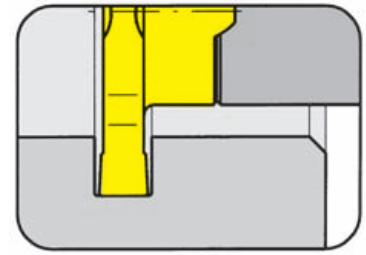
Dimensions in inch

**Note:**

Inserts L313.0415.00 and L313.0515.00 only with toolholder dimension l<sub>2</sub> = max 1.654"

## INSERT Type

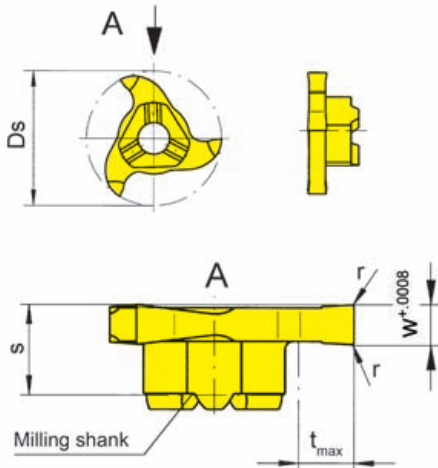
# L313



Depth of groove up to .177"  
 Width of groove up to .236"  
 Cutting edge Ø Ds .854"

for use with Milling shank

Type MU313  
 M313  
 M313.ER  
 M313.M



L = left hand version shown

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades			
						MG12	TN35	T125	AS45
L313.0150.00	.059	-							Δ
L313.0150.01	.059	.004							Δ
L313.0200.00	.079	.008							Δ
L313.0250.00	.098	.008							Δ
L313.0300.00	.118	.008	.224	.177	.854				Δ
L313.0350.00	.138	.008				Δ		Δ	Δ
L313.0400.00	.157	.008						Δ	Δ
L313.0500.00	.197	.008						Δ	Δ
L313.0600.00	.236	.008	.272	.177	.854			Δ	Δ

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

**Note:**

Inserts **L313.0500.00** and **L313.0600.00** only with toolholder dimension  $l_2 = \max 1.654"$

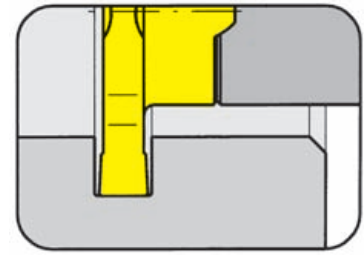
	MG12	TN35	T125	AS45
P	○	●	●	●
M	●	●	●	●
K	●	●	●	●
N	●	●	●	○
S	●	●	●	●
H	●	●	●	●

Carbide grades

INSERT Type

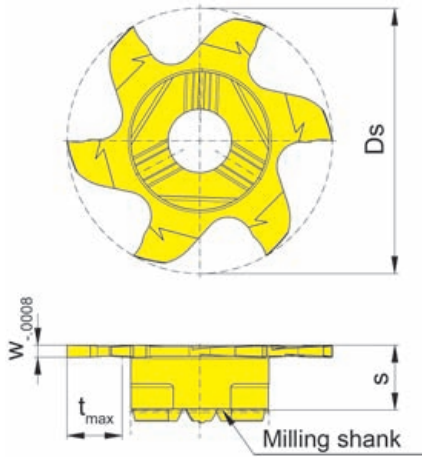
613

Depth of groove up to	.177"
Width of groove	.039"
Cutting edge Ø	Ds .854"



for use with Milling shank

Type MU313  
M313  
M313.ER  
M313.M



Picture = right hand cutting version

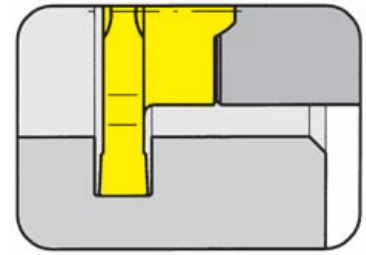
Part number	w	s	t <sub>max</sub>	Ds	Carbide grades				
					MG12	TN35	TI25	TA45	AS45
<b>613.0100.1.00</b>	.039	.209	.177	.854			▲		
▲ on stock Δ 4 weeks					P		•		
● main recommendation					M		•		
○ alternative recommendation					K		•		
■ uncoated grades					N		•		
■ coated grades					S		•		
■ brazed/Cermet					H				

Dimensions in inch

## INSERT Type

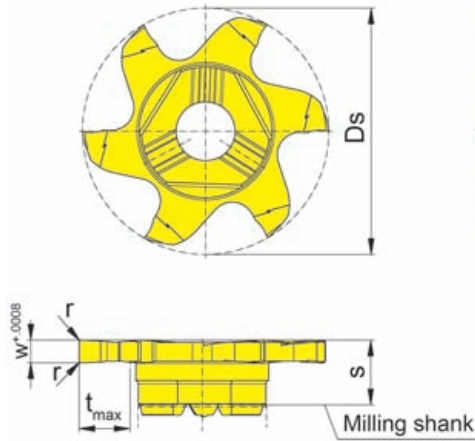
# 613

Depth of groove up to .177"  
 Width of groove up to .157"  
 Cutting edge Ø Ds .854"



for use with Milling shank

Type MU313  
 M313  
 M313.ER  
 M313.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades		
						MG12	T125	AS45
613.0150.00	.059	-					▲	▲
613.0200.00	.079	.008					▲	▲
613.0250.00	.098	.008	.224	.177	.854		▲	▲
613.0300.00	.118	.008					▲	▲
613.0400.00	.157	.008					▲	▲
						P	●	●
						M	●	●
						K	●	●
						N	●	○
						S	●	●
						H		

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

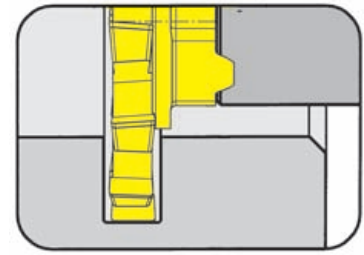
Dimensions in inch

**Note:**  
 Insert 613.0400.00 only with toolholder dimension l<sub>2</sub> = max 1.654"

INSERT Type

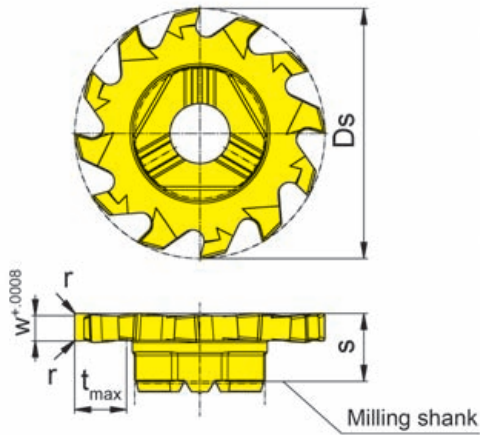
713

Depth of groove up to .177"  
 Width of groove .039 - .118"  
 Cutting edge Ø Ds .854"



for use with Milling shank

Type MU313  
 M313  
 M313.ER  
 M313.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Z	Carbide grades				
							MG12	TN35	TI25	TA45	AS45
713.0100.00	.039	-							▲		
713.0150.00	.059	-							▲		
713.0200.00	.079	.008	.232	.177	.854	12			▲		
713.0250.00	.098	.008							▲		
713.0300.00	.118	.008							▲		
							P		•		
							M		•		
							K		•		
							N		•		
							S		•		
							H				

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

Carbide grades

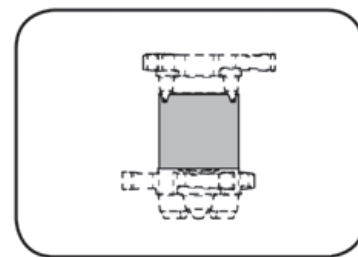


MILLING SHANK type **Z313**

Double Groove Milling  
with inserts **type 313 and 313.D**  
from bore  $\varnothing$  .866" (22.0 mm)



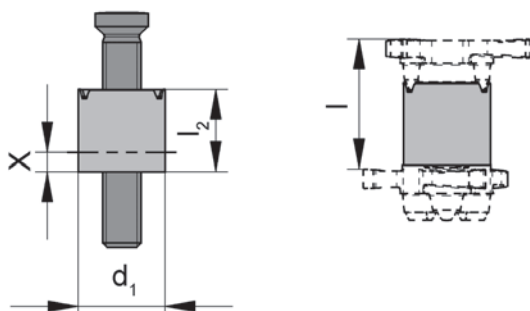
ADAPTOR Type

**Z313**

Adaptor for inserts type 313.D...

Material of shank: Steel

for use with Insert

 Type U313  
 313  
 313.D...


Part number	l	l <sub>2</sub>	X	d <sub>1</sub>
Z.313.0011.057	9.9	3,7 - 5,7	0 - 2,0	11.3
Z.313.0011.082	11.9	5,7 - 8,2	0 - 2,5	
Z.313.0011.107	14.4	8,2 - 10,7	0 - 2,5	

Further sizes upon request

Dimensions in mm

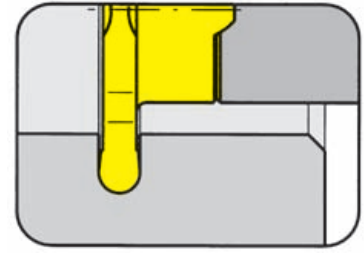
For torque specifications of the screw, please see Technical Instructions.

**Spare parts**

Adaptor	Screw	TORX PLUS® Wrench
Z.313.0011.057	<b>5.26T20P</b>	<b>T20PQ</b>
Z.313.0011.082	<b>5.28T20P</b>	<b>T20PQ</b>
Z.313.0011.107	<b>5.30T20P</b>	<b>T20PQ</b>

## INSERT Type

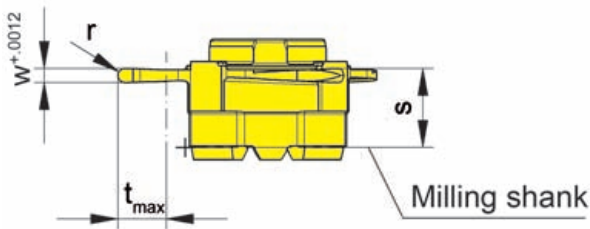
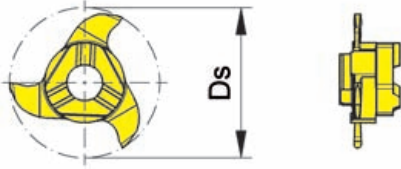
# 313.D



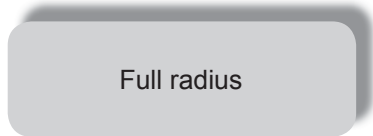
Depth of groove up to .177"  
 Full radius r .020 - .059"  
 Cutting edge  $\emptyset$  Ds .854"

for use with Milling shank

Type MU313  
 M313  
 Z313



Picture = right hand cutting version



Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades			
						MG12	TN35	TI25	AS45
313.D.0005.10	.039	.020					▲		▲
313.D.0010.20	.079	.039					▲		▲
313.D.0014.28	.110	.055	.224	.177	.854		▲		▲
313.D.0015.30	.118	.059					▲		▲
						P	•		•
						M	•		•
						K	•		•
						N	•		○
						S	•		•
						H			

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

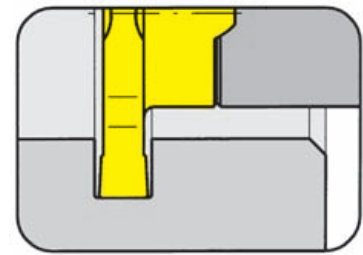
Dimensions in inch

Carbide grades

INSERT Type

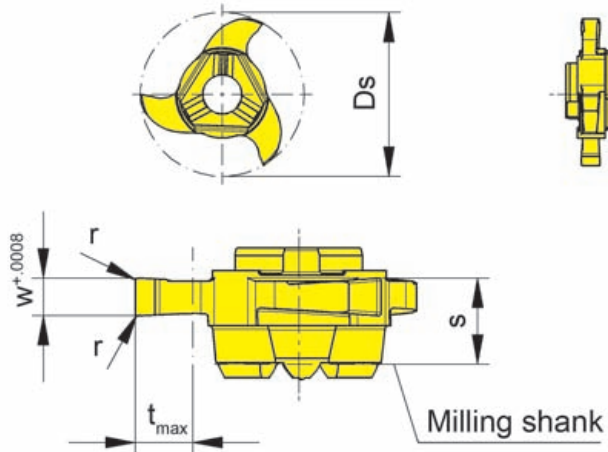
313.D

Depth of groove up to	.177"
Width of groove	.059 - .118"
Cutting edge Ø	Ds .854"



for use with Milling shank

Type MU313  
M313  
Z313



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	MG12	TN35	TI25	AS45
313.D.0150.00	.059	-					▲		▲
313.D.0150.01	.059	.004					▲		▲
313.D.0200.00	.079	.008	.224	.177	.854		▲		▲
313.D.0250.00	.098	.008					▲		▲
313.D.0300.00	.118	.008					▲		▲
						P	•		•
						M	•		•
						K	•		•
						N	•		○
						S	•		•
						H			

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

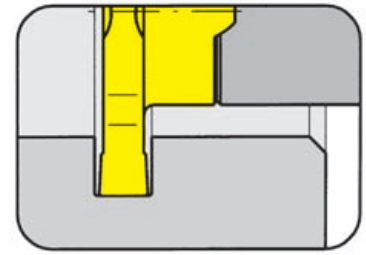
Dimensions in inch

Carbide grades

## INSERT Type

# 313.D

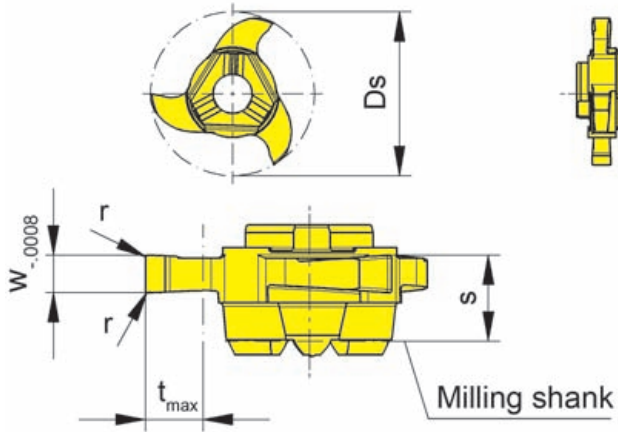
Depth of groove up to	.177"
Width of circlip Nw	.051 - .124"
Cutting edge Ø	Ds .854"



Widths for circlip grooves DIN 471/472

for use with Milling shank

Type MU313  
M313  
Z313



Picture = right hand cutting version

Part number	Nw	w	r	s	t <sub>max</sub>	Ds	Carbide grades			
							MG12	TN35	TI25	AS45
313.D.0130.00	.051	.056	-					▲	▲	
313.D.0160.00	.063	.067	-					▲	▲	
313.D.0185.00	.073	.077	.008	.224	.177	.854		▲	▲	
313.D.0215.00	.085	.089	.008					▲	▲	
313.D.0265.00	.104	.109	.008					▲	▲	
313.D.0315.00	.124	.128	.008					▲	▲	
▲ on stock Δ 4 weeks ● main recommendation ○ alternative recommendation ■ uncoated grades ■ coated grades ■ brazed/Cermet							P	●	●	●
							M	●	●	●
							K	●	●	●
							N	●	○	○
							S	●	●	●
							H			

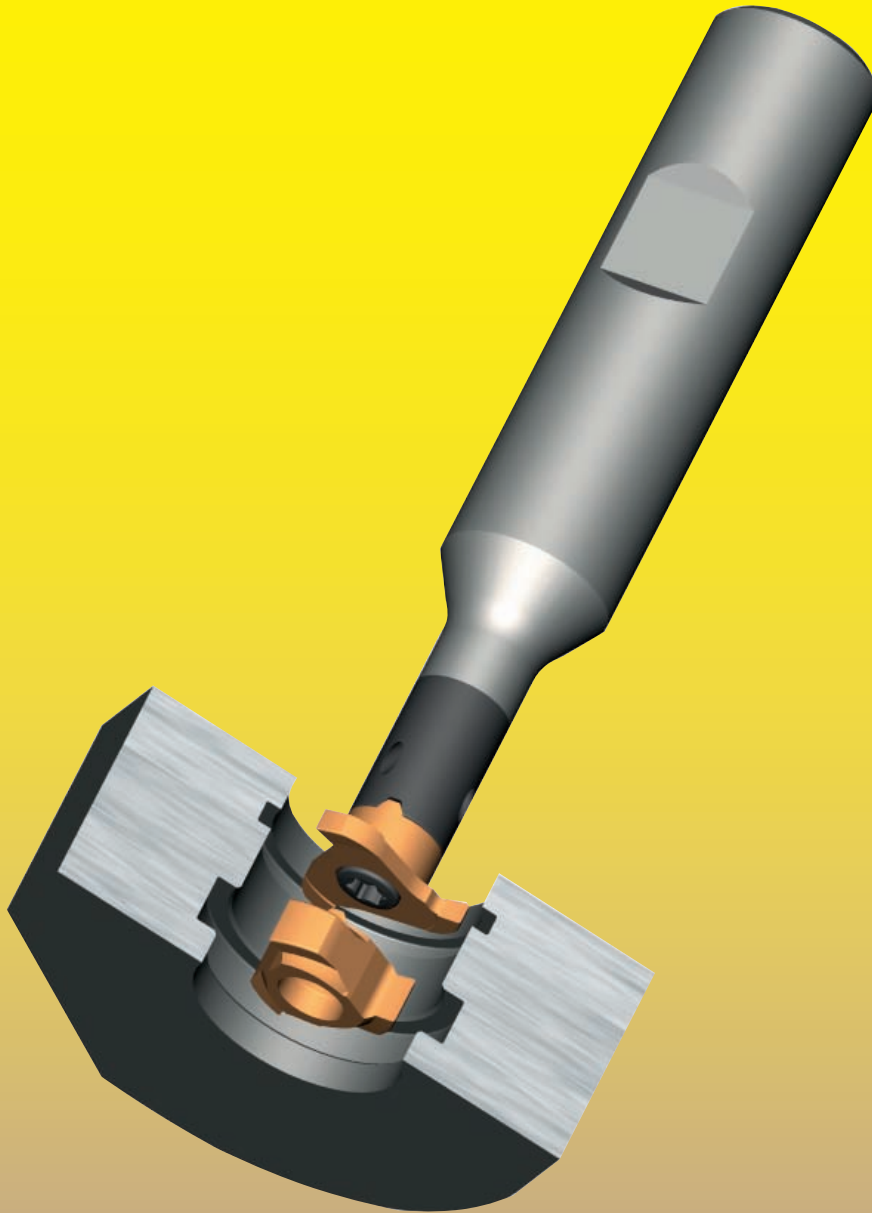
Dimensions in inch

Carbide grades

If required, the connecting pieces Z.313.0011... can be reduced by the dimension "X" through hard turning or grinding. The screw will not change.



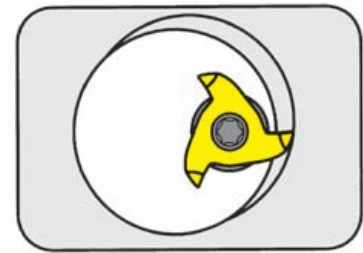
MILLING SHANK type **MU / M328**  
from bore  $\varnothing$  1.102" (28.0 mm)



## MILLING SHANK Type

**MU328**

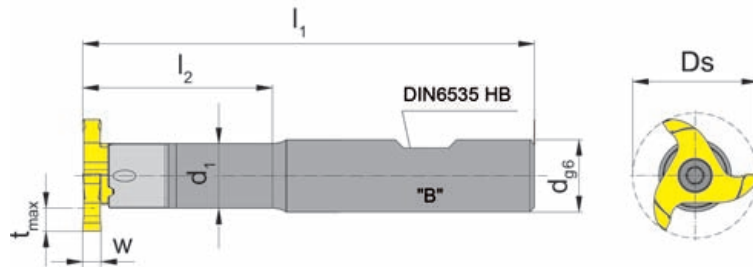
with through coolant supply

Cutting edge  $\varnothing$ 

Ds .976 / 1.091 "

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert


 Type U325  
 U328  
 325  
 328  
 628

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
MU328.0500.01B	3.937	.815	.563	.500
MU328.0500.02B	5.118	.815	.563	.500
MU328.0625.01B	3.937	1.654	.563	.625
MU328.0625.02B	5.118	2.362	.563	.625
MU328.0625.03B	6.299	3.346	.563	.625
MU328.0750.03B	6.299	3.346	.563	.750

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in inch

**Ordering note:**

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

**Spare parts**

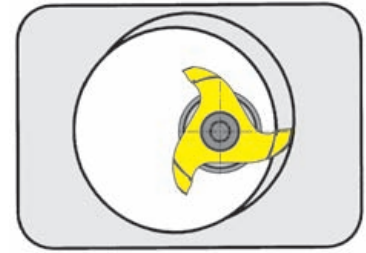
Milling shank	Screw	TORX PLUS® Wrench
MU328.0...	5.17T20P	T20PQ



## MILLING SHANK Type

# M328

with through coolant supply

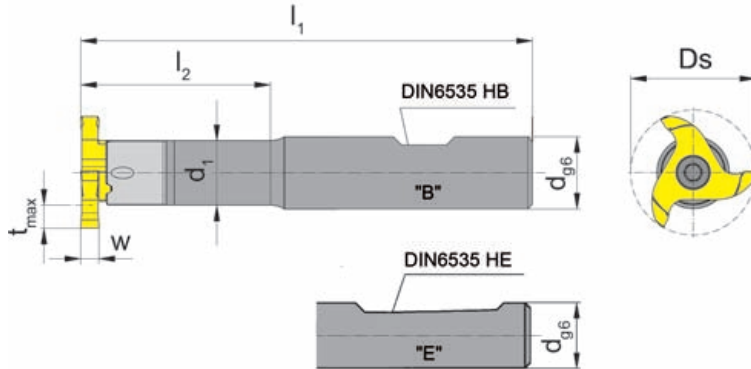


Cutting edge  $\varnothing$

Ds 24.8/27.7 mm

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert



Type U325  
U328  
325  
328  
628

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M328.0016.01B	100	42	14.3	16	B
M328.0016.02B	130	60		16	
M328.0016.03B	160	85		16	
M328.0020.01B	100	42		20	
M328.0020.02B	130	60		20	
M328.0020.03B	160	85		20	
M328.0016.01E	100	42	14.3	16	E
M328.0016.02E	130	60		16	
M328.0016.03E	160	85		16	
M328.0020.01E	100	42		20	
M328.0020.02E	130	60		20	
M328.0020.03E	160	85		20	

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

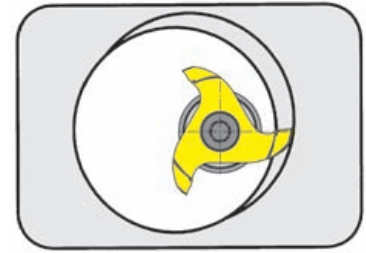
### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M328.00...	5.14T20P	T20PQ

## MILLING SHANK Type

**M328**

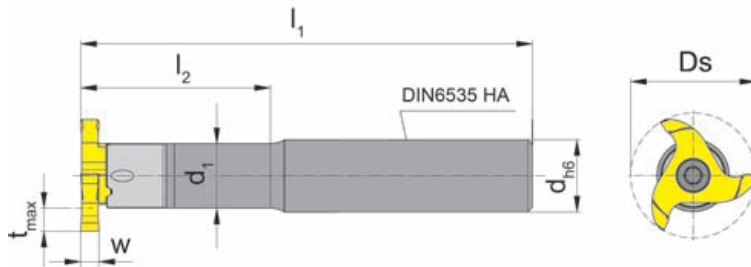
with through coolant supply

Cutting edge  $\varnothing$ 

Ds 24.8/27.7 mm

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert


 Type U325  
 U328  
 325  
 328  
 628

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
M328.0016.01A	100	42		
M328.0016.02A	130	60	14.3	16
M328.0016.03A	160	85		
M328.0020.01A	100	42		
M328.0020.02A	130	60	14.3	20
M328.0020.03A	160	85		

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

**Ordering note:**

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

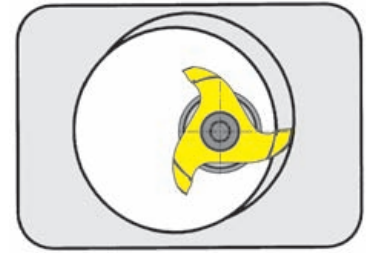
**Spare parts**

Milling shank	Screw	TORX PLUS® Wrench
M328.00...	5.14T20P	T20PQ

## MILLING SHANK Type

# M328

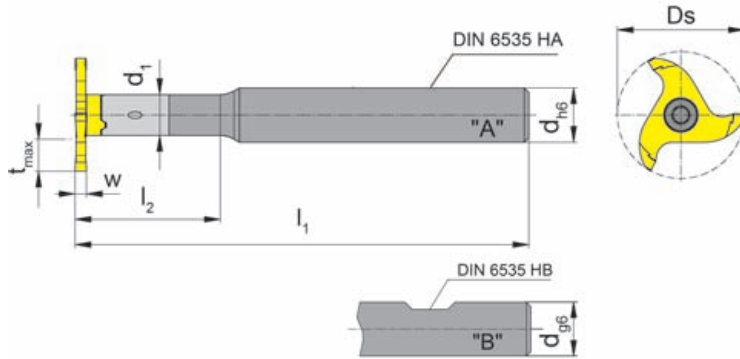
no coolant supply



Cutting edge Ø Ds 28.0 mm

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert



Type U325  
U328  
325  
328  
628

for inserts with increased milling depth

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M328.0909.01A*	120	-	-	9	A
M328.0912.01A	100	32	9	12	A
M328.0912.01B	100	32	-	12	B

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

\* = no through coolant supply!

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

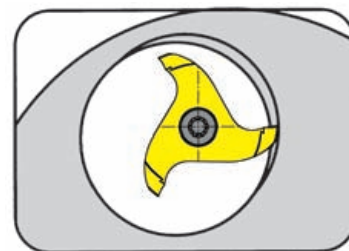
### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M328.09...	5.14T20P	T20PQ

## MILLING SHANK Type

**M328.ST**

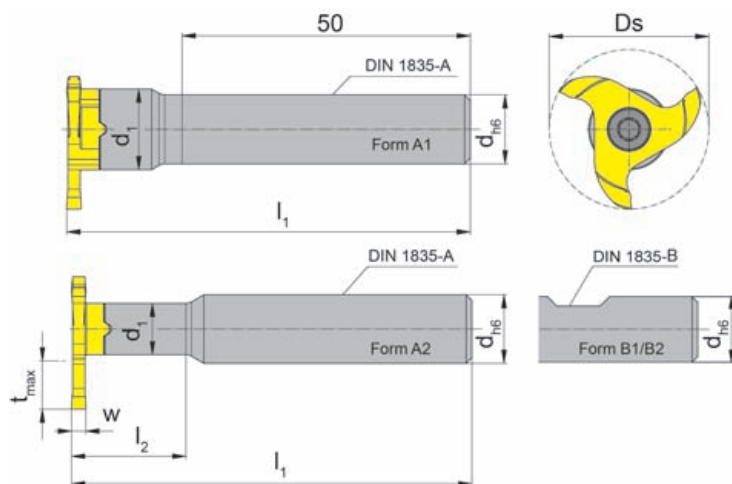
no coolant supply



Cylindrical steel milling shank for collets Ds 24.8/27.7 mm

with cylindrical shank for CNC-lathes

for use with Insert

 Type U325  
 U328  
 325  
 328  
 628


Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	$d$	Form
M328.ST12.01A M328.ST13.01A	70	-	14	12 13	A1
M328.ST12.2.01A M328.ST16.01A M328.ST20.01A	70 90 100	20 36 36	9 14 14	12 16 20	A2
M328.ST12.01B M328.ST12.2.01B	70	- 20	14 9	12	B1 B2

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

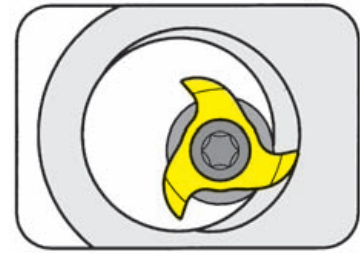
## Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M328.ST...	5.14T20P	T20PQ

## SCREW-IN CUTTER Type

# M328.M

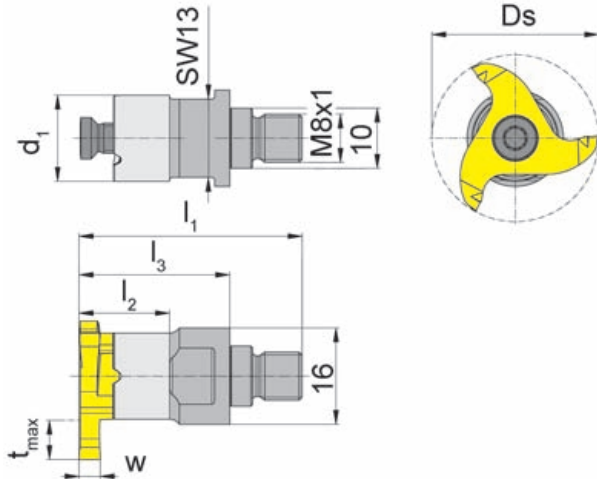
no coolant supply



Screw-in Cutter for basic holder type WFB.20

for use with Insert

- Type U325
- U328
- 325
- 328
- 628



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$l_3$	$d_1$
<b>M328.M081.01</b>	37	15	25	14.3

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.



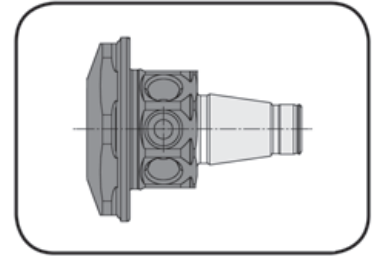
## Spare parts

Screw-in cutter	Screw	TORX PLUS® Wrench
M328.M081.01	<b>5.14T20P</b>	<b>T20PQ</b>

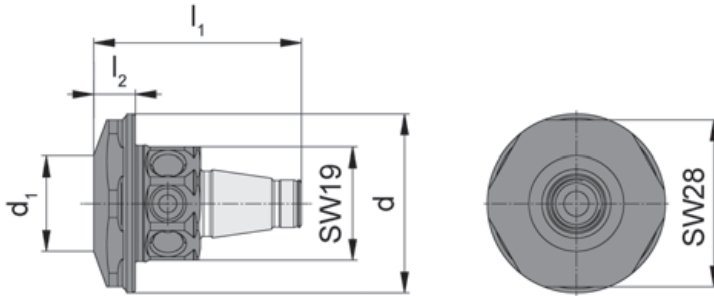
## BASIC HOLDER Type

## WFB

Basic shank WFB.20 for screw-in cutter



for use with Screw-in cutter



Type M306.M081...  
M308.M081...  
M311.M081...  
M313.M081...  
M328.M081...  
M332.M081...

Part number	$l_1$	$l_2$	$d_1$	d
WFB.2012.M081.01	35	7	16	30

Further sizes upon request

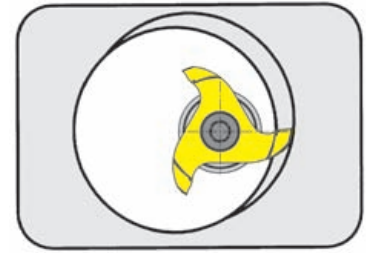
Dimensions in mm



## MILLING SHANK Type

# M328.ER

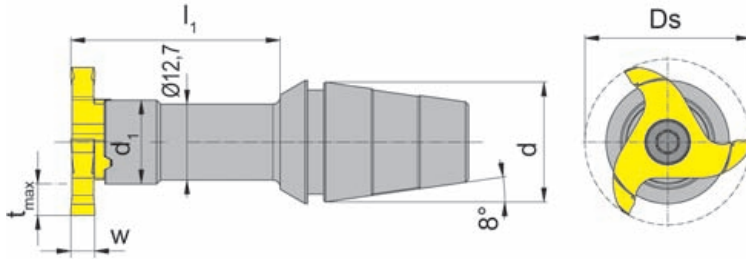
no coolant supply



Milling shanks for collet chucks DIN6499-A (8°) Ds  
24.8/27.7 mm

with ER taper for CNC-lathes

for use with Insert



Type U325  
U328  
325  
328  
628

Picture = right hand cutting version

Part number	$l_1$	$d_1$	d	Clamping nut
M328.ER20.02	35	14	20	ER20.6499/ERM...
M328.ER25.02	35	14	25	ER25.6499
M328.ER32.02	35	14	32	ER32.6499

Further sizes upon request

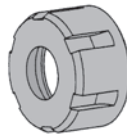
w, Ds,  $t_{max}$  see inserts

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

### Ordering note:

Clamping nut is not combined with milling shank - separate order required!

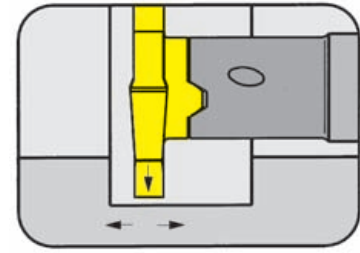


### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M328.ER...	5.14T20P	T20PQ

INSERT Type

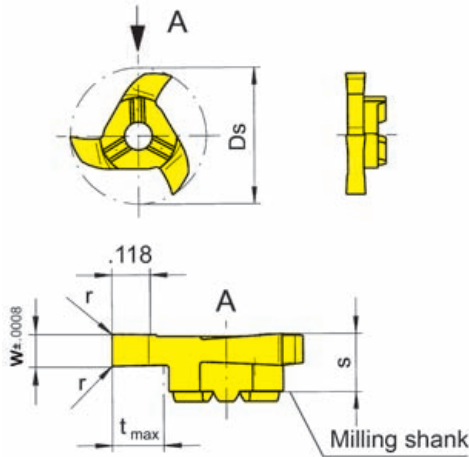
325/U325



Depth of cut up to .197"  
Cutting edge Ø Ds .976"

for use with Milling shank

Type MU328  
M328  
M328.ER  
M328.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades			
						MG12	TN35	T125	AS45
U325.0125.52	.125	.008	.197	.197	.976		▲		
325.0350.52	.138	.008	.224	.197	.976		▲		▲
						P	•	•	•
						M	•	•	•
						K	•	•	•
						N	•	•	○
						S	•	•	•
						H			

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

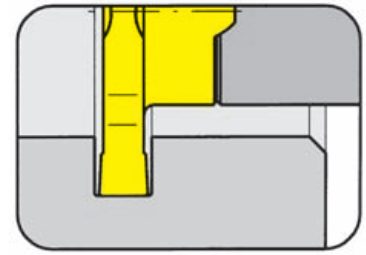
Carbide grades



## INSERT Type

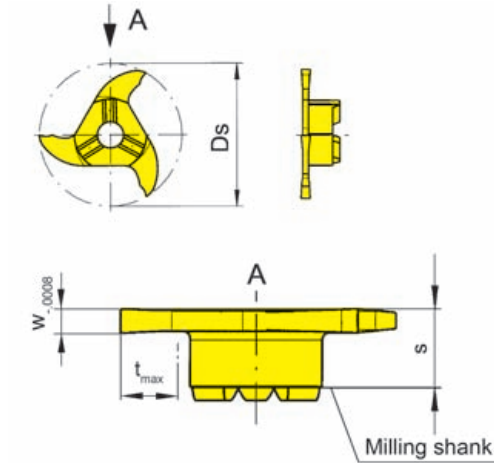
# 328

Depth of groove up to	.197"
Width of groove up to	.032"
Cutting edge Ø	Ds 1.091"



for use with Milling shank

Type MU328  
M328  
M328.ER  
M328.M



Picture = right hand cutting version

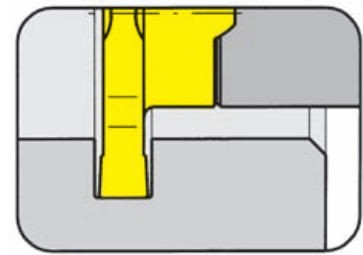
Part number	w	s	t <sub>max</sub>	Ds	Carbide grades		
					MG12	TN35	TI25
<b>328.0082.1.00</b>	.032	.224	.197	1.091		▲	▲
▲ on stock Δ 4 weeks					P	•	•
● main recommendation					M	•	•
○ alternative recommendation					K	•	•
■ uncoated grades					N	•	•
■ coated grades					S	•	•
■ brazed/Cermet					H		

Dimensions in inch

INSERT Type

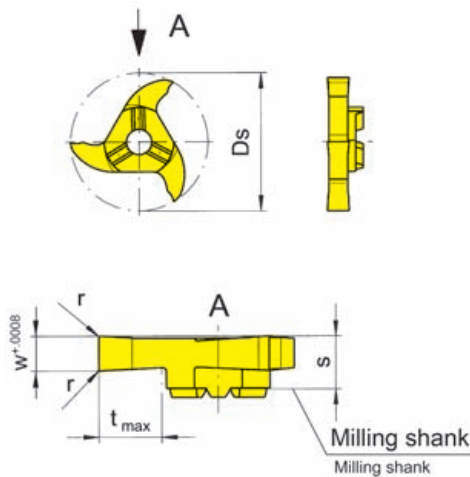
328/U328

Depth of groove up to	.256"
Width of groove up to	.394"
Cutting edge Ø	Ds 1.091"



for use with Milling shank

Type MU328  
M328  
M328.ER  
M328.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades				
						MG12	TN35	T125	AS45	TF45
328.0200.00	.079		.224				▲		▲	
328.0250.00	.098		.224				▲		▲	
328.0300.00	.118		.224				▲		▲	
328.0350.00	.138		.224				▲		▲	
328.0400.00	.157	.008	.224	.256	1.091		▲		▲	
328.0500.00	.197		.224				▲		▲	
328.0600.00	.236		.276				▲		▲	
328.1000.00	.394		.394				▲		▲	
U328.0094.08	.094							▲		
U328.0125.08	.125							▲		Δ
U328.0157.08	.157	.008	.224	.256	1.091			▲		Δ
U328.0187.08	.187							▲		
U328.0157.16	.157							▲		
U328.0187.16	.187	.016	.224	.256	1.091			▲		Δ
▲ on stock Δ 4 weeks						P	•	•	•	•
• main recommendation						M	•	•	•	•
o alternative recommendation						K	•	•	•	•
■ uncoated grades						N	•	•	o	•
■ coated grades						S	•	•	•	•
■ brazed/Cermet						H				

Dimensions in inch

Carbide grades

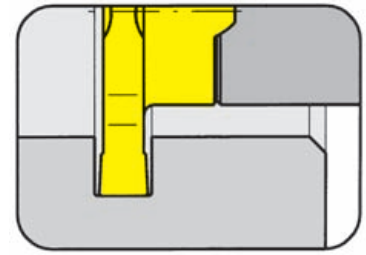
Insert 328.1000.00 with staggered tooth (Z=1) and insert 328.0600.00 with chip divider!

Inserts 328.0400.00, 328.0500.00, 328.0600.00, 328.1000.00, U328.0157.08, U328.0157.16, U328.0187.08, and U328.0187.16 only with toolholder dimension l<sub>2</sub> = max. 1.654"

## INSERT Type

# 328

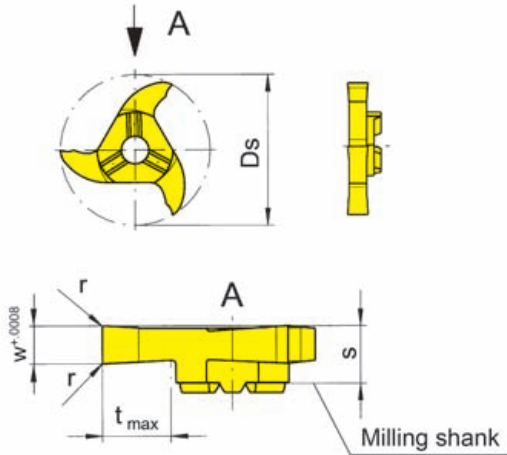
machining of aluminium



Depth of groove up to	.256"
Width of groove up to	.157"
Cutting edge $\emptyset$	Ds 1.091"

for use with Milling shank

Type MU328  
M328  
M328.ER  
M328.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades	
						MG12	TI25
328.0250.40	.098						▲
328.0300.40	.118						▲
328.0350.40	.138	.008	.224	.256	1.091		▲
328.0400.40	.157						▲
						P	•
						M	•
						K	•
						N	•
						S	•
						H	•

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

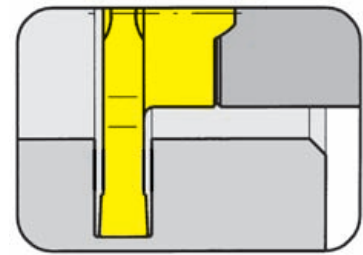
Carbide grades

Further sizes upon request

INSERT Type

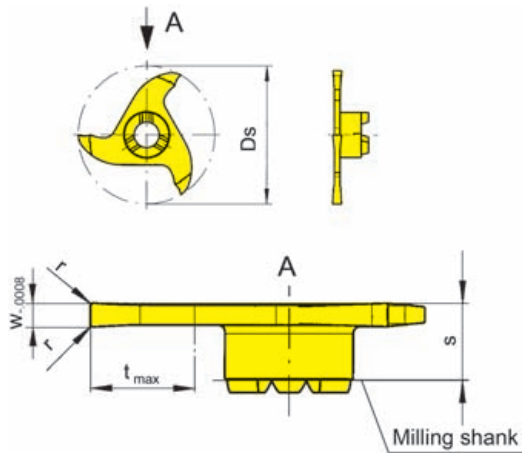
328

Depth of groove up to .366"  
 Width of groove up to .098"  
 Cutting edge Ø Ds 1.102"



for use with Milling shank

Type M328.0909.01A  
 M328.0912.01A  
 M328.0912.01B



Picture = right hand cutting version

increased milling depth

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades			
						MG12	TN35	TI25	AS45
328.0110.2.00	.043	.008					▲	▲	
328.0120.2.00	.047	.008					▲	▲	
328.0132.2.00	.052	.006					▲	▲	
328.0150.2.00	.059	.008	.224	.366	1.102		▲	▲	▲
328.0160.2.00	.063	.008					▲	▲	▲
328.0200.2.00	.079	.008					▲	▲	▲
328.0250.2.00	.098	.008					▲	▲	▲
▲ on stock Δ 4 weeks ● main recommendation ○ alternative recommendation ■ uncoated grades ■ coated grades ■ brazed/Cermet						P	●	●	●
						M	●	●	●
						K	●	●	●
						N	●	●	○
						S	●	●	●
						H			

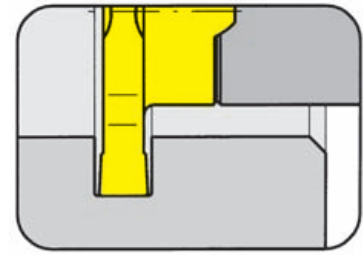
Dimensions in inch

Carbide grades

## INSERT Type

# 628

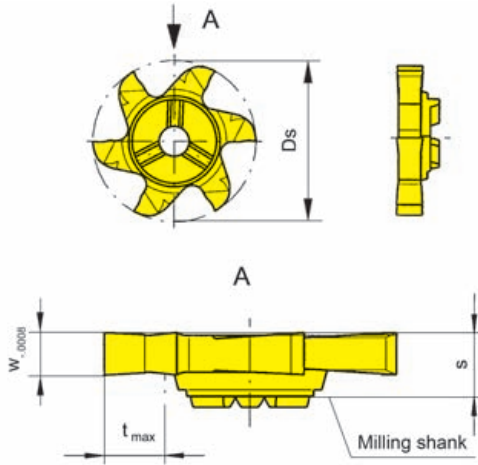
Depth of groove up to	.256"
Width of circlip Nw	.051 - .104"
Cutting edge Ø	Ds 1.091"



Widths for circlip grooves DIN 471/472

for use with Milling shank

Type MU328  
M328  
M328.ER  
M328.M



Picture = right hand cutting version

Part number	Nw	w	r	s	t <sub>max</sub>	Ds	Carbide grades		
							MG12	TI25	AS45
628.0130.00	.051	.056	-					▲	
628.0160.00	.063	.067	-					▲	▲
628.0185.00	.073	.077	.008	.240	.256	1.091		▲	▲
628.0215.00	.085	.089	.008					▲	▲
628.0265.00	.104	.109	.008					▲	▲
							P	•	•
							M	•	•
							K	•	•
							N	•	○
							S	•	•
							H		

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

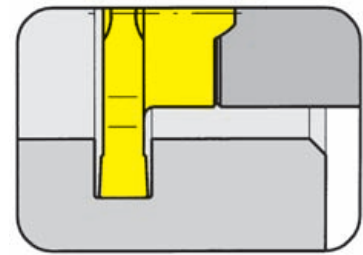
Dimensions in inch

Carbide grades

INSERT Type

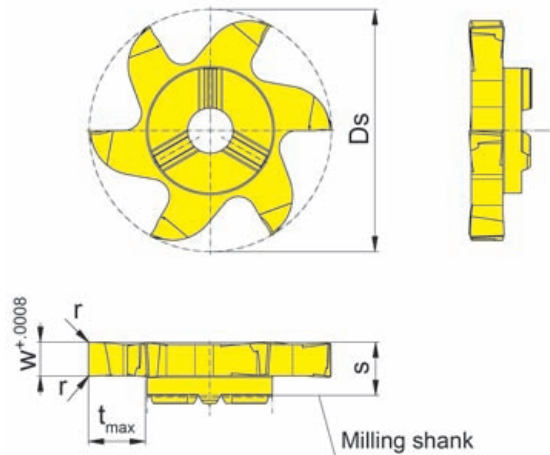
628

Depth of groove up to .256"  
 Width of groove up to .157"  
 Cutting edge Ø Ds 1.091"



for use with Milling shank

Type MU328  
 M328  
 M328.ER  
 M328.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades		
						MG12	T125	AS45
628.0250.00	.098						▲	▲
628.0300.00	.118						▲	▲
628.0350.00	.138	.008	.240	.256	1.091		▲	▲
628.0400.00	.157						▲	▲
						P	•	•
						M	•	•
						K	•	•
						N	•	○
						S	•	•
						H		

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

Insert 628.0400.00 only with toolholder dimension l<sub>2</sub> = 1.654"

## INSERT Type

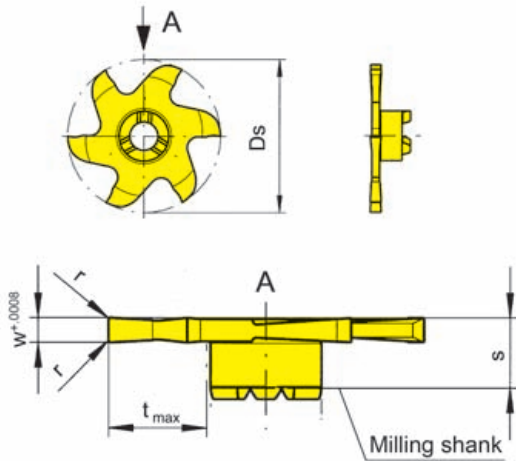
# 628

Depth of groove up to .366"  
 Width of groove up to .098"  
 Cutting edge  $\emptyset$  Ds 1.102"



for use with Milling shank

Type M328.0909.01A  
 M328.0912.01A  
 M328.0912.01B



Picture = right hand cutting version

increased milling depth

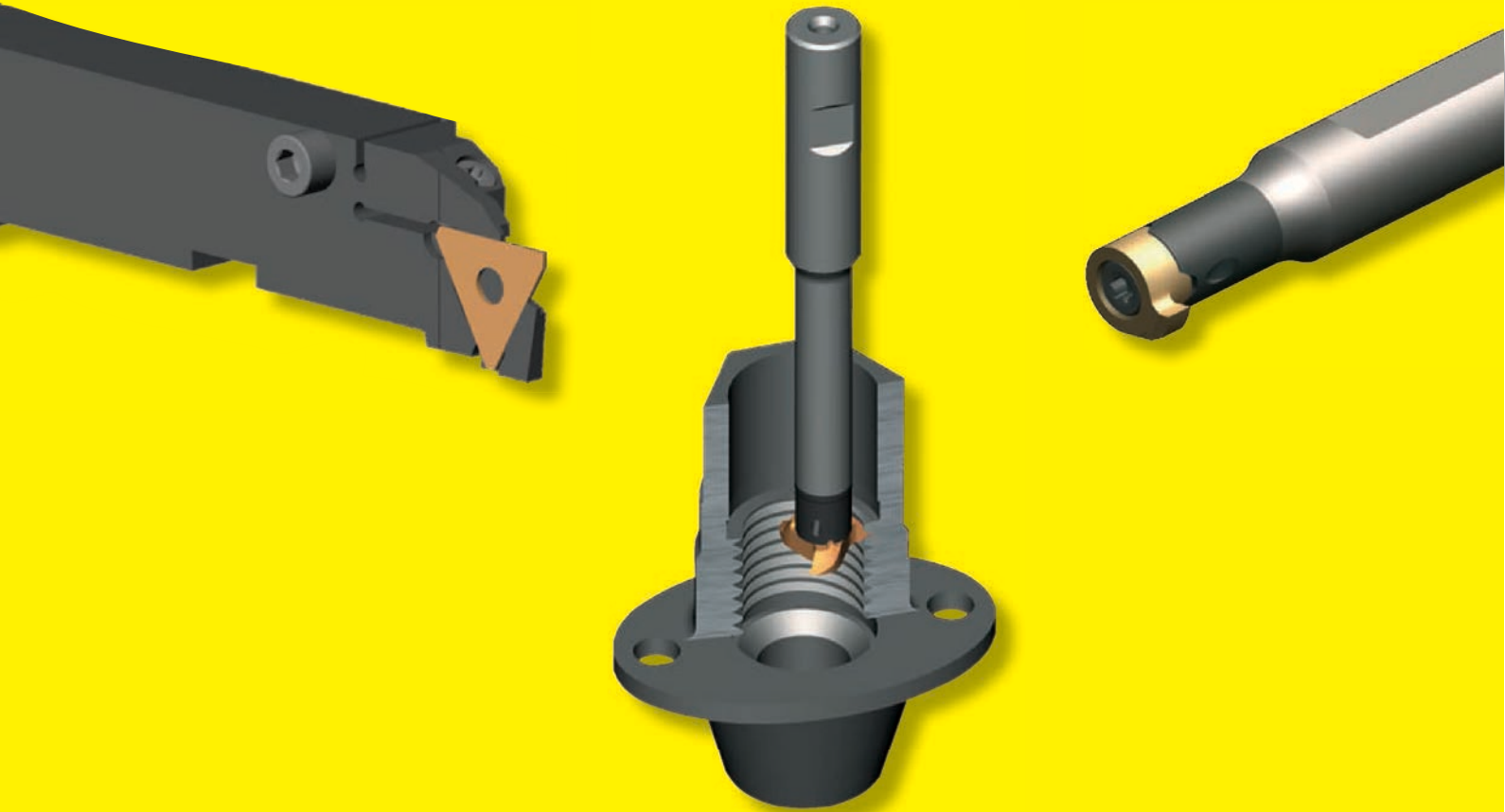
Part number	w	r	s	t <sub>max</sub>	Ds	MG12	TN35	TI25	AS45
628.0120.2.00	.047							▲	
628.0150.2.00	.059							▲	▲
628.0160.2.00	.063	.008	.240	.366	1.102			▲	▲
628.0200.2.00	.079							▲	▲
628.0240.2.00	.094							▲	▲
628.0250.2.00	.098							▲	▲
						P		•	•
						M		•	•
						K		•	•
						N		•	○
						S		•	•
						H			

▲ on stock Δ 4 weeks  
 • main recommendation  
 ○ alternative recommendation  
 ■ uncoated grades  
 ■ coated grades  
 ■ brazed/Cermet

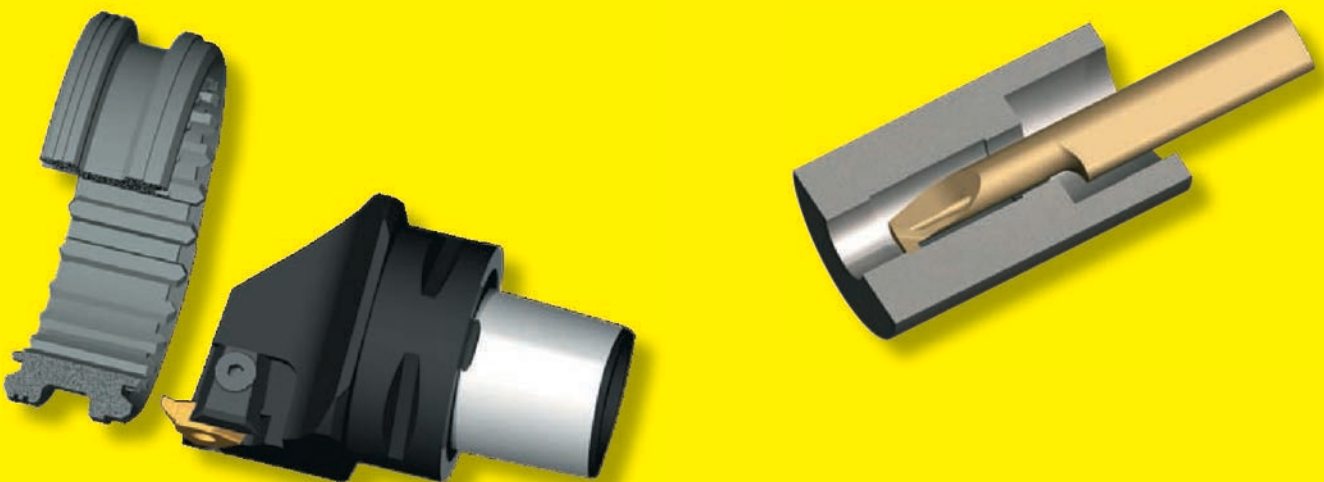
Carbide grades

Dimensions in inch

# SOLUTIONS PLUS Program



**Need faster delivery?  
Inquire about our Solutions Plus Program.**





MILLING SHANK type **M332**

from bore  $\varnothing$  1.260" (32.0 mm)



## MILLING SHANK Type

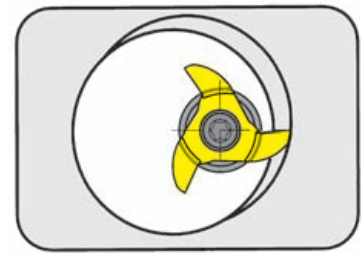
**MU332**

with through coolant supply

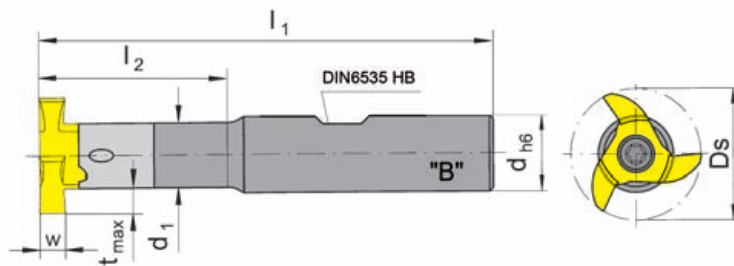
Cutting edge  $\emptyset$ 

Ds 1.248"

Material of shank: Carbide - Giving a good vibration resistance



for use with Insert

 Type 332  
 632  
 636


Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
MU332.0625.01B	3.937	1.654		
MU332.0625.02B	5.118	2.362	.563	.625
MU332.0625.03B	6.299	3.346		
MU332.0750.01B	3.937	1.654		
MU332.0750.02B	5.118	2.362	.563	.750
MU332.0750.03B	6.299	3.346		

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in inch

**Ordering note:**

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

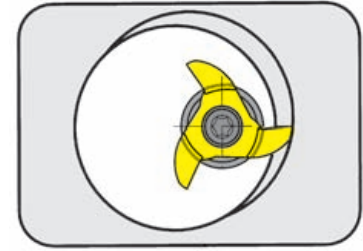
**Spare parts**

Milling shank	Screw	TORX PLUS® Wrench
MU332.0...	5.17T20P	T20PQ

## MILLING SHANK Type

# M332

with through coolant supply



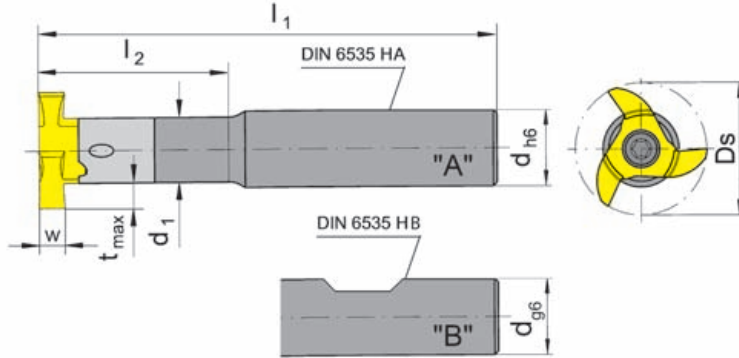
Cutting edge  $\emptyset$

Ds 1.248" (31.7 mm)

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 332  
632  
636



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M332.0016.01A	100	42	14.3	16	A
M332.0016.02A	130	60			
M332.0016.03A	160	85			
M332.0020.01A	100	42	14.3	20	A
M332.0020.02A	130	60			
M332.0020.03A	160	85			
M332.0016.01B	100	42	14.3	16	B
M332.0016.02B	130	60			
M332.0016.03B	160	85			
M332.0020.01B	100	42	14.3	20	B
M332.0020.02B	130	60			
M332.0020.03B	160	85			

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

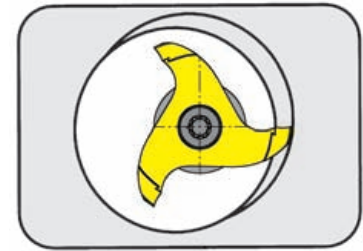
### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M332.00...	5.17T20P	T20PQ

## MILLING SHANK Type

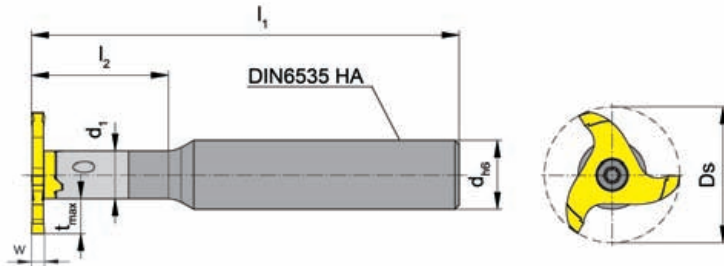
**M332**

with through coolant supply

Cutting edge  $\varnothing$ 

Ds 1.248" (31.7 mm)

Material of shank: Carbide - Giving a good vibration resistance



for use with Insert

 Type 332  
 632  
 636

Picture = right hand cutting version

 for inserts with increased  
 milling depth

Part number	$l_1$	$l_2$	$d_1$	d
M332.0012.2.01A	100	32	11	12
M332.0016.2.01A				16

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

**Ordering note:**

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

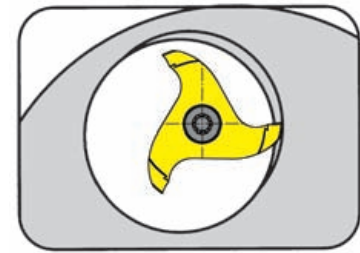
**Spare parts**

Milling shank	Screw	TORX PLUS® Wrench
M332.001...	5.17T20P	T20PQ

## MILLING SHANK Type

# M332.ST

no coolant supply

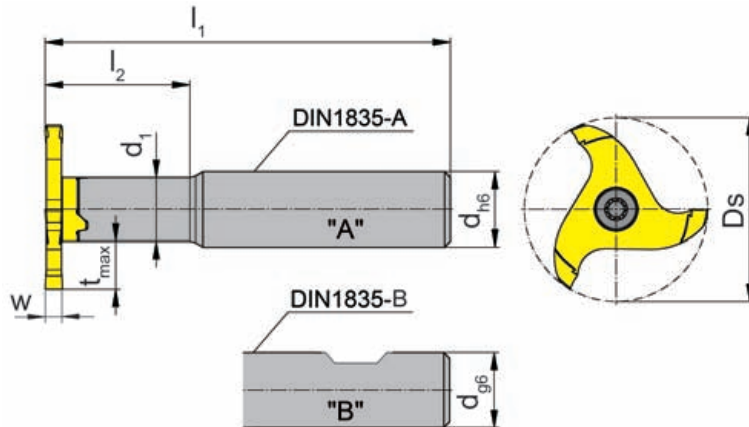


Cylindrical steel milling shank for collets Ds 31.7 mm

with cylindrical shank for CNC-lathes

for use with Insert

Type 332  
632  
636



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	$d$	Form
M332.ST16.01A	90	36	14.3	16	A
M332.ST20.01A	100			20	
M332.ST12.2.01A	70	25	11.0	12	A
M332.ST13.2.01A				13	
M332.ST12.2.01B	70	25	11.0	12	B

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

### Note:

Milling shanks **M332.ST12.2.01A**, **M332.ST12.2.01B** and **M332.ST13.2.01A** are usable for inserts with increased milling depth!

For torque specifications of the screw, please see Technical Instructions.

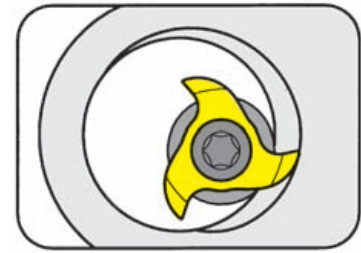
## Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M332.ST...	<b>5.17T20P</b>	<b>T20PQ</b>

## SCREW-IN CUTTER Type

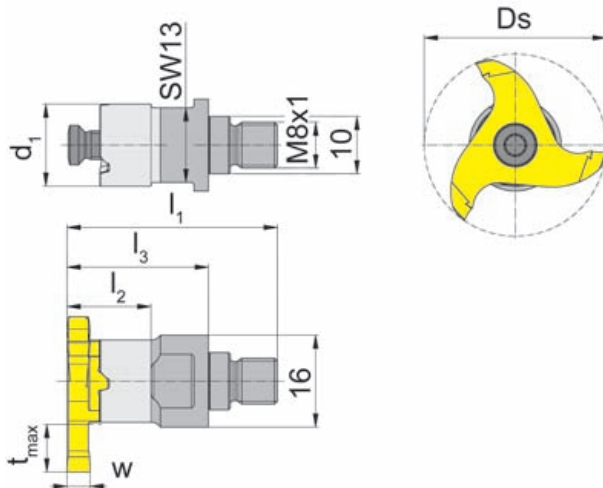
**M332.M**

no coolant supply



Screw-in Cutter for basic holder type WFB.20

for use with Insert

 Type 332  
 632  
 636


Picture = right hand cutting version

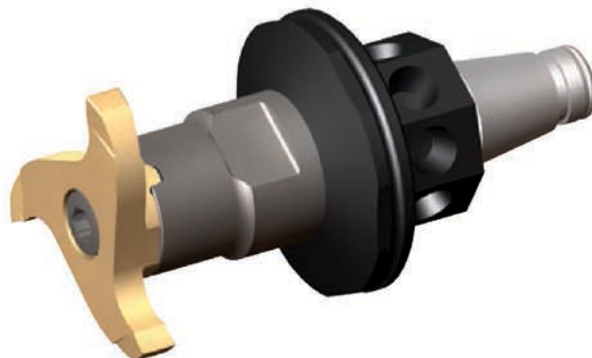
Part number	$l_1$	$l_2$	$l_3$	$d_1$
<b>M332.M081.01</b>	37	15	25	14.3

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.



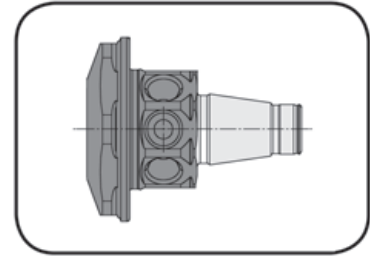
## Spare parts

Screw-in cutter	Screw	TORX PLUS® Wrench
M332.M081.01	<b>5.17T20P</b>	<b>T20PQ</b>

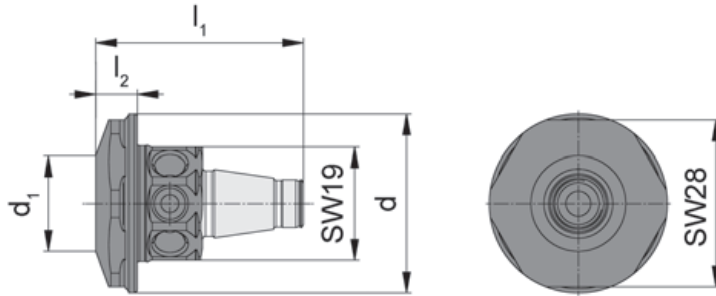
## BASIC HOLDER Type

# WFB

Basic holder WFB.20 for screw-in cutter



for use with Screw-in cutter



- Type
- M306.M081...
  - M308.M081...
  - M311.M081...
  - M313.M081...
  - M328.M081...
  - M332.M081...

Part number	$l_1$	$l_2$	$d_1$	d
WFB.2012.M081.01	35	7	16	30

Further sizes upon request

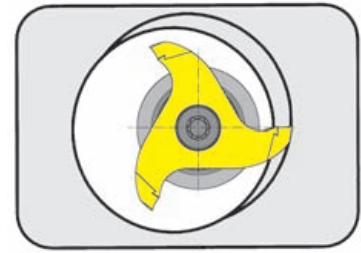
Dimensions in mm



## MILLING SHANK Type

**M332.ER**

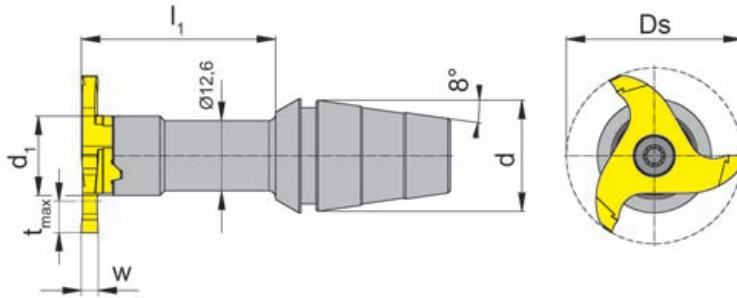
no coolant supply



Milling shanks for collet chucks DIN6499-A (8°) Ds 31.7/35,7 mm

with ER taper for CNC-lathes

for use with Insert

 Type 332  
 632  
 636


Picture = right hand cutting version

Part number	$l_1$	$d_1$	d	Clamping nut
<b>M332.ER20.02</b>	35	14.3	20	ER20.6499/ERM20.6499

Further sizes upon request

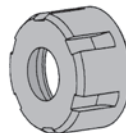
w, Ds,  $t_{max}$  see inserts

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

**Ordering note:**

Clamping nut is not combined with milling shank - separate order required!

**Spare parts**

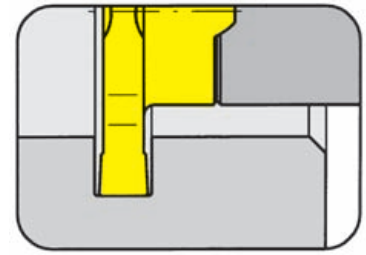
Milling shank	Screw	TORX PLUS® Wrench
M332.ER20.02	<b>5.17T20P</b>	<b>T20PQ</b>



## INSERT Type

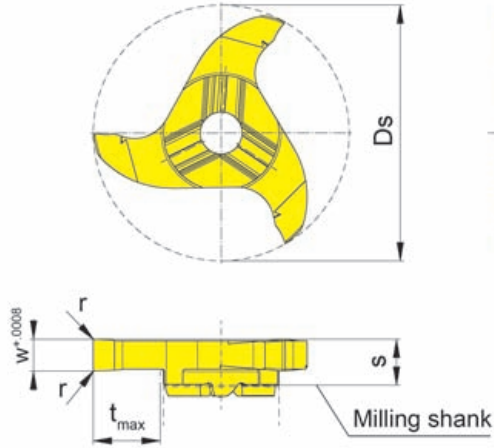
# 332

Depth of groove up to .327"  
 Width of groove up to .157"  
 Cutting edge Ø Ds 1.248"



for use with Milling shank

Type MU332  
 M332  
 M332.ER  
 M332.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades			
						MG12	TN35	TI25	AS45
332.0200.00	.079							▲	△
332.0250.00	.098							▲	△
332.0300.00	.118	.008	.224	.327	1.248			▲	△
332.0350.00	.138							▲	△
332.0400.00	.157							▲	△
						P		●	●
						M		●	●
						K		●	●
						N		●	○
						S		●	●
						H			

- ▲ on stock    △ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

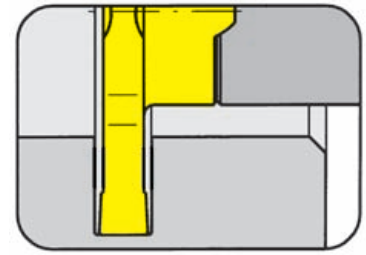
Dimensions in inch

Carbide grades

INSERT Type

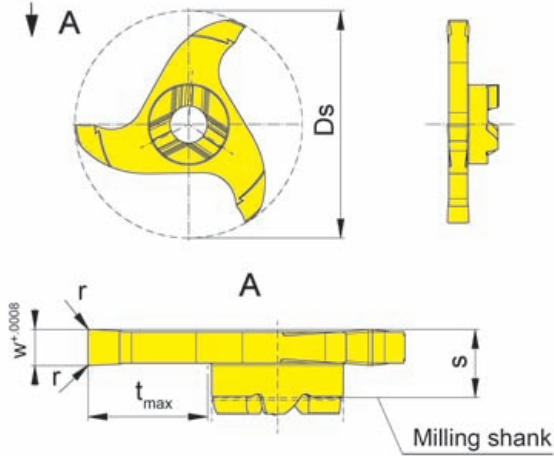
332

Depth of groove up to .394"  
 Width of groove up to .118"  
 Cutting edge  $\emptyset$  Ds 1.248"



for use with Milling shank

- Type M332.0012.2.01A  
 M332.0016.2.01A  
 M332.ST12.2.01A  
 M332.ST12.2.01B  
 M332.ST13.2.01A



Picture = right hand cutting version

increased milling depth

Part number	w	r	s	t <sub>max</sub>	Ds	MG12	TN35	TI25	AS45
332.0150.2.00	.059							▲	△
332.0160.2.00	.063							▲	△
332.0200.2.00	.079	.008	.224	.394	1.248			▲	△
332.0250.2.00	.098							▲	△
332.0300.2.00	.118							▲	△
						P		●	●
						M		●	●
						K		●	●
						N		●	○
						S		●	●
						H			

- ▲ on stock    △ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

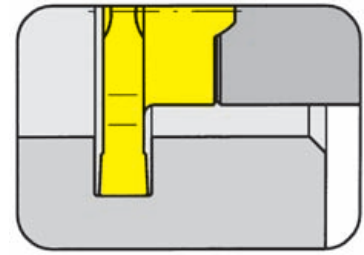
Dimensions in inch

Carbide grades

## INSERT Type

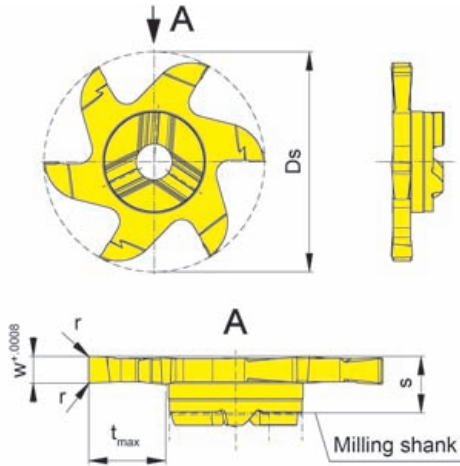
# 632

Depth of groove up to .327"  
 Width of groove up to .157"  
 Cutting edge Ø Ds 1.248"



for use with Milling shank

Type MU332  
 M332  
 M332.ER  
 M332.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades				
						MG12	TN35	T125	TA45	AS45
632.0200.00	.079								▲	△
632.0250.00	.098								▲	△
632.0300.00	.118	.008	.240	.327	1.248				▲	△
632.0400.00	.157								▲	△
▲ on stock    △ 4 weeks ● main recommendation ○ alternative recommendation ■ uncoated grades ■ coated grades ■ brazed/Cermet						P			●	●
						M			●	●
						K			●	●
						N			●	○
						S			●	●
						H				

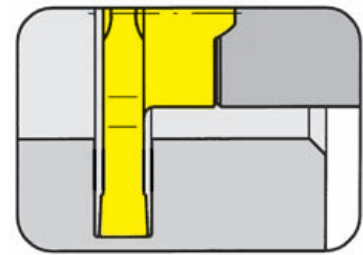
Dimensions in inch

Carbide grades

INSERT Type

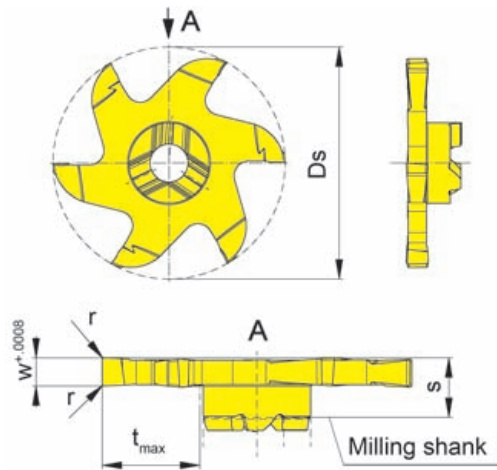
632

Depth of groove up to .394"  
 Width of groove up to .118"  
 Cutting edge  $\emptyset$  Ds 1.248"



for use with Milling shank

- Type M332.0012.2.01A  
 M332.0016.2.01A  
 M332.ST12.2.01A  
 M332.ST12.2.01B  
 M332.ST13.2.01A



Picture = right hand cutting version

increased milling depth

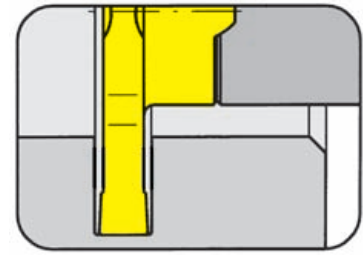
Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades				
						MG12	TN35	T125	TA45	AS45
632.0150.2.00	.059								▲	△
632.0160.2.00	.063								▲	△
632.0200.2.00	.079	.008	.240	.394	1.248				▲	△
632.0250.2.00	.098								▲	△
632.0300.2.00	.118								▲	△
▲ on stock    △ 4 weeks ● main recommendation ○ alternative recommendation ■ uncoated grades ■ coated grades ■ brazed/Cermet						P			●	●
						M			●	●
						K			●	●
						N			●	○
						S			●	●
						H				

Dimensions in inch

## INSERT Type

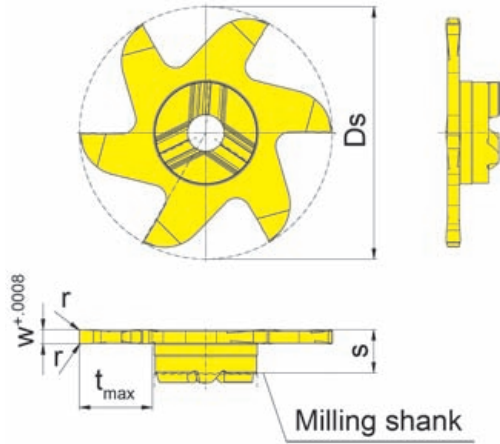
# 636

Depth of groove up to .402"  
 Width of groove up to .118"  
 Cutting edge Ø Ds 1.406"



for use with Milling shank

Type MU332  
 M332  
 M332.ER  
 M332.M



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades				
						MG12	TN35	T125	TA45	AS45
636.0150.00	.059	.004							▲	△
636.0200.00	.079	.008							▲	△
636.0250.00	.098	.008	.240	.402	1.406				▲	△
636.0300.00	.118	.008							▲	△
▲ on stock    △ 4 weeks ● main recommendation ○ alternative recommendation ■ uncoated grades ■ coated grades ■ brazed/Cermet						P			●	●
						M			●	●
						K			●	●
						N			●	○
						S			●	●
						H				

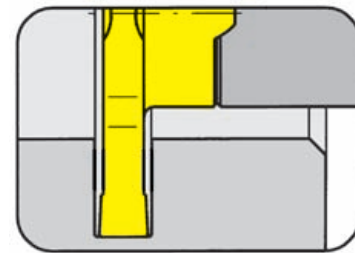
Dimensions in inch

Carbide grades

INSERT Type

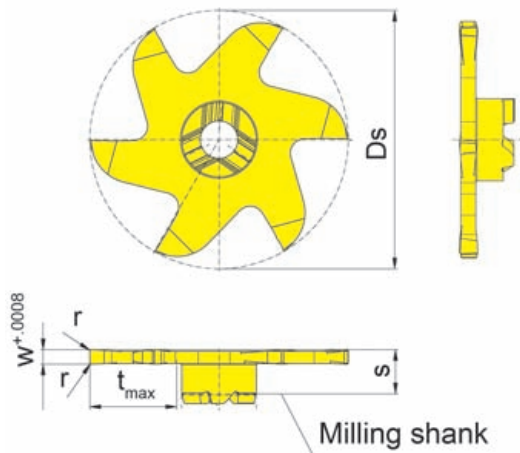
636

Depth of groove up to .472"  
 Width of groove up to .098"  
 Cutting edge Ø Ds 1.406"



for use with Milling shank

- Type M332.0012.2.01A  
 M332.0016.2.01A  
 M332.ST12.2.01A  
 M332.ST12.2.01B  
 M332.ST13.2.01A



Picture = right hand cutting version

increased milling depth

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades				
						MG12	TN35	T125	TA45	AS45
636.0150.2.00	.059	.004							▲	△
636.0200.2.00	.079	.008	.240	.472	1.406				▲	△
636.0250.2.00	.098	.008							▲	△
						P			●	●
						M			●	●
						K			●	●
						N			●	○
						S			●	●
						H				

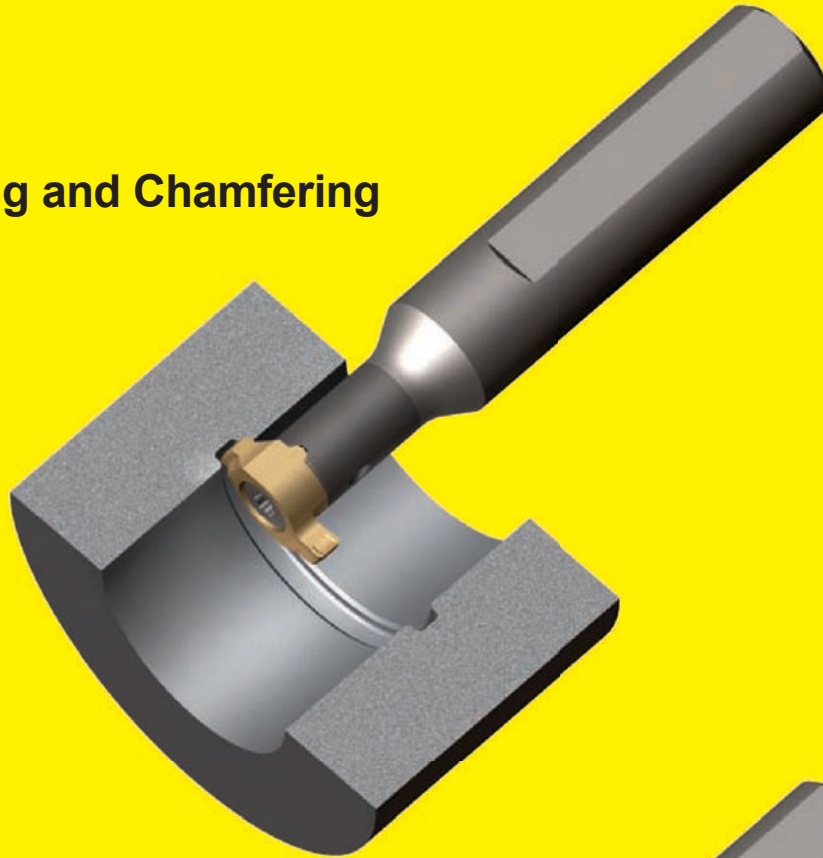
- ▲ on stock △ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

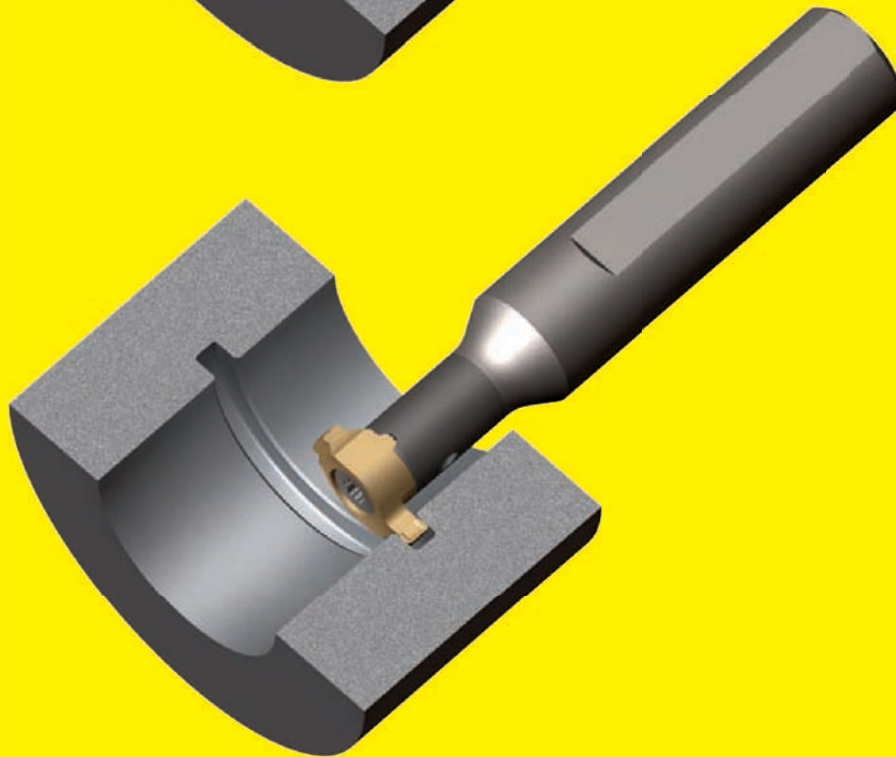
Carbide grades

Reducing of tool change  
from Ø .709" (18 mm)

Pregrooving and Chamfering



Finishing



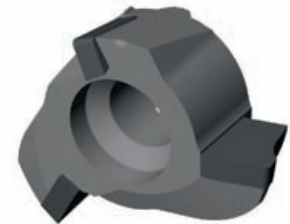
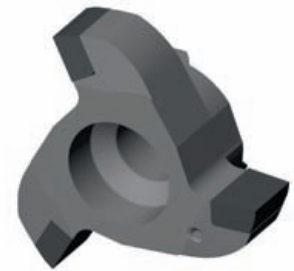
For further information, please contact HORN USA.



Carbide milling cutter shanks offer excellent antivibration properties, resulting in greater rigidity, ideally suited for holding PCD tipped inserts.



PCD tipped inserts of the 306, 308, 311, 313 and 328 range are manufactured according to customers requirements. Intermediate widths as well as complicated forms are all part of our product range.



Cutting data calculated from our HCT program guarantees both optimum and economical performance of the HORN groove milling tools.





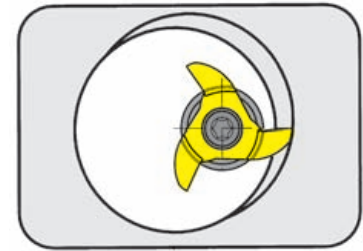
MILLING SHANK type **M335**  
from bore  $\varnothing$  1.378" (35.0 mm)



## MILLING SHANK Type

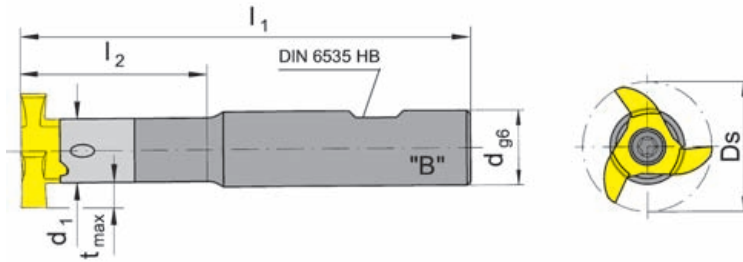
**MU335**

with through coolant supply

Cutting edge  $\emptyset$ 

Ds 1.366"

Material of shank: Carbide - Giving a good vibration resistance



for use with Insert

Type 335

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
MU335.0750.01B	3.937	1.575		
MU335.0750.02B	5.118	2.362	.689	.750
MU335.0750.03B	6.299	3.346		

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in inch

**Ordering note:**

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

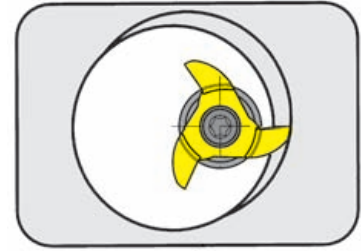
**Spare parts**

Milling shank	Screw	TORX PLUS® Wrench
MU335.0750.0...	6.17T25P	T25PQ

## MILLING SHANK Type

## M335

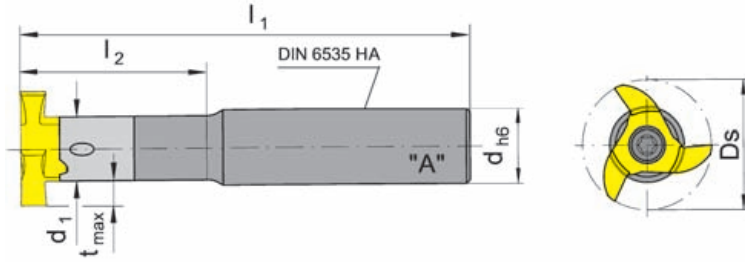
with through coolant supply



Cutting edge Ø

Ds 1.366" (34.7 mm)

Material of shank: Carbide - Giving a good vibration resistance



for use with Insert

Type 335

Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
M335.0020.01A	100	40	17.5	20
M335.0020.02A	130	60	17.5	20

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

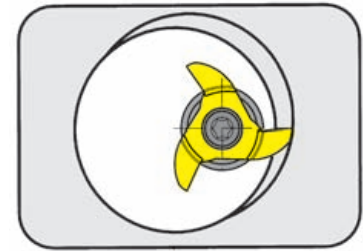
### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M335.0020.0...	6.17T25P	T25PQ

## MILLING SHANK Type

**M335**

with through coolant supply

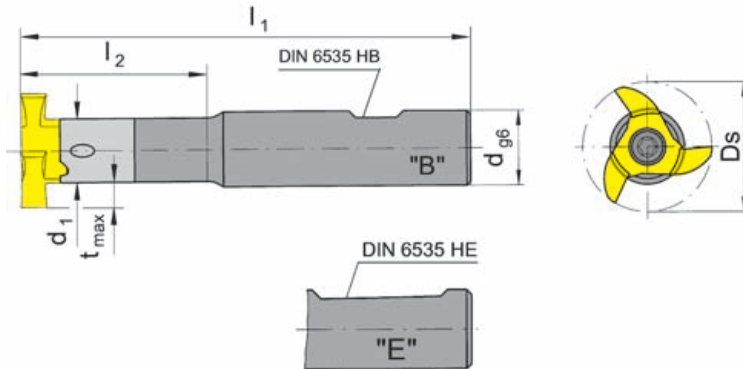
Cutting edge  $\emptyset$ 

Ds 1.366" (34.7 mm)

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 335



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
<b>M335.0020.01B</b>	100	40	17.5	20	B
<b>M335.0020.02B</b>	130	60	17.5	20	B
<b>M335.0020.02E</b>	130	60	17.5	20	E

Further sizes upon request

w, Ds,  $t_{max}$  see inserts

Dimensions in mm

**Ordering note:**

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

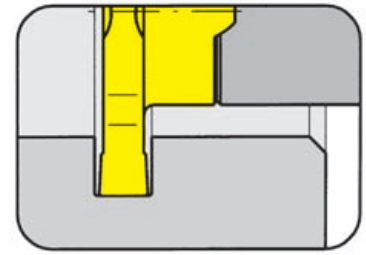
**Spare parts**

Milling shank	Screw	TORX PLUS® Wrench
M335.0020.0...	<b>6.17T25P</b>	<b>T25PQ</b>

## INSERT Type

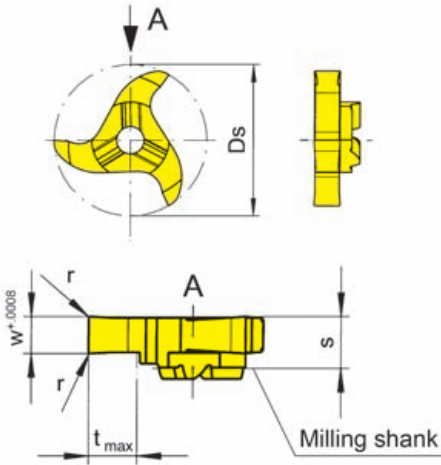
# 335

Depth of groove up to .315"  
 Width of groove up to .236"  
 Cutting edge Ø Ds 1.366"



for use with Milling shank

Type M335  
 MU335



Picture = right hand cutting version

Part number	w	r	s	t <sub>max</sub>	Ds	Carbide grades			
						MG12	TN35	TI25	AS45
335.0200.00	.079							▲	▲
335.0300.00	.118							▲	▲
335.0400.00	.157	.008	.343	.315	1.366			▲	▲
335.0500.00	.197							▲	▲
335.0600.00	.236							▲	▲
						P		●	●
						M		●	●
						K		●	●
						N		●	○
						S		●	●
						H			

- ▲ on stock    Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

Carbide grades

# CHAPTER B

- Step #1: Establish bore diameter  
 Step #2: Find Depth of Cut (DOC) requirements  
 Step #3: Follow column and row to find correct tool type  
 Step #4: Look up tool type to find available widths

DOC (Depth of cut) $t_{max}$				
Bore $\varnothing$	.098 (2.5)	.157 (4.0)	.177 (4.5)	.197 (5.0)
1.260 (32.0)	<i>M275.031.D25.3.04A</i> <i>M275.031.M16.1.04</i>			
1.457 (37.0)	<i>M275.036.M16.1.04</i>			
1.535 (39.0)	<i>M275.0038.A16.05</i>			
1.772 (45.0)		<i>U380.1732.03 / 380.044.03</i> <i>HSK-32-380.0044.03</i> <i>ABS-32-3280.0044.03</i>		
1.929 (49.0)	<i>M275.0048.A22.08</i>			
2.008 (51.0)			<i>HSK-40-380.0050.04</i> <i>ABS-40-3280.0050.04</i>	
2.323 (59.0)	<i>M275.0058.A27.10</i> <i>M275.0058.S22.10</i>			
2.520 (64.0)				<i>U380.2480.05 / 380.0063.05</i> <i>U381.2480.05 / 381.0063.05</i> <i>HSK-40-380.0063.05 / HSK-50-380.0063.05</i> <i>ABS-40-380.0063.05 / ABS-50-380.0063.05</i>
3.110 (79.0)	<i>M275.0078.A32.14</i> <i>M275.0078.S27.14</i>			
3.189 (81.0)				<i>U380.3150.08 / 380.0080.08</i> <i>U381.3150.08 / 381.0080.08</i> <i>HSK-50-380.0080.08 / HSK-63-380.0080.08</i> <i>ABS-50-380.0080.08 / ABS-63-380.0080.08</i>
3.898 (99.0)	<i>M275.0098.S32.16</i>			
3.976 (101.0)				<i>U381.3937.10 / 381.0100.10</i>

Inserts for M275 holders can be found on pages B6-B7. Standard widths from .047 - .128" (1.2 - 3.25 mm)  
 Inserts for 380/381 cutters can be found on pages B22-B25. Standard widths from .046 - .207" (1.17 - 5.26 mm)  
 Tool recommendations based on largest tool for application

Dimensions in inch (mm)

Groove milling with System 275  
from bore  $\emptyset$

**1.260" (32 mm)**

Example:

Milling cutter M275.0078.A32.14

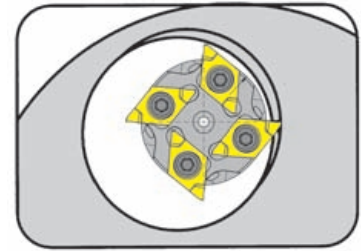
Cutting edge  $\emptyset$  3.071" (78 mm)



## MILLING SHANK Type

# M275

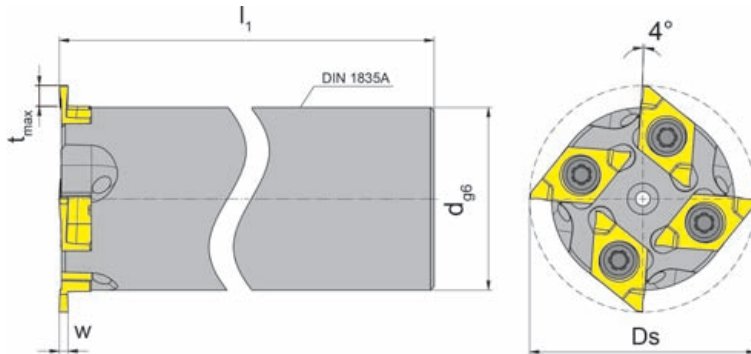
with through coolant supply



Cutting edge  $\emptyset$

Ds 1.220" (31 mm)

Material of shank: Steel (not recommended for shrink fitting)



for use with Indexable insert

Type S275

Picture = right hand cutting version

Part number	Z	Ds	l <sub>1</sub>	d
<b>M275.031.D25.3.04A</b>	4	31	125	25

Further sizes upon request

w and t<sub>max</sub> see inserts

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

## Spare parts

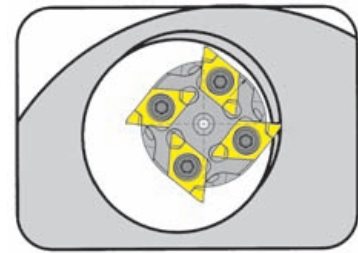
Milling shank	Screw	TORX PLUS® Wrench
M275.031.D25.3.04A	<b>3.5.10.T10P</b>	<b>T10PL</b>



## SCREW-IN CUTTER Type

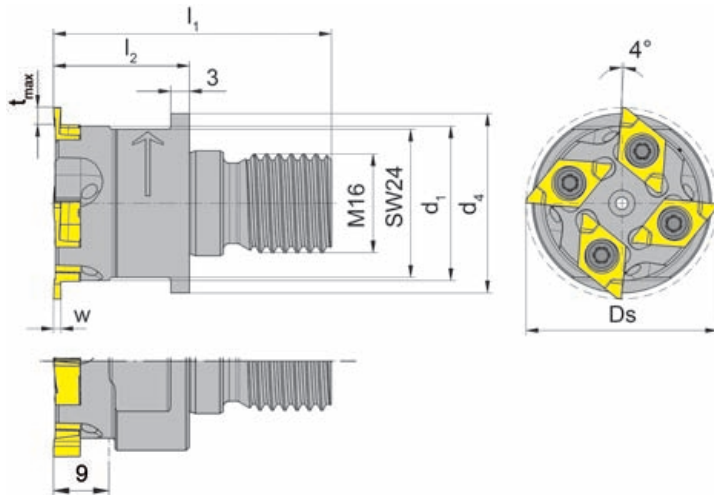
# M275

with through coolant supply



Cutting edge  $\varnothing$  Ds 31 / 36 mm

Material of shank: Steel



for use with Indexable insert

Type S275

Picture = right hand cutting version shown

Part number	Z	Ds	$l_1$	$l_2$	$d_1$	$d_4$	SW
M275.031.M16.1.04	4	31	45	22	25	29	24
M275.036.M16.1.04	4	36	45	22	30	29	27

Further sizes upon request

w and  $t_{max}$  see inserts

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

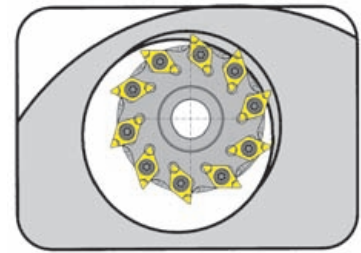
### Spare parts

Screw-in cutter	Screw	TORX PLUS® Wrench
M275.03...	3.5.10.T10P	T10PL

## MILLING CUTTER Type

# M275

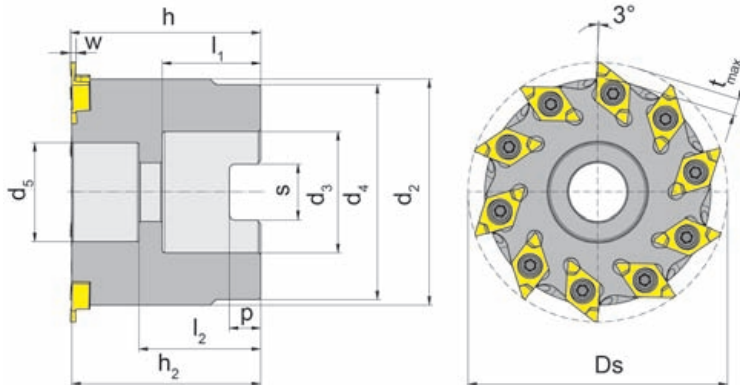
with through coolant supply



Cutting edge  $\varnothing$

Ds 38/48/58/78 mm

Cutterhole and cross keyway as per DIN 138



for use with Indexable insert

Type S275

Picture = right hand cutting version shown

Part number	Z	Ds	h	h <sub>2</sub>	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	d <sub>5</sub>	l <sub>1</sub>	l <sub>2</sub>	s	p
M275.0038.A16.05	5	38	33.0	32.7	32.0	16	32.0	13.5	18	22.7	8.4	5.6
M275.0048.A22.08	8	48	37.0	36.7	40.5	22	40.5	18.5	20	24.7	10.4	6.3
M275.0058.A27.10	10	58	42.5	42.2	50.0	27	48.0	22.0	22	27.2	12.4	7.0
M275.0078.A32.14	14	78	50.0	49.7	3.5	32	58.0	33.0	25	36.7	14.4	8.0

Further sizes upon request

w and t<sub>max</sub> see inserts

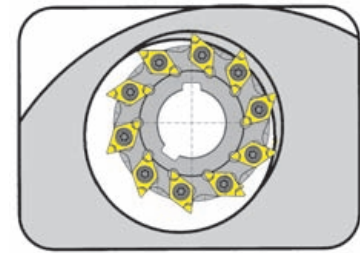
Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling cutter	Screw	Screw	TORX PLUS® Wrench	Washer
M275.0038.A16.05	DIN912-M8x25	3.5.10.T10P	T10PL	020.0813.3438
M275.0048.A22.08	DIN912-M10x25	3.5.10.T10P	T10PL	DIN433-10.5-St
M275.0058.A27.10	DIN912-M12x30	3.5.10.T10P	T10PL	DIN433-13-St
M275.0078.A32.14	DIN7984-M16x35	3.5.10.T10P	T10PL	DIN433-17-St

## DISC MILLING CUTTER Type **M275**

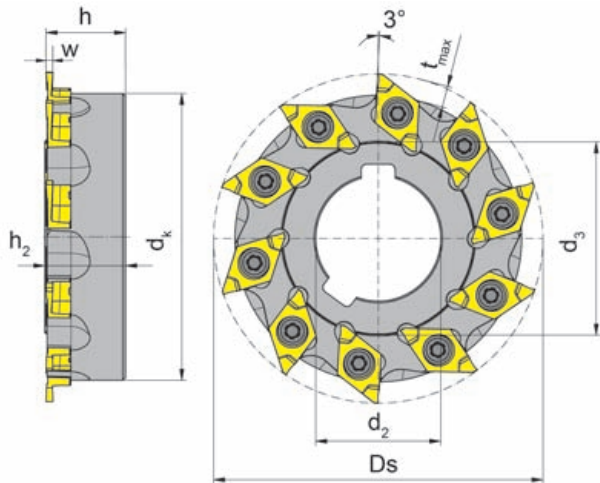


Cutting edge  $\varnothing$  Ds 58/78/98 mm

Bore ( $d_2$ ) with longitudinal keyway to DIN 138

for use with Indexable insert

Type S275



R = right hand version shown

L = left hand version

Part number	Z	Ds	h	h <sub>2</sub>	d <sub>3</sub>	d <sub>2</sub>	d <sub>k</sub>
R/LM275.0058.S22.10	10	58	14	14.2	34	22	50.5
R/LM275.0078.S27.14	14	78	16	16.2	43	27	70.5
R/LM275.0098.S32.16	16	98	20	20.2	48	32	90.5

Further sizes upon request

w and t<sub>max</sub> see inserts

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Disc milling cutter	Screw	TORX PLUS® Wrench
R/LM275.00...	<b>3.5.10.T10P</b>	<b>T10PL</b>

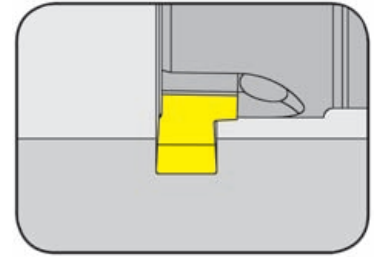
# GROOVE MILLING by circular interpolation



B

INDEXABLE INSERT Type

## S275

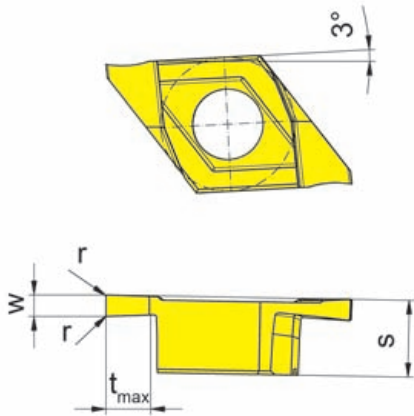


Depth of groove up to .098"  
Width of circlip Nw .043 - .124"

Widths for circlip grooves DIN 471/472

for use with Milling shank

Type M275



R = right hand version shown

L = left hand version

Part number	Nw	w	r	s	t <sub>max</sub>	Carbide grades				
						MG12	TN35	T125	TA45	AS45
R/LS275.0110.00	.043	.047	.004							▲▲
R/LS275.0130.00	.051	.055	.004							▲▲
R/LS275.0160.00	.063	.067	.004							▲▲
R/LS275.0185.00	.073	.077	.006	.169	.098					▲▲
R/LS275.0215.00	.085	.089	.006							▲▲
R/LS275.0265.00	.104	.108	.006							▲▲
R/LS275.0315.00	.124	.128	.006							▲▲
▲ on stock   Δ 4 weeks ● main recommendation ○ alternative recommendation ■ uncoated grades ■ coated grades ■ brazed/Cermet						P				●
						M				●
						K				●
						N				○
						S				●
						H				

Dimensions in inch

Carbide grades

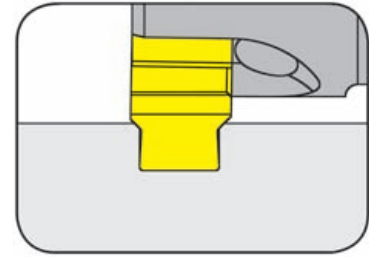
# GROOVE MILLING by circular interpolation



B

INDEXABLE INSERT Type

## S275

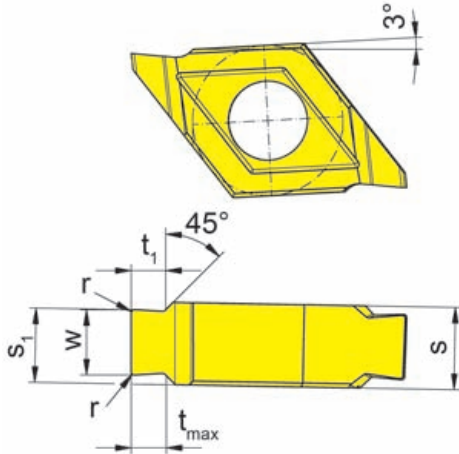


Depth of groove up to .069"  
Width of circlip Nw .043 - .124"

Widths for circlip grooves DIN 471/472 with chamfer

for use with Milling shank

Type M275



R = right hand version shown

L = left hand version

Part number	Nw	w	r	t <sub>1</sub>	s <sub>1</sub>	s	t <sub>max</sub>	Carbide grades					
								MG12	TN35	T125	TA45	AS45	
R/LS275.1105.41	.043	.047	.004	.019	.125	.161	.020					▲▲	
R/LS275.1308.41	.051	.055	.004	.032	.129		.033						▲▲
R/LS275.1610.41	.063	.067	.004	.037	.125		.039						▲▲
R/LS275.1812.41	.073	.077	.006	.048	.130		.049						▲▲
R/LS275.2115.41	.085	.089	.006	.057	.135		.059						▲▲
R/LS275.2617.41	.104	.108	.006	.067	.133		.069						▲▲
R/LS275.3118.41	.124	.128	.006	.067	.146		.069						▲▲
								P				•	
								M				•	
								K				•	
								N				o	
								S				•	
								H					

Dimensions in inch

Carbide grades

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation

■ uncoated grades

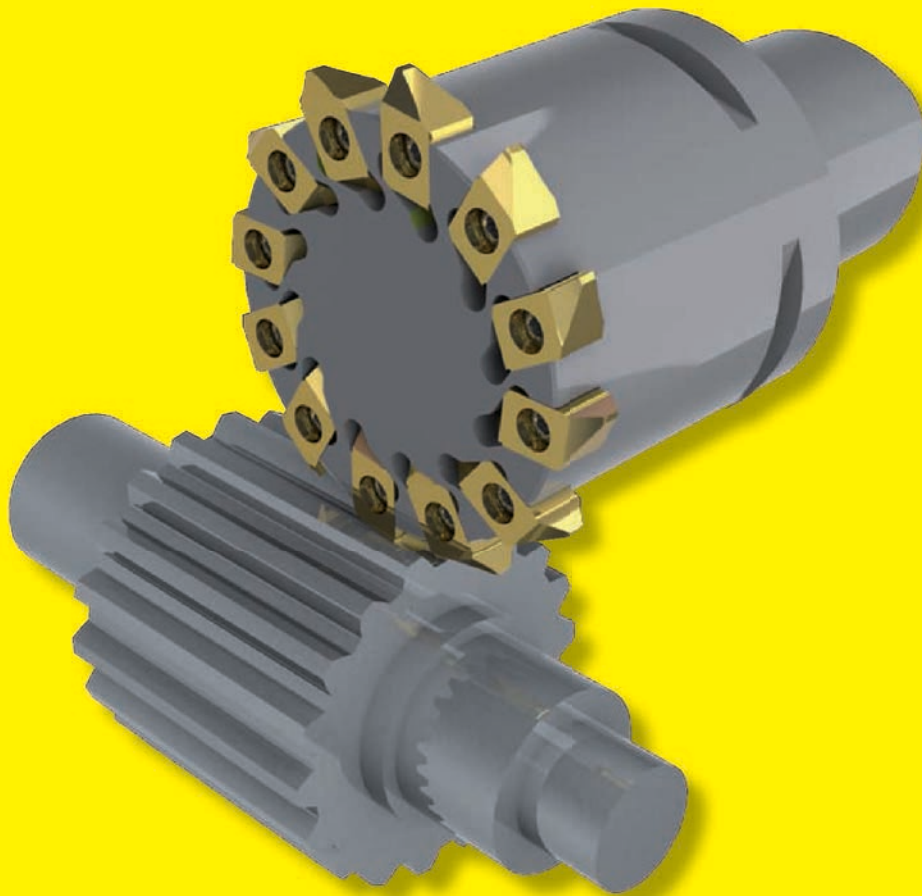
■ coated grades

■ brazed/Cermet

## Gear milling

Example:

- Single tooth spline profile
- backend HORN Polygon shank



For further information, please contact HORN USA.

GROOVE MILLING by circular interpolation



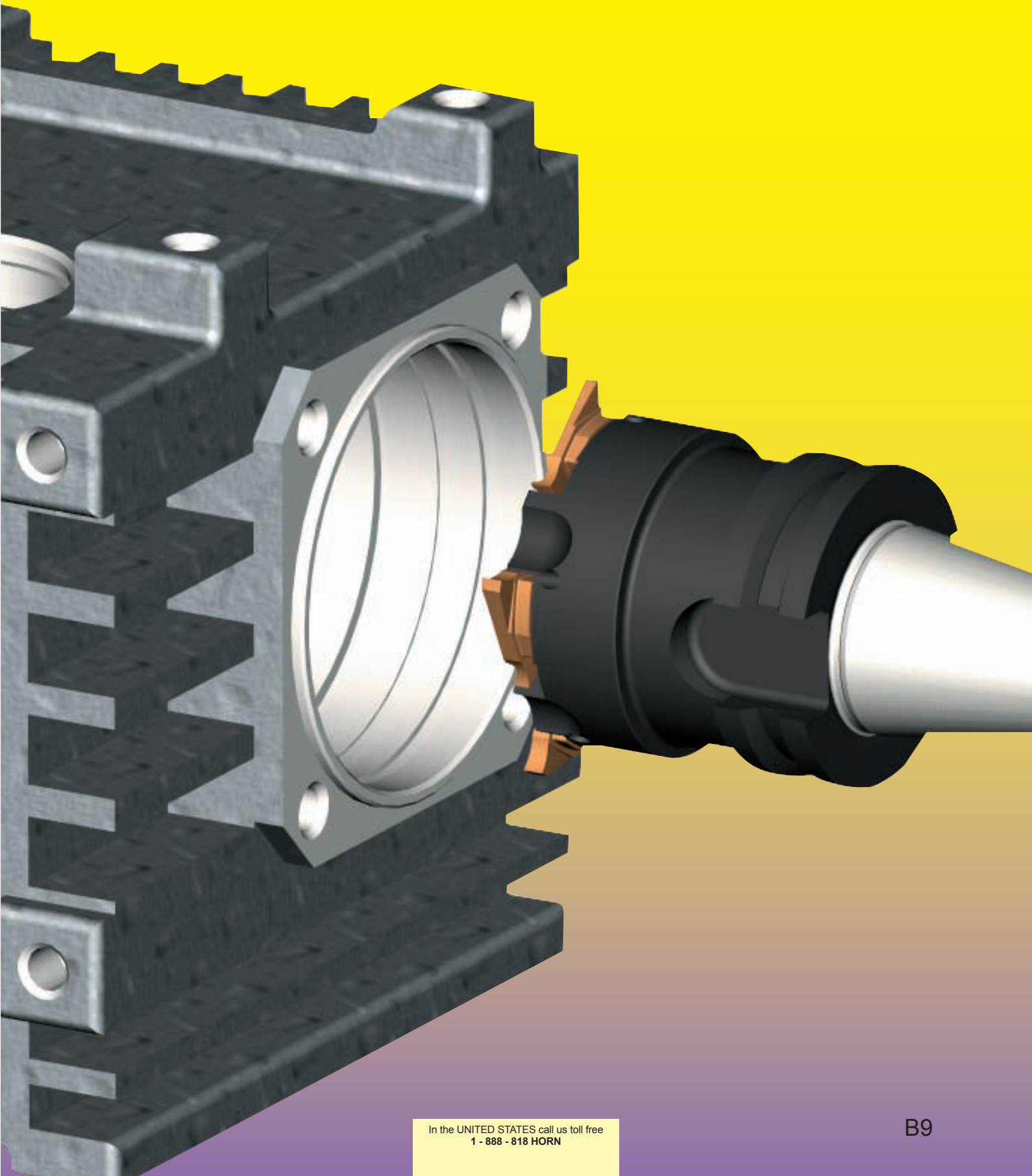
B

MILLING SHANK type

MU / M380

from bore  $\varnothing$  1.772" (45 mm)

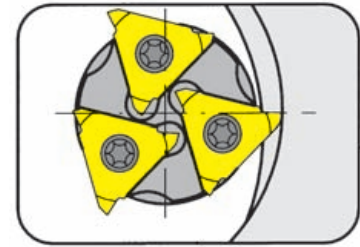
MU / M381





## MILLING SHANK Type

# U380

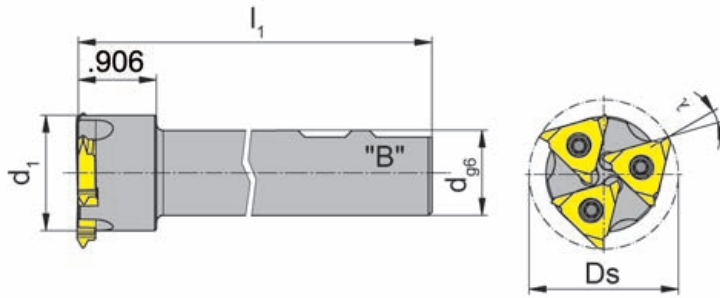


Depth of groove up to	.157"
Width of groove up to	.236"
Cutting edge Ø	Ds 1.732"

Material of shank: Steel (not recommended for shrink fitting)

for use with Indexable insert

Type RU314  
R314



Picture = right hand cutting version

Part number	Z	Ds	t <sub>max</sub>	l <sub>1</sub>	d <sub>1</sub>	d	λ
U380.1732.03B	3	1.732	.157	5.000	1.339	1.000	14°

Further sizes upon request

Dimensions in inch

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

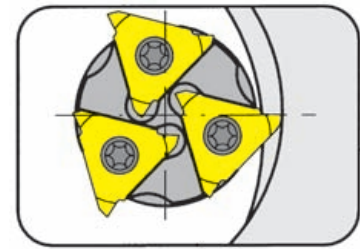
Milling shank	Screw	TORX PLUS® Wrench
U380.1732.03B	5.12T20P	T20PQ



## MILLING SHANK Type

# 380

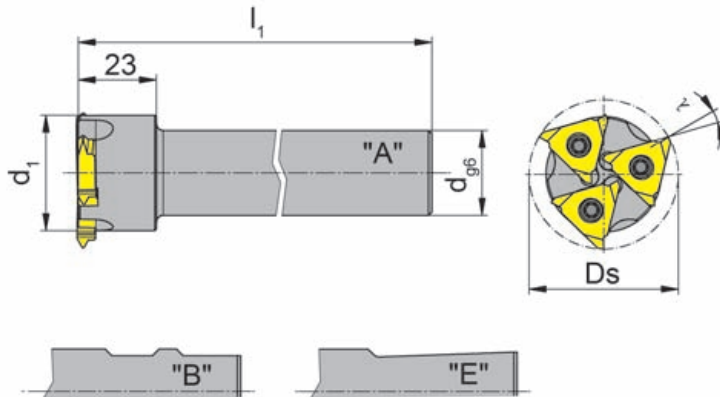
Depth of groove up to .157" (4.0 mm)  
 Width of groove up to .236" (6.0 mm)  
 Cutting edge Ø Ds 1.732" (44.0 mm)



Material of shank: Steel (not recommended for shrink fitting)

for use with Indexable insert

Type RU314  
R314



Picture = right hand cutting version

Part number	Z	Ds	t <sub>max</sub>	l <sub>1</sub>	d <sub>1</sub>	d	λ
380.0044.03A							
380.0044.03B	3	44	4	125	34	25	14°
380.0044.03E							

Further sizes upon request

Dimensions in mm

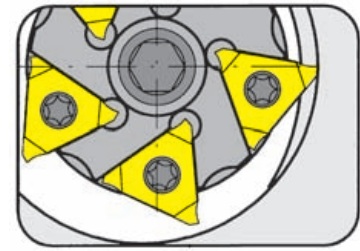
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
380.0044.03...	5.12T20P	T20PQ

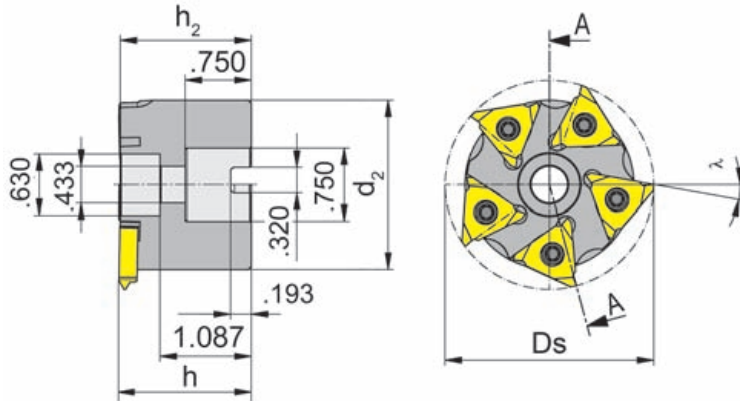
## MILLING CUTTER Type

# U380



Depth of groove up to	.197"
Width of groove	.236"
Cutting edge Ø	Ds 2.480"

Cutterhole and cross keyway as per DIN 138



for use with Indexable insert

Type RU314  
R314

Picture = right hand cutting version shown

Part number	Z	Ds	t <sub>max</sub>	h	h <sub>2</sub>	d <sub>2</sub>	λ
<b>U380.2480.05</b>	5	2.480	.197	1.575	1.559	2.008	10°

Further sizes upon request

Dimensions in inch

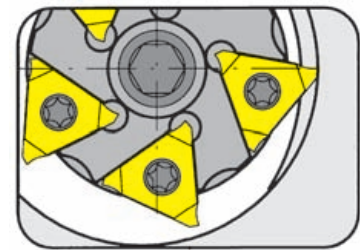
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling cutter	Screw	Screw	TORX PLUS® Wrench	Washer
U380.2480.05	<b>10.25.912</b>	<b>5.12T20P</b>	<b>T20PQ</b>	<b>10.5.433</b>

## MILLING CUTTER Type

# 380

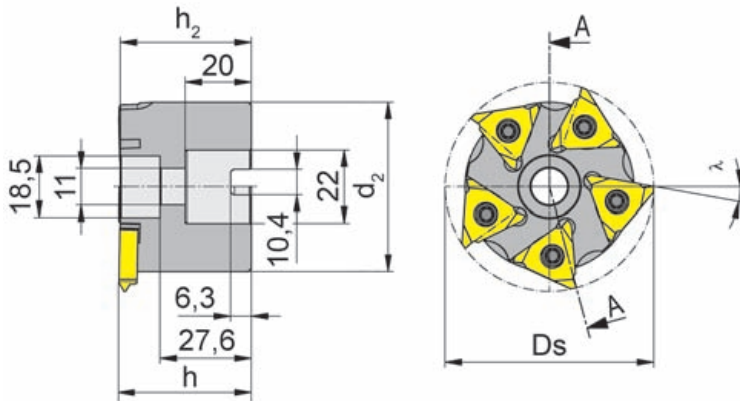


Depth of groove up to .197" (5.0 mm)  
 Width of groove up to .236" (6.0 mm)  
 Cutting edge Ø Ds 2.480" (63.0 mm)

Cutterhole and cross keyway as per DIN 138

for use with Indexable insert

Type RU314  
 R314



Picture = right hand cutting version shown

Part number	Z	Ds	t <sub>max</sub>	h	h <sub>2</sub>	d <sub>2</sub>	λ
380.0063.05	5	63	5	40	39.6	51	10°

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

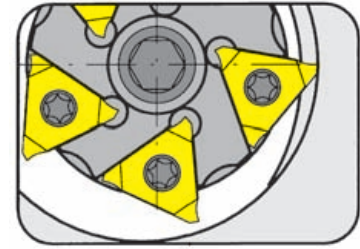
### Spare parts

Milling cutter	Screw	Screw	TORX PLUS® Wrench	Washer
380.0063.05	10.25.912	5.12T20P	T20PQ	10.5.433

## MILLING CUTTER Type

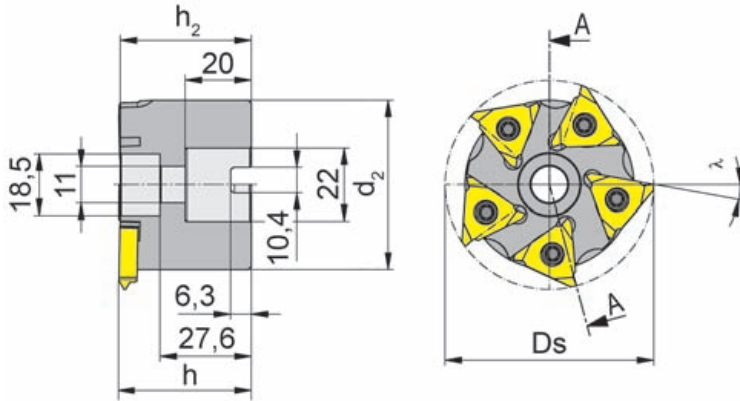
# 380...IK

with through coolant supply



Depth of groove up to .197" (5.0 mm)  
 Width of groove up to .236" (6.0 mm)  
 Cutting edge Ø Ds 2.480" (63.0 mm)

Cutterhole and cross keyway as per DIN 138



for use with Indexable insert

Type U314  
314

IK=through coolant supply

Picture = right hand cutting version shown

Part number	Z	Ds	t <sub>max</sub>	h	h <sub>2</sub>	d <sub>2</sub>	λ
380.0063.05IK	5	63	5	40	39.6	51	10°

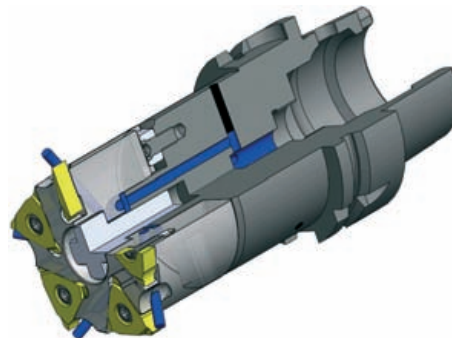
Further sizes upon request

Dimensions in mm

### Ordering note:

Milling arbor is not combined with milling cutter - separate order required!

For torque specifications of the screw, please see Technical Instructions.



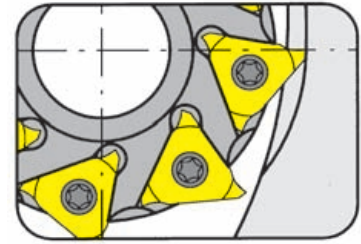
### Spare parts

Milling cutter	Screw	Screw	TORX PLUS® Wrench	Washer
380.0063.05IK	10.25.912	5.12T20P	T20PQ	10.5.433

## MILLING CUTTER Type

# 380...IK

with through coolant supply

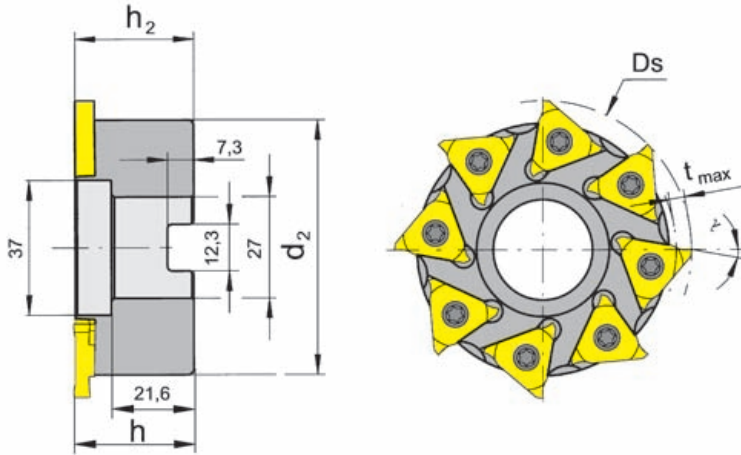


Depth of groove up to	.197" (5.0 mm)
Width of groove up to	.236" (6.0 mm)
Cutting edge Ø	Ds 3.150" (80.0 mm)

Cutterhole and cross keyway as per DIN 138

for use with Indexable insert

Type U314  
314



Picture = right hand cutting version shown

IK=through coolant supply

Part number	Z	Ds	t <sub>max</sub>	h	h <sub>2</sub>	d <sub>2</sub>	λ
380.0080.08IK	8	80	5	40	39.8	68	10°

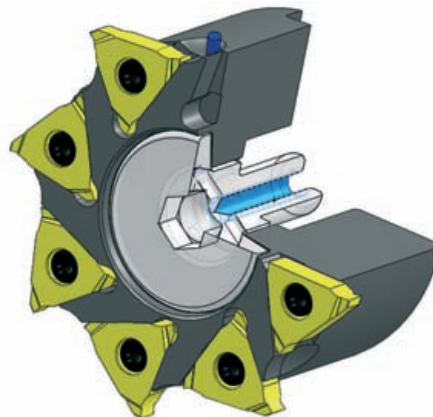
Further sizes upon request

Dimensions in mm

### Ordering note:

Bolt screw **030.0012.0726** is combined with the milling cutter.

For torque specifications of the screw, please see Technical Instructions.

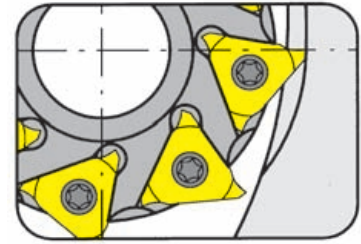


### Spare parts

Milling cutter	Screw	TORX PLUS® Wrench
380.0080.08IK	5.12T20P	T20PQ

## MILLING CUTTER Type

# U380

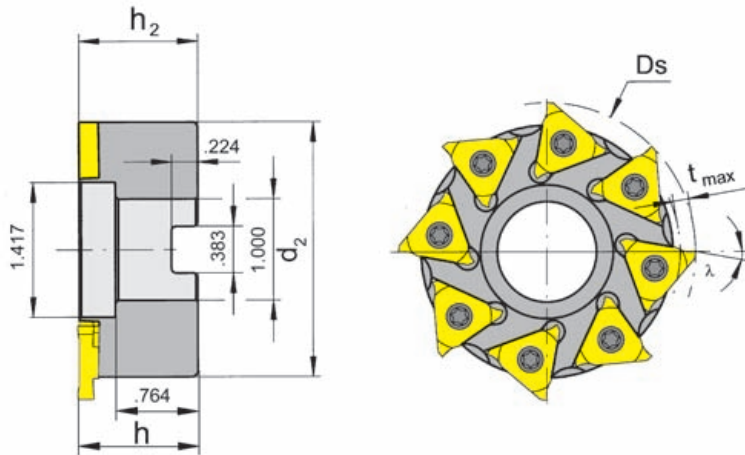


Depth of groove up to	.197"
Width of groove	.236"
Cutting edge $\varnothing$	Ds 3.150"

Cutterhole and cross keyway as per DIN 138

for use with Indexable insert

Type RU314  
R314



Picture = right hand cutting version shown

Part number	Z	Ds	t <sub>max</sub>	h	h <sub>2</sub>	d <sub>2</sub>	$\lambda$
U380.3150.08	8	3.150	.197	1.260	1.244	2.677	10°

Further sizes upon request

Dimensions in inch

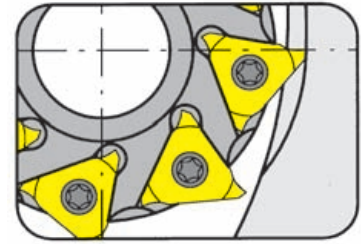
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling cutter	Screw	TORX PLUS® Wrench
U380.3150.08	5.12T20P	T20PQ

## MILLING CUTTER Type

# 380

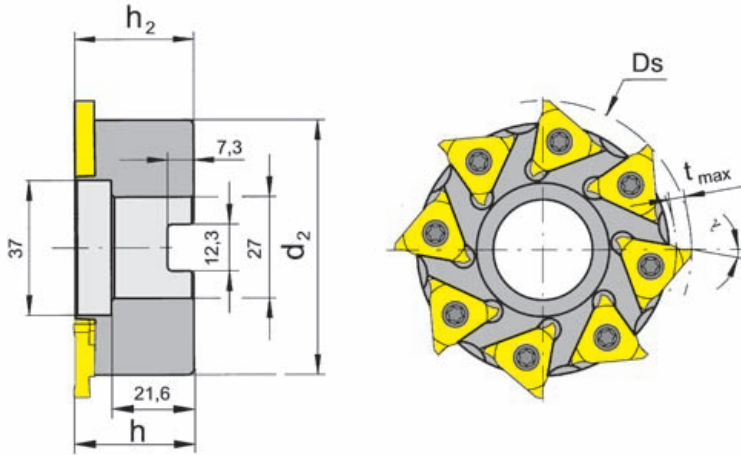


Depth of groove up to .197" (5.0 mm)  
 Width of groove up to .236" (6.0 mm)  
 Cutting edge Ø Ds 3.150" (80.0 mm)

Cutterhole and cross keyway as per DIN 138

for use with Indexable insert

Type RU314  
 R314



Picture = right hand cutting version shown

Part number	Z	Ds	t <sub>max</sub>	h	h <sub>2</sub>	d <sub>2</sub>	λ
<b>380.0080.08</b>	8	80	5	32	31.6	68	10°

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling cutter	Screw	TORX PLUS® Wrench
380.0080.08	<b>5.12T20P</b>	<b>T20PQ</b>

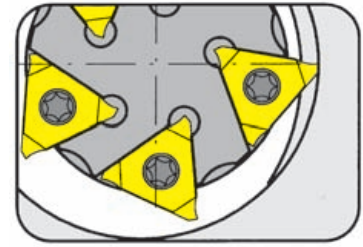


## MILLING CUTTER Type

# HSK..380

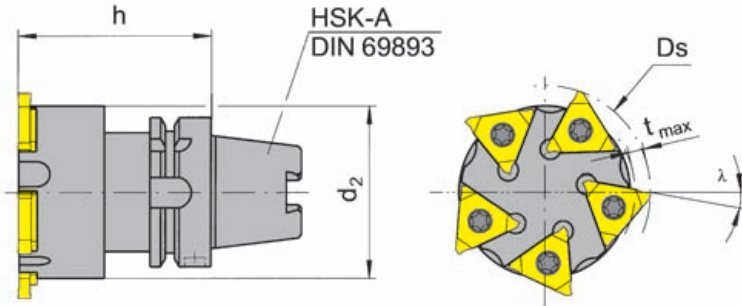
with through coolant supply

Depth of groove up to .197" (5.0 mm)  
 Width of groove up to .236" (6.0 mm)  
 Cutting edge Ø from Ds 1.732" (44.0 mm)



for use with Indexable insert

Type RU314  
 R314



Picture = right hand cutting version shown

HSK-coupling system

Part number	Z	Ds	t <sub>max</sub>	h	d <sub>2</sub>	λ
HSK-32-380.0044.03	3	44	4.0	55	34	14°
HSK-40-380.0050.04	4	50	4.5	55	40	14°
HSK-40-380.0063.05	5	63	5.0	55	51	10°
HSK-50-380.0063.05	5	63	5.0	65	51	10°
HSK-50-380.0080.08	8	80	5.0	65	68	10°
HSK-63-380.0080.08	8	80	5.0	70	68	10°

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

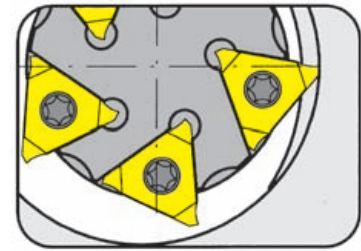
Milling cutter	Screw	TORX PLUS® Wrench
HSK-...	5.12T20P	T20PQ



## MILLING CUTTER Type

# ABS..380

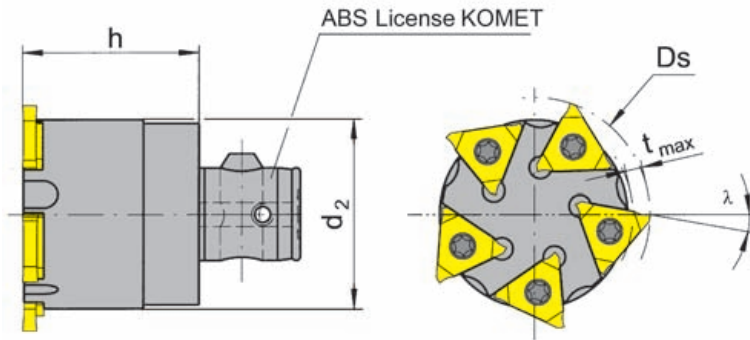
with through coolant supply



Depth of groove up to	.197" (5.0 mm)
Width of groove up to	.236" (6.0 mm)
Cutting edge Ø from	Ds 1.732" (44.0 mm)

for use with Indexable insert

Type RU314  
R314



Picture = right hand cutting version shown

ABS-coupling system  
license KOMET

Part number	Z	Ds	t <sub>max</sub>	h	d <sub>2</sub>	λ
ABS-32-380.0044.03	3	44	4.0	35	34	14°
ABS-40-380.0050.04	4	50	4.5	40	40	14°
ABS-40-380.0063.05	5	63	5.0	40	51	10°
ABS-50-380.0063.05	5	63	5.0	50	51	10°
ABS-50-380.0080.08	8	80	5.0	50	68	10°
ABS-63-380.0080.08	8	80	5.0	63	68	10°

Further sizes upon request

Dimensions in mm

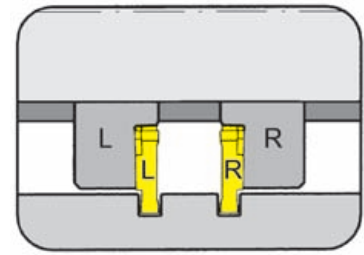
For torque specifications of the screw, please see Technical Instructions.

## Spare parts

Milling cutter	Screw	TORX PLUS® Wrench	ABS set
ABS-32-380.0044.03	5.12T20P	T20PQ	ABS-32-ES-M3
ABS-40-380.00...04/05	5.12T20P	T20PQ	ABS-40-ES-M3
ABS-50-380.00...05/08	5.12T20P	T20PQ	ABS-50-ES-M3
ABS-63-380.0080.08	5.12T20P	T20PQ	ABS-63-ES-M3

## DISC MILLING CUTTER Type **U381**

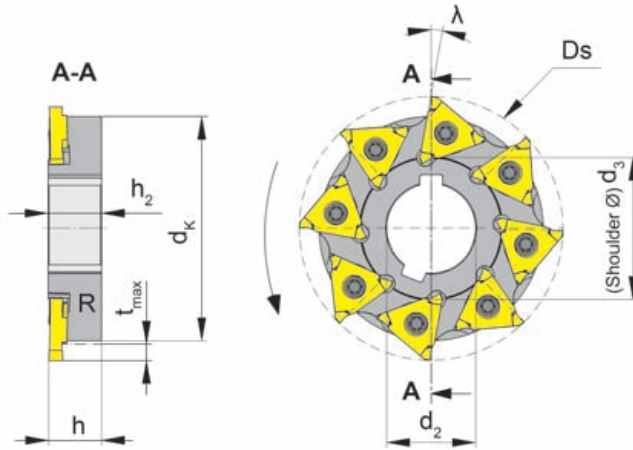
Depth of groove up to	.197"
Width of groove up to	.236"
Cutting edge $\varnothing$	Ds 2.480 - 3.937"



Bore ( $d_2$ ) with longitudinal keyway to DIN 138

for use with Indexable insert

Type RU314  
R314



R = right hand cutting - left side mounted    L = left hand cutting - right side mounted

Part number	Z	Ds	h	h <sub>2</sub>	d <sub>3</sub>	d <sub>2</sub>	d <sub>k</sub>	$\lambda$	t <sub>max</sub>
R/LU381.2480.05	5	2.480	.551	.559	1.220	.750	2.008	14°	.197
R/LU381.3150.08	8	3.150	.630	.638	1.693	1.000	2.677	10°	.197
R/LU381.3937.10	10	3.937	.787	.795	1.890	1.250	3.465	10°	.197

Further sizes upon request

Dimensions in inch

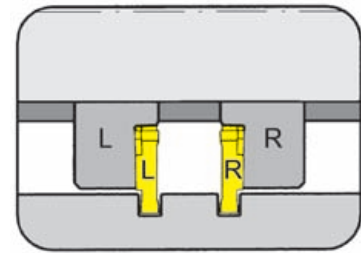
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Disc milling cutter	Screw	TORX PLUS® Wrench
R/LU381....	5.12T20P	T20PQ

## DISC MILLING CUTTER Type **381**

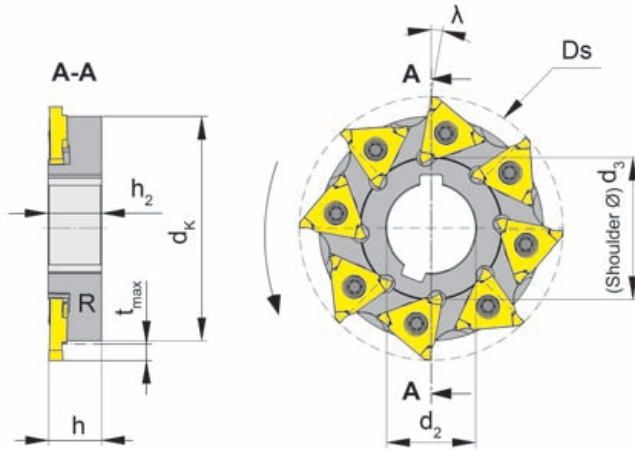
Depth of groove up to .197" (5.0 mm)  
 Width of groove up to .236" (6.0 mm)  
 Cutting edge Ø from Ds 2.480" (63.0 mm)



Bore ( $d_2$ ) with longitudinal keyway to DIN 138

for use with Indexable insert

Type RU314  
R314



R = right hand cutting - left side mounted    L = left hand cutting - right side mounted

Part number	Z	Ds	h	$h_2$	$d_3$	$d_2$	$d_k$	$\lambda$	$t_{max}$
R/L381.0063.05	5	63	14	14.2	34	22	51	14°	5
R/L381.0080.08	8	80	16	16.2	43	27	68	10°	5
R/L381.0100.10	10	100	20	20.2	48	32	88	10°	5

State R or L version

Dimensions in mm

Further sizes upon request

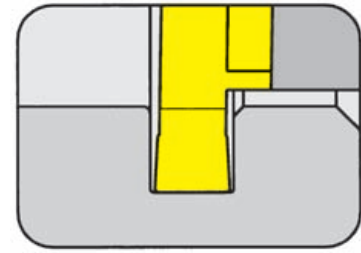
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Disc milling cutter	Screw	TORX PLUS® Wrench
R/L381.0...	5.12T20P	T20PQ

## INDEXABLE INSERT Type

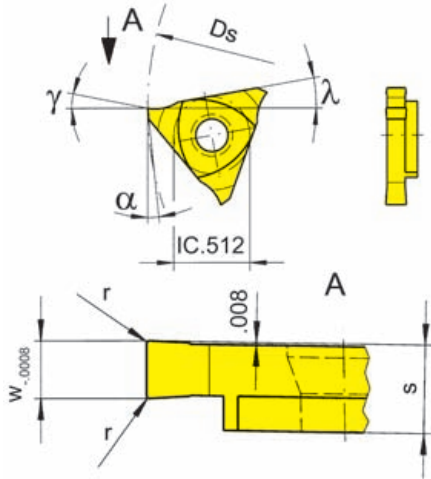
# U314



Depth of groove up to .197"  
Width of groove .046 - .187"

for use with Milling shank

Type U380 / 380  
U381 / 381  
ABS..380  
HSK..380



Geometries depending on angle of seating  $\lambda$

$\lambda$	$\gamma$	$\alpha$
10°	15°	6°
14°	11°	10°

R = right hand version shown

L = left hand version

Part number	w	r	s	MG12	TN35	T125	TF45
R/LU314.0046.00	.046	-	.213		▲/▲		
R/LU314.0062.00	.062	.004			▲/▲		
R/LU314.0078.00	.078	.006			▲/▲		
R/LU314.0094.00	.094	.006			▲/▲		
R/LU314.0125.00	.125	.006			▲/▲		Δ
R/LU314.0157.00	.157	.006			▲/▲		
R/LU314.0187.00	.187	.006			▲/▲		
				P	•		•
				M	•		•
				K	•		•
				N	•		•
				S	•		•
				H			

▲ on stock Δ 4 weeks  
• main recommendation  
o alternative recommendation  
■ uncoated grades  
■ coated grades  
■ brazed/Cermet

Carbide grades

Dimensions in inch

State R or L version

# GROOVE MILLING by circular interpolation



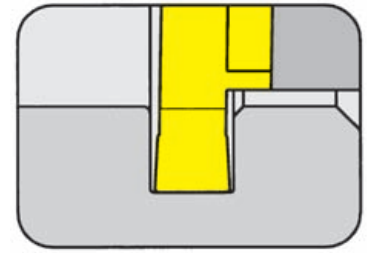
B

## INDEXABLE INSERT Type

# 314

Depth of groove up to .197"  
 Width of circlip Nw .051 - .203"

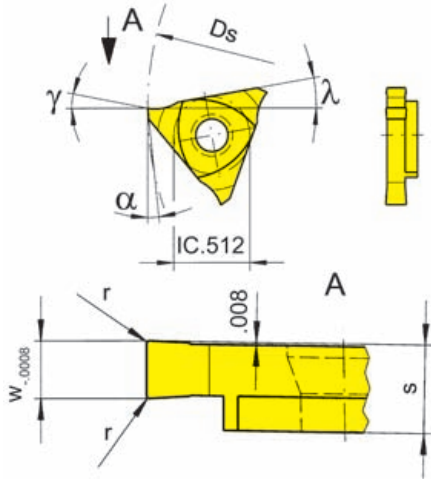
Widths for circlip grooves DIN 471/472



for use with Milling cutter

Type U380 / 380  
 U381 / 381  
 ABS..380  
 HSK..380

Geometries depending on angle of seating  $\lambda$



$\lambda$	$\gamma$	$\alpha$
10°	15°	6°
14°	11°	10°

R = right hand version shown

L = left hand version

Part number	Nw	w	r	s	MG12	TN35	T125	AS45
R/L314.0130.00	.051	.056	.004	.213		▲/▲		▲/▲
R/L314.0160.00	.063	.067	.004			▲/▲		▲/▲
R/L314.0185.00	.073	.077	.006			▲/▲		▲/▲
R/L314.0215.00	.085	.089	.006		▲/▲	▲/▲		▲/▲
R/L314.0265.00	.104	.109	.006		▲/▲	▲/▲	▲/▲	▲/▲
R/L314.0315.00	.124	.128	.006		▲/▲	▲/▲	▲/▲	▲/▲
R/L314.0415.00	.163	.168	.006		▲/▲	▲/▲	▲/▲	▲/▲
R/L314.0515.00	.203	.207	.006		▲/▲	▲/▲	▲/▲	▲/▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	○	●	●	●
M	●	●	●	●
K	●	●	●	●
N	●	●	●	○
S	●	●	●	●
H				

Carbide grades

Dimensions in inch

State R or L version

# GROOVE MILLING by circular interpolation

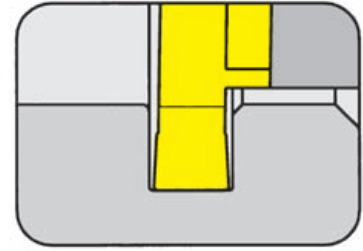


B

## INDEXABLE INSERT Type

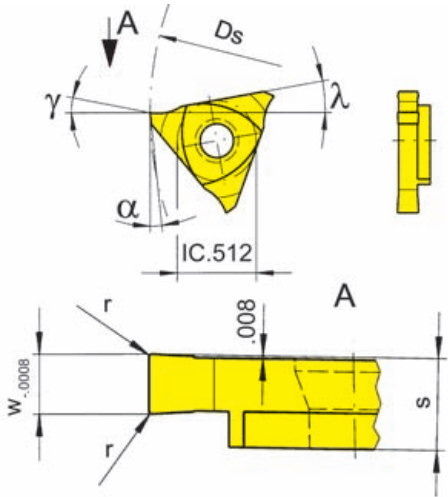
# 314

machining of aluminium



Depth of groove up to .197"  
 Width of circlip Nw .051 - .203"

Widths for circlip grooves DIN 471/472



R = right hand version shown

L = left hand version

for use with Milling cutter

Type U380 / 380  
 U381 / 381  
 ABS..380  
 HSK..380

Geometries depending on angle of seating  $\lambda$

$\lambda$	$\gamma$	$\alpha$
10°	15°	6°
14°	11°	10°

Part number	Nw	w	r	s	Carbide grades		
					MG12	TN35	TI25
R/L314.0130.40	.051	.056	.004	.213		▲/▲	▲/▲
R/L314.0160.40	.063	.067	.004			▲/▲	▲/▲
R/L314.0185.40	.073	.077	.006			▲/▲	▲/▲
R/L314.0215.40	.085	.089	.006			▲/▲	▲/▲
R/L314.0265.40	.104	.109	.006			▲/▲	▲/▲
R/L314.0315.40	.124	.128	.006			▲/▲	▲/▲
R/L314.0415.40	.163	.168	.006			▲/▲	▲/▲
R/L314.0515.40	.203	.207	.006			▲/▲	▲/▲
					P	•	•
					M	•	•
					K	•	•
					N	•	•
					S	•	•
					H		

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

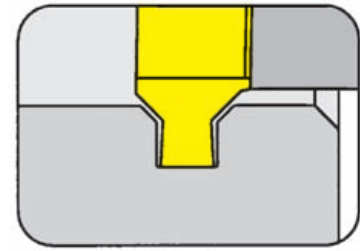
Dimensions in inch

State R or L version

Carbide grades

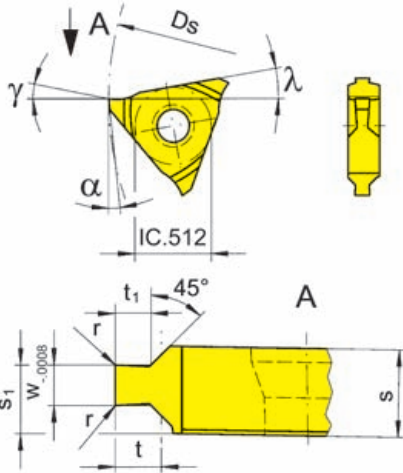
## INDEXABLE INSERT Type

# 314



Depth of groove up to .118"  
 Width of circlip Nw .043 - .203"

Widths for circlip grooves DIN 471/472 with chamfer



for use with Milling cutter

Type U380 / 380  
 U381 / 381  
 ABS..380  
 HSK..380

Geometries depending on angle of seating  $\lambda$

$\lambda$	$\gamma$	$\alpha$
10°	15°	6°
14°	11°	10°

R = right hand version shown

L = left hand version

Part number	Nw	w	r	t <sub>1</sub>	s	t <sub>max</sub>	Carbide grades			
							MG12	TN35	T125	AS45
R/L314.1105.54	.043	.048		.019		.020		Δ		
R/L314.1307.54	.051	.056		.026		.028		Δ		Δ/Δ
R/L314.1308.54	.051	.056	.004	.033	.215	.033		Δ/Δ		Δ/Δ
R/L314.1609.54	.063	.067		.033		.033		▲/▲		▲/▲
R/L314.1610.54	.063	.067		.038		.039		Δ/▲		Δ/▲
R/L314.1812.54	.073	.077		.048		.049		▲/▲		▲/▲
R/L314.2115.54	.085	.089		.058		.059		▲/▲		▲/▲
R/L314.2616.54	.104	.109		.058		.059		▲/▲		▲/▲
R/L314.2617.54	.104	.109	.006	.068	.215	.069		▲/▲		▲/▲
R/L314.3118.54	.124	.128		.068		.069		▲/▲		▲/▲
R/L314.4120.54	.163	.168		.078		.079		▲/		▲/Δ
R/L314.4125.54	.163	.168		.097		.098		▲/		▲/Δ
R/L314.5130.61	.203	.207	.006	.117	.240	.118		▲/		▲/Δ
							P	•	•	•
							M	•	•	•
							K	•	•	•
							N	•	•	○
							S	•	•	•
							H			

▲ on stock Δ 4 weeks

• main recommendation  
 ○ alternative recommendation

■ uncoated grades  
 ■ coated grades  
 ■ brazed/Cermet

Dimensions in inch

State R or L version

Carbide grades

# CHAPTER C

- Step #1: Establish bore diameter
- Step #2: Find Depth of Cut (DOC) requirements
- Step #3: Follow column and row to find correct tool type
- Step #4: Look up tool type to find available widths

Width of cut												
DOC $t_{max}$	.063 (1.6)	.079 (2.0)	.118 (.0)	.118 (3.0)	.157 (4.0)	.197 (5.0)	.236 (6.0)	.315 (8.0)	.394 (10.0)	.472 (12.0)	.551 (14.0)	
				.125 (3.18)								
(26.5)				M310	M310	M310						
.709 (18.0)	M101	M101	M101									
.787 (20.0)												
.796 (20.2)							382		382		382	
.827 (21.0)								383		383		383
.984 (25.0)												
1.004 (25.5)												
1.023 (25.98)												
1.043 (26.5)												
1.086 (27.58)												
1.102 (28.0)												
1.181 (30.0)												
1.260 (32.0)												
1.280 (32.5)												
1.299 (33.0)	M101	M101	M101									
1.406 (35.7)												
1.711 (43.46)												
1.732 (44.0)												
1.921 (48.79)												
1.969 (50.0)				M310								
2.126 (54.0)								383		383		383
2.500 (63.5)							382		382		382	
2.520 (64.0)												
2.756 (70.0)					M310	M310						

Dimensions in inch (mm)

Tool type				
	M101	M310	382	383
Page number	C12	C20	C2	C5



## DISC MILLING CUTTER type

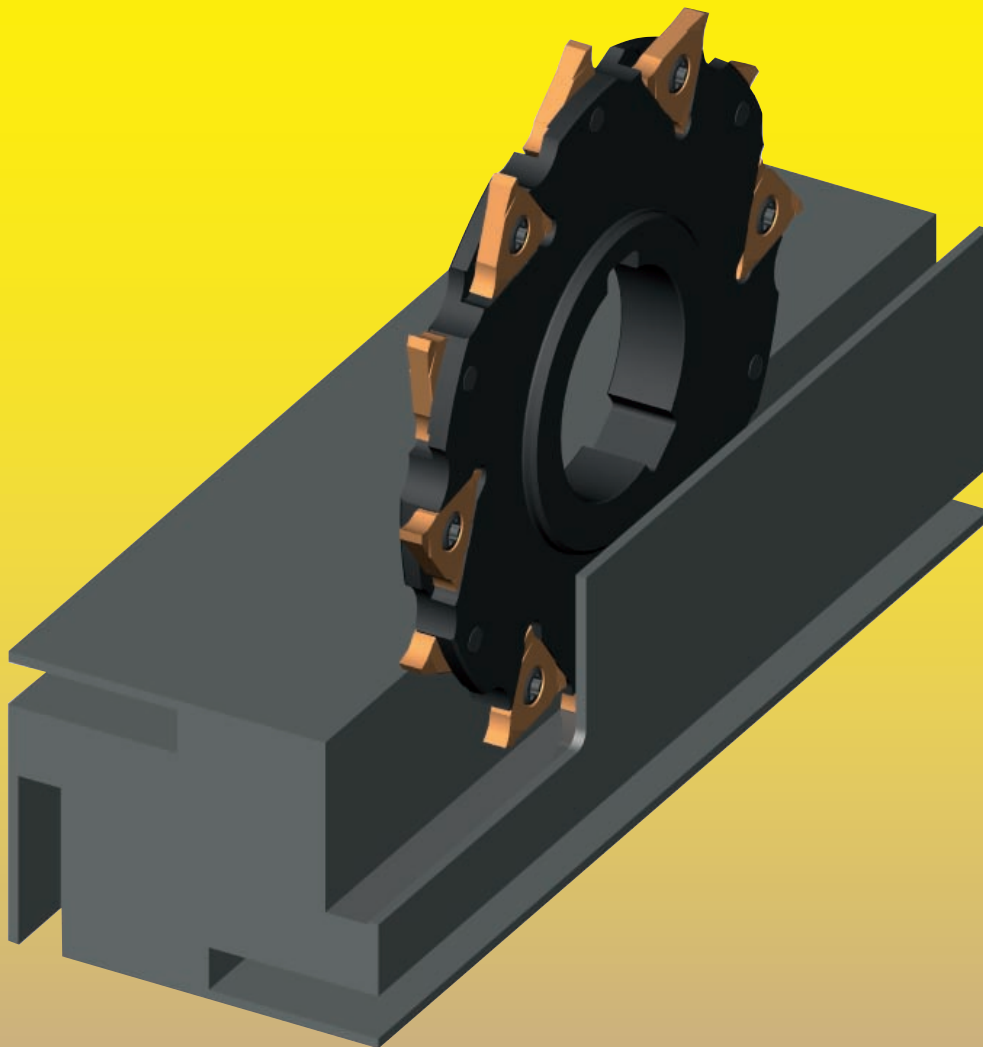
**U382 / 382**

- universal geometry for steel and light alloys

**U383 / 383**

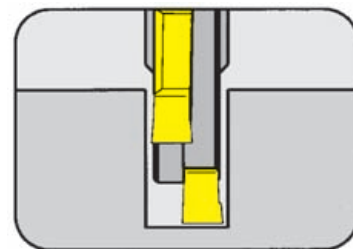
- 10° positive top rake
- best swarf evacuation
- outstanding cutting performance and surface finish

C



## DISC MILLING CUTTER Type **U382**

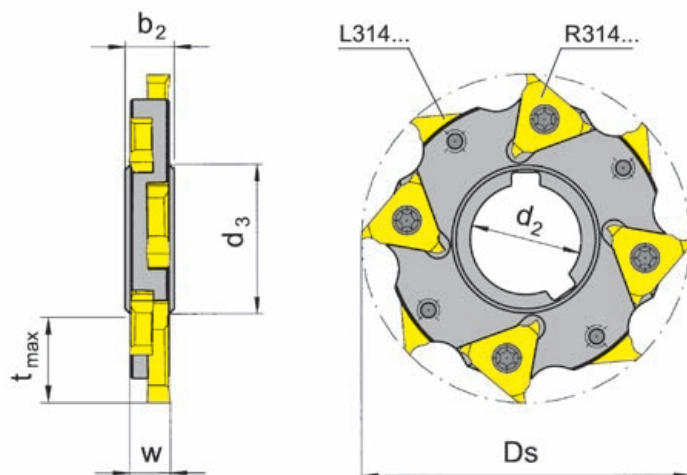
Depth of groove up to 2.500"  
 Width of groove up to .551"  
 Cutting edge Ø from Ds 3.250"



Bore (d<sub>2</sub>) with longitudinal keyway to DIN 138

for use with Indexable insert

Type 314



Picture = right hand cutting version shown

Part number	Z	Ds	t <sub>max</sub>	w	d <sub>2</sub>	d <sub>3</sub>	b <sub>2</sub>	right hand insert	left hand insert
U382.3250.06	8	3.250	.827	.236	1.000	1.500	.375	4x R314.6032.00	4x L314.6032.00
U382.3250.08				.315			.500	4x R314.8043.00	4x L314.8043.00
U382.3250.10				.394			.500	4x R314.0054.00	4x L314.0054.00
U382.4000.06	10	4.000	1.004	.236	1.250	1.875	.375	5x R314.6032.00	5x L314.6032.00
U382.4000.08				.315			.500	5x R314.8043.00	5x L314.8043.00
U382.4000.10				.394			.500	5x R314.0054.00	5x L314.0054.00
U382.5000.06	12	5.000	1.280	.236	1.500	2.250	.375	6x R314.6032.00	6x L314.6032.00
U382.5000.08				.315			.500	6x R314.8043.00	6x L314.8043.00
U382.5000.10				.394			.550	6x R314.0054.00	6x L314.0054.00
U382.5000.12				.472			.550	2x4 R314.0054.00	4x L314.0054.00
U382.6250.06	16	6.250	1.969	.236	1.500	2.250	.375	8x R314.6032.00	8x L314.6032.00
U382.6250.08	16			.315			.500	8x R314.8043.00	8x L314.8043.00
U382.6250.10	16			.394			.550	8x R314.0054.00	8x L314.0054.00
U382.6250.12	15			.472			.550	10x R314.0054.00	5x L314.0054.00
U382.7875.14	18	7.875	2.500	.551	2.000	2.875	.625	12x R314.0054.00	6x L314.0054.00

Further sizes upon request

Dimensions in inch

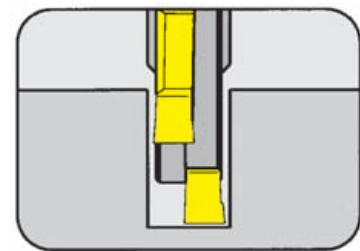
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Disc milling cutter	Screw	TORX PLUS® Wrench
U382....06	<b>5F.06T15P</b>	<b>T15PQ</b>
U382....08	<b>5F.08T20P</b>	<b>T20PQ</b>
U382....10/12/14	<b>5.10T20P</b>	<b>T20PQ</b>

## DISC MILLING CUTTER Type **382**

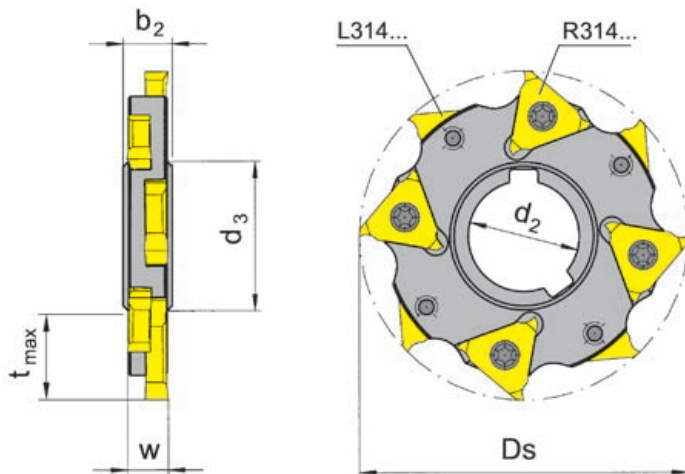
Depth of groove up to	1.969" (50.0 mm)
Width of groove up to	.472" (12.0 mm)
Cutting edge Ø from	Ds 3.150" (80.0 mm)



Bore ( $d_2$ ) with longitudinal keyway to DIN 138

for use with Indexable insert

Type 314



Picture = right hand cutting version shown

Part number	Z	Ds	t <sub>max</sub>	w	d <sub>2</sub>	d <sub>3</sub>	b <sub>2</sub>	right hand insert	left hand insert
<b>382.0080.27.06</b>	8	80	21.0	6	27	36	10	4x R314.6032.00	4x L314.6032.00
<b>382.0080.27.08</b>				8				4x R314.8043.00	4x L314.8043.00
<b>382.0080.27.10</b>				10				4x R314.0054.00	4x L314.0054.00
<b>382.0100.32.06</b>	10	100	25.5	6	32	47	10	5x R314.6032.00	5x L314.6032.00
<b>382.0100.32.08</b>				8				5x R314.8043.00	5x L314.8043.00
<b>382.0100.32.10</b>				10				5x R314.0054.00	5x L314.0054.00
<b>382.0125.40.06</b>	12	125	32.5	6	40	58	10	6x R314.6032.00	6x L314.6032.00
<b>382.0125.40.08</b>				8				6x R314.8043.00	6x L314.8043.00
<b>382.0125.40.10</b>				10				6x R314.0054.00	6x L314.0054.00
<b>382.0125.40.12</b>				12				2x4 R314.0054.00	4x L314.0054.00
<b>382.0160.40.06</b>	16	160	50.0	6	40	58	10	8x R314.6032.00	8x L314.6032.00
<b>382.0160.40.08</b>				8				8x R314.8043.00	8x L314.8043.00
<b>382.0160.40.10</b>				10				8x R314.0054.00	8x L314.0054.00
<b>382.0160.40.12</b>				15				2x5 R314.0054.00	5x L314.0054.00

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

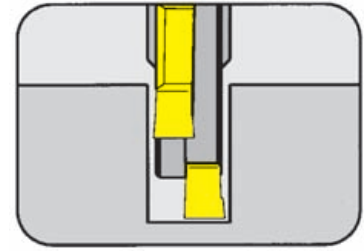
### Spare parts

Disc milling cutter	Screw	TORX PLUS® Wrench
382.0...06	<b>5F.06T15P</b>	<b>T15PQ</b>
382.0...08	<b>5F.08T20P</b>	<b>T20PQ</b>
382.0...10/12	<b>5.10T20P</b>	<b>T20PQ</b>

## DISC MILLING CUTTER Type **382**

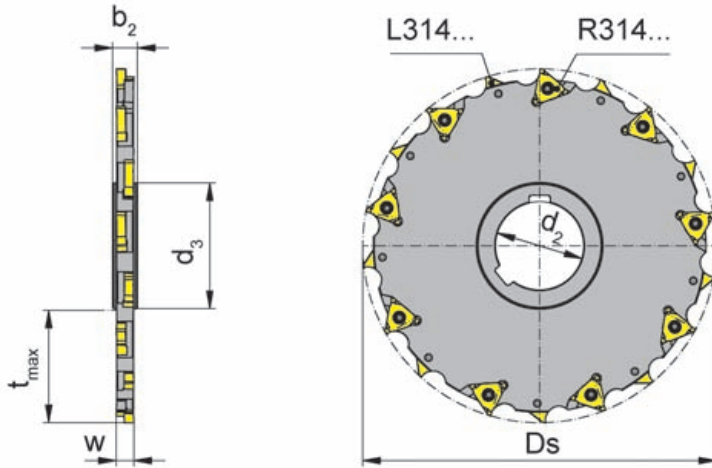
Depth of groove 2.500" (63.5 mm)  
 Width of groove up to .551" (14.0 mm)  
 Cutting edge Ø Ds 7.874" (200.0 mm)

Bore (d<sub>2</sub>) with longitudinal keyway to DIN 138



for use with Indexable insert

Type 314



Picture = right hand cutting version shown

Part number	Z	Ds	t <sub>max</sub>	w	d <sub>2</sub>	d <sub>3</sub>	b <sub>2</sub>	right hand insert	left hand insert
382.0200.50.06				6			10	9x R314.6032.00	9x L314.6032.00
382.0200.50.08				8			12	9x R314.8043.00	9x L314.8043.00
382.0200.50.10	18	200	63.5	10	50	71	14	9x R314.0054.00	9x L314.0054.00
382.0200.50.12				12			14	2x6 R314.0054.00	6x L314.0054.00
382.0200.50.14				14			16	2x6 R314.0054.00	6x L314.0054.00

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

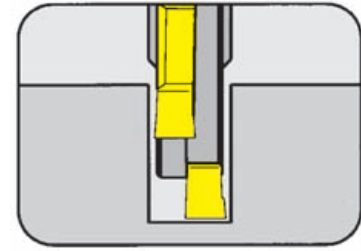
### Spare parts

Disc milling cutter	Screw	TORX PLUS® Wrench
382.0200.50.06	<b>5F.06T15P</b>	<b>T15PQ</b>
382.0200.50.08	<b>5F.08T20P</b>	<b>T20PQ</b>
382.0200.50.10/12/14	<b>5.10T20P</b>	<b>T20PQ</b>

## DISC MILLING CUTTER Type **U383**

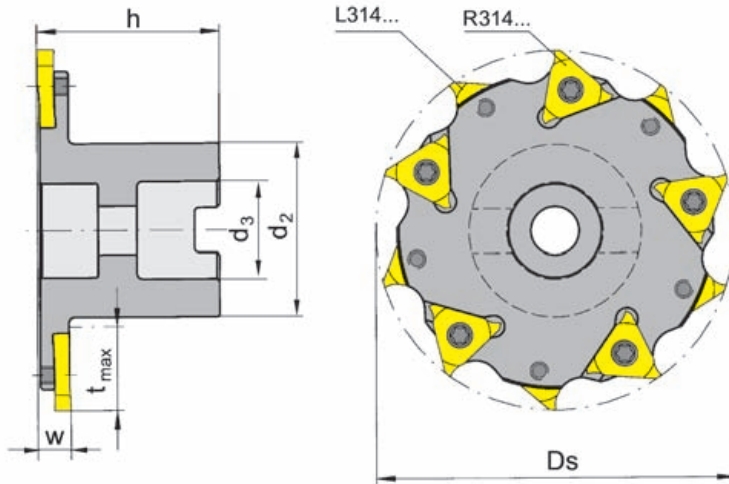
Depth of groove up to	1.023"
Width of groove up to	.394"
Cutting edge Ø	Ds 4.000"

Bore (d<sub>2</sub>) with longitudinal keyway to DIN 138



for use with Indexable insert

Type 314



Picture = right hand cutting version shown

Part number	Z	Ds	t <sub>max</sub>	w	h	d <sub>2</sub>	d <sub>3</sub>	right hand insert	left hand insert
U383.4000.06				.236				5x R314.6032.00	5x 314.6032.00
U383.4000.08	10	4.000	1.023	.315	2.000	1.875	1.000	5x R314.8043.00	5x L314.8043.00
U383.4000.10				.394				5x R314.0054.00	5x L314.0054.00

Further sizes upon request

Dimensions in inch

For torque specifications of the screw, please see Technical Instructions.

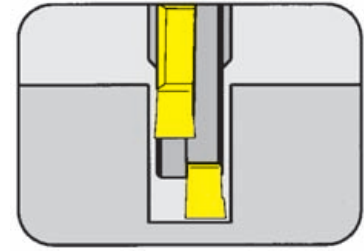
### Spare parts

Disc milling cutter	Screw	Screw	TORX PLUS® Wrench
U383.4000.06	12.30.912	5F.06T15P	T15PQ
U383.4000.08	12.30.912	5F.08T20P	T20PQ
U383.4000.10	12.30.912	5.10T20P	T20PQ

## DISC MILLING CUTTER Type **383**

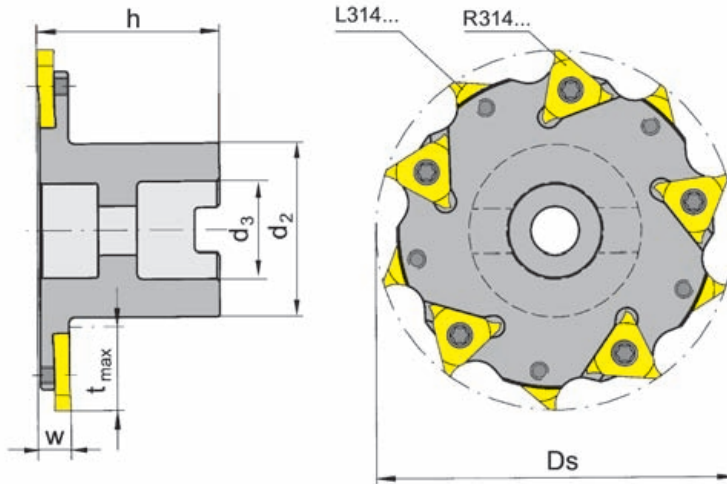
Depth of groove up to .984" (25.0 mm)  
 Width of groove up to .394" (10.0 mm)  
 Cutting edge  $\varnothing$  Ds 3.937" (100.0 mm)

Bore ( $d_3$ ) with longitudinal keyway to DIN 138



for use with Indexable insert

Type 314



Picture = right hand cutting version shown

Part number	Z	Ds	t <sub>max</sub>	w	h	d <sub>2</sub>	d <sub>3</sub>	right hand insert	left hand insert
<b>383.0100.27.06</b>				6				5x R314.6032.00	5x L314.6032.00
<b>383.0100.27.08</b>	10	100	25	8	50	48	27	5x R314.8043.00	5x L314.8043.00
<b>383.0100.27.10</b>				10				5x R314.0054.00	5x L314.0054.00

Further sizes upon request

Dimensions in mm

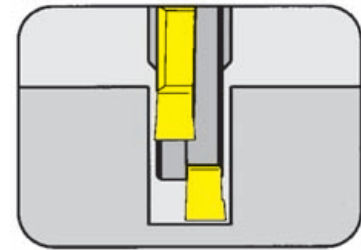
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

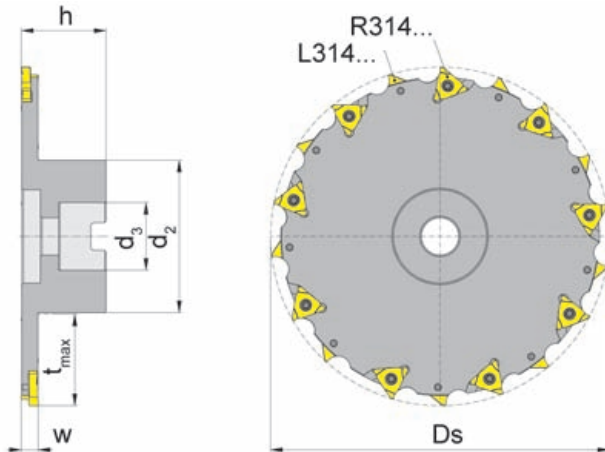
Disc milling cutter	Screw	Screw	TORX PLUS® Wrench
383.0100.27.06	<b>12.30.912</b>	<b>5F.06T15P</b>	<b>T15PQ</b>
383.0100.27.08	<b>12.30.912</b>	<b>5F.08T20P</b>	<b>T20PQ</b>
383.0100.27.10	<b>12.30.912</b>	<b>5.10T20P</b>	<b>T20PQ</b>

## DISC MILLING CUTTER Type **383**

Depth of groove up to	2.126" (54.0 mm)
Width of groove up to	.472" (12.0 mm)
Cutting edge Ø	Ds 7.874" (200.0 mm)



Bore (d<sub>3</sub>) with cross keyway to DIN 138



for use with Indexable insert

Type 314

Picture = right hand cutting version shown

Part number	Z	Ds	t <sub>max</sub>	w	h	d <sub>2</sub>	d <sub>3</sub>	right hand insert	left hand insert
<b>383.0200.40.06</b>	18	200	54	6	50	90	40	9x R314.6032.00	9x L314.6032.00
<b>383.0200.40.08</b>				8				9x R314.8043.00	9x L314.8043.00
<b>383.0200.40.10</b>				10				9x R314.0054.00	9x L314.0054.00
<b>383.0200.40.12</b>				12				2x6 R314.0054.00	6x L314.0054.00

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

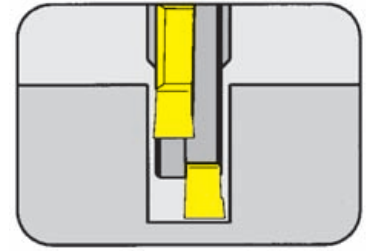
### Spare parts

Disc milling cutter	Screw	TORX PLUS® Wrench
383.0200.40.06	<b>5F.06T15P</b>	<b>T15PQ</b>
383.0200.40.08	<b>5F.08T20P</b>	<b>T20PQ</b>
383.0200.40.10/12	<b>5.10T20P</b>	<b>T20PQ</b>

## INDEXABLE INSERT Type

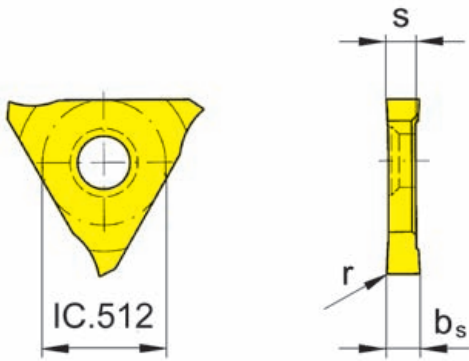
# 314/N314

Width of groove .236 - .551"



for use with Disc milling cutter

Type U382 / 382  
U383 / 383



R = right hand version shown

L = left hand version

Part number	w	r	s	b <sub>s</sub>	TN35	TI25	AS45
					R/L314.6032.00	.236	.008
R/L314.8043.00	.315	.008	.161	.169	▲/▲	▲/▲	▲/▲
R/L314.0054.00	.394/.472/.551	.008	.205	.213	▲/▲	▲/▲	▲/▲
N314.0056.00	-	.008	.205	.220	▲		▲
					P	•	•
					M	•	•
					K	•	•
					N	•	•
					S	•	•
					H		

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- coated grades
- uncoated grades
- brazed/Cermet

Dimensions in inch

State R, L or N version

**Note:**

Standard insert **N314.0056.00** for use with special cutters.

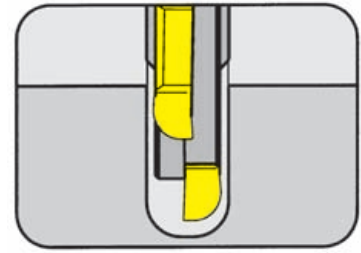
Carbide grades



## INDEXABLE INSERT Type

# 314

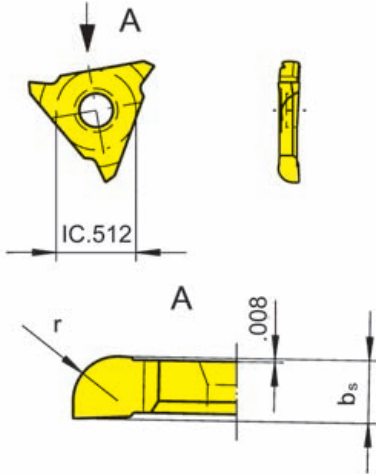
Width of groove .236 - .394"



C

for use with Disc milling cutter

Type U382 / 382  
U383 / 383



R = right hand version shown

L = left hand version

Part number	w	r	b <sub>s</sub>	Carbide grades		
				TN35	TI25	AS45
R/L314.0320.20	.236	.079	.126		▲/▲	▲/▲
R/L314.0430.20	.315	.079	.169		▲/▲	▲/▲
R/L314.0430.25	.315	.098	.169		▲/▲	▲/▲
R/L314.0540.20	.394	.079	.214		▲/Δ	▲/▲
R/L314.0540.25	.394	.098	.214		▲/▲	▲/▲
R/L314.0540.40	.394	.157	.215		▲/▲	▲/▲
				P	•	•
				M	•	•
				K	•	•
				N	•	○
				S	•	•
				H		

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- coated grades
- uncoated grades
- brazed/Cermet

Dimensions in inch  
State R or L version

Carbide grades

# HORN - THE LEADERS IN GROOVING TECHNOLOGY

C

## GETTING A GRIP ON PRODUCTIVITY

### PARTING OFF

Pity the poor part-off tool. Under pressure all the time. Being worn down on all sides. Engaged in a constant tug of war with the material.

At **HORN**, we thought about this - a lot.

The **HORN** part-off system draws on our extensive experience of grooving. It has positive geometry to optimise machining performance and tool life. Cutting edge corner and insert flank reliefs helps to minimise flank wear. And the extra long super secure six sided insert sits in a precision machined seating to maximise security and minimise movement. We couldn't do much about the hot cramped conditions, but we have equipped our part-off tooling to survive them.



**HORN - INTELLIGENT TOOL DESIGN AT WORK.**

For further information, please contact HORN USA.

Disc Milling Cutter Type M101

Cutting edge Ø from

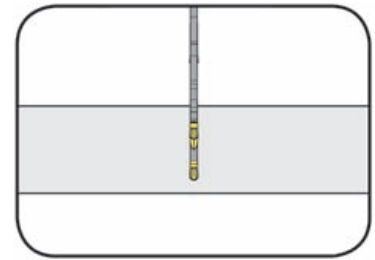
C

3.151" (80 mm)



## DISC MILLING CUTTER Type **M101**

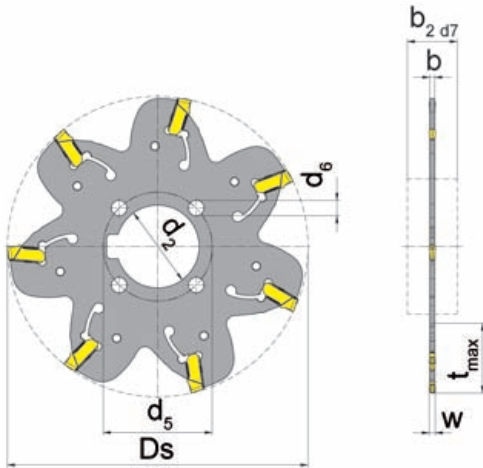
Depth of milling up to 1.299" (33.0 mm)  
 Clamping range .063 - .130" (1.6 - 3.3 mm)  
 Cutting edge Ø from 3.150" (80.0 mm)



Cutterhole and cross keyway as per DIN 138

for use with Insert

Type S101



Picture = right hand cutting version

Type disc milling cutter

Part number	Z	Ds	t <sub>max</sub>	b	d <sub>2</sub>	d <sub>5</sub>	d <sub>6</sub>	b <sub>2</sub>	Size	Clamping range
M101.0080.22.16	7	80	20		22	29	4.25	13.3	16	1.6 - 1.8
M101.0100.22.16	9	100	30	1.3	22	29	4.25	13.3		
M101.0125.32.16	11	125	33		32	45	6.25	21.3		
M101.0080.22.20	7	80	20		22	29	4.25	13.6	20	2.0 - 2.3
M101.0100.22.20	9	100	30	1.6	22	29	4.25	13.6		
M101.0125.32.20	11	125	33		32	45	6.25	21.6		
M101.0080.22.30	7	80	20		22	29	4.25	14.6	30	3.0 - 3.3
M101.0100.22.30	9	100	30	2.6	22	29	4.25	14.6		
M101.0125.32.30	11	125	33		32	45	6.25	22.6		

Further sizes upon request

w see inserts

Dimensions in mm

### Note:

Wrench P101.01 and the driving collar set is not combined with slotting cutter - separate order required!

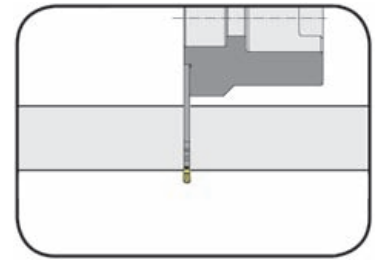
### Spare parts

Disc milling cutter	Driving collar set	Wrench
M101.0...16/20/30	<b>020.22.06.36</b>	<b>P101.01</b>
M101.0125.32.16/20/30	<b>020.32.10.55</b>	<b>P101.01</b>

## DISC MILLING CUTTER Type **M101**

Depth of milling up to	1.102" (28.0 mm)
Clamping range	.063 - .091" (1.6 - 2.3 mm)
Cutting edge Ø from	3.150" (80.0 mm)

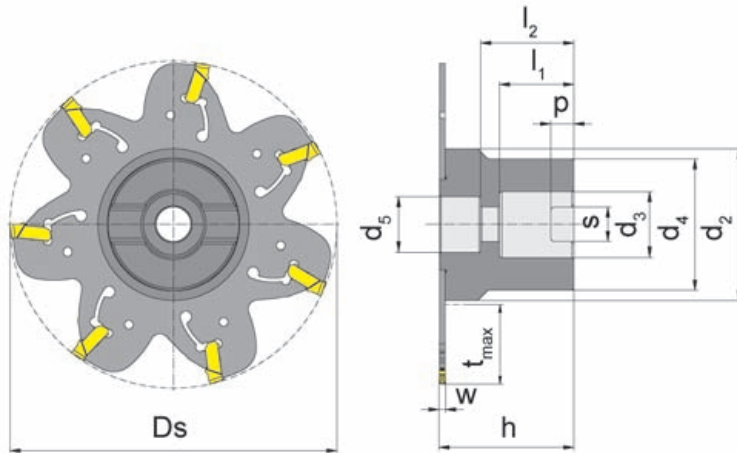
Arbor mounted slitting cutter as per DIN 8030-A



**C**

for use with Insert

Type S101



Picture = right hand cutting version

Type arbor mounted slitting cutter

Part number	Z	Ds	t <sub>max</sub>	h	b	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	d <sub>5</sub>	l <sub>1</sub>	l <sub>2</sub>	Size	Clamping range
<b>M101.0080.A16.16</b>	7	80	20	33	1.3	37.0	16	32.0	13.5	18	22.7	16	1.6 - 1.8
<b>M101.0100.A22.16</b>	9	100	28	37	1.3	40.5	22	40.5	18.5	20	24.7	16	1.6 - 1.8
<b>M101.0080.A16.20</b>	7	80	20	33	1.6	37.0	16	32.0	13.5	18	22.7	20	2.0 - 2.3
<b>M101.0100.A22.20</b>	9	100	28	37	1.6	40.5	22	40.5	18.5	20	24.7	20	2.0 - 2.3

Further sizes upon request

w see inserts

Dimensions in mm

**Note:**

Wrench **P101.01** is not combined with slotting cutter - separate order required!

For torque specifications of the screw, please see Technical Instructions.

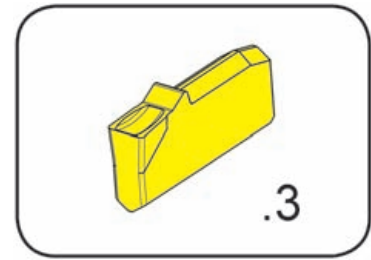
### Spare parts

Disc milling cutter	Blade	Screw	Screw	Washer	Flange	Wrench
M101.0080.A16.16	<b>M101.0080.28.16</b>	<b>DIN912-M8x25</b>	<b>030.3543.T8P</b>	<b>020.0813.3438</b>	<b>020.0016.32.13</b>	<b>P101.01</b>
M101.0080.A16.20	<b>M101.0080.28.20</b>	<b>DIN912-M8x25</b>	<b>030.3543.T8P</b>	<b>020.0813.3438</b>	<b>020.0016.32.16</b>	<b>P101.01</b>
M101.0100.A22.16	<b>M101.0100.28.16</b>	<b>DIN912-M10x25</b>	<b>030.3543.T8P</b>	<b>DIN433-10.5-St</b>	<b>020.0022.40.13</b>	<b>P101.01</b>
M101.0100.A22.20	<b>M101.0100.28.20</b>	<b>DIN912-M10x25</b>	<b>030.3543.T8P</b>	<b>DIN433-10.5-St</b>	<b>020.0022.40.16</b>	<b>P101.01</b>

## INSERT Type

# S101

with chip forming

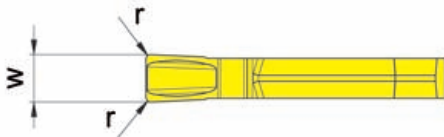
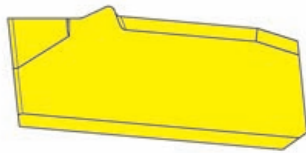


Width of milling

.063 - .079"

for use with Disc milling cutter

Type M101



Part number	w	r	Size	Carbide grades		
				T125	TA45	AS45
<b>S101.0160.315</b>	.063	.006	16			▲
<b>S101.0200.320</b>	.079	.008	20			▲
				P		•
				M		•
				K		•
				N		○
				S		•
				H		

Dimensions in inch

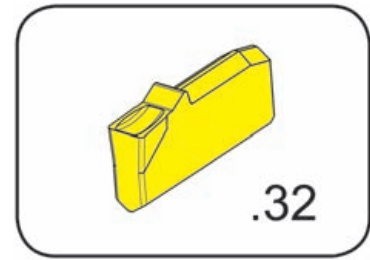
- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Carbide grades

## INSERT Type

# S101

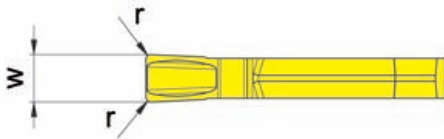
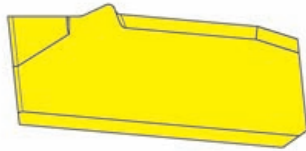
with chip forming



Width of milling .118"

for use with Disc milling cutter

Type M101



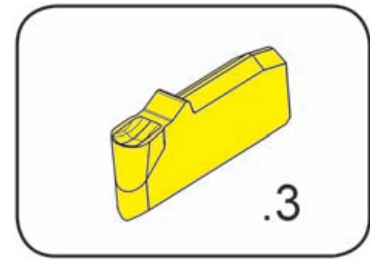
Part number	w	r	Size	Carbide grades		
				T125	TA45	AS45
<b>S101.0300.E32</b>	.118	.008	30			▲
▲ on stock Δ 4 weeks				P		•
● main recommendation				M		•
○ alternative recommendation				K		•
■ uncoated grades				N		○
■ coated grades				S		•
■ brazed/Cermet				H		

Dimensions in mm

## INSERT Type

# S101

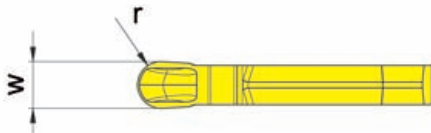
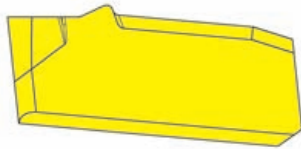
with chip forming



Width of milling .063 - .079"

for use with Disc milling cutter

Type M101



Full radius

Part number	w	r	Size	Carbide grades		
				T125	TA45	AS45
S101.0160.E3.R08	.063	.031	16			▲
S101.0200.E3.R10	.079	.039	20			▲
				P		•
				M		•
				K		•
				N		○
				S		•
				H		

Dimensions in inch

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet



- Use only conventional milling to avoid chip jamming
- After changing inserts reduce the feed rate by 50% for initial contact

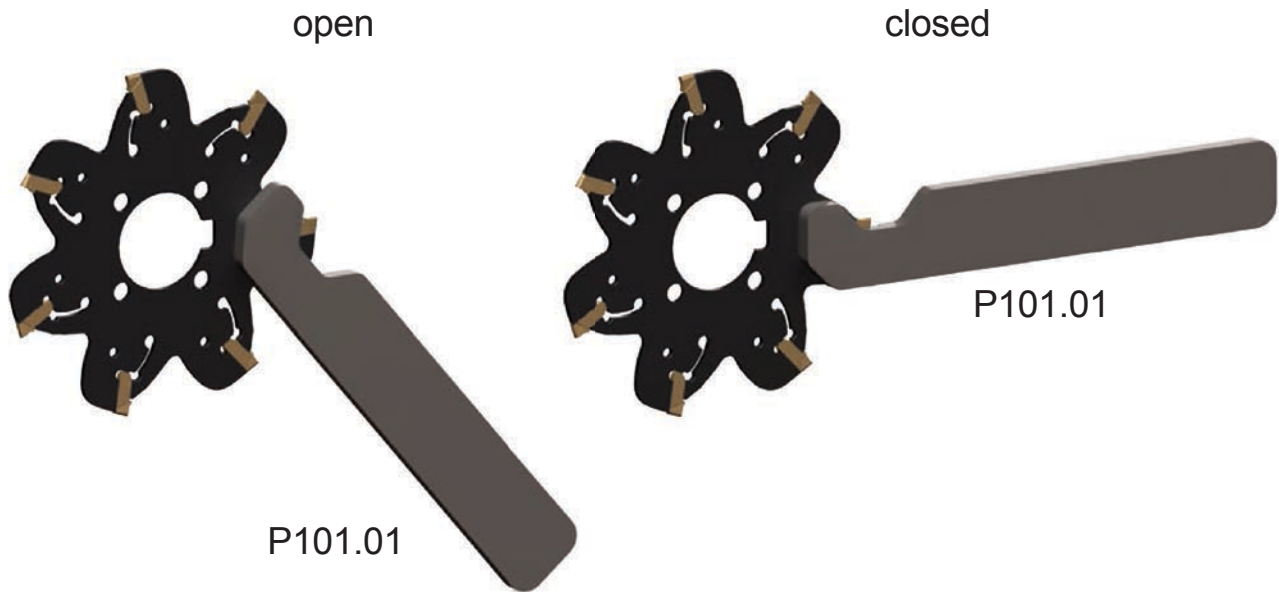
Standard values for cutting speeds  $v_c$  and medium thickness  $h_m$  for calculating feed rates by calculating cutting program »HCT«.

Material	Hardness Brinell (HB)	$v_c$ (m/min)	$h_m$ (mm)	$v_c$ (ft/min)	$h_m$ (inch)		
						AS45	
<b>P</b>	Carbon steel	0,2% C	140	200	0.02 - 0.05	655	.0008-.002
		0,4% C	180	170		560	
		0,6% C	200	130		425	
	Alloyed steel	annealed	180	130	0.02 - 0.03	425	.0008-.002
		quenched	280	100		330	
			350	80		260	
	high alloyed steel(>5%)	annealed	200	80	0.02 - 0.03	260	.0008-.002
	Cast steel	unalloyed	180	160	0.02 - 0.03	525	.0008-.002
		alloyed	220	100		330	
	<b>M</b>	Stainless steel	martensitic, ferritic	200	120	0.02 - 0.03	395
austenitic			180	100	330		
<b>K</b>	Grey cast iron	low tensile strength	180	90	0.01 - 0.03	295	.0004 - .0012
		high tensile strength	250	80		260	
	Spheroidal graphite cast iron	ferritic	160	90		295	
		perlitic	250	50		165	
	Malleable cast iron	ferritic	125	90		295	
		perlitic	225	100		330	
<b>N</b>	Al-alloys	not heat treatable	30-80	200	0.01 - 0.08	655	.0004 - .003
		heat treatable	80-120	200		655	
	Al-cast-alloy	not heat treatable	80	200		655	
		heat treatable	100	170		560	
	Copper-alloys	not heat treatable	90	100		330	
		heat treatable	100	90		295	
<b>S</b>	Heat resistant alloy (Fe)	annealed	200	70	0.01 - 0.02	230	.0004 - .0008
		hardened	275	-		-	
	Heat resistant alloy (Ni, Co)	annealed	250	30		100	
		hardened	350	-		-	



Setting position clamping wrench P101.01

C



Please note the max. revolutions!

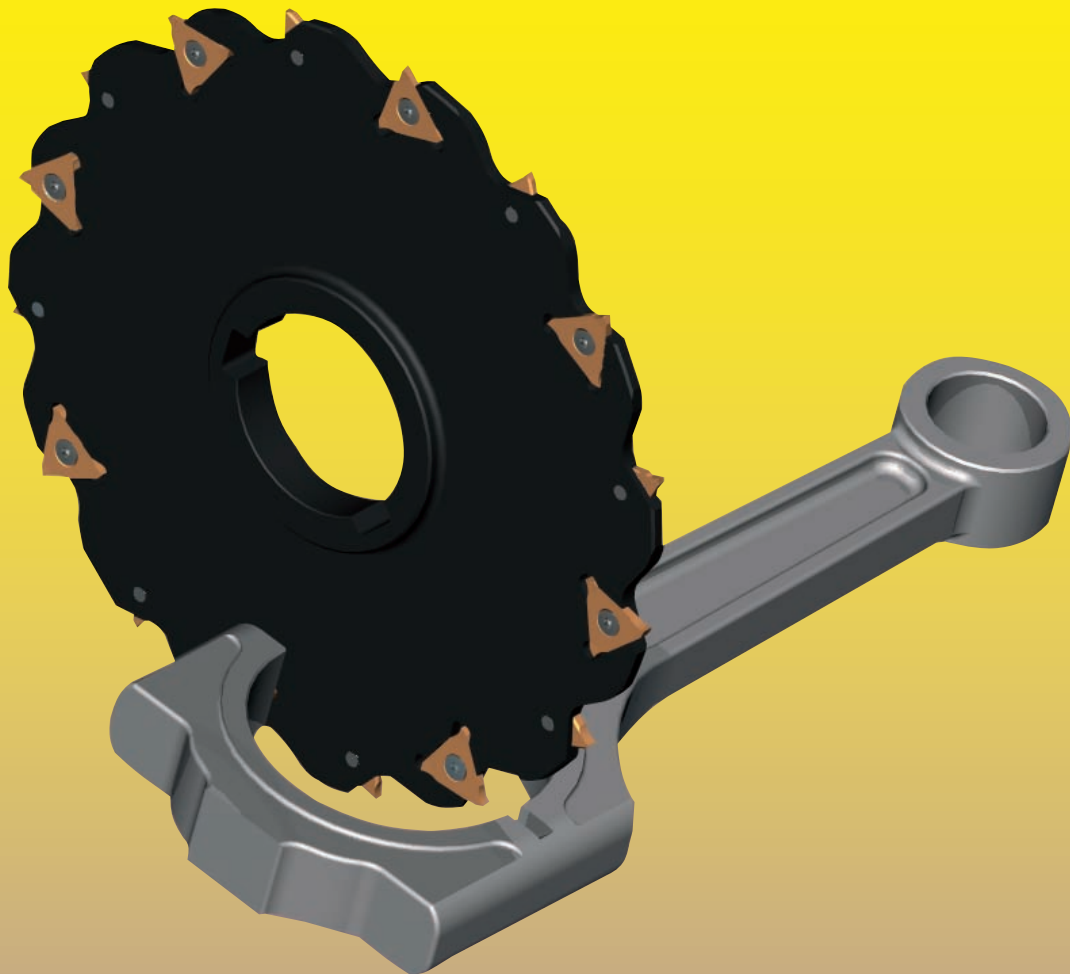
Ø Disc milling cutter	max. Revolutions $n_{max}$
Ø 3.151" (80 mm)	800 1/min
Ø 3.937" (100 mm)	640 1/min
Ø 4.921 (125 mm)	510 1/min

SLOTTING CUTTER type **MU310 / M310**

Width of cut .157" - .197" (4.0 - 5.0 mm)

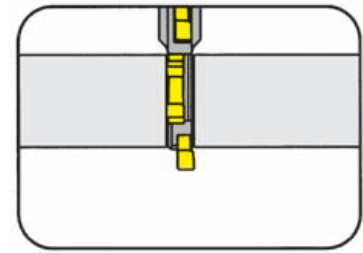
Ø 3.250" - 7.875" (80 - 200 mm)

C



## SLOTTING CUTTER Type

# MU310

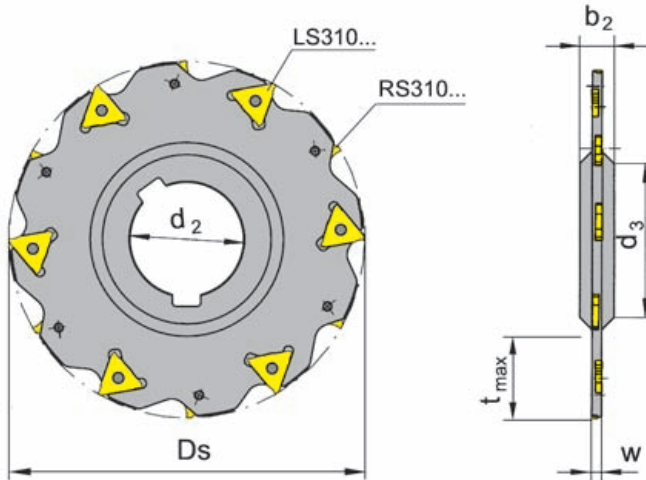


Depth of milling up to	1.921"
Width of slot	.157 - .197"
Cutting edge Ø from	Ds 3.250"

Bore (d<sub>2</sub>) with cross keyway to DIN 138

for use with Indexable insert

Type S310



Picture = right hand cutting version

Part number	Z	Ds	t <sub>max</sub>	w	d <sub>2</sub>	d <sub>3</sub>	b <sub>2</sub>	right hand insert	left hand insert	Size
MU310.3250.04	8	3.250	.796	.157	1.000	1.500	.325	4x RS310.4023.00	4x LS310.4023.00	04
MU310.4000.04	10	4.000	.984		1.250	1.875	.325	5x RS310.4023.00	5x LS310.4023.00	
MU310.5000.04	12	5.000	1.260		1.500	2.250	.375	6x RS310.4023.00	6x LS310.4023.00	
MU310.6250.04	16	6.250	1.921		1.500	2.250	.375	8x RS310.4023.00	8x LS310.4023.00	
MU310.3250.05	8	3.250	.796	.197	1.000	1.500	.325	4x RS310.5028.00	4x LS310.5028.00	05
MU310.4000.05	10	4.000	.984		1.250	1.875	.325	5x RS310.5028.00	5x LS310.5028.00	
MU310.5000.05	12	5.000	1.260		1.500	2.250	.375	6x RS310.5028.00	6x LS310.5028.00	
MU310.6250.05	16	6.250	1.921		1.500	2.250	.375	8x RS310.5028.00	8x LS310.5028.00	

Further sizes upon request

Dimensions in inch

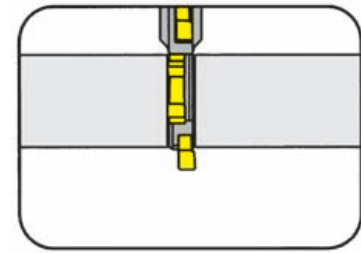
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Slotting cutter	Screw	TORX PLUS® Wrench
MU310....04	030.3535.T8P	T8PQ
MU310....05	030.3543.T8P	T8PQ

## SLOTING CUTTER Type

# M310



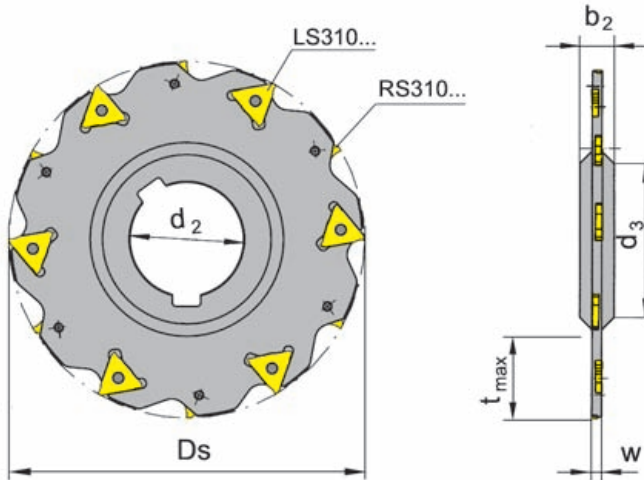
**C**

Depth of milling up to	2.756" (70.0 mm)
Width of slot	.118 - .197" (3.0 - 5.0 mm)
Cutting edge Ø from	Ds 3.150" (80.0 mm)

Bore (d<sub>2</sub>) with cross keyway to DIN 138

for use with Indexable insert

Type S310



Picture = right hand cutting version

Part number	Z	Ds	t <sub>max</sub>	w	d <sub>2</sub>	d <sub>3</sub>	b <sub>2</sub>	right hand insert	left hand insert	Size
M310.0080.27.03	8	80	18	3	27	40	8	4x RS310.3017.00	4x LS310.3017.00	03
M310.0100.32.03	10	100	25		32	46	8	5x RS310.3017.00	5x LS310.3017.00	
M310.0125.40.03	12	125	32		40	54	10	6x RS310.3017.00	6x LS310.3017.00	
M310.0160.40.03	16	160	50		40	54	10	8x RS310.3017.00	8x LS310.3017.00	
M310.0080.27.04	8	80	18	4	27	40	8	4x RS310.4023.00	4x LS310.4023.00	04
M310.0100.32.04	10	100	25		32	46	8	5x RS310.4023.00	5x LS310.4023.00	
M310.0125.40.04	12	125	32		40	54	10	6x RS310.4023.00	6x LS310.4023.00	
M310.0160.40.04	16	160	50		40	54	10	8x RS310.4023.00	8x LS310.4023.00	
M310.0200.40.04	20	200	70		40	54	10	10x RS310.4023.00	10x LS310.4023.00	
M310.0080.27.05	8	80	18	5	27	40	8	4x RS310.5028.00	4x LS310.5028.00	05
M310.0100.32.05	10	100	25		32	46	8	5x RS310.5028.00	5x LS310.5028.00	
M310.0125.40.05	12	125	32		40	54	10	6x RS310.5028.00	6x LS310.5028.00	
M310.0160.40.05	16	160	50		40	54	10	8x RS310.5028.00	8x LS310.5028.00	
M310.0200.40.05	20	200	70		40	54	10	10x RS310.5028.00	10x LS310.5028.00	

Further sizes upon request

Dimensions in mm

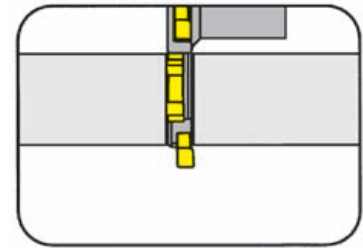
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Slotting cutter	Screw	TORX PLUS® Wrench
M310.0...03	030.0324.T7P	T7PL
M310.0...04	030.3535.T8P	T8PQ
M310.0...05	030.3543.T8P	T8PQ

## SLOTING CUTTER Type

# MU310

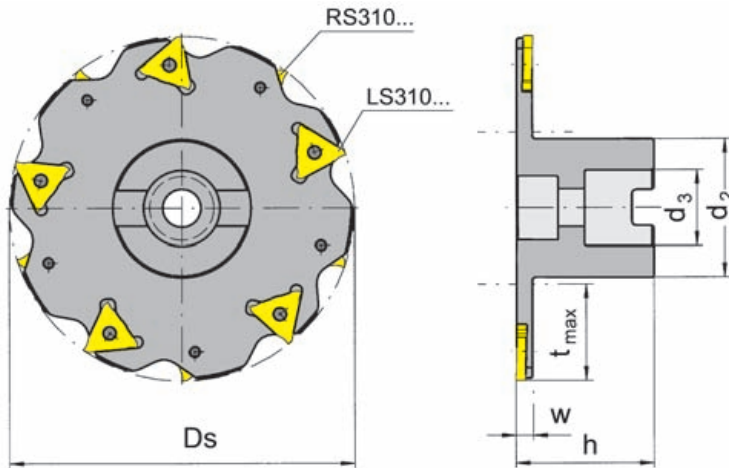


Depth of milling up to	1.711"
Width of slot	.157 - .197"
Cutting edge Ø from	Ds 4.000"

Bore (d<sub>2</sub>) with cross keyway to DIN 138

for use with Indexable insert

Type S310



Picture = right hand cutting version

Part number	Z	Ds	t <sub>max</sub>	w	h	d <sub>2</sub>	d <sub>3</sub>	right hand insert	left hand insert	Size
<b>MU310.1140.04</b>	10	4.000	1.023			1.875	1.000	5x RS310.4023.00	5x LS310.4023.00	04
<b>MU310.1150.04</b>	12	5.000	1.086	.157	2.000	2.750	1.500	6x RS310.4023.00	6x LS310.4023.00	
<b>MU310.1162.04</b>	16	6.250	1.711			2.750	1.500	8x RS310.4023.00	8x LS310.4023.00	
<b>MU310.1140.05</b>	10	4.000	1.023			1.875	1.000	5x RS310.5028.00	5x LS310.5028.00	05
<b>MU310.1150.05</b>	12	5.000	1.086	.197	2.000	2.750	1.500	6x RS310.5028.00	6x LS310.5028.00	
<b>MU310.1162.05</b>	16	6.250	1.711			2.750	1.500	8x RS310.5028.00	8x LS310.5028.00	

Further sizes upon request

Dimensions in inch

For torque specifications of the screw, please see Technical Instructions.

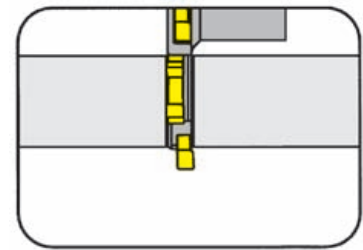
### Spare parts

Slotting cutter	Screw	Screw	TORX PLUS® Wrench	Washer
MU310.1140.04	<b>DIN912-M12x35</b>	<b>030.3535.T8P</b>	<b>T8PQ</b>	<b>DIN433-13-St</b>
MU310.1140.05	<b>DIN912-M12x35</b>	<b>030.3543.T8P</b>	<b>T8PQ</b>	<b>DIN433-13-St</b>
MU310.11...04	<b>DIN7984-M20x40</b>	<b>030.3535.T8P</b>	<b>T8PQ</b>	<b>DIN433-21-St</b>
MU310.11...05	<b>DIN7984-M20x40</b>	<b>030.3543.T8P</b>	<b>T8PQ</b>	<b>DIN433-21-St</b>

## SLOTING CUTTER Type

# M310

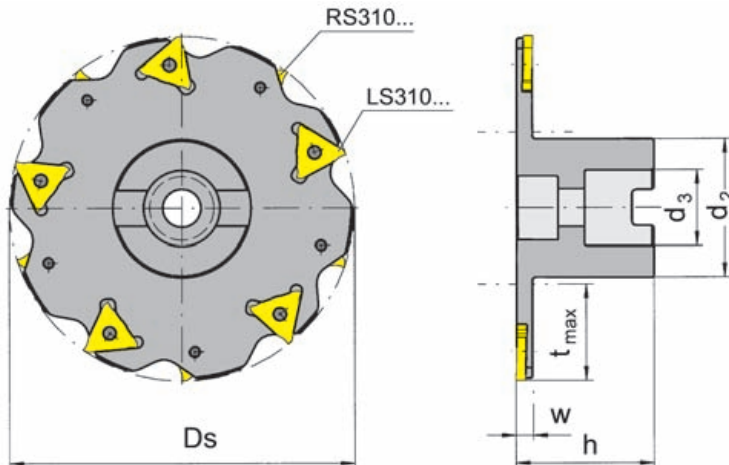
Depth of milling up to	2.520" (64.0 mm)
Width of slot	.118 - .157" (3.0 - 4.0 mm)
Cutting edge Ø from	Ds 3.937" (100.0 mm)



Bore (d<sub>3</sub>) with cross keyway to DIN 138

for use with Indexable insert

Type S310



Picture = right hand cutting version

Part number	Z	Ds	t <sub>max</sub>	w	h	d <sub>2</sub>	d <sub>3</sub>	right hand insert	left hand insert	Size
<b>M310.1100.27.03</b>	10	100	25.0			48	27	5x RS310.3017.00	5x LS310.3017.00	03
<b>M310.1125.27.03</b>	12	125	35.7			48	27	6x RS310.3017.00	6x LS310.3017.00	
<b>M310.1125.32.03</b>	12	125	32.5	3	50	58	32	6x RS310.3017.00	6x LS310.3017.00	
<b>M310.1125.40.03</b>	12	125	26.5			70	40	6x RS310.3017.00	6x LS310.3017.00	
<b>M310.1160.40.03</b>	16	160	44.0			70	40	8x RS310.3017.00	8x LS310.3017.00	
<b>M310.1100.27.04</b>	10	100	25.0			48	27	5x RS310.4023.00	5x LS310.4023.00	04
<b>M310.1125.32.04</b>	12	125	32.5			58	32	6x RS310.4023.00	6x LS310.4023.00	
<b>M310.1125.40.04</b>	12	125	26.5	4	50	70	40	6x RS310.4023.00	6x LS310.4023.00	
<b>M310.1160.40.04</b>	16	160	44.0			70	40	8x RS310.4023.00	8x LS310.4023.00	
<b>M310.1200.40.04</b>	20	200	64.0			70	40	10x RS310.4023.00	10x LS310.4023.00	

Further sizes upon request

Dimensions in mm

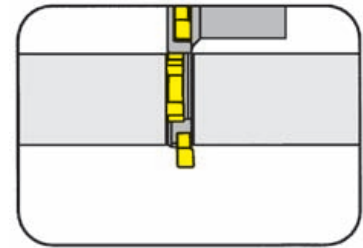
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Slotting cutter	Screw	Screw	TORX PLUS® Wrench	Washer
M310.11...03	<b>DIN912-M12x35</b>	<b>030.0324.T7P</b>	<b>T7PL</b>	<b>DIN433-13-St</b>
M310.1100.27.04	<b>DIN912-M12x35</b>	<b>030.3535.T8P</b>	<b>T8PQ</b>	<b>DIN433-13-St</b>
M310.1125.32.03	<b>DIN7984-M16x35</b>	<b>030.0324.T7P</b>	<b>T7PL</b>	<b>DIN433-17-St</b>
M310.1125.32.04	<b>DIN7984-M16x35</b>	<b>030.3535.T8P</b>	<b>T8PQ</b>	<b>DIN433-17-St</b>
M310.11...03	<b>DIN7984-M20x40</b>	<b>030.0324.T7P</b>	<b>T7PL</b>	<b>DIN433-21-St</b>
M310.1...04	<b>DIN7984-M20x40</b>	<b>030.3535.T8P</b>	<b>T8PQ</b>	<b>DIN433-21-St</b>

## SLOTING CUTTER Type

# M310

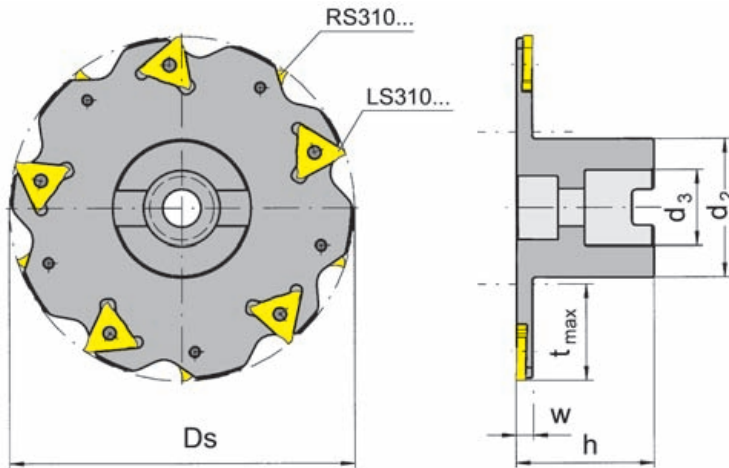


Depth of milling up to	2.520" (64.0 mm)
Width of slot	.197" (5.0 mm)
Cutting edge Ø from	Ds 3.937" (100.0 mm)

Bore (d<sub>3</sub>) with cross keyway to DIN 138

for use with Indexable insert

Type S310



Picture = right hand cutting version

Part number	Z	Ds	t <sub>max</sub>	w	h	d <sub>2</sub>	d <sub>3</sub>	right hand insert	left hand insert	Size
M310.1100.27.05	10	100	25.0			48	27	5x RS310.5028.00	5x LS310.5028.00	
M310.1125.32.05	12	125	32.5			58	32	6x RS310.5028.00	6x LS310.5028.00	
M310.1125.40.05	12	125	26.5	5	50	70	40	6x RS310.5028.00	6x LS310.5028.00	05
M310.1160.40.05	16	160	44.0			70	40	8x RS310.5028.00	8x LS310.5028.00	
M310.1200.40.05	20	200	64.0			70	40	10x RS310.5028.00	10x LS310.5028.00	

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

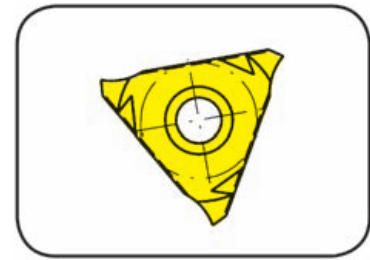
### Spare parts

Slotting cutter	Screw	Screw	TORX PLUS® Wrench	Washer
M310.1100.27.05	DIN912-M12x35	030.3543.T8P	T8PQ	DIN433-13-St
M310.1125.32.05	DIN7984-M16x35	030.3543.T8P	T8PQ	DIN433-17-St
M310.1...05	DIN7984-M20x40	030.3543.T8P	T8PQ	DIN433-21-St



## INDEXABLE INSERT Type

# S310

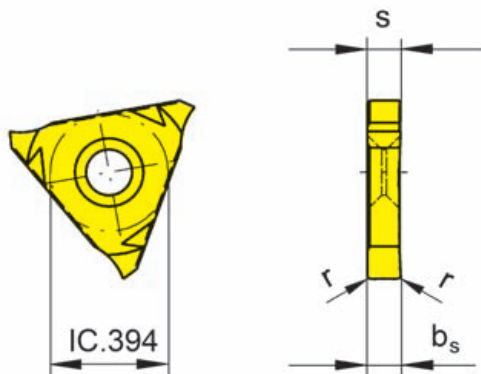


C

Width of groove .118 - .197"

for use with Slotting cutter

Type MU310  
M310



R = right hand version shown

L = left hand version

Part number	w	r	s	b <sub>s</sub>	Size	Carbide grades			
						TN35	AS45	TF45	
R/LS310.3017.00	.118	.008	.063	.067	03		▲/▲		
R/LS310.3118.00	.125	.006	.063	.071	03		▲/▲		
R/LS310.4023.00	.157	.008	.087	.091	04	▲/▲	▲/▲	▲/	
R/LS310.5028.00	.197	.008	.106	.110	05	▲/▲	▲/▲	▲/▲	
▲ on stock   Δ 4 weeks ● main recommendation ○ alternative recommendation □ uncoated grades ■ coated grades ■ brazed/Cermet						P	●	●	●
						M	●	●	●
						K	●	●	●
						N	●	○	●
						S	●	●	●
						H			

Dimensions in inch

State R or L version

Carbide grades

# CHAPTER D

## 60° Included, Partial Profile

TPI (Threads per Inch)						
Minor Ø	28 - 56	18 - 32	16 - 20	14 - 16	10 - 14	4 - 10
.421 - .555	108	108/306	108/306	108/306	306	
.579 - .646	111	111	111	306/111	306/111/308	308
.669 - .740			111/308	111	306/111	306
.768 - .807	608/311/611	608/311/611	608/311/611	608/311	306/608/111	306/111
.827 - .945	608/311	308/608/311/611	308/608/311/611	308/608/311/611	308/608/311	308/608/311
1.024 - 1.102	313/613	313/613	313/613	313/613	611/313/613	611
1.244 - 1.460	328	328/628	328/628/S275	328/628/S275	313/613/328/628/S275	313/613/S275
1.654 - 1.890			314	314	328/328/314	328/628/632/314
2.717 - 4.055			314	314	314	314

Tool Type										
	108	306/606	111	308 / 608	311 / 611	313 / 613	328 / 628	632	S275	314
Page number	D5	D6	D13	D14	D23	D37	D46	D50	D54	D60

## 55° Included, Whitworth Pipe Thread, Full Profile

TPI (Threads per Inch)					
Minor Ø	19	14	11	8	6
G1/4"	306 / 606				
G3/8"		606			
G1/2"	111	306 / 606 / 111 / 608			
G3/4"		111 / 608 / 311			
G1"			306 / 311 / 313 / 613		
G1-1/2"				313	313

Tool Type				
	306 / 606	111 / 608	311	313 / 613
Page number	D7	D16	D26	D40

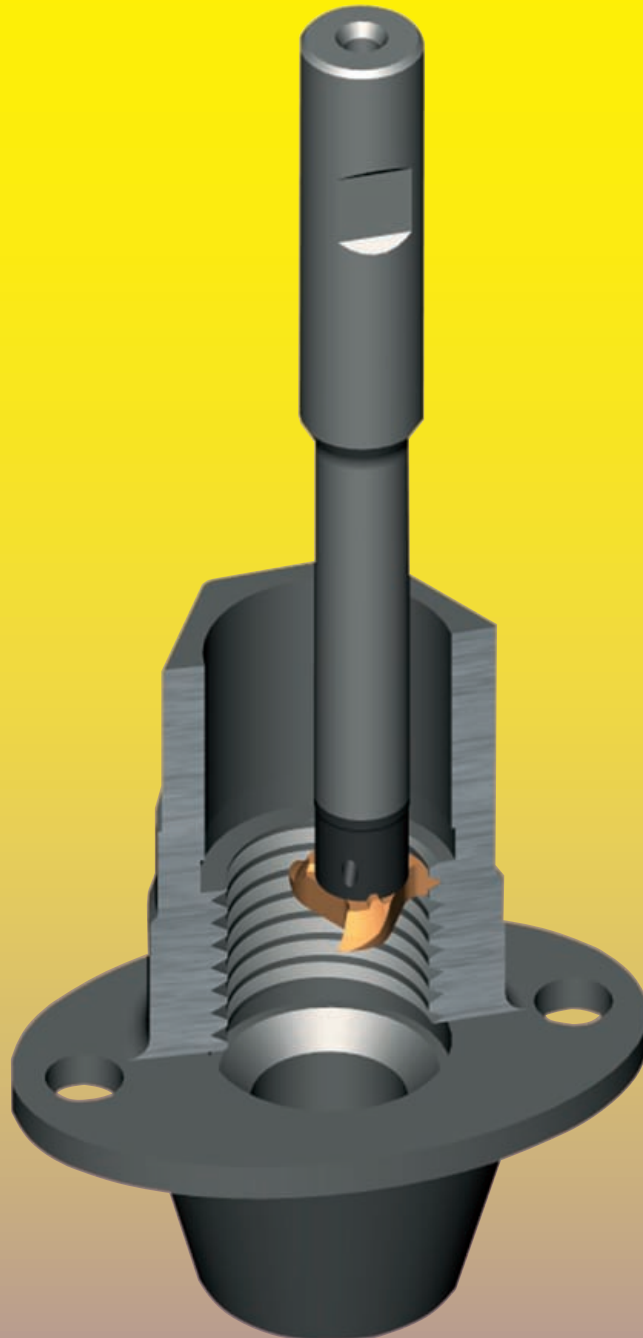
## 29° Included, ACME/Stub ACME Thread Partial Profile

TPI (Threads per Inch)						
Minor Ø	10	8	6	5	4	3
.827 - 1.142	111	111	111			
1.260 - 1.299				111		
1.374 - 1.614			116			
1.614 - 1.732				116		
2.0 - 2.5					116	116

Tool Type		
	111	116
Page number	D18	D31

- high cylindricity
- constant milled profile
- simple checking of thread
- in high strength material

D



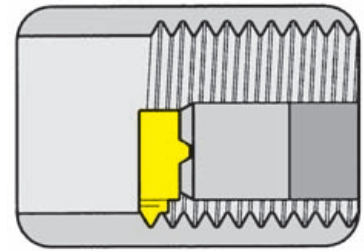
# THREAD MILLING (internal)



MILLING SHANK Type

## MU306

with through coolant supply



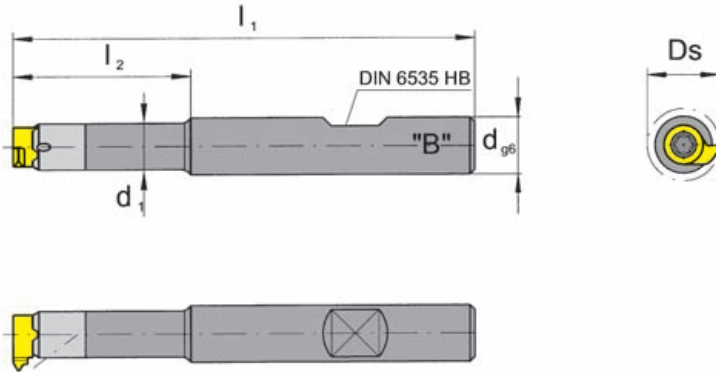
Cutting edge Ø

Ds .378 - .461"

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 108  
306  
606



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
<b>MU306.0625.01B</b>	3.937	.984	.287	.625

Further sizes upon request

Ds see inserts

Dimensions in inch

### Ordering note:

All milling cutter shanks can be used for **right** and **left** hand inserts type 108.

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
MU306.0625.01B	<b>2.6.5T8EP</b>	<b>T8PL</b>

D2

In the UNITED STATES call us toll free  
1 - 888 - 818 HORN

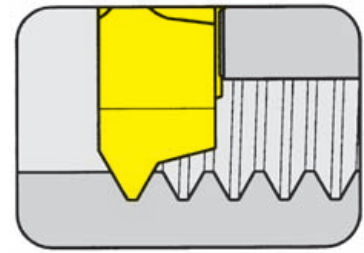
# THREAD MILLING (internal)



## MILLING SHANK Type

## M306

with through coolant supply



D

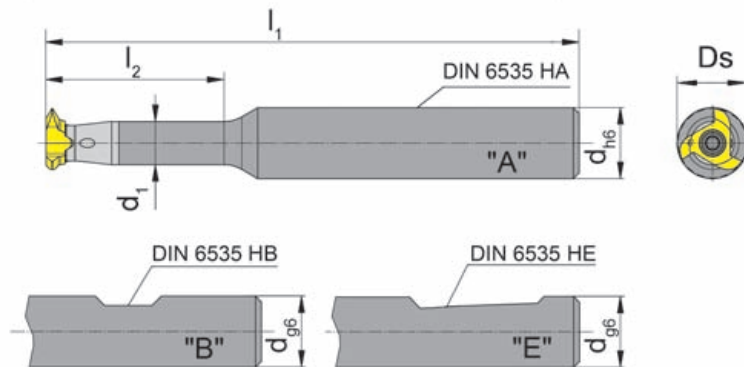
Cutting edge Ø from

Ds .378" (9.6 mm)

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 108  
306  
606



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M306.0707.03A	100	-	6.0	7.5	A
M306.0712.02A	90	30	7.3	12.0	
M306.0716.01A	100	25	7.3	16.0	
M306.0716.02A	110	35	7.3	16.0	
M306.0712.02B	90	30	7.3	12.0	B
M306.0716.01B	100	25		16.0	
M306.0716.02B	110	35		16.0	
M306.0712.02E	90	30	7.3	12.0	E
M306.0716.01E	100	25		16.0	

Further sizes upon request

Ds see inserts

Dimensions in mm

### Ordering note:

All milling cutter shanks can be used for **right** and **left** hand inserts type 108.

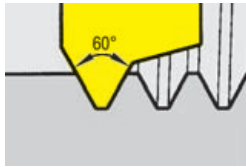
Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M306.07...	2.6.5T8EP	T8PL

## Partial Profile type 108 and 306

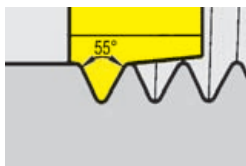


D

Pitch tpi	Pitch mm	108 Ds .378" (9.6)	smallest minor Ø	306 Ds .394" (10.0)	smallest minor Ø	306 Ds .461" (11.7)	smallest minor Ø
48	0.5	R/L108.0205.01	0.421	306.0515.00	0.451		
40		R/L108.0205.01	0.421	306.0515.00	0.451		
36		R/L108.0205.01	0.421	306.0515.00	0.451		
32	0.75	R/L108.0205.01 R/L108.0510.01	0.421 0.496	306.0515.00	0.451	306.0720.01	0.551
28		R/L108.0205.01 R/L108.0510.01	0.421 0.496	306.0515.00	0.451	306.0720.01	0.551
24	1.0	R/L108.0510.01	0.496	306.0515.00	0.512	306.0720.01	0.551
20	1.25	R/L108.0510.01 R/L108.0815.01	0.496 0.555	306.0515.00	0.512	306.0720.01	0.551
18		R/L108.0510.01 R/L108.0815.01	0.496 0.555	306.0515.00	0.551	306.0720.01 306.0815.01	0.551 0.606
16	1.5	R/L108.0815.01	0.555	306.1020.01 306.0515.01	0.465 0.551	306.0720.01 306.0815.01	0.551 0.606
14	1.75	R/L108.0815.01	0.555	306.1020.01	0.465	306.0720.01 306.0815.01	0.551 0.606
13						306.0720.01 306.0815.01	0.551 0.606
12	2.0					306.0720.01 306.0815.01 306.2530.01	0.551 0.606 0.787
11						306.2530.01	0.787
10	2.5					306.2530.01	0.787
9						306.2530.01	0.787
8	3.0					306.2530.01	0.787

Dimensions in inch (mm)

## Full profile Whitworth type 306 and 606



Pitch	306 Ds .394" (10.0)	Thread type	606 Ds .394 (10.0)	Thread type	306 Ds .461 (11.7)	Thread type	606 Ds .461 (11.7)	Thread type
11					306.5511.02	G1"		
14					306.5514.02	G1/2"	606.5514.02	G1/2"
19	306.5519.10.22	G1/4"	606.5519.10.22	G1/4"	306.5519.02	G3/8"	606.5519.02	G3/8"

Dimensions in inch (mm)

### Attention:

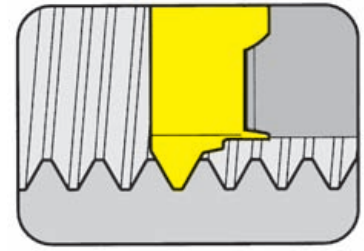
Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.

# THREAD MILLING (internal) Partial profile



INSERT Type

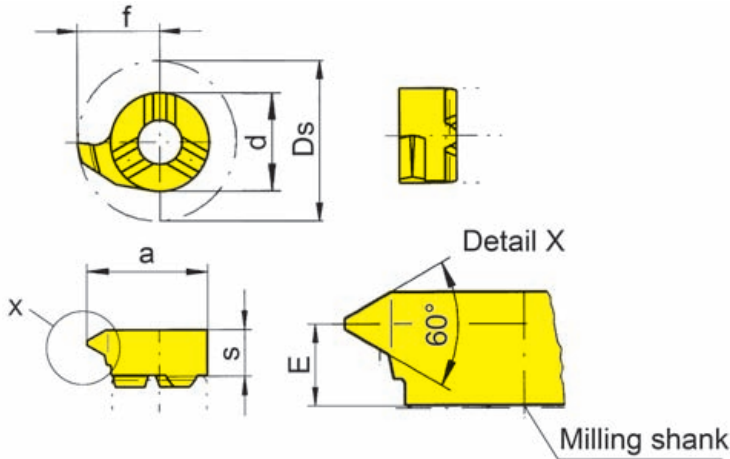
## 108



Threads per inch 14 - 48  
Cutting edge  $\emptyset$  Ds .378"

for use with Milling shank

Type MU306  
M306



R = right hand version shown

L = left hand version

Metric ISO and UN thread

Part number	Threads per Inch	P	smallest minor $\emptyset$	E	s	f	d	Ds	Carbide grades			
									MG12	TN35	TI25	TH35
R/L108.0205.01	28 - 48	0.5 - 0.75	.421	.110					▲/▲	▲/▲		▲/▲
R/L108.0510.01	18 - 24	1.0 - 1.25	.496	.110	.142	.189	.236	.378	▲/▲	▲/▲	▲/▲	▲/▲
R/L108.0815.01	14 - 18	1.5 - 1.75	.555	.102					▲/▲	▲/▲		▲/▲
									P	o	•	•
									M	•	•	•
									K	•	•	•
									N	•	•	•
									S	•	•	•
									H			

- ▲ on stock    Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch / P in mm

State R or L version

Carbide grades

# THREAD MILLING (internal) Partial profile

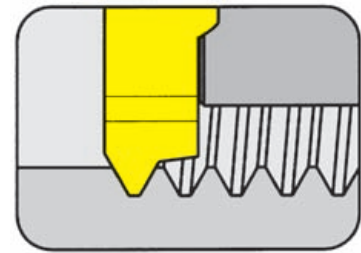


INSERT Type

## 306

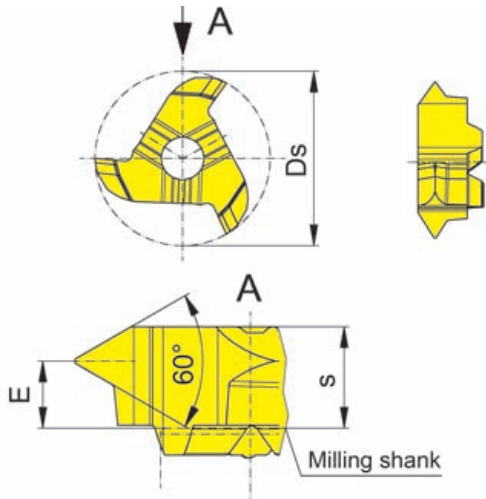
Threads per inch  
Cutting edge  $\emptyset$

8 - 48  
Ds .394 - .461"



for use with Milling shank

Type MU306  
M306



Picture = right hand cutting version

Metric ISO and UN thread

Part number	Threads per Inch	P	smallest minor $\emptyset$	E	s	Ds	TN35	T125	TA45	TF45	
306.0515.01	18 - 48	0.5 - 1.5	.451	.091	.134	.394			▲		
306.1020.01	14 - 16	2.0	.465	.087				▲			
306.0720.01	12 - 20	1.0 - 2.0	.551	.077	.134	.461	▲	▲		▲	
306.0815.01	12 - 16	1.5	.606	.089			▲	▲			
306.2530.01	8 - 11	2.5 - 3.0	.787	.067			▲	▲		▲	
							P	•	•	•	•
							M	•	•	•	•
							K	•	•	•	•
							N	•	•	•	•
							S	•	•	•	•
							H				

- ▲ on stock  $\Delta$  4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch / P in mm

Carbide grades



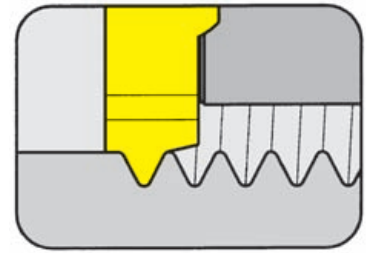
# THREAD MILLING (internal) Full profile



INSERT Type

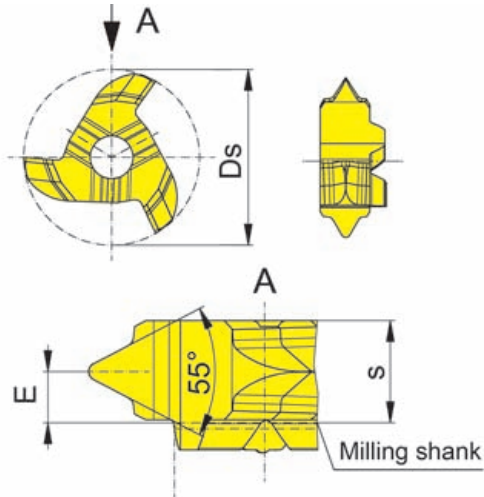
**306**

Threads per inch 11 - 19  
Cutting edge Ø Ds .382 - .461"



for use with Milling shank

Type MU306  
M306



Picture = right hand cutting version

Whitworth pipe thread as per  
DIN ISO 228; (259) and  
2999

Part number	Threads per Inch	E	s	Ds	Carbide grades		
					TN35	TI25	TA45
306.5519.10.02	19	.087	.134	.382			▲
306.5511.02	11	.067					▲
306.5514.02	14	.079	.134	.461			▲
306.5519.02	19	.087					▲
					P		●
					M		●
					K		●
					N		●
					S		●
					H		

▲ on stock   Δ 4 weeks  
 ● main recommendation  
 ○ alternative recommendation  
 ■ uncoated grades  
 ■ coated grades  
 ■ brazed/Cermet

Dimensions in inch

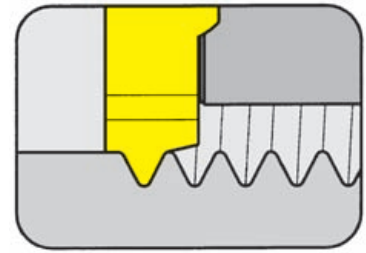
# THREAD MILLING (internal) Full profile



INSERT Type

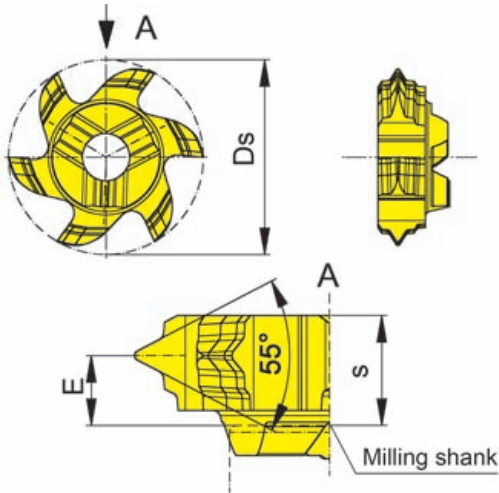
**606**

Threads per inch 14 - 19  
Cutting edge  $\emptyset$  Ds .382 - .461"



for use with Milling shank

Type M308



Picture = right hand cutting version

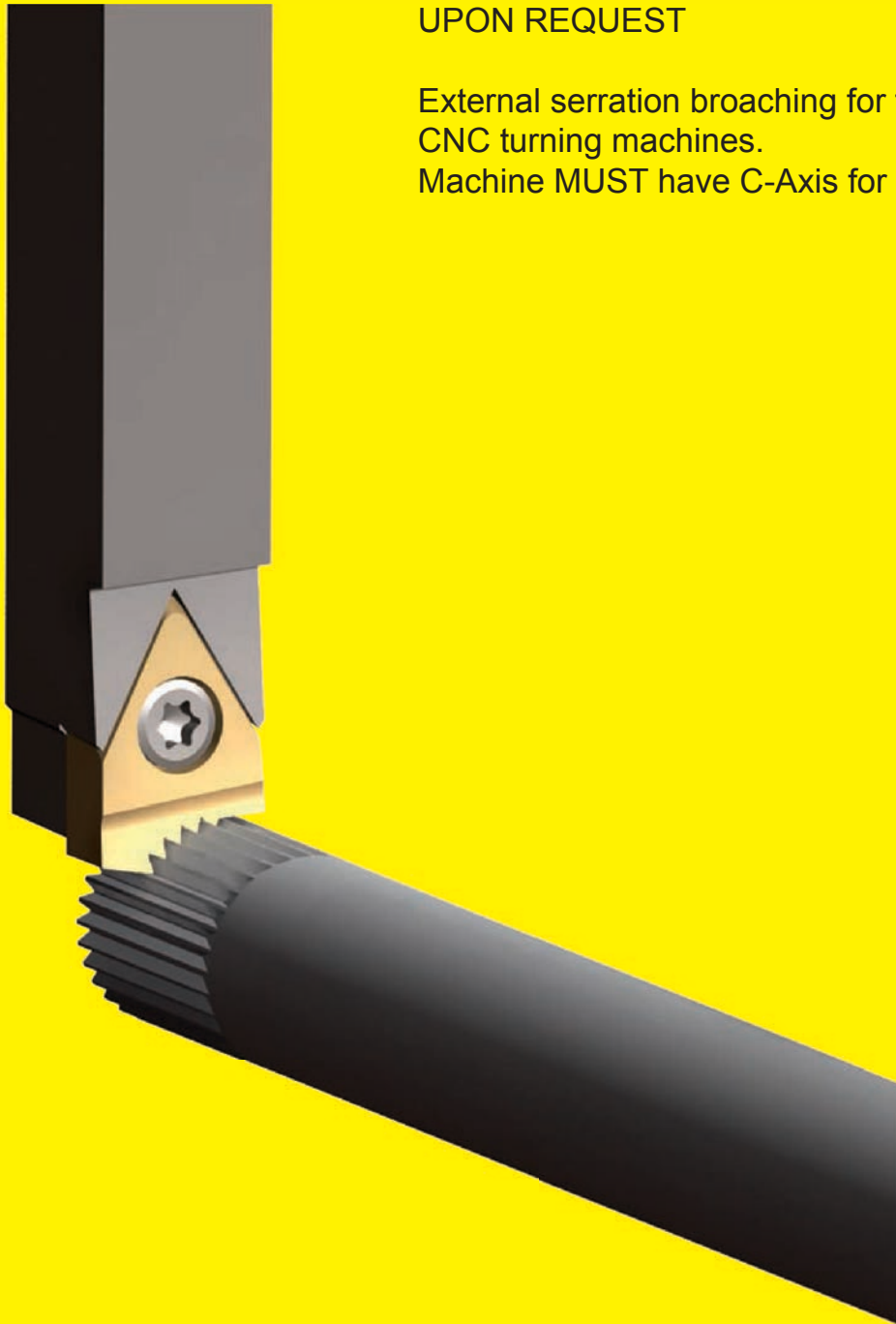
Whitworth pipe thread as per  
DIN ISO 228; (259) and  
2999

Part number	Threads per Inch	E	s	Ds	Carbide grades		
					TN35	TI25	TA45
606.5519.10.02	19	.083	.130	.382			▲
606.5514.02	14	.079	.130	.461			▲
606.5519.02	19	.083	.130	.461			▲
					P		•
					M		•
					K		•
					N		•
					S		•
					H		

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

Carbide grades



## UPON REQUEST

External serration broaching for finish machining on CNC turning machines.  
Machine **MUST** have C-Axis for this application!



For further information, please contact HORN USA.

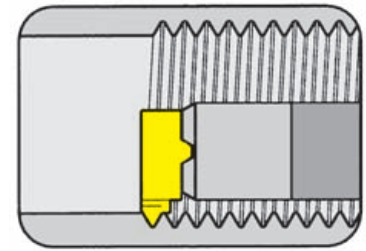
# THREAD MILLING (internal)



## MILLING SHANK Type

# MU308

with through coolant supply



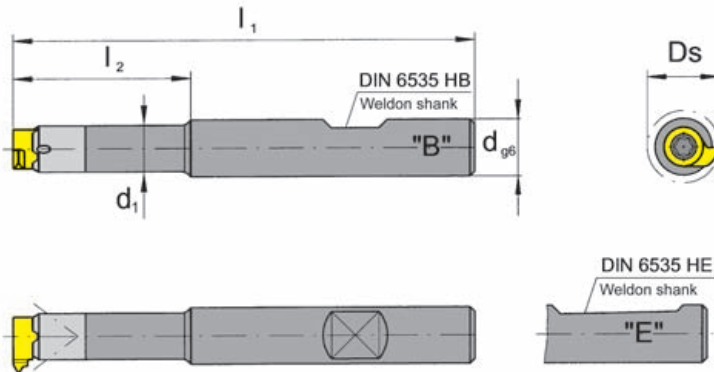
Cutting edge  $\varnothing$

Ds .528 - .618"

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type U111  
111  
308  
608



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
MU308.0625.01B	4.331	1.299	.374	.625

Further sizes upon request

Ds see inserts

Dimensions in inch

### Ordering note:

All milling cutter shanks can be used for **right** and **left** hand inserts type 111.

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
MU308.0625.01B	3.5.12T10EP	T10PL

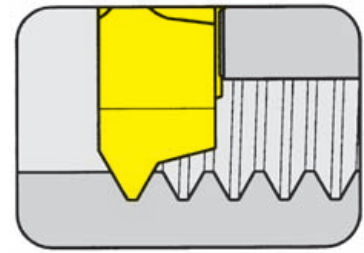
D10

In the UNITED STATES call us toll free  
1 - 888 - 818 HORN

## MILLING SHANK Type

# M308

with through coolant supply

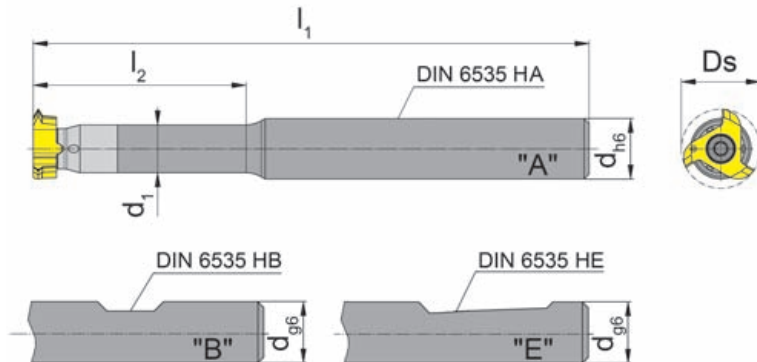


Cutting edge $\varnothing$	Ds 13.4/15.7 mm
----------------------------	-----------------

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type U111  
111  
308  
608



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M308.0012.07A	160	-	8.0	12	A
M308.1012.02A	110	42	9.5	12	
M308.1016.01A	110	33	9.5	16	
M308.1016.02A	110	45	9.5	16	
M308.1016.03A	130	64	9.5	16	
M308.1012.02B	110	42	9.5	12	B
M308.1016.01B	110	33		16	
M308.1016.02B	110	45		16	
M308.1016.02B	110	45		16	
M308.1016.03B	130	64		16	
M308.1012.02E	110	42	9.5	12	E
M308.1016.01E	110	33		16	
M308.1016.02E	110	45		16	
M308.1016.02E	110	45		16	
M308.1016.03E	130	64		16	

Further sizes upon request

Ds see inserts

Dimensions in mm

### Ordering note:

All milling cutter shanks can be used for **right** and **left** hand inserts type 111.

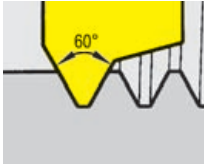
Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M308....	3.5.12T10EP	T10PL

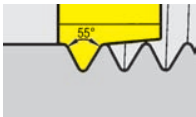
## Partial Profile Type 111, 308 and 608



Pitch tpi	Pitch mm	111 Ds .528" (13.4)	smallest minor Ø	308 Ds .520" (13.2)	smallest minor Ø	608 Ds .618" (15.7)	smallest minor Ø
56		R/L111.0205.01	0.579				
48	0.5	R/L111.0205.01	0.579				
40		R/L111.0205.01	0.579				
36		R/L111.0205.01	0.579				
32	0.75	R/L111.0205.01 R/L111.0510.01	0.579 0.587			308.0720.01 608.0720.01	0.827 0.787
28		R/L111.0205.01 R/L111.0510.01	0.579 0.587			308.0720.01 608.0720.01	0.827 0.787
24	1.0	R/L111.0510.01	0.587			308.0720.01 608.0720.01	0.827 0.787
20	1.25	R/L111.0510.01 R/L111.0815.01	0.587 0.646			308.0815.01 308.0720.01 608.0720.01	0.728 0.827 0.787
18		R/L111.0510.01 R/L111.0815.01	0.587 0.646			308.0815.01 308.0720.01 608.0720.01	0.728 0.827 0.787
16	1.5	R/L111.0815.01 R/L111.1020.01	0.646 0.740			308.0815.01 308.0720.01 608.0720.01	0.728 0.827 0.787
14	1.75	R/L111.0815.01 R/L111.1020.01	0.646 0.740			308.0720.01 608.0720.01	0.827 0.787
13		R/L111.0815.01 R/L111.1020.01	0.646 0.740			308.0720.01 608.0720.01	0.827 0.787
12	2.0	R/L111.0815.01 R/L111.1020.01 R/L111.1325.01	0.646 0.740 0.799			308.0720.01 308.2530.01 608.0720.01 608.2530.01	0.827 0.866 0.787 0.945
11		R/L111.1020.01 R/L111.1325.01	0.740 0.799			308.2530.01 608.2530.01	0.866 0.945
10	2.5	R/L111.1325.01	0.799	308.1325.01 608.1325.01	0.709 0.709	308.2530.01 608.2530.01	0.866 0.945
9		R/L111.1325.01	0.799			308.2530.01 608.2530.01	0.866 0.945
8	3.0					308.2530.01 608.2530.01	0.866 0.945

Dimensions in inch (mm)

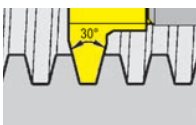
## Full Profile Whitworth Type 111 and 608



Pitch	111 Ds .528" (13.4)	Thread type	608 Ds .531 (13.5)	Thread type
14	R/L111.5514.02	G1/2" & 3/4"	608.5514.02	G1/2" & G3/4"
19	R/L111.5519.02	G3/8"		

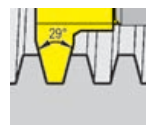
Dimensions in inch (mm)

## Partial Profile .rapezoidal Type 111



Pitch in mm	111 Ds .528" (13.4)	smallest minor Ø
1.5	R/L111.1015.01	.787
2.0	R/L111.1220.01	.945
3.0	R/L111.1730.01	1.102

Dimensions in inch (mm)



## Partial Profile ACME/Stub ACME Type 111

Thread type	Pitch	111 Ds .528" (13.4)	smallest minor Ø
ACME	8	R/LU111.AC08.01	1.102
ACME	6	R/LU111.AC06.01	1.260
Stub ACME	10	R/LU111.SA10.01	0.827
Stub ACME	8	R/LU111.SA08.01	0.984
Stub ACME	6	R/LU111.SA06.01	1.142
Stub ACME	5	R/LU111.SA05.01	1.299

Dimensions in inch (mm)

### Attention:

Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.

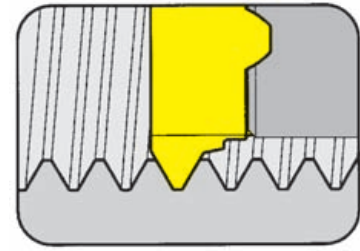
# THREAD MILLING (internal) Partial profile



INSERT Type

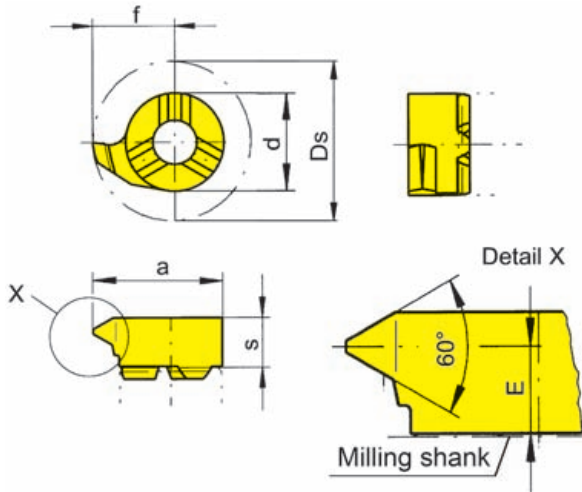
# 111

Threads per inch 9 - 56  
Cutting edge  $\emptyset$  Ds .528"



for use with Milling shank

Type MU308  
M308



R = right hand version shown

L = left hand version

Metric ISO and UN thread

Part number	Threads per Inch	P	smallest minor $\emptyset$	E	s	f	d	Ds	Carbide grades			
									MG12	TN35	TH35	
R/L111.0205.01	28 - 56	0.5 - 0.75	.579	.138						▲▲	▲▲	▲▲
R/L111.0510.01	18 - 28	1.0 - 1.25	.587	.130						▲▲	▲▲	▲▲
R/L111.0815.01	12 - 20	1.5 - 1.75	.646	.130	.163	.264	.315	.528		▲▲	▲▲	▲▲
R/L111.1020.01	11 - 16	2.0	.740	.118						▲▲	▲▲	▲▲
R/L111.1325.01	9 - 12	2.5	.799	.110						▲/▲	▲/▲	▲/▲

- ▲ on stock  $\Delta$  4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch / P in mm

State R or L version

	MG12	TN35	TH35
P	○	●	●
M	●	●	●
K	●	●	●
N	●	●	●
S	●	●	●
H	●	●	●

Carbide grades

# THREAD MILLING (internal) Partial profile

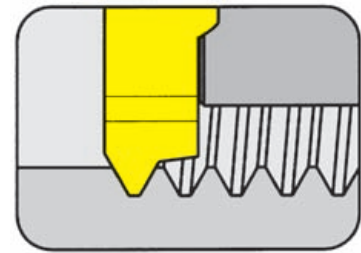


INSERT Type

## 308

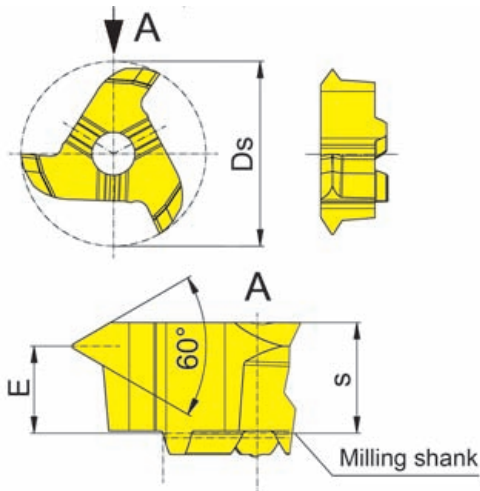
Threads per inch  
Cutting edge  $\emptyset$

8 - 32  
Ds .520 / .618"



for use with Milling shank

Type MU308  
M308



Picture = right hand cutting version

Metric ISO and UN thread

Part number	Threads per Inch	P	smallest minor $\emptyset$	E	s	Ds	TN35	T125	TA45	TF45
308.1325.01	10	2.5	.602	.130	.185	.520			▲	
308.0720.01	12 - 32	1.0 - 2.0	.827	.130			▲			
308.0815.01	16 - 20	1.5	.728	.146	.185	.618	▲			
308.2530.01	8 - 12	2.5 - 3.0	.866	.106			▲			▲
							P	•	•	•
							M	•	•	•
							K	•	•	•
							N	•	•	•
							S	•	•	•
							H			

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch / P in mm

Carbide grades



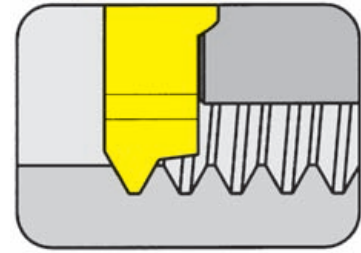
# THREAD MILLING (internal) Partial profile



INSERT Type

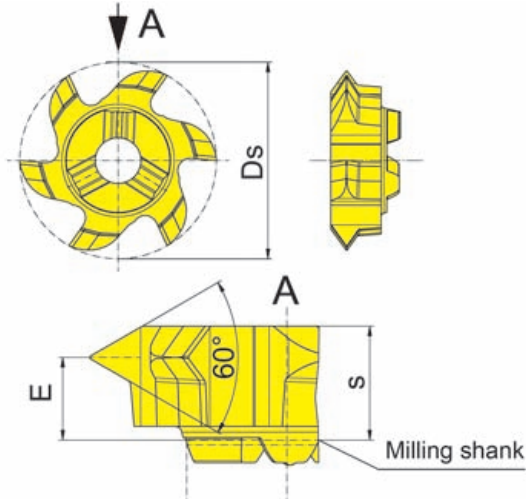
**608**

Threads per inch 8 - 32  
Cutting edge Ø Ds .618"



for use with Milling shank

Type MU308  
M308



Picture = right hand cutting version

Metric ISO and UN thread

Part number	Threads per Inch	P	smallest minor Ø	E	s	Ds	Carbide grades	
							TN35	T125
608.0720.01	12 - 32	1.0 - 2.0	.787	.130	.179	.618	▲	▲
608.2530.01	8 - 32	2.5 - 3.0	.945	.114			▲	▲
							P	•
							M	•
							K	•
							N	•
							S	•
							H	•

Dimensions in inch / P in mm

Carbide grades

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

# THREAD MILLING (internal) Full profile

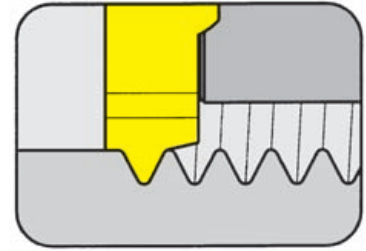


INSERT Type

## 111

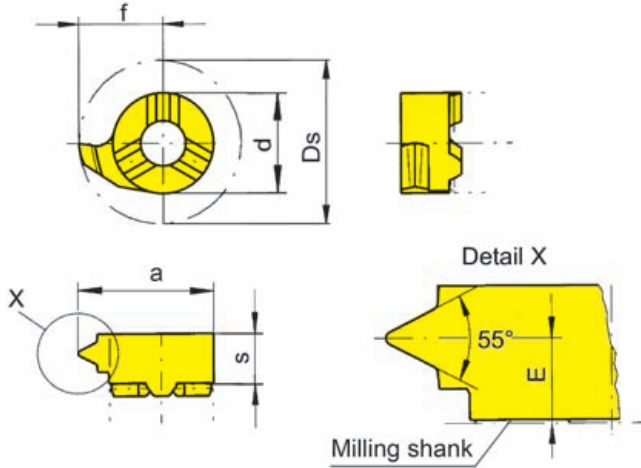
Threads per inch  
Cutting edge  $\emptyset$

14 - 19  
Ds .528"



for use with Milling shank

Type MU308  
M308



R = right hand version shown

L = left hand version

Whitworth pipe thread as per  
DIN ISO 228; (259) and  
2999

Part number	Threads per Inch	E	s	d	Ds	Carbide grades		
						MG12	TN35	T125
R/L111.5514.02	14	.098	.163	.315	.528		▲/▲	
R/L111.5519.02	19	.114	.163	.315	.528		▲/▲	
						P	•	
						M	•	
						K	•	
						N	•	
						S	•	
						H		

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

State R or L version

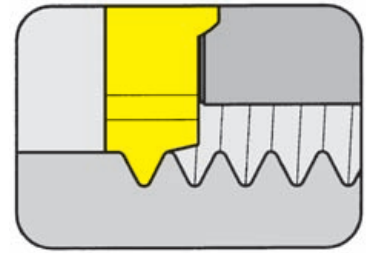
# THREAD MILLING (internal) Full profile



INSERT Type

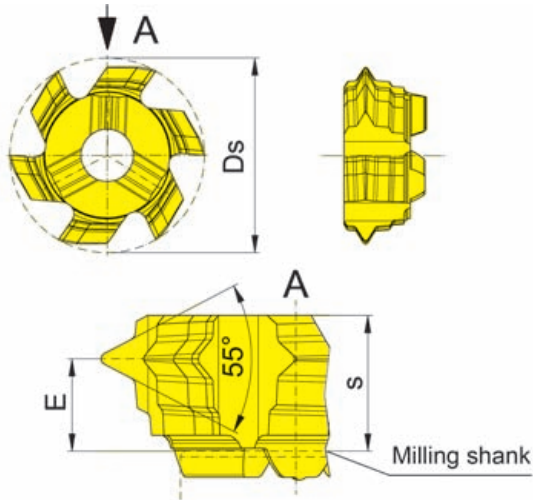
**608**

Threads per inch 14  
Cutting edge  $\emptyset$  Ds .531"



for use with Milling shank

Type MU308  
M308



Picture = right hand cutting version

Whitworth pipe thread as per  
DIN ISO 228; (259) and  
2999

Part number	Threads per Inch	E	s	Ds	Carbide grades		
					TN35	TI25	TA45
<b>608.5514.02</b>	14	.126	.185	.531			▲
<ul style="list-style-type: none"> <li>▲ on stock Δ 4 weeks</li> <li>● main recommendation</li> <li>○ alternative recommendation</li> <li>■ uncoated grades</li> <li>■ coated grades</li> <li>■ brazed/Cermet</li> </ul>					P		●
					M		●
					K		●
					N		●
					S		●
					H		

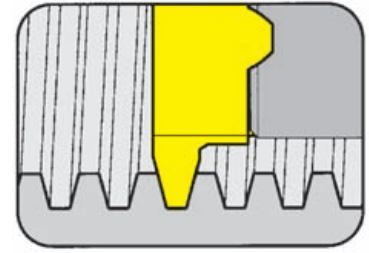
Dimensions in inch

# THREAD MILLING (internal) Partial profile



INSERT Type

## U111

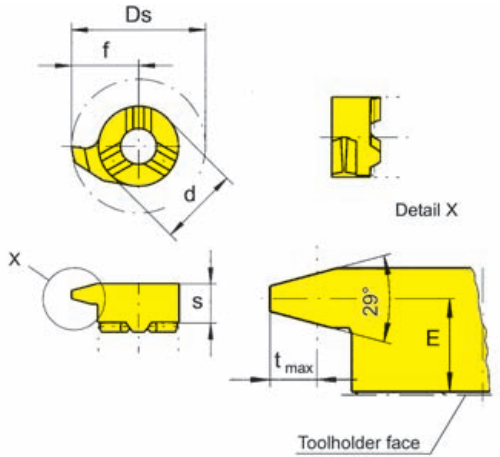


Threads per inch  
Cutting edge  $\varnothing$

5 - 10  
Ds .528"

for use with Milling shank

Type MU308  
M308



R = right hand version shown

L = left hand version

ACME / Stub ACME  
thread

Part number	Threads per Inch	smallest minor $\varnothing$	$t_{max}$	E	s	f	d	Ds	MG12	TN35
R/LU111.AC06.01	6	1.206	.093	.106						▲/▲
R/LU111.AC08.01	8	1.102	.072	.119	.163	.264	.315	.528	▲/▲	▲/▲
R/LU111.SA05.01	5	1.299	.070	.098						Δ/
R/LU111.SA06.01	6	1.142	.060	.110						▲/Δ
R/LU111.SA08.01	8	.984	.048	.112	.163	.264	.315	.528		▲/▲
R/LU111.SA10.01	10	.827	.040	.126						▲/▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

State R or L version

	MG12	TN35
P	○	●
M	●	●
K	●	●
N	●	●
S	●	●
H	●	●

Carbide grades

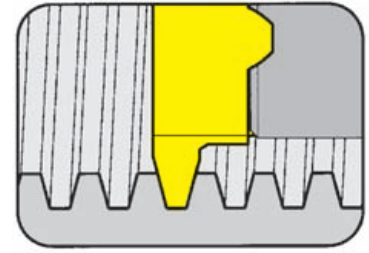
# THREAD MILLING (internal) Partial profile



INSERT Type

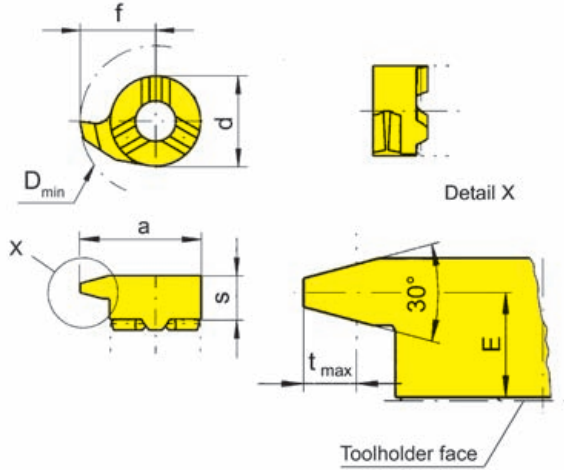
# 111

Pitch 1.5 - 3.0 mm  
Cutting edge  $\varnothing$  Ds .528"



for use with Milling shank

Type MU308  
M308



R = right hand version shown

L = left hand version

Metric ISO trapezoidal  
thread DIN 103

Part number	P	smallest minor $\varnothing$	$t_{max}$	E	s	f	d	Ds	MG12	TN35
									▲/△	▲/▲
R/L111.1015.01	1.5	.787	.031	.138					▲/△	▲/▲
R/L111.1220.01	2.0	.945	.049	.130	.163	.264	.315	.528	▲/△	▲/▲
R/L111.1730.01	3.0	1.102	.069	.118					▲/△	▲/▲

- ▲ on stock    △ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch / P in mm

State R or L version

	MG12	TN35
P	○	●
M	●	●
K	●	●
N	●	●
S	●	●
H	●	●

Carbide grades

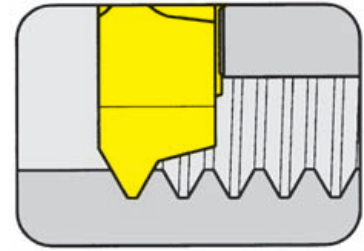
# THREAD MILLING (internal)



## MILLING SHANK Type

# MU311

with through coolant supply



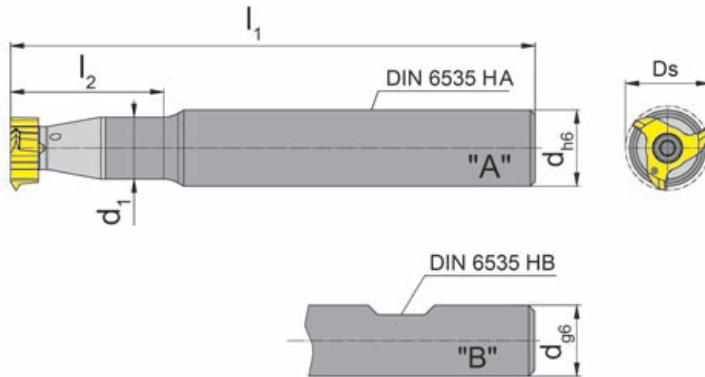
Cutting edge Ø

Ds .697"

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 311  
611



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
MU311.1212.07A	6.301	-	.354	.500	A
MU311.0625.04B	4.331	1.260	.512	.625	B
MU311.0625.05B	5.118	1.772	.512	.625	B

Further sizes upon request

Ds see inserts

Dimensions in inch

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
MU311.0625.04B/05B MU311.1212.07A	4.14T15P 2.6.5T8EP	T15PQ T8PL

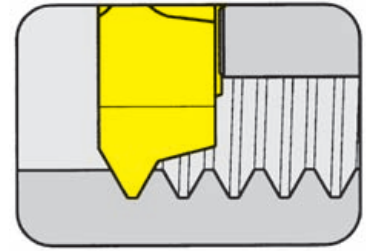
D20

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## MILLING SHANK Type

# M311

with through coolant supply

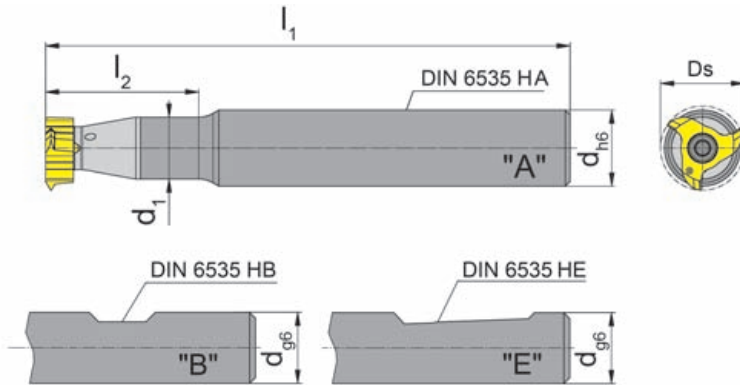


Cutting edge Ø Ds .697" (17.7 mm)

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 311  
611



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M311.1316.01A	110	32	13	16	A
M311.1316.02A	130	45			
M311.1316.03A	145	64			
M311.1316.01B	110	32	13	16	B
M311.1316.02B	130	45			
M311.1316.03B	145	64			
M311.1316.01E	110	32	13	16	E
M311.1316.02E	130	45			
M311.1316.03E	145	64			

Further sizes upon request

Ds see inserts

Dimensions in mm

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

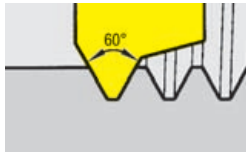
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M311.1316.0...	4.14T15P	T15PQ



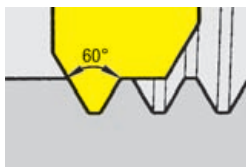
## Partial Profile Type 311 and 611



Pitch tpi	Pitch mm	311 Ds .694" (17.7)	smallest minor Ø	611 Ds .694" (17.7)	smallest minor Ø
48		311.0515.01	0.766	611.0515.01	0.766
32	0.75	311.0515.01	0.766	611.0515.01	0.766
		311.0510.01	0.768	611.0720.01	0.866
		311.0720.01	0.866		
28		311.0515.01	0.766	611.0515.01	0.766
		311.0510.01	0.768	611.0720.01	0.866
		311.0720.01	0.866		
24	1.0	311.0515.01	0.766	611.0515.01	0.766
		311.0510.01	0.768	611.0720.01	0.866
		311.0720.01	0.866		
20	1.25	311.0515.01	0.766	611.0515.01	0.766
		311.0720.01	0.866	611.0720.01	0.866
		311.0815.01	0.807		
18		311.0515.01	0.766	611.0515.01	0.766
		311.0720.01	0.866	611.0720.01	0.866
		311.0815.01	0.807		
16	1.5	311.0515.01	0.866	611.0515.01	0.866
		311.0720.01	0.866	611.0720.01	0.866
		311.0815.01	0.807		
		311.1020.01	0.866		
14	1.75	311.0720.01	0.866	611.0720.01	0.866
		311.1020.01	0.866		
13		311.0720.01	0.866	611.0720.01	0.866
12	2.0	311.0720.01	0.866	611.0720.01	0.866
		311.1325.01	0.906	611.2535.01	1.102
		311.2535.01	0.945		
11		311.1325.01	0.906	611.2535.01	1.102
		311.2535.01	0.945		
10	2.5	311.1325.01	0.906	611.2535.01	1.102
		311.1630.01	0.925		
		311.2535.01	0.945		
9		311.1630.01	0.925	611.2535.01	1.102
		311.2535.01	0.945		
8	3.0	311.1630.01	0.925	611.2535.01	1.102
		311.1835.01	0.945		
		311.2535.01	0.945		
7	3.5	311.1835.01	0.945	611.2535.01	1.102
		311.2535.01	0.945		
6	4	311.2535.01	0.945	611.2535.01	1.102

Dimensions in inch (mm)

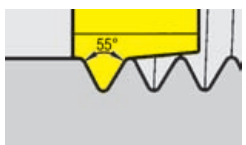
## Full Profile Type 311



Pitch mm	611 Ds .694" (17.7)	smallest minor Ø
1.5	311.0815.02	0.906
1.75	311.0917.02	0.965
2	311.1020.02	1.004
2.5	311.1325.02	1.112
3	311.1630.02	1.260
3.5	311.1835.02	1.378

Dimensions in inch (mm)

## Full Profile Whitworth Type 311



Pitch	311 Ds .531 (13.5)	Thread type
11	311.5511.02	G1"
14	311.5514.02	G3/4"

Dimensions in inch (mm)

### Attention:

Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.

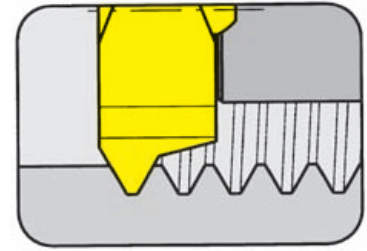


# THREAD MILLING (internal) Partial profile



INSERT Type

## 311

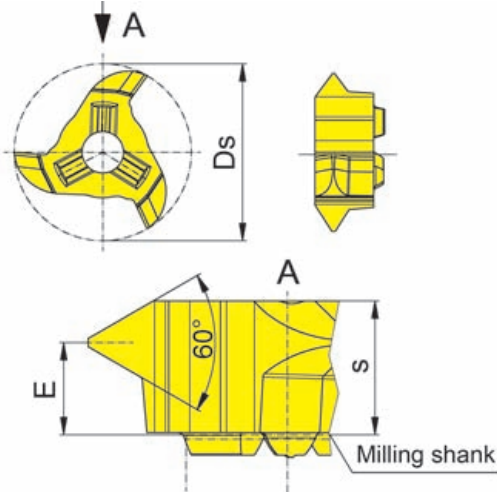


Threads per inch 6 - 48  
Cutting edge  $\varnothing$  Ds .697"



for use with Milling shank

Type MU311  
M311



Picture = right hand cutting version

Metric ISO and UN thread

Part number	Threads per Inch	P	smallest minor $\varnothing$	E	s	Ds	Carbide grades		
							TN35	TI25	TA45
311.0515.01	18 - 48	0.5 - 1.5	.766	.189					▲
311.0510.01	24 - 32	1.0	.768	.197			▲		
311.0720.01	12 - 32	1.0 - 2.0	.866	.181			▲		
311.0815.01	16 - 20	1.5	.807	.189			▲		
311.1020.01	14 - 16	2.0	.866	.181	.234	.697	▲		
311.1325.01	11 - 12	2.5	.906	.173			▲		
311.2535.01	6 - 8	2.5 - 3.5	.945	.146			▲		
311.1630.01	8 - 9	3.0	.925	.169			▲		
311.1835.01	7 - 8	3.5	.945	.161			▲		

- ▲ on stock  $\Delta$  4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch / P in mm

	TN35	TI25	TA45
P	●	●	●
M	●	●	●
K	●	●	●
N	●	●	●
S	●	●	●
H	●	●	●

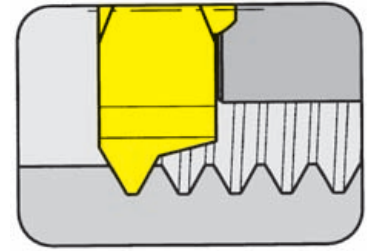
Carbide grades

# THREAD MILLING (internal) Partial profile



INSERT Type

## 611

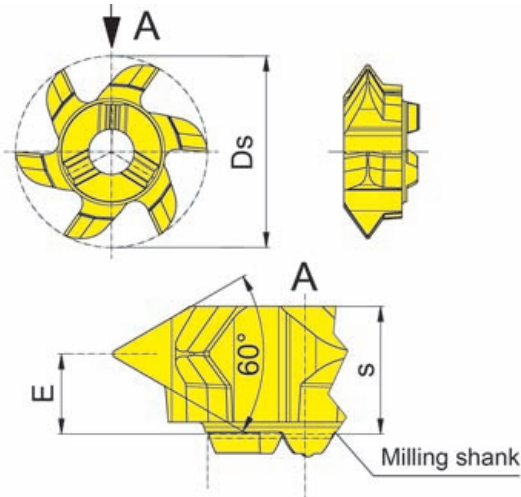


Threads per inch  
Cutting edge  $\varnothing$

6 - 48  
Ds .697"

for use with Milling shank

Type MU311  
M311



Picture = right hand cutting version

Metric ISO and UN thread

Part number	Threads per Inch	P	smallest minor $\varnothing$	E	s	Ds	Carbide grades		
							TN35	TI25	TA45
611.0515.01	18 - 48	0.5 - 1.5	.766	.189					▲
611.0720.01	12 - 32	1.0 - 2.0	.866	.181	.226	.697		▲	
611.2535.01	6 - 12	2.5 - 3.5	1.102	.146				▲	
							P	•	•
							M	•	•
							K	•	•
							N	•	•
							S	•	•
							H		

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch / P in mm

Carbide grades

D

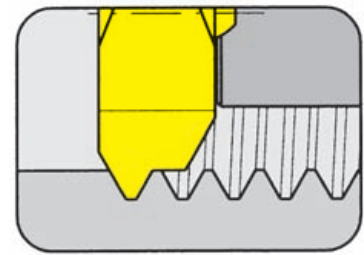
# THREAD MILLING (internal) Full profile



INSERT Type

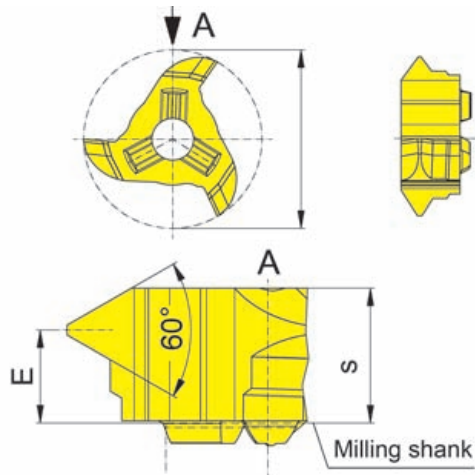
## 311

Pitch P 1.5 - 3.5 mm  
Cutting edge  $\varnothing$  Ds .697"



for use with Milling shank

Type MU311  
M311



Picture = right hand cutting version

Metric ISO and UN thread

Part number	P	smallest minor $\varnothing$	E	s	Ds	Carbide grades	
						TN35	T125
311.0815.02	1.50	.906	.189	.234	.697	▲	
311.0917.02	1.75	.965	.185			▲	
311.1020.02	2.00	1.004	.181			▲	
311.1325.02	2.50	1.112	.173			▲	
311.1630.02	3.00	1.260	.169			▲	
311.1835.02	3.50	1.378	.161			▲	
						P	•
						M	•
						K	•
						N	•
						S	•
						H	

▲ on stock Δ 4 weeks  
● main recommendation  
○ alternative recommendation  
■ uncoated grades  
■ coated grades  
■ brazed/Cermet

Dimensions in inch / P in mm

Carbide grades

# THREAD MILLING (internal) Full profile

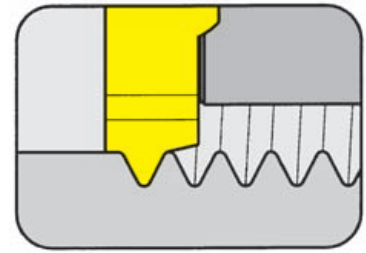


INSERT Type

## 311

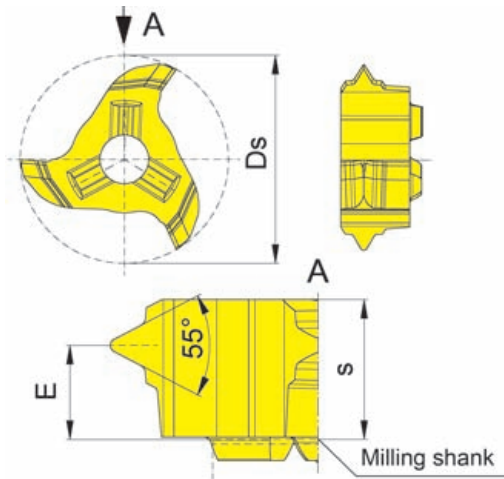
Threads per inch  
Cutting edge  $\emptyset$

11 - 14  
Ds .697"



for use with Milling shank

Type MU311  
M311



Picture = right hand cutting version

Whitworth pipe thread as per  
DIN ISO 228; (259) and  
2999

Part number	Threads per Inch	E	s	Ds	Carbide grades			
					TN35	T125	TA45	
311.5511.02	11	.157	.234	.697	△	△	△	
311.5514.02	14	.171	.234	.697	△	△	△	
<ul style="list-style-type: none"> <li>▲ on stock    △ 4 weeks</li> <li>● main recommendation</li> <li>○ alternative recommendation</li> <li>■ uncoated grades</li> <li>■ coated grades</li> <li>■ brazed/Cermet</li> </ul>					P	•	•	•
					M	•	•	•
					K	•	•	•
					N	•	•	•
					S	•	•	•
					H	•	•	•

Dimensions in inch

Carbide grades

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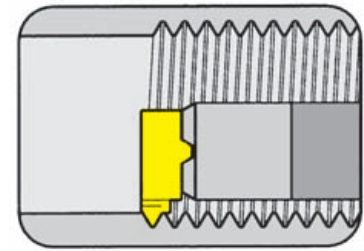
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D27

## MILLING SHANK Type

# MU116

with through coolant supply



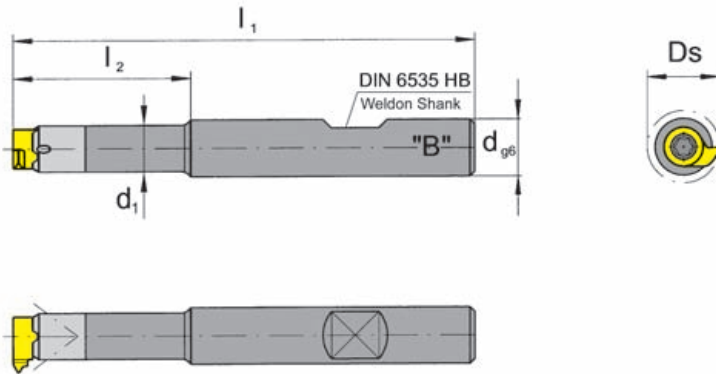
Cutting edge  $\varnothing$

Ds .803"

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type U116  
116



Picture = right hand cutting version

Part number	Ds	t <sub>max</sub>	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d
MU116.0625.01B			5.118	1.575		
MU116.0625.02B	.803	.169	5.118	2.205	.433	.625
MU116.0625.03B			5.906	3.150		

Further sizes upon request

Dimensions in inch

### Ordering note:

All milling cutter shanks can be used for **right** and **left** hand inserts type 116.

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

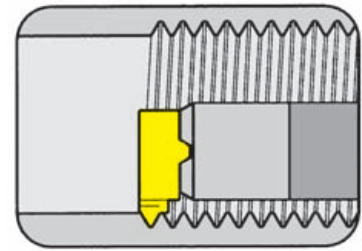
### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
MU116.0625.0...	5.13T20EP	T20PQ

## MILLING SHANK Type

# M116

with through coolant supply



D

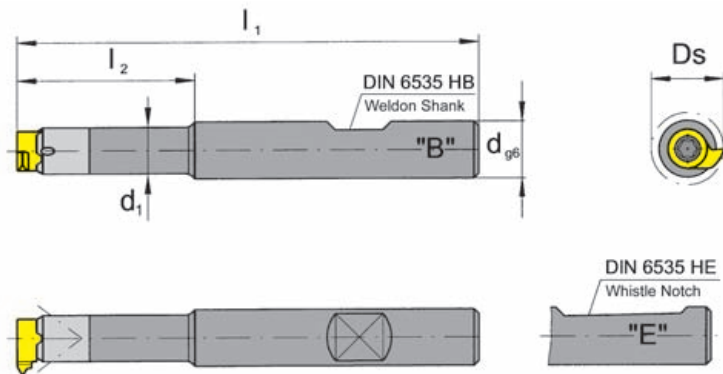
Cutting edge  $\emptyset$

Ds 20.4 (16) mm

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type U116  
116



Picture = right hand cutting version

Part number	Ds	t <sub>max</sub>	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	Form
M116.0012.01B	20.4	4.3	130	40	11	12	B
M116.0012.02B			130	56			
M116.0012.03B			150	80			
M116.0016.01B	20.4	4.3	130	40	11	16	B
M116.0016.02B			130	56			
M116.0016.03B			150	80			
M116.0016.01E	20.4	4.3	130	40	11	16	E
M116.0016.02E			130	56			
M116.0016.03E			150	80			

Further sizes upon request

Dimensions in mm

### Ordering note:

All milling cutter shanks can be used for **right** and **left** hand inserts type 116.

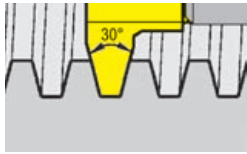
Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M116.001...	5.13T20EP	T20PQ

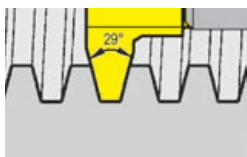
## Partial Profile Trapezoidal Type 116



Pitch mm	116 Ds .528" (13.4)	smallest minor Ø
2.0	R/L116.1220.01	1.259
3.0	R/L116.1730.01	1.574
4.0	R/L116.2240.01	2.047

Dimensions in inch

## Partial profile ACME/Stub ACME Type 116



Type	Pitch tpi	111 Ds .528" (13.4)	smallest minor Ø
ACME	5	R/LU116.AC05.01	2.206
ACME	4	R/LU116.AC04.01	2.500
Stub ACME	6	R/LU111.SA06.01	1.374
Stub ACME	5	R/LU111.SA05.01	1.750
Stub ACME	4	R/LU111.SA04.01	2.000
Stub ACME	3	R/LU111.SA03.01	2.500

Dimensions in inch

### Attention:

Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.

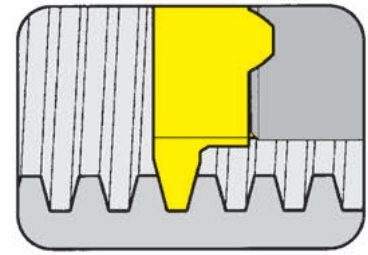


# THREAD MILLING (internal)



INSERT Type

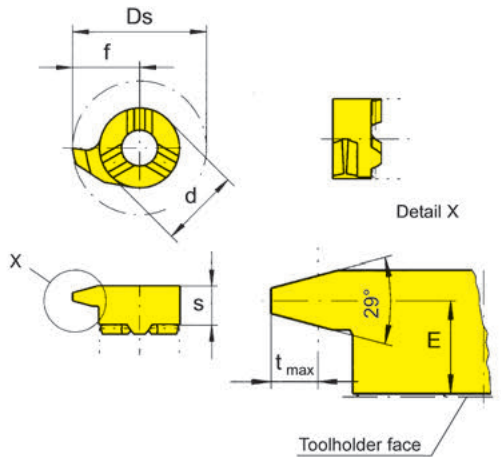
## U116



Threads per inch 3 - 6  
Cutting edge Ø Ds .764"

for use with Milling shank

Type MU116  
M116



R = right hand version shown

L = left hand version

ACME / Stub ACME thread

Part number	Threads per Inch	smallest minor Ø	t <sub>max</sub>	E	s	f	d	Ds	MG12	TN35	TI25
R/LU116.AC04.01	4	2.500	.135	.131	.217	.382	.433	.764		▲/▲	
R/LU116.AC05.01	5	2.206	.110	.147	.217	.382	.433	.764		▲/▲	
R/LU116.SA03.01	3	2.500	.110	.150	.256	.402		.803		▲/	
R/LU116.SA04.01	4	2.000	.085	.138	.217	.402		.803		▲/	
R/LU116.SA05.01	5	1.750	.070	.150	.217	.402	.433	.803		▲/▲	
R/LU116.SA06.01	6	1.374	.060	.157	.217	.382		.764		▲/▲	

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

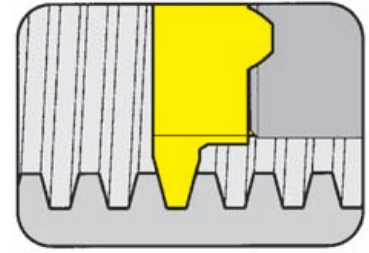
Carbide grades	MG12	TN35	TI25
P	●	●	●
M	●	●	●
K	●	●	●
N	●	●	●
S	●	●	●
H	●	●	●

Dimensions in inch

State R or L version

## INSERT Type

# 116

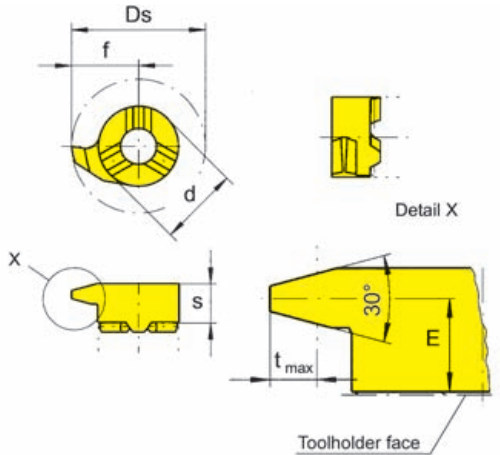


Threads per inch  
Cutting edge  $\emptyset$

Tr 2.0 - 4.0 mm  
Ds .764"

for use with Milling shank

Type MU116  
M116



R = right hand version shown

L = left hand version

Metric ISO trapezoidal  
thread DIN 103

Part number	P	smallest minor $\emptyset$	$t_{max}$	E	s	f	d	Ds	Carbide grades		
									MG12	TN35	T125
R/L116.1220.01	2	1.259	.049	.177						▲/▲	
R/L116.1730.01	3	1.574	.069	.169	.217	.382	.433	.764		▲/▲	
R/L116.2240.01	4	2.047	.089	.157						▲/▲	
									P	•	
									M	•	
									K	•	
									N	•	
									S	•	
									H		

- ▲ on stock    Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch / P in mm

State R or L version

## HORN - THE LEADERS IN GROOVING TECHNOLOGY



## ONE RESOURCE THAT WILL NEVER RUN DRY!

### TOOLING SYSTEMS FOR THE OIL INDUSTRY: S117

- Extreme precision
- Optimal repeatability ( $\leq 0.005$  mm)
- Extremely simple handling
- Patented reliability
- Certification according to API Q1



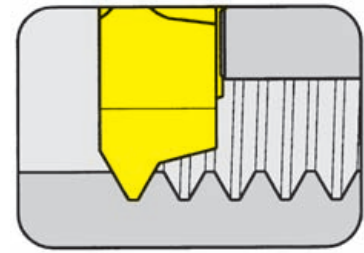
## HORN - INTELLIGENT TOOL DESIGN AT WORK.

For further information, please contact HORN USA.

## MILLING SHANK Type

# MU313

with through coolant supply



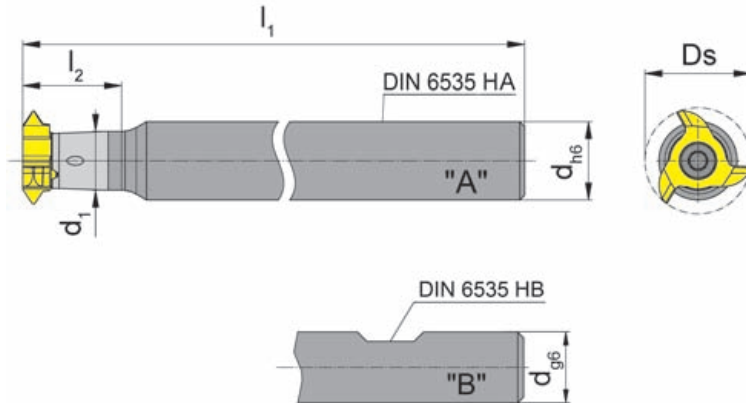
Cutting edge  $\varnothing$

Ds .854"

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 313  
613



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
<b>MU313.1515.08A</b>	7.874	-	.445	.625	A
<b>MU313.0750.04B</b>	4.331	1.772	.630	.750	B
<b>MU313.0750.05B</b>	5.118	2.559	.630	.750	B

Further sizes upon request

Ds see inserts

Dimensions in inch

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

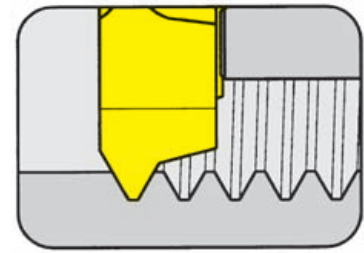
### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
MU313.0750.04B/05B MU313.1515.08A	<b>5.14T20P</b> <b>2.6.5T8EP</b>	<b>T20PQ</b> <b>T8PL</b>

## MILLING SHANK Type

# M313

with through coolant supply

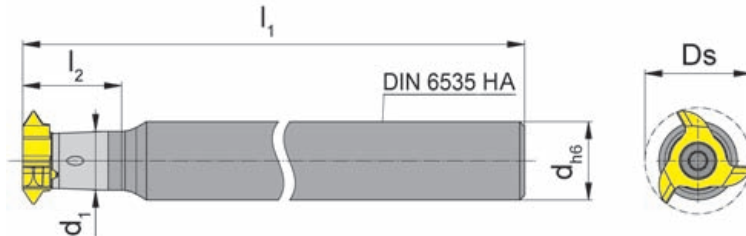


Cutting edge Ø	Ds .854" (21.7 mm)
----------------	--------------------

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 313  
613



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M313.0016.07A	160	20	12	16	A
M313.1620.01A	110	45			
M313.1620.02A	130	65	16	20	A
M313.1620.03A	160	85			
M313.1620.01B	110	45			
M313.1620.02B	130	65	16	20	B
M313.1620.03B	160	85			
M313.1620.01E	110	45			
M313.1620.02E	130	65	16	20	E
M313.1620.03E	160	85			

Further sizes upon request

Ds see inserts

Dimensions in mm

### Ordering note:

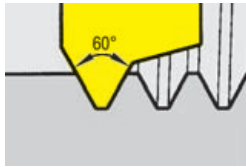
Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

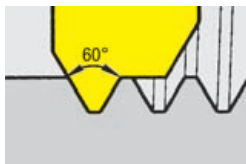
Milling shank	Screw	TORX PLUS® Wrench
M313....	5.14T20P	T20PQ

## Partial Profile Type 313 and 613



Pitch tpi	Pitch mm	313 Ds .854" (21.7)	smallest minor Ø	613 Ds .854" (21.7)	smallest minor Ø
32	0.75	313.0720.01	1.102	613.0720.01	1.063
28		313.0720.01	1.102	613.0720.01	1.063
24	1.0	313.0720.01	1.102	613.0720.01	1.063
20	1.25	313.0720.01 313.0815.01	1.102 1.102	613.0720.01	1.063
18		313.0720.01 313.0815.01	1.102 1.102	613.0720.01	1.063
16	1.5	313.0720.01 313.0815.01 313.1020.01	1.102 1.102 1.102	613.0720.01	1.063
14		313.0720.01 313.1020.01	1.102 1.102	613.0720.01	1.063
13		313.0720.01	1.102	613.0720.01	1.063
12	2	313.0720.01 313.2545.01	1.102 1.457	613.0720.01 613.2545.01	1.063 1.300
11		313.2545.01	1.457	613.2545.01	1.300
10	2.5	313.1630.01 313.2545.01	1.26 1.457	613.2545.01	1.300
9		313.1630.01 313.2545.01	1.26 1.457	613.2545.01	1.300
8	3	313.1630.01 313.2140.01 313.2545.01	1.26 1.244 1.457	613.2545.01	1.300
7	3.5	313.2140.01 313.2445.01 313.2545.01	1.244 1.461 1.457	613.2545.01	1.300
6	4	313.2445.01 313.2545.01	1.461 1.457	613.2545.01	1.300

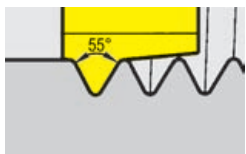
## Full Profile Type 313 - metric



Pitch mm	611 Ds .694" (17.7)	smallest minor Ø
1.5	313.0815.02	1.063
2	313.1020.02	1.181
3	313.1630.02	1.457
3.5	313.1835.02	1.575
4	313.2140.02	1.732
4.5	313.2445.02	1.890

Dimensions in inch (mm)

## Full Profile Whitworth Type 313 and 613



Pitch	11	8	6
<b>Nominal diameter</b>			
<b>Type 313 / Ds .854 (21.7)</b>			
313.5508.02		≥ 40	
313.5506.02			≥ 48
<b>Thread</b>			
<b>Type 313 / Ds .854 (21.7)</b>			
313.5511.02	G1"		
<b>Type 613 / Ds .854 (21.7)</b>			
613.5511.02	G1"		

Dimensions in inch (mm)

### Attention:

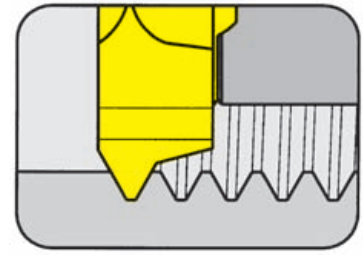
Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.

# THREAD MILLING (internal) Partial profile



INSERT Type

## 313

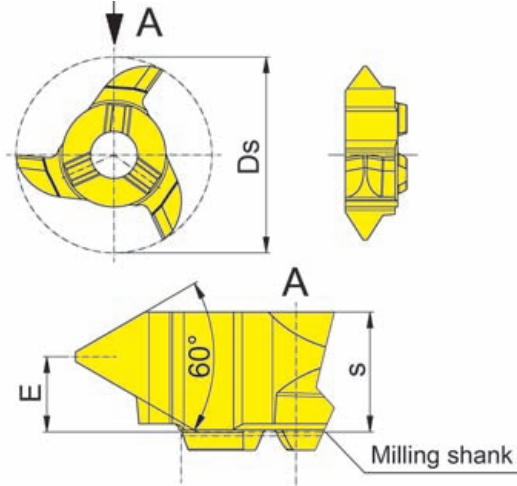


Threads per inch 6 - 32  
Cutting edge  $\emptyset$  Ds .854"



for use with Milling shank

Type MU313  
M313



Picture = right hand cutting version

Metric ISO and UN thread

Part number	Threads per Inch	P	smallest minor $\emptyset$	E	s	Ds	Carbide grades	
							TN35	T125
313.0720.01	12 - 32	1.0 - 2.0	1.102	.181	.232	.854	▲	
313.0815.01	16 - 20	1.5	1.102	.189			▲	
313.1020.01	14 - 16	2.0	1.102	.181			▲	
313.1630.01	8 - 10	3.0	1.260	.169			▲	
313.2140.01	7 - 8	4.0	1.244	.154			▲	
313.2445.01	6 - 7	4.5	1.461	.146			▲	
313.2545.01	6 - 12	2.5 - 4.5	1.457	.146			▲	
							P ●	
							M ●	
							K ●	
							N ●	
							S ●	
							H	

- ▲ on stock  $\Delta$  4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch / P in mm

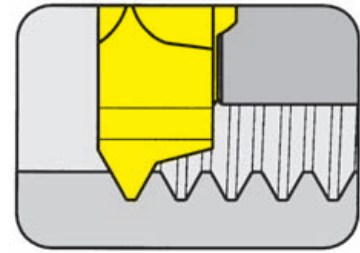
Carbide grades

# THREAD MILLING (internal) Partial profile



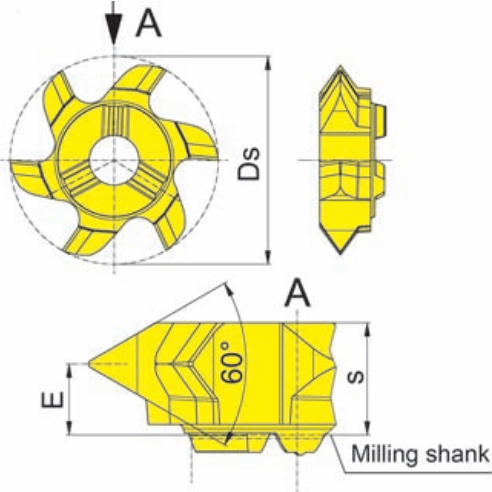
INSERT Type

## 613



Threads per inch  
Cutting edge  $\emptyset$

6 - 32  
Ds .854"



Picture = right hand cutting version

for use with Milling shank

Type MU313  
M313

Metric ISO and UN thread

Part number	Threads per Inch	P	smallest minor $\emptyset$	E	s	Ds	Carbide grades	
							TN35	T125
613.0720.01	12 - 32	1.0 - 2.0	1.063	.181	.220	.854	▲	•
613.2545.01	6 - 12	2.5 - 4.5	1.300	.146	.226	.854	▲	•
							P	•
							M	•
							K	•
							N	•
							S	•
							H	•

Dimensions in inch / P in mm

Carbide grades

▲ on stock Δ 4 weeks  
• main recommendation  
o alternative recommendation  
■ uncoated grades  
■ coated grades  
■ brazed/Cermet

D



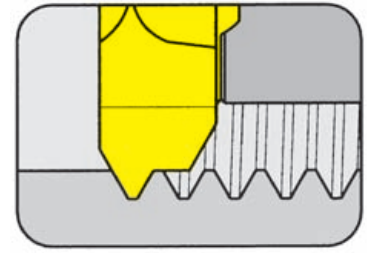
# THREAD MILLING (internal) Full profile



INSERT Type

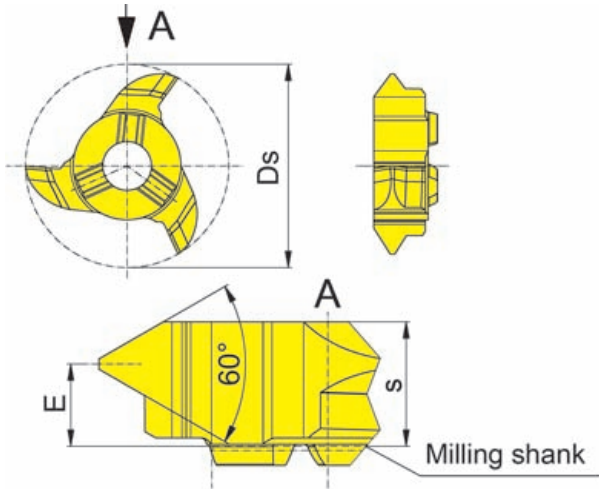
## 313

Pitch P 1.5 - 4.5 mm  
Cutting edge  $\emptyset$  Ds .854"



for use with Milling shank

Type MU313  
M313



Picture = right hand cutting version

Metric ISO and UN thread

Part number	P	smallest minor $\emptyset$	E	s	Ds	Carbide grades	
						TN35	T125
313.0815.02	1.5	1.063	.189	.232	.854	▲	
313.1020.02	2.0	1.181	.181			▲	
313.1630.02	3.0	1.457	.169			▲	
313.1835.02	3.5	1.575	.161			△	
313.2140.02	4.0	1.732	.154			▲	
313.2445.02	4.5	1.890	.150			▲	
						P	•
						M	•
						K	•
						N	•
						S	•
						H	

▲ on stock △ 4 weeks  
● main recommendation  
○ alternative recommendation  
■ uncoated grades  
■ coated grades  
■ brazed/Cermet

Dimensions in inch / P in mm

Carbide grades



# THREAD MILLING (internal) Full profile

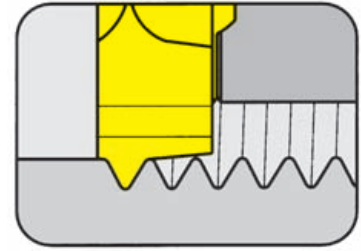


INSERT Type

## 313

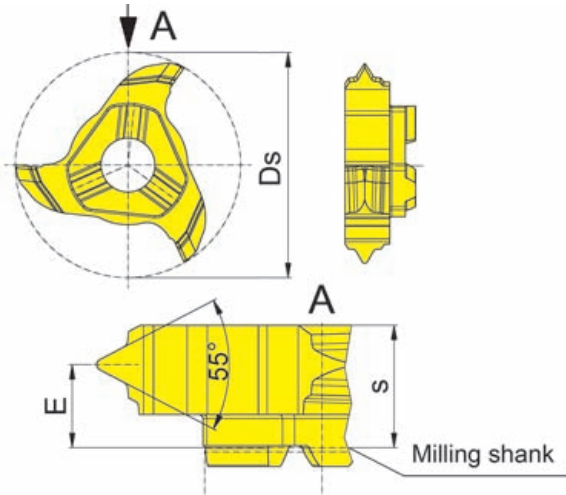
Threads per inch  
Cutting edge  $\emptyset$

6 - 11  
Ds .854"



for use with Milling shank

Type MU313  
M313



Picture = right hand cutting version

Whitworth pipe thread as per  
DIN ISO 228; (259) and  
2999

Part number	Threads per Inch	E	s	Ds	Carbide grades	
					TN35	T125
313.5506.02	6	.118		.854	▲	
313.5508.02	8	.142	.232	.854	▲	
313.5511.02	11	.157			▲	
					P	•
					M	•
					K	•
					N	•
					S	•
					H	•

- ▲ on stock    Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

Carbide grades

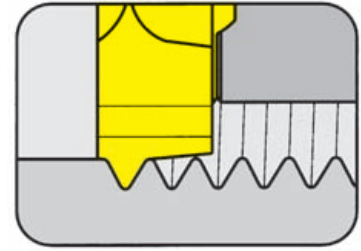
# THREAD MILLING (internal) Full profile



INSERT Type

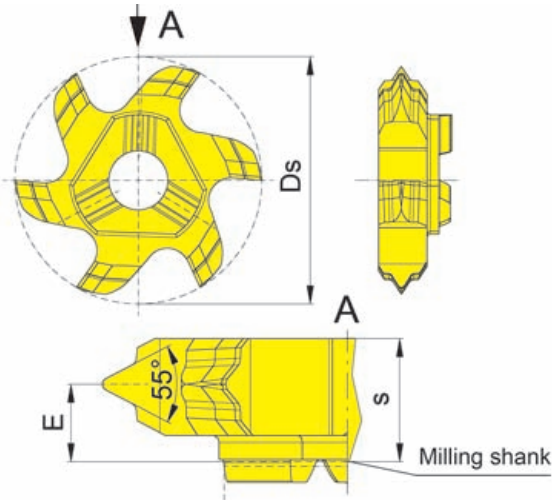
## 613

Threads per inch	11
Cutting edge Ø	Ds .854"



for use with Milling shank

Type MU313  
M313



Picture = right hand cutting version

Whitworth pipe thread as per  
DIN ISO 228; (259) and  
2999

Part number	Threads per Inch	E	s	Ds	Carbide grades		
					TN35	TI25	TA45
<b>613.5511.02</b>	11	.134	.213	.854		Δ	Δ
					P	•	•
					M	•	•
					K	•	•
					N	•	•
					S	•	•
					H		

▲ on stock Δ 4 weeks  
• main recommendation  
○ alternative recommendation  
■ uncoated grades  
■ coated grades  
■ brazed/Cermet

Dimensions in inch

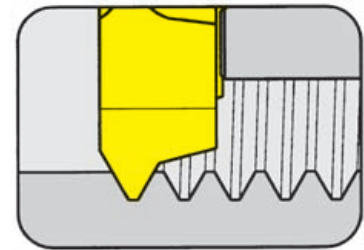
# THREAD MILLING (internal)



MILLING SHANK Type

## SMU328

with through coolant supply



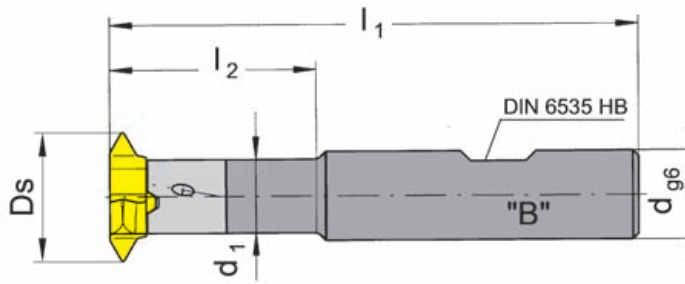
Cutting edge Ø

Ds 1.091"

Material of shank: tungsten alloy (giving good vibration resistance)

for use with Insert

Type 328  
628



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
SMU328.0750.05B	5.118	.984	.591	.750
SMU328.0750.06B	5.709	-	.750	
SMU328.0750.07B	6.299	.984	.591	
SMU328.0750.08B	7.874	-	.750	

Further sizes upon request

Ds see inserts

Dimensions in inch

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
SMU328.0750.0...	5.17T20P	T20PQ

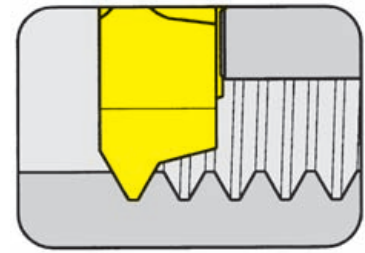
D42

In the UNITED STATES call us toll free  
1 - 888 - 818 HORN

## MILLING SHANK Type

# SM328

with through coolant supply

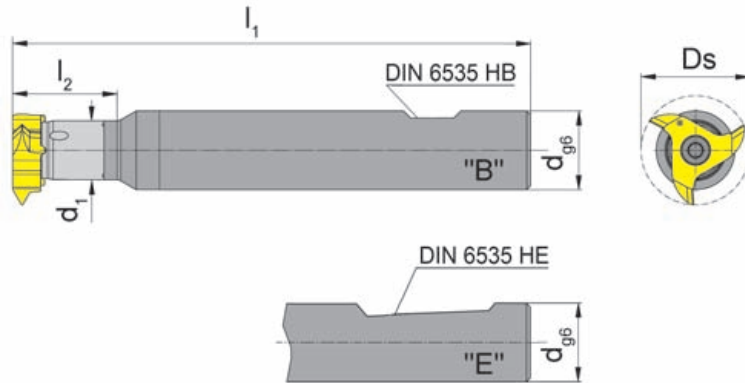


Cutting edge  $\varnothing$  Ds 1.091" (27.7 mm)

Material of shank: tungsten alloy (giving good vibration resistance)

for use with Insert

Type 328  
628



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
SM328.0020.05B	130	25	15	20	B
SM328.0020.06B	145	-	20		
SM328.0020.07B	160	25	15		
SM328.0020.08B	200	-	20		
SM328.0020.05E	130	25	15	20	E
SM328.0020.06E	145	-	20		
SM328.0020.07E	160	25	15		
SM328.0020.08E	200	-	20		

Further sizes upon request

Dimensions in mm

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
SM328.0020.0...	5.17T20P	T20PQ

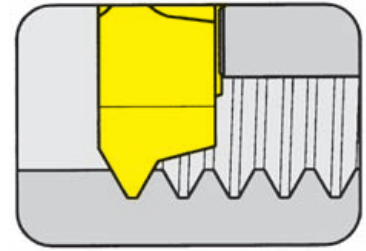
# THREAD MILLING (internal)



## MILLING SHANK Type

# M328

with through coolant supply



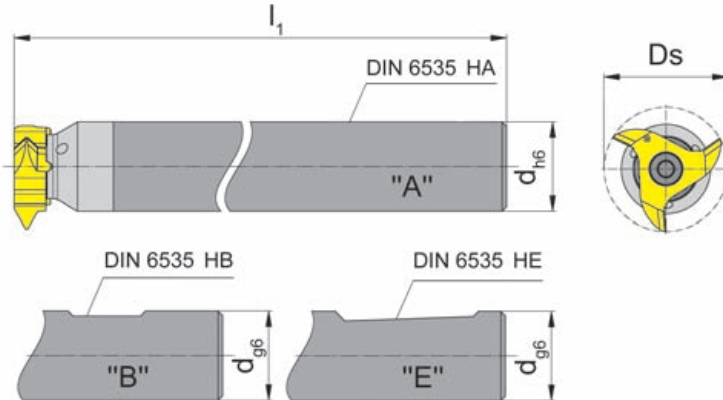
Cutting edge  $\varnothing$

Ds 1.091" (27.7 mm)

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 328  
628



Picture = right hand cutting version

Part number	$l_1$	d	Form
M328.0020.D.05A	145	20	A
M328.0020.D.06A	160		
M328.0020.D.07A	180		
M328.0020.D.05B	145	20	B
M328.0020.D.06B	160		
M328.0020.D.07B	180		
M328.0020.D.05E	145	20	E
M328.0020.D.06E	160		
M328.0020.D.07E	180		

Further sizes upon request

Ds see inserts

Dimensions in mm

### Ordering note:

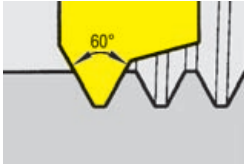
Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M328.0020.D.0...	5.17T20P	T20PQ

## Partial Profile Type 328 and 628



Pitch tpi	Pitch mm	328 Ds 1.091" (27.7)	smallest minor Ø	628 Ds 1.091" (27.7)	smallest minor Ø
32	0.75	328.0720.01	1.260		
28		328.0720.01	1.260		
24	1	328.0720.01	1.260		
20	1.25	328.0720.01	1.260	628.1525.01	1.339
		328.1525.01	1.260		
18		328.0720.01	1.260	628.1525.01	1.339
		328.1525.01	1.260		
16	1.5	328.0720.01	1.260	628.1525.01	1.339
		328.1525.01	1.299		
14		328.0720.01	1.260	628.1525.01	1.339
		328.1525.01	1.299		
13		328.1525.01	1.299	628.1525.01	1.339
12	2	328.1525.01	1.299	628.1525.01	1.339
10	2.5	328.3050.01	1.654	628.3050.01	1.575
9		328.3050.01	1.654	628.3050.01	1.575
8	3	328.3050.01	1.654	628.3050.01	1.575
7	3.5	328.3050.01	1.654	628.3050.01	1.575
6	4	328.3050.01	1.654	628.3050.01	1.575
		328.5060.01	1.811		
5	5	328.5060.01	1.811	628.5060.01	1.890
	5.5	328.5060.01	1.811	328.5060.01	1.890
	6.0	328.5060.01	1.811	328.5060.01	1.890

Dimensions in inch (mm)

### Attention:

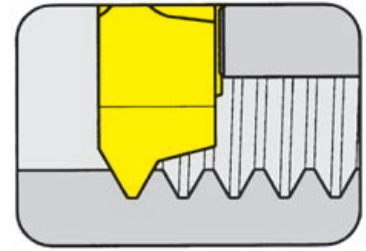
Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.

# THREAD MILLING (internal) Partial profile



INSERT Type

## 328

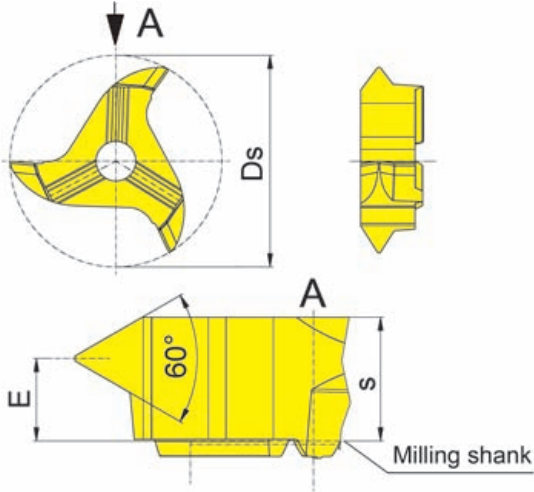


Threads per inch  
Cutting edge  $\emptyset$

5 - 32  
Ds 1.091"

for use with Milling shank

Type SMU328  
SM328  
M328



Picture = right hand cutting version

Metric ISO and UN thread

Part number	Threads per Inch	P	smallest minor $\emptyset$	E	s	Ds	Carbide grades	
							TN35	T125
328.0720.01	14 - 32	1.0 - 2.0	1.260	.181	.234	1.091	▲	
328.1525.01	12 - 20	1.5 - 2.5	1.299	.169	.234		▲	
328.3050.01	6 - 10	3.0 - 5.0	1.654	.189	.283		▲	▲
328.5060.01	5 - 6	5.0 - 6.0	1.811	.173	.283		▲	
							P	• •
							M	• •
							K	• •
							N	• •
							S	• •
							H	

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch / P in mm

Carbide grades

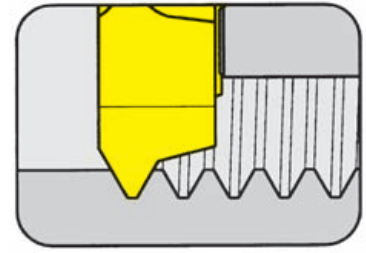


# THREAD MILLING (internal) Partial profile



INSERT Type

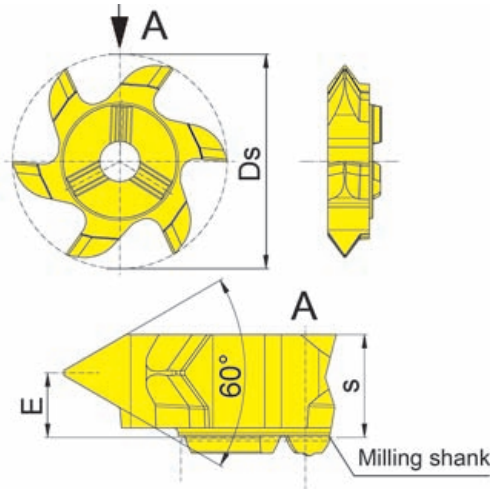
## 628



Threads per inch	5 - 20
Cutting edge $\varnothing$	Ds 1.091"

for use with Milling shank

Type SMU328  
SM328  
M328



Picture = right hand cutting version

Metric ISO and UN thread

Part number	Threads per Inch	P	smallest minor $\varnothing$	E	s	Ds	Carbide grades	
							TN35	T125
628.1525.01	12 - 20	1.5 - 2.5	1.339	.189	.236	1.091	▲	▲
628.3050.01	6 - 10	3.0 - 5.0	1.575	.146	.226	1.091	▲	▲
628.5060.01	5 - 6	5.0 - 6.0	1.890	.126	.226	1.091	▲	▲
							P	•
							M	•
							K	•
							N	•
							S	•
							H	•

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch / P in mm

Carbide grades



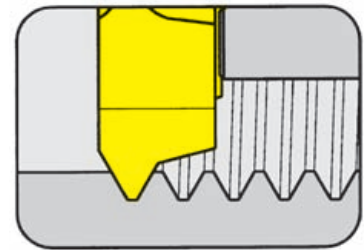
# THREAD MILLING (internal)



## MILLING SHANK Type

## M332

with through coolant supply



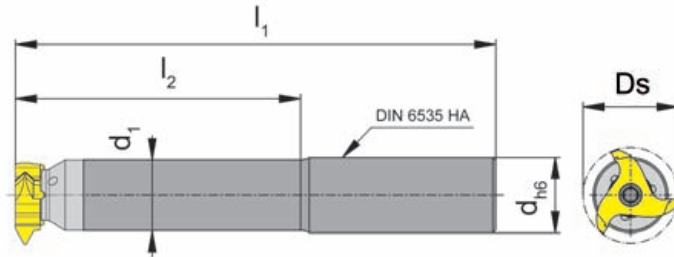
Cutting edge  $\varnothing$

Ds 1.248" (31.7 mm)

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 332  
632



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M332.2325.06A	160	95	23.5	25	A
M332.2325.07A	180	115			
M332.2325.08A	200	135			
M332.2325.09A	250	185			

Further sizes upon request

Ds see inserts

Dimensions in mm

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

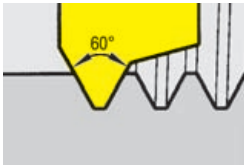
### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M332.2325.0...	5.17T20P	T20PQ

## Selection for thread inserts

type 632

Partial profile, metric type 632



Pitch tpi	Pitch mm	Insert 632 Ds 1.248" (31.7 mm)	smallest minor $\varnothing$ (inch)
6	4	632.4060.01	1.634
5	5	632.4060.01	1.594
	5.5	632.4060.01	1.575
4	6	632.4060.01	1.555

Dimensions in inch



### Attention:

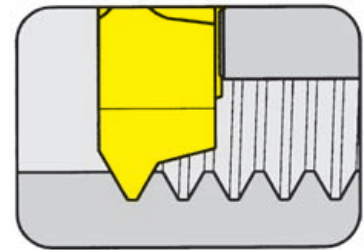
Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.

# THREAD MILLING (internal) Partial profile



INSERT Type

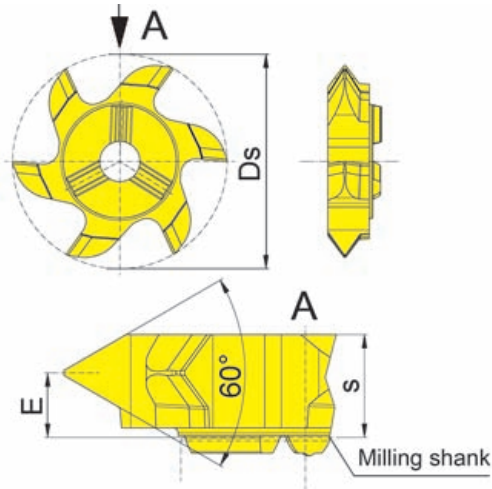
**632**



Pitch P 4.0 - 6.0 mm  
Cutting edge  $\varnothing$  Ds 1.248"

for use with Milling shank

Type M332



Picture = right hand cutting version

Metric ISO thread

Part number	P	smallest minor $\varnothing$	E	s	Ds	Carbide grades				
						MG12	TN35	T125	TA45	AS45
<b>632.4060.01</b>	4.0 - 6.0	1.555	.126	.228	1.248			▲		
						P		•		
						M		•		
						K		•		
						N		•		
						S		•		
						H				

- ▲ on stock  $\Delta$  4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

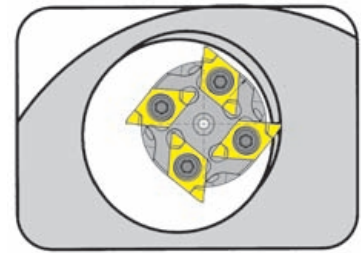
Dimensions in inch / P in mm

Carbide grades

## MILLING SHANK Type

# M275

with through coolant supply



D

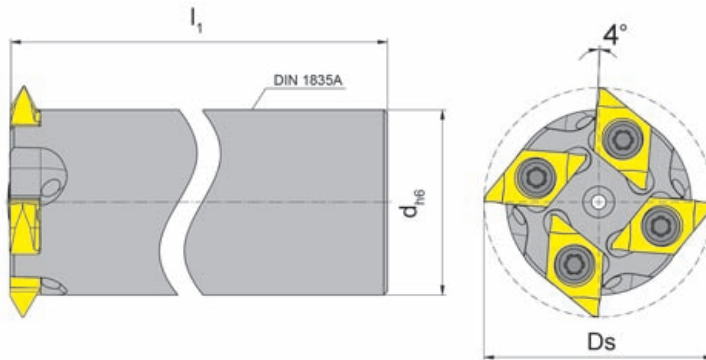
Cutting edge  $\varnothing$

1.220" (31.0 mm)

Material of shank: Steel (not recommended for shrink fitting)

for use with Indexable insert

Type RS275



Picture = right hand cutting version

Part number	Z	Ds	$l_1$	d
<b>M275.031.D25.3.04A</b>	4	31	125	25

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

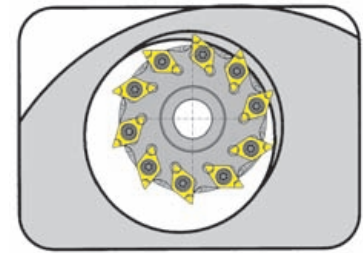
## Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M275.031.D25.3.04A	<b>3.5.10.T10P</b>	<b>T10PL</b>

## MILLING CUTTER Type

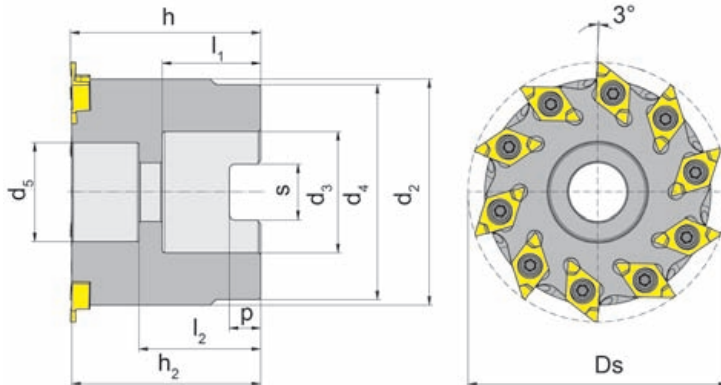
# M275

with through coolant supply



Cutting edge  $\varnothing$

38 / 48 / 58 mm



for use with Indexable insert

Type S275

Picture = right hand cutting version

Part number	Z	Ds	h	h <sub>2</sub>	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	d <sub>5</sub>	l <sub>1</sub>	l <sub>2</sub>	s	p
<b>M275.0038.A16.05</b>	5	38	33.0	32.7	32.0	16	32.0	13.5	18	22.7	8.4	5.6
<b>M275.0048.A22.08</b>	8	48	37.0	36.7	40.5	22	40.5	18.5	20	24.7	10.4	6.3
<b>M275.0058.A27.10</b>	10	58	42.5	42.2	50.0	27	48.0	22.0	22	27.2	12.4	7.0

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

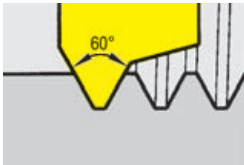
## Spare parts

Milling cutter	Screw	Screw	TORX PLUS® Wrench	Washer
M275.0038.A16.05	<b>DIN912-M8x25</b>	<b>3.5.10.T10P</b>	<b>T10PL</b>	<b>020.0813.3438</b>
M275.0048.A22.08	<b>DIN912-M10x25</b>	<b>3.5.10.T10P</b>	<b>T10PL</b>	<b>DIN433-10.5-St</b>
M275.0058.A27.10	<b>DIN912-M12x30</b>	<b>3.5.10.T10P</b>	<b>T10PL</b>	<b>DIN433-13-St</b>

## Selection for thread inserts

type **S275**

Partial profile, metric type S275



Pitch tpi	Pitch mm	Insert	smallest minor Ø (inch) per cutter body Ds			
			M275 Ds 1.220" (31mm)	M275 Ds 1.496" (38 mm)	M275 Ds 1.890" (48 mm)	M275 Ds 2.284" (58 mm)
16	1.5	RS275.1535.01	1.432	1.708	2.101	2.495
14		RS275.1535.01				
13		RS275.1535.01				
12	2.0	RS275.1535.01	1.332	1.608	2.041	2.434
10	2.5	RS275.1535.01	1.311	1.586	2.019	2.413
9		RS275.1535.01				
8	3.0	RS275.1535.01	1.329	1.604	1.998	2.392
7	3.5	RS275.1535.01	1.308	1.583	1.977	2.371

Dimensions in inch

### Attention:

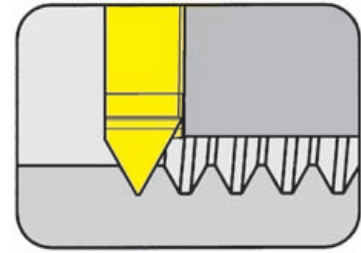
Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.

# THREAD MILLING (internal) Partial profile



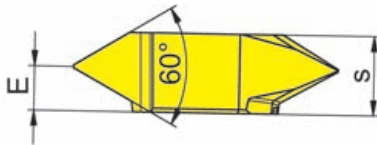
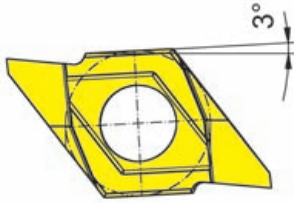
INDEXABLE INSERT Type

## RS275



Threads per inch  
Cutting edge  $\emptyset$

7 - 16  
Ds manuell "



for use with Milling shank

Type M275

R = right hand version shown

Metric ISO thread

Part number	Threads per Inch	P	smallest minor $\emptyset$	E	s	Ds	Carbide grades				
							MG12	TN35	T125	TA45	AS45
<b>RS275.1535.01</b>	7 - 16	1.5 - 3.5	1.457	.091	.161	1.220				▲	
							P				•
							M				•
							K				•
							N				•
							S				•
							H				

- ▲ on stock  $\Delta$  4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

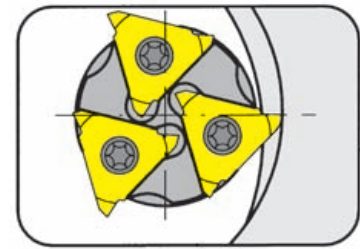
Dimensions in inch / P in mm

Carbide grades

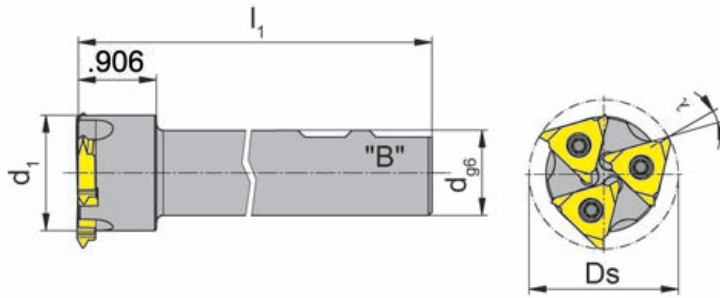


## MILLING SHANK Type

# U380



Cutting edge Ø Ds 1.732"



for use with Indexable insert

Type 314

Picture = right hand cutting version

Part number	Z	Ds	t <sub>max</sub>	w	l <sub>1</sub>	d <sub>1</sub>	d
U380.1732.03B	3	1.732	.157	.236	5.000	1.339	1.000

Further sizes upon request

Dimensions in inch

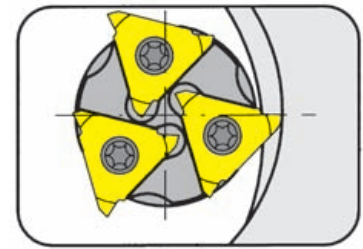
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
U380.1732.03B	5.12T20P	T20PQ

MILLING SHANK Type

**380**

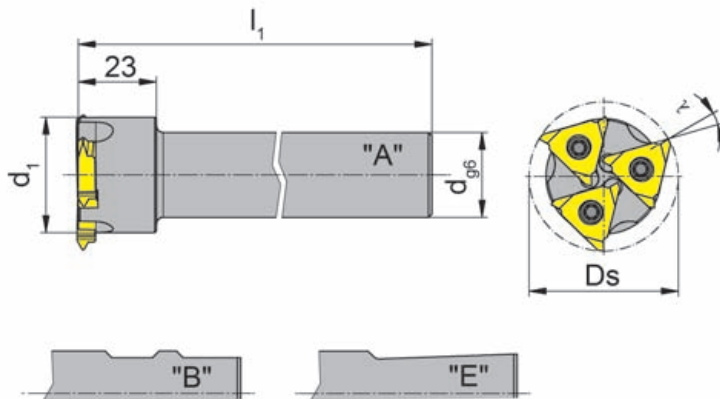


Cutting edge  $\varnothing$

Ds 1.732" (44.0 mm)

for use with Indexable insert

Type 314



Picture = right hand cutting version

Part number	Z	Ds	t <sub>max</sub>	l <sub>1</sub>	d <sub>1</sub>	d	$\lambda$	Form
380.0044.03A	3	44	4	125	34	25	14°	A
380.0044.03B	3	44	4	125	34	25	14°	B
380.0044.03E	3	44	4	125	34	25	14°	E

Further sizes upon request

Dimensions in mm

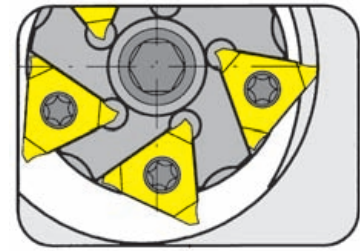
For torque specifications of the screw, please see Technical Instructions.

## Spare parts

Milling shank	Screw	TORX PLUS® Wrench
380.0044.03...	5.12T20P	T20PQ

## MILLING CUTTER Type

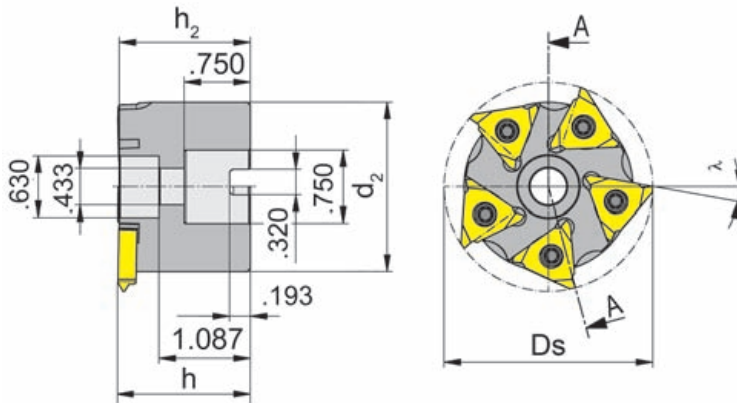
# U380



Cutting edge  $\varnothing$  Ds 2.480"

for use with Indexable insert

Type 314



Picture = right hand cutting version

Part number	Z	Ds	t <sub>max</sub>	h	h <sub>2</sub>	d <sub>2</sub>	λ
<b>U380.2480.05</b>	5	2.480	.197	1.575	1.559	2.008	10°

Further sizes upon request

Dimensions in inch

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

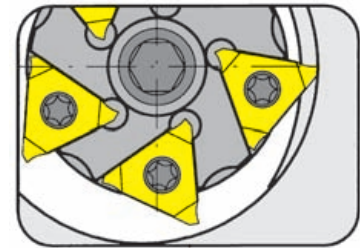
Milling cutter	Screw	Screw	TORX PLUS® Wrench	Washer
U380.2480.05	<b>10.25.912</b>	<b>5.12T20P</b>	<b>T20PQ</b>	<b>10.5.433</b>

# THREAD MILLING (internal)



MILLING CUTTER Type

**380**



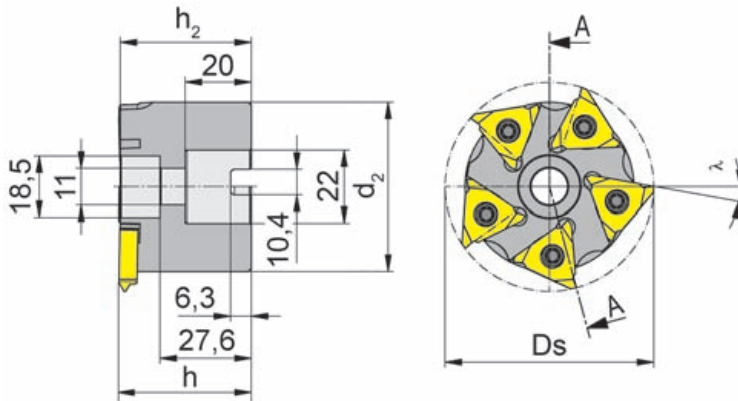
Cutting edge  $\varnothing$

Ds 2.480" (63.0 mm)

Cutterhole and cross keyway as per DIN 138

for use with Indexable insert

Type 314



Picture = right hand cutting version

Part number	Z	Ds	t <sub>max</sub>	h	h <sub>2</sub>	d <sub>2</sub>	λ
380.0063.05	5	63	5	40	39.6	51	10°

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

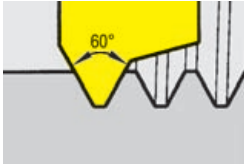
## Spare parts

Milling cutter	Screw	Screw	TORX PLUS® Wrench	Washer
380.0063.05	10.25.912	5.12T20P	T20PQ	10.5.433

D58

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## Partial Profile Type 314



Pitch tpi	Pitch mm	314 Ds 1.732" (44.0)	smallest minor Ø per cutter body	
			380 Ds 1.732" (44mm)	380 Ds 2.480" (63mm)
16	1.5	R314.1535.01	1.983	2.771
14		R314.1535.01		
13		R314.1535.01		
12	2.0	R314.1535.01	1.883	2.671
10	2.5	R314.1535.01	1.862	2.649
9				
8	3.0	R314.1535.01	1.841	2.628
7	3.5	R314.1535.01	1.819	2.607
6	4.0	R314.2140.01	2.664	3.570
		R314.4060.01	2.389	3.294
5	5.0	R314.4060.01	2.149	2.858
	5.5	R314.4060.01	2.049	2.836
4	6	R314.3260.01	3.051	3.918
		R314.4060.01	2.028	2.815

Dimensions in inch



### Attention:

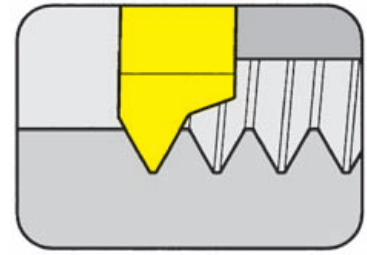
Recutting of the milling tool will create profile errors if the nominal diameter of the component will be smaller than recommended.

# THREAD MILLING (internal) Partial profile



INDEXABLE INSERT Type

## 314

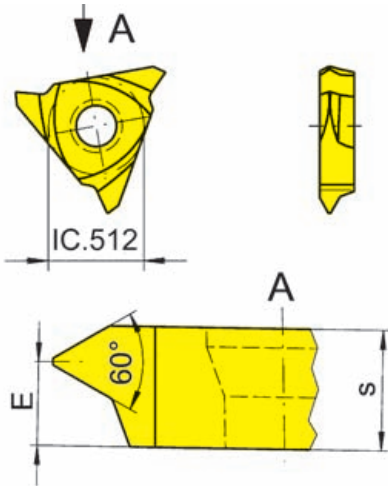


Threads per inch  
Cutting edge Ø from

4 - 16  
Ds 1.732"

for use with Milling shank

Type U380  
380



Picture = right hand cutting version

Metric ISO and UN thread

Part number	Threads per Inch	P	smallest minor Ø	E	s	Ds	Carbide grades	
							TN35	T125
R314.1535.01	7 - 16	1.5 - 3.5		.130			▲	
R314.2140.01	6	4.0	2.717	.118	.215	1.732	▲	
R314.4060.01	4 - 6	4.0 - 6.0		.106			▲	
R314.3260.01	4	6.0	4.055	.106	.215	2.480	▲	
							P	•
							M	•
							K	•
							N	•
							S	•
							H	•

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

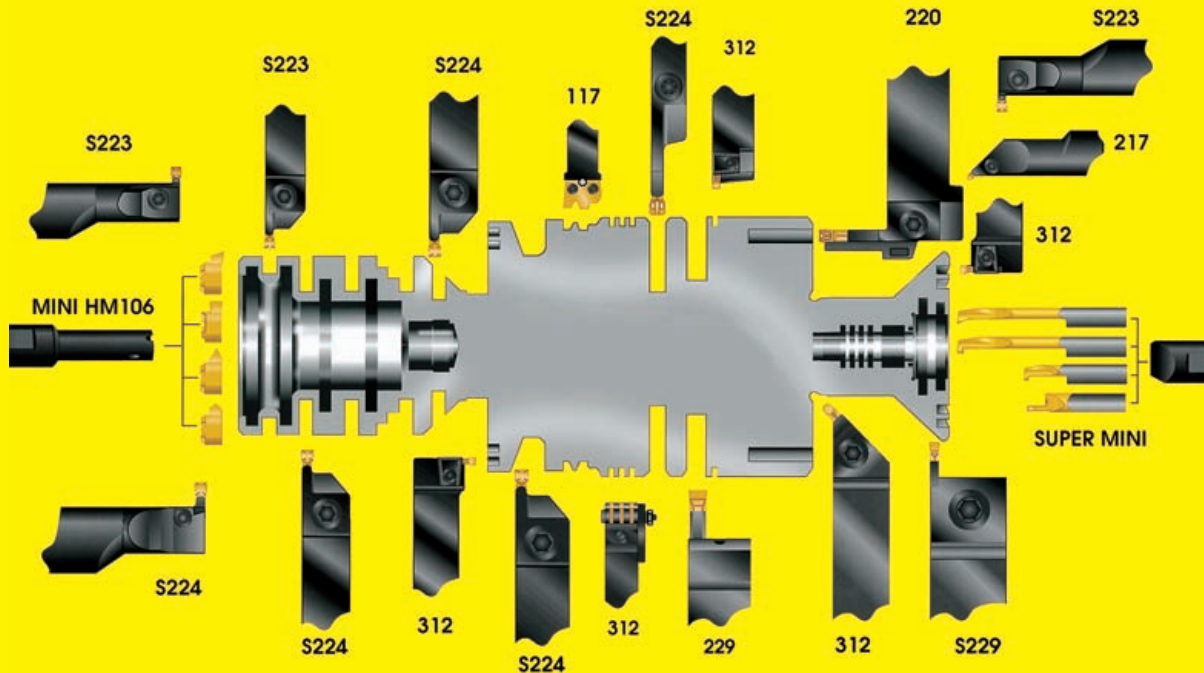
Dimensions in inch / P in mm

Carbide grades

**Ordering note:**

R314.3260.01 only for milling cutter 380.0063.05

## HORN - THE LEADERS IN GROOVING TECHNOLOGY



### THERE IS ALWAYS A (GROOVING) SOLUTION...

...and if it doesn't already exist, we will find it.

**HORN** has developed the world's most effective range of grooving technology by providing solutions to problems that others have walked away from.

Many of our 9000 standard catalog items were developed as specials - but many customers had the same requirements leading to standards. Even though our standard catalog range is very broad, it is dwarfed by our database of over 85000 special solutions. So your problem might be something that we've already encountered. If we haven't, then we like a challenge.

**HORN – INTELLIGENT TOOL DESIGN AT WORK.**

For further information, please contact HORN USA.

# CHAPTER E

- Step #1: Establish bore diameter
- Step #2: Find Depth of Cut (DOC) requirements
- Step #3: Follow column and row to find correct tool type
- Step #4: Look up tool type to find available widths

		DOC (Depth of cut) $t_{max}$										
Bore $\varnothing$	$\leq .031$ (0.79)	$\leq .043$ (1.1)	$\leq .047$ (1.2)	$\leq .055$ (1.4)	$\leq .059$ (1.5)	$\leq .067$ (1.7)	$\leq .087$ (2.2)	$\leq .091$ (2.3)	$\leq .098$ (2.5)	$\leq .110$ (2.8)	$\leq .118$ (3.0)	$\leq .138$ (3.5)
$\geq .377$ (9.6)	108 306	108 306	108 306	108 306								
$\geq .472$ (12.0)	306 606	606	606	606	606							
$\geq .539$ (13.7)	111	111	111	111	111							
$\geq .603$ (15.3)	311	311	311	311	311	311	311	311	311			
$\geq .630$ (16.0)	308 608	308 608	308 608	608	608	608	608					
$\geq .709$ (18.0)	311 611	311 611	311 611	311 611	611	611	611	611	611	611		
$\geq .866$ (22.0)	313 613	313 613	313 613	313 613	313 613	313 613	313 613	313 613	313 613	313	313	
$\geq 1.103$ (28.0)	328 628	328 628	328 628	328 628	328 628	328 628	328 628	328 628	328 628	328 628	328	328
$\geq 1.260$ (32.0)	332	332	332	332	332	332	332	332	332	332	332	332

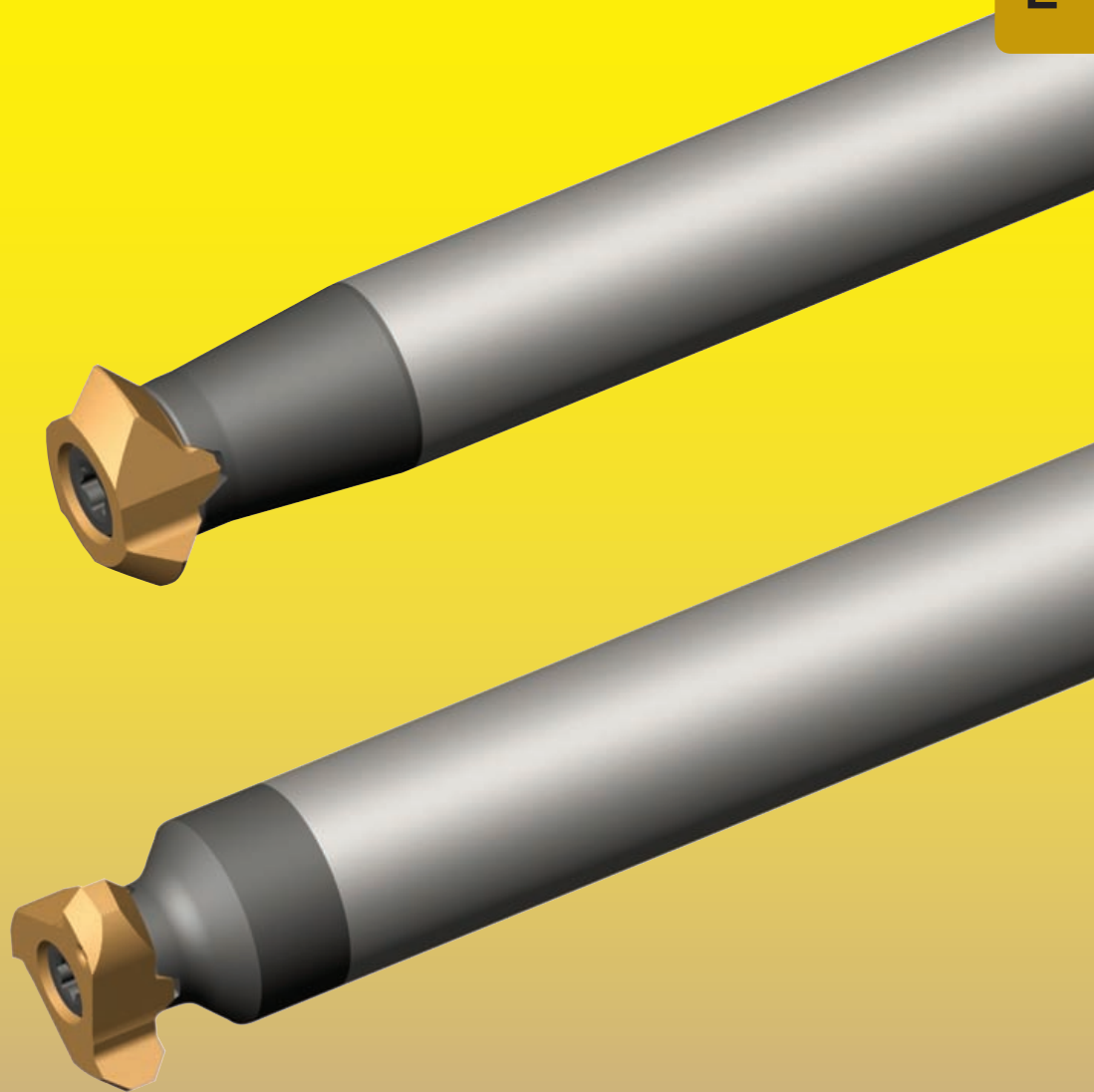
Dimensions in inch (mm)



MILLING SHANK type **M306**

Cutting edge Ø

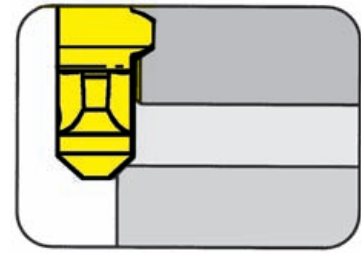
**.366" / .461" (9.3 / 11.7 mm)**



## MILLING SHANK Type

# M306

no coolant supply



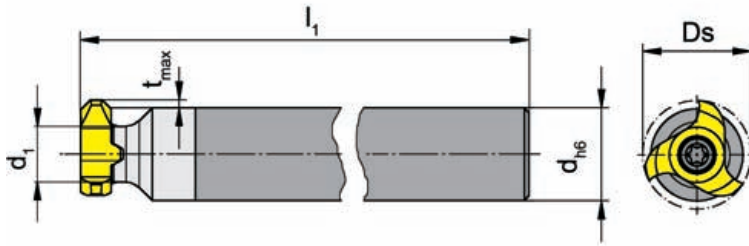
Cutting edge  $\emptyset$

Ds 9.3/11.7 mm

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 108  
306  
606



Picture = right hand cutting version

Part number	$l_1$	$d_1$	d
M306.0707.03A	100	6	7.5
M306.1010.03A	120	6	10.0

Further sizes upon request

$t_{max}$  and Ds see inserts

Dimensions in mm

### Ordering note:

All milling cutter shanks can be used for **right** and **left** hand inserts type 108.

Milling cutter shanks with damaged seating can be repaired by HORN.

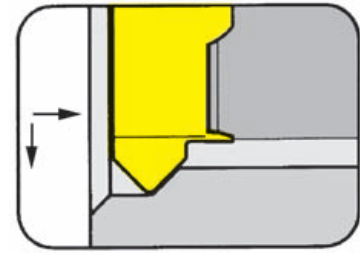
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M306....	2.6.5T8EP	T8PL

## INSERT Type

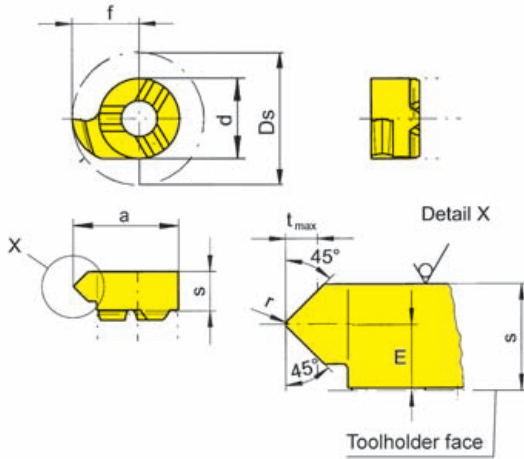
# 108



Width of chamfer up to  $.055''$   
Cutting edge  $\varnothing$  Ds  $.366''$

for use with Milling shank

Type MU306  
M306



R = right hand version shown

L = left hand version

Part number	E	r	s	f	d	t <sub>max</sub>	Ds	Carbide grades			
								MG12	TN35	T125	TA45
<b>R/L108.4545.02</b>	.071	.008	.142	.183	.236	.055	.366		▲/▲	▲/▲	▲/
								P	•	•	•
								M	•	•	•
								K	•	•	•
								N	•	•	•
								S	•	•	•
								H			

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

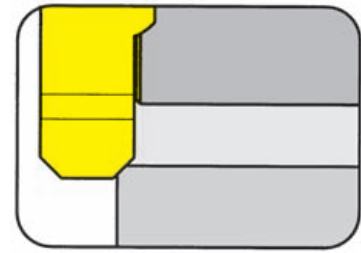
Dimensions in inch

State R or L version

When using toolholder M306.0707.03A or M306.1010.03A t<sub>max</sub> is reduced.

## INSERT Type

# 306

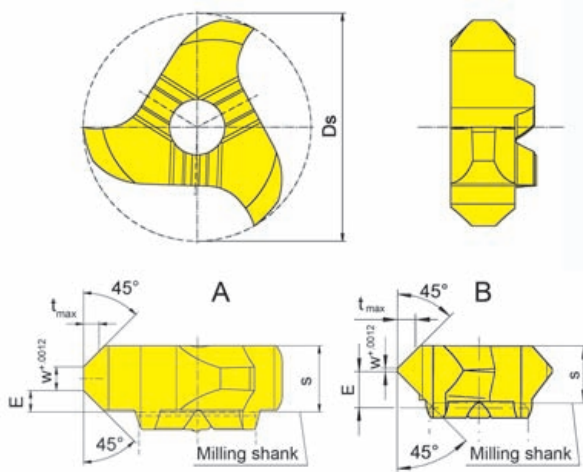


Width of chamfer up to  
Cutting edge  $\varnothing$

.055"  
Ds .366 / .461 "

for use with Milling shank

Type MU306  
M306



Picture = right hand cutting version

Part number	w	s	t <sub>max</sub>	E	Ds	Form	MG12	TN35	T125	TF45	
306.4545.00	.047	.134	.031	.043	.461	A	▲	▲	▲	▲	
306.4593.20	.008	.134	.055	.063	.366	B			▲		
							P	○	●	●	●
							M	●	●	●	●
							K	●	●	●	●
							N	●	●	●	●
							S	●	●	●	●
							H				

Dimensions in inch

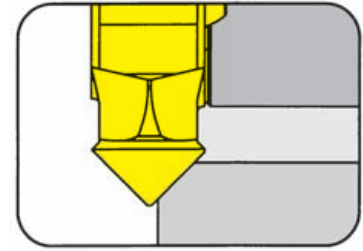
Carbide grades

When using toolholder M306.0707.03A or M306.1010.03A with insert 306.4593.20 t<sub>max</sub> is reduced.

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

## INSERT Type

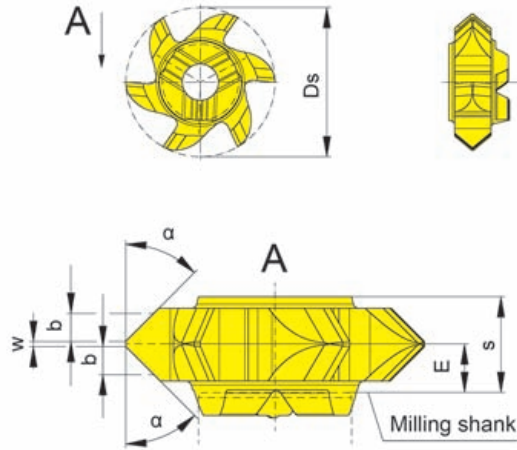
# 606



Width of chamfer up to Cutting edge  $\varnothing$  .059"  
Ds .461"

for use with Milling shank

Type MU306  
M306



Picture = right hand cutting version

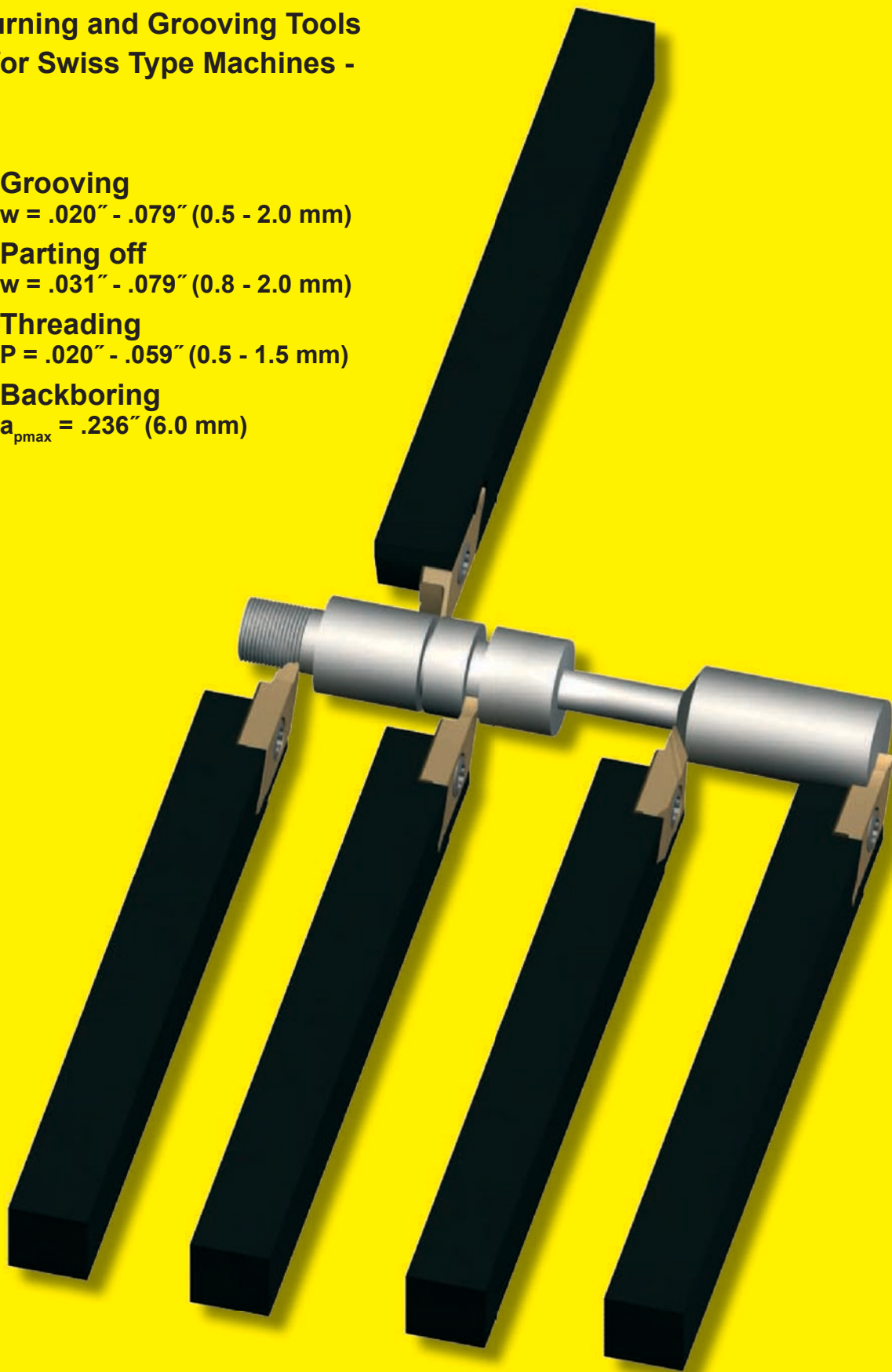
Part number	w	b	s	E	Ds	$\alpha$	Carbide grades			
							MG12	TN35	T125	TA45
606.1515.20	.008	.059	.146	.075	.461	15°				▲
606.2020.20		.059				20°				▲
606.3030.20		.059				30°				▲
606.4545.20		.043				45°				▲
▲ on stock    Δ 4 weeks ● main recommendation ○ alternative recommendation □ uncoated grades ■ coated grades ■ brazed/Cermet							P			●
							M			●
							K			●
							N			●
							S			●
							H			

Dimensions in inch

Carbide grades

**Turning and Grooving Tools  
- for Swiss Type Machines -**

- **Grooving**  
w = .020" - .079" (0.5 - 2.0 mm)
- **Parting off**  
w = .031" - .079" (0.8 - 2.0 mm)
- **Threading**  
P = .020" - .059" (0.5 - 1.5 mm)
- **Backboring**  
a<sub>pmax</sub> = .236" (6.0 mm)

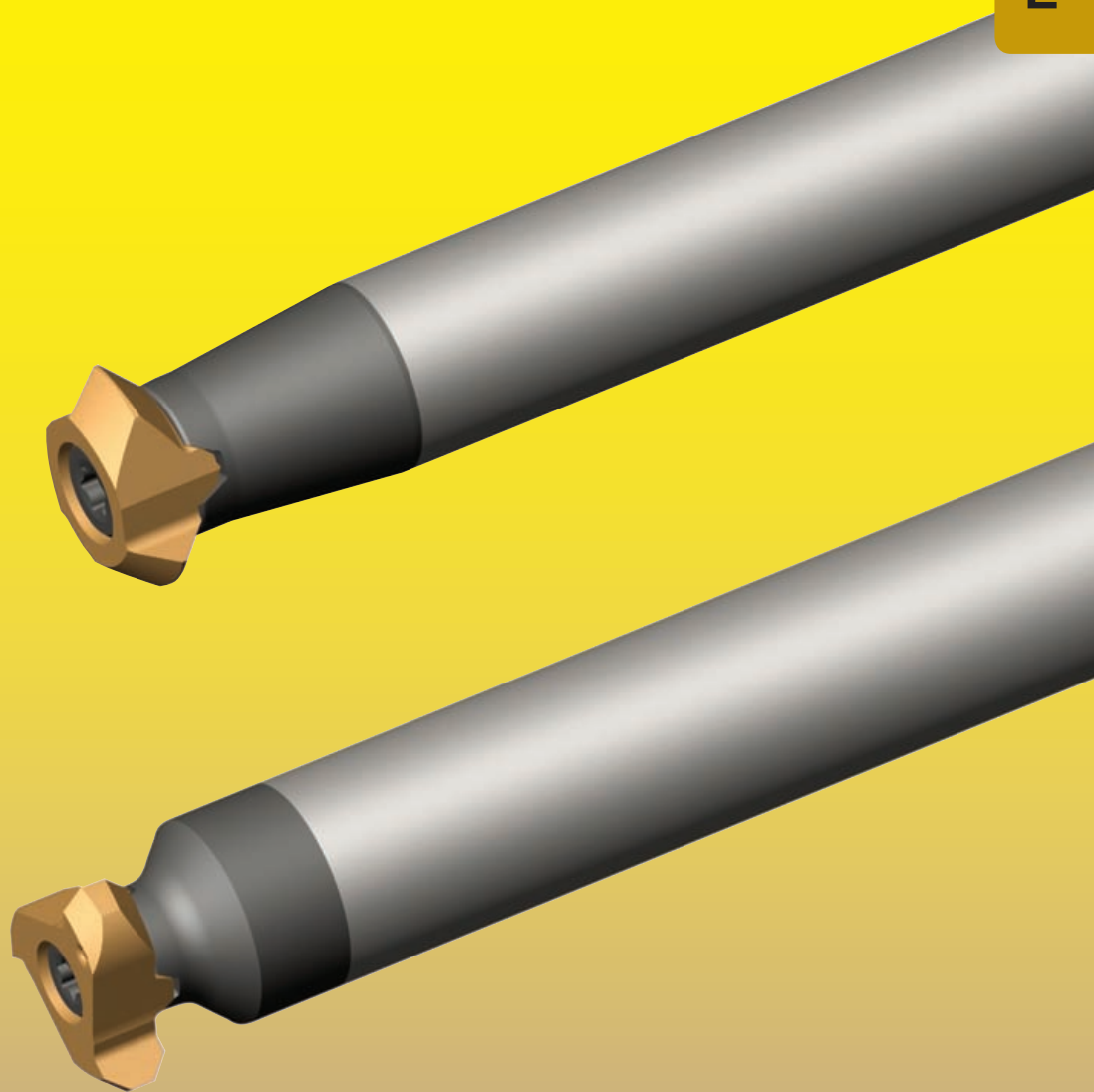


For further tools for Swiss type machines please see our catalog  
"CARBIDE GROOVING TOOLS"

MILLING SHANK type **M308**

Cutting edge Ø

**.528" / .618" (13.4 / 15.7 mm)**



## MILLING SHANK Type

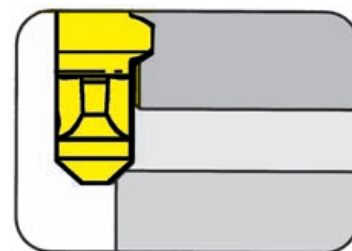
## M308

with through coolant supply

Cutting edge  $\emptyset$

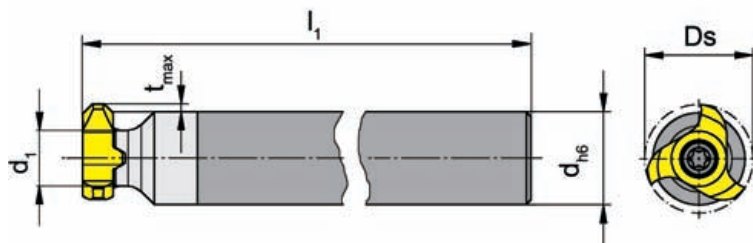
Ds 13.4/15.7 mm

Material of shank: Carbide - Giving a good vibration resistance



for use with Insert

Type 111  
308  
608



Picture = right hand cutting version

Part number	$l_1$	$d_1$	d
M308.0012.07A	160	8	12

Further sizes upon request

$t_{max}$  and Ds see inserts

Dimensions in mm

### Ordering note:

All milling cutter shanks can be used for **right** and **left** hand inserts type 111.

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

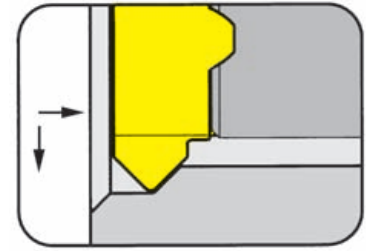
### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M308.0012.07A	3.5.12T10EP	T10PL



## INSERT Type

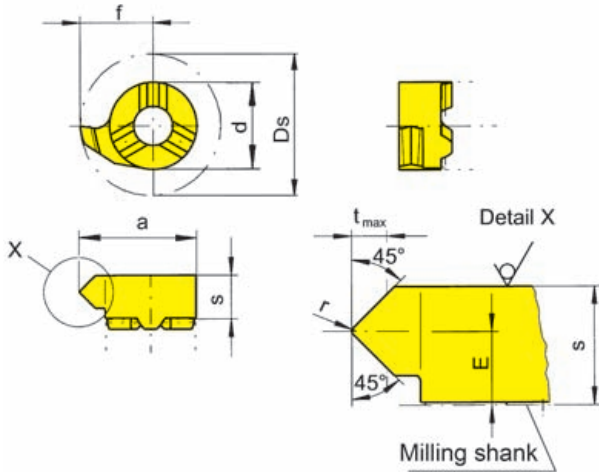
# 111



Width of chamfer up to Cutting edge  $\varnothing$  .059"  
Ds .528"

for use with Milling shank

Type MU308  
M308



R = right hand version shown

L = left hand version

Part number	E	r	s	f	d	t <sub>max</sub>	Ds	Carbide grades		
								MG12	TN35	T125
<b>R/L111.4545.02</b>	.094	.008	.163	.264	.315	.059	.528		▲/▲	
								P	•	
								M	•	
								K	•	
								N	•	
								S	•	
								H		

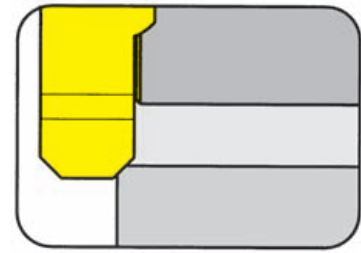
- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

State R or L version

## INSERT Type

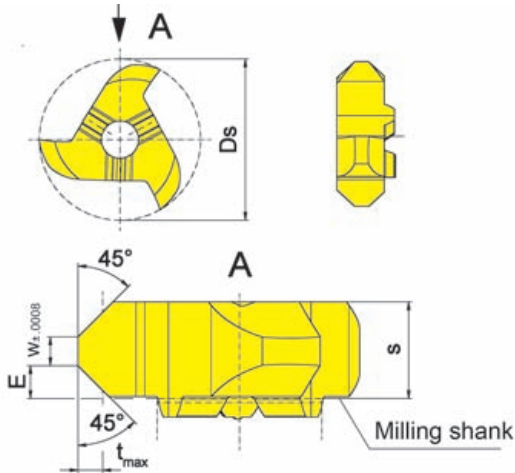
# 308



Width of chamfer up to  $.047''$   
Cutting edge  $\varnothing$  Ds  $.618''$

for use with Milling shank

Type MU308  
M308



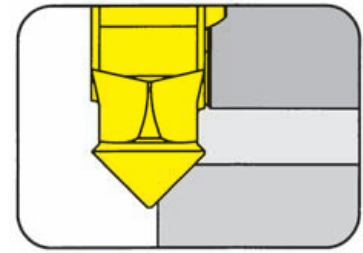
Picture = right hand cutting version

Part number	w	s	t <sub>max</sub>	E	Ds	Carbide grades		
						MG12	TN35	T125
<b>308.4545.00</b>	.055	.185	.047	.063	.618		▲	
▲ on stock Δ 4 weeks ● main recommendation ○ alternative recommendation ■ uncoated grades ■ coated grades ■ brazed/Cermet						P	●	
						M	●	
						K	●	
						N	●	
						S	●	
						H		

Dimensions in inch

## INSERT Type

# 608

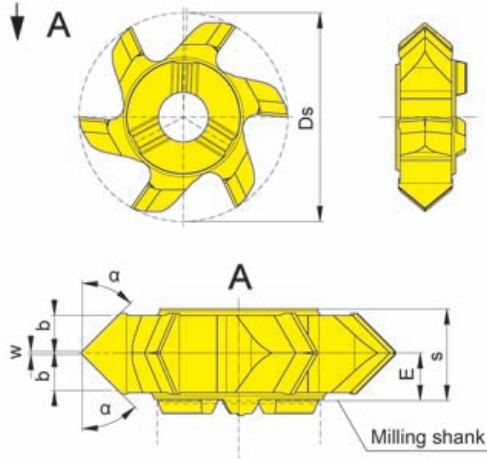


Width of chamfer up to  $.087''$   
Cutting edge  $\emptyset$  Ds  $.618''$

for use with Milling shank

Type MU308  
M308

**E**



Picture = right hand cutting version

Part number	w	b	s	E	Ds	$\alpha$	Carbide grades				
							MG12	TN35	TI25	TA45	AS45
608.1515.20		.087				15°				△	
608.2020.20		.087				20°				△	
608.3030.20	.008	.087	.201	.102	.618	30°				△	
608.4545.20		.067				45°			▲		
▲ on stock    △ 4 weeks ● main recommendation ○ alternative recommendation ■ uncoated grades ■ coated grades ■ brazed/Cermet							P		●	●	
							M		●	●	
							K		●	●	
							N		●	●	
							S		●	●	
							H				

Dimensions in inch

## HORN - THE LEADERS IN GROOVING TECHNOLOGY

E



**Broaching on CNC Machines from Ø 14 mm**

SYSTEM 117

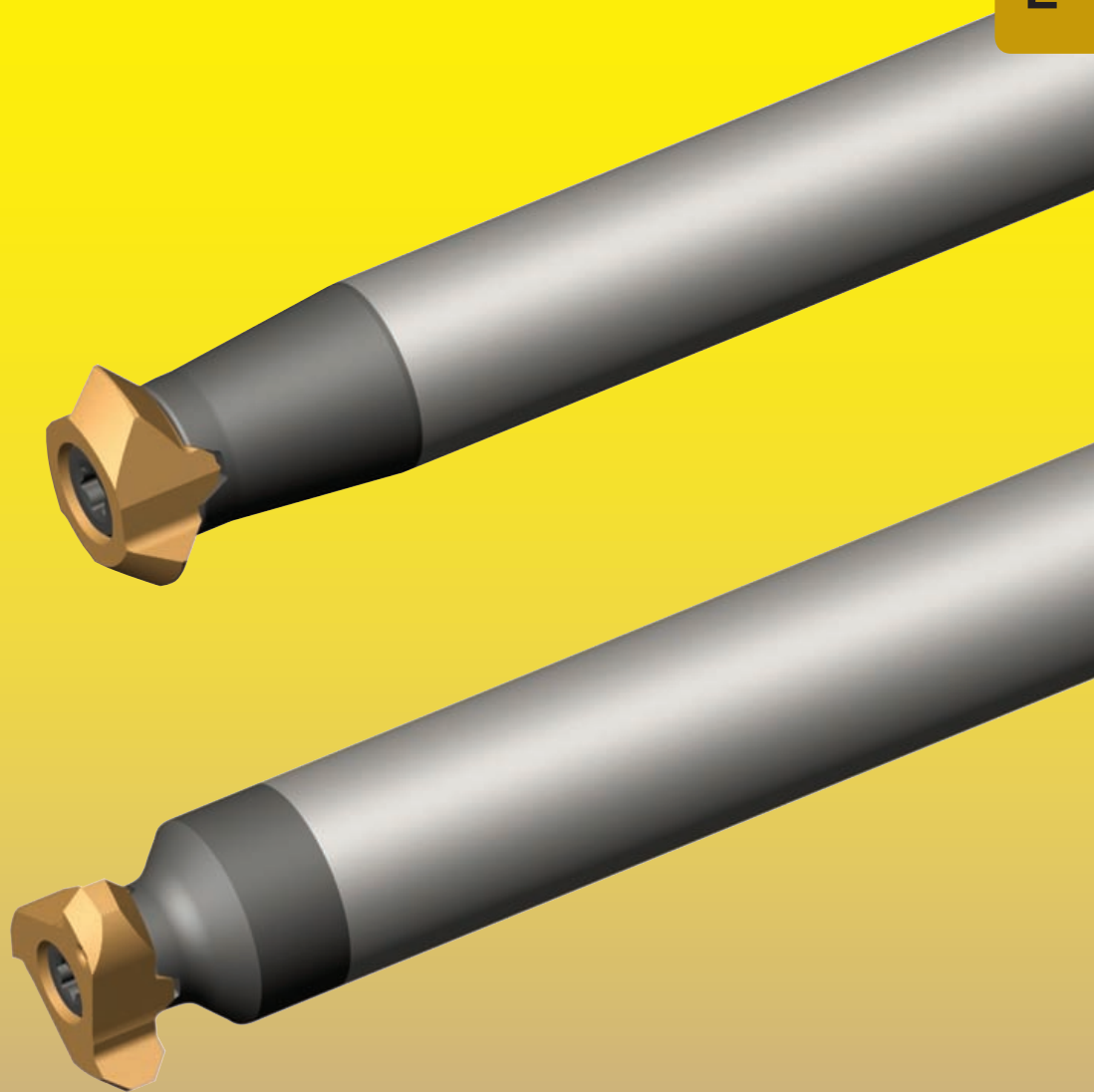
**HORN - INTELLIGENT TOOL DESIGN AT WORK.**

For further information, please see our catalog "CARBIDE GROOVING TOOLS".

MILLING SHANK type **MU311**

Cutting edge Ø

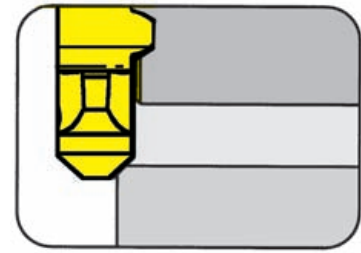
**.591" / .697" (15.0 / 17.7 mm)**



## MILLING SHANK Type

# MU311

with through coolant supply



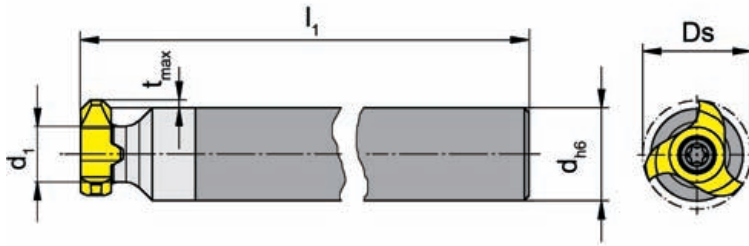
Cutting edge  $\emptyset$

Ds .697 / .591 "

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 311  
611



Picture = right hand cutting version

Part number	$l_1$	$d_1$	d
MU311.1212.07A	6.301	.354	.500

Further sizes upon request

$t_{max}$  and Ds see inserts

Dimensions in inch

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

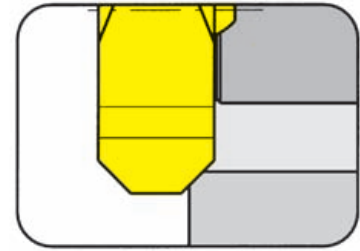
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
MU311.1212.07A	2.6.5T8EP	T8PL

## INSERT Type

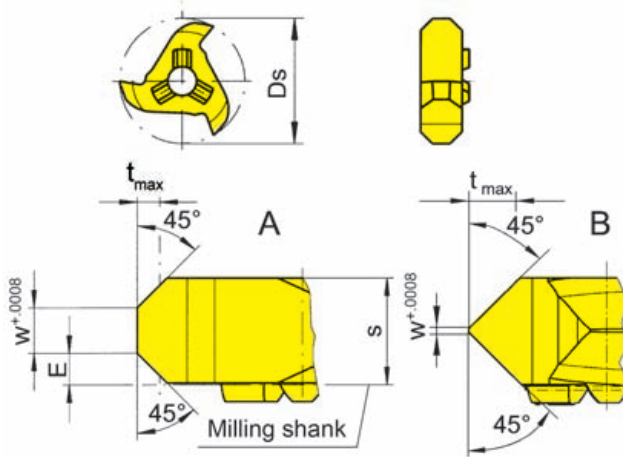
# 311



Width of chamfer up to  $\varnothing$  .098" / Ds .591 / .697 "

for use with Milling shank

Type MU311  
M311



Picture = right hand cutting version

Part number	w	s	t <sub>max</sub>	E	Ds	Form	Carbide grades		
							MG12	TN35	TI25
311.4545.00	.098	.234	.055	.067	.697	A		▲	
311.4545.20	.008	.234	.098	.116	.591	B		▲	▲
							P	•	•
							M	•	•
							K	•	•
							N	•	•
							S	•	•
							H		

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

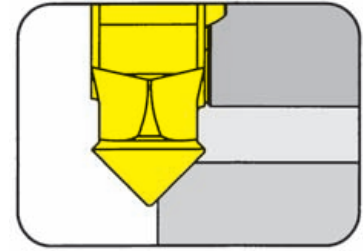
Dimensions in inch

Carbide grades

When using toolholder MU311.1212.07A with insert 311.4545.20 t<sub>max</sub> is reduced.

## INSERT Type

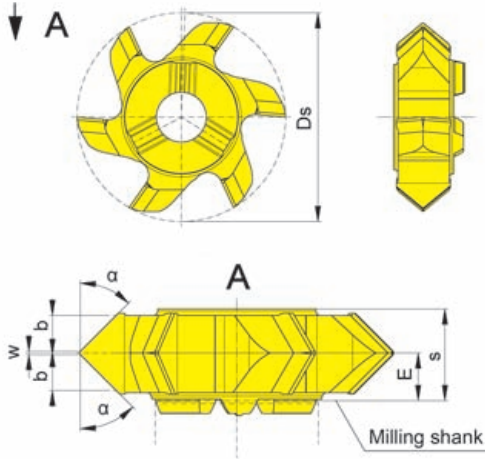
# 611



Width of chamfer up to  $.110''$   
Cutting edge  $\emptyset$  Ds  $.697''$

for use with Milling shank

Type MU311  
M311



Picture = right hand cutting version

Part number	w	b	s	E	Ds	$\alpha$	Carbide grades			
							MG12	TN35	TI25	TA45
611.1515.20	.008	.110	.248	.126	.697	15°				Δ
611.2020.20		.110				20°			Δ	
611.3030.20		.110				30°			Δ	
611.4545.20		.091				45°			Δ	
▲ on stock   Δ 4 weeks ● main recommendation ○ alternative recommendation ■ uncoated grades ■ coated grades ■ brazed/Cermet							P		●	●
							M		●	●
							K		●	●
							N		●	●
							S		●	●
							H			

Dimensions in inch

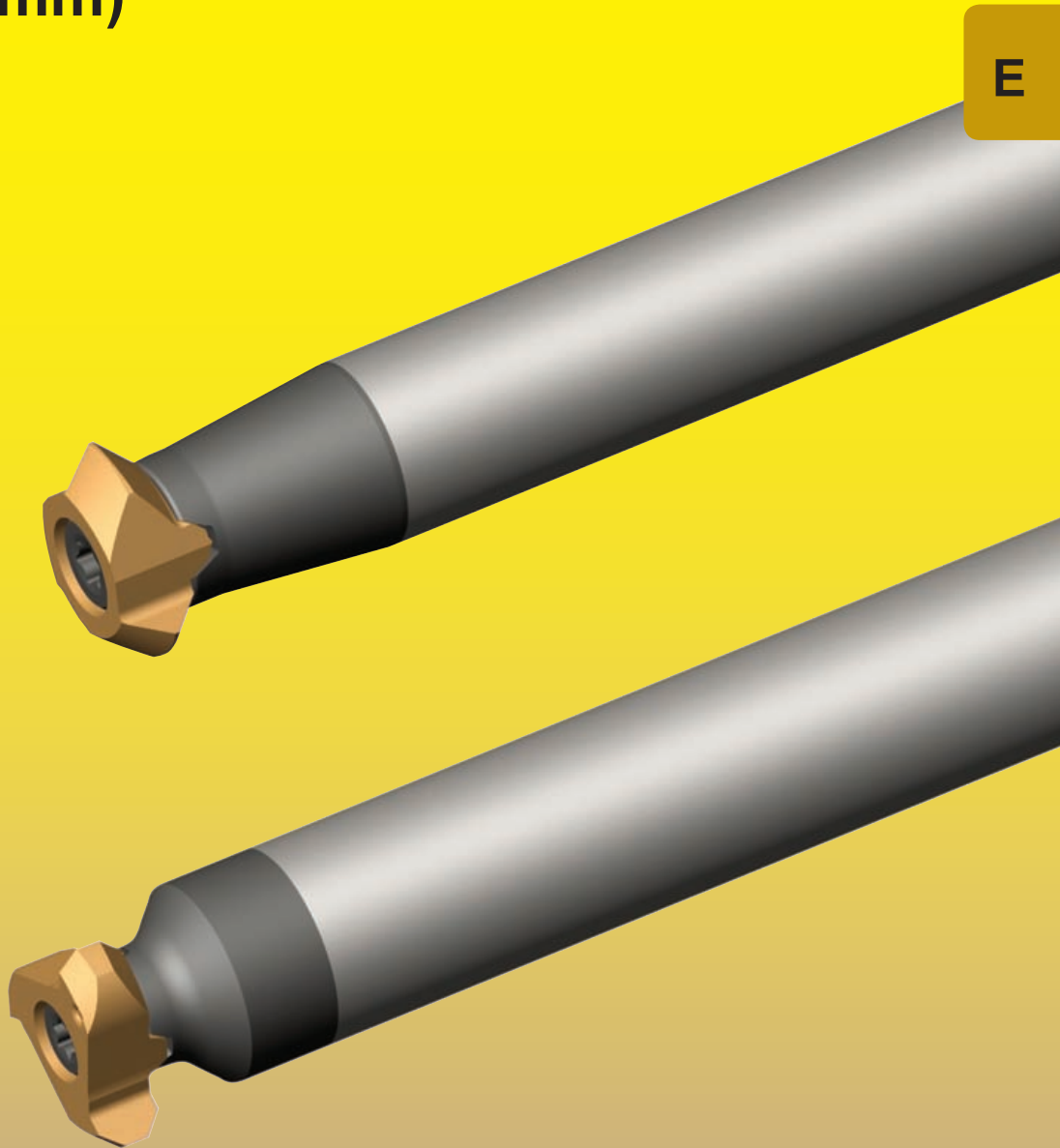
Carbide grades



MILLING SHANK type **MU313**

Cutting edge Ø

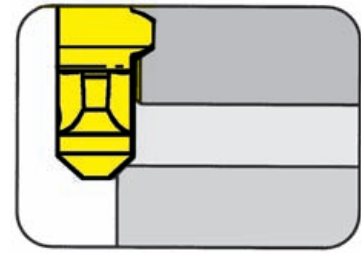
**.854" (21.7 mm)**



## MILLING SHANK Type

# MU313

with through coolant supply



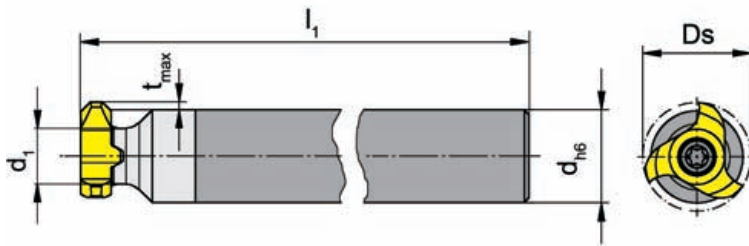
Cutting edge  $\varnothing$

Ds .854"

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 313  
613



Picture = right hand cutting version

Part number	$l_1$	$d_1$	d
MU313.1515.08A	7.874	.445	.625

Further sizes upon request

$t_{max}$  and Ds see inserts

Dimensions in inch

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

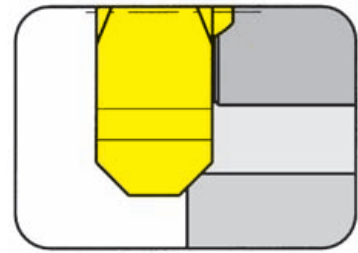
Milling shank	Screw	TORX PLUS® Wrench
MU313.1515.08A	2.6.5T8EP	T8PL

## INSERT Type

# 313

Width of chamfer up to  
Cutting edge  $\varnothing$

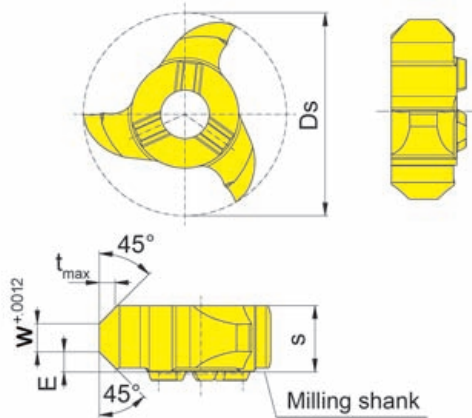
.118"  
Ds .854"



for use with Milling shank

Type MU313  
M313

E



Picture = right hand cutting version

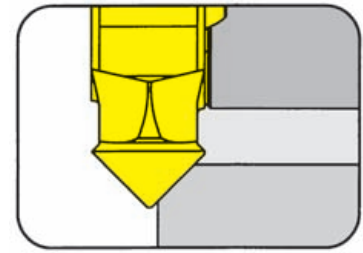
Part number	w	s	t <sub>max</sub>	E	Ds	MG12	TN35	TI25	TA45
<b>313.4545.00</b>	.118	.280	.067	.085	.854		▲		▲
<b>313.4545.30.00</b>	.102	.370	.118	.142	.854				▲
▲ on stock Δ 4 weeks						P	•	•	•
• main recommendation						M	•	•	•
o alternative recommendation						K	•	•	•
■ uncoated grades						N	•	•	•
■ coated grades						S	•	•	•
■ brazed/Cermet						H			

Dimensions in inch

Carbide grades

## INSERT Type

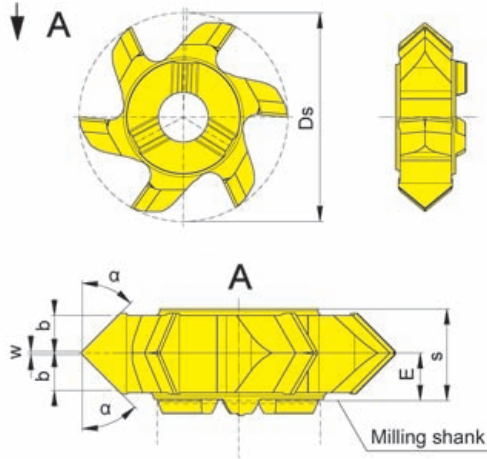
# 613



Width of chamfer up to  $.106''$   
Cutting edge  $\emptyset$  Ds  $.854''$

for use with Milling shank

Type MU313  
M313



Picture = right hand cutting version

Part number	w	b	s	E	Ds	$\alpha$	Carbide grades			
							MG12	TN35	TI25	TA45
613.1515.20	.008	.106	.248	.130	.854	15°				▲
613.2020.20		.106				20°			▲	
613.3030.20		.106				30°			▲	
613.4545.20		.098				45°			▲	
							P		•	•
							M		•	•
							K		•	•
							N		•	•
							S		•	•
							H			

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

Carbide grades

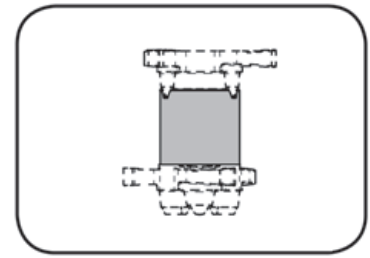
## Double grooving with insert type 313

E



## ADAPTOR Type

# Z313

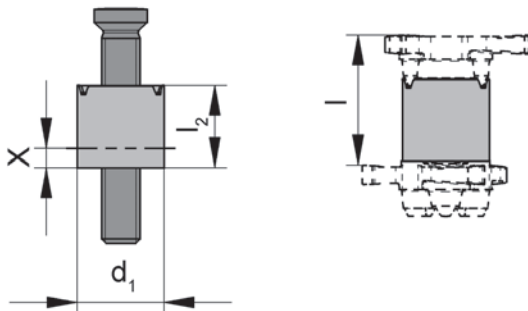


Adaptor for inserts type 313.D...

Material of shank: Steel

for use with Insert

Type U313  
313  
313.D



Part number	l	l <sub>2</sub>	X	d <sub>1</sub>
Z.313.0011.057	9.9	3.7 - 5.7	0 - 2.0	11.3
Z.313.0011.082	11.9	5.7 - 8.2	0 - 2.5	
Z.313.0011.107	14.4	8.2 - 10.7	0 - 2.5	

Further sizes upon request

Dimensions in mm

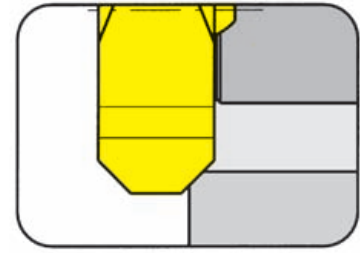
For torque specifications of the screw, please see Technical Instructions.

## Spare parts

Adaptor	Screw	TORX PLUS® Wrench
Z.313.0011.057	<b>5.26T20P</b>	<b>T20PQ</b>
Z.313.0011.082	<b>5.28T20P</b>	<b>T20PQ</b>
Z.313.0011.107	<b>5.30T20P</b>	<b>T20PQ</b>

## INSERT Type

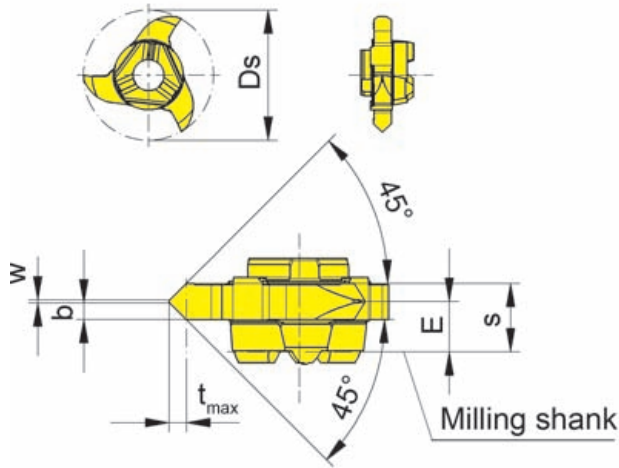
# 313.D



Width of chamfer up to  $.055''$   
Cutting edge  $\varnothing$   $D_s .854''$

for use with Milling shank

Type M313



Picture = right hand cutting version

Part number	w	b	s	t <sub>max</sub>	E	D <sub>s</sub>	Carbide grades				
							MG12	TN35	T125	TA45	AS45
<b>313.D.4545.00</b>	.009	.051	.224	.055	.165	.854		▲			▲
▲ on stock Δ 4 weeks							P	•	•	•	•
• main recommendation							M	•	•	•	•
o alternative recommendation							K	•	•	•	•
■ uncoated grades							N	•	•	•	o
■ coated grades							S	•	•	•	•
■ brazed/Cermet							H				

Dimensions in inch

# High Polish Turning with diamond tools Type 105 and 117



**H10**  
*technische Diamanten*

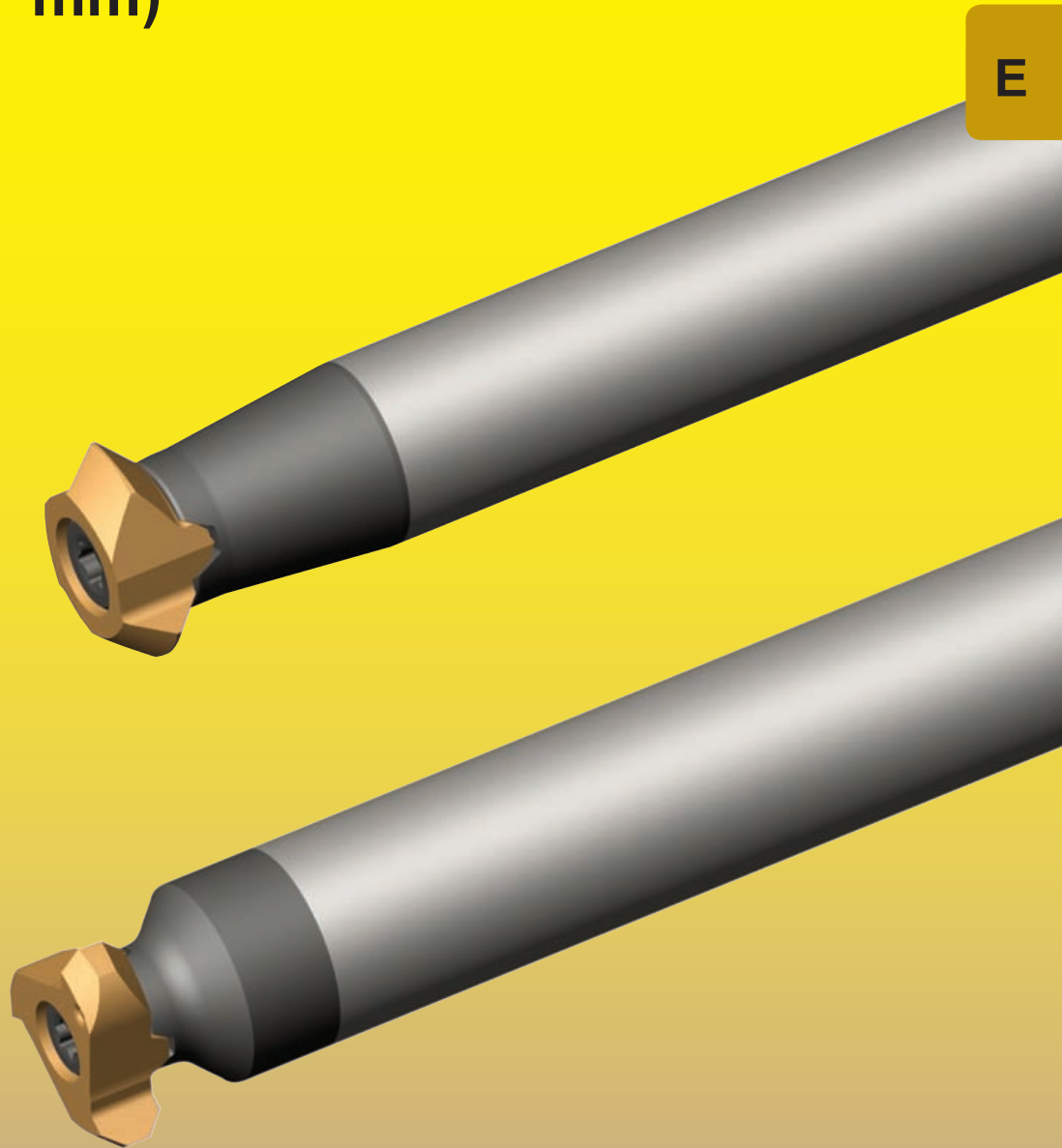
For further tools for high polish turning please see our catalog  
"CARBIDE GROOVING TOOLS"



MILLING SHANK type **M328**

Cutting edge Ø

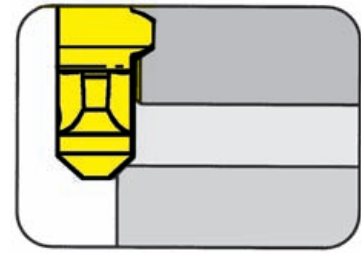
**1.091" (27.7 mm)**



## MILLING SHANK Type

# M328

with through coolant supply



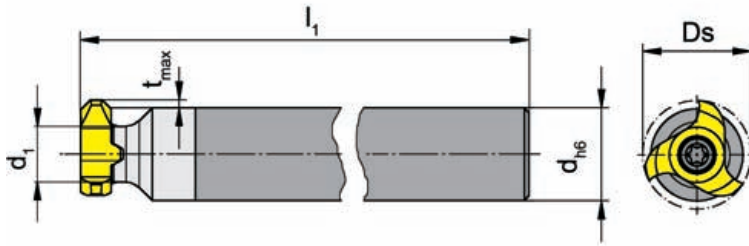
Cutting edge  $\varnothing$

Ds .976" (24.8 mm)

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 328  
628



Picture = right hand cutting version

Part number	$l_1$	$d_1$	d
M328.0020.10A	250	14.3	20

Further sizes upon request

$t_{max}$  and Ds see inserts

Dimensions in mm

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

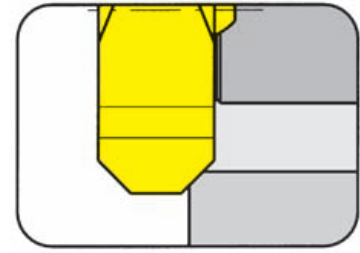
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M328.0020.10A	5.14T20P	T20PQ

## INSERT Type

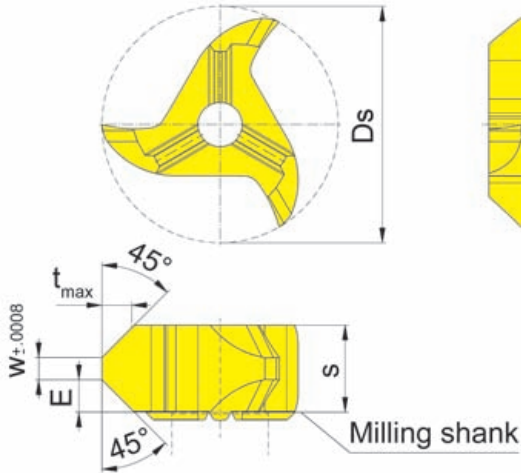
# 328



Width of chamfer up to Cutting edge  $\varnothing$  .138"  
Ds 1.091"

for use with Milling shank

Type M328



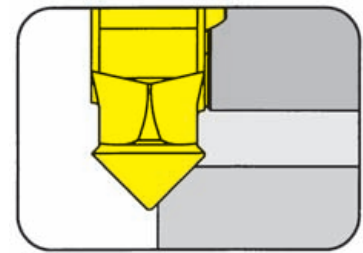
Picture = right hand cutting version

Part number	w	s	t <sub>max</sub>	E	Ds	Carbide grades				
						MG12	TN35	T125	TA45	AS45
<b>328.4545.35.00</b>	.102	.402	.138	.150	1.091				▲	
▲ on stock Δ 4 weeks						P			•	
● main recommendation						M			•	
○ alternative recommendation						K			•	
■ uncoated grades						N			•	
■ coated grades						S			•	
■ brazed/Cermet						H				

Dimensions in inch

## INSERT Type

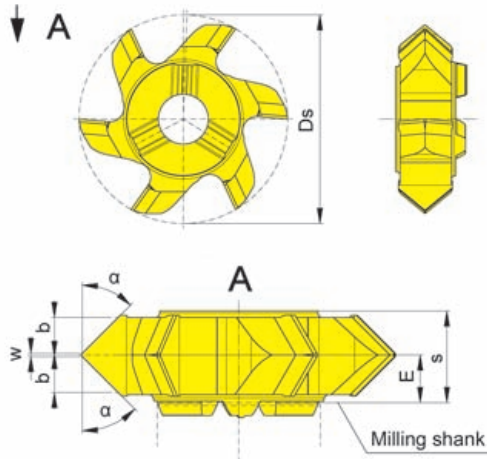
# 628



Width of chamfer up to  $.110''$   
Cutting edge  $\varnothing$  Ds  $1.091''$

for use with Milling shank

Type M328



Picture = right hand cutting version

Part number	w	b	s	E	Ds	$\alpha$	Carbide grades			
							MG12	TN35	T125	TA45
<b>628.3030.20</b>	.008	.110	.248	.126	1.091	30°				△
<b>628.4545.20</b>						45°				△
<ul style="list-style-type: none"> <li>▲ on stock    △ 4 weeks</li> <li>● main recommendation</li> <li>○ alternative recommendation</li> <li>■ uncoated grades</li> <li>■ coated grades</li> <li>■ brazed/Cermet</li> </ul>							P			●
							M			●
							K			●
							N			●
							S			●
							H			

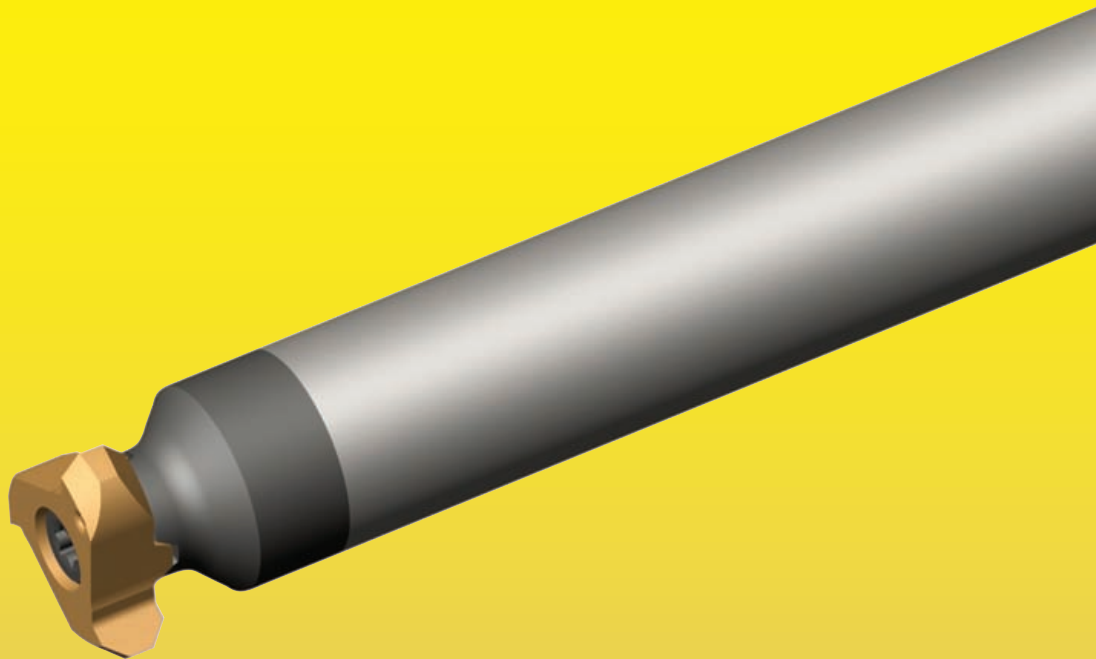
Dimensions in inch

Carbide grades

MILLING SHANK type **MU332**

Cutting edge Ø

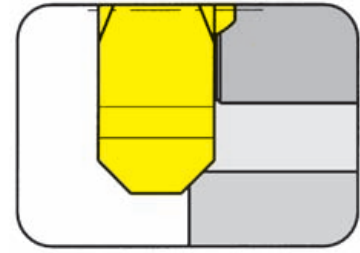
**1.248" (31.7 mm)**



## MILLING SHANK Type

# MU332

with through coolant supply



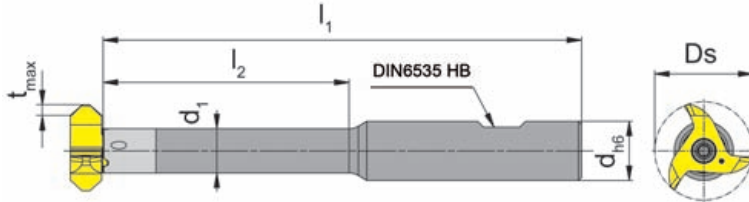
Cutting edge Ø

Ds 1.248"

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 332



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
<b>MU332.0750.03B</b>	6.299	3.346	.563	.750

Further sizes upon request

$t_{max}$  and Ds see inserts

Dimensions in inch

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

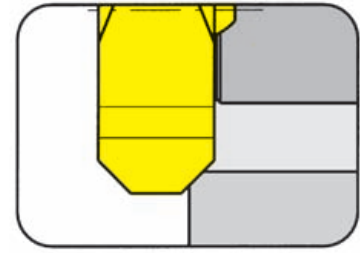
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
MU332.0750.03B	<b>5.17T20P</b>	<b>T20PQ</b>

## INSERT Type

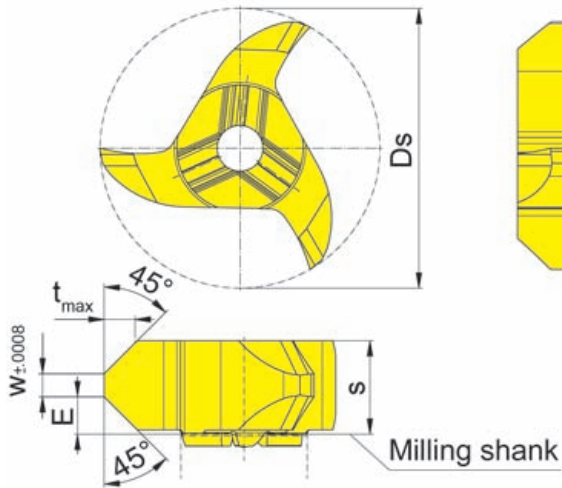
# 332



Width of chamfer up to Cutting edge  $\varnothing$  .138"  
Ds 1.248"

for use with Milling shank

Type M332



Picture = right hand cutting version

Part number	w	s	t <sub>max</sub>	E	Ds	Carbide grades				
						MG12	TN35	T125	TA45	AS45
<b>332.4545.35.00</b>	.102	.417	.138	.167	1.248				▲	
▲ on stock Δ 4 weeks						P			•	
● main recommendation						M			•	
○ alternative recommendation						K			•	
■ uncoated grades						N			•	
■ coated grades						S			•	
■ brazed/Cermet						H				

Dimensions in inch

**OVER GROOVING HEAD  
with attachment HSK**

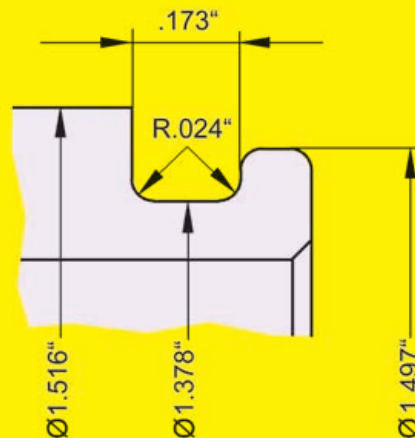
type **389**



Example: Wheel cylinder  
**Material: GG25 (cast iron)**  
 Tool data:  
 Cutting edge  $\varnothing D_s = 1.535''$   
 Number of teeth  $Z = 6$

Cutting data:  
 $v_c = 590$  sfm  
 $v_{f3} = 154$  ipm  
 $t_g = 1.92$  sec

Profile of groove

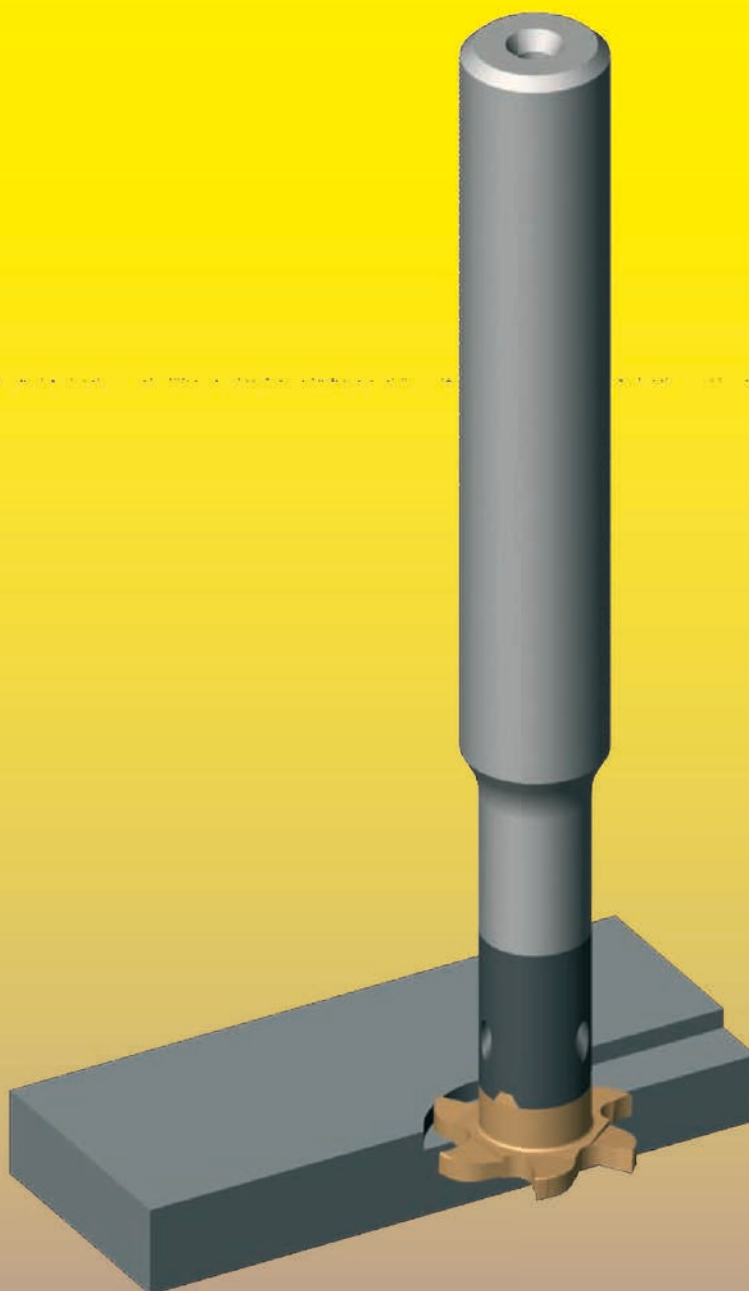




MILLING SHANK type **M306**

Cutting edge  $\varnothing$

**.461" (11.7 mm)**



F

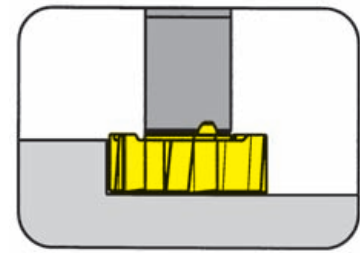
## MILLING SHANK Type

## M306

with through coolant supply

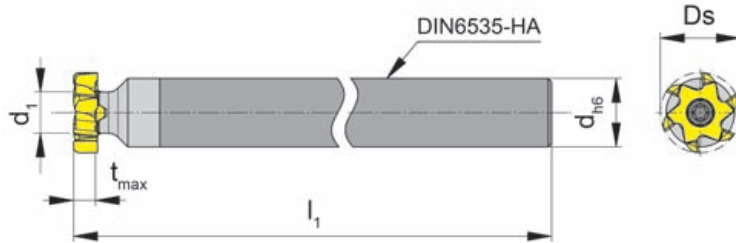
Cylindrical steel milling shank for collets

with cylindrical shank for CNC-lathes



for use with Insert

Type 606



Picture = right hand cutting version

Part number	$l_1$	$d_1$	d
M306.0707.03A	100	6	7.5
M306.1010.03A	120	6	10.0

Further sizes upon request

Ds see inserts

Dimensions in mm

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M306....	2.6.5T8EP	T8PL

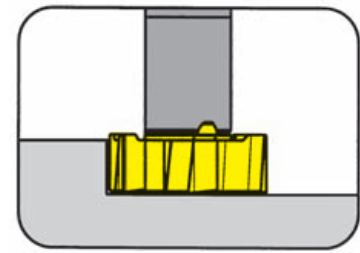
## MILLING SHANK Type

# M306.ST

no coolant supply

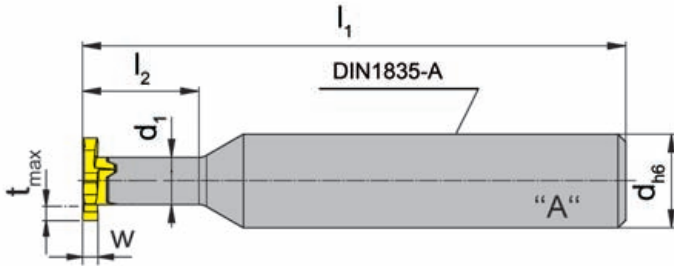
Cylindrical steel milling shank for collets

with cylindrical shank for CNC-lathes



for use with Insert

Type 606



Picture = right hand cutting version

Part number	$l_1$	$d_1$	d
M306.ST10.01A	60	6	10
M306.ST12.01A	70	6	12

Further sizes upon request

Ds see inserts

Dimensions in mm

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

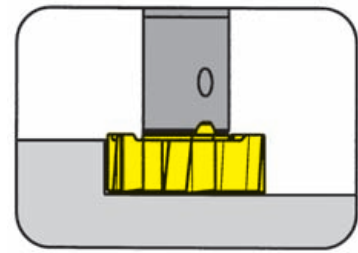
Milling shank	Screw	TORX PLUS® Wrench
M306.ST1...	2.6.5T8EP	T8PL



## INSERT Type

# 606

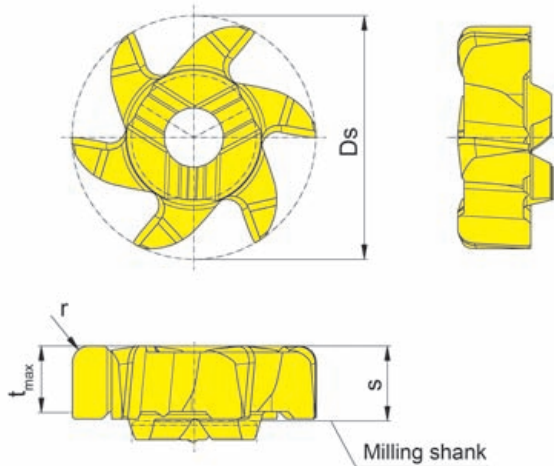
Depth of cut up to .126"  
Cutting edge Ø Ds .461"



for use with Milling shank

Type M306

F



Picture = right hand cutting version

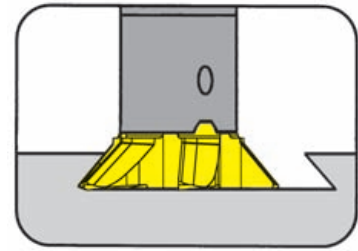
Part number	s	t <sub>max</sub>	r	Ds	Carbide grades				
					MG12	TN35	TI25	TA45	AS45
<b>606.PLT6.08</b>	.142	.126	.031	.461			△		▲
▲ on stock △ 4 weeks					P		•		•
• main recommendation					M		•		•
○ alternative recommendation					K		•		•
■ uncoated grades					N		•		○
■ coated grades					S		•		•
■ brazed/Cermet					H				

Dimensions in inch

## INSERT Type

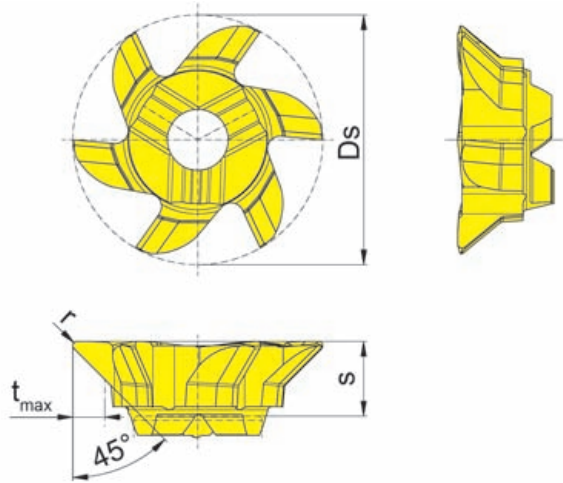
# 606

Depth of cut up to .059"  
Cutting edge  $\emptyset$  Ds .461"



for use with Milling shank

Type M306



Picture = right hand cutting version

Part number	s	t <sub>max</sub>	r	Ds	Carbide grades				
					MG12	TN35	T125	TA45	AS45
<b>606.0045.22</b>	.138	.059	.008	.461					▲
▲ on stock Δ 4 weeks					P				•
● main recommendation					M				•
○ alternative recommendation					K				•
■ uncoated grades					N				○
■ coated grades					S				•
■ brazed/Cermet					H				

Dimensions in inch



# Accuracy Taken to the Extreme



Machine the smallest parts with maximum precision – accurate to tolerances of hundredths and thousandths. Typical **Supermini**<sup>®</sup>. The high-production tooling system handles the most challenging tasks in the micro-range, starting at a hole diameter of 0.2 mm. Carbide inserts with the ideal geometry are available in over 1,000 versions and special designs. All fit the same tool holder. With and without internal cooling. Minimalism – for high-tech machining of miniature parts. And mirror-finish turning through use of diamond inserts. [www.hornusa.com](http://www.hornusa.com)



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**HORN IS AHEAD IN TECHNOLOGY**



For further information, please see our catalog "Supermini<sup>®</sup> & Mini - Carbide Grooving Tools"

**GROOVING PARTING OFF GROOVE MILLING BROACHING PROFILE MILLING DRILLING REAMING**



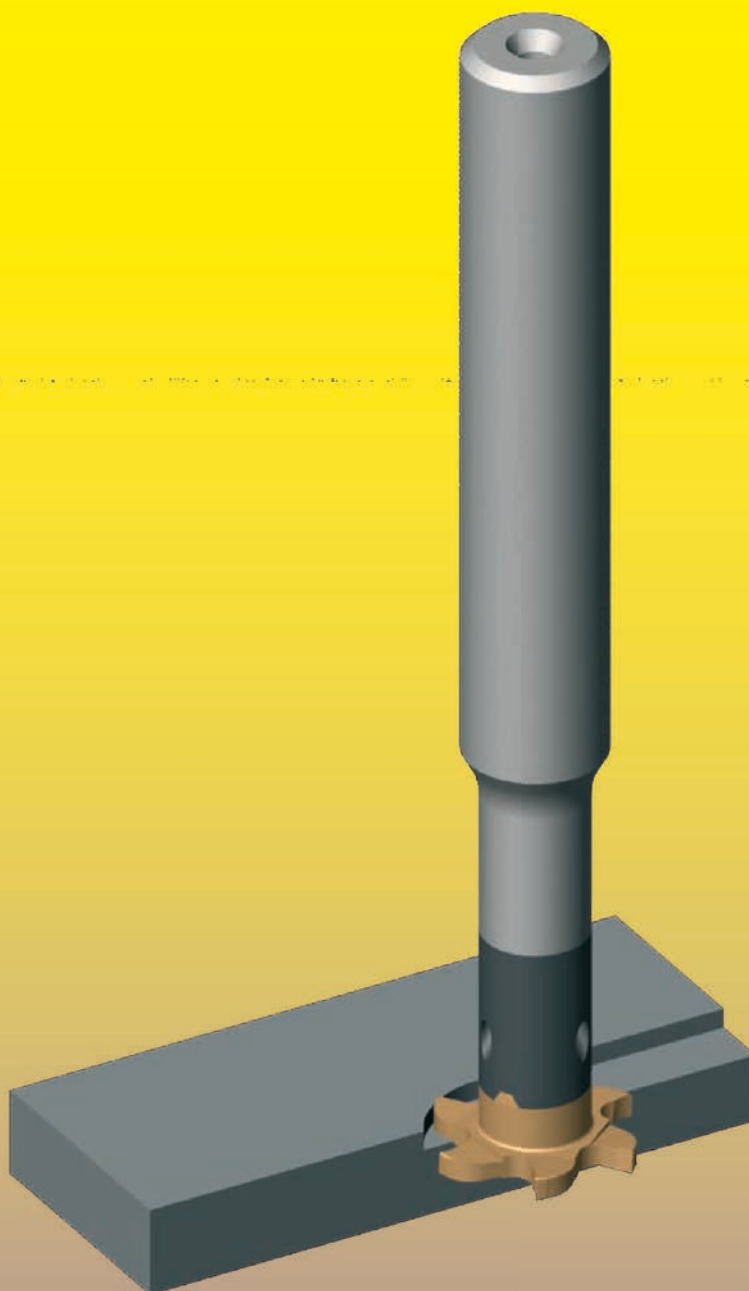
F6

In the UNITED STATES call us toll free  
1 - 888 - 818 HORN

MILLING SHANK type **M311**

Cutting edge  $\varnothing$

**.697" (17.7 mm)**



F

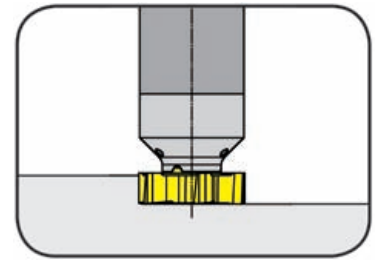
## MILLING SHANK Type

# M311

with through coolant supply

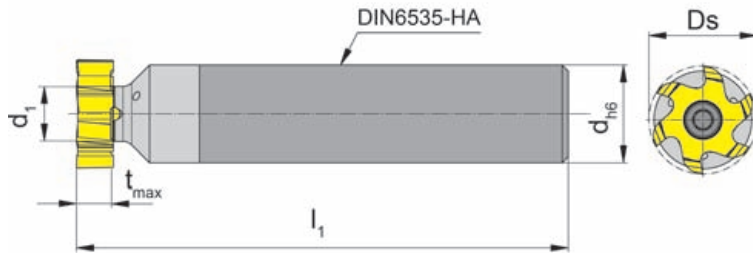
Cylindrical steel milling shank for collets

with cylindrical shank for CNC-lathes



for use with Insert

Type 611



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
M311.0012.D.00A	80	7	9	12
M311.0016.D.00A	80	7	9	16

Further sizes upon request

$D_s$  see inserts

Dimensions in mm

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

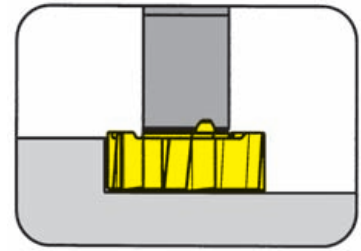
Milling shank	Screw	TORX PLUS® Wrench
M311.001...	4.14T15P	T15PQ



## MILLING SHANK Type

# M311.ER

no coolant supply

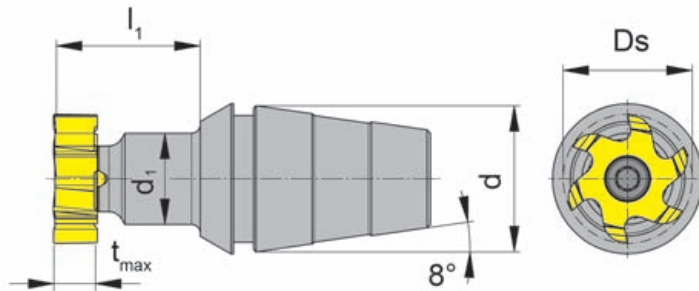


Milling shanks for collet chucks DIN6499-A (8°) Ds 17.7 mm

with ER taper for CNC-lathes

for use with Insert

Type 611



Picture = right hand cutting version

Part number	$l_1$	$d_1$	$d$	Clamping nut
M311.ER20.14.01	19.7	12.5	20	ER20.6499/ERM...
M311.ER25.14.01	19.7	14.5	25	ER25.6499

Further sizes upon request

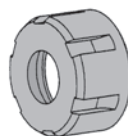
Ds see inserts

Dimensions in mm

### Ordering note:

Clamping nut is not combined with milling shank - separate order required!

For torque specifications of the screw, please see Technical Instructions.



### Spare parts

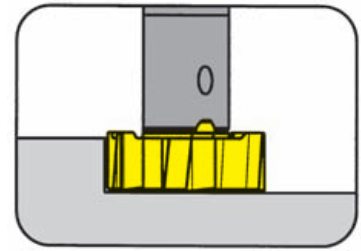
Milling shank	Screw	TORX PLUS® Wrench
M311.ER2...	4.14T15P	T15PQ



## INSERT Type

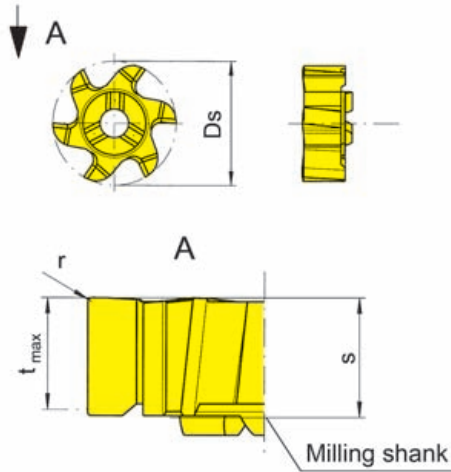
# 611

Depth of cut up to .224"  
Cutting edge  $\emptyset$  Ds .697"



for use with Milling shank

Type M311



Picture = right hand cutting version

Part number	s	t <sub>max</sub>	r	Ds	Carbide grades			
					MG12	TN35	T125	TF45
<b>611.PL61.62</b>	.240	.224	.008	.697			▲	▲
▲ on stock Δ 4 weeks					P		•	•
• main recommendation					M		•	•
o alternative recommendation					K		•	•
■ uncoated grades					N		•	•
■ coated grades					S		•	•
■ brazed/Cermet					H			

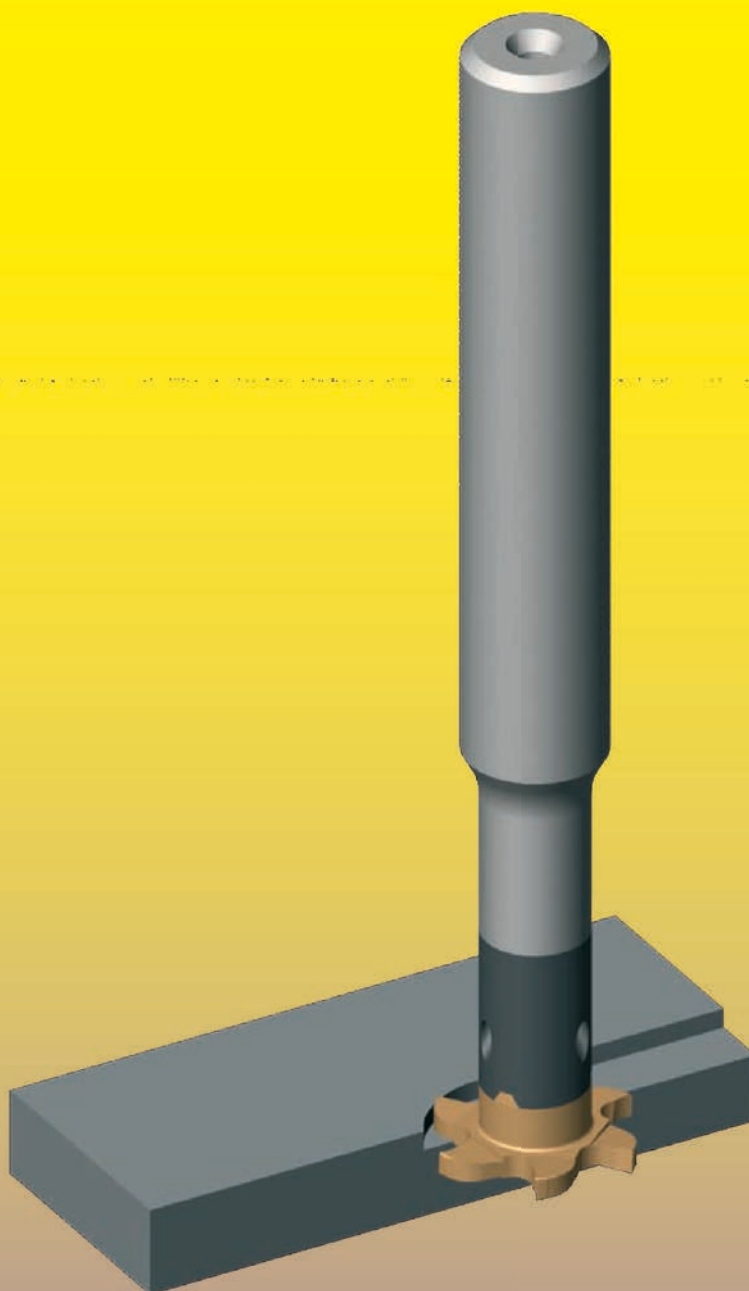
Dimensions in inch

F

MILLING SHANK type **M313**

Cutting edge  $\varnothing$

**.854" (21.7 mm)**



F

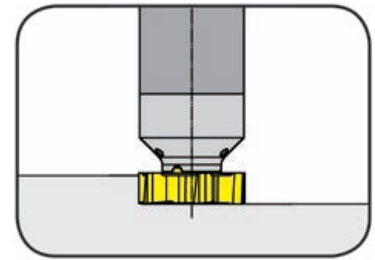
## MILLING SHANK Type

# M313

with through coolant supply

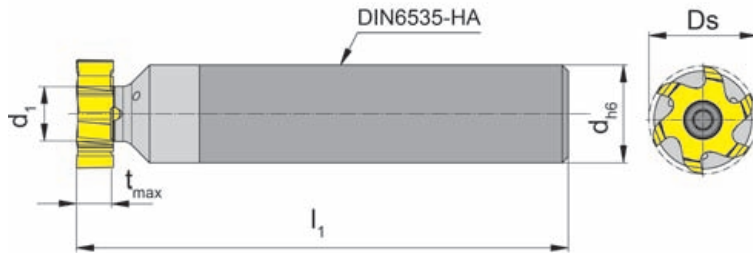
Cylindrical steel milling shank for collets

with cylindrical shank for CNC-lathes



for use with Insert

Type 613  
713



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
M313.0016.D.00A	80	7	11.3	16
M313.0020.D.00A	80	7	11.3	20

Further sizes upon request

Ds see inserts

Dimensions in mm

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

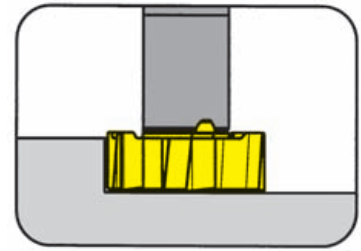
### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M313.00...	5.14T20P	T20PQ

## MILLING SHANK Type

# M313.ER

no coolant supply

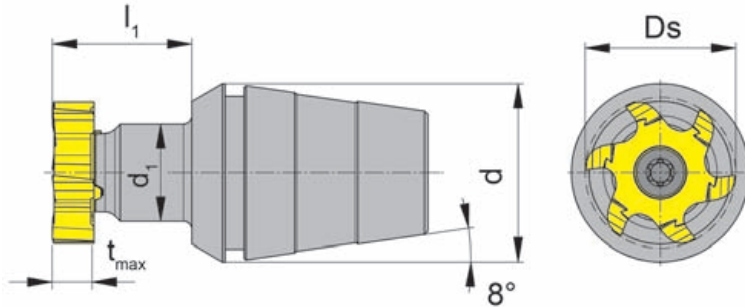


Milling shanks for collet chucks DIN6499-A (8°) Ds 21.7 mm

with ER taper for CNC-lathes

for use with Insert

Type 613  
713



Picture = right hand cutting version

Part number	$l_1$	$d_1$	d	Clamping nut
M313.ER25.14.01	19.7	14	25	ER25.6499
M313.ER32.14.01	19.7	14	32	ER32.6499

Further sizes upon request

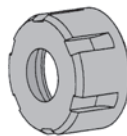
Ds see inserts

Dimensions in mm

### Ordering note:

Clamping nut is not combined with milling shank - separate order required!

For torque specifications of the screw, please see Technical Instructions.



### Spare parts

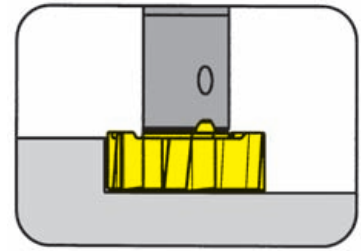
Milling shank	Screw	TORX PLUS® Wrench
M313.ER...	5.14T20P	T20PQ

## INSERT Type

# 613

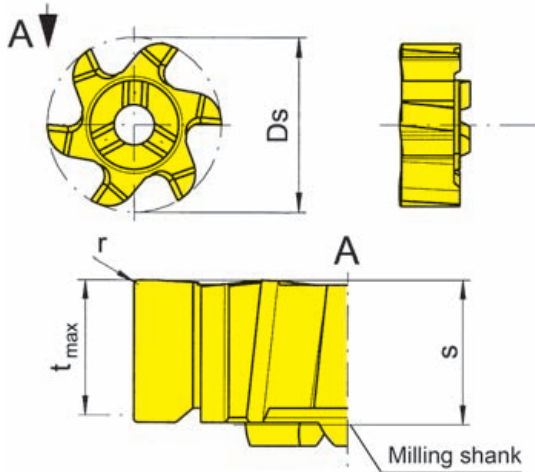
Depth of cut up to  
Cutting edge  $\emptyset$

.224"  
Ds .854"



for use with Milling shank

Type M313



Picture = right hand cutting version

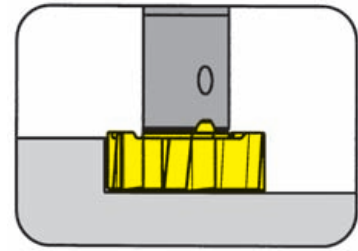
Part number	s	t <sub>max</sub>	r	Ds	Carbide grades			
					MG12	TN35	T125	TF45
<b>613.PL61.62</b>	.240	.224	.008	.854			▲	▲
▲ on stock Δ 4 weeks					P		•	•
• main recommendation					M		•	•
○ alternative recommendation					K		•	•
■ uncoated grades					N		•	•
■ coated grades					S		•	•
■ brazed/Cermet					H			

Dimensions in inch

F

## INSERT Type

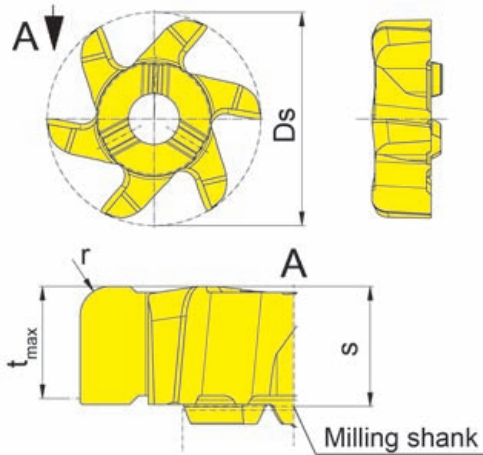
# 613



Depth of cut up to .224"  
Cutting edge  $\emptyset$  Ds .854"

for use with Milling shank

Type M313



Picture = right hand cutting version

Part number	s	t <sub>max</sub>	r	Ds	Carbide grades				
					MG12	TN35	T125	TA45	AS45
<b>613.PLT6.15</b>	.240	.224	.059	.854			△		▲
▲ on stock △ 4 weeks					P		•		•
• main recommendation					M		•		•
○ alternative recommendation					K		•		•
■ uncoated grades					N		•		○
■ coated grades					S		•		•
■ brazed/Cermet					H				

Dimensions in inch

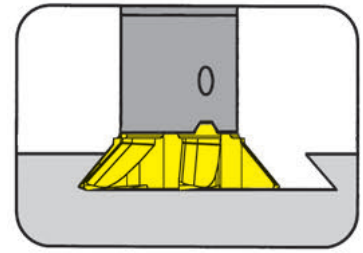


# FACE MILLING



INSERT Type

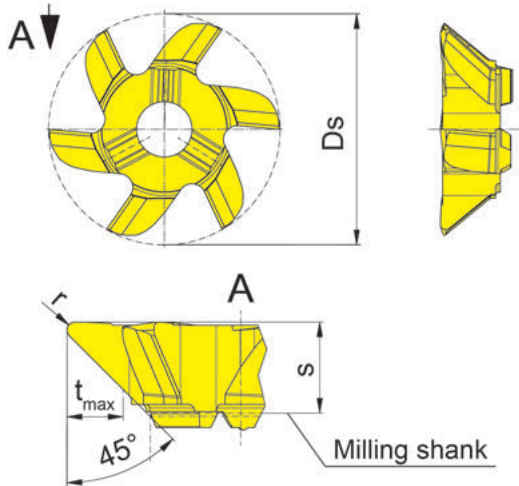
## 613



Depth of cut up to .138"  
Cutting edge Ø Ds .854"

for use with Milling shank

Type M313



Picture = right hand cutting version

F

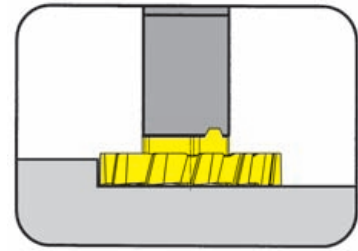
Part number	s	t <sub>max</sub>	r	Ds	Carbide grades				
					MG12	TN35	TI25	TA45	AS45
<b>613.0045.25</b>	.224	.138	.020	.854					▲
▲ on stock Δ 4 weeks					P				•
• main recommendation					M				•
o alternative recommendation					K				•
■ uncoated grades					N				o
■ coated grades					S				•
■ brazed/Cermet					H				

Dimensions in inch



## INSERT Type

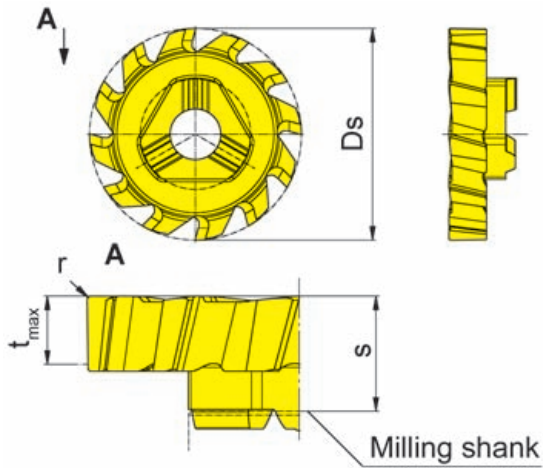
# 713



Depth of cut up to .138"  
Cutting edge Ø Ds .854"

for use with Milling shank

Type M313



Picture = right hand cutting version

Part number	s	t <sub>max</sub>	r	Z	Ds	Carbide grades				
						MG12	TN35	TI25	TA45	AS45
<b>713.PL35.15.02</b>	.232	.138	.008	12	.854			▲		
▲ on stock Δ 4 weeks						P		•		
● main recommendation						M		•		
○ alternative recommendation						K		•		
■ uncoated grades						N		•		
■ coated grades						S		•		
■ brazed/Cermet						H				

Dimensions in inch



## Groove milling on brake caliper

Simultaneous milling of two grooves with special insert type 314.

Special design of the milling cutter body due to the form of the brake caliper.

Because of the position of the inserts in the special milling heads type 380 it is not necessary to perform the cutting edges of the inserts with a chip divider.

The shank shows a good antivibration resistance.

Possible roundness of the machined grooves appr. .0008"

**Material: GGG40 (60-40-18)**

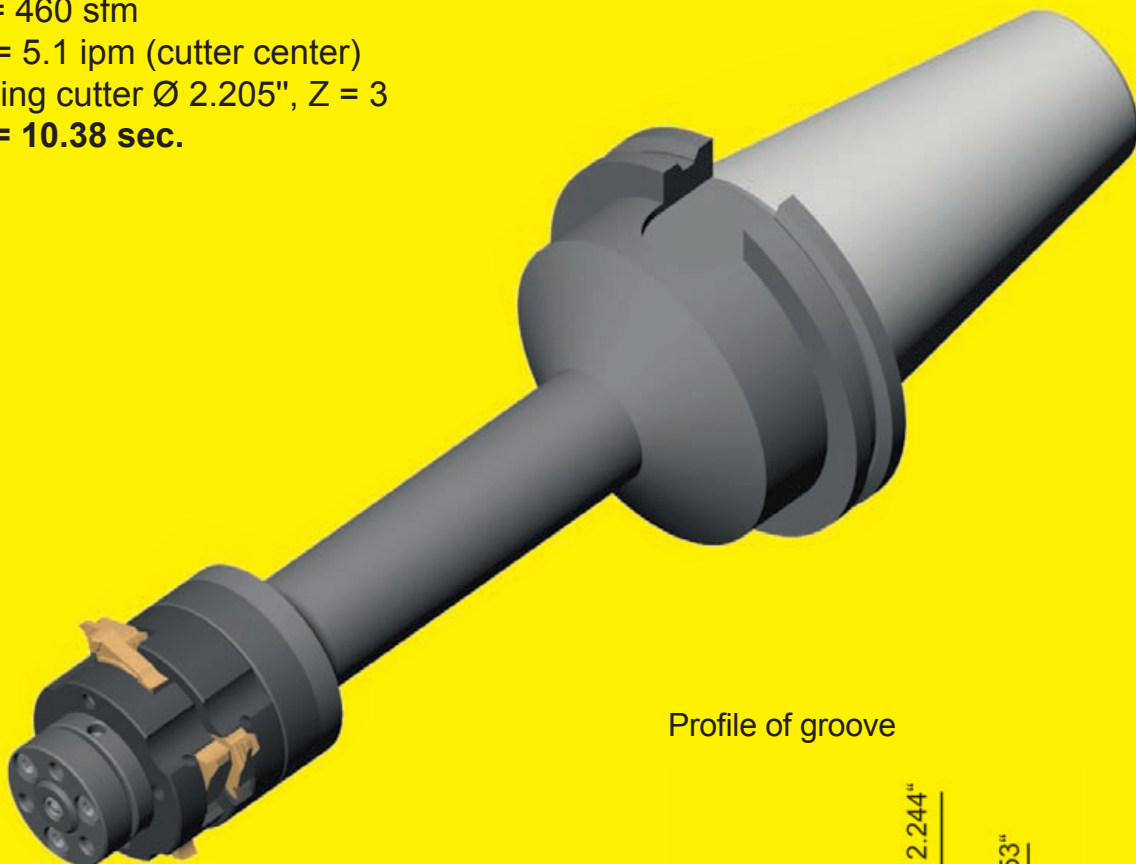
Cutting data:

$v_c = 460$  sfm

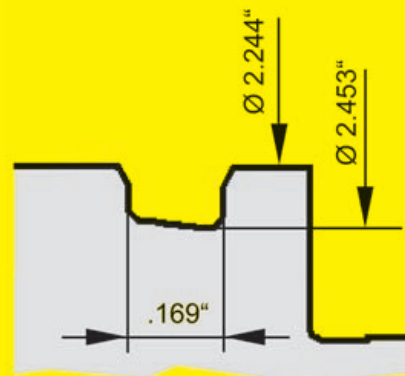
$v_{f3} = 5.1$  ipm (cutter center)

Milling cutter  $\varnothing 2.205$ ",  $Z = 3$

$t_g = 10.38$  sec.



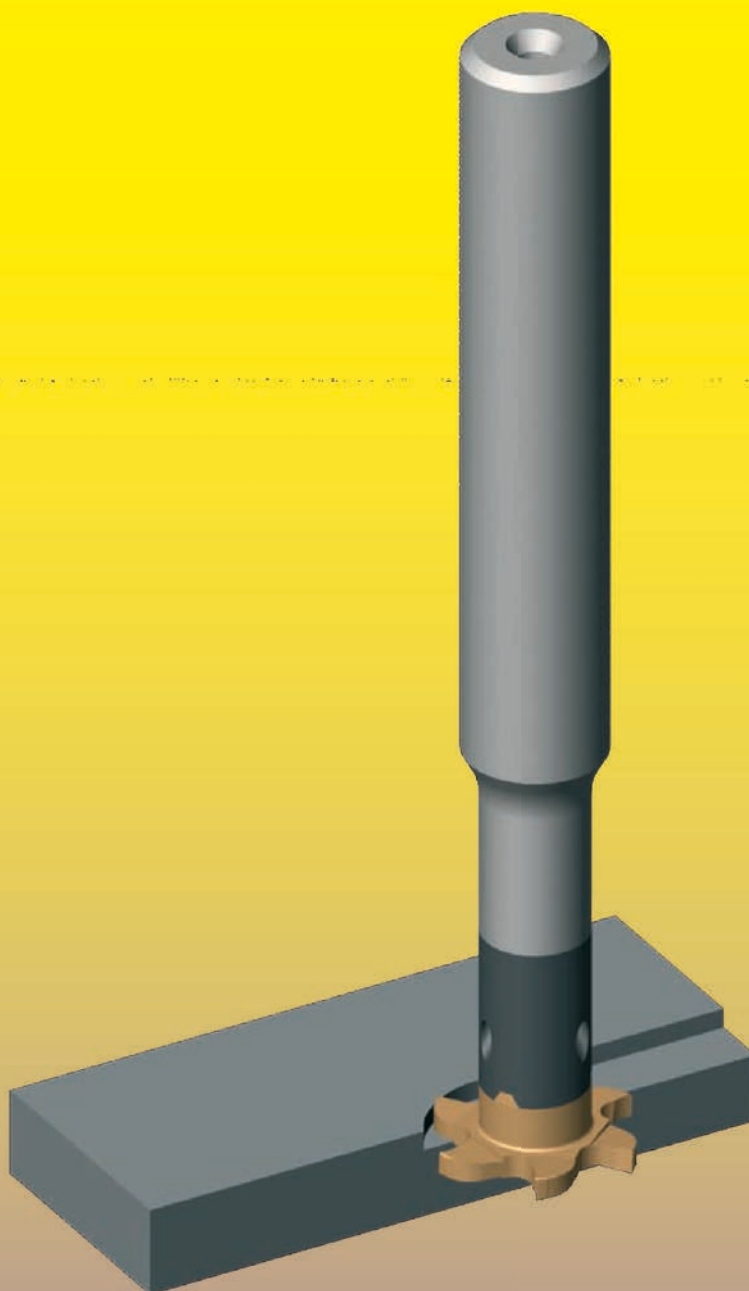
Profile of groove



MILLING SHANK type **M328**

Cutting edge  $\varnothing$

**1.091" (27.7 mm)**



F

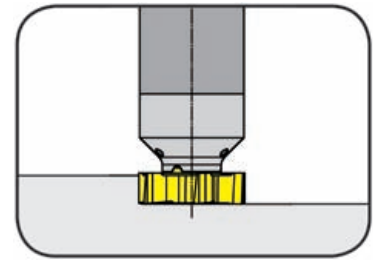
## MILLING SHANK Type

# M328

with through coolant supply

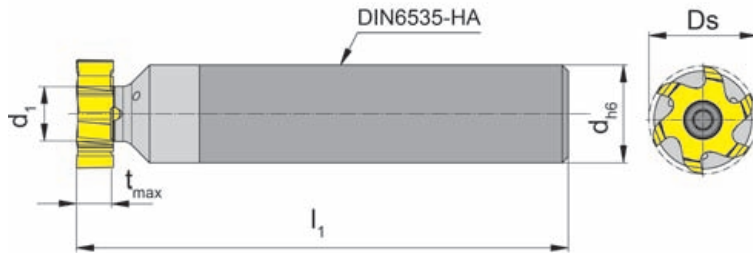
Cylindrical steel milling shank for collets

with cylindrical shank for CNC-lathes



for use with Insert

Type 628



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	$d$
M328.0016.D.00A	80	7	14.3	16
M328.0020.D.00A	80	7	14.3	20

Further sizes upon request

$D_s$  see inserts

Dimensions in mm

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

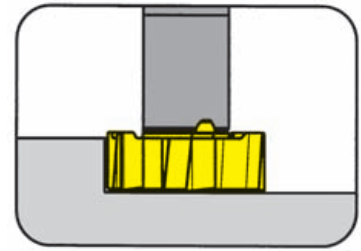
### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M328.00...	5.14T20P	T20PQ

## MILLING SHANK Type

# M328.ER

no coolant supply

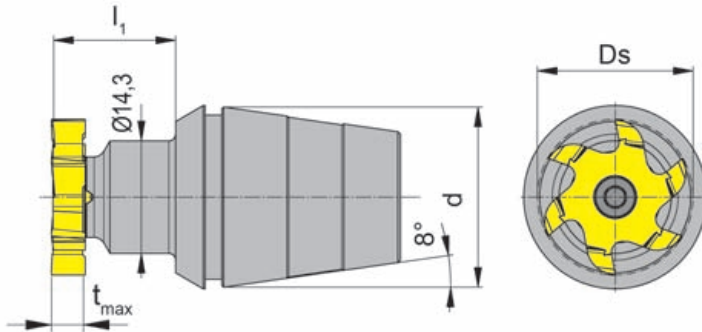


Milling shanks for collet chucks DIN6499-A (8°) Ds 27.7 mm

with ER taper for CNC-lathes

for use with Insert

Type 628



Picture = right hand cutting version

Part number	$l_1$	$d_1$	d	Clamping nut
M328.ER25.16.01	21.7	15	25	ER25.6499
M328.ER32.16.01	21.7	20	32	ER32.6499

Further sizes upon request

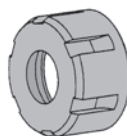
Ds see inserts

Dimensions in mm

### Ordering note:

Clamping nut is not combined with milling shank - separate order required!

For torque specifications of the screw, please see Technical Instructions.



### Spare parts

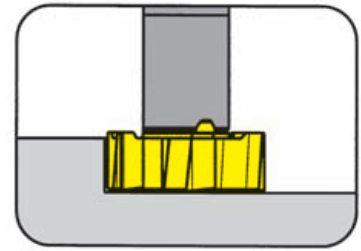
Milling shank	Screw	TORX PLUS® Wrench
M328.ER...	5.14T20P	T20PQ



## INSERT Type

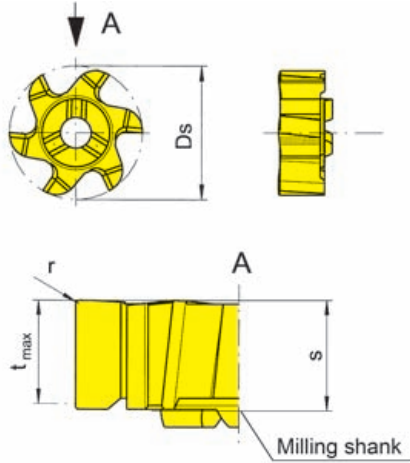
# 628

Depth of cut up to  $.224''$   
Cutting edge  $\emptyset$  Ds  $1.091''$



for use with Milling shank

Type M328



Picture = right hand cutting version

Part number	s	t <sub>max</sub>	r	Ds	Carbide grades			
					MG12	TN35	TI25	TF45
<b>628.PL61.62</b>	.240	.224	.008	1.091			▲	▲
▲ on stock Δ 4 weeks					P		•	•
• main recommendation					M		•	•
o alternative recommendation					K		•	•
■ uncoated grades					N		•	•
■ coated grades					S		•	•
■ brazed/Cermet					H			

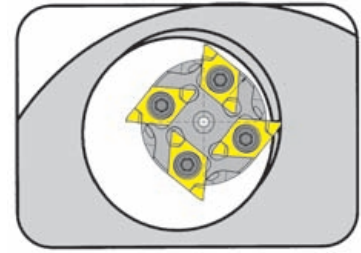
Dimensions in inch

F

## MILLING SHANK Type

# M275

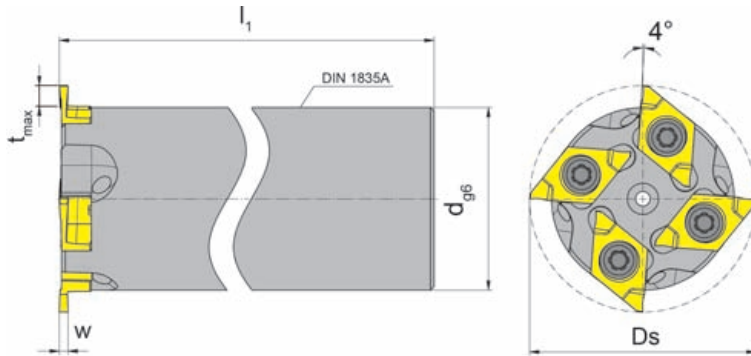
with through coolant supply



Cutting edge  $\emptyset$

Ds 1.220" (31 mm)

Material of shank: Steel (not recommended for shrink fitting)



for use with Indexable insert

Type S275

Picture = right hand cutting version

Part number	Z	Ds	l <sub>1</sub>	d
<b>M275.031.D25.3.04A</b>	4	31	125	25

Further sizes upon request

w and t<sub>max</sub> see inserts

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

## Spare parts

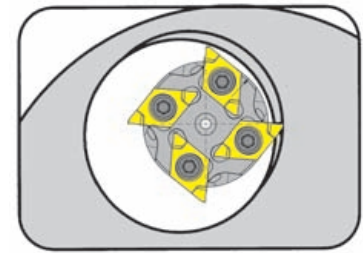
Milling shank	Screw	TORX PLUS® Wrench
M275.031.D25.3.04A	<b>3.5.10.T10P</b>	<b>T10PL</b>



## SCREW-IN CUTTER Type

# M275

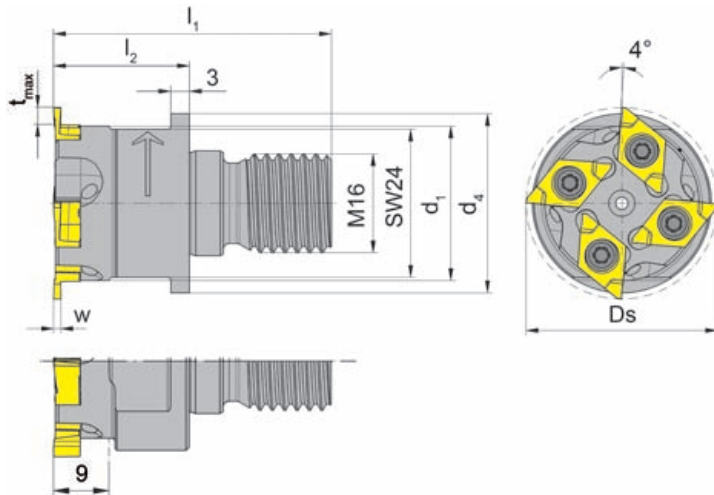
with through coolant supply



Cutting edge  $\varnothing$

Ds 31 / 36 mm

Material of shank: Steel



for use with Indexable insert

Type S275

Picture = right hand cutting version

Part number	Z	Ds	$l_1$	$l_2$	$d_1$	$d_4$	SW
M275.031.M16.1.04	4	31	45	22	25	29	24
M275.036.M16.1.04	4	36	45	22	30	29	27

Further sizes upon request

w and  $t_{max}$  see inserts

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

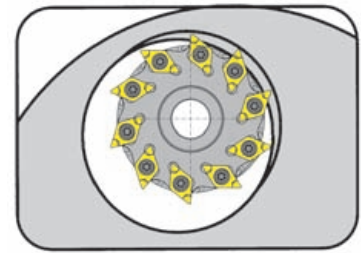
Screw-in cutter	Screw	TORX PLUS® Wrench
M275.03...	3.5.10.T10P	T10PL



## MILLING CUTTER Type

# M275

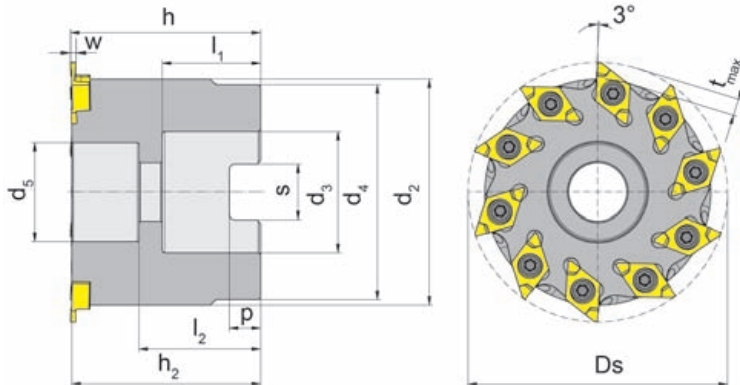
with through coolant supply



Cutting edge  $\varnothing$

Ds 38/48/58/78 mm

Cutterhole and cross keyway as per DIN 138



for use with Indexable insert

Type S275

Picture = right hand cutting version

Part number	Z	Ds	h	h <sub>2</sub>	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	d <sub>5</sub>	l <sub>1</sub>	l <sub>2</sub>	s	p
M275.0038.A16.05	5	38	33.0	32.7	32.0	16	32.0	13.5	18	22.7	8.4	5.6
M275.0048.A22.08	8	48	37.0	36.7	40.5	22	40.5	18.5	20	24.7	10.4	6.3
M275.0058.A27.10	10	58	42.5	42.2	50.0	27	48.0	22.0	22	27.2	12.4	7.0
M275.0078.A32.14	14	78	50.0	49.7	3.5	32	58.0	33.0	25	36.7	14.4	8.0

Further sizes upon request

w and t<sub>max</sub> see inserts

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

## Spare parts

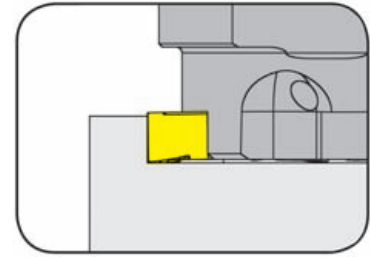
Milling cutter	Screw	Screw	TORX PLUS® Wrench	Washer
M275.0038.A16.05	DIN912-M8x25	3.5.10.T10P	T10PL	020.0813.3438
M275.0048.A22.08	DIN912-M10x25	3.5.10.T10P	T10PL	DIN433-10.5-St
M275.0058.A27.10	DIN912-M12x30	3.5.10.T10P	T10PL	DIN433-13-St
M275.0078.A32.14	DIN7984-M16x35	3.5.10.T10P	T10PL	DIN433-17-St



## INDEXABLE INSERT Type

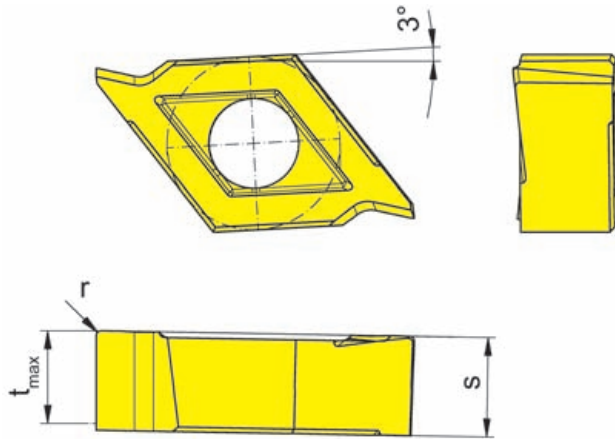
# RS275

Depth of cut up to .157"



for use with Milling shank

Type M275



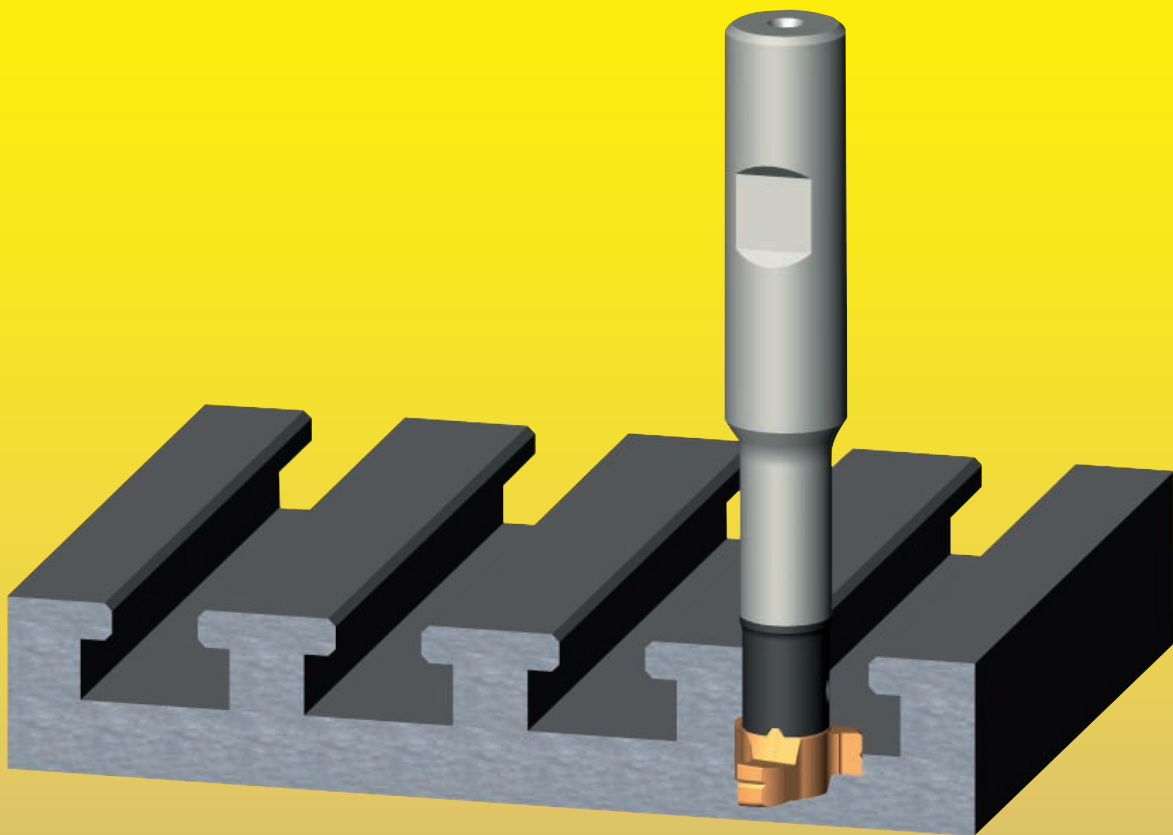
R = right hand version shown

Part number	s	t <sub>max</sub>	r	Carbide grades				
				MG12	TN35	T125	TA45	AS45
<b>RS275.PL43.52</b>	.169	.157	.008					▲
▲ on stock Δ 4 weeks				P				•
• main recommendation				M				•
o alternative recommendation				K				•
■ uncoated grades				N				o
■ coated grades				S				•
■ brazed/Cermet				H				

Dimensions in mm

F

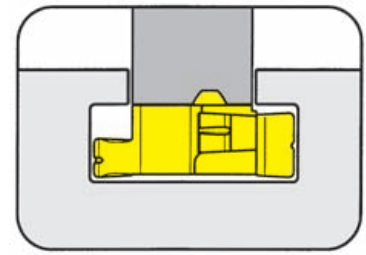
**Excellent removal of chips, flushed by  
through coolant supply.**



**G**

## MILLING SHANK Type

# MU311

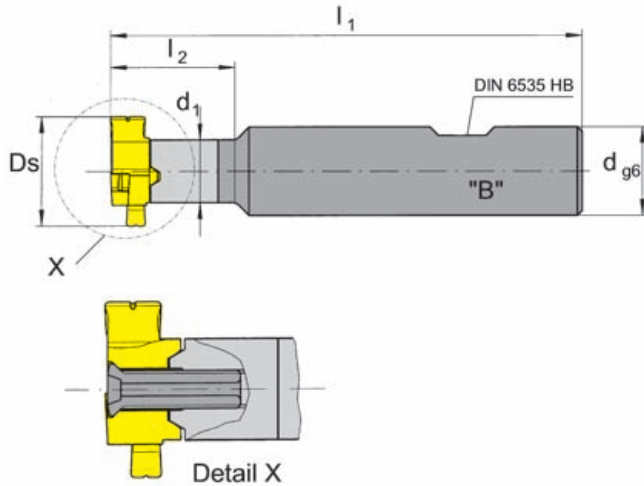


Cutting edge  $\varnothing$  .669"

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 311



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
<b>MU311.0625.00B</b>	3.543	.984	.354	.625

Further sizes upon request

Ds see inserts

Dimensions in inch

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

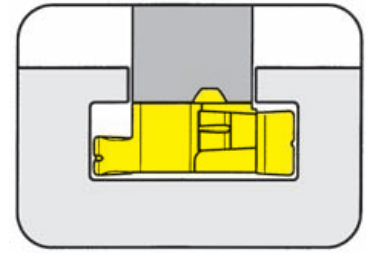
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
MU311.0625.00B	<b>4.16T15KP</b>	<b>T15PQ</b>

## MILLING SHANK Type

# M311



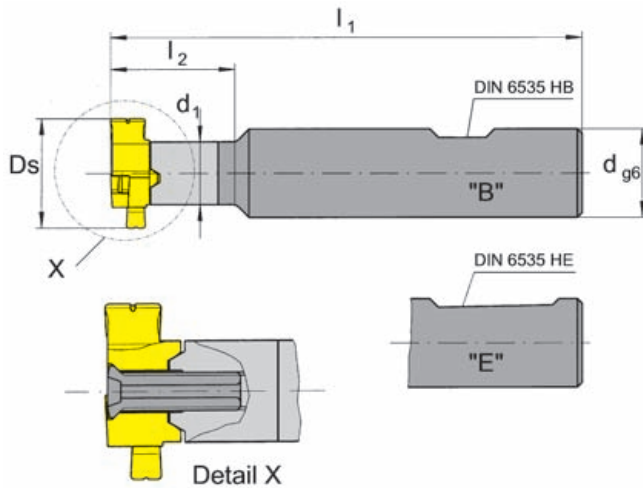
Cutting edge  $\varnothing$

Ds .669" (17.0 mm)

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 311



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M311.0016.00B	90	25	9	16	B
M311.0016.00E	90	25	9	16	E

Further sizes upon request

Ds see inserts

Dimensions in mm

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M311.0016.00...	4.16T15KP	T15PQ



# MILLING OF T-SLOTS

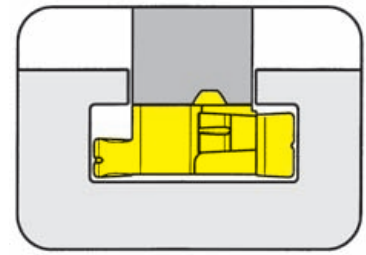


INSERT Type

## 311

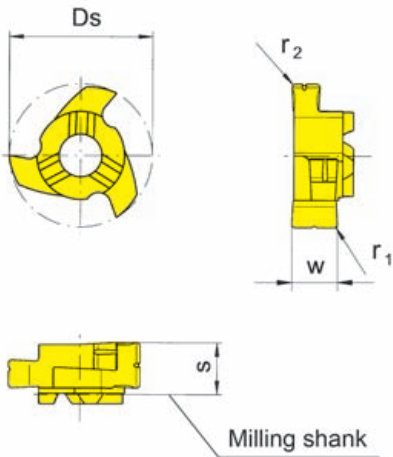
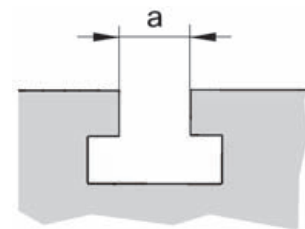
T-Slots DIN 650  
Cutting edge  $\emptyset$

a .394"  
Ds .669"



for use with Milling shank

Type M311



Picture = right hand cutting version

Part number	Ds	w	s	r <sub>1</sub>	a	Carbide grades	
						MG12	TI25
<b>311.1016.00</b>	.669	.283	.303	.020	.394		▲
						P	•
						M	•
						K	•
						N	•
						S	•
						H	

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

Further sizes upon request

Carbide grades

G

# CHAMFERING OF T-SLOTS

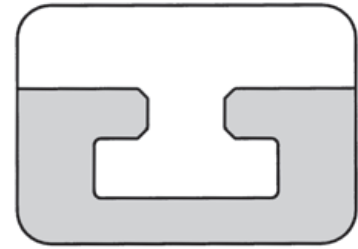


INSERT Type

## 311

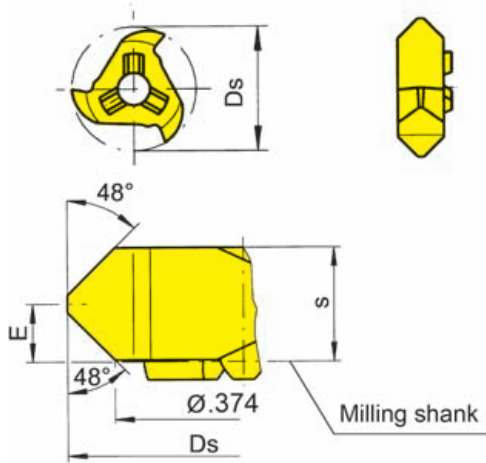
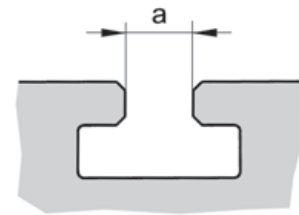
T-Slots DIN 650  
Cutting edge  $\emptyset$

a .394/.472/.551"  
Ds .622"



for use with Milling shank

Type M311



Picture = right hand cutting version

Part number	Ds	s	E	Carbide grades		
				MG12	TN35	TI25
<b>311.4216.00</b>	.622	.234	.118			▲
▲ on stock Δ 4 weeks				P		•
● main recommendation				M		•
○ alternative recommendation				K		•
■ uncoated grades				N		•
■ coated grades				S		•
■ brazed/Cermet				H		

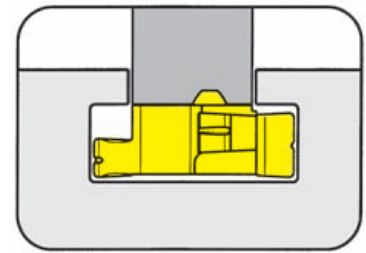
Dimensions in inch

Further sizes upon request



## MILLING SHANK Type

# MU313

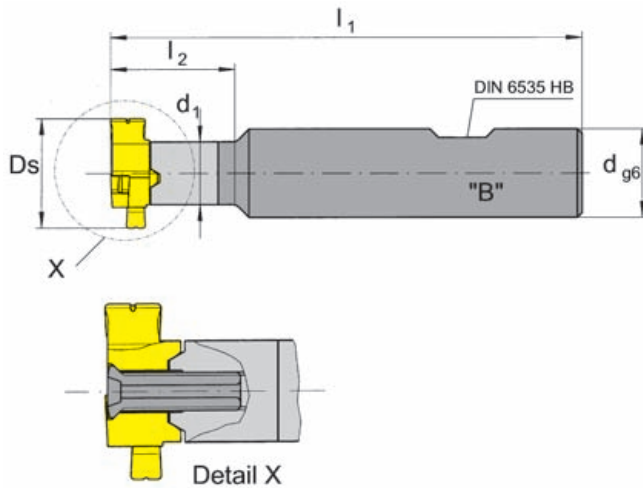


Cutting edge  $\varnothing$  .787"

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 313



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
<b>MU313.0625.00B</b>	3.661	1.181	.453	.625

Further sizes upon request

Ds see inserts

Dimensions in inch

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
MU313.0625.00B	<b>5.13T20KP</b>	<b>T20PQ</b>



## MILLING SHANK Type

# M313

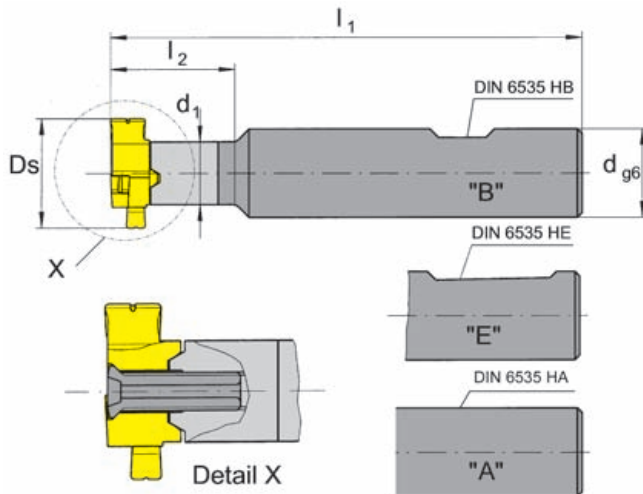
Cutting edge  $\varnothing$

Ds .787" (20.0 mm)

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 313



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M313.0016.00A	93	30	11.5	16	A
M313.0016.00B	93	30	11.5	16	B
M313.0016.00E	93	30	11.5	16	E

Further sizes upon request

Ds see inserts

Dimensions in mm

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

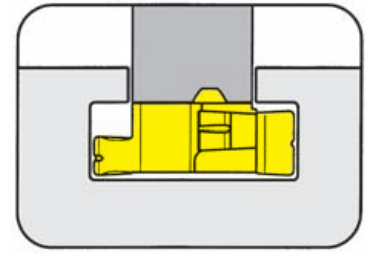
Milling shank	Screw	TORX PLUS® Wrench
M313.0016.00A	5.14T20P	T20PQ
M313.0016.00B/00E	5.13T20KP	T20PQ

## INSERT Type

# 313

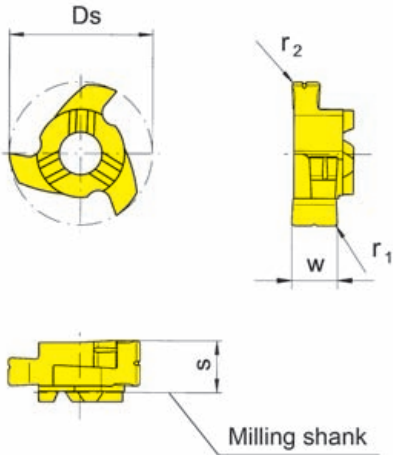
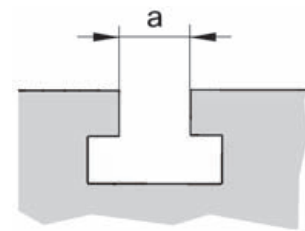
T-Slots DIN 650  
Cutting edge  $\emptyset$

a .472"  
Ds .787"



for use with Milling shank

Type M313



Picture = right hand cutting version

Part number	Ds	w	s	r <sub>1</sub>	a	Carbide grades	
						MG12	TI25
<b>313.1219.00</b>	.787	.323	.343	.020	.472		▲
						P	•
						M	•
						K	•
						N	•
						S	•
						H	

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

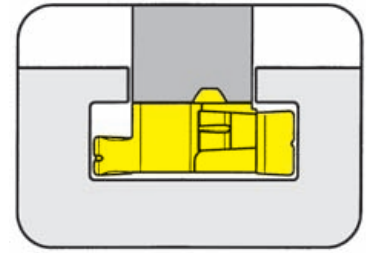
Further sizes upon request

Carbide grades

G

## MILLING SHANK Type

# MU328

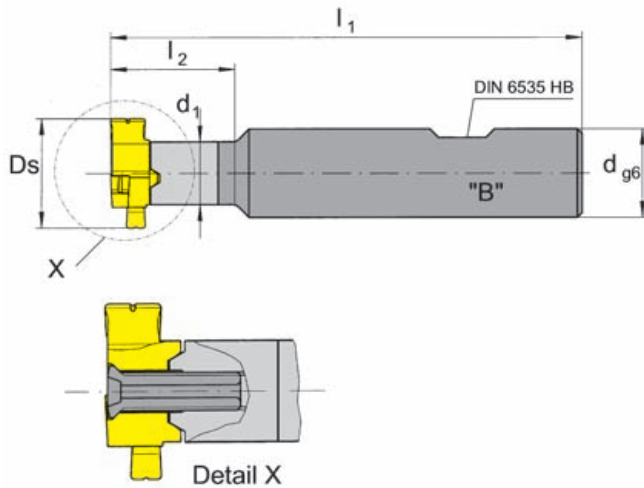


Cutting edge  $\varnothing$  .945"

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 328



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d
<b>MU328.0750.00B</b>	4.094	1.378	.531	.750

Further sizes upon request

Ds see inserts

Dimensions in inch

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

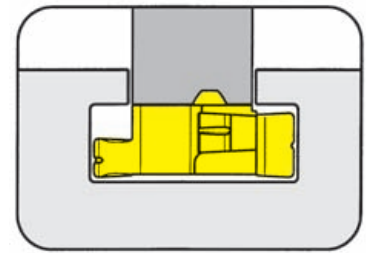
### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
MU328.0750.00B	<b>5.13T20KP</b>	<b>T20PQ</b>



## MILLING SHANK Type

# M328

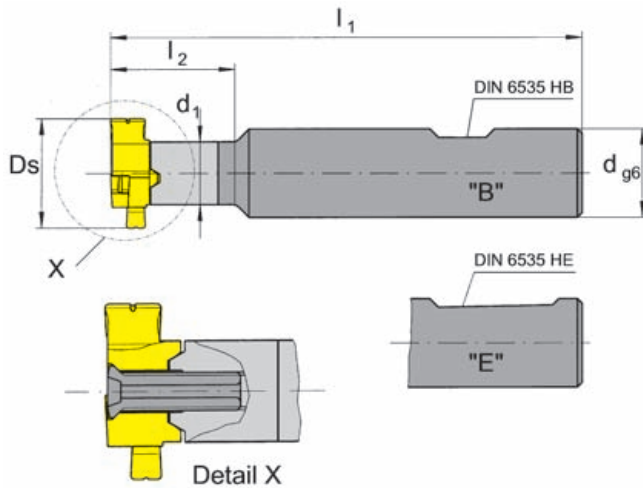


Cutting edge  $\varnothing$  Ds .945" (24.0 mm)

Material of shank: Carbide - Giving a good vibration resistance

for use with Insert

Type 328



Picture = right hand cutting version

Part number	$l_1$	$l_2$	$d_1$	d	Form
M328.0020.00B	104	35	13.5	20	B
M328.0020.00E	104	35	13.5	20	E

Further sizes upon request

Dimensions in mm

### Ordering note:

Milling cutter shanks with damaged seating can be repaired by HORN.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M328.0020.00...	5.13T20KP	T20PQ

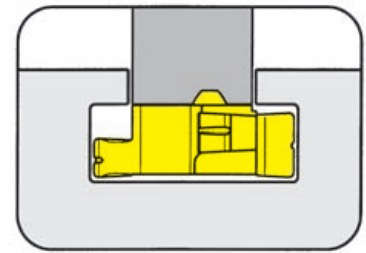
# MILLING OF T-SLOTS



INSERT Type

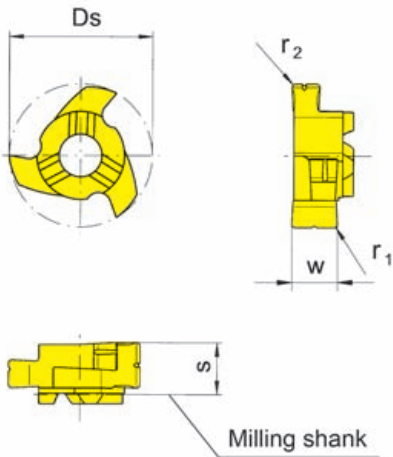
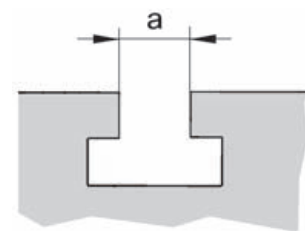
328

T-Slots DIN 650  
Cutting edge  $\emptyset$  a .551"  
Ds .945"



for use with Milling shank

Type M328



Picture = right hand cutting version

Part number	Ds	w	s	r <sub>1</sub>	a	Carbide grades	
						MG12	TI25
<b>328.1423.00</b>	.945	.362	.386	.020	.551		▲
						P	•
						M	•
						K	•
						N	•
						S	•
						H	

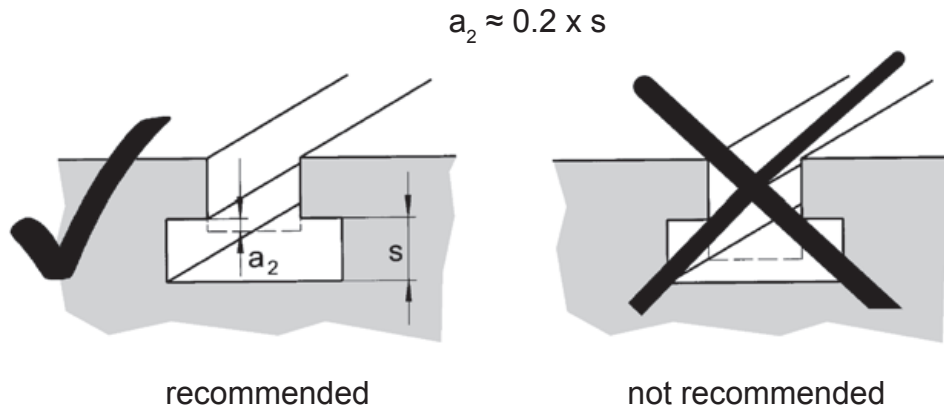
- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

Further sizes upon request



## Application Technology



G

### CUTTING DATA

### MILLING OF T-SLOTS

Workpiece material	Cutting material	$v_c$ [sfm]	$f_z = \text{IPT}$ Ds .669"	$f_z = \text{IPT}$ Ds .787"-.945"
Carbon steel	TI25	650 - 980	.0012 - .0025	.0020 - .0031
Alloyed steel	TI25	460 - 720	.0008 - .0016	.0012 - .0020
Grey cast iron	TI25	330 - 520	.0012 - .0025	.0020 - .0039

### CUTTING DATA

### CHAMFERING OF T-SLOTS

Workpiece material	Cutting material	$v_c$ [sfm]	$f_z = \text{IPT}$
Carbon steel	TI25	980 - 1300	.0051 - .0083
Alloyed steel	TI25	590 - 980	.0039 - .0051
Grey cast iron	TI25	460 - 790	.0063 - .0106

The cutting data is only valid for standard carbide toolholders (shanks) listed in this chapter.

## Feed rates and time calculation

It is simple and easy to calculate your speed and feeds using HORN'S HCT program. We recommend that you calculate the cutting data with this program as it will provide you with the best cutting performance and results. Basic features of the calculations can be found on the following pages.

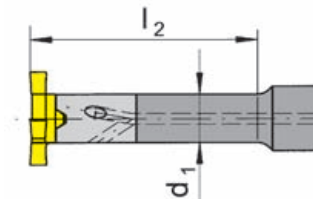
### HCT (HORN Circular Technology)

- safe and fast -  
Your cutting data for groove milling by circular interpolation of internal and external grooves as well as groove milling of linear grooves.  
System requirements from Windows 95.  
Available on CD-ROM.

## BASIC RECOMMENDATIONS

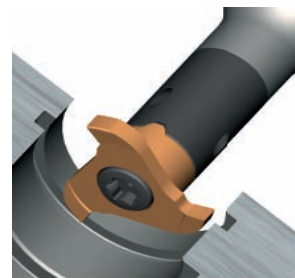
### Overhang of the milling cutter

Select the shortest possible clamping device and milling shank, and control the runout tolerance of the tools. Large cutting widths in combination with long overhangs require specific manufacturing methods such as dividing the cutting width to achieve the best possible cutting result due to reduced cutting forces.



### Diameter of the milling cutter

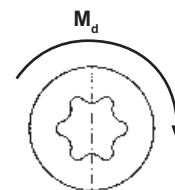
When using a large diameter cutter, whose relationship is close to the bore diameter, manufacturing cycle time can be reduced, due to the smaller center of rotation and higher feed rates. Many times the rotation of the milling cutter centre will be defined by the parameters of the workpiece and the whole application setup.



### Clamping torque of the screws

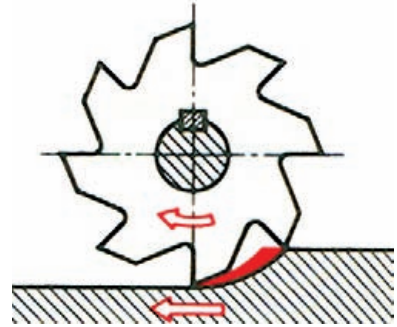
We recommend to use a torque screw driver to achieve the indicated torque values per insert and tool type. Additional additives such as copper paste are not permitted. This will have a negative effect and change the clamping forces.

**All clamping screws are already coated with additives.**



## Milling direction

Most HORN milling tools are right handed , and it is recommended to use them with the climb milling process as this is generally recommend for carbide tools.

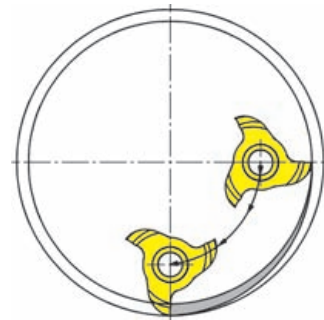


## Milling entry into the workpiece

A simple radial entry of the milling cutter creates a very long contact angle which leads to vibrations which will not disappear for the rest of the milling operation and are visual on the bottom of the groove.

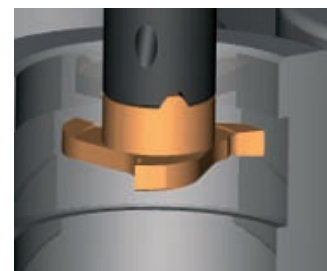
It is recommended to enter the groove with a ramp angle of  $45^\circ$  up to  $180^\circ$  to the maximum depth of cut. The calculated cutting data refers to the milling condition when the insert is in the full cut but can be also used for the entry loop.

Ramp angle  $> 45^\circ$



## Bore milling and offset milling by helical interpolation

HORN milling inserts are manufactured with a round chip breaker. This means that beyond a depth of cut of 2 mm in axial direction the insert gets a negative cutting angle. Milling inserts are limited to a depth of cut of 2 mm when used for helical interpolation. Larger depths of cut can only be produced when choosing special chip breakers. Please contact us in case of any further questions.

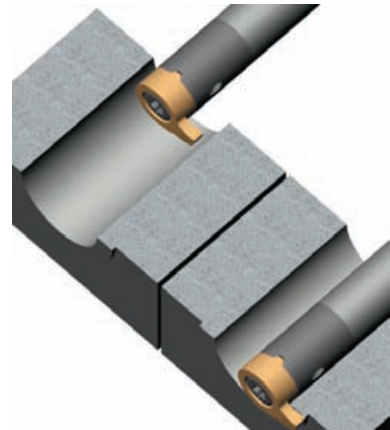


H



## Single edged inserts

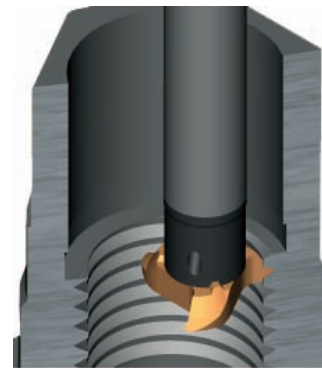
When entering through a bore off center and without rotating it is possible to generate back chamfers and flats with inserts having a larger cutting diameter than the bore diameter. Single edged cutters have no run out tolerance.



## Thread milling

With HORN thread milling inserts the thread profile is generated in one full cut to the profile depth of the thread. This produces threads with minimal taper especially in high alloyed steels.

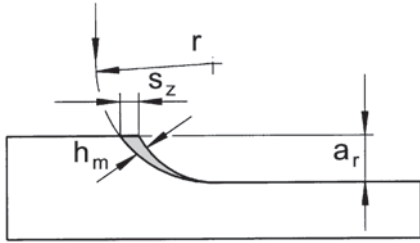
In blind holes it is recommended to mill from the bottom to the top. Otherwise there is the risk of damaging the tool because of milling into chips at the bottom of the blind hole.



### **A general recommendation for thread milling:**

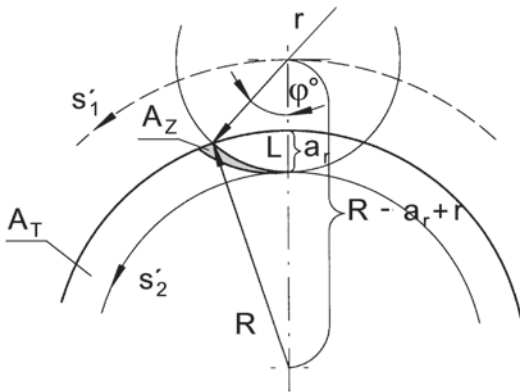
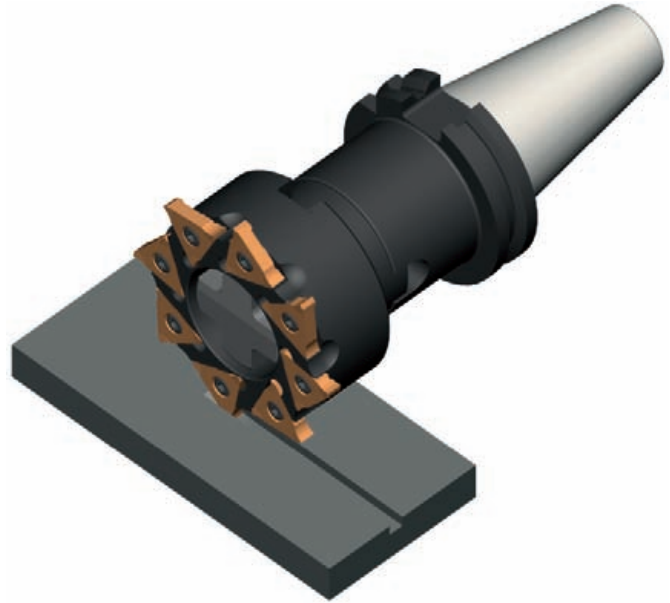
The milling cutter diameter should not exceed 70% of the minor diameter of the thread. Otherwise recutting of the profile occurs which could bring the whole thread out of tolerance.

## MILLING OF A LINEAR GROOVE - EXTERNAL



$$s_z = h_m \sqrt{\frac{2r}{a_r}}$$

$$s = n \cdot z \cdot s_z \text{ mm/min}$$



$$\cos \varphi^\circ = \frac{r^2 + [R + r - a_r]^2 - R^2}{2r [R + r - a_r]} \rightarrow \varphi^\circ$$



$L = \frac{\pi \cdot 2r \cdot \varphi^\circ}{360^\circ} \text{ mm}$	Length of cut	$t = \frac{A_T}{n \cdot z \cdot A_z} \text{ min}$	Time for cut (for $A_T$ )
$A_z = L \cdot h_m \text{ mm}^2$	Area of chip	$s'_1 = \frac{\pi \cdot 2 (R+r-a_r)}{t} \text{ mm/min}$	Feed rate of tool centre
$A_T = \pi [R^2 - (R-a_r)^2] \text{ mm}^2$	Area of groove section	$s'_2 = s'_1 \frac{R - a_r}{R + r - a_r} \text{ mm/min}$	Feed rate of tool tip

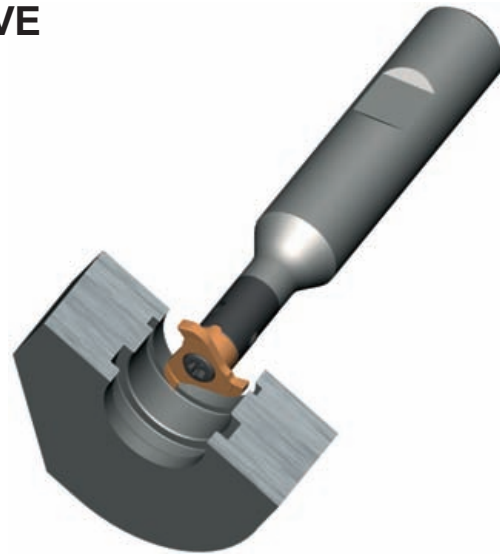
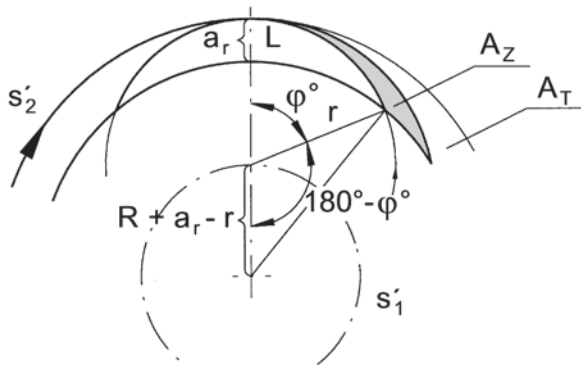


### HCT (HORN Circular Technology)

- safe and fast -

Your cutting data for groove milling by circular interpolation of internal and external grooves as well as groove milling of linear grooves. System requirements from Windows 95. Available on CD-ROM.

## MILLING OF AN INTERNAL GROOVE



$$\cos [180^\circ - \varphi^\circ] = \frac{r^2 + [R + a_r - r]^2 - R^2}{2r [R + a_r - r]} \rightarrow 180^\circ - \varphi^\circ \rightarrow \varphi^\circ$$

$L = \frac{\pi \cdot 2r \cdot \varphi^\circ}{360^\circ} \text{ mm}$	Length of cut
$A_z = L \cdot h_m \text{ mm}^2$	Area of chip
$A_T = \pi [R^2 - (R - a_r)^2] \text{ mm}^2$	Area of groove section

$t = \frac{A_T}{n \cdot z \cdot A_z} \text{ min}$	Time for cut (for $A_T$ )
$s'_1 = \frac{\pi \cdot 2 (R + r - a_r)}{t} \text{ mm/min}$	Feed rate of tool centre
$s'_2 = s'_1 \frac{R - a_r}{R + r - a_r} \text{ mm/min}$	Feed rate of tool tip

	Specification	ISO Specification
Feed rate	$s'$	$v_f$
Revolutions	$n$	$n$
Number of teeth	$z$	$z$
Feed/tooth	$s_z$	$f_z$
medium thickness of chip	$h_m$	$h_m$
radial depth of cut	$a_r$	$a_e$

	Specification	ISO Specification
Radius of cutter	$r$	$r$
Radius of workpiece	$R$	$R$
Feed rate of tool centre	$s'_1$	$v_{f3}$
Feed rate of tool tip	$s'_2$	$v_{f2}$

H

Following torques are allowed for screws of inserts.  
For torque screw drivers please see chapter additional equipment.

Type	Screw	M <sub>d</sub> Nm	Torque lbf-in.	Wrench	Blade
380	5.12T20P	6.0 - 6.5	53 - 58	T20PQ	DT20PK / DT20PQ
381.0...	5.12T20P	6.0 - 6.5	53 - 58	T20PQ	DT20PK / DT20PQ
382...06	5F.06T15P	5.0 - 5.5	44 - 49	T15PQ	DT15PK
382...08	5F.08T20P	5.0 - 5.5	44 - 49	T20PQ	DT20PK
382...10/12/14	5.10T20P	6.0 - 6.5	53 - 58	T20PQ	DT20PK / DT20PQ
383...06	5F.06T15P	5.0 - 5.5	44 - 49	T15PQ	DT15PK
383...08	5F.08T20P	5.0 - 5.5	44 - 49	T20PQ	DT20PK
383...10/12	5.10T20P	6.0 - 6.5	53 - 58	T20PQ	DT20PK / DT20PQ
ABS	5.12T20P	6.0 - 6.5	53 - 58	T20PQ	DT20PK / DT20PQ
ADR.01...	C009000	0.75	7	T6W	DT6K
ADR.02/03...	C009001	1.5	13	T8L	DT8K
ADR.04/05/06...	C009002	1.5	13	T8L	DT8K
B105/BKT105	6.075T15P	5.0	44	T15PQ	DT15PK
B110/BKT110	6.075T15P	5.0	44	T15PQ	DT15PK
BKT356	5.12T20P	6.0 - 6.5	53 - 58	T20PQ	DT20PK / DT20PQ
DAHM	030.3070.T10P	3.0	27	T10PL	DT10PK
DAM31...02B	030.2541.T8P	1.3	12	T8PL	DT8PK
DAM31...03A/B	030.2547.T8P	1.3	12	T8PL	DT8PK
DAM31...04A/B	030.2553.T8P	1.3	12	T8PL	DT8PK
DAM31...05A/B	030.2557.T8P	1.3	12	T8PL	DT8PK
DAM32...02A/B	030.3562.T10P	3.5	31	T10PL	DT10PK
DAM32.025.D...03A/B	030.3569.T10P	3.5	31	T10PL	DT10PK
DAM32.032.D...03A/B	030.3576.T10P	3.5	31	T10PL	DT10PK
DAM32.417.M...03B	030.3569.T10P	3.5	31	T10PL	DT10PK
DRHD	6.075T15P	5.0	44	T15PQ	DT15PK
HSK	5.12T20P	6.0 - 6.5	53 - 58	T20PQ	DT20PK / DT20PQ
L381.A...	5F.08T20P	5.0 - 5.5	44 - 49	T20PQ	DT20PK
L381.D080...	5F.08T20P	5.0 - 5.5	44 - 49	T20PQ	DT20PK
L381.D086...	5.12T20P	6.0 - 6.5	53 - 58	T20PQ	DT20PK / DT20PQ
L381.G070...	5.10T20P	6.0 - 6.5	53 - 58	T20PQ	DT20PK / DT20PQ
L381.G080...	5F.08T20P	5.0 - 5.5	44 - 49	T20PQ	DT20PK
L381.G086/090/098	5.12T20P	6.0 - 6.5	53 - 58	T20PQ	DT20PK / DT20PQ
L381.G090...	5.12T20P	6.0 - 6.5	53 - 58	T20PQ	DT20PK / DT20PQ
L381.N090...	5F.08T20P	5.0 - 5.5	44 - 49	T20PQ	DT20PK
L381.S...	5.15T20P	6.0 - 6.5	53 - 58	T20PQ	DT20PK / DT20PQ
L381.T...	5F.08T20P	5.0 - 5.5	44 - 49	T20PQ	DT20PK
L381.X090...	5.12T20P	6.0 - 6.5	53 - 58	T20PQ	DT20PK / DT20PQ
LM275.D...	030.357P.315	2.5 - 3.0	22 - 27	T10PL	DT10PK

Following torques are allowed for screws of inserts.  
For torque screw drivers please see chapter additional equipment.

Type	Screw	M <sub>d</sub> Nm	Torque lbf-in.	Wrench	Blade
M116	5.13T20EP	6.0 - 6.5	53 - 58	T20PQ	DT20PK / DT20PQ
M117K...05	030.265P.0821	1.2	11	T8PL	DT8PK
M117K...07	030.265P.0819	1.2	11	T8PL	DT8PK
M117K...09	030.400P.0227	4.3	38	T15PQ	DT15PK
M117.MD10...	030.400P.0227	4.3	38	T15PQ	DT15PK
M117U...05	030.265P.0818	1.2	11	T8PL	DT8PK
M117U...07	2.6.5T8EP	1.2	11	T8PL	DT8PK
M117P...05	030.265P.0818	1.2	11	T8PL	DT8PK
M117P...07	2.6.5T8EP	1.2	11	T8PL	DT8PK
M275	3.5.10T10P	2.5 - 3.0	22 - 27	T10PL	DT10PK
M306	2.6.5T8EP	1.2	11	T8PL	DT8PK
M308	3.5.12T10EP	3.0	27	T10PL	DT10PK
M310...03	030.0324.T7P	1.2	11	T7PL	DT7PK
M310...04	030.3535.T8P	2.0	18	T8PL	DT8PK
M310...05	030.3543.T8P	2.0	18	T8PL	DT15PK
M311	4.14T15P	5.0	44	T15PQ	DT15PK
M311...00.B/E	4.16T15KP	5.0	44	T15PQ	DT15PK
M313	5.14T20P	6.5	58	T20PQ	DT20PK / DT20PQ
M313...00.B/E	5.15T20KP	6.5	58	T20PQ	DT20PK / DT20PQ
M328	5.14T20P	6.5	58	T20PQ	DT20PK / DT20PQ
M328...00.B/E	5.13T20KP	6.5	58	T20PQ	DT20PK / DT20PQ
M328.0020.D...	5.17T20P	6.5	58	T20PQ	DT20PK / DT20PQ
M332	5.17T20P	6.5	58	T20PQ	DT20PK / DT20PQ
M335	6.17T25P	12.0	106	T25PQ	DT20PQ
MDR.01...	C009000	0.75	7	T6W	DT6K
MDR.02/03...	C009001	1.5	13	T8L	DT8K
MDR.04/05/06...	C009002	1.5	13	T8L	DT8K
MDR.08/09/10...	C009004	3.5	31	T15Q	DT15K
R381.X090...	5.12T20P	6.0 - 6.5	53 - 58	T20PQ	DT20PK / DT20PQ
R381.X073...	5F.08T20P	6.0 - 6.5	53 - 58	T20PQ	DT20PK / DT20PQ
RM275.D...	030.357P.315	2.5 - 3.0	22 - 27	T10PL	DT10PK
RM275.T...	3.510.T10P	2.5 - 3.0	22 - 27	T10PL	DT10PK
SM328	5.17T20P	6.5	58	T20PQ	DT20PK / DT20PQ
Z313...057	5.26T20P	6.5	58	T20PQ	DT20PK / DT20PQ
Z313...082	5.28T20P	6.5	58	T20PQ	DT20PK / DT20PQ
Z313...107	5.30T20P	6.5	58	T20PQ	DT20PK / DT20PQ

# Available METRIC size carbide and tungsten alloy shanks - Summary



Dimensions in mm				Part number	Inserts (inch and metric)			Use	Page
$l_1$	$d_{g6}$	$l_2$	$d_1$		Type	$t_{max}$	Ds		
130	12	40	11	M116.0012.01B	116	4.3	20.4		A59
130	12	56	11	M116.0012.02B					
130	16	40	11	M116.0016.01B/E	116	4.3	20.4		A59
130	16	56	11	M116.0016.02B/E					
150	16	80	11	M116.0016.03B/E					
80	12	21	6	M306.0012.01B/E/A	108/306	1.0/2.5	9.6/11.7		A3 - A4
90	12	30	6	M306.0012.02B/E/A					
100	12	42	6	M306.0012.03B/E/A					
100	7.5	-	6	M306.0707.03A	108/306	0.85/2.0	9.3/11.7		D3; E2 E2
120	10	-	6	M306.1010.03A					
90	12	30	7.3	M306.0712.02B/E/A	108/306	0.7/2.0	9.6/11.7		D3
100	16	25	7.3	M306.0716.01B/E/A					
60	10	15.2	6	M306.ST10.01A	108/306	1.0/2.5	9.4/11.7		A5
95	12	29	8	M308.0012.01B/E/A	111/308/608	2.3/3.5	13.4/15.7		A25-A26
110	12	42	8	M308.0012.02B/E/A					
120	12	56	8	M308.0012.03B/E/A					
160	12	-	-	M308.0012.07A	111/308/608	2.3/3.5	13.4/15.7		D11; E8
110	12	42	9.5	M308.1012.02B/E/A	111/308	1.5/2.7	13.4/15.7		
110	16	33	9.5	M308.1016.01B/E/A					
60	10	17.7	8	M308.ST10.01A	111/308	2.3/3.5	13.4/15.7		A27
70	13	25.7	8	M308.ST13.01A					
100	12	32	9	M311.0012.01B/E/A	311/611	3.5/2.5	17.7		A43-A44
100	12	45	9	M311.0012.02B/E/A					
120	12	64	9	M311.0012.03B/E/A					
90	16	25	9	M311.0016.00B/E	311	3.6	17.0		G3
100	16	32	9	M311.0016.01B/E/A	311/611	3.5/2.5	17.7		A43-A44
110	16	45	9	M311.0016.02B/E/A					
130	16	64	9	M311.0016.03B/E/A					
110	16	32	13	M311.1316.01B/E/A	311/611	1.5	17.7		D21
130	16	45	13	M311.1316.02B/E/A					
145	16	64	13	M311.1316.03B/E/A					
60	10	17.7	9	M311.ST10.01A	311/611	3.5	17.7		A45
70	13	25.7	9	M311.ST13.01A					
80	16	25.7	9	M311.ST16.01A					
100	12	-	-	M313.0012.01B/E/A	313/613	4.5/3.2	21.7		A65-A66
130	12	-	-	M313.0012.02B/E/A					
93	16	30	11.5	M313.0016.00B/E	313	4.75	21.7		G7
100	16	42	12	M313.0016.01B/E/A	313/613	4.5/3.2	21.7		A65-A66
130	16	60	12	M313.0016.02B/E/A					
160	16	85	12	M313.0016.03B/E/A					
160	16	20	12	M313.0016.07A	313/613	2.5	21.7		D35
110	20	45	16	M313.1620.01A/B/E					
130	20	60	16	M313.1620.02A/B/E					
160	20	85	16	M313.1620.03A/B/E					

Dimensions in mm

# Available METRIC size carbide and tungsten alloy shanks - Summary



Dimensions in mm				Part number	Inserts (inch and metric)			Use	Page
$l_1$	$d_{g6}$	$l_2$	$d_1$		Type	$t_{max}$	Ds		
60	10	10.7	11.3	M313.ST10.01A	313/613	4.85	21.7		A67
70	13	25.7	11.3	M313.ST13.01A					
80	16	25.7	11.3	M313.ST16.01A					
120	9	-	-	M328.0909.01A	328/628	9.3	28		A95
100	12	36	9	M328.0912.01A					
100	16	42	14.3	M328.0016.01B/E/A	325/328/628	5.0/6.4/4.3	24.8/27.7		A93 - A94
130	16	60	14.3	M328.0016.02B/E/A					
160	16	85	14.3	M328.0016.03B/E/A					
100	20	42	14.3	M328.0020.01B/E/A					
130	20	60	14.3	M328.0020.02B/E/A					
160	20	85	14.3	M328.0020.03B/E/A					
104	20	35	13.5	M328.0020.00B/E	328	6.5	27.7		G10
130	20	20	15	SM328.0020.05B/E	328	6.0	27.7		D43
145	20	-	-	SM328.0020.06B/E		3.5			
160	20	20	15	SM328.0020.07B/E		6.0			
200	20	-	-	SM328.0020.08B/E		3.5			
70	13	10.7	14	M328.ST13.01A	328/628	6.0	27.7		A96
100	20	35.7	14	M328.ST20.01A					
100	16	42	16	M332.0016.01A	332	8.5	31.7		A11
130	16	60	16	M332.0016.02A					
160	16	85	16	M332.0016.03A					
100	20	42	20	M332.0020.01A					
130	20	60	20	M332.0020.02A					
160	20	85	20	M332.0020.03A					
100	12	32	11	M332.0012.2.01A	332	10	31.7		A112
100	16	32	11	M332.0016.2.01A					
70	13	25	11	M332.ST13.2.01A					A113
100	20	40	17.5	M335.0020.01B/A	335	7.9/8.0	34.7		A127 - A128
130	20	60	17.5	M335.0020.02B/A/E					

Dimensions in mm



# Available INCH size carbide and tungsten alloy shanks - Summary

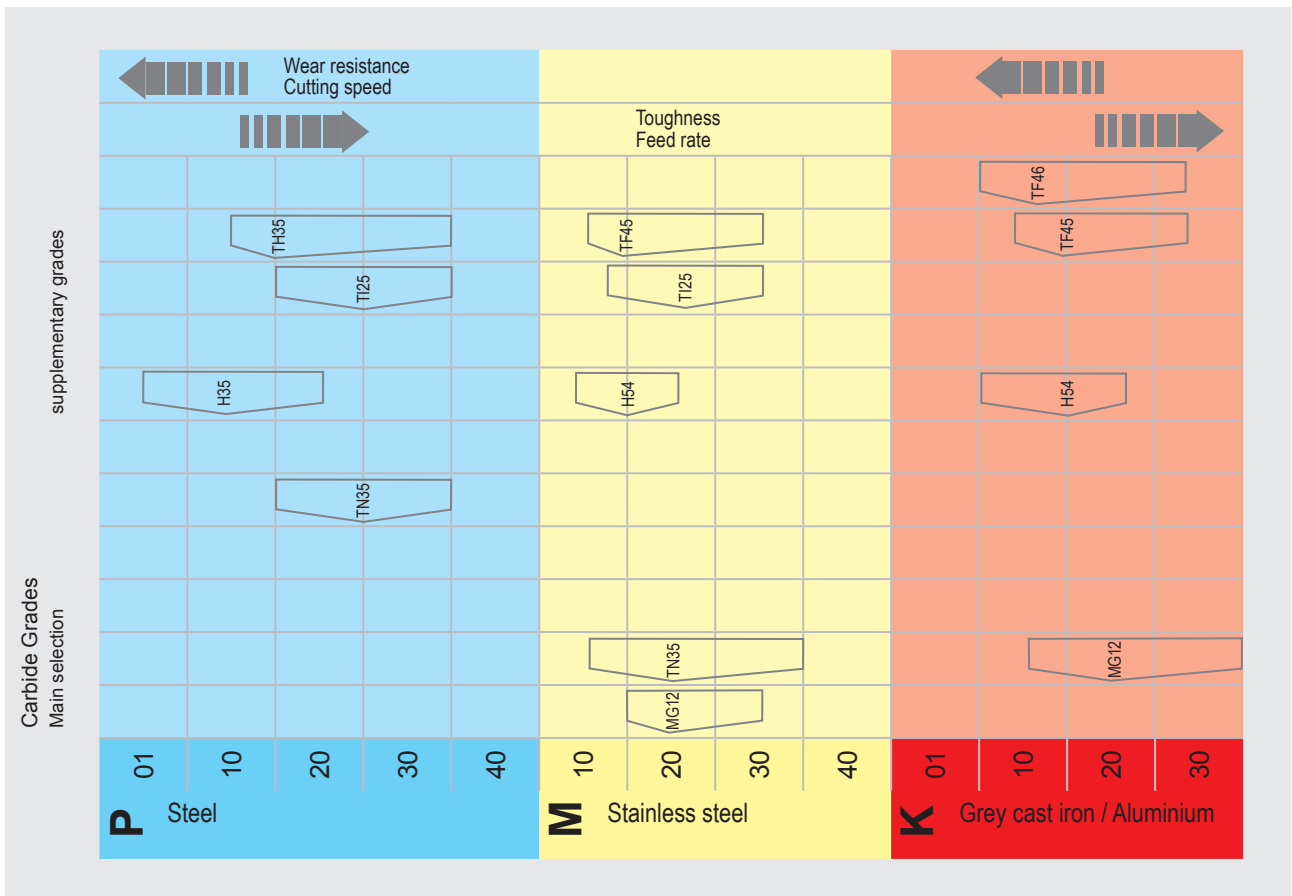
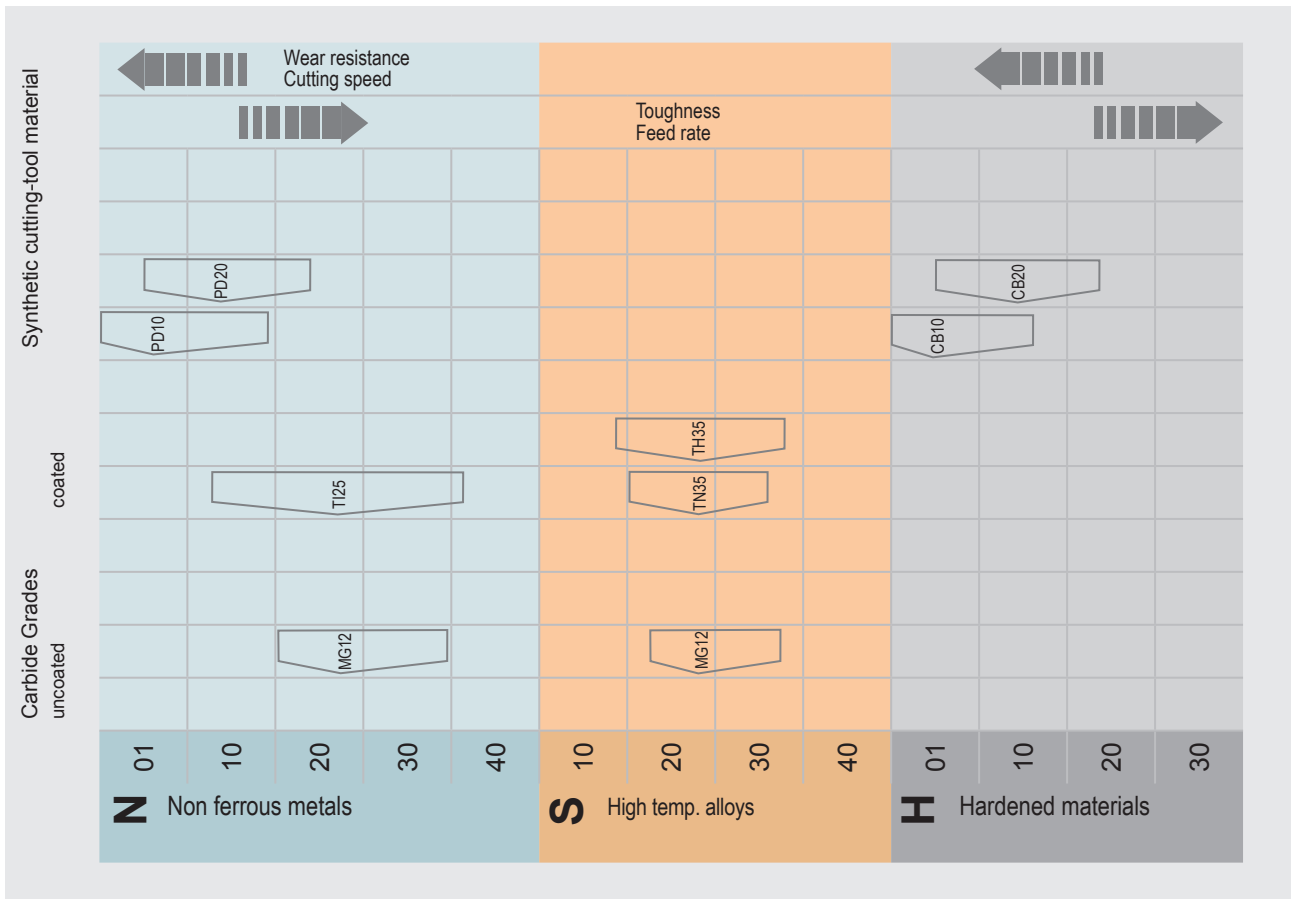


Dimensions in inch				Part number	Inserts (inch and metric)			Use	Page
$l_1$	$d_{g6}$	$l_2$	$d_1$		Type	$t_{max}$	Ds		
3.150	.500	.827	.236	MU306.0500.01B	108/306	.039/.098	.378/.461		A2; D2
3.543	.500	1.181	.236	MU306.0500.02B	108/306	.039/.098	.378/.461		
3.937	.500	1.654	.236	MU306.0500.03B	108/306	.039/.098	.378/.461		
3.937	.625	.984	.287	MU306.0625.01B	108/306	.028/.078	.378/.461		
3.740	.500	1.142	.315	MU308.0500.01B	111/308	.091/.138	.528/.618		A24; D10
4.331	.500	1.654	.315	MU308.0500.02B	111/308	.091/.138	.528/.618		
4.724	.500	2.205	.315	MU308.0500.03B	111/308	.091/.138	.528/.618		
4.331	.625	1.299	.315	MU308.0625.01B	111/308	.091/.138	.528/.618		
3.937	.500	1.260	.354	MU311.0500.01B	311/611	.138	.697		A42
3.937	.500	1.772	.354	MU311.0500.02B	311/611	.138	.697		
4.724	.500	2.520	.354	MU311.0500.03B	311/611	.138	.697		
3.543	.625	.984	.354	MU311.0625.00B	311	.143	.669		G2
3.937	.625	1.260	.354	MU311.0625.01B	311/611	.138	.697		A42
4.331	.625	1.772	.354	MU311.0625.02B	311/611	.138	.697		
5.118	.625	2.520	.354	MU311.0625.03B	311/611	.138	.697		
4.331	.625	1.260	.512	MU311.0625.04B	311	.059	.697		D20
5.118	.625	1.772	.512	MU311.0625.05B	311	.059	.697		
6.301	.500	-	.354	MU311.1212.07A	313/613	.177	.854		
3.937	.500	-	-	MU313.0500.01B	313/613	.177	.854		A64
5.118	.500	-	-	MU313.0500.02B	313/613	.177	.854		
3.661	.625	1.181	.453	MU313.0625.00B	313	.187	.787		G6
3.937	.625	1.654	.472	MU313.0625.01B	313/613	.177	.854		A64
5.118	.625	2.362	.472	MU313.0625.02B	313/613	.177	.854		
6.299	.625	3.346	.472	MU313.0625.03B	313/613	.177	.854		
4.331	.750	1.772	.630	MU313.0750.04B	313/613	.098	.854		D34
5.118	.750	2.559	.630	MU313.0625.05B	313/613	.098	.854		
7.874	.625	-	.445	MU313.1515.08A	313/613	.098	.854		
3.937	.500	-	.563	MU328.0500.01B	328/628	.256	1.091		A92
5.118	.500	-	.563	MU328.0500.02B	328/628	.256	1.091		
3.937	.625	1.654	.563	MU328.0625.01B	328/628	.256	1.091		
5.118	.625	2.362	.563	MU328.0625.02B	328/628	.256	1.091		
6.299	.625	3.346	.563	MU328.0625.03B	328/628	.256	1.091		
6.299	.750	3.346	.563	MU328.0750.03B	328/628	.256	1.091		
4.094	.750	1.378	.531	MU328.0750.00B	328	.256	.945		
5.118	.750	.787	.591	SMU328.0750.05B	328	.236	1.091		D42
5.709	.750	-	-	SMU328.0750.06B	328	.138	1.091		
6.299	.750	.787	.591	SMU328.0750.07B	328	.236	1.091		
7.874	.750	-	-	SMU328.0750.08B	328	.138	1.091		

Dimensions in inch



# CHOICE OF CARBIDE GRADES



H

# CUTTING DATA



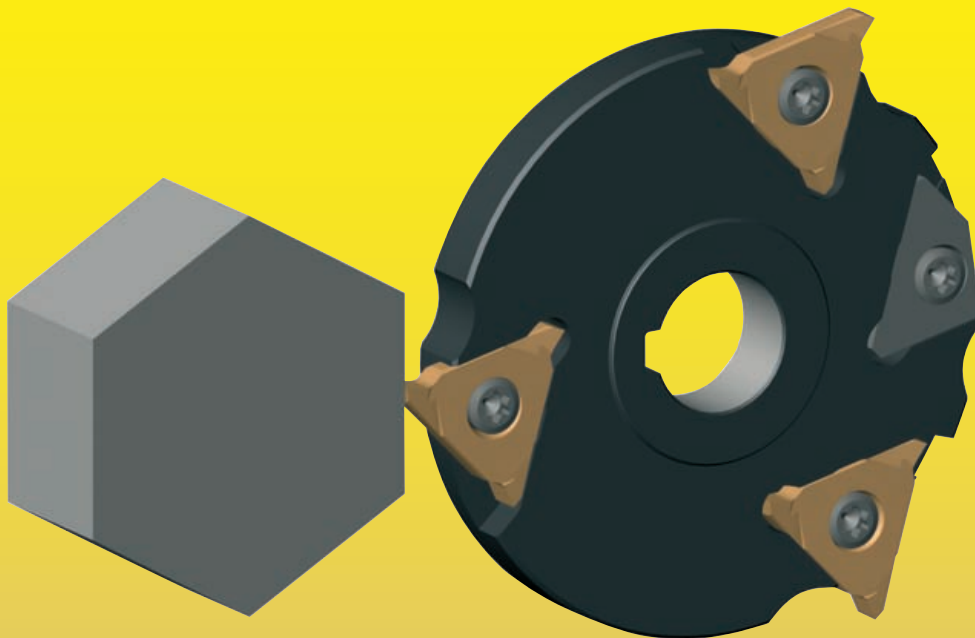
Standard values for cutting speeds  $v_c$  and medium thickness  $h_m$  for calculating feed rates by calculating cutting program »HCT«.

Material	Hardness Brinell	Cutting speeds $v_c$ (sfm) referring to carbide grade and coating			medium thickness of chip $h_m$							
		MG12	TN35 TI25 TF45	*H35	Indexable Insert Type 314			Insert Type 311,313,328,108,111,116				
					very rigid	rigid	not rigid	very rigid	rigid	not rigid		
<b>P</b> Carbon steel	0.2% C	140	-	790	650-1150	.0039	.0020	.0012	.0020	.0012	.0004	
	0.4% C	180	-	690	650-980							
	0.6% C	200	-	520	500-820							
	Alloyed steel	annealed	180	-	490							590
		quenched	280	-	390							520
		quenched	350	-	230							-
	high alloyed steel (>5%)	annealed	200	-	230							-
		hardened	-	-	-							-
	Cast steel	unalloyed	180	80	430							-
		alloyed	220	70	390							-
<b>M</b> Stainless steel	martensitic, ferritic	200	80	590	-							
	austenitic	180	70	390	-							
<b>K</b> Grey cast iron	low tensile strength	180	70	330	-							
	high tensile strength	250	60	390	-							
	Spheroidal graphite cast iron	ferritic	160	70	330	-						
		perlitic	250	-	300	-						
	Malleable cast iron	ferritic	125	60	330	-						
		perlitic	225	70	200	-						
<b>S</b> Heat resistant alloy (Fe)	annealed	200	40	260	-							
	hardened	275	30	-	-							
	Heat resistant alloy (Ni, Co)	annealed	250	20	130	-						
		hardened	350	15	-	-						
<b>N</b> Al-alloys	not heat treatable	30-80	550	2600	-							
	heat treatable	80-120	220	980	-							
	Al-cast-alloy	not heat treatable	80	220	980	-						
		heat treatable	100	100	660	-						
	Copper-alloys	not heat treatable	90	120	-	-						
		heat treatable	100	100	-	-						

H

## Polygon Milling Cutter

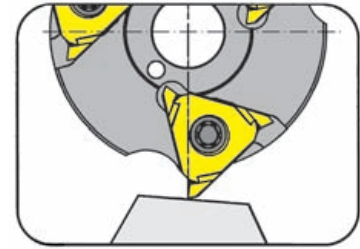
For use on lathes with ability to machine polygon profiles.



J

**CUTTER Type**

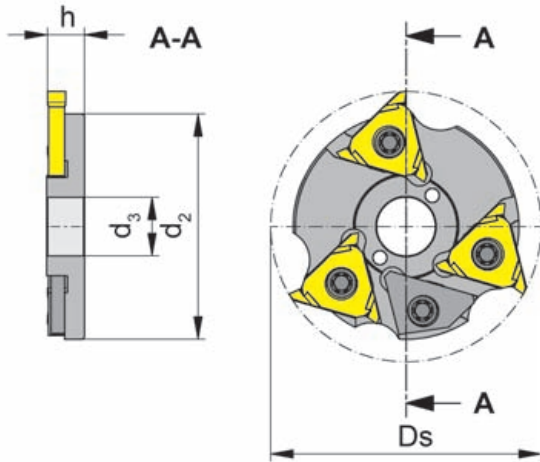
**381**



Cutting edge  $\varnothing$

Ds 2.362" (60 mm)

for machine: **Star SR-20J**



Picture = left hand cutting version

for insert **N314.MK40.20**

Part number	Insert	Ds	d <sub>2</sub>	d <sub>3</sub>	h	t <sub>max</sub>	Type of machine
<b>L381.A060.13.04</b>	N314...	60	50	13	8.2	4.5	Star SR-20J

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

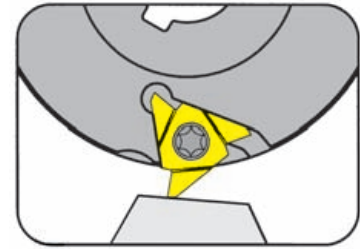


### Spare parts

Cutter	Screw	TORX PLUS® Wrench	Balance element
L381.A060.13.04	<b>5F.08T20P</b>	<b>T20PQ</b>	<b>N314.AT30.HM</b>

## CUTTER Type

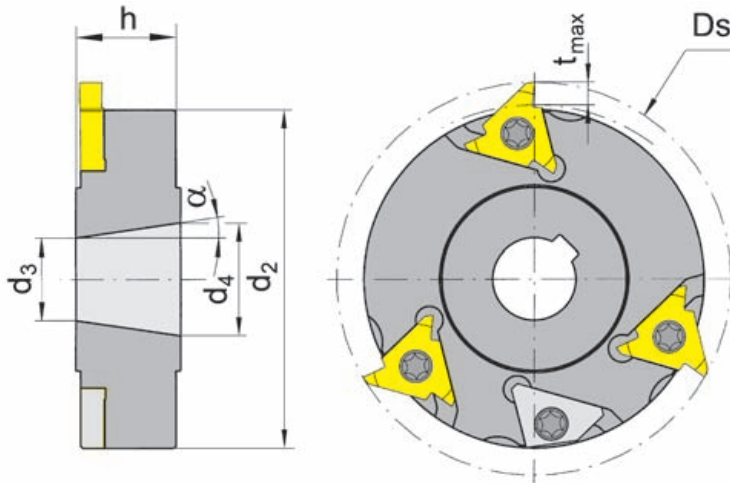
# 381



Cutting edge  $\emptyset$

Ds 70/86/98 mm

for machine: **Gildemeister**



Picture = left hand cutting version

for insert **L314.MK50.20**

Part number	Insert	Ds	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	h	$\alpha$	t <sub>max</sub>	Type of machine
<b>L381.G070.15.04</b>	L314...	70	58	11.5	15.0	15	8°16'	5	GLD25/GD32
<b>L381.G086.25.04</b>	L314...	86	74	18.0	24.7	23	8°16'	5	GM20-6.-35-8/GMC35
<b>L381.G098.26.04</b>	L314...	98	86	20.0	25.8	23	8°32'	5	GM35-6.-35-8.-42-6/GMC35

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

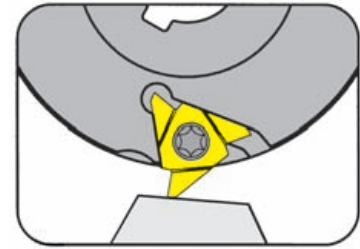


## Spare parts

Cutter	Screw	TORX PLUS® Wrench	Balance element
L381.G070.15.04	<b>5.10T20P</b>	<b>T20PQ</b>	<b>N314.AT40.HM</b>
L381.G0...04	<b>5.12T20P</b>	<b>T20PQ</b>	<b>N314.AT40.HM</b>

## CUTTER Type

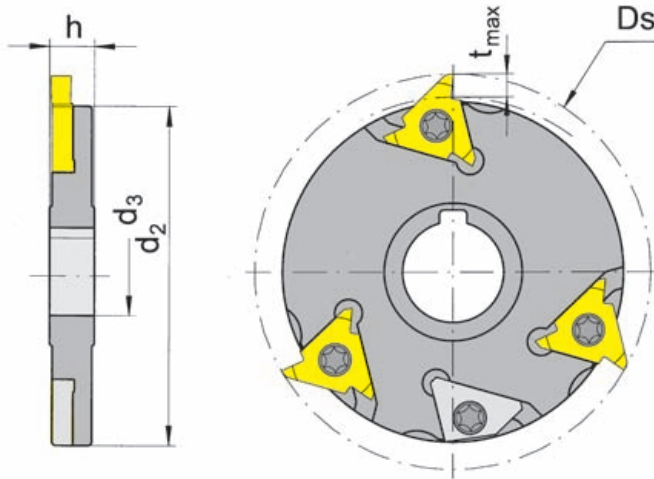
# 381



Cutting edge  $\varnothing$

Ds 3.150" (80 mm)

for machine: **Gildemeister**



Picture = left hand cutting version

for insert **N314.MK40.20**

Part number	Insert	Ds	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	h	t <sub>max</sub>	Type of machine
<b>L381.G080.16.04</b>	N314...	80	68	16	16	9	5	SPRINT 20/32

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

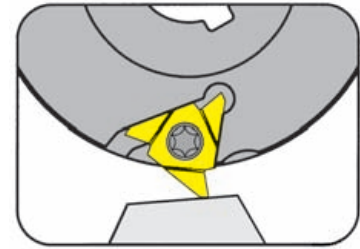


## Spare parts

Cutter	Screw	TORX PLUS® Wrench	Balance element
L381.G080.16.04	<b>5F.08T20P</b>	<b>T20PQ</b>	<b>L314.AT30.HM</b>

## CUTTER Type

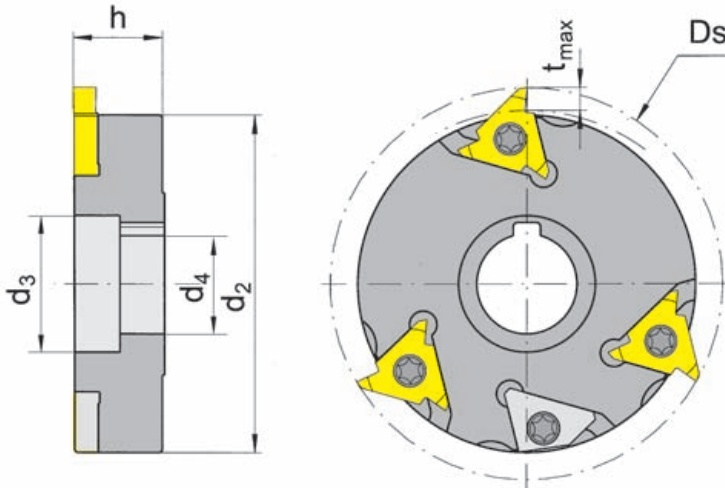
# 381



Cutting edge  $\emptyset$

Ds 3.543" (90 mm)

for machine: **Gildemeister**



Picture = left hand cutting version

for inserts **L314.MK50...**

Part number	Insert	Ds	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	h	t <sub>max</sub>	Type of machine
<b>L381.G090.22.04</b>	L314...	90	78	30	22	20	5	SPRINT32L/-42L

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

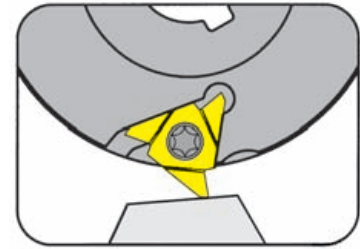


## Spare parts

Cutter	Screw	TORX PLUS® Wrench	Balance element
L381.G090.22.04	<b>5.12T20P</b>	<b>T20PQ</b>	<b>N314.AT40.HM</b>

## CUTTER Type

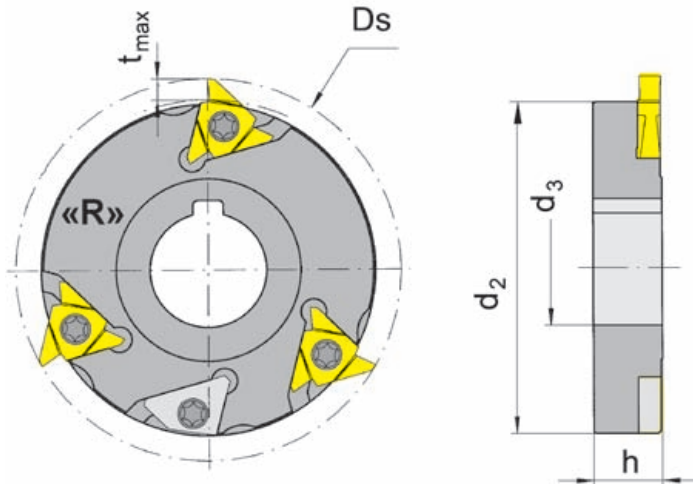
# 381



Cutting edge  $\emptyset$

Ds 3.543" (90 mm)

for machine: **INDEX**



Picture = right hand cutting version

R = right hand version

for inserts **R/L314.MK50...**

Part number	Insert	Ds	d <sub>2</sub>	d <sub>3</sub>	h	t <sub>max</sub>	Type of machine
<b>L381.X090.27.04</b>	L314...	90	78	27	16.2	5	Index ABC
<b>R381.X090.27.04</b>	R314...						

State R or L version

Dimensions in mm

Further sizes upon request

For torque specifications of the screw, please see Technical Instructions.



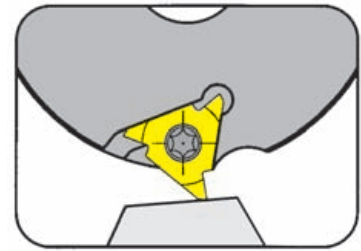
## Spare parts

Cutter	Screw	TORX PLUS® Wrench	Balance element
R/L381.X090.27.04	<b>5.12T20P</b>	<b>T20PQ</b>	<b>020.0314.1531</b>



## CUTTER Type

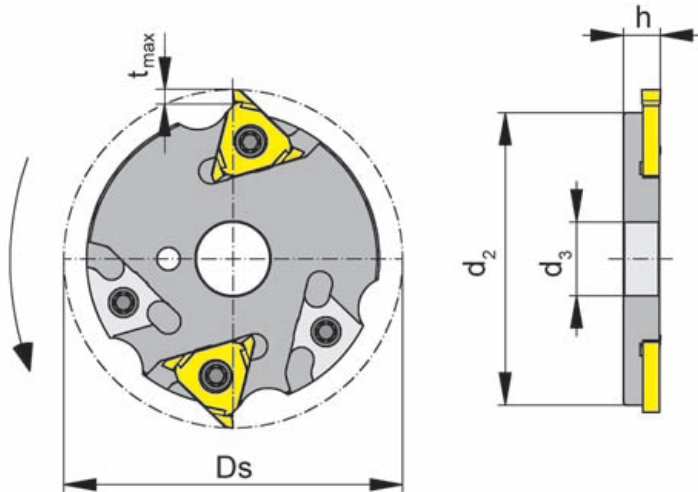
# 381



Cutting edge  $\varnothing$

Ds 2.894" (73.5 mm)

for machine: **INDEX**



Picture = right hand cutting version

for insert **N314.MK40.20**

Part number	Insert	Ds	d <sub>2</sub>	d <sub>3</sub>	h	t <sub>max</sub>	Type of machine
<b>R381.X073.16.04</b>	N314...	73.5	63.5	16	8	5	INDEX MS25

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

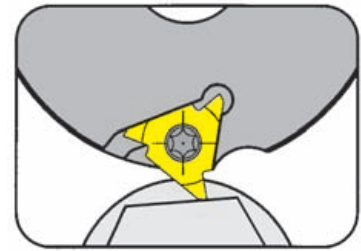


## Spare parts

Cutter	Screw	TORX PLUS® Wrench	Balance element
R381.X073.16.04	<b>5F.08T20P</b>	<b>T20PQ</b>	<b>R314.AT30.HM</b>

CUTTER Type

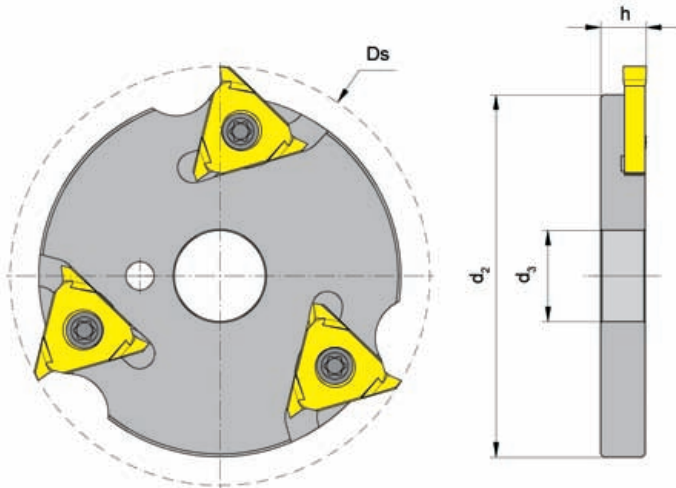
## 381



Cutting edge  $\emptyset$

Ds 2.894" (73.5 mm)

for machine: **INDEX**



Picture = right hand cutting version

for insert **N314.MK40.20**

Part number	Insert	Ds	d <sub>2</sub>	d <sub>3</sub>	h	t <sub>max</sub>	Type of machine
<b>R381.X073.16.03</b>	R314...	73.5	63.5	16	8	5	INDEX MS25

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

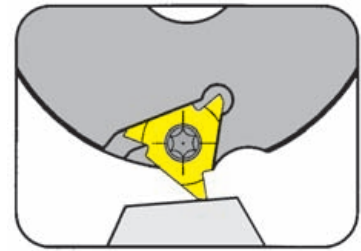


### Spare parts

Cutter	Screw	TORX PLUS® Wrench
R381.X073.16.03	<b>5F.08T20P</b>	<b>T20PQ</b>

CUTTER Type

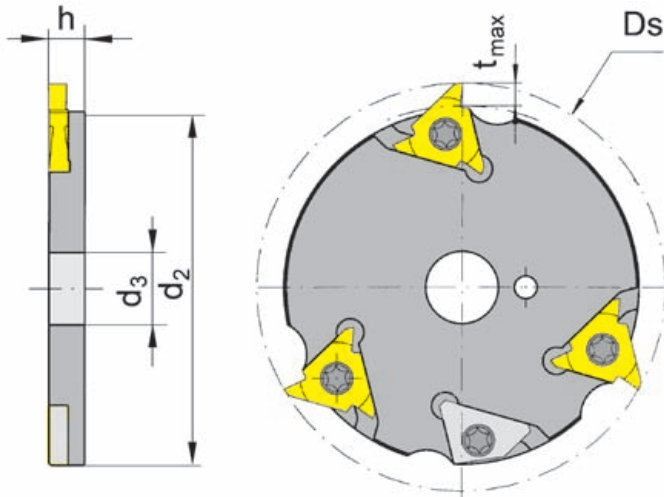
## 381



Cutting edge  $\varnothing$

Ds 3.543" (90.0 mm)

for machine: **Nakamura**



Picture = left hand cutting version

for insert **N314.MK40.20**

Part number	Insert	Ds	d <sub>2</sub>	d <sub>3</sub>	h	t <sub>max</sub>	Type of machine
<b>L381.N090.16.04</b>	N314...	90	80	16	7.8	5	WT250

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

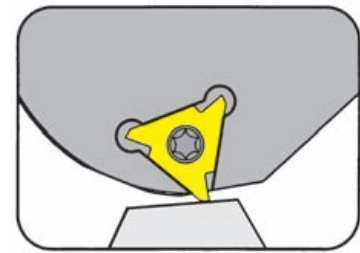


### Spare parts

Cutter	Screw	TORX PLUS® Wrench	Balance element
L381.N090.16.04	<b>5F.08T20P</b>	<b>T20PQ</b>	<b>L314.AT30.HM</b>

## CUTTER Type

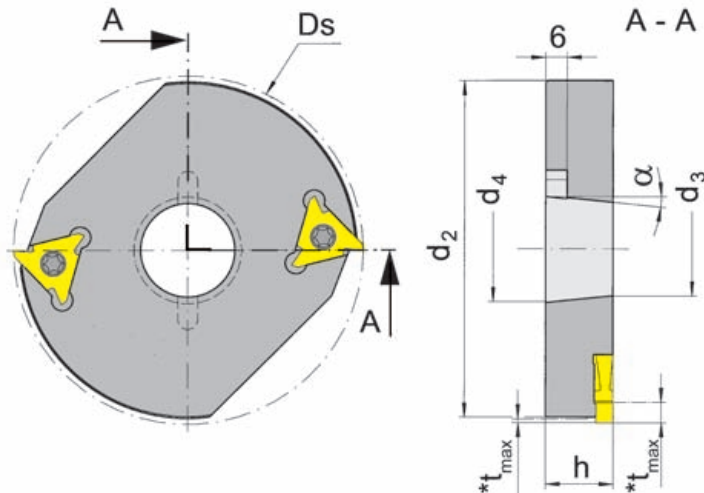
# 381



Cutting edge  $\emptyset$

Ds 78/98/118 mm

for machine: **A.H. Schütte**



Picture = left hand cutting version

for insert **L314.MK70.M0**

Part number	Insert	Ds	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	h	$\alpha$	t <sub>max</sub>	Type of machine
<b>L381.S078.30.02</b>	L314...	78	66.0	26.3	30.1	19	5°42'38"	*	SG18.SG20.AG18
<b>L381.S098.30.02</b>	L314...	98	94.6	26.3	30.1	19	5°42'38"	*	SG20/SF26.-S.-L/SE18/AF26.32
<b>L381.S118.30.02</b>	L314...	118	115.0	26.3	30.1	19	5°42'38"	*	SF32.42.51.67/AF42

Further sizes upon request

Dimensions in mm

**Note:**

reinforced pocket, feed in axial direction

\* t<sub>max</sub> Side milling = .197" (5.0 mm) / Groove milling = .047" (1.2 mm)

For torque specifications of the screw, please see Technical Instructions.

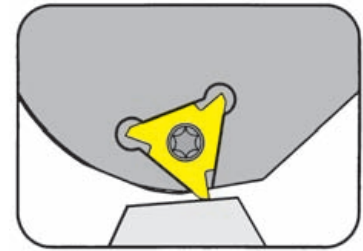


### Spare parts

Cutter	Screw	TORX PLUS® Wrench
L381.S...	<b>5.15T20P</b>	<b>T20PQ</b>

## CUTTER Type

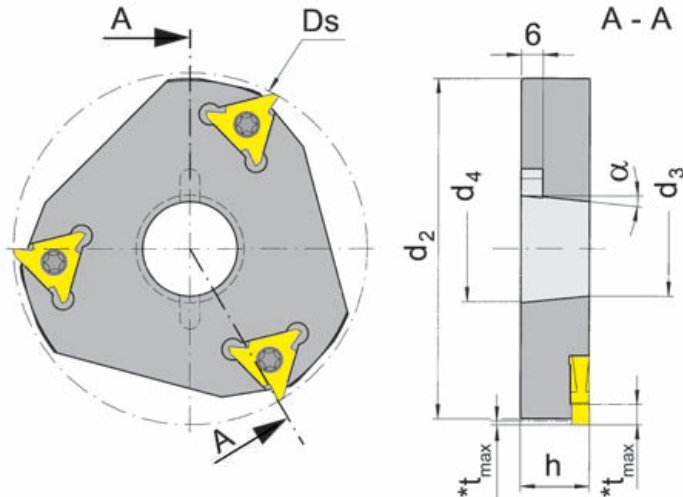
# 381



Cutting edge  $\emptyset$

Ds 79/98/118 mm

for machine: A.H. Schütte



Picture = left hand cutting version

for insert **L314.MK70.M0**

Part number	Insert	Ds	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	h	$\alpha$	t <sub>max</sub>	Type of machine
<b>L381.S078.30.03</b>	L314...	78	77.0	26.3	30.1	19	5°42'38"	*	SG18.SG20.AG18
<b>L381.S098.30.03</b>	L314...	98	94.6	26.3	30.1	19	5°42'38"	*	SG20/SF26.-S.-L/SE18/AF26.32
<b>L381.S118.30.03</b>	L314...	118	115.0	26.3	30.1	19	5°42'38"	*	SF32.42.51.67/AF42

Further sizes upon request

Dimensions in mm

### Note:

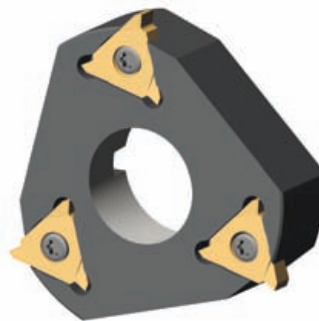
reinforced pocket, feed in axial direction

\* t<sub>max</sub> Side milling = .197" (5.0mm) / Groove milling = .047" (1.2mm)

For torque specifications of the screw, please see Technical Instructions.

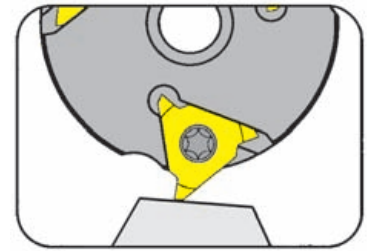
### Spare parts

Cutter	Screw	TORX PLUS® Wrench
L381.S...	<b>5.15T20P</b>	<b>T20PQ</b>



## CUTTER Type

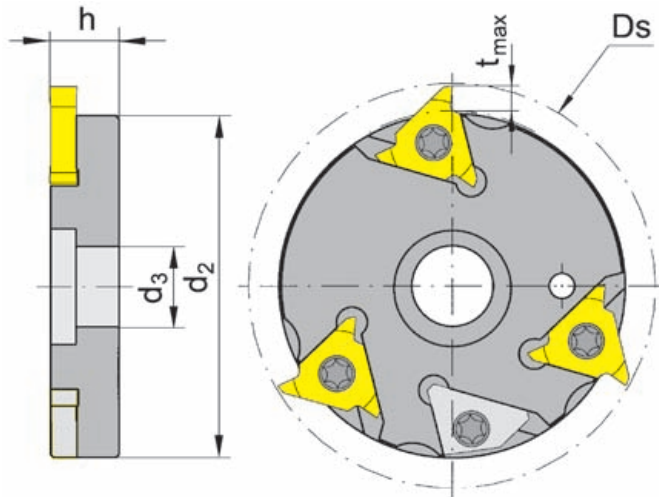
# 381



Cutting edge  $\varnothing$

Ds 3.150" (80 mm)

for machine: **Tornos**



Picture = left hand cutting version

for insert **N314.MK40.20**

Part number	Insert	Ds	d <sub>2</sub>	d <sub>3</sub>	h	t <sub>max</sub>	Type of machine
<b>L381.D080.16.04</b>	N314...	80	57.5	16	13.6	5	DECO 2000/ DECO 13/20/26

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

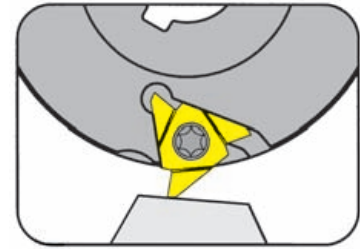


## Spare parts

Cutter	Screw	TORX PLUS® Wrench	Balance element
L381.D080.16.04	<b>5F.08T20P</b>	<b>T20PQ</b>	<b>L314.AT30.HM</b>

## CUTTER Type

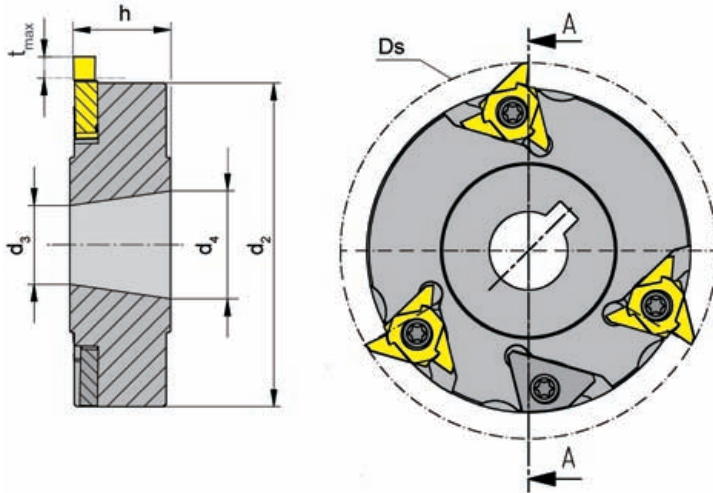
# 381



Cutting edge  $\emptyset$

Ds 3.386" (86 mm)

for machine: **Tornos**



Picture = left hand cutting version

for inserts **L314.MK50...**

Part number	Insert	Ds	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	h	t <sub>max</sub>	Type of machine
<b>L381.D086.25.04</b>	L314...	86	74	18	24.7	23	5	Tornos Multi-Deco

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

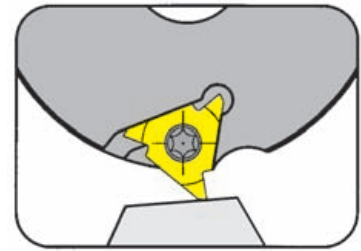


## Spare parts

Cutter	Screw	TORX PLUS® Wrench	Balance element
L381.D086.25.04	<b>5.12T20P</b>	<b>T20PQ</b>	<b>N314.AT40.HM</b>

## CUTTER Type

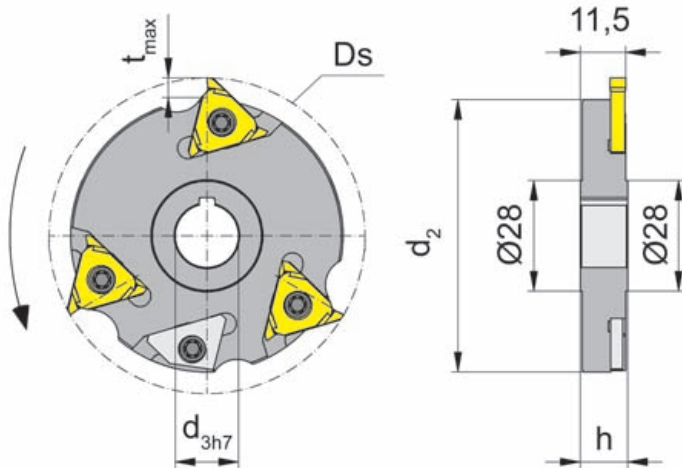
# 381



Cutting edge  $\varnothing$

Ds 3.150" (80.0 mm)

for machine: **Traub**



Picture = right hand cutting version

for insert **N314.MK40.20**

Part number	Insert	Ds	d <sub>2</sub>	d <sub>3</sub>	h	t <sub>max</sub>	Type of machine
<b>R381.T080.16.04</b>	N314...	80	69	16	12	5	TRAUB TNL18

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.



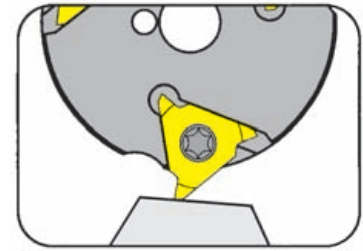
## Spare parts

Cutter	Screw	TORX PLUS® Wrench	Balance element
R381.T080.16.04	<b>5F.08T20P</b>	<b>T20PQ</b>	<b>R314.AT40.HM</b>



CUTTER Type

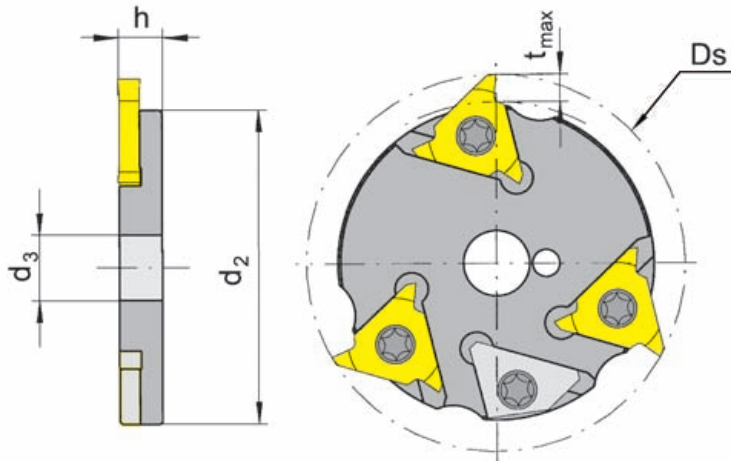
## 381



Cutting edge  $\varnothing$

Ds 2.717" (69 mm)

for machine: **Traub**



Picture = left hand cutting version

for insert **N314.MK40.20**

Part number	Insert	Ds	d <sub>2</sub>	d <sub>3</sub>	h	t <sub>max</sub>	Type of machine
<b>L381.T069.12.04</b>	N314...	69	57.5	12	8	5	TNL12-7/TNL26/TNK36

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

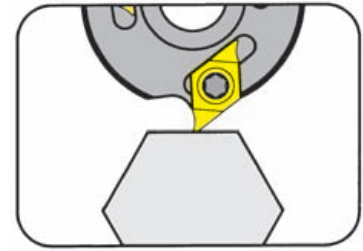


### Spare parts

Cutter	Screw	TORX PLUS® Wrench	Balance element
L381.T069.12.04	<b>5F.08T20P</b>	<b>T20PQ</b>	<b>L314.AT30.HM</b>

## CUTTER Type

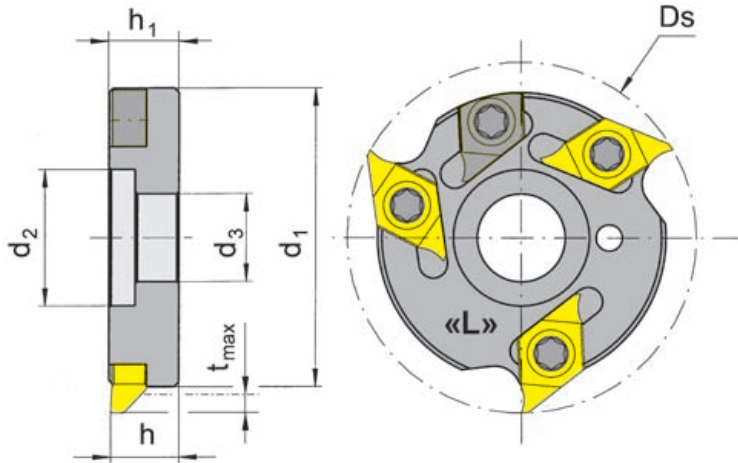
# M275



Cutting edge  $\emptyset$

Ds 1.575" (40 mm)

for machine: **Tornos**



Picture = left hand cutting version

L = left hand version

for insert  
**R/LS275.MK13.M0**

Part number	Insert	Ds	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	h	h <sub>1</sub>	t <sub>max</sub>	Type of machine
<b>LM275.D040.10.04</b> <b>RM275.D040.10.04</b>	LS275... RS275...	40	33	15.5	10	7.9	8	3	DECO 7/10

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

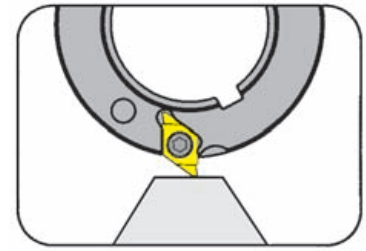


## Spare parts

Cutter	Screw	TORX PLUS® Wrench	Balance element
LM275.D040.10.04 RM275.D040.10.04	<b>030.357P.315</b> <b>030.357P.315</b>	<b>T10PL</b> <b>T10PL</b>	<b>LS275.AT41.HM</b> <b>RS275.AT41.HM</b>

## CUTTER Type

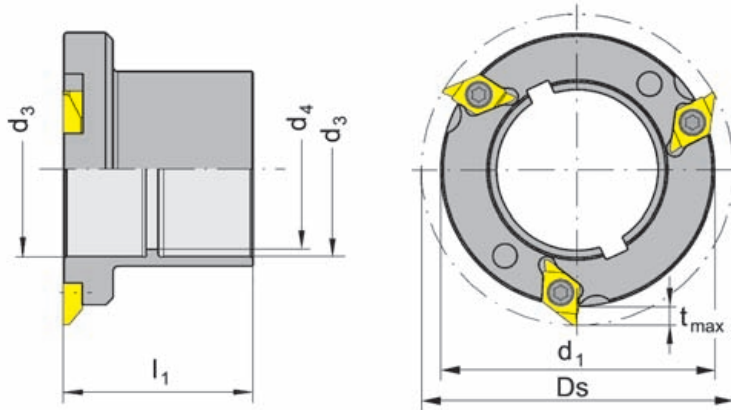
# M275



Cutting edge  $\emptyset$

Ds 2.520" (64 mm)

for machine: **Traub**



Picture = right hand cutting version

for insert  
**RS275.MK13.M0**

Part number	Insert	Ds	d <sub>1</sub>	l <sub>1</sub>	d <sub>3</sub>	d <sub>4</sub>	t <sub>max</sub>	Type of machine
<b>RM275.T064.33.03</b>	RS275...	64	56	39	36	33	3	TNL12-7 Gegenspindel

Further sizes upon request

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

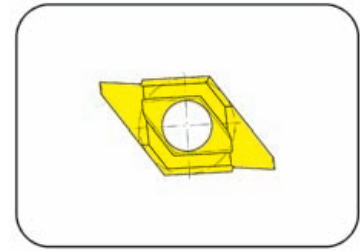


## Spare parts

Cutter	Screw	TORX PLUS® Wrench
RM275.T064.33.03	<b>3.5.10.T10P</b>	<b>T10PL</b>

## INDEXABLE INSERT Type

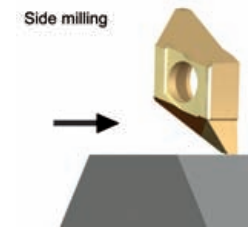
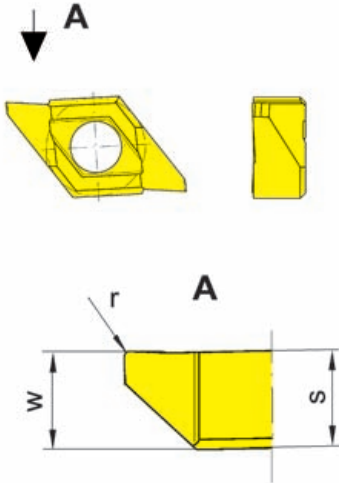
# S275



Width of milling .157"

for use with Cutter

Type M275



R = right hand version shown

L = left hand version

J

Part number	w	s	r	MG12	TN35	TI25	TF45
						▲/▲	
<b>R/LS275.MK13.M0</b>	.157	.154	.008			•	
				P	•		
				M	•		
				K	•		
				N	•		
				S	•		
				H			

▲ on stock Δ 4 weeks

• main recommendation

o alternative recommendation

■ uncoated grades

■ coated grades

■ brazed/Cermet

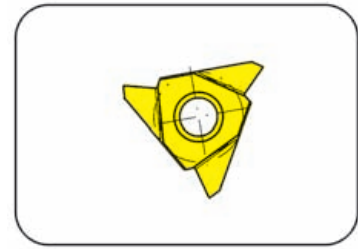
Dimensions in inch

Further sizes upon request

Carbide grades

## INDEXABLE INSERT Type

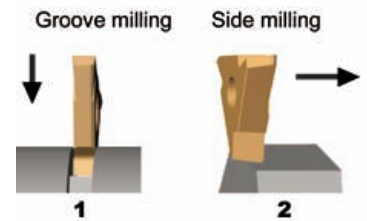
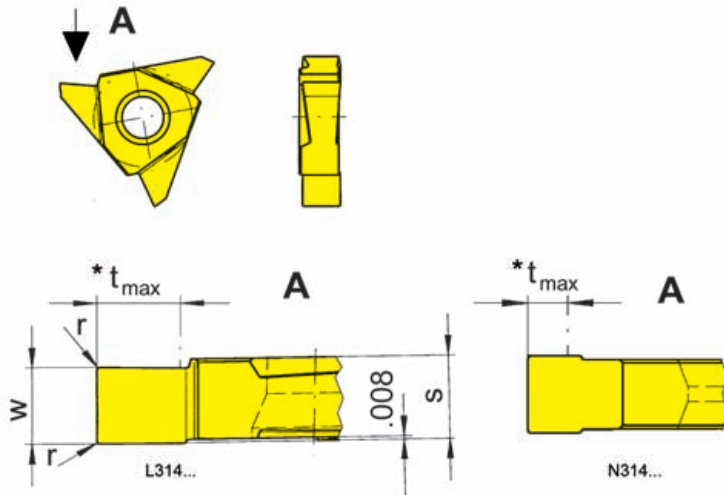
# 314/N314



Width of milling .157 - .276"

for use with Cutter

Type 381



Part number	w	s	r	Operation	Carbide grades				
					MG12	TN35	TI25	TA45	AS45
N314.MK40.20	.157	.142	-	1 + 2	▲		▲		
R/L314.MK50.20	.197	.205	.006	1 + 2			▲▲		
L314.MK70.M0	.276	.291	.006	1 + 2		Δ	▲		
▲ on stock Δ 4 weeks ● main recommendation ○ alternative recommendation □ uncoated grades ■ coated grades ■ brazed/Cermet					P	○	●	●	■
					M	●	●	●	■
					K	●	●	●	■
					N	●	●	●	■
					S	●	●	●	■
					H				■

Dimensions in inch

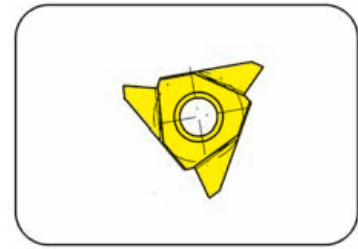
State R, L or N version

Further sizes upon request

* t <sub>max</sub>	Groove milling (1)	Side milling (2)
N314.MK40.20	see cutter	.098" (2.5mm)
R/L314.MK50.20		.197" (5.0mm)
L314.MK70.M0		.197" (5.0mm)

## INDEXABLE INSERT Type

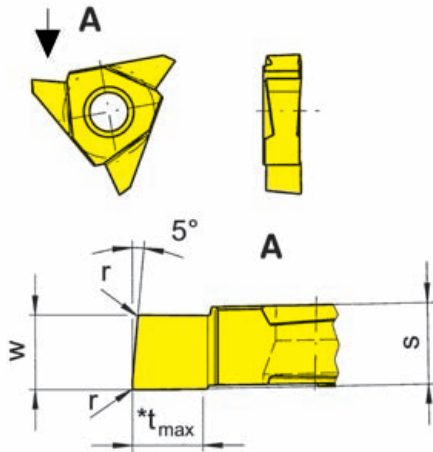
# 314



Width of milling .197 - .213"

for use with Cutter

Type 381



L = left hand version shown

R = right hand version

Part number	w	s	r	t <sub>max</sub>	MG12	TN35	TI25	TF45
R/L314.MK50.5.20	.197	.213	.006	.197			Δ/▲	
L314.MK50.20L	.213	.213	.024	.197			▲	
R314.MK50.20L							▲	
					P		•	
					M		•	
					K		•	
					N		•	
					S		•	
					H			

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Carbide grades
P
M
K
N
S
H

Dimensions in inch

State R or L version

Further sizes upon request

## The concept of Polygon Milling

Polygon milling describes the manufacturing of flats while rotating components with polygon milling cutters on CNC lathes, Swiss Automatics lathes or Multi Spindle machines. The component (main spindle) and the milling cutter (live tool) have to run with synchronized rotations.

### The operation only works in conventional milling!

The number of flats depends on the rotation ratio between component and milling cutter as well as on the number of inserts of the milling cutter.

At a revolution ratio of 2:1, the shape of the produced flats are little convex. The form error is suitable for most applications such as across-flats.

At a revolution ratio of 1:1, the shape of the produced flats are heavily convex. This shape is not suitable for across-flats.

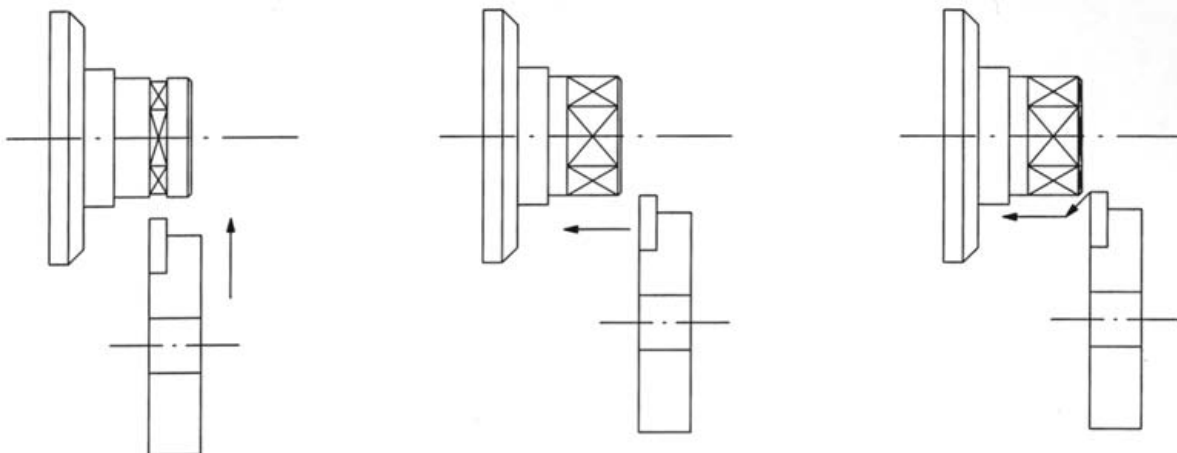
At a revolution ratio of 3:1, the shape of the produced flats are heavily concave. This shape is as well not suitable for across-flats.

According to this, the number of flats at the component is twice the number of cutting inserts on the milling cutter.

To calculate the shape of the flats following parameter are necessary:

1. Cutting diameter of the polygon milling cutter
2. Across-flats dimension
3. Premachined diameter of the component
4. Number of flats
5. Revolution ratio of component and milling cutter

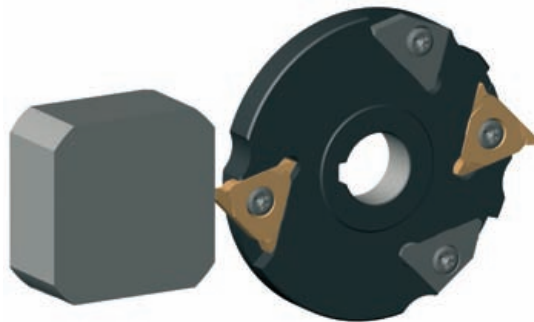
The flats can be produced by grooving or by turning. Chamfers can be produced by profiling (deburring).



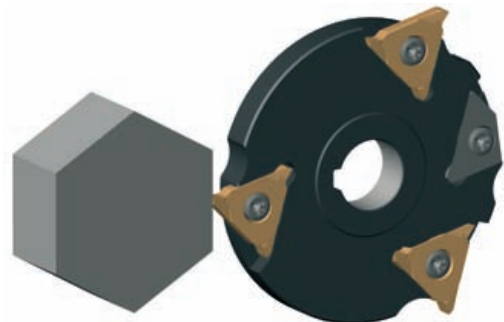
Two flats machined with 1 cutting edge. Revolution ratio 2:1 to the main spindle.



Four flats machined with 2 cutting edges. Revolution ratio 2:1 to the main spindle.



Six flats machined with 3 cutting edges. Revolution ratio 2:1 to the main spindle.



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Form	No. of inserts on the cutter	Ratio = Tool:Spindel	Flats
	1	1 : 1	not suitable, heavily convex
	2 1	1 : 1 2 : 1	not suitable, convex very suitable, little convex
	3 2 1	1 : 1 1.5 : 1 3 : 1	not suitable, convex suitable, convex very suitable, little concave
	2 1	2 : 1 4 : 1	very suitable, little convex not suitable, concave
	3 2 1	1.66 : 1 2.5 : 1 5 : 1	suitable, convex very suitable, little concave not suitable, concave
	3 2	2 : 1 3 : 1	very suitable, little convex not suitable, concave
	4 2	2 : 1 4 : 1	very suitable, little convex not suitable, concave

## Cutting data

Material	Grades	$v_c$ sfm	Feed rate IPT
Al	MG12	1600 - 3200	.004 - .008
Ms58	MG12	1600 - 3200	.004 - .008
9SMnPb28	TI25	600 - 1600	.003 - .006
16MnCr5/C45	TI25	500 - 800	.002 - .004

**Feed rate values only valid for turning process!**

**At grooving process the feed rate has to be reduced by 30 - 50 %, depending on the insert width!**

Example::

Cutter Ø 90 mm

SW 24 mm

Material: Steel

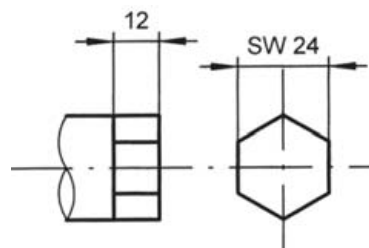
$v_c = 1474$  SFM

$f_z = .003$  IPT

3 Inserts,  $l = 2:1$

Flat length: 12 mm

Cycle time: ~ 2 sec.



# MILLING CUTTER - SUMMARY



Machine manufacturer	Machine	Polygon milling cutter	Indexable inserts	Z	RPM <sub>max.</sub>
Gildemeister	GD32	L381.G070.15.04	L314.MK50.20 TN35	2/3	13,000
Gildemeister	GDL25	L381.G070.15.04	L314.MK50.20 TN35	2/3	13,000
Gildemeister	GM20-6	L381.G086.25.04	L314.MK50.20 TN35	2/3	11,000
Gildemeister	GM26-6	L381.G080.16.04	L314.MK50.20 TN35	2/3	12,000
Gildemeister	GM35-6	L381.G098.26.04	L314.MK50.20 TN35	2/3	10,000
Gildemeister	GM35-8	L381.G086.25.04	L314.MK50.20 TN35	2/3	11,000
Gildemeister	GM35-8	L381.G098.26.04	L314.MK50.20 TN35	2/3	10,000
Gildemeister	GM42-6	L381.G098.26.04	L314.MK50.20 TN35	2/3	10,000
Gildemeister	GMC35	L381.G086.25.04	L314.MK50.20 TN35	2/3	11,000
Gildemeister	GMC35	L381.G098.26.04	L314.MK50.20 TN35	2/3	10,000
Gildemeister	SPRINT32L	L381.G090.22.04	L314.MK50.20 TN35	2/3	13,000
Gildemeister	SPRINT44L	L381.G090.22.04	L314.MK50.20 TN35	2/3	13,000
INDEX	ABC	R381.X090.27.04	R314.MK50.20 TN35	2/3	11,000
INDEX	ABC	L381.X090.27.04	L314.MK50.20 TN35	2/3	11,000
INDEX	MS25	R381.X073.16.04	N314.MK40.20 TN35	2/3	12,000
INDEX	MS25	R381.X073.16.03	N314.MK40.20 TN35	3	12,000
NAKAMURA	WT250	L381.N090.16.04	N314.MK40.20 TN35	2/3	11,000
Alfred H. Schütte	AF26	L381.S098.30.03	L314.MK70.M0 TN35	3	15,000 *
Alfred H. Schütte	AF26	L381.S098.30.02	L314.MK70.M0 TN35	2	15,000 *
Alfred H. Schütte	AF32	L381.S098.30.03	L314.MK70.M0 TN35	3	15,000 *
Alfred H. Schütte	AF32	L381.S098.30.02	L314.MK70.M0 TN35	2	15,000 *
Alfred H. Schütte	AF42	L381.S118.30.03	L314.MK70.M0 TN35	3	12,000 *
Alfred H. Schütte	AF42	L381.S118.30.02	L314.MK70.M0 TN35	2	12,000 *
Alfred H. Schütte	AG18	L381.S078.30.03	L314.MK70.M0 TN35	3	20,000 *
Alfred H. Schütte	AG18	L381.S078.30.02	L314.MK70.M0 TN35	2	20,000 *
Alfred H. Schütte	SE18	L381.S098.30.03	L314.MK70.M0 TN35	3	15,000 *
Alfred H. Schütte	SE18	L381.S098.30.02	L314.MK70.M0 TN35	2	15,000 *
Alfred H. Schütte	SF20	L381.S098.30.03	L314.MK70.M0 TN35	3	15,000 *
Alfred H. Schütte	SF20	L381.S098.30.02	L314.MK70.M0 TN35	2	15,000 *
Alfred H. Schütte	SF26L	L381.S098.30.03	L314.MK70.M0 TN35	3	15,000 *
Alfred H. Schütte	SF26L	L381.S098.30.02	L314.MK70.M0 TN35	2	15,000 *
Alfred H. Schütte	SF26S	L381.S098.30.03	L314.MK70.M0 TN35	3	15,000 *
Alfred H. Schütte	SF26S	L381.S098.30.03	L314.MK70.M0 TN35	3	15,000 *
Alfred H. Schütte	SF26S	L381.S098.30.02	L314.MK70.M0 TN35	2	15,000 *
Alfred H. Schütte	SF26S	L381.S098.30.02	L314.MK70.M0 TN35	2	15,000 *
Alfred H. Schütte	SF32	L381.S118.30.03	L314.MK70.M0 TN35	3	12,000 *
Alfred H. Schütte	SF32	L381.S118.30.02	L314.MK70.M0 TN35	2	12,000 *
Alfred H. Schütte	SF42	L381.S118.30.03	L314.MK70.M0 TN35	3	12,000 *
Alfred H. Schütte	SF42	L381.S118.30.02	L314.MK70.M0 TN35	2	12,000 *
Alfred H. Schütte	SF51	L381.S118.30.03	L314.MK70.M0 TN35	3	12,000 *
Alfred H. Schütte	SF51	L381.S118.30.02	L314.MK70.M0 TN35	2	12,000 *
Alfred H. Schütte	SF67	L381.S118.30.03	L314.MK70.M0 TN35	3	12,000 *
Alfred H. Schütte	SF67	L381.S118.30.02	L314.MK70.M0 TN35	2	12,000 *
Alfred H. Schütte	SG18	L381.S078.30.03	L314.MK70.M0 TN35	3	20,000 *
Alfred H. Schütte	SG18	L381.S078.30.02	L314.MK70.M0 TN35	2	20,000 *
Alfred H. Schütte	SG20	L381.S078.30.03	L314.MK70.M0 TN35	3	20,000 *
Alfred H. Schütte	SG20	L381.S078.30.02	L314.MK70.M0 TN35	2	20,000 *

Polygon cutter for further machines upon request.

\* reinforced pocket



# MILLING CUTTER - SUMMARY



Machine manufacturer	Machine	Polygon milling cutter	Indexable inserts	Z	RPM <sub>max.</sub>
Star	SR-20J	L381.A060.13.04	N314.MK40.20 TN35	3	13,000
TORNOS	Deco13	L381.D080.16.04	N314.MK40.20 TN35	2/3	12,000
TORNOS	Deco20	L381.D080.16.04	N314.MK40.20 TN35	2/3	12,000
TORNOS	Deco26	L381.D080.16.04	N314.MK40.20 TN35	2/3	12,000
TORNOS	Deco2000	L381.D080.16.04	N314.MK40.20 TN35	2/3	12,000
TORNOS	Multi-Deco	L381.D086.25.04	L314.MK50...	3	11,000
TORNOS	Deco 7/10	LM275.D040.10.04	LS275.MK13.M0 Ti25	3	15,000
TORNOS	Deco 7/10	RM275.D040.10.04	RS275.MK13.M0 Ti25	3	15,000
TRAUB	TNL12-7	RM275.T064.33.03	RS275.MK13.M0TN35	3	13,000
TRAUB	TNL12-7	L381.T069.12.04	N314.MK40.20 TN35	2/3	13,000
TRAUB	TNL26	L381.T069.12.04	N314.MK40.20 TN35	2/3	13,000
TRAUB	TNK36	L381.T069.12.04	N314.MK40.20 TN35	2/3	13,000
TRAUB	TNL12-7/TNL26/ TNK36	L381.T069.12.04	N314.MK40.20 TN35	2/3	13,000

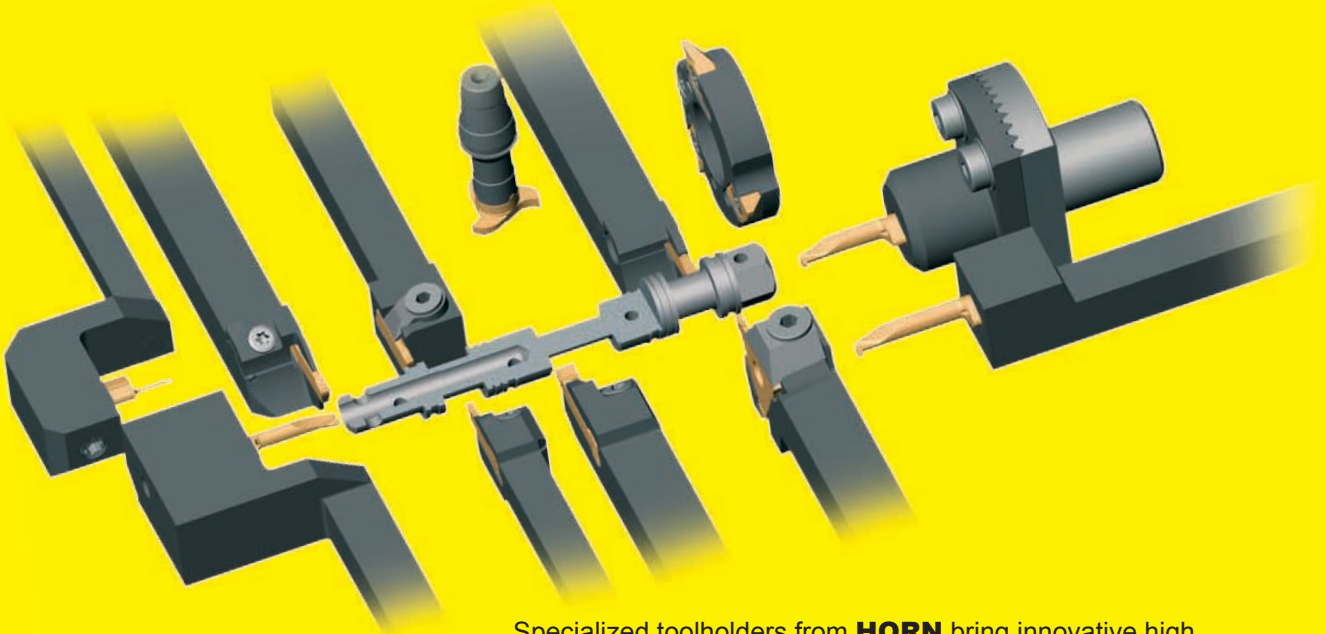
Polygon cutter for further machines upon request.

\* reinforced pocket

# HORN - THE LEADERS IN GROOVING TECHNOLOGY

## THE TEAM APPROACH

### SWISS TURNING



J

Specialized toolholders from **HORN** bring innovative high performance solutions to swiss style machining.

**HORN** Supermini® is a highly developed system for machining of small internal features such as bores, grooves and threads. Supermini® also includes fully engineered broaching capabilities for slots, keyways and splines.

**HORN** high performance external grooving, turning and part off systems 264 and 274 include holders specifically tailored for swiss machine applications.

**HORN** 300 series milling tools and polygon turning tools provide efficient and economical solutions to generating a variety of cross sections from round bar.

The more difficult the material, the greater the advantage gained with **HORN**.

**HORN - INTELLIGENT TOOL DESIGN AT WORK.**

For further information, please contact HORN USA.

## Thread whirling for Swiss type machines



### Indexable carbide inserts for Whirling Heads



Two starts



One start



Two starts

Insert type 314 widths from 5.4 / 6.5 / 7.5 mm

Insert type S302 widths from 4.4 / 5.4 / 6.1 mm

In order to manufacture accurate customer specific profiles, complete thread form data is required.

**Monobloc System:**  
means maximum precision and rigidity



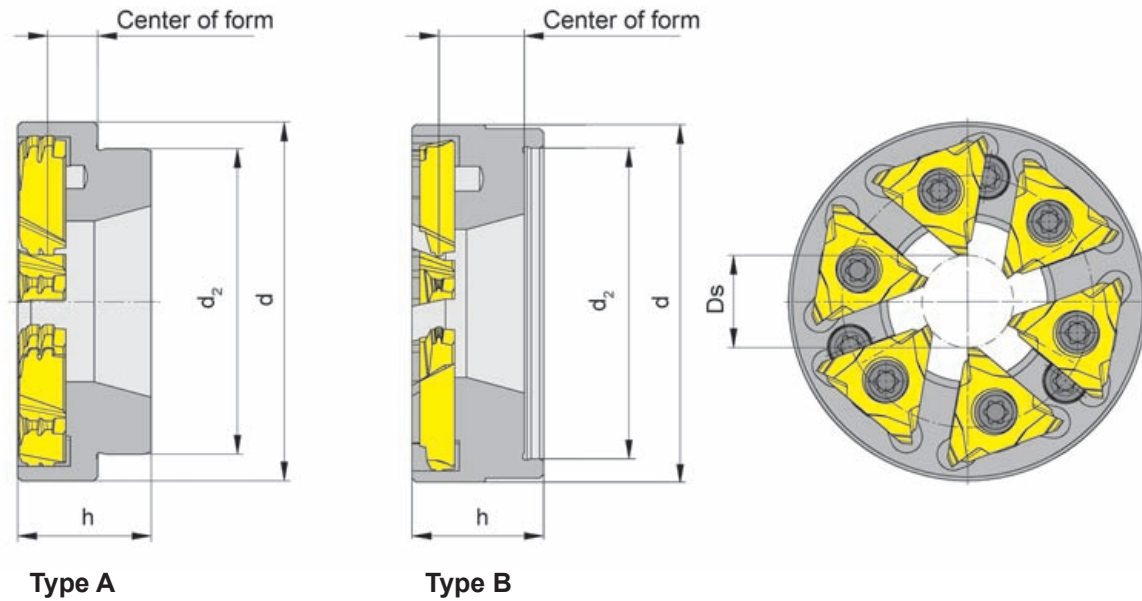
Other combinations are available upon request.  
Please contact HORN USA for further details.

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## MONOBLOC SYSTEM

## L389 / M302



Part number	*Center of form	Z	Ds	d	h	d <sub>2</sub>	Insert	Machine / unit	Type
Standard tools (ex stock)									
L389.D014.40.06	12.750	6	14.0	57.2	21.0	40.000	314	Tomos DECO 2000/20a	A
M302.T025.54.06	11.000	6	25.0	106.0	24.1	53.975	S302	Traub TNL 26 / Front unit	A
M302.T010.37.06	6.700	6	10.0	73.55	16.5	36.990	S302	Traub TNL 12 / Front unit	A
M302.C012.33.06	8.000	6	12.0	46.9	15.5	33.000	S302	Citizen L20/M20/M32 / Whirling unit BTW-1000	A
M302.C012.40.06	11.000	6	12.0	46.0	17.0	40.000	S302	Citizen Cincom M16 / Whirling unit PCM: MSW-101 Whirling unit PCM: LSW-215-1000 Nexturn SA20 / SA32 / Whirling unit PCM: NES-32-SWG15	B
M302.A012.40.06	6.575	6	12.0	47.0	17.5	40.000	S302	Star SV/SR20/ECAS20 / Whirling unit 42173	A
M302.W012.36.06	8.500	6	12.0	43.8	21.5	32.000	S302	Device WTO TN762004 / Whirling unit WTO TN762004	A
M302.C112.40.06	10.000	6	12	46.0	15.5	40.000	S302	Citizen - Jarvis / LTR-0128/-0132/-0139/-0168/-0183	B

The center of form depends on the individual insert.

Dimensions in mm

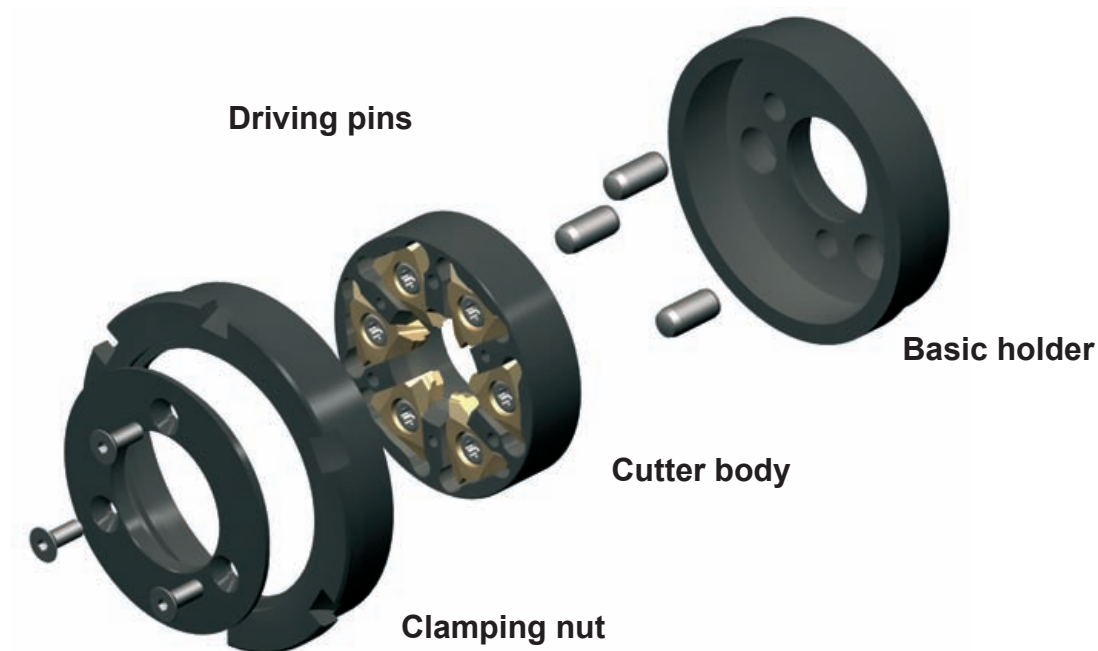
Further sizes upon request

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## Modular Tooling System:

The solution for tool changes on machines with limited handling space. The basic holder will remain on the machine while the cutter body is removed with the clamping nut.

The indexable inserts can now be changed outside the machine without interference.

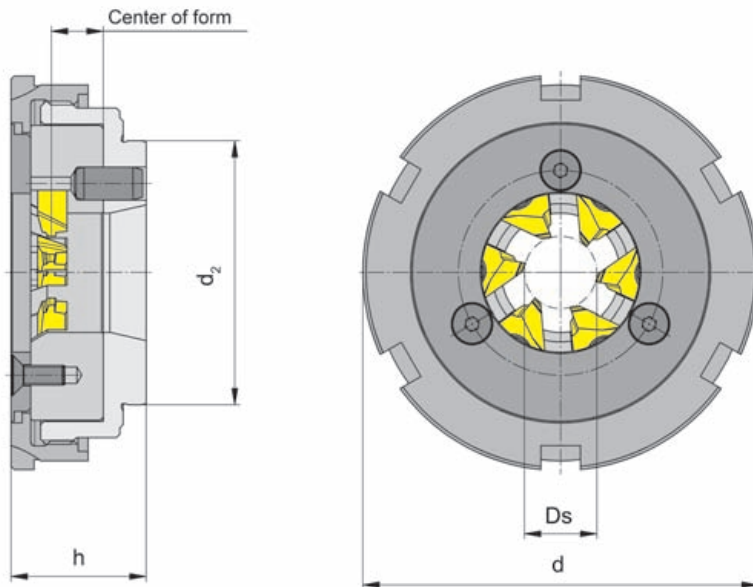


K

Other combinations are available upon request.  
Please contact HORN USA for further details.



## MODULAR TOOLING SYSTEM **M302**



Part number	*Center of form	Z	Ds	d	h	d <sub>2</sub>	Insert	Type of machine
Standard tools (ex stock)								
<b>M302.AM12.40.06</b>	11.9	12	12	47 (52)	20,7	40	S302	Star SV12/20ECAS20
<b>M302.DM11.0.40.06</b>	7.8	6	11	60	20,5	40	S302	Tomos Deco 2000/13a/20
<b>M302.AM12.T.40.06</b>	5.0	12	12	60	17,0	40	S302	Star SR20III

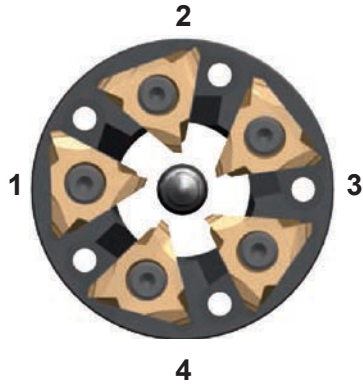
The center of form depends on the individual insert.

Dimensions in mm

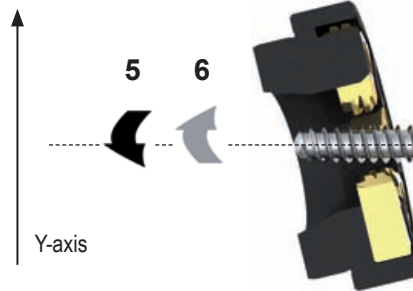
Further sizes upon request

**K**

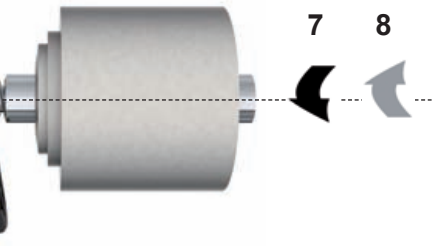
Cutting location



Turning direction of whirling unit



Turning direction of bar



Machine specifications	
Machine manufacturer	
Model number of machine	
Whirling unit manufacturer	
Model number of whirling unit	
Y-axis	<input type="checkbox"/> yes <input type="checkbox"/> no
High pressure coolant	<input type="checkbox"/> yes <input type="checkbox"/> no
Turning direction of whirling unit	<input type="checkbox"/> 5 <input type="checkbox"/> 6
Turning direction of bar	<input type="checkbox"/> 7 <input type="checkbox"/> 8
Cutting location	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4

Material	
Specification (DIN)	
Bar diameter	Ø

Thread	
Profile drawing	
One start	
Two starts	

K

## System DC

- Thread milling partial profile
- Thread milling full profile
- Groove milling
- Chamfer milling

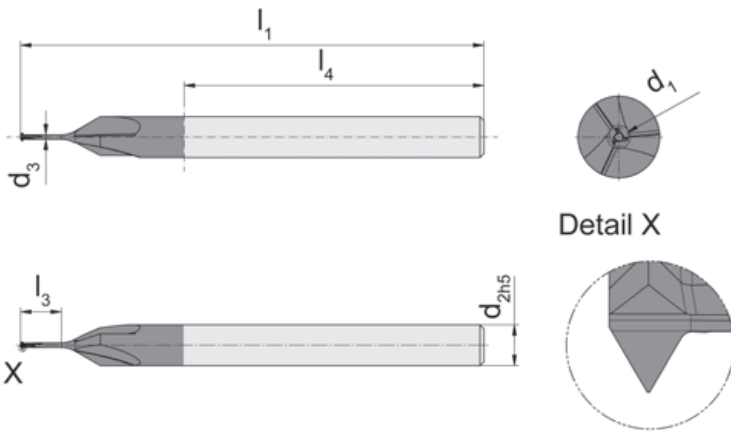


L

Metric ISO-thread DIN13-20 Partial profile

DCG

Thread M1 - M2.5



Part number	Thread	D <sub>min</sub>	Z	P	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	MG12	ST35
DCG.3.M1.025.2.1.03	M1	0.75		0.25	0.70		0.33		3		▲	
DCG.3.M11.025.2.1.03	M1.1	0.75		0.25	0.75		0.40		3		▲	
DCG.3.M12.025.2.1.03	M1.2	0.90		0.25	0.80		0.43		3		▲	
DCG.3.M14.025.2.1.03	M1.4	1.10		0.30	1.00		0.43		4		▲	
DCG.3.M16.035.2.1.03	M1.6	1.20	3	0.35	1.10	3	0.53	34	4	22	▲	
DCG.3.M18.035.2.1.03	M1.8	1.50		0.35	1.30		0.73		4		▲	
DCG.3.M2.040.2.1.03	M2	1.70		0.40	1.50		0.93		6		▲	
DCG.3.M22.045.2.1.03	M2.2	1.90		0.45	1.70		1.13		6		▲	
DCG.3.M25.045.2.1.03	M2.5	2.20		0.45	2.00		1.30		8		▲	

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

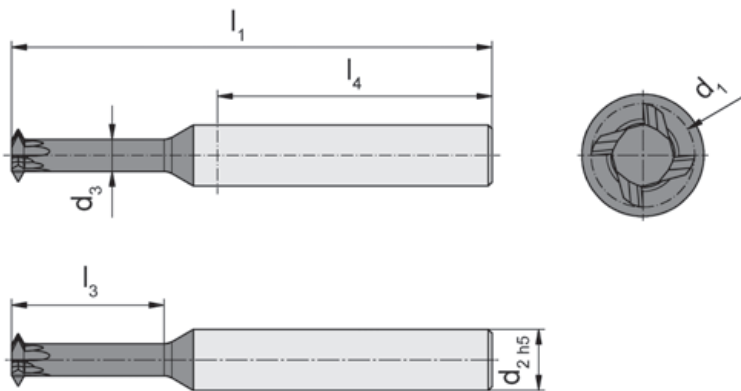
Carbide grades	MG12	ST35
P	○	■
M	●	■
K	●	■
N	●	■
S	●	■
H	■	■

Carbide grades

## Metric ISO-thread DIN13-20 Partial profile

## DCG

Thread M3 - M12



Part number	Thread	D <sub>min</sub>	Z	P	P <sub>max</sub>	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	MG12	ST35
DCG.3.M3.025.2.1.04	M3	2.4	3	0.25	0.25	2.0	4	1.45	39	8	22	△	▲
DCG.3.M3.035.2.1.04				0.35	0.35			1.35				△	▲
DCG.3.M3.050.2.1.04				0.50	0.50			1.20				△	▲
DCG.3.M3.5.050.2.1.04	M3.5	2.7	3	0.50	0.60	2.3	4	1.35	39	8	22	△	▲
DCG.3.M4.070.3.1.06	M4	3.3	3	0.70	0.75	2.8	6	1.70	50	10	36	△	▲
DCG.3.M5.050.3.1.06	M5	4.2	3	0.50	0.75	3.6	6	2.50	50	10	36	△	▲
DCG.3.M5.080.3.1.06				0.80	1.00			2.20				△	▲
DCG.4.M6.100.3.1.06	M6	5.0	4	1.00	1.25	4.3	6	2.40	63	10	40	△	▲
DCG.4.M6.100.5.1.06				1.25	1.50			2.40	63	16	40	△	▲
DCG.4.M8.075.5.1.08	M8-M10	6.5	4	0.75	1.00	5.5	8	3.85	63	16	40	△	▲
DCG.4.M8.075.6.1.08				0.75	1.00			3.85	63	20	36	△	▲
DCG.4.M8.075.7.1.08				0.75	1.00			3.85	77	25	40	△	▲
DCG.4.M8.125.6.1.08				1.25	1.50			3.40	63	20	36	△	▲
DCG.4.M8.125.8.1.08				1.25	1.50			3.40	77	30	40	△	▲
DCG.4.M10.150.6.1.08	M10-M12	8.0	4	1.50	1.75	6.8	8	4.10	63	20	36	△	▲
DCG.4.M10.150.8.1.08				1.75	2.00			4.10	77	30	40	△	▲

- ▲ on stock    △ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

	P	M	K	N	S	H
MG12	○	●	●	●	●	○
ST35	○	●	●	●	●	○

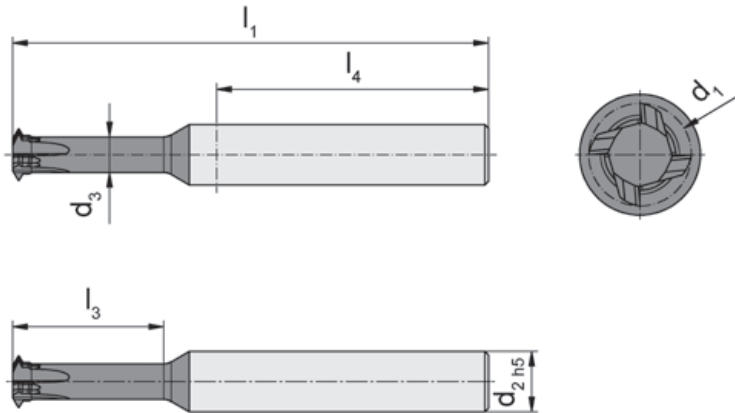
Carbide grades

## Metric ISO-thread DIN13-20 Full profile

## DCG

Thread

M3 - M12



Part number	Thread	D <sub>min</sub>	Z	P	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	MG12	ST35	
DCG.3.M3.035.2.2.04	M3	2.4	3	0.35	2.0	4	1.40	39	8	22	Δ	▲	
DCG.3.M3.050.2.2.04				0.50			1.25				Δ	▲	
DCG.3.M35.060.2.2.04	M3.5	2.7	3	0.60	2.3	4	1.80	39	9	22	Δ	▲	
DCG.3.M4.050.3.2.06	M4	3.3	3	0.50	2.8	6	2.50	50	10	36	Δ	▲	
DCG.3.M4.070.3.2.06				0.70			1.90				Δ	▲	
DCG.3.M5.050.3.2.06	M5	4.2	3	0.50	3.6	6	2.85	50	10	36	Δ	▲	
DCG.3.M5.080.3.2.06				0.80			2.50				Δ	▲	
DCG.4.M6.075.5.2.06	M6	5.0	4	0.75	4.2	6	3.10	63	16	40	Δ	▲	
DCG.4.M6.100.5.2.06				1.00			2.80				Δ	▲	
DCG.4.M8.100.5.2.08	M8	6.5	4	1.00	5.5	8	4.00	63	16	40	Δ	▲	
DCG.4.M8.125.5.2.08				1.25			3.70				Δ	▲	
DCG.4.M10.075.6.2.08	M10	8.0	4	0.75	6.8	8	5.60	63	20	36	Δ	▲	
DCG.4.M10.100.6.2.08				1.00			5.40		63	20	36	Δ	▲
DCG.4.M10.100.7.2.08				1.00			5.40		77	25	40	Δ	▲
DCG.4.M10.150.3.2.08				1.50			4.70		63	12	40	Δ	▲
DCG.4.M10.150.6.2.08				1.50			4.70		63	20	36	Δ	▲
DCG.4.M12.100.6.2.10	M12	10.0	4	1.00	8.0	10	6.30	63	20	36	Δ	▲	
DCG.4.M12.125.8.2.10				1.25			6.10		77	30	40	Δ	▲
DCG.4.M12.175.6.2.10				1.75			5.50		63	20	36	Δ	▲
DCG.4.M12.175.8.2.10				1.75			5.50		77	30	40	Δ	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

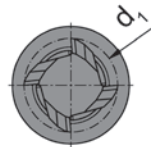
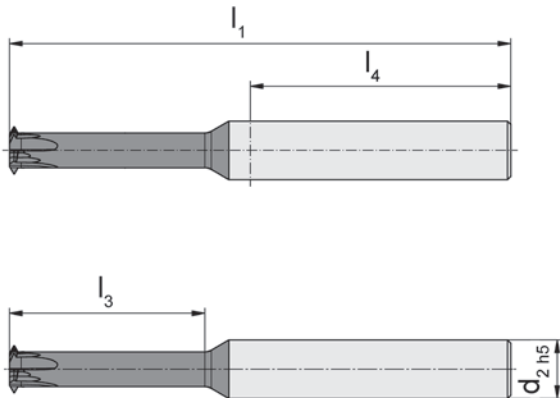
	P	M	K	N	S	H
MG12	○	●	●	●	●	○
ST35	○	●	●	●	●	○

Carbide grades

American Unified thread UNF / UNC / UNEF

## DCG

Thread #5 - 40  
7/16" - 20



Part number	Thread	D <sub>min</sub>	Z	P	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	MG12	ST35
DCG.3.60.540.2.04	#5 - 40 UNC	2.4	3	0.635	2.0	4	39	8	22	Δ	▲
DCG.3.60.544.2.04	#5 - 44 UNF	2.5	3	0.577	2.0	4	39	8	22	Δ	▲
DCG.3.60.632.2.04	#6 - 32UNC #8 - 32UNC	2.6	3	0.794	2.2	4	39	8	22	Δ	▲
DCG.3.60.640.2.04	#6 - 40 UNF	2.8	3	0.635	2.3	4	39	8	22	Δ	▲
DCG.3.60.836.3.06	#8 - 36 UNF	3.4	3	0.706	2.5	6	50	10	36	Δ	▲
DCG.3.60.1024.3.06	#10 - 24UNC #12 - 24UNC	3.6	3	1.058	2.9	6	50	10	36	Δ	▲
DCG.4.60.1420.3.06	1/4" - 20 UNC	4.9	4	1.270	3.5	6	63	10	40	Δ	▲
DCG.4.60.1428.3.06	1/4" - 28 UNF	5.3	4	0.907	3.5	6	63	10	40		▲
DCG.4.60.51618.3.06	5/16" - 18 UNC	6.4	4	1.411	4.2	6	63	10	40	Δ	▲
DCG.4.60.3816.7.08	3/8" - 16 UNC	7.8	4	1.588	5.5	8	77	25	40		▲
DCG.4.60.71614.7.08	7/16" - 14 UNC	9.1	4	1.814	6.8	8	77	25	40	Δ	▲
DCG.4.60.71620.7.08	7/16" - 20 UNF	9.1	4	1.270	7.2	8	77	30	40	Δ	▲
DCG.4.60.1213.7.08	1/2" - 13 UNC	10.5	4	1.953	7.9	8	77	30	40	Δ	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P	○	●
M	●	●
K	●	●
N	●	●
S	●	●
H	○	○

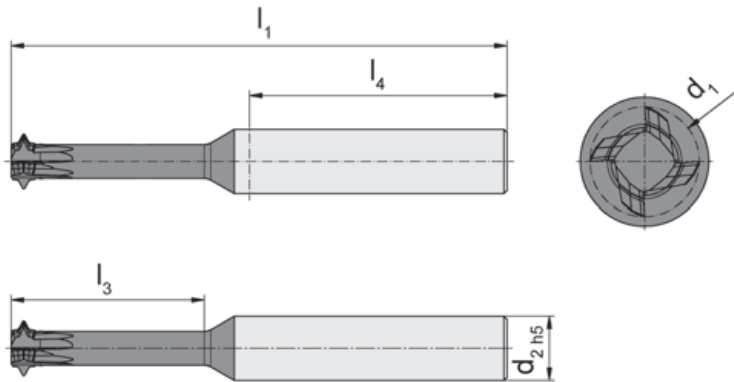
Carbide grades



## Whitworth thread "medium class" BSW / BSF

## DCG

Thread 1/8"-1/2"



Part number	Thread	D <sub>min</sub>	Z	P	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	MG12	ST35
DCG.3.55.1840.2.04	1/8" - 40 BSW	2.3	3	0.635	2.0	4	39	8	22	Δ	▲
DCG.3.55.53232.2.04	5/32" - 32 BSW	2.9	3	0.794	2.3	4	39	8	22	Δ	▲
DCG.3.55.31624.3.06	3/16" - 24 BSW	3.4	3	1.058	2.8	6	50	10	36	Δ	▲
DCG.3.55.31632.3.06	3/16" - 32 BSF	3.7	3	0.794	2.8	6	50	10	36	Δ	▲
DCG.3.55.73224.3.06	7/32" - 24 BSW	4.2	3	1.058	3.6	6	50	10	36	Δ	▲
DCG.3.55.73228.3.06	7/32" - 28 BSF	4.3	3	0.907	3.6	6	50	10	36	Δ	▲
DCG.3.55.1420.5.06	1/4" - 20 BSW	4.7	3	1.270	4.0	6	63	16	40	Δ	▲
DCG.3.55.1426.5.06	1/4" - 26 BSF	5.0	3	0.977	4.2	6	63	16	40	Δ	▲
DCG.4.55.93226.5.06	9/32" - 26 BSF	5.8	4	0.977	5.0	6	63	16	40	Δ	▲
DCG.4.55.51618.5.06	5/16" - 18 BSW	6.1	4	1.411	5.2	6	63	16	40	Δ	▲
DCG.4.55.51622.5.08	5/16" - 22 BSF	6.4	4	1.155	5.3	8	63	16	40	Δ	▲
DCG.4.55.3816.5.08	3/8" - 16 BSW	7.4	4	1.588	6.3	8	63	16	40	Δ	▲
DCG.4.55.3820.5.08	3/8" - 20 BSF	7.8	4	1.270	6.5	8	63	16	40	Δ	▲
DCG.4.55.71614.5.08	7/16" - 14 BSW	8.7	4	1.814	7.2	8	63	16	40	Δ	▲
DCG.4.55.71614.7.08							77	25	40	Δ	▲
DCG.4.55.71618.5.08	7/16" - 18 BSF	9.3	4	1.411	7.5	8	63	16	40	Δ	▲
DCG.4.55.71618.7.08							77	25	40	Δ	▲
DCG.4.55.1212.6.10	1/2" - 12 BSW	9.9	4	2.117	8.5	10	63	20	40	Δ	▲
DCG.4.55.1212.8.10							77	30	40	Δ	▲
DCG.4.55.1216.6.10	1/2" - 16 BSF	10.6	4	1.588	9.5	10	63	20	40	Δ	▲
DCG.4.55.1216.8.10							77	30	40	Δ	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	○	●
M	●	●
K	●	●
N	●	●
S	●	●
H	○	○

Dimensions in mm

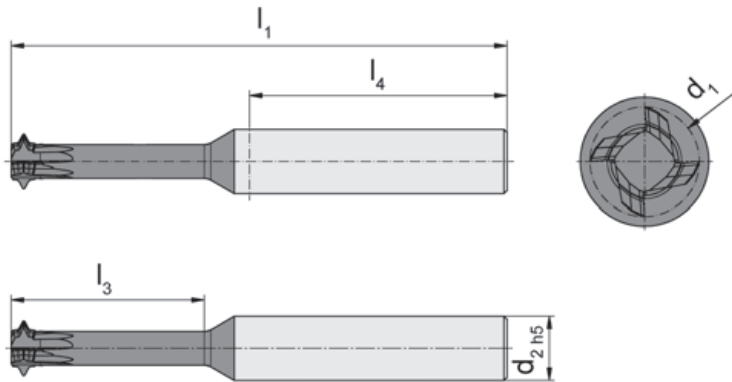
Carbide grades



## Whitworth pipe thread

## DCG

Thread G 1/16"-3/8"



Part number	Thread	D <sub>min</sub>	Z	P	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	Carbide grades	
										MG12	ST35
<b>DCG.4.55.G116.5.06</b>	G 1/16"	6.5	4	0.91	5.5	6	63	16	40	△	▲
<b>DCG.4.55.G18.5.08</b>	G 1/8"	8.5		0.91	6.6	8	63	16	40	△	▲
<b>DCG.4.55.G14.6.10</b>	G 1/4"	11.4		1.34	9.5	10	63	20	36	△	▲
<b>DCG.4.55.G38.8.10</b>	G 3/8"	14.9		1.34	11.8	12	77	30	40	△	▲

- ▲ on stock    △ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

	P	M	K	N	S	H
MG12	○	●	●	●	●	○
ST35	●	●	●	●	●	○

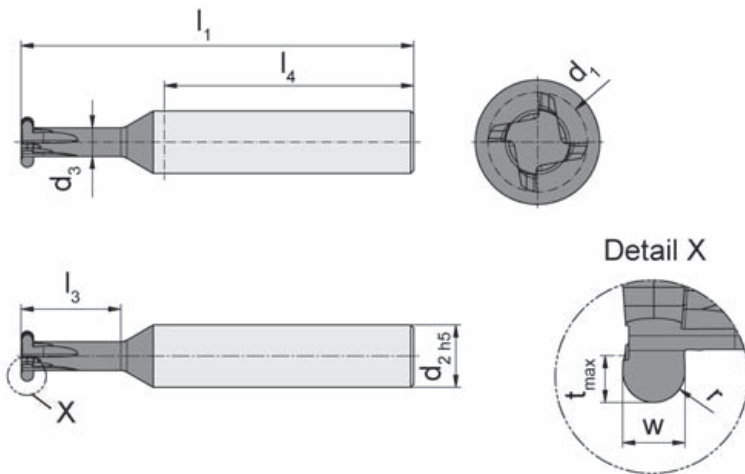
Carbide grades



## Groove milling

## DCR

Cutting edge $\varnothing$	.157 - .394" (4.0 - 10.0 mm)
Full radius	.020 - .059" (0.5 - 1.5 mm)
Depth of groove	.020 - .079" (0.5 - 2.0 mm)



Part number	Z	w	t <sub>max</sub>	r	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	Carbide grades			
											MG12	ST35		
<b>DCR.3.40.10.05.1.06</b>	3	1.0	0.5	0.50	4	6	2.75	50	4	36	Δ	▲		
<b>DCR.3.60.10.05.1.06</b>	3	1.0	1.0	0.50	6	6	3.70	50	4	36	Δ	▲		
<b>DCR.3.60.10.05.2.06</b>		1.0		0.50				63	6	40	Δ	▲		
<b>DCR.3.60.15.75.2.06</b>		1.5		0.75				63	6	40	Δ	▲		
<b>DCR.4.80.15.75.3.08</b>	4	1.5	1.5	0.75	8	8	4.60	63	8	40	Δ	▲		
<b>DCR.4.80.20.10.3.08</b>		2.0		1.00					8		8	40	Δ	▲
<b>DCR.4.80.15.75.5.08</b>		1.5		0.75					16		16	40	Δ	▲
<b>DCR.4.80.20.10.5.08</b>		2.0		1.00					16		16	40	Δ	▲
<b>DCR.4.100.10.05.6.10</b>	4	1.0	2.0	0.50	10	10	5.50	77	20	55	Δ	▲		
<b>DCR.4.100.15.75.6.10</b>		1.5		0.75							Δ	▲		
<b>DCR.4.100.20.10.6.10</b>		2.0		1.00							Δ	▲		
<b>DCR.4.100.25.12.6.10</b>		2.5		1.25							Δ	▲		
<b>DCR.4.100.30.15.6.10</b>		3.0		1.50							Δ	▲		

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P	○	●
M	●	●
K	●	●
N	●	●
S	●	●
H	○	○

Carbide grades

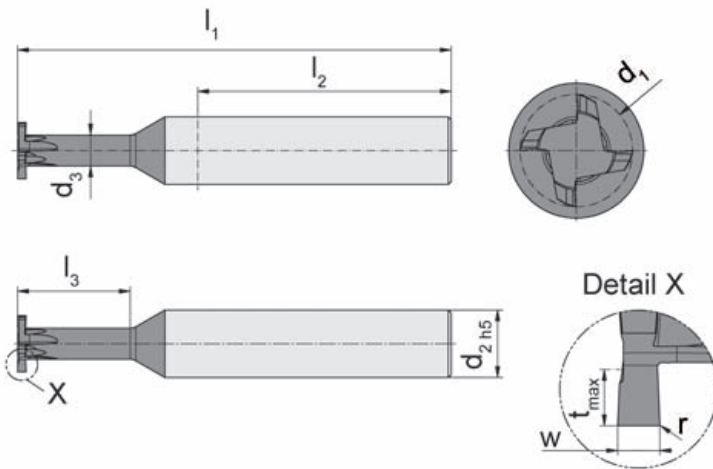
# DC GROOVE MILLING CUTTER



## Groove milling

## DCN

Cutting edge $\varnothing$	.157 - .394" (4.0 - 10.0 mm)
Width of groove	.020 - .118" (0.5 - 3.0 mm)
Depth of groove	.020 - .079" (0.5 - 2.0 mm)



Part number	Z	w	t <sub>max</sub>	r	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	MG12	ST35		
DCN.3.40.05.00.1.06	3	0.5	0.5	-	4	6	2.8	50	4	36	Δ	▲		
DCN.3.40.10.00.1.06		1.0									Δ	▲		
DCN.3.60.10.00.1.06	3	1.0	1.0	-	6	6	3.7	50	4	36	Δ	▲		
DCN.3.60.10.00.2.06		1.0									Δ	▲		
DCN.3.60.15.15.2.06		1.5									0.15	63	6	40
DCN.4.80.15.15.3.08	4	1.5	1.5	0.15	8	8	4.6	63	8	40	Δ	▲		
DCN.4.80.20.15.3.08		2.0									Δ	▲		
DCN.4.80.15.15.5.08		1.5									16	16	Δ	▲
DCN.4.80.20.15.5.08		2.0									16	16	Δ	▲
DCN.4.100.10.00.6.10	4	1.0	2.0	-	10	10	5.5	77	20	50	Δ	▲		
DCN.4.100.15.00.6.10		1.5									Δ	▲		
DCN.4.100.20.15.6.10		2.0									0.15	Δ	▲	
DCN.4.100.25.15.6.10		2.5									0.15	Δ	▲	
DCN.4.100.30.15.6.10		3.0									0.15	Δ	▲	

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P	○	●
M	●	●
K	●	●
N	●	●
S	●	●
H	○	○

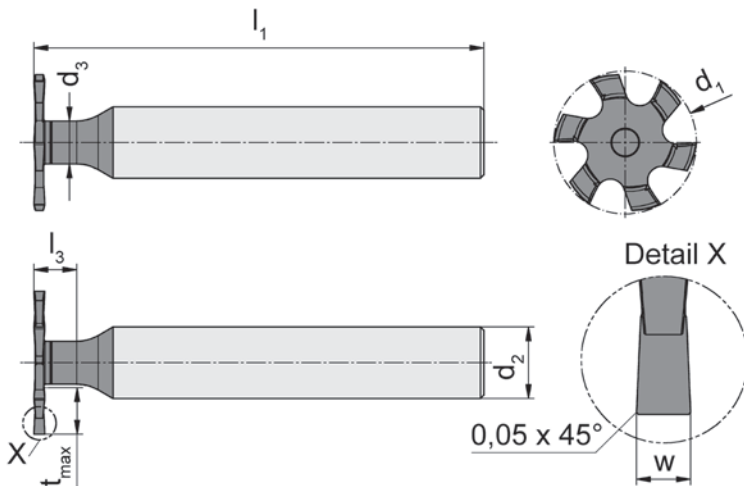
Carbide grades



## Groove milling

## DCX

Cutting edge  $\varnothing$  .787 - 1.575" (20.0 - 40.0 mm)  
 Width of groove .059 - .118" (1.5 - 3.0 mm)  
 Depth of groove .276 - .591" (7.0 - 15.0 mm)



Part number	Z	w	t <sub>max</sub>	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	MG12	AS45
DCX.6.20.150.2.05.10		1.5								
DCX.6.20.200.2.05.10	6	2.0	7	20	10	5	63	6		▲
DCX.6.20.250.2.05.10		2.5								▲
DCX.6.25.150.2.06.10		1.5								▲
DCX.6.25.200.2.06.10	6	2.0	9	25	10	6	63	6		▲
DCX.6.25.250.2.06.10		2.5								▲
DCX.6.30.150.4.07.12		1.5								▲
DCX.6.30.200.4.07.12	6	2.0	11	30	12	7	80	9		▲
DCX.6.30.250.4.07.12		2.5								▲
DCX.6.30.300.4.07.12		3.0								▲
DCX.6.35.150.4.08.12		1.5								▲
DCX.6.35.200.4.08.12	6	2.0	13	35	12	8	80	11		▲
DCX.6.35.250.4.08.12		2.5								▲
DCX.6.35.300.4.08.12		3.0								▲
DCX.8.40.150.4.09.12		1.5								▲
DCX.8.40.200.4.09.12	8	2.0	15	40	12	9	80	11		▲
DCX.8.40.250.4.09.12		2.5								▲
DCX.8.40.300.4.09.12		3.0								▲

- ▲ on stock    Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

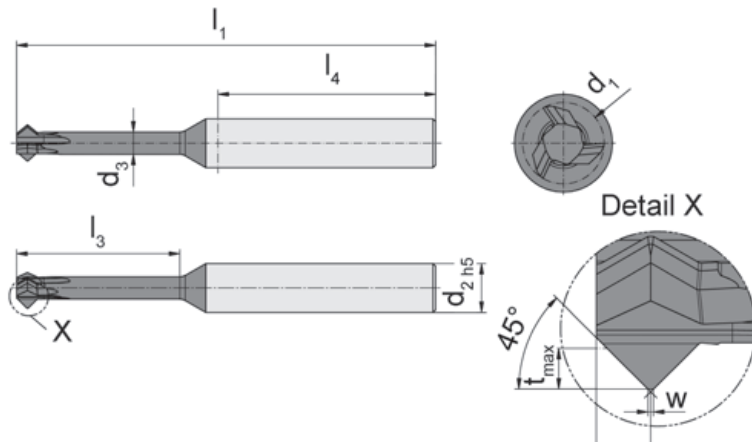
Carbide grades	MG12	AS45
P	●	●
M	●	●
K	●	●
N	○	○
S	●	●
H		

Carbide grades

## Chamfer milling

## DCF

Cutting edge $\varnothing$	.079 - .295" (2.0 - 7.5 mm)
Width of chamfer	45°
Size of chamfer	.012 - .059" (0.3 - 1.5 mm)



Part number	Z	w	Chamfer	t <sub>max</sub>	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>3</sub>	l <sub>4</sub>	MG12	ST35
DCF.3.20.4545.1.04	3	0.2	45°	0.30	2.0	4	1.25	39	4	22	Δ	▲
DCF.3.30.4545.2.04	3	0.2	45°	0.30	3.0	4	2.10	39	6	22	Δ	▲
DCF.3.40.4545.3.06	3	0.2	45°	0.75	4.0	6	2.20	50	8	36	Δ	▲
DCF.3.50.4545.3.06	3	0.2	45°	1.00	5.0	6	2.70	50	10	36	Δ	▲
DCF.3.60.4545.5.06	3	0.2	45°	1.50	6.0	6	2.80	63	16	40	Δ	▲
DCF.3.60.4545.6.06	3	0.2	45°	1.50	6.0	6	2.80	63	20	40	Δ	▲
DCF.3.75.4545.6.08	3	0.2	45°	1.50	7.5	8	4.10	63	20	40	Δ	▲
DCF.3.75.4545.8.08	3	0.2	45°	1.50	7.5	8	4.10	77	30	40	Δ	▲
DCF.4.75.4545.8.08	4	0.2	45°	1.50	7.5	8	4.10	77	30	40	Δ	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P	○	●
M	●	●
K	●	●
N	●	●
S	●	●
H	○	○

Carbide grades



Standard values for cutting speeds  $v_c$  and Feed/tooth  $f_z$

Material	Hardness Brinell (HB)	Cutting speed $v_c$		Feed/tooth $f_z$	
		MG12	ST35		
<b>P</b>	Carbon steel	0.2% C	140	180 - 250	0.01 - 0.03
		0.4% C	180	160 - 220	
		0.6% C	200	140 - 200	
	Alloyed steel	annealed	180	150 - 200	
		quenched	280		
		quenched	350		
	high alloyed steel (>5%)	annealed	200	100 - 140	
		hardened	-		
	Cast steel	unalloyed	180	130 - 170	
		alloyed	220		
<b>M</b>	Stainless steel	martensitic, ferritic	200	90 - 150	0.02
		austenitic	180		
<b>K</b>	Grey cast iron	low tensile strength	180	190 - 230	0.01 - 0.03
		high tensile strength	250		
	Spheroidal graphite cast iron	ferritic	160	160 - 220	
		perlitic	250		
	Malleable cast iron	ferritic	125	160 - 220	
		perlitic	225		
<b>N</b>	Al-alloys	not heat treatable	30-80	up to max.	0.02 - 0.04
		heat treatable	80-120		
	Al-cast-alloy	not heat treatable	80	200 - 600	
		heat treatable	100		
	Copper-alloys	not heat treatable	90	200 - 400	
		heat treatable	100		
<b>S</b>	Heat resistant alloy (Fe)	annealed	200	60 - 120	0.01 - 0.02
		hardened	275		
	Heat resistant alloy (Ni. Co)	annealed	250	30 - 90	
		hardened	350		

L

## Feed rates and time calculation

It is simple and easy to calculate your speed and feeds using HORN'S HCT program. We recommend that you calculate the cutting data with this program as it will provide you with the best cutting performance and results. Basic features of the calculations can be found on the following pages.

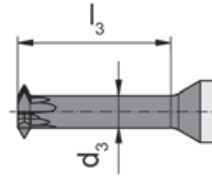
### HCT (HORN Circular Technology)

- safe and fast -  
Your cutting data for groove milling by circular interpolation of internal and external grooves as well as groove milling of linear grooves.  
System requirements from Windows 95.  
Available on CD-ROM.

## BASIC RECOMMENDATIONS

### Overhang of the milling cutter

Select the shortest possible clamping device and milling shank, to control the runout tolerance of the tools.  
Large cutting widths in combination with long overhangs require specific manufacturing methods such as dividing the cutting width to achieve the best possible cutting result due to reduced cutting forces.



### Diameter of the milling cutter

When using a large diameter cutter, whose relationship is close to the bore diameter, manufacturing cycletime can be reduced, due to the smaller center of rotation and higher feed rates. Many times the rotation of the milling cutter center will be defined by the parameters of the workpiece and the whole application setup.

### Thread milling

With HORN thread milling inserts the thread profile is generated in one full cut to the profile depth of the thread. This produces threads with minimal taper especially in high alloyed steels.

In blind holes it is recommended to mill from the bottom to the top. Otherwise there is the risk of damaging the tool because of milling into chips at the bottom of the blind hole.

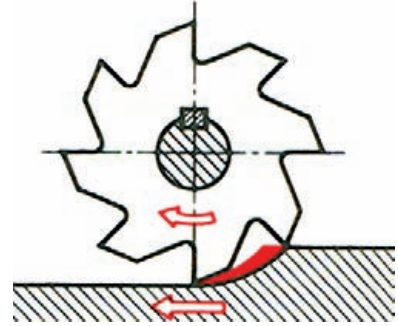
#### A general recommendation for thread milling:

The milling cutter diameter should not exceed 70% of the minor diameter of the thread. Otherwise recutting of the profile occurs which could bring the whole thread out of tolerance.



## Milling direction

Most HORN milling tools are right handed , and it is recommended to use them with the climb milling process as this is generally recommend for carbide tools.

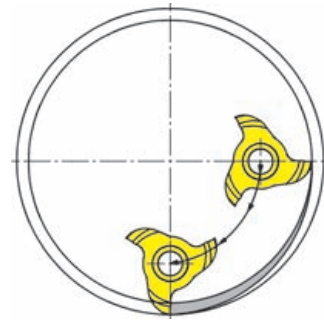


## Milling entry into the workpiece

A simple radial entry of the milling cutter creates a very long contact angle which leads to vibrations which will not disappear for the rest of the milling operation and are visual on the bottom of the groove.

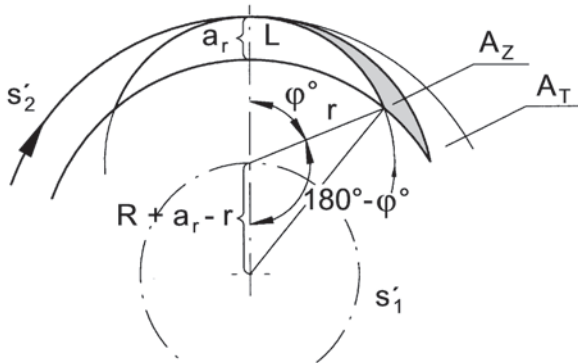
It is recommended to enter the groove with a ramp angle of  $45^\circ$  up to  $180^\circ$  to the maximum depth of cut. The calculated cutting data refers to the milling condition when the insert is in the full cut but can be also used for the entry loop.

Ramp angle  $> 45^\circ$





## MILLING OF AN INTERNAL GROOVE



$$\cos [180^\circ - \varphi^\circ] = \frac{r^2 + [R + a_r - r]^2 - R^2}{2r [R + a_r - r]} \longrightarrow 180^\circ - \varphi^\circ \longrightarrow \varphi^\circ$$

$L = \frac{\pi \cdot 2r \cdot \varphi^\circ}{360^\circ} \text{ mm}$	Length of cut
$A_z = L \cdot h_m \text{ mm}^2$	Area of chip
$A_T = \pi [(R + a_r)^2 - R^2] \text{ mm}^2$	Area of groove section

$t = \frac{A_T}{n \cdot z \cdot A_z} \text{ min}$	Time for cut (for $A_T$ )
$s'_1 = \frac{\pi \cdot 2 (R - r + a_r)}{t} \text{ mm/min}$	Feed rate of tool centre
$s'_2 = s'_1 \frac{R + a_r}{R - r + a_r} \text{ mm/min}$	Feed rate of tool tip

### Specification

	Specification	ISO Specification
Feed rate	$s'$	$v_f$
Revolutions	$n$	$n$
Number of teeth	$z$	$z$
Feed/tooth	$s_z$	$f_z$
medium thickness of chip	$h_m$	$h_m$
radial depth of cut	$a_r$	$a_e$

	Specification	ISO Specification
Radius of cutter	$r$	$r$
Radius of workpiece	$R$	$R$
Feed rate of tool centre	$s'_1$	$v_{f3}$
Feed rate of tool tip	$s'_2$	$v_{f2}$



### HCT (HORN Circular Technology)

- safe and fast -

Your cutting data for groove milling by circular interpolation of internal and external grooves as well as groove milling of linear grooves. System requirements from Windows 95. Available on CD-ROM.

Z = Number of teeth

d = Cutting edge Ø [mm]

n = Revolutions 
$$n = \frac{v_c \cdot 1000}{d \cdot \pi} \text{ [1/min] [RPM]}$$

$v_c$  = Cutting speed 
$$v_c = \frac{d \cdot \pi \cdot n}{1000} \text{ [m/min]} / .3048 = \text{sfm}$$

$f_z$  = Feed/tooth 
$$f_z = \frac{v_f}{Z \cdot n} \text{ [mm]} / 25.4 = \text{inch}$$

f = Feed per revolutions 
$$f = f_z \cdot Z \text{ [mm/U] [mm/rev]}$$

$v_f$  = Feed rate 
$$v_f = f_z \cdot Z \cdot n \text{ [mm/min]} / 25.4 = \text{inch/min}$$

Notes



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## Milling system DG for

- Centre cutting and groove milling
- Chamfering and centering
- Copy milling
- High feed milling



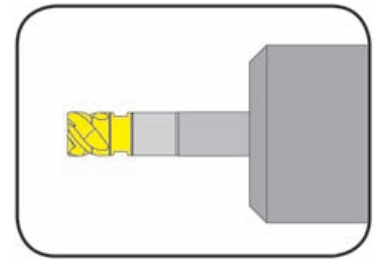
## MILLING SHANK Type

## MDG

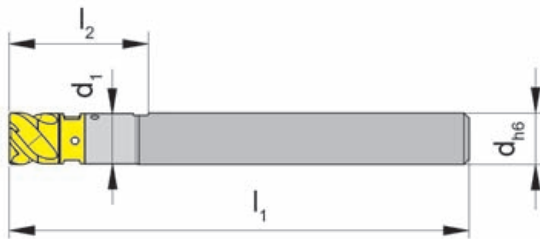
no coolant supply

Shank 90° - shrink fit

Material of shank: Carbide



for use with Cutting Insert



Type DGF  
DGFF  
DGH  
DGK  
DGM  
DGR  
DGRR

Part number	Ds	$l_1$	$l_2$	$d_1$	d
MDG.10.0010.90.01.A	10	101.8	56.8	9.8	10
MDG.12.0012.90.01.A	12	114.3	59.3	11.7	12
MDG.16.0016.90.01.A	16	129.8	64.8	15.6	16
MDG.20.0020.90.01.A	20	150.3	70.3	19.5	20

Further sizes upon request

Dimensions in mm

### Spare parts

Wrenches and additional equipment are not combined with the milling shank. Separate order required!  
For more details please see the technical data.

M

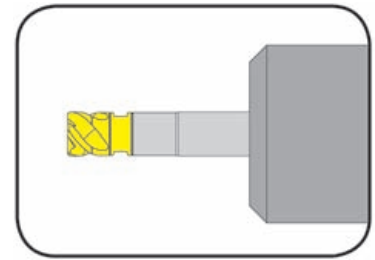
## MILLING SHANK Type

## MDG

no coolant supply

Shank 90° - not recommended for shrinking

Material of shank: Steel



for use with Cutting Insert



Type DGF  
DGFF  
DGH  
DGK  
DGM  
DGR  
DGRR

Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d
MDG.10.ST10.90.01.A	10	91.8	36.8	9.8	10
MDG.10.ST16.90.01.A			19.8		16
MDG.12.ST12.90.01.A	12	109.3	44.3	11.7	12
MDG.12.ST16.90.01.A			99.3		22.3
MDG.16.ST16.90.01.A	16	134.8	49.8	15.6	16
MDG.16.ST20.90.01.A			104.8		27.8
MDG.20.ST20.90.01.A	20	150.3	60.3	19.5	20
MDG.20.ST25.90.01.A			110.3		33.3

Further sizes upon request

Dimensions in mm

### Spare parts

Wrenches and additional equipment are not combined with the milling shank. Separate order required!  
For more details please see the technical data.

M

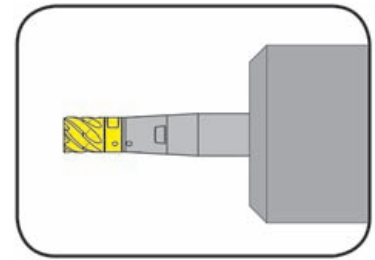
## MILLING SHANK Type

## MDG

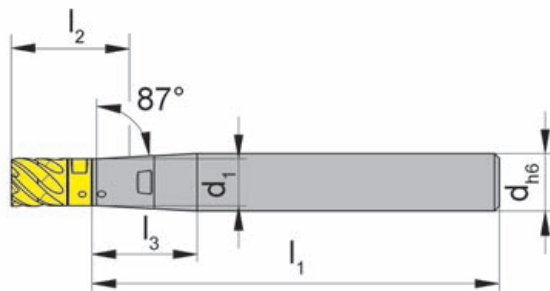
no coolant supply

Shank 87° - shrink fit

Material of shank: Carbide



for use with Cutting Insert



Type DGF  
DGFF  
DGH  
DGK  
DGM  
DGR  
DGRR

Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d <sub>1</sub>	d
MDG.10.0012.87.01.A	10	85	19.7	22	9.8	12
MDG.12.0016.87.01.A	12	100	23.1	42	11.7	16
MDG.16.0020.87.01.A	16	100	29.6	43	15.6	20

Further sizes upon request

Dimensions in mm

### Spare parts

Wrenches and additional equipment are not combined with the milling shank. Separate order required!  
For more details please see the technical data.

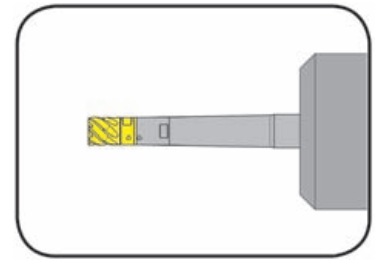
## MILLING SHANK Type

## MDG

no coolant supply

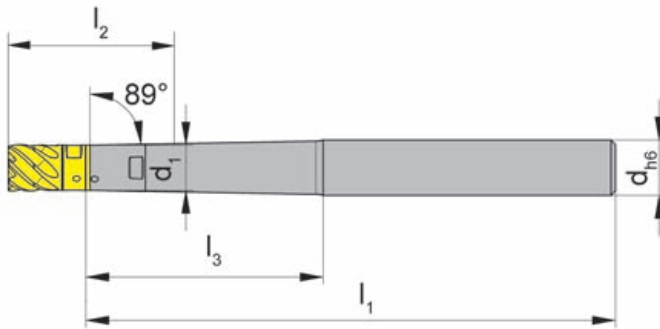
Shank 89° - shrink fit

Material of shank: Carbide



for use with Cutting Insert

Type DGF  
DGFF  
DGH  
DGK  
DGM  
DGR  
DGRR



Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d <sub>1</sub>	d
MDG.10.0012.89.01.A	10	115	23.5	50	9.8	12
MDG.12.0016.89.01.A	12	140	28.8	50	11.7	16
MDG.16.0020.89.01.A	16	160	37.2	75	15.6	20

Further sizes upon request

Dimensions in mm

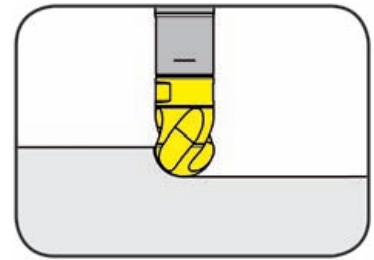
### Spare parts

Wrenches and additional equipment are not combined with the milling shank. Separate order required!  
For more details please see the technical data.

## CUTTING INSERT Type

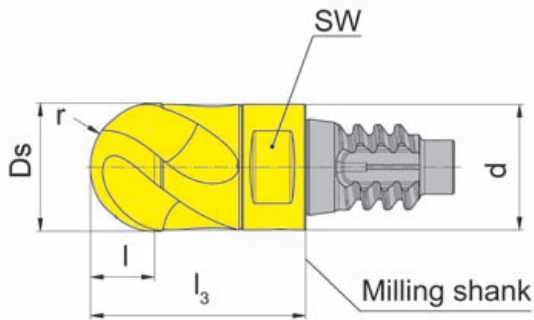
# DGK

Ballnose milling head 180°



for use with Milling shank

Type MDG



Picture = right hand cutting version

face cutting edge  
cutting across centre

Part number	System	Z	Ds	d	r	l	l <sub>3</sub>	ST3P	AN2P
DGK.2.10.1000.00	DG10	2	.394	.386	.197	.217	.661		Δ
DGK.4.10.1000.00		4							
DGK.2.12.1200.00	DG12	2	.472	.461	.236	.256	.760		Δ
DGK.4.12.1200.00		4							
DGK.2.16.1600.00	DG16	2	.630	.614	.315	.335	.976		Δ
DGK.4.16.1600.00		4							
DGK.2.20.2000.00	DG20	2	.787	.768	.394	.472	1.193		Δ
DGK.4.20.2000.00		4							

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

Carbide grades	ST3P	AN2P
P	●	●
M	●	●
K	○	○
N	○	○
S	○	○
H	○	○

Carbide grades

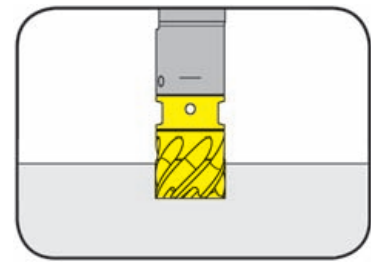
M



## CUTTING INSERT Type

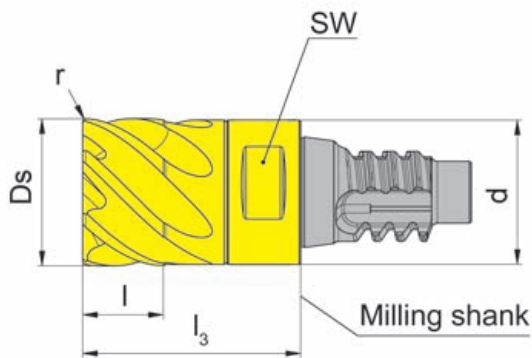
## DGM

multiple fluted



for use with Milling shank

Type MDG



Picture = right hand cutting version

face cutting edge  
not cutting across centre

Part number	System	Z	Ds	d	r	l	l <sub>3</sub>	ST3P	AN2P	
DGM.7.10.1000.02.0	DG10	7	.394	.386	.008	.217	.661	•	Δ	
DGM.7.10.1000.10.0									Δ	
DGM.7.12.1200.02.0	DG12	7	.472	.461	.008	.256	.760	•	Δ	
DGM.7.12.1200.10.0									Δ	
DGM.9.16.1600.02.0	DG16	9	.630	.614	.008	.354	.976	•	Δ	
DGM.9.16.1600.10.0									Δ	
DGM.9.20.2000.02.0	DG20	9	.787	.768	.008	.433	1.193	•	Δ	
DGM.9.20.2000.10.0									Δ	
									P	•
									M	•
									K	o
									N	o
									S	o
									H	o

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

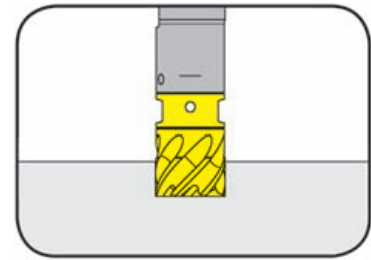
Carbide grades



## CUTTING INSERT Type

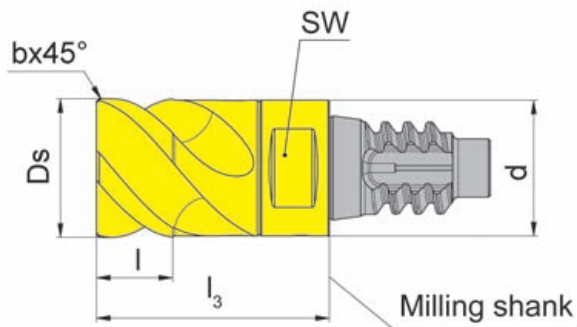
# DGF

Cutting insert with corner chamfer



for use with Milling shank

Type MDG



Picture = right hand cutting version

face cutting edge  
cutting across centre

Part number	System	Z	Ds	d	l	l <sub>3</sub>	b	ST3P	AN2P
DGF.3.10.1000.02.00	DG10	3	.394	.386	.217	.661	.008		Δ
DGF.3.12.1200.02.00	DG12	3	.472	.461	.256	.760	.008		Δ
DGF.4.16.1600.02.00	DG16	4	.630	.614	.335	.976	.008		Δ
DGF.4.20.2000.03.00	DG20	4	.787	.768	.472	1.193	.010		Δ

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

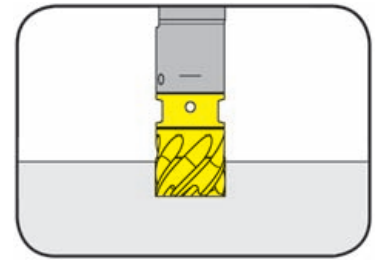
Material	ST3P	AN2P
P	●	●
M	●	●
K	○	○
N	○	○
S	○	○
H	○	○

Carbide grades



## CUTTING INSERT Type

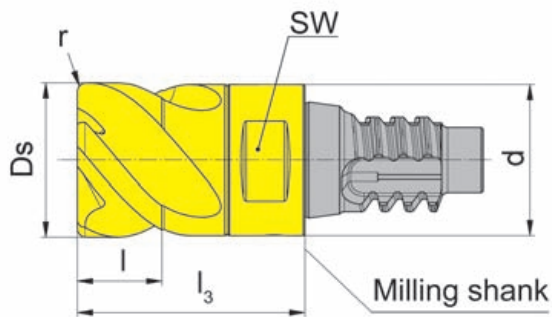
# DGR



Cutting insert with corner radius

for use with Milling shank

Type MDG



Picture = right hand cutting version

face cutting edge  
cutting across centre

Part number	System	Z	Ds	d	r	l	l <sub>3</sub>	ST3P	AN2P
DGR.3.10.1000.05.00	DG10	3	.394	.386	.020	.217	.661	•	Δ
DGR.3.10.1000.10.00		3							Δ
DGR.4.10.1000.05.00		4							Δ
DGR.4.10.1000.10.00		4							Δ
DGR.3.12.1200.05.00	DG12	3	.472	.461	.020	.256	.760	•	Δ
DGR.4.12.1200.05.00		4							Δ
DGR.4.12.1200.10.00		4							Δ
DGR.5.16.1600.05.00	DG16	5	.630	.614	.020	.335	.976	•	Δ
DGR.5.16.1600.10.00									Δ
DGR.5.16.1600.15.00									Δ
DGR.5.16.1600.20.00									Δ
DGR.5.20.2000.05.00	DG20	5	.787	.768	.020	.472	1.193	•	Δ
DGR.5.20.2000.10.00									Δ
DGR.5.20.2000.15.00									Δ
DGR.5.20.2000.20.00									Δ

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

P	•
M	•
K	○
N	○
S	○
H	○

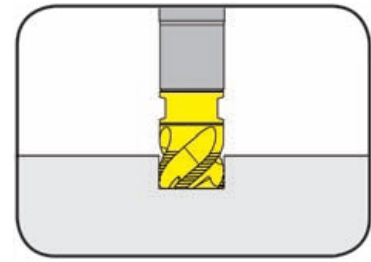
Carbide grades



## CUTTING INSERT Type

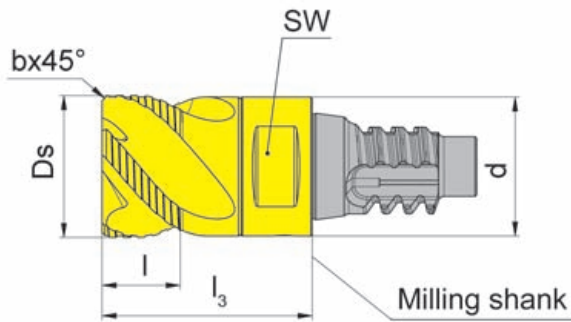
# DGRR

Cutting insert with corner radius



for use with Milling shank

Type MDG



Picture = right hand cutting version

face cutting edge  
cutting across centre

Part number	System	Z	Ds	d	l	l <sub>3</sub>	b	ST3P	AN2P
DGRR.3.10.1000.00	DG10	3	.394	.386	.217	.661	.012		Δ
DGRR.4.10.1000.00		4							Δ
DGRR.3.12.1200.00	DG12	3	.472	.461	.256	.760	.020		Δ
DGRR.4.12.1200.00		4							Δ
DGRR.5.16.1600.00	DG16	5	.630	.614	.335	.976	.020		Δ
DGRR.5.20.2000.00	DG20	5	.787	.768	.472	1.193	.020		Δ

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Carbide grades	ST3P	AN2P
P	●	●
M	●	●
K	○	○
N	○	○
S	○	○
H	○	○

Dimensions in inch

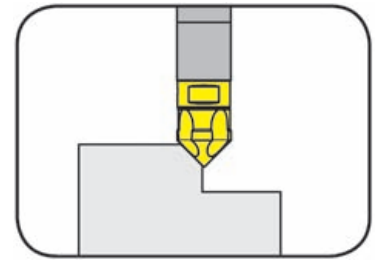
Carbide grades



## CUTTING INSERT Type

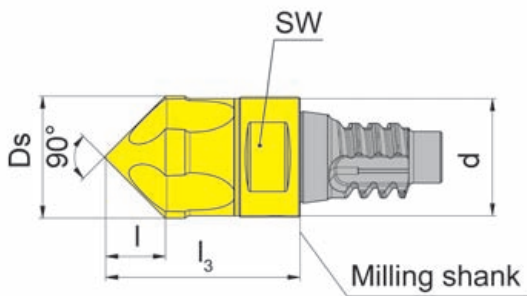
# DGFF

Angle of chamfer 45 °



for use with Milling shank

Type MDG



Picture = right hand cutting version

face cutting edge  
not cutting across centre

Part number	System	Z	Ds	d	l	l <sub>3</sub>	ST3P	AN2P
DGFF.4.10.45.00	DG10	4	.394	.386	.177	.661		Δ
DGFF.4.12.45.00	DG12	4	.472	.461	.217	.760		Δ
DGFF.6.16.45.00	DG16	6	.630	.614	.295	.976		Δ

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation

- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

P	●
M	●
K	○
N	○
S	○
H	○

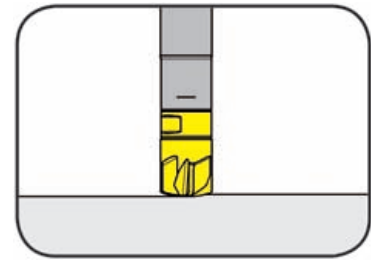
Carbide grades



## CUTTING INSERT Type

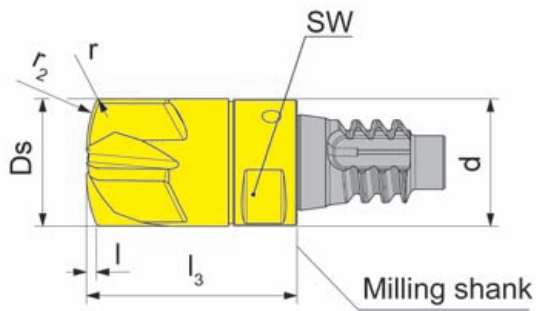
# DGH

Cutting insert with corner radius



for use with Milling shank

Type MDG



Picture = right hand cutting version

face cutting edge  
cutting across centre

Part number	System	Z	Ds	d	r	r <sub>2</sub>	r <sub>theo</sub>	l	l <sub>3</sub>	ST3P	AN2P
DGH.4.10.1000.00	DG10	4	.394	.386	.020	.394	1.07	.028	.661		Δ
DGH.4.12.1200.00	DG12	4	.472	.461	.020	.512	1.18	.031	.760		Δ
DGH.4.16.1600.00	DG16	4	.630	.614	.031	.787	1.38	.039	.976		Δ
DGH.4.20.2000.00	DG20	4	.787	.768	.031	.945	1.96	.047	1.193		Δ

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Carbide grades	ST3P	AN2P
P	●	●
M	●	●
K	○	○
N	○	○
S	○	○
H	○	○

Dimensions in inch

Carbide grades



recommended cutting speeds

Material		Hardness Brinell (HB)	Shoulder milling $a_p < 0.5 \times D_s$ $a_e < 0.3 \times D_s$	Shoulder milling $a_p < 0.5 \times D_s$ $a_e < 1.0 \times D_s$	Groove milling $a_p < 0.5 \times D_s$	Copy milling $a_p < 0.02 \times D_s$	
			$v_c$ (ft/min)	$v_c$ (ft/min)	$v_c$ (ft/min)	$v_c$ (ft/min)	
<b>P</b>	Carbon steel	0.2% C	140	820	590	525	1150
		0.4% C	180	720	525	460	1050
		0.6% C	200	655	460	425	985
	Alloyed steel	annealed	180	655	490	425	920
		quenched	280				
	high alloyed steel(>5%)	annealed	200	460	330	295	590
		hardened	-				
	Cast steel	unalloyed	180	560	425	395	920
		alloyed	220				
	<b>M</b>	Stainless steel	martensitic, ferritic	200	490	295	260
austenitic			180				
<b>K</b>	Grey cast iron	low tensile strength	180	755	625	560	920
		high tensile strength	250				
	Spheroidal graphite cast iron	ferritic	160	720	525	460	985
		perlitic	250				
	Malleable cast iron	ferritic	125	720	525	460	1050
		perlitic	225				
<b>N</b>	Al-alloys	not heat treatable	30-80	up to max.	up to max.	up to max.	up to max.
		heat treatable	80-120				
	Al-cast-alloy	not heat treatable	80	1970	655	590	1970
		heat treatable	100				
	Copper-alloys	not heat treatable	90	1970	655	590	1970
		heat treatable	100				
<b>S</b>	Heat resistant alloy (Fe)	annealed	200	260	200	164,04	260
		hardened	275				
	Heat resistant alloy (Ni, Co)	annealed	250	150	115	100	200
		hardened	350				



## recommended feed rate

Shoulder milling $a_p < 0.5 \times D_s$ $a_e < 0.3 \times D_s$		Shoulder milling $a_p < 0.5 \times D_s$ $a_e < 1.0 \times D_s$		Groove milling $a_p < 0.5 \times D_s$		Copy milling $a_p < 0.02 \times D_s$	
Ds (inch)	f <sub>z</sub> (inch)	f <sub>z</sub> (inch)	f <sub>z</sub> (inch)	f <sub>z</sub> (inch)	f <sub>z</sub> (inch)	f <sub>z</sub> (inch)	f <sub>z</sub> (inch)
.394"	.0024"	.0016"	.0012"	.0012"	.0051"		
.472"	.0035"	.002"	.0016"	.0016"	.0055"		
.630"	.0039"	.0028"	.0024"	.0024"	.0063"		
.787"	.0047"	.0032"	.0028"	.0028"	.0075"		

## Torque for setting

System	Torque for setting (Nm)	Wrench size <b>SW</b>	Combination wrench	Torque wrench		
				Application	Effective range	for small series
<b>DG10</b>	12	<b>8</b>	S.DG1012	D.DG1001	D0525VK 5 - 25 Nm	D1050VK 10 - 50 Nm
<b>DG12</b>	18	<b>10</b>		D.DG1201		
<b>DG16</b>	25	<b>13</b>	S.DG1620	D.DG1601	D20100VK 20 - 100 Nm	
<b>DG20</b>	50	<b>17</b>		D.DG2001		

## Assembly instruction

1. Remove any dirt from the interface and seating surface of the milling cutter shank and cutting insert.
  2. Grip milling cutter shank in jig.
  3. Apply lubricant sparingly to thread, taper and seat surface of cutting insert.
  4. Insert cutting insert into shank and clamp it manually according to mark.
- Attention: risk of injury!**
5. Tighten cutting insert in milling cutter shank with a torque wrench, using the recommended torque.

### Note:

The use of lubricant reduces friction between cutting insert and tool holder. For optimum radial and axial run-out precision it is crucial that interfaces and seat surfaces are clean. Applying the recommended tightening torque for gripping cutting inserts guarantees the correct insert fit.



recommended cutting speeds

Material		Hardness Brinell (HB)	Shoulder milling $a_p < 0.5 \times D_s$ $a_e < 0.3 \times D_s$	Shoulder milling $a_p < 0.5 \times D_s$ $a_e < 1.0 \times D_s$	Groove milling $a_p < 0.5 \times D_s$	Copy milling $a_p < 0.02 \times D_s$	
			$v_c$ (m/min)	$v_c$ (m/min)	$v_c$ (m/min)	$v_c$ (m/min)	
<b>P</b>	Carbon steel	0.2% C	140	250	180	160	350
		0.4% C	180	220	160	140	320
		0.6% C	200	200	140	130	300
	Alloyed steel	annealed	180	200	150	130	280
		quenched	280				
	high alloyed steel(>5%)	annealed	200	140	100	90	180
		hardened	-				
	Cast steel	unalloyed	180	170	130	120	280
alloyed		220					
<b>M</b>	Stainless steel	martensitic, ferritic	200	150	90	80	180
		austenitic	180				
<b>K</b>	Grey cast iron	low tensile strength	180	230	190	170	280
		high tensile strength	250				
	Spheroidal graphite cast iron	ferritic	160	220	160	140	300
		perlitic	250				
	Malleable cast iron	ferritic	125	220	160	140	320
		perlitic	225				
<b>N</b>	Al-alloys	not heat treatable	30-80	up to max.	up to max.	up to max.	up to max.
		heat treatable	80-120				
	Al-cast-alloy	not heat treatable	80	600	200	180	600
		heat treatable	100				
	Copper-alloys	not heat treatable	90	600	200	180	600
		heat treatable	100				
<b>S</b>	Heat resistant alloy (Fe)	annealed	200	80	60	50	80
		hardened	275				
	Heat resistant alloy (Ni, Co)	annealed	250	45	35	30	60
		hardened	350				



## recommended feed rate

Shoulder milling $a_p < 0.5 \times D_s$ $a_e < 0.3 \times D_s$		Shoulder milling $a_p < 0.5 \times D_s$ $a_e < 1.0 \times D_s$		Groove milling $a_p < 0.5 \times D_s$		Copy milling $a_p < 0.02 \times D_s$	
$D_s$ (mm)	$f_z$ (mm)	$f_z$ (mm)	$f_z$ (mm)	$f_z$ (mm)	$f_z$ (mm)	$f_z$ (mm)	$f_z$ (mm)
10	0,06	0,04	0,03	0,13			
12	0,09	0,05	0,04	0,14			
16	0,1	0,07	0,06	0,16			
20	0,12	0,08	0,07	0,19			

## Torque for setting

System	Torque for setting (Nm)	Wrench size <b>SW</b>	Combination wrench	Torque wrench		
				Application	Effective range	for small series
<b>DG10</b>	12	<b>8</b>	S.DG1012	D.DG1001	D0525VK 5 - 25 Nm	D1050VK 10 - 50 Nm
<b>DG12</b>	18	<b>10</b>		D.DG1201		
<b>DG16</b>	25	<b>13</b>	S.DG1620	D.DG1601	D20100VK 20 - 100 Nm	
<b>DG20</b>	50	<b>17</b>		D.DG2001		

## Assembly instruction

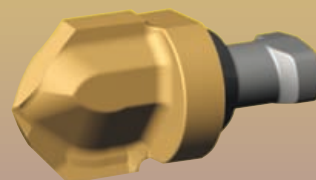
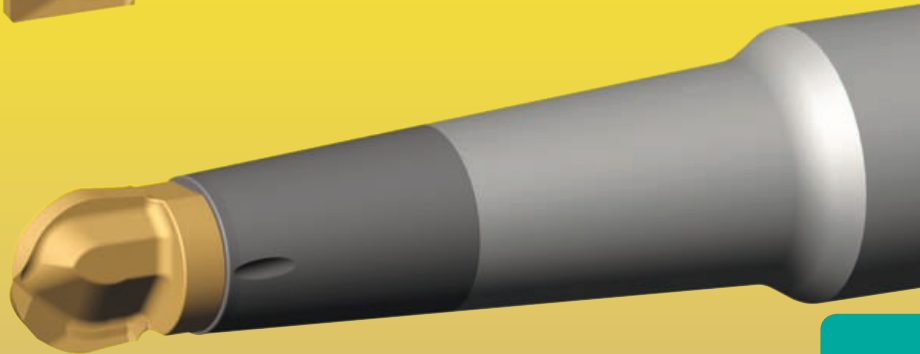
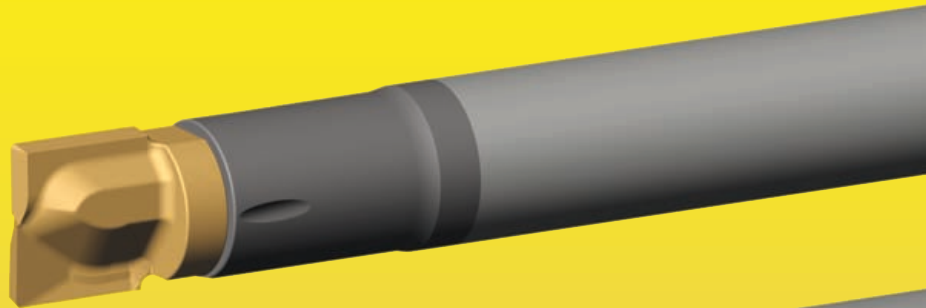
1. Remove any dirt from the interface and seating surface of the milling cutter shank and cutting insert.
2. Grip milling cutter shank in jig.
3. Apply lubricant sparingly to thread, taper and seat surface of cutting insert.
4. Insert cutting insert into shank and clamp it manually according to mark.  
**Attention: risk of injury!**
5. Tighten cutting insert in milling cutter shank with a torque wrench, using the recommended torque.

### Note:

The use of lubricant reduces friction between cutting insert and tool holder. For optimum radial and axial run-out precision it is crucial that interfaces and seat surfaces are clean. Applying the recommended tightening torque for gripping cutting inserts guarantees the correct insert fit.

## Multi-Milling DM-System

- Corner and Groove Milling
- Chamfering
- Centering and Chamfering
- Copy Milling



M

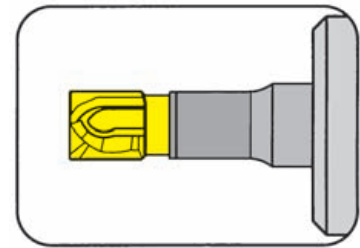
## MILLING SHANK Type

# DMU008

no coolant supply

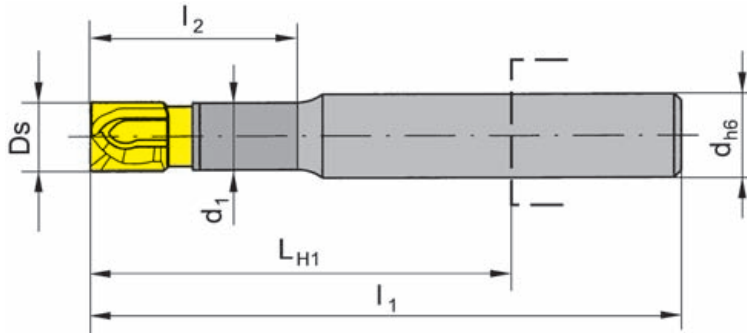
Shank 90° - shrink fit

Material of shank: Carbide



for use with Cutting Insert

Type DM208



Part number	Ds	$l_1$	$l_2$	$d_1$	d	$LH_1$
DMU008.0312.02A	.315	3.615	.858	.303	.312	2.197
DMU008.0375.02A	.315	3.615	.858	.303	.375	2.039
DMU008.0500.02A	.315	4.008	1.055	.303	.500	2.236
DMU008.0625.02A	.315	4.008	1.055	.303	.625	2.118

Further sizes upon request

Dimensions in inch

### Spare parts

The clamping wrench and spare parts need to be ordered separately.

The cutting insert can only be exchanged by use of the correct clamping wrench S.DM08 (see page M50).

M

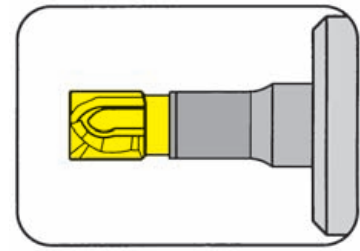
## MILLING SHANK Type

# DM008

no coolant supply

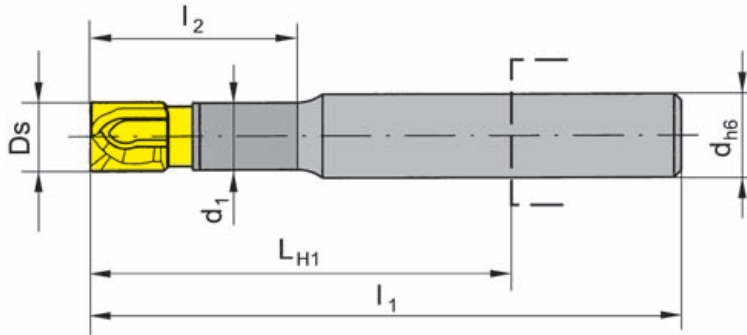
Shank 90° - shrink fit

Material of shank: Carbide



for use with Cutting Insert

Type DM208



Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	LH <sub>1</sub>
DM008.0008.02A	8	91.8	21.8	7.7	8	55.8
DM008.0010.02A	8	91.8	21.8	7.7	10	51.8
DM008.0012.02A	8	101.8	26.8	7.7	12	56.8
DM008.0016.02A	8	101.8	26.8	7.7	16	53.8

Further sizes upon request

Dimensions in mm

### Spare parts

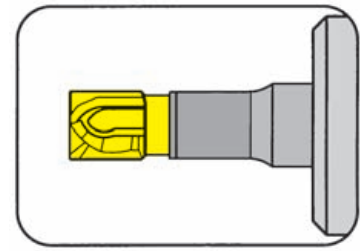
The clamping wrench and spare parts need to be ordered separately.

The cutting insert can only be exchanged by use of the correct clamping wrench S.DM08 (see page M50).

## MILLING SHANK Type

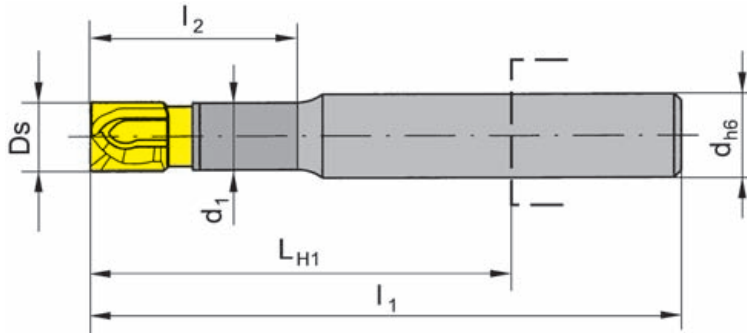
# DMU008

no coolant supply



Shank 90° - not recommended for shrinking

Material of shank: Steel



for use with Cutting Insert

Type DM208

Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	LH <sub>1</sub>
DMU008.ST31.01A	.315	2.827	.858	.303	.312	1.409

Further sizes upon request

Dimensions in inch

### Spare parts

The clamping wrench and spare parts need to be ordered separately.

The cutting insert can only be exchanged by use of the correct clamping wrench S.DM08 (see page M50).

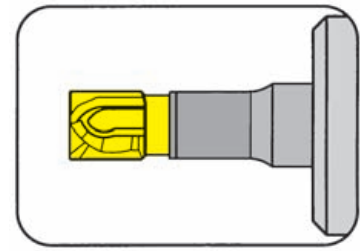
## MILLING SHANK Type

# DM008

no coolant supply

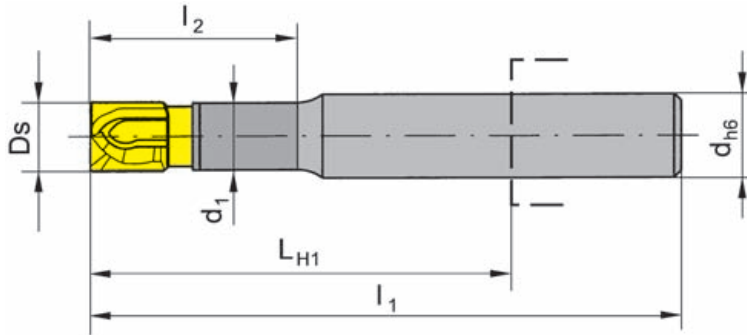
Shank 90° - not recommended for shrinking

Material of shank: Steel



for use with Cutting Insert

Type DM208



Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	LH <sub>1</sub>
DM008.ST08.01A	8	71.8	21.8	7.7	8	35.8

Further sizes upon request

Dimensions in mm

### Spare parts

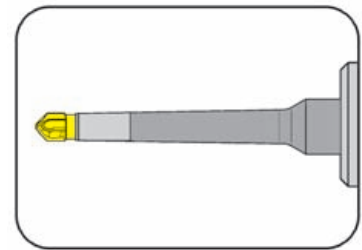
The clamping wrench and spare parts need to be ordered separately.

The cutting insert can only be exchanged by use of the correct clamping wrench S.DM08 (see page M50).

## MILLING SHANK Type

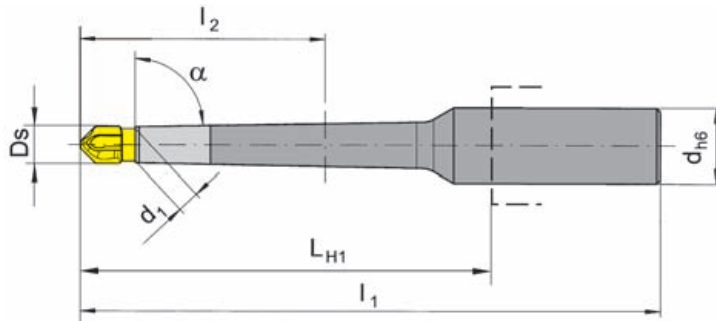
# DMU008

no coolant supply



Shank 87° - shrink fit

Material of shank: Carbide



for use with Cutting Insert

Type DM208

Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	LH <sub>1</sub>	α
DMU008.0375.87.02A	.315	3.811	.616	.303	.375	2.236	87°
DMU008.0500.87.02A	.315	3.811	.616	.303	.500	2.039	87°
DMU008.0500.89.02A	.315	4.992	.843	.303	.500	3.221	89°
DMU008.0625.87.02A	.315	4.992	.616	.303	.625	3.024	87°
DMU008.0625.89.02A	.315	5.976	.843	.303	.625	4.008	89°

Further sizes upon request

Dimensions in inch

### Spare parts

The clamping wrench and spare parts need to be ordered separately.

The cutting insert can only be exchanged by use of the correct clamping wrench S.DM08 (see page M50).

M



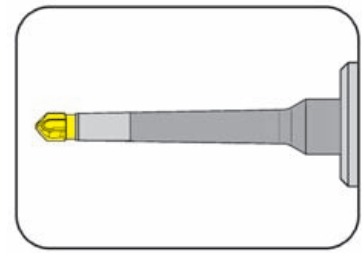
## MILLING SHANK Type

# DM008

no coolant supply

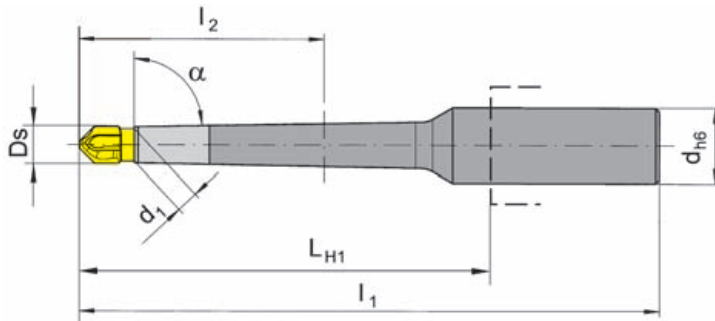
Shank 87° - shrink fit

Material of shank: Carbide



for use with Cutting Insert

Type DM208



Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	LH <sub>1</sub>	α
DM008.0010.87.02A	8	96.8	15.65	7.7	10	56.8	87°
DM008.0012.87.02A	8	96.8	15.65	7.7	12	51.8	87°
DM008.0012.89.02A		126.8	21.40			81.8	89°
DM008.0016.87.02A	8	126.8	15.65	7.7	16	76.8	87°
DM008.0016.89.02A		151.8	21.40			101.8	89°

Further sizes upon request

Dimensions in mm

### Spare parts

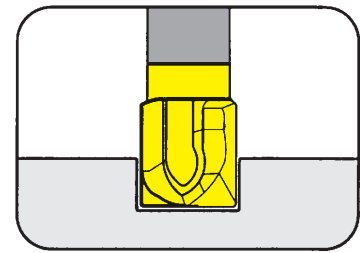
The clamping wrench and spare parts need to be ordered separately.

The cutting insert can only be exchanged by use of the correct clamping wrench S.DM08 (see page M50).

M

## CUTTING INSERT Type

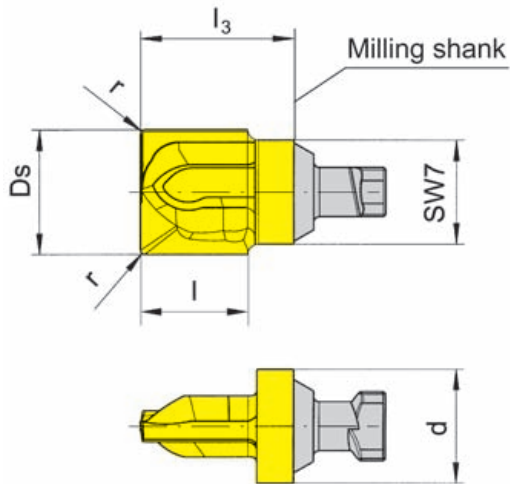
# DM208



Width of groove from .315"

for use with Milling shank

Type DM008



Picture = right hand cutting version

Part number	Ds	d	r	l	l <sub>3</sub>	Carbide grades	
						MG12	TH35
DM.208.0080.00.00	.315	.303	-	.299	.465		▲
DM.208.0080.02.00			.008			▲	
DM.208.0080.03.00			.012			▲	
DM.208.0080.04.00			.016			▲	
DM.208.0080.10.00			.039			▲	
DM.208.0080.16.00			.063			▲	
						P	•
						M	•
						K	•
						N	•
						S	•
						H	

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

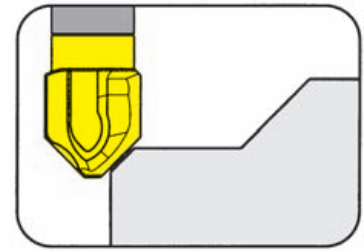
Carbide grades



## CUTTING INSERT Type

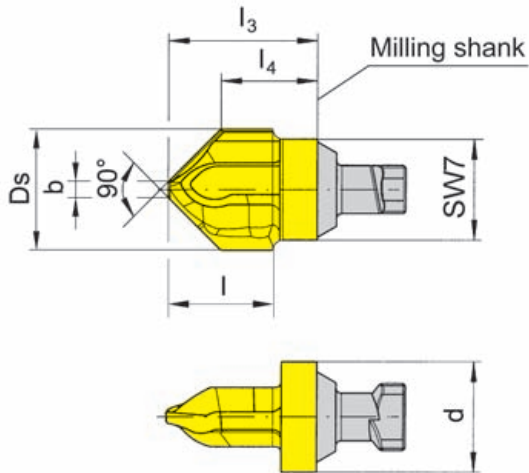
# DM208

Chamfering up to 3 x 45 °



for use with Milling shank

Type DM008



Picture = right hand cutting version

Part number	Ds	d	l	l <sub>3</sub>	l <sub>4</sub>	b	Carbide grades	
							MG12	TH35
<b>DM.208.4545.00.00</b>	.315	.303	.299	.465	.329	.039		▲
							P	•
							M	•
							K	•
							N	•
							S	•
							H	

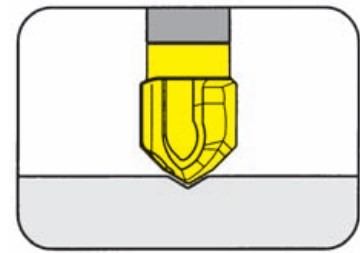
▲ on stock Δ 4 weeks  
 • main recommendation  
 o alternative recommendation  
 ■ uncoated grades  
 ■ coated grades  
 ■ brazed/Cermet

Dimensions in inch



## CUTTING INSERT Type

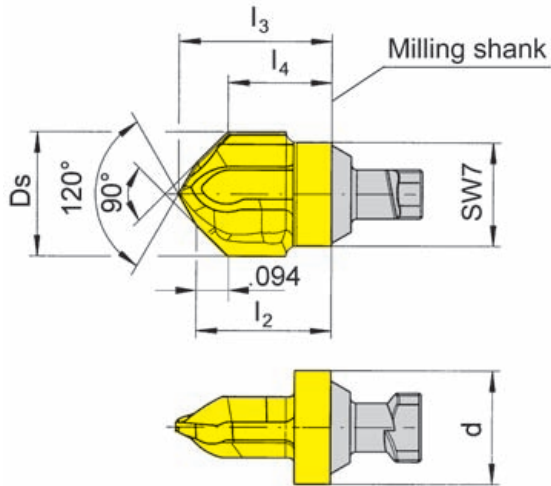
# DM208



Point angle 120° / 90°

for use with Milling shank

Type DM008



Picture = right hand cutting version

Part number	Ds	d	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	Carbide grades	
						MG12	TH35
<b>DM.208.3045.00.00</b>	.315	.303	.409	.465	.327		▲
▲ on stock Δ 4 weeks						P	•
● main recommendation						M	•
○ alternative recommendation						K	•
■ uncoated grades						N	•
■ coated grades						S	•
■ brazed/Cermet						H	•

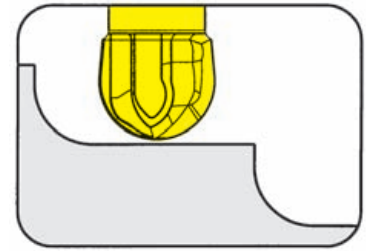
Dimensions in inch

Carbide grades



## CUTTING INSERT Type

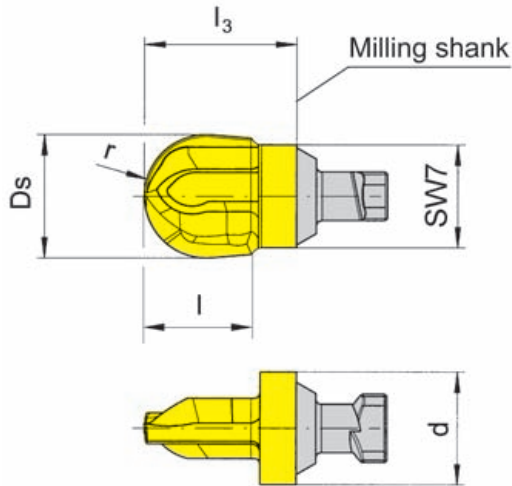
# DM208



Copy radius r .157"

for use with Milling shank

Type DM008



Picture = right hand cutting version

Part number	Ds	d	r	l	l <sub>3</sub>	Carbide grades	
						MG12	TH35
<b>DM.208.0080.40.00</b>	.315	.303	.157	.295	.465		▲
▲ on stock Δ 4 weeks						P	•
● main recommendation						M	•
○ alternative recommendation						K	•
■ uncoated grades						N	•
■ coated grades						S	•
■ brazed/Cermet						H	•

Dimensions in inch



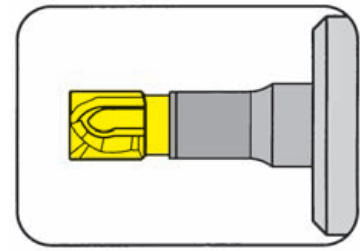
## MILLING SHANK Type

# DMU010

no coolant supply

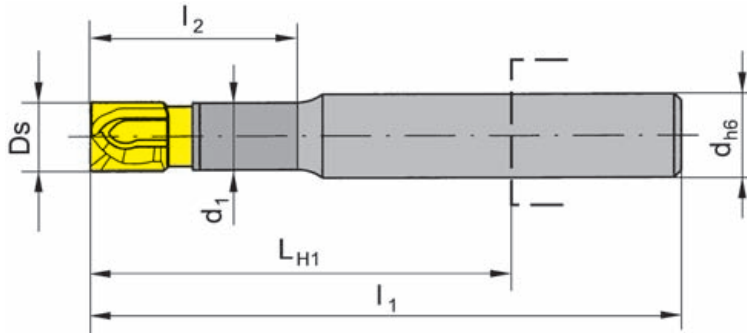
Shank 90° - shrink fit

Material of shank: Carbide



for use with Cutting Insert

Type DM210



Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	LH <sub>1</sub>
DMU010.0375.02A	.394	3.724	1.165	.378	.375	2.150
DMU010.0500.12A	.394	4.118	1.165	.378	.500	2.347

Further sizes upon request

Dimensions in inch

### Spare parts

The clamping wrench and spare parts need to be ordered separately.

The cutting insert can only be exchanged by use of the correct clamping wrench S.DM10 (see page M50).

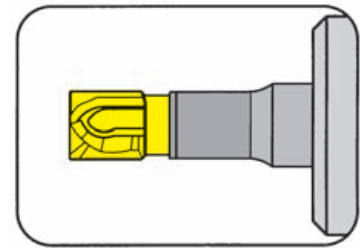
## MILLING SHANK Type

# DM010

no coolant supply

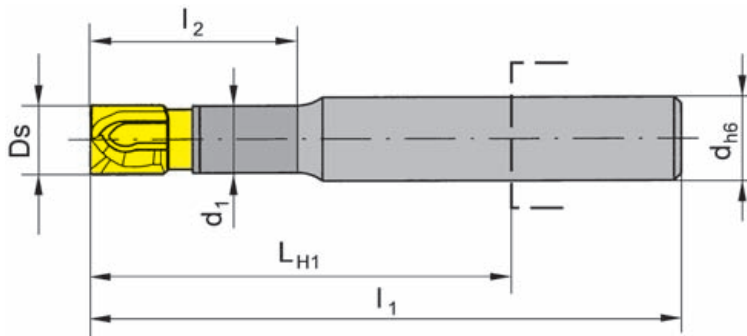
Shank 90° - shrink fit

Material of shank: Carbide



for use with Cutting Insert

Type DM210



Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	LH <sub>1</sub>
DM010.0010.02A	10	94.6	29.6	9.6	10.0	54.6
DM010.0012.12A	10	104.6	29.6	9.6	12.0	59.6
DM010.0095.05A	10	124.6	34.6	9.6	9.5	84.6

Further sizes upon request

Dimensions in mm

### Spare parts

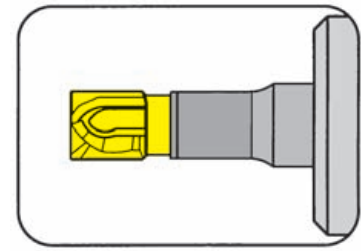
The clamping wrench and spare parts need to be ordered separately.

The cutting insert can only be exchanged by use of the correct clamping wrench S.DM10 (see page M50).

## MILLING SHANK Type

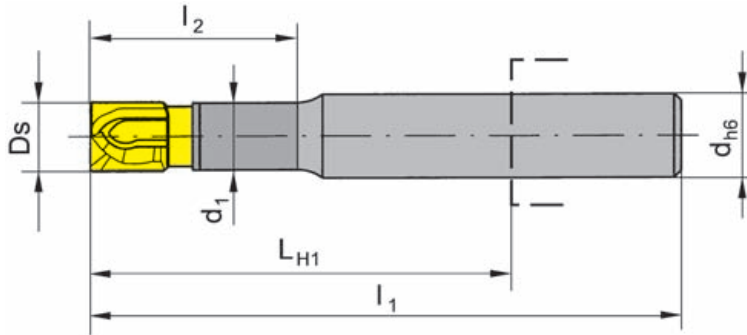
# DMU010

no coolant supply



Shank 90° - not recommended for shrinking

Material of shank: Steel



for use with Cutting Insert

Type DM210

Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	LH <sub>1</sub>
DMU010.ST37.01A	.394	3.134	.969	.378	.375	1.559
DMU010.ST05.02A	.394	3.331	1.165	.378	.500	1.559

Further sizes upon request

Dimensions in inch

### Spare parts

The clamping wrench and spare parts need to be ordered separately.

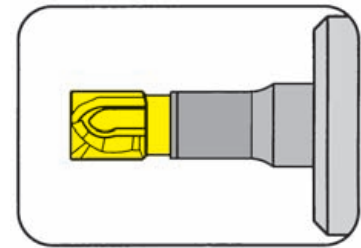
The cutting insert can only be exchanged by use of the correct clamping wrench S.DM10 (see page M50).



## MILLING SHANK Type

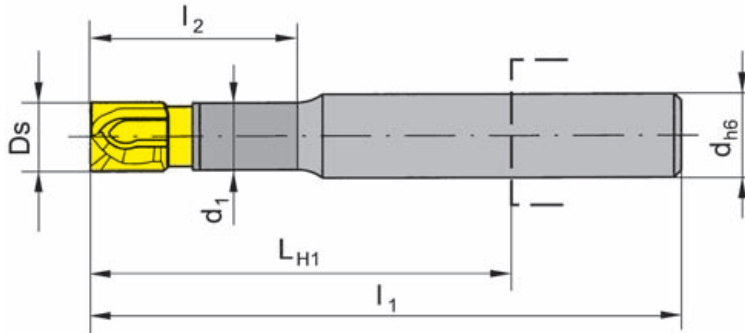
# DM010

no coolant supply



Shank 90° - not recommended for shrinking

Material of shank: Steel



for use with Cutting Insert

Type DM210

Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	LH <sub>1</sub>
DM010.ST10.01A	10	79.6	24.6	9.6	10	39.6
DM010.ST12.02A	10	84.6	29.6	9.6	12	39.6

Further sizes upon request

Dimensions in mm

### Spare parts

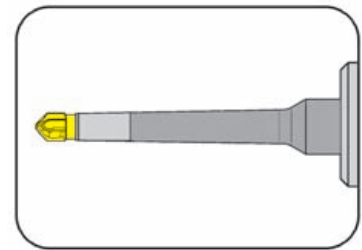
The clamping wrench and spare parts need to be ordered separately.

The cutting insert can only be exchanged by use of the correct clamping wrench S.DM10 (see page M50).

## MILLING SHANK Type

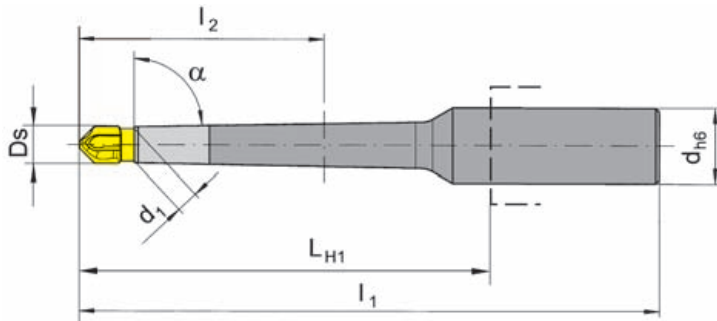
# DMU010

no coolant supply



Shank 87° - shrink fit

Material of shank: Carbide



for use with Cutting Insert

Type DM210

Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	LH <sub>1</sub>	α
DMU010.0500.87.02A	.394	3.921	.764	.378	.500	2.150	87°
DMU010.0500.89.05A	.394	5.102	1.063	.378	.500	3.331	89°
DMU010.0625.87.05A	.394	5.102	.764	.378	.625	3.213	87°
DMU010.0625.89.07A	.394	6.087	1.063	.378	.625	4.197	89°
DMU010.0750.87.04A	.394	4.512	.764	.378	.750	2.543	87°
DMU010.0750.89.07A	.394	6.874	1.063	.378	.750	4.906	89°

Further sizes upon request

Dimensions in inch

### Spare parts

The clamping wrench and spare parts need to be ordered separately.

The cutting insert can only be exchanged by use of the correct clamping wrench S.DM10 (see page M50).

M

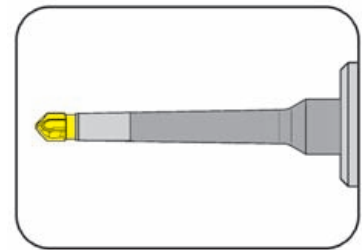
## MILLING SHANK Type

# DM010

no coolant supply

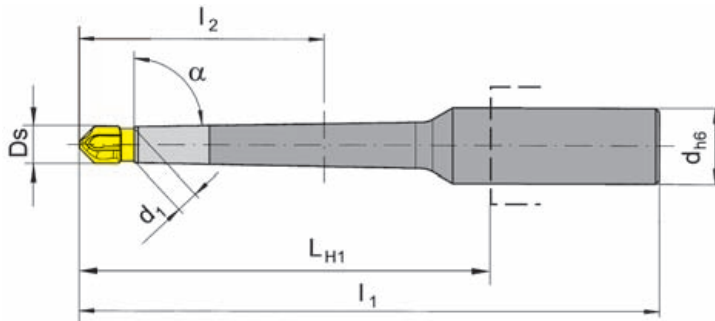
Shank 87° - shrink fit

Material of shank: Carbide



for use with Cutting Insert

Type DM210



Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	LH <sub>1</sub>	α
DM010.0012.87.02A	10	99.6	19.4	9.6	12	54.6	87°
DM010.0012.89.05A		129.6	27.0			84.6	89°
DM010.0016.87.05A	10	129.6	19.4	9.6	16	81.6	87°
DM010.0016.89.07A		154.6	27.0			106.6	89°
DM010.0020.87.04A	10	114.6	19.4	9.6	20	64.6	87°
DM010.0020.89.07A		174.6	27.0			124.6	89°

Further sizes upon request

Dimensions in mm

### Spare parts

The clamping wrench and spare parts need to be ordered separately.

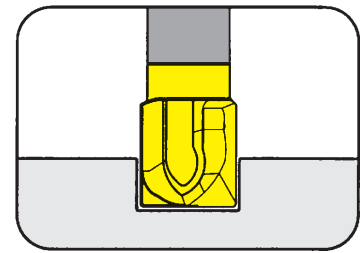
The cutting insert can only be exchanged by use of the correct clamping wrench S.DM10 (see page M50).

M

## CUTTING INSERT Type

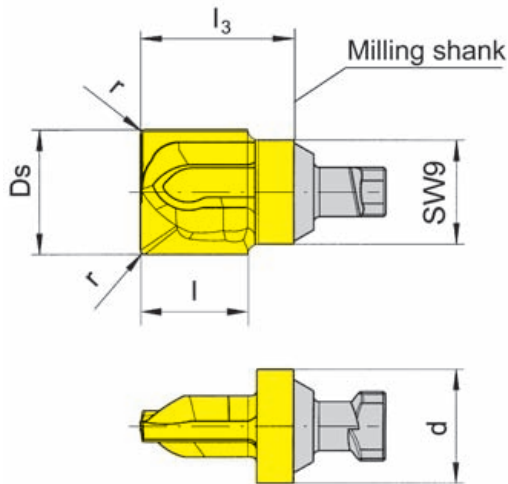
# DM210

Width of groove from .394"



for use with Milling shank

Type DM010



Picture = right hand cutting version

Part number	Ds	d	r	l	l <sub>3</sub>	Carbide grades	
						MG12	TH35
DM.210.0100.00.00	.394	.382	-	.394	.575		▲
DM.210.0100.03.00			.012			▲	
DM.210.0100.04.00			.016			▲	
DM.210.0100.10.00			.039			▲	
DM.210.0100.20.00			.079			▲	
DM.210.0100.30.00			.118			▲	
DM.210.0100.40.00			.157			▲	
						P	•
						M	•
						K	•
						N	•
						S	•
						H	

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

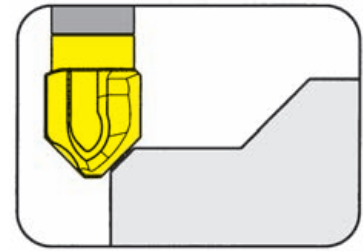
Carbide grades



## CUTTING INSERT Type

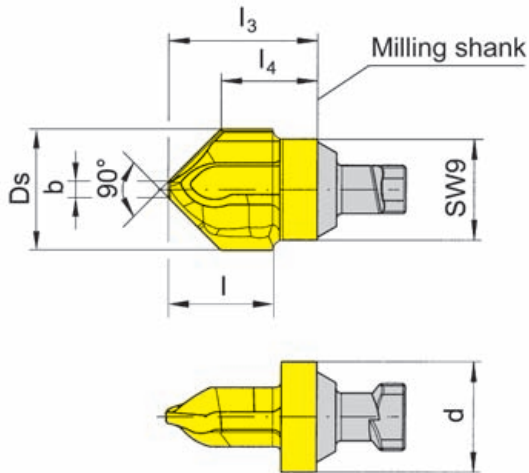
# DM210

Chamfering up to 4,5 x 45 °



for use with Milling shank

Type DM010



Picture = right hand cutting version

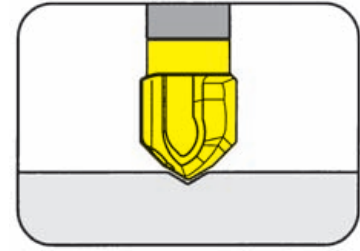
Part number	Ds	d	l	l <sub>3</sub>	l <sub>4</sub>	b	Carbide grades	
							MG12	TH35
<b>DM.210.4545.00.00</b>	.394	.382	.394	.575	.390	.039		▲
▲ on stock Δ 4 weeks							P	•
● main recommendation							M	•
○ alternative recommendation							K	•
■ uncoated grades							N	•
■ coated grades							S	•
■ brazed/Cermet							H	•

Dimensions in inch



## CUTTING INSERT Type

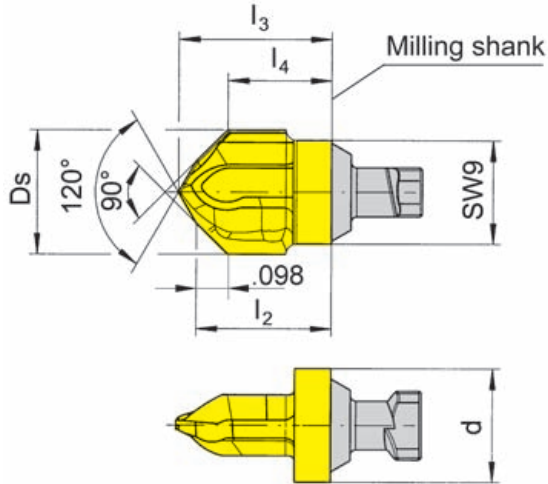
# DM210



Point angle 120° / 90°

for use with Milling shank

Type DM010



Picture = right hand cutting version

Part number	Ds	d	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	Carbide grades	
						MG12	TH35
<b>DM.210.3045.00.00</b>	.394	.382	.520	.575	.421		▲
▲ on stock Δ 4 weeks						P	•
● main recommendation						M	•
○ alternative recommendation						K	•
■ uncoated grades						N	•
■ coated grades						S	•
■ brazed/Cermet						H	•

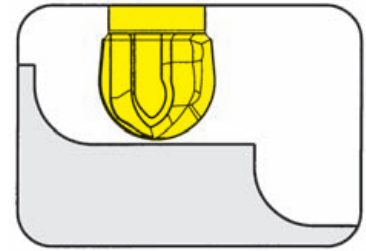
Dimensions in inch

Carbide grades



## CUTTING INSERT Type

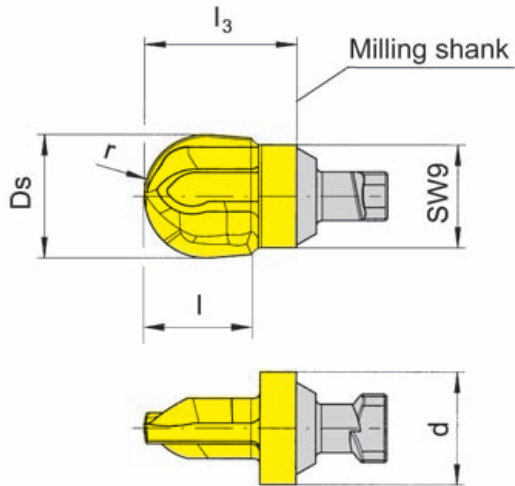
# DM210



Copy radius r .197"

for use with Milling shank

Type DM010



Picture = right hand cutting version

Part number	Ds	d	r	l	l <sub>3</sub>	Carbide grades	
						MG12	TH35
<b>DM.210.0100.50.00</b>	.394	.382	.197	.433	.575		▲
						P	•
						M	•
						K	•
						N	•
						S	•
						H	

▲ on stock Δ 4 weeks  
 • main recommendation  
 ○ alternative recommendation  
 □ uncoated grades  
 ■ coated grades  
 ■ brazed/Cermet

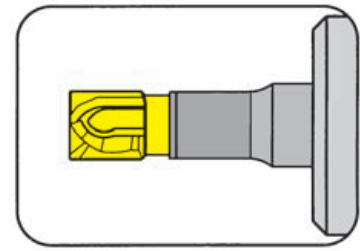
Dimensions in inch



## MILLING SHANK Type

# DMU012

with through coolant supply

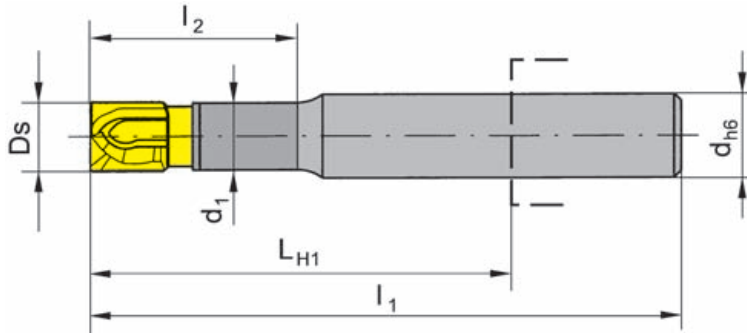


Shank 90° - shrink fit

Material of shank: Carbide

for use with Cutting Insert

Type DM212



Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	LH <sub>1</sub>
DMU012.0500.02A	.472	4.118	1.165	.453	.500	2.347

Further sizes upon request

Dimensions in inch

### Spare parts

The clamping wrench and spare parts need to be ordered separately.

The cutting insert can only be exchanged by use of the correct clamping wrench S.DM12 (see page M50).



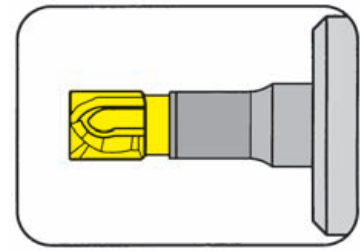
## MILLING SHANK Type

# DM012

with through coolant supply

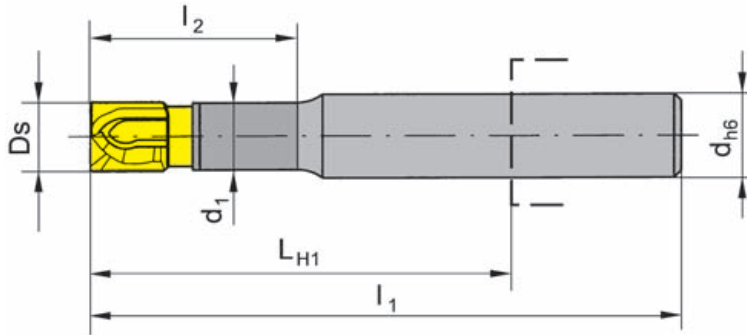
Shank 90° - shrink fit

Material of shank: Carbide



for use with Cutting Insert

Type DM212



Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	LH <sub>1</sub>
DM012.0012.02A	12	104.6	29.6	11.5	12	59.6
DM012.0016.04A	12	114.6	59.6	11.5	16	66.6

Further sizes upon request

Dimensions in mm

### Spare parts

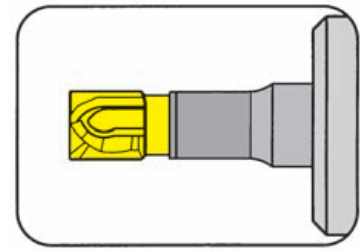
The clamping wrench and spare parts need to be ordered separately.

The cutting insert can only be exchanged by use of the correct clamping wrench S.DM12 (see page M50).

## MILLING SHANK Type

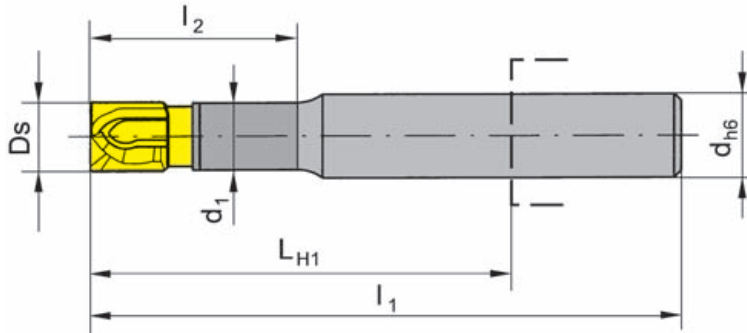
# DMU012

with through coolant supply



Shank 90° - not recommended for shrinking

Material of shank: Steel



for use with Cutting Insert

Type DM212

Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	LH <sub>1</sub>
DMU012.ST05.02A	.472	3.528	.969	.453	.500	1.756

Further sizes upon request

Dimensions in inch

### Spare parts

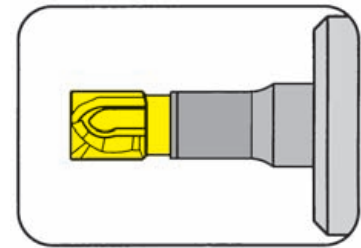
The clamping wrench and spare parts need to be ordered separately.

The cutting insert can only be exchanged by use of the correct clamping wrench S.DM12 (see page M50).

## MILLING SHANK Type

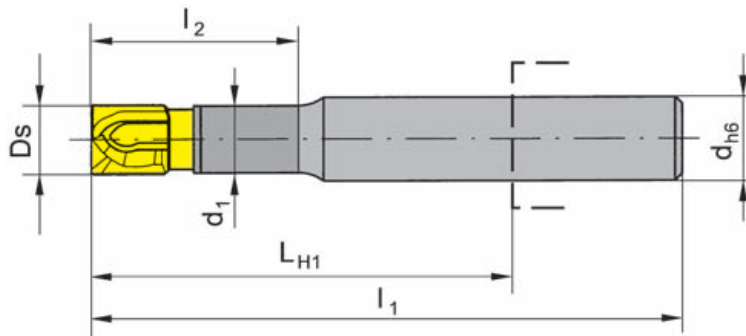
# DM012

with through coolant supply



Shank 90° - not recommended for shrinking

Material of shank: Steel



for use with Cutting Insert

Type DM212

Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	LH <sub>1</sub>
DM012.ST12.02A	12	89.6	24.6	11.5	12	44.6

Further sizes upon request

Dimensions in mm

### Spare parts

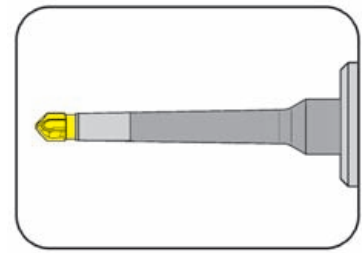
The clamping wrench and spare parts need to be ordered separately.

The cutting insert can only be exchanged by use of the correct clamping wrench S.DM12 (see page M50).

## MILLING SHANK Type

# DMU012

with through coolant supply

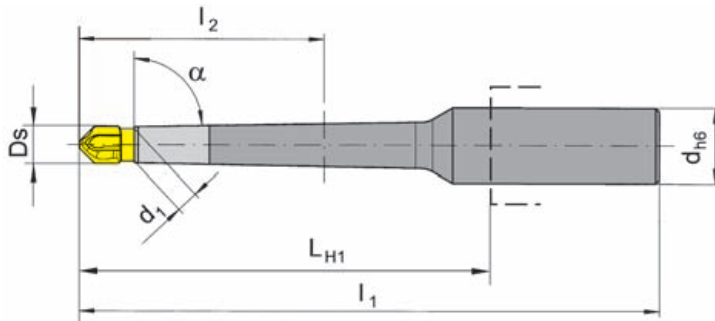


Shank 87° - shrink fit

Material of shank: Carbide

for use with Cutting Insert

Type DM212



Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	LH <sub>1</sub>	α
DMU012.0625.87.04A	.472	4.512	.799	.453	.625	2.622	87°
DMU012.0625.89.07A		6.087	1.177			4.197	89°
DMU012.0750.87.04A	.472	4.512	.799	.453	.750	2.543	87°
DMU012.0750.89.07A		6.874	1.177			4.906	89°

Further sizes upon request

Dimensions in inch

### Spare parts

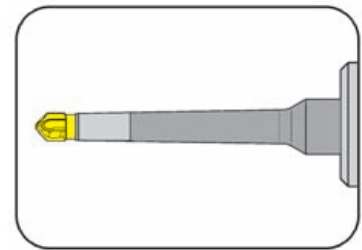
The clamping wrench and spare parts need to be ordered separately.

The cutting insert can only be exchanged by use of the correct clamping wrench S.DM12 (see page M50).

## MILLING SHANK Type

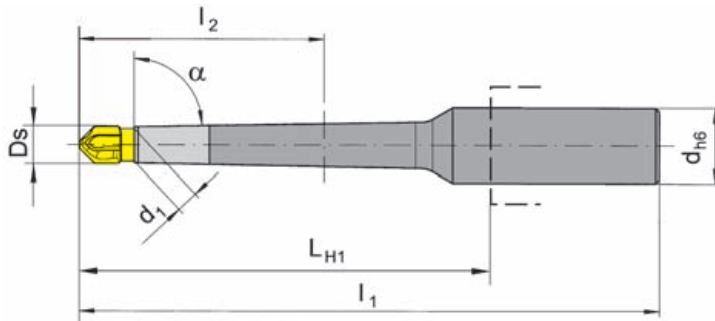
# DM012

with through coolant supply



Shank 87° - shrink fit

Material of shank: Carbide



for use with Cutting Insert

Type DM212

Part number	Ds	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d	LH <sub>1</sub>	α
DM012.0016.87.04A	12	114.6	20.3	11.5	16	66.6	87°
DM012.0016.89.07A		154.6	29.9			106.6	89°
DM012.0020.87.04A	12	114.6	20.3	11.5	20	64.6	87°
DM012.0020.89.07A		174.6	29.9			124.6	89°

Further sizes upon request

Dimensions in mm

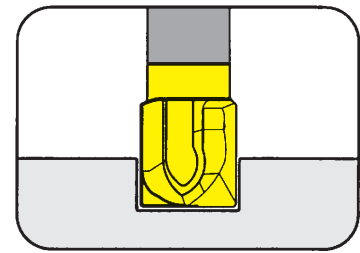
### Spare parts

The clamping wrench and spare parts need to be ordered separately.

The cutting insert can only be exchanged by use of the correct clamping wrench S.DM12 (see page M50).

## CUTTING INSERT Type

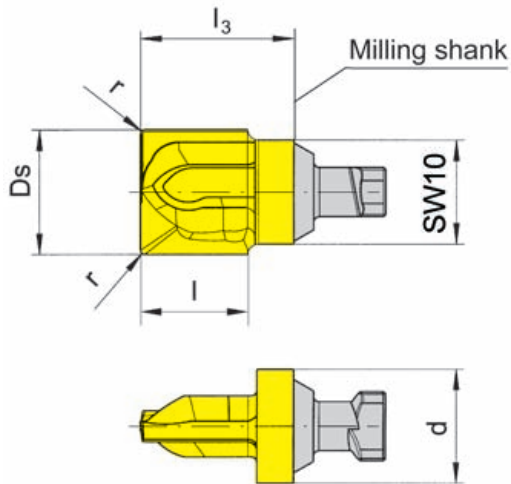
# DM212



Width of groove from .472"

for use with Milling shank

Type DM012



Picture = right hand cutting version

Part number	Ds	d	r	l	l <sub>3</sub>	Carbide grades	
						MG12	TH35
DM.212.0120.00.00	.472	.433	-	.394	.575		▲
DM.212.0120.03.00			.012			▲	
DM.212.0120.04.00			.016			▲	
DM.212.0120.08.00			.031			▲	
DM.212.0120.20.00			.079			▲	
DM.212.0120.30.00			.118			▲	
						P	•
						M	•
						K	•
						N	•
						S	•
						H	

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

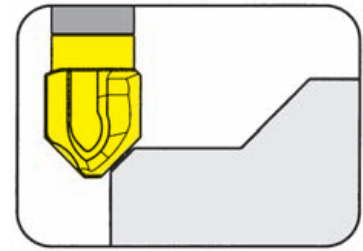
Carbide grades



## CUTTING INSERT Type

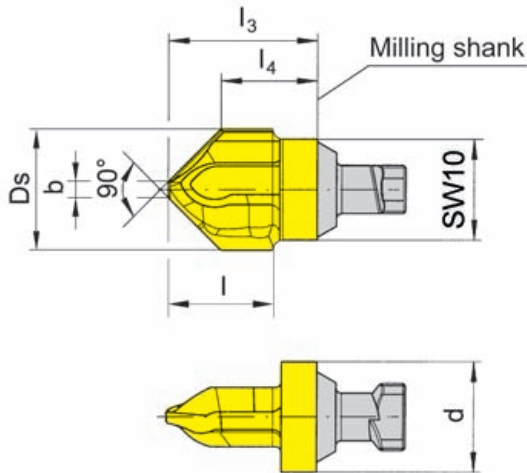
# DM212

Chamfering 4,5 °



for use with Milling shank

Type DM012



Picture = right hand cutting version

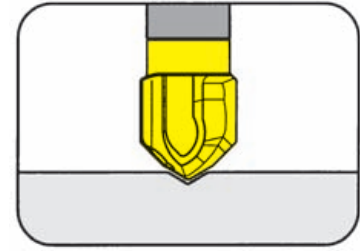
Part number	Ds	d	l	l <sub>3</sub>	l <sub>4</sub>	b	Carbide grades	
							MG12	TH35
<b>DM.212.4545.00.00</b>	.472	.433	.394	.575	.354	.039		▲
▲ on stock Δ 4 weeks							P	•
● main recommendation							M	•
○ alternative recommendation							K	•
■ uncoated grades							N	•
■ coated grades							S	•
■ brazed/Cermet							H	•

Dimensions in inch



## CUTTING INSERT Type

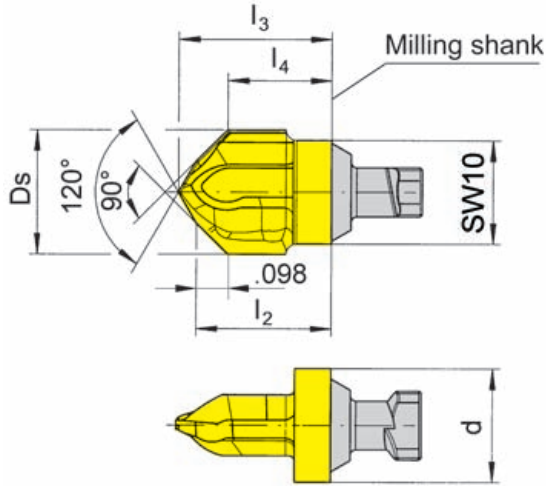
# DM212



Point angle 120° / 90°

for use with Milling shank

Type DM012



Picture = right hand cutting version

Part number	Ds	d	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	Carbide grades	
						MG12	TH35
<b>DM.212.3045.00.00</b>	.472	.433	.496	.575	.398		▲
▲ on stock Δ 4 weeks						P	•
● main recommendation						M	•
○ alternative recommendation						K	•
■ uncoated grades						N	•
■ coated grades						S	•
■ brazed/Cermet						H	•

Dimensions in inch

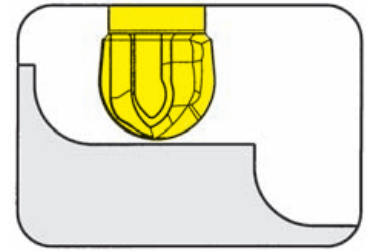
Carbide grades





## CUTTING INSERT Type

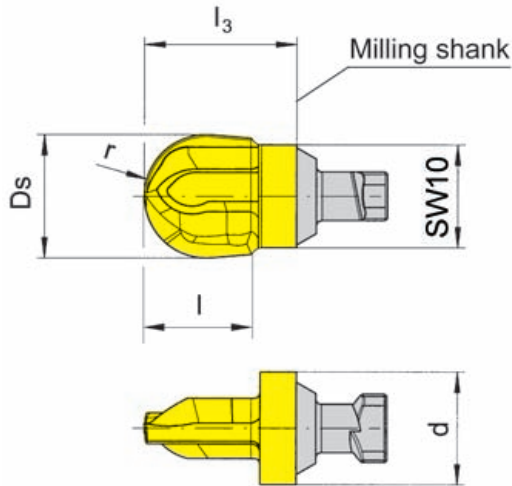
# DM212



Copy radius r .236"

for use with Milling shank

Type DM012



Picture = right hand cutting version

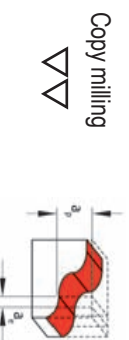
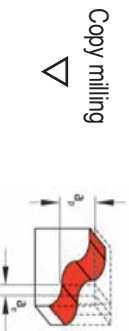
Part number	Ds	d	r	l	l <sub>3</sub>	Carbide grades	
						MG12	TH35
<b>DM.212.0120.60.00</b>	.472	.433	.236	.394	.575		▲
						P	•
						M	•
						K	•
						N	•
						S	•
						H	

▲ on stock Δ 4 weeks  
 • main recommendation  
 o alternative recommendation  
 □ uncoated grades  
 ■ coated grades  
 ■ brazed/Cermet

Dimensions in inch



# Cutting data for carbide grade TH35



ISO	Material	Hardness Brinell	$a_e / D$					$a_e / D$										
			$v_c$ sfm	D (inch)	$a_p$ (ipr)	$W\emptyset$	$f_z$ (ipr)	$v_c$ sfm	D (inch)	$a_p$ (ipr)	$W\emptyset$	$f_z$ (ipr)						
<b>P</b>	unalloyed steel	125	920-1180	.315	.098	0.9xD	.10% $f_z$ (ipr)	20% $f_z$ (ipr)	40% $f_z$ (ipr)	50% $f_z$ (ipr)	980-1250	.315	.0394	0.54xD	2% $f_z$ (ipr)	5% $f_z$ (ipr)	.10% $f_z$ (ipr)	15% $f_z$ (ipr)
	unalloyed steel	190	820-1050		.079	0.83xD	.0071	.0051	.0039	.0035	890-1120		.0197	0.46xD	.0035	.019	.0051	.0043
	low alloyed steel	200	750-980		.059	0.75xD	.0079	.0063	.0051	.0051	820-1050		.0118	0.36xD	.0035	.0098	.0067	.0059
	low alloyed steel	300	620-890		.039	0.83xD	.0079	.0063	.0051	.0051	690-950		.0079	0.29xD	.0035	.0098	.0067	.0059
	high alloyed steel	200	400-460		.020	0.54xD	.0091	.0087	.0059	.0059	460-620		.0039	0.21xD	.0035	.0098	.0098	.0079
	Stainless steel martensitic	240	490-660								460-620							
<b>M</b>	Stainless steel austenitic	180	400-560			.118	0.9xD	.0079	.0059	.0043	660-1180	.0394	0.6xD	.0039	.0079	.0055	.0472	
	Malleable cast iron ferritic	130	590-980	.394	.098	0.85xD	.0079	.0059	.0043	660-1180	.0315	0.55xD	.0039	.0079	.0055	.0472		
	Malleable cast iron perlite	230	790-1180		.079	0.8xD	.0098	.0067	.0051	660-1180	.0197	0.45xD	.0039	.0098	.0071	.0059		
	Spheroidal graphite cast iron ferritic/perlitic	180	890-1300		.059	0.7xD	.0098	.0067	.0051	850-1250	.0118	0.35xD	.0039	.0098	.0071	.0059		
<b>K</b>	Spheroidal graphite cast iron ferritic/perlitic	180	890-1300		.039	0.6xD	.0118	.0079	.0067	980-1480	.0039	0.2xD	.0039	.0098	.0098	.0098		
	Spheroidal graphite cast iron	260	590-820							660-980								
	Grey cast iron	160	590-980		.157	0.9xD	.0098	.0063	.0047	660-1180	.0394	0.55xD	.0047	.0098	.0067	.0055		
<b>S</b>	Super alloy Ni/Co based	350	50-200	.472	.118	0.85xD	.0098	.0063	.0047	660-1180	.0315	0.5xD	.0047	.0098	.0067	.0055		
	Titanium based alloy	350	150-300		.079	0.75xD	.0118	.0079	.0063	50-200	.0197	0.4xD	.0047	.0079	.0071	.0071		
<b>N</b>	Al-alloys	90	3280		.059	0.65xD	.0118	.0079	.0063	150-300	.0118	0.3xD	.0047	.0118	.0079	.0071	.0098	
					.039	0.55xD	.0138	.0098	.0079	3280	.0039	0.2xD	.0047	.0118	.0098	.0098		

$v_c$  is depending on the tool diameter and therefore of the maximum numbers of revolutions of the machine.

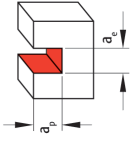
Feed rate calculation:

$$f_z = hm \sqrt{\frac{2r}{a_e}}$$

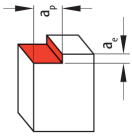
Feed rate

$$v_f = n \cdot f_z \cdot z \text{ inch/min}$$

# Cutting data for carbide grade TH35



Groove milling  
 $a_{pmax} = 0.5 \times D$   
 $a_e = D$



Shoulder milling  
 $a_{pmax} = 0.25 \times D$   
 $a_e < 0.25 \times D$

ISO	Material	Hardness Brinell	$a_e / D = 25\%$			$a_e / D = 10\%$			$a_e / D = 5\%$			D (inch)	$f_z$ (ipr)	$h_m$	
			$V_c$ (sfm)	D (inch)	$f_z$ (ipr)	$h_m$	$V_c$ (sfm)	D (inch)	$f_z$ (ipr)	$h_m$	$V_c$ (sfm)				D (inch)
<b>P</b>	unalloyed steel	125	720-920		.0008	.0004		.0012	.0004	850-1050		.0016	.0004		.0004
	unalloyed steel	190	660-850		.0008	.0004		.0012	.0004	820-980		.0016	.0004		.0004
	low alloyed steel	200	590-750	.315	.0016	.0008	.315	.0024	.0008	750-890	.315	.0031	.0008	.315	.0008
	low alloyed steel	300	590-750		.0024	.0012		.0035	.0012	750-890		.0047	.0012		.0012
	high alloyed steel	200	400-430							490-620					
<b>M</b>	Stainless steel martensitic	240	200-330							390-520					
	Stainless steel austenitic	180	160-260							230-300					
	Malleable cast iron ferritic	130	460-630		.0016	.0008		.0024	.0008	560-790		.0035	.0008		.0008
<b>K</b>	Malleable cast iron perlitic	230	360-490	.394	.0028	.0012	.394	.0039	.0012	430-620	.394	.0055	.0012	.394	.0012
	Spheroidal graphite cast iron ferritic/perlitic	180	400-520		.0043	.0020		.0063	.0020	490-620		.0091	.0020		.0020
	Spheroidal graphite cast iron perlitic	260	330-460							430-560					
	Grey cast iron	160	330-560		.0016	.0008		.0024	.0008	460-590		.0035	.0008		.0008
	Super alloy Ni/Co based	350	50-200	.472	.0035	.0016	.472	.0055	.0016	50-200	.472	.0079	.0016	.472	.0016
<b>S</b>	Titanium based alloy	350	150-300		.0051	.0024		.0079	.0024	150-300		.0114	.0024		.0024
	Al-alloys	90	1310-2130							2620-3280					

$V_c$  is depending on the tool diameter and therefore of the maximum numbers of revolutions of the machine.

Feed rate calculation:  $f_z = hm \sqrt{\frac{2r}{a_e}}$  Feed rate  $v_f = n \cdot f_z \cdot z$  mm/min



**Carbide Groove Milling Tools are preferably used for climb milling.**

**Cutting conditions for groove and side milling:**

The medium chip thickness  $h_m$  defines the feed rate per tooth. If you do not use the full width of the milling cutter it is recommended to increase  $v_c$  and  $f_z$ .  
Examples for specific conditions  $a_e/D$  are shown in the cutting data table.

- $a_p$  = depth of milling
- $a_e$  = working width
- $D$  = milling cutter  $\varnothing$

**Cutting conditions for copy milling:**

The working diameter ( $W\varnothing$ ) of a full radius milling cutter is equal to the cutting depth  $a_p$  and influences all relevant feed rates.

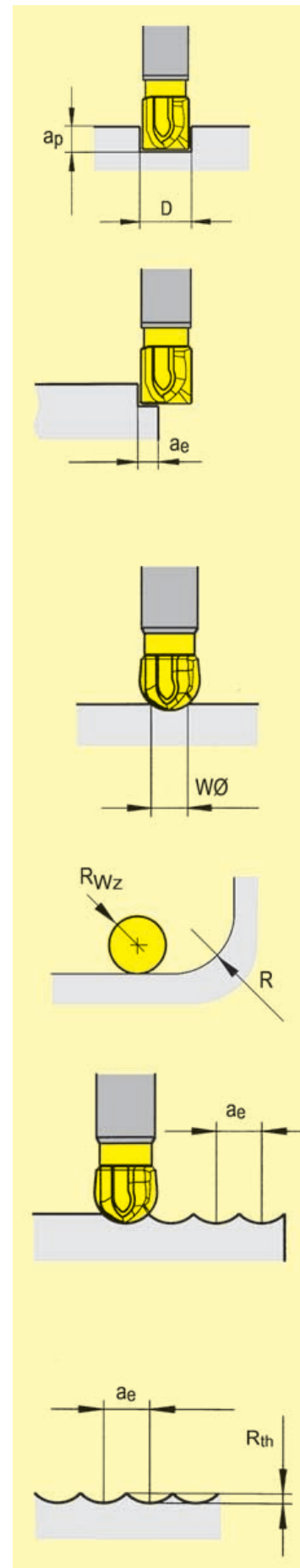
For pocket or contour milling always choose the cutting diameter of the milling cutter smaller than the resulting radius in the corners of the pocket or the contour.

$$R > RWz$$

In the corners and the bottom of the pocket the normal pressure angle respectively the working diameter of the milling cutter shows a considerable increase which also reflects the medium chip thickness  $h_m$ . In this case please use the proposed feed rates for the full cut. This will result in using lower feed rates.

You can influence the surface quality and roughness of the component considering the right milling widths, the correct lane distance during copy milling and of course the proposed speeds and feeds.

$$R_{th} = \frac{D}{2} - \sqrt{\frac{D^2 - a_e^2}{4}}$$





**D 28 VL**  
2 - 8 Nm

**Torque screw driver with scale**  
- variable torque setting  
- adjusted torque is shown on display

The Torque can be adjusted with a special torque setter (included). Ergonomical form gives perfect handling abilities. Acoustic signal when setted torque is reached.  
(Standard: EN ISO 6798, BS EN 26789, ASME B 107.14.M.)  
(Precision:  $\pm 6\%$ )



**ED 28 VL**

**Torque setter**

Device for setting the required torque.  
Handle: Celluloseacetat with micro structured surface  
Blade: Octogonal (8 flats) blade, hardened galvanized



**D14ZBK**

**Universal Bitholder**  
For S.DM08, S.DM10 and S.DM12 also  
for all C6,3 and E6,3 (1/4") Bits

Blade: High quality Chrome-Vanadium steel, through hardened, chrome plated.  
Collar: Stainless steel  
Utilization: For controlled screw setting with definite torque in combination with torque screw driver handle.



**14ZQK**

**Universal Bitholder with T-handle**  
For S.DM08, S.DM10 and S.DM12  
also for all C6,3 and E6,3 (1/4") Bits

Blade: High quality Chrome-Vanadium steel, through hardened, chrome plated.  
Collar: Stainless steel  
Utilization: For controlled opening





## S.DM08

Torque for setting



4 Nm Clamping wrench SW7  
for multi milling shank DM8

## S.DM10

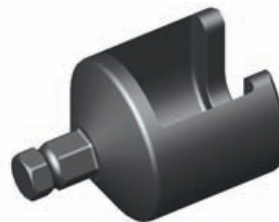
Torque for setting



6 Nm Clamping wrench SW9  
for multi milling shank DM10

## S.DM12

Torque for setting



6 Nm Clamping wrench SW10  
for multi milling shank DM12

M

Part number	Includes
WKITDM08	D 28 VL D14ZBK 14ZQK SDM08
WKITDM10	D 28 VL D14ZBK 14ZQK SDM10
WKITDM12	D 28 VL D14ZBK 14ZQK SDM12

# The Generation of Milling Tools

## System DA



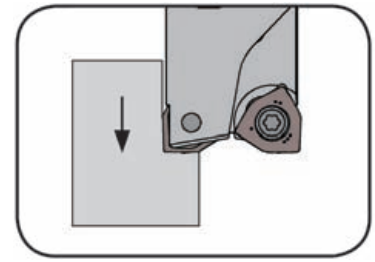
## System DAH



N

## MILLING SHANK Type

# DAM31



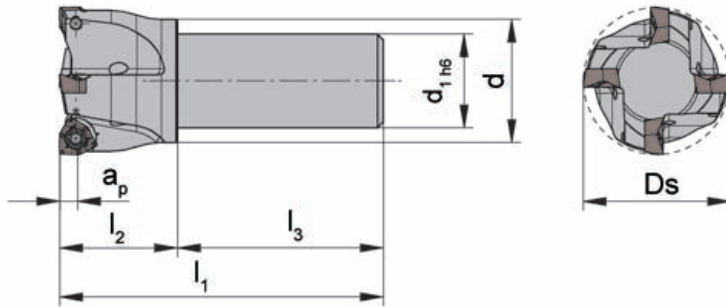
Cutting edge  $\varnothing$

20/25/32 mm

with cylindrical shank for CNC-lathes

for use with Indexable insert

Type DA31



Part number	Z	Ds	ap	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d <sub>1</sub>	d	Insert
DAM31.020.D160.03A	3	20	3	52	17	35	16	19	DA31.020...
DAM31.025.D161.04A DAM31.025.D201.04A	4	25	3	55	20	35	16 20	24	DA31.025...
DAM31.032.D162.05A DAM31.032.D202.05A	5	32	3	60	25	35	16 20	31	DA31.032...

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

N

### Spare parts

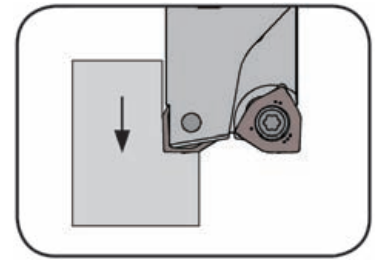
Milling shank	Screw	TORX PLUS® Wrench
DAM31.020.D160.03A	<b>030.2547.T8P</b>	<b>T8PL</b>
DAM31.025.D...04A	<b>030.2553.T8P</b>	<b>T8PL</b>
DAM31.032.D...05A	<b>030.2557.T8P</b>	<b>T8PL</b>

N2



## MILLING SHANK Type

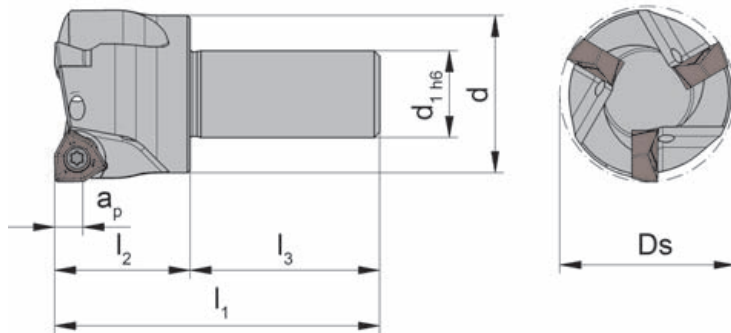
# DAM32



Cutting edge  $\varnothing$

20/25/32 mm

with cylindrical shank for CNC-lathes



for use with Indexable insert

Type DA32

Part number	Z	Ds	$a_p$	$l_1$	$l_2$	$l_3$	$d_1$	d	Insert
DAM32.020.D160.02A	2	20	4.5	52	17	35	16	19	DA32.020...
DAM32.025.D161.03A	3	25	4.5	55	20	35	16	24	DA32.025...
DAM32.032.D162.03A	3	32	4.5	60	25	35	16	31	DA32.032...

Dimensions in mm

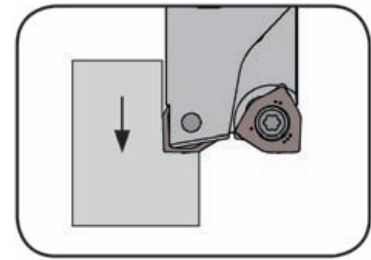
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
DAM32.020.D160.02A	<b>030.3562.T10P</b>	<b>T10PL</b>
DAM32.025.D161.03A	<b>030.3569.T10P</b>	<b>T10PL</b>
DAM32.032.D162.03A	<b>030.3576.T10P</b>	<b>T10PL</b>

## MILLING SHANK Type

# DAM31/DAM32



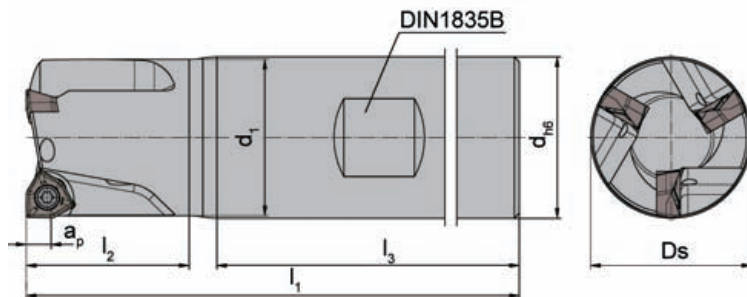
Cutting edge  $\varnothing$

32/25/20/16 mm

Material of shank: Steel (not recommended for shrink fitting)

for use with Indexable insert

Type DA31  
DA32



Part number	Z	Ds	a <sub>p</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d <sub>1</sub>	d	Insert
<b>DAM31.016.D163.02B</b>	2	16	3.0	79	17	54	15	16	DA31.016...
<b>DAM31.020.D204.03B</b>	3	20		86	21	59	19	20	DA31.020...
<b>DAM31.025.D255.04B</b>	4	25		97	27	64	24	25	DA31.025...
<b>DAM31.032.D326.05B</b>	5	32		106	32	68	31	32	DA31.032...
<b>DAM32.020.D205.02B</b>	2	20	4.8	87	22	19	19	20	DA32.020...
<b>DAM32.025.D256.03B</b>	3	25		102	32	64	24	25	DA32.025...
<b>DAM32.032.D327.03B</b>	3	32		106	32	68	31	32	DA32.032...

Dimensions in mm

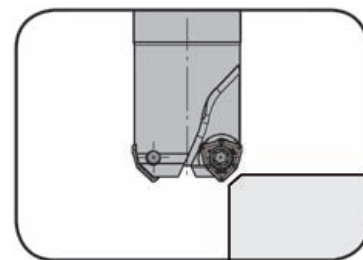
For torque specifications of the screw, please see Technical Instructions.

N

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
DAM31.016.D163.02B	<b>030.2541.T8P</b>	<b>T8PL</b>
DAM31.020.D204.03B	<b>030.2547.T8P</b>	<b>T8PL</b>
DAM31.025.D255.04B	<b>030.2553.T8P</b>	<b>T8PL</b>
DAM31.032.D326.05B	<b>030.2557.T8P</b>	<b>T8PL</b>
DAM32.020.D205.02B	<b>030.3562.T10P</b>	<b>T10PL</b>
DAM32.025.D256.03B	<b>030.3569.T10P</b>	<b>T10PL</b>
DAM32.032.D327.03B	<b>030.3576.T10P</b>	<b>T10PL</b>

## MILLING SHANK Type **DAM31/DAM32** for 45° Milling and Chamfering

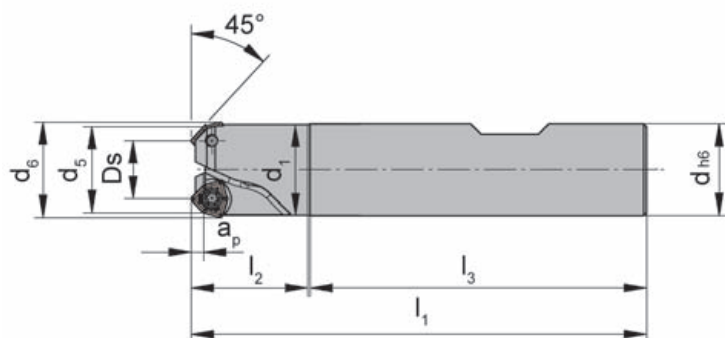


Cutting edge  $\varnothing$  10.4/14.4/17 mm

Material of shank: Steel (not recommended for shrink fitting)

for use with Indexable insert

Type DA31  
DA32



Part number	Z	Ds	a <sub>p</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d <sub>1</sub>	d	d <sub>5</sub>	d <sub>6</sub>	Insert
<b>DAM31.411.D163.02B</b>	2	10.4	2.0	80	20.0	59	15.8	16	15	16.9	DA31.016...
<b>DAM31.414.D204.03B</b>	3	14.4	2.0	87	23.0	62	18.8	20	19	20.9	DA31.020...
<b>DAM32.417.D256.03B</b>	3	17.6	3.2	103	34.5	67	24.8	25	24	28.3	DA32.025...

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
DAM31.411.D163.02B	<b>030.2541.T8P</b>	<b>T8PL</b>
DAM31.414.D204.03B	<b>030.2547.T8P</b>	<b>T8PL</b>
DAM32.417.D256.03B	<b>030.3569.T10P</b>	<b>T10PL</b>

# Mini cutting at its Peak



Small, Strong, Streamlined. The updated **Mini Tool System** achieves outstanding results for internal machining. Standard grades are available for all materials. Bore diameters from 6 mm (.236"). Groove widths from 0,74 to 3 mm (.029" - .118"), with radial depths of cut up to 8 mm (.315") are standard. Sintered, chip breaking geometries ensure excellent chip control and increased productivity. Horn's Mini system, the tool you need for internal applications. [www.hornusa.com](http://www.hornusa.com)



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**GROOVING PARTING OFF GROOVE MILLING BROACHING PROFILE MILLING DRILLING REAMING**

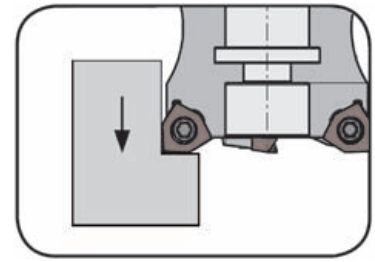


N6

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## MILLING CUTTER Type

# DAM32



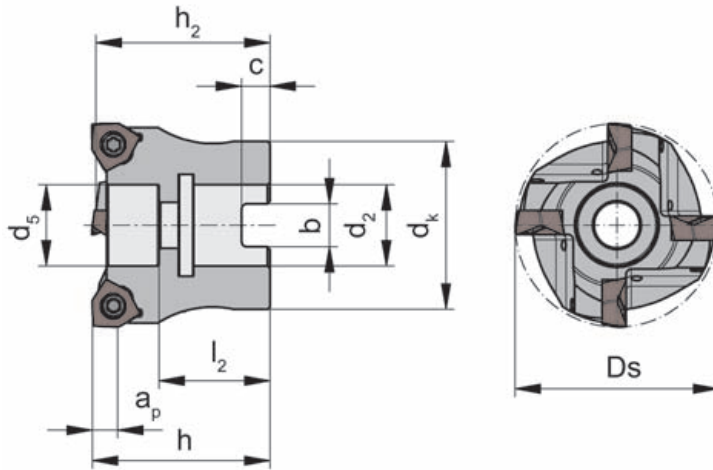
Cutting edge  $\varnothing$

40/50/63 mm

Arbor mounted cutter as per DIN 8030-A

for use with Indexable insert

Type DA32



Picture = right hand cutting version

Type arbor mounted

Part number	Z	Ds	ap	h	h <sub>2</sub>	dk	d <sub>2</sub>	d <sub>5</sub>	b	c	l <sub>2</sub>
<b>DAM.32.040.A1635.04</b>	4	40	3	35	34.4	33	16	16.0	8.4	5.6	22
<b>DAM.32.050.A2240.05</b>	5	50	3	40	39.4	41	22	19.5	10.4	6.3	24
<b>DAM.32.063.A2745.06</b>	6	63	3	45	44.4	49	27	21.5	12.4	7.0	27

Dimensions in mm

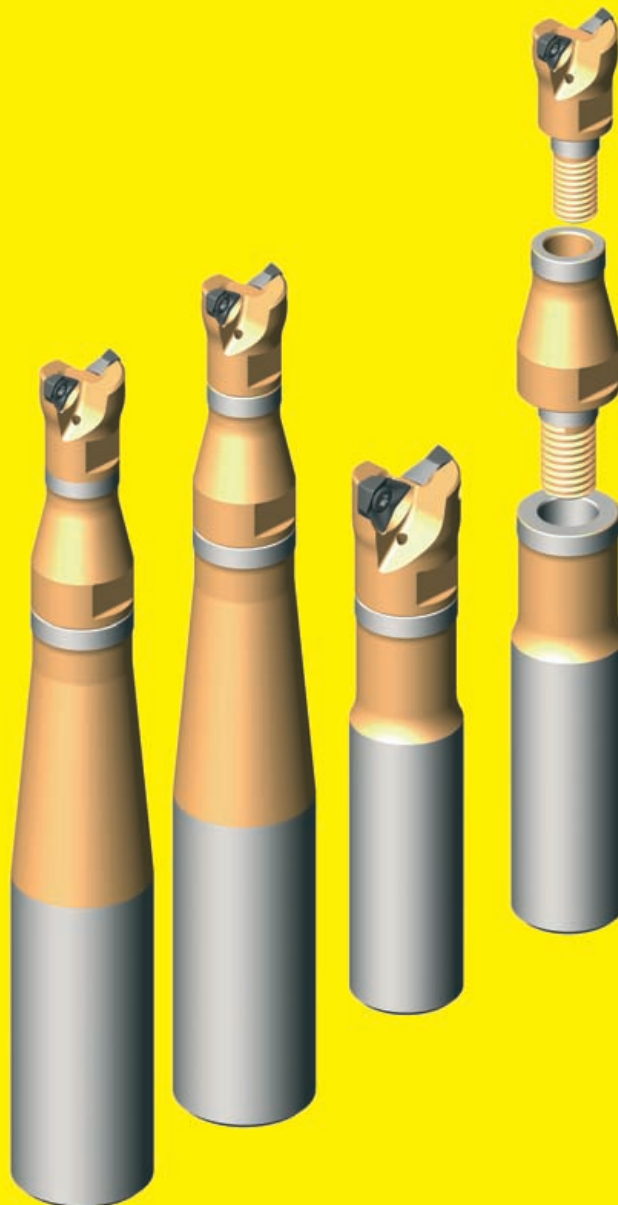
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Milling cutter	Screw	TORX PLUS® Wrench
DAM.32.0...	<b>030.3576.T10P</b>	<b>T10PL</b>

# System DA

Triple Power

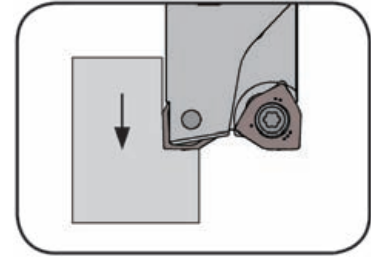


**Milling head DAM31/32 with shank or  
with reducer and shank**

N

## SCREW-IN CUTTER Type

# DAM31/DAM32



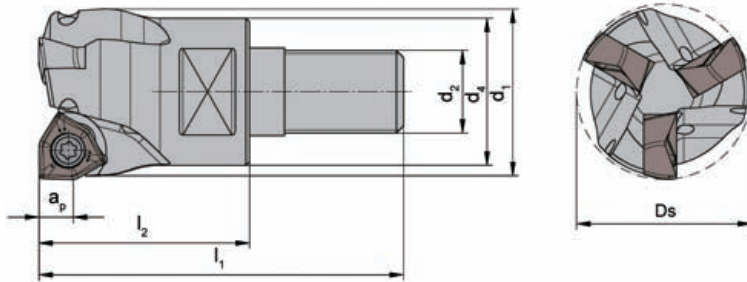
Cutting edge  $\varnothing$

32/25/20/16 mm

Material of shank: Steel

for use with Indexable insert

Type DA31  
DA32



Part number	Z	Ds	a <sub>p</sub>	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d <sub>2</sub>	d <sub>4</sub>	SW	Insert
<b>DAM31.016.M083.02B</b>	2	16	3.0	38	20	15	<b>M8</b>	<b>13</b>	10	DA31.016...
<b>DAM31.020.M104.03B</b>	3	20		45	25	19	<b>M10</b>	<b>18</b>	15	DA31.020...
<b>DAM31.025.M125.04B</b>	4	25		52	30	24	<b>M12</b>	<b>21</b>	17	DA31.025...
<b>DAM31.032.M166.05B</b>	5	32		58	35	31	<b>M16</b>	<b>29</b>	24	DA31.032...
<b>DAM32.020.M104.02B</b>	2	20	4.8	45	25	19	<b>M10</b>	<b>18</b>	15	DA32.020...
<b>DAM32.025.M125.03B</b>	3	25		52	30	24	<b>M12</b>	<b>21</b>	17	DA32.025...
<b>DAM32.032.M166.03B</b>	3	32		58	35	31	<b>M16</b>	<b>29</b>	24	DA32.032...

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

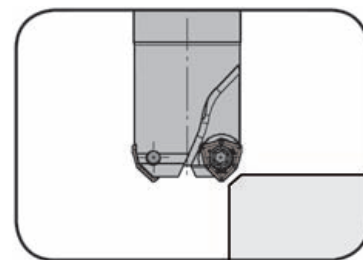
Screw-in cutter	Screw	TORX PLUS® Wrench
DAM31.016.M083.02B	<b>030.2541.T8P</b>	<b>T8PL</b>
DAM31.020.M104.03B	<b>030.2547.T8P</b>	<b>T8PL</b>
DAM31.025.M125.04B	<b>030.2553.T8P</b>	<b>T8PL</b>
DAM31.032.M166.05B	<b>030.2557.T8P</b>	<b>T8PL</b>
DAM32.020.M104.02B	<b>030.3562.T10P</b>	<b>T10PL</b>
DAM32.025.M125.03B	<b>030.3569.T10P</b>	<b>T10PL</b>
DAM32.032.M166.03B	<b>030.3576.T10P</b>	<b>T10PL</b>



## SCREW-IN CUTTER Type

# DAM31/DAM32

for 45° Milling and Chamfering



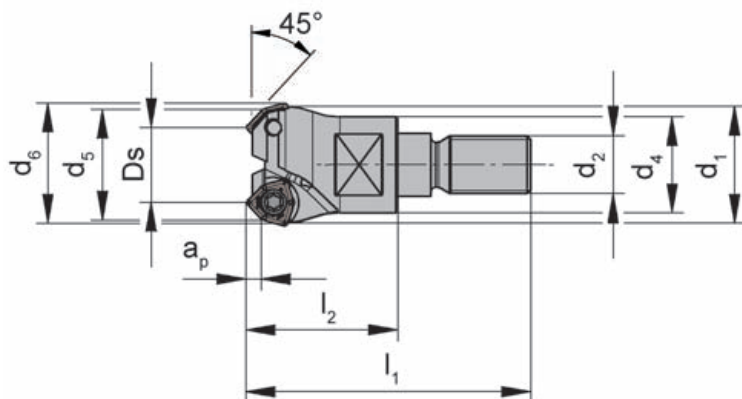
Cutting edge Ø

10.5/14.4/17 mm

Material of shank: Steel

for use with Indexable insert

Type DA31  
DA32



Part number	Z	Ds	a <sub>p</sub>	l <sub>1</sub>	l <sub>2</sub>	d <sub>1</sub>	d <sub>2</sub>	d <sub>4</sub>	d <sub>5</sub>	d <sub>6</sub>	Insert
<b>DAM31.411.M083.02B</b>	2	10.5	2.0	38	20	15.8	<b>M8</b>	13	15	16.9	DA31.016...
<b>DAM31.414.M104.03B</b>	3	14.4	2.0	45	25	19.8	<b>M10</b>	18	19	20.9	DA31.020...
<b>DAM32.417.M125.03B</b>	3	17.6	3.2	52	30	24.8	<b>M12</b>	21	24	28.3	DA32.025...

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

N

### Spare parts

Screw-in cutter	Screw	TORX PLUS® Wrench
DAM31.411.M083.02B	<b>030.2541.T8P</b>	<b>T8PL</b>
DAM31.414.M104.03B	<b>030.2547.T8P</b>	<b>T8PL</b>
DAM32.417.M125.03B	<b>030.3569.T10P</b>	<b>T10PL</b>

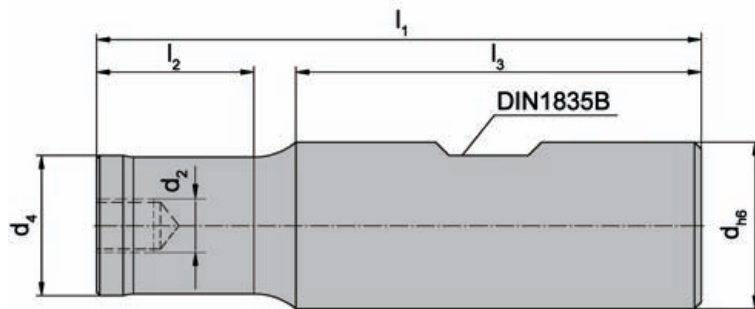


ADAPTOR Type

## MD

for milling head DAM/DAHM...M and reducer MD...M

Material of shank: Steel (not recommended for shrink fitting)



Part number	$l_1$	$l_2$	$l_3$	d	$d_2$	$d_4$
MD13.02.00.D16B	73	14	53	16	M8	13
MD18.04.00.D20B	80	20	55	20	M10	18
MD21.06.00.D25B	91	23	61	25	M12	21
MD29.08.00.D32B	100	29	65	32	M16	29

Dimensions in mm

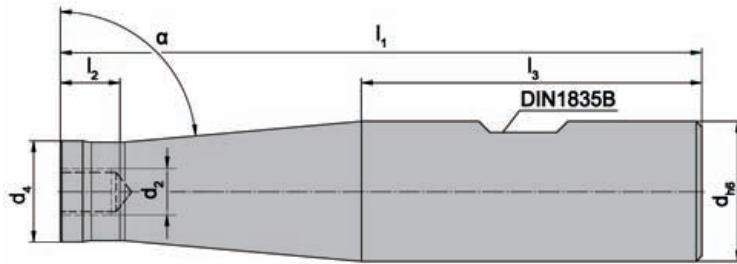
N

ADAPTOR Type

## MD

for milling head DAM/DAH...M and reducer MD...M

Material of shank: Steel (not recommended for shrink fitting)



Part number	$l_1$	$l_2$	$l_3$	d	$d_2$	$d_4$	$\alpha$
MD13.02.85.D20B	105	7	55	20	M8	13	85°
MD18.04.85.D25B	115	10	61	25	M10	18	85°
MD21.06.85.D32B	140	8	65	32	M12	21	85°
MD29.08.85.D40B	150	8	75	40	M16	29	85°

from  $\varnothing$  25 mm 2 clamping flats

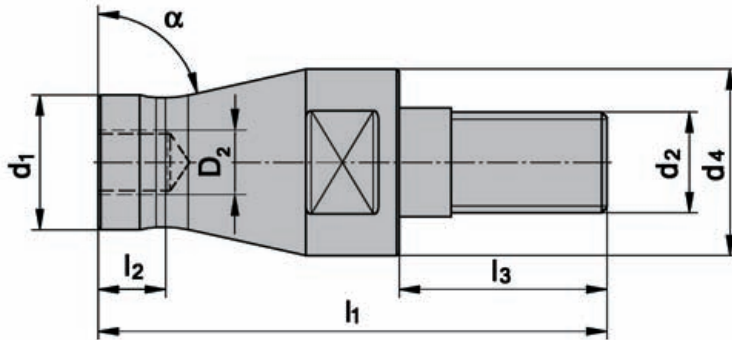
Dimensions in mm

ADAPTOR Type

## MD

Reducer for milling head DAM/DAHM...M

Material of shank: Steel



Part number	$l_1$	$l_2$	$l_3$	$d_1$	$d_2$	$d_4$	$\alpha$	SW
MD18.02.77.M10	49	6	20	13	M10	18	77.5°	15
MD21.04.77.M12	56	10	22	18	M12	21	77.5°	17
MD29.06.77.M16	52	6	23	21	M16	29	77.5°	24

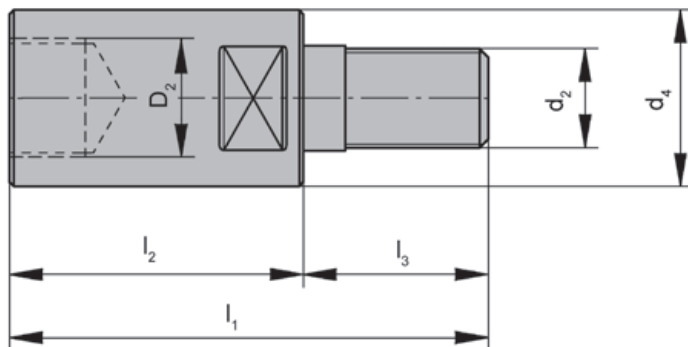
Dimensions in mm

## LENGTHENING Type

## MD

Lengthening bar for milling head DAM/DAHM...M

Material of shank: Steel



Part number	$l_1$	$l_2$	$l_3$	$d_2$	$d_4$	SW
MD13.02.00.M08	48	30	18	M8	13	10
MD18.04.00.M10	55	35	20	M10	18	15
MD21.06.00.M12	57	35	22	M12	21	17
MD29.08.00.M16	58	35	23	M16	29	24

Dimensions in mm

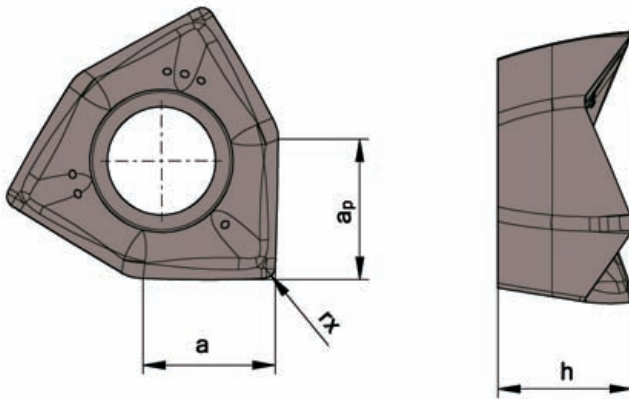
## INDEXABLE INSERT Type

# DA31

Depth of cut up to .118"  
 Cutting edge  $\varnothing$  Ds .630/.787/.984/1.260"

for use with Milling shank

Type DAM31



Part number	Ds	a <sub>p</sub>	a	h	r <sub>x</sub>	Carbide grades		
						TA45	SA4B	
DA31.016.A.00	.630	.118	.118	.122	-	▲	▲	
DA31.016.A.02						▲	▲	
DA31.016.A.04						▲	▲	
DA31.020.A.00	.787	.118	.118	.122	-	▲	▲	
DA31.020.A.02						▲	▲	
DA31.020.A.04						▲	▲	
DA31.025.A.00	.984	.118	.118	.122	-	▲	▲	
DA31.025.A.02						▲	▲	
DA31.025.A.04						▲	▲	
DA31.032.A.00	1.260	.118	.118	.122	-	▲	▲	
DA31.032.A.02						▲	▲	
DA31.032.A.04						▲	▲	
						P	•	•
						M	•	•
						K	•	•
						N	•	•
						S	•	•
						H		

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

Carbide grades

Carbide grade TA45 preferred for easy to machine materials, aluminium and finishing.  
 Carbide grade SA4B preferred for middle and difficult to machine materials.



## INDEXABLE INSERT Type

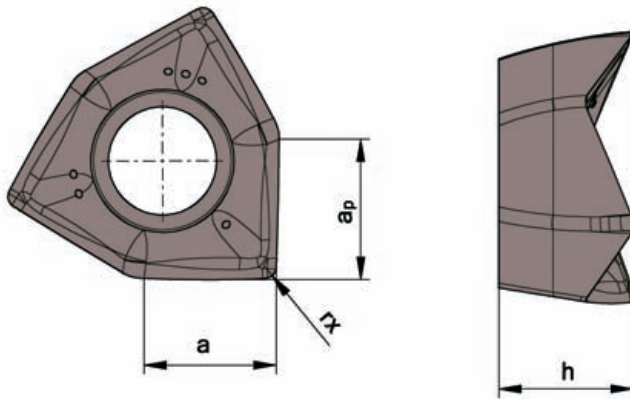
# DA32

Depth of cut up to  
Cutting edge  $\emptyset$

.189"  
Ds .787/.984/1.260"

for use with Milling shank

Type DAM32



Part number	Ds	a <sub>p</sub>	a	h	r <sub>x</sub>	TA45	SA4B
DA32.020.A.00	.787	.189	.181	.185	-	▲	▲
DA32.020.A.02					.008	▲	▲
DA32.020.A.04					.016	▲	▲
DA32.020.A.08					.031	▲	▲
DA32.020.A.10					.039	▲	▲
DA32.025.A.00	.984	.189	.181	.185	-	▲	▲
DA32.025.A.02					.008	▲	▲
DA32.025.A.04					.016	▲	▲
DA32.025.A.08					.031	▲	▲
DA32.025.A.10					.039	▲	▲
DA32.032.A.00	1.260	.189	.181	.185	-	▲	▲
DA32.032.A.02					.008	▲	▲
DA32.032.A.04					.016	▲	▲
DA32.032.A.08					.031	▲	▲
DA32.032.A.10					.039	▲	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Carbide grades	P	M	K	N	S	H
TA45	●	●	●	●	●	●
SA4B	●	●	●	●	●	●

Dimensions in inch

Carbide grades

Carbide grade TA45 preferred for easy to machine materials, aluminium and finishing.  
Carbide grade SA4B preferred for middle and difficult to machine materials.

Z = Number of flutes

d = Cutting edge Ø

n = Revolutions 
$$n = \frac{v_c \cdot 1000}{d \cdot \pi} \text{ (1/min) (RPM)}$$

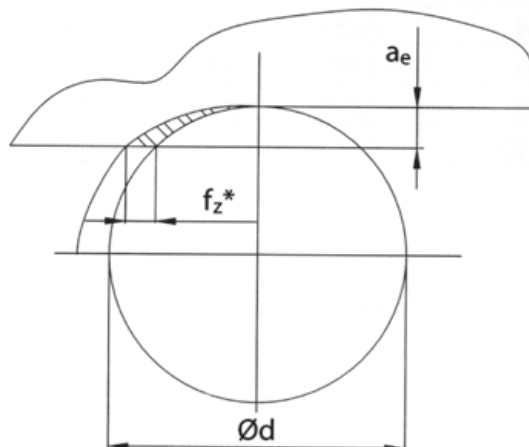
$v_c$  = Cutting speed 
$$v_c = \frac{d \cdot \pi \cdot n}{1000} \text{ (m/min) / .3048 = sfm}$$

$f_z$  = Feed/tooth 
$$f_z = \frac{V_f}{Z \cdot n} \text{ (mm) / 25.4 = inch}$$

$v_f$  = Feed rate 
$$V_f = f_z \cdot Z \cdot n \text{ (mm/min) / 25.4 = inch/min}$$

Q = Material removal rate 
$$Q = \frac{a_e \cdot a_p \cdot V_f}{1000} \text{ (cm}^3\text{/min) * .06102376 = inch}^3\text{/min}$$

$f_z$  = effective for side milling with small  $a_e$  (up to  $0.25 \cdot d$ ) 
$$*f_z = f_z \sqrt{\frac{d}{a_e}} \text{ (mm/tooth) / 25.4 = inch}$$



N

## Cutting data System DA

ISO	Material	Hardness Brinell	Insert size DA31 Feed/tooth $f_z$	Insert size DA32 Feed/tooth $f_z$	Cutting speed $v_c$ (ft/min)
<b>P</b>	unalloyed steel	125	0.001 - 0.012	0.002 - 0.016	850-1250
	unalloyed steel	190	0.001 - 0.012	0.002 - 0.016	790-1150
	low alloyed steel	200	0.001 - 0.012	0.002 - 0.016	660-1050
	low alloyed steel	300	0.001 - 0.012	0.001 - 0.012	460-820
	high alloyed steel	200	0.001 - 0.012	0.001 - 0.012	360-690
<b>M</b>	Stainless steel martenitic	240	0.001 - 0.012	0.001 - 0.012	430-660
	Stainless steel austenitic	180	0.001 - 0.006	0.001 - 0.008	360-620
<b>K</b>	Malleable cast iron ferritic	130	0.001 - 0.012	0.002 - 0.012	490-820
	Malleable cast iron perlitic	230	0.001 - 0.006	0.002 - 0.015	430-750
	Spheroidal graphite cast iron ferritic/perlitic	180	0.001 - 0.006	0.002 - 0.015	390-660
	Spheroidal graphite cast iron perlitic	260	0.001 - 0.006	0.002 - 0.008	330-620
	Grey cast iron	160	0.001 - 0.012	0.002 - 0.016	490-820
<b>S</b>	Super alloy Ni/Co based	350	0.001 - 0.004	0.001 - 0.008	100-230
	Alloy Titanium based alloy	350	0.001 - 0.004	0.001 - 0.008	100-230
<b>N</b>	Al-alloys	90	0.001 - 0.016	0.002 - 0.02	1640-3940

When 45° milling the feed per tooth  $f_z$  could be increased by factor 1.4!



## Ramp angle and plunging with a 90° milling cutter

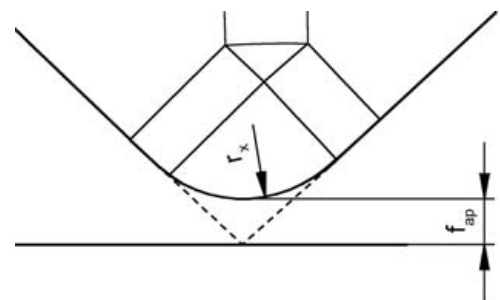
Ø (mm) Insert size	32 DA32	25 DA32	20 DA32	32 DA31	25 DA31	20 DA31	16 DA31
Diving angle (°)	3.5°	3.5°	3.5°	4.0°	3.5°	3.5°	3.0°
vertical full diving max. (inch)	.039	.024	.016	.067	.031	.024	.016
vertical side diving ae max. (inch)	.181	.181	.181	.122	.122	.122	.122
Predrilling D <sub>b</sub> min. (inch)	.898	.622	.425	1.016	.740	.543	.386

## Ramp angle and plunging with a 45° milling cutter

Ø (mm) Insert size	17 DA32	14.4 DA31	10.5 DA31
Diving angle (°)	11°	7°	10,5°
vertical full diving max. (inch)	.126	.079	.079

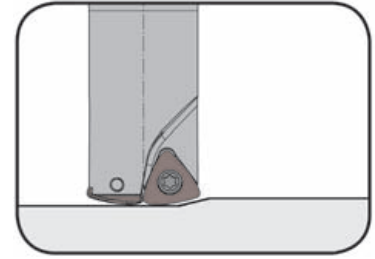
## Correction factor for reduced cutting depth in consideration to the corner radius when 45° milling.

Corner radius r <sub>x</sub> (inch)	Correction factor f <sub>ap</sub> (inch)
.000	.0000
.008	.0031
.016	.0067
.031	.0130
.039	.0161



## MILLING HEAD Type

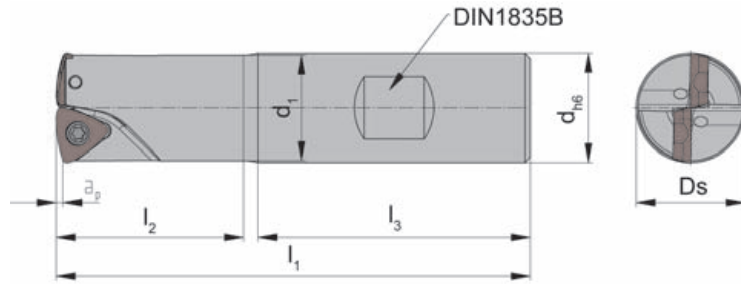
# DAHM



Cutting edge  $\emptyset$

40/32/25/20 mm

Material of shank: Steel



for use with Indexable insert

Type DAH37

Part number	Z	Ds	$a_p$	$l_1$	$l_2$	$l_3$	$d_1$	d
DAHM.37.020.D204.02B	2	20	1.2	87	34	50	19	20
DAHM.37.025.D255.03B	3	25	1.2	101	41	56	24	25
DAHM.37.032.D326.04B	4	32	1.2	111	47	60	31	32
DAHM.37.040.D326.05B	5	40	1.2	111	47	60	39	32

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

N

### Spare parts

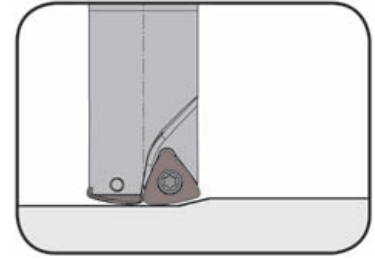
Milling head	Screw	TORX PLUS® Wrench
DAHM.37.0...	030.3070.T10P	T10PL

N20

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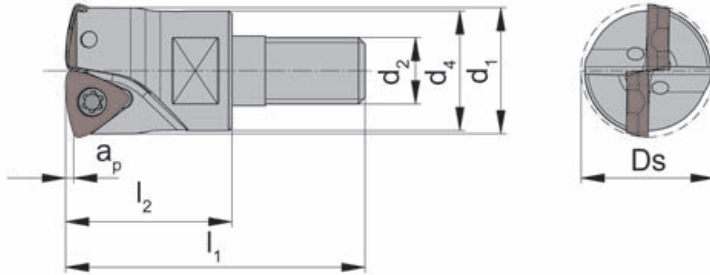
## SCREW-IN CUTTER Type

# DAHM



Cutting edge  $\varnothing$  40/32/25/20 mm

Material of shank: Steel



for use with Indexable insert

Type DAH37

suitable for  
**Shank Type MD**

Part number	Z	Ds	$a_p$	$l_1$	$l_2$	$d_1$	$d_2$	$d_4$	SW
DAHM.37.020.M104.02	2	20	1.2	45	25	19	M10	18	15
DAHM.37.025.M125.03	3	25	1.2	52	30	24	M12	21	17
DAHM.37.032.M166.04	4	32	1.2	58	35	31	M16	29	24
DAHM.37.040.M166.05	5	40	1.2	58	35	39	M16	29	24

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

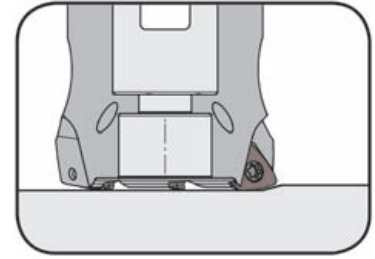
### Spare parts

Screw-in cutter	Screw	TORX PLUS® Wrench
DAHM.37.0...	030.3070.T10P	T10PL



## MILLING CUTTER Type

# DAHM



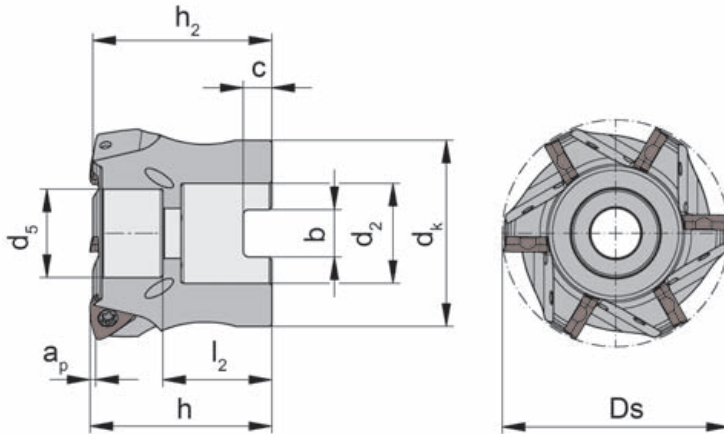
Cutting edge  $\varnothing$

40/50/63/80 mm

Arbor mounted cutter as per DIN 8030-A

for use with Indexable insert

Type DAHM37



Picture = right hand cutting version

Type arbor mounted

Part number	Z	Ds	$a_p$	h	$h_2$	$d_k$	$d_2$	$d_s$	b	c	$l_2$
DAHM.37.040.A1635.05	5	40	1.2	35	34.4	33	16	16.0	8.4	5.6	22
DAHM.37.050.A2235.06	6	50	1.2	40	39.4	41	22	19.5	10.4	6.3	24
DAHM.37.063.A2740.07	7	63	1.2	45	44.4	49	27	21.5	12.4	7.0	27
DAHM.37.080.A3245.08	8	80	1.2	55	54.4	59	32	29.5	14.4	8.0	33

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

N

### Spare parts

Milling cutter	Screw	TORX PLUS® Wrench
DAHM.37.0...	030.3070.T10P	T10PL

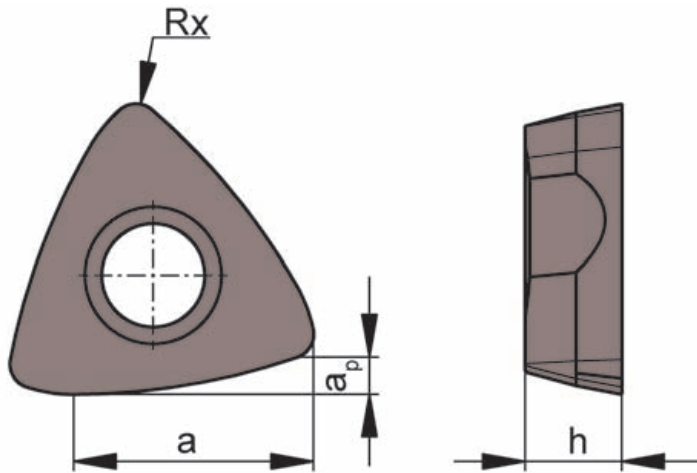
## INDEXABLE INSERT Type

# DAH37

Depth of cut up to .047"

for use with Milling head

Type DAHM37



Part number	$a_p$	$a$	$h$	$r_x$	SA4B
<b>DAH.37.022.N.08</b>	.047	.311	.125	.031	▲
▲ on stock Δ 4 weeks					P ●
● main recommendation					M ●
○ alternative recommendation					K ●
■ uncoated grades					N ●
■ coated grades					S ●
■ brazed/Cermet					H ●

Dimensions in inch Carbide grades

N

Z = Number of teeth

$d_{\text{eff}}$  = effective cutting edge  $\emptyset$

n = Revolutions 
$$n = \frac{v_c \cdot 1000}{d \cdot \pi} \text{ (1/min) (RPM)}$$

$v_c$  = Cutting speed 
$$v_c = \frac{d \cdot \pi \cdot n}{1000} \text{ (m/min) / .3048 = sfm}$$

$f_z$  = Feed/tooth 
$$f_z = \frac{V_f}{Z \cdot n} \text{ (mm) / 25.4 = inch}$$

$v_f$  = Feed rate 
$$V_f = f_z \cdot Z \cdot n \text{ (mm/min) / 25.4 = inch/min}$$

Q = Material removal rate 
$$Q = \frac{a_e \cdot a_p \cdot V_f}{1000} \text{ (cm}^3\text{/min) * .06102376 = inch}^3\text{/min}$$

The effective cutting diameter  $d_{\text{eff}}$  must be calculated to obtain the correct RPM and the cutting feed.

The effective cutting diameter is calculated using the following values and formula.

$a_p$  = depth of cut

$D_s$  = cutter diameter

$K_D$  = from Correction value chart

$d_{\text{eff}} = K_D + (D_s - 20)$

### Correction value

$a_p$ [mm]	$K_D$ [mm]
0.1	9.71
0.2	11.47
0.3	12.81
0.4	13.93
0.5	14.92
0.6	15.82
0.7	16.63
0.8	17.39
0.9	18.10
1.0	18.77
1.1	19.40
1.2	20.00

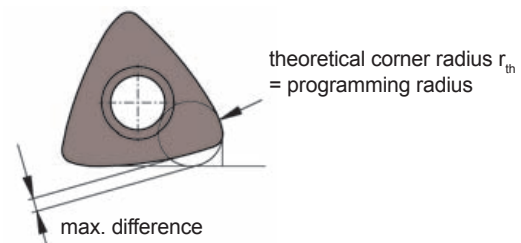
ISO	Material	Hardness HB	feed / tooth		Cutting speed	
			f <sub>z</sub> (inch)	f <sub>z</sub> (mm)	v <sub>c</sub> (ft/min)	v <sub>c</sub> (m/min)
<b>P</b>	unalloyed steel	125	.032-.087	0.8 - 2.2	655-985	200 - 300
	unalloyed steel	190	.032-.087	0.8 - 2.2	655-985	200 - 300
	low alloyed steel	200	.032-.079	0.8 - 2.0	590-985	180 - 300
	low alloyed steel	300	.032-.079	0.8 - 2.0	525-920	160 - 280
	high alloyed steel	200	.024-.063	0.6 - 1.6	490-820	150 - 250
<b>M</b>	Stainless steel martenistic	240	.032-.079	0.8 - 2.0	460-720	140 - 220
	Stainless steel austenitic	180	.024-.063	0.6 - 1.6	395-655	120 - 200
<b>K</b>	Malleable cast iron ferritic	130	.032-.087	0.8 - 2.2	525-920	160 - 280
	Malleable cast iron perlitic	230	.028-.071	0.7 - 1.8	490-820	150 - 250
	Spheroidal graphite cast iron ferritic/perlitic	180	.028-.071	0.7 - 1.8	490-820	150 - 250
	Spheroidal graphite cast iron perlitic	260	.028-.071	0.7 - 1.8	460-785	140 - 240
	Grey cast iron	160	.032-.098	0.8 - 2.5	590-1050	180 - 320
<b>N</b>	Al-alloys	90	.039-.118	1.0 - 3.0	3280-4921	1000 - 1500

### Diving angle

Ø (mm)	Diving angle
20	5.0°
25	4.0°
32	1.0°
40	0.5°
50	0.5°
63	0.4°
80	0.4°

### Programming radius and difference

r <sub>th</sub> (inch)	max. difference (inch)
.079" (2.0 mm)	.033" (0.83 mm)


**N**

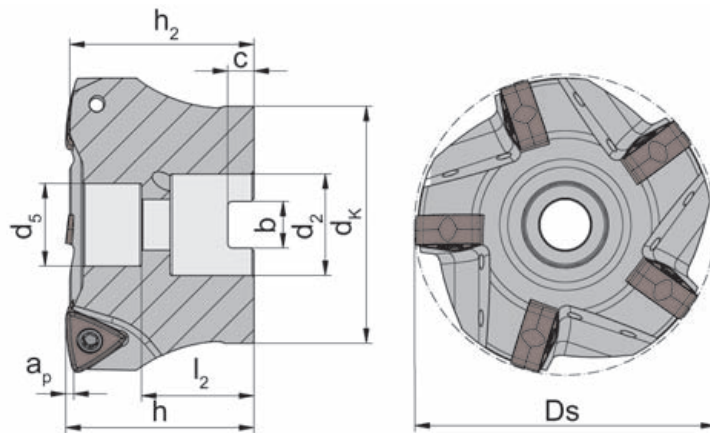
## MILLING CUTTER Type

# DAHM

Cutting edge  $\emptyset$

63/80/100/12 mm

Arbor mounted cutter as per DIN 8030-A



for use with Indexable insert

Type DAH62

Picture = right hand cutting version

Type arbor mounted

Part number	Z	Ds	$a_p$	h	$h_2$	$d_k$	$d_2$	$d_5$	b	c	$l_2$
DAHM.62.063.A2245.04	4	63	2.1	45	44	50	22	20	10.4	6.3	22.0
DAHM.62.080.A2750.05	5	80	2.1	50	49	63	27	22	12.4	7.0	29.9
DAHM.62.100.A3255.06	6	100	2.1	55	54	80	32	29	14.4	8.0	32.9
DAHM.62.125.A4063.07	7	125	2.1	63	62	89	40	36	16.4	9.0	34.7

Dimensions in mm

For torque specifications of the screw, please see Technical Instructions.

N

### Spare parts

Milling cutter	Screw	TORX PLUS® Wrench
DAHM.62....	5.15T20P	T20PQ



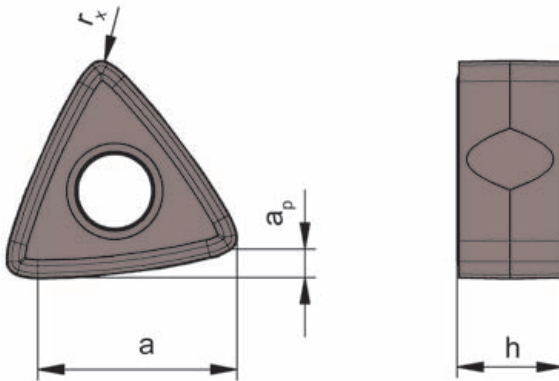
## INDEXABLE INSERT Type

# DAH62

Depth of cut up to **.083"**

for use with Milling shank

Type DAH62



Part number	$a_p$	$a$	$h$	$r_x$	SC6A
<b>DAH.62.055.S.10</b>	.083	.583	.311	.039	▲
▲ on stock Δ 4 weeks					P ●
● main recommendation					M ●
○ alternative recommendation					K ●
■ uncoated grades					N ●
■ coated grades					S ●
■ brazed/Cermet					H ●

Dimensions in mm

Carbide grades

N

Z = Number of teeth

$d_{\text{eff}}$  = effective cutting edge Ø

n = Revolutions 
$$n = \frac{v_c \cdot 1000}{d \cdot \pi} \text{ (1/min) (RPM)}$$

$v_c$  = Cutting speed 
$$v_c = \frac{d \cdot \pi \cdot n}{1000} \text{ (m/min) / .3048 = sfm}$$

$f_z$  = Feed/tooth 
$$f_z = \frac{V_f}{Z \cdot n} \text{ (mm) / 25.4 = inch}$$

$v_f$  = Feed rate 
$$V_f = f_z \cdot Z \cdot n \text{ (mm/min) / 25.4 = inch/min}$$

Q = Material removal rate 
$$Q = \frac{a_e \cdot a_p \cdot V_f}{1000} \text{ (cm}^3\text{/min) * .06102376 = inch}^3\text{/min}$$

The effective cutting diameter  $d_{\text{eff}}$  must be calculated to obtain the correct RPM and the cutting feed.

The effective cutting diameter is calculated using the following values and formula.

$a_p$  = depth of cut

Ds = cutter diameter

$K_D$  = from Correction value chart

$d_{\text{eff}} = K_D + (Ds - 63)$

### Correction value

$a_p$ [mm]	$K_D$ [mm]
0.1	40.0
0.2	42.8
0.3	45
0.4	46.6
0.5	48.2
0.6	49.6
0.7	50.8
0.8	52.0
0.9	53.2
1.0	54.4
1.1	55.4
1.2	56.4
1.3	57.2
1.4	58.2
1.5	59.0
1.6	59.8
1.7	60.2
1.8	60.8
1.9	61.2
2.0	62.0
2.1	63.0

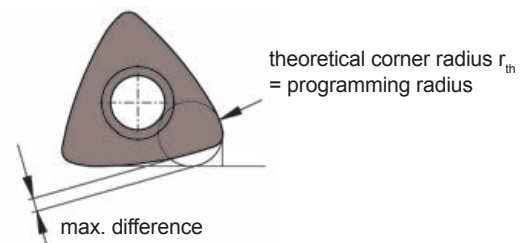
ISO	Material	Hardness HB	feed / tooth		Cutting speed	
			f <sub>z</sub> (inch)	f <sub>z</sub> (mm)	v <sub>c</sub> (ft/min)	v <sub>c</sub> (m/min)
<b>P</b>	unalloyed steel	125	.039 - .087	1.0 - 2.2	590 - 920	180 - 280
	unalloyed steel	190	.039 - .087	1.0 - 2.2	590 - 920	180 - 280
	low alloyed steel	200	.039 - .079	1.0 - 2.0	560 - 855	170 - 260
	low alloyed steel	300	.039 - .079	1.0 - 2.0	560 - 790	170 - 240
	high alloyed steel	200	.032 - .063	0.8 - 1.6	490 - 720	150 - 220
<b>M</b>	Stainless steel martenistic	240	.032 - .079	0.8 - 2.0	395 - 720	120 - 220
	Stainless steel austenitic	180	.024 - .063	0.6 - 1.6	330 - 525	100 - 160
<b>K</b>	Malleable cast iron ferritic	130	.032 - .087	0.8 - 2.2	525 - 790	160 - 240
	Malleable cast iron perlitic	230	.028 - .071	0.7 - 1.8	490 - 720	150 - 220
	Spheroidal graphite cast iron ferritic/perlitic	180	.028 - .071	0.7 - 1.8	490 - 720	150 - 220
	Spheroidal graphite cast iron perlitic	260	.028 - .071	0.7 - 1.8	460 - 720	140 - 220
	Grey cast iron	160	.032 - .098	0.8 - 2.5	590 - 920	180 - 280
<b>N</b>	Al-alloys	90	.059 - .118	1.5 - 3.0	3280 - 4920	1000 - 1500

### Diving angle

Ø (mm)	Diving angle
63	0.5°
80	0.3°
100	0.2°
125	0.2°

### Programming radius and difference

r <sub>th</sub> (inch)	max. difference (inch)
.116" (2.94 mm)	.051" (1.3 mm)



N

## Groove milling on swivel bearings

Set of milling cutters type M275 with different cutting diameters. Mounted on a HSK arbor with through coolant supply. All operations - Grooving and Facing - are done in one step. For multispindle use on transfer lines, the length adjustment is achieved by spacers.

The example shows a detail of a swivel bearing with tool.

**Material: C45**

Cutting data:

$$v_c = 460 \text{ sfm}$$

$$v_f = .020''$$

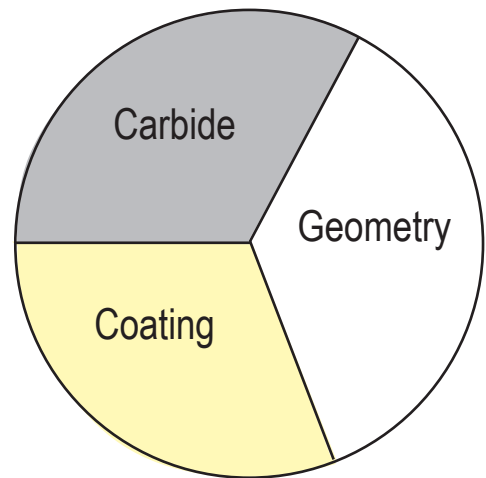


## Solid carbide endmills for

- ordinary steels
- high tensile steels
- Cobalt Chromium Steel
- Copper
- Graphite
- Aluminium



The basis of the systems DP and DS are a very well balanced composition of the three main components, always in relation to the application area. For each application the best combination of the three main components is bundled in the milling tool.



## SYSTEM DP

for

<b>P</b>	ordinary steels	O4-O18
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## SYSTEM DS

for

<b>P</b>	high tensile steels	O19-O49
<b>S</b>	Cobalt Chromium	O50-O56
<b>N</b>	Copper	O58-O65
	Graphite	O66-O75
	Aluminum (Synthetics)	O76-O85

Formulas	O87-O88
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Cutting data	O89-O133
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Selection chart list	O134
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# HIGH PRODUCTIVE MACHINING

- for steel materials -





**P ordinary steels**

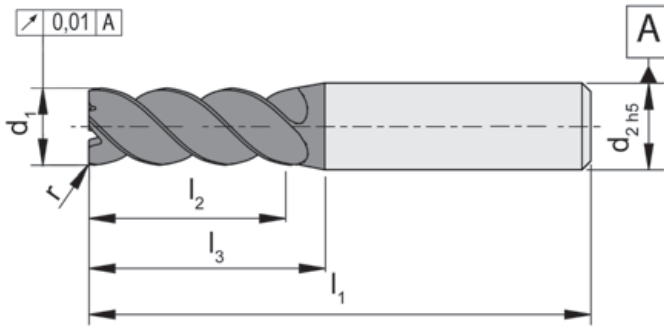
	type	Page
Roughing/Finishing Endmill	DPX	O6
Deburring Endmill	DPFF	O7
Roughing with ripper profile	DPS	O8
Roughing Endmill with chip breaker	DPSB	O9
Roughing Endmill, plain, unequally twisted	DPSV	O10
Roughing Endmill, plain	DPSG	O11 -O12
Torus Endmill	DPTR	O13-O14
Multiple fluted Endmill	DPM	O15
Ballnose Endmill	DPK	O16-O18
Formulas		O87-O88
Cutting data		O89

## Soft milling

## DPX

4-fluted, 35°-38° helix angle, with corner radius

recommended cutting data page O89



Part number	d <sub>1</sub>	r	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	Z	Version	TF2K
DPX.4.03.025.06.11	3	0.25	6	57	11				▲
DPX.4.03.050.06.13	3	0.50	6	57	13				▲
DPX.4.04.050.06.13	4	0.50	6	57	13				▲
DPX.4.05.050.06.13	5	0.50	6	57	13				▲
DPX.4.06.050.06.13	6	0.50	6	57	13				▲
DPX.4.06.100.06.13	6	1.00	6	57	13				▲
DPX.4.06.150.06.13	6	1.50	6	57	13				▲
DPX.4.08.050.08.19	8	0.50	8	63	19				▲
DPX.4.08.100.08.19	8	1.00	8	63	19	-	4	Weldon	▲
DPX.4.08.150.08.19	8	1.50	8	63	19				▲
DPX.4.10.050.10.22	10	0.50	10	72	22				▲
DPX.4.10.100.10.22	10	1.00	10	72	22				▲
DPX.4.10.150.10.22	10	1.50	10	72	22				▲
DPX.4.12.050.12.26	12	0.50	12	83	26				▲
DPX.4.12.150.12.26	12	1.50	12	83	26				▲
DPX.4.16.150.16.32	16	1.50	16	92	32				▲
DPX.4.16.300.16.32	16	3.00	16	92	32				▲
DPX.4.03.025.06.A21	3	0.25	6	57	11	21			▲
DPX.4.03.050.06.A21	3	0.50	6	57	13	21			▲
DPX.4.04.050.06.A21	4	0.50	6	57	13	21			▲
DPX.4.05.050.06.A21	5	0.50	6	57	13	21			▲
DPX.4.06.050.06.A21	6	0.50	6	57	13	21			▲
DPX.4.06.100.06.A21	6	1.00	6	57	13	21			▲
DPX.4.06.150.06.A21	6	1.50	6	57	13	21			▲
DPX.4.08.050.08.A28	8	0.50	8	63	19	28			▲
DPX.4.08.100.08.A28	8	1.00	8	63	19	28	4	Weldon	▲
DPX.4.08.150.08.A28	8	1.50	8	63	19	28			▲
DPX.4.10.050.10.A32	10	0.50	10	72	22	32			▲
DPX.4.10.100.10.A32	10	1.00	10	72	22	32			▲
DPX.4.10.150.10.A32	10	1.50	10	72	22	32			▲
DPX.4.12.050.12.A38	12	0.50	12	83	26	38			▲
DPX.4.12.150.12.A38	12	1.50	12	83	26	38			▲
DPX.4.16.150.16.A44	16	1.50	16	92	32	44			▲
DPX.4.16.300.16.A44	16	3.00	16	92	32	44			▲

Dimensions in mm

Carbide grades

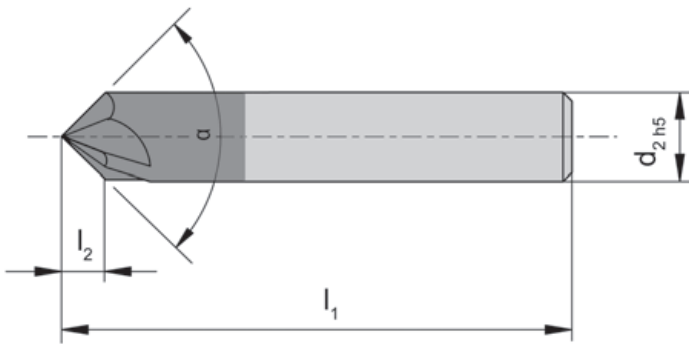
Carbide grade T2FK preferred for "ordinary steels"

## Soft milling

## DPFF

Deburring 60° - 120°

recommended cutting data page O89



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	α	Z	Version	TF2K
DPFF.4.04.011.120	4	4	51	1.1	120°	4	-	▲
DPFF.4.06.017.120	6	6	64	1.7			Weldon	▲
DPFF.4.08.023.120	8	8	64	2.3			Weldon	▲
DPFF.4.10.028.120	10	10	70	2.8			Weldon	▲
DPFF.4.12.034.120	12	12	78	3.4			Weldon	▲
DPFF.4.04.035.060	4	4	51	3.5	60°	4	-	▲
DPFF.4.06.052.060	6	6	64	5.2			Weldon	▲
DPFF.4.08.069.060	8	8	64	6.9			Weldon	▲
DPFF.4.10.087.060	10	10	70	8.7			Weldon	▲
DPFF.4.12.104.060	12	12	78	10.4			Weldon	▲
DPFF.4.04.020.090	4	4	51	2.0	90°	4	-	▲
DPFF.4.06.030.090	6	6	64	3.0			Weldon	▲
DPFF.4.08.040.090	8	8	64	4.0			Weldon	▲
DPFF.4.10.050.090	10	10	70	5.0			Weldon	▲
DPFF.4.12.060.090	12	12	78	6.0			Weldon	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	●
K	●
N	●
S	●
H	●

Dimensions in mm

Carbide grades

Carbide grade T2FK preferred for "ordinary steels"

# ROUGHING ENDMILL WITH RIPPER PROFILE

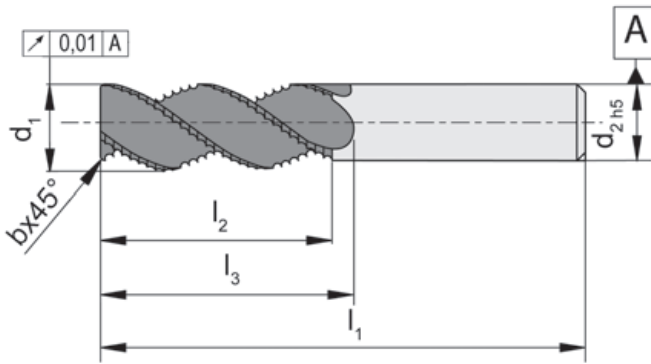


Soft milling

## DPS

3-/ 4-/ 5-/ 6-fluted, 45° helix angle, with corner chamfer

recommended cutting data page P89



Part number	d <sub>1</sub>	b	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	Z	Version	TF2K
DPS.3.04.025.06.11	4	0.25	6	57	11		3	Weldon	▲
DPS.4.05.025.06.13	5	0.25	6	57	13		4		▲
DPS.4.06.025.06.13	6	0.25	6	57	13		4		▲
DPS.4.08.025.08.19	8	0.25	8	63	19		4		▲
DPS.4.10.025.10.22	10	0.25	10	72	22	-	4		▲
DPS.4.12.025.12.26	12	0.25	12	83	26		4		▲
DPS.5.16.025.16.32	16	0.25	16	92	32		5		▲
DPS.6.20.040.20.38	20	0.40	20	104	38		6	▲	
DPS.4.06.025.06.A21	6	0.25	6	57	13	21	4	Weldon	▲
DPS.4.08.025.08.A27	8	0.25	8	63	19	27	4		▲
DPS.4.10.025.10.A32	10	0.25	10	72	22	32	4		▲
DPS.4.12.025.12.A38	12	0.25	12	83	26	38	4		▲
DPS.5.16.025.16.A44	16	0.25	16	92	32	44	5		▲
DPS.6.20.040.20.A54	20	0.40	20	104	38	54	6		▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	■
K	■
N	■
S	■
H	■

Dimensions in mm

Carbide grades

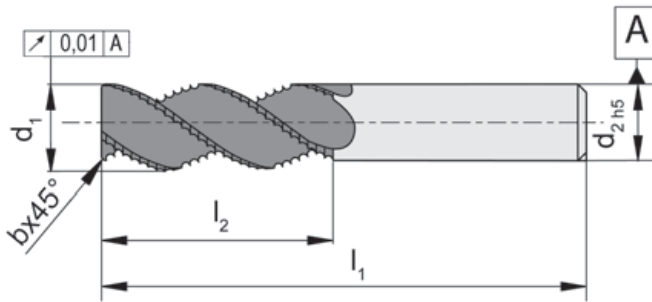
Carbide grade T2FK preferred for "ordinary steels"

## Soft milling

## DPSB

4-fluted, 45° helix angle, with corner chamfer

recommended cutting data page O89



Part number	d <sub>1</sub>	b	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Z	Version	TF2K
DPSB.4.04.025.06.11	4	0.25	6	57	11	4	Weldon	▲
DPSB.4.05.025.06.13	5	0.25	6	57	13			▲
DPSB.4.06.025.06.13	6	0.25	6	57	13			▲
DPSB.4.08.025.08.19	8	0.25	8	63	19			▲
DPSB.4.10.025.10.22	10	0.25	10	72	22			▲
DPSB.4.12.025.12.26	12	0.25	12	83	26			▲
DPSB.4.16.025.16.32	16	0.25	16	92	32			▲
DPSB.4.20.040.20.38	20	0.40	20	104	38			▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P	●
M	■
K	■
N	■
S	■
H	■

Carbide grades

Carbide grade T2FK preferred for "ordinary steels"

# ROUGHING ENDMILL

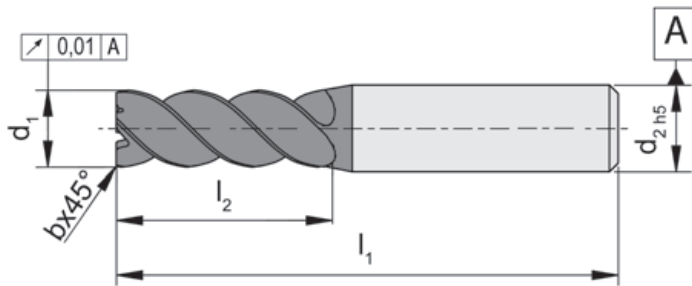


Soft milling

## DPSV

4-fluted, 35°-38° helix angle, with corner chamfer

recommended cutting data page P89



unequal twist

Part number	d <sub>1</sub>	b	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Z	Version	TF2K
DPSV.4.04.025.06.11	4	0.25	6	57	11	4	Weldon	▲
DPSV.4.05.025.06.13	5	0.25	6	57	13			▲
DPSV.4.06.025.06.13	6	0.25	6	57	13			▲
DPSV.4.08.025.08.19	8	0.25	8	63	19			▲
DPSV.4.10.025.10.22	10	0.25	10	72	22			▲
DPSV.4.12.025.12.26	12	0.25	12	83	26			▲
DPSV.4.16.025.16.32	16	0.25	16	92	32			▲
DPSV.4.20.040.20.38	20	0.40	20	104	38			▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	■
K	■
N	■
S	■
H	■

Dimensions in mm

Carbide grades

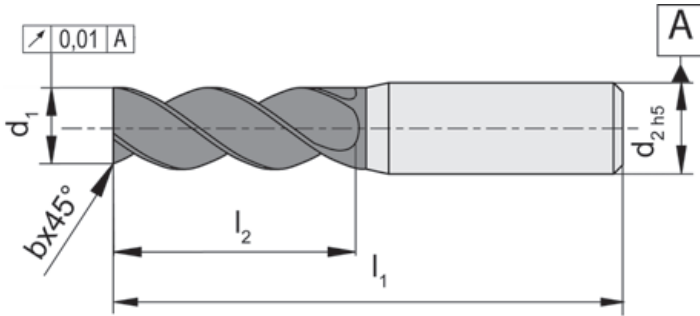
Carbide grade T2FK preferred for "ordinary steels"

## Soft milling

## DPSG

3-fluted, 50° helix angle, with corner chamfer

recommended cutting data page O89



Part number	d <sub>1</sub>	b	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Z	Version	TF2K
DPSG.3.02.010.03.08	2	0.10	3	40	8	3	-	▲
DPSG.3.03.010.03.10	3	0.10	3	40	10		-	▲▲
DPSG.3.04.010.04.12	4	0.10	4	50	12		-	▲▲▲
DPSG.3.05.015.05.15	5	0.15	5	50	15		-	▲▲▲▲
DPSG.3.06.015.06.15	6	0.15	6	65	15		Weldon	▲▲▲▲▲
DPSG.3.08.020.08.20	8	0.20	8	65	20		Weldon	▲▲▲▲▲▲
DPSG.3.10.020.10.22	10	0.20	10	70	22		Weldon	▲▲▲▲▲▲▲
DPSG.3.12.025.12.25	12	0.25	12	80	25		Weldon	▲▲▲▲▲▲▲▲
DPSG.3.16.025.16.35	16	0.25	16	90	35		Weldon	▲▲▲▲▲▲▲▲▲
DPSG.3.20.025.20.40	20	0.25	20	102	40		Weldon	▲▲▲▲▲▲▲▲▲▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P	●
M	■
K	■
N	■
S	■
H	■

Carbide grades

Carbide grade T2FK preferred for "ordinary steels"

# ROUGHING ENDMILL

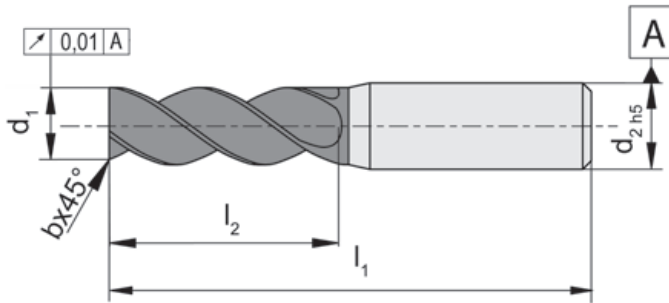


Soft milling

## DPSG

4-fluted, 50° helix angle, with corner chamfer

recommended cutting data page O89



Part number	d <sub>1</sub>	b	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Z	Version	TF2K
DPSG.4.03.010.03.10	3	0.10	3	40	10	4	-	▲
DPSG.4.04.010.04.12	4	0.10	4	50	12		-	▲
DPSG.4.05.015.05.15	5	0.15	5	50	15		-	▲
DPSG.4.06.015.06.15	6	0.15	6	65	15		Weldon	▲
DPSG.4.08.020.08.20	8	0.20	8	65	20		Weldon	▲
DPSG.4.10.020.10.22	10	0.20	10	70	22		Weldon	▲
DPSG.4.12.025.12.25	12	0.25	12	80	25		Weldon	▲
DPSG.4.16.025.16.35	16	0.25	16	90	35		Weldon	▲
DPSG.4.20.025.20.40	20	0.25	20	102	42		Weldon	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

Carbide grades

Carbide grade T2FK preferred for "ordinary steels"

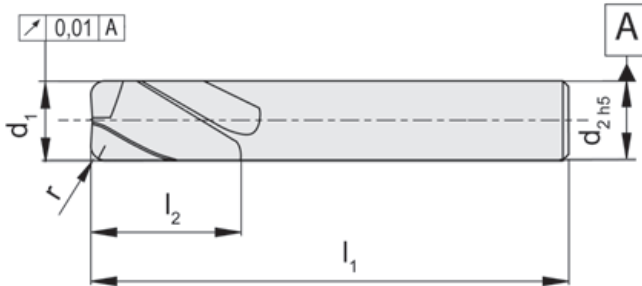


## Soft milling

## DPTR

2-fluted, 30° helix angle, with corner radius

recommended cutting data page O89



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	r	Z	Version	TF2K
DPTR.2.03.03.06.12	3	6	50	12	0.3			▲
DPTR.2.04.03.06.15	4	6	50	15	0.3			▲
DPTR.2.04.05.06.15	4	6	50	15	0.5			▲
DPTR.2.05.03.06.20	5	6	60	20	0.3			▲
DPTR.2.05.05.06.20	5	6	60	20	0.5			▲
DPTR.2.06.03.06.20	6	6	60	20	0.3			▲
DPTR.2.06.05.06.20	6	6	60	20	0.5			▲
DPTR.2.06.10.06.20	6	6	60	20	1.0			▲
DPTR.2.08.03.08.25	8	8	70	25	0.3			▲
DPTR.2.08.05.08.25	8	8	70	25	0.5			▲
DPTR.2.08.10.08.25	8	8	70	25	1.0			▲
DPTR.2.08.15.08.25	8	8	70	25	1.5			▲
DPTR.2.08.20.08.25	8	8	70	25	2.0			▲
DPTR.2.10.03.10.30	10	10	90	30	0.3			▲
DPTR.2.10.05.10.30	10	10	90	30	0.5			▲
DPTR.2.10.10.10.30	10	10	90	30	1.0	2	Weldon	▲
DPTR.2.10.15.10.30	10	10	90	30	1.5			▲
DPTR.2.10.20.10.30	10	10	90	30	2.0			▲
DPTR.2.12.05.12.30	12	12	90	30	0.5			▲
DPTR.2.12.10.12.30	12	12	90	30	1.0			▲
DPTR.2.12.15.12.30	12	12	90	30	1.5			▲
DPTR.2.12.20.12.30	12	12	90	30	2.0			▲
DPTR.2.16.05.16.50	16	16	110	50	0.5			▲
DPTR.2.16.10.16.50	16	16	110	50	1.0			▲
DPTR.2.16.15.16.50	16	16	110	50	1.5			▲
DPTR.2.16.20.16.50	16	16	110	50	2.0			▲
DPTR.2.20.05.20.50	20	20	110	50	0.5			▲
DPTR.2.20.10.20.50	20	20	110	50	1.0			▲
DPTR.2.20.15.20.50	20	20	110	50	1.5			▲
DPTR.2.20.20.20.50	20	20	110	50	2.0			▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades

P	●
M	
K	
N	
S	

Dimensions in mm

Carbide grades

Carbide grade T2FK preferred for "ordinary steels"

# TORUS ENDMILL

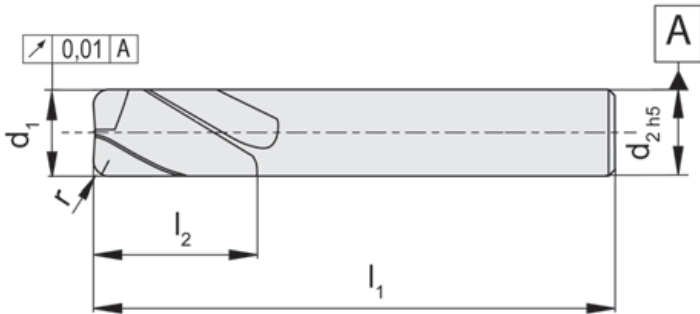


Soft milling

## DPTR

4-fluted, 30° helix angle, with corner radius

recommended cutting data page O89



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	r	Z	Version	TF2K
DPTR.4.03.03.06.12	3	6	50	12	0.3			▲
DPTR.4.04.03.06.15	4	6	50	15	0.3			▲
DPTR.4.04.05.06.15	4	6	50	15	0.5			▲
DPTR.4.05.03.06.20	5	6	60	20	0.3			▲
DPTR.4.05.05.06.20	5	6	60	20	0.5			▲
DPTR.4.06.03.06.20	6	6	60	20	0.3			▲
DPTR.4.06.05.06.20	6	6	60	20	0.5			▲
DPTR.4.06.10.06.20	6	6	60	20	1.0			▲
DPTR.4.08.03.08.25	8	8	70	25	0.3			▲
DPTR.4.08.05.08.25	8	8	70	25	0.5			▲
DPTR.4.08.10.08.25	8	8	70	25	1.0			▲
DPTR.4.08.15.08.25	8	8	70	25	1.5			▲
DPTR.4.08.20.08.25	8	8	70	25	2.0			▲
DPTR.4.10.03.10.30	10	10	90	30	0.3			▲
DPTR.4.10.05.10.30	10	10	90	30	0.5			▲
DPTR.4.10.10.10.30	10	10	90	30	1.0	4	Weldon	▲
DPTR.4.10.15.10.30	10	10	90	30	1.5			▲
DPTR.4.10.20.10.30	10	10	90	30	2.0			▲
DPTR.4.12.05.12.30	12	12	90	30	0.5			▲
DPTR.4.12.10.12.30	12	12	90	30	1.0			▲
DPTR.4.12.15.12.30	12	12	90	30	1.5			▲
DPTR.4.12.20.12.30	12	12	90	30	2.0			▲
DPTR.4.16.05.16.50	16	16	110	50	0.5			▲
DPTR.4.16.10.16.50	16	16	110	50	1.0			▲
DPTR.4.16.15.16.50	16	16	110	50	1.5			▲
DPTR.4.16.20.16.50	16	16	110	50	2.0			▲
DPTR.4.20.05.20.50	20	20	110	50	0.5			▲
DPTR.4.20.10.20.50	20	20	110	50	1.0			▲
DPTR.4.20.15.20.50	20	20	110	50	1.5			▲
DPTR.4.20.20.20.50	20	20	110	50	2.0			▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades

P	●
M	
K	
N	
S	

Dimensions in mm

Carbide grades

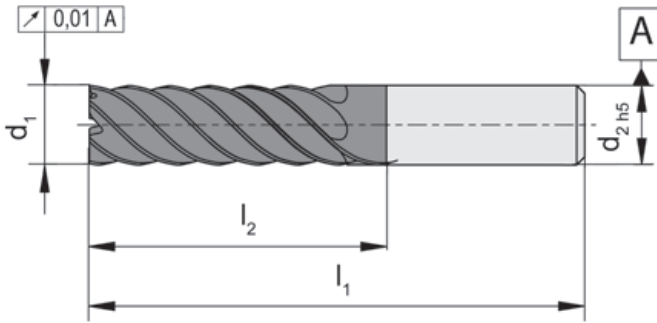
Carbide grade T2FK preferred for "ordinary steels"

## Soft milling

## DPM

6-/ 8-fluted, 45° helix angle

recommended cutting data page O89



Part number	$d_1$	$d_2$	$l_1$	$l_2$	Z	Version	TF2K
DPM.6.06.00.06.13	6	6	58	13	6	Weldon	▲
DPM.6.08.00.08.19	8	8	65	19	6		▲
DPM.6.10.00.10.22	10	10	72	22	6		▲
DPM.6.12.00.12.26	12	12	83	26	6		▲
DPM.6.16.00.16.32	16	16	92	32	6		▲
DPM.8.18.00.20.32	18	20	92	32	8		▲
DPM.8.20.00.20.38	20	20	103	38	8		▲
							P ●
							M
							K
							N
							S
							H

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

Carbide grades

Carbide grade T2FK preferred for "ordinary steels"

# BALLNOSE ENDMILL

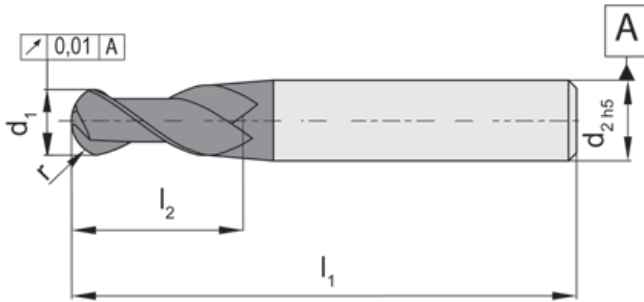


Soft milling

## DPK

2-fluted, 30° helix angle

recommended cutting data page O89



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	r	Z	Version	TF2K
DPK.2.010.03.03	1.0	3	40	3	0.50	2	-	▲
DPK.2.015.03.05	1.5	3	40	5	0.75		▲	
DPK.2.020.03.07	2.0	3	40	7	1.00		▲	
DPK.2.025.03.07	2.5	3	40	7	1.25		▲	
DPK.2.030.03.10	3.0	3	40	10	1.50		▲	
DPK.2.035.04.12	3.5	4	50	12	1.75		▲	
DPK.2.040.04.15	4.0	4	50	15	2.00		▲	
DPK.2.045.05.15	4.5	5	50	15	2.25		▲	
DPK.2.050.05.15	5.0	5	50	15	2.50		▲	
DPK.2.060.06.20	6.0	6	65	20	3.00		Weldon	▲
DPK.2.070.08.20	7.0	8	65	20	3.50		Weldon	▲
DPK.2.080.08.20	8.0	8	65	20	4.00		Weldon	▲
DPK.2.090.10.22	9.0	10	70	22	4.50		Weldon	▲
DPK.2.100.10.22	10.0	10	70	22	5.00		Weldon	▲
DPK.2.110.11.25	11.0	11	70	25	5.50		Weldon	▲
DPK.2.120.12.25	12.0	12	80	25	6.00		Weldon	▲
DPK.2.140.14.30	14.0	14	90	30	7.00		Weldon	▲
DPK.2.160.16.32	16.0	16	90	32	8.00		Weldon	▲
DPK.2.180.18.35	18.0	18	100	35	9.00		Weldon	▲
DPK.2.200.20.38	20.0	20	100	38	10.00		Weldon	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	
K	
N	
S	
H	

Dimensions in mm

Carbide grades

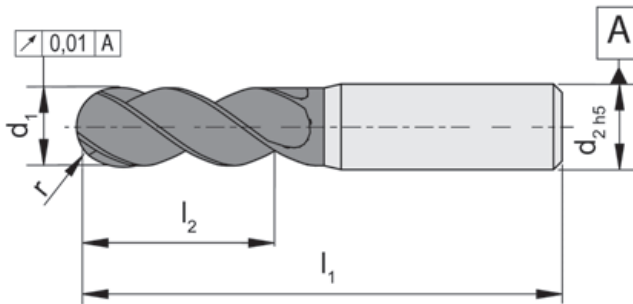
Carbide grade T2FK preferred for "ordinary steels"

## Soft milling

## DPK

3-fluted, 30° helix angle

recommended cutting data page O89



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	r	Z	Version	TF2K
DPK.3.015.03.05	1.5	3	40	5	0.75		-	▲
DPK.3.020.03.07	2.0	3	40	7	1.00		-	▲
DPK.3.025.03.07	2.5	3	40	7	1.25		-	▲
DPK.3.030.03.10	3.0	3	40	10	1.50		-	▲
DPK.3.035.04.12	3.5	4	50	12	1.75		-	▲
DPK.3.040.04.15	4.0	4	50	15	2.00		-	▲
DPK.3.045.05.15	4.5	5	50	15	2.25		-	▲
DPK.3.050.05.15	5.0	5	50	15	2.50		-	▲
DPK.3.060.06.20	6.0	6	65	20	3.00		Weldon	▲
DPK.3.070.08.20	7.0	8	65	20	3.50	3	Weldon	▲
DPK.3.080.08.20	8.0	8	65	20	4.00		Weldon	▲
DPK.3.090.10.22	9.0	10	70	22	4.50		Weldon	▲
DPK.3.100.10.22	10.0	10	70	22	5.00		Weldon	▲
DPK.3.110.11.25	11.0	11	70	25	5.50		Weldon	▲
DPK.3.120.12.25	12.0	12	80	25	6.00		Weldon	▲
DPK.3.140.14.30	14.0	14	90	30	7.00		Weldon	▲
DPK.3.160.16.32	16.0	16	90	32	8.00		Weldon	▲
DPK.3.180.18.35	18.0	18	100	35	9.00		Weldon	▲
DPK.3.200.20.38	20.0	20	100	38	10.00		Weldon	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	
K	
N	
S	
H	

Dimensions in mm

Carbide grades

Carbide grade T2FK preferred for "ordinary steels"

# BALLNOSE ENDMILL

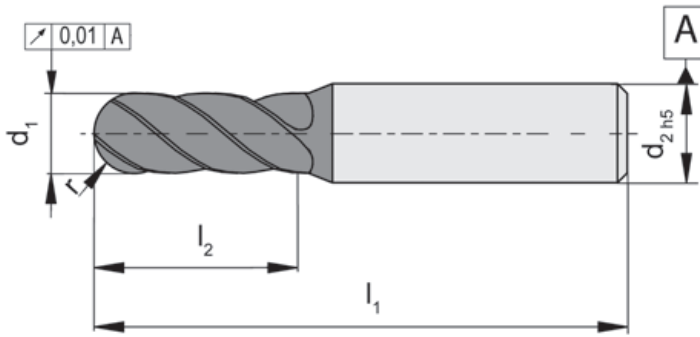


Soft milling

## DPK

4-fluted, 30° helix angle

recommended cutting data page O89



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	r	Z	Version	TF2K
DPK.4.010.03.03	1.0	3	40	3	0.50	4	-	▲
DPK.4.015.03.05	1.5	3	40	5	0.75		▲	
DPK.4.020.03.07	2.0	3	40	7	1.00		▲	
DPK.4.025.03.07	2.5	3	40	7	1.25		▲	
DPK.4.030.03.10	3.0	3	40	10	1.50		▲	
DPK.4.035.04.12	3.5	4	50	12	1.75		▲	
DPK.4.040.04.15	4.0	4	50	15	2.00		▲	
DPK.4.045.05.15	4.5	5	50	15	2.25		▲	
DPK.4.050.05.15	5.0	5	50	15	2.50		▲	
DPK.4.060.06.20	6.0	6	65	20	3.00		Weldon	▲
DPK.4.070.08.20	7.0	8	65	20	3.50		Weldon	▲
DPK.4.080.08.20	8.0	8	65	20	4.00		Weldon	▲
DPK.4.090.10.22	9.0	10	70	22	4.50		Weldon	▲
DPK.4.100.10.22	10.0	10	70	22	5.00		Weldon	▲
DPK.4.110.11.25	11.0	11	70	25	5.50		Weldon	▲
DPK.4.120.12.25	12.0	12	80	25	6.00		Weldon	▲
DPK.4.140.14.30	14.0	14	90	30	7.00		Weldon	▲
DPK.4.160.16.32	16.0	16	90	32	8.00		Weldon	▲
DPK.4.180.18.35	18.0	18	100	35	9.00		Weldon	▲
DPK.4.200.20.38	20.0	20	100	38	10.00		Weldon	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	
K	
N	
S	
H	

Dimensions in mm

Carbide grades

Carbide grade T2FK preferred for "ordinary steels"

**P high tensile steels**

Soft and hard milling of steel materials up to 70 HRC

	type	Page
Endmill Ballnose, 2-/4-fluted	DSK / DSKH DSKL / DSKLH DSK 220° / DSKH 220°	O20-O26
Micro Endmill Ballnose, 2-fluted	DSKM	O27-O29
Endmill Double radius, 4-fluted	DSDS / DSDH	O30-O31
Torus Endmill, 2-/4-fluted with Corner radius	DST / DSTH	O32-O36
Endmill, 6-/8-/10-/12-/16-fluted with and without Corner radius	DSM / DSMH DSMR / DSMRH DSML	O37-O42
Roughing Endmill, 3-/4-fluted with Corner radius or Corner chamfer	DSR / DSF DSRF / DSRR DSRV / DSFF	O43-O47
Endmill, 4-/5-fluted with Corner radius	DSRV	O48
Endmill Chamfering, 4-fluted	DSFF	O49
Formulas		O78-O88
Cutting data		O90-O111

# BALLNOSE ENDMILL

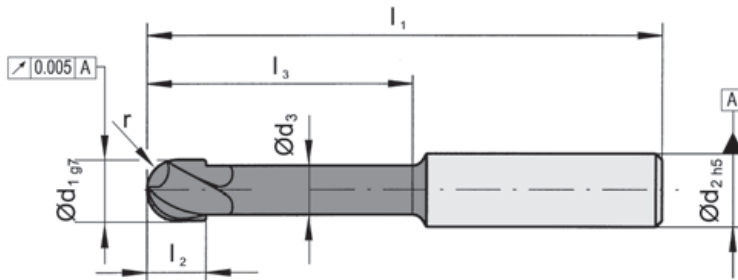


Recommended material group II - soft and hard milling

## DSK

2-fluted, 30° helix angle

recommended cutting data page O90



Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	TS3K	TS3H
DSK.2.010.063.06	1.0	6	0.9	63	2	4.5	0.50	2	▲	▲
DSK.2.015.063.06	1.5	6	1.4	63	2	4.5	0.75	2	▲	▲
DSK.2.020.063.06	2.0	6	1.9	63	3	5.5	1.00	2	▲	▲
DSK.2.020.077.06				77		15.5			▲	▲
DSK.2.030.063.06	3.0	6	2.9	63	4	7.5	1.50	2	▲	▲
DSK.2.030.077.06				77		15.5			▲	▲
DSK.2.040.063.06	4.0	6	3.8	63	5	8.5	2.00	2	▲	▲
DSK.2.040.077.06				77		15.5			▲	▲
DSK.2.050.063.06	5.0	6	4.7	63	5	10.5	2.50	2	▲	▲
DSK.2.050.077.06				77		20.5			▲	▲
DSK.2.060.063.06	6.0	6	5.6	63	6	25.5	3.00	2	▲	▲
DSK.2.060.077.06		6		77		35.5			▲	▲
DSK.2.060.099.08		8		99		25.5			▲	▲
DSK.2.080.063.08	8.0	8	7.4	63	8	25.5	4.00	2	▲	▲
DSK.2.080.077.08		8		77		35.5			▲	▲
DSK.2.080.099.08		8		99		50.5			▲	▲
DSK.2.080.119.10		10		119		30.5			▲	▲
DSK.2.100.077.10	10.0	10	9.4	77	10	35.5	5.00	2	▲	▲
DSK.2.100.099.10		10		99		55.5			▲	▲
DSK.2.100.119.12		12		119		30.5			▲	▲
DSK.2.120.077.12	12.0	12	11.4	77	12	35.5	6.00	2	▲	▲
DSK.2.120.099.12				99		55.5			▲	▲
DSK.2.160.099.16	16.0	16	15.4	100	20	50.0	8.00	2	▲	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Carbide grades	P	M	K	N	S	H
	●	●	●	●	●	●
	●	●	●	●	●	●
	●	●	●	●	●	●
	●	●	●	●	●	●
	●	●	●	●	●	●
	●	●	●	●	●	●
	●	●	●	●	●	●

Dimensions in mm

Carbide grades

Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 60 HRC  
 Carbide grade TS3H preferred for "Hardmilling" from 56 HRC

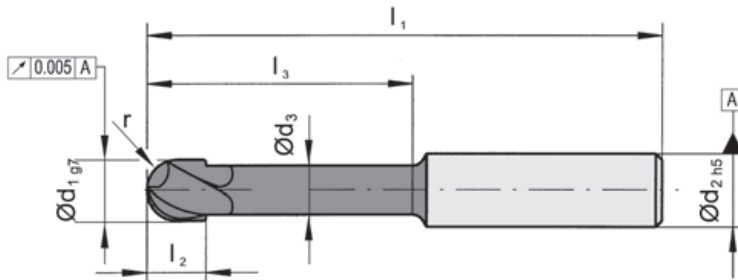


## Hard milling

## DSKH

2-fluted, 30° helix angle

recommended cutting data page O91



Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	TS3E
DSKH.2.010.063.06	1.0	6	0.9	63	2	3.0	0.50	2	▲
DSKH.2.015.063.06	1.5	6	1.4	63	2	4.5	0.75	2	▲
DSKH.2.020.063.06	2.0	6	1.9	63	3	5.0	1.00	2	▲
DSKH.2.020.077.06									▲
DSKH.2.030.063.06	3.0	6	2.9	63	4	7.5	1.50	2	▲
DSKH.2.030.077.06									▲
DSKH.2.040.063.06	4.0	6	3.8	63	5	10.0	2.00	2	▲
DSKH.2.040.077.06									▲
DSKH.2.050.063.06	5.0	6	4.7	63	5	12.5	2.50	2	▲
DSKH.2.050.077.06									▲
DSKH.2.060.063.06	6.0	6	5.6	63	6	15.0	3.00	2	▲
DSKH.2.060.077.06		6		77		24.0			▲
DSKH.2.060.099.08		8		99		36.0			▲
DSKH.2.080.063.08	8.0	8	7.4	63	8	20.0	4.00	2	▲
DSKH.2.080.077.08		8		77		32.0			▲
DSKH.2.080.099.08		8		99		48.0			▲
DSKH.2.080.119.10		10		119		40.0			▲
DSKH.2.100.077.10	10.0	10	9.4	77	10	25.0	5.00	2	▲
DSKH.2.100.099.10				99		40.0			▲
DSKH.2.120.077.12	12.0	12	11.4	77	12	30.0	6.00	2	▲
DSKH.2.120.099.12				99		48.0			▲
DSKH.2.160.099.16	16.0	16	15.4	100	20	50.0	8.00	2	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	■
K	■
N	■
S	■
H	●

Dimensions in mm

Carbide grades

Carbide grade TS3E for "Hardmilling" from 50 up to 70 HRC

# BALLNOSE ENDMILL

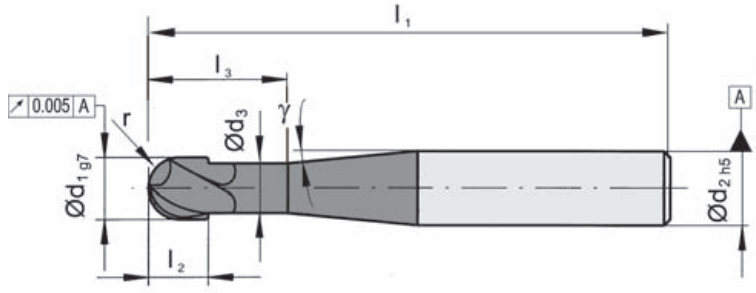


Recommended material group II - soft and hard milling

## DSKL

2-fluted, 40° helix angle

recommended cutting data page O92



long style

Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	γ	TS3K	TS3H
DSKL.2.060.149.08	6	8	5.6	149	6	15	3	2	1.5°	▲	▲
DSKL.2.080.149.10	8	10	7.4	149	8	20	4	2	1.5°	▲	▲
DSKL.2.100.149.12	10	12	9.4	149	10	25	5	2	1.5°	▲	▲
DSKL.2.160.149.16	16	16	15.4	149	20	100	8	2	2°	▲	▲
										P	•
										M	•
										K	•
										N	•
										S	•
										H	•

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

Carbide grades

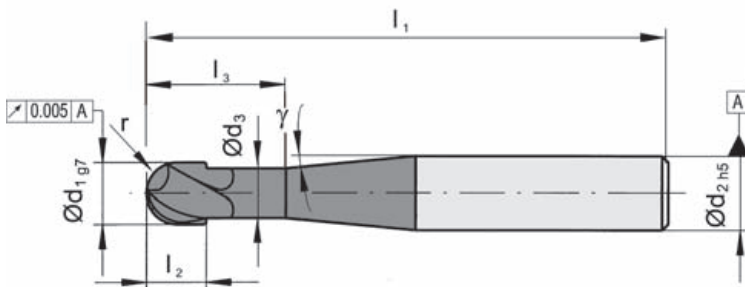
Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 60 HRC  
 Carbide grade TS3H preferred for "Hardmilling" from 56 HRC

## Hard milling

## DSKLH

2-fluted, 30° helix angle

recommended cutting data page O93



long style

Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	γ	TS3E
<b>DSKLH.2.060.149.08</b>	6	8	5.6	149	6	15	3	2	1.5°	▲
<b>DSKLH.2.080.149.10</b>	8	10	7.4	149	8	20	4	2	1.5°	▲
<b>DSKLH.2.100.149.12</b>	10	12	9.4	149	10	25	5	2	1.5°	▲
<b>DSKLH.2.120.149.16</b>	12	16	11.4	149	12	30	6	2	2°	▲
										P •
										M •
										K •
										N •
										S •
										H •

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

Carbide grades

Carbide grade TS3E for "Hardmilling" from 50 up to 70 HRC

# BALLNOSE ENDMILL 220°

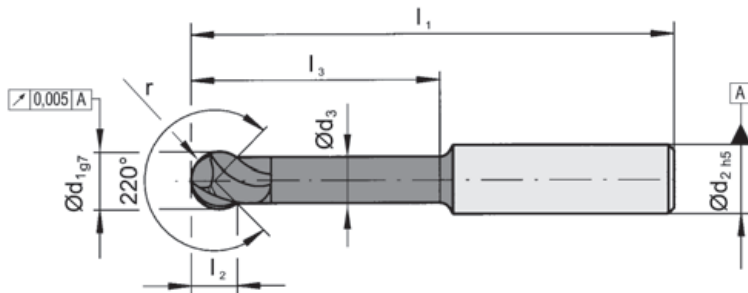


Recommended material group II - soft and hard milling

DSK

2-fluted, 30° helix angle

recommended cutting data page O94



Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	TS3K	TS3H
DSK.2.030.063.06.2	3	6	2.70	63	2.1	25.5	1.5	2	▲	▲
DSK.2.040.063.06.2	4	6	3.60	63	2.8	25.5	2.0	2	▲	▲
DSK.2.050.077.06.2	5	6	4.40	77	3.5	30.5	2.5	2	▲	▲
DSK.2.060.077.06.2	6	6	5.28	77	4.1	37.5	3.0	2	▲	▲
DSK.2.080.088.08.2	8	8	7.04	88	5.5	46.5	4.0	2	▲	▲
DSK.2.100.101.10.2	10	10	8.80	101	6.9	55.5	5.0	2	▲	▲
DSK.2.120.119.12.2	12	12	10.56	119	8.2	72.5	6.0	2	▲	▲
DSK.2.160.119.16.2	16	16	14.08	120	11.0	72.0	8.0	2	▲	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P	●	●
M		
K		
N		
S		
H	●	○

Carbide grades

Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 60 HRC  
 Carbide grade TS3H preferred for "Hardmilling" from 56 HRC

# BALLNOSE ENDMILL 220°



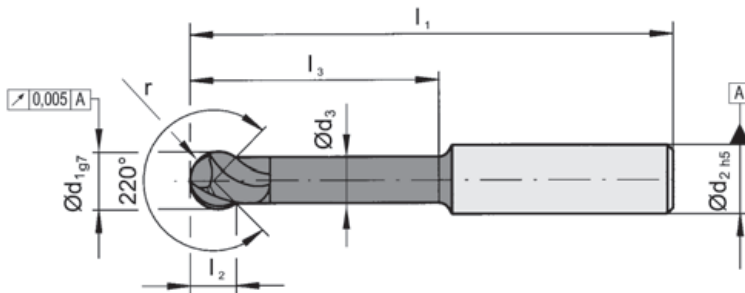
high tensile steel

Hard milling

DSKH

2-fluted, 30° helix angle

recommended cutting data page O95



Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	TS3E
DSKH.2.030.063.06.2	3	6	2.70	63	2.1	15	1.5	2	▲
DSKH.2.040.063.06.2	4	6	3.60	63	2.8	20	2.0	2	▲
DSKH.2.050.063.06.2	5	6	4.40	63	3.5	25	2.5	2	▲
DSKH.2.060.063.06.2	6	6	5.28	63	4.1	30	3.0	2	▲
DSKH.2.080.088.08.2	8	8	7.04	88	5.5	40	4.0	2	▲
DSKH.2.100.101.10.2	10	10	8.80	101	6.9	50	5.0	2	▲
DSKH.2.120.119.12.2	12	12	10.56	119	8.2	60	6.0	2	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	•
M	•
K	•
N	•
S	•
H	•

Dimensions in mm

Carbide grades

Carbide grade TS3E for "Hardmilling" from 50 up to 70 HRC

# BALLNOSE ENDMILL

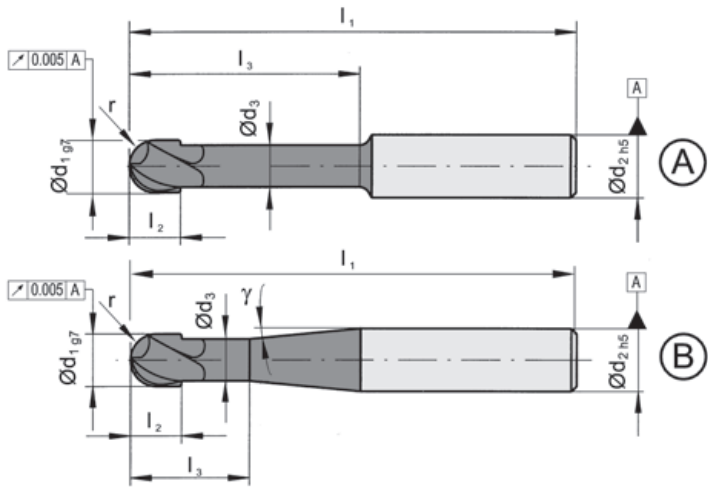


Recommended material group II - soft and hard milling

## DSK

4-fluted, 30° helix angle

recommended cutting data page O96



Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	γ	Version	TS3K	TS3H
DSK.4.060.063.06	6	6	5.6	63	6	25.5	3	4	-	A	▲	▲
DSK.4.060.077.06				77		35.5					▲	▲
DSK.4.080.063.08	8	8	7.4	63	8	25.5	4	4	-	A	▲	▲
DSK.4.080.077.08				77		35.5					▲	▲
DSK.4.080.099.08				99		50.5					▲	▲
DSK.4.100.077.10	10	10	9.4	77	10	30.5	5	4	-	A	▲	▲
DSK.4.100.099.10				99		55.5					▲	▲
DSK.4.120.099.12	12	12	11.4	99	12	55.5	6	4	-	A	▲	▲
DSK.4.160.099.16	16	16	15.4	99	20	50.0	8	4	-	A	▲	
DSK.4.160.149.16				149		100.0					▲	
DSK.4.060.099.08	6	8	5.6	99	6	25.5	3	4	1.9°	B	▲	▲
DSK.4.080.119.10	8	10	7.4	119	8	30.5	4	4	1.6°	B	▲	▲
DSK.4.100.119.12	10	12	9.4	119	10	30.5	5	4	1.8°	B	▲	▲
DSK.4.120.077.12	12	12	11.4	77	12	35.5	6	4	1.8°	B	▲	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●	●
M		
K		
N		
S		
H	●	○

Dimensions in mm

Carbide grades

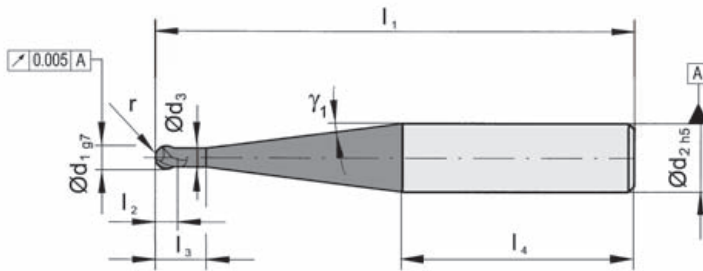
Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 60 HRC  
 Carbide grade TS3H preferred for "Hardmilling" from 56 HRC

Recommended material group II - soft and hard milling

## DSKM

2-fluted, 30° helix angle

recommended cutting data page O97



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	d <sub>3</sub>	r	Z	γ <sub>1</sub>	TS3K	TS3H
DSKM.2.02.63.04.L00	0.2	4	63	0.3	0.3	51.9	0.20	0.10	2	10°	▲	▲
DSKM.2.05.63.04.L31	0.5	4	63	0.8	3.1	51.6	0.47	0.25	2	12°	▲	▲
DSKM.2.05.63.04.L61					6.1	48.6					▲	▲
DSKM.2.05.63.04.L81					8.1	46.6					▲	▲
DSKM.2.10.63.04.L00	1.0	4	63	1.5	1.0	53.5	1.00	0.50	2	10°	▲	▲
DSKM.2.10.63.04.L11					10.1	47.2	0.95			15°	▲	▲
DSKM.2.10.63.04.L15					15.1	42.2	0.95			15°	▲	▲
DSKM.2.10.63.04.L41					4.1	52.3	0.95			13°	▲	▲
DSKM.2.10.63.04.L61					6.1	50.8	0.95			14°	▲	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

Carbide grades

Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 60 HRC  
 Carbide grade TS3H preferred for "Hardmilling" from 56 HRC

# MICRO ENDMILL Ballnose

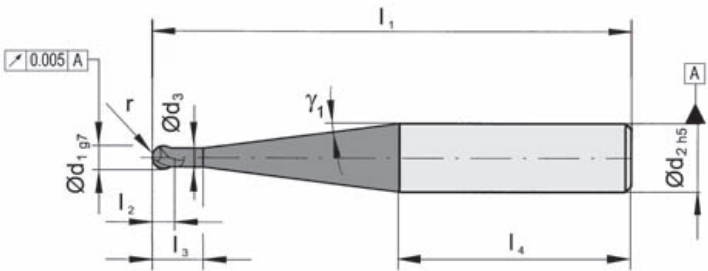


Recommended material group II - soft and hard milling

## DSKM

2-fluted, 30° helix angle

recommended cutting data page O97



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	d <sub>3</sub>	r	Z	γ <sub>1</sub>	TS3K	TS3H
DSKM.2.02.63.06.L03	0.2	6	63	0.3	0.3	46	-	0.10	2	10°	▲	▲
DSKM.2.03.63.06.L06	0.3	6	63	0.6	0.6	47	-	0.15	2	11°	▲	▲
DSKM.2.04.63.06.L08	0.4	6	63	0.8	0.8	47	-	0.20	2	11°	▲	▲
DSKM.2.05.63.06.L11	0.5			1.0	1.1	47	-	0.25		11°	▲	▲
DSKM.2.05.63.06.L31	0.5	6	63	1.0	3.1	46	0.45	0.25	2	12°	▲	▲
DSKM.2.06.63.06.L13	0.6			1.2	1.3	46	-	0.30		10°	▲	▲
DSKM.2.06.63.06.L41	0.6			1.2	4.1	47	0.55	0.30		13°	▲	▲
DSKM.2.08.63.06.L17	0.8	6	63	1.6	1.7	46	-	0.40	2	10°	▲	▲
DSKM.2.08.63.06.L51	0.8			1.6	5.1	46	0.75	0.40		13°	▲	▲
DSKM.2.10.63.06.L21	1.0			2.0	2.1	46	-	0.50		10°	▲	▲
DSKM.2.10.63.06.L61	1.0	6	63	2.0	6.1	46	0.90	0.50	2	14°	▲	▲
DSKM.2.12.63.06.L25	1.2			2.4	2.5	46	-	0.60		10°	▲	▲
DSKM.2.12.63.06.L81	1.2	6	63	2.4	8.1	45	1.10	0.60	2	15°	▲	▲
DSKM.2.15.63.06.L11	1.5			3.0	10.1	44	1.40	0.75		15°	▲	▲
DSKM.2.15.63.06.L31	1.5	6	63	3.0	3.1	47	-	0.75	2	10°	▲	▲
DSKM.2.20.63.06.L11	2.0			3.0	10.1	45	1.90	1.00		15°	▲	▲
DSKM.2.20.63.06.L31	2.0	6	63	3.0	3.1	49	-	1.00	2	11°	▲	▲
DSKM.2.25.63.06.L11	2.5			3.0	10.1	46	2.40	1.25		15°	▲	▲
DSKM.2.25.63.06.L31	2.5	6	63	3.0	3.1	47	-	1.25	2	8°	▲	▲
DSKM.2.30.63.06.L11	3.0			3.0	10.1	46	2.90	1.50		14°	▲	▲
DSKM.2.30.63.06.L31	3.0	6	63	3.0	3.1	47	-	1.50	2	7°	▲	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●	●
M		
K		
N		
S		
H	●	○

Dimensions in mm

Carbide grades

Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 60 HRC  
 Carbide grade TS3H preferred for "Hardmilling" from 56 HRC

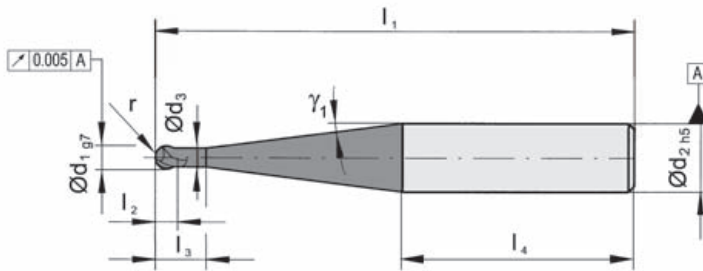


Recommended material group II - soft and hard milling

## DSKM

2-fluted, 30° helix angle

recommended cutting data page O97



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	d <sub>3</sub>	r	Z	γ <sub>1</sub>	TS3K	TS3H
DSKM.2.02.39.06.L03	0.2	6	39	0.3	0.3	22	-	0.10	2	10°	Δ	Δ
DSKM.2.03.39.06.L06	0.3	6	39	0.6	0.6	23	-	0.15	2	11°	Δ	Δ
DSKM.2.04.39.06.L08	0.4	6	39	0.8	0.8	23	-	0.20	2	11°	▲	▲
DSKM.2.05.39.06.L11	0.5	6	39	1.0	1.1	23	-	0.25	2	11°	Δ	Δ
DSKM.2.05.39.06.L31	0.5	6	39	1.0	3.1	22	0.45	0.25	2	12°	Δ	Δ
DSKM.2.06.39.06.L13	0.6	6	39	1.2	1.3	22	-	0.30	2	10°	Δ	Δ
DSKM.2.06.39.06.L41	0.6	6	39	1.2	4.1	23	0.55	0.30	2	13°	Δ	Δ
DSKM.2.08.39.06.L17	0.8	6	39	1.6	1.7	22	-	0.40	2	10°	▲	Δ
DSKM.2.08.39.06.L51	0.8	6	39	1.6	5.1	22	0.75	0.40	2	13°	▲	Δ
DSKM.2.10.39.06.L21	1.0	6	39	2.0	2.1	22	-	0.50	2	10°	Δ	Δ
DSKM.2.10.39.06.L61	1.0	6	39	2.0	6.1	22	0.90	0.50	2	14°	Δ	Δ
DSKM.2.12.39.06.L25	1.2	6	39	2.4	2.5	22	-	0.60	2	10°	Δ	Δ
DSKM.2.12.39.06.L81	1.2	6	39	2.4	8.1	21	1.10	0.60	2	15°	Δ	Δ
DSKM.2.15.39.06.L11	1.5	6	39	3.0	10.1	20	1.40	0.75	2	15°	Δ	Δ
DSKM.2.15.39.06.L31	1.5	6	39	3.0	3.1	23	-	0.75	2	10°	Δ	Δ
DSKM.2.20.39.06.L11	2.0	6	39	3.0	10.1	21	1.90	1.00	2	15°	Δ	Δ
DSKM.2.20.39.06.L31	2.0	6	39	3.0	3.1	25	-	1.00	2	11°	Δ	Δ
DSKM.2.25.39.06.L11	2.5	6	39	3.0	10.1	22	2.40	1.25	2	15°	Δ	Δ
DSKM.2.25.39.06.L31	2.5	6	39	3.0	3.1	23	-	1.25	2	8°	▲	Δ
DSKM.2.30.39.06.L11	3.0	6	39	3.0	10.1	22	2.90	1.50	2	14°	Δ	Δ
DSKM.2.30.39.06.L31	3.0	6	39	3.0	3.1	23	-	1.50	2	7°	Δ	Δ

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Carbide grades	P	M	K	N	S	H
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●

Dimensions in mm

Carbide grades

Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 60 HRC  
 Carbide grade TS3H preferred for "Hardmilling" from 56 HRC

# ENDMILL Double radius

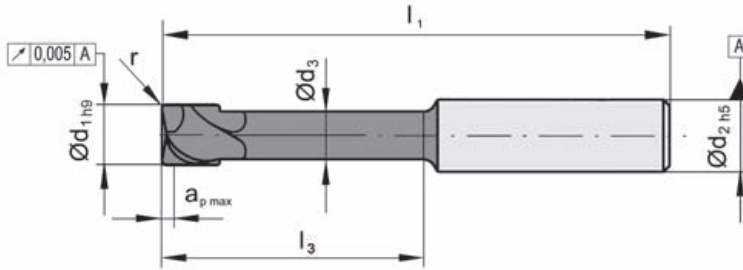


Recommended material group II - soft and hard milling

## DSDS

4-fluted, 30° helix angle

recommended cutting data page O98



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>3</sub>	d <sub>3</sub>	r <sub>theo</sub>	a <sub>p max</sub>	Z	TS3K
DSDS.4.06.63.06.08	6	6	63	15	5.4	0.8	0.4	4	▲
DSDS.4.06.77.06.08			77						▲
DSDS.4.08.63.08.10	8	8	63	20	7.2	1.4	0.5	4	▲
DSDS.4.08.77.08.10			77						▲
DSDS.4.10.77.10.15	10	10	77	25	9.0	2.0	0.7	4	▲
DSDS.4.10.99.10.15			99						▲
DSDS.4.12.77.12.15	12	12	77	30	10.8	2.1	0.8	4	▲
DSDS.4.12.99.12.15			99						▲
DSDS.4.16.77.16.20	16	16	77	40	14.4	2.8	1.0	4	▲
DSDS.4.16.99.16.20			99						▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	●
K	●
N	●
S	●
H	●

Dimensions in mm

Carbide grades

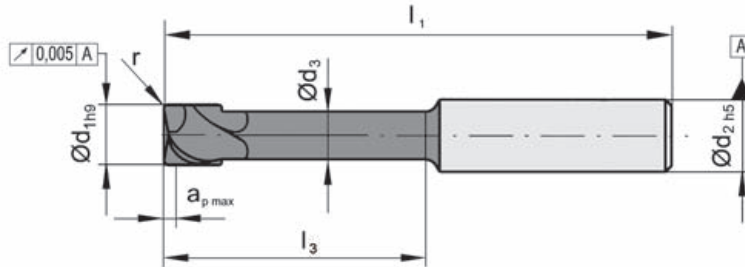
Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 45 HRC

Recommended material group II - soft and hard milling

## DSDH

4-fluted, 30° helix angle

recommended cutting data page O99



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>3</sub>	d <sub>3</sub>	r <sub>theo</sub>	a <sub>p max</sub>	Z	TS3K
DSDH.4.06.63.06.05	6	6	63	15	5.4	0.7	0.20	4	Δ
DSDH.4.06.77.06.05			77						▲
DSDH.4.08.63.08.05	8	8	63	20	7.2	1.2	0.25	4	Δ
DSDH.4.08.77.08.05			77						▲
DSDH.4.10.77.10.06	10	10	77	25	9.0	1.8	0.30	4	Δ
DSDH.4.10.99.10.06			99						▲
DSDH.4.12.77.12.08	12	12	77	30	10.8	1.9	0.40	4	Δ
DSDH.4.12.99.12.08			99						▲
DSDH.4.16.77.16.10	16	16	77	40	14.4	2.1	0.50	4	Δ
DSDH.4.16.99.16.10			99						▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	●
K	●
N	●
S	●
H	●

Dimensions in mm

Carbide grades

Carbide grade TS3K preferred for "Soft- and Hardmilling" from 45 up to 54 HRC

# TORUS ENDMILL

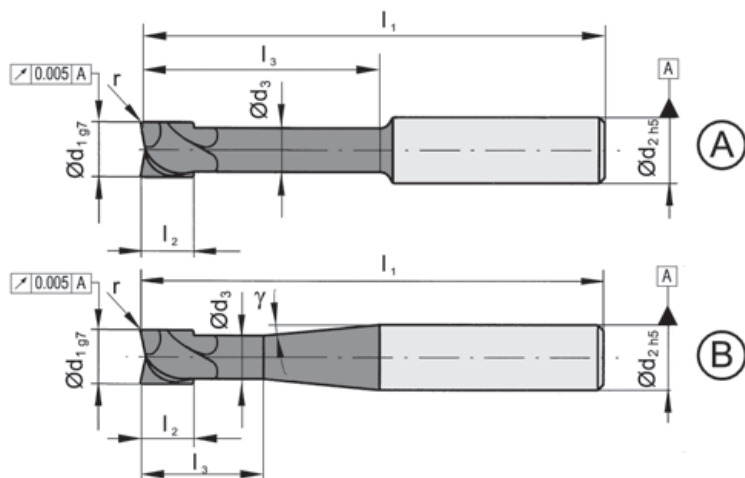


Recommended material group II - soft and hard milling

## DST

2-fluted, 30° helix angle, with corner radius

recommended cutting data page O100



Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	γ	Version	TS3K	TS3H
DST.2.06.05.063.06	6.0	6	5.6	63	6	25.5	0.5	2	-	A	▲	▲
DST.2.06.05.077.06				77		35.5					▲	▲
DST.2.06.15.063.06				63		25.5					▲	▲
DST.2.06.15.077.06				77		35.5					▲	▲
DST.2.15.03.063.06	1.5	6	0.9	63	3	10.0	0.3	2	9°	B	▲	▲
DST.2.02.05.063.06	2.0	6	1.9	63	3	5.5	0.5	2	6°	B	▲	▲
DST.2.02.05.077.06				77					5°		▲	▲
DST.2.03.05.063.06	3.0	6	2.9	63	4	7.5	0.5	2	4°	B	▲	▲
DST.2.03.05.077.06				77		15.5					▲	▲
DST.2.04.05.063.06	4.0	6	3.8	63	4	8.5	0.5	2	4°	B	▲	▲
DST.2.04.05.077.06				77	5	15.5			3°		▲	▲
DST.2.04.10.063.06				63	5	8.5			4°		▲	▲
DST.2.04.10.077.06				77	5	15.5			3°		▲	▲
DST.2.05.05.063.06	5.0	6	4.7	63	5	10.5	0.5	2	3°	B	▲	▲
DST.2.05.05.077.06				77		20.5			2°		▲	▲
DST.2.05.10.063.06				63		10.5			3°		▲	▲
DST.2.05.10.077.06				77		20.5			2°		▲	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●	●
M		
K		
N		
S		
H	●	○

Dimensions in mm

Carbide grades

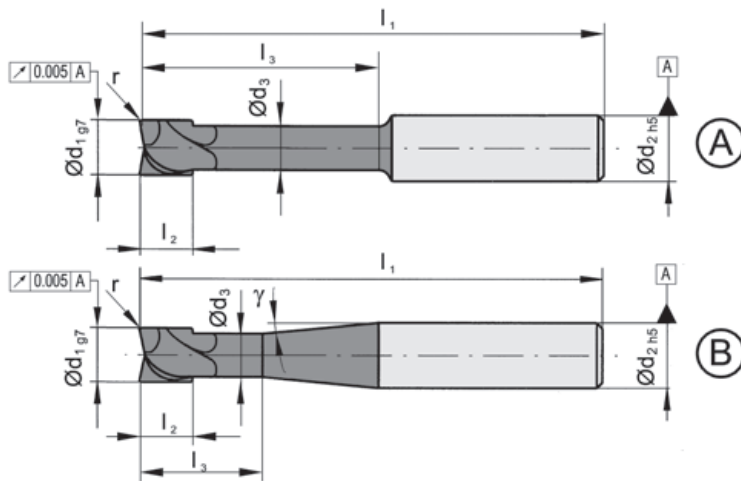
Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 60 HRC  
 Carbide grade TS3H preferred for "Hardmilling" from 56 HRC

Recommended material group II - soft and hard milling

## DST

2-fluted, 30° helix angle, with corner radius

recommended cutting data page O100



Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	Version	TS3K	TS3H
DST.2.08.05.063.08			7.6	63		25.5	0.5			▲	▲
DST.2.08.05.077.08			7.4	77		35.5	0.5			▲	▲
DST.2.08.10.063.08			7.4	63		25.5	1.0			▲	▲
DST.2.08.10.077.08	8	8	7.4	77	8	35.5	1.0	2	A	▲	▲
DST.2.08.10.099.08			7.4	99		50.5	1.0			▲	▲
DST.2.08.20.063.08			7.4	63		25.5	2.0			▲	▲
DST.2.08.20.077.08			7.4	77		35.5	2.0			▲	▲
DST.2.08.20.099.08			7.4	99		50.5	2.0			▲	▲
DST.2.10.05.077.10				77		35.5	0.5			▲	▲
DST.2.10.10.099.10	10	10	9.4	99	10	55.5	1.0	2	A	▲	▲
DST.2.10.20.077.10				77		35.5	2.0			▲	▲
DST.2.10.20.099.10				99		55.5	2.0			▲	▲
DST.2.12.05.077.12				77		35.5	0.5			▲	▲
DST.2.12.10.099.12	12	12	11.4	99	12	55.5	1.0	2	A	▲	▲
DST.2.12.20.077.12				77		35.5	2.0			▲	▲
DST.2.12.20.099.12				99		55.5	2.0			▲	▲
DST.2.160.20.099.16				100		50.0	2.0			▲	▲
DST.2.160.20.149.16	16	16	15.4	150	20	100.0	2.0	2	A	▲	▲
DST.2.160.35.099.16				100		50.0	3.5			▲	▲
DST.2.160.35.149.16				150		100.0	3.5			▲	▲
DST.2.06.05.099.08	6	8	5.6	99	6	25.5	0.5	2	B	▲	▲
DST.2.06.15.099.08							1.5			▲	▲
DST.2.08.10.119.10	8	10	7.4	119	8	30.5	1.0	2	B	▲	▲
DST.2.08.20.119.10							2.0			▲	▲
DST.2.10.20.119.12	10	12	9.4	119	10	30.5	2.0	2	B	▲	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 60 HRC  
 Carbide grade TS3H preferred for "Hardmilling" from 56 HRC

P	●	●
M		
K		
N		
S		
H	●	○

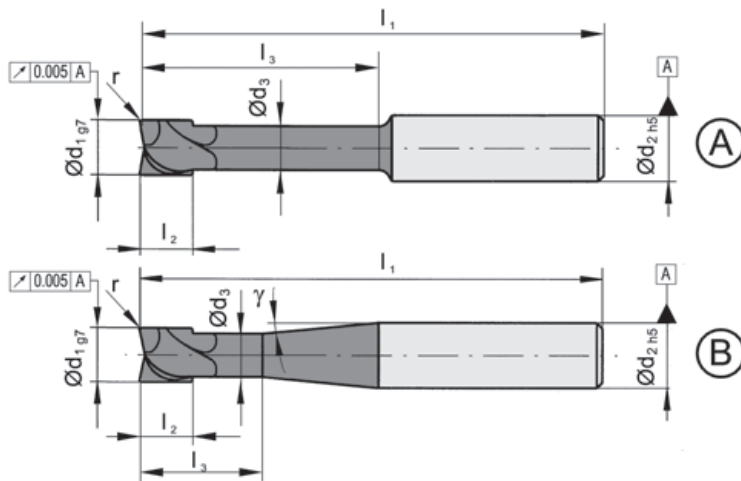
Carbide grades

## Hard milling

## DSTH

2-fluted, 30° helix angle, with corner radius

recommended cutting data page O101



Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	γ	Version	TS3E
DSTH.2.06.02.055.06	6.0	6	5.6	55	6.0	15.5	0.2	2	-	A	▲
0.5							▲				
1.0							▲				
DSTH.2.08.02.063.08	8.0	8	7.4	63	10.0	20.5	0.2	2	-	A	▲
0.5							▲				
1.0							▲				
1.5							▲				
DSTH.2.10.02.077.10	10.0	10	9.4	77	15.0	25.5	0.2	2	-	A	▲
0.5							▲				
1.0							▲				
1.5							▲				
DSTH.2.12.03.077.12	12.0	12	11.4	77	18.0	30.5	0.3	2	-	A	▲
0.5							▲				
1.0							▲				
1.5							▲				
DSTH.2.15.01.055.06	1.5	6	1.4	55	2.5	5.5	0.1	2	15°	B	▲
DSTH.2.02.02.055.06	2.0	6	1.9	55	3.0	5.5	0.2	2	15°	B	▲
DSTH.2.02.05.055.06							0.5				▲
DSTH.2.03.02.055.06	3.0	6	2.9	55	4.0	7.5	0.2	2	15°	B	▲
DSTH.2.03.05.055.06							0.5				▲
DSTH.2.04.02.055.06	4.0	6	3.8	55	5.0	8.5	0.2	2	15°	B	▲
DSTH.2.04.05.055.06							0.5				▲
DSTH.2.05.02.055.06	5.0	6	4.7	55	6.0	12.5	0.2	2	15°	B	▲
DSTH.2.05.05.055.06							0.5				▲
DSTH.2.05.10.055.06							1.0				▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	●
K	●
N	●
S	●
H	●

Dimensions in mm

Carbide grade TS3E for "Hardmilling" from 50 up to 70 HRC

Carbide grades

O34

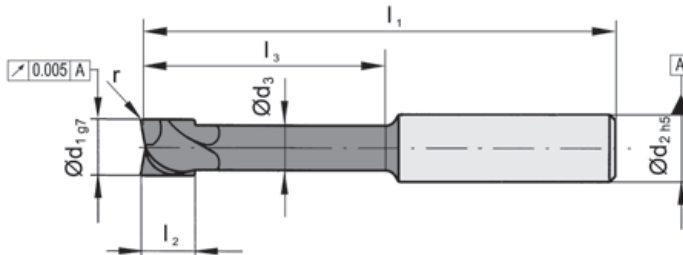
In the UNITED STATES call us toll free  
1 - 888 - 818 HORN

Recommended material group II - soft and hard milling

## DST

4-fluted, 30° helix angle, with corner radius

recommended cutting data page O102



Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	TS3K
DST.4.06.063.06.3.05				63		25.5	0.5		▲
DST.4.06.063.06.3.10				63		25.5	1.0		▲
DST.4.06.077.06.3.05	6	6	5.6	77	6	35.5	0.5	4	▲
DST.4.06.077.06.3.15				77		35.5	1.5		▲
DST.4.08.063.08.3.05				63		25.5	0.5		▲
DST.4.08.063.08.3.10				63		25.5	1.0		▲
DST.4.08.063.08.3.20				63		25.5	2.0		▲
DST.4.08.077.08.3.05	8	8	7.4	77	8	25.5	0.5	4	▲
DST.4.08.077.08.3.10				77		35.5	1.0		▲
DST.4.08.077.08.3.20				77		35.5	2.0		▲
DST.4.08.099.08.3.10				99		50.5	1.0		▲
DST.4.08.099.08.3.20				99		50.5	2.0		▲
DST.4.10.077.10.3.05				77		35.5	0.5		▲
DST.4.10.077.10.3.20				77		35.5	2.0		▲
DST.4.10.099.10.3.10	10	10	9.4	99	10	55.5	1.0	4	▲
DST.4.10.099.10.3.20				99		55.5	2.0		▲
DST.4.12.077.12.3.05				77		35.5	0.5		▲
DST.4.12.077.12.3.20				77		35.5	2.0		▲
DST.4.12.099.12.3.10	12	12	11.4	99	12	55.5	1.0	4	▲
DST.4.12.099.12.3.20				99		55.5	2.0		▲
DST.4.160.20.099.16				99		50.0	2.0		▲
DST.4.160.20.149.16				149		100.0	2.0		▲
DST.4.160.35.099.16	16	16	15.4	99	20	50.0	3.5	4	▲
DST.4.160.35.149.16				149		100.0	3.5		▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	■
K	■
N	■
S	■
H	●

Dimensions in mm

Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 60 HRC

Carbide grades

# TORUS ENDMILL

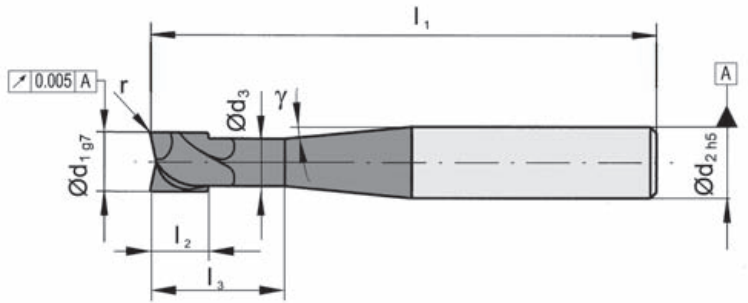


Recommended material group II - soft and hard milling

## DST

4-fluted, 30° helix angle, with corner radius

recommended cutting data page O102



Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	γ	TS3K
DST.4.06.099.08.3.05	6	8	5.6	99	6	25.5	0.5	4	4°	▲
DST.4.06.099.08.3.15										▲
DST.4.08.119.10.3.10	8	10	7.4	119	8	30.5	1.0	4	4°	▲
DST.4.08.119.10.3.20										▲
DST.4.10.119.12.3.20	10	12	9.4	119	10	30.5	2.0	4	4°	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	■
K	■
N	■
S	■
H	●

Dimensions in mm

Carbide grades

Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 60 HRC



# ENDMILL Multiple fluted



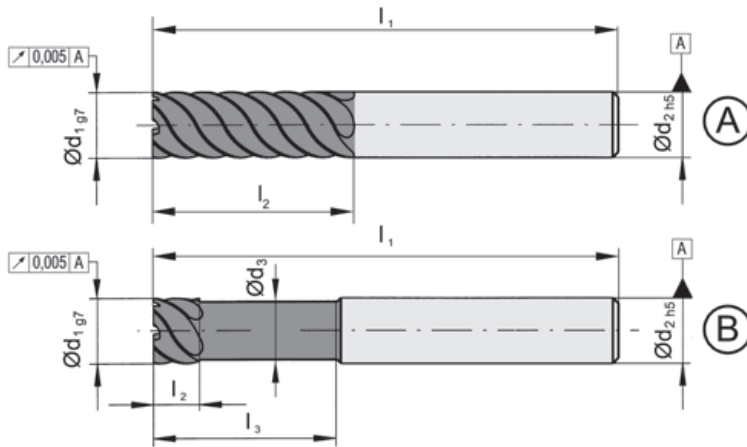
high tensile steel

Recommended material group I / II / III / IV - soft milling

DSM

6-/8-/10-/12-/16-fluted, 45° helix angle

recommended cutting data page O103



Standard

Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d <sub>3</sub>	Z	Version	TS3K
DSM.6.03.63.06	3	6	63	10	-	-	6	A	▲
DSM.6.04.63.06	4	6	63	10	-	-	6	A	▲
DSM.6.05.63.06	5	6	63	15	-	-	6	A	▲
DSM.6.06.63.06	6	6	63	20	-	-	6	A	▲
DSM.6.08.63.08	8	8	63	20	-	-	6	A	▲
DSM.8.08.77.08	8	8	77	25	-	-	8	A	▲
DSM.10.10.77.10	10	10	77	30	-	-	10	A	▲
DSM.6.10.69.10	10	10	69	25	-	-	6	A	▲
DSM.12.12.88.12	12	12	88	35	-	-	12	A	▲
DSM.6.12.77.12	12	12	77	25	-	-	6	A	▲
DSM.16.16.88.16	16	16	88	34	-	-	16	A	▲
DSM.6.16.88.16	16	16	88	30	-	-	6	A	▲
DSM.6.03.63.06S	3	6	63	3	10.5	2.9	6	B	▲
DSM.6.04.63.06S	4	6	63	4	10.5	3.8	6	B	▲
DSM.6.05.63.06S	5	6	63	5	15.5	4.7	6	B	▲
DSM.6.06.63.06S	6	6	63	6	20.5	5.6	6	B	▲
DSM.6.08.63.08S	8	8	63	8	20.5	7.4	6	B	▲
DSM.6.10.69.10S	10	10	69	10	25.5	9.4	6	B	▲
DSM.6.12.77.12S	12	12	77	12	25.5	11.4	6	B	▲
DSM.6.16.88.16S	16	16	88	16	35.0	15.4	6	B	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	•
M	•
K	•
N	•
S	•
H	•

Dimensions in mm

Carbide grades

**Note:**  
Not cutting across centre!

Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 60 HRC

# ENDMILL Multiple fluted

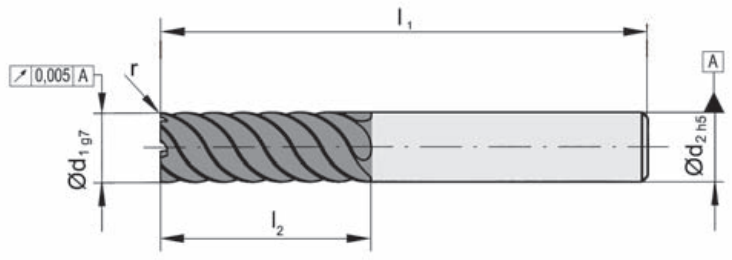


Hard milling

## DSMH

6-fluted, 45° helix angle

recommended cutting data page O104



Standard

Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	γ	Z	TS3E
DSMH.6.03.55.06	3	6	55	9.5	30°	6	▲
DSMH.6.04.55.06	4	6	55	12.5	30°	6	▲
DSMH.6.05.55.06	5	6	55	15.5	30°	6	▲
DSMH.6.06.63.06	6	6	63	18.5	-	6	▲
DSMH.6.08.63.08	8	8	63	24.5	-	6	▲
DSMH.6.10.77.10	10	10	77	30.5	-	6	▲
DSMH.6.12.88.12	12	12	88	36.5	-	6	▲
DSMH.6.16.99.16	16	16	99	48.5	-	6	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	●
K	●
N	●
S	●
H	●

Dimensions in mm

Carbide grades

Carbide grade TS3E for "Hardmilling" from 50 up to 70 HRC

**Note:**  
Not cutting across centre!

# ENDMILL Multiple fluted

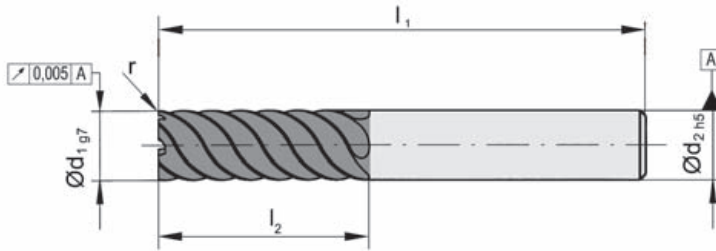


high tensile steel

Recommended material group I / II / III / IV - soft and hard milling **DSMR**

6-/8-/10-/12-/16-fluted, 45° helix angle, with corner radius

recommended cutting data page O103



Standard

Part number	d <sub>1</sub>	r	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Z	TS3K	TS3H
DSMR.6.03.63.06.03	3	0.3	6	63	10	6	▲	▲
DSMR.6.04.63.06.03	4	0.3	6	63	10	6	▲	▲
DSMR.6.05.63.06.03	5	0.3	6	63	15	6	▲	▲
DSMR.6.05.63.06.05		0.5					▲	▲
DSMR.6.06.63.06.05	6	0.5	6	63	20	6	▲	▲
DSMR.6.06.63.06.10		1.0					▲	▲
DSMR.6.08.63.08.05	8	0.5	8	63	20	6	▲	▲
DSMR.6.08.63.08.10		1.0					▲	▲
DSMR.6.10.69.10.05	10	0.5	10	69	25	6	▲	▲
DSMR.6.10.69.10.10		1.0					▲	▲
DSMR.6.10.69.10.15		1.5					▲	▲
DSMR.6.12.77.12.05	12	0.5	12	77	25	6	▲	▲
DSMR.6.12.77.12.10		1.0					▲	▲
DSMR.6.12.77.12.20		2.0					▲	▲
DSMR.6.16.88.16.05	16	0.5	16	88	35	6		▲
DSMR.6.16.88.16.10		1.0			30		▲	▲
DSMR.6.16.88.16.20		2.0			30		▲	▲
DSMR.8.08.77.08.05	8	0.5	8	77	25	8	▲	▲
DSMR.10.10.77.10.05	10	0.5	10	77	30	10	▲	▲
DSMR.12.12.88.12.05	12	0.5	12	88	35	12	▲	▲
DSMR.16.16.88.16.05	16	0.5	16	88	34	16	▲	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●	●
M		
K		
N		
S		
H	●	○

Dimensions in mm

Carbide grades

**Note:**  
Not cutting across centre!

Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 60 HRC  
Carbide grade TS3H preferred for "Hardmilling" from 56 HRC

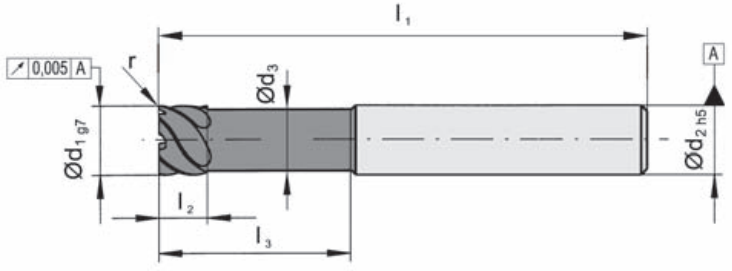
# ENDMILL Multiple fluted



Recommended material group I / II / III / IV - soft and hard milling **DSMR**

6-fluted, 45° helix angle, with corner radius

recommended cutting data page O103



short style

Part number	d <sub>1</sub>	r	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d <sub>3</sub>	Z	TS3K	TS3H
DSMR.6.03.63.06.03S	3	0.3	6	63	3	10.5	2.9	6	▲	▲
DSMR.6.04.63.06.03S	4	0.3	6	63	4	10.5	3.8	6	▲	▲
DSMR.6.05.63.06.03S	5	0.3	6	63	5	15.5	4.7	6	▲	▲
DSMR.6.05.63.06.05S		0.5							▲	▲
DSMR.6.06.63.06.05S	6	0.5	6	63	6	20.5	5.6	6	▲	▲
DSMR.6.06.63.06.10S		1.0							▲	▲
DSMR.6.08.63.08.05S	8	0.5	8	63	8	20.5	7.4	6	▲	▲
DSMR.6.08.63.08.10S		1.0							▲	▲
DSMR.6.10.69.10.05S	10	0.5	10	69	10	25.5	9.4	6	▲	▲
DSMR.6.10.69.10.10S		1.0							▲	▲
DSMR.6.10.69.10.15S		1.5							▲	▲
DSMR.6.12.77.12.05S	12	0.5	12	77	12	25.5	11.4	6	▲	▲
DSMR.6.12.77.12.10S		1.0							▲	▲
DSMR.6.12.77.12.20S		2.0							▲	▲
DSMR.6.16.88.16.10S	16	1.0	16	88	16	35.0	15.4	6	▲	▲
DSMR.6.16.88.16.20S		2.0							▲	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●	●
M	■	■
K	■	■
N	■	■
S	■	■
H	●	○

Dimensions in mm

Carbide grades

Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 60 HRC  
 Carbide grade TS3H preferred for "Hardmilling" from 56 HRC

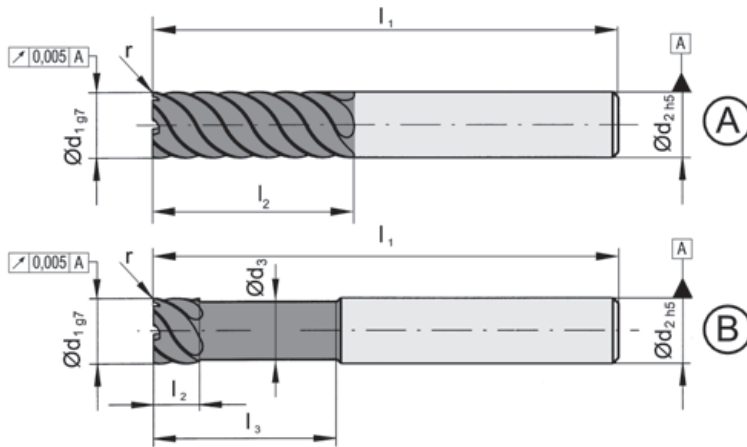
**Note:**  
 Not cutting across centre!

## Hard milling

## DSMRH

6-fluted, 45° helix angle

recommended cutting data page O104



Standard

Part number	d <sub>1</sub>	r	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d <sub>3</sub>	γ	Z	Version	TS3E
DSMRH.6.03.55.06.01	3	0.1	6	55	9.5	-	-	30°	6	A	▲
DSMRH.6.04.55.06.02	4	0.2	6	55	12.5	-	-	30°	6	A	▲
DSMRH.6.05.55.06.02	5	0.2	6	55	15.5	-	-	30°	6	A	▲
DSMRH.6.06.63.06.03	6	0.3	6	63	18.5	-	-	-	6	A	▲
DSMRH.6.08.63.08.05	8	0.5	8	63	24.5	-	-	-	6	A	▲
DSMRH.6.10.77.10.05	10	0.5	10	77	30.5	-	-	-	6	A	▲
DSMRH.6.12.88.12.05	12	0.5	12	88	36.5	-	-	-	6	A	▲
DSMRH.6.16.99.16.05	16	0.5	16	99	48.5	-	-	-	6	A	▲
DSMRH.6.03.55.06.1S	3	0.1	6	55	3.0	9.5	2.9	30°	6	B	▲
DSMRH.6.04.55.06.3S	4	0.3	6	55	4.0	12.5	3.9	30°	6	B	▲
DSMRH.6.05.55.06.2S	5	0.2	6	55	5.0	15.5	4.8	30°	6	B	▲
DSMRH.6.06.63.06.3S	6	0.3	6	63	6.0	18.5	5.8	-	6	B	▲
DSMRH.6.08.63.08.5S	8	0.5	8	63	8.0	24.5	7.8	-	6	B	▲
DSMRH.6.10.77.10.5S	10	0.5	10	77	10.0	30.5	9.8	-	6	B	▲
DSMRH.6.12.88.12.5S	12	0.5	12	88	12.0	36.5	11.8	-	6	B	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	●
K	●
N	●
S	●
H	●

Dimensions in mm

Carbide grades

Carbide grade TS3E for "Hardmilling" from 50 up to 70 HRC

**Note:**  
Not cutting across centre!

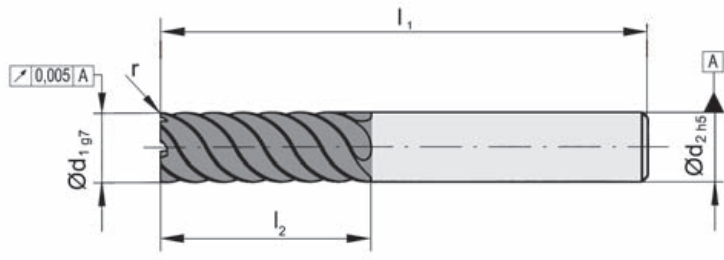
# ENDMILL Multiple fluted



Recommended material group I / II / III / IV - soft and hard milling **DSML**

6-fluted, 45° helix angle, with corner radius

recommended cutting data page O103



long style

Part number	d <sub>1</sub>	r	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Z	TS3K
DSML.6.08.077.08	8	0.5	8	77	30	6	▲
DSML.6.10.088.10	10	0.5	10	88	35	6	▲
DSML.6.12.099.12	12	0.5	12	99	40	6	▲
DSML.6.16.101.16	16	0.5	16	101	45	6	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	■
K	■
N	■
S	■
H	●

Dimensions in mm

Carbide grades

Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 60 HRC

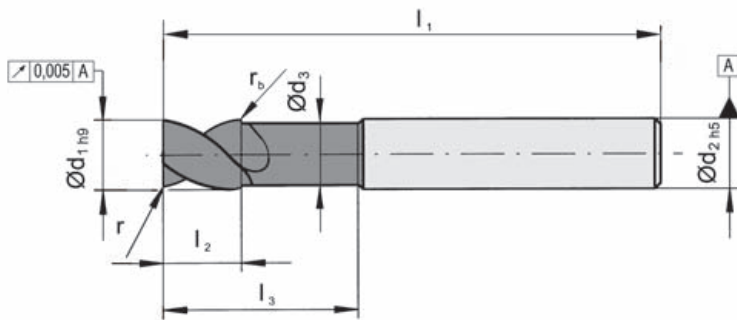
**Note:**  
Not cutting across centre!

Recommended material group I / II / III / IV - soft milling

## DSR

3-fluted, 45° helix angle, with corner radius

recommended cutting data page O105



Part number	d <sub>1</sub>	r	r <sub>b</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d <sub>3</sub>	Z	TS3K
<b>DSR.3.020.38.03</b>	2	0.2	2	3	38	3	10.5	1.9	3	▲
<b>DSR.3.030.38.03</b>	3	0.2	2	3	38	4	10.5	2.9	3	▲
<b>DSR.3.040.50.06</b>	4	0.2	2	6	50	5	12.5	3.8	3	▲
<b>DSR.3.040.63.06</b>					63					▲
<b>DSR.3.050.50.06</b>	5	0.2	2	6	50	6	14.5	4.7	3	▲
<b>DSR.3.050.63.06</b>					63					▲
<b>DSR.3.060.63.06</b>	6	0.3	2	6	63	7	16.5	5.6	3	▲
<b>DSR.3.080.63.08</b>	8	0.5	2	8	63	9	20.5	7.4	3	▲
<b>DSR.3.100.69.10</b>	10	0.5	2	10	69	12	25.5	9.4	3	▲
<b>DSR.3.120.77.12</b>	12	0.5	2	12	77	15	30.5	11.4	3	▲
<b>DSR.3.160.88.16</b>	16	0.5	2	16	88	18	38.0	15.4	3	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	●
K	●
N	●
S	●
H	●

Dimensions in mm

Carbide grades

Carbide grade TS3K preferred for "Softmilling" up to 54 HRC

# ROUGHING ENDMILL

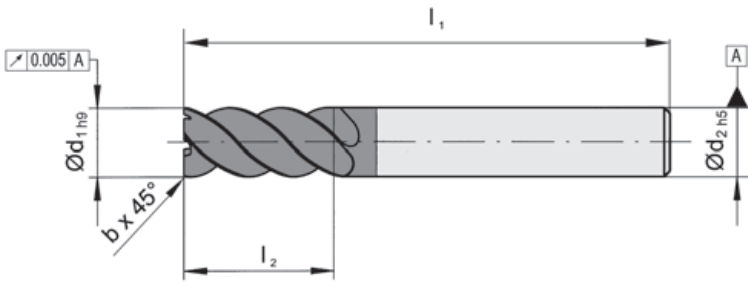


Recommended material group I / II / III / IV - soft milling

## DSF

3-fluted, 45° helix angle, with corner chamfer

recommended cutting data page O106



Part number	d <sub>1</sub>	b	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Z	TS3K
DSF.3.020.38.03	2	0.10	3	38	8	3	▲
DSF.3.030.38.03	3	0.10	3	38	10	3	▲
DSF.3.040.50.04	4	0.10	4	50	12	3	▲
DSF.3.050.50.05	5	0.15	5	50	14	3	▲
DSF.3.060.63.06	6	0.15	6	63	16	3	▲
DSF.3.080.63.08	8	0.20	8	63	20	3	▲
DSF.3.100.69.10	10	0.20	10	69	22	3	▲
DSF.3.120.77.12	12	0.25	12	77	25	3	▲
DSF.3.160.88.16	16	-	16	88	35	3	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	●
K	●
N	●
S	●
H	●

Dimensions in mm

Carbide grades

Carbide grade TS3K preferred for "Softmilling" up to 54 HRC

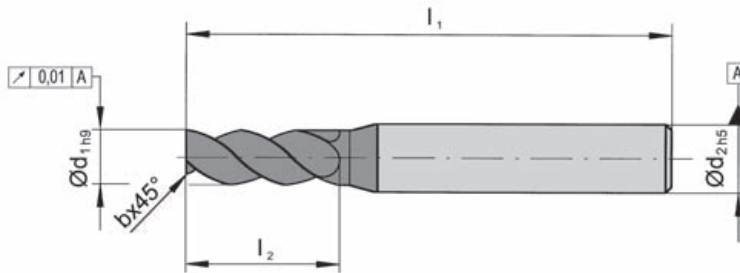


Recommended material group II - soft and hard milling

## DSF

4-fluted, 50° helix angle, with corner chamfer

recommended cutting data page O107



Part number	d <sub>1</sub>	b	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Z	TS3K
DSF.4.040.50.04	4	0.10	4	50	12	4	▲
DSF.4.060.63.06	6	0.15	6	63	16	4	▲
DSF.4.080.63.08	8	0.20	8	63	20	4	▲
DSF.4.100.69.10	10	0.20	10	69	22	4	▲
DSF.4.120.77.12	12	0.25	12	77	25	4	▲
DSF.4.160.88.16	16	-	16	88	35	4	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	•
M	•
K	•
N	•
S	•
H	•

Dimensions in mm

Carbide grades

Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 54 HRC

# ROUGHING RIPPED ENDMILL

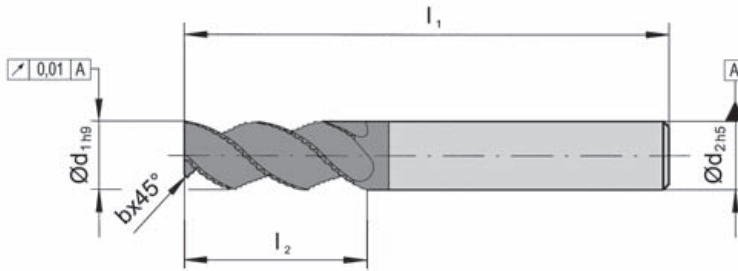


Recommended material group I / II / IV - soft milling

## DSRF

3-fluted, 45° helix angle, with corner chamfer

recommended cutting data page O108



Part number	d <sub>1</sub>	b	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Z	TS3K
<b>DSRF.3.06.63.06.25</b>	6	0.25	6	63	16	3	▲
<b>DSRF.3.08.63.08.50</b>	8	0.50	8	63	20	3	▲
<b>DSRF.3.10.69.10.50</b>	10	0.50	10	69	22	3	▲
<b>DSRF.3.12.77.12.50</b>	12	0.50	12	77	25	3	▲
<b>DSRF.3.16.88.16.10</b>	16	-	16	88	32	3	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	•
M	•
K	•
N	•
S	•
H	•

Dimensions in mm

Carbide grades

Carbide grade TS3K preferred for "Softmilling"

# ROUGHING RIPPED ENDMILL



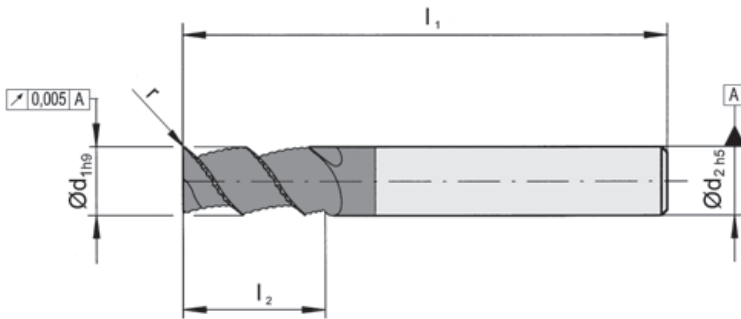
high tensile steel

Recommended material group III - soft milling

## DSRR

3-fluted, 45° helix angle, with corner radius

recommended cutting data page O109



Part number	d <sub>1</sub>	r	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Z	TS3K
DSRR.3.06.63.06.03	6	0.3	6	63	16	3	▲
DSRR.3.08.63.08.05	8	0.5	8	63	20	3	▲
DSRR.3.10.69.10.05	10	0.5	10	69	22	3	▲
DSRR.3.12.77.12.05	12	0.5	12	77	25	3	▲
DSRR.3.16.88.16.05	16	0.5	16	88	35	3	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	•
M	•
K	•
N	•
S	•
H	•

Dimensions in mm

Carbide grades

Carbide grade TS3K preferred for "Softmilling"

# ENDMILL Multiple fluted

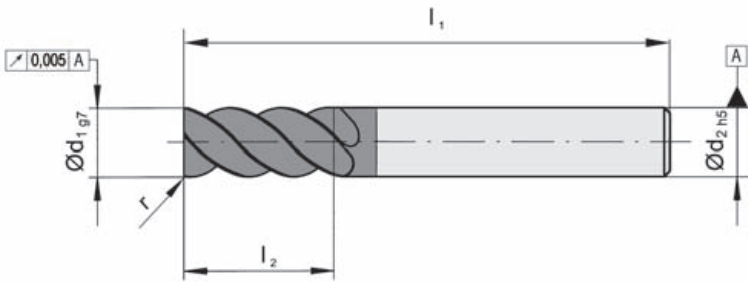


Recommended material group III and Titanium

## DSRV

4-/ 5-fluted, 45° helix angle, with corner radius

recommended cutting data page O110



Standard

Part number	d <sub>1</sub>	r	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Z	TS3K
DSRV.4.03.38.03	3	0.2	3	38	7	4	▲
DSRV.4.04.50.04	4	0.2	4	50	9	4	▲
DSRV.4.05.50.05	5	0.2	5	50	11	4	▲
DSRV.4.06.63.06	6	0.3	6	63	13	4	▲
DSRV.4.08.63.08	8	0.5	8	63	18	4	▲
DSRV.4.10.69.10	10	0.5	10	69	22	4	▲
DSRV.4.12.77.12	12	1.0	12	77	25	4	▲
DSRV.5.16.88.16	16	1.0	16	88	35	5	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	●
K	●
N	●
S	●
H	●

Dimensions in inch

Carbide grades

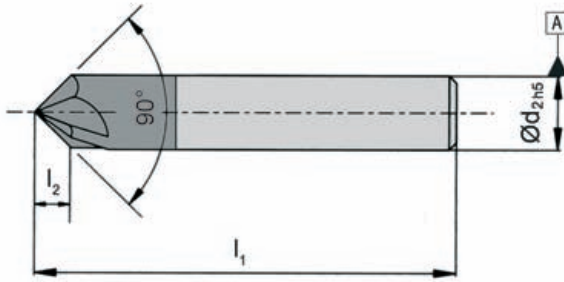
Carbide grade TS3K preferred for "Softmilling"

Recommended material group I / II / III / IV - soft and hard milling

## DSFF

4-fluted

recommended cutting data page O111



Part number	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Z	TS3K
DSFF.4.04.50.04.45	4	50	2	4	▲
DSFF.4.06.63.06.45	6	63	3	4	▲
DSFF.4.08.63.08.45	8	63	4	4	▲
DSFF.4.10.69.10.45	10	69	5	4	▲
DSFF.4.12.77.12.45	12	77	6	4	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	●
M	●
K	●
N	●
S	●
H	●

Dimensions in mm

Carbide grades

Carbide grade TS3K preferred for "Soft- and Hardmilling" up to 60 HRC

# HIGH PRODUCTIVE MACHINING

- for Cobalt chromium alloys -



**S Cobalt Chromium alloys**

	type	Page
Ballnose Endmill	DSKC	O52
Ballnose Endmill	DSKLC	O53
Endmill 220° Full radius	DSKC	O54
Torus Endmill	DSTC	O55
Endmill multiple fluted	DSMRC	O56
Formulas		O87-O88
Cutting data		O112-O115

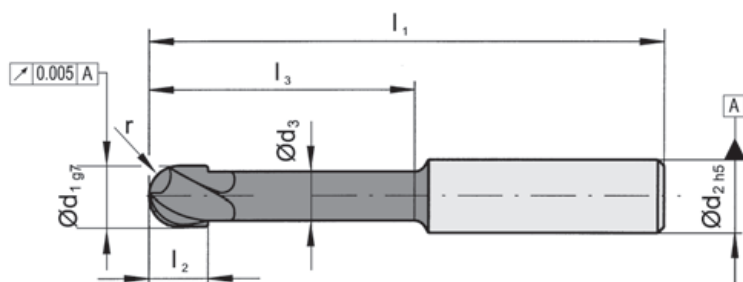
Cobalt Chromium

Recommended material group III - CoCr alloys

## DSKC

2-/3-/4-/5-/7-fluted, 30° helix angle

recommended cutting data page O112



Cobalt Chromium

Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	TSCC
DSKC.2.010.063.06	1.0	6	0.9	63	2	3.0	0.50	2	▲
DSKC.2.015.063.06	1.5	6	1.4	63	2	4.5	0.75	2	▲
DSKC.2.020.063.06	2.0	6	1.9	63	3	5.0	1.00	2	▲
DSKC.2.020.077.06				77		8.0			▲
DSKC.2.030.063.06	3.0	6	2.9	63	4	7.5	1.50	2	▲
DSKC.2.030.077.06				77		12.0			▲
DSKC.3.040.063.06	4.0	6	3.8	63	5	10.0	2.00	3	▲
DSKC.3.040.077.06				77		16.0			▲
DSKC.4.050.063.06	5.0	6	4.7	63	5	12.5	2.50	4	▲
DSKC.4.050.077.06				77		20.0			▲
DSKC.4.060.063.06		6		63		15.0			▲
DSKC.4.060.077.06	6.0	6	5.6	77	6	24.0	3.00	4	▲
DSKC.4.060.099.08		8		99		36.0			▲
DSKC.5.080.063.08		8		63		20.0			▲
DSKC.5.080.077.08		8		77		32.0			▲
DSKC.5.080.099.08	8.0	8	7.4	99	8	48.0	4.00	5	▲
DSKC.5.080.119.10		10		119		40.0			▲
DSKC.5.100.077.10		10		77		25.0			▲
DSKC.5.100.099.10	10.0	10	9.4	99	10	40.0	5.00	5	▲
DSKC.5.100.119.12		12		119		60.0			▲
DSKC.7.120.077.12	12.0	12	11.4	77	12	30.0	6.00	7	▲
DSKC.7.120.099.12				99		48.0			▲
DSKC.7.160.099.16	16.0	16	15.4	99	20	50.0	8.00	7	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P
M
K
N
S ●
H

Dimensions in mm

Carbide grades

Carbide grade TSCC preferred for CoCr alloys, e.g Medical technology

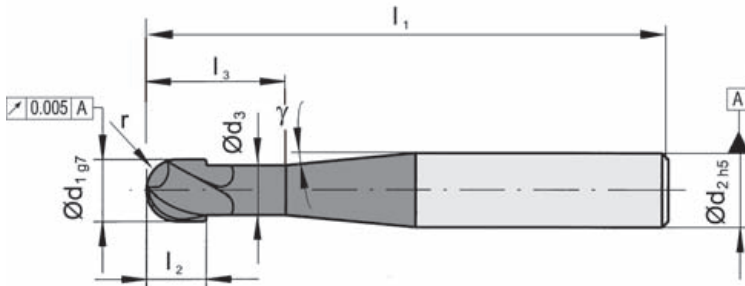


Recommended material group III - CoCr alloys

## DSKLC

4-/5-/7-fluted, 30° helix angle

recommended cutting data page O112



Cobalt Chromium

Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	γ	TSCC
<b>DSKLC.4.060.149.08</b>	6	8	5.6	149	6	15	3	4	1.5°	▲
<b>DSKLC.5.080.149.10</b>	8	10	7.4	149	8	20	4	5	1.5°	▲
<b>DSKLC.5.100.149.12</b>	10	12	9.4	149	10	25	5	5	1.5°	▲
<b>DSKLC.7.120.149.16</b>	12	16	11.4	149	12	30	6	7	2.0°	▲
										P
										M
										K
										N
										S •
										H

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

Carbide grades

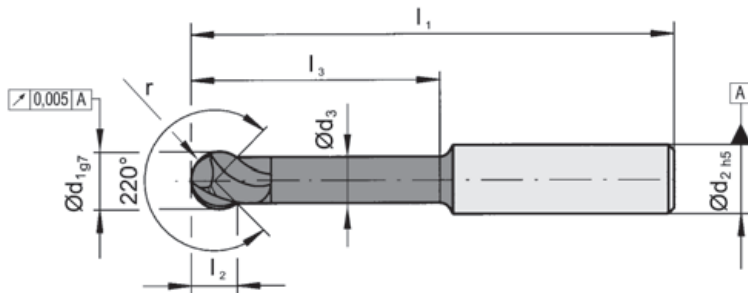
Carbide grade TSCC preferred for CoCr alloys, e.g Medical technology

Recommended material group III - CoCr alloys

## DSKC

2-/3-/4-/5-/7-fluted, 30° helix angle

recommended cutting data page O113



Cobalt Chromium

Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	TSCC
DSKC.2.030.063.06.2	3	6	2.80	63	2.0	15	1.5	2	▲
DSKC.3.040.063.06.2	4	6	3.75	63	2.6	20	2.0	3	▲
DSKC.4.050.063.06.2	5	6	4.70	63	3.3	25	2.5	4	▲
DSKC.4.060.063.06.2	6	6	5.65	63	4.0	30	3.0	4	▲
DSKC.5.080.088.08.2	8	8	7.50	88	5.3	40	4.0	5	▲
DSKC.5.100.101.10.2	10	10	9.40	101	6.7	50	5.0	5	▲
DSKC.7.120.119.12.2	12	12	11.30	119	8.0	60	6.0	7	▲
DSKC.7.160.119.16.2	16	16	15.10	119	10.7	72	8.0	7	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P
M
K
N
S •
H

Dimensions in mm

Carbide grades

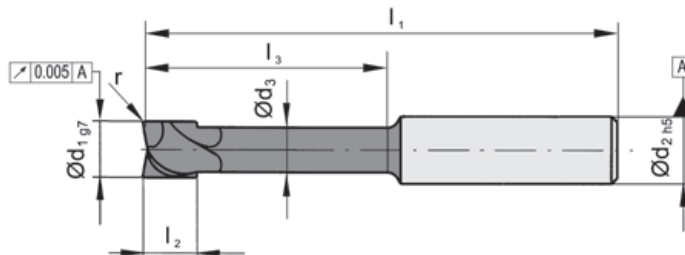
Carbide grade TSCC preferred for CoCr alloys, e.g Medical technology

Recommended material group III - CoCr alloys

## DSTC

2-/3-/4-/5-fluted, 30° helix angle

recommended cutting data page O114



Cobalt Chromium

Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	TSCC
DSTC.2.15.01.055.06	1.5	6	1.4	55	2.5	5.5	0.1	2	▲
DSTC.2.02.02.055.06	2.0	6	1.9	55	3.0	5.5	0.2	2	▲
DSTC.2.02.05.055.06							0.5		▲
DSTC.2.03.02.055.06	3.0	6	2.9	55	4.0	7.5	0.2	2	▲
DSTC.2.03.05.055.06							0.5		▲
DSTC.3.04.02.055.06	4.0	6	3.8	55	5.0	8.5	0.2	3	▲
DSTC.3.04.05.055.06							0.5		▲
DSTC.4.05.02.055.06	5.0	6	4.7	55	6.0	12.5	0.2	4	▲
DSTC.4.05.05.055.06							0.5		▲
DSTC.4.05.10.055.06							1.0		▲
DSTC.4.06.02.055.06	6.0	6	5.6	55	6.0	15.5	0.2	4	▲
DSTC.4.06.05.055.06							0.5		▲
DSTC.4.06.10.055.06							1.0		▲
DSTC.5.08.02.063.08	8.0	8	7.4	63	10.0	20.5	0.2	5	▲
DSTC.5.08.05.063.08							0.5		▲
DSTC.5.08.10.063.08							1.0		▲
DSTC.5.08.15.063.08	8.0	8	7.4	63	10.0	20.5	1.5	5	▲
DSTC.5.10.02.077.10	10.0	10	9.4	77	15.0	25.5	0.2	5	▲
DSTC.5.10.05.077.10	10.0	10	9.4	77	15.0	25.5	0.5		▲
DSTC.5.10.10.077.10	10.0	10	9.4		15.0	25.5	1.0		▲
DSTC.5.10.15.077.10	10.0	10	9.4		15.0	25.5	1.5		▲
DSTC.5.12.02.077.12	12.0	12	11.4		18.0	30.5	0.2		▲
DSTC.5.12.05.077.12	12.0	12	11.4	77	18.0	30.5	0.5	5	▲
DSTC.5.12.10.077.12	12.0	12	11.4		18.0	30.5	1.0		▲
DSTC.5.12.15.077.12	12.0	12	11.4		18.0	30.5	1.5		▲
DSTC.5.12.20.077.12	12.0	12	11.4		18.0	30.5	2.0		▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P
M
K
N
S
H

Dimensions in mm

Carbide grade TSCC preferred for CoCr alloys, e.g Medical technology

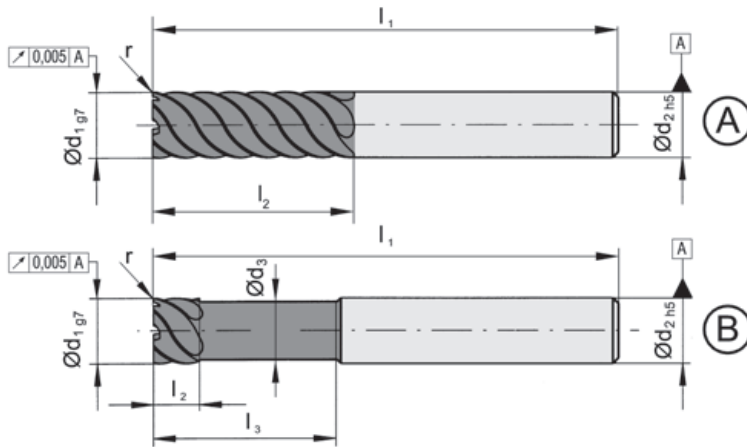
Carbide grades

Recommended material group III - CoCr alloys

## DSMRC

4-/5-/7-fluted, 30° helix angle

recommended cutting data page O115



Cobalt Chromium

Part number	d <sub>1</sub>	r	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d <sub>3</sub>	Z	Version	TSCC
DSMRC.4.03.55.06.02	3	0.2	6	55	9.5	-	-	4	A	▲
DSMRC.4.03.55.06.3S		0.3			3.0	9.5	2.9		B	▲
DSMRC.4.04.55.06.02	4	0.2	6	55	12.5	-	-	4	A	▲
DSMRC.4.04.55.06.3S		0.3			4.0	12.5	3.9		B	▲
DSMRC.4.05.55.06.02	5	0.2	6	55	15.5	-	-	4	A	▲
DSMRC.4.05.55.06.5S		0.5			5.0	15.5	4.8		B	▲
DSMRC.5.06.63.06.02	6	0.2	6	63	18.5	-	-	5	A	▲
DSMRC.5.06.63.06.5S		0.5			6.0	18.5	5.8		B	▲
DSMRC.5.08.63.08.10	8	1.0	8	63	24.5	-	-	5	A	▲
DSMRC.5.08.63.08.5S		0.5			8.0	24.5	7.8		B	▲
DSMRC.5.10.77.10.10	10	1.0	10	77	30.5	-	-	5	A	▲
DSMRC.5.10.77.10.5S		0.5			10.0	30.5	9.8		B	▲
DSMRC.7.12.88.12.10	12	1.0	12	88	36.5	-	-	7	A	▲
DSMRC.7.12.88.12.2S		0.2			12.0	36.5	11.8		B	▲
DSMRC.7.16.99.16.05	16	0.5	16	99	48.5	-	-	7	A	▲
DSMRC.7.16.99.16.20		2.0								▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P
M
K
N
S
H

Dimensions in mm

Carbide grades

Carbide grade TSCC preferred for CoCr alloys, e.g Medical technology



## **S100 Insert with through coolant**

Cutting edge cooled effectively.



HORN - LEADERS IN GROOVING TECHNOLOGY

For further information, please contact HORN USA.

# HIGH PRODUCTIVE MACHINING

- for copper materials -



Copper

**N**      **Copper**

	type	Page
Endmill Full radius 4-fluted	DSKK	O60
Torus Endmill 4-fluted with Corner radius	DSTK	O61
Endmill 3-fluted, with and without Corner radius	DSMK DSMRK	O62-O63
Micro Endmill Ballnose 2-fluted with Corner radius	DSKMK DSMMK	O64-O65
Formulas		O87-O88
Cutting data		O116-O121

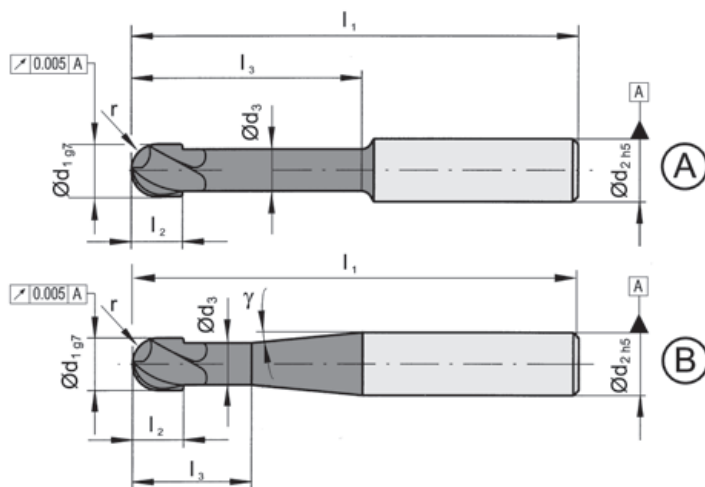
Copper

for copper

## DSKK

4-fluted, 30° helix angle

recommended cutting data page O116



Copper

Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	γ	Version	CN2K
DSKK.4.060.063.06	6	6	5.8	63	9	25	3.0	4	0°	A	▲
DSKK.4.080.077.08	8	8	7.8	77	10	25	4.0	4	0°	A	▲
DSKK.4.100.077.10	10	10	9.8	77	12	35	5.0	4	0°	A	▲
DSKK.4.120.088.12	12	12	11.7	88	16	40	6.0	4	0°	A	▲
DSKK.4.030.050.04	3	4	2.9	50	7	15	1.5	4	15°	B	▲
DSKK.4.030.063.06	3	6	2.9	63	7	15	1.5	4	15°	B	▲
DSKK.4.040.063.06	4	6	3.9	63	7	15	2.0	4	15°	B	▲
DSKK.4.050.063.06	5	6	4.8	63	7	20	2.5	4	15°	B	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P
M
K
N ●
S
H

Carbide grades

CrCn coated

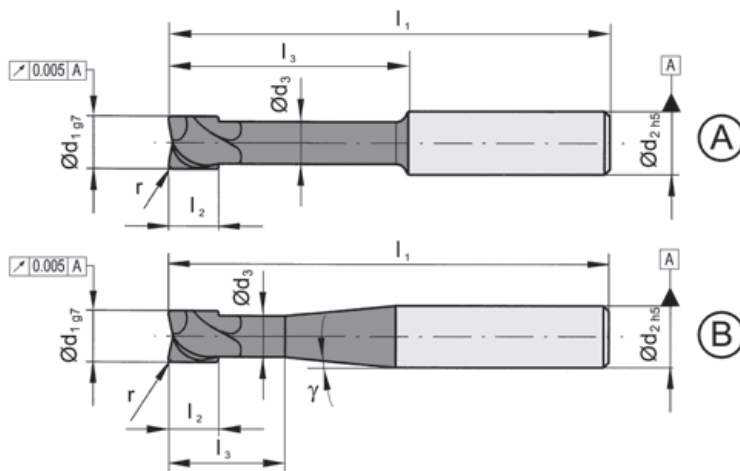


for copper

## DSTK

4-fluted, 20° helix angle, with corner radius

recommended cutting data page O117



Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	γ	Version	CN2K
DSTK.4.06.05.63.06	6	6	5.8	63	9	25	0.5				▲
DSTK.4.06.10.63.06	6	6	5.8	63	9	25	1.0				▲
DSTK.4.08.05.77.08	8	8	7.8	77	10	25	0.5				▲
DSTK.4.08.10.77.08	8	8	7.8	77	10	25	1.0				▲
DSTK.4.10.05.77.10	10	10	9.8	77	12	35	0.5	4	0°	A	▲
DSTK.4.10.10.77.10	10	10	9.8	77	12	35	1.0				▲
DSTK.4.12.10.88.12	12	12	11.7	88	16	40	1.0				▲
DSTK.4.16.10.99.16	16	16	15.7	100	28	40	1.0				▲
DSTK.4.03.05.50.04	3	4	2.9	50		15					▲
DSTK.4.03.05.63.06	3	6	2.9	63		15					▲
DSTK.4.04.05.63.06	4	6	3.9	63	7	15	0.5	4	15°	B	▲
DSTK.4.05.05.63.06	5	6	4.8	63		20					▲

Copper

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P
M
K
N •
S
H

Carbide grades

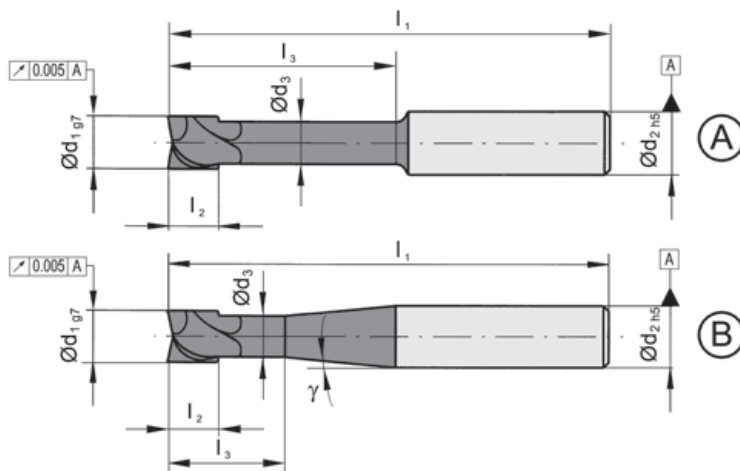
CrCn coated

for copper

## DSMK

3-fluted, 20° helix angle

recommended cutting data page O118



Copper

Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	Z	γ	Version	CN2K
DSMK.3.06.63.06	6	6	5.8	63	14	25	3	0°	A	▲
DSMK.3.08.77.08	8	8	7.8	77	18	25				▲
DSMK.3.10.77.10	10	10	9.8	77	22	35				▲
DSMK.3.12.88.12	12	12	11.7	88	26	40				▲
DSMK.3.16.99.16	16	16	15.7	100	32	45				▲
DSMK.3.03.50.04	3	4	2.9	50	7	15	3	15°	B	▲
DSMK.3.03.63.06	3	6	2.9	63	7	15				▲
DSMK.3.04.63.06	4	6	3.9	63	9	15				▲
DSMK.3.05.63.06	5	6	4.8	63	12	20				▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P
M
K
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H

Carbide grades

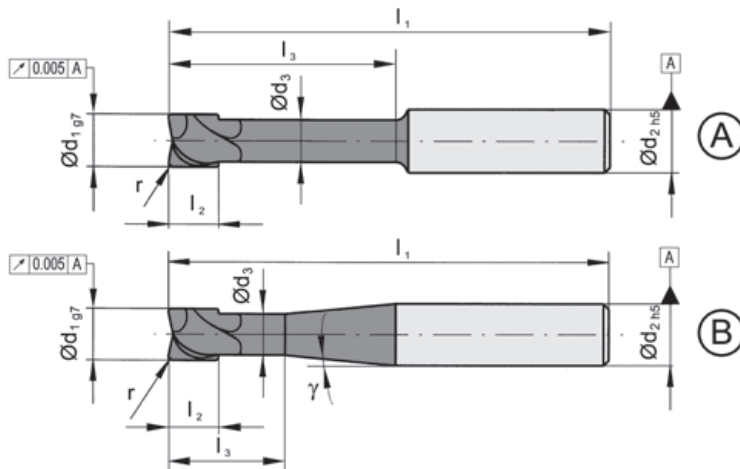
CrCn coated

for copper

## DSMRK

3-fluted, 20° helix angle, with corner radius

recommended cutting data page O119



with radius

Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	γ	Version	CN2K
DSMRK.3.06.63.06.02	6	6	5.8	63	14	25					▲
DSMRK.3.08.77.08.02	8	8	7.8	77	18	25					▲
DSMRK.3.10.77.10.02	10	10	9.8	77	22	35	0.2	3	0°	A	▲
DSMRK.3.12.88.12.02	12	12	11.7	88	26	40					▲
DSMRK.3.16.99.16.02	16	16	15.7	100	32	45					▲
DSMRK.3.03.50.04.01	3	4	2.9	50	7	15					▲
DSMRK.3.03.63.06.01	3	6	2.9	63	7	15	0.1	3	15°	B	▲
DSMRK.3.04.63.06.01	4	6	3.9	63	9	15					▲
DSMRK.3.05.63.06.01	5	6	4.8	63	12	20					▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P
M
K
N
S
H

Carbide grades

CrCn coated

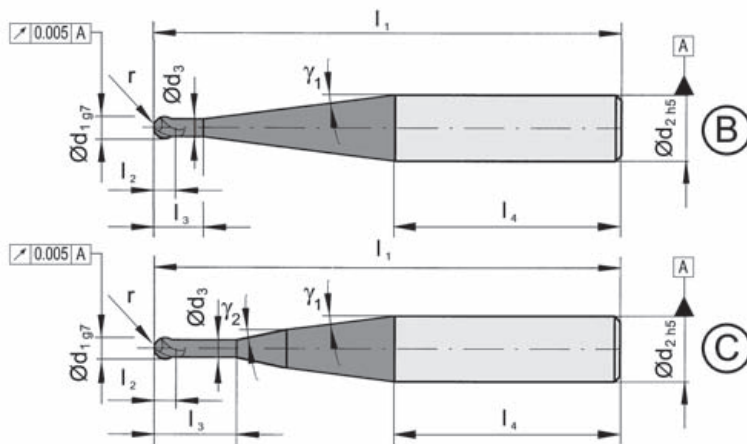
Copper

for copper

## DSKMK

2-fluted, 20° helix angle

recommended cutting data page O120



Copper

Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	d <sub>3</sub>	r	Z	γ <sub>1</sub>	γ <sub>2</sub>	Version	CN2K
DSKMK.2.03.50.4.L30	0.3			1.0	3	36	0.25	0.15		9.7°			▲
DSKMK.2.04.50.4.L30	0.4			1.0	3	36	0.35	0.20		9.4°			▲
DSKMK.2.05.50.4.L30	0.5			1.5	3	36	0.45	0.25		9.2°			▲
DSKMK.2.05.50.4.L50	0.5			1.5	5	36	0.45	0.25		11.2°			▲
DSKMK.2.06.50.4.L50	0.6	4	50	1.5	5	36	0.55	0.30	2	10.9°	0°	B	▲
DSKMK.2.08.50.4.L60	0.8			2.0	6	36	0.75	0.40		11.5°			▲
DSKMK.2.10.50.4.L40	1.0			2.5	4	36	0.90	0.50		8.8°			▲
DSKMK.2.10.50.4.L80	1.0			2.5	8	36	0.90	0.50		14.5°			▲
DSKMK.2.15.50.4.L10	1.5			3.5	10	34	1.40	0.75		12.2°			▲
DSKMK.2.20.50.4.L12	2.0			3.5	12	34	1.90	1.00		14.7°			▲
DSKMK.2.05.63.6.L30	0.5			1.5	3		0.45	0.25		8.9°			▲
DSKMK.2.05.63.6.L50	0.5			1.5	5		0.45	0.25		10.2°			▲
DSKMK.2.10.63.6.L40	1.0	6	63	2.5	4	40	0.90	0.50	2	8.6°	5°	C	▲
DSKMK.2.10.63.6.L80	1.0			2.5	8		0.90	0.50		11.9°			▲
DSKMK.2.15.63.6.L10	1.5			3.5	10		1.40	0.75		13.1°			▲
DSKMK.2.20.63.6.L12	2.0			3.5	12		1.90	1.00		15°			▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P
M
K
N •
S
H

Carbide grades

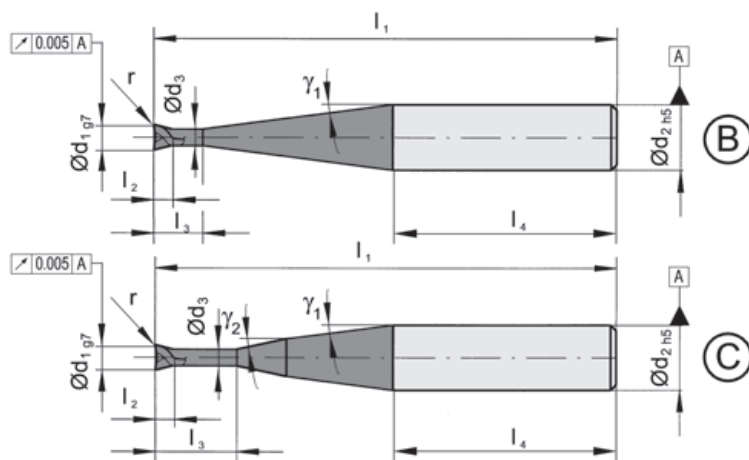
CrCn coated

for copper

## DSMMK

2-fluted, 20° helix angle, with corner radius

recommended cutting data page O121



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	d <sub>3</sub>	r	Z	γ <sub>1</sub>	γ <sub>2</sub>	Version	CN2K
DSMMK.2.03.50.4.L30	0.3			1.0	3	36	0.25			9.7°			▲
DSMMK.2.04.50.4.L30	0.4			1.0	3	36	0.35			9.4°			▲
DSMMK.2.05.50.4.L30	0.5			1.5	3	36	0.45			9.2°			▲
DSMMK.2.05.50.4.L50	0.5			1.5	5	36	0.45			11.2°			▲
DSMMK.2.06.50.4.L50	0.6	4	50	1.5	5	36	0.55	0.05	2	10.9°	0°	B	▲
DSMMK.2.08.50.4.L60	0.8			2.0	6	36	0.75			11.5°			▲
DSMMK.2.10.50.4.L40	1.0			2.5	4	36	0.90			8.8°			▲
DSMMK.2.10.50.4.L80	1.0			2.5	8	36	0.90			14.5°			▲
DSMMK.2.15.50.4.L10	1.5			3.5	10	34	1.40			12.2°			▲
DSMMK.2.20.50.4.L12	2.0			3.5	12	34	1.90			14.7°			▲
DSMMK.2.05.63.6.L30	0.5			1.5	3		0.45			8.9°			▲
DSMMK.2.05.63.6.L50	0.5			1.5	5		0.45			10.2°			▲
DSMMK.2.10.63.6.L40	1.0	6	63	2.5	4	40	0.90	0.05	2	8.6°	5°	C	▲
DSMMK.2.10.63.6.L80	1.0			2.5	8		0.90			11.9°			▲
DSMMK.2.15.63.6.L10	1.5			3.5	10		1.40			13.1°			▲
DSMMK.2.20.63.6.L12	2.0			3.5	12		1.90			15°			▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P
M
K
N •
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H

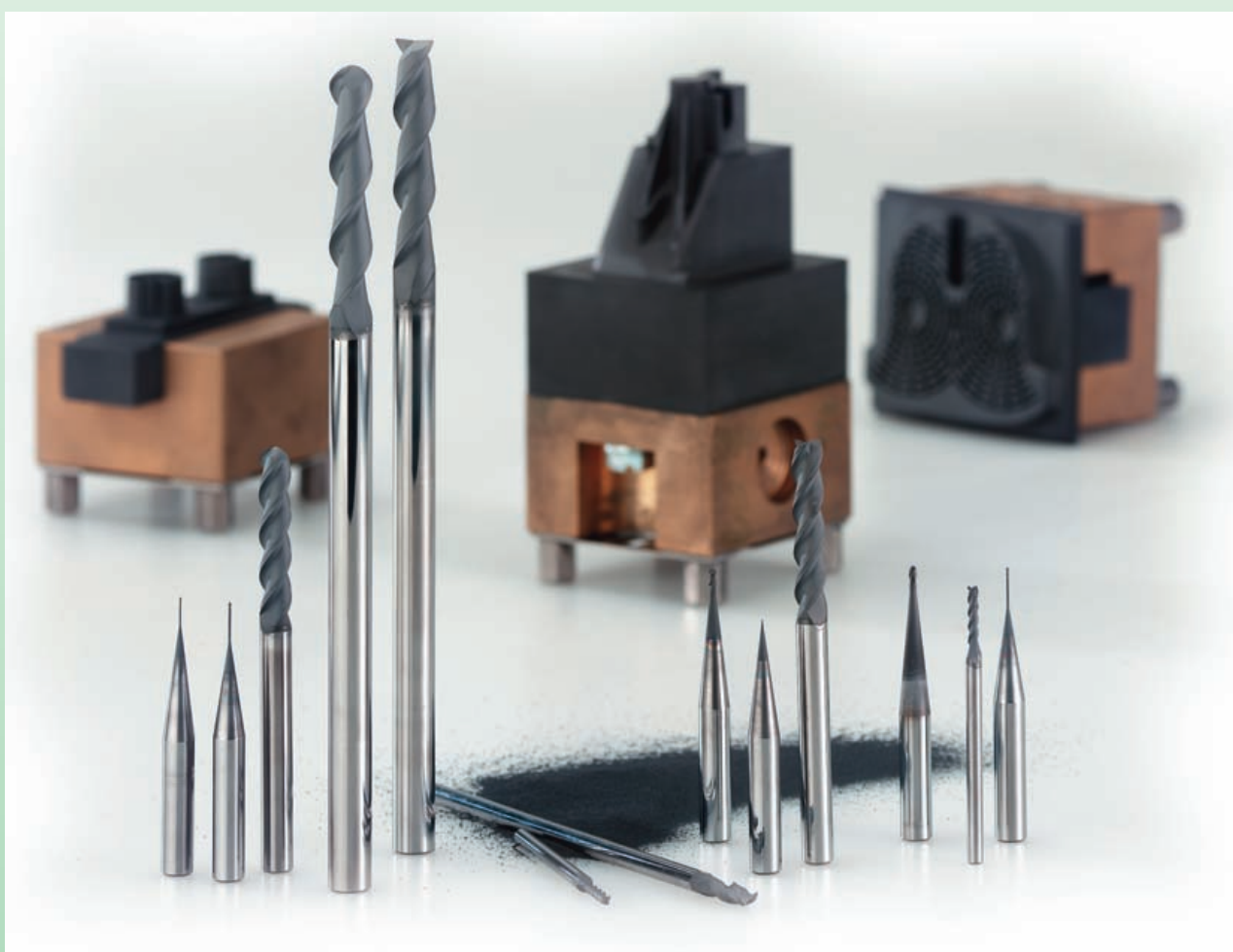
Carbide grades

CrCn coated

Copper

# HIGH PRODUCTIVE MACHINING

- for graphite materials -



Graphite

**N Graphite**

	type	Page
Endmill Ballnose 2-fluted / 3-fluted	DSKG DSKGL	O68-O69
Torus Endmill 2-/3-fluted with Corner radius	DSTG DSTLG	O70-O72
Roughing Endmill	DSVG	O73
Micro Endmill Ballnose 2-fluted	DSKMG	O74
Micro Endmill Multiple fluted Endmill 2-fluted with Corner radius	DSMMG	O75
Formulas		O87-O88
Cutting data		O122-O127

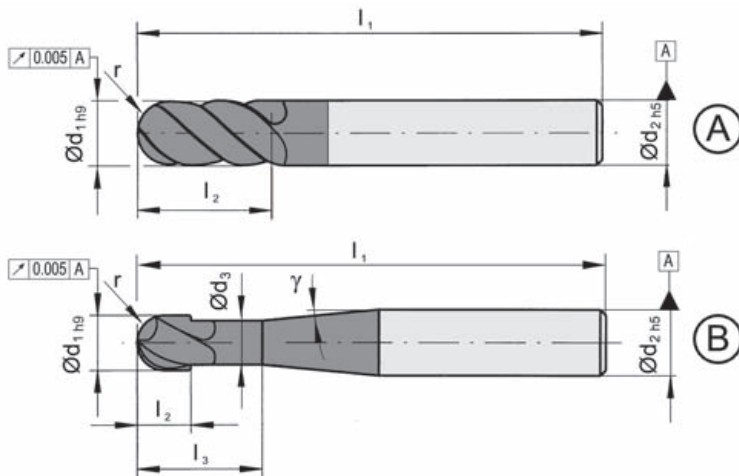
Graphite

for graphite

## DSKG

3-fluted, 40° helix angle

recommended cutting data page O122



Standard

Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	γ	Version	CD5K
DSKG.3.06.77.06	6	6					3.0				▲
DSKG.3.08.77.08	8	8					4.0				▲
DSKG.3.10.77.10	10	10	-	77	32	-	5.0	3	-	A	▲
DSKG.3.12.77.12	12	12					6.0				▲
DSKG.3.02.50.04.L20	2	4	1.9	50	12	20	1.0				▲
DSKG.3.02.63.06.L25	2	6	1.9	63	12	25	1.0				▲
DSKG.3.03.50.04.L20	3	4	2.9	50	12	20	1.5				▲
DSKG.3.03.63.06.L25	3	6	2.9	63	12	25	1.5	3	15°	B	▲
DSKG.3.04.63.06.L30	4	6	3.8	63	16	30	2.0				▲
DSKG.3.05.63.06.L30	5	6	4.8	63	22	30	2.5				▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P
M
K
N ○
S
H

Carbide grades

Diamond coated

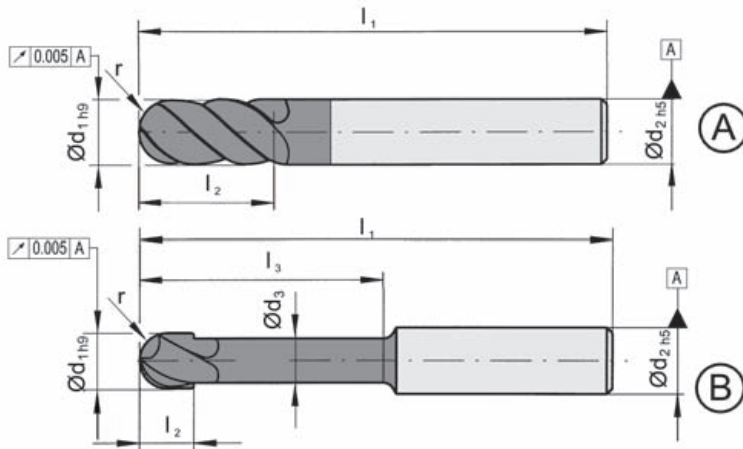


for graphite

## DSKGL

2-fluted, 40° helix angle

recommended cutting data page O123



long style

Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	Version	CD5K
<b>DSKGL.2.06.099.06</b>	6	6	5.6	99	20	45	3.0	2	A	▲
<b>DSKGL.2.08.149.08</b>	8	8	7.6	149	20	60	4.0			▲
<b>DSKGL.2.10.149.10</b>	10	10	9.6	149	20	75	5.0			▲
<b>DSKGL.2.12.149.12</b>	12	12	11.6	149	25	75	6.0			▲
<b>DSKGL.2.02.099.04</b>	2	4	1.9	99	5	10	1.0	2	B	▲
<b>DSKGL.2.03.099.04</b>	3	4	2.9		8	15	1.5			▲
<b>DSKGL.2.04.099.06</b>	4	6	3.8		15	30	2.0			▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P
M
K
N ○
S
H

Carbide grades

Diamond coated

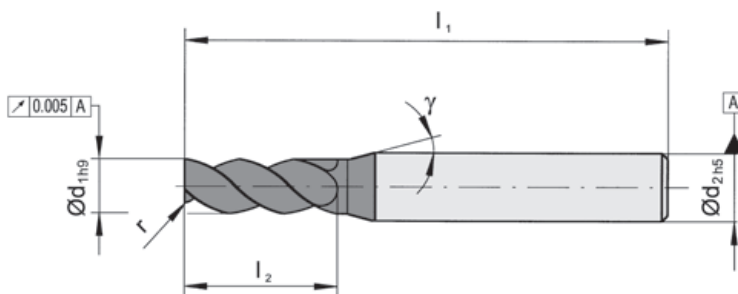
Graphite

for graphite

## DSTG

3-fluted, 40° helix angle, with corner radius

recommended cutting data page O124



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	r	Z	γ	CD5K
DSTG.3.02.1.50.04	2	4	50	12	0.1	3	15°	▲
DSTG.3.02.3.50.04								▲
DSTG.3.02.1.63.06	2	6	63	12	0.1	3	15°	▲
DSTG.3.02.3.63.06								▲
DSTG.3.03.1.50.04	3	4	50	12	0.1	3	15°	▲
DSTG.3.03.3.50.04								▲
DSTG.3.03.1.63.06	3	6	63	12	0.1	3	15°	▲
DSTG.3.03.3.63.06								▲
DSTG.3.04.2.63.06	4	6	63	16	0.2	3	15°	▲
DSTG.3.04.5.63.06								▲
DSTG.3.05.2.63.06	5	6	63	22	0.2	3	15°	▲
DSTG.3.05.5.63.06								▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P
M
K
N ○
S
H

Carbide grades

Diamond coated

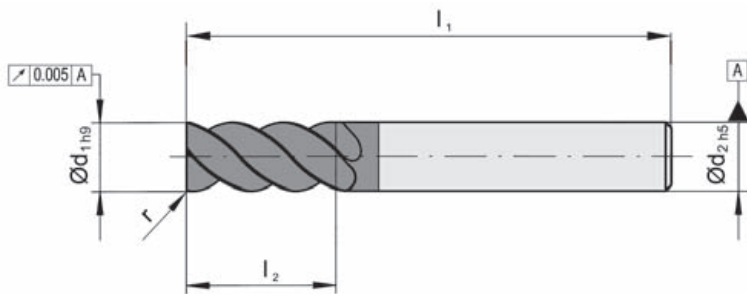
Graphite

for graphite

## DSTG

3-fluted, 40° helix angle, with corner radius

recommended cutting data page O124



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	r	Z	CD5K
DSTG.3.06.3.77.06	6	6	77	32	0.3	3	▲
DSTG.3.06.5.77.06							▲
DSTG.3.06.10.77.06							▲
DSTG.3.08.3.77.08	8	8	77	32	0.3	3	▲
DSTG.3.08.5.77.08							▲
DSTG.3.08.10.77.08							▲
DSTG.3.10.3.77.10	10	10	77	32	0.3	3	▲
DSTG.3.10.5.77.10							▲
DSTG.3.10.10.77.10							▲
DSTG.3.12.3.77.12	12	12	77	32	0.3	3	▲
DSTG.3.12.5.77.12							▲
DSTG.3.12.10.77.12							▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P
M
K
N ○
S
H

Carbide grades

Diamond coated

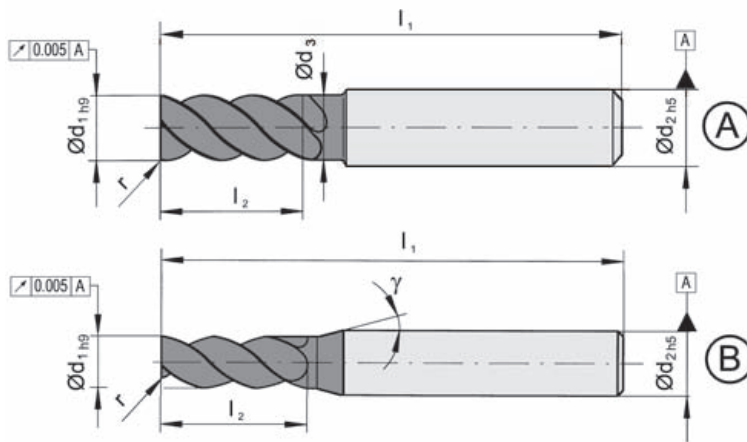
Graphite

for graphite

## DSTLG

2-fluted, 40° helix angle, with corner radius

recommended cutting data page O124



long style

Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	γ	Version	CD5K
DSTLG.2.06.5.099.06	6	6	5.6	99	20	45					▲
DSTLG.2.08.5.149.08	8	8	7.6	149	20	60	0.5	2	-	A	▲
DSTLG.2.10.5.149.10	10	10	9.6	149	20	75					▲
DSTLG.2.12.5.149.12	12	12	11.6	149	25	75					▲
DSTLG.2.02.3.099.04	2	4	1.9		5	10					▲
DSTLG.2.03.3.099.04	3	4	2.9	99	8	15	0.3	2	15°	B	▲
DSTLG.2.04.3.099.06	4	6	3.8		15	30					▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P
M
K
N ○
S
H

Carbide grades

Diamond coated

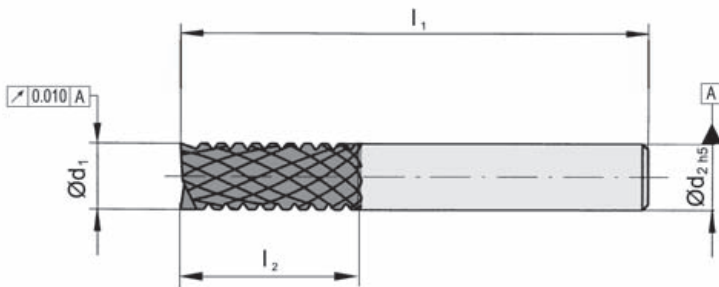
Graphite

for graphite

## DSVG

multiple fluted

recommended cutting data page O125



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	CD5K
DSVG.X.04.0.59.04	4	4	59	12	▲
DSVG.X.06.0.77.06	6	6	77	18	▲
DSVG.X.08.0.77.08	8	8	77	24	▲
DSVG.X.10.0.77.10	10	10	77	30	▲
DSVG.X.12.0.88.12	12	12	88	36	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P
M
K
N ○
S
H

Carbide grades

Diamond coated

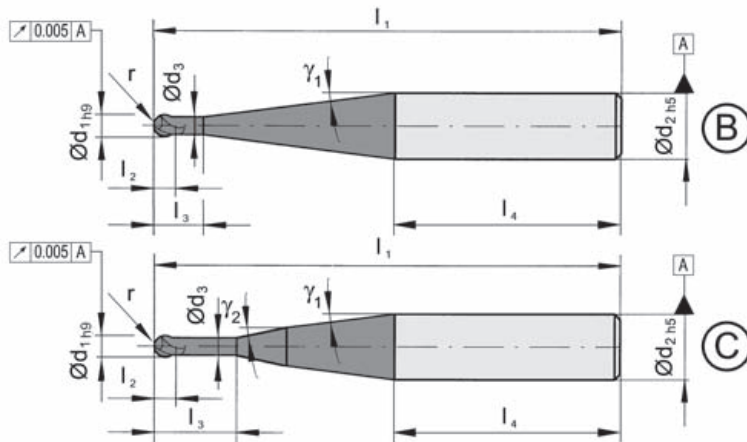
Graphite

for graphite

## DSKMG

2-fluted, 40° helix angle

recommended cutting data page O126



Graphite

Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	d <sub>3</sub>	r	Z	γ <sub>1</sub>	γ <sub>2</sub>	Version	CD5K
DSKMG.2.03.50.4.L40	0.3			2.0	4		0.25	0.15		10.6°		B	▲
DSKMG.2.04.50.4.L50	0.4			2.0	5		0.35	0.20		11.5°			▲
DSKMG.2.05.50.4.L60	0.5			2.0	6		0.45	0.25		12.5°			▲
DSKMG.2.06.50.4.L70	0.6	4	50	2.5	7	36	0.55	0.30	2	13.8°			▲
DSKMG.2.08.50.4.L80	0.8			2.5	8		0.75	0.40		15.2°			▲
DSKMG.2.10.50.4.L10	1.0			3.5	10		0.90	0.50		21.2°			▲
DSKMG.2.10.50.4.L60	1.0			3.5	6		0.90	0.50		11°			▲
DSKMG.2.15.50.4.L10	1.5			3.5	10		1.40	0.75		18°			▲
DSKMG.2.05.63.6.L40	0.5			2.0	4		0.45	0.25		9.5°		C	▲
DSKMG.2.05.63.6.L60	0.5			2.0	6		0.45	0.25		11°			▲
DSKMG.2.10.63.6.L10	1.0	6	63	2.5	10	40	0.90	0.50	2	14.8°	5		▲
DSKMG.2.10.63.6.L60	1.0			3.5	6		0.90	0.50		10°			▲
DSKMG.2.15.63.6.L10	1.5			3.5	10		1.40	0.75		13.1°			▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P
M
K
N ○
S
H

Carbide grades

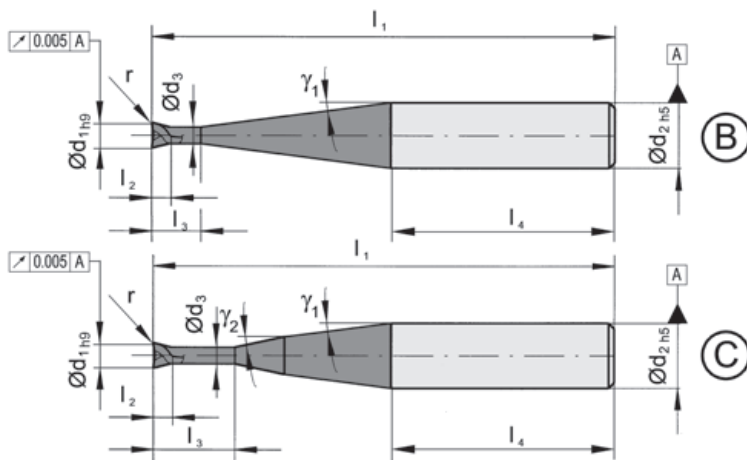
Diamond coated

for graphite

## DSMMG

2-fluted, 40° helix angle, with corner radius

recommended cutting data page O127



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	d <sub>3</sub>	r	Z	γ <sub>1</sub>	γ <sub>2</sub>	Version	CD5K
DSMMG.2.03.50.4.L40	0.3			2.0	4		0.25			10.6°			▲
DSMMG.2.04.50.4.L50	0.4			2.0	5		0.35			11.5°			▲
DSMMG.2.05.50.4.L40	0.5			2.0	4		0.45			10.1°			▲
DSMMG.2.05.50.4.L60	0.5			2.0	6		0.45			12.5°			▲
DSMMG.2.06.50.4.L70	0.6	4	50	2.5	7	36	0.55	0.05	2	13.8°	0°	B	▲
DSMMG.2.08.50.4.L80	0.8			2.5	8		0.75			15.2°			▲
DSMMG.2.10.50.4.L10	1.0			3.5	10		0.90			21.2°			▲
DSMMG.2.10.50.4.L60	1.0			3.5	6		0.90			11°			▲
DSMMG.2.15.50.4.L10	1.5			3.5	10		1.40			18°			▲
DSMMG.2.05.63.6.L40	0.5			2.0	4		0.45			9.5°			▲
DSMMG.2.05.63.6.L60	0.5			2.0	6		0.45			11°			▲
DSMMG.2.10.63.6.L10	1.0	6	63	3.5	10	40	0.90	0.05	2	14.8°	5°	C	▲
DSMMG.2.10.63.6.L60	1.0			3.5	6		0.90			10°			▲
DSMMG.2.15.63.6.L10	1.5			3.5	10		1.40			13.1°			▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P
M
K
N ○
S
H

Carbide grades

Diamond coated

Graphite

# HIGH PRODUCTIVE MACHINING

- for Aluminum materials and Synthetics -





## N Aluminum and Synthetics

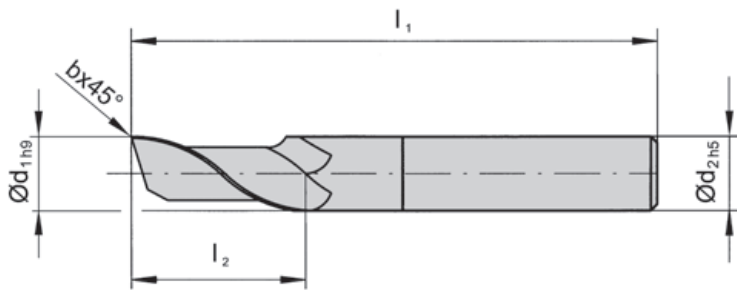
	type	Page
Endmill 1-/2-fluted	DSA	O78-O80
Endmill Ballnose 2-fluted	DSAKH DSAK	O81-O83
Roughing ripped Endmill 3-fluted	DSAR	O84
Torus Endmill 2-fluted with Corner radius	DSAT	O85
Formulas		O88-87
Cutting data		O128-O133

## Recommended material group V

## DSA

single fluted

recommended cutting data page O128



Part number	d <sub>1</sub>	b	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Z	MG3K	CD3K
DSA.1.006.37.03	0.6	-	3	37	3	1	▲	▲
DSA.1.008.37.03	0.8	-	3	37	4		▲	▲
DSA.1.010.37.03	1.0	-	3	37	5		▲	▲
DSA.1.012.37.03	1.2	-	3	37	5		▲	▲
DSA.1.015.37.03	1.5	-	3	37	5		▲	▲
DSA.1.016.37.03	1.6	-	3	37	6		▲	▲
DSA.1.018.37.03	1.8	-	3	37	7		▲	▲
DSA.1.020.37.03	2.0	-	3	37	8		▲	▲
DSA.1.025.37.03	2.5	-	3	37	9		▲	▲
DSA.1.030.37.03	3.0	0.10	3	37	12		▲	▲
DSA.1.040.49.04	4.0	0.10	4	49	12		▲	▲
DSA.1.050.49.05	5.0	0.15	5	49	15		▲	▲
DSA.1.060.49.06	6.0	0.20	6	49	16		▲	▲
DSA.1.070.59.07	7.0	0.20	7	59	20		▲	▲
DSA.1.080.59.08	8.0	0.25	8	59	20		▲	▲
DSA.1.100.69.10	10.0	0.30	10	69	22		▲	▲
DSA.1.120.74.12	12.0	0.35	12	74	25		▲	▲
DSA.1.160.101.16	16.0	0.35	16	101	30		▲	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Carbide grades	MG3K	CD3K
P	●	■
M	○	■
K	●	■
N	●	●
S	●	■
H	■	■

Dimensions in mm

Carbide grades

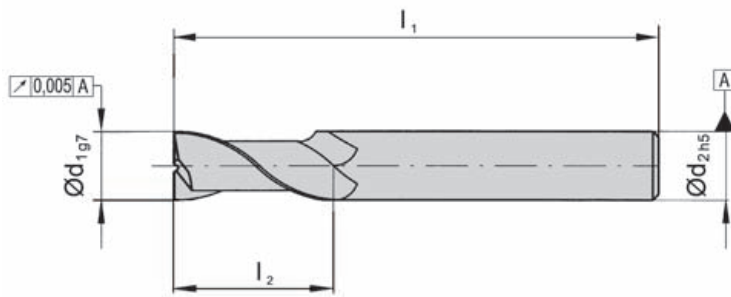
Carbide grade MG3K preferred for Synthetics, pure Aluminum and Aluminum ≤ 5% Si  
 Carbide grade CD3K preferred for Aluminum ≥ 5% Si

## Recommended material group V

## DSA

2-fluted, 55° helix angle

recommended cutting data page O129



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Z	Carbide grades	
						MG3K	DD2K
DSA.2.03.50.03	3	3	50	10	2	▲	▲
DSA.2.04.50.04	4	4	50	15		▲	▲
DSA.2.05.50.05	5	5	50	20		▲	▲
DSA.2.06.77.06	6	6	77	30		▲	▲
DSA.2.08.77.08	8	8	77	30		▲	▲
DSA.2.10.88.10	10	10	88	35		▲	▲
DSA.2.12.88.12	12	12	88	35		▲	▲
DSA.2.14.101.14	14	14	101	40		▲	▲
DSA.2.16.101.16	16	16	101	40		▲	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

Carbide grades

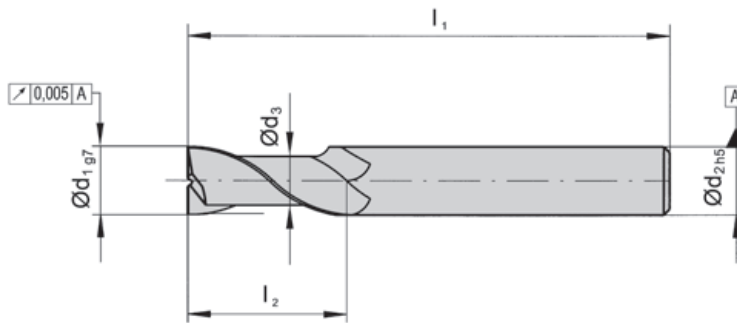
Carbide grade MG3K preferred for Synthetics, pure Aluminum and Aluminum ≤ 5% Si  
 Carbide grade DD2K preferred for AlSi-alloys up to 6% Si, Copper and Titanium

## Recommended material group V

## DSA

2-fluted, 55° helix angle

recommended cutting data page O129



short style

Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Z	MG3K	DD2K
DSA.2.03.50.03S	3	3	50	5	2	▲	▲
DSA.2.04.50.04S	4	4	50	7		▲	▲
DSA.2.05.50.05S	5	5	50	10		▲	▲
DSA.2.06.77.06S	6	6	77	15		▲	▲
DSA.2.08.77.08S	8	8	77	15		▲	▲
DSA.2.10.88.10S	10	10	88	17		▲	▲
DSA.2.12.88.12S	12	12	88	18		▲	▲
DSA.2.14.101.14S	14	14	101	20		▲	▲
DSA.2.16.101.16S	16	16	101	20		▲	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

Carbide grades

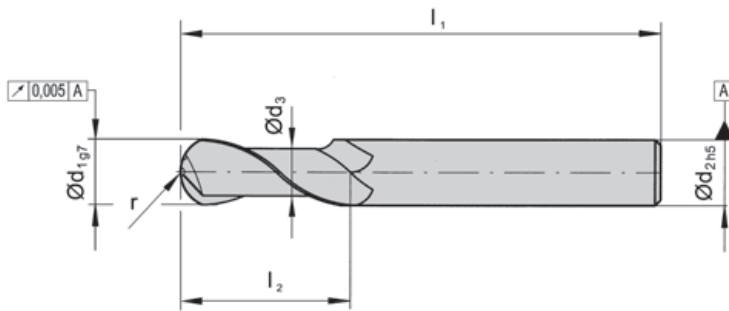
Carbide grade MG3K preferred for Synthetics, pure Aluminum and Aluminum ≤ 5% Si  
 Carbide grade DD2K preferred for AlSi-alloys up to 6% Si, Copper and Titanium

## Recommended material group V

## DSAKH

2-fluted, 25° helix angle

recommended cutting data page O130



Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	r	Z	MG3K	DD2K
DSAKH.2.06.77.08	6	8	5.9	77	8	3	2	▲	▲
DSAKH.2.08.77.10	8	10	7.9	77	10	4		▲	▲
DSAKH.2.10.77.12	10	12	9.9	77	10	5		▲	▲
DSAKH.2.12.77.12	12	12	11.9	77	12	6		▲	▲
DSAKH.2.14.88.14	14	14	13.9	88	14	7		▲	▲
DSAKH.2.16.88.16	16	16	15.9	88	16	8		▲	▲
								P	•
								M	o
								K	•
								N	•
								S	• •
								H	

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

Carbide grades

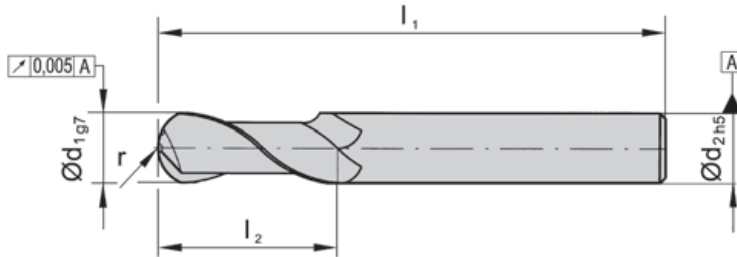
Carbide grade MG3K preferred for Synthetics, pure Aluminum and Aluminum ≤ 5% Si  
 Carbide grade DD2K preferred for AlSi-alloys up to 6% Si, Copper and Titanium

## Recommended material group V

## DSAK

2-fluted, 55° helix angle

recommended cutting data page O131



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	r	Z	MG3K	DD2K
DSAK.2.03.50.03	3	3	50	10	1.5	2	▲	▲
DSAK.2.04.50.04	4	4	50	15	2.0		▲	▲
DSAK.2.05.50.05	5	5	50	20	2.5		▲	▲
DSAK.2.06.77.06	6	6	77	30	3.0		▲	▲
DSAK.2.08.77.08	8	8	77	30	4.0		▲	▲
DSAK.2.10.88.10	10	10	88	35	5.0		▲	▲
DSAK.2.12.88.12	12	12	88	35	6.0		▲	▲
DSAK.2.14.101.14	14	14	101	40	7.0		▲	▲
DSAK.2.16.101.16	16	16	101	40	8.0		▲	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

Carbide grades

P	●	■
M	○	■
K	●	■
N	●	■
S	●	●
H		

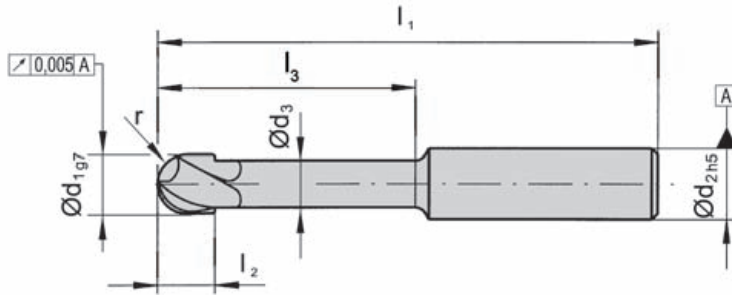
Carbide grade MG3K preferred for Synthetics, pure Aluminum and Aluminum ≤ 5% Si  
 Carbide grade DD2K preferred for AlSi-alloys up to 6% Si, Copper and Titanium

## Recommended material group V

## DSAK

2-fluted, 55° helix angle

recommended cutting data page O131



short style

Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	MG3K	DD2K
DSAK.2.03.50.03S	3	3	2.9	50	5	20	1.5	2	▲	▲
DSAK.2.04.50.04S	4	4	3.9	50	7	20	2.0		▲	▲
DSAK.2.05.50.05S	5	5	4.9	50	10	20	2.5		▲	▲
DSAK.2.06.77.06S	6	6	5.8	77	15	40	3.0		▲	▲
DSAK.2.08.77.08S	8	8	7.8	77	15	40	4.0		▲	▲
DSAK.2.10.88.10S	10	10	9.7	88	17	55	5.0		▲	▲
DSAK.2.12.88.12S	12	12	11.7	88	18	55	6.0		▲	▲
DSAK.2.14.101.14S	14	14	13.6	101	20	64	7.0		▲	▲
DSAK.2.16.101.16S	16	16	15.6	101	20	64	8.0		▲	▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

Carbide grades	MG3K	DD2K
P	●	■
M	○	■
K	●	■
N	●	■
S	●	●
H	■	■

Carbide grades

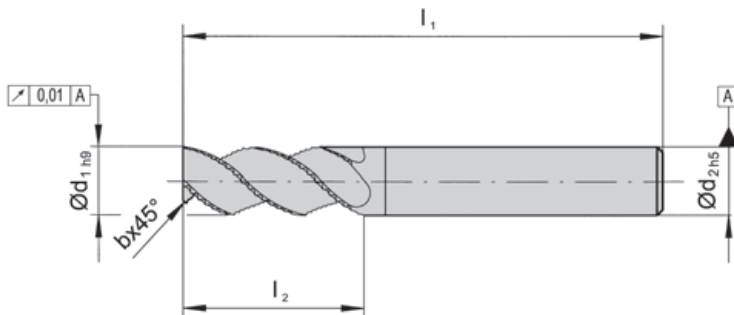
Carbide grade MG3K preferred for Synthetics, pure Aluminum and Aluminum ≤ 5% Si  
 Carbide grade DD2K preferred for AlSi-alloys up to 6% Si, Copper and Titanium

Recommended material group V

## DSAR

3-fluted, 25° helix angle, with corner chamfer

recommended cutting data page O132



Part number	d <sub>1</sub>	b	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	Z	MG3K
DSAR.3.06.63.06.25	6	0.25	6	63	16	3	▲
DSAR.3.08.63.08.50	8	0.50	8	63	20		▲
DSAR.3.10.69.10.50	10	0.50	10	69	22		▲
DSAR.3.12.77.12.50	12	0.50	12	77	25		▲
DSAR.3.16.88.16.10	16	1.00	16	88	35		▲
							P ●
							M ○
							K ●
							N ●
							S ●
							H

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

Carbide grades

Carbide grade MG3K preferred for Synthetics, pure Aluminum and Aluminum ≤ 5% Si

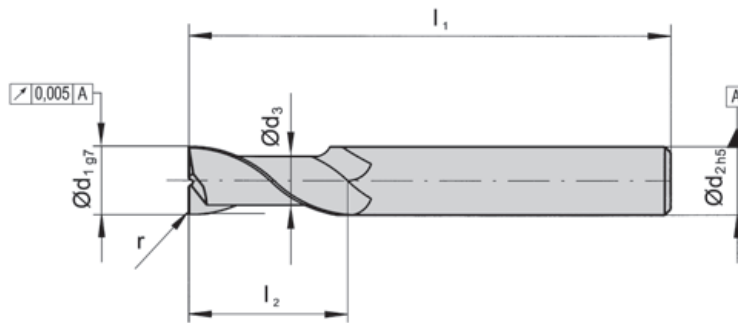


## Recommended material group V

## DSAT

2-fluted, 25° helix angle, with corner radius

recommended cutting data page O133



Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	r	Z	MG3K	DD2K
DSAT.2.06.10.77.08	6	8	5.9	77	8	1.0	2	▲	▲
DSAT.2.08.10.77.10	8	10	7.9	77	10	1.0		▲	▲
DSAT.2.10.15.77.12	10	12	9.9	77	10	1.5		▲	▲
DSAT.2.12.15.77.12	12	12	11.9	77	12	1.5		▲	▲
DSAT.2.14.20.88.14	14	14	13.9	88	14	2.0		▲	▲
DSAT.2.16.20.88.16	16	16	15.9	88	16	2.0		▲	▲
								P	•
								M	o
								K	•
								N	•
								S	• •
								H	

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

Carbide grades

Carbide grade MG3K preferred for Synthetics, pure Aluminum and Aluminum ≤ 5% Si  
 Carbide grade DD2K preferred for AlSi-alloys up to 6% Si, Copper and Titanium

## Accuracy and Precision

Example:

HORN Microendmill DS with HSK-Shrink chuck



Z = Number of flutes

d = Cutting edge Ø

n = Revolutions 
$$n = \frac{v_c \cdot 1000}{d \cdot \pi} \text{ (1/min) (RPM)}$$

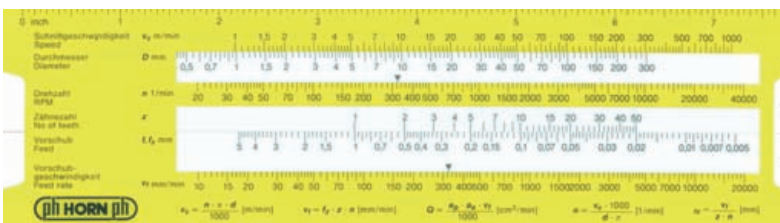
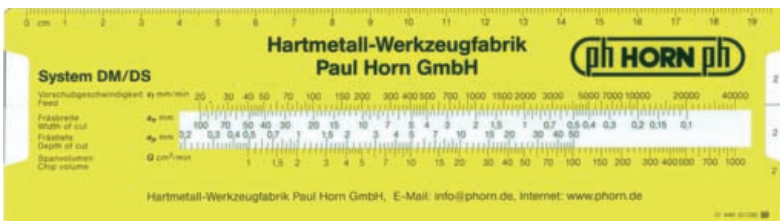
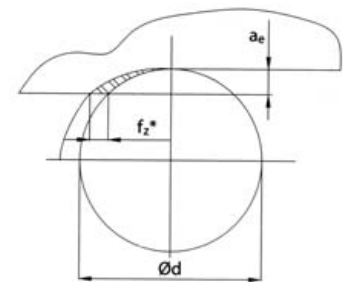
$v_c$  = Cutting speed 
$$v_c = \frac{d \cdot \pi \cdot n}{1000} \text{ (m/min)} / .3048 = \text{sfm}$$

$f_z$  = Feed/tooth 
$$f_z = \frac{V_f}{Z \cdot n} \text{ (mm/tooth)} / 25.4 = \text{inch/tooth}$$

$v_f$  = Feed rate 
$$V_f = f_z \cdot Z \cdot n \text{ (mm/min)} / 25.4 = \text{inch/min}$$

Q = Material removal rate 
$$Q = \frac{a_e \cdot a_p \cdot V_f}{1000} \text{ (cm}^3\text{/min)} * .06102376 = \text{inch}^3\text{/min}$$

$f_z^*$  = effective for side milling with small  $a_e$  (up to  $0.25 \cdot d$ ) 
$$*f_z = f_z \sqrt{\frac{d}{a_e}} \text{ (mm/tooth)} / 25.4 = \text{inch}$$



To easily determine the correct cutting data, please use the HORN speed and feed calculation.

## Cutting speed and number of revolutions for copy milling

$v_c =$  Cutting speed

$$v_c = \frac{d_{\text{eff}} \cdot \pi \cdot n}{1000} \quad (\text{m/min}) / .3048 = \text{sfm}$$

$n =$  Revolutions

$$n = \frac{v_c \cdot 1000}{d_{\text{eff}} \cdot \pi} \quad (1/\text{min}) \text{ (RPM)}$$

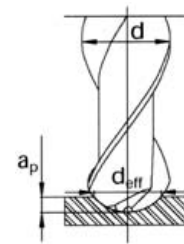
Effective cutting diameter  $d_{\text{eff}}$  of  $\beta = 0^\circ$

$$d_{\text{eff}} = 2\sqrt{d \cdot a_p - a_p^2} \quad (\text{mm})$$

Example:

$d = \text{Ø}12 \text{ mm}; a_p = 1.2 \text{ mm}; \beta = 0^\circ$

→  $d_{\text{eff}} = 7.2 \text{ mm}$



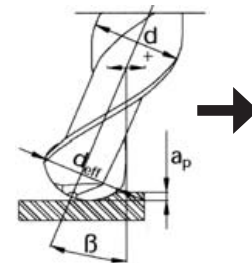
Effective cutting diameter  $d_{\text{eff}}$  of  $\beta = +20^\circ$

$$d_{\text{eff}} = d \cdot \sin \left[ \beta + \arccos \left( \frac{d - 2a_p}{d} \right) \right]$$

Example:

$d = \text{Ø}12 \text{ mm}; a_p = 1.2 \text{ mm}; \beta = +20^\circ$

→  $d_{\text{eff}} = 10.05 \text{ mm}$



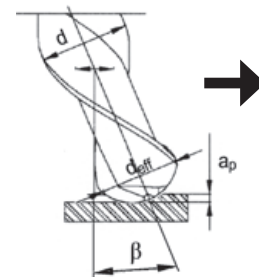
Effective cutting diameter  $d_{\text{eff}}$  of  $\beta = -20^\circ$

$$d_{\text{eff}} = d \cdot \sin \left[ \arccos \left( \frac{d - 2a_p}{d} \right) - \beta \right]$$

Example:

$d = \text{Ø}12 \text{ mm}; a_p = 1.2 \text{ mm}; \beta = -20^\circ$

→  $d_{\text{eff}} = 3.48 \text{ mm}$



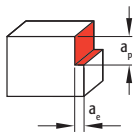
## Milling cutter System DP

Material	Rm (N/mm <sup>2</sup> )	Cutting speed (V <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 600	120-240
Alloyed steel	< 1200	80-180
High alloyed steel	< 1400	50-120
<b>M</b> Stainless steel austenitic/ferritic martenistic	< 680 < 820	60-140 40-120
<b>K</b> Grey cast iron		80-180
Cast steel		60-140
<b>N</b> Aluminium alloys		160-500
Copper		160-600
Brass		
Graphite		
Synthetics		
<b>S</b> High temp. alloys	< 3300	30-80
Titanium alloys	< 2100	40-90
<b>H</b> Hardened steel		

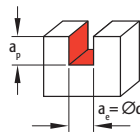
### Tolerances

Ø Range	Cutting edge Ø	Shank Ø
≤ 3	0	0
	-0.025	-0.004
> 3 ≤ 6	0	0
	-0.030	-0.005
> 6 ≤ 10	0	0
	-0.036	-0.006
> 10 ≤ 18	0	0
	-0.043	-0.008
> 18 ≤ 30	0	0
	-0.052	-0.009

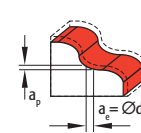
For further material specifications see material cross reference list.



Shoulder milling



Slot milling



Copy milling

$$a_p = 1.25 \times d \quad a_p = 1.50 \times d \quad a_p = 2.00 \times d$$

$$a_e = 0.40 \times d \quad a_e = 0.20 \times d \quad a_e = 0.05 \times d$$

$$a_p = 0.50 \times d \quad a_p = 1.00 \times d$$

$$a_e = 1.00 \times d \quad a_e = 1.00 \times d$$

$$a_p = 0.10 \times d \quad a_p = 0.20 \times d$$

$$a_e = 0.40 \times d \quad a_e = 0.05 \times d$$

Ø d (mm)	roughing	semi finishing	finishing
	f <sub>z</sub> (mm)	f <sub>z</sub> (mm)	f <sub>z</sub> (mm)
1	0.005	0.007	0.009
2	0.008	0.009	0.011
3	0.015	0.025	0.035
4	0.020	0.030	0.045
5	0.025	0.035	0.055
6	0.030	0.040	0.065
8	0.035	0.045	0.075
10	0.040	0.055	0.085
12	0.050	0.065	0.095
16	0.070	0.090	0.115
20	0.090	0.110	0.130

0.5 x d	1.0 x d
f <sub>z</sub> (mm)	f <sub>z</sub> (mm)
0.008	0.005
0.010	0.008
0.020	0.010
0.025	0.013
0.030	0.015
0.035	0.020
0.045	0.030
0.055	0.040
0.065	0.050
0.075	0.060
0.085	0.075

semi finishing	finishing
f <sub>z</sub> (mm)	f <sub>z</sub> (mm)
0.020	0.040
0.030	0.050
0.040	0.060
0.050	0.080
0.060	0.100
0.070	0.120
0.080	0.140
0.100	0.180
0.120	0.200
0.140	0.220
0.160	0.250

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill Ballnose



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
Alloyed steel	> 1000	< 300	
Tool steel	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600 < 850	< 200 < 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	
Aluminium < 5%Si	< 500	< 150	
Aluminium > 5%Si	< 400	< 120	
Copper	< 350	< 100	
Brass	< 700	< 200	
Graphite			
Synthetics			
<b>S</b> High temp. alloys	< 900	< 300	
Titanium alloys	< 900	< 300	
<b>H</b> Hardened steel		45-52 HRc 50-60 HRc 58-70 HRc	300-500 200-400

AlTiN coated

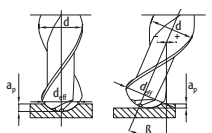
recommended cooling:  
1. Minimum lubrication  
2. Air

HSM

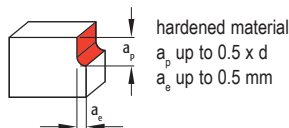


Ballnose

For further material specifications see material cross reference list.



For the cutting speed v<sub>c</sub> calculation the effective cutting diameter d<sub>eff</sub> has to be taken into account. See formula.



hardened material  
a<sub>p</sub> up to 0.5 x d  
a<sub>e</sub> up to 0.5 mm



hardened material  
a<sub>p</sub> up to 0.025 x d  
a<sub>e</sub> up to 0.280 mm

$$\beta = 0: d_{\text{eff}} = 2 \cdot \sqrt{d \cdot a_p \cdot a_p^2}$$

$$\beta \neq 0: d_{\text{eff}} = d \cdot \sin \left[ \beta \pm \arccos \left( \frac{d - 2a_p}{d} \right) \right]$$

### Shoulder milling

### Copy milling

type	Z	Ø d (mm)	Shoulder milling			Copy milling		
			a <sub>p</sub> max (mm)	a <sub>g</sub> max (mm)	f <sub>z</sub> (mm)	a <sub>p</sub> max (mm)	a <sub>g</sub> max (mm)	f <sub>z</sub> (mm)
DSK	2	1.0	< 0.5	< 0.02	0.020 - 0.030	< 0.04	< 0.01	0.030 - 0.040
DSK	2	1.5	< 0.8	< 0.03	0.020 - 0.030	< 0.06	< 0.02	0.030 - 0.040
DSK	2	2.0	< 1.0	< 0.04	0.030 - 0.050	< 0.08	< 0.02	0.050 - 0.075
DSK	2	3.0	< 1.5	< 0.06	0.040 - 0.060	< 0.11	< 0.03	0.055 - 0.090
DSK	2	4.0	< 2.0	< 0.10	0.050 - 0.080	< 0.14	< 0.05	0.065 - 0.100
DSK	2	5.0	< 2.5	< 0.13	0.060 - 0.120	< 0.18	< 0.07	0.075 - 0.120
DSK	2	6.0	< 3.0	< 0.18	0.065 - 0.125	< 0.20	< 0.09	0.080 - 0.125
DSK	2	8.0	< 4.0	< 0.24	0.080 - 0.130	< 0.25	< 0.12	0.090 - 0.130
DSK	2	10.0	< 5.0	< 0.30	0.085 - 0.135	< 0.30	< 0.15	0.100 - 0.135
DSK	2	12.0	< 6.0	< 0.36	0.100 - 0.140	< 0.36	< 0.20	0.110 - 0.140
DSK	2	16.0	< 8.0	< 0.50	0.100 - 0.150	< 0.40	< 0.28	0.120 - 0.150

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill Ballnose



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
	Alloyed steel	> 1000	< 300
	Tool steel	> 850 > 1000	> 250 > 300
<b>M</b> Stainless steel	< 600	< 200	
	< 850	< 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	
	Aluminium < 5%Si	< 500	< 150
	Aluminium > 5%Si	< 400	< 120
	Copper	< 350	< 100
	Brass	< 700	< 200
	Graphite Synthetics		
<b>S</b> High temp. alloys	< 900	< 300	
	Titanium alloys	< 900	< 300
<b>H</b> Hardened steel		50-60 HRc	140-280
		58-70 HRc	120-220

AlTiN coated

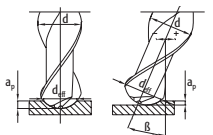
recommended cooling:  
1. Minimum lubrication  
2. Air

HSM

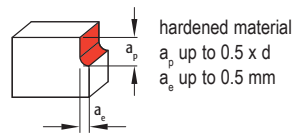


Ballnose

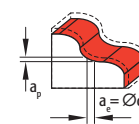
For further material specifications see material cross reference list.



For the cutting speed v<sub>c</sub> calculation the effective cutting diameter d<sub>eff</sub> has to be taken into account. See formula.



hardened material  
a<sub>p</sub> up to 0.5 x d  
a<sub>e</sub> up to 0.5 mm



hardened material  
a<sub>p</sub> up to 0.025 x d  
a<sub>e</sub> up to 0.280 mm

$$\beta = 0: d_{\text{eff}} = 2 \cdot \sqrt{d \cdot a_p - a_p^2}$$

$$\beta \neq 0: d_{\text{eff}} = d \cdot \sin \left[ \beta \pm \arccos \left( \frac{d - 2a_p}{d} \right) \right]$$

### Shoulder milling

### Copy milling

type	Z	Ø d (mm)	Shoulder milling			Copy milling		
			a <sub>p</sub> max (mm)	a <sub>g</sub> max (mm)	f <sub>z</sub> (mm)	a <sub>p</sub> max (mm)	a <sub>g</sub> max (mm)	f <sub>z</sub> (mm)
DSKH	2	1.0	< 0.5	< 0.02	0.020 - 0.030	< 0.04	< 0.01	0.030 - 0.060
DSKH	2	1.5	< 0.8	< 0.03	0.020 - 0.030	< 0.06	< 0.02	0.030 - 0.060
DSKH	2	2.0	< 1.0	< 0.04	0.030 - 0.050	< 0.08	< 0.02	0.050 - 0.070
DSKH	2	3.0	< 1.5	< 0.06	0.040 - 0.060	< 0.11	< 0.03	0.055 - 0.080
DSKH	2	4.0	< 2.0	< 0.10	0.050 - 0.080	< 0.14	< 0.05	0.065 - 0.100
DSKH	2	5.0	< 2.5	< 0.13	0.060 - 0.120	< 0.18	< 0.07	0.075 - 0.150
DSKH	2	6.0	< 3.0	< 0.18	0.065 - 0.125	< 0.20	< 0.09	0.080 - 0.200
DSKH	2	8.0	< 4.0	< 0.24	0.080 - 0.130	< 0.25	< 0.12	0.090 - 0.250
DSKH	2	10.0	< 5.0	< 0.30	0.085 - 0.135	< 0.30	< 0.15	0.100 - 0.250
DSKH	2	12.0	< 6.0	< 0.36	0.100 - 0.140	< 0.36	< 0.20	0.110 - 0.250
DSKH	2	16.0	< 8.0	< 0.50	0.100 - 0.150	< 0.40	< 0.28	0.120 - 0.250

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill Ballnose



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
	Alloyed steel	> 1000	< 300
	Tool steel	> 850 > 1000	> 250 > 300
<b>M</b> Stainless steel	< 600	< 200	
	< 850	< 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	
	Aluminium < 5%Si	< 500	< 150
	Aluminium > 5%Si	< 400	< 120
	Copper	< 350	< 100
	Brass	< 700	< 200
	Graphite Synthetics		
<b>S</b> High temp. alloys	< 900	< 300	
	Titanium alloys	< 900	< 300
<b>H</b> Hardened steel		45-52 HRc	300-500
		50-60 HRc	200-400
		58-70 HRc	

AlTiN coated

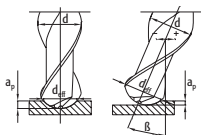
recommended cooling:  
1. Minimum lubrication  
2. Air

HSM

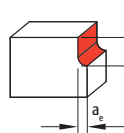


Ballnose

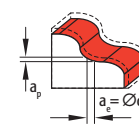
For further material specifications see material cross reference list.



For the cutting speed v<sub>c</sub> calculation the effective cutting diameter d<sub>eff</sub> has to be taken into account. See formula.



hardened material  
a<sub>p</sub> up to 0.50 x d  
a<sub>e</sub> up to 0.36 mm



hardened material  
a<sub>p</sub> up to 0.03 x d  
a<sub>e</sub> up to 0.20 mm

$$\beta = 0: d_{\text{eff}} = 2 \cdot \sqrt{d \cdot a_p \cdot a_p^2}$$

$$\beta \neq 0: d_{\text{eff}} = d \cdot \sin \left[ \beta \pm \arccos \left( \frac{d - 2a_p}{d} \right) \right]$$

### Shoulder milling

### Copy milling

type ?	Z	Ø d (mm)
DSKL	2	6.0
DSKL	2	8.0
DSKL	2	10.0
DSKL	2	12.0

a <sub>p</sub> max (mm)	a <sub>g</sub> max (mm)	f <sub>z</sub> (mm)
< 3.0	< 0.18	0.065 - 0.125
< 4.0	< 0.24	0.080 - 0.130
< 5.0	< 0.30	0.085 - 0.135
< 6.0	< 0.36	0.100 - 0.140

a <sub>p</sub> max (mm)	a <sub>g</sub> max (mm)	f <sub>z</sub> (mm)
< 0.20	< 0.09	0.080 - 0.125
< 0.25	< 0.12	0.090 - 0.130
< 0.30	< 0.15	0.100 - 0.135
< 0.36	< 0.20	0.110 - 0.140

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.



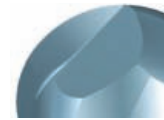
## Endmill Ballnose



AlTiN coated

recommended cooling:  
1. Minimum lubrication  
2. Air

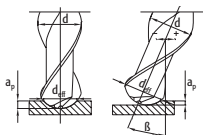
HSM



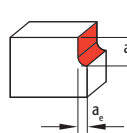
Ballnose

Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
Alloyed steel	> 1000	< 300	
Tool steel	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600 < 850	< 200 < 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	
Aluminium < 5%Si	< 500	< 150	
Aluminium > 5%Si	< 400	< 120	
Copper	< 350	< 100	
Brass	< 700	< 200	
Graphite			
Synthetics			
<b>S</b> High temp. alloys	< 900	< 300	
Titanium alloys	< 900	< 300	
<b>H</b> Hardened steel		50-60 HRc 58-70 HRc	140-280 120-220

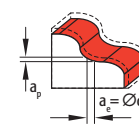
For further material specifications see material cross reference list.



For the cutting speed v<sub>c</sub> calculation the effective cutting diameter d<sub>eff</sub> has to be taken into account. See formula.



hardened material  
a<sub>p</sub> up to 0.50 x d  
a<sub>e</sub> up to 0.36 mm



hardened material  
a<sub>p</sub> up to 0.03 x d  
a<sub>e</sub> up to 0.20 mm

$$\beta = 0: d_{\text{eff}} = 2 \cdot \sqrt{d \cdot a_p \cdot a_p^2}$$

$$\beta \neq 0: d_{\text{eff}} = d \cdot \sin \left[ \beta \pm \arccos \left( \frac{d - 2a_p}{d} \right) \right]$$

### Shoulder milling

### Copy milling

type ?	Z	Ø d (mm)
DSKLH	2	6.0
DSKLH	2	8.0
DSKLH	2	10.0
DSKLH	2	12.0

a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
< 3.0	< 0.18	0.065 - 0.125
< 4.0	< 0.24	0.080 - 0.130
< 5.0	< 0.30	0.085 - 0.135
< 6.0	< 0.36	0.100 - 0.140

a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
< 0.20	< 0.09	0.080 - 0.200
< 0.25	< 0.12	0.090 - 0.250
< 0.30	< 0.15	0.100 - 0.250
< 0.36	< 0.20	0.110 - 0.250

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## 220° Endmill Ballnose



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300
<b>M</b> Stainless steel	< 600	< 200	
	< 850	< 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	
	Aluminium < 5%Si	< 500	< 150
	Aluminium > 5%Si	< 400	< 120
	Copper	< 350	< 100
	Brass	< 700	< 200
	Graphite		
	Synthetics		
<b>S</b> High temp. alloys	< 900	< 300	
	Titanium alloys	< 900	
<b>H</b> Hardened steel		45-52 HRc	300-500
		50-60 HRc	200-400
		58-70 HRc	

AlTiN coated

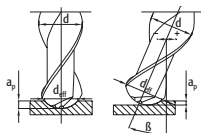
recommended cooling:  
1. Minimum lubrication  
2. Air

HSM

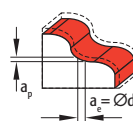


220° Ballnose

For further material specifications see material cross reference list.



For the cutting speed v<sub>c</sub> calculation the effective cutting diameter d<sub>eff</sub> has to be taken into account. See formula.



hardened material  
a<sub>p</sub> up to 0.025 x d  
a<sub>e</sub> up to 0.28 mm

$$\beta = 0: d_{\text{eff}} = 2 \cdot \sqrt{d \cdot a_p - a_p^2}$$

$$\beta \neq 0: d_{\text{eff}} = d \cdot \sin \left[ \beta \pm \arccos \left( \frac{d - 2a_p}{d} \right) \right]$$

### Copy milling

type	Z	Ø d (mm)	a <sub>p</sub> max (mm)	a <sub>g</sub> max (mm)	f <sub>z</sub> (mm)
DSK 220°	2	3.0	< 0.11	< 0.03	0.020 - 0.035
DSK 220°	2	4.0	< 0.14	< 0.05	0.025 - 0.040
DSK 220°	2	5.0	< 0.18	< 0.07	0.030 - 0.045
DSK 220°	2	6.0	< 0.20	< 0.09	0.030 - 0.050
DSK 220°	2	8.0	< 0.25	< 0.12	0.040 - 0.050
DSK 220°	2	12.0	< 0.30	< 0.15	0.040 - 0.060
DSK 220°	2	12.0	< 0.36	< 0.20	0.050 - 0.060
DSK 220°	2	16.0	< 0.40	< 0.28	0.080 - 0.080

## 220° Endmill Ballnose



AlTiN coated

recommended cooling:  
1. Minimum lubrication  
2. Air

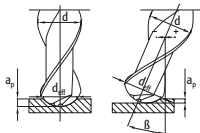
HSM



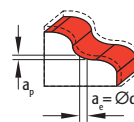
220° Ballnose

Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
	Alloyed steel	< 300	
	Tool steel	> 850 > 1000	> 250 > 300
<b>M</b> Stainless steel	< 600	< 200	
	< 850	< 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	
	Aluminium < 5%Si	< 150	
	Aluminium > 5%Si	< 120	
	Copper	< 100	
	Brass	< 200	
	Graphite		
	Synthetics		
<b>S</b> High temp. alloys	< 900	< 300	
	Titanium alloys	< 300	
<b>H</b> Hardened steel		50-60 HRc	140-280
		58-70 HRc	120-220

For further material specifications see material cross reference list.



For the cutting speed v<sub>c</sub> calculation the effective cutting diameter d<sub>eff</sub> has to be taken into account. See formula.



hardened material  
a<sub>p</sub> up to 0.025 x d  
a<sub>e</sub> up to 0.28 mm

$$\beta = 0: d_{\text{eff}} = 2 \cdot \sqrt{d \cdot a_p - a_p^2}$$

$$\beta \neq 0: d_{\text{eff}} = d \cdot \sin \left[ \beta \pm \arccos \left( \frac{d - 2a_p}{d} \right) \right]$$

### Copy milling

type	Z	Ø d (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
DSKH 220°	2	3.0	< 0.11	< 0.03	0.020 - 0.080
DSKH 220°	2	4.0	< 0.14	< 0.05	0.025 - 0.100
DSKH 220°	2	5.0	< 0.18	< 0.07	0.030 - 0.150
DSKH 220°	2	6.0	< 0.20	< 0.09	0.030 - 0.200
DSKH 220°	2	8.0	< 0.25	< 0.12	0.040 - 0.250
DSKH 220°	2	10.0	< 0.30	< 0.15	0.040 - 0.250
DSKH 220°	2	12.0	< 0.36	< 0.20	0.050 - 0.250
DSKH 220°	2	16.0	< 0.40	< 0.28	0.050 - 0.250

## Endmill Ballnose



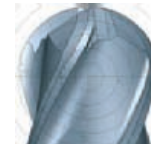
Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)	
<b>P</b> Carbon steel	< 750	< 250		
	Alloyed steel	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600	< 200		
	< 850	< 250		
<b>K</b> Malleable cast iron		< 260		
<b>N</b> Aluminium	< 350	< 100		
	Aluminium < 5%Si	< 500	< 150	
	Aluminium > 5%Si	< 400	< 120	
	Copper	< 350	< 100	
	Brass	< 700	< 200	
	Graphite			
	Synthetics			
<b>S</b> High temp. alloys	< 900	< 300		
	Titanium alloys	< 900		
<b>H</b> Hardened steel		45-52 HRc	300-500	
		50-60 HRc	200-400	
		58-70 HRc		

AlTiN coated

recommended cooling:  
1. Minimum lubrication  
2. Air

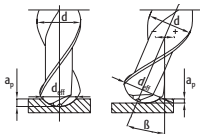
**HSM**

Attention: In the centre z = 2!

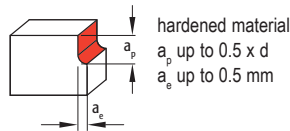


Ballnose

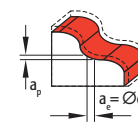
For further material specifications see material cross reference list.



For the cutting speed v<sub>c</sub> calculation the effective cutting diameter d<sub>eff</sub> has to be taken into account. See formula.



hardened material  
a<sub>p</sub> up to 0.5 x d  
a<sub>e</sub> up to 0.5 mm



hardened material  
a<sub>p</sub> up to 0.025 x d  
a<sub>e</sub> up to 0.280 mm

$$\beta = 0: d_{\text{eff}} = 2 \cdot \sqrt{d \cdot a_p \cdot a_e}$$

$$\beta \neq 0: d_{\text{eff}} = d \cdot \sin \left[ \beta \pm \arccos \left( \frac{d - 2a_p}{d} \right) \right]$$

### Shoulder milling

### Copy milling

type	Z	Ø d (mm)
DSK	4	6.0
DSK	4	8.0
DSK	4	10.0
DSK	4	12.0
DSK	4	16.0

a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
< 3.0	< 0.18	0.065 - 0.125
< 4.0	< 0.24	0.080 - 0.130
< 5.0	< 0.30	0.085 - 0.135
< 6.0	< 0.36	0.100 - 0.140
< 8.0	< 0.50	0.110 - 0.150

a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
< 0.20	< 0.09	0.080 - 0.125
< 0.25	< 0.12	0.090 - 0.130
< 0.30	< 0.15	0.100 - 0.135
< 0.36	< 0.20	0.110 - 0.140
< 0.40	< 0.28	0.120 - 0.150

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Micro Endmill Ballnose



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)	
<b>P</b> Carbon steel	< 750	< 250		
	Alloyed steel	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300	< 110
<b>M</b> Stainless steel	< 600	< 200	< 90	
	< 850	< 250		
<b>K</b> Malleable cast iron		< 260		
<b>N</b> Aluminium	< 350	< 100		
	Aluminium < 5%Si	< 500	< 150	
	Aluminium > 5%Si	< 400	< 120	
	Copper	< 350	< 100	
	Brass	< 700	< 200	
	Graphite			
	Synthetics			
<b>S</b> High temp. alloys	< 900	< 300	30-50	
	Titanium alloys	< 900	< 300	35-60
<b>H</b> Hardened steel		45-52 HRc	< 250	
		50-60 HRc	< 200	
		58-70 HRc		

AlTiN coated

Recommendation:  
Air pressure to remove chips

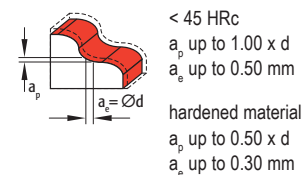
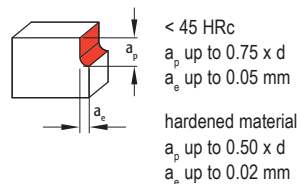
HSM



Ballnose

For further material specifications see material cross reference list.

Cutting Speed v<sub>c</sub> is based on max. 40.000 rpm.



L2	Reduction
1 - 5 x d	0%
5 - 10 x d	30%
10 ~	50%

### Shoulder milling

### Copy milling

type	Z	Ø d (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
			< 45 HRc	< 45 HRc	> 45 HRc	> 45 HRc	
DSKM	2	0.2	< 0.08	< 0.007	< 0.05	< 0.004	0.002 - 0.004
DSKM	2	0.3	< 0.11	< 0.011	< 0.10	< 0.006	0.003 - 0.006
DSKM	2	0.4	< 0.15	< 0.015	< 0.14	< 0.008	0.004 - 0.008
DSKM	2	0.5	< 0.20	< 0.019	< 0.18	< 0.010	0.005 - 0.009
DSKM	2	0.6	< 0.30	< 0.022	< 0.25	< 0.012	0.006 - 0.010
DSKM	2	0.8	< 0.40	< 0.030	< 0.35	< 0.016	0.006 - 0.012
DSKM	2	1.0	< 0.75	< 0.045	< 0.50	< 0.020	0.008 - 0.015
DSKM	2	1.2	< 0.90	< 0.054	< 0.60	< 0.024	0.010 - 0.016
DSKM	2	1.5	< 1.13	< 0.067	< 0.75	< 0.030	0.012 - 0.018
DSKM	2	2.0	< 1.50	< 0.090	< 1.00	< 0.040	0.016 - 0.022
DSKM	2	2.5	< 1.90	< 0.110	< 1.25	< 0.050	0.016 - 0.025
DSKM	2	3.0	< 2.25	< 0.130	< 1.50	< 0.060	0.019 - 0.028

a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
< 0.02	< 0.004	< 0.008	< 0.002	0.002 - 0.004
< 0.03	< 0.006	< 0.012	< 0.003	0.003 - 0.006
< 0.04	< 0.008	< 0.016	< 0.004	0.004 - 0.008
< 0.05	< 0.010	< 0.020	< 0.005	0.005 - 0.009
< 0.06	< 0.012	< 0.024	< 0.006	0.006 - 0.010
< 0.08	< 0.016	< 0.032	< 0.008	0.006 - 0.012
< 0.10	< 0.025	< 0.040	< 0.010	0.008 - 0.015
< 0.12	< 0.030	< 0.048	< 0.012	0.010 - 0.016
< 0.15	< 0.040	< 0.060	< 0.015	0.012 - 0.018
< 0.20	< 0.050	< 0.080	< 0.020	0.016 - 0.022
< 0.25	< 0.060	< 0.100	< 0.025	0.016 - 0.025
< 0.30	< 0.075	< 0.120	< 0.030	0.019 - 0.028

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill Double radius



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)	
<b>P</b> Carbon steel	< 750	< 250		
	> 1000	< 300		
	Tool steel	> 850 > 1000	> 250 > 300	170-250 150-200
<b>M</b> Stainless steel	< 600	< 200		
	< 850	< 250		
<b>K</b> Malleable cast iron		< 260	180-250	
<b>N</b> Aluminium	< 350	< 100		
	< 500	< 150		
	< 400	< 120		
	< 350	< 100		
	< 700	< 200		
	Graphite			
	Synthetics			
<b>S</b> High temp. alloys	< 900	< 300		
	< 900	< 300		
<b>H</b> Hardened steel		45-52 HRc		
		50-60 HRc 58-70 HRc		

AlTiN coated

recommended cooling:  
1. Minimum lubrication  
2. Air

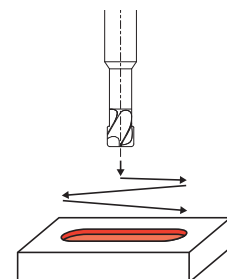
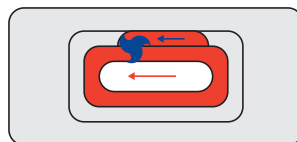
HSM



Double radius

For further material specifications see material cross reference list.

This endmill can be used for pocket milling; for strategy see drawings. Always mill from inside to outside. If possible use helicoidal down-milling, otherwise rampingdown.



### Shoulder milling

### Pocket milling

type	Z	Ø d (mm)
DSDS	4	6.0
DSDS	4	8.0
DSDS	4	10.0
DSDS	4	12.0
DSDS	4	16.0

a <sub>p</sub> max (mm)	a <sub>g</sub> max (mm)	f <sub>z</sub> (mm)
< 0.4	< 3.0	0.6 - 1.0
< 0.5	< 4.0	0.6 - 1.0
< 0.7	< 5.0	0.6 - 1.0
< 0.8	< 6.0	0.6 - 1.0
< 1.0	< 8.0	0.6 - 1.0

a <sub>p</sub> max (mm)	a <sub>g</sub> max (mm)	f <sub>z</sub> (mm)
< 0.4	< 6.0	0.5 - 1.0
< 0.5	< 8.0	0.5 - 1.0
< 0.7	< 10.0	0.5 - 1.0
< 0.8	< 12.0	0.5 - 1.0
< 1.0	< 16.0	0.5 - 1.0

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill Double radius



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
	Alloyed steel	> 1000	< 300
	Tool steel	> 850 > 1000	> 250 > 300
<b>M</b> Stainless steel	< 600	< 200	
	< 850	< 250	
<b>K</b> Malleable cast iron		< 260	180-250
<b>N</b> Aluminium	< 350	< 100	
	Aluminium < 5%Si	< 500	< 150
	Aluminium > 5%Si	< 400	< 120
	Copper	< 350	< 100
	Brass	< 700	< 200
	Graphite		
	Synthetics		
<b>S</b> High temp. alloys	< 900	< 300	
	Titanium alloys	< 900	< 300
<b>H</b> Hardened steel		45-52 HRc	
		50-60 HRc	
		58-70 HRc	

AlTiN coated

recommended cooling:  
1. Minimum lubrication  
2. Air

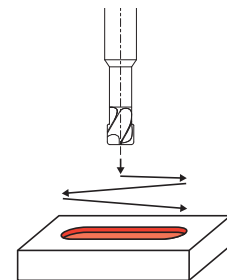
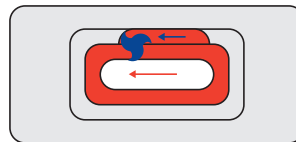
HSM



Double radius

For further material specifications see material cross reference list.

This endmill can be used for pocket milling; for strategy see drawings. Always mill from inside to outside. If possible use helicoidal down-milling, otherwise rampingdown.



### Shoulder milling

### Pocket milling

type	Z	Ø d (mm)
DSDH	4	6.0
DSDH	4	8.0
DSDH	4	10.0
DSDH	4	12.0
DSDH	4	16.0

a <sub>p</sub> max (mm)	a <sub>g</sub> max (mm)	f <sub>z</sub> (mm)
< 0.20	< 3.0	0.15 - 0.30
< 0.25	< 4.0	0.15 - 0.30
< 0.30	< 5.0	0.15 - 0.30
< 0.40	< 6.0	0.15 - 0.30
< 0.50	< 8.0	0.15 - 0.35

a <sub>p</sub> max (mm)	a <sub>g</sub> max (mm)	f <sub>z</sub> (mm)
< 0.20	< 6.0	0.15 - 0.30
< 0.25	< 8.0	0.15 - 0.30
< 0.30	< 10.0	0.15 - 0.30
< 0.40	< 12.0	0.15 - 0.30
< 0.50	< 16.0	0.15 - 0.35

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Torus Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
Alloyed steel	> 1000	< 300	
Tool steel	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600 < 850	< 200 < 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	
Aluminium < 5%Si	< 500	< 150	
Aluminium > 5%Si	< 400	< 120	
Copper	< 350	< 100	
Brass	< 700	< 200	
Graphite			
Synthetics			
<b>S</b> High temp. alloys	< 900	< 300	
Titanium alloys	< 900	< 300	
<b>H</b> Hardened steel		45-52 HRc 50-60 HRc 58-70 HRc	300-500 200-400

AlTiN coated

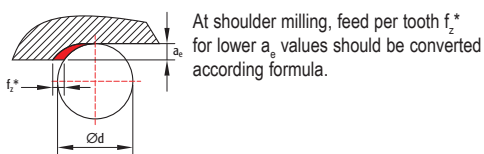
recommended cooling:  
1. Minimum lubrication  
2. Air

HSM

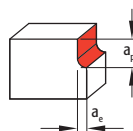


Torus

For further material specifications see material cross reference list.



$a_e$	$f_z^*$
0.10 x d	$f_z \times 3$
0.25 x d	$f_z \times 2$
0.50 x d	$f_z \times 1$



hardened material  
 $a_p$  up to 0.5 x d  
 $a_e$  up to 0.5 mm



hardened material  
 $a_p$  up to 0.025 x d  
 $a_e$  up to 0.280 mm

### Shoulder milling

### Copy milling

type	Z	Ø d (mm)
DST	2	1.5
DST	2	2.0
DST	2	3.0
DST	2	4.0
DST	2	5.0
DST	2	6.0
DST	2	8.0
DST	2	10.0
DST	2	12.0
DST	2	16.0

$a_p$ max (mm)	$a_e$ max (mm)	$f_z$ (mm)
< 0.7	< 0.03	0.025 - 0.040
< 1.0	< 0.04	0.030 - 0.050
< 1.5	< 0.06	0.040 - 0.060
< 2.0	< 0.10	0.050 - 0.080
< 2.5	< 0.13	0.060 - 0.120
< 3.0	< 0.18	0.065 - 0.125
< 4.0	< 0.24	0.080 - 0.130
< 5.0	< 0.30	0.085 - 0.135
< 6.0	< 0.36	0.100 - 0.140
< 8.0	< 0.50	0.110 - 0.150

$a_p$ max (mm)	$a_e$ max (mm)	$f_z$ (mm)
< 0.06	< 0.01	0.045 - 0.060
< 0.08	< 0.02	0.050 - 0.075
< 0.11	< 0.03	0.055 - 0.090
< 0.14	< 0.05	0.065 - 0.100
< 0.18	< 0.07	0.075 - 0.120
< 0.20	< 0.09	0.080 - 0.125
< 0.25	< 0.12	0.090 - 0.130
< 0.30	< 0.15	0.100 - 0.135
< 0.36	< 0.20	0.110 - 0.140
< 0.40	< 0.28	0.120 - 0.150

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.



## Torus Endmill



AlTiN coated

recommended cooling:  
1. Minimum lubrication  
2. Air

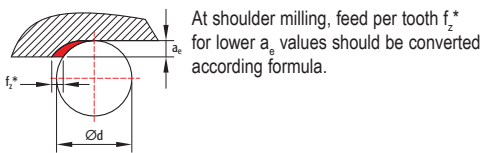
HSM



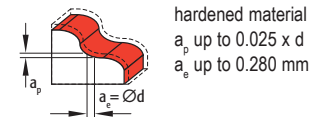
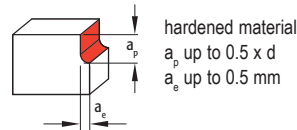
Torus

Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
	Alloyed steel	< 300	
	Tool steel	> 850 > 1000	> 250 > 300
<b>M</b> Stainless steel	< 600	< 200	
	< 850	< 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	
	Aluminium < 5%Si	< 150	
	Aluminium > 5%Si	< 120	
	Copper	< 100	
	Brass	< 200	
	Graphite Synthetics		
<b>S</b> High temp. alloys	< 900	< 300	
	Titanium alloys	< 300	
<b>H</b> Hardened steel		50-60 HRc 58-70 HRc	140-280 120-220

For further material specifications see material cross reference list.



$f_z^*$	$a_e$	$f_z$
$f_z^* = f_z \sqrt{\frac{d}{a_e}}$	0.10 x d	$f_z \times 3$
	0.25 x d	$f_z \times 2$
	0.50 x d	$f_z \times 1$



### Shoulder milling

### Copy milling

type	Z	Ø d (mm)	Shoulder milling			Copy milling		
			$a_p$ max (mm)	$a_e$ max (mm)	$f_z$ (mm)	$a_p$ max (mm)	$a_e$ max (mm)	$f_z$ (mm)
DSTH	2	1.5	< 0.7	< 0.03	0.025 - 0.040	< 0.06	< 0.02	0.030 - 0.060
DSTH	2	2.0	< 1.0	< 0.04	0.030 - 0.050	< 0.08	< 0.02	0.050 - 0.070
DSTH	2	3.0	< 1.5	< 0.06	0.040 - 0.060	< 0.11	< 0.03	0.055 - 0.080
DSTH	2	4.0	< 2.0	< 0.10	0.050 - 0.080	< 0.14	< 0.05	0.065 - 0.100
DSTH	2	5.0	< 2.5	< 0.13	0.060 - 0.120	< 0.18	< 0.07	0.075 - 0.150
DSTH	2	6.0	< 3.0	< 0.18	0.065 - 0.125	< 0.20	< 0.09	0.080 - 0.200
DSTH	2	8.0	< 4.0	< 0.24	0.080 - 0.130	< 0.25	< 0.12	0.090 - 0.250
DSTH	2	10.0	< 5.0	< 0.30	0.085 - 0.135	< 0.30	< 0.15	0.100 - 0.250
DSTH	2	12.0	< 6.0	< 0.36	0.100 - 0.140	< 0.36	< 0.20	0.110 - 0.250
DSTH	2	16.0	< 8.0	< 0.50	0.110 - 0.150	< 0.40	< 0.28	0.120 - 0.250

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Torus Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
Alloyed steel	> 1000	< 300	
Tool steel	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600 < 850	< 200 < 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	
Aluminium < 5%Si	< 500	< 150	
Aluminium > 5%Si	< 400	< 120	
Copper	< 350	< 100	
Brass	< 700	< 200	
Graphite			
Synthetics			
<b>S</b> High temp. alloys	< 900	< 300	
Titanium alloys	< 900	< 300	
<b>H</b> Hardened steel		45-52 HRc 50-60 HRc 58-70 HRc	300-500 200-400

AlTiN coated

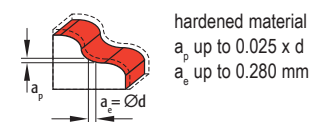
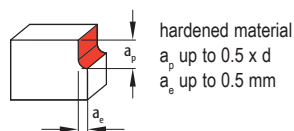
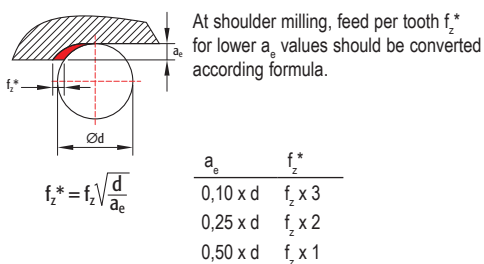
recommended cooling:  
1. Minimum lubrication  
2. Air

HSM



Torus

For further material specifications see material cross reference list.



### Shoulder milling

### Copy milling

type	Z	Ø d (mm)
DST	4	6.0
DST	4	8.0
DST	4	10.0
DST	4	12.0
DST	4	16.0

$a_{p,max}$ (mm)	$a_{e,max}$ (mm)	$f_z$ (mm)
< 3.0	< 0.18	0.065 - 0.125
< 4.0	< 0.24	0.080 - 0.130
< 5.0	< 0.30	0.085 - 0.135
< 6.0	< 0.36	0.100 - 0.140
< 8.0	< 0.50	0.110 - 0.150

$a_{p,max}$ (mm)	$a_{e,max}$ (mm)	$f_z$ (mm)
< 0.20	< 0.09	0.080 - 0.125
< 0.25	< 0.12	0.090 - 0.130
< 0.30	< 0.15	0.100 - 0.135
< 0.36	< 0.20	0.110 - 0.140
< 0.40	< 0.28	0.120 - 0.150

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill



AlTiN coated

recommended cooling:  
1. Minimum lubrication  
2. Air

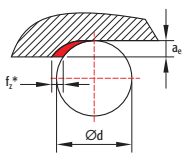
HPM  
HSM



Corner radius

Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300
<b>M</b> Stainless steel	< 600	< 200	
	< 850	< 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	
	< 500	< 150	
	< 400	< 120	
	< 350	< 100	
	< 700	< 200	
<b>S</b> High temp. alloys	< 900	< 300	
	< 900	< 300	
<b>H</b> Hardened steel		45-52 HRc 50-60 HRc 58-70 HRc	120-170

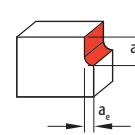
For further material specifications see material cross reference list.



$$f_z^* = f_z \sqrt{\frac{d}{a_e}}$$

At shoulder milling, feed per tooth  $f_z^*$  for lower  $a_e$  values should be converted according formula.

$a_e$	$f_z^*$
0.10 x d	$f_z \times 3$
0.25 x d	$f_z \times 2$
0.50 x d	$f_z \times 1$



hardened material  
 $a_p$  up to 2.00 x d  
 $a_e$  up to 0.35 mm

### Shoulder milling

type	Z	Ø d (mm)	$a_p$ max (mm)	$a_e$ max (mm)	$f_z$ (mm)
DSM / DSMR	6	3.0	< 3.0	< 0.03	0.020 - 0.035
DSM / DSMR	6	4.0	< 6.0	< 0.05	0.030 - 0.045
DSM / DSMR	6	5.0	< 7.5	< 0.07	0.035 - 0.055
DSM / DSMR	6	6.0	< 12.0	< 0.10	0.045 - 0.065
DSM / DSMR	6	8.0	< 16.0	< 0.13	0.060 - 0.080
DSM / DSMR	6	10.0	< 20.0	< 0.17	0.070 - 0.095
DSM / DSMR	6	12.0	< 24.0	< 0.21	0.085 - 0.110
DSM / DSMR	6	16.0	< 32.0	< 0.28	0.095 - 0.125
DSM / DSMR	8	20.0	< 40.0	< 0.35	0.105 - 0.140
DSM / DSMR	8	8.0	< 16.0	< 0.13	0.060 - 0.080
DSM / DSMR	10	10.0	< 20.0	< 0.17	0.070 - 0.095
DSM / DSMR	12	12.0	< 24.0	< 0.21	0.085 - 0.110
DSM / DSMR	16	16.0	< 32.0	< 0.28	0.095 - 0.125
DSML	6	8.0	< 16.0	< 0.13	0.060 - 0.080
DSML	6	10.0	< 20.0	< 0.17	0.070 - 0.095
DSML	6	12.0	< 24.0	< 0.21	0.085 - 0.110
DSML	8	16.0	< 32.0	< 0.28	0.095 - 0.125

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

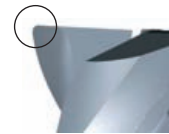
## Endmill



AlTiN coated

recommended cooling:  
1. Minimum lubrication  
2. Air

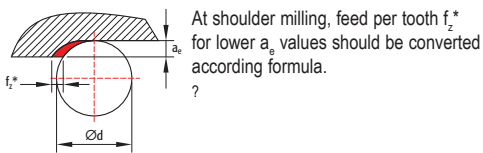
HPM  
HSM



Corner radius

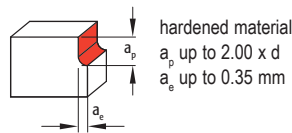
Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
	Alloyed steel	> 1000	< 300
	Tool steel	> 850 > 1000	> 250 > 300
<b>M</b> Stainless steel	< 600	< 200	
	< 850	< 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	
	Aluminium < 5%Si	< 500	< 150
	Aluminium > 5%Si	< 400	< 120
	Copper	< 350	< 100
	Brass	< 700	< 200
	Graphite		
	Synthetics		
<b>S</b> High temp. alloys	< 900	< 300	
	Titanium alloys	< 900	< 300
<b>H</b> Hardened steel		50-60 HRc	140-280
		58-70 HRc	120-220

For further material specifications see material cross reference list.



$$f_z^* = f_z \sqrt{\frac{d}{a_e}}$$

$a_e$	$f_z^*$
0.10 x d	$f_z \times 3$
0.25 x d	$f_z \times 2$
0.50 x d	$f_z \times 1$



### Shoulder milling

type	Z	Ø d (mm)	$a_p$ max (mm)	$a_e$ max (mm)	$f_z$ (mm)
DSMH / DSMRH	6	3,0	< 3.0	< 0.03	0.020 - 0.035
DSMH / DSMRH	6	4,0	< 6.0	< 0.05	0.030 - 0.045
DSMH / DSMRH	6	5,0	< 7.5	< 0.07	0.035 - 0.055
DSMH / DSMRH	6	6,0	< 12.0	< 0.10	0.045 - 0.065
DSMH / DSMRH	6	8,0	< 16.0	< 0.13	0.060 - 0.080
DSMH / DSMRH	6	10,0	< 20.0	< 0.17	0.070 - 0.095
DSMH / DSMRH	6	12,0	< 24.0	< 0.21	0.085 - 0.110
DSMH / DSMRH	6	16,0	< 32.0	< 0.28	0.095 - 0.125
DSMH / DSMRH	8	20,0	< 40.0	< 0.35	0.105 - 0.140
DSMH / DSMRH	8	8,0	< 16.0	< 0.13	0.060 - 0.080
DSMH / DSMRH	10	10,0	< 20.0	< 0.17	0.070 - 0.095
DSMH / DSMRH	12	12,0	< 24.0	< 0.21	0.085 - 0.110
DSMH / DSMRH	16	16,0	< 32.0	< 0.28	0.095 - 0.125

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Roughing Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300
<b>M</b> Stainless steel	< 600	< 200	100-130
	< 850	< 250	50-70
<b>K</b> Malleable cast iron		< 260	100-190
<b>N</b> Aluminium	< 350	< 100	
	< 500	< 150	
	< 400	< 120	
	< 350	< 100	
	< 700	< 200	130-260
	Graphite Synthetics		
<b>S</b> High temp. alloys	< 900	< 300	30-50
	< 900	< 300	50-80
<b>H</b> Hardened steel		45-52 HRc	100-180
		50-60 HRc	
		58-70 HRc	

AlTiN coated

recommended cooling:

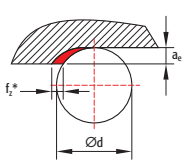
1. Emulsion
2. Air
3. Minimum lubrication

HVM  
HPM



Corner radius

For further material specifications see material cross reference list.

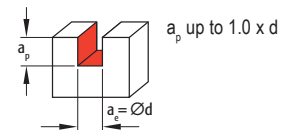
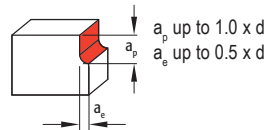


At shoulder milling, feed per tooth  $f_z^*$  for lower  $a_e$  values should be converted according formula.

For finishing application  $v_c$  can be increased up to 30%.

$$f_z^* = f_z \sqrt{\frac{d}{a_e}}$$

$a_e$	$f_z^*$
0,10 x d	$f_z \times 3$
0,25 x d	$f_z \times 2$
0,50 x d	$f_z \times 1$



### Shoulder milling

### Slot milling

type	Z	Ø d (mm)
DSR	3	2.0
DSR	3	3.0
DSR	3	4.0
DSR	3	5.0
DSR	3	6.0
DSR	3	8.0
DSR	3	10.0
DSR	3	12.0
DSR	3	16.0

$a_p$ max (mm)	$a_e$ max (mm)	$f_z$ (mm)
< 2.0	< 0.25	0.010 - 0.020
< 3.0	< 0.40	0.015 - 0.025
< 4.0	< 0.80	0.020 - 0.030
< 5.0	< 1.00	0.020 - 0.030
< 6.0	< 2.25	0.025 - 0.040
< 8.0	< 3.00	0.030 - 0.050
< 10.0	< 3.75	0.035 - 0.065
< 12.0	< 6.00	0.045 - 0.070
< 16.0	< 8.00	0.060 - 0.100

$a_p$ max (mm)	$a_e$ max (mm)	$f_z$ (mm)
< 2.0	< 2.0	0.010 - 0.020
< 3.0	< 3.0	0.015 - 0.025
< 4.0	< 4.0	0.020 - 0.030
< 5.0	< 5.0	0.020 - 0.030
< 6.0	< 6.0	0.025 - 0.040
< 8.0	< 8.0	0.030 - 0.050
< 10.0	< 10.0	0.035 - 0.065
< 12.0	< 12.0	0.045 - 0.070
< 16.0	< 16.0	0.060 - 0.100

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Roughing Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300
<b>M</b> Stainless steel	< 600	< 200	100-130
	< 850	< 250	50-70
<b>K</b> Malleable cast iron		< 260	100-190
<b>N</b> Aluminium	< 350	< 100	
	< 500	< 150	
	< 400	< 120	
	< 350	< 100	
	< 700	< 200	130-260
	Graphite Synthetics		
<b>S</b> High temp. alloys	< 900	< 300	30-50
	< 900	< 300	50-80
<b>H</b> Hardened steel		45-52 HRc	100-180
		50-60 HRc	
		58-70 HRc	

AlTiN coated

recommended cooling:

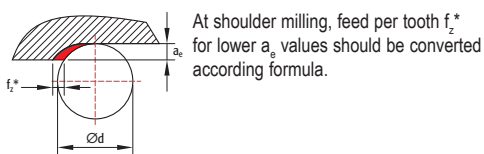
1. Emulsion
2. Air
3. Minimum lubrication

HVM  
HPM



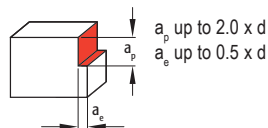
Chamfer

For further material specifications see material cross reference list.

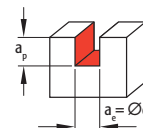


At shoulder milling, feed per tooth  $f_z^*$  for lower  $a_e$  values should be converted according formula.

$a_e$	$f_z^*$
0.10 x d	$f_z \times 3$
0.25 x d	$f_z \times 2$
0.50 x d	$f_z \times 1$



$a_p$  up to 2.0 x d  
 $a_e$  up to 0.5 x d



$a_p$  up to 1.5 x d

### Shoulder milling

### Slot milling

type	Z	Ø d (mm)
DSF	3	2.0
DSF	3	3.0
DSF	3	4.0
DSF	3	5.0
DSF	3	6.0
DSF	3	8.0
DSF	3	10.0
DSF	3	12.0
DSF	3	16.0

$a_{p,max}$ (mm)	$a_{e,max}$ (mm)	$f_z$ (mm)
< 3.0	< 0.25	0.010 - 0.020
< 4.0	< 0.40	0.015 - 0.025
< 5.0	< 0.80	0.020 - 0.030
< 7.5	< 1.00	0.020 - 0.030
< 9.0	< 2.25	0.025 - 0.040
< 16.0	< 3.00	0.030 - 0.050
< 20.0	< 3.75	0.035 - 0.065
< 24.0	< 6.00	0.045 - 0.070
< 32.0	< 8.00	0.060 - 0.100

$a_{p,max}$ (mm)	$a_{e,max}$ (mm)	$f_z$ (mm)
< 2.0	< 2.0	0.010 - 0.020
< 3.0	< 3.0	0.015 - 0.025
< 4.0	< 4.0	0.020 - 0.030
< 5.0	< 5.0	0.020 - 0.030
< 6.0	< 6.0	0.025 - 0.040
< 10.0	< 8.0	0.030 - 0.050
< 12.0	< 10.0	0.035 - 0.065
< 18.0	< 12.0	0.045 - 0.070
< 24.0	< 16.0	0.060 - 0.100

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Roughing Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300
<b>M</b> Stainless steel	< 600	< 200	80-110
	< 850	< 250	50-70
<b>K</b> Malleable cast iron		< 260	150-200
<b>N</b> Aluminium	< 350	< 100	
	< 500	< 150	
	< 400	< 120	
	< 350	< 100	
	< 700	< 200	130-260
	Graphite Synthetics		
<b>S</b> High temp. alloys	< 900	< 300	30-50
	< 900	< 300	50-80
<b>H</b> Hardened steel		45-52 HRc 50-60 HRc 58-70 HRc	100-180

AlTiN coated

recommended cooling:

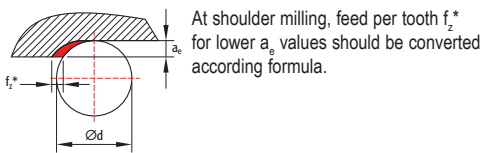
1. Emulsion
2. Air
3. Minimum lubrication

HVM  
HPM



Chamfer

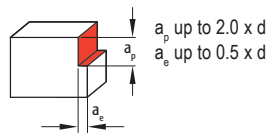
For further material specifications see material cross reference list.



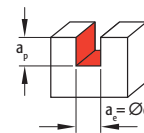
At shoulder milling, feed per tooth  $f_z^*$  for lower  $a_e$  values should be converted according formula.

$$f_z^* = f_z \sqrt{\frac{d}{a_e}}$$

$a_e$	$f_z^*$
0.10 x d	$f_z \times 3$
0.25 x d	$f_z \times 2$
0.50 x d	$f_z \times 1$



$a_p$  up to 2.0 x d  
 $a_e$  up to 0.5 x d



$a_p$  up to 1.5 x d

### Shoulder milling

### Slot milling

type	Z	Ø d (mm)
DSF	4	4.0
DSF	4	6.0
DSF	4	8.0
DSF	4	10.0
DSF	4	12.0
DSF	4	16.0

$a_p$ max (mm)	$a_e$ max (mm)	$f_z$ (mm)
< 5.0	< 0.80	0.015 - 0.025
< 9.0	< 2.25	0.020 - 0.030
< 16.0	< 3.00	0.025 - 0.035
< 20.0	< 3.75	0.030 - 0.045
< 24.0	< 6.00	0.035 - 0.050
< 32.0	< 8.00	0.045 - 0.060

$a_p$ max (mm)	$a_e$ max (mm)	$f_z$ (mm)
< 4.0	< 4.0	0.015 - 0.025
< 6.0	< 6.0	0.020 - 0.030
< 10.0	< 8.0	0.025 - 0.035
< 12.0	< 10.0	0.030 - 0.045
< 18.0	< 12.0	0.035 - 0.050
< 24.0	< 16.0	0.045 - 0.060

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Roughing Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)	
<b>P</b> Carbon steel	< 750	< 250		
	> 1000	< 300		
	Tool steel	> 850 > 1000	> 250 > 300	150-180 110-150
<b>M</b> Stainless steel	< 600	< 200		
	< 850	< 250		
<b>K</b> Malleable cast iron		< 260	130-200	
<b>N</b> Aluminium	< 350	< 100		
	< 500	< 150		
	< 400	< 120		
	< 350	< 100		
	< 700	< 200	130-260	
	Graphite			
	Synthetics			
<b>S</b> High temp. alloys	< 900	< 300		
	< 900	< 300		
<b>H</b> Hardened steel		45-52 HRc		
		50-60 HRc 58-70 HRc		

AlTiN coated

recommended cooling:

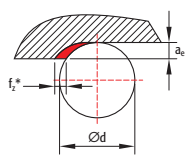
1. Emulsion
2. Air
3. Minimum lubrication

HVM  
HPM



Chamfer

For further material specifications see material cross reference list.

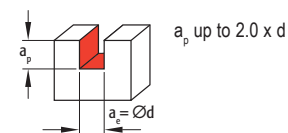
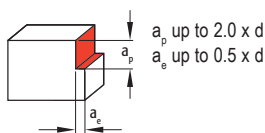


At shoulder milling, feed per tooth  $f_z^*$  for lower  $a_e$  values should be converted according formula.

For finishing application  $v_c$  can be increased up to 30%.

$$f_z^* = f_z \sqrt{\frac{d}{a_e}}$$

$a_e$	$f_z^*$
0.10 x d	$f_z \times 3$
0.25 x d	$f_z \times 2$
0.50 x d	$f_z \times 1$



### Shoulder milling

### Slot milling

type	Z	Ø d (mm)
DSRF	3	6.0
DSRF	3	8.0
DSRF	3	10.0
DSRF	3	12.0
DSRF	3	14.0
DSRF	3	16.0
DSRF	3	20.0

$a_{p,max}$ (mm)	$a_{e,max}$ (mm)	$f_z$ (mm)
< 9.0	< 3.0	0.03 - 0.04
< 16.0	< 4.0	0.04 - 0.06
< 20.0	< 5.0	0.06 - 0.08
< 24.0	< 6.0	0.08 - 0.10
< 28.0	< 7.0	0.10 - 0.12
< 32.0	< 8.0	0.12 - 0.15
< 40.0	< 10.0	0.12 - 0.20

$a_{p,max}$ (mm)	$a_{e,max}$ (mm)	$f_z$ (mm)
< 6.0	< 6.0	0.03 - 0.04
< 10.0	< 8.0	0.04 - 0.06
< 15.0	< 10.0	0.06 - 0.08
< 24.0	< 12.0	0.08 - 0.10
< 28.0	< 14.0	0.10 - 0.12
< 32.0	< 16.0	0.12 - 0.15
< 40.0	< 20.0	0.12 - 0.20

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.



## Roughing Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)	
<b>P</b> Carbon steel	< 750	< 250		
	> 1000	< 300		
	Tool steel	> 850 > 1000	> 250 > 300	150-180 110-150
<b>M</b> Stainless steel	< 600	< 200		
	< 850	< 250		
<b>K</b> Malleable cast iron		< 260	130-200	
<b>N</b> Aluminium	< 350	< 100		
	< 500	< 150		
	< 400	< 120		
	< 350	< 100		
	< 700	< 200	130-260	
	Graphite			
	Synthetics			
<b>S</b> High temp. alloys	< 900	< 300		
	< 900	< 300		
<b>H</b> Hardened steel		45-52 HRc		
		50-60 HRc		
		58-70 HRc		

AlTiN coated

recommended cooling:

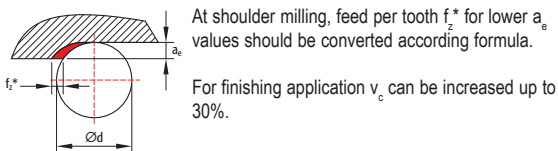
1. Emulsion
2. Air
3. Minimum lubrication

HVM  
HPM



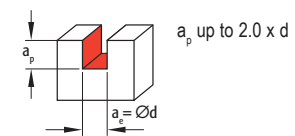
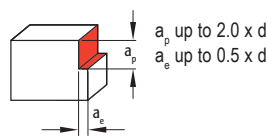
Corner radius

For further material specifications see material cross reference list.



$$f_z^* = f_z \sqrt{\frac{d}{a_e}}$$

$a_e$	$f_z^*$
0.10 x d	$f_z \times 3$
0.25 x d	$f_z \times 2$
0.50 x d	$f_z \times 1$



### Shoulder milling

### Slot milling

type	Z	$\varnothing d$ (mm)
DSRR	3	6.0
DSRR	3	8.0
DSRR	3	10.0
DSRR	3	12.0
DSRR	3	14.0
DSRR	3	16.0
DSRR	4	20.0

$a_p$ max (mm)	$a_e$ max (mm)	$f_z$ (mm)
< 9.0	< 3.0	0.03 - 0.04
< 16.0	< 4.0	0.04 - 0.06
< 20.0	< 5.0	0.06 - 0.08
< 24.0	< 6.0	0.08 - 0.10
< 28.0	< 7.0	0.10 - 0.12
< 32.0	< 8.0	0.12 - 0.15
< 40.0	< 10.0	0.12 - 0.20

$a_p$ max (mm)	$a_e$ max (mm)	$f_z$ (mm)
< 6.0	< 6.0	0.03 - 0.04
< 10.0	< 8.0	0.04 - 0.06
< 15.0	< 10.0	0.06 - 0.08
< 24.0	< 12.0	0.08 - 0.10
< 28.0	< 14.0	0.10 - 0.12
< 32.0	< 16.0	0.12 - 0.15
< 40.0	< 20.0	0.12 - 0.20

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Roughing Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>M</b> Stainless steel	< 600	< 200	
	< 850	< 250	
<b>S</b> High temp. alloys Titanium alloys	< 900	< 300	30 - 50
	< 900	< 300	70 - 100

TS3K coated

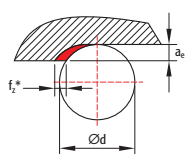
recommended cooling:  
Emulsion

Material	Example:
<b>M</b> Stainless steel	1.4404
	1.4435
	1.4541
	1.4571
	1.4301
<b>S</b> Titanium alloys	3.7024
	3.7165



Corner radius

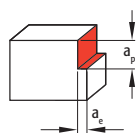
For further material specifications see material cross reference list.



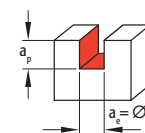
At shoulder milling, feed per tooth  $f_z^*$  for lower  $a_e$  values should be converted according formula.

$$f_z^* = f_z \sqrt{\frac{d}{a_e}}$$

$a_e$	$f_z^*$
0.10 x d	$f_z \times 3$
0.25 x d	$f_z \times 2$
0.50 x d	$f_z \times 1$



$a_p$  up to 2.0 x d  
 $a_e$  up to 0.5 x d



$a_p$  up to 1.0 x d

### Shoulder milling

### Slot milling

type	Z	Ø d (mm)
DSRV	4	3.0
DSRV	4	4.0
DSRV	4	5.0
DSRV	4	6.0
DSRV	4	8.0
DSRV	4	10.0
DSRV	4	12.0
DSRV	5	16.0

$a_{p,max}$ (mm)	$a_{e,max}$ (mm)	$f_z$ (mm)
< 4.0	< 0.5	0.01 - 0.02
< 7.0	< 0.8	0.02 - 0.03
< 9.0	< 1.2	0.02 - 0.03
< 12.0	< 2.0	0.02 - 0.04
< 16.0	< 3.0	0.03 - 0.05
< 20.0	< 4.0	0.04 - 0.07
< 24.0	< 6.0	0.05 - 0.08
< 32.0	< 8.0	0.06 - 0.10

$a_{p,max}$ (mm)	$a_{e,max}$ (mm)	$f_z$ (mm)
< 2.0	< 3.0	0.01 - 0.02
< 3.0	< 4.0	0.02 - 0.03
< 4.0	< 5.0	0.02 - 0.03
< 5.0	< 6.0	0.02 - 0.04
< 6.0	< 8.0	0.03 - 0.05
< 8.0	< 10.0	0.04 - 0.07
< 10.0	< 12.0	0.05 - 0.08
< 12.0	< 16.0	0.06 - 0.10

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Chamfering Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)	
<b>P</b> Carbon steel	< 750	< 250		
	Alloyed steel	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300	150-180 110-150
<b>M</b> Stainless steel	< 600	< 200		
	< 850	< 250		
<b>K</b> Malleable cast iron		< 260	130-200	
<b>N</b> Aluminium	< 350	< 100		
	Aluminium < 5%Si	< 500	< 150	
	Aluminium > 5%Si	< 400	< 120	
	Copper	< 350	< 100	
	Brass	< 700	< 200	130-260
	Graphite			
	Synthetics			
<b>S</b> High temp. alloys	< 900	< 300		
	Titanium alloys	< 900	< 300	
<b>H</b> Hardened steel		45-52 HRc		
		50-60 HRc		
		58-70 HRc		

TS3K coated

recommended cooling:

1. Emulsion
2. Air

HVM  
HPM

For further material specifications see material cross reference list.



$a_e$  up to  $0.40 \times d$

### Chamfering

type	Z	Ø d (mm)	f <sub>z</sub> (mm)
DSFF	4	4.0	0.040 - 0.060
DSFF	4	6.0	0.050 - 0.070
DSFF	4	8.0	0.060 - 0.080
DSFF	4	10.0	0.070 - 0.095
DSFF	4	12.0	0.085 - 0.115

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill Ballnose



AlTiN coated

recommended cooling:  
Emulsion

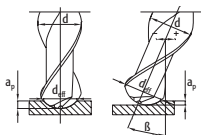
Cobalt Chromium

Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)	
<b>P</b> Carbon steel	< 750	< 250		
	Alloyed steel	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600	< 200		
	< 850	< 250		
<b>K</b> Malleable cast iron		< 260		
<b>N</b> Aluminium	< 350	< 100		
	Aluminium < 5%Si	< 500	< 150	
	Aluminium > 5%Si	< 400	< 120	
	Copper	< 350	< 100	
	Brass	< 700	< 200	
	Graphite			
	Synthetics			
<b>S</b> High temp. alloys	< 900	< 300		
	Titanium alloys	< 900	< 300	
	Cobalt Chromium alloys			35-70

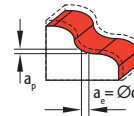
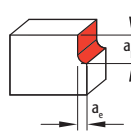


Ballnose

For further material specifications see material cross reference list.



For the cutting speed v<sub>c</sub> calculation the effective cutting diameter d<sub>eff</sub> has to be taken into account. See formula.



$$\beta = 0: d_{\text{eff}} = 2 \cdot \sqrt{d \cdot a_p} \cdot a_p$$

$$\beta \neq 0: d_{\text{eff}} = d \cdot \sin \left[ \beta \pm \arccos \left( \frac{d - 2a_p}{d} \right) \right]$$

### Shoulder milling

### Copy milling

type	Z	Ø d (mm)	Shoulder milling			Copy milling		
			a <sub>p</sub> max (mm)	a <sub>g</sub> max (mm)	f <sub>z</sub> (mm)	a <sub>p</sub> max (mm)	a <sub>g</sub> max (mm)	f <sub>z</sub> (mm)
DSKC	2	1.0	< 2.0	0.5	0.02 - 0.04	< 2.0	0.5	0.02 - 0.04
DSKC	2	1.5	< 2.0	0.7	0.02 - 0.04	< 2.0	0.7	0.02 - 0.04
DSKC	2	2.0	< 3.0	1.0	0.02 - 0.04	< 3.0	1.0	0.02 - 0.04
DSKC	2	3.0	< 4.0	1.5	0.02 - 0.04	< 4.0	1.5	0.02 - 0.04
DSKC	3	4.0	< 5.0	2.0	0.02 - 0.04	< 5.0	2.0	0.02 - 0.04
DSKC	4	5.0	< 5.0	2.5	0.02 - 0.04	< 5.0	2.5	0.02 - 0.04
DSKC/DSKLC	4	6.0	< 6.0	3.0	0.02 - 0.04	< 6.0	3.0	0.02 - 0.04
DSKC/DSKLC	5	8.0	< 8.0	4.0	0.02 - 0.04	< 8.0	4.0	0.02 - 0.04
DSKC/DSKLC	5	10.0	< 10.0	5.0	0.02 - 0.04	< 10.0	5.0	0.02 - 0.04
DSKC/DSKLC	7	12.0	< 12.0	6.0	0.02 - 0.04	< 12.0	6.0	0.02 - 0.04
DSKC	7	16.0	< 20.0	6.0	0.02 - 0.04	< 20.0	8.0	0.02 - 0.04

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill Ballnose



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel Alloyed steel Tool steel	< 750	< 250	
	> 1000	< 300	
	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600 < 850	< 200 < 250	
	<b>K</b> Malleable cast iron		< 260
<b>N</b> Aluminium Aluminium < 5%Si Aluminium > 5%Si Copper Brass Graphite Synthetics		< 350	< 100
	< 500	< 150	
	< 400	< 120	
	< 350	< 100	
	< 700	< 200	
<b>S</b> High temp. alloys Titanium alloys Cobalt Chromium alloys	< 900 < 900	< 300 < 300	
			35-70

AlTiN coated

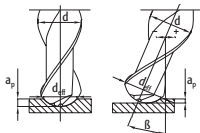
recommended cooling:  
Emulsion



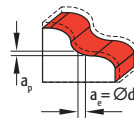
220° Ballnose

Cobalt Chromium

For further material specifications see material cross reference list.



For the cutting speed v<sub>c</sub> calculation the effective cutting diameter d<sub>eff</sub> has to be taken into account. See formula.



$$\beta = 0: d_{\text{eff}} = 2 \cdot \sqrt{d \cdot a_p - a_p^2}$$

$$\beta \neq 0: d_{\text{eff}} = d \cdot \sin \left[ \beta \pm \arccos \left( \frac{d - 2a_p}{d} \right) \right]$$

## Copy milling

type	Z	Ø d (mm)	a <sub>p</sub> max (mm)	a <sub>g</sub> max (mm)	f <sub>z</sub> (mm)
DSKC 220°	2	3.0	< 2.0	< 1.5	0.02 - 0.04
DSKC 220°	3	4.0	< 2.6	< 2.0	0.02 - 0.04
DSKC 220°	4	5.0	< 3.3	< 2.5	0.02 - 0.04
DSKC 220°	4	6.0	< 4.0	< 3.0	0.02 - 0.04
DSKC 220°	5	8.0	< 5.3	< 4.0	0.02 - 0.04
DSKC 220°	5	10.0	< 6.7	< 5.0	0.02 - 0.04
DSKC 220°	7	12.0	< 8.0	< 6.0	0.02 - 0.04
DSKC 220°	7	16.0	< 10.7	< 8.0	0.02 - 0.04

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill Ballnose



AlTiN coated

recommended cooling:  
Emulsion

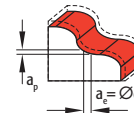
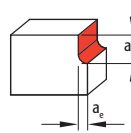
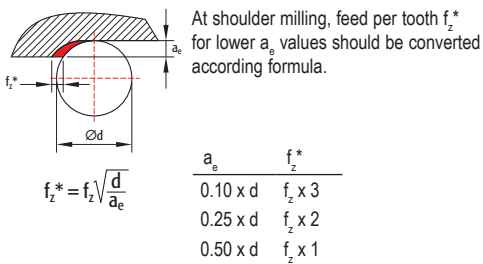
Cobalt Chromium

Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
	Alloyed steel	< 300	
	Tool steel	> 850 > 1000	> 250 > 300
<b>M</b> Stainless steel	< 600	< 200	
	< 850	< 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	
	Aluminium < 5%Si	< 500	< 150
	Aluminium > 5%Si	< 400	< 120
	Copper	< 350	< 100
	Brass	< 700	< 200
	Graphite		
	Synthetics		
<b>S</b> High temp. alloys	< 900	< 300	
	Titanium alloys	< 900	< 300
	Cobalt Chromium alloys		



Torus

For further material specifications see material cross reference list.



### Shoulder milling

### Copy milling

type	Z	Ø d (mm)	Shoulder milling			Copy milling		
			$a_{p,max}$ (mm)	$a_{e,max}$ (mm)	$f_z$ (mm)	$a_{p,max}$ (mm)	$a_{e,max}$ (mm)	$f_z$ (mm)
DSTC	2	1.5	< 2.5	0.7	0.02 - 0.04	< 2.5	0.7	0.02 - 0.04
DSTC	2	2.0	< 3.0	1.0	0.02 - 0.04	< 3.0	1.0	0.02 - 0.04
DSTC	2	3.0	< 4.0	1.5	0.02 - 0.04	< 4.0	1.5	0.02 - 0.04
DSTC	3	4.0	< 5.0	2.0	0.02 - 0.04	< 5.0	2.0	0.02 - 0.04
DSTC	4	5.0	< 6.0	2.5	0.02 - 0.04	< 6.0	2.5	0.02 - 0.04
DSTC	4	6.0	< 6.0	3.0	0.02 - 0.04	< 6.0	3.0	0.02 - 0.04
DSTC	5	8.0	< 10.0	4.0	0.02 - 0.04	< 10.0	4.0	0.02 - 0.04
DSTC	5	10.0	< 15.0	5.0	0.02 - 0.04	< 15.0	5.0	0.02 - 0.04
DSTC	5	12.0	< 18.0	6.0	0.02 - 0.04	< 18.0	6.0	0.02 - 0.04

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

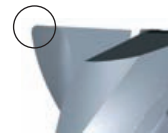
## Endmill Ballnose



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)	
<b>P</b> Carbon steel	< 750	< 250		
	Alloyed steel	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600	< 200		
	< 850	< 250		
<b>K</b> Malleable cast iron		< 260		
<b>N</b> Aluminium	< 350	< 100		
	Aluminium < 5%Si	< 500	< 150	
	Aluminium > 5%Si	< 400	< 120	
	Copper	< 350	< 100	
	Brass	< 700	< 200	
	Graphite			
	Synthetics			
<b>S</b> High temp. alloys	< 900	< 300		
	Titanium alloys	< 900	< 300	
	Cobalt Chromium alloys			35-70

AlTiN coated

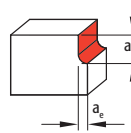
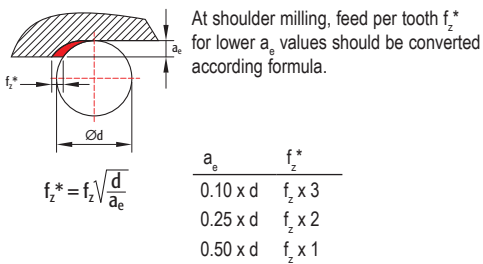
recommended cooling:  
Emulsion



Corner radius

Cobalt Chromium

For further material specifications see material cross reference list.



### Shoulder milling

type	Z	Ø d (mm)	$a_p$ max (mm)	$a_e$ max (mm)	$f_z$ (mm)
DSMRC	4	3.0	< 3.0	1.0	0.02 - 0.04
DSMRC	4	4.0	< 4.0	2.0	0.02 - 0.04
DSMRC	4	5.0	< 5.0	2.5	0.02 - 0.04
DSMRC	5	6.0	< 6.0	3.0	0.02 - 0.04
DSMRC	5	8.0	< 8.0	4.0	0.02 - 0.04
DSMRC	5	10.0	< 10.0	5.0	0.02 - 0.04
DSMRC	7	12.0	< 12.0	6.0	0.02 - 0.04
DSMRC	7	16.0	up to 48.0	8.0	0.02 - 0.04

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill Ballnose



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel Alloyed steel Tool steel	< 750	< 250	
	> 1000	< 300	
	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600	< 200	
	< 850	< 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium Aluminium < 5%Si Aluminium > 5%Si Copper Brass Graphite Synthetics	< 350	< 100	< 350
	< 500	< 150	
	< 400	< 120	
	< 350	< 100	
	< 700	< 200	
			< 350
<b>S</b> High temp. alloys Titanium alloys	< 900	< 300	
	< 900	< 300	
<b>H</b> Hardened steel		45-52 HRc 50-60 HRc 58-70 HRc	

CrCn coated

recommended cooling:  
1. Emulsion  
2. Minimum lubrication

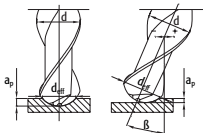
HPM



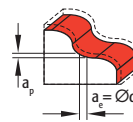
Ballnose

For further material specifications see material cross reference list.

Copper



For profile milling cutting speed v<sub>c</sub> may be increased up to 30%.



a<sub>p</sub> up to 0.10 x d  
a<sub>e</sub> up to 0.10 x d

$$\beta = 0: d_{\text{eff}} = 2 \cdot \sqrt{d \cdot a_p \cdot a_p}$$

$$\beta \neq 0: d_{\text{eff}} = d \cdot \sin \left[ \beta \pm \arccos \left( \frac{d - 2a_p}{d} \right) \right]$$

## Copy milling

type	Z	Ø d (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
DSKK	4	3.0	< 0.3	< 0.15	0.015 - 0.020
DSKK	4	4.0	< 0.4	< 0.30	0.020 - 0.030
DSKK	4	5.0	< 0.5	< 0.35	0.025 - 0.035
DSKK	4	6.0	< 0.6	< 0.50	0.030 - 0.040
DSKK	4	8.0	< 0.8	< 0.70	0.040 - 0.060
DSKK	4	10.0	< 1.0	< 0.90	0.055 - 0.075
DSKK	4	12.0	< 1.2	< 1.20	0.100 - 0.130
DSKK	4	14.0	< 1.4	< 1.40	0.120 - 0.180
DSKK	4	16.0	< 1.6	< 1.60	0.150 - 0.250

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.



## Torus Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)	
<b>P</b> Carbon steel	< 750	< 250		
	Alloyed steel	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600	< 200		
	< 850	< 250		
<b>K</b> Malleable cast iron		< 260		
<b>N</b> Aluminium	< 350	< 100	< 350	
	Aluminium < 5%Si	< 500	< 150	
	Aluminium > 5%Si	< 400	< 120	
	Copper	< 350	< 100	
	Brass	< 700	< 200	
	Graphite			
	Synthetics			< 350
<b>S</b> High temp. alloys	< 900	< 300		
	Titanium alloys	< 900		
<b>H</b> Hardened steel		45-52 HRc		
		50-60 HRc		
		58-70 HRc		

CrCn coated

recommended cooling:

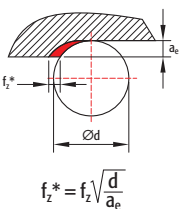
1. Emulsion
2. Minimum lubrication

HSM  
HPM



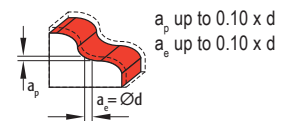
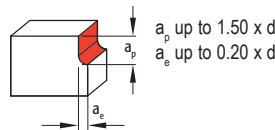
Torus

For further material specifications see material cross reference list.



At shoulder milling, feed per tooth  $f_z^*$  for lower  $a_e$  values should be converted according formula.

$a_e$	$f_z^*$
0.10 x d	$f_z \times 3$
0.25 x d	$f_z \times 2$
0.50 x d	$f_z \times 1$



### Shoulder milling

### Copy milling

type	Z	Ø d (mm)	Shoulder milling			Copy milling		
			a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
DSTK	4	3.0	< 3.0	< 0.3	0.015 - 0.020	< 0.3	< 0.15	0.015 - 0.020
DSTK	4	4.0	< 6.0	< 0.4	0.020 - 0.030	< 0.4	< 0.30	0.020 - 0.030
DSTK	4	5.0	< 7.5	< 0.5	0.025 - 0.035	< 0.5	< 0.35	0.025 - 0.035
DSTK	4	6.0	< 9.0	< 0.8	0.030 - 0.040	< 0.6	< 0.50	0.030 - 0.040
DSTK	4	8.0	< 12.0	< 1.0	0.040 - 0.060	< 0.8	< 0.70	0.040 - 0.060
DSTK	4	10.0	< 15.0	< 1.3	0.055 - 0.075	< 1.0	< 0.90	0.055 - 0.075
DSTK	4	12.0	< 18.0	< 2.4	0.100 - 0.130	< 1.2	< 1.20	0.100 - 0.130
DSTK	4	14.0	< 21.0	< 2.8	0.120 - 0.180	< 1.4	< 1.40	0.120 - 0.180
DSTK	4	16.0	< 24.0	< 3.2	0.150 - 0.250	< 1.6	< 1.60	0.150 - 0.250

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill



CrCn coated

recommended cooling:  
1. Emulsion  
2. Minimum lubrication

Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300
<b>M</b> Stainless steel	< 600	< 200	
	< 850	< 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	< 350
	Aluminium < 5%Si	< 500	< 150
	Aluminium > 5%Si	< 400	< 120
	Copper	< 350	< 100
	Brass	< 700	< 200
	Graphite Synthetics		
<b>S</b> High temp. alloys	< 900	< 300	
	Titanium alloys	< 900	
<b>H</b> Hardened steel		45-52 HRc	
		50-60 HRc	
		58-70 HRc	

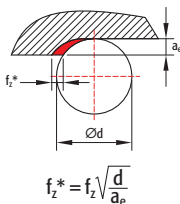
HPM



Sharp

For further material specifications see material cross reference list.

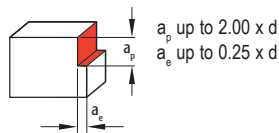
Copper



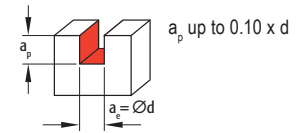
For shoulder milling cutting speed v<sub>c</sub> can be increased up to 30%.

At shoulder milling, feed per tooth f<sub>z</sub>\* for lower a<sub>e</sub> values should be converted according formula.

$$f_z^* = f_z \sqrt{\frac{d}{a_e}}$$



a<sub>p</sub> up to 2.00 x d  
a<sub>e</sub> up to 0.25 x d



a<sub>p</sub> up to 0.10 x d

a <sub>e</sub>	f <sub>z</sub> *
0.10 x d	f <sub>z</sub> x 3
0.25 x d	f <sub>z</sub> x 2
0.50 x d	f <sub>z</sub> x 1

### Shoulder milling

### Slot milling

type	Z	Ø d (mm)	Shoulder milling			Slot milling		
			a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
DSMK	3	2.0	< 2.0	< 0.2	0.010 - 0.015	< 0.2	< 2.0	0.010 - 0.015
DSMK	3	3.0	< 3.0	< 0.3	0.015 - 0.020	< 0.3	< 3.0	0.015 - 0.020
DSMK	3	4.0	< 6.0	< 0.5	0.020 - 0.030	< 0.4	< 4.0	0.020 - 0.025
DSMK	3	5.0	< 7.5	< 0.7	0.025 - 0.035	< 0.5	< 5.0	0.020 - 0.030
DSMK	3	6.0	< 12.0	< 1.2	0.030 - 0.040	< 0.6	< 6.0	0.025 - 0.035
DSMK	3	8.0	< 16.0	< 1.6	0.040 - 0.060	< 0.8	< 8.0	0.035 - 0.050
DSMK	3	10.0	< 20.0	< 2.0	0.055 - 0.075	< 1.0	< 10.0	0.055 - 0.065
DSMK	3	12.0	< 24.0	< 3.0	0.100 - 0.130	< 1.2	< 12.0	0.060 - 0.100
DSMK	3	14.0	< 28.0	< 3.5	0.120 - 0.180	< 1.4	< 14.0	0.080 - 0.150
DSMK	3	16.0	< 32.0	< 4.0	0.150 - 0.250	< 1.6	< 16.0	0.090 - 0.180

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill



CrCn coated

recommended cooling:

1. Emulsion
2. Minimum lubrication

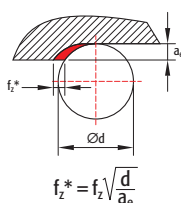
Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300
<b>M</b> Stainless steel	< 600	< 200	
	< 850	< 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	< 350
	Aluminium < 5%Si	< 500	< 150
	Aluminium > 5%Si	< 400	< 120
	Copper	< 350	< 100
	Brass	< 700	< 200
	Graphite Synthetics		
<b>S</b> High temp. alloys	< 900	< 300	
	Titanium alloys	< 900	
<b>H</b> Hardened steel		45-52 HRc	
		50-60 HRc	
		58-70 HRc	

HPM



Corner radius

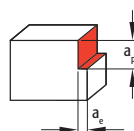
For further material specifications see material cross reference list.



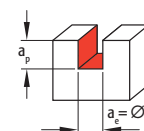
For shoulder milling cutting speed v<sub>c</sub> can be increased up to 30%.

At shoulder milling, feed per tooth f<sub>z</sub>\* for lower a<sub>e</sub> values should be converted according formula.

$$f_z^* = f_z \sqrt{\frac{d}{a_e}}$$



a<sub>p</sub> up to 2.00 x d  
a<sub>e</sub> up to 0.25 x d



a<sub>p</sub> up to 0.10 x d

a <sub>e</sub>	f <sub>z</sub> *
0.10 x d	f <sub>z</sub> x 3
0.25 x d	f <sub>z</sub> x 2
0.50 x d	f <sub>z</sub> x 1

### Shoulder milling

### Slot milling

type	z	Ø d (mm)
DSMRK	3	2.0
DSMRK	3	3.0
DSMRK	3	4.0
DSMRK	3	5.0
DSMRK	3	6.0
DSMRK	3	8.0
DSMRK	3	10.0
DSMRK	3	12.0
DSMRK	3	14.0
DSMRK	3	16.0

a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
< 2.0	< 0.2	0.010 - 0.015
< 3.0	< 0.3	0.015 - 0.020
< 6.0	< 0.5	0.020 - 0.030
< 7.5	< 0.7	0.025 - 0.035
< 12.0	< 1.2	0.030 - 0.040
< 16.0	< 1.6	0.040 - 0.060
< 20.0	< 2.0	0.055 - 0.075
< 24.0	< 3.0	0.100 - 0.130
< 28.0	< 3.5	0.120 - 0.180
< 32.0	< 4.0	0.150 - 0.250

a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
< 0.2	< 2.0	0.010 - 0.015
< 0.3	< 3.0	0.015 - 0.020
< 0.4	< 4.0	0.020 - 0.025
< 0.5	< 5.0	0.020 - 0.030
< 0.6	< 6.0	0.025 - 0.035
< 0.8	< 8.0	0.035 - 0.050
< 1.0	< 10.0	0.055 - 0.065
< 1.2	< 12.0	0.060 - 0.100
< 1.4	< 14.0	0.080 - 0.150
< 1.6	< 16.0	0.090 - 0.180

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Micro Endmill



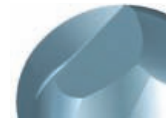
Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)	
<b>P</b> Carbon steel	< 750	< 250		
	Alloyed steel	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600	< 200		
	< 850	< 250		
<b>K</b> Malleable cast iron		< 260		
<b>N</b> Aluminium	< 350	< 100	< 350	
	Aluminium < 5%Si	< 500	< 150	
	Aluminium > 5%Si	< 400	< 120	
	Copper	< 350	< 100	
	Brass	< 700	< 200	
	Graphite			
	Synthetics			< 350
<b>S</b> High temp. alloys	< 900	< 300		
Titanium alloys	< 900	< 300		
<b>H</b> Hardened steel		45-52 HRc		
		50-60 HRc		
		58-70 HRc		

CrCn coated

recommended cooling:

1. Emulsion
2. Minimum lubrication

HSM

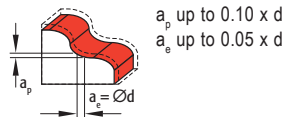


Ballnose

For further material specifications see material cross reference list.

Copper

Cutting Speed v<sub>c</sub> is based on max. 40.000 rpm.



L2	Reduction
1 - 5 x d	0%
5 - 10 x d	30 %
10 ~	50 %

## Copy milling

type	Z	Ø d (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
DSKMK	2	0.3	< 0.02	< 0.01	0.005 - 0.010
DSKMK	2	0.4	< 0.02	< 0.02	0.007 - 0.015
DSKMK	2	0.5	< 0.03	< 0.02	0.010 - 0.017
DSKMK	2	0.6	< 0.06	< 0.02	0.015 - 0.020
DSKMK	2	0.8	< 0.08	< 0.03	0.017 - 0.025
DSKMK	2	1.0	< 0.10	< 0.05	0.020 - 0.030
DSKMK	2	1.2	< 0.12	< 0.06	0.025 - 0.035
DSKMK	2	1.5	< 0.15	< 0.07	0.030 - 0.045
DSKMK	2	2.0	< 0.20	< 0.10	0.035 - 0.060
DSKMK	2	2.5	< 0.25	< 0.12	0.045 - 0.070
DSKMK	2	3.0	< 0.30	< 0.15	0.055 - 0.080

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Micro Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
Alloyed steel	> 1000	< 300	
Tool steel	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600 < 850	< 200 < 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	< 350
Aluminium < 5%Si	< 500	< 150	
Aluminium > 5%Si	< 400	< 120	
Copper	< 350	< 100	
Brass	< 700	< 200	
Graphite			
Synthetics			< 350
<b>S</b> High temp. alloys	< 900	< 300	
Titanium alloys	< 900	< 300	
<b>H</b> Hardened steel		45-52 HRc 50-60 HRc 58-70 HRc	

CrCn coated

recommended cooling:  
1. Emulsion  
2. Minimum lubrication

HSM

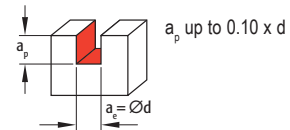
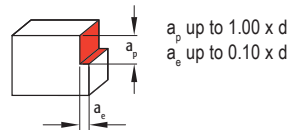


Corner radius

For further material specifications see material cross reference list.

Cutting Speed v<sub>c</sub> is based on max. 40.000 rpm.

L2	Reduction
1 - 5 x d	0%
5 - 10 x d	30 %
10 ~	50 %



Copper

### Shoulder milling

### Slot milling

type	Z	Ø d (mm)
DSMMK	2	0.3
DSMMK	2	0.4
DSMMK	2	0.5
DSMMK	2	0.6
DSMMK	2	0.8
DSMMK	2	1.0
DSMMK	2	1.2
DSMMK	2	1.5
DSMMK	2	2.0
DSMMK	2	2.5
DSMMK	2	3.0

a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
< 0.15	< 0.03	0.005 - 0.009
< 0.20	< 0.03	0.007 - 0.010
< 0.25	< 0.04	0.009 - 0.015
< 0.45	< 0.05	0.010 - 0.017
< 0.60	< 0.07	0.013 - 0.020
< 1.00	< 0.10	0.016 - 0.025
< 1.20	< 0.12	0.020 - 0.030
< 1.50	< 0.15	0.030 - 0.035
< 2.00	< 0.20	0.035 - 0.050
< 2.50	< 0.25	0.040 - 0.060
< 3.00	< 0.30	0.050 - 0.075

a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
< 0.03	< 0.3	0.005 - 0.009
< 0.04	< 0.4	0.007 - 0.010
< 0.05	< 0.5	0.009 - 0.012
< 0.06	< 0.6	0.010 - 0.015
< 0.08	< 0.8	0.012 - 0.017
< 0.10	< 1.0	0.013 - 0.020
< 0.12	< 1.2	0.015 - 0.025
< 0.15	< 1.5	0.017 - 0.030
< 0.20	< 2.0	0.020 - 0.040
< 0.25	< 2.5	0.022 - 0.045
< 0.30	< 3.0	0.025 - 0.055

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill Ballnose



Diamond coated

Dry milling, with air pressure to remove the Graphit / Graphite powder

HSM

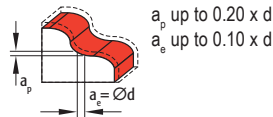


Ballnose

Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)	
<b>P</b> Carbon steel	< 750	< 250		
	Alloyed steel	< 300		
	Tool steel	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600	< 200		
	< 850	< 250		
<b>K</b> Malleable cast iron		< 260		
<b>N</b> Aluminium	< 350	< 100		
	Aluminium < 5%Si	< 150		
	Aluminium > 5%Si	< 400	< 400	
	Copper	< 350	< 100	
	Brass	< 700	< 200	
	Graphite			< 500
	Synthetics			
<b>S</b> High temp. alloys	< 900	< 300		
	Titanium alloys	< 900		
<b>H</b> Hardened steel		45-52 HRc 50-60 HRc 58-70 HRc		

For further material specifications see material cross reference list.

Cutting Speed v<sub>c</sub> is based on max. 40.000 rpm.



## Copy milling

type	Z	Ø d (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
DSKG	3	2.0	< 0.4	< 0.1	0.010 - 0.030
DSKG	3	3.0	< 0.6	< 0.2	0.015 - 0.040
DSKG	3	4.0	< 0.8	< 0.3	0.025 - 0.050
DSKG	3	5.0	< 1.0	< 0.4	0.035 - 0.060
DSKG	3	6.0	< 1.2	< 0.5	0.045 - 0.080
DSKG	3	8.0	< 1.6	< 0.7	0.055 - 0.100
DSKG	3	10.0	< 2.0	< 0.9	0.075 - 0.120
DSKG	3	12.0	< 2.4	< 1.2	0.075 - 0.140

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill Ballnose



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)	
<b>P</b> Carbon steel	< 750	< 250		
	Alloyed steel	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600	< 200		
	< 850	< 250		
<b>K</b> Malleable cast iron		< 260		
<b>N</b> Aluminium	< 350	< 100		
	Aluminium < 5%Si	< 500	< 150	
	Aluminium > 5%Si	< 400	< 120	< 400
	Copper	< 350	< 100	
	Brass	< 700	< 200	
	Graphite			< 500
	Synthetics			
<b>S</b> High temp. alloys	< 900	< 300		
	Titanium alloys	< 900	< 300	
<b>H</b> Hardened steel		45-52 HRc		
		50-60 HRc		
		58-70 HRc		

Diamond coated

Dry milling, with air pressure to remove the Graphit / Graphite powder

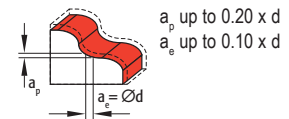
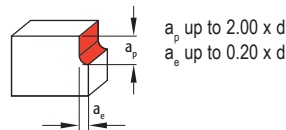
HSM



Ballnose

For further material specifications see material cross reference list.

Cutting Speed v<sub>c</sub> is based on max. 40.000 rpm.



### Shoulder milling

type	Z	Ø d (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
DSKGL	2	2.0	< 2.0	< 0.2	0.010 - 0.030
DSKGL	2	3.0	< 3.0	< 0.3	0.015 - 0.040
DSKGL	2	4.0	< 6.0	< 0.4	0.025 - 0.050
DSKGL	2	5.0	< 7.5	< 0.5	0.035 - 0.060
DSKGL	2	6.0	< 9.0	< 0.8	0.045 - 0.080
DSKGL	2	8.0	< 12.0	< 1.0	0.055 - 0.100
DSKGL	2	10.0	< 15.0	< 1.3	0.075 - 0.120
DSKGL	2	12.0	< 24.0	< 2.4	0.075 - 0.140

### Copy milling

a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
< 0.4	< 0.1	0.010 - 0.030
< 0.6	< 0.2	0.015 - 0.040
< 0.8	< 0.3	0.025 - 0.050
< 1.0	< 0.4	0.035 - 0.060
< 1.2	< 0.5	0.045 - 0.080
< 1.6	< 0.7	0.055 - 0.100
< 2.0	< 0.9	0.075 - 0.120
< 2.4	< 1.2	0.075 - 0.140

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Torus Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
Alloyed steel	> 1000	< 300	
Tool steel	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600 < 850	< 200 < 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	
Aluminium < 5%Si	< 500	< 150	
Aluminium > 5%Si	< 400	< 120	< 400
Copper	< 350	< 100	
Brass	< 700	< 200	
Graphite			< 500
Synthetics			
<b>S</b> High temp. alloys	< 900	< 300	
Titanium alloys	< 900	< 300	
<b>H</b> Hardened steel		45-52 HRc 50-60 HRc 58-70 HRc	

Diamond coated

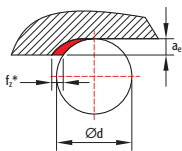
Dry milling, with air pressure to remove the Graphit / Graphite powder

HSM



Corner radius

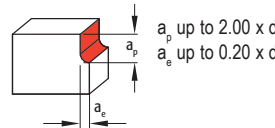
For further material specifications see material cross reference list.



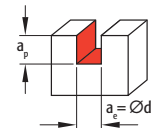
Cutting Speed v<sub>c</sub> is based on max. 40.000 rpm.

Given conditions are based on DSTG standard endmills with Z=3.  
At shoulder milling, feed per tooth f<sub>z</sub>\* for lower a<sub>e</sub> values should be converted according formula.

$$f_z^* = f_z \sqrt{\frac{d}{a_e}}$$



a<sub>p</sub> up to 2.00 x d  
a<sub>e</sub> up to 0.20 x d



a<sub>p</sub> up to 1.00 x d

a <sub>e</sub>	f <sub>z</sub> *
0,10 x d	f <sub>z</sub> x 3
0,25 x d	f <sub>z</sub> x 2
0,50 x d	f <sub>z</sub> x 1

### Shoulder milling

### Slot milling

type	Z	Ø d (mm)	Shoulder milling			Slot milling		
			a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
DSTG/DSTLG	2 - 3 - 4	2.0	< 2.0	< 0.2	0.010 - 0.030	< 0.5	< 2.0	0.010 - 0.030
DSTG/DSTLG	2 - 3 - 4	3.0	< 3.0	< 0.3	0.015 - 0.040	< 0.8	< 3.0	0.015 - 0.040
DSTG/DSTLG	2 - 3 - 4	4.0	< 6.0	< 0.4	0.025 - 0.050	< 2.0	< 4.0	0.025 - 0.050
DSTG/DSTLG	2 - 3 - 4	5.0	< 7.5	< 0.5	0.035 - 0.060	< 2.5	< 5.0	0.035 - 0.060
DSTG/DSTLG	2 - 3 - 4	6.0	< 9.0	< 0.8	0.045 - 0.080	< 4.5	< 6.0	0.045 - 0.080
DSTG/DSTLG	2 - 3 - 4	8.0	< 12.0	< 1.0	0.055 - 0.100	< 6.0	< 8.0	0.055 - 0.100
DSTG/DSTLG	2 - 3 - 4	10.0	< 15.0	< 1.3	0.075 - 0.120	< 7.5	< 10.0	0.075 - 0.120
DSTG/DSTLG	2 - 3 - 4	12.0	< 24.0	< 2.4	0.075 - 0.140	< 12.0	< 12.0	0.075 - 0.140

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.



## Roughing Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
Alloyed steel	> 1000	< 300	
Tool steel	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600 < 850	< 200 < 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	
Aluminium < 5%Si	< 500	< 150	
Aluminium > 5%Si	< 400	< 120	
Copper	< 350	< 100	
Brass	< 700	< 200	
Graphite			350-500
Synthetics			
<b>S</b> High temp. alloys	< 900	< 300	
Titanium alloys	< 900	< 300	
<b>H</b> Hardened steel		45-52 HRc 50-60 HRc 58-70 HRc	

Diamond coated

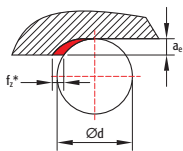
Dry milling, with air pressure to remove the Graphit / Graphite powder

HSM



Sharp

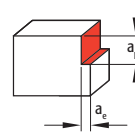
For further material specifications see material cross reference list.



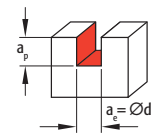
At shoulder milling, feed per tooth  $f_z^*$  for lower  $a_e$  values should be converted according formula.

$$f_z^* = f_z \sqrt{\frac{d}{a_e}}$$

$a_e$	$f_z^*$
0,10 x d	$f_z \times 3$
0,25 x d	$f_z \times 2$
0,50 x d	$f_z \times 1$



$a_p$  up to 2.50 x d  
 $a_e$  up to 0.50 x d



$a_p$  up to 1.00 x d

### Shoulder milling

type	Z	Ø d (mm)	$a_{p,max}$ (mm)	$a_{e,max}$ (mm)	Vf (mm/min)
DSVG	x	4.0	< 10.0	< 2.0	< 3600
DSVG	x	6.0	< 15.0	< 3.0	< 4100
DSVG	x	8.0	< 20.0	< 4.0	< 4500
DSVG	x	10.0	< 25.0	< 5.0	< 5100
DSVG	x	12.0	< 30.0	< 6.0	< 6000

### Slot milling

$a_{p,max}$ (mm)	$a_{e,max}$ (mm)	Vf (mm/min)
< 4.0	< 4.0	< 3600
< 6.0	< 6.0	< 4100
< 8.0	< 8.0	< 4500
< 10.0	< 10.0	< 5100
< 12.0	< 12.0	< 6000

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Micro Endmill Ballnose



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel Alloyed steel Tool steel	< 750	< 250	
	> 1000	< 300	
	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600 < 850	< 200 < 250	
	<b>K</b> Malleable cast iron		< 260
<b>N</b> Aluminium Aluminium < 5%Si Aluminium > 5%Si Copper Brass Graphite Synthetics		< 350	< 100
	< 500	< 150	
	< 400	< 120	< 200
	< 350	< 100	
	< 700	< 200	
			< 200
<b>S</b> High temp. alloys Titanium alloys	< 900 < 900	< 300 < 300	
	<b>H</b> Hardened steel		45-52 HRc 50-60 HRc 58-70 HRc

Diamond coated

Dry milling, with air pressure to remove the Graphit / Graphite powder

HSM

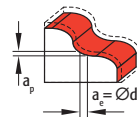


Ballnose

For further material specifications see material cross reference list.

Cutting Speed v<sub>c</sub> is based on max. 40.000 rpm.

L2	Reduction
1 - 5 x d	0%
5 - 10 x d	30 %
10 ~	50 %



a<sub>p</sub> up to 0.20 x d  
a<sub>e</sub> up to 0.10 x d

Graphite

### Copy milling

type	Z	Ø d (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
DSKMG	2	0.3	< 0.03	< 0.02	0.006 - 0.012
DSKMG	2	0.4	< 0.04	< 0.03	0.008 - 0.015
DSKMG	2	0.5	< 0.05	< 0.03	0.010 - 0.020
DSKMG	2	0.6	< 0.12	< 0.04	0.012 - 0.022
DSKMG	2	0.8	< 0.16	< 0.05	0.015 - 0.025
DSKMG	2	1.0	< 0.20	< 0.09	0.018 - 0.030
DSKMG	2	1.2	< 0.24	< 0.10	0.020 - 0.035
DSKMG	2	1.5	< 0.30	< 0.13	0.025 - 0.040

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Roughing Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
Alloyed steel	> 1000	< 300	
Tool steel	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600 < 850	< 200 < 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	
Aluminium < 5%Si	< 500	< 150	
Aluminium > 5%Si	< 400	< 120	< 200
Copper	< 350	< 100	
Brass	< 700	< 200	
Graphite			< 200
Synthetics			
<b>S</b> High temp. alloys	< 900	< 300	
Titanium alloys	< 900	< 300	
<b>H</b> Hardened steel		45-52 HRc 50-60 HRc 58-70 HRc	

Diamond coated

Dry milling, with air pressure to remove the Graphit / Graphite powder

HSM

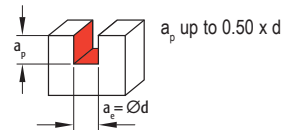
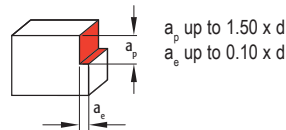


Corner radius

For further material specifications see material cross reference list.

Cutting Speed v<sub>c</sub> is based on max. 40.000 rpm.

L2	Reduction
1 - 5 x d	0%
5 - 10 x d	30 %
10 ~	50 %



### Shoulder milling

type	Z	Ø d (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
DSMMG	2	0.3	< 0.15	< 0.03	0.006 - 0.012
DSMMG	2	0.4	< 0.20	< 0.04	0.008 - 0.015
DSMMG	2	0.5	< 0.25	< 0.04	0.010 - 0.020
DSMMG	2	0.6	< 0.45	< 0.05	0.012 - 0.022
DSMMG	2	0.8	< 0.60	< 0.07	0.015 - 0.025
DSMMG	2	1.0	< 1.00	< 0.10	0.018 - 0.030
DSMMG	2	1.2	< 1.20	< 0.12	0.020 - 0.035
DSMMG	2	1.5	< 1.50	< 0.15	0.025 - 0.040

### Slot milling

a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
< 0.08	< 0.3	0.006 - 0.012
< 0.10	< 0.4	0.008 - 0.015
< 0.13	< 0.5	0.010 - 0.020
< 0.15	< 0.6	0.012 - 0.022
< 0.20	< 0.8	0.015 - 0.025
< 0.25	< 1.0	0.018 - 0.030
< 0.30	< 1.2	0.020 - 0.035
< 0.38	< 1.5	0.025 - 0.040

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300
<b>M</b> Stainless steel	< 600	< 200	
	< 850	< 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	250-400
	< 500	< 150	200-300
	< 400	< 120	100-250
	< 350	< 100	
	< 700	< 200	
	Graphite Synthetics		
<b>S</b> High temp. alloys	< 900	< 300	
	< 900	< 300	
<b>H</b> Hardened steel		45-52 HRc 50-60 HRc 58-70 HRc	

uncoated  
Diamond coated

recommended cooling:  
Emulsion

HVM



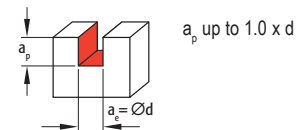
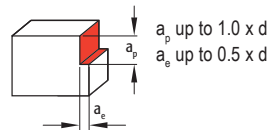
Ø 0.6 - Ø 2.5 mm  
Sharp

Ø 3.0 - Ø 12.0 mm  
Chamfer

For further material specifications see material cross reference list.

Cutting Speed v<sub>c</sub> is based on max. 20.000 rpm.

Conditions based on pure aluminium. For aluminium < 5% Si reduce feed per tooth f<sub>z</sub> up to 10% and for > 5% Si reduce fz up to 20%.



### Shoulder milling

### Slot milling

type	Z	Ø d (mm)	Shoulder milling			Slot milling		
			a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
DSA	1	0.6	< 0.3	< 0.08	0.010 - 0.015	< 0.3	< 0.6	0.010 - 0.015
DSA	1	0.8	< 0.4	< 0.10	0.014 - 0.018	< 0.4	< 0.8	0.014 - 0.018
DSA	1	1.0	< 0.8	< 0.25	0.015 - 0.020	< 0.8	< 1.0	0.015 - 0.020
DSA	1	1.2	< 0.9	< 0.30	0.018 - 0.023	< 0.9	< 1.2	0.018 - 0.023
DSA	1	1.5	< 1.1	< 0.38	0.023 - 0.027	< 1.1	< 1.5	0.023 - 0.027
DSA	1	1.6	< 1.2	< 0.40	0.025 - 0.032	< 1.2	< 1.6	0.025 - 0.032
DSA	1	1.8	< 1.4	< 0.45	0.027 - 0.036	< 1.4	< 1.8	0.027 - 0.036
DSA	1	2.0	< 1.5	< 0.50	0.030 - 0.043	< 1.5	< 2.0	0.030 - 0.043
DSA	1	2.5	< 1.9	< 0.63	0.034 - 0.060	< 1.9	< 2.5	0.034 - 0.060
DSA	1	3.0	< 2.3	< 0.75	0.045 - 0.070	< 2.3	< 3.0	0.045 - 0.070
DSA	1	4.0	< 4.0	< 2.00	0.050 - 0.080	< 4.0	< 4.0	0.050 - 0.080
DSA	1	5.0	< 5.0	< 2.50	0.060 - 0.100	< 5.0	< 5.0	0.060 - 0.100
DSA	1	6.0	< 6.0	< 3.00	0.075 - 0.120	< 6.0	< 6.0	0.075 - 0.120
DSA	1	7.0	< 7.0	< 3.50	0.080 - 0.135	< 7.0	< 7.0	0.080 - 0.135
DSA	1	8.0	< 8.0	< 4.00	0.095 - 0.150	< 8.0	< 8.0	0.095 - 0.150
DSA	1	10.0	< 10.0	< 5.00	0.115 - 0.185	< 10.0	< 10.0	0.115 - 0.185
DSA	1	12.0	< 12.0	< 6.00	0.140 - 0.230	< 12.0	< 12.0	0.140 - 0.230

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel Alloyed steel Tool steel	< 750	< 250	
	> 1000	< 300	
	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600 < 850	< 200 < 250	
	<b>K</b> Malleable cast iron		< 260
<b>N</b> Aluminium Aluminium < 5%Si Aluminium > 5%Si Copper Brass Graphite Synthetics		< 350	< 100
	< 500	< 150	250-800
	< 400	< 120	100-400
	< 350	< 100	
	< 700	< 200	
<b>S</b> High temp. alloys Titanium alloys	< 900 < 900	< 300 < 300	
	<b>H</b> Hardened steel		45-52 HRc 50-60 HRc 58-70 HRc

uncoated  
TiB<sub>2</sub> coated

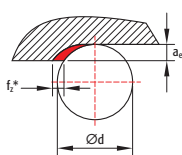
recommended cooling:  
Emulsion

HSM

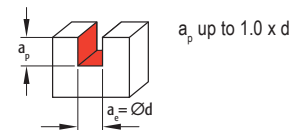
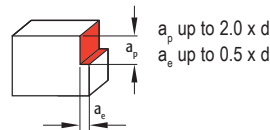


Sharp

For further material specifications see material cross reference list.



Cutting Speed v<sub>c</sub> is based on max. 20.000 rpm.  
Conditions based on pure aluminium. For aluminium < 5% Si reduce feed per tooth f<sub>z</sub> up to 10% and for > 5% Si reduce f<sub>z</sub> up to 20%.



a <sub>e</sub>	f <sub>z</sub> *
0.10 x d	f <sub>z</sub> x 3
0.25 x d	f <sub>z</sub> x 2
0.50 x d	f <sub>z</sub> x 1

### Shoulder milling

### Slot milling

type	Z	Ø d (mm)	Shoulder milling			Slot milling		
			a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
DSA	2	3.0	< 3.0	< 0.6	0.030 - 0.075	< 2.3	< 3.0	0.020 - 0.070
DSA	2	4.0	< 6.0	< 1.0	0.035 - 0.085	< 4.0	< 4.0	0.025 - 0.080
DSA	2	5.0	< 7.5	< 1.3	0.040 - 0.100	< 5.0	< 5.0	0.030 - 0.100
DSA	2	6.0	< 12.0	< 2.3	0.045 - 0.115	< 6.0	< 6.0	0.035 - 0.120
DSA	2	8.0	< 16.0	< 3.0	0.050 - 0.120	< 8.0	< 8.0	0.040 - 0.150
DSA	2	10.0	< 20.0	< 3.8	0.055 - 0.130	< 10.0	< 10.0	0.045 - 0.160
DSA	2	12.0	< 24.0	< 6.0	0.065 - 0.150	< 12.0	< 12.0	0.055 - 0.170
DSA	2	14.0	< 28.0	< 7.0	0.085 - 0.170	< 14.0	< 14.0	0.065 - 0.180
DSA	2	16.0	< 32.0	< 8.0	0.100 - 0.180	< 16.0	< 16.0	0.075 - 0.190
DSA	2	18.0	< 36.0	< 9.0	0.110 - 0.200	< 18.0	< 18.0	0.085 - 0.200
DSA	2	20.0	< 40.0	< 10.0	0.125 - 0.210	< 20.0	< 20.0	0.100 - 0.210

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill Ballnose



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
	Alloyed steel	> 1000	< 300
	Tool steel	> 850 > 1000	> 250 > 300
<b>M</b> Stainless steel	< 600	< 200	
	< 850	< 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	500-2000
	Aluminium < 5%Si	< 500	< 150
	Aluminium > 5%Si	< 400	< 120
	Copper	< 350	< 100
	Brass	< 700	< 200
	Graphite		
	Synthetics		
<b>S</b> High temp. alloys	< 900	< 300	
	Titanium alloys	< 900	< 300
<b>H</b> Hardened steel		45-52 HRc	
		50-60 HRc	
		58-70 HRc	

uncoated  
TiB<sub>2</sub> coated

recommended cooling:  
1. Emulsion  
2. Minimum lubrication  
3. Air

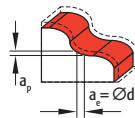
HSM



Ballnose

For further material specifications see material cross reference list.

Conditions based on pure aluminium. For aluminium < 5% Si reduce feed per tooth f<sub>z</sub> up to 10% and for > 5% Si reduce f<sub>z</sub> up to 20%.



a<sub>p</sub> up to 0.05 x d  
a<sub>e</sub> up to 0.10 x d

## Copy milling

type	Z	Ø d (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
DSAKH	2	6.0	< 0.6	< 0.50	0.035 - 0.050
DSAKH	2	8.0	< 0.8	< 0.70	0.050 - 0.070
DSAKH	2	10.0	< 1.0	< 0.90	0.055 - 0.090
DSAKH	2	12.0	< 1.2	< 1.20	0.065 - 0.100
DSAKH	2	14.0	< 1.4	< 1.40	0.075 - 0.120
DSAKH	2	16.0	< 1.6	< 1.60	0.085 - 0.140
DSAKH	2	18.0	< 1.8	< 1.80	0.100 - 0.145
DSAKH	2	20.0	< 2.0	< 2.00	0.105 - 0.150
DSAKH	2	25.0	< 2.5	< 2.50	0.110 - 0.200

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Endmill Ballnose



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)	
<b>P</b> Carbon steel	< 750	< 250		
	> 1000	< 300		
	Tool steel	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600	< 200		
	< 850	< 250		
<b>K</b> Malleable cast iron		< 260		
<b>N</b> Aluminium	< 350	< 100	400-1000	
	< 500	< 150	250-800	
	< 400	< 120	100-400	
	Copper	< 350	< 100	
	Brass	< 700	< 200	
	Graphite Synthetics			
<b>S</b> High temp. alloys	< 900	< 300		
	Titanium alloys	< 900		
<b>H</b> Hardened steel		45-52 HRc 50-60 HRc 58-70 HRc		

uncoated  
TiB<sub>2</sub> coated

recommended cooling:  
1. Emulsion  
2. Minimum lubrication  
3. Air

**HSM**

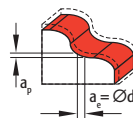


Ballnose

For further material specifications see material cross reference list.

Cutting Speed v<sub>c</sub> is based on max. 20.000 rpm.

Conditions based on pure aluminium. For aluminium < 5% Si reduce feed per tooth f<sub>z</sub> up to 10% and for > 5% Si reduce fz up to 20%.



a<sub>p</sub> up to 0.20 x d  
a<sub>e</sub> up to 0.10 x d

For DSAK short at shoulder milling a<sub>p</sub> max = 1,5 x d.

## Copy milling

type	Z	Ø d (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
DSAK	2	3.0	< 0.6	< 0.2	0.030 - 0.075
DSAK	2	4.0	< 0.8	< 0.3	0.035 - 0.085
DSAK	2	5.0	< 1.0	< 0.4	0.040 - 0.100
DSAK	2	6.0	< 1.2	< 0.5	0.045 - 0.115
DSAK	2	8.0	< 1.6	< 0.7	0.050 - 0.120
DSAK	2	10.0	< 2.0	< 0.9	0.055 - 0.130
DSAK	2	12.0	< 2.4	< 1.2	0.065 - 0.150
DSAK	2	14.0	< 2.8	< 1.4	0.085 - 0.170
DSAK	2	16.0	< 3.2	< 1.6	0.100 - 0.180
DSAK	2	18.0	< 3.6	< 1.8	0.110 - 0.200
DSAK	2	20.0	< 4.0	< 2.0	0.125 - 0.210

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

## Roughing Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)
<b>P</b> Carbon steel	< 750	< 250	
	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300
<b>M</b> Stainless steel	< 600	< 200	
	< 850	< 250	
<b>K</b> Malleable cast iron		< 260	
<b>N</b> Aluminium	< 350	< 100	400-1000
	< 500	< 150	250-800
	< 400	< 120	100-400
	< 350	< 100	
	< 700	< 200	
<b>S</b> High temp. alloys	< 900	< 300	
	< 900	< 300	
<b>H</b> Hardened steel		45-52 HRc	
		50-60 HRc 58-70 HRc	

uncoated  
TiB<sub>2</sub> coated

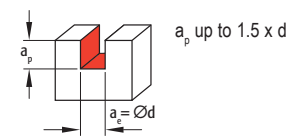
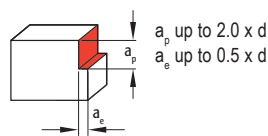
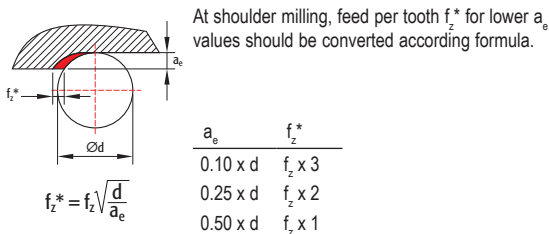
recommended cooling:  
1. Emulsion  
2. Air

HVM



Chamfer

For further material specifications see material cross reference list.



### Shoulder milling

### Slot milling

type	Z	$\varnothing d$ (mm)	$a_{p,max}$ (mm)	$a_{e,max}$ (mm)	$f_z$ (mm)	$a_{p,max}$ (mm)	$a_{e,max}$ (mm)	$f_z$ (mm)
DSAR	3	6.0	< 12.0	< 3.0	0.03 - 0.05	< 9.0	< 6.0	0.04 - 0.04
DSAR	3	8.0	< 16.0	< 4.0	0.04 - 0.07	< 12.0	< 8.0	0.04 - 0.06
DSAR	3	10.0	< 20.0	< 5.0	0.05 - 0.10	< 15.0	< 10.0	0.05 - 0.08
DSAR	3	12.0	< 24.0	< 6.0	0.06 - 0.12	< 18.0	< 12.0	0.06 - 0.09
DSAR	3	16.0	< 32.0	< 8.0	0.09 - 0.17	< 24.0	< 16.0	0.09 - 0.13

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.



## Torus Endmill



Material	Rm (N/mm <sup>2</sup> )	Hardness HB	Cutting speed (v <sub>c</sub> m/min)	
<b>P</b> Carbon steel	< 750	< 250		
	Alloyed steel	> 1000	< 300	
	Tool steel	> 850 > 1000	> 250 > 300	
<b>M</b> Stainless steel	< 600	< 200		
	< 850	< 250		
<b>K</b> Malleable cast iron		< 260		
<b>N</b> Aluminium	< 350	< 100	500-2000	
	Aluminium < 5%Si	< 500	< 150	
	Aluminium > 5%Si	< 400	< 120	
	Copper	< 350	< 100	
	Brass	< 700	< 200	
	Graphite Synthetics			< 500
<b>S</b> High temp. alloys	< 900	< 300		
	Titanium alloys	< 900	< 300	
<b>H</b> Hardened steel		45-52 HRc 50-60 HRc 58-70 HRc		

uncoated  
TiB<sub>2</sub> coated

recommended cooling:  
1. Emulsion  
2. Minimum lubrication  
3. Air

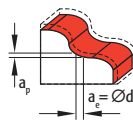
**HSM**



Torus

For further material specifications see material cross reference list.

Conditions based on pure aluminium. For aluminium < 5% Si reduce feed per tooth f<sub>z</sub> up to 10% and for > 5% Si reduce fz up to 20%.



a<sub>p</sub> up to 0.05 x d  
a<sub>e</sub> up to 0.10 x d

## Copy milling

type	Z	Ø d (mm)	a <sub>p</sub> max (mm)	a <sub>e</sub> max (mm)	f <sub>z</sub> (mm)
DSAT	2	6.0	< 0.6	< 0.50	0.035 - 0.050
DSAT	2	8.0	< 0.8	< 0.70	0.050 - 0.070
DSAT	2	10.0	< 1.0	< 0.90	0.055 - 0.090
DSAT	2	12.0	< 1.2	< 1.20	0.065 - 0.100
DSAT	2	14.0	< 1.4	< 1.40	0.075 - 0.120
DSAT	2	16.0	< 1.6	< 1.60	0.085 - 0.140
DSAT	2	18.0	< 1.8	< 1.80	0.100 - 0.145
DSAT	2	20.0	< 2.0	< 2.00	0.105 - 0.150
DSAT	2	25.0	< 2.5	< 2.50	0.110 - 0.200

All above mentioned cutting conditions should be regarded as guidelines. The conditions can be further optimised, depending on the stability and power of the machine and toolholder.

# Selection chart list - SYSTEM DS



type	Number of teeth Z	Carbide Grades								Groove milling	Shoulder milling	Copy milling	Material groups										Items Page	Cutting data Page					
		TS3K	TS3E	TS3H	TSCC	MG3K	CN2K	CD3K	CD5K				DD2K	Steel I	Steel II	Hard milling	CoCr	Copper	Graphite	AlSi < 5%	AlSi > 5%	Synthetics							
DSK	2	•																									020	090	
DSK	4	•																										026	096
DSKH	2			•																								021	091
DSK220°	2			•																								024	094
DSKH220°	2			•																								025	095
DSKL	2			•																								022	092
DSKLH	2			•																								023	093
DSKM	2			•																								027-029	097
DST	2			•																								032-033	0100
DST	4			•																								035-036	0102
DSTH	2			•																								034	0101
DSDS	4			•																								030	098
DSDH	4			•																								031	099
DSMH	6			•																								037	0103
DSMH	6/8/10/12/16			•																								038	0104
DSMR	6/8/10/12/16			•																								039-040	0103
DSMRH	6			•																								041	0104
DSML	6/8			•																								042	0103
DSR	3			•																								043	0105
DSF	3/4			•																								044-045	0106-0107
DSFE	4			•																								049	0111
DSRF	3			•																								046	0108
DSRR	3			•																								047	0109
DSRV	4/5			•																								048	0110
DSKC	23/4/5/7			•																								052	0112
DSKLC	4/5/7			•																								053	0112
DSKC220°	23/4/5/7			•																								054	0113
DSTC	2/3/4/5			•																								055	0114
DSMRC	4/5/7			•																								056	0115
DSKK	4																											060	0116
DSTK	4																											061	0117
DSMK	3																											062	0118
DSMRK	3																											063	0119
DSMKK	2																											064	0120
DSMMK	2																											065	0121
DSKG	3																											068	0122
DSKGL	2																											069	0123
DSTG	3																											070-071	0124
DSTLG	2																											072	0124
DSKMG	2																											074	0126
DSMMG	2																											075	0127
DSVG	x																											073	0125
DSA	1																											078	0128
DSA	2																											079-080	0129
DSAKH	2																											081	0130
DSAK	2																											082-083	0131
DSAR	3																											084	0132
DSAT	2																											085	0133

- TS3K • AlTiN coated for materials ≤ 40 HRC
- TS3E • AlTiN coated for hard milling ≥ 50-70 HRC
- TS3H • AlTiN coated for materials ≥ 38-53 HRC
- TSCC • AlTiN coated for CoCr alloys

- MG3K • uncoated
- CN2K • CrCn coated
- CD5K • Diamond coated
- CD3K
- DD2K • TiB<sub>2</sub> coated

√√ best suitable  
√ suitable

## CVD Diamond milling tools for

- Die and molding industry
- Aerospace and Automotive industry



## Die and mould industry

Milling of Graphite and Aluminium

### type DSK

Ballnose endmill, 2-fluted  
Ø 2,0 - 12,0 mm



### type DST

Torus Endmill with corner radius  
Ø 2,0 - 12,0 mm  
Corner radius 0,2 - 1,0 mm  
Length of cut 2,5 - 9,0 mm

### type DST

Torus Endmill with corner chamfer  
Ø 4,0 - 16,0 mm  
Chamfer 0,1 x 45°  
Length of cut 8,0 - 20,0 mm

## Aerospace and Automotive industry

Carbon fibre and Glass reinforced plastics

### type DSUD

Up and down endmill, pushing and pulling, 4-fluted  
Ø 8,0 - 16,0 mm



### type DSNF

Multiple fluted Finishing Endmill, neutral, 5-9-fluted  
Ø 8,0 - 16,0 mm

### type DSFU

Multiple fluted Finishing Endmill, pulling, 5-9-fluted  
Ø 8,0 - 16,0 mm

### type DSFD

Multiple fluted Finishing Endmill, pushing, 5-9-fluted  
Ø 8,0 - 16,0 mm

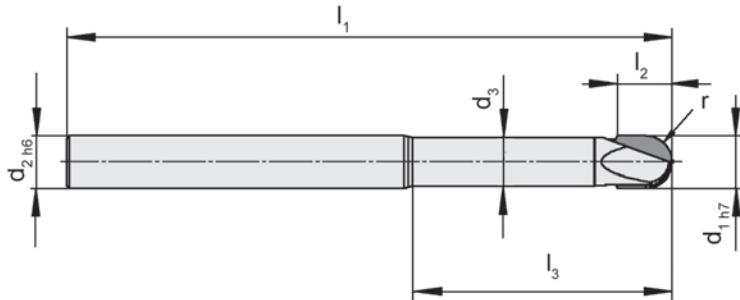
### type DSHF

Helix Endmill, 3-4-fluted  
Ø 8,0 - 20,0 mm

## Die and mould industry

## DSK

Ballnose Endmill, 2-fluted, Ø 2.0 - 10.0 mm



Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	CVD Diamond tipped			
									HD03	HD05	HD08	
DSK.2.020.08.04.00	2	4	1.95	45	2.5	8	1.0	2	▲			
DSK.2.03.09.06.00	3	6	2.85	55	3.0	9	1.5		▲			
DSK.2.03.12.06.00	3	6	2.85	55	3.0	12	1.5		▲			
DSK.2.03.15.06.00	3	6	2.85	55	3.0	15	1.5		▲			
DSK.2.04.10.06.00	4	6	3.90	60	4.0	10	2.0			▲		
DSK.2.04.15.06.00	4	6	3.90	60	4.0	15	2.0			▲		
DSK.2.04.20.06.00	4	6	3.90	60	4.0	20	2.0			▲		
DSK.2.06.20.06.00	6	6	5.60	70	6.0	20	3.0				▲	
DSK.2.06.25.06.00	6	6	5.60	70	6.0	25	3.0				▲	
DSK.2.06.30.06.00	6	6	5.60	70	6.0	30	3.0				▲	
DSK.2.08.25.08.00	8	8	7.50	65	7.0	25	4.0				▲	
DSK.2.08.40.08.00	8	8	7.50	80	7.0	40	4.0				▲	
DSK.2.10.30.10.00	10	10	9.30	70	8.0	30	5.0				▲	
DSK.2.10.50.10.00	10	10	9.30	90	8.0	50	5.0				▲	
DSK.2.12.30.12.00	12	12	11.30	75	9.0	30	6.0				▲	
DSK.2.12.60.12.00	12	12	11.30	105	9.0	60	6.0				▲	
									P			
									M			
									K			
									N	•	•	•
									S			
									H			

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

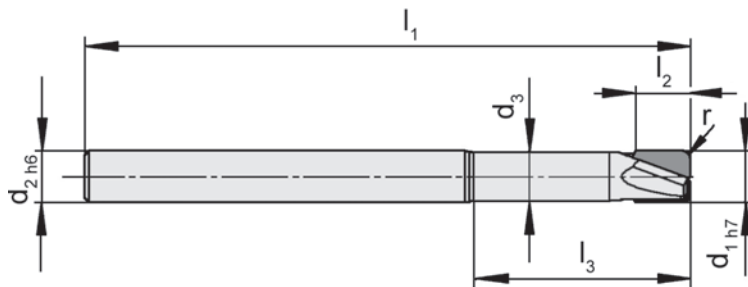
CVD Diamond tipped



Die and mould industry

## DST

Torus Endmill, 2-fluted with corner radius, Ø 2.0 - 6.0 mm



Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	HD03	HD05	HD08
DST.2.02.0425.02.04	2	4	1.95	45	2.5	4	0.2	2	▲		
DST.2.02.0625.02.04	2	4	1.95	45	2.5	6	0.2		▲		
DST.2.02.0825.02.04	2	4	1.95	45	2.5	8	0.2		▲		
DST.2.03.0925.03.06	3	6	2.85	55	2.5	9	0.3		▲		
DST.2.03.0925.05.06	3	6	2.85	55	2.5	9	0.5		▲		
DST.2.03.1225.03.06	3	6	2.85	55	2.5	12	0.3		▲		
DST.2.03.1225.05.06	3	6	2.85	55	2.5	12	0.5		▲		
DST.2.03.1525.03.06	3	6	2.85	55	2.5	15	0.3		▲		
DST.2.03.1525.05.06	3	6	2.85	55	2.5	15	0.5		▲		
DST.2.04.1025.03.06	4	6	3.90	60	2.5	10	0.3			▲	
DST.2.04.1025.05.06	4	6	3.90	60	2.5	10	0.5			▲	
DST.2.04.1525.03.06	4	6	3.90	60	2.5	15	0.3			▲	
DST.2.04.1525.05.06	4	6	3.90	60	2.5	15	0.5			▲	
DST.2.04.2025.03.06	4	6	3.90	60	2.5	20	0.3			▲	
DST.2.04.2025.05.06	4	6	3.90	60	2.5	20	0.5			▲	
DST.2.06.2060.03.06	6	6	5.60	70	6.0	20	0.3				▲
DST.2.06.2060.05.06	6	6	5.60	70	6.0	20	0.5				▲
DST.2.06.2060.10.06	6	6	5.60	70	6.0	20	1.0				▲
DST.2.06.2560.03.06	6	6	5.60	70	6.0	25	0.3				▲
DST.2.06.2560.05.06	6	6	5.60	70	6.0	25	0.5				▲
DST.2.06.2560.10.06	6	6	5.60	70	6.0	25	1.0				▲
DST.2.06.3060.03.06	6	6	5.60	70	6.0	30	0.3				▲
DST.2.06.3060.05.06	6	6	5.60	70	6.0	30	0.5				▲
DST.2.06.3060.10.06	6	6	5.60	70	6.0	30	1.0				▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P		
M		
K		
N	•	•
S		
H		

Dimensions in mm

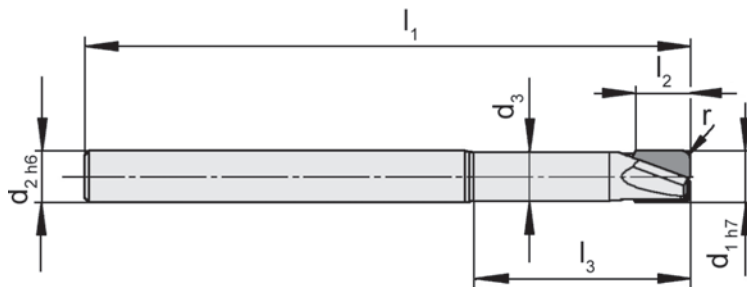
CVD Diamond tipped



Die and mould industry

## DST

Torus Endmill, 2-fluted with corner radius, Ø 8.0 - 12.0 mm



Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	r	Z	HD08
DST.2.08.2570.03.08	8	8	7.5	65	7	25	0.3	2	▲
DST.2.08.2570.05.08	8	8	7.5	65	7	25	0.5		▲▲
DST.2.08.2570.10.08	8	8	7.5	65	7	25	1.0		▲▲▲
DST.2.08.4070.03.08	8	8	7.5	80	7	40	0.3		▲▲▲
DST.2.08.4070.05.08	8	8	7.5	80	7	40	0.5		▲▲▲
DST.2.08.4070.10.08	8	8	7.5	80	7	40	1.0		▲▲▲
DST.2.10.3080.05.10	10	10	9.3	70	8	30	0.5		▲▲▲
DST.2.10.3080.10.10	10	10	9.3	70	8	30	1.0		▲▲▲
DST.2.10.5080.05.10	10	10	9.3	90	8	50	0.5		▲▲▲
DST.2.10.5080.10.10	10	10	9.3	90	8	50	1.0		▲▲▲
DST.2.12.3090.05.12	12	12	11.3	75	9	30	0.5		▲▲▲
DST.2.12.3090.10.12	12	12	11.3	75	9	30	1.0		▲▲▲
DST.2.12.6090.05.12	12	12	11.3	105	9	60	0.5		▲▲▲
DST.2.12.6090.10.12	12	12	11.3	105	9	60	1.0		▲▲▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P
M
K
N ●
S
H

Dimensions in mm

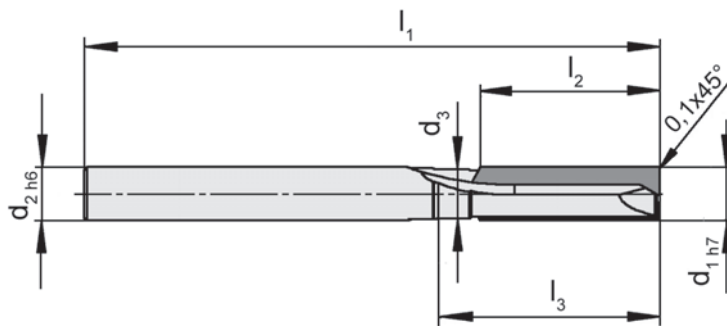
CVD Diamond tipped



Die and mould industry

## DST

Torus Endmill, 2-fluted with corner chamfer, Ø 4.0 - 16.0 mm



Part number	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	Z	HD05	HD08	
DST.2.04.1008.03.06	4	6	3.9	60	8	10	2	▲		
DST.2.04.2015.03.06	4	6	3.9	60	15	20		▲		
DST.2.06.1510.04.06	6	6	5.8	60	10	15			▲	
DST.2.06.2015.04.06	6	6	5.8	60	15	20			▲	
DST.2.06.2520.04.06	6	6	5.8	65	20	25			▲	
DST.2.08.1510.06.08	8	8	7.8	60	10	15			▲	
DST.2.08.2015.06.08	8	8	7.8	60	15	20			▲	
DST.2.08.3020.06.08	8	8	7.8	70	20	30			▲	
DST.2.10.2010.08.10	10	10	9.8	70	10	20			▲	
DST.2.10.2515.08.10	10	10	9.8	70	15	25			▲	
DST.2.10.3020.08.10	10	10	9.8	80	20	30			▲	
DST.2.12.2010.10.12	12	12	11.7	70	10	20			▲	
DST.2.12.2515.10.12	12	12	11.7	70	15	25			▲	
DST.2.12.3020.10.12	12	12	11.7	80	20	30			▲	
DST.2.16.2510.20.16	16	16	15.6	80	10	25			▲	
DST.2.16.3015.20.16	16	16	15.6	80	15	30			▲	
DST.2.16.3520.20.16	16	16	15.6	90	20	35			▲	
									P	
									M	
									K	
								N	• •	
								S		
								H		

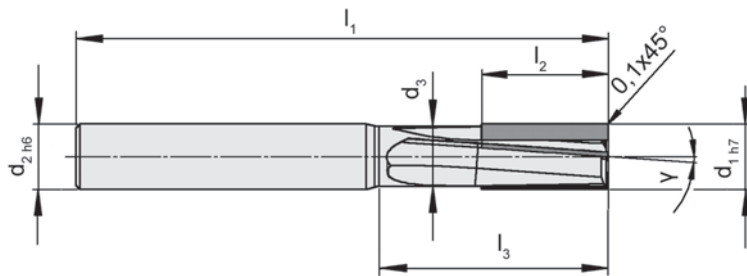
- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

CVD Diamond tipped



Up and down Endmill, 4-fluted



pulling and pushing

Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d <sub>3</sub>	γ	Z	HD05
DSUD.4.08.15.44.08	8	8	70	15	30	7.5	+4° -4° +4° -4°	4	▲
DSUD.4.08.20.33.08	8	8	75	20	35	7.5	+3° -3° +3° -3°		Δ
DSUD.4.08.24.22.08	8	8	80	24	40	7.5	+2° -2° +2° -2°		▲
DSUD.4.10.15.44.10	10	10	75	15	30	9.3	+4° -4° +4° -4°		▲
DSUD.4.10.20.33.10	10	10	80	20	35	9.3	+3° -3° +3° -3°		Δ
DSUD.4.10.24.22.10	10	10	85	24	40	9.3	+2° -2° +2° -2°		▲
DSUD.4.12.15.44.12	12	12	80	15	30	11.3	+4° -4° +4° -4°		▲
DSUD.4.12.20.44.12	12	12	85	20	35	11.3	+4° -4° +4° -4°		Δ
DSUD.4.12.24.33.12	12	12	90	24	40	11.3	+3° -3° +3° -3°		▲
DSUD.4.16.15.44.16	16	16	85	15	30	15.3	+4° -4° +4° -4°		▲
DSUD.4.16.20.44.16	16	16	90	20	35	15.3	+4° -4° +4° -4°		Δ
DSUD.4.16.24.44.16	16	16	95	24	40	15.3	+4° -4° +4° -4°		▲

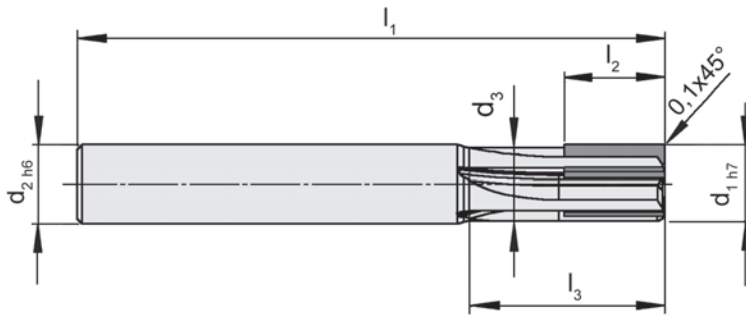
- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

P
M
K
N •
S
H

CVD Diamond tipped

Multiple fluted Finishing Endmill, 5-9-fluted



neutral

Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d <sub>3</sub>	Z	HD05
DSFN.5.08.10.54.0.08	8	8	60	10	20	7.5	5	▲
DSFN.5.08.20.64.0.08	8	8	70	20	30	7.5	5	▲▲
DSFN.5.10.12.60.0.10	10	10	65	12	20	9.3	5	▲▲
DSFN.5.10.22.70.0.10	10	10	75	22	30	9.3	5	▲▲
DSFN.7.12.15.68.0.12	12	12	75	15	25	11.3	7	▲▲
DSFN.7.12.24.77.0.12	12	12	85	24	35	11.3	7	▲▲
DSFN.7.16.24.80.0.16	16	16	85	24	35	15.3	7	▲▲
DSFN.9.16.24.80.0.16	16	16	85	24	35	15.3	9	▲▲

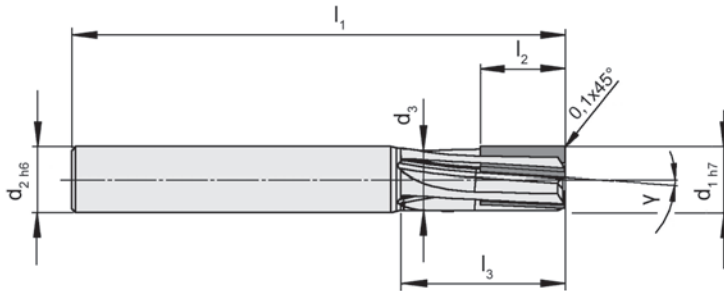
- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in mm

CVD Diamond tipped

P	▲
M	▲▲
K	▲▲
N	●
S	
H	

Multiple fluted Finishing Endmill, 5-9-fluted



pulling

Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d <sub>3</sub>	γ	Z	HD05
DSFU.5.08.10.54.4.08	8	8	60	10	20	7.5	+4°	5	▲
DSFU.5.08.20.64.3.08	8	8	70	20	30	7.5	+3°	5	▲
DSFU.5.10.12.60.4.10	10	10	65	12	20	9.3	+4°	5	▲
DSFU.5.10.22.70.3.10	10	10	75	22	30	9.3	+3°	5	▲
DSFU.7.12.15.68.4.12	12	12	75	15	25	11.3	+4°	7	▲
DSFU.7.12.24.77.3.12	12	12	85	24	35	11.3	+3°	7	▲
DSFU.7.16.24.80.4.16	16	16	85	24	35	15.3	+4°	7	▲
DSFU.9.16.24.80.4.16	16	16	85	24	35	15.3	+4°	9	▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

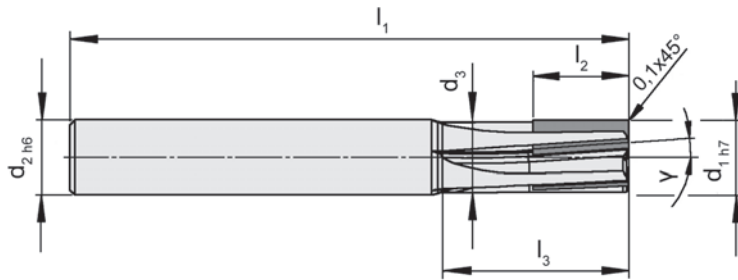
P
M
K
N •
S
H

Dimensions in mm

CVD Diamond tipped

P

### Multiple fluted Finishing Endmill, 5-9-fluted



pushing

Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d <sub>3</sub>	γ	Z	HD05
DSFD.5.08.10.54.4.08	8	8	60	10	20	7.5	-4°	5	▲
DSFD.5.08.20.64.3.08	8	8	70	20	30	7.5	-3°	5	▲▲
DSFD.5.10.12.60.4.10	10	10	65	12	20	9.3	-4°	5	▲▲
DSFD.5.10.22.70.3.10	10	10	75	22	30	9.3	-3°	5	▲▲
DSFD.7.12.15.68.4.12	12	12	75	15	25	11.3	-4°	7	▲▲
DSFD.7.12.24.77.3.12	12	12	85	24	35	11.3	-3°	7	▲▲
DSFD.7.16.24.80.4.16	16	16	85	24	35	15.3	-4°	7	▲▲
DSFD.9.16.24.80.4.16	16	16	85	24	35	15.3	-4°	9	▲▲

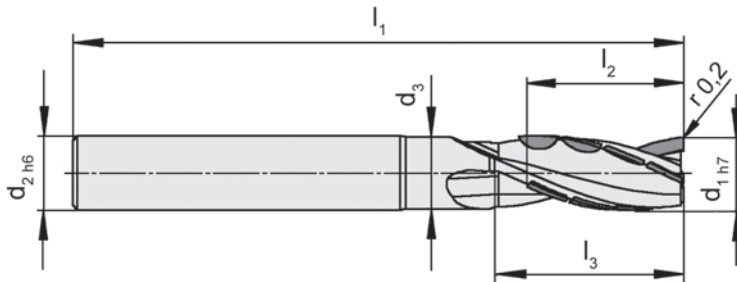
- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P
M
K
N •
S
H

Dimensions in mm

CVD Diamond tipped

### Helix Endmill, 3-4-fluted



Part number	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d <sub>3</sub>	Z	HD05
DSHF.3.08.15.70.08	8	8	70	15	30	7.8	3	▲
DSHF.3.08.25.80.08	8	8	80	25	40	7.8	3	▲▲
DSHF.3.10.20.80.10	10	10	80	20	35	9.8	3	▲▲
DSHF.3.10.30.90.10	10	10	90	30	45	9.8	3	▲▲
DSHF.4.12.20.85.12	12	12	85	20	35	11.8	4	▲▲
DSHF.4.12.30.95.12	12	12	95	30	45	11.8	4	▲▲
DSHF.4.16.30.100.16	16	16	100	30	45	15.7	4	▲▲
DSHF.4.16.50.120.16	16	16	120	50	65	15.7	4	▲▲

- ▲ on stock    Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P	▲
M	▲
K	▲
N	●
S	▲
H	▲

Dimensions in mm

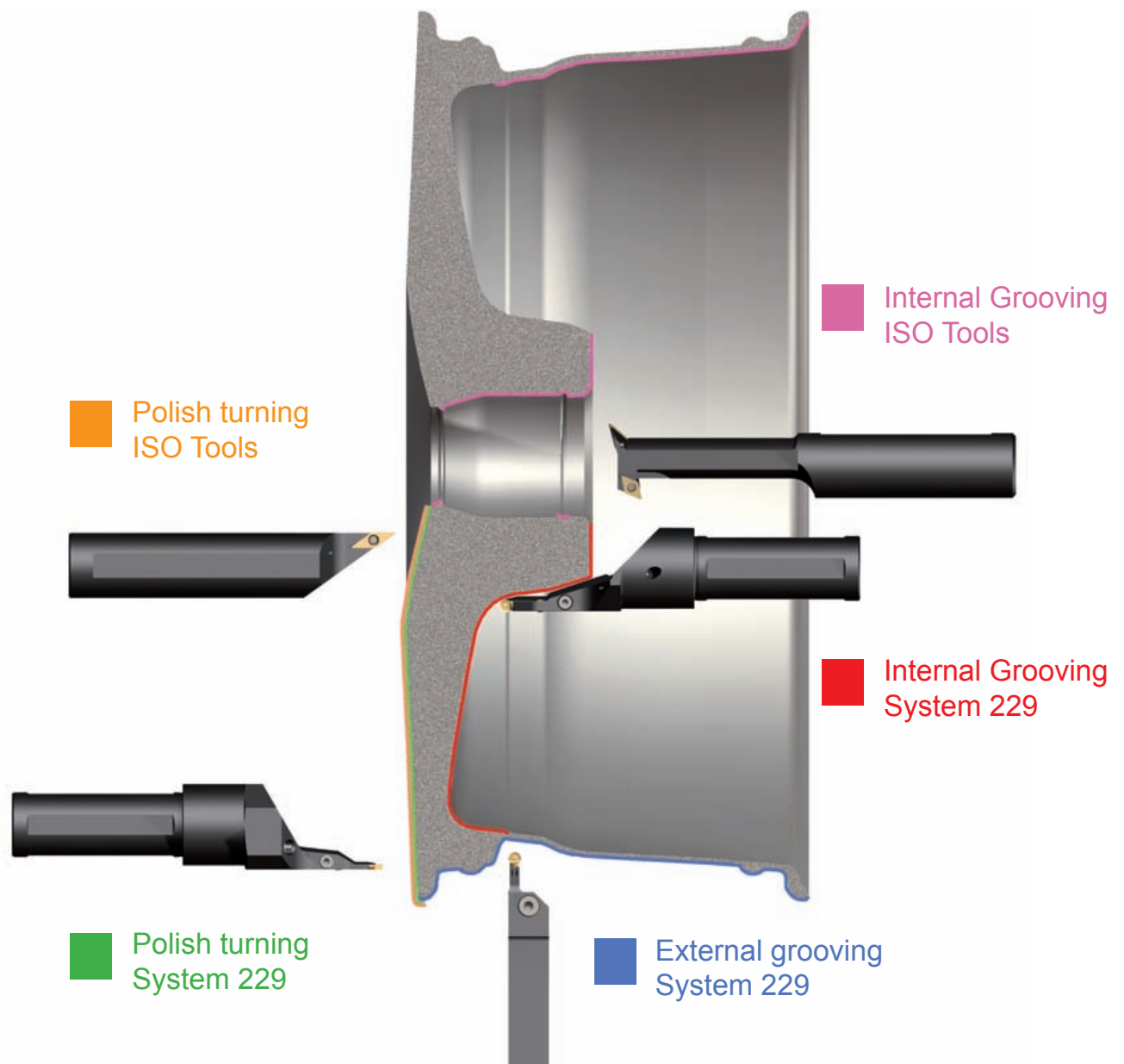
CVD Diamond tipped

## Shoulder milling

Material	$v_c$ (m/min)	$a_p \times \varnothing$ (mm)	$a_e \times \varnothing$ (mm)	Feed rate $f_z$ (mm)									Feed rate direction	recommended cooling	
				$\varnothing 2$	$\varnothing 3$	$\varnothing 4$	$\varnothing 6$	$\varnothing 8$	$\varnothing 10$	$\varnothing 12$	$\varnothing 16$	$\varnothing 20$			
<b>N</b> AISi (< 6 %)	3000	0.65	0.40	0.02	0.02	0.03	0.05	0.10	0.10	0.12	0.15	0.20	Climbing	Emulsion / MMS	
	1800	0.60	0.30	0.01	0.02	0.02	0.04	0.10	0.08	0.10	0.13	0.18	Climbing		
	1100	0.50	0.25	0.01	0.01	0.02	0.03	0	0.06	0.08	0.10	0.15	Climbing		
	PMMA (Acryl)	1200	0.50	0.50	0.01	0.015	0.02	0.03	0.05	0.07	0.09	0.12	0.15	Climbing	Emulsion
	PA66 - CF/GF 30	1000	0.50	0.30	0.008	0.01	0.015	0.025	0.04	0.06	0.08	0.10	0.12	Conventional	
	PEEK - CF/GF30	1000	0.50	0.25	0.007	0.008	0.01	0.02	0.03	0.05	0.07	0.08	0.10	Conventional	
	POM - CF/GF30	1100	0.50	0.50	0.008	0.01	0.015	0.025	0.04	0.06	0.08	0.10	0.12	Conventional	
	PTFE - CF/GF30	900	0.50	0.30	0.01	0.015	0.02	0.03	0.05	0.07	0.09	0.12	0.15	Conventional	
	GFK	650	0.50	0.30	0.01	0.015	0.02	0.03	0.05	0.07	0.09	0.12	0.15	Conventional	
	CFK	500	0.40	0.25	0.008	0.01	0.015	0.025	0.04	0.06	0.08	0.10	0.12	Conventional	dry / Air pressure to remove chips
	SFK/AFK (Armid)	600	0.45	0.30	0.01	0.015	0.02	0.03	0.05	0.07	0.09	0.12	0.14	Conventional	
	Zirconium	350	0.50	0.40	0.01	0.02	0.02	0.04	0.10	0.08	0.10	0.13	0.18	Climbing	

## Copy milling

Material	$v_c$ (m/min)	$a_p \times \varnothing$ (mm)	$a_e \times \varnothing$ (mm)	Feed rate $f_z$ (mm)									Feed rate direction	recommended cooling	
				$\varnothing 2$	$\varnothing 3$	$\varnothing 4$	$\varnothing 6$	$\varnothing 8$	$\varnothing 10$	$\varnothing 12$	$\varnothing 16$	$\varnothing 20$			
<b>N</b> AISi (< 6 %)	3000	0.25	0.15	0.02	0.02	0.03	0.05	0.10	0.10	0.12	0.10	0.20	Climbing	Emulsion / MMS	
	1800	0.20	0.10	0.001	0.002	0.002	0.004	0.10	0.08	0.10	0.13	0.18	Climbing		
	1100	0.15	0.10	0.01	0.01	0.02	0.03	0	0.06	0.08	0.10	0.15	Climbing		
	PMMA (Acryl)	1200	0.15	0.15	0.01	0.015	0.02	0.03	0.05	0.07	0.09	0.12	0.15	Climbing	Emulsion
	PA66 - CF/GF 30	1000	0.15	0.10	0.008	0.01	0.015	0.025	0.04	0.06	0.08	0.10	0.12	Conventional	
	PEEK - CF/GF30	1000	0.15	0.10	0.007	0.008	0.01	0.02	0.03	0.05	0.07	0.08	0.10	Conventional	
	POM - CF/GF30	1100	0.15	0.015	0.008	0.01	0.015	0.025	0.04	0.06	0.08	0.10	0.12	Conventional	
	PTFE - CF/GF30	900	0.15	0.10	0.001	0.015	0.02	0.03	0.05	0.07	0.09	0.12	0.15	Conventional	
	GFK	650	0.15	0.10	0.01	0.015	0.02	0.03	0.05	0.07	0.09	0.12	0.15	Conventional	
	CFK	500	0.15	0.10	0.008	0.01	0.015	0.025	0.04	0.06	0.08	0.10	0.12	Conventional	dry / Air pressure to remove chips
	SFK/AFK (Armid)	600	0.15	0.10	0.01	0.015	0.02	0.03	0.05	0.07	0.09	0.12	0.14	Conventional	
	Zirconium	350	0.15	0.15	0.01	0.02	0.02	0.04	0.10	0.08	0.10	0.13	0.18	Climbing	



## Wheel turning

HORN - LEADERS IN GROOVING TECHNOLOGIES



For further information, please contact HORN USA.

**GROOVING** PARTING OFF GROOVE MILLING BROACHING PROFILE MILLING DRILLING REAMING



## High polish milling with MCD for

- non ferrous metals: aluminum, platinum, gold, silver  
copper, brass
- synthetics: acryl (PMMA)  
polycarbonat (PC)



## Diamond cutting materials

- Monocrystalline and natural diamonds are the hardest materials
- Colour: yellowish to grey, sometimes greenish
- Oriented crystalline structure
- Monocrystalline diamond is the perfect cutting material for brilliant finish and high-precision machining with geometrically determined cutter
- min. 99% carbon
- < 1% hydrogen, nitrogen and oxygen
- Hardness of 10,000 kg/mm<sup>2</sup>
- Mohs hardness at 20° C: 10
- Density 3.52 g/cm<sup>3</sup>
- Boiling point: 4827°C
- Thermal coefficient: 0.0000011/K

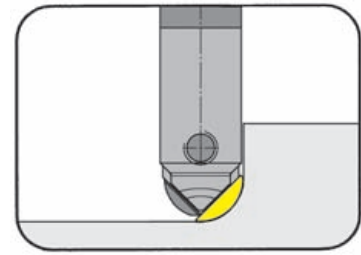


## MILLING SHANK Type

# M117K

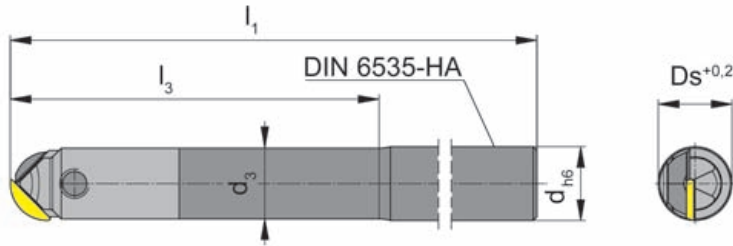
Cylindrical carbide shank - shrink fit

Material of shank: Carbide - Giving a good vibration resistance



for use with Insert

Type S117.  
MD...K.X0



Picture = right hand cutting version

Part number	Ds	$l_1$	$l_3$	d	$d_3$	Size
M117K.MD06.06.5.05	6	63	25	6	5.6	05
M117K.MD08.08.5.07	8	77	35	8	7.6	07
M117K.MD10.10.5.09	10	100	50	10	9.6	09

Dimensions in mm

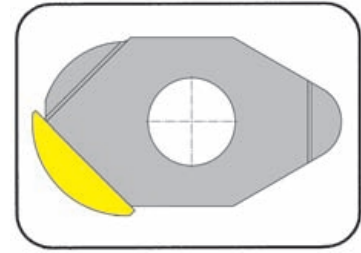
### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M117K.MD06.06.5.05	030.265P.0821	T8PL
M117K.MD08.08.5.07	030.265P.0819	T8PL
M117K.MD10.10.5.09	030.400P.0227	T15PQ

## INSERT Type

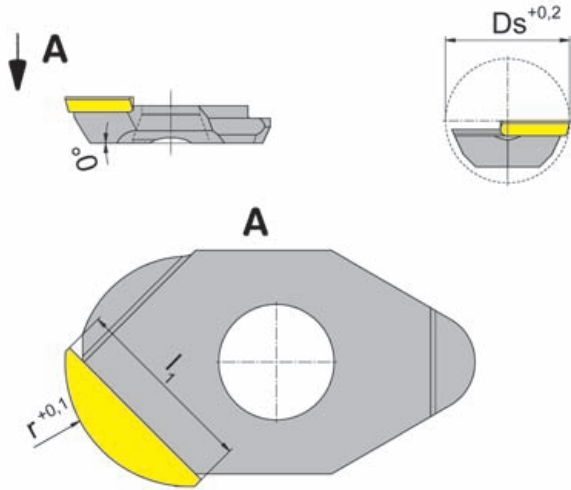
# S117

High polish milling



for use with Milling shank

Type M117K



Part number	Ds	r	l <sub>1</sub>	Size	Grade	Geometries for		
						Aluminum	Brass/Gold	Synthetics (PMMA)
S117.MD06.05K.X0	.236	.118	.181	05	Δ	x	x	x
S117.MD08.07K.X0	.315	.157	.236	07	Δ	x	x	x
S117.MD10.09K.X0	.394	.197	.295	09	Δ	x	x	x
					P			
					M			
					K			
					N	•		
					S			
					H			

Dimensions in mm  
Cutting edges must be measured optically!

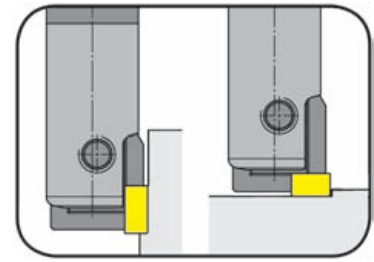
## MILLING SHANK Type

# M117

with through coolant supply

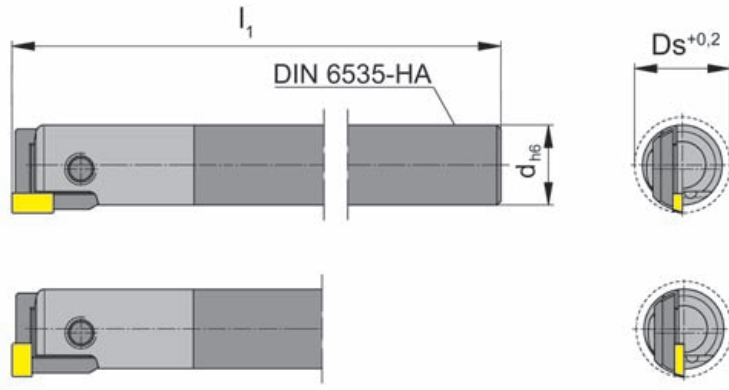
Cylindrical carbide shank - shrink fit

Material of shank: Carbide - Giving a good vibration resistance



for use with Insert

Type S117...09P...  
S117...09U...



Picture = right hand cutting version

Part number	Ds	$l_1$	d	Size
M117.MD10.12.5.09	12	100	10	09

Dimensions in mm

## Spare parts

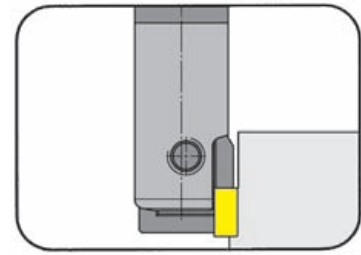
Milling shank	Screw	TORX PLUS® Wrench
M117.MD10.12.5.09	030.400P.0227	T15PQ

## MILLING SHANK Type

# M117U

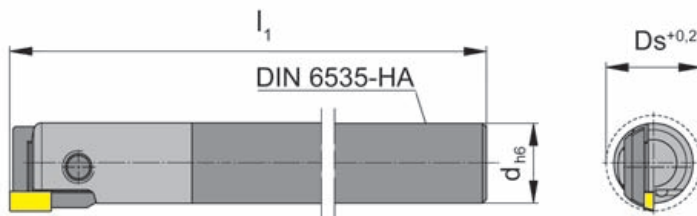
Cylindrical carbide shank - shrink fit

Material of shank: Carbide - Giving a good vibration resistance



for use with Insert

Type S117...U...



Picture = right hand cutting version

Part number	Ds	$l_1$	d	Size
M117U.MD06.08.5.05	8	63	6	05
M117U.MD08.10.5.07	10	77	8	07

Dimensions in mm

### Spare parts

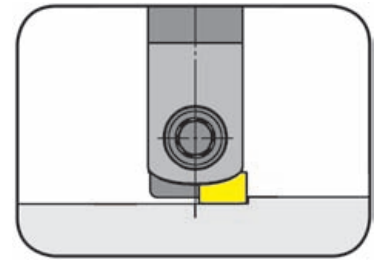
Milling shank	Screw	TORX PLUS® Wrench
M117U.MD06.08.5.05	<b>030.265P.0818</b>	<b>T8PL</b>
M117U.MD08.10.5.07	<b>2.6.5T8EP</b>	<b>T8PL</b>

## MILLING SHANK Type

# M117P

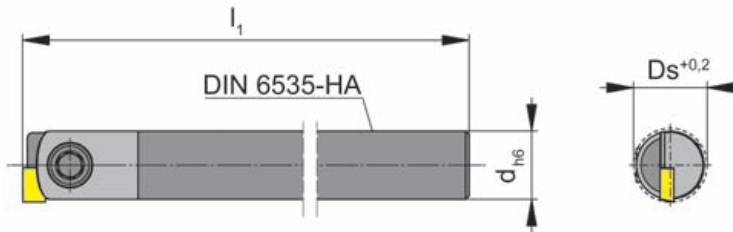
Cylindrical carbide shank - shrink fit

Material of shank: Carbide - Giving a good vibration resistance



for use with Insert

Type S117...P...



Picture = right hand cutting version

Part number	Ds	$l_1$	d	Size
M117P.MD06.08.5.05	8	63	6	05
M117P.MD08.10.5.07	10	77	8	07

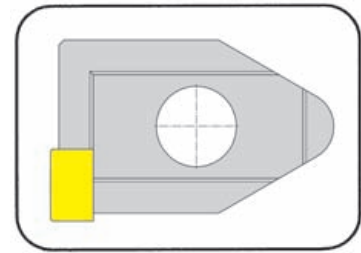
Dimensions in mm

### Spare parts

Milling shank	Screw	TORX PLUS® Wrench
M117P.MD06.08.5.05	<b>030.265P.0818</b>	<b>T8PL</b>
M117P.MD08.10.5.07	<b>2.6.5T8EP</b>	<b>T8PL</b>

## INSERT Type

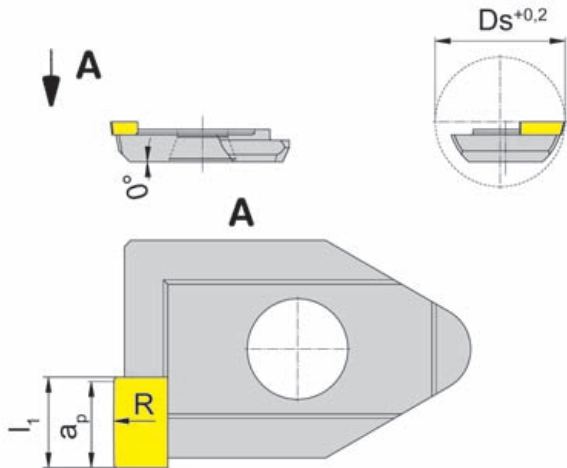
# S117



High polish milling

for use with Milling shank

Type M117



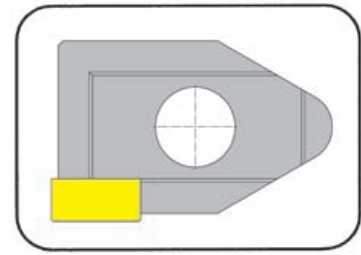
Part number	R	a <sub>p</sub>	l <sub>1</sub>	Ds	Size	Grade MD10	Geometries for			
							Aluminum	Brass/Gold	Synthetics (PMMA)	
S117.MD08.05P.M0 S117.MD08.05P.X0	1.969	.118	.126	.315	05	Δ Δ	x	x	x	
S117.MD10.07P.M0 S117.MD10.07P.X0	3.937	.138	.146	.394	07	Δ Δ	x	x	x	
S117.MD12.09P.M0 S117.MD12.09P.X0	3.937	.157	.165	.472	09	Δ Δ	x	x	x	
							P			
							M			
							K			
							N	•	•	•
							S			
							H			

Dimensions in inch  
Cutting edges must be measured optically!

## INSERT Type

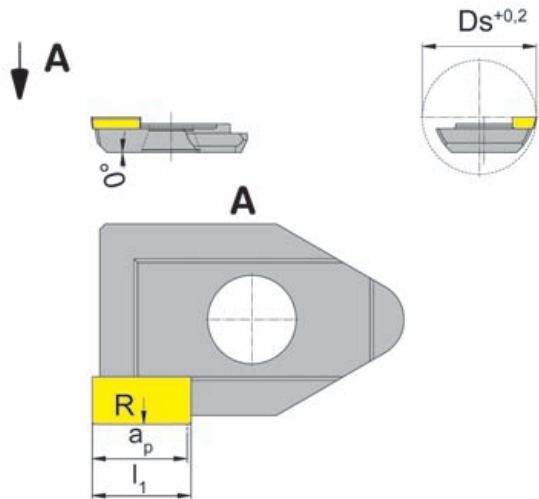
# S117

High polish milling



for use with Milling shank

Type M117U



Part number	Ds	R	l <sub>1</sub>	Size	Grade MD10	Geometries for		
						Aluminum	Brass/Gold	Synthetics (PMMA)
S117.MD08.4.05U.M0 S117.MD08.4.05U.X0	.315	3.937	.165	05	Δ Δ	x	x	x
S117.MD10.5.07U.M0 S117.MD10.5.07U.X0	.394	11.811	.205	07	Δ Δ	x	x	x
S117.MD12.5.09U.M0 S117.MD12.5.09U.X0	.472	11.811	.205	09	Δ Δ	x	x	x
					P			
					M			
					K			
					N	•	•	•
					S			
					H			

Dimensions in inch  
Cutting edges must be measured optically!



Machining of high polished surfaces in nano quality

## Machinable materials:

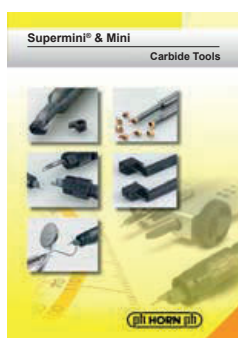
Non ferrous metals	Synthetics
Aluminium	Polycarbonat (PC)
Copper	Acrylic (PMMA)
Brass	
Gold	
Silver	
Platin	



Further sizes and versions upon request.

Material	$v_c$ (m/min)	f (mm/U)	$a_p$ (mm)	cooling	
Non ferrous metals	Ag	200 - 250	0.05 - 0.06	0.02 - 0.05	●
	Al	200 - 400	0.02 - 0.10	0.02 - 0.05	●
	Au	200 - 250	0.05 - 0.06	0.02 - 0.05	●
	CuSn	150 - 250	0.05 - 0.10	0.02 - 0.05	●
	Cu	150 - 300	0.02 - 0.10	0.02 - 0.05	● / -
	CuZn	150 - 250	0.05 - 0.10	0.02 - 0.05	● / -
	Pt	150 - 125	0.02 - 0.04	0.01 - 0.03	●
Synthetics	PMMA	100 - 150	0.05 - 0.10	0.02 - 0.05	● / -
	PC	80 - 150	0.05 - 0.10	0.02 - 0.05	● / -
	PVC	150 - 250	0.05 - 0.10	0.02 - 0.05	● / -
	PE	150 - 300	0.05 - 0.10	0.02 - 0.05	● / -

For further technical information please ask for our current catalogues.



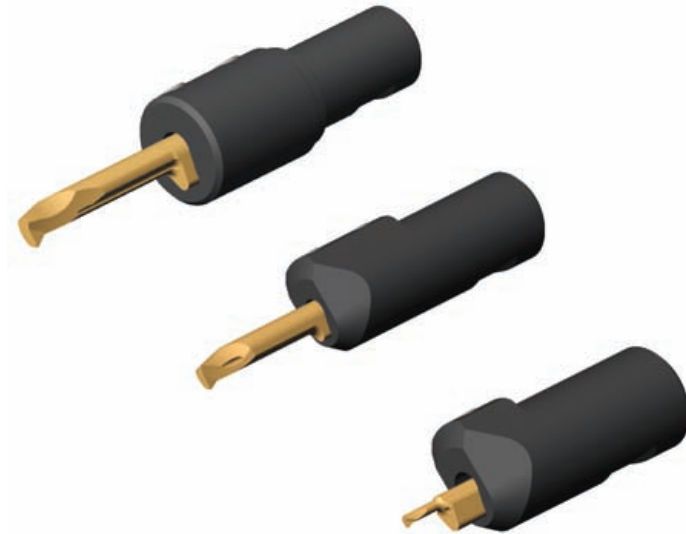
Face grooving with  
URMA IntraMax  
and  
boring with  
URMA fine boring head



Benefits of Synergy



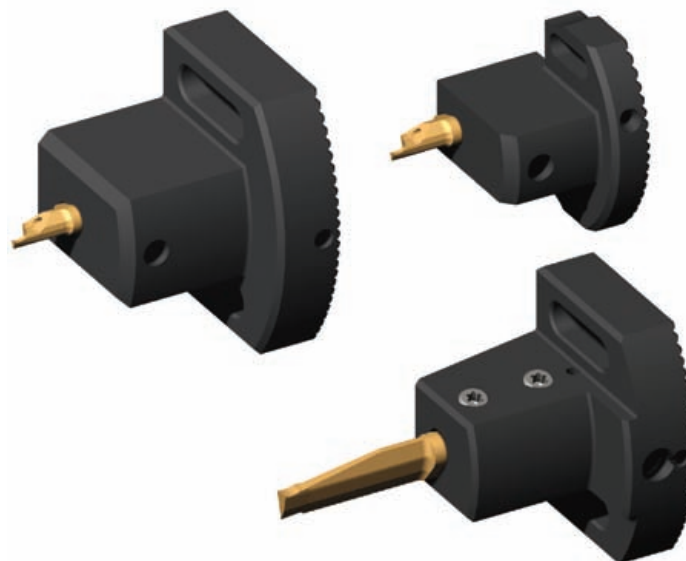
## Boring with Fine boring head URMA 05



from Ø .008"  
with Insert type 105  
or  
from Ø .236"  
with Insert type 110

CBN (from Ø .118") or PKD (from Ø .157") tipped inserts are also available for boring operations in cast iron or hardened materials.

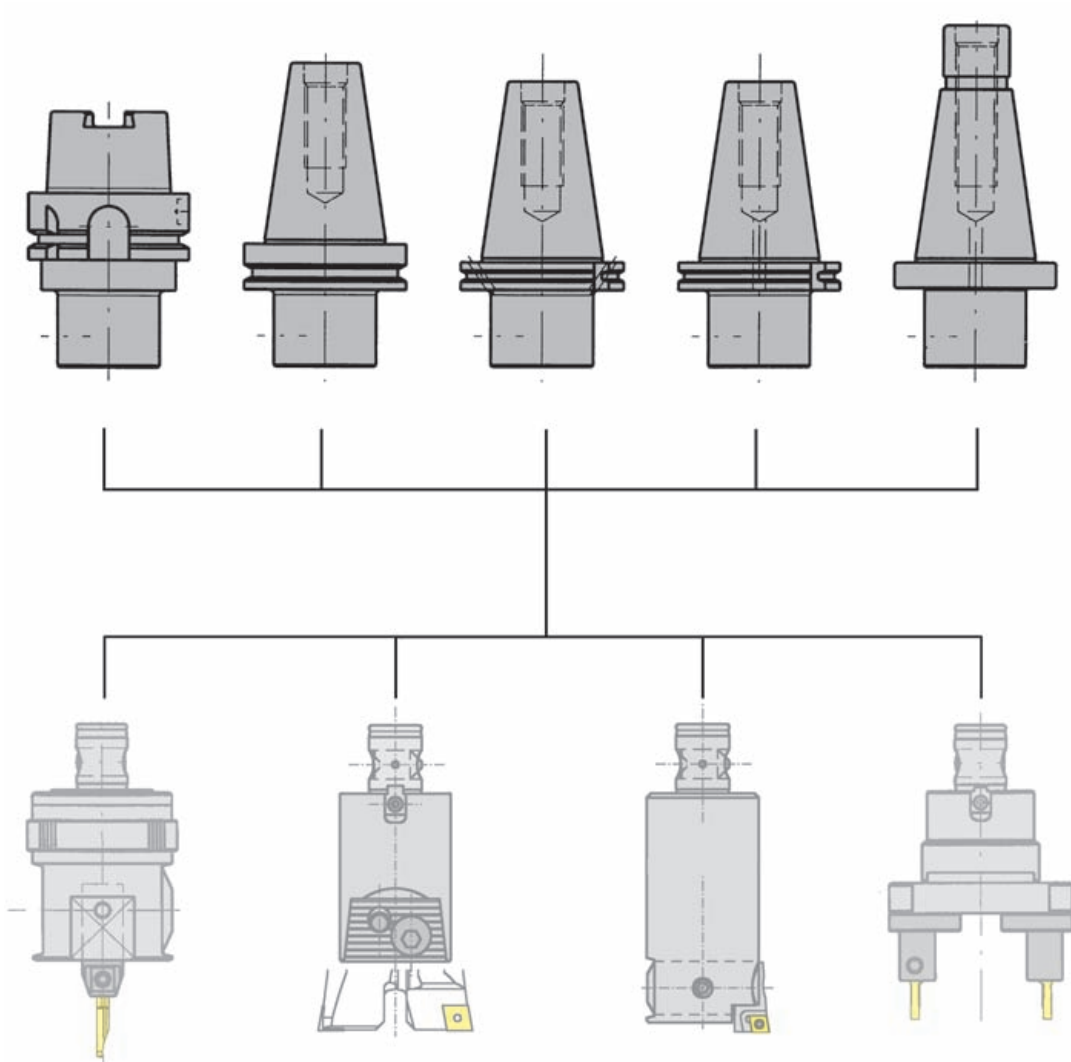
## Face grooving with URMA-IntraMax



from Ø .197"  
with Insert type 105

$t_{\max}$  up to 1.181"  
with Insert type A110

Adaptor with Beta module 25/32/40/50/80/100



Fine boring head 05

Double cutter head

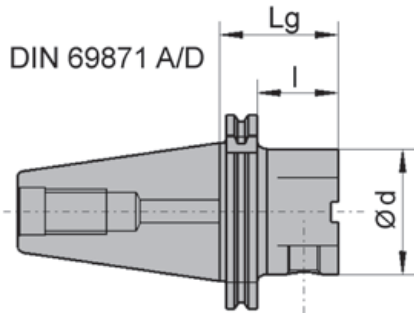
Fine boring head B02

IntraMax 49-88  
or  
IntraMax 87-207

## SYSTEM HOLDER URMA Type **BD**



Beta Module 25/32/40/50/63/80/100



Part number	beta-modul	L <sub>g</sub>	l	d	Weight	System
<b>BD1040A25050</b>	25	50	31	25	0.8 kg	SK40
<b>BD1040A32050</b>	32	50	31	35	0.9 kg	
<b>BD1040A40035</b>	40	35	16	42	0.9 kg	
<b>BD1040A40050</b>	40	50	31	42	1.1 kg	
<b>BD1040A50050</b>	50	50	31	50	1.2 kg	
<b>BD1040A63065</b>	63	65	46	63	1.5 kg	
<b>BD1040A63090</b>	63	90	70	63	2.0 kg	
<b>BD1050A25060</b>	25	60	41	25	2.8 kg	SK50
<b>BD1050A32060</b>	32	60	41	32	2.9 kg	
<b>BD1050A40060</b>	40	60	41	42	3.0 kg	
<b>BD1050A50060</b>	50	60	41	50	3.2 kg	
<b>BD1050A63060</b>	63	60	41	63	3.3 kg	
<b>BD1050A80070</b>	80	70	51	50	4.0 kg	
<b>BD1050A100115</b>	100	115	96	50	6.9 kg	

Dimensions in mm

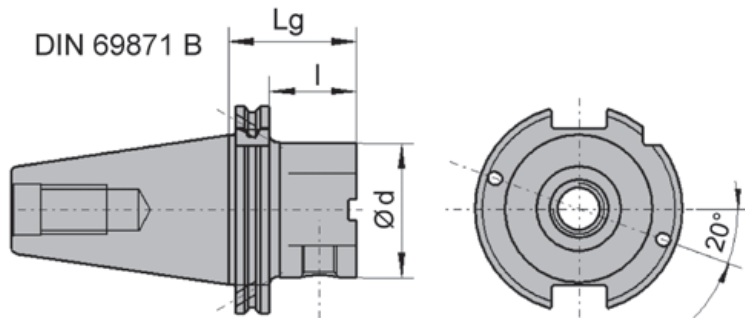
### Spare parts

System Holder URMA	Threaded pin
BD10...A25...	<b>Z002524</b>
BD10...A32...	<b>Z003224</b>
BD10...A40...	<b>Z004024</b>
BD10...A50...	<b>Z005024</b>
BD10...A63...	<b>Z006324</b>
BD1050A100115	<b>Z0010024</b>
BD1050A80070	<b>Z008024</b>

## SYSTEM HOLDER URMA Type **BD**



Beta Module 25/32/40/50/63/80/100



Part number	beta-modul	L <sub>g</sub>	l	d	Weight	System
<b>BD1040B25050</b>	25	50	31	25	0.8 kg	SK40
<b>BD1040B32050</b>	32	50	31	35	0.9 kg	
<b>BD1040B40035</b>	40	35	16	42	0.9 kg	
<b>BD1040B40050</b>	40	50	31	42	1.1 kg	
<b>BD1040B50050</b>	50	50	31	50	1.2 kg	
<b>BD1040B63065</b>	63	65	46	63	1.5 kg	
<b>BD1040B63090</b>	63	90	70	63	2.0 kg	
<b>BD1050B25060</b>	25	60	41	25	2.8 kg	SK50
<b>BD1050B32060</b>	32	60	41	32	2.9 kg	
<b>BD1050B40060</b>	40	60	41	42	3.0 kg	
<b>BD1050B50060</b>	50	60	41	50	3.2 kg	
<b>BD1050B63060</b>	63	60	41	63	3.3 kg	
<b>BD1050B80070</b>	80	70	51	80	4.0 kg	
<b>BD1050B100115</b>	100	115	96	100	6.9 kg	

Dimensions in mm

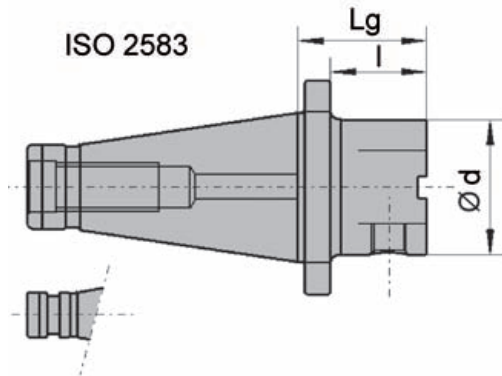
### Spare parts

System Holder URMA	Threaded pin
BD10...B25...	<b>Z002524</b>
BD10...B32...	<b>Z003224</b>
BD10...B40...	<b>Z004024</b>
BD10...B50...	<b>Z005024</b>
BD10...B63...	<b>Z006324</b>
BD1050B100115	<b>Z0010024</b>
BD1050B80070	<b>Z008024</b>

## SYSTEM HOLDER URMA Type **BI**



Beta Module 40/63/100



Part number	beta-modul	L <sub>g</sub>	l	d	Weight	System
<b>BI104040035</b>	40	35	23	42	0.7 kg	SK40
<b>BI104040050</b>	40	50	38	42	1.1 kg	
<b>BI104063070</b>	63	70	58	63	1.8 kg	
<b>BI105040060</b>	40	60	45	42	3.0 kg	SK50
<b>BI105063060</b>	63	60	45	63	3.5 kg	
<b>BI1050100100</b>	100	100	85	100	6.8 kg	

Dimensions in mm

### Spare parts

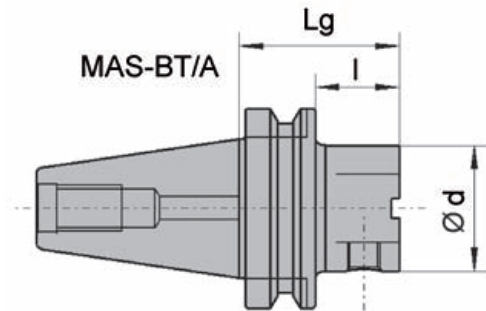
System Holder URMA	Threaded pin
BI10...40...	<b>Z004024</b>
BI10...63...	<b>Z006324</b>
BI1050100100	<b>Z0010024</b>



## SYSTEM HOLDER URMA Type **BT**



Beta Module 25/32/40/50/63/80/100



Part number	beta-modul	$L_g$	$l$	$d$	Weight	System
<b>BT1040A25060</b>	25	60	33	25	0.8 kg	SK40
<b>BT1040A32060</b>	32	60	33	32	0.9 kg	
<b>BT1040A40028</b>	40	28	1	42	0.9 kg	
<b>BT1040A40060</b>	40	60	33	42	1.2 kg	
<b>BT1040A50060</b>	50	60	33	50	1.3 kg	
<b>BT1040A63055</b>	63	55	28	63	1.4 kg	
<b>BT1040A63070</b>	63	70	43	63	1.7 kg	
<b>BT1050A32070</b>	32	70	32	32	3.7 kg	SK50
<b>BT1050A40070</b>	40	70	32	42	3.9 kg	
<b>BT1050A50070</b>	50	70	32	50	4.1 kg	
<b>BT1050A63080</b>	63	80	42	63	4.3 kg	
<b>BT1050A80100</b>	80	100	62	80	5.5 kg	
<b>BT1050A100100</b>	100	110	72	100	7.0 kg	

Dimensions in mm

### Spare parts

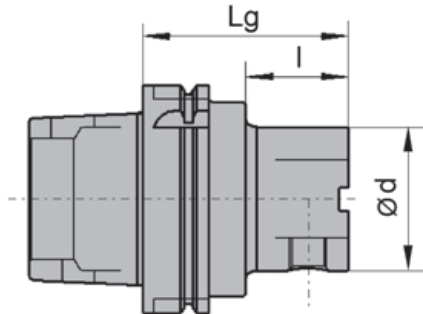
System Holder URMA	Threaded pin
BT1040A25060	<b>Z002524</b>
BT10...A32...	<b>Z003224</b>
BT10...A40...	<b>Z004024</b>
BT10...A50...	<b>Z005024</b>
BT10...A63...	<b>Z006324</b>
BT1050A100100	<b>Z0010024</b>
BT1050A80100	<b>Z008024</b>

## SYSTEM HOLDER URMA Type **BH**



Beta Module 25/32/40/50/63/80/100

DIN 69893A HSK



Part number	beta-modul	L <sub>g</sub>	l	d	Weight	System
<b>BH1050A25055</b>	25	55	29	25	0.5 kg	HSK50
<b>BH1050A32060</b>	32	60	34	32	0.6 kg	
<b>BH1050A40065</b>	40	65	39	42	0.7 kg	
<b>BH1063A25055</b>	25	55	29	25	0.9 kg	HSK63
<b>BH1063A32060</b>	32	60	34	32	1.0 kg	
<b>BH1063A40065</b>	40	65	23	42	1.1 kg	
<b>BH1063A50070</b>	50	70	44	50	1.5 kg	
<b>BH1063A63080</b>	63	80	38	63	1.5 kg	
<b>BH10100A40080</b>	40	80	35	42	2.3 kg	HSK100
<b>BH10100A50080</b>	50	80	35	50	2.5 kg	
<b>BH10100A63080</b>	63	80	35	63	2.8 kg	
<b>BH10100A80090</b>	80	90	45	80	3.8 kg	
<b>BH10100A100100</b>	100	100	55	100	4.0 kg	

Dimensions in mm

### Spare parts

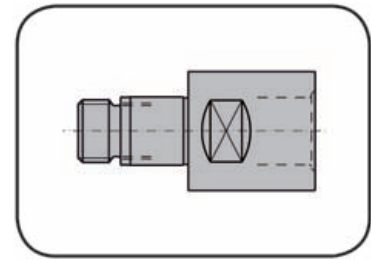
System Holder URMA	Threaded pin	Coolant tube
BH10100A100100	<b>Z0010024</b>	<b>H0010001</b>
BH10100A40080	<b>Z004024</b>	<b>H0010001</b>
BH10100A50080	<b>Z005024</b>	<b>H0010001</b>
BH10100A63080	<b>Z006324</b>	<b>H0010001</b>
BH10100A80090	<b>Z008024</b>	<b>H0010001</b>
BH1050A25055	<b>Z002524</b>	<b>H005001</b>
BH1050A32060	<b>Z003224</b>	<b>H005001</b>
BH1050A40065	<b>Z004024</b>	<b>H005001</b>
BH1063A25055	<b>Z002524</b>	<b>H006301</b>
BH1063A32060	<b>Z003224</b>	<b>H006301</b>
BH1063A40065	<b>Z004024</b>	<b>H006301</b>
BH1063A50070	<b>Z005024</b>	<b>H006301</b>
BH1063A63080	<b>Z006324</b>	<b>H006301</b>

### Ordering note:

Coolant tube ist not included - separate order required!

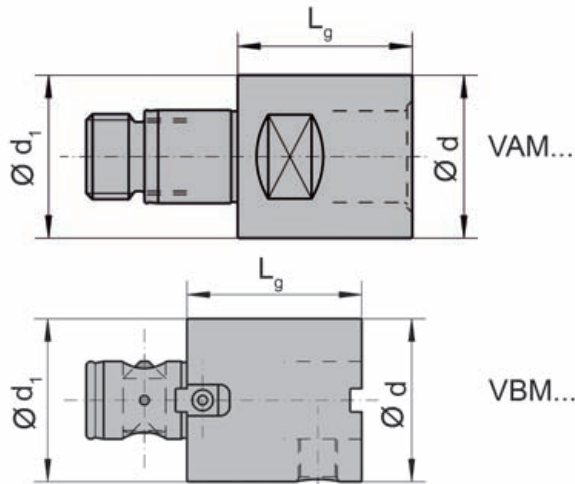
## EXTENSION Type

## VAM/VBM



fo alpha- and beta-modules  
Cutting edge  $\varnothing$

35.601 - 140 mm



Part number	alpha-modul	beta-modul	$L_g$	d	$d_1$	Weight	SW
<b>VAM.1818.025</b>	18.5		25	18.5	18.5	0.1kg	17
<b>VAM.1818.035</b>			35				
<b>VBM.2525.045</b>		25	45	25.0	25.0	0.2 kg	-
<b>VBM.3232.035</b>		32	35	32.0	32.0	0.2 kg	
<b>VBM.3232.070</b>		32	70	32.0	32.0	0.4 kg	
<b>VBM.4040.045</b>		40	45	42.0	42.0	0.4 kg	
<b>VBM.4040.070</b>		40	70	42.0	42.0	0.7 kg	
<b>VBM.5050.065</b>		50	65	50.0	50.0	1.0 kg	
<b>VBM.5050.100</b>		50	100	50.0	50.0	1.5 kg	
<b>VBM.6363.060</b>		63	60	63.0	63.0	1.3 kg	
<b>VBM.6363.125</b>		63	125	63.0	63.0	2.9 kg	

Further sizes upon request

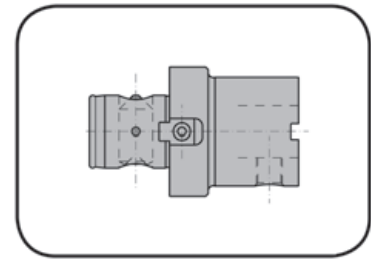
Dimensions in mm

### Spare parts

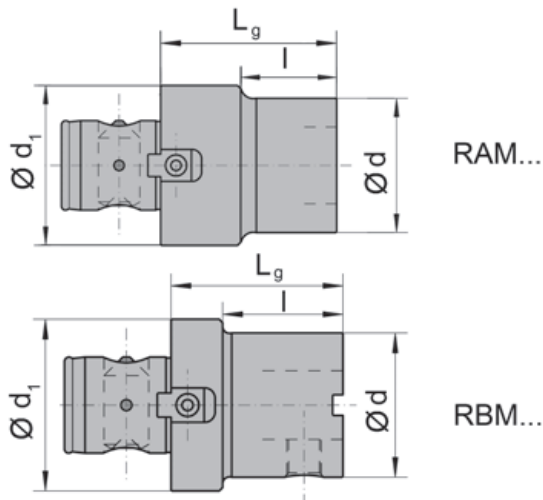
Extension	Locating pin	Screw	Bolt	Threaded pin	Key
VBM.2525.045	<b>Z002523</b>		<b>Z002521</b>	<b>Z002524</b>	
VBM.3232.035/070	<b>Z003223</b>		<b>Z003221</b>	<b>Z003224</b>	
VBM.4040.045/070	<b>Z004023</b>	<b>C002258</b>	<b>Z004021</b>	<b>Z004024</b>	<b>Z004025</b>
VBM.5050.065/100	<b>Z005023</b>	<b>C002260</b>	<b>Z005021</b>	<b>Z005024</b>	<b>Z005025</b>
VBM.6363.060/125	<b>Z006323</b>	<b>C002205</b>	<b>Z006321</b>	<b>Z006324</b>	<b>Z006325</b>

## REDUCER Type

## RAM/RBM



for alpha- and beta-modules



Part number	alpha-modul	beta-modul	L <sub>g</sub>	l	d	d <sub>1</sub>	Weight	SW
<b>RAM.2518.040</b>	18.5	25	40	25	18.5	25	0.1kg	17
<b>RBM.3225.040</b>		32 / 25	40	25	25.0	32	0.2 kg	
<b>RBM.4025.040</b>		40 / 25	40	25	25.0	42	0.3 kg	
<b>RBM.4032.040</b>		40 / 32	45	30	32.0	42	0.3 kg	
<b>RBM.5040.050</b>		50 / 40	50	35	42.0	50	0.5 kg	-
<b>RBM.6325.045</b>		63 / 25	45	25	25.0	63	0.7 kg	
<b>RBM.6332.050</b>		63 / 32	50	30	32.0	63	0.9 kg	
<b>RBM.6340.055</b>		63 / 40	55	35	42.0	63	1.1 kg	

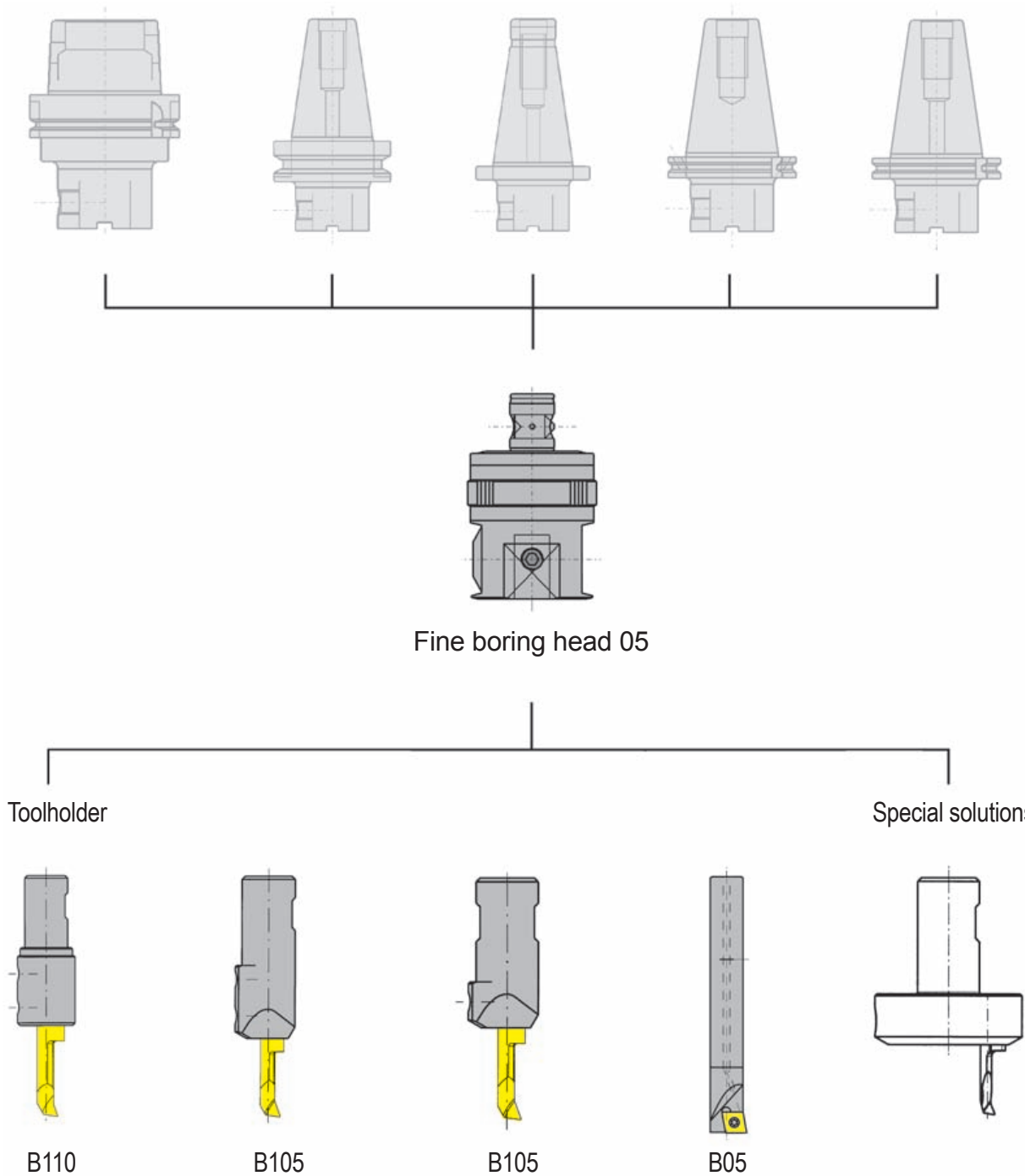
Further sizes upon request

Dimensions in mm

### Spare parts

Reducer	Locating pin	Screw	Bolt	Threaded pin	Key
RAM.2518.040	<b>Z002523</b>		<b>Z002521</b>	<b>Z002524</b>	
RBM.3225.040	<b>Z003223</b>		<b>Z003221</b>	<b>Z003224</b>	
RBM.4025.040	<b>Z004023</b>	<b>C002258</b>	<b>Z004021</b>	<b>Z004024</b>	<b>Z004025</b>
RBM.4032.040	<b>Z004023</b>	<b>C002258</b>	<b>Z004021</b>	<b>Z004024</b>	<b>Z004025</b>
RBM.5040.050	<b>Z005023</b>	<b>C002260</b>	<b>Z005021</b>	<b>Z005024</b>	<b>Z005025</b>
RBM.6325.045	<b>Z006323</b>	<b>C002205</b>	<b>Z006321</b>	<b>Z006324</b>	<b>Z006325</b>
RBM.6332.050	<b>Z006323</b>	<b>C002205</b>	<b>Z006321</b>	<b>Z006324</b>	<b>Z006325</b>
RBM.6340.055	<b>Z006323</b>	<b>C002205</b>	<b>Z006321</b>	<b>Z006324</b>	<b>Z006325</b>

Adaptor with alpha-modul and beta-modul® 40



## Boring



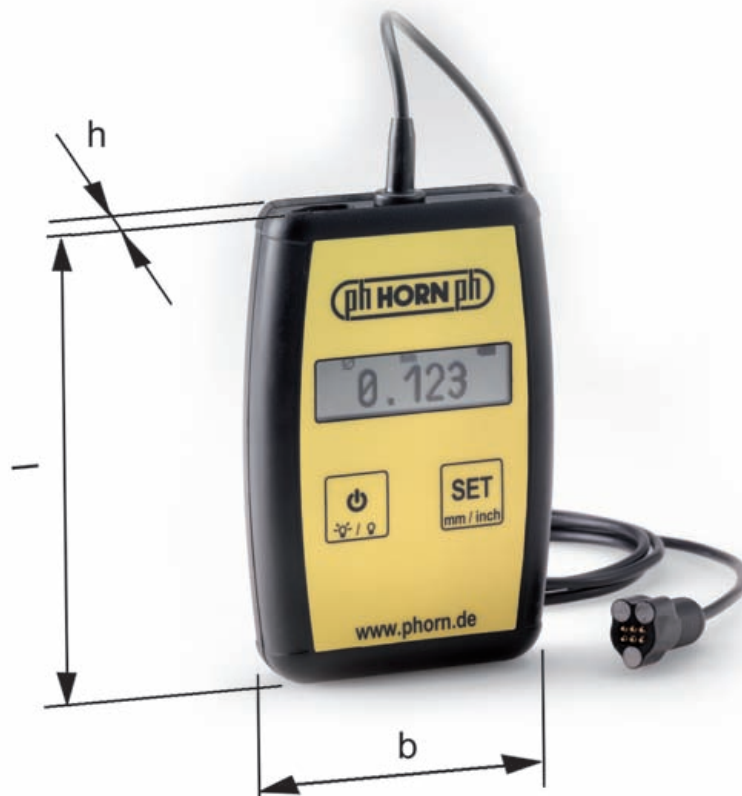
## Twin Boring



Digital display unit

## DAZ

Displays the adjusting range



Part number	l	b	h	Weight*
DAZ	120	80	25	0.125 kg

\* Weight includes 9V battery

Dimensions in mm

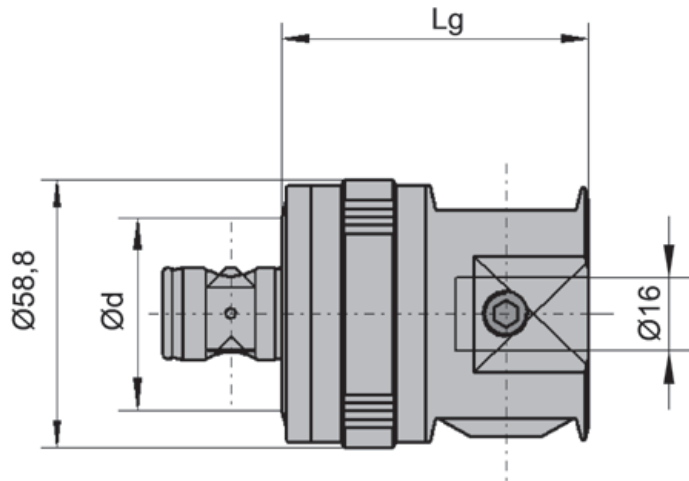
## FINE BORING HEAD Type

# 05

Beta Module 40

Bore Ø from	0,2 mm
Number of revolutions	20.000 1/min
Adjustable range	3,0 mm

with through coolant supply



Part number	beta-modul	$L_g$	d	Weight
<b>B05 40 20 067</b> <b>DB05.BM40.01</b>	40	67	40	1.3 kg

Dimensions in mm

### Additional equipment only for DB...:

Digital display unit DAZ to show the adjusting range

### Spare parts

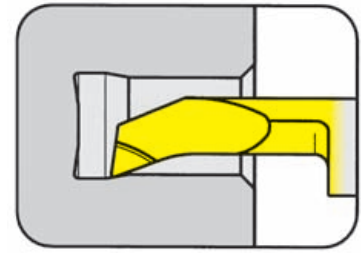
Fine boring head	Threaded pin	Locating pin	Bolt	Threaded pin
B05... / DB05...	<b>Z000501</b>	<b>Z004023</b>	<b>Z004021</b>	<b>Z002301</b>



## TOOLHOLDER Type

# B105

with through coolant supply



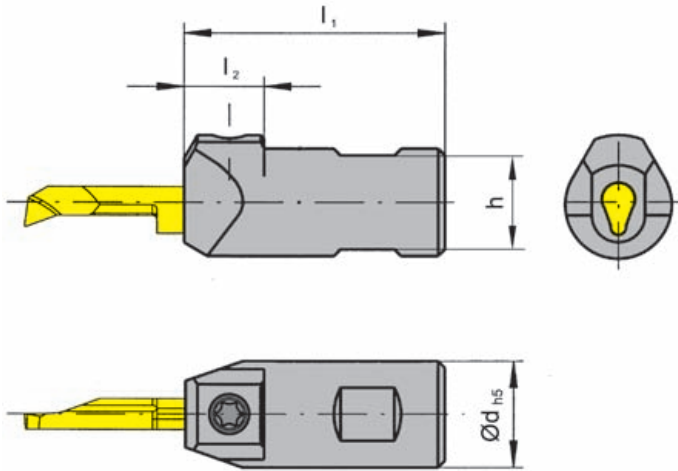
Bore Ø from

.008" (0.2 mm)

Clamping length 12 mm

for use with Insert

Type 105



for use with boring head  
type 05

Part number	d	l <sub>1</sub>	l <sub>2</sub>	h
<b>B105.0016.U1.01</b>	16	39	12	14

Dimensions in mm

### Note:

The double sided clamping surface allows to rotate the toolholder in the boring head of 180°. With this option it is possible to set the insert behind centre which is necessary for diameters less than Ø 0,7 mm.

Toolholders can be used with right and left hand inserts.

For torque specifications of the screw, please see Technical Instructions.

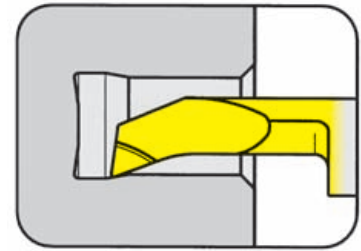
### Spare parts

Toolholder	Screw	TORX PLUS® Wrench
B105.0016.U1.01	<b>6.075T15P</b>	<b>T15PQ</b>

## TOOLHOLDER Type

# B105

with through coolant supply

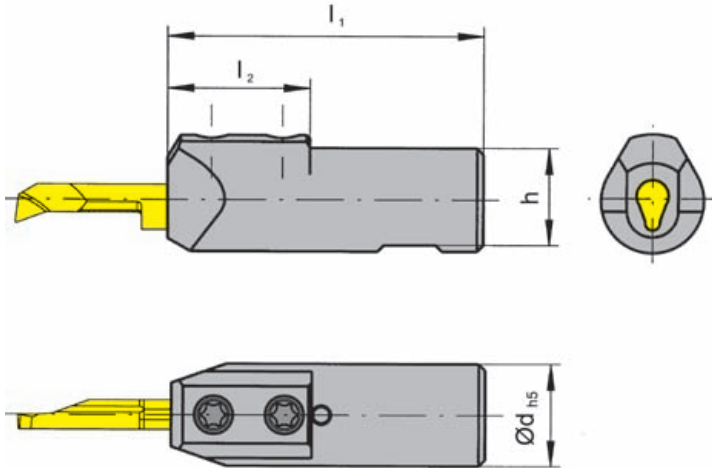


Bore Ø from .197" (5.0 mm)

Clamping length 22 mm

for use with Insert

Type 105



for use with boring head type 05

Part number	d	l <sub>1</sub>	l <sub>2</sub>	h
B105.0016.U1.02	16	49	22	15

Dimensions in mm

**Note:**

Toolholders can be used with right and left hand inserts.

For torque specifications of the screw, please see Technical Instructions.

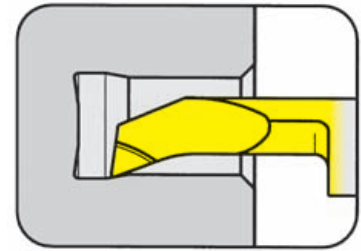
### Spare parts

Toolholder	Screw	TORX PLUS® Wrench
B105.0016.U1.02	6.075T15P	T15PQ

## TOOLHOLDER Type

# B110

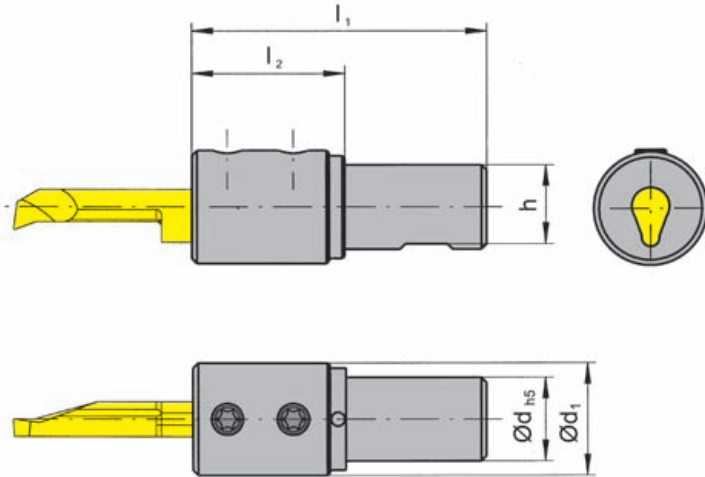
with through coolant supply



Bore Ø from .236" (6.0 mm)

for use with Insert

Type 110



for use with boring head type 05

Part number	d	l <sub>1</sub>	l <sub>2</sub>	h	d <sub>1</sub>
B110.0016.U1.02	16	56	29	15	21.5

Dimensions in mm

**Note:**

Toolholders can be used with right and left hand inserts.

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Toolholder	Screw	TORX PLUS® Wrench
B110.0016.U1.02	6.075T15P	T15PQ

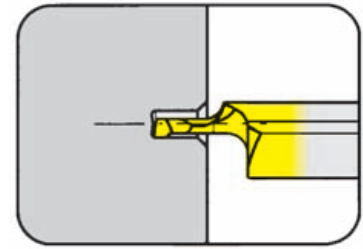


**INSERT Type**

**105**

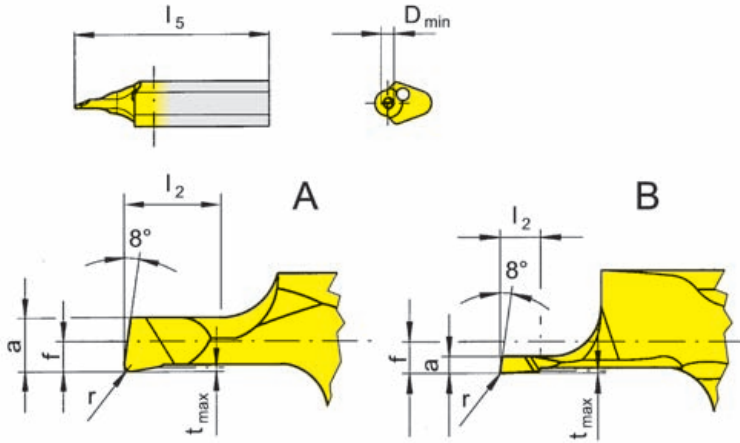
Bore  $\varnothing$  from **.008''**

Clamping length 12 mm



for use with Toolholder

Type B105  
H105  
HC105  
VDI



R = right hand version shown

L = left hand version

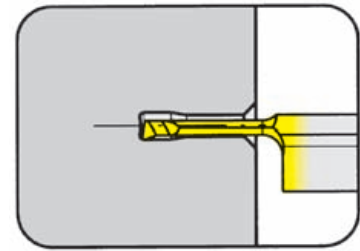
Part number	f	a	l <sub>2</sub>	l <sub>5</sub>	t <sub>max</sub>	D <sub>min</sub>	r	Form	Carbide grades				
									MG12	TN35	TI25	TH35	
R/L105.1802.0.02	.039	.007	.039	.906	.001	<b>.008</b>	.001	B	▲/▲				
R/L105.1802.0.03	.039	.010	.039	.906	.001	<b>.012</b>	.001	B	▲/▲				
R/L105.1802.0.05	.039	.016	.079	.906	.002	<b>.020</b>	.002	B	▲/▲				
R/L105.1803.0.07	.012	.024	.079	.906	.002	<b>.028</b>	.002	A	▲/▲				
▲ on stock   Δ 4 weeks ● main recommendation ○ alternative recommendation □ uncoated grades ■ coated grades ■ brazed/Cermet										P	○		
										M	●		
										K	●		
										N	●		
										S	●		
										H			

Dimensions in inch

State R or L version

**INSERT Type**

**105**

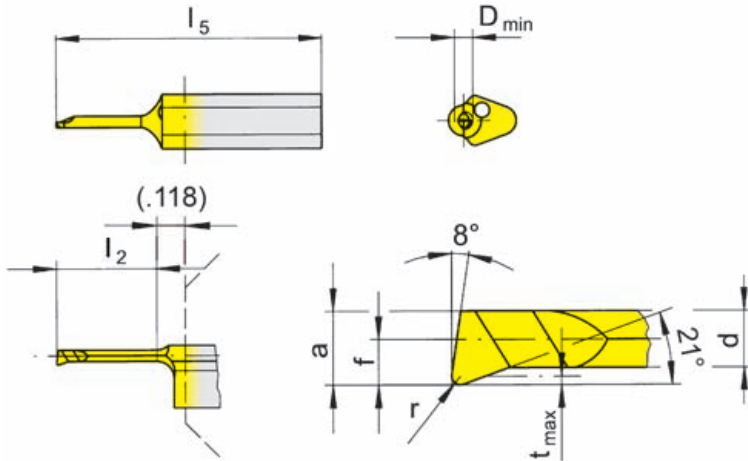


Bore Ø from .039"

Clamping length 12 mm

for use with Toolholder

Type B105  
H105  
HC105  
VDI



R = right hand version shown

L = left hand version

Part number	f	a	d	l <sub>2</sub>	l <sub>5</sub>	t <sub>max</sub>	D <sub>min</sub>	r	Carbide grades									
									MG12	TN35	T125	TF45	TH35					
R/L105.1805.005.0.1				.157														
R/L105.1805.005.1.1	.020	.035	.026	.236	.984	.004	<b>.039</b>	.002					▲/▲					
R/L105.1805.005.2.1				.315									▲/▲					
R/L105.1805.0.1				.157					▲/▲									
R/L105.1805.1.1	.020	.035	.026	.236	.984	.004	<b>.039</b>	.004					▲/▲	▲/▲				
R/L105.1805.2.1				.315									▲/▲	▲/▲				
R/L105.1813.005.0.15				.236	.984													▲/▲
R/L105.1813.005.1.15	.051	.055	.043	.354	.984	.006	<b>.059</b>	.002										▲/▲
R/L105.1813.005.2.15				.472	1.181													▲/▲
R/L105.1813.01.0.15				.236	.984													▲/▲
R/L105.1813.01.1.15	.051	.055	.043	.354	.984	.006	<b>.059</b>	.004										▲/▲
R/L105.1813.01.2.15				.472	1.181													▲/▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

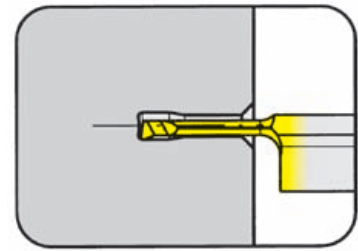
State R or L version

P	○	●	●	●	●
M	●	●	●	●	●
K	●	●	●	●	●
N	●	●	●	●	●
S	●	●	●	●	●
H	■	■	■	■	■

Carbide grades

## INSERT Type

# 105

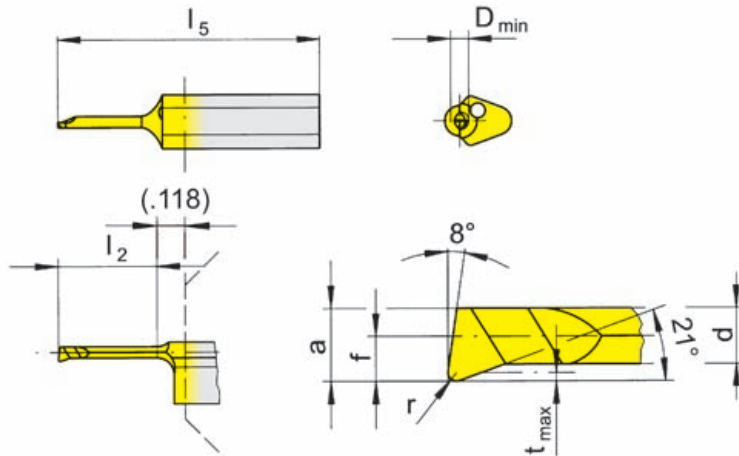


Bore Ø from .079"

Clamping length 12 mm

for use with Toolholder

Type B105  
H105  
HC105  
VDI



R = right hand version shown

L = left hand version

Part number	f	a	d	l <sub>2</sub>	l <sub>5</sub>	t <sub>max</sub>	D <sub>min</sub>	r							
									MG12	TN35	T125	TF45	TH35		
R/L105.1809.005.0.2				.236	.984										
R/L105.1809.005.1.2	.039	.075	.063	.354	.984	.006	<b>.079</b>	.002					▲/▲		
R/L105.1809.005.2.2				.472	1.181								▲/▲		
R/L105.1809.01.0.2				.236	.984								▲/▲		▲/▲
R/L105.1809.01.1.2	.039	.075	.063	.354	.984	.006	<b>.079</b>	.004					▲/▲		▲/▲
R/L105.1809.01.2.2				.472	1.181								▲/▲		▲/▲
R/L105.1809.0.2				.236	.984				▲/▲	▲/▲	▲/▲		▲/▲		▲/▲
R/L105.1809.1.2	.039	.075	.063	.354	.984	.006	<b>.079</b>	.006	▲/▲	▲/▲	▲/▲		▲/▲		▲/▲
R/L105.1809.2.2				.472	1.181				▲/▲	▲/▲	▲/▲		▲/▲		▲/▲
R/L105.1813.005.0.25				.236	.984										▲/▲
R/L105.1813.005.1.25				.354	.984										▲/▲
R/L105.1813.005.2.25	.051	.091	.077	.472	1.181	.006	<b>.098</b>	.002					▲/▲		▲/▲
R/L105.1813.005.3.25				.630	1.378								▲/▲		▲/▲
▲ on stock   Δ 4 weeks									P	o	•	•	•	•	•
• main recommendation									M	•	•	•	•	•	•
o alternative recommendation									K	•	•	•	•	•	•
■ uncoated grades									N	•	•	•	•	•	•
■ coated grades									S	•	•	•	•	•	•
■ brazed/Cermet									H	•	•	•	•	•	•

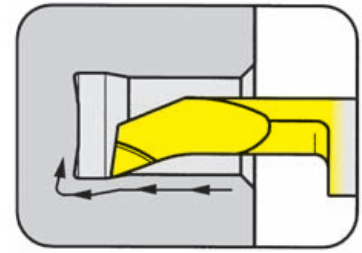
Dimensions in mm

State R or L version

Carbide grades

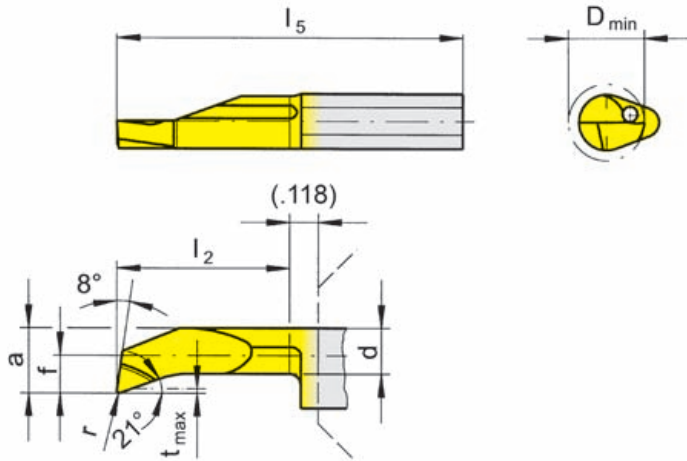
## INSERT Type

# 105



Bore Ø from .118"

Clamping length 12 mm



for use with Toolholder

Type B105  
H105  
HC105  
VDI

R = right hand version shown

L = left hand version

Part number	f	a	d	l <sub>2</sub>	l <sub>5</sub>	t <sub>max</sub>	D <sub>min</sub>	r	MG12	TN35	TI25	TF45	TH35
R/L105.1813.005.1.3				.394	.984							▲/▲	
R/L105.1813.005.2.3	.051	.102	.091	.591	1.181	.006	.118	.002				▲/▲	
R/L105.1813.005.3.3				.787	1.378							▲/▲	
R/L105.1813.01.1.3				.394	.984						▲/▲		▲/▲
R/L105.1813.01.2.3	.051	.102	.091	.591	1.181	.006	.118	.004			▲/▲		▲/▲
R/L105.1813.01.3.3				.787	1.378						▲/▲		▲/▲
R/L105.1813.1.3				.394	.984				▲/▲	▲/▲	▲/▲		▲/▲
R/L105.1813.2.3	.051	.102	.091	.591	1.181	.006	.118	.008	▲/▲	▲/▲	▲/▲		▲/▲
R/L105.1813.3.3				.787	1.378				▲/▲	▲/▲	▲/▲		▲/▲
R/L105.1819.005.1.4				.394	.984							▲/▲	
R/L105.1819.005.2.4	.075	.146	.114	.591	1.181	.012	.157	.002				▲/▲	
R/L105.1819.005.3.4				.787	1.378							▲/▲	
R/L105.1819.1.4				.394	.984				▲/▲	▲/▲	▲/▲		▲/▲
R/L105.1819.2.4	.075	.146	.114	.591	1.181	.012	.157	.008	▲/▲	▲/▲	▲/▲		▲/▲
R/L105.1819.3.4				.787	1.378				▲/▲	▲/▲	▲/▲		▲/▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

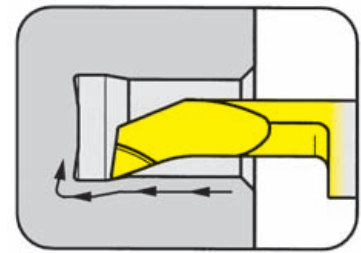
State R or L version

	P	M	K	N	S	H
MG12	○	●	●	●	●	●
TN35	●	●	●	●	●	●
TI25	●	●	●	●	●	●
TF45	●	●	●	●	●	●
TH35	●	●	●	●	●	●

Carbide grades

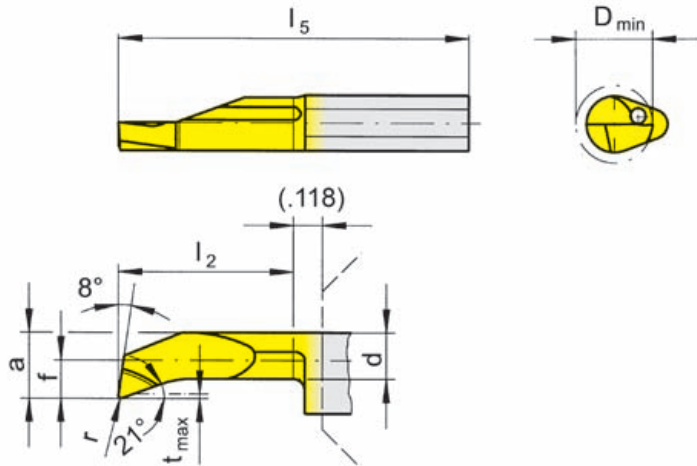
## INSERT Type

# 105



Bore Ø from .197"

Clamping length 12 mm



for use with Toolholder

Type B105  
H105  
HC105  
VDI

R = right hand version shown

L = left hand version

Part number	f	a	d	l <sub>2</sub>	l <sub>5</sub>	t <sub>max</sub>	D <sub>min</sub>	r	MG12	TN35	T125	TF45	TH35
R/L105.1823.005.1.5				.394	.984							▲/▲	
R/L105.1823.005.2.5				.591	1.181							▲/▲	
R/L105.1823.005.3.5	.091	.185	.157	.787	1.378	.020	.197	.002				▲/▲	
R/L105.1823.005.4.5				.984	1.575							▲/▲	
R/L105.1823.005.5.5				1.181	1.772							▲/▲	
R/L105.1823.1.5				.394	.984				▲/▲	▲/▲	▲/▲		▲/▲
R/L105.1823.2.5				.591	1.181				▲/▲	▲/▲	▲/▲		▲/▲
R/L105.1823.3.5	.091	.185	.157	.787	1.378	.020	.197	.008	▲/▲	▲/▲	▲/▲		▲/▲
R/L105.1823.4.5				.984	1.575				▲/▲	▲/▲	▲/▲		▲/▲
R/L105.1823.5.5				1.181	1.772				▲/▲	▲/▲	▲/▲		▲/▲

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

	P	M	K	N	S	H
MG12	○	●	●	●	●	●
TN35	●	●	●	●	●	●
T125	●	●	●	●	●	●
TF45	●	●	●	●	●	●
TH35	●	●	●	●	●	●

Dimensions in inch

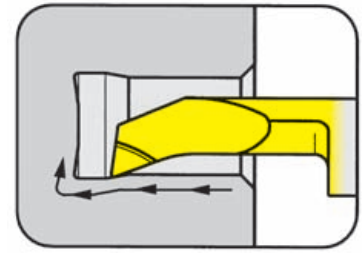
Carbide grades

State R or L version



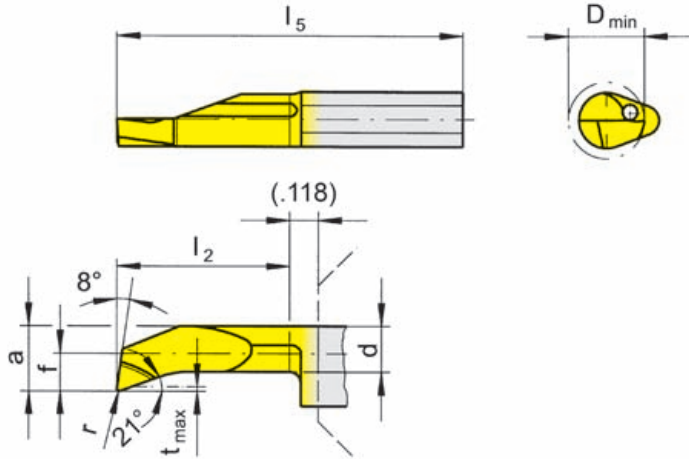
## INSERT Type

# 105



Bore Ø from .236"

Clamping length 12 mm



for use with Toolholder

Type B105  
H105  
HC105  
VDI

R = right hand version shown

L = left hand version

Part number	f	a	d	l <sub>2</sub>	l <sub>5</sub>	t <sub>max</sub>	D <sub>min</sub>	r	MG12	TN35	T125	TF45	TH35
R/L105.1833.005.2.6	.130	.224	.185	.591	1.181	.020	.236	.002				▲/▲	
R/L105.1833.005.3.6				.787	1.378				▲/▲				
R/L105.1833.005.4.6				.984	1.575				▲/▲				
R/L105.1833.005.5.6				1.181	1.772				▲/▲				
R/L105.1833.2.6	.130	.224	.185	.591	1.181	.020	.236	.008	▲/▲	▲/▲	▲/▲		▲/▲
R/L105.1833.3.6				.787	1.378				▲/▲	▲/▲	▲/▲		▲/▲
R/L105.1833.4.6				.984	1.575				▲/▲	▲/▲	▲/▲		▲/▲
R/L105.1833.5.6				1.181	1.772				▲/▲	▲/▲	▲/▲		▲/▲
R/L105.1840.005.3.7	.157	.252	.205	.787	1.378	.020	.268	.002				▲/▲	
R/L105.1840.005.4.7				.984	1.575						▲/▲		
R/L105.1840.005.5.7				1.181	1.772						▲/▲		
R/L105.1840.3.7	.157	.252	.205	.787	1.378	.020	.268	.008	▲/▲	▲/▲	▲/▲		▲/▲
R/L105.1840.4.7				.984	1.575				▲/▲	▲/▲	▲/▲		▲/▲
R/L105.1840.5.7				1.181	1.772				▲/▲	▲/▲	▲/▲		▲/▲

- ▲ on stock   Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

State R or L version

P	○	●	●	●	●
M	●	●	●	●	●
K	●	●	●	●	●
N	●	●	●	●	●
S	●	●	●	●	●
H					

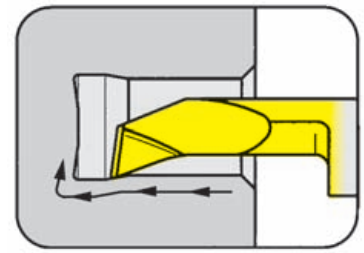
Carbide grades

# BORING $\geq \varnothing .157''$



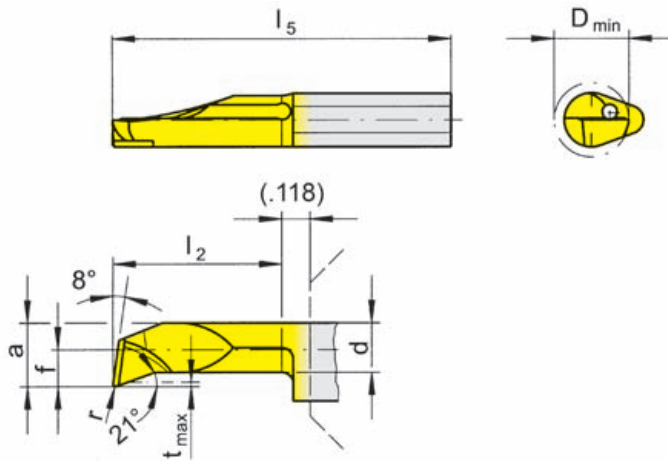
## INSERT Type

# 105



Bore  $\varnothing$  from .157''

Clamping length 12 mm



for use with Toolholder

Type B105  
H105  
HC105  
VDI

with chip breaker  
(geometry H)

R = right hand version shown

L = left hand version

Part number	f	a	d	l <sub>2</sub>	l <sub>5</sub>	t <sub>max</sub>	D <sub>min</sub>	r	Carbide grades			
									MG12	TN35	T125	TH35
R/L105.1819.1.H4	.075	.146	.114	.394	.984	.012	.157	.008				▲/△
R/L105.1819.2.H4				.591	1.181							▲/△
R/L105.1819.3.H4				.787	1.378							▲/△
R/L105.1823.1.H5	.091	.185	.157	.394	.984	.020	.197	.008				▲/△
R/L105.1823.2.H5				.591	1.181							▲/△
R/L105.1823.3.H5				.787	1.378							▲/△
R/L105.1823.4.H5				.984	1.575							▲/△
R/L105.1823.5.H5				1.181	1.772							▲/△
R/L105.1833.2.H6				.130	.224				.185	.591	1.181	.020
R/L105.1833.3.H6	.787	1.378						▲/△				
R/L105.1833.4.H6	.984	1.575						▲/△				
R/L105.1833.5.H6	1.181	1.772						▲/△				
R/L105.1840.3.H7	.157	.252	.205	.787	1.378	.020	.268	.008				▲/△
R/L105.1840.4.H7				.984	1.575							▲/△
R/L105.1840.5.H7				1.181	1.772							▲/△

- ▲ on stock    △ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

	P	M	K	N	S	H
MG12						
TN35						
T125						
TH35	●	●	●	●	●	

Dimensions in inch

Carbide grades

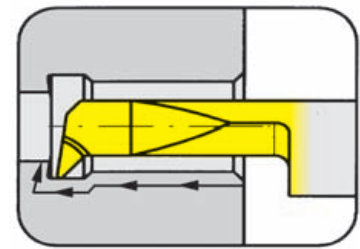
State R or L version

## INSERT Type

# 105

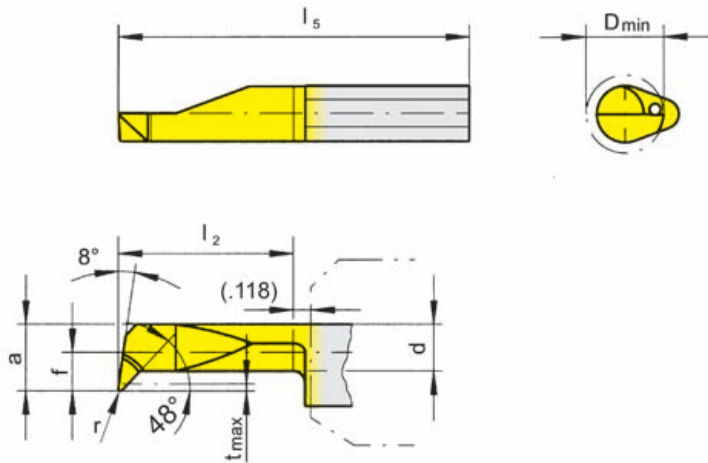
Bore  $\varnothing$  from .157''

Clamping length 12 mm



for use with Toolholder

Type B105  
H105  
HC105  
VDI



R = right hand version shown

L = left hand version

Part number	f	a	d	l <sub>2</sub>	l <sub>5</sub>	t <sub>max</sub>	D <sub>min</sub>	r	Carbide grades			
									MG12	TN35	TI25	TH35
R/L105.4719.1.4	.075	.146	.114	.394	.984	.024	.157	.006				▲▲
R/L105.4719.3.4									▲/▲	▲/▲	▲/▲	
R/L105.4723.2.5	.091	.185	.146	.591	1.181	.031	.197	.006				▲/▲
R/L105.4723.4.5									▲/▲	▲/▲	▲/▲	
R/L105.4733.3.6	.130	.224	.146	.787	1.378	.071	.236	.006				▲/▲
R/L105.4733.5.6									▲/▲	Δ/	▲/▲	
									P	•	•	•
									M	•	•	•
									K	•	•	•
									N	•	•	•
									S	•	•	•
									H			

▲ on stock Δ 4 weeks

• main recommendation

o alternative recommendation

■ uncoated grades

■ coated grades

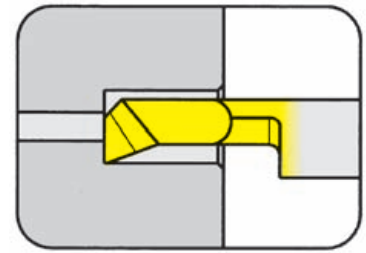
■ brazed/Cermet

Dimensions in inch

State R or L version

## INSERT Type

# 105

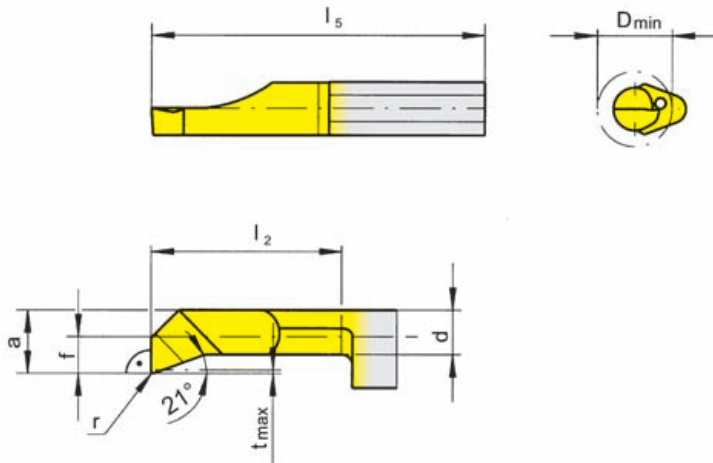


Bore Ø from .118"

Clamping length 12 mm

for use with Toolholder

Type B105  
H105  
HC105  
VDI



R = right hand version shown

L = left hand version

Part number	f	a	d	l <sub>2</sub>	l <sub>5</sub>	t <sub>max</sub>	D <sub>min</sub>	r	Carbide grades									
									MG12	TN35	T125	TH35						
R/L105.9013.01.1.3	.051	.102	.091	.394	.984	.006	.118	.004				▲/△						
R/L105.9013.01.2.3												▲/△						
R/L105.9013.1.3									▲/▲									
R/L105.9013.2.3									▲/▲									
R/L105.9019.01.1.4	.075	.146	.114	.394	.984	.012	.157	.004				▲/△						
R/L105.9019.01.2.4												▲/△						
R/L105.9019.01.3.4												▲/▲		△/△				
R/L105.9019.1.4									▲/▲									
R/L105.9019.2.4	▲/▲			.591	1.181		.008											
R/L105.9023.01.1.5	.091	.185	.157	.394	.984	.020	.197	.004				▲/△						
R/L105.9023.01.2.5												▲/△						
R/L105.9023.01.3.5												.787	1.378		.004			▲/△
R/L105.9023.01.4.5												.984	1.575		.004			▲/
R/L105.9023.1.5												.394	.984		.008		▲/▲	▲/
R/L105.9023.2.5												.591	1.181		.008		▲/▲	
R/L105.9023.3.5												.787	1.378		.008		▲/▲	

- ▲ on stock    △ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

State R or L version

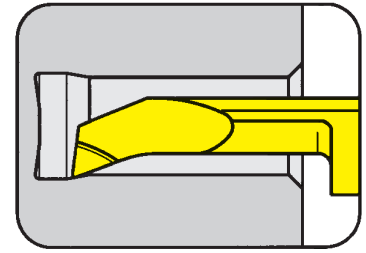
	P	M	K	N	S	H
MG12	●					
TN35	●					
T125	●					
TH35	●					

Carbide grades

## INSERT Type

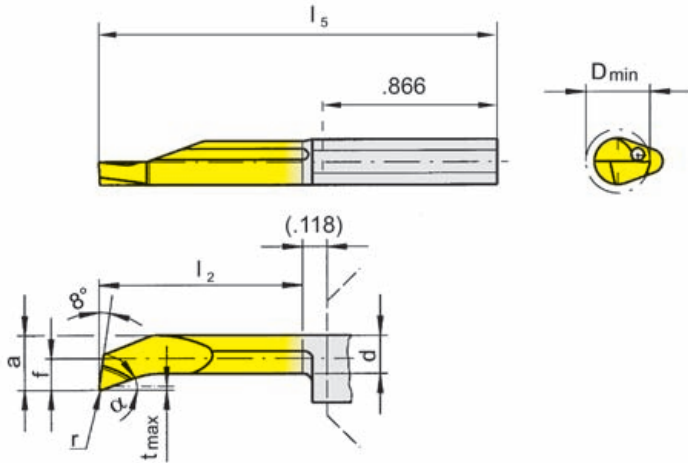
# 105

with extended clamping shank



Bore Ø from .197"

Clamping length 22 mm



for use with Toolholder

Type B105.0012.02  
B105.0016.02  
B105.0020.02

R = right hand version shown

L = left hand version

Part number	f	a	d	l <sub>2</sub>	l <sub>5</sub>	t <sub>max</sub>	D <sub>min</sub>	r	α	Carbide grades				
										MG12	TN35	T125	TF45	TH35
R/L105.1823.4.5.2	.091	.185	.165	.984	1.969	.012	<b>.197</b>	.004	20°			▲/▲		▲/▲
R/L105.1823.5.5.2												▲/▲		▲/▲
R/L105.1833.4.6.2	.130	.224	.193	.984	1.969	.012	<b>.236</b>	.004	20°			▲/▲		▲/▲
R/L105.1833.5.6.2												▲/▲		▲/▲
R/L105.1840.4.7.2	.157	.252	.213	.984	1.969	.012	<b>.268</b>	.004	20°			▲/▲		▲/▲
R/L105.1840.5.7.2												▲/▲		▲/▲
R/L105.1840.7.7.2						▲/▲	1.575	2.559					▲/▲	
R/L105.4733.5.6.2	.130	.224	.146	1.181	2.165	.071	<b>.236</b>	.004	47°			▲/▲		▲/▲
▲ on stock   Δ 4 weeks ● main recommendation ○ alternative recommendation ■ uncoated grades ■ coated grades ■ brazed/Cermet										P		●		●
										M		●		●
										K		●		●
										N		●		●
										S		●		●
										H				

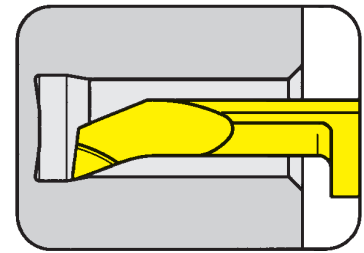
Dimensions in inch

State R or L version

Carbide grades

## INSERT Type

# 110

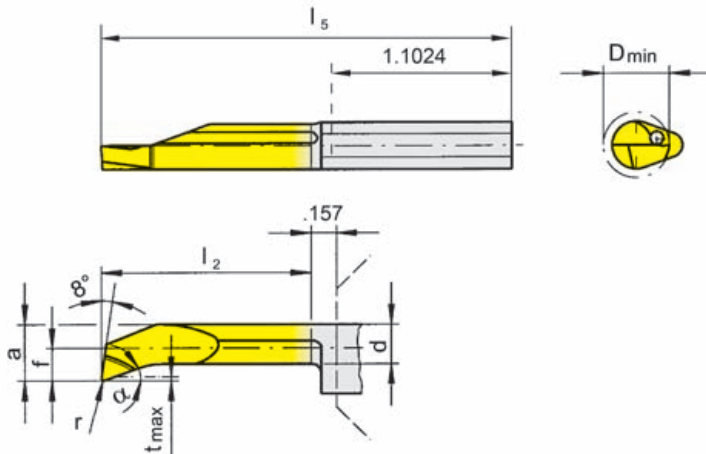


Bore Ø from .236"

Clamping length 26 mm

for use with Toolholder

Type B110  
VDI



R = right hand version shown

L = left hand version

Part number	f	a	d	l <sub>2</sub>	l <sub>5</sub>	t <sub>max</sub>	D <sub>min</sub>	r	α	Carbide grades			
										MG12	TN35	TI25	TH35
R/L110.1829.7.6	.114	.224	.189	1.575	2.756	.020	.236	.008	20°			▲/▲	▲/▲
R/L110.1829.7.6												▲/▲	▲/▲
R/L110.1829.9.6	.114	.224	.189	1.969	3.150	.020	.236	.008	20°			▲/▲	▲/▲
R/L110.1829.9.6												▲/▲	▲/▲
R/L110.1829.9.8	.157	.291	.236	1.969	3.150	.020	.315	.008	20°			▲/▲	▲/▲
R/L110.1829.9.8												▲/▲	▲/▲
										P		•	•
										M		•	•
										K		•	•
										N		•	•
										S		•	•
										H			

▲ on stock Δ 4 weeks  
 • main recommendation  
 o alternative recommendation  
 □ uncoated grades  
 ■ coated grades  
 ■ brazed/Cermet

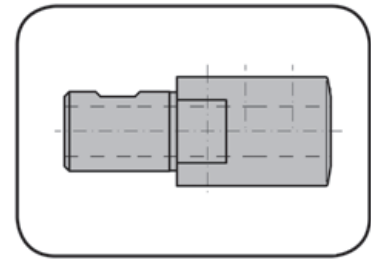
Dimensions in inch  
 State R or L version

Carbide grades			
P		•	•
M		•	•
K		•	•
N		•	•
S		•	•
H			

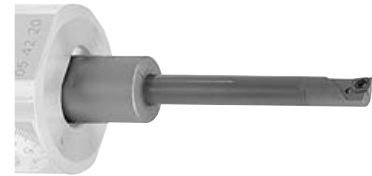
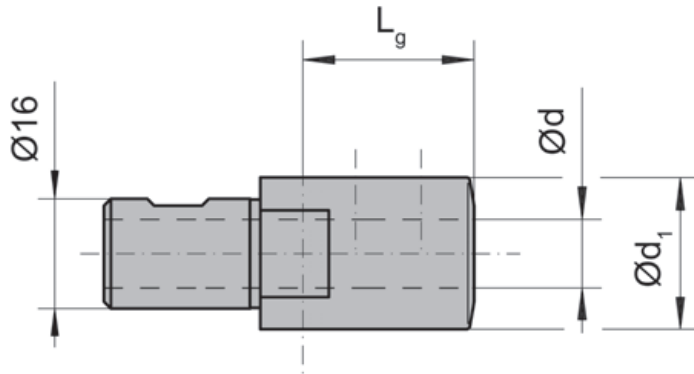
## REDUCER Type

## B05

Beta Module 40



Bore Ø from	0,2 mm
Number of revolutions	20.000 1/min
Adjustable range	3,0 mm



Part number	D <sub>a min</sub>	D <sub>a max</sub>	L <sub>g</sub>	d	d <sub>1</sub>
B05.0516	5.8	10	17	5	16
B05.0616	7.3	11	17	6	16
B05.0816	8.8	13	22	8	19
B05.1016	11.8	16	25	10	22
B05.1216	13.8	18	31	12	22

Dimensions in mm

## Spare parts

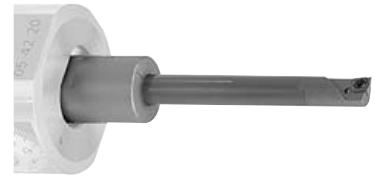
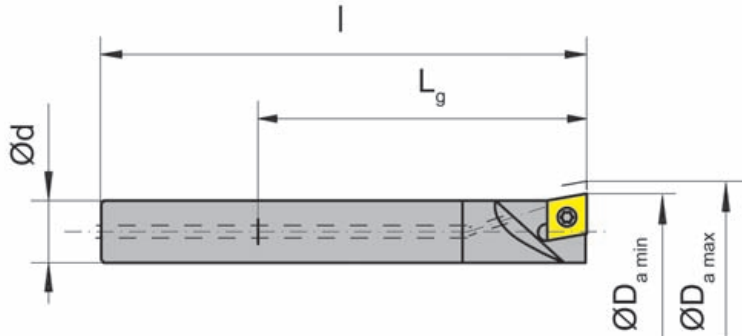
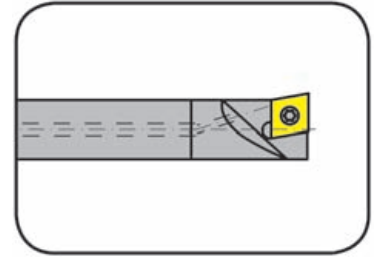
Reducer	Screw	Wrench
B05.0616	C000701	G000203
B05.0816/1016	C002503	G000204
B05.1216	C000702	G000204

## BORING BAR Type

# B05.HM

Beta Module 40

Bore Ø from	0,2 mm
Number of revolutions	20.000 1/min
Adjustable range	3,0 mm



Part number	D <sub>a min</sub>	D <sub>a max</sub>	L <sub>g</sub>	l	d <sub>1</sub>
B05.HM05.0610.1	5.8	10.0	65	20	5
B05.HM06.0711.1	7.3	11.0	65	24	6
B05.HM08.0913.1	8.8	13.0	90	40	8
B05.HM10.1216.1	11.8	16.0	105	50	10
B05.HM12.1418.1	13.8	18.0	120	60	12
B05.HM16.1620.1	15.8	20.0	130	100	16
B05.HM16.1823.1	18.3	22.5	145	115	16

Dimensions in mm

## Spare parts

Boring bar	Screw	Torx Wrench
B05.HM0...1	C002010	G002001
B05.HM...1	C002004	G002005
B05.HM1...1	C002001	G002005

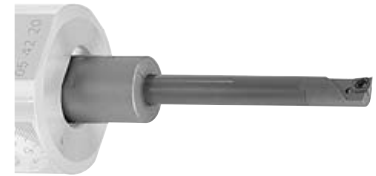
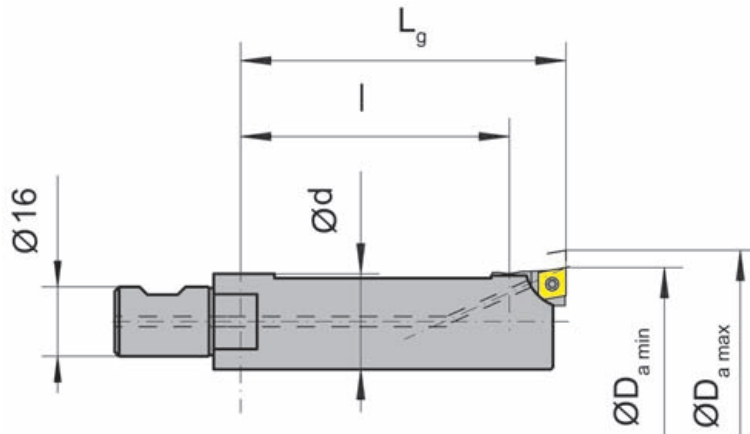
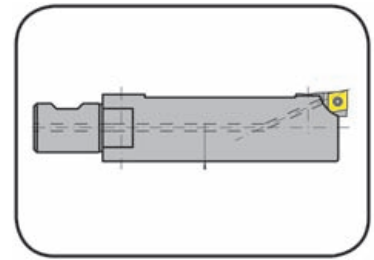


## BORING BAR Type

# B05.ST

Beta Module 40

Bore Ø from	0,2 mm
Number of revolutions	20.000 1/min
Adjustable range	3,0 mm



Part number	D <sub>a min</sub>	D <sub>a max</sub>	L <sub>g</sub>	l	d
B05.ST16.2025.01	20	25	60	47	17
B05.ST16.2530.01	25	30	75	62	22
B05.ST16.3035.01	30	35	75	62	27
B05.ST16.3540.01	35	40	75	62	32

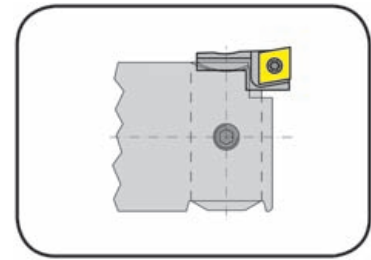
Dimensions in mm

### Spare parts

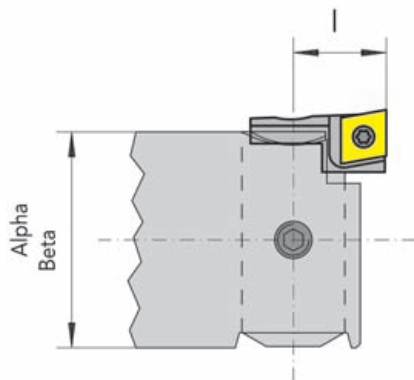
Boring bar	Lens head screw	Torx Wrench
B05.ST16....	C002511	G002007

## INSERT HOLDER Type

# B05



Bore Ø .787 - 1.535" (20 - 39 mm)



Part number	D <sub>a min</sub>	D <sub>a max</sub>	l	Insert
B05.050.200206	20	39	13	CC06

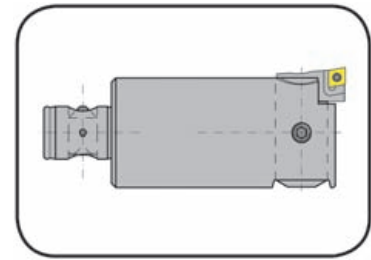
Dimensions in mm

### Spare parts

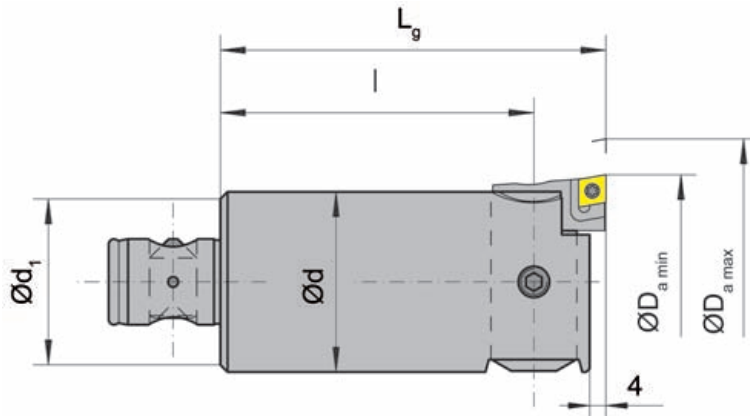
Insert holder	Screw	Torx Wrench
B05.050.200206	C002004	G002005

## FINE BORING HEAD Type

# B02/DB



Bore Ø .787 - 3.465" (20 - 88 mm)



Part number	alpha-modul	beta-modul	D <sub>a min</sub>	D <sub>a max</sub>	d	d <sub>1</sub>	Weight
<b>B02.2025.18.AM</b> <b>B02.22530.18.AM</b>	18.5		20.0 22.5	25 30	19.7 20.0	18.5	0.1 kg
<b>DB02.2939.25.BM</b> <b>DB02.3851.32.BM</b> <b>DB02.5067.40.BM</b> <b>DB10.6688.63.BM</b>		25 32 40 63	29.0 38.0 50.0 66.0	39 51 67 88	26.0 32.0 42.0 63.0	25.0 32.0 40.0 63.0	0.2 kg 0.4 kg 1.0 kg 2.5 kg

Dimensions in mm

### Additional equipment only for DB...:

Digital display unit DAZ to show the adjusting range

### Note:

alpha-modul = balancable 2µm

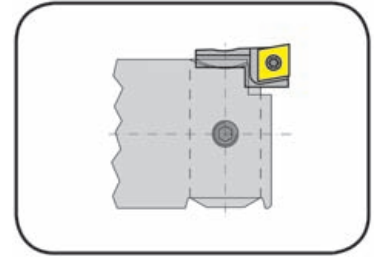
beta-modul = with digital adjustment

### Spare parts

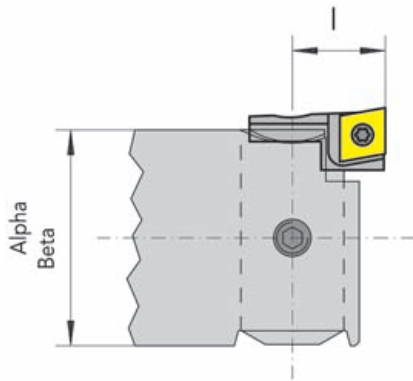
Fine boring head	Threaded pin	Lens head screw	Locating pin	Screw	Torx Wrench	Bolt	Wrench
B02.2025.18.AM	<b>Z001018</b>	<b>C002511</b>		<b>C002501</b>	<b>G002001</b>		<b>G000201/...04</b>
B02.22530.18.AM	<b>Z001018</b>	<b>C002511</b>		<b>C002501</b>	<b>G002001</b>		<b>G000201/...04</b>
DB02.2939.25.BM		<b>C002511</b>	<b>Z002523</b>	<b>C002502</b>	<b>G002007</b>	<b>Z002521</b>	
DB02.3851.32.BM		<b>C002512</b>	<b>Z003223</b>	<b>C002503</b>	<b>G002003</b>	<b>Z003221</b>	<b>G000204</b>
DB02.5067.40.BM		<b>C002512</b>	<b>Z004023</b>	<b>C002504</b>	<b>G002003</b>	<b>Z004021</b>	<b>G000204</b>
DB10.6688.63.BM		<b>C002513</b>	<b>Z006323</b>	<b>C002505</b>		<b>Z006321</b>	<b>G000206/...05</b>

## INSERT HOLDER Type

# B05



Bore Ø .787 - 3.465" (20 - 88 mm)



Part number	D <sub>a min</sub>	D <sub>a max</sub>	l	Insert
B05.050.200206	20	39	13	CC06
B05.050.200406	38	67	17	
B05.050.200609	66	88	22	CC09

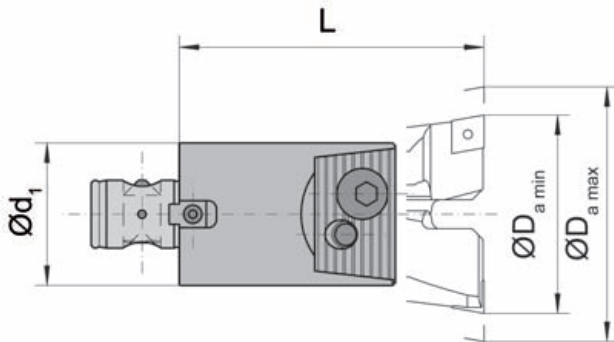
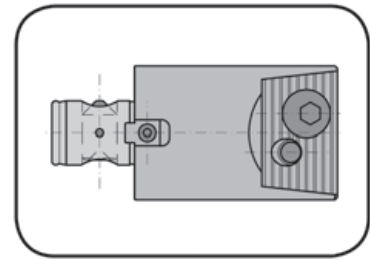
Dimensions in mm

### Spare parts

Insert holder	Screw	Torx Wrench
B05.050.200206	<b>C002004</b>	<b>G002005</b>
B05.050.200406	<b>C002001</b>	<b>G002005</b>
B05.050.200609	<b>C002002</b>	<b>G002003</b>

## DOUBLE CUTTER HEAD Type **D02**

Bore Ø .768 - 3.465" (20 - 88 mm)



Type alpha-modul  
beta-modul



Part number	alpha-modul	beta-modul	D <sub>a min</sub>	D <sub>a max</sub>	L <sub>g</sub>	d <sub>1</sub>	Weight
<b>D02.19530.18.AM</b>	18.5		19.5	30	40	18.5	0.1 kg
<b>D02.2939.25.BM</b>		25	29.0	39	50	25.0	0.2 kg
<b>D02.3851.32.BM</b>		32	38.0	51	65	32.0	0.3 kg
<b>D02.5067.40.BM</b>		40	50.0	51	90	67.0	0.6 kg
<b>D02.6688.63.BM</b>		63	66.0	88	100	67.0	1.5 kg

Dimensions in mm

**Note:**

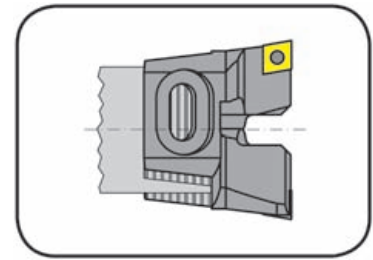
alpha-modul = balancable 2µm  
beta-modul = with digital adjustment

### Spare parts

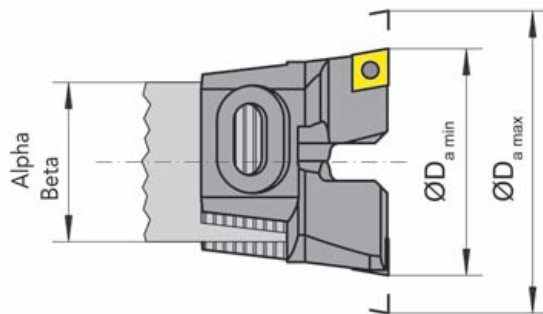
Double cutter head	Lens head screw	Locating pin	Screw	Torx Wrench	Washer	Cylindrical Pin	Bolt	Key	Wrench
D02.3851.32.BM	<b>B002203</b>	<b>Z003223</b>			<b>K000203</b>	<b>C001208</b>	<b>Z003221</b>		<b>G000205</b>
D02.19530.18.AM	<b>B002201</b>			<b>G002023</b>	<b>K000201</b>	<b>C001201</b>			
D02.2939.25.BM	<b>B002202</b>	<b>Z002523</b>		<b>G002024</b>	<b>K000202</b>	<b>C001201</b>	<b>Z002521</b>		
D02.5067.40.BM	<b>B002204</b>	<b>Z004023</b>	<b>C002258</b>		<b>K000204</b>	<b>C001204</b>	<b>Z004021</b>	<b>Z004025</b>	<b>G000206</b>
D02.6688.63.BM	<b>B002205</b>	<b>Z006323</b>	<b>C002205</b>		<b>K000205</b>	<b>C001205</b>	<b>Z006321</b>	<b>Z006325</b>	<b>G000207</b>

## INSERT HOLDER Type

# D050



Bore Ø .768 - 2.638" (19.5 - 67.0 mm)



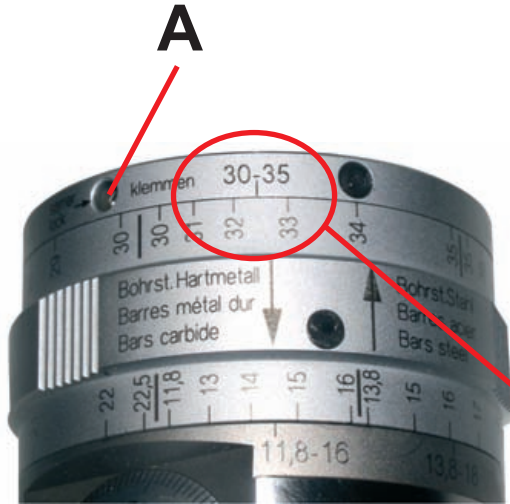
Part number	D <sub>a min</sub>	D <sub>a max</sub>	Weight	Insert
D050.19525.90	19.5	25	0.1 kg	CC06
D050.22530.90	22.5	30		
D050.2939.90	29.0	39		
D050.3851.90	38.0	51	0.1 kg	CC09
D050.5067.90	50.0	67		

Dimensions in mm

### Spare parts

Insert holder	Screw	Torx Wrench	Threaded pin	Wrench
D050.19525/22530.90	C002001	G002005	C000210	G000201
D050.2939.90	C002001	G002005	C000211	G000201
D050.3851.90	C002002	G002003	C000212	G000202
D050.5067.90	C002002	G002003	C000213	G000203

For URMA fine boring head when using HORN B105..../  
B110... with B05 40 20 067 or DB05 40 20 067



### Balancing the fine boring head:

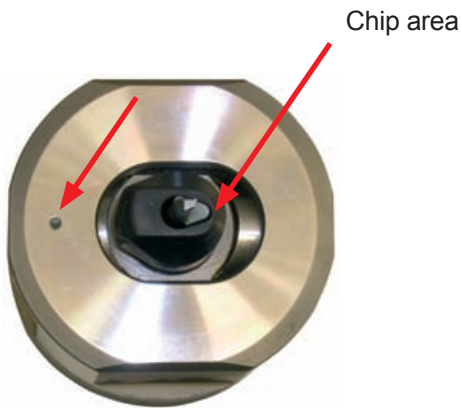
1. Loosening the locking screw A
2. Align the two scales to set the bore diameter
3. Re-tighten the locking screw

Example:

Insert R105.1823.4.5.2  
Toolholder B105.0016.U1.01  
Bore Ø 9 mm

Part number	Bore Ø	Bore Ø					
		5	6	7	8	9	10
R105.1823.4.5.2	5 - 10	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5

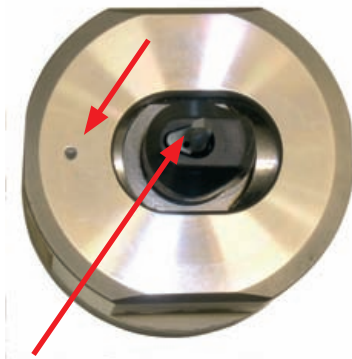
Dimensions in mm



### Bore Ø 0.2 - 1.0 mm

Insert type left hand

For this bore range, it's necessary to turn the toolholder B105... by 180°. With this option, it is possible to set the insert behind the center line which is necessary for Ø less than 1.0 mm.



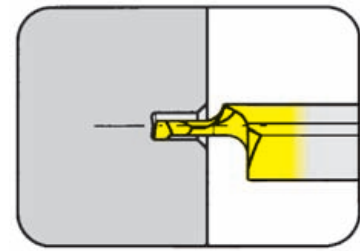
### Bore Ø > 1.0 mm

Insert type right hand

Chip area

for TOOLHOLDER Type

## B105.0016.U1.01



Part number	Bore $\varnothing$	Bore $\varnothing$				
		0.2/0.5/0.7	1	1.3/2/2.5	3	4
L105.1802.0.02*	0.2-1.0	(15-20) 17.0	(15-20) 16.3	-	-	-
L105.1802.0.03*						
L105.1802.0.05*	0.5-1.3	(10-15) 12.0	(10-15) 11.5	(20-25) 21.0	-	-
L105.1803.0.07*	0.7-1.0	(10-15) 10.3	(10-15) 10.0	-	-	-
R105.1805.005.0.1	1.0-3.0	-	(10-15) 10.0	(10-15) 11	(10-15) 12	-
R105.1805.005.1.1						
R105.1805.005.2.1						
R105.1805.0.1	1.0-3.0	-	(10-15) 10.0	(10-15) 11	(10-15) 12	-
R105.1805.0.1						
R105.1805.0.1						
R105.1813.005.0.15	2.5-4.0	-	-	(10-15) 9.9	(10-15) 10.5	(10-15) 10.5
R105.1813.005.1.15					(10-15) 10.5	-
R105.1813.005.2.15					(10-15) 10.3	-
R105.1813.01.0.15	2.5-4.0	-	-	(10-15) 9.9	(10-15) 10.5	(10-15) 10.5
R105.1813.01.1.15					(10-15) 10.5	-
R105.1813.01.2.15					(10-15) 10.3	-

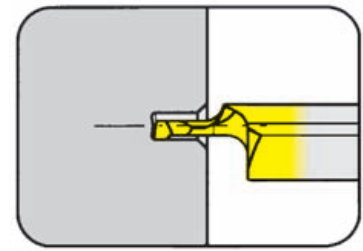
Dimensions in mm

\*It's necessary to turn the toolholder B105.0016.U1.01 by 180°. With this option, it is possible to set the insert behind the center line which is necessary for  $\varnothing$  less than 1.0 mm.



for TOOLHOLDER Type

## B105.0016.U1.01

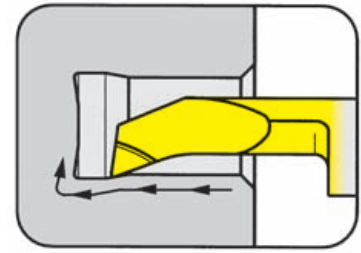


Part number	Bore Ø	Bore Ø					
		2	3	4	5	6	7
R105.1809.005.0.2	2-7	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5
R105.1809.005.1.2		(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5
R105.1809.005.2.2		(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5
R105.1809.1.0.2	2-7	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5
R105.1809.1.1.2		(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5
R105.1809.1.2.2		(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5
R105.1809.005.0.2	2-7	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5
R105.1809.005.1.2		(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5
R105.1809.005.2.2		(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5
R105.1809.0.2	2-7	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5
R105.1809.1.2		(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5
R105.1809.2.2		(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5	(10-15) 10.5
R105.1813.005.0.25	3-8	-	(10-15) 10.5	(10-15) 11.5	(10-15) 12.5	(10-15) 13.5	(10-15) 14.5
R105.1813.005.1.25		(10-15) 10.5	(10-15) 11.5	(10-15) 13.5	(10-15) 13.5	(10-15) 14.5	
R105.1813.005.2.25		(10-15) 11.4	(10-15) 13.4	(10-15) 13.4	(10-15) 14.4		
R105.1813.005.3.25		(10-15) 11.4	(10-15) 13.4	(10-15) 13.4	(10-15) 14.4		

Dimensions in mm

for TOOLHOLDER Type

## B105.0016.U1.01

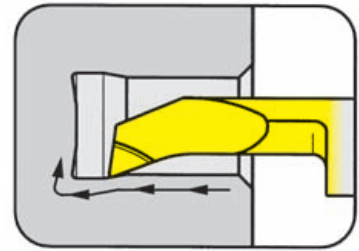


Part number	Bore Ø	Bore Ø						
		3	4	5	6	7	8	9
R105.1813.005.1.3	3-8	(10-15) 10.5	(10-15) 11.5	(10-15) 12.5	(10-15) 13.5	(10-15) 14.5	(15-20) 19.9	-
R105.1813.005.2.3			(10-15) 11.5	(10-15) 13.5	(10-15) 13.5	(10-15) 14.5	(15-20) 19.9	
R105.1813.005.3.3			(10-15) 11.4	(10-15) 13.4	(10-15) 13.4	(10-15) 14.4	(15-20) 19.8	
R105.1813.1.1.3	3-8	(10-15) 10.5	(10-15) 11.5	(10-15) 12.5	(10-15) 13.5	(10-15) 14.5	(15-20) 19.9	-
R105.1813.1.2.3			(10-15) 11.5	(10-15) 13.5	(10-15) 13.5	(10-15) 14.5	(15-20) 19.9	
R105.1813.1.3.3			(10-15) 11.4	(10-15) 13.4	(10-15) 13.4	(10-15) 14.4	(15-20) 19.8	
R105.1813.1.3	3-8	(10-15) 10.5	(10-15) 11.5	(10-15) 12.5	(10-15) 13.5	(10-15) 14.5	(15-20) 19.9	-
R105.1813.2.3			(10-15) 11.5	(10-15) 13.5	(10-15) 13.5	(10-15) 14.5	(15-20) 19.9	
R105.1813.3.3			(10-15) 11.4	(10-15) 13.4	(10-15) 13.4	(10-15) 14.4	(15-20) 19.8	
R105.1809.005.1.4	4-9	-	(10-15) 10.3	(10-15) 11.3	(10-15) 12.3	(10-15) 13.3	(10-15) 14.3	(15-20) 19.7
R105.1809.005.2.4			(10-15) 10.2	(10-15) 11.2	(10-15) 12.2	(10-15) 13.2	(10-15) 14.2	(15-20) 19.7
R105.1809.005.3.4			(10-15) 10.2	(10-15) 11.2	(10-15) 12.2	(10-15) 13.2	(10-15) 14.2	(15-20) 19.7
R105.1819.1.4	4-9	-	(10-15) 10.3	(10-15) 11.3	(10-15) 12.3	(10-15) 13.3	(10-15) 14.3	(15-20) 19.7
R105.1809.1.2			(10-15) 10.2	(10-15) 11.2	(10-15) 12.2	(10-15) 13.2	(10-15) 14.2	(15-20) 19.7
R105.1809.2.2			(10-15) 10.2	(10-15) 11.2	(10-15) 12.2	(10-15) 13.2	(10-15) 14.2	(15-20) 19.7

Dimensions in mm

for TOOLHOLDER Type

## B105.0016.U1.01

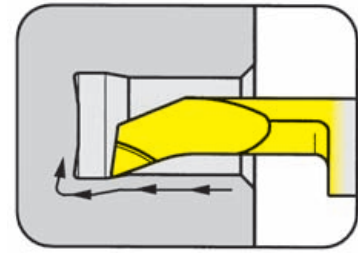


Part number	Bore $\varnothing$	Bore $\varnothing$								
		5	6	7	8	9	10	11	12	13
R105.1823.005.1.5	5-10	(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(15-20) 19.0	(25-30) 28.0			
R105.1823.005.2.5		(10-15) 10.5	(10-15) 11.5	(10-15) 12.5	(10-15) 13.5	(15-20) 19.1	(25-30) 28.1			
R105.1823.005.3.5		(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(15-20) 19.0	(25-30) 28.0			
R105.1823.005.4.5		(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(15-20) 19.0	(25-30) 28.0			
R105.1823.005.5.5		(10-15) 10.3	(10-15) 11.3	(10-15) 12.3	(10-15) 13.3	(15-20) 19.0	(25-30) 28.0			
R105.1823.1.5	5-10	(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(15-20) 19.0	(25-30) 28.0			
R105.1823.2.5		(10-15) 10.5	(10-15) 11.5	(10-15) 12.5	(10-15) 13.5	(15-20) 19.1	(25-30) 28.1			
R105.1823.3.5		(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(15-20) 19.0	(25-30) 28.0			
R105.1823.4.5		(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(15-20) 19.0	(25-30) 28.0			
R105.1823.5.5		(10-15) 10.3	(10-15) 11.3	(10-15) 12.3	(10-15) 13.3	(15-20) 19.0	(25-30) 28.0			
R105.1833.005.2.6	7-12			(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(15-20) 19.1	(25-30) 28.1	
R105.1833.005.3.6				(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(15-20) 19.0	(25-30) 28.0	
R105.1833.005.4.6				(10-15) 10.4	(10-15) 11.3	(10-15) 12.4	(10-15) 13.4	(15-20) 19.0	(25-30) 28.0	
R105.1833.005.5.6				(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(15-20) 19.0	(25-30) 28.0	
R105.1833.2.6	7-12			(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(15-20) 19.1	(25-30) 28.1	
R105.1833.3.6				(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(15-20) 19.0	(25-30) 28.0	
R105.1833.4.6				(10-15) 10.4	(10-15) 11.3	(10-15) 12.4	(10-15) 13.4	(15-20) 19.0	(25-30) 28.0	
R105.1833.5.6				(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(15-20) 19.0	(25-30) 28.0	
R105.1840.005.3.7	8-13				(10-15) 10.0	(10-15) 11.0	(10-15) 12.0	(10-15) 13.0	(10-15) 14.0	(15-20) 19.5
R105.1840.005.4.7					(10-15) 10.0	(10-15) 11.0	(10-15) 12.0	(10-15) 13.0	(10-15) 14.0	(15-20) 19.5
R105.1840.005.5.7					(10-15) 10.0	(10-15) 11.0	(10-15) 12.0	(10-15) 13.0	(10-15) 14.0	(15-20) 19.5
R105.1840.3.7	8-13				(10-15) 10.0	(10-15) 11.0	(10-15) 12.0	(10-15) 13.0	(10-15) 14.0	(15-20) 19.5
R105.1840.3.7					(10-15) 10.0	(10-15) 11.0	(10-15) 12.0	(10-15) 13.0	(10-15) 14.0	(15-20) 19.5
R105.1840.3.7					(10-15) 10.0	(10-15) 11.0	(10-15) 12.0	(10-15) 13.0	(10-15) 14.0	(15-20) 19.5

Dimensions in mm

for TOOLHOLDER Type

## B105.0016.U1.01

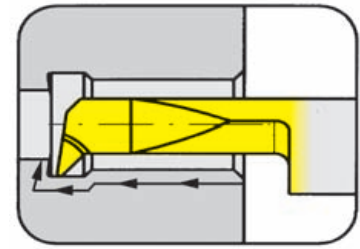


Part number	Bore $\emptyset$	Bore $\emptyset$									
		4	5	6	7	8	9	10	11	12	13
R105.1819.1.H4	4-9	(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(15-20) 19.0	(25-30) 28.0				
R105.1819.1.H4		(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(15-20) 19.0	(25-30) 28.0				
R105.1819.1.H4		(10-15) 10.3	(10-15) 11.3	(10-15) 12.3	(10-15) 13.3	(15-20) 19.0	(25-30) 28.0				
R105.1823.1.H5	5-10		(10-15) 10.5	(10-15) 11.5	(10-15) 12.5	(10-15) 13.5	(15-20) 19.1	(25-30) 28.1			
R105.1823.2.H5			(10-15) 10.5	(10-15) 11.5	(10-15) 12.5	(10-15) 13.5	(15-20) 19.1	(25-30) 28.1			
R105.1823.3.H5			(10-15) 10.5	(10-15) 11.5	(10-15) 12.5	(10-15) 13.5	(15-20) 19.1	(25-30) 28.1			
R105.1823.4.H5			(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(15-20) 19.0	(25-30) 28.0			
R105.1823.5.H5			(10-15) 10.4	(10-15) 11.4	(10-15) 12.5	(10-15) 13.5	(15-20) 19.1	(25-30) 28.1			
R105.1833.2.H6	7-12				(10-15) 10.5	(10-15) 11.5	(10-15) 12.5	(10-15) 13.5	(15-20) 19.1	(25-30) 28.1	
R105.1833.3.H6					(10-15) 10.4	(10-15) 11.4	(10-15) 12.5	(10-15) 13.5	(15-20) 19.1	(25-30) 28.1	
R105.1833.4.H6					(10-15) 10.4	(10-15) 11.4	(10-15) 12.5	(10-15) 13.5	(15-20) 19.1	(25-30) 28.1	
R105.1833.5.H6					(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(15-20) 19.1	(25-30) 28.1	
R105.1840.3.H7	8-13					(10-15) 10.0	(10-15) 11.0	(10-15) 12.0	(10-15) 13.1	(10-15) 14.1	(15-20) 19.5
R105.1840.4.H7						(10-15) 10.0	(10-15) 11.0	(10-15) 12.0	(10-15) 13.0	(10-15) 14.0	(15-20) 19.5
R105.1840.5.H7						(10-15) 10.0	(10-15) 11.0	(10-15) 12.0	(10-15) 13.0	(10-15) 14.0	(15-20) 19.5

Dimensions in mm

for TOOLHOLDER Type

## B105.0016.U1.01

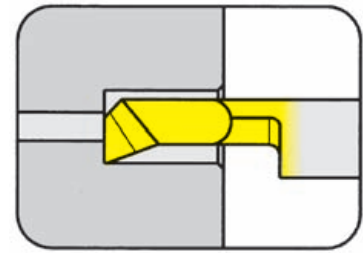


Part number	Bore $\emptyset$	Bore $\emptyset$									
		4	5	6	7	8	9	10	11	12	
R105.4719.1.4 R105.4719.3.4	4-9	(10-15) 10.3	(10-15) 11.3	(10-15) 12.3	(10-15) 13.3	(15-20) 19.0	(25-30) 28.0				
R105.4723.2.5 R105.4723.4.5	5-10		(10-15) 10.5	(10-15) 11.5	(10-15) 12.5	(10-15) 13.5	(10-15) 14.5	(20-25) 24.0			
R105.4733.3.6 R105.4733.5.6	7-12				(10-15) 10.2	(10-15) 11.2	(10-15) 12.5	(10-15) 18.0	(15-20) 19.0	(15-20) 19.8	

Dimensions in mm

for TOOLHOLDER Type

## B105.0016.U1.01

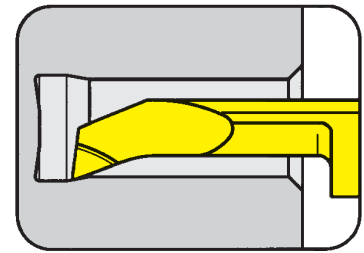


Part number	Bore $\emptyset$	Bore $\emptyset$							
		3	4	5	6	7	8	9	10
R105.9013.01.1.3	3-8	(10-15) 10.6	(10-15) 11.6	(10-15) 12.6	(10-15) 13.7	(10-15) 14.6	(20-25) 24.0		
R105.9013.01.2.3									
R105.9013.1.3									
R105.9013.2.3									
R105.9019.01.1.4	4-9		(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(10-15) 14.4	(20-25) 28.0	
R105.9019.01.2.4			(10-15) 10.2	(10-15) 11.2	(10-15) 12.2	(10-15) 13.2	(10-15) 14.1	(20-25) 27.8	
R105.9019.01.3.4			(10-15) 10.2	(10-15) 11.2	(10-15) 12.2	(10-15) 13.2	(10-15) 14.1	(20-25) 27.8	
R105.9019.1.4			(10-15) 10.4	(10-15) 11.4	(10-15) 12.4	(10-15) 13.4	(10-15) 14.4	(20-25) 28.0	
R105.9019.2.4			(10-15) 10.2	(10-15) 11.2	(10-15) 12.2	(10-15) 13.2	(10-15) 14.1	(20-25) 27.8	
R105.9023.01.1.5	5-10			(10-15) 10.5	(10-15) 11.5	(10-15) 12.5	(10-15) 13.6	(10-15) 14.5	(20-25) 24.0
R105.9023.01.2.5									
R105.9023.1.5									
R105.9023.2.5									
R105.9023.3.5									

Dimensions in mm

for TOOLHOLDER Type

## B105.0016.U1.02

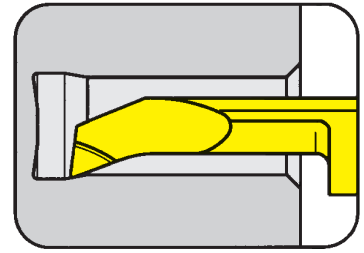


Part number	Bore Ø	Bore Ø								
		5	6	7	8	9	10	11	12	13
R105.1823.4.5.2 R105.1823.5.5.2	5-10	(10-15) 10.5	(10-15) 11.5	(10-15) 12.5	(25-30) 27.0	(30-35) 32.5	(20-25) 24.2			
R105.1833.4.6.2 R105.1833.5.6.2	7-12			(10-15) 10.5	(10-15) 11.5	(10-15) 12.5	(25-30) 27.0	(30-35) 32.5	(20-25) 24.2	
R105.1840.4.7.2 R105.1840.5.7.2 R105.1840.7.7.2	8-13				(10-15) 10.0	(10-15) 11.0	(15-20) 17.0	(15-20) 18.0	(15-20) 19.0	(15-20) 19.8
R105.4733.5.6.2	7-12			(10-15) 10.3	(10-15) 11.5	(10-15) 12.6	(10-15) 13.7	(10-15) 14.8	(20-25) 24.2	

Dimensions in mm

for TOOLHOLDER Type

**B110.0016.U1.02**

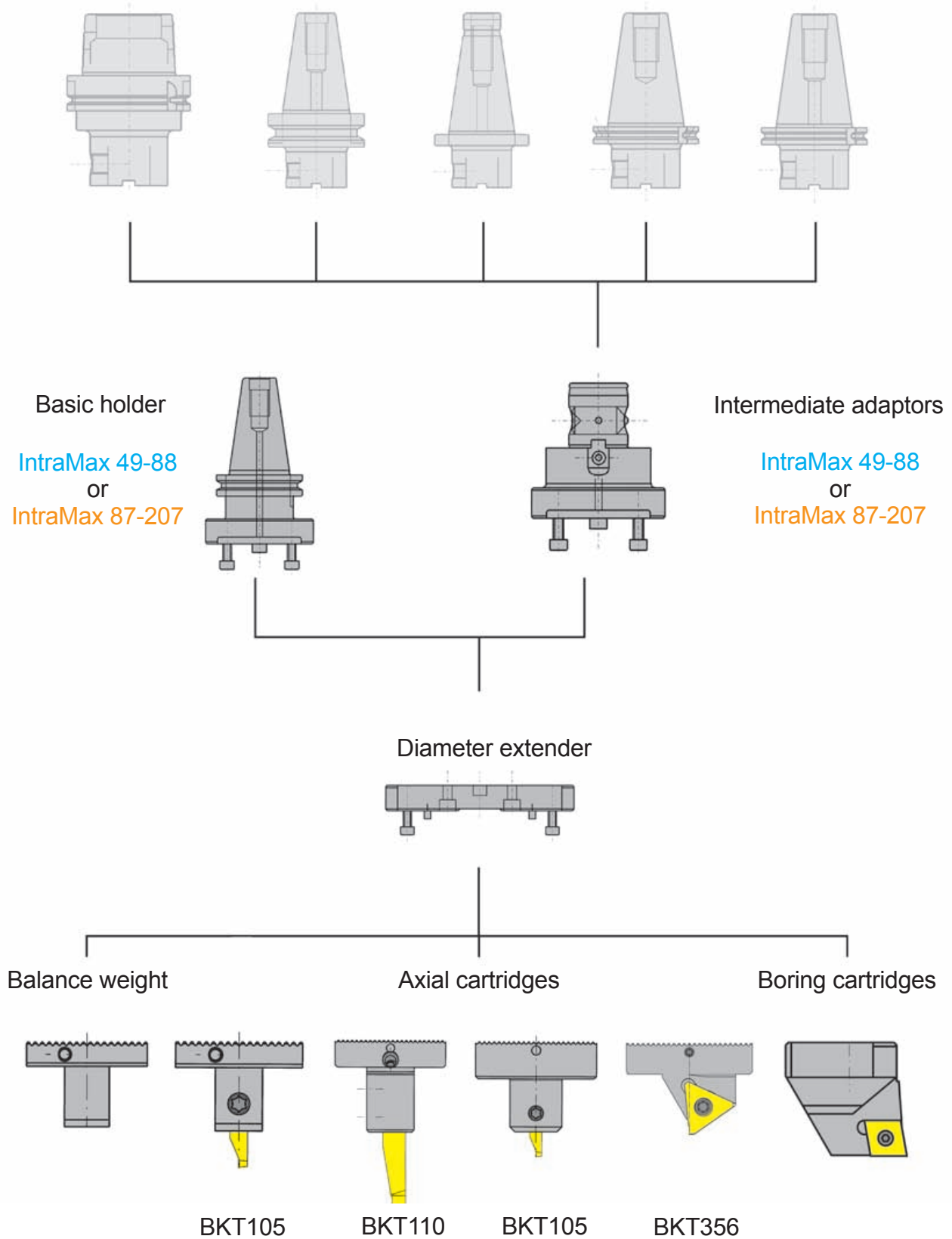


Part number	Bore Ø	Bore Ø							
		3	4	5	6	7	8	9	10
R105.9013.1.3	6-11	(30-35) 30.0	(25-30) 26.0	(15-20) 18.0	(25-30) 27.5	(20-25) 24.2	(25-30) 29.0		
R105.9013.2.3		(30-35) 30.0	(25-30) 26.0	(15-20) 18.0	(25-30) 27.5	(20-25) 24.2	(25-30) 29.0		
R105.9019.1.4	8-13			(10-15) 10.0	(10-15) 11.5	(10-15) 13.0	(15-20) 19.0	(15-20) 20.0	(25-30) 28.9

Dimensions in mm



Adaptor with Beta module 40/63

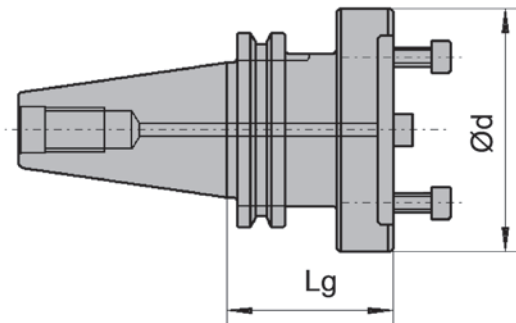


## BASIC HOLDER URMA Type

## IntraMax 49-88



- direct mounting for cartridge type BKT105.U90K.01 and BKT356.U90K.05
- for balance weight type 020.U00K.040
- for diameter bracked type 22 03...



Part number	$L_g$	d	Weight	Diameter Range for type 105 / 315	System
C114103052	52	46	1.2 kg	5 - 18	CAT40
D114103052	52		1.2 kg	5 - 18 / 47 - 61	SK40/A
H114303052	52		1.2 kg	5 - 18 / 47 - 61	SK40/B
HSKA116303	60		1.3 kg	5 - 18 / 47 - 61	HSKA-63
T114103052	52		1.3 kg	5 - 18 / 47 - 61	MAS-BT40

Dimensions in mm

### Spare parts

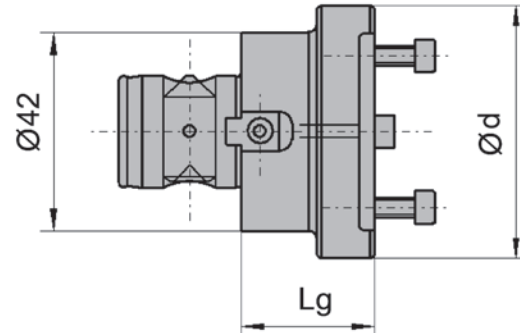
Basic Holder Urma	Screw	Washer	Cylindrical Pin
C/D/H/HSKA/T11...	<b>C002212</b>	<b>K000201</b>	<b>C001208</b>

## Intermediate adaptors URMA

## IntraMax 49-88



- direct mounting for cartridge type BKT105.U90K.01 and BKT356.U90K.05
- for balance weight type 020.U00K.040
- for diameter extender type 22 03...
- coupling Beta module



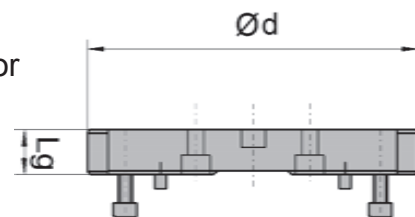
Part number	BETA MODULE	d	L <sub>g</sub>	Weight	Diameter range for type 105 / 315
B21 40 46 036	40	46	36	0.5 kg	5 - 18 / 47 - 61

Dimensions in mm

## Diameter extender URMA

## IntraMax 49-88

- Direct mounting for cartridge type BKT105.U90K.01 or BKT356.U90K.05



Part number	d	L <sub>g</sub>	Weight	Diameter range for type 105 / 315
22 03 06 012	59	12	0.2 kg	18 - 31 / 60 - 74
22 03 07 012	72	12	0.3 kg	31 - 45 / 73 - 87

Dimensions in mm

## Spare parts

Screw	Washer	Screw	Key	Screw	Cylindrical pin	Bolt
C002212	K000201	Z004023	Z004025	C002258	C001208	Z004021

## ADJUSTABLE HOLDER Type

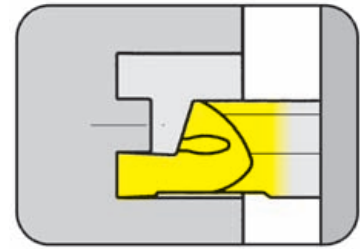
## BKT

for URMA IntraMax System 49-88

from outer groove  $\varnothing$   
Depth of groove up to

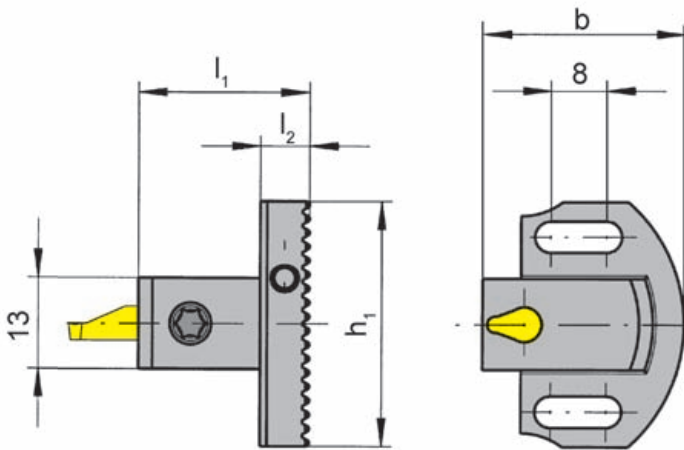
5,0 mm  
6,0 mm

Clamping length 12 mm



for use with Insert

Type 105



Part number	$h_1$	$l_1$	$l_2$	b
<b>BKT105.U90K.01</b>	35	24.5	7	28.5

Dimensions in mm

2 Cartridges are suitable from  $D_{amin} = 2x(6\text{ mm} + f_{Insert})$

For torque specifications of the screw, please see Technical Instructions.

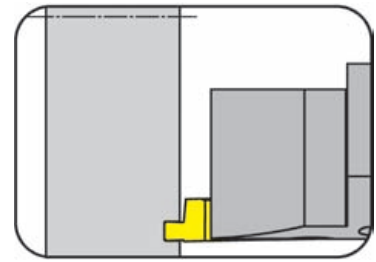
### Spare parts

Adjustable holder	Screw	TORX PLUS® Wrench
<b>BKT105.U90K.01</b>	<b>6.075T15P</b>	<b>T15PQ</b>

## CARTRIDGE Type

## BKT

for URMA IntraMax System 49-88



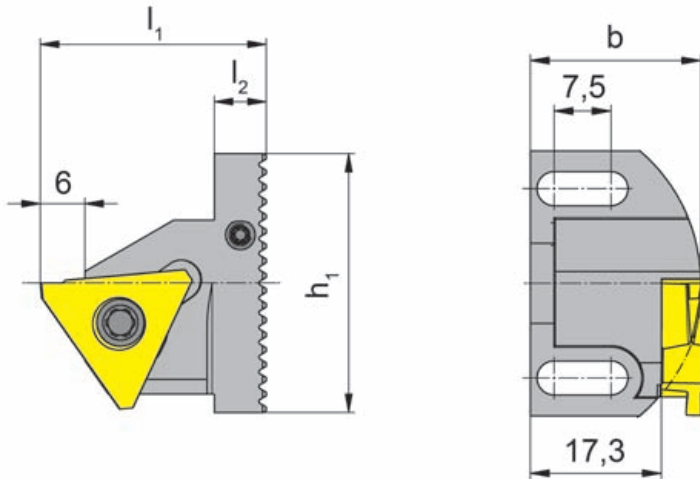
from outer groove  $\varnothing$   
Depth of groove up to

1.850" (47.0 mm)  
.197" (5.0 mm)

Clamping length 12 mm

for use with Indexable  
insert

Type 315



Part number	$h_1$	$l_1$	$l_2$	b
<b>BKT356.U90K.05</b>	35	30.5	7	22.8

Dimensions in mm

2 Cartridges are suitable from  $\varnothing$  47 - 87 mm

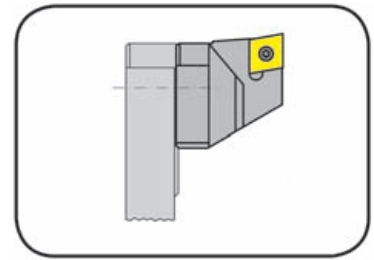
For torque specifications of the screw, please see Technical Instructions.

## Spare parts

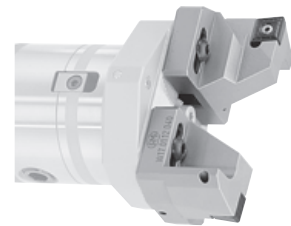
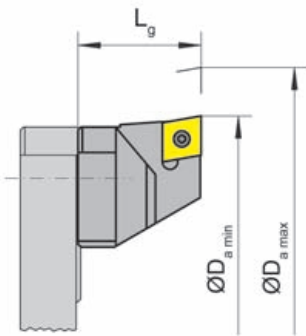
Cartridge	Screw	TORX PLUS® Wrench
BKT356.U90K.05	<b>5.12T20P</b>	<b>T20PQ</b>

## INSERT HOLDER Type

# 050.K



Bore Ø 1.929 - 3.465" (49 - 88 mm)



external and internal

Part number	D <sub>a min</sub>	D <sub>a max</sub>	L <sub>g</sub>	Weight	Insert
050.K4988.C09	49	88	28	0.1 kg	CC09

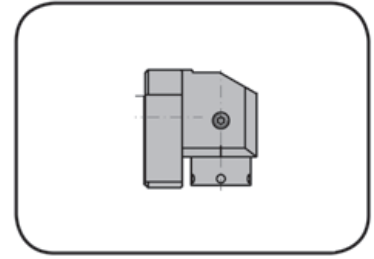
Dimensions in mm

### Spare parts

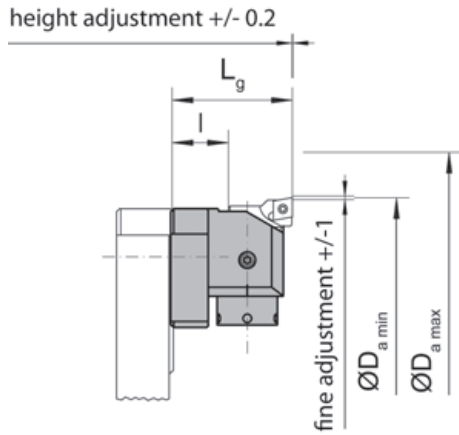
Insert holder	Screw	Torx Wrench	Threaded pin	Wrench
050.K4988.C09	<b>C002002</b>	<b>G002003</b>	<b>C000286</b>	<b>G000201</b>

FINE BORING HEAD Type

**F050.K**



Bore Ø 1.929 - 3.465" (49 - 88 mm)



Part number	D <sub>a min</sub>	D <sub>a max</sub>	L <sub>g</sub>	l	Weight
F050.K988.01	49	88	28	10	0.15 kg

Dimensions in mm

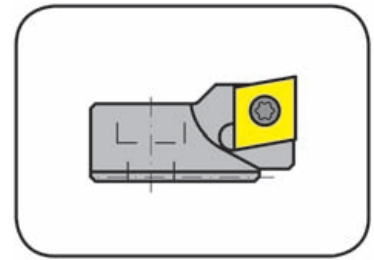
Spare parts

Fine boring head	Threaded pin	Screw	Screw	Torx Wrench	Washer	Threaded pin	Wrench
F050.K988.01	Z002302	C002501	C002256	G002007	K000244	C000286	G000201/...3



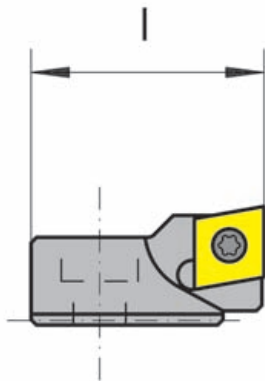
INSERT HOLDER Type

## 050.C



Bore Ø

1.929 - 3.465" (49 - 88 mm)



Part number	D <sub>a min</sub>	D <sub>a max</sub>	l	Insert
050.CC06.01	49	88	18	CC06

Dimensions in mm

### Spare parts

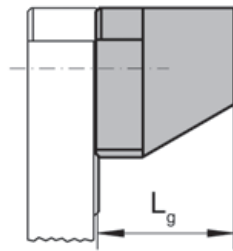
Insert holder	Torx Wrench
050.CC06.01	G002007



BALANCING WEIGHT Type **23**



Bore Ø 1.929 - 3.465 (49 - 88 mm)



Part number	D <sub>a min</sub>	D <sub>a max</sub>	L <sub>g</sub>	Weight
230210024	49	88	28	0.1 kg

Dimensions in mm

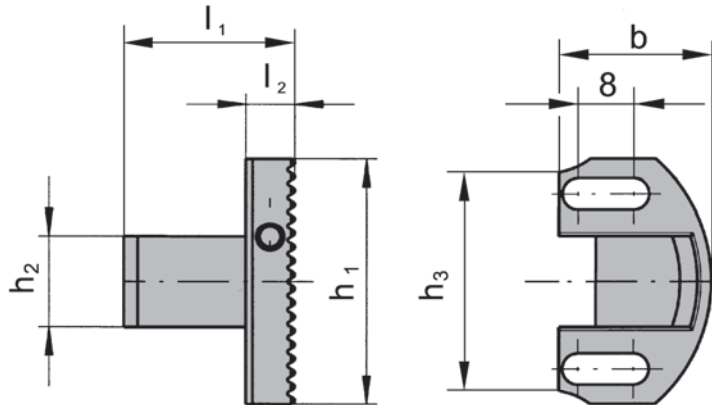
Spare parts

Balancing Weight	Threaded pin	Wrench
230210024	C000286	G000201



BALANCING WEIGHT Type **020**

for URMA IntraMax System 49-88



Part number	$l_1$	$l_2$	$h_1$	$h_2$	$h_3$	$b$
020.U00K.2040	24.5	7	35	13	31	22

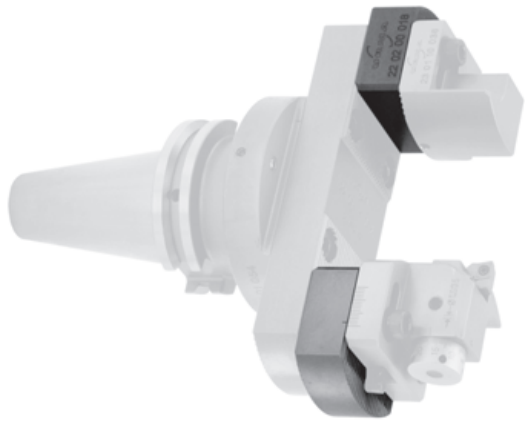
Dimensions in mm

Spare parts

Balancing Weight	Screw
020.U00K.2040	6.075T15

PLATE BETWEEN URMA

## IntraMax 49-88



External machining

Part number	$D_{a \text{ min}}$	$D_{a \text{ max}}$	Weight	System
2204000012	9	35	0.25 kg	K

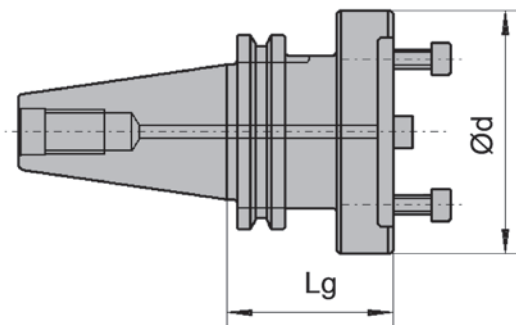
Dimensions in mm

## BASIC HOLDER URMA Type

## IntraMax 87-207



- direct mounting for cartridge type BKT105.U90G.01, BKT110.U17G.02 or BKT356.U90G.05
- for balance weight type 230110036
- for diameter bracked type 22 01...



Part number	$L_g$	d	Weight	Diameter Range for type 105+110 / 315	System
C114101054	54	80	1.5 kg	31-61	CAT40
D114101054	54		1.4 kg	31 - 61 / 81 - 110	SK40/A
H114301054	54		1.4 kg	31 - 61 / 81 - 110	SK40/B
HSKA116301	60		1.4 kg	31 - 61 / 81 - 110	HSKA-63
T114101054	54		1.5 kg	31 - 61 / 81 - 110	MAS-BT40

Dimensions in mm

### Spare parts

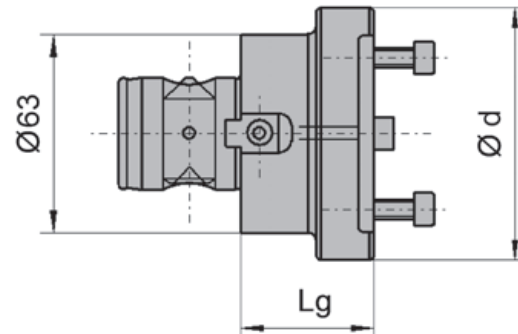
Basic Holder Urma	Screw	Screw	Washer
C/D/H/HSKA/T11...	Z002120	C002202	K000220

## Intermediate adaptors URMA

## IntraMax 87-207



- Direct mounting for cartridge type BKT105.U90G.01, BKT110.U17G.02 and BKT356.U90G.05
- for balance weight type 230110036
- for diameter extender type 22 01...
- coupling Beta module



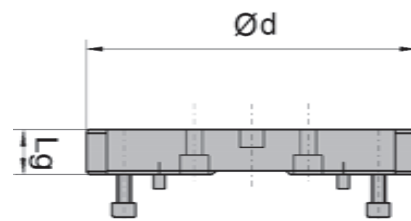
Part number	BETA MODULE	d	L <sub>g</sub>	Weight	Diameter range for type 105+110 / 315
B21 63 80 042	63	80	42	0.8 kg	31 - 61 / 81 - 110

Dimensions in mm

## Diameter extender URMA

## IntraMax 87-207

- Direct mounting for cartridge type BKT105.U90G.01 BKT110.U17G.02 and BKT356.U90G.05



Part number	d	L <sub>g</sub>	Weight	Diameter range for type 105+110 / 315
22 01 11 018	110	18	0.8 kg	61 - 91 / 111 - 140,5
22 01 14 018	140	18	1.0 kg	91 - 122 / 140,5 - 170,5
22 01 17 018	170	18	1.2 kg	122 - 152 / 170,5 - 200
22 01 20 023	200	23	1,6 kg	152 - 182 / 200 - 230

Dimensions in mm

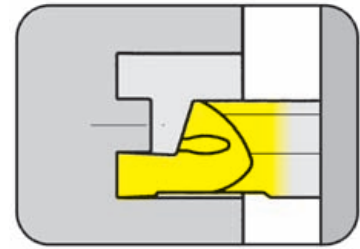
## Spare parts

type	Screw	Washer	Screw	Key	Screw	Screw	Cylindrical pin	Bolt
B21...								
22 01...	C002202	K000220	Z006023	Z006025	C002205	Z002120	CC001208	Z006321
								-

## ADJUSTABLE HOLDER Type

## BKT

for URMA IntraMax System 87-207



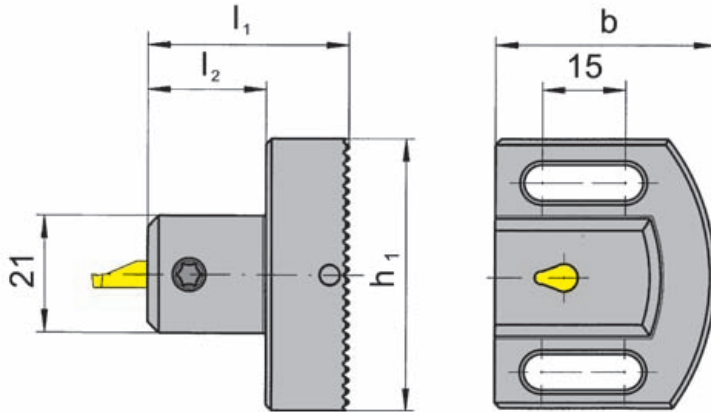
from outer groove  $\varnothing$   
Depth of groove up to

31,0 mm  
6,0 mm

Clamping length 12 mm

for use with Insert

Type 105



Part number	$h_1$	$l_1$	$l_2$	b
<b>BKT105.U90G.01</b>	49	36.4	24.4	39.5

Dimensions in mm

2 Cartridges are suitable from  $D_{amin} = 2x (6 \text{ mm} + f_{Insert})$

For torque specifications of the screw, please see Technical Instructions.

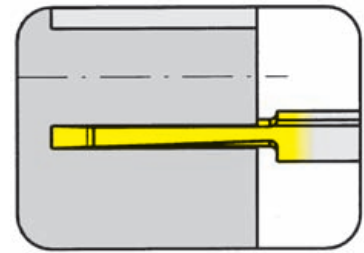
### Spare parts

Adjustable holder	Screw	TORX PLUS® Wrench
<b>BKT105.U90G.01</b>	<b>6.075T15P</b>	<b>T15PQ</b>

## CARTRIDGE Type

## BKT

for URMA IntraMax System 87-207

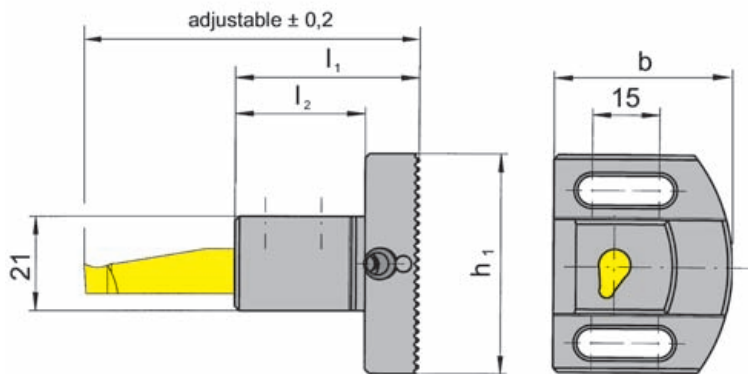


from outer groove  $\varnothing$   
Depth of groove up to

31.0 mm  
30.0 mm

for use with Insert

Type A110



Part number	$h_1$	$l_1$	$l_2$	b
<b>BKT110.U17G.02</b>	49	41	26	39.5

Dimensions in mm

2 Cartridges are suitable from  $D_{amin} = 2x (13,5 \text{ mm} + f_{Insert})$

For torque specifications of the screw, please see Technical Instructions.

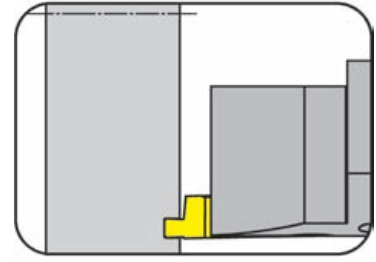
### Spare parts

Cartridge	Screw	Adjust screw axial	TORX PLUS® Wrench
BKT110.U17G.02	<b>6.075T15P</b>	<b>030.0006.0488</b>	<b>T15PQ</b>

## CARTRIDGE Type

## BKT

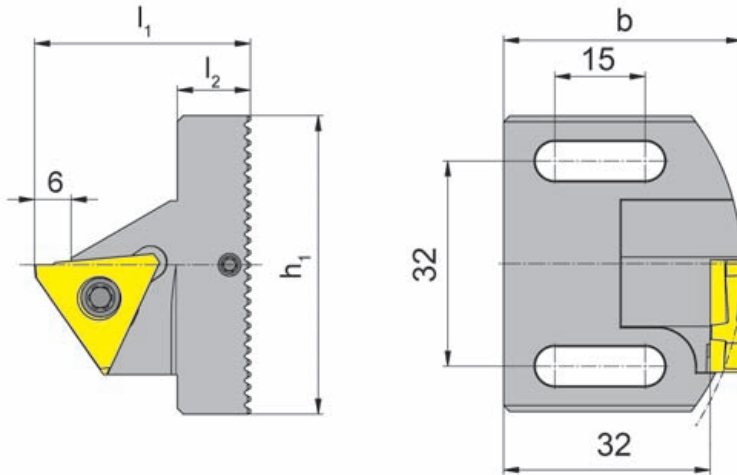
for URMA IntraMax System 87-207



from outer groove  $\varnothing$   
Depth of groove up to

3.189" (81.0 mm)  
.197" (5.0 mm)

Clamping length 12 mm



for use with Indexable  
insert

Type 315

Part number	$h_1$	$l_1$	$l_2$	b
<b>BKT356.U90G.05</b>	49	35.4	12	39.8

Dimensions in mm

2 Cartridges are suitable from  $\varnothing$  81 - 200 mm

For torque specifications of the screw, please see Technical Instructions.

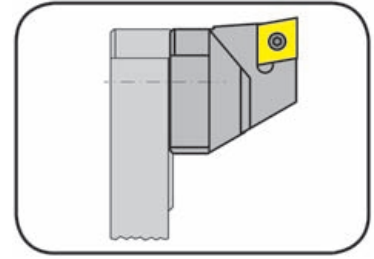
### Spare parts

Cartridge	Screw	TORX PLUS® Wrench
BKT356.U90G.05	<b>5.12T20P</b>	<b>T20PQ</b>

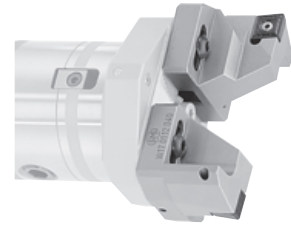
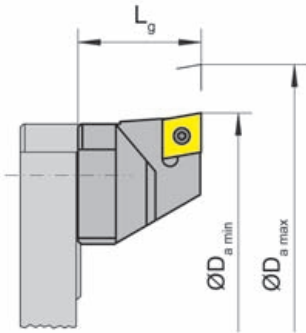


INSERT HOLDER Type

**050.G**



Bore Ø 3.425 - 11.693" (87 - 297 mm)



external and internal

Part number	D <sub>a min</sub>	D <sub>a max</sub>	L <sub>g</sub>	Weight	Insert
050.G87297.C12	87	297	40	0.3 kg	CN12

Dimensions in mm

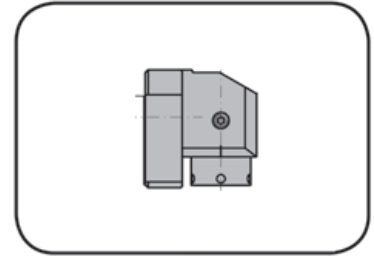
Spare parts

Insert holder	Clamp bolt	Clamping finger	Screw	Torx Wrench	Threaded pin	Wrench
050.G87297.C12	Z001202	A001211	A003207	G002003	C000279	G000202

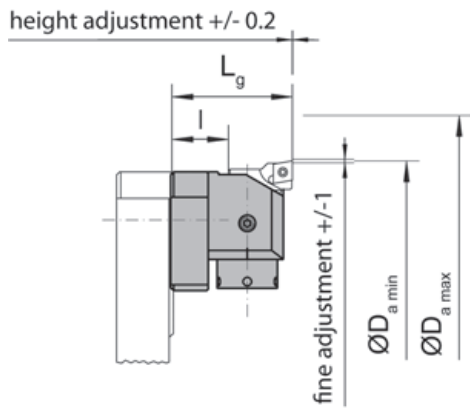


FINE BORING HEAD Type

**F050.G**



Bore Ø 3.425 - 11.693" (87 - 297 mm)



Part number	D <sub>a min</sub>	D <sub>a max</sub>	L <sub>g</sub>	l	Weight
DF050.G87297.02 F050.G87297.02	87	297	40	18	0.4 kg

Dimensions in mm

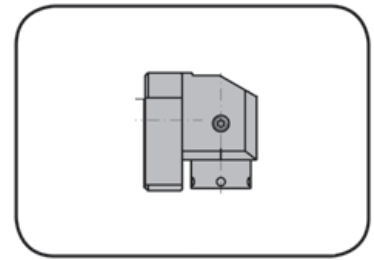
**Additional equipment only for DF050...:**  
Digital display unit DAZ to show the adjusting range

Spare parts

Fine boring head	Threaded pin	Screw	Screw	Washer	Threaded pin	Wrench
DF050... / F050...	Z002302	C000701	C002211	K000201	C000279	G000201 G000202 G000203 G000204

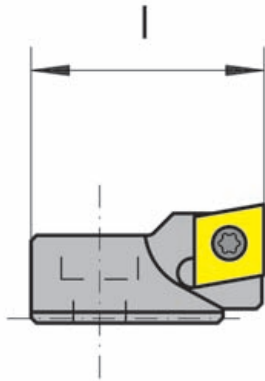
INSERT HOLDER Type

## 050.C



Bore Ø

3.425 - 11.693" (87 - 297 mm)



Part number	$D_{a \text{ min}}$	$D_{a \text{ max}}$	l	Insert
050.CC06.02	87	297	18	CC06

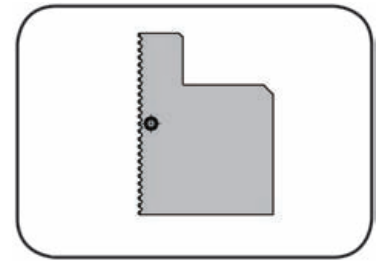
Dimensions in mm

### Spare parts

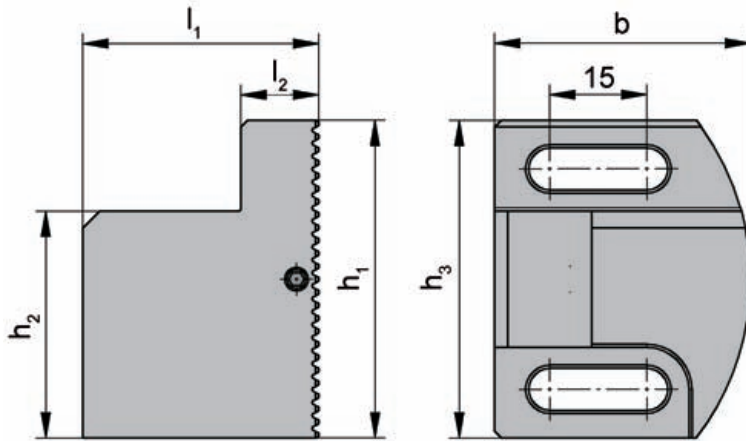
Insert holder	Screw	Torx Wrench
050.CC06.02	<b>C002001</b>	<b>G002005</b>

BALANCING WEIGHT Type

23



for URMA IntraMax System 87-207



Part number	$l_1$	$l_2$	$h_1$	$h_2$	$h_3$	$b$	Weight
230110036	36.4	12.5	49	34.8	49	39.5	0.3 kg

Dimensions in mm

Spare parts

Balancing Weight	Screw	Washer
230110036	C002202	K000220

PLATE BETWEEN URMA

IntraMax 87-207



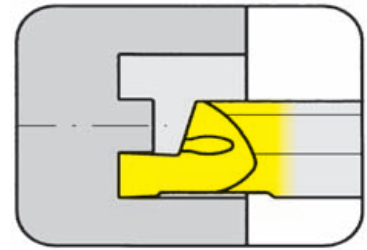
External machining

Part number	D <sub>a min</sub>	D <sub>a max</sub>	Weight	System
2202000018	9	189	0.25 kg	G

Dimensions in mm

## INSERT Type

# 105

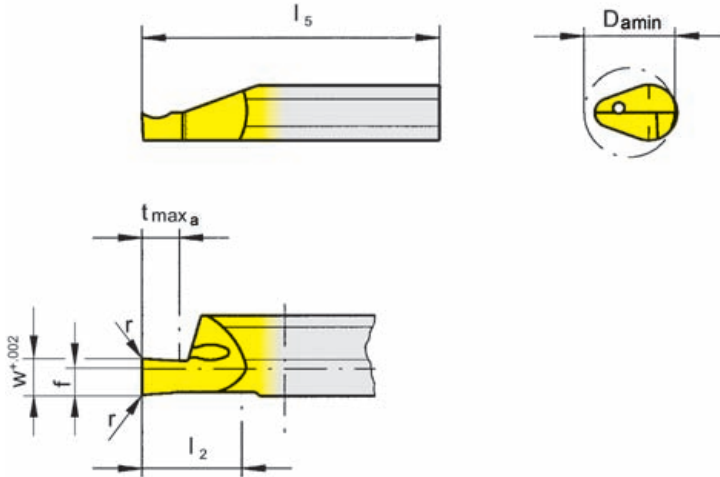


from outer groove $\varnothing$	.197"
Depth of groove	.197"
Width of groove up to	.079"

Clamping length 12 mm

for use with Toolholder

Type B105  
BKT



R = right hand version shown

L = left hand version

Part number	w	r	f	l <sub>2</sub>	l <sub>5</sub>	t <sub>max a</sub>	D <sub>a min</sub>	Carbide grades			
								MG12	TN35	TI25	TH35
R/L105.0510.1.8	.039					.079	.197	▲/△		▲/▲	
R/L105.0515.1.8	.059	.002	.079	.394	.984	.118	.197	▲/△		▲/▲	
R/L105.0520.1.8	.079					.197		▲/△		▲/▲	
R/L105.0510.2.8	.039					.079		△/△		▲/▲	
R/L105.0515.2.8	.059	.002	.079	.591	1.378	.118	.197	△/△		▲/▲	
R/L105.0520.2.8	.079					.197		▲/▲		▲/▲	
								P	○	●	●
								M	●	●	●
								K	●	●	●
								N	●	●	●
								S	●	●	●
								H			

- ▲ on stock    △ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

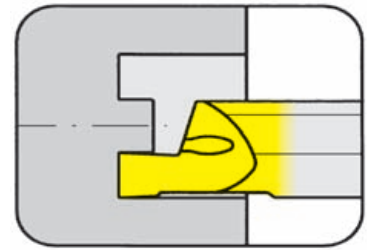
Dimensions in inch

State R or L version

Carbide grades

## INSERT Type

# 105

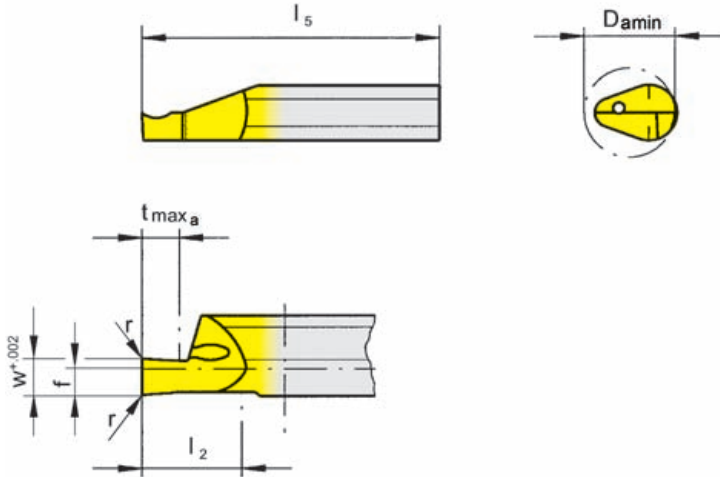


from outer groove $\varnothing$	.236"
Depth of groove	.197"
Width of groove up to	.079"

Clamping length 12 mm

for use with Toolholder

Type B105  
BKT



R = right hand version shown

L = left hand version

Part number	w	r	f	l <sub>2</sub>	l <sub>5</sub>	t <sub>max a</sub>	D <sub>a min</sub>	MG12	TN35	TI25	TH35
R/L105.0610.1.8	.039					.079		▲/▲		▲/▲	
R/L105.0615.1.8	.059	.002	.079	.394	.984	.118	.236	△/△		▲/▲	
R/L105.0620.1.8	.079					.197		▲/△		▲/▲	
R/L105.0610.2.8	.039					.079		△/△		△/▲	
R/L105.0615.2.8	.059	.002	.079	.591	1.378	.118	.236	△/		▲/△	
R/L105.0620.2.8	.079					.197		△/△		▲/▲	
								P	o	•	
								M	•	•	
								K	•	•	
								N	•	•	
								S	•	•	
								H			

- ▲ on stock    △ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

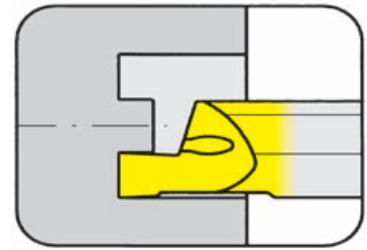
Dimensions in inch

State R or L version

Carbide grades

## INSERT Type

# 105

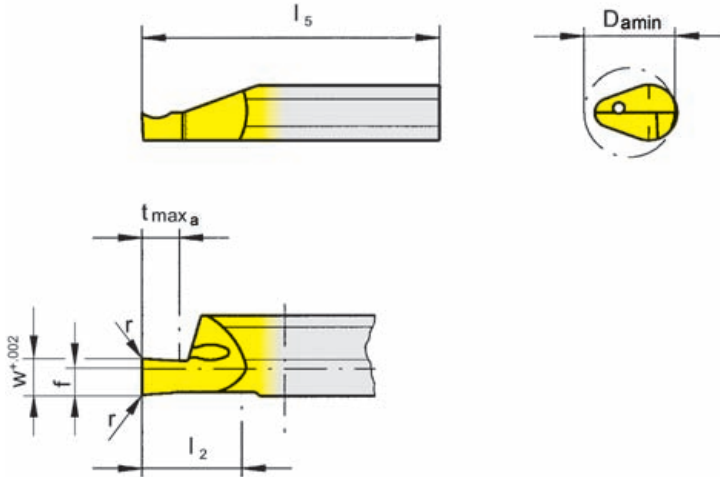


from outer groove $\varnothing$	.315"
Depth of groove	.236"
Width of groove up to	.118"

Clamping length 12 mm

for use with Toolholder

Type B105  
BKT



R = right hand version shown

L = left hand version

Part number	w	r	f	l <sub>2</sub>	l <sub>5</sub>	t <sub>max a</sub>	D <sub>a min</sub>	Carbide grades			
								MG12	TN35	TI25	TH35
R/L105.0810.1.8	.039					.079				▲/▲	
R/L105.0815.1.8	.059					.118				▲/▲	
R/L105.0820.1.8	.079	.006	.079	.394	.984	.157	.315			▲/▲	
R/L105.0825.1.8	.098					.197				▲/▲	
R/L105.0830.1.8	.118					.236				▲/▲	
R/L105.0810.2.8	.039					.079				▲/▲	
R/L105.0815.2.8	.059					.118				▲/▲	
R/L105.0820.2.8	.079	.006	.079	.591	1.378	.157	.315			▲/▲	
R/L105.0825.2.8	.098					.197				▲/▲	
R/L105.0830.2.8	.118					.236				▲/▲	

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

	P	M	K	N	S	H
MG12						
TN35						
TI25	●	●	●	●	●	
TH35						

Dimensions in inch

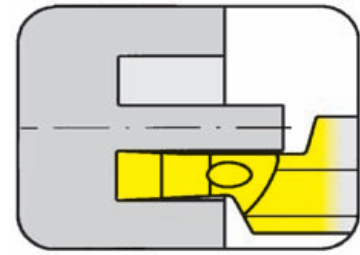
Carbide grades

State R or L version



## INSERT Type

# 105

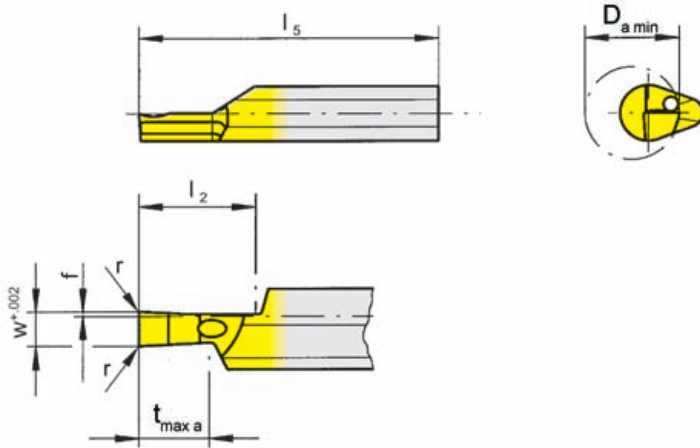


from outer groove $\varnothing$	.315"
Depth of groove	.236"
Width of groove up to	.118"

Clamping length 12 mm

for use with Toolholder

Type B105  
BKT



R = right hand version shown

L = left hand version

Part number	w	r	f	l <sub>2</sub>	l <sub>5</sub>	t <sub>max a</sub>	D <sub>a min</sub>	Carbide grades				
								MG12	TN35	TI25	TH35	
R/L105.0810.1.9	.039					.079				▲/▲		
R/L105.0815.1.9	.059					.118				▲/▲		
R/L105.0820.1.9	.079	.006	.016	.394	.984	.157	.315			▲/▲		
R/L105.0825.1.9	.098					.197				▲/▲		
R/L105.0830.1.9	.118					.236				▲/▲		
								P		•		
								M		•		
								K		•		
								N		•		
								S		•		
								H				

- ▲ on stock Δ 4 weeks
- main recommendation
- o alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

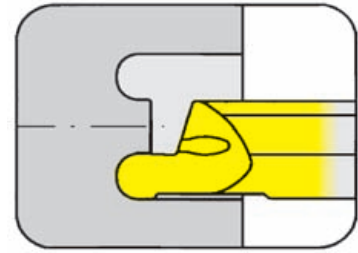
Dimensions in inch

State R or L version

Carbide grades

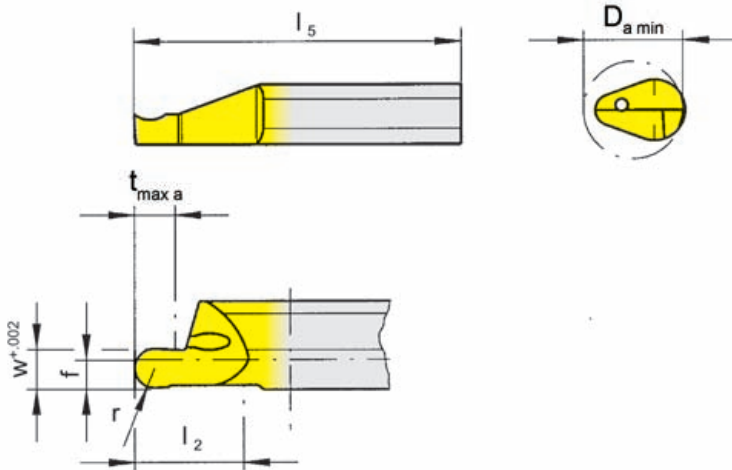
## INSERT Type

# 105



from outer groove $\varnothing$	.315"
Depth of groove	.236"
Width of groove up to	.118"

Clamping length 12 mm

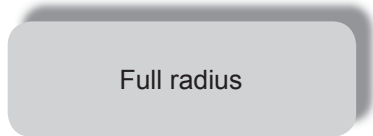


for use with Toolholder

Type B105  
BKT

R = right hand version shown

L = left hand version



Part number	w	r	f	l <sub>2</sub>	l <sub>5</sub>	t <sub>max a</sub>	D <sub>a min</sub>	Carbide grades			
								MG12	TN35	TI25	TH35
R/L105.8V10.1.8	.039	.020				.079				▲/▲	
R/L105.8V16.1.8	.063	.031				.118				▲/▲	
R/L105.8V20.1.8	.079	.039	.079	.394	.984	.157	.315			▲/▲	
R/L105.8V25.1.8	.098	.049				.197				▲/▲	
R/L105.8V30.1.8	.118	.059				.236				▲/▲	
R/L105.8V10.2.8	.039	.020				.079				▲/▲	
R/L105.8V16.2.8	.063	.031				.118				▲/▲	
R/L105.8V20.2.8	.079	.039	.079	.591	1.378	.157	.315			▲/▲	
R/L105.8V25.2.8	.098	.049				.197				▲/▲	
R/L105.8V30.2.8	.118	.059				.236				▲/▲	

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

P			●
M			●
K			●
N			●
S			●
H			

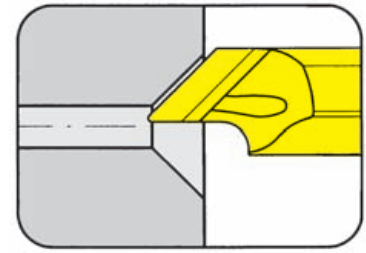
Dimensions in inch

Carbide grades

State R or L version

## INSERT Type

# 105



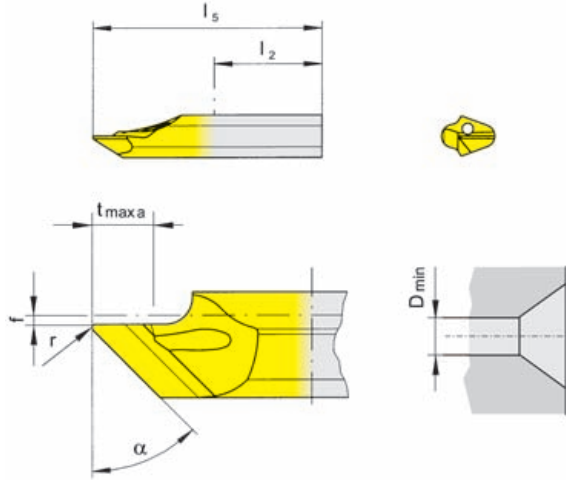
Angle of chamfer  
Width of chamfer up to

45°/60°  
.157"

Clamping length 12 mm

for use with Toolholder

Type B105  
BKT



R = right hand version shown

L = left hand version

Part number	r	α	f	l <sub>2</sub>	l <sub>5</sub>	t <sub>max a</sub>	D <sub>min</sub>	Carbide grades				
								MG12	TN35	T125	TF45	TH35
R/L105.0045.1.1	.008	45°	.020	.472	.984	.138	.039				▲/▲	
R/L105.0060.1.1	.008	60°	.020	.472	.984	.157	.039				▲/▲	
								P			•	
								M			•	
								K			•	
								N			•	
								S			•	
								H				

▲ on stock Δ 4 weeks

• main recommendation

o alternative recommendation

- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

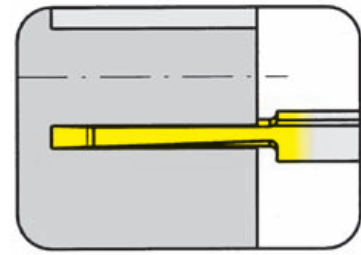
State R or L version

Carbide grades

## INSERT Type

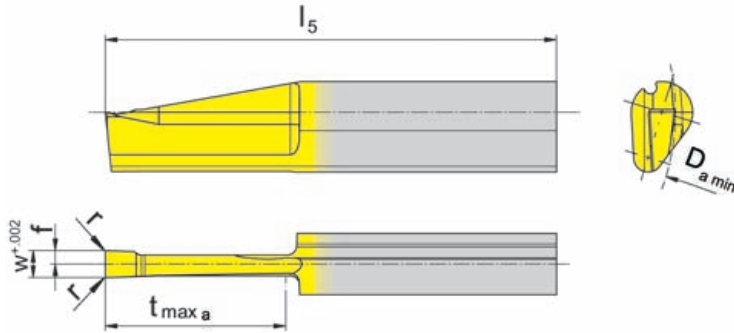
# A110

from outer groove $\varnothing$	.787"
Depth of groove	1.181"
Width of groove	.118"



for use with Toolholder

Type B110



R = right hand version shown

Part number	w	r	f	l <sub>5</sub>	t <sub>max a</sub>	D <sub>a min</sub>	Carbide grades				
							MG12	TN35	TI25	TF45	TH35
RA110.2030.3.0	.118	.008	.059	1.969	.787	.787		▲	▲		▲
RA110.2030.5.0							▲	▲		▲	
RA110.5030.3.0	.118	.008	.059	1.969	.787	1.969			▲		
RA110.5030.5.0								▲			
							P	•	•		•
							M	•	•		•
							K	•	•		•
							N	•	•		•
							S	•	•		•
							H				

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

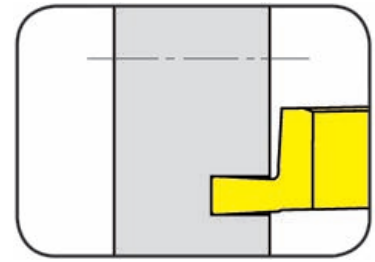
Dimensions in inch

Face grooving with full width of the full depth only possible between D<sub>amin</sub> 20 - 50 mm.

## INDEXABLE INSERT Type

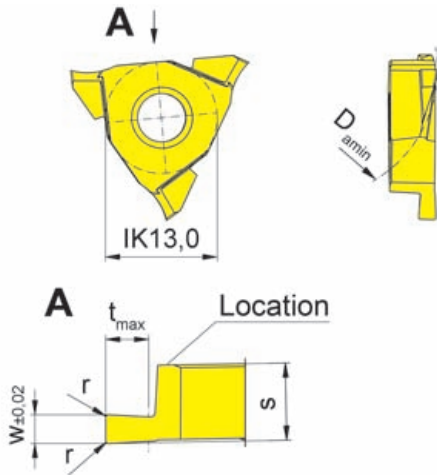
# A315

from outer groove $\varnothing$	.787"
Depth of groove up to	.118"
Width of groove	.059 - .118"



for use with Toolholder

Type BKT356



R = right hand version shown

Indexability length  
± 0,02 mm

Part number	w	s	r	t <sub>max</sub>	D <sub>a min</sub>	Size	Carbide grades		
							T125	TA45	TH35
RA315.2015.02R	.059			.079	.787			Δ	
RA315.3020.02R	.079	.213	.008	.118	1.181	05		Δ	
RA315.3030.02R	.118			.118	1.181			Δ	
							P		•
							M		•
							K		•
							N		•
							S		•
							H		

- ▲ on stock Δ 4 weeks
- main recommendation
- alternative recommendation
- uncoated grades
- coated grades
- brazed/Cermet

Dimensions in inch

Carbide grades

## UNCOATED GRADES

MG12 - a universal grade with good wear resistance. Used at low or medium cutting speeds for machining steel, cast iron and non ferrous materials

## COATED GRADES

TN35 - a very popular grade TiN coated used to low or medium cutting speeds. Also recommended for machining stainless steel or exotic alloyed materials

TI25 - a TiCN coated grade with high abrasion resistance. Recommended for machining steel and non ferrous materials at medium cutting speeds

TF45 - a TiAlN coated grade. This coating has a very high temperature stability and high hardness and is only used for special applications.

TH35 - new standard grade - extreme Oxidation resistance with high hardness and very good coefficient of friction.

AS45 - new standard grade and first choice for most machining operations. This grade offers extreme Oxidation resistance and high hardness providing good wear resistance.

## Nominal cutting speeds with HORN grades

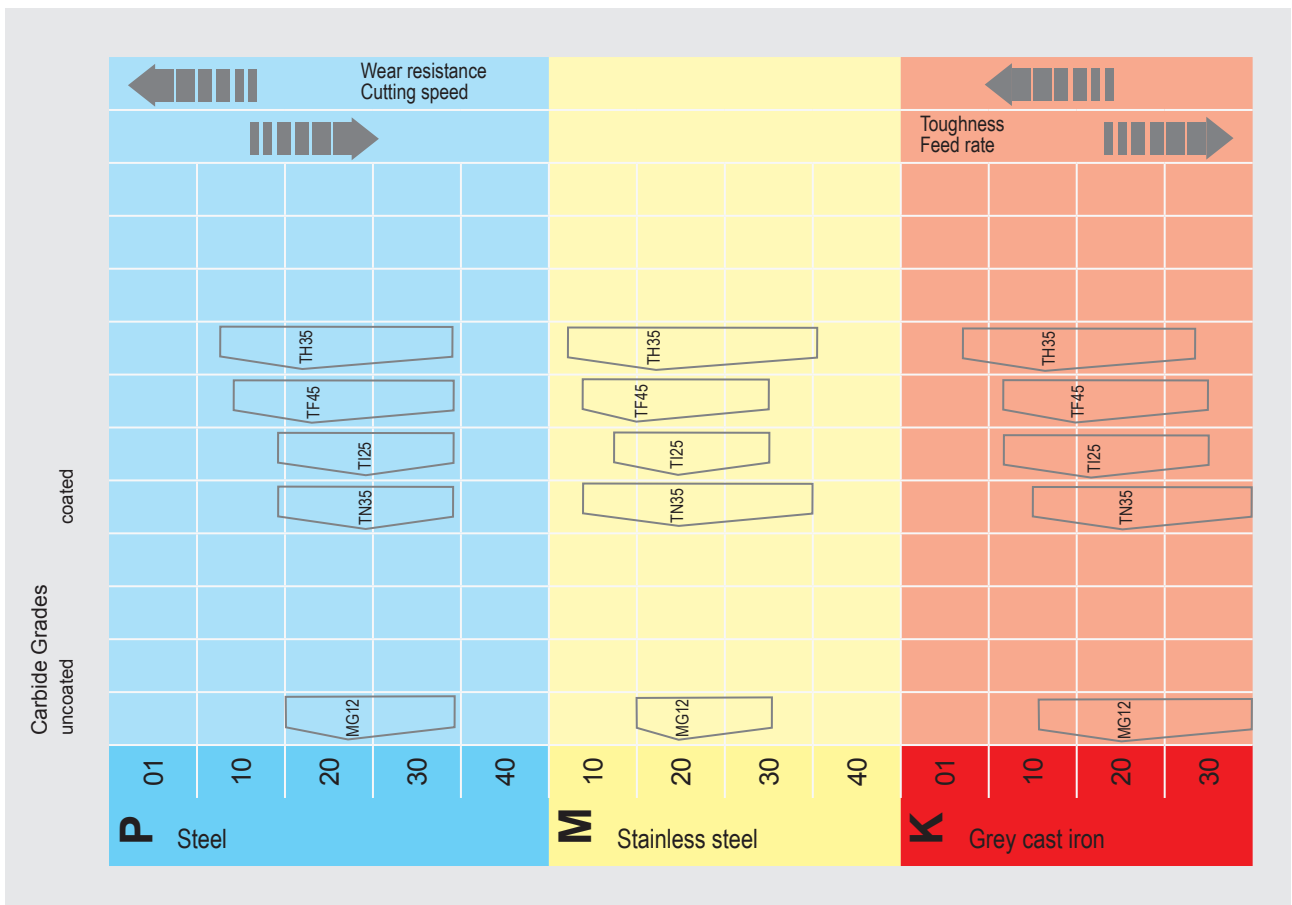
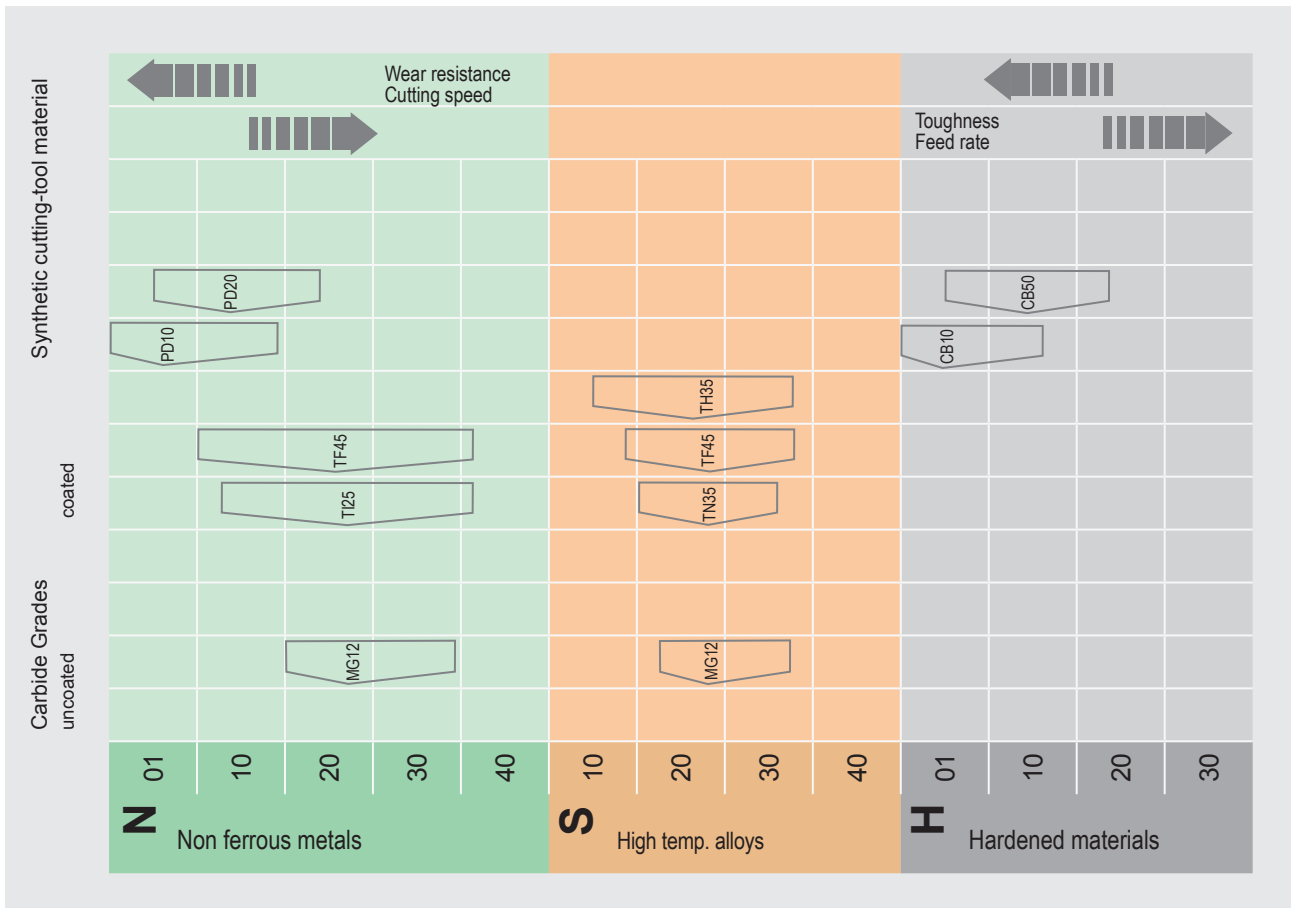
			Feed rate f mm/U						
			Supermini®			Mini			
				0,01 - 0,02		0,01 - 0,03			
				0,02 - 0,05		0,03 - 0,10			
				0,02 - 0,05		0,01 - 0,08			
ISO	Material	Hardness Brinell HB	Cutting speed *v <sub>c</sub> m/min						
			MG12	TN35	TI25	TF45	TH35	CB10/50	
<b>P</b>	Carbon steel	C < 0,4%	125						
		C > 0,4% < 0,6 %	150	14-110	14-180	14-180	14-180	14-180	
		C > 0,4% < 0,6 %	200						
	low alloyed steel	annealed	180						
		quenched	275	16-90	16-150	16-150		16-180	
		quenched	300						
	high alloyed steel	annealed	200		19-90	19-90		19-120	
		quenched	325						
	Cast steel	unalloyed	180						
		low alloye-dgiertLng2>	220	19-110	19-180	19-180		19-180	
high alloyed		225							
<b>M</b>	Stainless steel	martensitic, ferritic	200		19-90	19-90		19-90	
		austenitic	180		16-80			16-80	
<b>K</b>	Grey cast iron	180-260	16-90	16-150	16-150	16-150	16-150		
	Spheroidal graphite cast iron	180-260	16-90	16-130	16-130	16-150	16-150		
	Malleable cast iron	130-230		16-130	16-130	16-150	16-150		
<b>N</b>	Al-alloys		14-220	16-600	16-600		16-600		
	Copper and brass alloys		14-220	14-700	14-700		14-700		
<b>S</b>	Heat resistant alloy	NiFe			18-75	18-75	18-75		
		NiCo			18-40	18-40	18-40		
<b>H</b>	hardened material	> 54 HRC						20-140	

V<sub>c</sub> is depending on the tool diameter and therefore of the maximum numbers of revolutions of the machine.

Material			Indexable Insert Type 315								Feed rate f mm/U	
			Hardness Brinell (HB)	Cutting speed v <sub>c</sub> (m/min)								
				K10	MG12	P20	T122 TN32	T125 TN35	TF45 TH35	TF46		AS62
<b>P</b>	Carbon steel	0,2% C	140			180-120	200-160	180-130	100-80	280-180	250-180	0,03 - 0,15
		0,4% C	180			160-110	180-150	170-120	90-60	250-140	230-170	
		0,6% C	200			140-90	180-140	150-100		230-120	220-160	
	Alloyed steel	annealed	180			140-100	180-140	160-110	90-60	230-100	200-150	
		quenched	280			110-90	160-110	130-90		190-90	160-110	
		quenched	350			80	140-90	100-70		170-80	130-100	
	high alloyed steel(>5%)	annealed	200			120-80	120-90			200-140	180-120	
		hardened	-									
	Cast steel	unalloyed	180				130-100				200-150	
		alloyed	220				110-80				160-100	
<b>M</b>	Stainless steel	martensitic, ferritic	200		90-70		130-100	120-60		180-120	170-120	0,03 - 0,10
		austenitic	180		90-60			100-70		140-110		
<b>K</b>	Grey cast iron	low tensile strength	180	90-60	80-60				130-90	180-120	180-120	0,03 - 0,20
		high tensile strength	250	90-60	80-60				90-70	140-100	140-100	
	Spheroidal graphite cast iron	ferritic	160				90-70	90-70	120-80	170-90	170-90	0,03 - 0,15
		perlitic	250				70-60	70-60	110-80	180-80	150-80	
	Malleable cast iron	ferritic	125		100-80		140-120	100-70		120-100	190-140	
		perlitic	225		70-50		100-80	80-60		90-80	140-100	
<b>N</b>	Al-alloys	not heat treatable	30-80	1000-600	800-400			1000-600				0,03 - 0,15
		heat treatable	80-120	400-220	300-200			400-220				
	Al-cast-alloy	not heat treatable	80	1000-600	800-400			1000-600				
		heat treatable	100	600-300	400-250			600-300				
	Copper-alloys	not heat treatable	90	200-120			200-150	210-130		200-150		
		heat treatable	100	150-90			150-60	160-90		150-110		
<b>S</b>	Heat resistant alloy (Fe)	annealed	200		50-30			50-30				0,03 - 0,08
		hardened	275		40-20			40-20				
	Heat resistant alloy (Ni, Co)	annealed	250		30-20			30-20				
		hardened	350		20-10			20-10				



# CHOICE OF CARBIDE GRADES



## HORN - THE LEADERS IN GROOVING TECHNOLOGY



### FACE GROOVING

### INDEXABLE INSERTS TYPE 312

The economic way to produce axial o-ring grooves

**HORN - INTELLIGENT TOOL DESIGN AT WORK.**

For further information, please contact HORN USA.

# HORN-System DR

License **URMA**

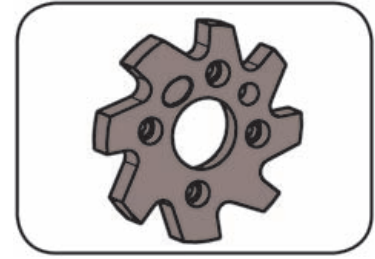


**Modular Tooling System**  
**Ø 11.9 - 140.6 mm**

## INSERT type

**DR**

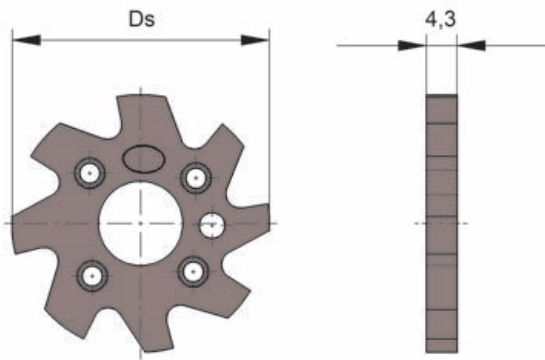
straight fluted

Cutting edge  $\varnothing$  Ds

11.900 - 140.600 mm

for through hole and blind hole

for use with Reaming insert holder

type MDR  
ADR

Right hand version shown

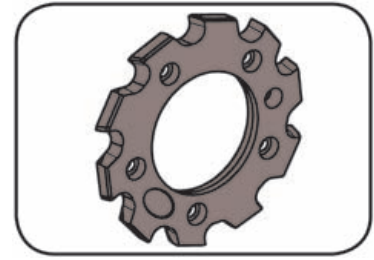
Part number Example:	Ds	Size	Z	recommended carbide grades								recommended cermet grades						
				MG10	HL3H	AC4H	AC5H	AN2H	AN4H	AD3H	DT2H	H20	HL38	AD48	AC48	AC58	HL38	DT28
DR.016...Straight	11.900 - 15.600	016	6	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.019...Straight	15.601 - 18.600	019	6	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.024...Straight	18.601 - 23.600	024	6	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.029...Straight	23.601 - 28.600	029	8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.036...Straight	28.601 - 35.600	036	8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.044...Straight	35.601 - 43.600	044	8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.052...Straight	43.601 - 51.600	052	10	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.061...Straight	51.601 - 60.600	061	10	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.081...Straight	60.601 - 80.600	081	12	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.101...Straight	80.601 - 100.600	101	12	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.121...Straight	100.601 - 120.600	121	12	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.141...Straight	120.601 - 140.600	141	12	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Dimensions in mm - according customers' requirements -  
Contact HORN USA for further information.

## INSERT type

## DR

left helical fluted

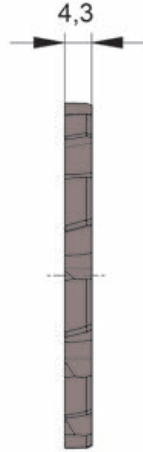
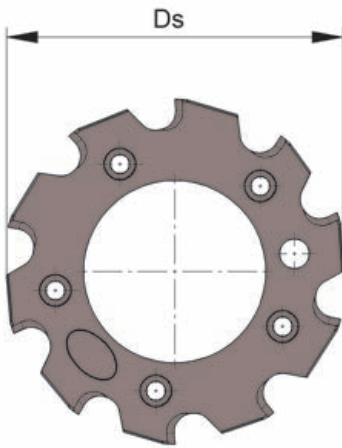


Cutting edge Ø Ds

11.900 - 140.600 mm

Through hole

for use with Reaming insert holder



type MDR  
ADR



Right hand version shown

Part number Example:	Ds	Size	Z	recommended carbide grades								recommended cermet grades						
				MG10	HL3H	AC4H	AC5H	AN2H	AN4H	AD3H	DT2H	H20	HL38	AD48	AC48	AC58	HL38	DT28
DR.016...Helical	11.900 - 15.600	016	6	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.019...Helical	15.601 - 18.600	019	6	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.024...Helical	18.601 - 23.600	024	6	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.029...Helical	23.601 - 28.600	029	8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.036...Helical	28.601 - 35.600	036	8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.044...Helical	35.601 - 43.600	044	8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.052...Helical	43.601 - 51.600	052	10	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.061...Helical	51.601 - 60.600	061	10	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.081...Helical	60.601 - 80.600	081	12	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.101...Helical	80.601 - 100.600	101	12	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.121...Helical	100.601 - 120.600	121	12	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DR.141...Helical	120.601 - 140.600	141	12	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Dimensions in mm - according customers' requirements -  
Contact HORN USA for further information.

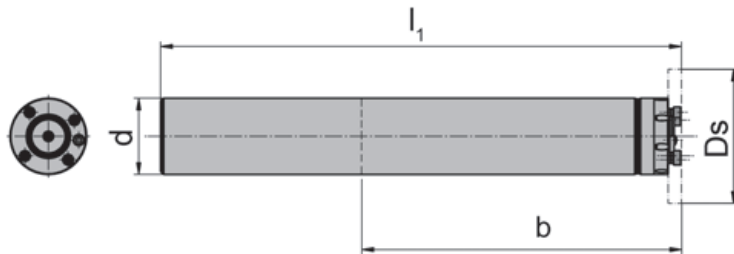
## REAMING INSERT HOLDER Type **MDR**

with through coolant supply

Cutting edge  $\varnothing$

11.900 - 35.600 mm

Material of shank: HM = Carbide ST = Steel



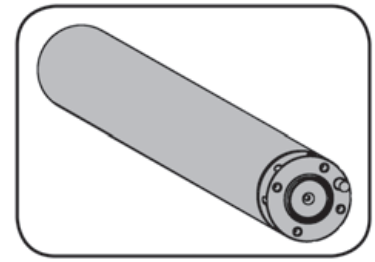
Through coolant



D = Through hole



S = Blind hole



for use with Insert

Type DR

Form A =  
Cylindrical shank DIN 1835-A

Part number	Ds	Ds <sub>max</sub>	l <sub>1</sub>	d	b	Form	Size
MDR.016.ST10.100.A.D/S	11.900	15.600	100	10	60	A	016
MDR.016.HM10.160.A.D/S			160		120		
MDR.016.ST10.160.A.D/S			160		120		
MDR.019.ST12.115.A.D/S	15.601	18.600	115	12	70	A	019
MDR.019.HM12.185.A.D/S			185		140		
MDR.019.ST12.185.A.D/S			185		140		
MDR.024.ST16.128.A.D/S	18.601	23.600	128	16	80	A	024
MDR.024.HM16.208.A.D/S			208		160		
MDR.024.ST16.208.A.D/S			208		160		
MDR.029.ST20.145.A.D/S	23.601	28.600	145	20	95	A	029
MDR.029.HM20.240.A.D/S			240		190		
MDR.029.ST20.240.A.D/S			240		190		
MDR.036.ST25.170.A.D/S	28.601	35.600	170	25	110	A	036
MDR.036.HM25.274.A.D/S			274		214		
MDR.036.ST25.274.A.D/S			274		214		

State D or S version

Further sizes upon request

Dimensions in mm

1 Set of screws, 1 Torx wrench - no separate order required!

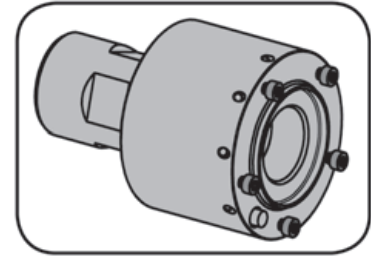
For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Reaming insert holder	Screw
MDR.016-019...	<b>C009000</b>
MDR.024-036...	<b>C009001</b>

## REAMING INSERT HOLDER Type **MDR**

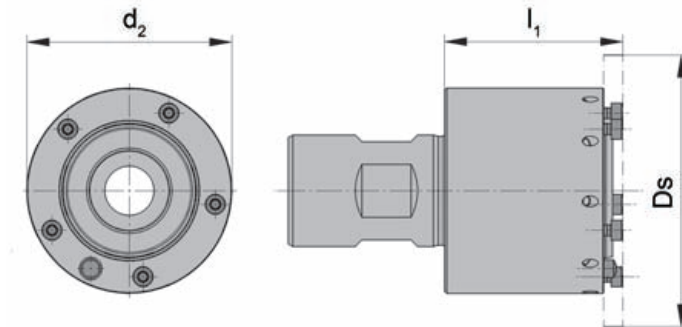
with through coolant supply



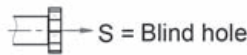
Cutting edge  $\varnothing$  35.601 - 140.600 mm

for use with Insert

Type DR



Through coolant



Form V =  
for use with shank type VDR, allowing  
for "0" runout adjustment.

Part number	Ds	Ds <sub>max</sub>	l <sub>1</sub>	d <sub>2</sub>	Form	Size
<b>MDR.044.32.30.V.D/S</b>	35.601	43.600	30	32	V	044
<b>MDR.052.39.35.V.D/S</b>	43.601	51.600	35	39	V	052
<b>MDR.061.46.40.V.D/S</b>	51.601	60.600	40	46	V	061
<b>MDR.081.56.50.V.D/S</b>	60.601	80.600	50	56	V	081
<b>MDR.101.76.60.V.D/S</b>	80.601	100.600	60	76	V	101
<b>MDR.121.76.60.V.D/S</b>	100.601	120.600	60	76	V	121
<b>MDR.141.76.60.V.D/S</b>	120.601	140.600	60	76	V	141

State D or S version

Further sizes upon request

Dimensions in mm

1 Set of screws, 1 Torx wrench - no separate order required!

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Reaming insert holder	Screw
MDR.044-061...	<b>C009002</b>
MDR.081-141...	<b>C009004</b>

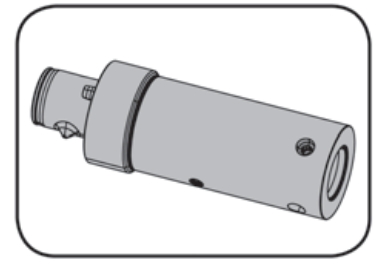
## SHANK Type

## VDR

with integrated compensation mechanism

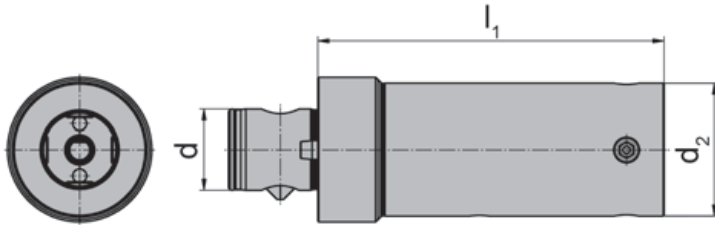
Cutting edge  $\varnothing$ 

35.601 - 60.600 mm



for use with Insert

Type DR



## Form

A = Cylindrical shank DIN 1835-A  
 B = Weldon shank DIN 1835-B  
 E = Whistle-Notch DIN 1835-E  
 BM = URMA Beta Modul (ABS)

Part number	$D_s$	$D_{s_{max}}$	$l_1$	$d_2$	$d$	Form	Size
VDR.044.32.55.20.A VDR.044.32.55.20.B VDR.044.32.55.20.E VDR.044.32.55.32.BM	35.601	43.600	55	32	20 20 20 32	A B E BM	044
VDR.044.32.80.20.A VDR.044.32.80.20.B VDR.044.32.80.20.E VDR.044.32.80.32.BM	35.601	43.600	80	32	20 20 20 32	A B E BM	044
VDR.052.39.60.25.A VDR.052.39.60.25.B VDR.052.39.60.25.E VDR.052.39.60.40.BM	43.601	51.600	60	39	25 25 25 40	A B E BM	052
VDR.052.39.100.25.A VDR.052.39.100.25.B VDR.052.39.100.25.E VDR.052.39.100.40.BM	43.601	51.600	100	39	25 25 25 40	A B E BM	052
VDR.061.46.70.32.A VDR.061.46.70.32.B VDR.061.46.70.32.E VDR.061.46.70.50.BM	51.601	60.600	70	46	32 32 32 50	A B E BM	061
VDR.061.46.120.32.A VDR.061.46.120.32.B VDR.061.46.120.32.E VDR.061.46.120.50.BM	51.601	60.600	120	46	32 32 32 50	A B E BM	061

Further sizes upon request

Dimensions in mm

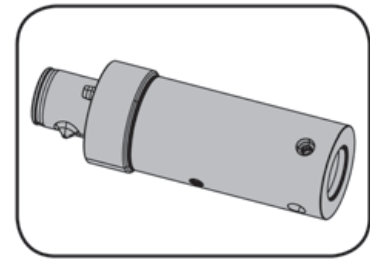
Spare parts see page R7



## SHANK Type

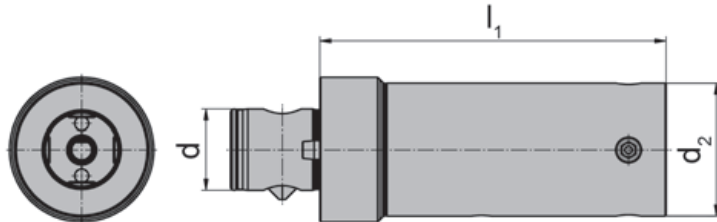
## VDR

with integrated compensation mechanism



Cutting edge Ø

60.601 - 140.600 mm



for use with Insert

Type DR

### Form

- A = Cylindrical shank DIN 1835-A
- B = Weldon shank DIN 1835-B
- E = Whistle-Notch DIN 1835-E
- BM = URMA Beta Modul (ABS)

Part number	Ds	Ds <sub>max</sub>	l <sub>1</sub>	d <sub>2</sub>	d	Form	Size
VDR.081.56.80.40.A	60.601	80.600	80	56	40	A	081
VDR.081.56.80.40.B					40	B	
VDR.081.56.80.40.E					40	E	
VDR.081.56.80.50.BM					50	BM	
VDR.081.56.140.40.A	60.601	80.600	140	56	40	A	081
VDR.081.56.140.40.B					40	B	
VDR.081.56.140.40.E					40	E	
VDR.081.56.140.50.BM					50	BM	
VDR.101.76.100.40.A	80.601	140.600	100	76	40	A	101 / 141
VDR.101.76.100.40.B					40	B	
VDR.101.76.100.40.E					40	E	
VDR.101.76.100.63.BM					63	BM	
VDR.101.76.160.40.A	80.601	140.600	160	76	40	A	101 / 141
VDR.101.76.160.40.B					40	B	
VDR.101.76.160.40.E					40	E	
VDR.101.76.160.63.BM					63	BM	

Further sizes upon request

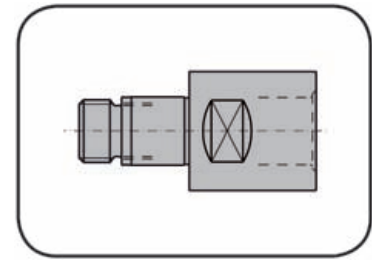
Dimensions in mm

## Spare parts

Extension	Adjustment Screw	Bolt	Locating pin
VDR.044...	C009008	Z003221	Z003223
VDR.052	C009010	Z004021	Z004023
VDR.061	C009010	Z005021	Z005023
VDR.081	C009012	Z005021	Z005023
VDR.101	C009016	Z006321	Z006323

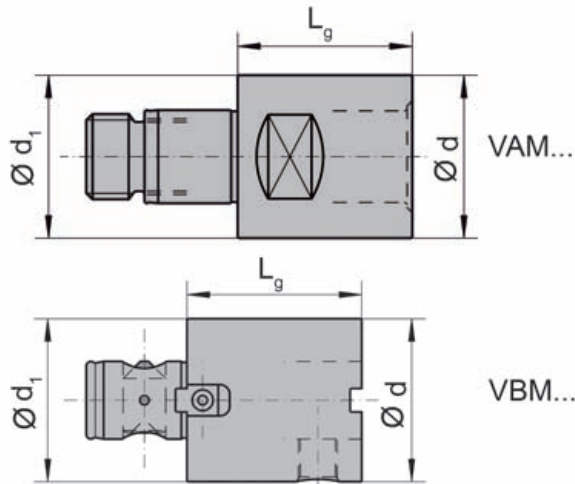
## EXTENSION Type

## VAM/VBM



for alpha- and beta-modules  
Cutting edge  $\emptyset$

Ds 35.601 - 140.600 mm



Part number	alpha-modul	beta-modul	$L_g$	d	$d_1$	Weight	SW
VAM.1818.025	18.5		25	18.5	18.5	0.1kg	17
VAM.1818.035			35				
VBM.2525.045		25	45	25.0	25.0	0.2 kg	-
VBM.3232.035		32	35	32.0	32.0	0.2 kg	
VBM.3232.070		32	70	32.0	32.0	0.4 kg	
VBM.4040.045		40	45	42.0	42.0	0.4 kg	
VBM.4040.070		40	70	42.0	42.0	0.7 kg	
VBM.5050.065		50	65	50.0	50.0	1.0 kg	
VBM.5050.100		50	100	50.0	50.0	1.5 kg	
VBM.6363.060		63	60	63.0	63.0	1.3 kg	
VBM.6363.125		63	125	63.0	63.0	2.9 kg	

Further sizes upon request

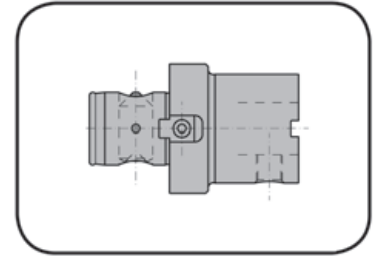
Dimensions in mm

## Spare parts

Extension	Locating pin	Screw	Bolt	Threaded pin	Key
VBM.2525.045	Z002523		Z002521	Z002524	
VBM.3232.035/070	Z003223		Z003221	Z003224	
VBM.4040.045/070	Z004023	C002258	Z004021	Z004024	Z004025
VBM.5050.065/100	Z005023	C002260	Z005021	Z005024	Z005025
VBM.6363.060/125	Z006323	C002205	Z006321	Z006324	Z006325

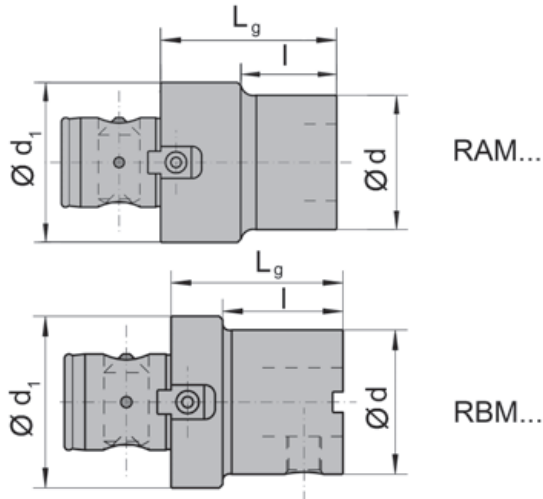
## REDUCER Type

# RAM/RBM



for alpha- and beta-modules  
Cutting edge  $\varnothing$

Ds 35.601 - 140.600 mm



Part number	alpha-modul	beta-modul	$L_g$	l	d	$d_1$	Weight	SW
<b>RAM.2518.040</b>	18.5	25	40	25	18.5	25	0.1kg	17
<b>RBM.3225.040</b>		32 / 25	40	25	25.0	32	0.2 kg	
<b>RBM.4025.040</b>		40 / 25	40	25	25.0	42	0.3 kg	
<b>RBM.4032.040</b>		40 / 32	45	30	32.0	42	0.3 kg	
<b>RBM.5040.050</b>		50 / 40	50	35	42.0	50	0.5 kg	-
<b>RBM.6325.045</b>		63 / 25	45	25	25.0	63	0.7 kg	
<b>RBM.6332.050</b>		63 / 32	50	30	32.0	63	0.9 kg	
<b>RBM.6340.055</b>		63 / 40	55	35	42.0	63	1.1 kg	

Further sizes upon request

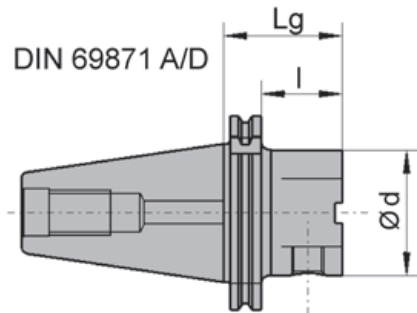
Dimensions in mm

## Spare parts

Reducer	Locating pin	Screw	Bolt	Threaded pin	Key
RAM.2518.040	<b>Z002523</b>		<b>Z002521</b>	<b>Z002524</b>	
RBM.3225.040	<b>Z003223</b>		<b>Z003221</b>	<b>Z003224</b>	
RBM.4025.040	<b>Z002523</b>	<b>C002258</b>	<b>Z002521</b>	<b>Z004024</b>	<b>Z004025</b>
RBM.4032.040	<b>Z003223</b>	<b>C002258</b>	<b>Z004021</b>	<b>Z004024</b>	<b>Z004025</b>
RBM.5040.050	<b>Z004023</b>	<b>C002258</b>	<b>Z004021</b>	<b>Z004024</b>	<b>Z004025</b>
RBM.6325.045	<b>Z006323</b>	<b>C002205</b>	<b>Z006321</b>	<b>Z006324</b>	<b>Z006325</b>
RBM.6332.050	<b>Z006323</b>	<b>C002205</b>	<b>Z006321</b>	<b>Z003224</b>	<b>Z006325</b>
RBM.6340.055	<b>Z004023</b>	<b>C002205</b>	<b>Z004021</b>	<b>Z004024</b>	<b>Z004025</b>

**SYSTEM HOLDER URMA Type BD**


Beta Module 25/32/40/50/63/80/100  
Cutting edge  $\varnothing$  Ds 35.601 - 140.600 mm



CAT compatible / Metric retention threads

Part number	beta-modul	$L_g$	l	d	Weight	System
<b>BD1040A25050</b>	25	50	31	25	0.8 kg	SK40
<b>BD1040A32050</b>	32	50	31	35	0.9 kg	
<b>BD1040A40035</b>	40	35	16	42	0.9 kg	
<b>BD1040A40050</b>	40	50	31	42	1.1 kg	
<b>BD1040A50050</b>	50	50	31	50	1.2 kg	
<b>BD1040A63065</b>	63	65	46	63	1.5 kg	
<b>BD1040A63090</b>	63	90	70	63	2.0 kg	
<b>BD1050A25060</b>	25	60	41	25	2.8 kg	SK50
<b>BD1050A32060</b>	32	60	41	32	2.9 kg	
<b>BD1050A40060</b>	40	60	41	42	3.0 kg	
<b>BD1050A50060</b>	50	60	41	50	3.2 kg	
<b>BD1050A63060</b>	63	60	41	63	3.3 kg	
<b>BD1050A80070</b>	80	70	51	50	4.0 kg	
<b>BD1050A100115</b>	100	115	96	50	6.9 kg	

Dimensions in mm

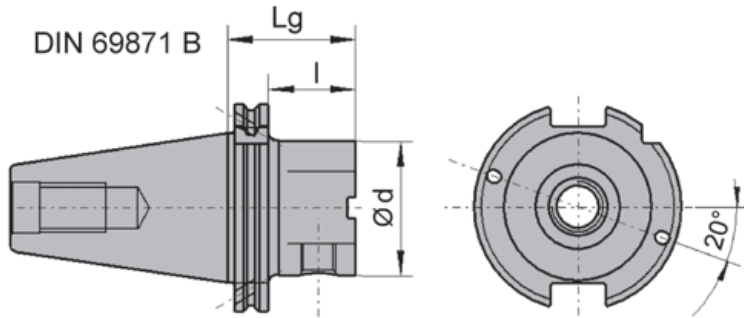
**Spare parts**

System Holder URMA	Threaded pin
BD10...A25...	<b>Z002524</b>
BD10...A32...	<b>Z003224</b>
BD10...A40...	<b>Z004024</b>
BD10...A50...	<b>Z005024</b>
BD10...A63...	<b>Z006324</b>
BD1050A100115	<b>Z0010024</b>
BD1050A80070	<b>Z008024</b>

## SYSTEM HOLDER URMA Type **BD**



Beta Module 25/32/40/50/63/80/100  
Cutting edge  $\emptyset$  Ds 35.601 - 140.600 mm



CAT compatible / Metric retention threads

Part number	beta-modul	$L_g$	$l$	$d$	Weight	System
<b>BD1040B25050</b>	25	50	31	25	0.8 kg	SK40
<b>BD1040B32050</b>	32	50	31	35	0.9 kg	
<b>BD1040B40035</b>	40	35	16	42	0.9 kg	
<b>BD1040B40050</b>	40	50	31	42	1.1 kg	
<b>BD1040B50050</b>	50	50	31	50	1.2 kg	
<b>BD1040B63065</b>	63	65	46	63	1.5 kg	
<b>BD1040B63090</b>	63	90	70	63	2.0 kg	
<b>BD1050B25060</b>	25	60	41	25	2.8 kg	SK50
<b>BD1050B32060</b>	32	60	41	32	2.9 kg	
<b>BD1050B40060</b>	40	60	41	42	3.0 kg	
<b>BD1050B50060</b>	50	60	41	50	3.2 kg	
<b>BD1050B63060</b>	63	60	41	63	3.3 kg	
<b>BD1050B80070</b>	80	70	51	80	4.0 kg	
<b>BD1050B100115</b>	100	115	96	100	6.9 kg	

Dimensions in mm

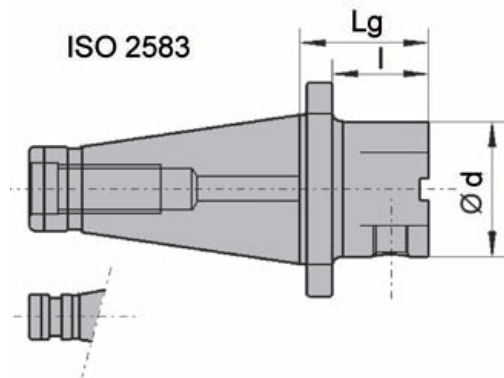
### Spare parts

System Holder URMA	Threaded pin
BD10...B25...	<b>Z002524</b>
BD10...B32...	<b>Z003224</b>
BD10...B40...	<b>Z004024</b>
BD10...B50...	<b>Z005024</b>
BD10...B63...	<b>Z006324</b>
BD1050B100115	<b>Z0010024</b>
BD1050B80070	<b>Z008024</b>

**SYSTEM HOLDER URMA Type BI**


Beta Module 40/63/100  
Cutting edge  $\emptyset$

Ds 35.601 - 140.600 mm



Part number	beta-modul	$L_g$	l	d	Weight	System
BI104040035	40	35	23	42	0.7 kg	SK40
BI104040050	40	50	38	42	1.1 kg	
BI104063070	63	70	58	63	1.8 kg	
BI105040060	40	60	45	42	3.0 kg	SK50
BI105063060	63	60	45	63	3.5 kg	
BI1050100100	100	100	85	100	6.8 kg	

Dimensions in mm

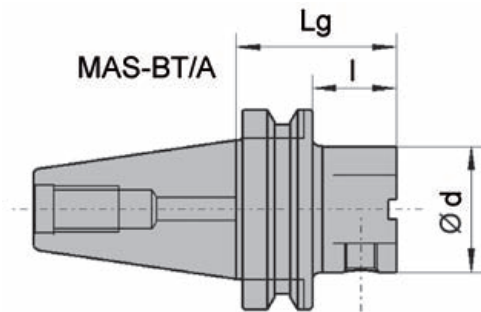
**Spare parts**

System Holder URMA	Threaded pin
BI10...40...	<b>Z004024</b>
BI10...63...	<b>Z006324</b>
BI1050100100	<b>Z0010024</b>

## SYSTEM HOLDER URMA Type **BT**



Beta Module 25/32/40/50/63/80/100  
Cutting edge  $\emptyset$  Ds 35.601 - 140.600 mm



Part number	beta-modul	$L_g$	$l$	$d$	Weight	System
BT1040A25060	25	60	33	25	0.8 kg	SK40
BT1040A32060	32	60	33	32	0.9 kg	
BT1040A40028	40	28	1	42	0.9 kg	
BT1040A40060	40	60	33	42	1.2 kg	
BT1040A50060	50	60	33	50	1.3 kg	
BT1040A63055	63	55	28	63	1.4 kg	
BT1040A63070	63	70	43	63	1.7 kg	SK50
BT1050A32070	32	70	32	32	3.7 kg	
BT1050A40070	40	70	32	42	3.9 kg	
BT1050A50070	50	70	32	50	4.1 kg	
BT1050A63080	63	80	42	63	4.3 kg	
BT1050A80100	80	100	62	80	5.5 kg	
BT1050A100100	100	110	72	100	7.0 kg	

Dimensions in mm

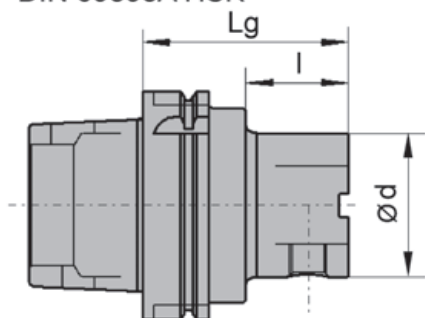
### Spare parts

System Holder URMA	Threaded pin
BT1040A25060	Z002524
BT10...A32...	Z003224
BT10...A40...	Z004024
BT10...A50...	Z005024
BT10...A63...	Z006324
BT1050A100100	Z0010024
BT1050A80100	Z008024

**SYSTEM HOLDER URMA Type BH**


Beta Module 25/32/40/50/63/80/100  
Cutting edge  $\emptyset$  Ds 35.601 - 140.600 mm

DIN 69893A HSK



Part number	beta-modul	$L_g$	$l$	$d$	Weight	System
<b>BH1050A25055</b>	25	55	29	25	0.5 kg	HSK50
<b>BH1050A32060</b>	32	60	34	32	0.6 kg	
<b>BH1050A40065</b>	40	65	39	42	0.7 kg	
<b>BH1063A25055</b>	25	55	29	25	0.9 kg	HSK63
<b>BH1063A32060</b>	32	60	34	32	1.0 kg	
<b>BH1063A40065</b>	40	65	23	42	1.1 kg	
<b>BH1063A50070</b>	50	70	44	50	1.5 kg	
<b>BH1063A63080</b>	63	80	38	63	1.5 kg	
<b>BH10100A40080</b>	40	80	35	42	2.3 kg	HSK100
<b>BH10100A50080</b>	50	80	35	50	2.5 kg	
<b>BH10100A63080</b>	63	80	35	63	2.8 kg	
<b>BH10100A80090</b>	80	90	45	80	3.8 kg	
<b>BH10100A100100</b>	100	100	55	100	4.0 kg	

**Spare parts**

Dimensions in mm

System Holder URMA	Threaded pin	Coolant tube
BH10100A100100	<b>Z0010024</b>	<b>H0010001</b>
BH10100A40080	<b>Z004024</b>	<b>H0010001</b>
BH10100A50080	<b>Z005024</b>	<b>H0010001</b>
BH10100A63080	<b>Z006324</b>	<b>H0010001</b>
BH10100A80090	<b>Z008024</b>	<b>H0010001</b>
BH1050A25055	<b>Z002524</b>	<b>H005001</b>
BH1050A32060	<b>Z003224</b>	<b>H005001</b>
BH1050A40065	<b>Z004024</b>	<b>H005001</b>
BH1063A25055	<b>Z002524</b>	<b>H006301</b>
BH1063A32060	<b>Z003224</b>	<b>H006301</b>
BH1063A40065	<b>Z004024</b>	<b>H006301</b>
BH1063A50070	<b>Z005024</b>	<b>H006301</b>
BH1063A63080	<b>Z006324</b>	<b>H006301</b>

**Ordering note:**

Coolant tube is not included - separate order required!



## HIGH-PERFORMANCE REAMING



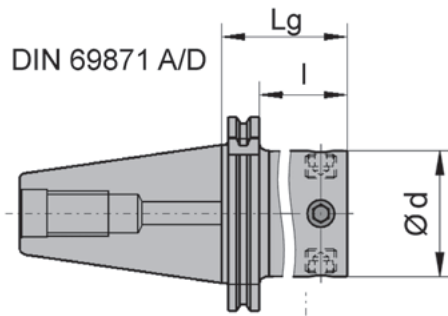
DIRECT MOUNTING URMA Type

**VDR**

with integrated compensation mechanism

Cutting edge  $\varnothing$ 

35.601-100.600 mm



CAT compatible / Metric retention threads

Part number	l	L <sub>g</sub>	d	Weight	System	Size
VDR.044.065.40AD	46	65	32	1.1 kg	SK40	044
VDR.052.065.40AD	46	65	39	1.2 kg		052
VDR.061.075.40AD	56	75	46	1.4 kg		061
VDR.081.080.40AD	61	80	56	1.6 kg		081
VDR.101.095.40AD	76	95	76	2.2 kg		101
VDR.044.065.50AD	46	65	32	2.9 kg	SK50	044
VDR.052.065.50AD	46	65	39	3.0 kg		052
VDR.061.075.50AD	56	75	46	3.2 kg		061
VDR.081.085.50AD	66	85	56	3.6 kg		081
VDR.101.095.50AD	76	95	76	4.6 kg		101

Further sizes upon request

Dimensions in mm

## Spare parts

Extension	Adjustment Screw
VDR.044...	<b>C009008</b>
VDR.052	<b>C009010</b>
VDR.061	<b>C009010</b>
VDR.081	<b>C009012</b>
VDR.101	<b>C009016</b>

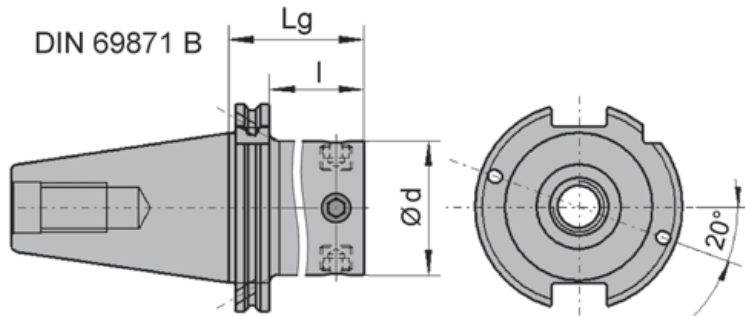
## DIRECT MOUNTING URMA Type

**VDR**

with integrated compensation mechanism

Cutting edge  $\varnothing$ 

35.601-100.600 mm



CAT compatible / Metric retention threads

Part number	l	L <sub>g</sub>	d	Weight	System	Size
VDR.044.065.40BD	46	65	32	1.1 kg	SK40	044
VDR.052.065.40BD	46	65	39	1.2 kg		052
VDR.061.075.40BD	56	75	46	1.4 kg		061
VDR.081.080.40BD	61	80	56	1.6 kg		081
VDR.101.095.40BD	76	95	76	2.2 kg		101
VDR.044.065.50BD	46	65	32	2.9 kg	SK50	044
VDR.052.065.50BD	46	65	39	3.0 kg		052
VDR.061.075.50BD	56	75	46	3.2 kg		061
VDR.081.085.50BD	66	85	56	3.6 kg		081
VDR.101.095.50BD	76	95	76	4.6 kg		101

Further sizes upon request

Dimensions in mm

Extension	Adjustment Screw
VDR.044...	<b>C009008</b>
VDR.052	<b>C009010</b>
VDR.061	<b>C009010</b>
VDR.081	<b>C009012</b>
VDR.101	<b>C009016</b>

## DIRECT MOUNTING URMA Type

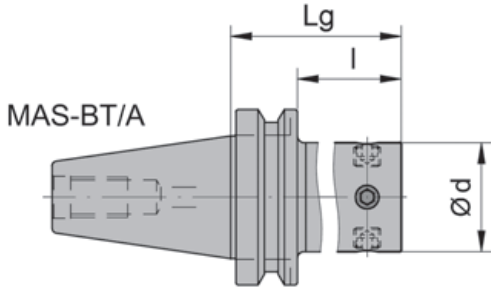
# VDR

with integrated compensation mechanism



Cutting edge Ø

35.601-100.600 mm



Part number	l	L <sub>g</sub>	d	Weight	System	Size
VDR.044.060.40BT	33	60	32	1.1 kg	SK40	044
VDR.052.065.40BT	38	65	39	1.3 kg		052
VDR.061.070.40BT	43	70	46	1.4 kg		061
VDR.081.080.40BT	53	80	56	1.7 kg		081
VDR.101.095.40BT	-	95	76	2.5 kg		101
VDR.044.065.50BT	27	65	32	3.7 kg	SK50	044
VDR.052.065.50BT	27	65	39	3.8 kg		052
VDR.061.075.50BT	37	75	46	4.0 kg		061
VDR.081.085.50BT	47	85	56	4.3 kg		081
VDR.101.095.50BT	57	95	76	5.1 kg		101

Further sizes upon request

Dimensions in mm

Extension	Adjustment Screw
VDR.044...	<b>C009008</b>
VDR.052	<b>C009010</b>
VDR.061	<b>C009010</b>
VDR.081	<b>C009012</b>
VDR.101	<b>C009016</b>

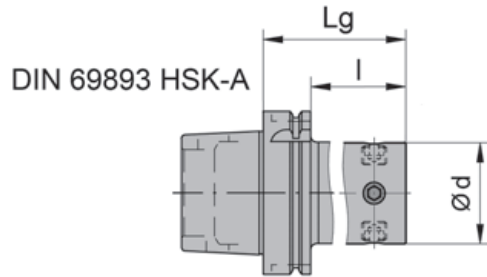
**DIRECT MOUNTING URMA Type VDR**

with integrated compensation mechanism



Cutting edge Ø

35.601-100.600 mm



Part number	l	L <sub>g</sub>	d	Weight	System	Size
<b>VDR.044.085.A063</b>	59	85	32	1.0 kg	HSK63	044
<b>VDR.052.090.A063</b>	64	90	39	1.2 kg		052
<b>VDR.061.100.A063</b>	74	100	46	1.5 kg		061
<b>VDR.081.105.A063</b>	79	105	56	1.8 kg		081
<b>VDR.101.120.A063</b>	94	120	76	2.4 kg		101
<b>VDR.044.090.A100</b>	61	90	32	2.3 kg	HSK100	044
<b>VDR.052.095.A100</b>	66	95	39	2.6 kg		052
<b>VDR.061.100.A100</b>	71	100	46	2.8 kg		061
<b>VDR.081.120.A100</b>	91	120	56	3.5 kg		081
<b>VDR.101.130.A100</b>	101	130	76	5.0 kg		101

Further sizes upon request

Dimensions in mm

Extension	Adjustment Screw	Coolant tube	Coolant tube
VDR.044...	<b>C009008</b>	<b>H006301</b>	<b>H0010001</b>
VDR.052	<b>C009010</b>	<b>H006301</b>	<b>H0010001</b>
VDR.061	<b>C009010</b>	<b>H006301</b>	<b>H0010001</b>
VDR.081	<b>C009012</b>	<b>H006301</b>	<b>H0010001</b>
VDR.101	<b>C009016</b>	<b>H006301</b>	<b>H0010001</b>

# ADJUSTABLE HYDRAULIC EXPANSION TOOLHOLDER

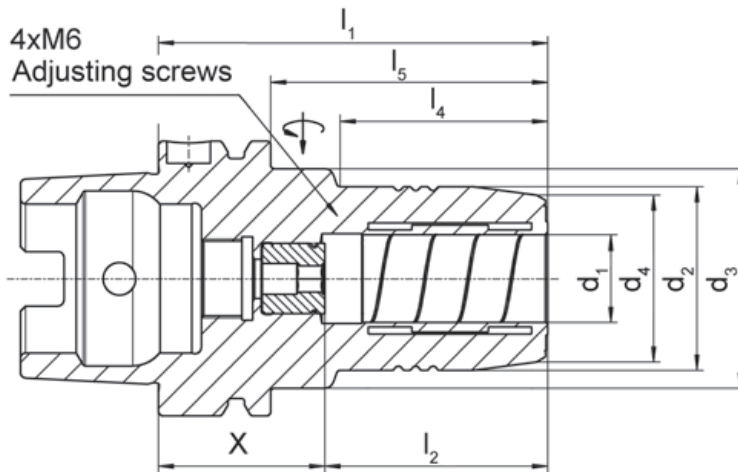


R

SYSTEM HOLDER Type

## DRHD

Adjustable run-out, with axial length adjustment, for automatic tool change



HSK A DIN69882-7

Part number	$l_1$	$l_2$	$l_3$	$l_4$	$l_5$	X	$d_1$	$d_2$	$d_3$	$d_4$	Weight	System
DRHD.12.A063	85	46	40	59	39	12	32	50	28	1.1 kg	HSK-A 63	
DRHD.20.A063	90	51	48	64	39	20	42	50	38	1.3 kg		
DRHD.32.A063	125	61	63	99	64	32	64	75	60	2.7 kg		
DRHD.12.A100	95	46	47	66	49	12	32	50	28	2.6 kg	HSK-A 100	
DRHD.20.A100	105	51	59	76	54	20	42	50	38	2.8 kg		
DRHD.32.A100	110	61	62	81	49	32	64	75	60	3.8 kg		

Dimensions in mm

### Ordering note:

Coolant tube is not included - separate order required!

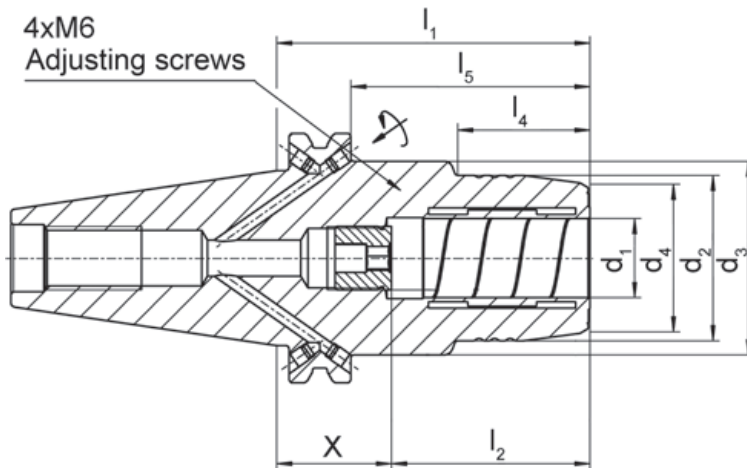
### Spare parts

System Holder	Screw	TORX PLUS® Wrench	Coolant tube
DRHD....A063	6.075T15P	T15PQ	H006301
DRHD....A100	6.075T15P	T15PQ	H0010001

SYSTEM HOLDER Type

## DRHD

Adjustable run-out, with axial length adjustment, for automatic tool change



SK DIN69871 AD/B

Part number	$l_1$	$l_2$	$l_3$	$l_4$	$l_5$	X	$d_1$	$d_2$	$d_3$	$d_4$	Weight	System
DRHD.12.040B	80.5	46	31.5	61.5	29.5	34.5	12	32	49.5	28	1.4 kg	SK 40
DRHD.20.040B		51	34.0			20	42	49.5	38	1.4 kg		
DRHD.32.040B		61	25.5			32	63	80.0	60	2.0 kg		
DRHD.12.050B	80.5	Upon request				12	Upon request				3.3 kg	SK 50
DRHD.20.050B		51	34.0	61.5	29.5	20	42	49.5	38			
DRHD.32.050B		Upon request				32	Upon request					

Dimensions in mm

### Spare parts

System Holder	Screw	TORX PLUS® Wrench
DRHD....	6.075T15P	T15PQ

# ADJUSTABLE HYDRAULIC EXPANSION TOOLHOLDER

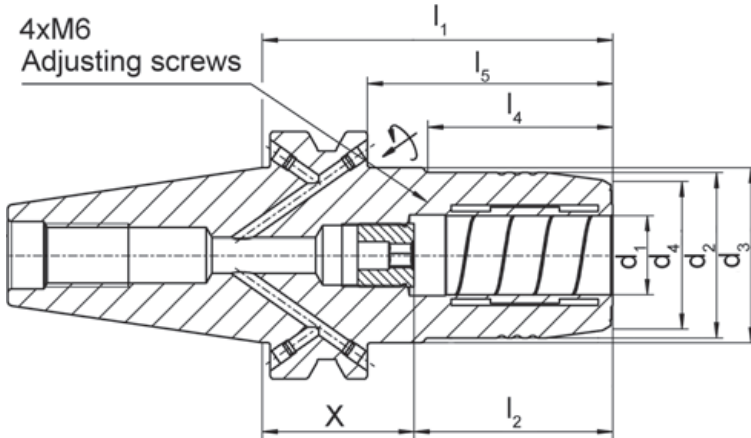


R

SYSTEM HOLDER Type

## DRHD

Adjustable run-out, with axial length adjustment, for automatic tool change



JIS-BT JIS B 6339

Part number	$l_1$	$l_2$	$l_4$	$l_5$	X	$d_1$	$d_2$	$d_3$	$d_4$	Weight	System					
DRHD.12.BT40	90	46	44.5	63	44	12	32	44.5	28	1.4 kg	JIS-BT 40					
DRHD.20.BT40		51	47.5		39	20	42		38	1.5 kg						
DRHD.12.BT50	90	46	34.0	52	44	12	32	44.5	28	4.0 kg	JIS-BT 50					
DRHD.20.BT50		51	34.0		39							20	42	44.5	38	4.0 kg
DRHD.32.BT50		Upon request														

Dimensions in mm

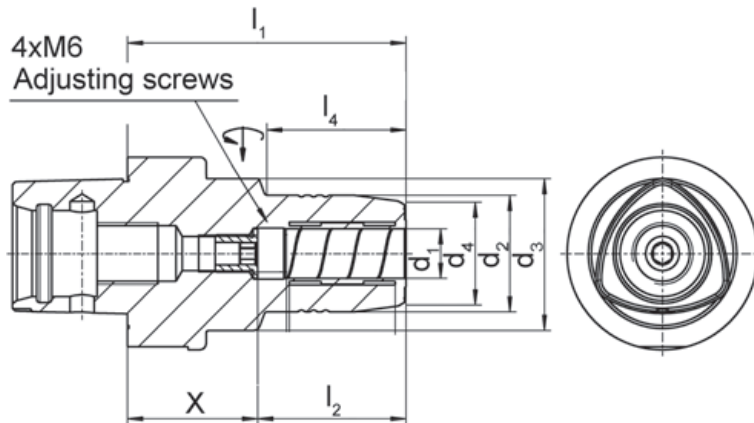
### Spare parts

System Holder	Screw	TORX PLUS® Wrench
DRHD....	6.075T15P	T15PQ

SYSTEM HOLDER Type

## DRHD

Adjustable run-out, with axial length adjustment, for automatic tool change



HORN Polygon shank  
according to ISO 26623

Part number	$l_1$	$l_2$	$l_4$	X	$d_1$	$d_2$	$d_3$	$d_4$	Weight	System
DRHD.12.C040	81	46	47	35	12	32.0	32.0	28	0.70 kg	C4
DRHD.20.C040	Upon request				20	Upon request				
DRHD.12.C050	85	46	44	39	12	32.0	32.0	28	0.90 kg	C5
DRHD.20.C050	90	51	52	39	20	42.0	42.0	38	1.05 kg	
DRHD.32.C050	Upon request				32	Upon request				
DRHD.12.C060	87	46	39	41	12	32.0	50.0	28	1.30 kg	C6
DRHD.20.C060	97	51	55	46	20	42.0	42.0	38	1.60 kg	
DRHD.32.C060	110	61	62	49	32	62.5	62.5	59	2.80 kg	

Dimensions in mm

### Spare parts

System Holder	Screw	TORX PLUS® Wrench
DRHD....	<b>6.075T15P</b>	<b>T15PQ</b>



# ADJUSTABLE HYDRAULIC EXPANSION TOOLHOLDER

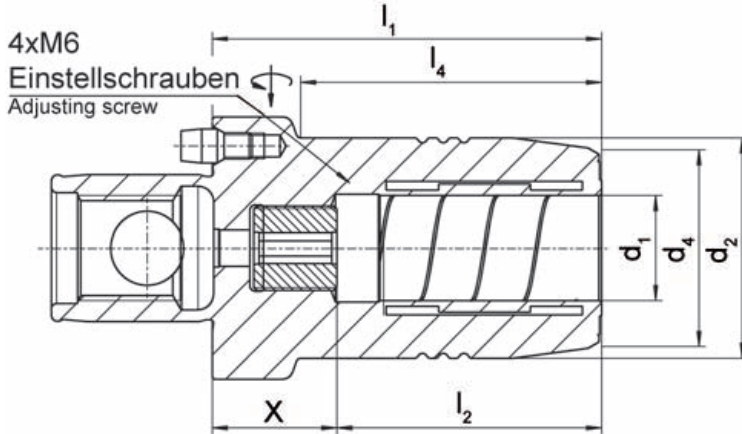


R

SYSTEM HOLDER Type

## DRHD

Adjustable run-out, with axial length adjustment, for automatic tool change



ABS H Beta Modul

Part number	$l_1$	$l_2$	$l_4$	X	$d_1$	$d_2$	$d_4$	Weight	System
DRHD.12.BM50	65	46	45.5	19	12	32	28	0.7 kg	ABS-H 50
DRHD.20.BM50	75	51	58.0	24	20	42	38	0.9 kg	
DRHD.32.BM50	Upon request				32	Upon request			

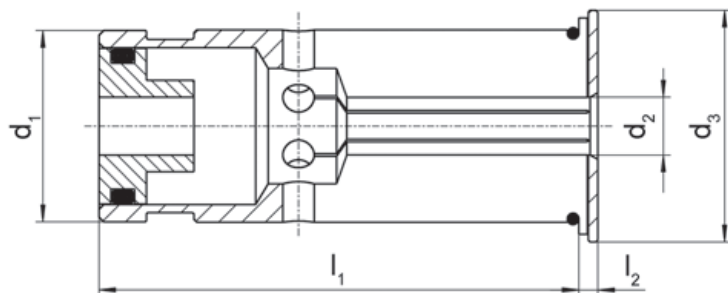
Dimensions in mm

### Spare parts

System Holder	Screw	TORX PLUS® Wrench
DRHD....	6.075T15P	T15PQ

## INTERMEDIATE SLEEVE Type **DRZB**

For internal coolant supply

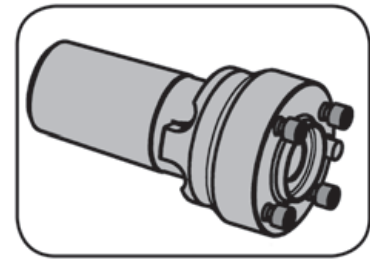


Part number	$l_1$	$l_2$	$d_1$	$d_2$	$d_3$
DRZB1206 DRZB1208	45.0	2	12	6 8	16.5
DRZB2006 DRZB2008 DRZB2010 DRZB2012 DRZB2016	50.5	2	20	6 8 10 12 16	24.0
DRZB3220 DRZB3225	60.5	3	32	20 25	35.5

Dimensions in mm

## ADAPTOR Type

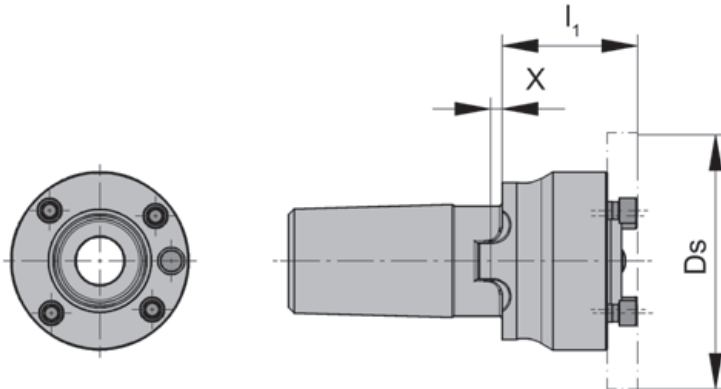
# ADR



Cutting edge Ø .496 - 2.386" (12.600 - 60.600 mm)

for use with Insert

Type DR



Part number	Ds	Ds <sub>max</sub>	X	l <sub>1</sub>	Size
<b>ADR.016.135.01</b>	12.600	15.600	1.5	13.5	016
<b>ADR.019.140.02</b>	15.601	18.600	1.5	14.0	019
<b>ADR.024.162.03</b>	18.601	23.600	1.5	16.2	024
<b>ADR.029.187.04</b>	23.601	28.600	1.5	18.7	029
<b>ADR.036.190.05</b>	28.601	35.600	1.5	19.0	036
<b>ADR.044.190.06</b>	35.601	43.600	2.0	19.0	044
<b>ADR.052.185.06</b>	43.601	51.600	2.0	18.5	052
<b>ADR.061.185.07</b>	51.601	60.600	2.0	18.5	061

Dimensions in mm

1 Set of screws, 1 Torx wrench - no separate order required!

For torque specifications of the screw, please see Technical Instructions.

### Spare parts

Adaptor	Screw
ADR.01...01/02	<b>C009000</b>
ADR.0...03/04/05	<b>C009001</b>
ADR.0...06/07	<b>C009002</b>

The information below explains the proper handling and set up for reaming tools.



Tool adjustments should be performed directly in the machine/spindle to achieve highest precision.



Insert the reamer shaft into the Hydraulic Expansion Toolholder or reducer sleeve until it bottoms out.



Tighten the clamping screw of the Hydraulic Expansion Toolholder with a hex wrench.



Turn the four adjusting screws with the TORX-PLUS® wrench T15PQ until contact, and check the concentricity with a  $\mu\text{m}$  indicator inside the arbor by hand rotating the tool.



Adjust the concentricity by turning the adjustment screws on their axis.



Lay insert on shaft with positioning hole over the pin and tighten the screws lightly.



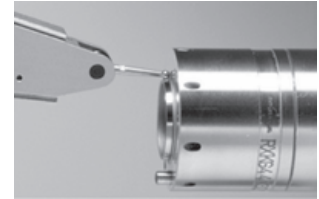
Tighten the screws with a torque setter screw driver in a crisscross pattern.

### Adjusting

To achieve the best reaming results a tool with zero run-out is desirable. In order to compensate for any errors due to run-out from the tool holders or the machine spindle, the following holders are recommended: compensation holders, hydraulic chucks, or shrink fit holders. DR reamers can be measured with different methods:

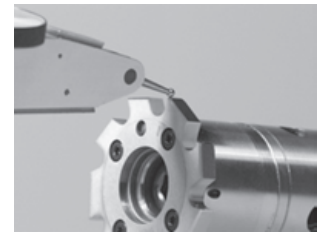
#### Through insert holder short taper

With the reamer disassembled measure directly on the insert holders short taper. High accuracy, simple handling. This is the most accurate and preferred method.



#### Through circular land

Measuring directly behind chamfer angle on external insert diameter. All interface errors are eliminated. This is the preferred method for small diameter inserts.



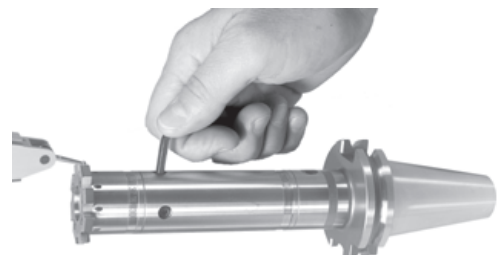
#### On the external diameter of the insert holder

DR tool holders are manufactured very accurately on all diameters. A method easy to handle that offers reasonable measuring results.



#### Shanks with integrated compensation device

These shanks with integrated comp. must be used for reaming diameters bigger than 35 mm



## Handling

Secure central locking screw (see value no 1). Measure run-out and set the cutting edge of the insert to the highest point. Compensate half of the total run-out by using the adjustment screws. Check run-out and repeat the adjustment if necessary. Secure central locking screw according to value 2 in chart below.



Parameter Md	1 Nm	2 Nm
DR 044	35	-
DR 052	35	-
DR 061	55	-
DR 081	60	85
DR 101	60	120
DR 121	60	120
DR 141	60	120

## Changing inserts

1. Don't take the shank out of the taper holder. Remove clamping screws and used insert.
2. Clean short taper of the shank carefully and check for possible damages.
3. Set new insert on position (pay attention to the positioning pin) and slightly tighten the clamping screws.
4. If available, use the torxtorque screw driver to tighten the screws crosswise (see torque chart)



Parameter Md	Nm
DR 016	0.75
DR 019	0.75
DR 024	1.5
DR 029	1.5
DR 036	1.5
DR 044	1.5
DR 052	1.5
DR 061	1.5
DR 081	3.5
DR 101	3.5



## Measuring of insert diameter

DR inserts have an unequally spaced pitch. To measure the diameter line up the two marked cutting edges. Measure directly on the chamfered angle because the inserts are ground with taper.



ISO	Code	Material	Rm N/mm <sup>2</sup>	HB HRC
<b>P</b>	1	Unalloyed carbon steel General structural steel	< 500	< 160
	2	Low-alloy carbon steel, Structural-, Cast-hardened-, Tool-, Low-alloy steel	500 - 900	140 - 325
	3	Alloyed tool steel Nitride steel	800 - 1200	250 - 350
	3.1	High alloyed steel	< 1000	
	3.2	High alloyed steel	< 1600	
	3.3	High speed steel		
<b>M</b>	5	Stainless steel, martensitic	500 - 1000	
	5.1	Stainless steel, austenitic		
	5.2	Stainless heat resisting steel		
<b>K</b>	6	Grey cast iron Alloyed grey cast iron		< 250
	6.1	Spheroidal graphite cast iron (GGG40)		
	6.2	Spheroidal graphite cast iron, ferritic/perlitic Malleable cast iron	> 550	
<b>N</b>	7	Aluminium < 10 % Si, Al-wrought alloys		
	7.1	Al-alloys		
	7.2	Non ferrous metals, Copper alloys, Brass, Bronze		
	7.3	Titanium		
	7.4	Nickelbased alloys		
<b>S</b>	8	Thermo-plastics, Duroplast		
	8.1	Fibre reinforced plastics		



HORN-Grades	ISO513	Properties	Recommended applications
<b>Carbide</b>			
<b>HL3H</b>	HC	ALCrN-Coating	First choice for Steel and cast iron. Extremely high hot hardness and high resistance against oxidation. High lubricity with resistance to build up edge. For high cutting speed and with coolant or mist coolant. Copper colour.
<b>AC4H AC5H</b>	HC	ALCrN-Coating	Similar coating structure and application range to HL3H. Grey colour.
<b>AD3H AD4H</b>	HC	TiALN-Coating	Good hot hardness and resistance against oxidation with excellent lubricity properties. For medium to high cutting speed and mist coolant. Resistant to build up edge.
<b>MG10</b>	HW	uncoated (micro grain)	Universal grade for most materials at low cutting speed. For Variopoint only.
<b>DT2H</b>	HC	PVD-DLC-Coating	"Diamond-Like-Carbon". Very good lubricity properties resistant to build up edge. Excellent chemical stability as well as very high hardness. Particularly suitable for Aluminum with less than 12 % Si at medium cutting speed.
<b>Cermet</b>			
<b>H20</b>	HT	uncoated	Reaming of carbon and low alloyed steel of up to 1200 N/mm <sup>2</sup> tensile strength and nodular cast iron at high cutting speed. Suitable for interrupted cuts due to high toughness.
<b>AD38 AD48 AC48 AC58 HL38 DT28</b>	-	coated	Coatings similar to those for carbide with resistance to build up edge. Application specific combination of substrate, geometry and coatings for improved tool life.

ISO	Code	Bore D*	Bore *S	Recommended radial cutting depth $a_p$			Uncoated HM ■ / Cermet □		Coated HM ■ / Cermet □	
		Left Helical Flutes 25°	Straight Flutes 45°	Ø <20 mm	Ø <20-35 mm	Ø >35 mm	$v_c$ (m/min)	$f_z$ (mm)	$v_c$ (m/min)	$f_z$ (mm)
P	1	●	●	0.05 - 0.12	0.08 - 0.15	0.10 - 0.25	□ 120 - 250	0.12 - 0.35	■ 100 - 220	0.12 - 0.35
							□ 120 - 250	0.12 - 0.35	■ 80 - 220	0.12 - 0.35
	2	●	●	0.05 - 0.12	0.08 - 0.15	0.10 - 0.25	□ 120 - 250	0.12 - 0.35	■ 100 - 220	0.12 - 0.35
							□ 120 - 250	0.12 - 0.35	■ 80 - 220	0.12 - 0.35
	3	●	●	0.05 - 0.10	0.08 - 0.15	0.10 - 0.25	□ 70 - 200	0.10 - 0.25	■ 60 - 180	0.10 - 0.25
							□ 70 - 200	0.10 - 0.25	■ 60 - 180	0.10 - 0.25
	3.1	●	●	0.05 - 0.10	0.08 - 0.15	0.08 - 0.20			■ 60 - 150	0.10 - 0.25
								■ 60 - 150	0.10 - 0.25	
	3.2	●	●	0.05 - 0.10	0.08 - 0.15	0.08 - 0.20			■ 15 - 60	0.06 - 0.18
								■ 15 - 60	0.06 - 0.18	
	3.3	●	●	0.05 - 0.10	0.06 - 0.12	0.06 - 0.15			■ 10 - 30	0.04 - 0.15
								■ 10 - 30	0.04 - 0.15	
M	5	●	●	0.05 - 0.10	0.08 - 0.15	0.08 - 0.20	□ 30 - 100	0.08 - 0.22	■ 20 - 80	0.08 - 0.22
							□ 30 - 100	0.08 - 0.22	■ 20 - 80	0.08 - 0.22
	5.1	●	●	0.05 - 0.10	0.08 - 0.15	0.08 - 0.20			■ 15 - 60	0.06 - 0.15
									■ 15 - 60	0.06 - 0.15
	5.2	●	●	0.05 - 0.10	0.08 - 0.15	0.08 - 0.20			■ 15 - 60	0.06 - 0.15
								■ 15 - 60	0.06 - 0.15	
K	6	●	●	0.08 - 0.15	0.08 - 0.18	0.10 - 0.25			■ 70 - 200	0.15 - 0.35
									■ 70 - 200	0.15 - 0.35
	6.1	●	●	0.08 - 0.15	0.08 - 0.18	0.10 - 0.25			■ 70 - 200	0.15 - 0.35
								■ 70 - 200	0.15 - 0.35	
	6.2	●	●	0.08 - 0.15	0.08 - 0.18	0.10 - 0.25			■ 60 - 200	0.12 - 0.30
								■ 60 - 200	0.12 - 0.30	
N	7	●	●	0.05 - 0.12	0.08 - 0.15	0.10 - 0.30	■ 10 - 50	0.12 - 0.35	■ 100 - 350	0.12 - 0.35
							■ 10 - 50	0.12 - 0.35	■ 100 - 350	0.12 - 0.35
	7.1	●	●	0.05 - 0.12	0.08 - 0.15	0.10 - 0.30	■ 10 - 40	0.12 - 0.35	■ 100 - 250	0.12 - 0.35
							■ 10 - 40	0.12 - 0.35	■ 100 - 250	0.12 - 0.35
	7.2	●	●	0.05 - 0.12	0.08 - 0.15	0.12 - 0.35	□ 100 - 250	0.12 - 0.35	■ 100 - 250	0.12 - 0.35
							□ 100 - 250	0.12 - 0.35	■ 100 - 250	0.10 - 0.30
	7.3	●	●	0.05 - 0.10	0.05 - 0.12	0.04 - 0.15			■ 10 - 25	0.06 - 0.18
								■ 10 - 25	0.06 - 0.18	
	7.4	●	●	0.05 - 0.10	0.05 - 0.12	0.04 - 0.15			■ 10 - 25	0.06 - 0.18
								■ 10 - 25	0.06 - 0.18	
S	8	●	●	0.05 - 0.12	0.08 - 0.15	0.1 - 0.25	□ 6 - 30	0.06 - 0.20	■ 6 - 30	0.06 - 0.20
							□ 6 - 30	0.06 - 0.20	■ 6 - 30	0.06 - 0.20
	8.1	PCD Tipped - Available Upon request								

● = Recommendation

Bore D\* = Through hole

Note:

Bore S\* = Blind Hole



Reduce  $f_z$  up to 25% during interrupted cuts

Description of cutting materials see page R30

# CUTTING DATA



R

ISO	Code	Bore D*	Bore *S	Recommended radial cutting depth $a_p$			Uncoated HM ■ / Cermet □		Coated HM ■ / Cermet □	
		Left Helical Flutes  25°	Straight Flutes  45°	Ø <.787"	Ø <.787-1.378"	Ø >1.378"	$v_c$ (ft/min)	$f_z$ (inch)	$v_c$ (ft/min)	$f_z$ (inch)
P	1	●	●	.0020 - .0047	.0032 - .0059	.0039 - .0098	□ 394 - 620	.0047 - .0138	■ 328 - 722	.0047 - .0138
							□ 394 - 620	.0047 - .0138	■ 262 - 722	.0047 - .0138
	2	●	●	.0020 - .0047	.0032 - .0059	.0039 - .0098	□ 394 - 620	.0047 - .0138	■ 328 - 722	.0047 - .0138
							□ 394 - 620	.0047 - .0138	■ 262 - 722	.0047 - .0138
	3	●	●	.0020 - .0039	.0032 - .0059	.0039 - .0098	□ 230 - 656	.0039 - .0098	■ 197 - 591	.0039 - .0098
							□ 230 - 656	.0039 - .0098	■ 197 - 591	.0039 - .0098
	3.1	●	●	.0020 - .0039	.0032 - .0059	.0032 - .0079			■ 197 - 492	.0039 - .0098
								■ 197 - 492	.0039 - .0098	
	3.2	●	●	.0020 - .0039	.0032 - .0059	.0032 - .0079			■ 49 - 197	.0024 - .0071
								■ 49 - 197	.0024 - .0071	
	3.3	●	●	.0020 - .0039	.0024 - .0047	.0024 - .0059			■ 33 - 98	.0016 - .0059
								■ 33 - 98	.0016 - .0059	
M	5	●	●	.0020 - .0039	.0032 - .0059	.0032 - .0079	□ 98 - 328	.0032 - .0087	■ 66 - 262	.0031 - .0087
							□ 98 - 328	.0032 - .0087	■ 66 - 262	.0031 - .0087
	5.1	●	●	.0020 - .0039	.0032 - .0059	.0032 - .0079			■ 49 - 197	.0024 - .0059
									■ 49 - 197	.0024 - .0059
	5.2	●	●	.0020 - .0039	.0032 - .0059	.0032 - .0079			■ 49 - 197	.0024 - .0059
								■ 49 - 197	.0024 - .0059	
K	6	●	●	.0031 - .0059	.0032 - .0071	.0039 - .0098			■ 230 - 656	.0059 - .0138
									■ 230 - 656	.0059 - .0138
	6.1	●	●	.0031 - .0059	.0032 - .0071	.0039 - .0098			■ 230 - 656	.0059 - .0138
									■ 230 - 656	.0059 - .0138
	6.2	●	●	.0031 - .0059	.0032 - .0071	.0039 - .0098			■ 197 - 656	.0047 - .0118
								■ 197 - 656	.0047 - .0118	
N	7	●	●	.0020 - .0047	.0032 - .0059	.0039 - .0118	■ 33 - 164	.0047 - .0138	■ 328 - 1148	.0047 - .0118
							■ 33 - 164	.0047 - .0138	■ 328 - 1148	.0047 - .0118
	7.1	●	●	.0020 - .0047	.0032 - .0059	.0039 - .0118	■ 33 - 131	.0047 - .0138	■ 328 - 820	.0047 - .0118
							■ 33 - 131	.0047 - .0138	■ 328 - 820	.0047 - .0118
	7.2	●	●	.0020 - .0047	.0032 - .0059	.0047 - .0138	□ 328 - 620	.0047 - .0138	■ 328 - 820	.0047 - .0118
							□ 328 - 620	.0047 - .0138	■ 328 - 820	.0047 - .0118
	7.3	●	●	.0020 - .0039	.0020 - .0047	.0016 - .0059			■ 33 - 82	.0024 - .0071
								■ 33 - 82	.0024 - .0071	
	7.4	●	●	.0020 - .0039	.0020 - .0047	.0016 - .0059			■ 33 - 82	.0024 - .0071
								■ 33 - 82	.0024 - .0071	
S	8	●	●	.0020 - .0047	.0032 - .0059	.0039 - .0098	□ 20 - 98	.0024 - .0079	■ 20 - 98	.0024 - .0079
							□ 20 - 98	.0024 - .0079	■ 20 - 98	.0024 - .0079
	8.1	PCD Tipped - Available Upon request								

● = Recommendation



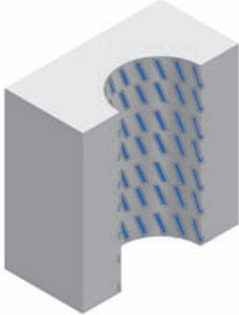
Bore D\* = Through hole

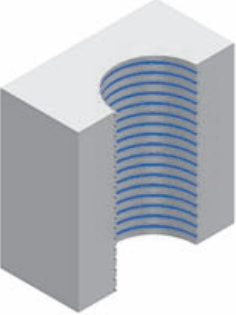
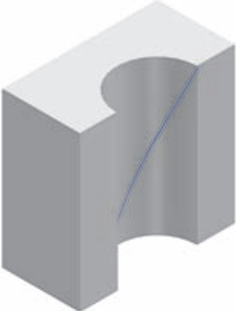


Bore S\* = Blind Hole

Note:

Reduce  $f_z$  up to 25% during interrupted cuts

Description of cutting materials see page R30

Fault	Remedy
<p>Hole too large</p> 	<ol style="list-style-type: none"> <li>1. Reduce run-out error and use compensation holder</li> <li>2. Reduce cutting speed</li> <li>3. Increase feed rate, increase coolant mix</li> <li>4. Reduce depth of cut</li> <li>5. Check tool wear (especiall build-up edges)</li> <li>6. Control reamer-<math>\emptyset</math></li> </ol>
<p>Tapered hole</p> 	<ol style="list-style-type: none"> <li>1. Reduce run-out error and use compensation holder</li> <li>2. Reduce cutting speed and feed, check coolant mix</li> <li>3. Improve pre-machining</li> <li>4. Improve workpiece clamping</li> <li>5. Measure bore in clamped and unclamped condition</li> <li>6. Check chip flow</li> </ol>
<p>Hole shows chatter marks</p> 	<ol style="list-style-type: none"> <li>1. Reduce run-out error and use compensation holder</li> <li>2. Change chamfer angle</li> <li>3. Improve workpiece clamping</li> <li>4. Reduce cutting speed</li> <li>5. Increase feed rate</li> </ol>

Fault	Remedy
<p>Surface quality unsatisfactory</p> 	<ol style="list-style-type: none"> <li>1. Check insert wear</li> <li>2. Reduce run-out error and use compensation holder, check cutting data (pages R32-R33)</li> <li>3. Use tool with internal coolant supply</li> <li>4. Increase coolant mix</li> </ol>
<p>Retention marks in hole</p> 	<ol style="list-style-type: none"> <li>1. Reduce run-out error and use compensation holder</li> <li>2. Check insert wear (build-up edges)</li> <li>3. Reduce depth of cut</li> <li>4. Use a sharper geometry</li> <li>5. Reduce pull back feed</li> </ol>
<p>Reamer jams</p> 	<ol style="list-style-type: none"> <li>1. Reduce coolant mix</li> <li>2. Increase depth of cut</li> <li>3. Check insert wear</li> <li>4. Change chamfer angle</li> </ol>
<p>Hole too small</p> 	<ol style="list-style-type: none"> <li>1. Change insert</li> <li>2. Reduce coolant mix</li> <li>3. Increase depth of cut</li> <li>4. Increase cutting speed</li> <li>5. Reduce feed rate</li> </ol>

Z = Number of teeth

d = Cutting edge Ø [mm]

L = Length of bore [mm]

SL = Clearance distance [mm]

n = Revolutions 
$$n = \frac{v_c \cdot 1000}{d \cdot \pi} [1/\text{min}] [\text{RPM}]$$

$v_c$  = Cutting speed 
$$v_c = \frac{d \cdot \pi \cdot n}{1000} [\text{m/min}] / .3048 = \text{sfm}$$

$f_z$  = Feed/tooth 
$$f_z = \frac{v_f}{Z \cdot n} [\text{mm}] / 25.4 = \text{inch}$$

f = Feed per revolutions 
$$f = f_z \cdot Z [\text{mm/U}] [\text{mm/rev}]$$

$v_f$  = Feed rate 
$$v_f = f_z \cdot Z \cdot n [\text{mm/min}] / 25.4 = \text{inch/min}$$

$T_c$  = Process time 
$$T_c = \frac{L + SL}{v_f} [\text{min}]$$

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**D 041 VL**  
Model 0.4-1 Nm

**Torque screw driver with scale**  
- variable torque setting  
- adjusted torque is shown on display

The Torque can be adjusted with a special torque setter (included).  
Ergonomical form gives perfect handling abilities. Audible signal when set torque is reached.  
(Standard: EN ISO 6798, BS EN 26789, ASME B 107.14.M.)  
(Precision:  $\pm 6 \%$ )



**D 15 VL**  
Model 1-5 Nm



**D 28 VL**  
Model 2-8 Nm



**D 515 QL**  
Model 5-15 Nm



**ED 28 VL**

**Torque setter**

Device for setting the required torque.

Handle: Celluloseacetat with micro structured surface

Blade: Octogonal (8 flats) blade, hardened galvanized



**ED 515 QL**



- DT6PK**
- DT7PK**
- DT8PK**
- DT9PK**
- DT10PK**
- DT15PK**
- DT20PK**
- DT25PK**

**Blade for TORX-Plus® screws**

Blade: High quality Chrome-Vanadium steel, through hardened, chrome plated.  
 Wiha Chrome Blade guarantees maximum precision.  
 Colored code dark green

Utilization: Controlled screw setting with definite torque in combination with Wiha torque screw driver handle.



- DT15PQ**
- DT20PQ**
- DT25PQ**
- DT27PQ**
- DT30PQ**



**DT6K**  
**DT8K**  
**DT15K**

### Blade for Torx screws

Blade: High quality Chrome-Vanadium steel, through hardened, chrome plated.  
Wiha Chrome Blade guarantees maximum precision.  
Colored code dark green

Utilization: Controlled screw setting with definite torque in combination with Wiha torque screw driver handle.



**DSW15K**  
**DSW20K**  
**DSW25K**  
**DSW30K**  
**DSW40K**

### Blade for allen screws

Blade: High quality Chrome-Vanadium steel, through hardened, chrome plated.  
Wiha Chrome Blade guarantees maximum precision.  
Colored code red

Utilization: Controlled screw setting with definite torque in combination with Wiha torque screw driver handle



**D14ZBK**

**Universal Bitholder**  
For S.DM08, S.DM10 and S.DM12 also  
for all C6,3 and E6,3 (1/4") Bits

Blade: High quality Chrome-Vanadium steel,  
through hardened, chrome plated.

Collar: Stainless steel

Utilization: For controlled screw setting with definite torque  
in combination with torque screw driver handle.



**D14ZBQ**



**14ZQK**

**Universal Bitholder with T-handle**  
For S.DM08, S.DM10 and S.DM12  
also for all C6,3 and E6,3 (1/4") Bits

Blade: High quality Chrome-Vanadium steel, through  
hardened, chrome plated.

Collar: Stainless steel

Utilization: For controlled opening



**Digital display unit**

Displays the adjusting range

**DAZ**

Part number	l	b	h	Weight*
DAZ	120	80	25	0.125 kg

\* Weight includes 9V battery

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Type	Chapter page
020	Q56
05	Q14
050.C	Q54,Q65
050.G	Q63
050.K	Q52
105	Q18-Q27,Q68-Q73
108	A9-A11,D5,E3
110	Q28
111	A31-A33,D14,D17,D20,E9
116	A60-A62,D32
23	Q55,Q66
306	A12-A20,D6-D7,E4
308	A34-A38,D15,E10
311	A49-A53,D24,D26-D27,E15,G4-G5
313	A71-A74,A76-A79,D37,D39-D40,E19,G8
313.D	A87-A89,E23
314	B23-B25,C8-C9,D60,J19-J20
325	A100
328	A101-A104,D46,E27,G11
332	A117-A118,E31
335	A129
380	B11,B13,B17,D56,D58
380...IK	B14-B15
381	B21,J2-J15
382	C3-C4
383	C6-C7
606	A21-A22,D8,E5,F4-F5
608	A39,D16,D18,E11
611	A54-A55,D25,E16,F10
613	A82-A83,D38,D41,E20,F14-F16
628	A105-A107,D47,E28,F22
632	A119-A120,D50
636	A121-A122
713	A84,F17
A110	Q74
A315	Q75
ABS..380	B19
ADR	R25
B02	Q33
B05	Q29,Q32,Q34
B05.HM	Q30
B05.ST	Q31
B105	Q15-Q16
B105.0016.U1.01	Q38-Q44
B105.0016.U1.02	Q45
B110	Q17
B110.0016.U1.02	Q46
BD	Q4-Q5,R10-R11
BH	Q8,R14
BI	Q6,R12
BKT	Q50-Q51,Q60-Q62
BT	Q7,R13
D02	Q35
D050	Q36
DA31	N15
DA32	N16
DAH37	N23
DAH62	N27
DAHM	N20-N22,N26
DAM31	N2,N4-N5,N9-N10
DAM32	N3-N5,N7,N9-N10
DAZ	Q13,S4
DB	Q33
DCF	L11
DCG	L2-L7
DCN	L9
DCR	L8
DCX	L10

Type	Chapter page
DGF	M8
DGFF	M11
DGH	M12
DGK	M6
DGM	M7
DGR	M9
DGRR	M10
DM008	M19,M21,M23
DM010	M29,M31,M33
DM012	M39,M41,M43
DM208	M24-M27
DM210	M34-M37
DM212	M44-M47
DMU008	M18,M20,M22
DMU010	M28,M30,M32
DMU012	M38,M40,M42
DPFF	O7
DPK	O16-O18
DPM	O15
DPS	O8
DPSB	O9
DPSG	O11-O12
DPSV	O10
DPTR	O13-O14
DPX	O6
DR	R2-R3
DRHD	R19-R23
DRZB	R24
DSA	O78-O80
DSAK	O82-O83
DSAKH	O81
DSAR	O84
DSAT	O85
DSDH	O31
DSDS	O30
DSF	O44-O45
DSFD	P11
DSFF	O49
DSFN	P9
DSFU	P10
DSHF	P12
DSK	O20,O24,O26,P4
DSKC	O52,O54
DSKG	O68
DSKGL	O69
DSKH	O21,O25
DSKK	O60
DSKL	O22
DSKLC	O53
DSKLH	O23
DSKM	O27-O29
DSKMG	O74
DSKMK	O64
DSM	O37
DSMH	O38
DSMK	O62
DSML	O42
DSMMG	O75
DSMMK	O65
DSMR	O39-O40
DSMRC	O56
DSMRH	O41
DSMRK	O63
DSR	O43
DSRF	O46
DSRR	O47
DSRV	O48
DST	O32-O33,O35-O36,P5-P7
DSTC	O55

Type	Chapter page
DSTG	O70-O71
DSTH	O34
DSTK	O61
DSTLG	O72
DSUD	P8
DSVG	O73
F050.G	Q64
F050.K	Q53
HSK..380	B18
IntraMax 49-88	Q48
L313	A80-A81
L389	K3
M101	C12-C13
M116	A59,D29
M117	P18
M117K	P16
M117P	P20
M117U	P19
M275	B2-B5,D51-D52,F23-F25,J16-J17
M302	K3,K5
M306	A3-A4,D3,E2,F2
M306.ER	A8
M306.M	A6
M306.ST	A5,F3
M308	A25-A26,D12,E8
M308.ER	A30
M308.M	A28
M308.ST	A27
M310	C21,C23-C24
M311	A43-A44,D22,F8,G3
M311.ER	A48,F9
M311.M	A46
M311.ST	A45
M313	A65-A66,D35,F12,G7
M313.ER	A70,F13
M313.M	A68
M313.ST	A67
M328	A93-A95,D44,E26,F20,G10
M328.ER	A99,F21
M328.M	A97
M328.ST	A96
M332	A111-A112,D48
M332.ER	A116
M332.M	A114
M332.ST	A113
M335	A127-A128

Type	Chapter page
MD	N11-N14
MDG	M2-M5
MDR	R4-R5
MU116	A58,D28
MU306	A2,D2
MU308	A24,D11
MU310	C20,C22
MU311	A42,D21,E14,G2
MU313	A64,D34,E18,G6
MU328	A92,G9
MU332	A110,E30
MU335	A126
N314	C8,J19
RAM	Q10,R9
RBM	Q10,R9
RS275	D54,F26
S101	C14-C16
S117	P17,P21-P22
S275	B6-B7,J18
S310	C25
SM328	D43
SMU328	D42
U108	A9-A11
U111	A32-A33,D19
U116	A60,A62,D31
U306	A17,A20
U308	A35,A38
U311	A50,A53
U313	A71,A75,A79
U314	B22
U325	A100
U328	A102
U380	B10,B12,B16,D55,D57
U381	B20
U382	C2
U383	C5
VAM	Q9,R8
VBM	Q9,R8
VDR	R6-R7,R15-R18
WFB	A7,A29,A47,A69,A98,A115
Z313	A86,E22

## Cutting Material Group per DIN ISO 513

Main Group	Symbol	Subgroups
Carbide	HW	uncoated carbides based upon WC
	HT	uncoated carbides based upon TIC/TIN (cermets)
	HC	coated carbides
Ceramic cutting material	CA	Oxide ceramics based upon $Al_2O_3$
	CM	Mixed ceramics $Al_2O_3$ + metal carbide
	CN	Nitride ceramics based upon $Si_3N_4$ -Basis
	CC	coated ceramics
Boron nitride	BN	Polycrystalline cubic boron nitride (CBN)
Diamond	DP	Polycrystalline diamond (PCD)

DIN ISO 513 does not replace the manufacturers grade discription or designation.  
DIN ISO 513 gives a comparison for grades from various manufacturers.

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