



SOLID CARBIDE END MILLS

Tooling systems and application consulting for the milling of complex 2.5 and 3D geometries



 **pokolm**
PREMIUMTOOLS. WE KNOW HOW.

NEW CATALOGUE OF SOLID CARBIDE END MILLS

The new catalogue of Pokolm's Solid Carbide End Mills

Dear Customer,

This catalogue provides you with current and thorough documentation on the comprehensive POKOLM range of Solid Carbide End Mills.

At the same time, this print catalogue is presented in a completely new structure. Our Solid Carbide End Mills are predominantly arranged according to the type of the material for machining. That makes finding the right POKOLM mills for your individual application even easier and faster. A two-page product overview additionally clarifies at a glance which mill shapes are available along with the machining modes and material groups they can be used on.

User friendliness chalks up even more points: you can find the respective application data and spindle speeds allocated immediately after the individual mill types - bothersome searching is a thing of the past! To provide you with even more certainty in the collision analysis, for all relevant mills the effective working lengths for contour angles from 0.5° to 3° are stated on top of that. Moreover, specifications on the rake and twist angle for every mill provide decision-making tools for various end-uses. DXF contour data on every single mill can be found on the POKOLM website.

Complemented by sound advice from our applications engineers who work together with you to develop the ideally matched milling strategy for your specific application, your production will be geared for maximum cost effectiveness. That optimally prepares you for stiff competition.

Use your chance and contact us without any obligation. We are happy to be of service and look forward to hearing from you!

Your POKOLM Team

Imprint

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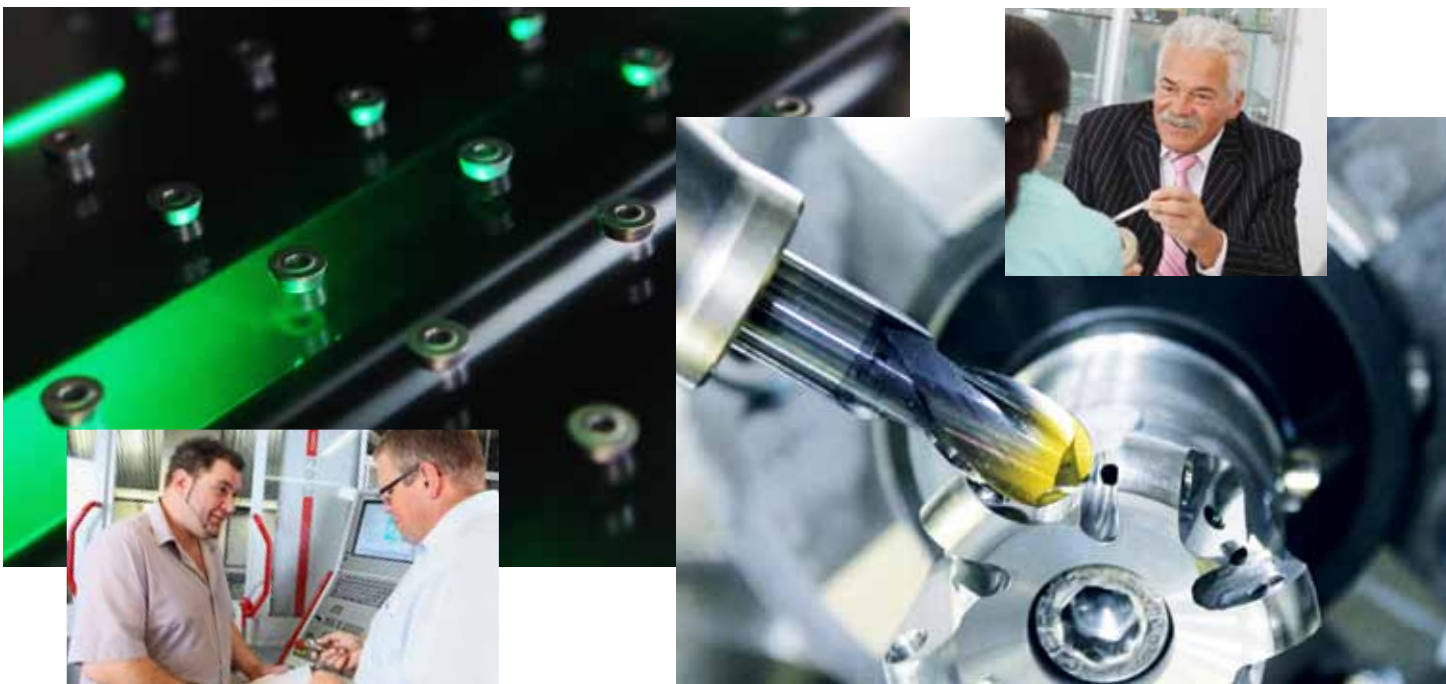
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BENEFIT FROM OUR SUCCESS STORY

Being better means continuously thinking about the competition and your own products and services, identifying potential optimisation and above all, developing innovations, which constitute real progress and benefit. In cutting/milling technology, lighter, significantly faster machines led to fundamental changes, which required new cutters for higher feed rates and considerably smaller cutting depths closer to the contour. The founder of our company, F.-J. Pokolm played a decisive role in this important milling cutter body development step with many innovations that are now considered to be the standard. For example, unlike the inch sizes commonly used before, today milling cutter bodies and inserts in metric sizes simplify calculation of the relevant values. The embedded insert seat is a POKOLM innovation, for which we have the inventive genius and practical experience of the founder of our company to thank. The patented DUOPLUG® system with its significantly increased holding forces and maximum concentricity is thought by the industry to be the perfect screw connection between tool and the toolholder. A current cutting/milling technology milestone is the **SPINWORX®** round insert cutter with self-rotating inserts.

Top quality and precision standards during development and series production, not only in-house but also at our suppliers, also form an indispensable basis for this success.

This applies just as much to the area of Solid Carbide End Mills used for our own production. And here POKOLM customers benefit from our own high standards of quality; only tools of this highest grade qualify for our extensive range of Solid Carbide End Mills.



Successful practitioners consciously opt for POKOLM premium tools and benefit from this decision. This little bit "more" that gives POKOLM customers the decisive competitive advantage, results automatically from the interaction of excellent

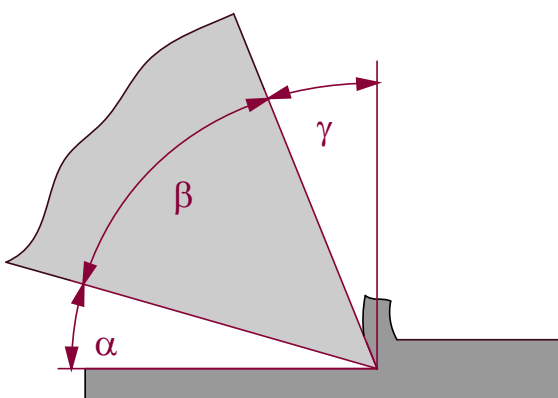
products and outstanding technical advice provided by our technical field service, which is completely and individually orientated to every single customer.

THE CATALOGUE SYSTEM - YOU WILL FIND EVERYTHING EASILY!

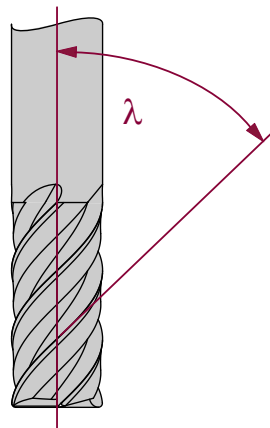
The two-page product overview provides an excellent summary of the complete range of POKOLM Solid Carbide End Mills and enables you to make a quick preselection of possible products for your individual use.

PRODUCT OVERVIEW		PAGE 1/2	
Product lines	Page	Types of machining	Material to be machined
End mills for steel, universal up to 52 HRC			
⊖ BALL NOSE	18		
⊖ 2 flutes	18		
⊖ 2 flutes taper neck	22		
⊖ 2 flutes spheric	24		
⊖ 4 flutes	25		
⊖ 4 flutes taper neck	28		
⊖ TORIC / CORNER RADIUS	30		
⊖ 2 flutes	30		
⊖ 2 flutes taper neck	34		
⊖ 2 flutes spheric	36		
⊖ 3 flutes	38		
⊖ 4 flutes	40		
⊖ 4 flutes taper neck	43		
⊖ SQUARE	45		
⊖ 2 flutes	45		
⊖ 4 flutes	48		
End mills for steel up to 58 HRC			
⊖ BALL NOSE	52		
⊖ 2 flutes	52		
⊖ TORIC / CORNER RADIUS	56		
⊖ 2 flutes	56		
⊖ 6 and 8 flutes	61		
⊖ END MILLS	62		
⊖ 4 and 8 flutes	62		
End mills for steel with more than 58 HRC			
⊖ BALL NOSE	66		
⊖ 2 flutes	66		
⊖ TORIC / CORNER RADIUS	68		
⊖ 5 flutes	68		
End mills for micro machining up to 2.5 mm			
⊖ BALL NOSE	70		
⊖ 2 flutes	70		
⊖ SQUARE	71		
⊖ 2 flutes	71		

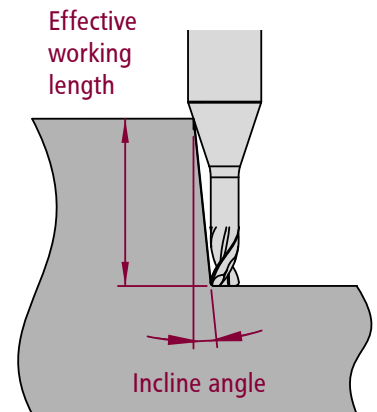
- ① Cutter group
- ② Cutter shape
- ③ Types of machining
- ④ Example photo
- ⑤ Available designs with page references
- ⑥ Material to be machined
- ⑦ Key



α = Clearance angle „Alpha“
 β = Wedge angle „Beta“
 γ = Rake angle „Gamma“



λ = Helix angle „Lambda“



- Effective working length
 - Incline angle

The product pages contain information needed for purchasing and for use of the POKOLM Solid Carbide End Mills. Time-consuming paging and searching for cutting data is no longer necessary - saving you valuable time!

END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC
Ball nose end mills | 2 flutes

2 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- short & long & extra long version
- with and without clearance between shank and flute

Ball nose end mills

Effective working length at X° of draft

Ball nose end mills

Material

Feed per tooth (fz) | d.o.c. (ap)

Cutting speed (Vc in m/min)

Material

Application

Quality Coating

Major application | Minor application | roughing | prefinishing | finishing

- ① Cutter group
- ② Description of the cutter group
- ③ Example photo of one product of the product range
- ④ Available designs
- ⑤ Dimensioned sketches of each design, corresponding dimensions given in the adjacent table
- ⑥ Effective working length at X° of draft, parameters only indicated if $d_1 < d_2$, missing data on request
- ⑦ Rake angle γ „Gamma“
- ⑧ Helix angle λ „Lambda“
- ⑨ Properties, symbols in the key
- ⑩ Carbide grade / Coating
- ⑪ Key of properties
- ⑫ Feed per tooth (fz) and d.o.c. - depth of cut (ap)
- ⑬ ATTENTION! The values given are merely guide values and must be checked for each individual case!
High a_p values may not be combined with high f_z values!
Therefore, in case of high a_p values, low f_z values must be used and in case of high f_z values, low a_p values must be used.
- ⑭ Cutting speed
- ⑮ The values given reflect the bandwidth for both roughing and finishing. The **bold** figure in the middle is the respective average value.
If the figures are in *italics*, they are merely given as values for minor applications!
- ⑯ Key to the pictograms in the tables and to the main and secondary precision, medium and rough machining applications
- ➔ DXF contour data on every single mill can be found on the POKOLM website.

PURCHASE- AND INFO-HOTLINE



Pokolm

Frästechnik GmbH & Co. KG



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"Click" for an electronic quotation!

On request we will send you a quotation or your order confirmation as a PDF file by email.

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Individual advice: the QR codes are the shortest route to contacts on our website!



Sales
office

Technical field service
National



Technical field service
International

TABLE OF CONTENTS

General information

from page 2

Product guide

from page 9

Solid carbide end mills

from page 16

Technical information

from page 136

Order forms

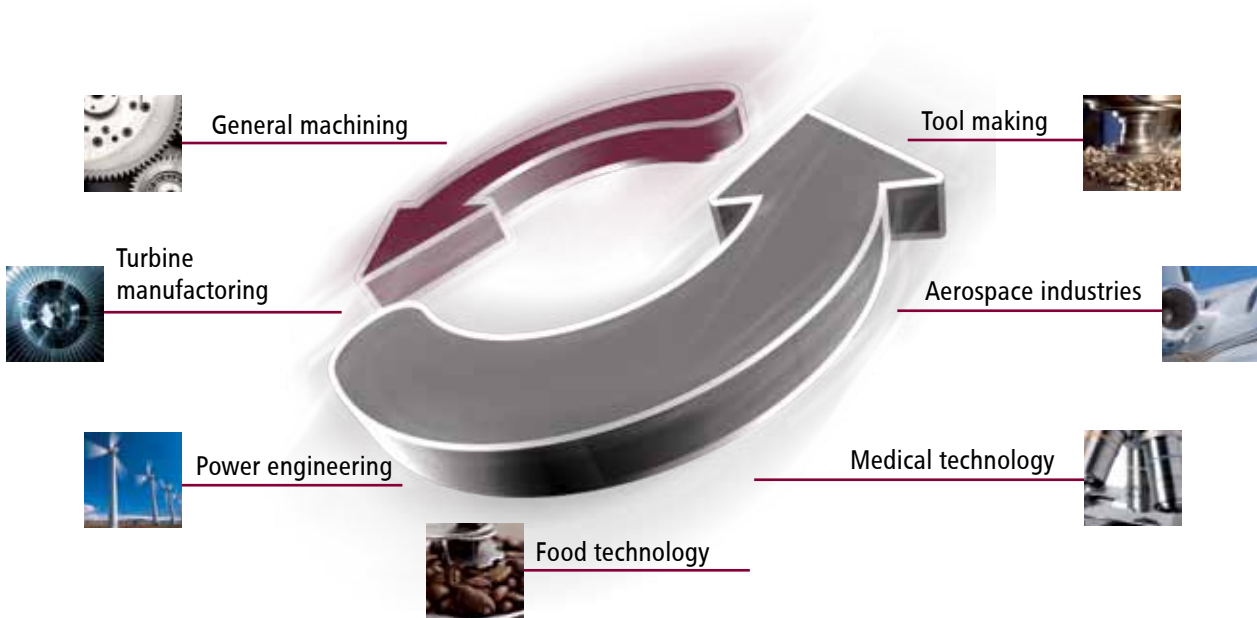
from page 148

Index

from page 151

CUSTOMIZED CONCEPTS FOR EVERY INDUSTRIAL SECTOR

From delicate medical engineering to powerful, vigorous racing sports – our services are used in the most various sectors. And at the same time, the requirements placed on our products are as diverse as they are demanding. Maximum precision, quality and expertise are what is demanded everywhere. It is inconsequential whether it is all about large components for aerospace or a highly-specific special tool for the wood industry. With this great diversity, direct contact with the customers is of decisive importance. That is the only way to precisely comprehend the specific challenges. Our highly-trained field service can often even help right onsite and flexibly and precisely find the perfect solution for highly customised requirements.



Dou-Plug®, SPINWORX® and other patents.

Guaranteed process optimization

If you don't go forward, you go backwards! For this reason, we continuously develop new products for our range of tooling. This is the only way to meet the requirements as technological leader in this field. And this is the way for you, having a lasting effect from our innovations and patents, which are able to promote your competitive advantage.

SOLID CARBIDE END MILLS

PRODUCT OVERVIEW

PAGE 1/2

Product lines	Page	Types of machining										Material to be machined					
												P	M	K	N	S	H
⊕ End mills for steel, universal up to 52 HRC																	
⊕ BALL NOSE	18																
⊕ 2 flutes	18																
⊕ 2 flutes taper neck	22																
⊕ 2 flutes spheric	24	⊕	-	-	⊕	-	⊕	-	-	⊕	⊕						
⊕ 4 flutes	25																
⊕ 4 flutes taper neck	28																
⊕ TORIC / CORNER RADIUS	30																
⊕ 2 flutes	30																
⊕ 2 flutes taper neck	34																
⊕ 2 flutes spheric	36	⊕	-	⊕	⊕	-	⊕	⊕	⊕	⊕	-						
⊕ 3 flutes	38																
⊕ 4 flutes	40																
⊕ 4 flutes taper neck	43																
⊕ SQUARE	45																
⊕ 2 flutes	45	⊕	⊕	⊕	⊕	-	⊕	⊕	⊕	-	-						
⊕ 4 flutes	48																
⊕ End mills for steel up to 58 HRC																	
⊕ BALL NOSE	52																
⊕ 2 flutes	52	⊕	-	-	⊕	-	⊕	-	-	⊕	⊕						
⊕ TORIC / CORNER RADIUS	56																
⊕ 2 flutes	56	⊕	-	⊕	⊕	-	⊕	⊕	⊕	⊕	-						
⊕ 6 and 8 flutes	61																
⊕ END MILLS	62																
⊕ 4 and 8 flutes	62	⊕	⊕	⊕	⊕	-	⊕	⊕	⊕	-	-						
⊕ End mills for steel with more than 58 HRC																	
⊕ BALL NOSE	66																
⊕ 2 flutes	66	⊕	-	-	⊕	-	⊕	-	-	⊕	⊕						
⊕ TORIC / CORNER RADIUS	68																
⊕ 5 flutes	68	⊕	-	⊕	⊕	-	⊕	⊕	⊕	⊕	-						
⊕ End mills for micro machining up to 2.5 mm																	
⊕ BALL NOSE	70																
⊕ 2 flutes	70	⊕	-	-	⊕	-	⊕	-	-	⊕	⊕						
⊕ SQUARE	71																
⊕ 2 flutes	71	⊕	⊕	⊕	⊕	-	⊕	⊕	⊕	-	-						

Major application

- roughing
- pre-finishing
- finishing

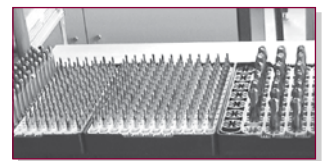
Minor application

- roughing
- pre-finishing
- finishing

Machining modes

- plunging
- chamfering
- face milling
- circular milling
- axial plunging
- slotting
- pocketing
- square shoulder milling
- copying
- c-slotting

REFURBISHING OF PREMIUM SOLID CARBIDE END MILLS



**Premium solid carbide tools live longer:
... in more ways than one!**

The Pokolm-service team offers within this Workout-program for existing, already used Solid carbide tooling a wide variety of services:

- ⊕ reproduction
- ⊕ refurbishing
- ⊕ modification
- ⊕ recoating

We check, classify and mark every single tool individually, in order to ensure, that every customer receives his own tools back.

WORKOUT offers this service for all genuine Pokolm-tooling and also for non-Pokolm-tools, if its quality allows this.

You can send your tools for refurbishing, using the code "Workout" at any time to the following address:

**Pokolm
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Adam-Opel-Straße 5
33428 Harsewinkel
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fon: +49 5247 9361-0
fax: +49 5247 9361-99

E-Mail: info@pokolm.com
Internet: www.pokolm.com



SOLID CARBIDE END MILLS

PRODUCT OVERVIEW

PAGE 2/2

Product lines	Page	Types of machining										Material to be machined					
												P	M	K	N	S	H
⊕ End mills for stainless steel titanium alloys																	
⊕ TORIC / CORNER RADIUS	74																
⊕ 4 flutes uneven cutting pitch	74		-			-					-	-		-	-		
⊕ SQUARE	76																
⊕ 4 flutes uneven cutting pitch	76					-					-	-		-	-		
⊕ End mills for aluminium copper plastics synthetics																	
⊕ BALL NOSE	80																
⊕ 2 flutes	80		-	-		-		-	-			-		-			
⊕ TORIC / CORNER RADIUS	86																
⊕ 2 flutes	86		-			-					-	-		-			
⊕ SQUARE	91																
⊕ 1 flute for aluminium	91												-	-	-		
⊕ 1 flute for plastics	93												-	-	-		
⊕ 2 flutes	95					-				-	-	-		-			
⊕ 3 flutes for aluminium	98												-		-		
⊕ 4 flutes for aluminium	100												-		-		
⊕ End mills for graphite GRP CFRP																	
⊕ BALL NOSE	104																
⊕ 2 flutes	104		-	-		-		-	-			-		-			
⊕ 3 flutes	108		-	-		-		-	-			-		-			
⊕ TORIC / CORNER RADIUS	110																
⊕ 2 flutes	110		-			-					-	-		-			
⊕ 3 flutes	112		-			-					-	-		-			
⊕ SQUARE	116																
⊕ 2 flutes	116					-				-	-	-		-			
⊕ End mills for extreme machining HPC																	
⊕ 3 and 4 flutes	118													-		-	
⊕ 4 flutes with corner radius	121													-		-	
⊕ 4 flutes with corner radius	123												-		-		
⊕ 4 flutes with corner radius	123					-				-	-	-		-			
⊕ 4 flutes for HPC machining	125														-		
⊕ 4 flutes for HPC machining	125														-		
⊕ 4 flutes working depth (wd.)	127															-	
⊕ End mills for high feed machining TRIGAWORX® HSC																	
⊕ 3 flutes	130													-		-	
⊕ 4 flutes	132		-			-				-	-	-					
⊕ 4 flutes with corner radius	132		-			-				-	-	-					
⊕ 4 flutes internal coolant supply	134															-	

Major application

- roughing
- pre-finishing
- finishing

Minor application

- roughing
- pre-finishing
- finishing

Machining modes

- plunging
- chamfering
- face milling
- circular milling
- axial plunging
- slotting
- pocketing
- square shoulder milling
- copying
- c-slotting

YOUR ELECTRONIC QUOTATION PER 'CLICK'

The following illustration shows the menu-range of our CD-ROM-catalogue.

Your electronic quotation per 'click'

Your advantage:

With only one click, you can receive all information about products selected, displayed on your screen

- ➔ photo
- ➔ drawing
- ➔ all dimensions
- ➔ accessories
- ➔ suitable arbors, adapters, inserts or solid carbide tools

All you need is internet connection!

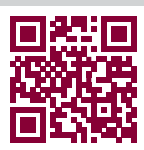
THE POKOLM BOX – THE INNOVATIVE CATALOGUE-SYSTEM



QR-CODES – THE QUICKEST WAY TO OUR WEB PRESENCES



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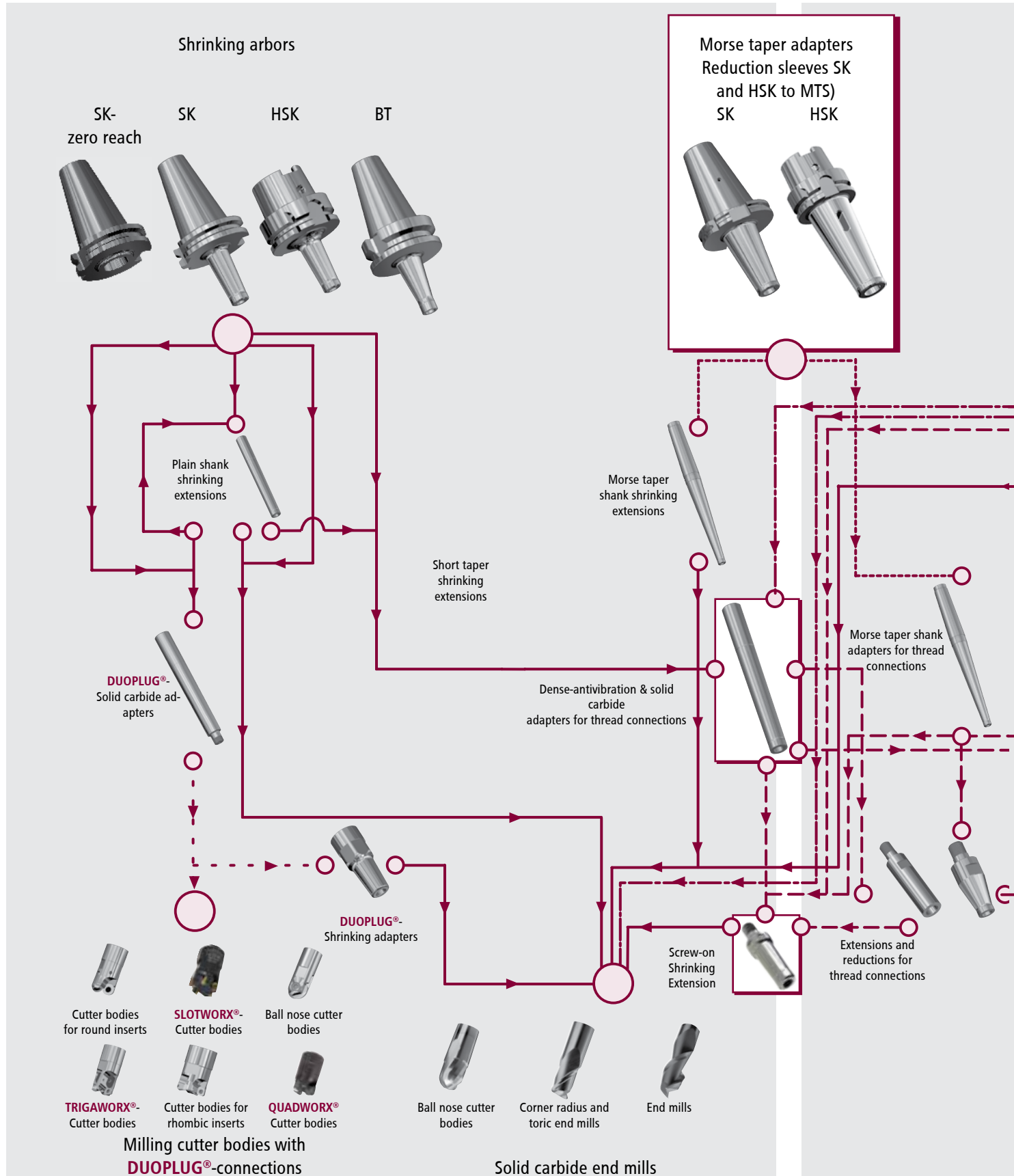


youtube.com



THE POKOLM TOOL SYSTEM

over 50000 combination possibilities

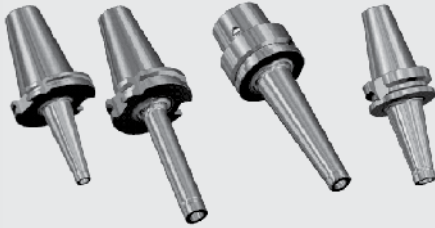


- Shrinking combinations
- - - - Morse taper combinations
- Thread connected combinations
- - - - Shell-type combinations
- - - - ER-Collet combinations
- - - - DUOPLUG®-combinations

The listed options are applications examples. Do not hesitate to contact our technical field service for a huge number of further possible combinations.

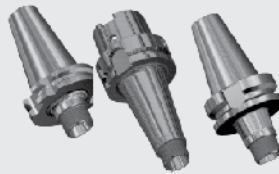
Arbors for thread connections

SK HSK BT



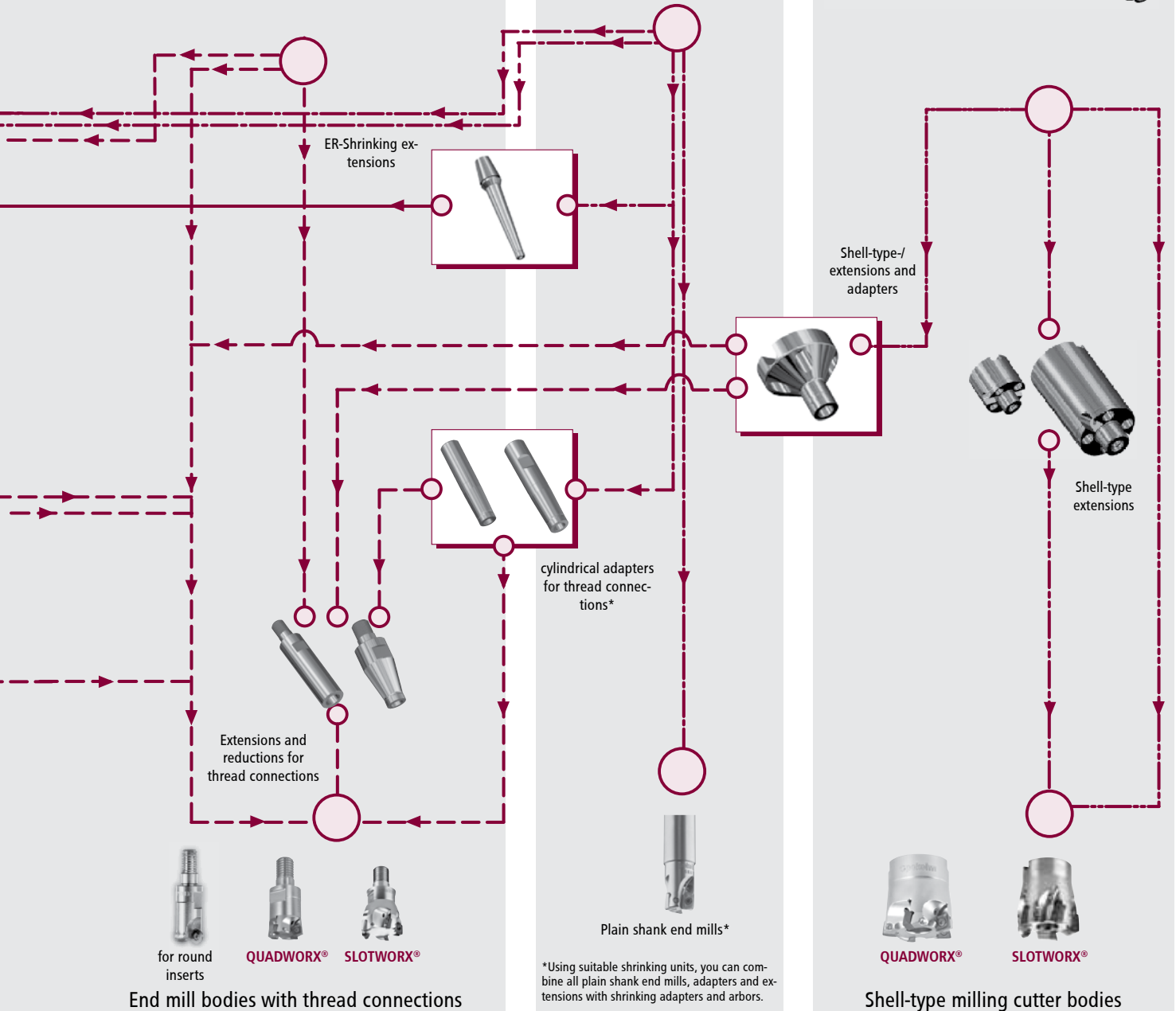
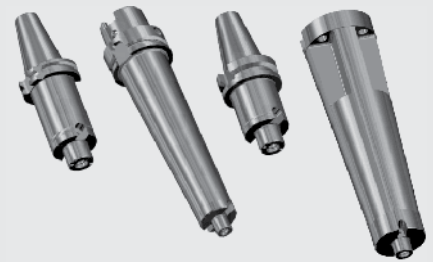
ER-Collet chucks arbors

SK HSK BT



Arbors for shell-type milling cutter bodies

SK HSK BT Direct spindle mounting



End mill bodies with thread connections

*Using suitable shrinking units, you can combine all plain shank end mills, adapters and extensions with shrinking adapters and arbors.

Shell-type milling cutter bodies

SOLID CARBIDE END MILLS



A complete line of products, full of systematic advantages.

Here is the best argument straight away for POKOLM solid carbide end mills: we use our own end mills to produce a large proportion of our milling cutter bodies and arbors - and for good reason. Our own solid carbide end mills are famous for its precise concentricity, plus it is suitable for shrinking processes and have a full range of advantages in high-speed and extreme milling operations.

We use specially selected materials and have suppliers and coating partners, who are integrated in our developmental and production process. This creates the most favourable environment for our highly specialized staff to produce first class, high-quality end mills using the latest high-tech grinding machines. A wide variety of differentiated cutter geometries and corresponding coatings and a broad range of diameters and working lengths make up a comprehensive product range in order to handle almost any task you can think of.

The entire range of our Solid Carbide End Mills is a part of our tool system and each one is precisely coordinated with all the other tools in our catalogue.

Right from the developmental stage, our tools are conceived and planned in detail together with our suppliers. We also maintain a close partnership and intensive collaboration with our raw materials suppliers and coating partners.

We understand the development of individual products as a process and thus, we guarantee high-quality final products. Furthermore, our solid carbide tools are created almost exclusively as a result of our close customer relations and are almost always developed out of individual solutions, that we devise into catalogue tools.

END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

		Page
Ball nose end mills	2 flutes	18
	2 flutes taper neck	22
	2 flutes spheric	24
	4 flutes	25
	4 flutes taper neck	28
Toric / corner radius end mills	2 flutes	30
	2 flutes taper neck	34
	2 flutes spheric	36
	3 flutes	38
	4 flutes	40
	4 flutes taper neck	43
End mills	2 flutes	45
	4 flutes	48



END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

Ball nose end mills | 2 flutes

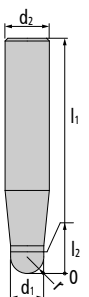
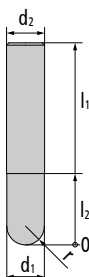
2 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- short | long | extra long version
- with and without clearance between shank and flute

Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. | short | long | extra long

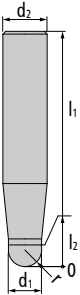
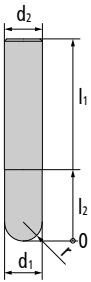
NW 1222 56 0041	0.4	0.6	-	-	50	0.2	4	2	0.84	0.97	1.08	1.19	1.39	9	30	MGC PVTi
NW 1222 56 0051	0.5	0.8	-	-	50	0.25	4	2	1.07	1.21	1.33	1.45	1.66	9	30	MGC PVTi
NW 1222 56 0061	0.6	0.9	-	-	50	0.3	4	2	1.18	1.32	1.45	1.56	1.78	9	30	MGC PVTi
NW 1222 56 0081	0.8	1.2	-	-	50	0.4	4	2	1.51	1.67	1.81	1.93	2.16	9	30	MGC PVTi
NW 1222 56 0111	1	1.5	-	-	50	0.5	4	2	1.84	2.01	2.16	2.29	2.53	9	30	MGC PVTi
NW 1222 56 0101	1	1.5	-	-	57	0.5	6	2	1.84	2.01	2.16	2.29	2.53	9	30	MGC PVTi
NW 1232 56 010	1	1.5	-	-	75	0.5	6	2	1.84	2.01	2.16	2.29	2.53	9	30	MGC PVTi
NW 1222 56 0121	1.2	1.8	-	-	50	0.6	4	2	2.17	2.35	2.51	2.64	2.89	9	30	MGC PVTi
NW 1222 56 0152	1.5	2.2	-	-	50	0.75	4	2	2.60	2.80	2.96	3.11	3.37	9	30	MGC PVTi
NW 1222 56 0151	1.5	2.2	-	-	57	0.75	6	2	2.60	2.80	2.96	3.11	3.37	9	30	MGC PVTi
NW 1222 56 0161	1.6	2.4	-	-	50	0.8	4	2	2.82	3.02	3.19	3.34	3.61	9	30	MGC PVTi
NW 1222 56 0181	1.8	2.7	-	-	50	0.9	4	2	3.14	3.35	3.53	3.68	3.96	9	30	MGC PVTi
NW 1222 56 0201	2	3	-	-	50	1	4	2	3.46	3.68	3.87	4.03	4.31	9	30	MGC PVTi
NW 1222 56 021	2	3	-	-	57	1	6	2	3.46	3.68	3.87	4.03	4.31	9	30	MGC PVTi
NW 1232 56 020	2	3	-	-	75	1	6	2	3.46	3.68	3.87	4.03	4.31	9	30	MGC PVTi
NW 1222 56 0301	3	4.5	-	-	50	1.5	4	2	5.06	5.32	5.52	5.71	6.06	9	30	MGC PVTi
NW 1222 56 030	3	4.5	-	-	57	1.5	6	2	5.06	5.32	5.52	5.71	6.06	9	30	MGC PVTi
NW 1132 56 030	3	30	-	-	60	1.5	3	2	-	-	-	-	-	8	30	MGC PVTi
NW 1232 56 030	3	4.5	-	-	75	1.5	6	2	5.06	5.32	5.52	5.71	6.06	9	30	MGC PVTi
NW 1132 56 031	3	30	-	-	75	1.5	3	2	-	-	-	-	-	8	30	MGC PVTi
NW 1222 56 0401	4	6	-	-	50	2	4	2	-	-	-	-	-	9	30	MGC PVTi
NW 1222 56 040	4	6	-	-	57	2	6	2	6.64	6.93	7.16	7.36	7.80	9	30	MGC PVTi
NW 1132 56 040	4	30	-	-	60	2	4	2	-	-	-	-	-	8	30	MGC PVTi



Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. | short | long | extra long

	NW 1232 56 040	4	6	-	-	75	2	6	2	6.64	6.93	7.16	7.36	7.80	9	30	MGC PVTi
	NW 1132 56 041	4	30	-	-	75	2	4	2	-	-	-	-	-	8	30	MGC PVTi
	NW 1222 56 050	5	7.5	-	-	57	2.5	6	2	8.20	8.52	8.79	9.01	9.55	9	30	MGC PVTi
	NW 1132 56 050	5	35	-	-	70	2.5	5	2	-	-	-	-	-	8	30	MGC PVTi
	NW 1232 56 050	5	7.5	-	-	75	2.5	6	2	8.20	8.52	8.77	9.01	9.55	9	30	MGC PVTi
	NW 1132 56 051	5	40	-	-	100	2.5	5	2	-	-	-	-	-	8	30	MGC PVTi
	NW 1232 56 055	5.5	8.5	-	-	75	2.75	6	2	-	-	-	-	-	9	30	MGC PVTi
	NW 1222 56 060	6	9	-	-	57	3	6	2	-	-	-	-	-	9	30	MGC PVTi
	NW 1232 56 060	6	9	-	-	75	3	6	2	-	-	-	-	-	9	30	MGC PVTi
	NW 1132 56 060	6	40	-	-	100	3	6	2	-	-	-	-	-	8	30	MGC PVTi
	NW 1132 56 061	6	50	-	-	150	3	6	2	-	-	-	-	-	8	30	MGC PVTi
	NW 1222 56 080	8	12	-	-	63	4	8	2	-	-	-	-	-	9	30	MGC PVTi
	NW 1232 56 080	8	12	-	-	90	4	8	2	-	-	-	-	-	9	30	MGC PVTi
	NW 1132 56 080	8	40	-	-	100	4	8	2	-	-	-	-	-	8	30	MGC PVTi
	NW 1132 56 081	8	50	-	-	150	4	8	2	-	-	-	-	-	8	30	MGC PVTi
	NW 1222 56 100	10	15	-	-	72	5	10	2	-	-	-	-	-	9	30	MGC PVTi
	NW 1232 56 100	10	15	-	-	100	5	10	2	-	-	-	-	-	9	30	MGC PVTi
	NW 1132 56 100	10	45	-	-	100	5	10	2	-	-	-	-	-	8	30	MGC PVTi
	NW 1132 56 101	10	60	-	-	150	5	10	2	-	-	-	-	-	8	30	MGC PVTi
	NW 1222 56 120	12	18	-	-	83	6	12	2	-	-	-	-	-	9	30	MGC PVTi
	NW 1132 56 120	12	45	-	-	100	6	12	2	-	-	-	-	-	8	30	MGC PVTi
	NW 1232 56 120	12	18	-	-	110	6	12	2	-	-	-	-	-	9	30	MGC PVTi
	NW 1132 56 121	12	75	-	-	150	6	12	2	-	-	-	-	-	8	30	MGC PVTi
	NW 1222 56 160	16	24	-	-	92	8	16	2	-	-	-	-	-	9	30	MGC PVTi
	NW 1132 56 160	16	45	-	-	100	8	16	2	-	-	-	-	-	8	30	MGC PVTi
	NW 1232 56 160	16	24	-	-	140	8	16	2	-	-	-	-	-	9	30	MGC PVTi
	NW 1132 56 161	16	75	-	-	150	8	16	2	-	-	-	-	-	8	30	MGC PVTi
	NW 1222 56 200	20	30	-	-	104	10	20	2	-	-	-	-	-	9	30	MGC PVTi
	NW 1132 56 200	20	55	-	-	125	10	20	2	-	-	-	-	-	8	30	MGC PVTi
	NW 1232 56 200	20	30	-	-	150	10	20	2	-	-	-	-	-	9	30	MGC PVTi



Ball nose end mills	catalogue no.	Effective working length at X° of draft													γ (chip angle)	λ (helix angle)	Features	QC
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°				

no wd. | short | long | extra long

	NW 1132 56 201	20	75	-	-	150	10	20	2	-	-	-	-	-	8	30	MGC PVTi




wd. | short | long

	NW 1322 56 020	2	3	10	1.9	75	1	6	2	11.17	11.51	11.80	12.08	12.71	9	30	MGC PVTi
	NW 1322 56 030	3	4.5	12	2.9	75	1.5	6	2	13.23	13.60	13.91	14.24	14.96	9	30	MGC PVTi
	NW 1322 56 040	4	6	12	3.8	75	2	6	2	13.40	13.72	14.02	14.34	15.04	9	30	MGC PVTi
	NW 1322 56 050	5	7.5	15	4.8	75	2.5	6	2	16.47	16.85	17.22	-	-	9	30	MGC PVTi
	NW 1322 56 060	6	9	20	5.8	75	3	6	2	-	-	-	-	-	9	30	MGC PVTi
	NW 1322 56 080	8	12	26	7.8	90	4	8	2	-	-	-	-	-	9	30	MGC PVTi
	NW 1322 56 100	10	15	31	9.8	100	5	10	2	-	-	-	-	-	9	30	MGC PVTi
	NW 1322 56 120	12	18	37	11.8	110	6	12	2	-	-	-	-	-	9	30	MGC PVTi
	NW 1322 56 160	16	24	43	15.8	140	8	16	2	-	-	-	-	-	9	30	MGC PVTi

Feed per tooth (fz) | d.o.c. (ap)

Material							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
copy milling 3D							
0.4-0.8	f _z (mm)	0.005-0.0125	-	0.005-0.02	-	-	0.005-0.015
	a _p (mm)	0.005-0.055	-	0.01-0.1	-	-	0.005-0.05
1-2	f _z (mm)	0.01-0.025	-	0.01-0.04	-	-	0.01-0.03
	a _p (mm)	0.05-0.13	-	0.06-0.2	-	-	0.04-0.1
3-4	f _z (mm)	0.04-0.07	-	0.04-0.07	-	-	0.04-0.07
	a _p (mm)	0.08-0.4	-	0.06-0.4	-	-	0.08-0.2
5-6	f _z (mm)	0.08-0.12	-	0.08-0.12	-	-	0.08-0.15
	a _p (mm)	0.1-0.6	-	0.12-0.6	-	-	0.1-0.3
8	f _z (mm)	0.08-0.15	-	0.08-0.15	-	-	0.08-0.15
	a _p (mm)	0.15-0.8	-	0.15-0.8	-	-	0.15-0.4
10	f _z (mm)	0.08-0.15	-	0.08-0.15	-	-	0.08-0.2
	a _p (mm)	0.2-1	-	0.3-1	-	-	0.2-0.5
12	f _z (mm)	0.08-0.15	-	0.08-0.15	-	-	0.08-0.25
	a _p (mm)	0.2-1.2	-	0.3-1.2	-	-	0.2-0.6
16	f _z (mm)	0.1-0.25	-	0.1-0.25	-	-	0.08-0.25
	a _p (mm)	0.2-1.6	-	0.3-1.6	-	-	0.2-0.8
20	f _z (mm)	0.1-0.25	-	0.1-0.25	-	-	0.08-0.25
	a _p (mm)	0.2-2	-	0.3-2	-	-	0.2-0.8

Cutting speed (Vc in m/min)

Material							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
MGC PVTi	roughing finishing	 120 210 300 200 275 350	-	 100 225 350 180 290 400	-	-	 80 140 200 100 175 250



END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

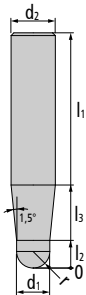
Ball nose end mills | 2 flutes | taper neck

2 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- ball nose
- long version
- l3: tapered 1.5°

Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

1.5° taper neck | strong shank




NW 1162 56 0041	0.4	0.6	25	-	75	0.2	6	2	-	-	-	-	-	9	30		MGC PVTi
NW 1162 56 010	1	1.5	25	-	75	0.5	6	2	5.00	9.51	26.14	27.06	28.14	9	30		MGC PVTi
NW 1162 56 0101	1	1.5	39	-	75	0.5	6	2	5.00	9.51	39.82	41.07	42.38	9	30		MGC PVTi
NW 1162 56 015	1.5	2.3	25	-	75	0.75	6	2	7.13	13.51	26.32	27.15	28.19	9	30		MGC PVTi
NW 1162 56 020	2	3	25	-	75	1	6	2	8.50	16.01	26.41	27.20	28.21	9	30		MGC PVTi
NW 1162 56 021	2	3	50	-	100	1	6	2	8.50	16.01	51.41	52.73	-	9	30		MGC PVTi
NW 1162 56 025	2.5	4	25	-	75	1.25	6	2	9.88	18.52	26.50	27.25	28.23	9	30		MGC PVTi
NW 1162 56 030	3	4.5	25	-	75	1.5	6	2	9.75	18.02	26.47	27.23	28.21	9	30		MGC PVTi
SW 1162 56 034	3	4.5	39	-	75	1.5	6	2	9.75	18.02	40.47	41.53	-	9	30		MGC PVTi
NW 1162 56 031	3	4.5	50	-	100	1.5	6	2	9.75	18.02	51.47	-	-	9	30		MGC PVTi
NW 1162 56 040	4	6	25	-	75	2	6	2	12.50	23.03	26.11	26.56	-	9	30		MGC PVTi
NW 1162 56 0401	4	6	39	-	75	2	6	2	12.50	23.03	40.11	-	-	9	30		MGC PVTi
NW 1162 56 041	4	6	44	-	100	2	6	2	12.50	23.03	-	-	-	9	30		MGC PVTi
NW 1162 56 050	5	7.5	25	-	75	2.5	6	2	15.25	25.45	-	-	-	9	30		MGC PVTi
NW 1162 56 051	5	7.5	50	-	90	2.5	8	2	15.25	25.45	51.21	-	-	9	30		MGC PVTi
NW 1162 56 060	6	9	35	-	75	3	8	2	18.00	33.05	36.30	-	-	9	30		MGC PVTi
NW 1162 56 061	6	9	50	-	100	3	10	2	19.51	36.04	51.36	52.01	-	9	30		MGC PVTi
NW 1162 56 080	8	12	50	-	100	4	10	2	22.01	40.06	-	-	-	9	30		MGC PVTi
NW 1162 56 081	8	12	90	-	150	4	12	2	23.51	43.06	-	-	-	9	30		MGC PVTi
NW 1162 56 100	10	15	50	-	110	5	12	2	27.51	50.08	-	-	-	9	30		MGC PVTi
NW 1162 56 101	10	15	50	-	150	5	12	2	27.51	50.08	-	-	-	9	30		MGC PVTi
NW 1162 56 121	12	18	90	-	150	6	16	2	31.51	57.09	-	-	-	9	30		MGC PVTi

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
copy milling 3D							
0.4	f _z (mm)	0.005-0.0125	-	0.005-0.02	-	-	0.005-0.015
	a _p (mm)	0.005-0.055	-	0.01-0.1	-	-	0.005-0.05
1-2.5	f _z (mm)	0.01-0.025	-	0.01-0.04	-	-	0.01-0.03
	a _p (mm)	0.05-0.13	-	0.06-0.2	-	-	0.04-0.1
3-4	f _z (mm)	0.04-0.07	-	0.04-0.07	-	-	0.04-0.07
	a _p (mm)	0.08-0.4	-	0.06-0.4	-	-	0.08-0.2
5-6	f _z (mm)	0.08-0.12	-	0.08-0.12	-	-	0.08-0.15
	a _p (mm)	0.1-0.6	-	0.12-0.6	-	-	0.1-0.3
8	f _z (mm)	0.08-0.15	-	0.08-0.15	-	-	0.08-0.15
	a _p (mm)	0.15-0.8	-	0.15-0.8	-	-	0.15-0.4
10	f _z (mm)	0.08-0.15	-	0.08-0.15	-	-	0.08-0.2
	a _p (mm)	0.2-1	-	0.3-1	-	-	0.2-0.5
12	f _z (mm)	0.08-0.15	-	0.08-0.15	-	-	0.08-0.25
	a _p (mm)	0.2-1.2	-	0.3-1.2	-	-	0.2-0.6

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
MGC PVTi	roughing finishing	 120 210 300 200 275 350	-	 100 225 350 180 290 400	-	-	 80 140 200 100 175 250



END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

Ball nose end mills | 2 flutes | spheric

2 flutes, plain shank, straight grooved

- center cutting end mill
- ball nose
- for bidirectional plunging
- with clearance between shank and flute

Ball nose end mills	catalogue no.	Effective working length at X° of draft													γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°				

wd. spherical																		
	NW 1342 56 030	3	4	12	2.9	75	1.5	6	2	12.18	12.28	12.38	12.48	12.68	8	-1		MGC PVTi
	NW 1342 56 040	4	5	16	3.8	75	2	6	2	16.25	16.37	16.50	16.63	16.90	8	-1		MGC PVTi
	NW 1342 56 050	5	6	20	4.8	100	2.5	6	2	20.35	20.51	20.67	-	-	8	-1		MGC PVTi
	NW 1342 56 060	6	7	24	5.8	100	3	6	2	-	-	-	-	-	8	-1		MGC PVTi
	NW 1342 56 080	8	9	32	7.8	100	4	8	2	-	-	-	-	-	8	-1		MGC PVTi
	NW 1342 56 100	10	11	40	9.8	125	5	10	2	-	-	-	-	-	8	-1		MGC PVTi
	NW 1342 56 120	12	13	40	11.8	125	6	12	2	-	-	-	-	-	8	-1		MGC PVTi

Feed per tooth (fz) | d.o.c. (ap)

Material							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
copy milling 3D							
3-4	f _z (mm) a _p (mm)	0.04-0.07 0.08-0.4	-	0.04-0.07 0.06-0.4	-	-	0.04-0.07 0.08-0.2
5-6	f _z (mm) a _p (mm)	0.08-0.12 0.1-0.6	-	0.08-0.12 0.12-0.6	-	-	0.08-0.15 0.1-0.3
8	f _z (mm) a _p (mm)	0.08-0.15 0.15-0.8	-	0.08-0.15 0.15-0.8	-	-	0.08-0.15 0.15-0.4
10	f _z (mm) a _p (mm)	0.08-0.15 0.2-1	-	0.08-0.15 0.3-1	-	-	0.08-0.2 0.2-0.5
12	f _z (mm) a _p (mm)	0.08-0.15 0.2-1.2	-	0.08-0.15 0.3-1.2	-	-	0.08-0.25 0.2-0.6

Cutting speed (Vc in m/min)

Material							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
MGC PVTi	roughing finishing	200 275 350	-	180 290 400	-	-	100 175 250

END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

Ball nose end mills | 4 flutes



4 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- ball nose
- short | long | extra long version
- with and without clearance between shank and flute

Ball nose end mills	catalogue no.	Effective working length at X° of draft													γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°				

no wd. | short | long | extra long

	NW 1224 56 020	2	3	-	-	57	1	6	4	3.46	3.68	3.87	4.03	4.31	9	30	MGC PVTi
	NW 1224 56 030	3	4.5	-	-	57	1.5	6	4	5.06	5.32	5.52	5.71	6.06	9	30	MGC PVTi
	NW 1224 56 0301	3	6	-	-	57	1.5	6	4	6.67	6.97	7.22	7.44	7.92	9	30	MGC PVTi
	NW 1134 56 030	3	30	-	-	60	1.5	3	4	-	-	-	-	-	8	30	MGC PVTi
	NW 1134 56 031	3	30	-	-	75	1.5	3	4	-	-	-	-	-	8	30	MGC PVTi
	NW 1224 56 040	4	6	-	-	57	2	6	4	6.64	6.93	7.16	7.36	7.80	9	30	MGC PVTi
	NW 1134 56 040	4	30	-	-	60	2	4	4	-	-	-	-	-	8	30	MGC PVTi
	NW 1134 56 041	4	30	-	-	75	2	4	4	-	-	-	-	-	8	30	MGC PVTi
	NW 1224 56 050	5	7.5	-	-	57	2.5	6	4	8.20	8.52	8.78	9.01	9.55	9	30	MGC PVTi
	NW 1134 56 050	5	35	-	-	70	2.5	5	4	-	-	-	-	-	8	30	MGC PVTi
	NW 1134 56 051	5	40	-	-	100	2.5	5	4	-	-	-	-	-	8	30	MGC PVTi
	NW 1224 56 060	6	9	-	-	57	3	6	4	-	-	-	-	-	9	30	MGC PVTi
	NW 1224 56 0601	6	12	-	-	57	3	6	4	-	-	-	-	-	9	30	MGC PVTi
	NW 1134 56 060	6	40	-	-	100	3	6	4	-	-	-	-	-	8	30	MGC PVTi
	NW 1134 56 061	6	50	-	-	150	3	6	4	-	-	-	-	-	8	30	MGC PVTi
	NW 1224 56 080	8	12	-	-	63	4	8	4	-	-	-	-	-	9	30	MGC PVTi
	NW 1134 56 080	8	40	-	-	100	4	8	4	-	-	-	-	-	8	30	MGC PVTi
	NW 1134 56 081	8	50	-	-	150	4	8	4	-	-	-	-	-	8	30	MGC PVTi
	NW 1224 56 100	10	15	-	-	72	5	10	4	-	-	-	-	-	9	30	MGC PVTi
	NW 1224 56 1001	10	20	-	-	72	5	10	4	-	-	-	-	-	9	30	MGC PVTi
NW 1134 56 100	10	45	-	-	100	5	10	4	-	-	-	-	-	8	30	MGC PVTi	
NW 1134 56 101	10	60	-	-	150	5	10	4	-	-	-	-	-	8	30	MGC PVTi	
NW 1224 56 120	12	18	-	-	83	6	12	4	-	-	-	-	-	9	30	MGC PVTi	

Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. | short | long | extra long

	NW 1224 56 1201	12	24	-	-	83	6	12	4	-	-	-	-	-	9	30	MGC PVTi	
	NW 1134 56 120	12	45	-	-	100	6	12	4	-	-	-	-	-	8	30	MGC PVTi	
	NW 1134 56 121	12	75	-	-	150	6	12	4	-	-	-	-	-	8	30	MGC PVTi	
	NW 1224 56 160	16	24	-	-	92	8	16	4	-	-	-	-	-	9	30	MGC PVTi	
	NW 1134 56 160	16	45	-	-	100	8	16	4	-	-	-	-	-	8	30	MGC PVTi	
	NW 1134 46 160	16	50	-	-	100	8	16	4	-	-	-	-	-	8	30	MGC PVTi	
	NW 1134 56 161	16	75	-	-	150	8	16	4	-	-	-	-	-	8	30	MGC PVTi	
	NW 1134 56 200	20	40	-	-	100	10	20	4	-	-	-	-	-	8	30	MGC PVTi	
	NW 1224 56 200	20	30	-	-	104	10	20	4	-	-	-	-	-	9	30	MGC PVTi	
	NW 1134 56 201	20	75	-	-	150	10	20	4	-	-	-	-	-	8	30	MGC PVTi	







wd. | long

	NW 1324 56 020	2	3	10	1.9	75	1	6	4	11.17	11.51	11.80	12.08	12.71	9	30	MGC PVTi	
	NW 1324 56 030	3	4.5	12	2.9	75	1.5	6	4	13.23	13.60	13.91	14.24	14.96	9	30	MGC PVTi	
	NW 1324 56 040	4	6	12	3.8	75	2	6	4	13.40	13.72	14.02	14.34	15.04	9	30	MGC PVTi	
	NW 1324 56 050	5	7.5	15	4.8	75	2.5	6	4	16.47	16.85	17.22	-	-	9	30	MGC PVTi	
	NW 1324 56 060	6	9	20	5.8	75	3	6	4	-	-	-	-	-	9	30	MGC PVTi	
	NW 1324 56 061	6	9	20	5.8	100	3	6	4	-	-	-	-	-	9	30	MGC PVTi	
	NW 1324 56 080	8	12	26	7.8	90	4	8	4	-	-	-	-	-	9	30	MGC PVTi	
	NW 1324 56 100	10	15	31	9.8	100	5	10	4	-	-	-	-	-	9	30	MGC PVTi	
	NW 1324 56 120	12	18	37	11.8	110	6	12	4	-	-	-	-	-	9	30	MGC PVTi	
	NW 1324 56 160	16	24	43	15.8	110	8	16	4	-	-	-	-	-	9	30	MGC PVTi	
	NW 1324 56 200	20	30	53	19.8	150	10	20	4	-	-	-	-	-	9	30	MGC PVTi	

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
copy milling 3D							
2	f _z (mm)	0.01-0.025	-	0.01-0.04	-	-	0.01-0.03
	a _p (mm)	0.05-0.13	-	0.06-0.2	-	-	0.04-0.1
3-4	f _z (mm)	0.04-0.07	-	0.04-0.07	-	-	0.04-0.07
	a _p (mm)	0.08-0.4	-	0.06-0.4	-	-	0.08-0.2
5-6	f _z (mm)	0.08-0.12	-	0.08-0.12	-	-	0.08-0.15
	a _p (mm)	0.1-0.6	-	0.12-0.6	-	-	0.1-0.3
8	f _z (mm)	0.08-0.15	-	0.08-0.15	-	-	0.08-0.15
	a _p (mm)	0.15-0.8	-	0.15-0.8	-	-	0.15-0.4
10	f _z (mm)	0.08-0.15	-	0.08-0.15	-	-	0.08-0.2
	a _p (mm)	0.2-1	-	0.3-1	-	-	0.2-0.5
12	f _z (mm)	0.08-0.15	-	0.08-0.15	-	-	0.08-0.25
	a _p (mm)	0.2-1.2	-	0.3-1.2	-	-	0.2-0.6
16	f _z (mm)	0.1-0.25	-	0.1-0.25	-	-	0.08-0.25
	a _p (mm)	0.2-1.6	-	0.3-1.6	-	-	0.2-0.8
20	f _z (mm)	0.1-0.25	-	0.1-0.25	-	-	0.08-0.25
	a _p (mm)	0.2-2	-	0.3-2	-	-	0.2-0.8

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
MGC PVTi	roughing finishing	 120 210 300  200 275 350	-	 100 225 350  180 290 400	-	-	 80 140 200  100 175 250



END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

Ball nose end mills | 4 flutes | taper neck

4 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- ball nose
- long version
- l3: tapered 1,5°

Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						




1.5° taper neck | strong shank

	NW 1164 56 030	3	4.5	25	-	75	1.5	6	4	9.75	18.02	26.47	27.23	28.21	9	30	MGC PVTi
	NW 1164 56 031	3	4.5	50	-	100	1.5	6	4	9.75	18.02	51.47	-	-	9	30	MGC PVTi
	NW 1164 56 040	4	6	25	-	75	2	6	4	12.50	23.03	26.11	26.56	-	-	-	MGC PVTi
	NW 1164 56 041	4	6	50	-	100	2	6	4	12.50	23.03	-	-	-	9	30	MGC PVTi
	NW 1164 56 050	5	7.5	25	-	75	2.5	6	4	15.25	25.45	-	-	-	9	30	MGC PVTi
	NW 1164 56 051	5	7.5	50	-	90	2.5	8	4	15.25	25.45	51.21	-	-	9	30	MGC PVTi
	NW 1164 56 060	6	9	35	-	75	3	8	4	18.00	33.05	36.30	-	-	9	30	MGC PVTi
	NW 1164 56 061	6	9	50	-	100	3	10	4	19.51	36.04	51.36	52.01	-	9	30	MGC PVTi
	NW 1164 56 080	8	12	50	-	100	4	10	4	22.01	40.06	-	-	-	9	30	MGC PVTi
	NW 1164 56 081	8	12	90	-	150	4	12	4	23.51	43.06	-	-	-	9	30	MGC PVTi
	NW 1164 56 100	10	15	50	-	110	5	12	4	27.51	50.08	-	-	-	9	30	MGC PVTi
	NW 1164 56 101	10	15	50	-	150	5	12	4	27.51	50.08	-	-	-	9	30	MGC PVTi

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
copy milling 3D							
3-4	f _z (mm)	0.04-0.07	-	0.04-0.07	-	-	0.04-0.07
	a _p (mm)	0.08-0.4	-	0.06-0.4	-	-	0.08-0.2
5-6	f _z (mm)	0.08-0.12	-	0.08-0.12	-	-	0.08-0.15
	a _p (mm)	0.1-0.6	-	0.12-0.6	-	-	0.1-0.3
8	f _z (mm)	0.08-0.15	-	0.08-0.15	-	-	0.08-0.15
	a _p (mm)	0.15-0.8	-	0.15-0.8	-	-	0.15-0.4
10	f _z (mm)	0.08-0.15	-	0.08-0.15	-	-	0.08-0.2
	a _p (mm)	0.2-1	-	0.3-1	-	-	0.2-0.5

Cutting speed (Vc in m/min)


Material							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
MGC PVTi	roughing finishing	 120 210 300 200 275 350	-	 100 225 350 180 290 400	-	-	 80 140 200 100 175 250



END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

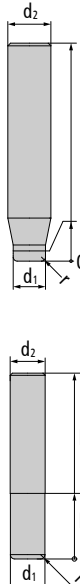


Toric / corner radius end mills | 2 flutes

2 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
-  corner radius end mill
- short | long version
- with and without clearance between shank and flute

Toric / corner radius end mills	catalogue no.	Effective working length at X° of draft													γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°				

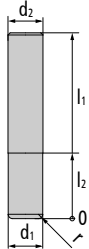
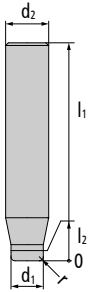
no wd. | short

	NW 0332 56 00501	0.5	0.8	-	-	50	0.1	4	2	0.74	0.87	0.98	1.09	1.29	9	30	MGC PVTi
	NW 0332 56 01001	1	1.5	-	-	50	0.1	4	2	1.90	2.09	2.25	2.39	2.65	9	30	MGC PVTi
	NW 0332 56 01002	1	1.5	-	-	50	0.2	4	2	1.88	2.07	2.23	2.37	2.62	9	30	MGC PVTi
	NW 0332 56 01502	1.5	2.3	-	-	50	0.2	4	2	2.77	3.00	3.18	3.34	3.63	9	30	MGC PVTi
	NW 0332 56 02002	2	3	-	-	50	0.2	4	2	3.54	3.79	3.99	4.17	4.50	9	30	MGC PVTi
	NW 0332 56 02003	2	3	-	-	50	0.3	4	2	3.53	3.78	3.98	4.15	4.48	9	30	MGC PVTi
	NW 0332 56 020	2	3	-	-	50	0.5	4	2	3.51	3.75	3.95	4.12	4.43	9	30	MGC PVTi
	NW 0172 56 020	2	3	-	-	57	0.6	6	2	3.50	3.74	3.93	4.10	4.41	2	30	 MGC PVTi
	NW 0332 56 03002	3	4.5	-	-	50	0.2	4	2	5.16	5.45	5.69	5.90	6.36	9	30	MGC PVTi
	NW 0332 56 03003	3	4.5	-	-	50	0.3	4	2	5.15	5.44	5.68	5.89	6.34	9	30	MGC PVTi
	NW 0332 56 030	3	4.5	-	-	50	0.5	4	2	5.14	5.42	5.66	5.86	6.29	9	30	MGC PVTi
	NW 0332 56 031	3	4.5	-	-	50	1	4	2	5.10	5.37	5.59	5.78	6.18	9	30	MGC PVTi
	NW 0332 56 0311	3	4.5	-	-	57	1	6	2	5.10	5.37	5.59	5.78	6.18	9	30	MGC PVTi
	NW 0332 56 04002	4	6	-	-	50	0.2	4	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0332 56 040021	4	6	-	-	57	0.2	6	2	6.75	7.09	7.36	7.63	8.23	9	30	MGC PVTi
	NW 0332 56 040	4	6	-	-	50	0.5	4	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0332 56 0401	4	6	-	-	57	0.5	6	2	6.74	7.07	7.33	7.58	8.16	9	30	MGC PVTi
	NW 0332 56 041	4	6	-	-	50	1	4	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0332 56 0411	4	6	-	-	57	1	6	2	6.70	7.02	7.27	7.51	8.04	9	30	MGC PVTi
	NW 0172 56 040	4	6	-	-	57	1.5	6	2	6.67	6.97	7.22	7.44	7.92	2	30	 MGC PVTi
NW 0332 56 05002	5	7.5	-	-	57	0.2	6	2	8.34	8.71	9.02	9.35	-	9	30	MGC PVTi	
NW 0332 56 050	5	7.5	-	-	57	0.5	6	2	8.32	8.69	8.99	9.31	10.02	9	30	MGC PVTi	
NW 0332 56 051	5	7.5	-	-	57	1	6	2	8.30	8.65	8.94	9.23	9.91	9	30	MGC PVTi	

Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

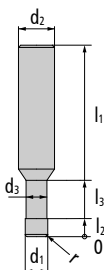
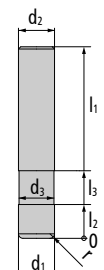




no wd. | short

	NW 0332 56 06003	6	9	-	-	57	0.3	6	2	-	-	-	-	-	9	30		MGC PVTi
	NW 0332 56 060	6	9	-	-	57	0.5	6	2	-	-	-	-	-	9	30		MGC PVTi
	NW 0332 56 061	6	9	-	-	57	1	6	2	-	-	-	-	-	9	30		MGC PVTi
	NW 0332 56 062	6	9	-	-	57	1.5	6	2	-	-	-	-	-	9	30		MGC PVTi
	NW 0172 56 060	6	9	-	-	57	2	6	2	-	-	-	-	-	2	30		MGC PVTi
	NW 0172 56 061	6	9	-	-	57	2.5	6	2	-	-	-	-	-	2	30		MGC PVTi
	NW 0332 56 080	8	12	-	-	63	0.5	8	2	-	-	-	-	-	9	30		MGC PVTi
	NW 0332 56 081	8	12	-	-	63	1	8	2	-	-	-	-	-	9	30		MGC PVTi
	NW 0332 56 082	8	12	-	-	63	1.5	8	2	-	-	-	-	-	9	30		MGC PVTi
	NW 0332 56 083	8	12	-	-	63	2	8	2	-	-	-	-	-	9	30		MGC PVTi
	NW 0172 56 080	8	12	-	-	63	2.5	8	2	-	-	-	-	-	2	30		MGC PVTi
	NW 0332 56 100	10	15	-	-	72	0.5	10	2	-	-	-	-	-	9	30		MGC PVTi
	NW 0332 56 101	10	15	-	-	72	1	10	2	-	-	-	-	-	9	30		MGC PVTi
	NW 0332 56 102	10	15	-	-	72	1.5	10	2	-	-	-	-	-	9	30		MGC PVTi
	NW 0332 56 103	10	15	-	-	72	2	10	2	-	-	-	-	-	9	30		MGC PVTi
	NW 0172 56 100	10	15	-	-	72	2.5	10	2	-	-	-	-	-	2	30		MGC PVTi
	NW 0172 56 101	10	15	-	-	72	3	10	2	-	-	-	-	-	2	30		MGC PVTi
	NW 0172 56 103	10	15	-	-	72	4	10	2	-	-	-	-	-	2	30		MGC PVTi
	NW 0332 56 120	12	18	-	-	83	0.5	12	2	-	-	-	-	-	9	30		MGC PVTi
	NW 0332 56 1206	12	18	-	-	83	0.6	12	2	-	-	-	-	-	9	30		MGC PVTi
	NW 0332 56 121	12	18	-	-	83	1	12	2	-	-	-	-	-	9	30		MGC PVTi
	NW 0332 56 122	12	18	-	-	83	1.5	12	2	-	-	-	-	-	9	30		MGC PVTi
	NW 0332 56 123	12	18	-	-	83	2	12	2	-	-	-	-	-	9	30		MGC PVTi
	NW 0172 56 121	12	18	-	-	83	3	12	2	-	-	-	-	-	2	30		MGC PVTi
	NW 0172 56 123	12	18	-	-	83	4	12	2	-	-	-	-	-	2	30		MGC PVTi
	NW 0172 56 124	12	18	-	-	83	5	12	2	-	-	-	-	-	2	30		MGC PVTi



Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	QC
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

wd. | short | long

 	NW 0362 56 020	2	3	10	1.9	75	0.5	6	2	11.19	11.54	11.83	12.14	12.79	9	30	MGC PVTi
	NW 0362 56 030	3	4.5	12	2.9	75	0.5	6	2	13.26	13.65	14.00	14.35	15.13	9	30	MGC PVTi
	NW 0362 56 031	3	4.5	12	2.9	75	1	6	2	13.24	13.62	13.95	14.30	15.05	9	30	MGC PVTi
	NW 0362 56 040	4	6	12	3.8	75	0.5	6	2	13.44	13.79	14.14	14.50	15.29	9	30	MGC PVTi
	NW 0362 56 041	4	6	12	3.8	75	1	6	2	13.43	13.77	14.10	14.45	15.21	9	30	MGC PVTi
	NW 0362 56 050	5	7.5	15	4.8	75	0.5	6	2	16.53	16.95	17.37	-	-	9	30	MGC PVTi
	NW 0362 56 051	5	7.5	15	4.8	75	1	6	2	16.52	16.92	17.33	-	-	9	30	MGC PVTi
	NW 0362 56 060	6	9	20	5.8	75	0.5	6	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0362 56 061	6	9	20	5.8	75	1	6	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0362 56 0611	6	9	20	5.8	100	1	6	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0362 56 062	6	9	20	5.8	75	1.5	6	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0182 56 060	6	9	20	5.8	75	2	6	2	-	-	-	-	-	1	30	 MGC PVTi
	NW 0182 56 061	6	9	20	5.8	75	2.5	6	2	-	-	-	-	-	1	30	 MGC PVTi
	NW 0362 56 080	8	12	26	7.8	90	0.5	8	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0362 56 081	8	12	26	7.8	90	1	8	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0362 56 082	8	12	26	7.8	90	1.5	8	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0362 56 083	8	12	26	7.8	90	2	8	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0182 56 080	8	12	26	7.8	90	2.5	8	2	-	-	-	-	-	1	30	 MGC PVTi
	NW 0182 56 081	8	12	26	7.8	90	3	8	2	-	-	-	-	-	1	30	 MGC PVTi
	NW 0362 56 100	10	15	31	9.8	100	0.5	10	2	-	-	-	-	-	9	30	MGC PVTi
SWV 0362 56 10061	10	15	61	9.8	100	0.5	10	2	-	-	-	-	-	9	30	MGC PVTi	
NW 0362 56 101	10	15	31	9.8	100	1	10	2	-	-	-	-	-	9	30	MGC PVTi	
NW 0362 56 102	10	15	31	9.8	100	1.5	10	2	-	-	-	-	-	9	30	MGC PVTi	

Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						
wd. short long																				
	NV 0362 56 103	10	15	31	9.8	100	2	10	2	-	-	-	-	-	9	30		MGC PVTi		
	NV 0182 56 100	10	15	31	9.8	100	2.5	10	2	-	-	-	-	-	1	30		MGC PVTi		
	NV 0182 56 101	10	15	31	9.8	100	3	10	2	-	-	-	-	-	1	30		MGC PVTi		
	NV 0182 56 103	10	15	31	9.8	100	4	10	2	-	-	-	-	-	1	30		MGC PVTi		
	NV 0362 56 120	12	18	37	11.8	110	0.5	12	2	-	-	-	-	-	9	30		MGC PVTi		
	NV 0362 56 121	12	18	37	11.8	110	1	12	2	-	-	-	-	-	9	30		MGC PVTi		
	NV 0362 56 122	12	18	37	11.8	110	1.5	12	2	-	-	-	-	-	9	30		MGC PVTi		
	NV 0362 56 123	12	18	37	11.8	110	2	12	2	-	-	-	-	-	9	30		MGC PVTi		
	SW 0362 56 12370	12	18	37	11.8	110	2	12	2	-	-	-	-	-	9	30		MGC PVTi		
	NV 0182 56 123	12	18	37	11.8	110	4	12	2	-	-	-	-	-	1	30		MGC PVTi		
	NV 0182 56 124	12	18	37	11.8	110	5	12	2	-	-	-	-	-	1	30		MGC PVTi		

Feed per tooth (fz) | d.o.c. (ap)

Material							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
copy milling 3D							
0.5	f _z (mm)	0.005-0.02	-	0.005-0.02	-	-	0.005-0.015
	a _p (mm)	0.005-0.1	-	0.01-0.1	-	-	0.005-0.05
1-2	f _z (mm)	0.01-0.04	-	0.01-0.04	-	-	0.01-0.03
	a _p (mm)	0.05-0.2	-	0.06-0.2	-	-	0.04-0.1
3-4	f _z (mm)	0.04-0.07	-	0.04-0.07	-	-	0.04-0.07
	a _p (mm)	0.08-0.4	-	0.06-0.4	-	-	0.08-0.2
5-6	f _z (mm)	0.08-0.12	-	0.08-0.12	-	-	0.08-0.15
	a _p (mm)	0.1-0.6	-	0.12-0.6	-	-	0.1-0.3
8	f _z (mm)	0.08-0.115	-	0.08-0.15	-	-	0.08-0.15
	a _p (mm)	0.15-0.525	-	0.15-0.8	-	-	0.15-0.4
10	f _z (mm)	0.08-0.115	-	0.08-0.15	-	-	0.08-0.2
	a _p (mm)	0.2-0.65	-	0.3-1	-	-	0.2-0.5
12	f _z (mm)	0.08-0.115	-	0.08-0.15	-	-	0.08-0.25
	a _p (mm)	0.2-0.75	-	0.3-1.2	-	-	0.2-0.6

Cutting speed (Vc in m/min)

Material							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
MGC PVTi	roughing finishing	120 210 300 200 275 350	-	100 225 350 180 290 400	-	-	80 140 200 100 175 250



END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

Toric / corner radius end mills | 2 flutes | taper neck

2 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- long version
- l3: tapered 1.5°

Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

1.5° taper neck | strong shank






NW 0162 56 020	2	3	25	-	75	0.2	6	2	6.65	13.10	26.32	27.17	28.21	9	30		MGC PVTi
NW 0162 56 0206	2	3	39	-	75	0.2	6	2	-	-	-	-	-	9	30		MGC PVTi
NW 0162 56 022	2	3	25	-	75	0.5	6	2	6.50	12.51	26.28	27.10	28.18	9	30		MGC PVTi
NW 0162 56 0221	2	3	39	-	75	0.5	6	2	6.50	12.51	39.97	41.14	-	9	30		MGC PVTi
NW 0162 56 021	2	3	50	-	100	0.5	6	2	6.50	12.51	51.28	52.68	-	9	30		MGC PVTi
NW 0162 56 03005	3	4.5	25	-	75	0.5	6	2	8.75	17.00	26.15	26.93	27.92	9	30		MGC PVTi
NW 0162 56 030	3	4.5	25	-	75	1	6	2	8.50	16.01	26.10	26.88	27.88	9	30		MGC PVTi
NW 0162 56 0301	3	4.5	39	-	75	1	6	2	8.50	16.01	40.10	41.19	-	9	30		MGC PVTi
NW 0162 56 031	3	4.5	50	-	100	1	6	2	8.50	16.01	50.87	-	-	9	30		MGC PVTi
NW 0162 56 04005	4	6	25	-	75	0.5	6	2	11.00	21.50	26.11	26.58	-	9	30		MGC PVTi
NW 0162 56 040	4	6	25	-	75	1	6	2	10.75	20.51	26.07	26.56	-	9	30		MGC PVTi
NW 0162 56 041	4	6	44	-	100	1	6	2	10.75	20.51	-	-	-	9	30		MGC PVTi
NW 0162 56 050	5	7.5	25	-	75	1	6	2	13.75	25.34	-	-	-	9	30		MGC PVTi
NW 0162 56 051	5	7.5	50	-	90	1	8	2	13.75	26.51	51.21	-	-	9	30		MGC PVTi
NW 0162 56 060	6	9	35	-	75	1	8	2	16.00	31.01	36.30	-	-	9	30		MGC PVTi
NW 0162 56 061	6	9	50	-	100	1	10	2	16.00	31.01	51.21	52.00	-	9	30		MGC PVTi
NW 0162 56 080	8	12	50	-	100	2	10	2	20.00	38.03	-	-	-	9	30		MGC PVTi
NW 0162 56 081	8	12	90	-	150	2	12	2	20.00	38.03	-	-	-	9	30		MGC PVTi
NW 0162 56 100	10	15	50	-	110	2	12	2	24.50	47.02	-	-	-	9	30		MGC PVTi
NW 0162 56 101	10	15	50	-	150	2	12	2	24.50	47.02	-	-	-	9	30		MGC PVTi

Feed per tooth (fz) | d.o.c. (ap)

Material							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
copy milling 3D							
2	f _z (mm)	0.01-0.04	-	0.01-0.04	-	-	0.01-0.03
	a _p (mm)	0.05-0.2	-	0.06-0.2	-	-	0.04-0.1
3-4	f _z (mm)	0.04-0.07	-	0.04-0.07	-	-	0.04-0.07
	a _p (mm)	0.08-0.4	-	0.06-0.4	-	-	0.08-0.2
5-6	f _z (mm)	0.08-0.12	-	0.08-0.12	-	-	0.08-0.15
	a _p (mm)	0.1-0.6	-	0.12-0.6	-	-	0.1-0.3
8	f _z (mm)	0.08-0.115	-	0.08-0.15	-	-	0.08-0.15
	a _p (mm)	0.15-0.525	-	0.15-0.8	-	-	0.15-0.4
10	f _z (mm)	0.08-0.115	-	0.08-0.15	-	-	0.08-0.2
	a _p (mm)	0.2-0.65	-	0.3-1	-	-	0.2-0.5

Cutting speed (Vc in m/min)

Material								
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel	
MGC PVTi	roughing finishing	 120 210 300 200 275 350	-	 100 225 350 180 290 400	-	-	-	 80 140 200 100 175 250



END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

Toric / corner radius end mills | 2 flutes | spheric

2 flutes, plain shank, straight grooved

- corner radius end mill
- for bidirectional plunging
- long version
- with clearance between shank and flute

Toric / corner radius end mills	catalogue no.	Effective working length at X° of draft													γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°				

wd. long																			
	NW 1362 56 020	2	2	8	1.9	75	0.5	6	2	8.12	8.18	8.25	8.32	8.47	6	-1		MGC PVTi	
	NW 1362 56 030	3	3	12	2.9	75	0.75	6	2	12.15	12.25	12.35	12.46	12.68	6	-1		MGC PVTi	
	NW 1362 56 040	4	4	16	3.8	75	1	6	2	16.23	16.37	16.51	16.65	16.94	6	-1		MGC PVTi	
	NW 1362 56 050	5	5	20	4.8	100	1.25	6	2	20.27	20.44	-	-	-	6	-1		MGC PVTi	
	NW 1362 56 060	6	6	24	5.8	100	1.5	6	2	-	-	-	-	-	6	-1		MGC PVTi	
	NW 1362 56 080	8	8	32	7.8	100	2	8	2	-	-	-	-	-	6	-1		MGC PVTi	
	NW 1362 56 100	10	10	40	9.8	125	2.5	10	2	-	-	-	-	-	6	-1		MGC PVTi	
	NW 1362 56 120	12	12	48	11.8	125	3	12	2	-	-	-	-	-	6	-1		MGC PVTi	
	NW 1362 56 160	16	16	56	15.8	165	4	16	2	-	-	-	-	-	6	-1		MGC PVTi	

Feed per tooth (fz) | d.o.c. (ap)

Material													
Diameter	Feed per tooth d.o.c.	steel		stainless steel		cast iron		non-ferrous materials		high-temperature alloys		hardened steel	
		copy milling 3D											
2	f _z (mm)	0.01-0.04		-		0.01-0.025		-		-		0.01	
	a _p (mm)	0.05-0.2		-		0.06-0.13		-		-		0.04	
3-4	f _z (mm)	0.04-0.07		-		0.04-0.055		-		-		0.04	
	a _p (mm)	0.08-0.4		-		0.06-0.26		-		-		0.08	
5-6	f _z (mm)	0.08-0.12		-		0.08-0.1		-		-		0.08-0.1	
	a _p (mm)	0.1-0.6		-		0.12-0.375		-		-		0.1-0.2	
8	f _z (mm)	0.08-0.15		-		0.08-0.115		-		-		0.08-0.1	
	a _p (mm)	0.15-0.8		-		0.15-0.525		-		-		0.15-0.275	
10	f _z (mm)	0.08-0.15		-		0.08-0.115		-		-		0.08-0.1	
	a _p (mm)	0.2-1		-		0.3-0.65		-		-		0.2-0.35	
12	f _z (mm)	0.08-0.15		-		0.08-0.115		-		-		0.08-0.115	
	a _p (mm)	0.2-1.2		-		0.3-0.75		-		-		0.2-0.4	
16	f _z (mm)	0.1-0.175		-		0.1-0.175		-		-		0.08-0.115	
	a _p (mm)	0.2-0.95		-		0.3-0.95		-		-		0.2-0.5	

Cutting speed (Vc in m/min)

Material							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
MGC PVTi	roughing finishing	▼ - 200 275 350	-	▼ - 180 290 400	-	-	▼ - 100 175 250



END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

Toric / corner radius end mills | 3 flutes

3 flutes, plain shank, 30° right hand helix angle

- corner radius end mill
- short | long version
- with and without clearance between shank and flute

Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. | short

	NW 0163 57 060	6	12	-	-	57	2.5	6	3	-	-	-	-	-	1	30		MGC PVCC
	NW 0163 57 080	8	16	-	-	63	3	8	3	-	-	-	-	-	2	30		MGC PVCC
	NW 0163 57 100	10	20	-	-	72	4	10	3	-	-	-	-	-	2	30		MGC PVCC
	NW 0163 57 120	12	24	-	-	83	5	12	3	-	-	-	-	-	2	30		MGC PVCC
	NW 0163 57 160	16	24	-	-	92	7	16	3	-	-	-	-	-	2	30		MGC PVCC



wd. | long

	NW 0183 57 060	6	12	20	5.8	75	2	6	3	-	-	-	-	-	1,5	30		MGC PVCC
	NW 0183 57 061	6	12	20	5.8	75	2.5	6	3	-	-	-	-	-	1,5	30		MGC PVCC
	NW 0183 57 080	8	16	26	7.8	90	2.5	8	3	-	-	-	-	-	1,5	30		MGC PVCC
	NW 0183 57 081	8	16	26	7.8	90	3	8	3	-	-	-	-	-	1,5	30		MGC PVCC
	NW 0183 57 100	10	20	31	9.8	100	2.5	10	3	-	-	-	-	-	1,5	30		MGC PVCC
	NW 0183 57 101	10	20	31	9.8	100	3	10	3	-	-	-	-	-	1,5	30		MGC PVCC
	NW 0183 57 103	10	20	31	9.8	100	4	10	3	-	-	-	-	-	1,5	30		MGC PVCC
	NW 0183 57 120	12	24	37	11.8	110	2.5	12	3	-	-	-	-	-	1,5	30		MGC PVCC
	NW 0183 57 123	12	24	37	11.8	110	4	12	3	-	-	-	-	-	1,5	30		MGC PVCC
	NW 0183 57 124	12	24	37	11.8	110	5	12	3	-	-	-	-	-	1,5	30		MGC PVCC

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
copy milling 3D							
6	f _z (mm)	0.08-0.12	-	0.08-0.1	-	-	-
	a _p (mm)	0.1-0.6	-	0.12-0.375	-	-	-
8	f _z (mm)	0.08-0.15	-	0.08-0.115	-	-	-
	a _p (mm)	0.15-0.8	-	0.15-0.525	-	-	-
10	f _z (mm)	0.08-0.15	-	0.08-0.115	-	-	-
	a _p (mm)	0.2-1	-	0.3-0.65	-	-	-
12	f _z (mm)	0.08-0.15	-	0.08-0.115	-	-	-
	a _p (mm)	0.2-1.2	-	0.3-0.75	-	-	-
16	f _z (mm)	0.1-0.175	-	0.1-0.175	-	-	-
	a _p (mm)	0.2-0.95	-	0.3-0.95	-	-	-

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
MGC PVCC	roughing finishing	 - 150 250 350	-	 - 150 275 400	-	-	-



END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

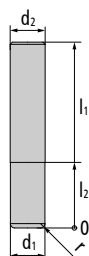
Toric / corner radius end mills | 4 flutes

4 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- short | long version
- with and without clearance between shank and flute

Toric / corner radius end mills	catalogue no.	Effective working length at X° of draft											γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°				

no wd. | short



NW 0334 56 02002	2	3	-	-	50	0.2	4	4	3.54	3.79	3.99	4.17	4.50	9	30	MGC PVTi
NW 0334 56 020	2	3	-	-	50	0.5	4	4	3.51	3.75	3.95	4.12	4.43	9	30	MGC PVTi
NW 0334 56 03002	3	4.5	-	-	50	0.2	4	4	5.16	5.45	5.69	5.90	6.36	9	30	MGC PVTi
NW 0334 56 03003	3	4.5	-	-	50	0.3	4	4	5.15	5.44	5.68	5.89	6.34	9	30	MGC PVTi
NW 0334 56 030	3	4.5	-	-	50	0.5	4	4	5.14	5.42	5.66	5.86	6.29	9	30	MGC PVTi
NW 0334 56 03005	3	4.5	-	-	57	0.5	6	4	5.14	5.42	5.66	5.86	6.29	9	30	MGC PVTi
NW 0334 56 031	3	4.5	-	-	50	1	4	4	5.10	5.37	5.59	5.78	6.18	9	30	MGC PVTi
NW 0334 56 04002	4	6	-	-	50	0.2	4	4	-	-	-	-	-	9	30	MGC PVTi
NW 0334 56 040	4	6	-	-	50	0.5	4	4	-	-	-	-	-	9	30	MGC PVTi
NW 0334 56 041	4	6	-	-	50	1	4	4	-	-	-	-	-	9	30	MGC PVTi
NW 0334 56 05002	5	7.5	-	-	57	0.2	6	4	8.34	8.71	9.02	9.35	-	9	30	MGC PVTi
NW 0334 56 050	5	7.5	-	-	57	0.5	6	4	8.32	8.69	8.99	9.31	10.02	9	30	MGC PVTi
NW 0334 56 051	5	7.5	-	-	57	1	6	4	8.30	8.65	8.94	9.23	9.91	9	30	MGC PVTi
NW 0334 56 06002	6	9	-	-	57	0.2	6	4	-	-	-	-	-	9	30	MGC PVTi
NW 0334 56 06003	6	9	-	-	57	0.3	6	4	-	-	-	-	-	9	30	MGC PVTi
NW 0334 56 060	6	9	-	-	57	0.5	6	4	-	-	-	-	-	9	30	MGC PVTi
NW 0334 56 061	6	9	-	-	57	1	6	4	-	-	-	-	-	9	30	MGC PVTi
NW 0334 56 062	6	9	-	-	57	1.5	6	4	-	-	-	-	-	9	30	MGC PVTi
NW 0334 56 080	8	12	-	-	63	0.5	8	4	-	-	-	-	-	9	30	MGC PVTi
NW 0334 56 081	8	12	-	-	63	1	8	4	-	-	-	-	-	9	30	MGC PVTi
NW 0334 56 082	8	12	-	-	63	1.5	8	4	-	-	-	-	-	9	30	MGC PVTi
NW 0334 56 083	8	12	-	-	63	2	8	4	-	-	-	-	-	9	30	MGC PVTi
NW 0334 56 100	10	15	-	-	72	0.5	10	4	-	-	-	-	-	9	30	MGC PVTi

Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. | short

	NVW 0334 56 101	10	15	-	-	72	1	10	4	-	-	-	-	-	9	30	MGC PVTi	
	NVW 0334 56 102	10	15	-	-	72	1.5	10	4	-	-	-	-	-	9	30	MGC PVTi	
	NVW 0334 56 103	10	15	-	-	72	2	10	4	-	-	-	-	-	9	30	MGC PVTi	
	NVW 0334 56 120	12	18	-	-	83	0.5	12	4	-	-	-	-	-	9	30	MGC PVTi	
	NVW 0334 56 121	12	18	-	-	83	1	12	4	-	-	-	-	-	9	30	MGC PVTi	
	NVW 0334 56 122	12	18	-	-	83	1.5	12	4	-	-	-	-	-	9	30	MGC PVTi	
	NVW 0334 56 123	12	18	-	-	83	2	12	4	-	-	-	-	-	9	30	MGC PVTi	
	NVW 0334 56 163	16	24	-	-	92	2	16	4	-	-	-	-	-	9	30	MGC PVTi	

wd. | long

	NVW 0364 56 020	2	3	10	1.9	75	0.5	6	4	11.19	11.54	11.83	12.14	12.79	9	30	MGC PVTi
	NVW 0364 56 030	3	4.5	12	2.9	75	0.5	6	4	13.26	13.65	14.00	14.35	15.13	9	30	MGC PVTi
	NVW 0364 56 031	3	4.5	12	2.9	75	1	6	4	13.24	13.62	13.95	14.30	15.05	9	30	MGC PVTi
	NVW 0364 56 040	4	6	12	3.8	75	0.5	6	4	13.44	13.79	14.14	14.50	15.29	9	30	MGC PVTi
	NVW 0364 56 041	4	6	12	3.8	75	1	6	4	13.43	13.77	14.10	14.45	15.21	9	30	MGC PVTi
	NVW 0364 56 050	5	7.5	15	4.8	75	0.5	6	4	16.53	16.95	17.37	-	-	9	30	MGC PVTi
	NVW 0364 56 051	5	7.5	15	4.8	75	1	6	4	16.52	16.92	17.33	-	-	9	30	MGC PVTi
	NVW 0364 56 060	6	9	20	5.8	75	0.5	6	4	-	-	-	-	-	9	30	MGC PVTi
	NVW 0364 56 061	6	9	20	5.8	75	1	6	4	-	-	-	-	-	9	30	MGC PVTi
	NVW 0364 56 062	6	9	20	5.8	75	1.5	6	4	-	-	-	-	-	9	30	MGC PVTi
	NVW 0364 56 080	8	12	26	7.8	90	0.5	8	4	-	-	-	-	-	9	30	MGC PVTi
	NVW 0364 56 081	8	12	26	7.8	90	1	8	4	-	-	-	-	-	9	30	MGC PVTi
	NVW 0364 56 082	8	12	26	7.8	90	1.5	8	4	-	-	-	-	-	9	30	MGC PVTi
	NVW 0364 56 083	8	12	26	7.8	90	2	8	4	-	-	-	-	-	9	30	MGC PVTi
	NVW 0364 56 100	10	15	31	9.8	100	0.5	10	4	-	-	-	-	-	9	30	MGC PVTi
	NVW 0364 56 101	10	15	31	9.8	100	1	10	4	-	-	-	-	-	9	30	MGC PVTi
	NVW 0364 56 102	10	15	31	9.8	100	1.5	10	4	-	-	-	-	-	9	30	MGC PVTi

Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	QC
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						
wd. long																				
	NW 0364 56 103	10	15	31	9.8	100	2	10	4	-	-	-	-	-	9	30	MGC PVTi			
	NW 0364 56 120	12	18	37	11.8	110	0.5	12	4	-	-	-	-	-	9	30	MGC PVTi			
	NW 0364 56 121	12	18	37	11.8	110	1	12	4	-	-	-	-	-	9	30	MGC PVTi			
	NW 0364 56 122	12	18	37	11.8	110	1.5	12	4	-	-	-	-	-	9	30	MGC PVTi			
	NW 0364 56 123	12	18	37	11.8	110	2	12	4	-	-	-	-	-	9	30	MGC PVTi			

Feed per tooth (fz) | d.o.c. (ap)

Material							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
copy milling 3D							
2	f _z (mm) a _p (mm)	0.01-0.04 0.05-0.2	-	0.01-0.04 0.06-0.2	-	-	0.01-0.03 0.04-0.1
3-4	f _z (mm) a _p (mm)	0.04-0.07 0.08-0.4	-	0.04-0.07 0.06-0.4	-	-	0.04-0.07 0.08-0.2
5-6	f _z (mm) a _p (mm)	0.08-0.12 0.1-0.6	-	0.08-0.12 0.12-0.6	-	-	0.08-0.15 0.1-0.3
8	f _z (mm) a _p (mm)	0.08-0.115 0.15-0.525	-	0.08-0.15 0.15-0.8	-	-	0.08-0.15 0.15-0.4
10	f _z (mm) a _p (mm)	0.08-0.115 0.2-0.65	-	0.08-0.15 0.3-1	-	-	0.08-0.2 0.2-0.5
12	f _z (mm) a _p (mm)	0.08-0.115 0.2-0.75	-	0.08-0.15 0.3-1.2	-	-	0.08-0.25 0.2-0.6
16	f _z (mm) a _p (mm)	0.1-0.175 0.2-0.95	-	0.1-0.25 0.3-1.6	-	-	0.08-0.25 0.2-0.8

Cutting speed (Vc in m/min)

Material							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
MGC PVTi	roughing finishing	120 210 300 200 275 350	-	100 225 350 180 290 400	-	-	80 140 200 100 175 250

END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

Toric / corner radius end mills | 4 flutes | taper neck



4 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- long version
- I3: tapered 1.5°




Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft				γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°					

1.5° taper neck strong shank																		
	NV 0164 56 030	3	4.5	25	-	75	1	6	4	8.50	16.01	26.10	26.88	27.88	9	30		MGC PVTi
	NV 0164 56 031	3	4.5	50	-	100	1	6	4	8.50	16.01	50.87	-	-	9	30		MGC PVTi
	NV 0164 56 040	4	6	25	-	75	1	6	4	10.75	20.51	26.07	26.56	-	9	30		MGC PVTi
	NV 0164 56 041	4	6	50	-	100	1	6	4	10.75	20.51	-	-	-	9	30		MGC PVTi
	NV 0164 56 050	5	7.5	25	-	75	1	6	4	13.75	25.34	-	-	-	9	30		MGC PVTi
	NV 0164 56 051	5	7.5	50	-	90	1	8	4	13.75	26.51	51.21	-	-	9	30		MGC PVTi
	NV 0164 56 052	5	6	25	-	75	1.5	6	4	-	-	-	-	-	9	30		MGC PVTi
	NV 0164 56 060	6	9	35	-	75	1	8	4	16.00	31.01	36.30	-	-	9	30		MGC PVTi
	NV 0164 56 061	6	9	50	-	100	1	10	4	16.00	31.01	51.21	52.00	-	9	30		MGC PVTi
	NV 0164 56 080	8	12	50	-	100	2	10	4	20.00	38.03	-	-	-	9	30		MGC PVTi
	NV 0164 56 081	8	12	90	-	150	2	12	4	20.00	38.03	-	-	-	9	30		MGC PVTi
	NV 0164 56 100	10	15	50	-	110	2	12	4	24.50	47.02	-	-	-	9	30		MGC PVTi
	NV 0164 56 101	10	15	50	-	150	2	12	4	24.50	47.02	-	-	-	9	30		MGC PVTi

Feed per tooth (fz) | d.o.c. (ap)

Material							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
		copy milling 3D					
3-4	f _z (mm)	0.04-0.07	-	0.04-0.07	-	-	0.04-0.07
	a _p (mm)	0.08-0.4	-	0.06-0.4	-	-	0.08-0.2
5-6	f _z (mm)	0.08-0.12	-	0.08-0.12	-	-	0.08-0.15
	a _p (mm)	0.1-0.6	-	0.12-0.6	-	-	0.1-0.3
8	f _z (mm)	0.08-0.115	-	0.08-0.15	-	-	0.08-0.15
	a _p (mm)	0.15-0.525	-	0.15-0.8	-	-	0.15-0.4
10	f _z (mm)	0.08-0.115	-	0.08-0.15	-	-	0.08-0.2
	a _p (mm)	0.2-0.65	-	0.3-1	-	-	0.2-0.5

Cutting speed (Vc in m/min)

Material								
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel	
MGC PVTi	roughing finishing	 120 210 300 200 275 350	-	 100 225 350 180 290 400	-	-	-	 80 140 200 100 175 250

END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

End mills | 2 flutes



2 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- straight face
- with chamfer
- short | long | extra long version
- with and without clearance between shank and flute

End mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. | short | extra long

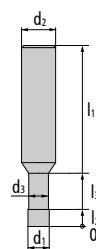
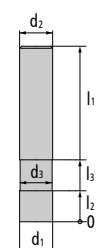
	NV 0222 56 0041	0.4	0.6	-	-	50	-	4	2	0.88	1.02	1.14	1.26	1.47	9	30	MGC PVTi
	NV 0222 56 0051	0.5	0.75	-	-	50	-	4	2	1.05	1.21	1.34	1.46	1.68	9	30	MGC PVTi
	NV 0222 56 0061	0.6	0.9	-	-	50	-	4	2	1.23	1.39	1.53	1.66	1.89	9	30	MGC PVTi
	NV 0222 56 0081	0.8	1.2	-	-	50	-	4	2	1.60	1.75	1.90	2.04	2.29	9	30	MGC PVTi
	NV 0222 56 0101	1	1.5	-	-	50	-	4	2	1.91	2.10	2.27	2.41	2.67	9	30	MGC PVTi
	NV 0222 56 0152	1.5	2.5	-	-	50	-	4	2	2.74	2.97	3.15	3.32	3.61	9	30	MGC PVTi
	NV 0222 56 0151	1.5	2.5	-	-	57	-	6	2	3.01	3.25	3.44	3.62	3.92	9	30	MGC PVTi
	NV 0222 56 020	2	3	-	-	50	-	4	2	3.55	3.81	4.02	4.20	4.54	9	30	MGC PVTi
	NV 0222 56 022	2	3	-	-	57	-	6	2	3.55	3.81	4.02	4.20	4.54	9	30	MGC PVTi
	NV 0222 56 0251	2.5	4	-	-	50	-	4	2	4.63	4.92	5.15	5.35	5.78	9	30	MGC PVTi
	NV 0222 56 025	2.5	4	-	-	57	-	6	2	4.63	4.92	5.15	5.35	5.78	9	30	MGC PVTi
	NV 0222 56 030	3	4.5	-	-	50	-	4	2	5.17	5.47	5.71	5.93	6.40	9	30	MGC PVTi
	NV 0222 56 031	3	4.5	-	-	57	-	6	2	5.17	5.47	5.71	5.93	6.40	9	30	MGC PVTi
	NV 0132 56 030	3	30	-	-	60	-	3	2	-	-	-	-	-	8	30	MGC PVTi
	NV 0132 56 031	3	30	-	-	75	-	3	2	-	-	-	-	-	8	30	MGC PVTi
	NV 0222 56 041	4	6	-	-	50	-	4	2	-	-	-	-	-	9	30	MGC PVTi
	NV 0222 56 040	4	6	-	-	57	-	6	2	6.76	7.10	7.38	7.65	8.27	9	30	MGC PVTi
	NV 0132 56 040	4	30	-	-	60	-	4	2	-	-	-	-	-	8	30	MGC PVTi
	NV 0132 56 041	4	30	-	-	75	-	4	2	-	-	-	-	-	8	30	MGC PVTi
	NV 0222 56 050	5	7.5	-	-	57	-	6	2	8.35	8.72	9.04	9.38	-	9	30	MGC PVTi
NV 0132 56 050	5	35	-	-	70	-	5	2	-	-	-	-	-	8	30	MGC PVTi	
NV 0132 56 051	5	40	-	-	100	-	5	2	-	-	-	-	-	8	30	MGC PVTi	
NV 0222 56 060	6	9	-	-	57	-	6	2	-	-	-	-	-	9	30	MGC PVTi	

End mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	QC
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. | short | extra long

 	NW 0132 56 060	6	40	-	-	100	-	6	2	-	-	-	-	-	8	30	MGC PVTi
	NW 0132 56 061	6	50	-	-	150	-	6	2	-	-	-	-	-	8	30	MGC PVTi
	NW 0222 56 080	8	12	-	-	63	-	8	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0132 56 080	8	40	-	-	100	-	8	2	-	-	-	-	-	8	30	MGC PVTi
	NW 0132 56 081	8	50	-	-	150	-	8	2	-	-	-	-	-	8	30	MGC PVTi
	NW 0222 56 100	10	15	-	-	72	-	10	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0132 56 100	10	45	-	-	100	-	10	2	-	-	-	-	-	8	30	MGC PVTi
	NW 0132 56 101	10	60	-	-	150	-	10	2	-	-	-	-	-	8	30	MGC PVTi
	NW 0222 56 120	12	18	-	-	83	-	12	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0132 56 120	12	45	-	-	100	-	12	2	-	-	-	-	-	8	30	MGC PVTi
	NW 0132 56 121	12	75	-	-	150	-	12	2	-	-	-	-	-	8	30	MGC PVTi
	NW 0222 56 160	16	24	-	-	92	-	16	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0132 56 160	16	45	-	-	100	-	16	2	-	-	-	-	-	8	30	MGC PVTi
	NW 0132 56 161	16	75	-	-	150	-	16	2	-	-	-	-	-	8	30	MGC PVTi
	NW 0132 56 200	20	40	-	-	100	-	20	2	-	-	-	-	-	8	30	MGC PVTi
	NW 0222 56 200	20	30	-	-	104	-	20	2	-	-	-	-	-	9	30	MGC PVTi
NW 0132 56 201	20	75	-	-	150	-	20	2	-	-	-	-	-	8	30	MGC PVTi	







wd. | long

 	NW 0322 56 020	2	3	10	1.9	75	-	6	2	11.21	11.57	11.87	12.19	12.87	9	30	MGC PVTi
	NW 0322 56 030	3	4.5	12	2.9	75	-	6	2	13.28	13.67	14.03	14.40	15.20	9	30	MGC PVTi
	NW 0322 56 040	4	6	12	3.8	75	-	6	2	13.46	13.82	14.17	14.55	15.36	9	30	MGC PVTi
	NW 0322 56 050	5	7.5	15	4.8	75	-	6	2	16.54	16.97	17.41	-	-	9	30	MGC PVTi
	NW 0322 56 060	6	9	20	5.8	75	-	6	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0322 56 080	8	12	26	7.8	90	-	8	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0322 56 100	10	15	31	9.8	100	-	10	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0322 56 120	12	18	37	11.8	110	-	12	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0322 56 160	16	24	43	15.8	140	-	16	2	-	-	-	-	-	9	30	MGC PVTi
	NW 0322 56 200	20	30	53	19.8	150	-	20	2	-	-	-	-	-	9	30	MGC PVTi

Feed per tooth (fz) | d.o.c. (ap)

Material							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
pocket and slot milling							
0.4-0.8	f _z (mm)	0.005-0.01	-	0.005-0.01	-	-	0.005-0.01
	a _p (mm)	0.02-0.1	-	0.02-0.1	-	-	0.02-0.05
1-2.5	f _z (mm)	0.01-0.02	-	0.01-0.02	-	-	0.01-0.02
	a _p (mm)	0.1-0.3	-	0.1-0.3	-	-	0.05-0.2
3-4	f _z (mm)	0.03-0.05	-	0.03-0.05	-	-	0.02-0.03
	a _p (mm)	0.2-0.7	-	0.2-0.7	-	-	0.1-0.2
5-6	f _z (mm)	0.03-0.05	-	0.03-0.05	-	-	0.03-0.04
	a _p (mm)	0.2-1	-	0.2-1	-	-	0.1-0.3
8	f _z (mm)	0.04-0.06	-	0.04-0.06	-	-	0.04-0.05
	a _p (mm)	0.2-1.1	-	0.2-1.1	-	-	0.1-0.4
10	f _z (mm)	0.05-0.08	-	0.05-0.08	-	-	0.05-0.06
	a _p (mm)	0.2-1.3	-	0.2-1.3	-	-	0.1-0.4
12	f _z (mm)	0.06-0.1	-	0.06-0.1	-	-	0.06-0.07
	a _p (mm)	0.2-1.5	-	0.2-1.5	-	-	0.1-0.4
16	f _z (mm)	0.06-0.1	-	0.06-0.1	-	-	0.06-0.07
	a _p (mm)	0.2-1.9	-	0.2-1.9	-	-	0.1-0.4
20	f _z (mm)	0.07-0.12	-	0.07-0.12	-	-	0.06-0.08
	a _p (mm)	0.2-2.1	-	0.2-2.1	-	-	0.1-0.4

Cutting speed (Vc in m/min)

Material								
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel	
MGC PVTi	roughing finishing	 120 210 300  200 275 350	-	 100 225 350  180 290 400	-	-	-	 120 160 200  100 175 250



END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

End mills | 4 flutes

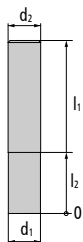
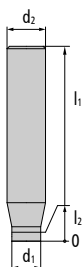
4 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- straight face
- with chamfer
- short | long | extra long version
- with and without clearance between shank and flute

End mills	catalogue no.	Effective working length at X° of draft											γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°				

no wd. | short | extra long

	NW 0224 56 015	1.5	2.5	-	-	50	-	4	4	3.01	3.25	3.44	3.62	3.92	9	30	MGC PVTi
	NW 0224 56 021	2	3	-	-	50	-	4	4	3.55	3.81	4.02	4.20	4.54	9	30	MGC PVTi
	NW 0224 56 022	2	3	-	-	57	-	6	4	3.55	3.81	4.02	4.20	4.54	9	30	MGC PVTi
	NW 0224 56 031	3	4.5	-	-	50	-	4	4	5.17	5.47	5.71	5.93	6.40	9	30	MGC PVTi
	NW 0224 56 030	3	4.5	-	-	57	-	6	4	5.17	5.47	5.71	5.93	6.40	9	30	MGC PVTi
	NW 0134 56 030	3	30	-	-	60	-	3	4	-	-	-	-	-	8	30	MGC PVTi
	NW 0134 56 031	3	30	-	-	75	-	3	4	-	-	-	-	-	8	30	MGC PVTi
	NW 0224 56 040	4	6	-	-	57	-	6	4	6.76	7.10	7.38	7.65	8.27	9	30	MGC PVTi
	NW 0134 56 040	4	30	-	-	60	-	4	4	-	-	-	-	-	8	30	MGC PVTi
	NW 0134 56 041	4	30	-	-	75	-	4	4	-	-	-	-	-	8	30	MGC PVTi
	NW 0224 56 050	5	7.5	-	-	57	-	6	4	8.35	8.72	9.04	9.38	-	9	30	MGC PVTi
	NW 0134 56 050	5	35	-	-	70	-	5	4	-	-	-	-	-	8	30	MGC PVTi
	NW 0134 56 051	5	40	-	-	100	-	5	4	-	-	-	-	-	8	30	MGC PVTi
	NW 0224 56 060	6	9	-	-	57	-	6	4	-	-	-	-	-	9	30	MGC PVTi
	NW 0134 56 060	6	40	-	-	100	-	6	4	-	-	-	-	-	8	30	MGC PVTi
	NW 0134 56 061	6	50	-	-	150	-	6	4	-	-	-	-	-	8	30	MGC PVTi
	NW 0224 56 080	8	12	-	-	63	-	8	4	-	-	-	-	-	9	30	MGC PVTi
	NW 0134 56 080	8	40	-	-	100	-	8	4	-	-	-	-	-	8	30	MGC PVTi
	NW 0134 56 081	8	50	-	-	150	-	8	4	-	-	-	-	-	8	30	MGC PVTi
	NW 0224 56 100	10	15	-	-	72	-	10	4	-	-	-	-	-	9	30	MGC PVTi
	NW 0134 56 100	10	45	-	-	100	-	10	4	-	-	-	-	-	8	30	MGC PVTi
	NW 0134 56 101	10	60	-	-	150	-	10	4	-	-	-	-	-	8	30	MGC PVTi
	NW 0224 56 120	12	18	-	-	83	-	12	4	-	-	-	-	-	9	30	MGC PVTi



End mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. | short | extra long

	NV 0134 56 120	12	45	-	-	100	-	12	4	-	-	-	-	-	8	30	MGC PVTi	
	NV 0134 56 121	12	75	-	-	150	-	12	4	-	-	-	-	-	8	30	MGC PVTi	
	NV 0224 56 160	16	24	-	-	92	-	16	4	-	-	-	-	-	9	30	MGC PVTi	
	NV 0134 56 160	16	45	-	-	100	-	16	4	-	-	-	-	-	8	30	MGC PVTi	
	NV 0134 56 161	16	75	-	-	150	-	16	4	-	-	-	-	-	8	30	MGC PVTi	
	NV 0134 56 200	20	40	-	-	100	-	20	4	-	-	-	-	-	8	30	MGC PVTi	
	NV 0224 56 200	20	30	-	-	104	-	20	4	-	-	-	-	-	9	30	MGC PVTi	
	NV 0134 56 201	20	75	-	-	150	-	20	4	-	-	-	-	-	8	30	MGC PVTi	

wd. | long

	NV 0324 56 020	2	4	10	1.9	75	-	6	4	11.21	11.57	11.87	12.19	12.87	9	30	MGC PVTi
	NV 0324 56 030	3	4.5	12	2.9	75	-	6	4	13.28	13.67	14.03	14.40	15.20	9	30	MGC PVTi
	NV 0324 56 040	4	6	12	3.8	75	-	6	4	13.46	13.82	14.17	14.55	15.36	9	30	MGC PVTi
	NV 0324 56 050	5	7.5	15	4.8	75	-	6	4	16.54	16.97	17.41	-	-	9	30	MGC PVTi
	NV 0324 56 060	6	9	20	5.8	75	-	6	4	-	-	-	-	-	9	30	MGC PVTi
	NV 0324 56 080	8	12	26	7.8	90	-	8	4	-	-	-	-	-	9	30	MGC PVTi
	NV 0324 56 100	10	15	31	9.8	100	-	10	4	-	-	-	-	-	9	30	MGC PVTi
	NV 0324 56 120	12	18	37	11.8	110	-	12	4	-	-	-	-	-	9	30	MGC PVTi
	NV 0324 56 160	16	24	43	15.8	140	-	16	4	-	-	-	-	-	9	30	MGC PVTi
	NV 0324 56 200	20	30	53	19.8	150	-	20	4	-	-	-	-	-	9	30	MGC PVTi

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
pocket and slot milling							
1.5-2	f _z (mm) a _p (mm)	0.01-0.02 0.1-0.3	-	0.01-0.02 0.1-0.3	-	-	0.01-0.02 0.05-0.2
3-4	f _z (mm) a _p (mm)	0.03-0.05 0.2-0.7	-	0.03-0.05 0.2-0.7	-	-	0.02-0.03 0.1-0.2
5-6	f _z (mm) a _p (mm)	0.03-0.05 0.2-1	-	0.03-0.05 0.2-1	-	-	0.03-0.04 0.1-0.3
8	f _z (mm) a _p (mm)	0.04-0.06 0.2-1.1	-	0.04-0.06 0.2-1.1	-	-	0.04-0.05 0.1-0.4
10	f _z (mm) a _p (mm)	0.05-0.08 0.2-1.3	-	0.05-0.08 0.2-1.3	-	-	0.05-0.06 0.1-0.4
12	f _z (mm) a _p (mm)	0.06-0.1 0.2-1.5	-	0.06-0.1 0.2-1.5	-	-	0.06-0.07 0.1-0.4
16	f _z (mm) a _p (mm)	0.06-0.1 0.2-1.9	-	0.06-0.1 0.2-1.9	-	-	0.06-0.07 0.1-0.4
20	f _z (mm) a _p (mm)	0.07-0.12 0.2-2.1	-	0.07-0.12 0.2-2.1	-	-	0.06-0.08 0.1-0.4

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
MGC PVTi	roughing finishing	120 210 300 200 275 350	-	100 225 350 180 290 400	-	-	120 160 200 100 175 250

END MILLS FOR STEEL UP TO 58 HRC

		Page
Ball nose end mills	2 flutes	52
Toric / corner radius end mills	2 flutes	56
	6 and 8 flutes	61
End mills	4 - 8 flutes	62



END MILLS FOR STEEL UP TO 58 HRC

Ball nose end mills | 2 flutes

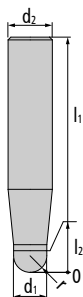
2 flutes, plain shank, right hand helix angle

- center cutting end mill
- ball nose
- with and without clearance between shank and flute up to 20 x d
- high precise: $r = \pm 0.005$; $d_1 = -0.015$

Ball nose end mills	catalogue no.	d_1	l_2	l_3	d_3	l_1	r	d_2	z	Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
										0.5°	1°	1.5°	2°	3°				

no wd. | high precise

NW 1722 85 001	0.1	0.1	-	-	50	0.05	4	2	0.22	0.32	0.41	0.49	0.67	4	30	UMGC PVTiH
NW 1722 85 002	0.2	0.2	-	-	50	0.1	4	2	0.35	0.45	0.54	0.63	0.81	4	30	UMGC PVTiH
NW 1722 85 003	0.3	0.3	-	-	50	0.15	4	2	0.47	0.57	0.67	0.76	0.95	4	30	UMGC PVTiH
NW 1722 85 004	0.4	0.4	-	-	50	0.2	4	2	0.56	0.65	0.74	0.82	0.97	4	30	UMGC PVTiH
NW 1722 85 005	0.5	0.5	-	-	50	0.25	4	2	0.67	0.77	0.86	0.94	1.10	4	30	UMGC PVTiH
NW 1722 85 006	0.6	0.6	-	-	50	0.3	4	2	0.78	0.89	0.98	1.06	1.22	4	30	UMGC PVTiH
NW 1722 85 008	0.8	0.8	-	-	50	0.4	4	2	1.01	1.12	1.21	1.30	1.47	4	30	UMGC PVTiH
NW 1722 85 010	1	1	-	-	50	0.5	4	2	1.26	1.34	1.45	1.54	1.72	4	30	UMGC PVTiH
NW 1722 85 0101	1	1	-	-	75	0.5	4	2	1.26	1.34	1.45	1.54	1.72	4	30	UMGC PVTiH
NW 1722 85 015	1.5	1.5	-	-	50	0.75	4	2	1.77	1.90	2.02	2.12	2.31	4	20	UMGC PVTiH
NW 1722 85 0151	1.5	1.5	-	-	75	0.75	4	2	1.77	1.90	2.02	2.12	2.31	4	20	UMGC PVTiH
NW 1722 85 020	2	2	-	-	50	1	4	2	2.30	2.45	2.58	2.69	2.89	4	20	UMGC PVTiH
NW 1722 85 0201	2	2	-	-	75	1	4	2	2.30	2.45	2.58	2.69	2.89	4	20	UMGC PVTiH
NW 1722 85 030	3	3	-	-	57	1.5	6	2	3.36	3.53	3.68	3.80	4.03	4	20	UMGC PVTiH
NW 1722 85 0301	3	3	-	-	75	1.5	6	2	3.36	3.53	3.68	3.80	4.03	4	20	UMGC PVTiH
NW 1722 85 040	4	4	-	-	57	2	6	2	4.41	4.60	4.76	4.90	5.15	4	20	UMGC PVTiH
NW 1722 85 0401	4	4	-	-	75	2	6	2	4.41	4.60	4.76	4.90	5.15	4	20	UMGC PVTiH
NW 1722 85 050	5	5	-	-	57	2.5	6	2	5.45	5.67	5.84	5.99	6.25	4	20	UMGC PVTiH
NW 1722 85 0501	5	5	-	-	75	2.5	6	2	5.45	5.67	5.84	5.99	6.25	4	20	UMGC PVTiH
NW 1722 85 060	6	6	-	-	57	3	6	2	-	-	-	-	-	4	20	UMGC PVTiH
NW 1722 85 0601	6	6	-	-	75	3	6	2	-	-	-	-	-	4	20	UMGC PVTiH
NW 1722 85 080	8	8	-	-	63	4	8	2	-	-	-	-	-	4	20	UMGC PVTiH
NW 1722 85 0801	8	8	-	-	90	4	8	2	-	-	-	-	-	4	20	UMGC PVTiH



Ball nose end mills	catalogue no.	d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
										0.5°	1°	1.5°	2°	3°				

no wd. | high precise

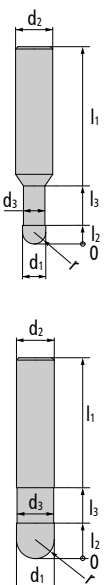
	NW 1722 85 100	10	10	-	-	72	5	10	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 1722 85 1001	10	10	-	-	100	5	10	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 1722 85 120	12	12	-	-	83	6	12	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 1722 85 1201	12	12	-	-	110	6	12	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 1722 85 160	16	16	-	-	92	8	16	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 1722 85 1601	16	16	-	-	150	8	16	2	-	-	-	-	-	4	20	UMGC PVTiH

wd. | high precise

	NW 1192 85 0033	0.3	0.3	1.5	0.27	50	0.15	4	2	2.06	2.21	2.35	2.48	2.71	4	30	UMGC PVTiH
	NW 1192 85 0041	0.4	0.4	1.5	0.385	50	0.2	4	2	1.92	2.07	2.19	2.30	2.51	4	30	UMGC PVTiH
	NW 1192 85 0042	0.4	0.4	3	0.385	50	0.2	4	2	3.54	3.74	3.91	4.06	4.32	4	30	UMGC PVTiH
	NW 1192 85 0043	0.4	0.4	5	0.385	50	0.2	4	2	5.66	5.92	6.13	6.31	6.62	4	30	UMGC PVTiH
	NW 1192 85 0051	0.5	0.5	3	0.48	50	0.25	4	2	3.56	3.75	3.92	4.06	4.32	4	30	UMGC PVTiH
	NW 1192 85 0052	0.5	0.5	5	0.48	50	0.25	4	2	5.68	5.93	6.13	6.31	6.62	4	30	UMGC PVTiH
	NW 1192 85 0053	0.5	0.5	10	0.48	50	0.25	4	2	10.90	11.26	11.53	11.77	12.70	4	30	UMGC PVTiH
	NW 1192 85 0061	0.6	0.6	3	0.58	50	0.3	4	2	3.55	3.75	3.90	4.05	4.31	4	30	UMGC PVTiH
	NW 1192 85 0062	0.6	0.6	5	0.58	50	0.3	4	2	5.67	5.92	6.13	6.31	6.62	4	30	UMGC PVTiH
	NW 1192 85 0063	0.6	0.6	10	0.58	50	0.3	4	2	10.90	11.25	11.53	11.77	12.65	4	30	UMGC PVTiH
	NW 1192 85 0081	0.8	0.8	3	0.78	50	0.4	4	2	3.55	3.74	3.90	4.04	4.29	4	30	UMGC PVTiH
	NW 1192 85 0082	0.8	0.8	5	0.78	50	0.4	4	2	5.67	5.92	6.12	6.30	6.60	4	30	UMGC PVTiH
	NW 1192 85 0083	0.8	0.8	10	0.78	50	0.4	4	2	10.89	11.25	11.52	11.76	12.62	4	30	UMGC PVTiH
	NW 1192 85 0101	1	1	5	0.98	50	0.5	4	2	5.66	5.91	6.11	6.29	6.59	4	30	UMGC PVTiH
	NW 1192 85 0102	1	1	10	0.98	50	0.5	4	2	10.89	11.24	11.52	11.75	12.59	4	30	UMGC PVTiH
	NW 1192 85 0103	1	1	15	0.98	50	0.5	4	2	16.07	16.49	16.82	17.38	19.22	4	30	UMGC PVTiH
NW 1192 85 0151	1.5	1.5	5	1.45	50	0.75	4	2	5.74	5.96	6.14	6.31	6.60	4	20	UMGC PVTiH	

Ball nose end mills	catalogue no.	Effective working length at X° of draft														γ (chip angle)	λ (helix angle)	Features	QC
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°					






wd. | high precise

	NV 1192 85 0152	1.5	1.5	10	1.45	50	0.75	4	2	10.95	11.28	11.54	11.76	12.54	4	20	UMGC PVTiH
	NV 1192 85 0153	1.5	1.5	15	1.45	50	0.75	4	2	16.12	16.52	16.84	17.36	19.18	4	20	UMGC PVTiH
	NV 1192 85 0154	1.5	1.5	20	1.45	75	0.75	4	2	21.26	21.73	22.28	23.34	-	4	20	UMGC PVTiH
	NV 1192 85 0201	2	2	5	1.95	50	1	4	2	5.73	5.94	6.12	6.28	6.56	4	20	UMGC PVTiH
	NV 1192 85 0202	2	2	10	1.95	50	1	4	2	10.94	11.26	11.52	11.75	12.46	4	20	UMGC PVTiH
	NV 1192 85 0203	2	2	15	1.95	50	1	4	2	16.11	16.51	16.82	17.31	19.10	4	20	UMGC PVTiH
	NV 1192 85 0204	2	2	20	1.95	75	1	4	2	21.25	21.72	22.25	23.29	-	4	20	UMGC PVTiH
	NV 1192 85 0302	3	3	10	2.95	57	1.5	6	2	10.92	11.23	11.49	11.71	12.30	4	20	UMGC PVTiH
	NV 1192 85 0303	3	3	15	2.95	57	1.5	6	2	16.09	16.49	16.80	17.22	18.94	4	20	UMGC PVTiH
	NV 1192 85 0304	3	3	20	2.95	75	1.5	6	2	21.24	21.70	22.18	23.20	25.57	4	20	UMGC PVTiH
	NV 1192 85 0305	3	3	25	2.95	75	1.5	6	2	26.37	26.88	27.88	29.18	-	4	20	UMGC PVTiH
	NV 1192 85 0402	4	4	10	3.9	57	2	6	2	11.01	11.29	11.52	11.72	12.20	4	20	UMGC PVTiH
	NV 1192 85 0403	4	4	15	3.9	57	2	6	2	16.17	16.53	16.82	17.17	18.84	4	20	UMGC PVTiH
	NV 1192 85 0404	4	4	20	3.9	75	2	6	2	21.30	21.73	22.16	23.15	-	4	20	UMGC PVTiH
	NV 1192 85 0405	4	4	25	3.9	75	2	6	2	26.43	26.91	27.86	29.14	-	4	20	UMGC PVTiH
	NV 1192 85 0502	5	5	10	4.9	57	2.5	6	2	10.99	11.26	11.49	11.69	-	4	20	UMGC PVTiH
	NV 1192 85 0503	5	5	15	4.9	57	2.5	6	2	16.15	16.51	16.80	-	-	4	20	UMGC PVTiH
	NV 1192 85 0504	5	5	20	4.9	75	2.5	6	2	21.29	21.71	-	-	-	4	20	UMGC PVTiH
	NV 1192 85 0505	5	5	25	4.9	75	2.5	6	2	26.42	26.89	-	-	-	4	20	UMGC PVTiH
	NV 1192 85 0602	6	6	10	5.85	57	3	6	2	-	-	-	-	-	4	20	UMGC PVTiH
NV 1192 85 0603	6	6	15	5.85	57	3	6	2	-	-	-	-	-	4	20	UMGC PVTiH	
NV 1192 85 0604	6	6	20	5.85	75	3	6	2	-	-	-	-	-	4	20	UMGC PVTiH	
NV 1192 85 0605	6	6	25	5.85	75	3	6	2	-	-	-	-	-	4	20	UMGC PVTiH	

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
copy milling 3D							
0.1-0.8	f _z (mm)	0.005-0.02	0.005-0.02	0.005-0.02	-	0.005-0.02	0.005-0.015
	a _p (mm)	0.005-0.1	0.005-0.08	0.01-0.1	-	0.005-0.08	0.005-0.05
1-2	f _z (mm)	0.01-0.04	0.01-0.04	0.01-0.04	-	0.01-0.04	0.01-0.03
	a _p (mm)	0.05-0.2	0.05-0.15	0.06-0.2	-	0.05-0.15	0.04-0.1
3-4	f _z (mm)	0.04-0.07	0.04-0.07	0.04-0.07	-	0.04-0.07	0.04-0.07
	a _p (mm)	0.08-0.4	0.08-0.3	0.12-0.4	-	0.08-0.3	0.08-0.2
5-6	f _z (mm)	0.08-0.12	0.08-0.12	0.08-0.12	-	0.08-0.12	0.08-0.12
	a _p (mm)	0.1-0.6	0.1-0.4	0.15-0.6	-	0.1-0.4	0.1-0.3
8	f _z (mm)	0.08-0.15	0.08-0.15	0.08-0.15	-	0.08-0.15	0.08-0.12
	a _p (mm)	0.15-0.8	0.15-0.6	0.25-0.8	-	0.15-0.6	0.15-0.4
10	f _z (mm)	0.08-0.15	0.08-0.15	0.08-0.15	-	0.08-0.15	0.08-0.12
	a _p (mm)	0.2-1	0.2-0.7	0.3-1	-	0.2-0.7	0.2-0.5
12	f _z (mm)	0.08-0.15	0.08-0.15	0.08-0.15	-	0.08-0.15	0.08-0.15
	a _p (mm)	0.2-1.2	0.2-0.8	0.3-1.2	-	0.2-0.8	0.2-0.6
16	f _z (mm)	0.1-0.21	0.1-0.175	0.1-0.21	-	0.1-0.175	0.08-0.165
	a _p (mm)	0.4-1.6	0.3-1.2	0.45-1.6	-	0.3-1.2	0.2-0.8

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
UMGC PVTiH	roughing finishing	 120 235 350	 110 130 150	 100 250 400	-	 50 65 80	 150 170 190 80 165 250



END MILLS FOR STEEL UP TO 58 HRC

Toric / corner radius end mills | 2 flutes

2 flutes, plain shank, right hand helix angle

- center cutting end mill
- with and without clearance between shank and flute up to 20 x d
- high precise $r = +/- 0.005$; $d_1 = - 0.015$

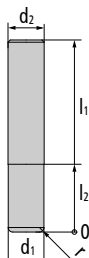
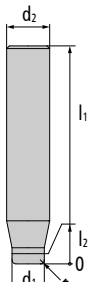
Toric / corner radius end mills	catalogue no.	d_1	l_2	l_3	d_3	l_1	r	d_2	z	Effective working length at X° of draft				γ (chip angle)	λ (helix angle)	Features	QC
										0.5°	1°	1.5°	2°				

no wd. | high precise

	NW 0722 85 001	0.1	0.1	-	-	50	0.02	4	2	0.24	0.33	0.43	0.52	0.69	4	30	UMGC PVTiH
	NW 0722 85 002	0.2	0.2	-	-	50	0.05	4	2	0.37	0.47	0.57	0.66	0.84	4	30	UMGC PVTiH
	NW 0722 85 003	0.3	0.3	-	-	50	0.05	4	2	0.50	0.61	0.72	0.82	1.01	4	30	UMGC PVTiH
	NW 0722 85 004	0.4	0.4	-	-	50	0.1	4	2	0.58	0.69	0.78	0.86	1.02	4	30	UMGC PVTiH
	NW 0722 85 005	0.5	0.5	-	-	50	0.1	4	2	0.71	0.82	0.91	1.00	1.17	4	30	UMGC PVTiH
	NW 0722 85 006	0.6	0.6	-	-	50	0.1	4	2	0.83	0.94	1.04	1.14	1.31	4	30	UMGC PVTiH
	NW 0722 85 008	0.8	0.8	-	-	50	0.1	4	2	1.06	1.19	1.30	1.40	1.59	4	30	UMGC PVTiH
	NW 0722 85 010	1	1	-	-	50	0.2	4	2	1.27	1.41	1.53	1.63	1.82	4	30	UMGC PVTiH
	NW 0722 85 0101	1	1	-	-	75	0.2	4	2	1.27	1.41	1.53	1.63	1.82	4	30	UMGC PVTiH
	NW 0722 85 015	1.5	1.5	-	-	50	0.2	4	2	1.84	2.00	2.14	2.26	2.47	4	20	UMGC PVTiH
	NW 0722 85 0151	1.5	1.5	-	-	75	0.2	4	2	1.84	2.00	2.14	2.26	2.47	4	20	UMGC PVTiH
	NW 0722 85 02002	2	2	-	-	50	0.2	4	2	2.39	2.58	2.73	2.86	3.09	4	20	UMGC PVTiH
	NW 0722 85 02102	2	2	-	-	75	0.2	4	2	2.39	2.58	2.73	2.86	3.09	4	20	UMGC PVTiH
	NW 0722 85 02005	2	2	-	-	50	0.5	4	2	2.36	2.53	2.67	2.80	3.02	4	20	UMGC PVTiH
	NW 0722 85 02105	2	2	-	-	75	0.5	4	2	2.36	2.53	2.67	2.80	3.02	4	20	UMGC PVTiH
	NW 0722 85 03002	3	3	-	-	57	0.2	6	2	3.48	3.70	3.87	4.03	4.29	4	20	UMGC PVTiH
	NW 0722 85 03102	3	3	-	-	75	0.2	6	2	3.48	3.70	3.87	4.03	4.29	4	20	UMGC PVTiH
	NW 0722 85 03005	3	3	-	-	57	0.5	6	2	3.45	3.66	3.83	3.98	4.24	4	20	UMGC PVTiH
	NW 0722 85 03105	3	3	-	-	75	0.5	6	2	3.45	3.66	3.83	3.98	4.24	4	20	UMGC PVTiH
	NW 0722 85 04002	4	4	-	-	57	0.2	6	2	4.55	4.80	5.00	5.17	5.46	4	20	UMGC PVTiH
NW 0722 85 04102	4	4	-	-	75	0.2	6	2	4.55	4.80	5.00	5.17	5.46	4	20	UMGC PVTiH	
NW 0722 85 04005	4	4	-	-	57	0.5	6	2	4.53	4.77	4.96	5.13	5.41	4	20	UMGC PVTiH	
NW 0722 85 04105	4	4	-	-	75	0.5	6	2	4.53	4.77	4.96	5.13	5.41	4	20	UMGC PVTiH	

Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

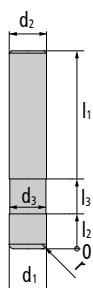
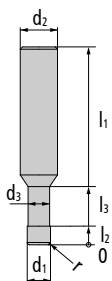
no wd. | high precise

 	NW 0722 85 05002	5	5	-	-	57	0.2	6	2	5.61	5.87	6.10	6.29	6.61	4	20	UMGC PVTiH
	NW 0722 85 05102	5	5	-	-	75	0.2	6	2	5.61	5.87	6.10	6.29	6.61	4	20	UMGC PVTiH
	NW 0722 85 05005	5	5	-	-	57	0.5	6	2	5.59	5.86	6.07	6.25	6.56	4	20	UMGC PVTiH
	NW 0722 85 05105	5	5	-	-	75	0.5	6	2	5.59	5.86	6.07	6.25	6.56	4	20	UMGC PVTiH
	NW 0722 85 06002	6	6	-	-	57	0.2	6	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 0722 85 06102	6	6	-	-	75	0.2	6	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 0722 85 06005	6	6	-	-	57	0.5	6	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 0722 85 06105	6	6	-	-	75	0.5	6	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 0722 85 06010	6	6	-	-	57	1	6	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 0722 85 06110	6	6	-	-	75	1	6	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 0722 85 08005	8	8	-	-	63	0.5	8	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 0722 85 08105	8	8	-	-	90	0.5	8	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 0722 85 08010	8	8	-	-	63	1	8	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 0722 85 08110	8	8	-	-	90	1	8	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 0722 85 10010	10	10	-	-	72	1	10	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 0722 85 10110	10	10	-	-	100	1	10	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 0722 85 10015	10	10	-	-	72	1.5	10	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 0722 85 10115	10	10	-	-	100	1.5	10	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 0722 85 12010	12	12	-	-	83	1	12	2	-	-	-	-	-	4	20	UMGC PVTiH
	NW 0722 85 12110	12	12	-	-	110	1	12	2	-	-	-	-	-	4	20	UMGC PVTiH
NW 0722 85 12020	12	12	-	-	83	2	12	2	-	-	-	-	-	4	20	UMGC PVTiH	
NW 0722 85 12120	12	12	-	-	110	2	12	2	-	-	-	-	-	4	20	UMGC PVTiH	

Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	QC
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

wd. | high precise

	NW 0192 85 00411	0.4	0.4	1.5	0.385	50	0.1	4	2	1.93	2.08	2.21	2.32	2.53	4	30	UMGC PVTiH
	NW 0192 85 00412	0.4	0.4	3	0.385	50	0.1	4	2	3.55	3.75	3.92	4.07	4.34	4	30	UMGC PVTiH
	NW 0192 85 00413	0.4	0.4	5	0.385	50	0.1	4	2	5.67	5.93	6.14	6.32	6.64	4	30	UMGC PVTiH
	NW 0192 85 00511	0.5	0.5	1.5	0.48	50	0.1	4	2	1.96	2.10	2.22	2.34	2.54	4	30	UMGC PVTiH
	NW 0192 85 00512	0.5	0.5	3	0.48	50	0.1	4	2	3.57	3.77	3.93	4.08	4.34	4	30	UMGC PVTiH
	NW 0192 85 00513	0.5	0.5	5	0.48	50	0.1	4	2	5.68	5.94	6.15	6.33	6.64	4	30	UMGC PVTiH
	NW 0192 85 00514	0.5	0.5	10	0.48	50	0.1	4	2	10.91	11.26	11.54	11.78	12.71	4	30	UMGC PVTiH
	NW 0192 85 00612	0.6	0.6	3	0.58	50	0.1	4	2	3.57	3.77	3.93	4.08	4.34	4	30	UMGC PVTiH
	NW 0192 85 00613	0.6	0.6	5	0.58	50	0.1	4	2	5.68	5.94	6.15	6.33	6.64	4	30	UMGC PVTiH
	NW 0192 85 00614	0.6	0.6	10	0.58	50	0.1	4	2	10.91	11.26	11.54	11.78	12.71	4	30	UMGC PVTiH
	NW 0192 85 00811	0.8	0.8	3	0.78	50	0.1	4	2	3.57	3.77	3.93	4.08	4.34	4	30	UMGC PVTiH
	NW 0192 85 00812	0.8	0.8	5	0.78	50	0.1	4	2	5.68	5.94	6.15	6.33	6.64	4	30	UMGC PVTiH
	NW 0192 85 00813	0.8	0.8	10	0.78	50	0.1	4	2	10.91	11.26	11.54	11.78	12.71	4	30	UMGC PVTiH
	NW 0192 85 00814	0.8	0.8	15	0.78	50	0.1	4	2	16.08	16.51	16.84	17.45	19.35	4	30	UMGC PVTiH
	NW 0192 85 01021	1	1	5	0.98	50	0.2	4	2	5.68	5.93	6.14	6.32	6.63	4	30	UMGC PVTiH
	NW 0192 85 01022	1	1	10	0.98	50	0.2	4	2	10.90	11.26	11.54	11.77	12.68	4	30	UMGC PVTiH
	NW 0192 85 01023	1	1	15	0.98	50	0.2	4	2	16.08	16.51	16.84	17.43	19.32	4	30	UMGC PVTiH
	NW 0192 85 01024	1	1	20	0.98	75	0.2	4	2	21.23	21.71	22.33	23.42	25.95	4	30	UMGC PVTiH
	NW 0192 85 01521	1.5	1.5	5	1.45	50	0.2	4	2	5.76	6.00	6.19	6.37	6.67	4	20	UMGC PVTiH
	NW 0192 85 01522	1.5	1.5	10	1.45	50	0.2	4	2	10.97	11.31	11.58	11.81	12.72	4	20	UMGC PVTiH
	NW 0192 85 01523	1.5	1.5	15	1.45	50	0.2	4	2	16.13	16.55	16.87	17.47	19.35	4	20	UMGC PVTiH
	NW 0192 85 01524	1.5	1.5	20	1.45	75	0.2	4	2	21.28	21.75	22.36	23.45	-	4	20	UMGC PVTiH
	NW 0192 85 02021	2	2	5	1.95	50	0.2	4	2	5.76	6.00	6.19	6.37	6.67	4	20	UMGC PVTiH
	NW 0192 85 02022	2	2	10	1.95	50	0.2	4	2	10.97	11.31	11.58	11.81	12.72	4	20	UMGC PVTiH
	NW 0192 85 02023	2	2	15	1.95	50	0.2	4	2	16.13	16.55	16.87	17.47	-	4	20	UMGC PVTiH
	NW 0192 85 02024	2	2	20	1.95	75	0.2	4	2	21.28	21.75	22.36	23.45	-	4	20	UMGC PVTiH



Toroid / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

wd. | high precise

	NW 0192 85 02025	2	2	25	1.95	75	0.2	4	2	26.40	26.92	28.06	-	-	4	20	UMGC PVTiH
	NW 0192 85 02051	2	2	5	1.95	50	0.5	4	2	5.75	5.98	6.17	6.33	6.63	4	20	UMGC PVTiH
	NW 0192 85 02052	2	2	10	1.95	50	0.5	4	2	10.96	11.29	11.56	11.78	12.62	4	20	UMGC PVTiH
	NW 0192 85 02053	2	2	15	1.95	50	0.5	4	2	16.13	16.53	16.85	17.41	19.26	4	20	UMGC PVTiH
	NW 0192 85 02054	2	2	20	1.95	75	0.5	4	2	21.27	21.74	22.32	23.39	-	4	20	UMGC PVTiH
	NW 0192 85 02055	2	2	25	1.95	75	0.5	4	2	26.40	26.91	28.02	-	-	4	20	UMGC PVTiH
	NW 0192 85 03021	3	3	10	2.95	57	0.2	6	2	10.97	11.31	11.58	11.81	12.72	4	20	UMGC PVTiH
	NW 0192 85 03022	3	3	15	2.95	57	0.2	6	2	16.13	16.55	16.87	17.47	19.35	4	20	UMGC PVTiH
	NW 0192 85 03023	3	3	20	2.95	75	0.2	6	2	21.28	21.75	22.36	23.45	25.99	4	20	UMGC PVTiH
	NW 0192 85 03024	3	3	25	2.95	75	0.2	6	2	26.40	26.92	28.06	29.43	-	4	20	UMGC PVTiH
	NW 0192 85 03051	3	3	10	2.95	57	0.5	6	2	10.96	11.29	11.56	11.78	12.62	4	20	UMGC PVTiH
	NW 0192 85 03052	3	3	15	2.95	57	0.5	6	2	16.13	16.53	16.85	17.41	19.26	4	20	UMGC PVTiH
	NW 0192 85 03053	3	3	20	2.95	75	0.5	6	2	21.27	21.74	22.32	23.39	25.89	4	20	UMGC PVTiH
	NW 0192 85 03054	3	3	25	2.95	75	0.5	6	2	26.40	26.91	28.02	29.37	-	4	20	UMGC PVTiH
	NW 0192 85 04021	4	4	10	3.9	57	0.2	6	2	11.07	11.38	11.64	11.86	12.77	4	20	UMGC PVTiH
	NW 0192 85 04022	4	4	15	3.9	57	0.2	6	2	16.22	16.61	16.91	17.52	-	4	20	UMGC PVTiH
	NW 0192 85 04023	4	4	20	3.9	75	0.2	6	2	21.35	21.80	22.41	23.50	-	4	20	UMGC PVTiH
	NW 0192 85 04024	4	4	25	3.9	75	0.2	6	2	26.47	26.97	28.11	-	-	4	20	UMGC PVTiH
	NW 0192 85 04051	4	4	10	3.9	57	0.5	6	2	11.05	11.36	11.62	11.84	12.68	4	20	UMGC PVTiH
	NW 0192 85 04052	4	4	15	3.9	57	0.5	6	2	16.21	16.59	16.90	17.46	19.31	4	20	UMGC PVTiH
NW 0192 85 04053	4	4	20	3.9	75	0.5	6	2	21.34	21.79	22.37	23.44	-	4	20	UMGC PVTiH	
NW 0192 85 04054	4	4	25	3.9	75	0.5	6	2	26.46	26.96	28.07	-	-	4	20	UMGC PVTiH	

Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	QC
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

wd. | high precise

	NW 0192 85 05021	5	5	10	4.9	57	0.2	6	2	11.07	11.38	11.64	11.86	-	4	20	UMGC PVTiH	
	NW 0192 85 05023	5	5	20	4.9	75	0.2	6	2	21.35	21.80	-	-	-	4	20	UMGC PVTiH	
	NW 0192 85 05051	5	5	10	4.9	57	0.5	6	2	11.06	11.36	11.62	11.84	-	4	20	UMGC PVTiH	
	NW 0192 85 05053	5	5	20	4.9	75	0.5	6	2	21.34	21.79	-	-	-	4	20	UMGC PVTiH	
	NW 0192 85 06021	6	6	10	5.85	57	0.2	6	2	-	-	-	-	-	4	20	UMGC PVTiH	
	NW 0192 85 06023	6	6	20	5.85	75	0.2	6	2	-	-	-	-	-	4	20	UMGC PVTiH	
	NW 0192 85 06051	6	6	10	5.85	57	0.5	6	2	-	-	-	-	-	4	20	UMGC PVTiH	
	NW 0192 85 06053	6	6	20	5.85	75	0.5	6	2	-	-	-	-	-	4	20	UMGC PVTiH	

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
copy milling 3D							
0.1-0.8	f _z (mm) a _p (mm)	0.005-0.02 0.005-0.1	0.005-0.02 0.005-0.08	0.005-0.02 0.01-0.1	0.01-0.03 0.01-0.3	0.005-0.02 0.005-0.08	0.005-0.015 0.005-0.05
1-2	f _z (mm) a _p (mm)	0.01-0.04 0.05-0.2	0.01-0.04 0.05-0.15	0.01-0.04 0.06-0.2	0.02-0.08 0.1-0.7	0.01-0.04 0.05-0.15	0.01-0.03 0.04-0.1
3-4	f _z (mm) a _p (mm)	0.04-0.07 0.08-0.4	0.04-0.07 0.08-0.3	0.04-0.07 0.12-0.4	0.04-0.1 0.15-1.4	0.04-0.07 0.08-0.3	0.04-0.07 0.08-0.2
5-6	f _z (mm) a _p (mm)	0.08-0.12 0.1-0.6	0.08-0.12 0.1-0.4	0.08-0.12 0.15-0.6	0.06-0.15 0.2-2	0.08-0.12 0.1-0.4	0.08-0.12 0.1-0.3
8	f _z (mm) a _p (mm)	0.08-0.15 0.15-0.8	0.08-0.15 0.15-0.6	0.08-0.15 0.25-0.8	-	0.08-0.15 0.15-0.6	0.08-0.12 0.15-0.4
10	f _z (mm) a _p (mm)	0.08-0.15 0.2-1	0.08-0.15 0.2-0.7	0.08-0.15 0.3-1	-	0.08-0.15 0.2-0.7	0.08-0.12 0.2-0.5
12	f _z (mm) a _p (mm)	0.08-0.15 0.2-1.2	0.08-0.15 0.2-0.8	0.08-0.15 0.3-1.2	-	0.08-0.15 0.2-0.8	0.08-0.15 0.2-0.6

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
UMGC PVTiH	roughing finishing	120 235 350	70 110 150	100 250 400	200 400 600	30 55 80	150 170 190 80 165 250

END MILLS FOR STEEL UP TO 58 HRC

Toric / corner radius end mills | 6 and 8 flutes



multiple flutes, plain shank, 50° right hand helix angle

- center cutting end mill
- corner radius for more stability
- short version
- without clearance between shank and flute

Toric / corner radius end mills	catalogue no.	Effective working length at X° of draft											γ (chip angle)	λ (helix angle)	Features	Q/C		
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°					2°	3°
	NVV 0280 56 060	6	12	-	-	57	1	6	6	-	-	-	-	-	6	50		MGC PVTi
	NVV 0280 56 080	8	16	-	-	63	1	8	6	-	-	-	-	-	6	50		MGC PVTi
	NVV 0280 56 100	10	20	-	-	72	1.5	10	6	-	-	-	-	-	6	50		MGC PVTi
	NVV 0280 56 120	12	24	-	-	83	1.5	12	6	-	-	-	-	-	6	50		MGC PVTi
	NVV 0280 56 160	16	32	-	-	92	2	16	6	-	-	-	-	-	6	50		MGC PVTi
	NVV 0280 56 200	20	40	-	-	104	2	20	8	-	-	-	-	-	6	50		MGC PVTi

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
contour milling							
6	f _z (mm)	0.03	-	-	-	-	0.02
	a _p (mm)	12	-	-	-	-	12
8	f _z (mm)	0.04	-	-	-	-	0.02
	a _p (mm)	16	-	-	-	-	16
10	f _z (mm)	0.04	-	-	-	-	0.03
	a _p (mm)	20	-	-	-	-	20
12	f _z (mm)	0.05	-	-	-	-	0.03
	a _p (mm)	24	-	-	-	-	24
16	f _z (mm)	0.05	-	-	-	-	0.04
	a _p (mm)	32	-	-	-	-	32
20	f _z (mm)	0.06	-	-	-	-	0.04
	a _p (mm)	40	-	-	-	-	40

The data above refer to a maximum cutting width ae of 2 % of the cutting diameter d1.

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
MGC PVTi	roughing finishing	 200 275 350	-	-	-	-	 100 175 250



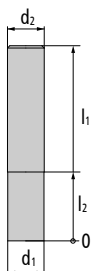
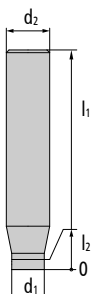
END MILLS FOR STEEL UP TO 58 HRC

End mills | 4 - 8 flutes

end mill multiple flutes, plain shank, 50° right hand helix angle

- center cutting end mill
- straight face
- short | long version
- with and without clearance between shank and flute

End mills	catalogue no.									Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°				
no wd. short long																		
	NW 0259 56 040	4	8	-	-	57	-	6	4	8.88	9.26	9.60	9.96	10.76	6	50		MGC PVTi
	NW 0359 56 040	4	12	-	-	57	-	6	4	13.06	13.54	14.03	14.56	15.74	6	50		MGC PVTi
	NW 0259 56 050	5	10	-	-	57	-	6	5	10.97	11.40	11.81	12.26	-	6	50		MGC PVTi
	NW 0359 56 050	5	15	-	-	57	-	6	5	16.18	16.75	17.35	-	-	6	50		MGC PVTi
	NW 0259 56 060	6	12	-	-	57	-	6	6	-	-	-	-	-	6	50		MGC PVTi
	NW 0258 56 061	6	12	-	-	57	-	6	6	-	-	-	-	-	6	50		MGC PVTi
	NW 0359 56 060	6	18	-	-	57	-	6	6	-	-	-	-	-	6	50		MGC PVTi
	NW 0259 56 080	8	16	-	-	63	-	8	6	-	-	-	-	-	6	50		MGC PVTi
	NW 0359 56 080	8	24	-	-	63	-	8	6	-	-	-	-	-	6	50		MGC PVTi
	NW 0259 56 100	10	20	-	-	72	-	10	6	-	-	-	-	-	6	50		MGC PVTi
	NW 0258 56 101	10	20	-	-	72	-	10	6	-	-	-	-	-	6	50		MGC PVTi
	NW 0359 56 100	10	30	-	-	72	-	10	6	-	-	-	-	-	6	50		MGC PVTi
	NW 0259 56 120	12	24	-	-	83	-	12	6	-	-	-	-	-	6	50		MGC PVTi
	NW 0258 56 121	12	24	-	-	83	-	12	6	-	-	-	-	-	6	50		MGC PVTi
	NW 0359 56 120	12	36	-	-	83	-	12	6	-	-	-	-	-	6	50		MGC PVTi
	NW 0359 56 140	14	42	-	-	100	-	14	6	-	-	-	-	-	6	50		MGC PVTi
	NW 0259 56 160	16	32	-	-	92	-	16	6	-	-	-	-	-	6	50		MGC PVTi
	NW 0359 56 160	16	48	-	-	92	-	16	6	-	-	-	-	-	6	50		MGC PVTi
	NW 0259 56 200	20	40	-	-	104	-	20	8	-	-	-	-	-	6	50		MGC PVTi
	NW 0359 56 200	20	60	-	-	125	-	20	8	-	-	-	-	-	6	50		MGC PVTi






Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
contour milling							
4	f _z (mm)	0.03	-	0.03	-	-	0.01
	a _p (mm)	8	-	8	-	-	8
5-6	f _z (mm)	0.03	-	0.03	-	-	0.02
	a _p (mm)	10	-	10	-	-	10
8	f _z (mm)	0.04	-	0.04	-	-	0.02
	a _p (mm)	16	-	16	-	-	16
10	f _z (mm)	0.04	-	0.04	-	-	0.03
	a _p (mm)	20	-	20	-	-	20
12	f _z (mm)	0.05	-	0.05	-	-	0.03
	a _p (mm)	24	-	24	-	-	24
14	f _z (mm)	0.05	-	0.05	-	-	0.03
	a _p (mm)	42	-	42	-	-	42
16	f _z (mm)	0.05	-	0.05	-	-	0.04
	a _p (mm)	32	-	32	-	-	32
20	f _z (mm)	0.06	-	0.06	-	-	0.04
	a _p (mm)	40	-	40	-	-	40

The data above refer to a maximum cutting width ae of 2 % of the cutting diameter d1.

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
MGC PVTi	roughing finishing	 - 200 275 350	-	 - 180 290 400	-	-	 - 100 175 250



END MILLS FOR STEEL MORE THAN 58 HRC

		Page
Ball nose end mills	2 flutes	66
Toric / corner radius end mills	5 flutes	68



END MILLS FOR STEEL MORE THAN 58 HRC

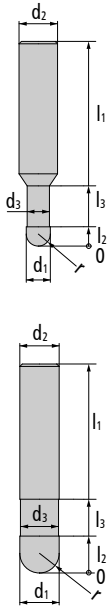
Ball nose end mills | 2 flutes

2 flutes, plain shank, 15° right hand helix angle

- center cutting end mill
- short | long version
- with and without clearance between shank and flute
- **extrem strong core diameter**

Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

wd. | short | long



NW 1313 59 011	1	1	6	0.95	75	0.5	6	2	6.90	7.18	7.42	7.63	8.04	0	15		MGC PVAT
NW 1313 59 016	1.5	1.5	8	1.4	75	0.75	6	2	9.10	9.40	9.66	9.90	10.41	0	15		MGC PVAT
NW 1313 59 021	2	2	10	1.9	75	1	6	2	11.17	11.51	11.80	12.08	12.71	0	15		MGC PVAT
NW 1313 59 031	3	3	12	2.9	75	1.5	6	2	13.23	13.60	13.91	14.24	14.96	0	15		MGC PVAT
NW 1313 59 041	4	4	15	3.8	75	2	6	2	16.49	16.87	17.26	17.66	18.55	0	15		MGC PVAT
NW 1313 59 051	5	5	18	4.8	75	2.5	6	2	19.56	20.00	20.45	-	-	0	15		MGC PVAT
NW 1313 59 061	6	6	20	5.8	75	3	6	2	-	-	-	-	-	0	15		MGC PVAT
NW 1313 59 081	8	8	26	7.8	90	4	8	2	-	-	-	-	-	0	15		MGC PVAT
NW 1313 59 101	10	10	31	9.8	100	5	10	2	-	-	-	-	-	0	15		MGC PVAT
NW 1313 59 121	12	12	37	11.8	110	6	12	2	-	-	-	-	-	0	15		MGC PVAT

Ball nose end mills	catalogue no.	Effective working length at X° of draft														γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°					
no wd. short																			
	NW 1312 59 011	1	1	-	-	57	0.5	6	2	1.26	1.40	1.52	1.63	1.84	0	15		MGC PVAT	
	NW 1312 59 016	1.5	1.5	-	-	57	0.75	6	2	1.80	1.96	2.09	2.22	2.44	0	15		MGC PVAT	
	NW 1312 59 021	2	2	-	-	57	1	6	2	2.34	2.52	2.66	2.79	3.03	0	15		MGC PVAT	
	NW 1312 59 031	3	3	-	-	57	1.5	6	2	3.41	3.61	3.77	3.92	4.19	0	15		MGC PVAT	
	NW 1312 59 041	4	4	-	-	57	2	6	2	4.46	4.69	4.87	5.03	5.32	0	15		MGC PVAT	
	NW 1312 59 051	5	5	-	-	57	2.5	6	2	5.51	5.75	5.95	6.13	6.44	0	15		MGC PVAT	
	NW 1312 59 061	6	6	-	-	57	3	6	2	-	-	-	-	-	0	15		MGC PVAT	
	NW 1312 59 081	8	8	-	-	63	4	8	2	-	-	-	-	-	0	15		MGC PVAT	
	NW 1312 59 101	10	10	-	-	72	5	10	2	-	-	-	-	-	0	15		MGC PVAT	
	NW 1312 59 121	12	12	-	-	83	6	12	2	-	-	-	-	-	0	15		MGC PVAT	

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
copy milling 3D							
1-2	f _z (mm) a _p (mm)	-	-	-	-	-	0.01-0.03 0.04-0.1
3-4	f _z (mm) a _p (mm)	-	-	-	-	-	0.04-0.07 0.08-0.2
5-6	f _z (mm) a _p (mm)	-	-	-	-	-	0.08-0.15 0.1-0.3
8	f _z (mm) a _p (mm)	-	-	-	-	-	0.08-0.15 0.15-0.4
10	f _z (mm) a _p (mm)	-	-	-	-	-	0.08-0.2 0.2-0.5
12	f _z (mm) a _p (mm)	-	-	-	-	-	0.08-0.25 0.2-0.6

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
MGC PVAT	roughing finishing	-	-	-	-	-	70 145 220 100 175 250



END MILLS FOR STEEL MORE THAN 58 HRC

corner radius end mill | 5 flutes

5 flutes, plain shank, 30° right hand helix angle

- corner radius end mill
- without clearance between shank and flute
- **extrem strong core diameter**

corner radius end mill	d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	Effective working length at X° of draft								
									0.5°	1°	1.5°	2°	3°				

no wd. short		d ₂	l ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°			
	NVW 0275 59 060	6	4.5	-	-	57	2	6	5	-	-	-	-	-	2	30		MGC PVAT
	NVW 0275 59 080	8	5.5	-	-	63	2.5	8	5	-	-	-	-	-	2	30		MGC PVAT
	NVW 0275 59 101	10	7.5	-	-	72	3	10	5	-	-	-	-	-	2	30		MGC PVAT
	NVW 0275 59 100	10	7.5	-	-	72	3.5	10	5	-	-	-	-	-	2	30		MGC PVAT
	NVW 0275 59 120	12	9	-	-	83	3.5	12	5	-	-	-	-	-	2	30		MGC PVAT
	NVW 0275 59 160	16	10.5	-	-	92	5	16	5	-	-	-	-	-	2	30		MGC PVAT

Feed per tooth (fz) | d.o.c. (ap)

Material		Material					
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
		copy milling 3D					
6	f _z (mm) a _p (mm)	0.08-0.12 0.1-0.6	-	-	-	-	0.08-0.1 0.1-0.2
8	f _z (mm) a _p (mm)	0.08-0.15 0.15-0.8	-	-	-	-	0.08-0.1 0.15-0.275
10	f _z (mm) a _p (mm)	0.08-0.15 0.2-1	-	-	-	-	0.08-0.1 0.2-0.35
12	f _z (mm) a _p (mm)	0.08-0.15 0.2-1.2	-	-	-	-	0.08-0.115 0.2-0.4
16	f _z (mm) a _p (mm)	0.1-0.175 0.2-0.95	-	-	-	-	0.08-0.115 0.2-0.5

Cutting speed (Vc in m/min)

Material		Material					
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
		MGC PVAT	roughing finishing	 - 120 235 350	-	-	-

END MILLS FOR MICRO MACHINING UP TO 2.5 MM

		Page
Ball nose end mills	2 flutes	70
End mills	2 flutes	71



END MILLS FOR MICRO MACHINING UP TO 2.5 MM

Ball nose end mills | 2 flutes

2 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- ball nose
- 3 mm shank-diameter
- short version
- without clearance between shank and flute

Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. short																		
	NW 1142 56 002	0.2	0.5	-	-	39	0.1	3	2	0.73	0.76	0.79	0.83	0.92	9	30		MGC PVTi
	NW 1142 56 003	0.3	1	-	-	39	0.15	3	2	0.83	0.86	0.90	0.94	1.04	9	30		MGC PVTi
	NW 1142 56 004	0.4	1	-	-	39	0.2	3	2	1.35	1.41	1.47	1.54	1.71	9	30		MGC PVTi
	NW 1142 56 005	0.5	1.5	-	-	39	0.25	3	2	1.56	1.62	1.70	1.78	1.96	9	30		MGC PVTi
	NW 1142 56 006	0.6	1.5	-	-	39	0.3	3	2	1.77	1.84	1.92	2.01	2.22	9	30		MGC PVTi
	NW 1142 56 008	0.8	2	-	-	39	0.4	3	2	2.18	2.27	2.37	2.47	2.73	9	30		MGC PVTi
	NW 1142 56 010	1	3	-	-	39	0.5	3	2	2.59	2.70	2.81	2.94	3.24	9	30		MGC PVTi
	NW 1142 56 012	1.2	3.6	-	-	38	0.6	3	2	4.27	4.45	4.65	4.87	5.40	9	30		MGC PVTi
	NW 1142 56 015	1.5	4	-	-	39	0.75	3	2	5.66	5.83	6.02	6.21	6.66	9	30		MGC PVTi
	NW 1142 56 020	2	5	-	-	39	1	3	2	7.20	7.42	7.65	7.90	8.47	9	30		MGC PVTi

Feed per tooth (fz) | d.o.c. (ap)

Material							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
copy milling 3D							
0.2-0.8	f _z (mm)	0.005-0.02	0.005-0.02	0.005-0.02	0.01-0.03	0.005-0.02	-
	a _p (mm)	0.005-0.1	0.005-0.08	0.01-0.1	0.01-0.3	0.005-0.08	-
1-2	f _z (mm)	0.01-0.04	0.01-0.04	0.01-0.04	0.02-0.08	0.01-0.04	-
	a _p (mm)	0.05-0.2	0.05-0.15	0.06-0.2	0.1-0.7	0.05-0.15	-

Cutting speed (Vc in m/min)

Material							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
MGC PVTi	roughing finishing	150 225 300 200 275 350	- 120 135 150	- 180 290 400	- 300 450 600	- 70 75 80	-

END MILLS FOR MICRO MACHINING UP TO 2.5 MM

End mills | 2 flutes



2 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- straight face
- 3 mm shank-diameter
- short version
- without clearance between shank and flute

End mills	catalogue no.											Effective working length at X° of draft				γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°					

no wd. short																		
	NV 0142 56 001	0.1	0.2	-	-	39	-	3	2	0.38	0.49	0.59	0.69	0.88	9	30		MGC PVTi
	NV 0142 56 002	0.2	0.5	-	-	39	-	3	2	0.94	0.99	1.04	1.10	1.23	9	30		MGC PVTi
	NV 0142 56 003	0.3	1	-	-	39	-	3	2	1.23	1.39	1.53	1.66	1.89	9	30		MGC PVTi
	NV 0142 56 004	0.4	1	-	-	39	-	3	2	1.57	1.75	1.90	2.04	2.29	9	30		MGC PVTi
	NV 0142 56 005	0.5	1.5	-	-	39	-	3	2	1.91	2.11	2.27	2.41	2.68	9	30		MGC PVTi
	NV 0142 56 006	0.6	1.5	-	-	39	-	3	2	2.24	2.45	2.63	2.78	3.06	9	30		MGC PVTi
	NV 0142 56 008	0.8	2	-	-	39	-	3	2	2.90	3.14	3.33	3.50	3.80	9	30		MGC PVTi
	NV 0142 56 010	1	3	-	-	39	-	3	2	3.56	3.81	4.02	4.20	4.55	9	30		MGC PVTi
	NV 0142 56 012	1.2	3	-	-	39	-	3	2	4.21	4.48	4.70	4.90	5.29	9	30		MGC PVTi
	NV 0142 56 015	1.5	4	-	-	39	-	3	2	5.17	5.47	5.71	5.93	6.41	9	30		MGC PVTi
	NV 0142 56 020	2	5	-	-	39	-	3	2	6.77	7.11	7.38	7.66	8.28	9	30		MGC PVTi

Feed per tooth (fz) | d.o.c. (ap)

Material							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
pocket and slot milling							
0.1-0.8	f _z (mm)	0.005-0.02	0.005-0.02	0.005-0.02	-	-	-
	a _p (mm)	0.01-0.1	0.005-0.08	0.01-0.1	-	-	-
1-2	f _z (mm)	0.02-0.04	0.02-0.04	0.02-0.04	-	-	-
	a _p (mm)	1-1.5	0.3-0.7	1-1.5	-	-	-

Cutting speed (Vc in m/min)

Material							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
MGC PVTi	roughing finishing	- 150 250 350	- 120 135 150	- 180 290 400	-	-	-

major application minor application roughing pre-finishing finishing



END MILLS FOR STAINLESS STEEL | TITANIUM ALLOYS

		Page
Toric / corner radius end mills	4 flutes uneven cutting pitch	74
End mills	4 flutes uneven cutting pitch	76



END MILLS FOR STAINLESS STEEL | TITANIUM ALLOYS

Toric / corner radius end mills | 4 flutes | uneven cutting pitch

4 flutes, plain shank, right hand helix angle

- center cutting end mill
- straight face
- unequal helix angle
- uneven cutting pitch

Toric / corner radius end mills	catalogue no.	Effective working length at X° of draft													γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°				

no wd. | short

	NW 0514 56 030	3	8	-	-	57	0.2	6	4	8.87	9.25	9.58	9.93	10.72	10	37.5	UMGC PVST
	NW 0514 56 040	4	10	-	-	57	0.3	6	4	10.96	11.38	11.78	12.21	13.18	10	37.5	UMGC PVST
	NW 0514 56 050	5	12	-	-	57	0.4	6	4	13.05	13.51	13.99	14.50	-	10	37.5	UMGC PVST
	NW 0514 56 060	6	16	-	-	57	0.5	6	4	-	-	-	-	-	10	37.5	UMGC PVST
	NW 0514 56 080	8	20	-	-	63	0.5	8	4	-	-	-	-	-	10	37.5	UMGC PVST
	NW 0514 56 100	10	26	-	-	72	1	10	4	-	-	-	-	-	10	37.5	UMGC PVST
	NW 0514 56 120	12	30	-	-	83	1	12	4	-	-	-	-	-	10	37.5	UMGC PVST
	NW 0514 56 160	16	37	-	-	92	2	16	4	-	-	-	-	-	10	37.5	UMGC PVST
	NW 0514 56 200	20	44	-	-	104	2	20	4	-	-	-	-	-	10	37.5	UMGC PVST
	NW 0514 56 250	25	50	-	-	104	3	25	4	-	-	-	-	-	10	37.5	UMGC PVST

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
contour milling							
3-4	f _z (mm) a _p (mm)	-	0.025-0.04 3-6	-	-	0.01-0.04 3-6	
5-6	f _z (mm) a _p (mm)	-	0.045-0.055 6-9	-	-	0.025-0.055 6-9	
8	f _z (mm) a _p (mm)	-	0.06-0.075 8-12	-	-	0.04-0.075 8-12	
10	f _z (mm) a _p (mm)	-	0.08-0.1 10-15	-	-	0.06-0.1 10-15	
12	f _z (mm) a _p (mm)	-	0.1-0.13 12-18	-	-	0.07-0.13 12-18	
16	f _z (mm) a _p (mm)	-	0.13-0.15 16-24	-	-	0.09-0.15 16-24	
20	f _z (mm) a _p (mm)	-	0.16-0.18 20-30	-	-	0.1-0.18 20-30	
25	f _z (mm) a _p (mm)	-	0.16-0.18 25-38	-	-	0.1-0.18 25-38	
pocket and slot milling							
3-4	f _z (mm) a _p (mm)	-	0.015-0.02 0.5-1.6	-	-	0.006-0.02 0.5-1.6	0.03-0.04 0.1-0.2
5-6	f _z (mm) a _p (mm)	-	0.025-0.03 0.5-3	-	-	0.01-0.03 0.5-3	0.05-0.08 0.1-0.3
8	f _z (mm) a _p (mm)	-	0.04-0.045 0.5-4	-	-	0.025-0.045 0.5-4	0.05-0.08 0.1-0.4
10	f _z (mm) a _p (mm)	-	0.05-0.06 0.5-5	-	-	0.03-0.06 0.5-5	0.07-0.1 0.1-0.4
12	f _z (mm) a _p (mm)	-	0.06-0.065 0.5-6	-	-	0.04-0.065 0.5-6	0.07-0.1 0.1-0.4
16	f _z (mm) a _p (mm)	-	0.085-0.09 0.5-8	-	-	0.06-0.09 0.5-8	0.08-0.12 0.1-0.4
20	f _z (mm) a _p (mm)	-	0.09-0.095 0.5-8	-	-	0.08-0.095 0.5-8	0.08-0.12 0.1-0.4
25	f _z (mm) a _p (mm)	-	0.09-0.095 0.5-8	-	-	0.08-0.095 0.5-8	0.08-0.12 0.1-0.4

The data above refer to a maximum cutting width ae of 2 % of the cutting diameter d1.

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
UMGC PVST	roughing finishing	-	40 60 80 80 90 100	-	-	15 43 70 20 50 80	- 100 175 250

Detailed technical information on page 138.



END MILLS FOR STAINLESS STEEL | TITANIUM ALLOYS

End mills | 4 flutes | uneven cutting pitch

4 flutes, plain shank, right hand helix angle

- center cutting end mill
- straight face
- unequal helix angle
- uneven cutting pitch

End mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. | short




	NW 0504 56 030	3	8	-	-	57	-	6	4	8.88	9.26	9.60	9.96	10.76	10	37.5	UMGC PVST
	NW 0504 56 040	4	10	-	-	57	-	6	4	10.97	11.40	11.81	12.26	13.25	10	37.5	UMGC PVST
	NW 0504 56 050	5	12	-	-	57	-	6	4	13.06	13.54	14.03	-	-	10	37.5	UMGC PVST
	NW 0504 56 060	6	16	-	-	57	-	6	4	-	-	-	-	-	10	37.5	UMGC PVST
	NW 0504 56 080	8	20	-	-	63	-	8	4	-	-	-	-	-	10	37.5	UMGC PVST
	NW 0504 56 100	10	26	-	-	72	-	10	4	-	-	-	-	-	10	37.5	UMGC PVST
	NW 0504 56 120	12	30	-	-	83	-	12	4	-	-	-	-	-	10	37.5	UMGC PVST
	NW 0504 56 160	16	37	-	-	92	-	16	4	-	-	-	-	-	10	37.5	UMGC PVST
	NW 0504 56 200	20	44	-	-	104	-	20	4	-	-	-	-	-	10	37.5	UMGC PVST
	NW 0504 56 250	25	50	-	-	104	-	25	4	-	-	-	-	-	10	37.5	UMGC PVST

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
contour milling							
3-4	f _z (mm) a _p (mm)	-	0.025-0.04 3-6	-	-	0.01-0.04 3-6	
5-6	f _z (mm) a _p (mm)	-	0.045-0.055 6-9	-	-	0.025-0.055 6-9	
8	f _z (mm) a _p (mm)	-	0.06-0.075 8-12	-	-	0.04-0.075 8-12	
10	f _z (mm) a _p (mm)	-	0.08-0.1 10-15	-	-	0.06-0.1 10-15	
12	f _z (mm) a _p (mm)	-	0.1-0.13 12-18	-	-	0.07-0.13 12-18	
16	f _z (mm) a _p (mm)	-	0.13-0.15 16-24	-	-	0.09-0.15 16-24	
20	f _z (mm) a _p (mm)	-	0.16-0.18 20-30	-	-	0.1-0.18 20-30	
25	f _z (mm) a _p (mm)	-	0.16-0.18 25-38	-	-	0.1-0.18 25-38	
pocket and slot milling							
3-4	f _z (mm) a _p (mm)	-	0.015-0.02 0.5-1.6	-	-	0.006-0.02 0.5-1.6	0.03-0.04 0.1-0.2
5-6	f _z (mm) a _p (mm)	-	0.025-0.03 0.5-3	-	-	0.01-0.03 0.5-3	0.05-0.08 0.1-0.3
8	f _z (mm) a _p (mm)	-	0.04-0.045 0.5-4	-	-	0.025-0.045 0.5-4	0.05-0.08 0.1-0.4
10	f _z (mm) a _p (mm)	-	0.05-0.06 0.5-5	-	-	0.03-0.06 0.5-5	0.07-0.1 0.1-0.4
12	f _z (mm) a _p (mm)	-	0.06-0.065 0.5-6	-	-	0.04-0.065 0.5-6	0.07-0.1 0.1-0.4
16	f _z (mm) a _p (mm)	-	0.085-0.09 0.5-8	-	-	0.06-0.09 0.5-8	0.08-0.12 0.1-0.4
20	f _z (mm) a _p (mm)	-	0.09-0.095 0.5-8	-	-	0.08-0.095 0.5-8	0.08-0.12 0.1-0.4
25	f _z (mm) a _p (mm)	-	0.09-0.095 0.5-8	-	-	0.08-0.095 0.5-8	0.08-0.12 0.1-0.4

The data above refer to a maximum cutting width ae of 2 % of the cutting diameter d1.

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
UMGC PVST	roughing finishing	-	 40 60 80 80 90 100	-	-	 15 43 70 20 50 80	 - 100 175 250

Detailed technical information on page 138.



END MILLS FOR ALUMINIUM | COPPER | PLASTIC | SYNTHETIC

		Page
Ball nose end mills	2 flutes	80
Toric / corner radius end mills	2 flutes	86
End mills	1 flute for aluminium	91
	1 flute for plastic	93
	2 flutes	95
	3 flutes for aluminium	98
	4 flutes for aluminium	100



END MILLS FOR ALUMINIUM | COPPER | PLASTIC | SYNTHETIC

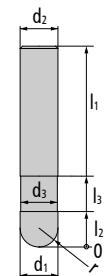
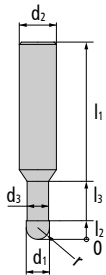
Ball nose end mills | 2 flutes

2 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- short | long version
- with and without clearance between shank and flute

Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

wd. | short | long



NW 1432 47 0101	1	1.5	6	0.95	50	0.5	4	2	6.90	7.18	7.42	7.63	8.04	9	30	KAC PVAS
NW 1432 47 0102	1	1.5	10	0.95	50	0.5	4	2	11.07	11.46	11.76	12.06	12.71	9	30	KAC PVAS
NW 1432 47 0103	1	1.5	15	0.95	50	0.5	4	2	16.27	16.73	17.15	17.59	18.55	9	30	KAC PVAS
NW 1432 47 0104	1	1.5	20	0.95	75	0.5	4	2	21.43	21.98	22.54	23.12	24.39	9	30	KAC PVAS
NW 1432 47 0105	1	1.5	25	0.95	75	0.5	4	2	26.57	27.23	27.92	28.65	-	9	30	KAC PVAS
NW 1432 47 0106	1	1.5	30	0.95	75	0.5	4	2	31.71	32.48	33.31	34.18	-	9	30	KAC PVAS
NW 1432 47 0152	1.5	2.5	10	1.4	50	0.75	4	2	11.18	11.53	11.82	12.11	12.75	9	30	KAC PVAS
NW 1432 47 0153	1.5	2.5	15	1.4	50	0.75	4	2	16.35	16.79	17.20	17.64	18.59	9	30	KAC PVAS
NW 1432 47 0154	1.5	2.5	20	1.4	75	0.75	4	2	21.50	22.04	22.59	23.17	24.43	9	30	KAC PVAS
NW 1432 47 0155	1.5	2.5	25	1.4	75	0.75	4	2	26.64	27.29	27.98	28.70	-	9	30	KAC PVAS
NW 1432 47 0156	1.5	2.5	30	1.4	75	0.75	4	2	31.76	32.54	33.37	34.23	-	9	30	KAC PVAS
NW 1432 47 0212	2	3	10	1.9	50	1	4	2	11.17	11.51	11.80	12.08	12.71	9	30	KAC PVAS
NW 1432 47 0213	2	3	15	1.9	50	1	4	2	16.34	16.78	17.18	17.62	18.55	9	30	KAC PVAS
NW 1432 47 0214	2	3	20	1.9	75	1	4	2	21.50	22.03	22.57	23.15	-	9	30	KAC PVAS
NW 1432 47 02141	2	3	25	1.9	75	1	4	2	26.63	27.28	27.96	28.68	-	9	30	KAC PVAS
NW 1432 47 0215	2	3	30	1.9	75	1	4	2	31.76	32.53	33.35	-	-	9	30	KAC PVAS
NW 1432 47 02151	2	3	35	1.9	75	1	4	2	36.87	37.78	38.74	-	-	9	30	KAC PVAS
NW 1432 47 0253	2.5	4	15	2.4	50	1.25	4	2	16.34	16.76	17.17	17.59	-	9	30	KAC PVAS
NW 1432 47 0254	2.5	4	20	2.4	75	1.25	4	2	21.49	22.02	22.55	-	-	9	30	KAC PVAS
NW 1432 47 02551	2.5	4	35	2.4	75	1.25	4	2	36.87	37.77	-	-	-	9	30	KAC PVAS
NW 1432 47 0302	3	4.5	10	2.9	57	1.5	6	2	11.15	11.48	11.76	12.03	12.63	9	30	KAC PVAS
NW 1432 47 0304	3	4.5	20	2.9	57	1.5	6	2	21.48	22.00	22.53	23.09	24.31	9	30	KAC PVAS
NW 1432 47 0305	3	4.5	30	2.9	75	1.5	6	2	31.74	32.51	33.31	34.16	-	9	30	KAC PVAS

Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

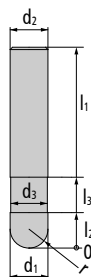
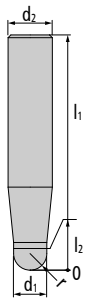
wd. | short | long

	NW 1432 47 0306	3	4.5	40	2.9	75	1.5	6	2	42.00	43.01	44.08	-	-	9	30	KAC PVAS
	NW 1432 47 0402	4	6	10	3.8	57	2	6	2	11.34	11.62	11.87	12.13	12.71	9	30	KAC PVAS
	NW 1432 47 0404	4	6	20	3.8	57	2	6	2	21.63	22.12	22.64	23.19	-	9	30	KAC PVAS
	NW 1432 47 0405	4	6	30	3.8	75	2	6	2	31.87	32.63	33.42	-	-	9	30	KAC PVAS
	NW 1432 47 0406	4	6	40	3.8	75	2	6	2	42.12	43.13	-	-	-	9	30	KAC PVAS
	NW 1432 47 0604	6	6	20	5.8	57	3	6	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1432 47 0605	6	6	30	5.8	75	3	6	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1432 47 0606	6	6	40	5.8	75	3	6	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1432 47 0607	6	6	50	5.8	100	3	6	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1432 47 0608	6	6	70	5.8	100	3	6	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1432 47 08051	8	12	35	7.8	90	4	8	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1432 47 0807	8	12	50	7.8	100	4	8	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1432 47 0808	8	12	70	7.8	100	4	8	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1432 47 1006	10	15	40	9.8	72	5	10	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1432 47 1007	10	15	50	9.8	100	5	10	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1432 47 1008	10	15	70	9.8	100	5	10	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1432 47 1009	10	15	100	9.8	150	5	10	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1432 47 1206	12	18	40	11.8	83	6	12	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1432 47 1207	12	18	50	11.8	110	6	12	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1432 47 1208	12	18	70	11.8	110	6	12	2	-	-	-	-	-	9	30	KAC PVAS
NW 1432 47 1209	12	18	100	11.8	150	6	12	2	-	-	-	-	-	9	30	KAC PVAS	
NW 1432 47 1609	16	24	100	15.8	150	8	16	2	-	-	-	-	-	9	30	KAC PVAS	
NW 1432 47 2009	20	30	100	19.8	150	10	20	2	-	-	-	-	-	9	30	KAC PVAS	

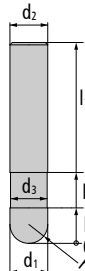
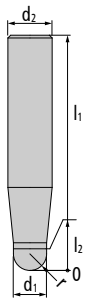
Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. | short | long

	NW 1462 43 004	0.4	0.6	-	-	50	0.2	4	2	0.84	0.97	1.08	1.19	1.39	9	30	KAC PVCN
	NW 1412 47 010	1	1.5	-	-	50	0.5	4	2	1.84	2.01	2.16	2.29	2.53	9	30	KAC PVAS
	NW 1462 43 010	1	1.5	-	-	50	0.5	4	2	1.84	2.01	2.16	2.29	2.53	9	30	KAC PVCN
	NW 1412 47 015	1.5	2.5	-	-	50	0.75	4	2	2.94	3.15	3.32	3.47	3.75	9	30	KAC PVAS
	NW 1462 43 015	1.5	2.5	-	-	57	0.75	6	2	2.94	3.15	3.32	3.47	3.75	9	30	KAC PVCN
	NW 1412 47 021	2	3	-	-	50	1	4	2	3.46	3.68	3.87	4.03	4.31	9	30	KAC PVAS
	NW 1412 47 020	2	3	-	-	57	1	6	2	3.46	3.68	3.87	4.03	4.31	9	30	KAC PVAS
	NW 1462 43 020	2	3	-	-	57	1	6	2	3.46	3.68	3.87	4.03	4.31	9	30	KAC PVCN
	NW 1422 47 020	2	4	-	-	75	1	4	2	4.56	4.81	5.02	5.21	5.55	9	30	KAC PVAS
	NW 1462 43 025	2.5	4	-	-	57	1.25	6	2	4.54	4.78	4.99	5.16	5.50	9	30	KAC PVCN
	NW 1412 47 030	3	4.5	-	-	57	1.5	6	2	5.06	5.32	5.52	5.71	6.06	9	30	KAC PVAS
	NW 1462 43 030	3	4.5	-	-	57	1.5	6	2	5.06	5.32	5.52	5.71	6.06	9	30	KAC PVCN
	NW 1422 47 030	3	15	-	-	60	1.5	4	2	16.12	16.65	17.19	-	-	9	30	KAC PVAS
	NW 1422 47 031	3	15	-	-	75	1.5	4	2	16.12	16.65	17.19	-	-	9	30	KAC PVAS
	NW 1462 43 040	4	6	-	-	57	2	6	2	6.64	6.93	7.16	7.36	7.80	9	30	KAC PVCN
	NW 1412 47 040	4	6	-	-	57	2	6	2	6.64	6.93	7.16	7.36	7.80	9	30	KAC PVAS
	NW 1422 47 040	4	20	-	-	60	2	4	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1422 47 041	4	20	-	-	75	2	4	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1472 43 041	4	20	-	-	75	2	4	2	-	-	-	-	-	9	30	KAC PVCN
	NW 1412 47 050	5	7.5	-	-	57	2.5	6	2	8.20	8.52	8.77	9.01	9.55	9	30	KAC PVAS
	NW 1462 43 050	5	7.5	-	-	57	2.5	6	2	8.20	8.52	8.77	9.01	9.55	9	30	KAC PVCN
	NW 1422 47 0501	5	20	-	-	75	2.5	6	2	21.27	21.93	-	-	-	9	30	KAC PVAS
	NW 1472 43 051	5	20	-	-	100	2.5	5	2	-	-	-	-	-	9	30	KAC PVCN
	NW 1422 47 0511	5	20	-	-	100	2.5	6	2	21.27	21.93	-	-	-	9	30	KAC PVAS
	NW 1462 43 060	6	9	-	-	57	3	6	2	-	-	-	-	-	9	30	KAC PVCN



Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						
		no wd. short long																		
NW 1412 47 060	6	9	-	-	57	3	6	2	-	-	-	-	-	9	30	KAC PVAS				
NW 1422 47 060	6	20	-	-	100	3	6	2	-	-	-	-	-	9	30	KAC PVAS				
NW 1472 43 060	6	20	-	-	100	3	6	2	-	-	-	-	-	9	30	KAC PVCN				
NW 1472 43 061	6	20	-	-	150	3	6	2	-	-	-	-	-	9	30	KAC PVCN				
NW 1422 47 061	6	20	-	-	150	3	6	2	-	-	-	-	-	9	30	KAC PVAS				
NW 1462 43 080	8	12	-	-	63	4	8	2	-	-	-	-	-	9	30	KAC PVCN				
NW 1412 47 080	8	12	-	-	63	4	8	2	-	-	-	-	-	9	30	KAC PVAS				
NW 1472 43 080	8	25	-	-	100	4	8	2	-	-	-	-	-	9	30	KAC PVCN				
NW 1422 47 080	8	25	-	-	100	4	8	2	-	-	-	-	-	9	30	KAC PVAS				
NW 1422 47 081	8	25	-	-	150	4	8	2	-	-	-	-	-	9	30	KAC PVAS				
NW 1472 43 081	8	25	-	-	150	4	8	2	-	-	-	-	-	9	30	KAC PVCN				
NW 1472 30 81	8	25	-	-	150	4	8	2	-	-	-	-	-	9	30	KAC PVCN				
NW 1462 43 090	9	13.5	-	-	72	4.5	10	2	14.43	14.83	15.21	15.62	-	9	30	KAC PVCN				
NW 1462 43 100	10	15	-	-	72	5	10	2	-	-	-	-	-	9	30	KAC PVCN				
NW 1412 47 100	10	15	-	-	72	5	10	2	-	-	-	-	-	9	30	KAC PVAS				
NW 1422 47 100	10	25	-	-	100	5	10	2	-	-	-	-	-	9	30	KAC PVAS				
NW 1422 47 101	10	25	-	-	150	5	10	2	-	-	-	-	-	9	30	KAC PVAS				
NW 1472 43 101	10	25	-	-	150	5	10	2	-	-	-	-	-	9	30	KAC PVCN				
NW 1412 47 120	12	18	-	-	83	6	12	2	-	-	-	-	-	9	30	KAC PVAS				
NW 1462 43 120	12	18	-	-	83	6	12	2	-	-	-	-	-	9	30	KAC PVCN				
NW 1422 47 120	12	30	-	-	100	6	12	2	-	-	-	-	-	9	30	KAC PVAS				
NW 1472 43 121	12	30	-	-	150	6	12	2	-	-	-	-	-	9	30	KAC PVCN				
NW 1422 47 121	12	30	-	-	150	6	12	2	-	-	-	-	-	9	30	KAC PVAS				



Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. | short | long

	NW 1462 43 140	14	21	-	-	83	7	14	2	-	-	-	-	-	9	30	KAC PVCN
	NW 1412 47 140	14	28	-	-	83	7	14	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1422 47 140	14	30	-	-	100	7	14	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1422 47 141	14	30	-	-	150	7	14	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1472 43 141	14	30	-	-	150	7	14	2	-	-	-	-	-	9	30	KAC PVCN
	NW 1462 43 160	16	24	-	-	92	8	16	2	-	-	-	-	-	9	30	KAC PVCN
	NW 1412 47 160	16	24	-	-	92	8	16	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1422 47 160	16	30	-	-	100	8	16	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1472 43 161	16	30	-	-	150	8	16	2	-	-	-	-	-	9	30	KAC PVCN
	NW 1422 47 161	16	30	-	-	150	8	16	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1462 43 180	18	27	-	-	92	9	18	2	-	-	-	-	-	9	30	KAC PVCN
	NW 1412 47 180	18	36	-	-	92	9	18	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1472 43 181	18	30	-	-	150	9	18	2	-	-	-	-	-	9	30	KAC PVCN
	NW 1412 47 200	20	30	-	-	104	10	20	2	-	-	-	-	-	9	30	KAC PVAS
	NW 1462 43 200	20	30	-	-	104	10	20	2	-	-	-	-	-	9	30	KAC PVCN
	NW 1472 43 201	20	35	-	-	150	10	20	2	-	-	-	-	-	9	30	KAC PVCN
NW 1422 47 201	20	35	-	-	150	10	20	2	-	-	-	-	-	9	30	KAC PVAS	

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
copy milling 3D							
0.4	f _z (mm)	-	-	-	0.01-0.03	0.005	-
	a _p (mm)	-	-	-	0.01-0.3	0.005	-
1-2.5	f _z (mm)	-	0.01-0.025	-	0.02-0.08	0.01	-
	a _p (mm)	-	0.05-0.1	-	0.1-0.7	0.05	-
3-4	f _z (mm)	-	0.04-0.055	-	0.04-0.1	0.04	-
	a _p (mm)	-	0.08-0.19	-	0.15-1.4	0.08	-
5-6	f _z (mm)	-	0.08-0.1	-	0.06-0.15	0.08	-
	a _p (mm)	-	0.1-0.25	-	0.2-2	0.1	-
8	f _z (mm)	-	0.08-0.115	-	0.08-0.2	0.08	-
	a _p (mm)	-	0.15-0.375	-	0.3-2.8	0.15	-
9-10	f _z (mm)	-	0.08-0.115	-	0.08-0.25	0.08	-
	a _p (mm)	-	0.2-0.45	-	0.4-3.5	0.2	-
12	f _z (mm)	-	0.08-0.115	-	0.1-0.3	0.08	-
	a _p (mm)	-	0.2-0.5	-	0.4-4.2	0.2	-
14	f _z (mm)	-	-	-	0.1-0.3	0.08	-
	a _p (mm)	-	-	-	0.4-5	0.2	-
16	f _z (mm)	-	0.1-0.175	-	0.1-0.3	0.1	-
	a _p (mm)	-	0.2-0.7	-	0.4-5.6	0.2	-
18	f _z (mm)	-	-	-	0.1-0.3	0.1	-
	a _p (mm)	-	-	-	0.4-6.5	0.2	-
20	f _z (mm)	-	0.1-0.175	-	0.1-0.35	0.1	-
	a _p (mm)	-	0.2-0.8	-	0.4-7	0.2	-

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
KAC PVAS	roughing finishing	-	▽ -	-	▽ 200 400 600	▽ -	-
			100 110 120		400 700 1000	50 55 60	
KAC PVCN	roughing finishing	-	-	-	▽ 200 500 800	▽ -	-
					200 600 1000	50 55 60	



END MILLS FOR ALUMINIUM | COPPER | PLASTIC | SYNTHETIC

Toric / corner radius end mills | 2 flutes

2 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- corner radius end mill
- short | long version
- with and without clearance between shank and flute

Toric / corner radius end mills	catalogue no.	Effective working length at X° of draft													γ (chip angle)	λ (helix angle)	Features	QC
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°				

no wd. | short | long

	NW 0442 47 004	0.4	1	-	-	50	0.12	4	2	1.32	1.49	1.63	1.75	1.98	9	30		KAC PVAS
	NW 0442 47 006	0.6	1	-	-	50	0.2	4	2	1.20	1.35	1.48	1.60	1.82	9	30		KAC PVAS
	NW 0442 47 008	0.8	1.2	-	-	50	0.25	4	2	1.54	1.70	1.85	1.98	2.21	9	30		KAC PVAS
	NW 0462 43 011	1	1	-	-	50	0.2	4	2	1.31	1.47	1.61	1.73	1.96	9	30		KAC PVCN
	NW 0442 47 010	1	1.5	-	-	50	0.3	4	2	1.87	2.05	2.21	2.34	2.59	9	30		KAC PVAS
	NW 0462 43 0151	1.5	1.5	-	-	50	0.2	4	2	1.88	2.07	2.23	2.37	2.62	9	30		KAC PVCN
	NW 0442 47 015	1.5	2.3	-	-	50	0.3	4	2	2.76	2.98	3.16	3.32	3.61	9	30		KAC PVAS
	NW 0462 43 021	2	2	-	-	50	0.2	4	2	2.44	2.65	2.83	2.98	3.26	9	30		KAC PVCN
	NW 0432 47 021	2	2	-	-	50	0.2	4	2	2.44	2.65	2.83	2.98	3.26	9	30		KAC PVAS
	NW 0432 47 02011	2	2	-	-	50	0.5	4	2	2.41	2.61	2.77	2.92	3.18	9	30		KAC PVAS
	NW 0462 43 02105	2	2	-	-	50	0.5	4	2	2.41	2.61	2.77	2.92	3.18	9	30		KAC PVCN
	NW 0442 47 020	2	3	-	-	50	0.5	4	2	3.51	3.75	3.95	4.12	4.43	9	30		KAC PVAS
	NW 0462 43 031	3	3	-	-	50	0.2	4	2	3.54	3.79	4.00	4.17	4.50	9	30		KAC PVCN
	NW 0432 47 031	3	3	-	-	50	0.2	4	2	3.54	3.79	4.00	4.17	4.50	9	30		KAC PVAS
	NW 0462 43 03105	3	3	-	-	50	0.5	4	2	3.51	3.75	3.95	4.12	4.43	9	30		KAC PVCN
	NW 0432 47 03011	3	3	-	-	50	0.5	4	2	3.51	3.75	3.95	4.12	4.43	9	30		KAC PVAS
	NW 0442 47 030	3	4	-	-	50	0.5	4	2	4.60	4.87	5.09	5.28	5.67	9	30		KAC PVAS
	NW 0432 47 041	4	4	-	-	50	0.2	4	2	-	-	-	-	-	9	30		KAC PVAS
	NW 0462 43 041	4	4	-	-	50	0.2	4	2	-	-	-	-	-	9	30		KAC PVCN
	NW 0432 47 04011	4	4	-	-	50	0.5	4	2	-	-	-	-	-	9	30		KAC PVAS
NW 0462 43 04105	4	4	-	-	50	0.5	4	2	-	-	-	-	-	9	30		KAC PVCN	
NW 0442 47 040	4	6	-	-	50	0.5	4	2	-	-	-	-	-	9	30		KAC PVAS	
NW 0462 43 051	5	5	-	-	57	0.2	6	2	5.68	6.00	6.24	6.47	6.98	9	30		KAC PVCN	



Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. | short | long

	NVW 0462 43 05105	5	5	-	-	57	0.5	6	2	5.66	5.97	6.21	6.42	6.91	9	30		KAC PVCN
	NVW 0442 47 050	5	7	-	-	57	1	6	2	7.77	8.11	8.38	8.66	9.28	9	30		KAC PVAS
	NVW 0462 43 06105	6	6	-	-	57	0.5	6	2	-	-	-	-	-	9	30		KAC PVCN
	NVW 0462 43 061	6	6	-	-	57	0.7	6	2	-	-	-	-	-	9	30		KAC PVCN
	NVW 0462 43 06110	6	6	-	-	57	1	6	2	-	-	-	-	-	9	30		KAC PVCN
	NVW 0442 47 060	6	8	-	-	57	1	6	2	-	-	-	-	-	9	30		KAC PVAS
	NVW 0462 43 0811	8	8	-	-	63	0.5	8	2	-	-	-	-	-	9	30		KAC PVCN
	NVW 0462 43 081	8	8	-	-	63	0.7	8	2	-	-	-	-	-	9	30		KAC PVCN
	NVW 0462 43 0812	8	8	-	-	63	1	8	2	-	-	-	-	-	9	30		KAC PVCN
	NVW 0442 47 080	8	10	-	-	63	1.5	8	2	-	-	-	-	-	9	30		KAC PVAS
	NVW 0462 43 101	10	10	-	-	72	0.7	10	2	-	-	-	-	-	9	30		KAC PVCN
	NVW 0442 47 100	10	12	-	-	72	2	10	2	-	-	-	-	-	9	30		KAC PVAS
	NVW 0462 43 121	12	12	-	-	83	0.7	12	2	-	-	-	-	-	9	30		KAC PVCN
	NVW 0462 43 1213	12	12	-	-	83	1.5	12	2	-	-	-	-	-	9	30		KAC PVCN
	NVW 0442 47 120	12	15	-	-	83	2.5	12	2	-	-	-	-	-	9	30		KAC PVAS
	NVW 0462 43 161	16	16	-	-	92	0.7	16	2	-	-	-	-	-	9	30		KAC PVCN
NVW 0462 43 201	20	20	-	-	104	0.7	20	2	-	-	-	-	-	9	30		KAC PVCN	

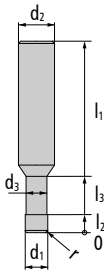
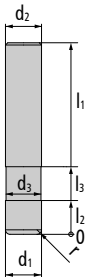
wd. | short | long

	NVW 0462 43 010	1	1	10	0.95	50	0.2	4	2	11.09	11.47	11.78	12.09	12.76	9	30		KAC PVCN
	NVW 0462 43 015	1.5	1.5	10	1.4	50	0.2	4	2	11.20	11.56	11.86	12.17	12.84	9	30		KAC PVCN
	NVW 0432 47 020	2	2	10	1.9	50	0.2	4	2	11.20	11.56	11.86	12.17	12.84	9	30		KAC PVAS
	NVW 0462 43 020	2	2	10	1.9	50	0.2	4	2	11.20	11.56	11.86	12.17	12.84	9	30		KAC PVCN
	NVW 0432 47 0201	2	2	10	1.9	50	0.5	4	2	11.19	11.54	11.84	12.14	12.79	9	30		KAC PVAS
	NVW 0462 43 02005	2	2	10	1.9	50	0.5	4	2	11.20	11.54	11.84	12.14	12.79	9	30		KAC PVCN
	NVW 0432 47 030	3	3	12	2.9	50	0.2	4	2	13.27	13.66	14.01	14.38	-	9	30		KAC PVAS
	NVW 0462 43 030	3	3	12	2.9	50	0.2	4	2	13.27	13.66	14.01	14.38	-	9	30		KAC PVCN
	NVW 0432 47 0301	3	3	12	2.9	50	0.5	4	2	13.26	13.65	13.99	14.35	-	9	30		KAC PVAS
	NVW 0462 43 03005	3	3	12	2.9	50	0.5	4	2	13.26	13.65	14.00	14.35	-	9	30		KAC PVCN
	NVW 0432 47 040	4	4	15	3.8	50	0.2	4	2	-	-	-	-	-	9	30		KAC PVAS
	NVW 0462 43 040	4	4	15	3.8	50	0.2	4	2	-	-	-	-	-	9	30		KAC PVCN

Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	QC
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

wd. | short | long

NV 0432 47 0401	4	4	15	3.8	50	0.5	4	2	-	-	-	-	-	9	30	KAC PVAS
NV 0462 43 04005	4	4	15	3.8	50	0.5	4	2	-	-	-	-	-	9	30	KAC PVCN
NV 0432 47 050	5	5	21	4.8	57	0.2	6	2	22.70	23.26	-	-	-	9	30	KAC PVAS
NV 0462 43 050	5	5	21	4.8	57	0.2	6	2	22.70	23.26	-	-	-	9	30	KAC PVCN
NV 0462 43 05005	5	5	21	4.8	57	0.5	6	2	22.69	23.25	-	-	-	9	30	KAC PVCN
NV 0432 47 0501	5	5	21	4.8	57	0.5	6	2	22.69	23.25	-	-	-	9	30	KAC PVAS
NV 0432 47 060	6	6	21	5.8	57	0.2	6	2	-	-	-	-	-	9	30	KAC PVAS
NV 0432 47 0601	6	6	21	5.8	57	0.5	6	2	-	-	-	-	-	9	30	KAC PVAS
NV 0462 43 06005	6	6	21	5.8	57	0.5	6	2	-	-	-	-	-	9	30	KAC PVCN
NV 0462 43 060	6	6	21	5.8	57	0.7	6	2	-	-	-	-	-	9	30	KAC PVCN
NV 0462 43 06010	6	6	21	5.8	57	1	6	2	-	-	-	-	-	9	30	KAC PVCN
NV 0432 47 0612	6	6	21	5.8	57	1	6	2	-	-	-	-	-	9	30	KAC PVAS
NV 0432 47 0613	6	6	30	5.8	75	1	6	2	-	-	-	-	-	9	30	KAC PVAS
NV 0432 47 081	8	8	27	7.8	63	0.5	8	2	-	-	-	-	-	9	30	KAC PVAS
NV 0462 43 0801	8	8	27	7.8	63	0.5	8	2	-	-	-	-	-	9	30	KAC PVCN
NV 0462 43 080	8	8	27	7.8	63	0.7	8	2	-	-	-	-	-	9	30	KAC PVCN
NV 0462 43 0802	8	8	27	7.8	63	1	8	2	-	-	-	-	-	9	30	KAC PVCN
NV 0432 47 080	8	8	30	7.8	63	1	8	2	-	-	-	-	-	9	30	KAC PVAS
NV 0432 47 0805	8	8	50	7.8	90	1	8	2	-	-	-	-	-	9	30	KAC PVAS
SW 0432 47 101135	10	10	-	9.8	72	0.5	10	2	-	-	-	-	-	9	30	KAC PVAS
NV 0432 47 1011	10	10	32	9.8	72	0.5	10	2	-	-	-	-	-	9	30	KAC PVAS
NV 0462 43 100	10	10	32	9.8	72	0.7	10	2	-	-	-	-	-	9	30	KAC PVCN
NV 0462 43 1002	10	10	32	9.8	72	1	10	2	-	-	-	-	-	9	30	KAC PVCN
NV 0432 47 101	10	10	32	9.8	72	1	10	2	-	-	-	-	-	9	30	KAC PVAS
NV 0432 47 1014	10	10	40	9.8	100	1	10	2	-	-	-	-	-	9	30	KAC PVAS
NV 0432 47 1016	10	10	60	9.8	100	1	10	2	-	-	-	-	-	9	30	KAC PVAS
NV 0432 47 100	10	10	32	9.8	72	1.5	10	2	-	-	-	-	-	9	30	KAC PVAS
NV 0432 47 1201	12	12	38	11.8	83	0.5	12	2	-	-	-	-	-	9	30	KAC PVAS
NV 0462 43 120	12	12	38	11.8	83	0.7	12	2	-	-	-	-	-	9	30	KAC PVCN
NV 0432 47 120	12	12	38	11.8	83	1.5	12	2	-	-	-	-	-	9	30	KAC PVAS








Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						
												0.5°	1°	1.5°	2°	3°				
wd. short long																				
	NVW 0462 43 1203	12	12	38	11.8	83	1.5	12	2	-	-	-	-	-	9	30	KAC PVCN			
	NVW 0432 47 1206	12	12	60	11.8	110	1.5	12	2	-	-	-	-	-	9	30	KAC PVAS			
	NVW 0432 47 1208	12	12	80	11.8	110	1.5	12	2	-	-	-	-	-	9	30	KAC PVAS			
	NVW 0462 43 160	16	16	44	15.8	92	0.7	16	2	-	-	-	-	-	9	30	KAC PVCN			
	NVW 0432 47 1615	16	16	50	15.8	92	1.5	16	2	-	-	-	-	-	9	30	KAC PVAS			
	NVW 0432 47 1619	16	16	100	15.8	150	1.5	16	2	-	-	-	-	-	9	30	KAC PVAS			
	NVW 0432 47 160	16	16	44	15.8	92	2	16	2	-	-	-	-	-	9	30	KAC PVAS			
	NVW 0462 43 200	20	20	54	19.8	104	0.7	20	2	-	-	-	-	-	9	30	KAC PVCN			
	NVW 0432 47 2009	20	20	100	19.8	150	1.5	20	2	-	-	-	-	-	9	30	KAC PVAS			
	NVW 0432 47 200	20	20	54	19.8	104	2	20	2	-	-	-	-	-	9	30	KAC PVAS			

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
copy milling 3D							
0.4-0.8	f _z (mm)	-	0.005-0.02	-	0.01-0.03	0.005	-
	a _p (mm)	-	0.005-0.08	-	0.01-0.3	0.005	-
1-2	f _z (mm)	-	0.01-0.04	-	0.02-0.08	0.01-0.04	-
	a _p (mm)	-	0.05-0.15	-	0.1-0.7	0.05-0.15	-
3-4	f _z (mm)	-	0.04-0.07	-	0.04-0.1	0.04-0.07	-
	a _p (mm)	-	0.08-0.3	-	0.15-1.4	0.08-0.3	-
5-6	f _z (mm)	-	0.08-0.12	-	0.06-0.15	0.08-0.12	-
	a _p (mm)	-	0.1-0.4	-	0.2-2	0.1-0.4	-
8	f _z (mm)	-	0.08-0.15	-	0.08-0.2	0.08-0.115	-
	a _p (mm)	-	0.15-0.6	-	0.3-2.8	0.15-0.375	-
10	f _z (mm)	-	0.08-0.15	-	0.08-0.25	0.08-0.115	-
	a _p (mm)	-	0.2-0.7	-	0.4-3.5	0.2-0.45	-
12	f _z (mm)	-	0.08-0.15	-	0.1-0.3	0.08-0.115	-
	a _p (mm)	-	0.2-0.8	-	0.4-4.2	0.2-0.5	-
16	f _z (mm)	-	0.1	-	0.1-0.3	0.1	-
	a _p (mm)	-	0.2	-	0.4-5.6	0.2	-
20	f _z (mm)	-	0.1	-	0.1-0.35	0.1	-
	a _p (mm)	-	0.2	-	0.4-7	0.2	-

Cutting speed (Vc in m/min)

Material								
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel	
KAC PVAS	roughing finishing	-	 - 100 110 120	-	 200 400 600 400 700 1000	 - 50 55 60	-	
KAC PVCN	roughing finishing	-	-	-	 200 500 800 200 600 1000	 - 50 55 60	-	

END MILLS FOR ALUMINIUM | COPPER | PLASTIC | SYNTHETIC

End mills | 1 flute for aluminium



single flute, plain shank, right hand helix angle

- polished


End mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	D/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. short																		
	NVV 0401 40 010	1	5	-	-	38	-	3	1	8.61	8.72	8.83	8.95	9.19	-	-	KAC polished	
	NVV 0401 40 020	2	10	-	-	38	-	3	1	12.56	13.79	14.81	-	-	-	-	KAC polished	
	NVV 0401 40 030	3	10	-	-	38	-	3	1	-	-	-	-	-	-	-	KAC polished	
	NVV 0401 40 040	4	14	-	-	50	-	4	1	-	-	-	-	-	-	-	KAC polished	
	NVV 0401 40 050	5	16	-	-	60	-	6	1	20.76	21.02	-	-	-	-	-	KAC polished	
	NVV 0401 40 060	6	20	-	-	60	-	6	1	-	-	-	-	-	-	-	KAC polished	
	NVV 0401 40 080	8	20	-	-	75	-	8	1	-	-	-	-	-	-	-	KAC polished	
	NVV 0401 40 100	10	22	-	-	64	-	10	1	-	-	-	-	-	-	-	KAC polished	
	NVV 0401 40 120	12	22	-	-	64	-	12	1	-	-	-	-	-	-	-	KAC polished	

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
pocket and slot milling							
1	f _z (mm) a _p (mm)	-	-	-	0.005-0.03 0.1-2	-	-
2	f _z (mm) a _p (mm)	-	-	-	0.005-0.04 0.2-4	-	-
3	f _z (mm) a _p (mm)	-	-	-	0.01-0.06 0.3-6	-	-
4	f _z (mm) a _p (mm)	-	-	-	0.01-0.08 0.4-8	-	-
5	f _z (mm) a _p (mm)	-	-	-	0.01-0.09 0.5-10	-	-
6	f _z (mm) a _p (mm)	-	-	-	0.015-0.1 0.6-12	-	-
8	f _z (mm) a _p (mm)	-	-	-	0.02-0.12 0.6-16	-	-
10	f _z (mm) a _p (mm)	-	-	-	0.025-0.14 1-16	-	-
12	f _z (mm) a _p (mm)	-	-	-	0.03-0.17 1-18	-	-

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
KAC polished	roughing finishing	-	-	-	 400 500 600 800 900 1000	-	-

END MILLS FOR ALUMINIUM | COPPER | PLASTIC | SYNTHETIC

End mills | 1 flute for plastic



end mill single flute, plain shank, right hand helix angle

- polished


End mills	catalogue no.	Effective working length at X° of draft													γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°				

no wd. short																		
	NVV 0411 40 010	1	5	-	-	38	-	3	1	8.61	8.72	8.83	8.95	9.19	-	-	KAC polished	
	NVV 0411 40 015	1.5	5	-	-	38	-	3	1	8.61	8.72	8.83	8.95	9.19	-	-	KAC polished	
	NVV 0411 40 020	2	10	-	-	38	-	3	1	13.16	13.33	13.51	13.68	-	-	-	KAC polished	
	NVV 0411 40 030	3	10	-	-	38	-	3	1	-	-	-	-	-	-	-	KAC polished	
	NVV 0411 40 040	4	14	-	-	50	-	4	1	-	-	-	-	-	-	-	KAC polished	
	NVV 0411 40 050	5	16	-	-	60	-	5	1	-	-	-	-	-	-	-	KAC polished	
	NVV 0411 40 060	6	20	-	-	60	-	6	1	-	-	-	-	-	-	-	KAC polished	
	NVV 0411 40 080	8	20	-	-	75	-	8	1	-	-	-	-	-	-	-	KAC polished	

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
pocket and slot milling							
1	f _z (mm) a _p (mm)	-	-	-	0.005-0.03 0.1-2	-	-
1.5	f _z (mm) a _p (mm)	-	-	-	0.005-0.03 0.1-2	-	-
2	f _z (mm) a _p (mm)	-	-	-	0.005-0.04 0.2-4	-	-
3	f _z (mm) a _p (mm)	-	-	-	0.01-0.06 0.3-6	-	-
4	f _z (mm) a _p (mm)	-	-	-	0.01-0.08 0.4-8	-	-
5	f _z (mm) a _p (mm)	-	-	-	0.01-0.09 0.5-10	-	-
6	f _z (mm) a _p (mm)	-	-	-	0.015-0.1 0.6-12	-	-
8	f _z (mm) a _p (mm)	-	-	-	0.02-0.12 0.6-16	-	-

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
KAC polished	roughing finishing	-	-	-	 200 300 400 350 425 500	-	-

END MILLS FOR ALUMINIUM | COPPER | PLASTIC | SYNTHETIC

End mills | 2 flutes



2 flutes, plain shank, 45° right hand helix angle

- center cutting end mill
- straight face
- short l long version
- with and without clearance between shank and flute

End mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. short long																		
	NV 0412 47 010	1	2	-	-	50	-	4	2	2.46	2.68	2.86	3.02	3.31	16	45	KAC PVAS	
	NV 0412 47 015	1.5	3	-	-	50	-	4	2	3.56	3.81	4.02	4.20	4.52	16	45	KAC PVAS	
	NV 0412 47 021	2	4	-	-	50	-	4	2	4.64	4.92	5.15	5.36	5.79	16	45	KAC PVAS	
	NV 0412 47 020	2	4	-	-	57	-	6	2	4.64	4.92	5.15	5.36	5.79	16	45	KAC PVAS	
	NV 0412 47 030	3	6	-	-	57	-	6	2	9.62	10.31	10.52	10.92	11.80	16	45	KAC PVAS	
	NV 0422 47 030	3	15	-	-	60	-	3	2	-	-	-	-	-	16	45	KAC PVAS	
	NV 0422 47 031	3	15	-	-	75	-	3	2	-	-	-	-	-	16	45	KAC PVAS	
	NV 0412 47 041	4	8	-	-	50	-	4	2	-	-	-	-	-	16	45	KAC PVAS	
	NV 0412 47 040	4	8	-	-	57	-	6	2	11.99	12.29	12.74	13.21	14.28	16	45	KAC PVAS	
	NV 0422 47 040	4	20	-	-	60	-	4	2	-	-	-	-	-	16	45	KAC PVAS	
	NV 0422 47 041	4	20	-	-	75	-	4	2	-	-	-	-	-	16	45	KAC PVAS	
	NV 0422 47 042	4	20	-	-	100	-	4	2	-	-	-	-	-	16	45	KAC PVAS	
	NV 0412 47 050	5	10	-	-	57	-	6	2	14.60	15.12	15.67	-	-	16	45	KAC PVAS	
	NV 0422 47 050	5	20	-	-	70	-	5	2	-	-	-	-	-	16	45	KAC PVAS	
	NV 0412 47 060	6	12	-	-	57	-	6	2	-	-	-	-	-	16	45	KAC PVAS	
	NV 0422 47 060	6	20	-	-	100	-	6	2	-	-	-	-	-	16	45	KAC PVAS	
	NV 0412 47 080	8	16	-	-	63	-	8	2	-	-	-	-	-	16	45	KAC PVAS	
	NV 0422 47 080	8	25	-	-	100	-	8	2	-	-	-	-	-	16	45	KAC PVAS	
	NV 0412 47 100	10	20	-	-	72	-	10	2	-	-	-	-	-	16	45	KAC PVAS	
	NV 0422 47 100	10	25	-	-	100	-	10	2	-	-	-	-	-	16	45	KAC PVAS	
NV 0422 47 101	10	25	-	-	150	-	10	2	-	-	-	-	-	16	45	KAC PVAS		
NV 0412 47 120	12	24	-	-	83	-	12	2	-	-	-	-	-	16	45	KAC PVAS		
NV 0422 47 120	12	30	-	-	100	-	12	2	-	-	-	-	-	16	45	KAC PVAS		

End mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	QC
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. | short | long

	NV 0422 47 121	12	30	-	-	150	-	12	2	-	-	-	-	-	16	45	KAC PVAS	
	NV 0412 47 160	16	32	-	-	92	-	16	2	-	-	-	-	-	16	45	KAC PVAS	
	NV 0422 47 161	16	30	-	-	150	-	16	2	-	-	-	-	-	16	45	KAC PVAS	
	NV 0412 47 200	20	40	-	-	104	-	20	2	-	-	-	-	-	16	45	KAC PVAS	
	NV 0422 47 201	20	35	-	-	150	-	20	2	-	-	-	-	-	16	45	KAC PVAS	

wd. | short | long

	NV 0412 47 0102	1	2	10	0.95	50	-	4	2	11.10	11.49	11.80	12.11	12.79	16	45	KAC PVAS
	NV 0412 47 0103	1	2	15	0.95	50	-	4	2	16.28	16.75	17.19	17.64	18.63	16	45	KAC PVAS
	NV 0412 47 0152	1.5	3	10	1.4	50	-	4	2	11.10	11.49	11.80	12.11	12.79	16	45	KAC PVAS
	NV 0412 47 0153	1.5	3	15	1.4	50	-	4	2	16.28	16.75	17.19	17.64	18.63	16	45	KAC PVAS
	NV 0412 47 0212	2	4	10	1.9	50	-	4	2	11.10	11.49	11.80	12.11	12.79	16	45	KAC PVAS
	NV 0412 47 0214	2	4	20	1.9	50	-	4	2	21.44	22.01	22.57	23.17	-	16	45	KAC PVAS
	NV 0412 47 0302	3	6	10	2.9	57	-	6	2	10.89	11.34	11.68	11.99	12.66	16	45	KAC PVAS
	NV 0412 47 0304	3	6	20	2.9	57	-	6	2	21.44	22.00	22.46	23.17	24.35	16	45	KAC PVAS
	NV 0412 47 0305	3	6	30	2.9	75	-	6	2	31.59	32.51	33.23	34.23	-	16	45	KAC PVAS
	NV 0412 47 0404	4	8	20	3.8	57	-	6	2	21.56	22.11	22.68	23.28	-	16	45	KAC PVAS
	NV 0412 47 0405	4	8	30	3.8	75	-	6	2	31.81	32.61	33.45	-	-	16	45	KAC PVAS
	NV 0412 47 0406	4	8	40	3.8	75	-	6	2	42.06	43.23	-	-	-	16	45	KAC PVAS
	NV 0412 47 0505	5	10	30	4.8	75	-	6	2	31.81	-	-	-	-	16	45	KAC PVAS
	NV 0412 47 0604	6	12	20	5.8	57	-	6	2	-	-	-	-	-	16	45	KAC PVAS
	NV 0412 47 0605	6	12	30	5.8	75	-	6	2	-	-	-	-	-	16	45	KAC PVAS
	NV 0412 47 0606	6	12	40	5.8	75	-	6	2	-	-	-	-	-	16	45	KAC PVAS
	NV 0412 47 0804	8	16	20	7.8	63	-	8	2	-	-	-	-	-	16	45	KAC PVAS
	NV 0412 47 0805	8	16	40	7.8	90	-	8	2	-	-	-	-	-	16	45	KAC PVAS
	NV 0412 47 0807	8	16	60	7.8	100	-	8	2	-	-	-	-	-	16	45	KAC PVAS

End mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						
wd. short long																				
	NVW 0412 47 1006	10	20	40	9.8	100	-	10	2	-	-	-	-	-	16	45	KAC PVAS			
	NVW 0412 47 1008	10	20	60	9.8	100	-	10	2	-	-	-	-	-	16	45	KAC PVAS			
	NVW 0412 47 1205	12	24	30	11.8	83	-	12	2	-	-	-	-	-	16	45	KAC PVAS			
	NVW 0412 47 1207	12	24	60	11.8	110	-	12	2	-	-	-	-	-	16	45	KAC PVAS			
	NVW 0412 47 1208	12	24	80	11.8	110	-	12	2	-	-	-	-	-	16	45	KAC PVAS			
	NVW 0412 47 1605	16	32	50	15.8	92	-	16	2	-	-	-	-	-	16	45	KAC PVAS			
	NVW 0412 47 1606	16	32	70	15.8	120	-	16	2	-	-	-	-	-	16	45	KAC PVAS			
	NVW 0412 47 1607	16	32	100	15.8	150	-	16	2	-	-	-	-	-	16	45	KAC PVAS			
	NVW 0412 47 1608	16	32	110	15.8	150	-	16	2	-	-	-	-	-	16	45	KAC PVAS			
	NVW 0412 47 2006	20	40	60	19.8	104	-	20	2	-	-	-	-	-	16	45	KAC PVAS			
NVW 0412 47 2008	20	40	100	19.8	150	-	20	2	-	-	-	-	-	16	45	KAC PVAS				

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
pocket and slot milling							
1-2	f _z (mm) a _p (mm)	-	0.01-0.02 0.2-0.3	-	0.01-0.03 0.1-0.7	0.01-0.02 0.2-0.3	-
3-4	f _z (mm) a _p (mm)	-	0.03-0.05 0.2-0.4	-	0.04-0.09 0.15-1.4	0.03-0.05 0.2-0.4	-
5-6	f _z (mm) a _p (mm)	-	0.03-0.05 0.2-0.6	-	0.05-0.1 0.15-2	0.03-0.05 0.2-0.6	-
8	f _z (mm) a _p (mm)	-	0.04-0.06 0.3-0.7	-	0.06-0.15 0.15-2.8	0.04-0.06 0.3-0.7	-
10	f _z (mm) a _p (mm)	-	0.05-0.08 0.4-0.8	-	0.08-0.17 0.2-3.5	0.05-0.08 0.4-0.8	-
12	f _z (mm) a _p (mm)	-	0.06-0.1 0.5-0.8	-	0.09-0.2 0.2-4.2	0.06-0.1 0.5-0.8	-
16	f _z (mm) a _p (mm)	-	0.06-0.1 0.7-1.1	-	0.1-0.27 0.2-5.6	0.06-0.1 0.7-1.1	-
20	f _z (mm) a _p (mm)	-	0.07-0.12 0.9-1.3	-	0.12-0.35 0.2-7	0.07-0.12 0.9-1.3	-

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
KAC PVAS	roughing finishing	-	▽ 100 110 120	-	▽ 200 400 600 400 700 1000	▽ 50 55 60	-



END MILLS FOR ALUMINIUM | COPPER | PLASTIC | SYNTHETIC

End mills | 3 flutes for aluminium

3 flutes, plain shank, right hand helix angle

- center cutting
- short version
- uneven cutting pitch
- without clearance between shank and flute
- straight face

End mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. | short | long

	SW 0253 45 030	3	6	-	-	50	-	4	3	-	-	-	-	-	9	35	MGC PVCS
	SW 0253 45 040	4	8	-	-	50	-	4	3	-	-	-	-	-	9	35	MGC PVCS
	SW 0253 45 050	5	10	-	-	57	-	6	3	-	-	-	-	-	9	35	MGC PVCS
	SW 0253 45 060	6	12	-	-	57	-	6	3	-	-	-	-	-	9	35	MGC PVCS
	SW 0253 45 080	8	16	-	-	63	-	8	3	-	-	-	-	-	9	35	MGC PVCS
	SW 0253 45 100	10	20	-	-	72	-	10	3	-	-	-	-	-	9	35	MGC PVCS
	SW 0253 45 120	12	24	-	-	83	-	12	3	-	-	-	-	-	9	35	MGC PVCS
	SW 0253 45 160	16	32	-	-	92	-	16	3	-	-	-	-	-	9	35	MGC PVCS

no wd. | long

	NW 0423 40 0201	2	8	-	-	38	-	3	3	-	-	-	-	-	-	30	KAC polished	
	NW 0423 40 040	4	10	-	-	38	-	4	3	-	-	-	-	-	-	30	KAC polished	
	NW 0423 40 080	8	16	-	-	60	-	8	3	-	-	-	-	-	-	30	KAC polished	
	NW 0423 40 100	10	20	-	-	65	-	10	3	-	-	-	-	-	-	30	KAC polished	
	NW 0423 40 120	12	24	-	-	75	-	12	3	-	-	-	-	-	-	30	KAC polished	
	NW 0423 40 160	16	32	-	-	88	-	16	3	-	-	-	-	-	-	30	KAC polished	

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
pocket and slot milling							
2	f _z (mm)	-	-	-	0.01-0.03	-	-
	a _p (mm)	-	-	-	0.1-0.7	-	-
3-4	f _z (mm)	-	0.03-0.05	-	0.04-0.09	0.03-0.05	-
	a _p (mm)	-	0.2-0.4	-	0.15-1.4	0.2-0.4	-
5-6	f _z (mm)	-	0.03-0.05	-	0.05-0.1	0.03-0.05	-
	a _p (mm)	-	0.2-0.6	-	0.15-2	0.2-0.6	-
8	f _z (mm)	-	0.04-0.06	-	0.06-0.15	0.04-0.06	-
	a _p (mm)	-	0.3-0.7	-	0.15-2.8	0.3-0.7	-
10	f _z (mm)	-	0.05-0.08	-	0.08-0.17	0.05-0.08	-
	a _p (mm)	-	0.4-0.8	-	0.2-3.5	0.4-0.8	-
12	f _z (mm)	-	0.06-0.1	-	0.09-0.2	0.06-0.1	-
	a _p (mm)	-	0.5-0.8	-	0.2-4.2	0.5-0.8	-
16	f _z (mm)	-	0.06-0.1	-	0.1-0.27	0.06-0.1	-
	a _p (mm)	-	0.7-1.1	-	0.2-5.6	0.7-1.1	-

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
MGC PVCS	roughing finishing	-	▽ - 60 80 100	-	▽ 200 400 600 350 575 800	▽ - 20 30 40	-
		-	-	-	▽ 200 400 600 350 675 1000	-	-



END MILLS FOR ALUMINIUM | COPPER | PLASTIC | SYNTHETIC

End mills | 4 flutes for aluminium

4 flutes, plain shank, 50° right hand helix angle

- center cutting
- straight face
- short version
- uneven cutting pitch
- corner radius
- with clearance between shank and flute
- < Ø 12 mm clamping surface is available on demand, ≥ Ø 12 mm with clamping surface by default




End mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

wd. short																		
	NVV 0394 45 06005	6	6	21	5.8	57	0.5	6	4	-	-	-	-	-	8	50	UMGC PVCS	
	NVV 0394 45 06010	6	6	21	5.8	57	1	6	4	-	-	-	-	-	8	50	UMGC PVCS	
	NVV 0394 45 08005	8	8	27	7.8	63	0.5	8	4	-	-	-	-	-	8	50	UMGC PVCS	
	NVV 0394 45 08010	8	8	27	7.8	63	1	8	4	-	-	-	-	-	8	50	UMGC PVCS	
	NVV 0394 45 10005	10	10	32	9.8	72	0.5	10	4	-	-	-	-	-	8	50	UMGC PVCS	
	NVV 0394 45 10010	10	10	32	9.8	72	1	10	4	-	-	-	-	-	8	50	UMGC PVCS	
	NVV 0394 45 12010	12	12	38	11.8	83	1	12	4	-	-	-	-	-	8	50	UMGC PVCS	
	NVV 0394 45 12020	12	12	38	11.8	83	2	12	4	-	-	-	-	-	8	50	UMGC PVCS	
	NVV 0394 45 16010	16	16	44	15.8	92	1	16	4	-	-	-	-	-	8	50	UMGC PVCS	
	NVV 0394 45 16020	16	16	44	15.8	92	2	16	4	-	-	-	-	-	8	50	UMGC PVCS	

Feed per tooth (fz) | d.o.c. (ap)

Material							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
		pocket and slot milling					
6	f _z (mm)	-	0.05-0.08	-	0.05-0.1	0.025-0.05	-
	a _p (mm)	-	1.5-1.8	-	0.15-2	0.2-1	-
8	f _z (mm)	-	0.05-0.08	-	0.06-0.15	0.04-0.06	-
	a _p (mm)	-	2-2.5	-	0.15-2.8	0.3-1	-
10	f _z (mm)	-	0.06-0.1	-	0.08-0.17	0.05-0.08	-
	a _p (mm)	-	2.5-3	-	0.2-3.5	0.4-1	-
12	f _z (mm)	-	0.07-0.12	-	0.09-0.2	0.06-0.1	-
	a _p (mm)	-	3-3.5	-	0.2-4.2	0.5-1	-
16	f _z (mm)	-	0.08-0.12	-	0.1-0.27	0.06-0.1	-
	a _p (mm)	-	4-4.5	-	0.2-5.6	0.5-1.5	-

Cutting speed (Vc in m/min)

Material							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
UMGC PVCS	roughing finishing	-	 - 70 95 120	-	 220 410 600 400 700 1000	 - 30 50 70	-



END MILLS FOR GRAPHITE | GRP | CFRP

		Page
Ball nose end mills	2 flutes	104
	3 flutes	108
Toric / corner radius end mills	2 flutes	110
	3 flutes	112
End mills	2 flutes	116



END MILLS FOR GRAPHITE | GRP | CFRP

Ball nose end mills | 2 flutes

2 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- short | long version
- with and without clearance between shank and flute
- \varnothing 3 mm: PVDiaG-Diamond treated
- $\geq \varnothing 3$ mm: PVDiaN-Diamond

Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d_1	l_2	l_3	d_3	l_1	r	d_2	z	0.5°	1°	1.5°	2°	3°						

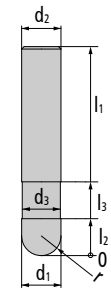
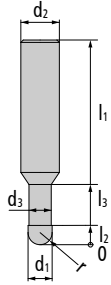
wd. | high precise | short | long

	NV 1462 49 0031	0.3	0.3	1	0.285	50	0.15	4	2	1.38	1.50	1.60	1.70	1.88	4	30	KAC PVDiaG
	NV 1462 49 0041	0.4	0.4	1	0.385	50	0.2	4	2	1.38	1.49	1.59	1.69	1.87	4	30	KAC PVDiaG
	NV 1462 49 0051	0.5	0.5	2	0.48	50	0.25	4	2	2.49	2.64	2.78	2.90	3.12	4	30	KAC PVDiaG
	NV 1462 49 0061	0.6	0.6	2	0.58	50	0.3	4	2	2.48	2.64	2.77	2.89	3.11	4	30	KAC PVDiaG
	NV 1462 49 0081	0.8	0.8	4	0.78	50	0.4	4	2	4.61	4.83	5.02	5.18	5.46	4	30	KAC PVDiaG
	NV 1462 49 0111	1	1	5	0.98	50	0.5	4	2	5.66	5.91	6.11	6.29	6.59	4	30	KAC PVDiaG
	NV 1462 49 0151	1.5	1.5	10	1.45	50	0.75	4	2	10.95	11.28	11.54	11.76	12.54	4	20	KAC PVDiaG
	NV 1462 49 0211	2	2	10	1.95	50	1	4	2	10.94	11.26	11.52	11.75	12.46	4	20	KAC PVDiaG
	NV 1462 49 0311	3	3	10	2.95	57	1.5	6	2	10.92	11.23	11.49	11.71	12.30	4	20	KAC PVDiaN
	NV 1462 49 0411	4	4	15	3.9	57	2	6	2	16.17	16.53	16.82	17.17	18.84	4	20	KAC PVDiaN
	NV 1462 49 0511	5	5	20	4.9	57	2.5	6	2	21.29	21.71	-	-	-	4	20	KAC PVDiaN
	NV 1462 49 0611	6	6	20	5.85	57	3	6	2	-	-	-	-	-	4	20	KAC PVDiaN
	NV 1462 49 0614	6	6	40	5.85	75	3	6	2	-	-	-	-	-	4	20	KAC PVDiaN
	NV 1462 49 0811	8	8	20	7.85	63	4	8	2	-	-	-	-	-	4	20	KAC PVDiaN
NV 1462 49 1001	10	10	20	9.85	72	5	10	2	-	-	-	-	-	4	20	KAC PVDiaN	

Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

wd. and no wd. | short | long

	SW 1452 48 00403	0.4	0.6	2.5	0.37	50	0.2	4	2	3.14	3.33	3.50	3.66	3.94	9	30	KAC PVDiaG
	SW 1452 48 00404	0.4	0.6	5	0.37	50	0.2	4	2	5.80	6.08	6.31	6.52	6.89	9	30	KAC PVDiaG
	NW 1452 48 0050	0.5	0.8	-	-	50	0.25	4	2	1.07	1.21	1.33	1.45	1.66	9	30	KAC PVDiaG
	SW 1452 48 00503	0.5	0.8	3.5	0.45	50	0.25	4	2	4.27	4.49	4.68	4.85	5.16	9	30	KAC PVDiaG
	NW 1452 48 00510	0.5	0.8	5	0.45	50	0.25	4	2	5.86	6.12	6.35	6.55	6.91	9	30	KAC PVDiaG
	SW 1452 48 00504	0.5	0.8	7	0.45	50	0.25	4	2	7.96	8.27	8.54	8.77	9.25	9	30	KAC PVDiaG
	NW 1452 48 0052	0.5	0.8	10	0.45	50	0.25	4	2	11.09	11.47	11.78	12.09	12.75	9	30	KAC PVDiaG
	SW 1452 48 00603	0.6	0.9	3.5	0.55	50	0.3	4	2	4.16	4.40	4.60	4.78	5.10	9	30	KAC PVDiaG
	SW 1452 48 00604	0.6	0.9	7	0.55	50	0.3	4	2	7.87	8.21	8.48	8.72	9.19	9	30	KAC PVDiaG
	SW 1452 48 00803	0.8	1.2	5	0.75	50	0.4	4	2	5.85	6.11	6.33	6.53	6.89	9	30	KAC PVDiaG
	SW 1452 48 00804	0.8	1.2	10	0.75	50	0.4	4	2	11.08	11.46	11.77	12.07	12.73	9	30	KAC PVDiaG
	NW 1452 48 010	1	1.5	-	-	50	0.5	4	2	1.84	2.01	2.16	2.29	2.53	9	30	KAC PVDiaG
	NW 1452 48 01000	1	1.5	5	0.95	50	0.5	4	2	5.84	6.10	6.32	6.52	6.87	9	30	KAC PVDiaG
	NW 1452 48 0101	1	1.5	10	0.95	50	0.5	4	2	11.08	11.46	11.76	12.06	12.71	9	30	KAC PVDiaG
	NW 1452 48 0102	1	1.5	15	0.95	50	0.5	4	2	16.27	16.73	17.15	17.59	18.55	9	30	KAC PVDiaG
	NW 1452 48 0103	1	1.5	20	0.95	50	0.5	4	2	21.43	21.98	22.54	23.12	24.39	9	30	KAC PVDiaG
	NW 1452 48 01510	1.5	2.3	-	-	50	0.75	4	2	2.71	2.91	3.08	3.23	3.50	9	30	KAC PVDiaG
	NW 1452 48 0152	1.5	2.3	10	1.4	50	0.75	4	2	11.18	11.53	11.82	12.11	12.75	9	30	KAC PVDiaG
	NW 1452 48 0153	1.5	2.3	25	1.4	75	0.75	4	2	26.64	27.29	27.98	28.70	-	9	30	KAC PVDiaG
	NW 1452 48 0200	2	3	-	-	50	1	4	2	3.46	3.68	3.86	4.03	4.31	9	30	KAC PVDiaG
	NW 1452 48 0201	2	3	5	1.9	50	1	4	2	5.96	6.18	6.37	6.54	6.87	9	30	KAC PVDiaG
	NW 1452 48 0202	2	3	10	1.9	50	1	4	2	11.17	11.51	11.80	12.08	12.71	9	30	KAC PVDiaG
	NW 1452 48 0203	2	3	15	1.9	50	1	4	2	16.34	16.78	17.18	17.62	18.55	9	30	KAC PVDiaG
	NW 1452 48 0204	2	3	20	1.9	75	1	4	2	21.50	22.03	22.57	23.15	-	9	30	KAC PVDiaG
	NW 1452 48 0205	2	3	25	1.9	75	1	4	2	26.63	27.28	27.96	28.68	-	9	30	KAC PVDiaG
	NW 1452 48 0301	3	4.5	5	2.9	50	1.5	4	2	5.94	6.14	6.32	6.48	6.79	9	30	KAC PVDiaN



Ball nose end mills	catalogue no.	Effective working length at X° of draft														γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°					

wd. and no wd. | short | long

	NV 1452 48 0302	3	4.5	10	2.9	50	1.5	4	2	11.15	11.48	11.76	12.03	-	9	30	KAC PVDiaN
	NV 1452 48 0303	3	4.5	15	2.9	50	1.5	4	2	16.33	16.75	17.15	-	-	9	30	KAC PVDiaN
	NV 1452 48 0304	3	4.5	20	2.9	75	1.5	4	2	21.48	22.00	-	-	-	9	30	KAC PVDiaN
	NV 1452 48 0305	3	4.5	25	2.9	75	1.5	4	2	26.62	27.26	-	-	-	9	30	KAC PVDiaN
	NV 1452 48 0306	3	4.5	30	2.9	100	1.5	4	2	31.74	-	-	-	-	9	30	KAC PVDiaN
	NV 1452 48 0402	4	6	10	3.8	50	2	4	2	-	-	-	-	-	9	30	KAC PVDiaN
	NV 1452 48 0403	4	6	15	3.8	50	2	4	2	-	-	-	-	-	9	30	KAC PVDiaN
	NV 1452 48 0404	4	6	20	3.8	75	2	4	2	-	-	-	-	-	9	30	KAC PVDiaN
	NV 1452 48 0405	4	6	25	3.8	75	2	4	2	-	-	-	-	-	9	30	KAC PVDiaN
	NV 1452 48 0406	4	6	45	3.8	100	2	4	2	-	-	-	-	-	9	30	KAC PVDiaN
	NV 1452 48 0502	5	7.5	10	4.8	57	2.5	5	2	-	-	-	-	-	9	30	KAC PVDiaN
	NV 1452 48 0503	5	7.5	25	4.8	75	2.5	5	2	-	-	-	-	-	9	30	KAC PVDiaN
	NV 1452 48 0504	5	7.5	45	4.8	100	2.5	5	2	-	-	-	-	-	9	30	KAC PVDiaN
	NV 1452 48 0601	6	9	10	5.8	57	3	6	2	-	-	-	-	-	9	30	KAC PVDiaN
	NV 1452 48 0603	6	9	15	5.8	57	3	6	2	-	-	-	-	-	9	30	KAC PVDiaN
	NV 1452 48 0604	6	9	20	5.8	75	3	6	2	-	-	-	-	-	9	30	KAC PVDiaN
	NV 1452 48 0605	6	9	25	5.8	75	3	6	2	-	-	-	-	-	9	30	KAC PVDiaN
	NV 1452 48 0606	6	9	30	5.8	75	3	6	2	-	-	-	-	-	9	30	KAC PVDiaN
	NV 1452 48 0607	6	9	45	5.8	100	3	6	2	-	-	-	-	-	9	30	KAC PVDiaN
	NV 1452 48 0608	6	9	60	5.8	150	3	6	2	-	-	-	-	-	9	30	KAC PVDiaN
NV 1452 48 0800	8	12	-	-	63	4	8	2	-	-	-	-	-	9	30	KAC PVDiaN	
NV 1452 48 0801	8	12	20	7.8	63	4	8	2	-	-	-	-	-	9	30	KAC PVDiaN	

Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						
wd. and no wd. short long																				
	NV 1452 48 0802	8	12	25	7.8	63	4	8	2	-	-	-	-	-	9	30	KAC PVDiaN			
	NV 1452 48 081	8	12	45	7.8	100	4	8	2	-	-	-	-	-	9	30	KAC PVDiaN			
	NV 1452 48 082	8	12	60	7.8	150	4	8	2	-	-	-	-	-	9	30	KAC PVDiaN			
	NV 1452 48 1009	10	15	25	9.8	72	5	10	2	-	-	-	-	-	9	30	KAC PVDiaN			
	NV 1452 48 1010	10	15	45	9.8	100	5	10	2	-	-	-	-	-	9	30	KAC PVDiaN			
	NV 1452 48 1209	12	18	25	11.8	83	6	12	2	-	-	-	-	-	9	30	KAC PVDiaN			
	NV 1452 48 1210	12	18	45	11.8	110	6	12	2	-	-	-	-	-	9	30	KAC PVDiaN			
	NV 1452 48 1220	12	18	60	11.8	150	6	12	2	-	-	-	-	-	9	30	KAC PVDiaN			

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
copy milling 3D							
0.3-0.8	f _z (mm)	-	0.005-0.0125	-	0.01-0.03	-	-
	a _p (mm)	-	0.005-0.0425	-	0.01-0.3	-	-
1-2	f _z (mm)	-	0.01-0.025	-	0.02-0.08	-	-
	a _p (mm)	-	0.05-0.1	-	0.1-0.7	-	-
3-4	f _z (mm)	-	0.04-0.055	-	0.04-0.1	-	-
	a _p (mm)	-	0.08-0.19	-	0.15-1.4	-	-
5-6	f _z (mm)	-	0.08-0.1	-	0.06-0.15	-	-
	a _p (mm)	-	0.1-0.25	-	0.2-2	-	-
8	f _z (mm)	-	0.08-0.115	-	0.08-0.2	-	-
	a _p (mm)	-	0.15-0.375	-	0.3-2.8	-	-
10	f _z (mm)	-	0.08-0.115	-	0.08-0.25	-	-
	a _p (mm)	-	0.2-0.45	-	0.4-3.5	-	-
12	f _z (mm)	-	0.08-0.115	-	0.1-0.3	-	-
	a _p (mm)	-	0.2-0.5	-	0.4-4.2	-	-

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
KAC PVDiaG	roughing finishing	-	▽	-	▽	-	-
		-	100 110 120	-	200 550 900 400 700 1000	-	-
KAC PVDiaN	roughing finishing	-	▽	-	▽	-	-
		-	100 110 120	-	200 400 600 400 700 1000	-	-

▽ major application ▽ minor application ▽ ▽ roughing ▽ ▽ pre-finishing ▽ ▽ finishing



END MILLS FOR GRAPHITE | GRP | CFRP

Ball nose end mills | 3 flutes

3 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- short | long version
- with clearance between shank and flute
- ≥ Ø 3 mm: PVDiaN-Diamond

Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						




wd. and no wd. | short | long

	catalogue no.	d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°	γ	λ	Features	Q/C	
	NVV 1453 48 1009	10	15	25	9.8	72	5	10	3	-	-	-	-	-	9	30		KAC PVDiaN	
	NVV 1453 48 1010	10	15	45	9.8	100	5	10	3	-	-	-	-	-	9	30		KAC PVDiaN	
	NVV 1453 48 1020	10	15	60	9.8	150	5	10	3	-	-	-	-	-	9	30		KAC PVDiaN	
	NVV 1453 48 1209	12	18	25	11.8	83	6	12	3	-	-	-	-	-	9	30		KAC PVDiaN	
	NVV 1453 48 1210	12	18	45	11.8	100	6	12	3	-	-	-	-	-	9	30		KAC PVDiaN	
	NVV 1453 48 1220	12	18	60	11.8	150	6	12	3	-	-	-	-	-	9	30		KAC PVDiaN	
	NVV 1453 48 1610	16	24	45	15.8	100	8	16	3	-	-	-	-	-	9	30		KAC PVDiaN	
	NVV 1453 48 162	16	24	60	15.8	150	8	16	3	-	-	-	-	-	9	30		KAC PVDiaN	
	NVV 1453 48 2000	20	30	45	19.8	100	10	20	3	-	-	-	-	-	9	30		KAC PVDiaN	
NVV 1453 48 2010	20	30	60	19.8	150	10	20	3	-	-	-	-	-	9	30		KAC PVDiaN		

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
copy milling 3D							
10	f _z (mm) a _p (mm)	-	-	-	0.08-0.25 0.4-3.5	-	-
12	f _z (mm) a _p (mm)	-	-	-	0.1-0.3 0.4-4.2	-	-
16	f _z (mm) a _p (mm)	-	-	-	0.1-0.3 0.4-5.6	-	-
20	f _z (mm) a _p (mm)	-	-	-	0.1-0.35 0.4-7	-	-

Cutting speed (Vc in m/min)

Material							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
KAC PVDiaN	roughing finishing	-	-	-	 200  400  600 -	-	-



END MILLS FOR GRAPHITE | GRP | CFRP

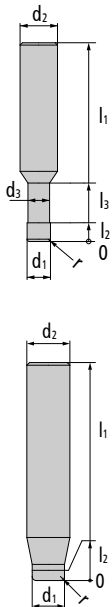
Toric / corner radius end mills | 2 flutes

2 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- short | long version
- with and without clearance between shank and flute
- corner radius
- $\lt; \varnothing 3 \text{ mm}$: PVDiaN-Diamond treated
- >math>\geq \varnothing 3 \text{ mm}</math>: PVDiaN-Diamond

Toric / corner radius end mills	catalogue no.	Effective working length at X° of draft												γ (chip angle)	λ (helix angle)	Features	Q/C
		d_1	l_2	l_3	d_3	l_1	r	d_2	z	0.5°	1°	1.5°	2°				

no wd. | short | long



SWV 0452 48 00403	0.4	0.6	2.5	0.37	50	0.05	4	2	3.15	3.35	3.52	3.68	3.97	9	30	KAC PVDiaG
SWV 0452 48 00404	0.4	0.6	5	0.37	50	0.05	4	2	5.81	6.09	6.33	6.54	6.91	9	30	KAC PVDiaG
SWV 0452 48 00503	0.5	0.8	3.5	0.45	50	0.05	4	2	4.29	4.51	4.70	4.88	5.19	9	30	KAC PVDiaG
NVV 0452 48 0052	0.5	0.8	10	0.45	50	0.05	4	2	10.97	11.31	11.58	11.82	12.76	9	30	KAC PVDiaG
SWV 0452 48 00603	0.6	0.9	3.5	0.55	50	0.05	4	2	4.29	4.51	4.70	4.89	5.19	9	30	KAC PVDiaG
SWV 0452 48 00604	0.6	0.9	7	0.55	50	0.05	4	2	7.97	8.29	8.55	8.79	9.28	9	30	KAC PVDiaG
SWV 0452 48 00803	0.8	1.2	5	0.75	50	0.05	4	2	5.87	6.14	6.39	6.67	7.31	9	30	KAC PVDiaG
SWV 0452 48 00804	0.8	1.2	10	0.75	50	0.05	4	2	11.10	11.54	12.03	12.55	13.76	9	30	KAC PVDiaG
NVV 0452 48 01000	1	1.5	5	0.95	50	0.1	4	2	5.77	6.00	6.21	6.38	6.68	9	30	KAC PVDiaG
NVV 0452 48 01010	1	1.5	10	0.95	50	0.1	4	2	10.97	11.31	11.58	11.81	12.75	9	30	KAC PVDiaG
NVV 0452 48 01011	1	1.5	20	0.95	75	0.1	4	2	21.28	21.75	22.37	23.47	26.02	9	30	KAC PVDiaG
NVV 0452 48 01020	1	1.5	10	0.95	50	0.2	4	2	10.97	11.31	11.58	11.81	12.72	9	30	KAC PVDiaG
NVV 0452 48 0102	1	1.5	15	0.95	50	0.2	4	2	16.13	16.55	16.87	17.47	19.35	9	30	KAC PVDiaG
SWV 0452 48 0152	1.5	2.3	10	1.4	50	0.1	4	2	11.20	11.56	11.87	12.18	12.86	9	30	KAC PVDiaG
NVV 0452 48 0151	1.5	2.3	-	-	50	0.15	4	2	2.72	2.92	3.08	3.22	3.47	9	30	KAC PVDiaG
NVV 0452 48 0152	1.5	2.3	10	1.4	50	0.15	4	2	11.05	11.38	11.64	11.86	12.78	9	30	KAC PVDiaG
NVV 0452 48 01521	1.5	2.3	15	1.4	50	0.15	4	2	16.22	16.61	16.92	17.53	19.43	9	30	KAC PVDiaG
SWV 0452 48 01521	1.5	2.3	10	1.4	50	0.2	4	2	11.20	11.56	11.86	12.17	12.84	9	30	KAC PVDiaG
NVV 0452 48 01520	1.5	2.3	15	1.4	50	0.2	4	2	16.22	16.61	16.91	17.52	19.41	9	30	KAC PVDiaG
SWV 0452 48 0154	1.5	2.3	25	1.4	75	0.2	4	2	26.65	27.32	28.02	28.76	-	9	30	KAC PVDiaG
SWV 0452 48 0202	2	3	10	1.9	50	0.1	4	2	11.20	11.56	11.87	12.18	12.86	9	30	KAC PVDiaG
NVV 0452 48 0200	2	3	-	-	50	0.2	4	2	3.48	3.70	3.87	4.03	4.29	9	30	KAC PVDiaG

Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	QC
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						
no wd. short long																				
	NVW 0452 48 0201	2	3	5	1.9	50	0.2	4	2	5.89	6.10	6.28	6.44	6.73	9	30	KAC PVDiaG			
	NVW 0452 48 0202	2	3	10	1.9	50	0.2	4	2	11.07	11.38	11.64	11.86	12.77	9	30	KAC PVDiaG			
	NVW 0452 48 0203	2	3	15	1.9	50	0.2	4	2	16.22	16.61	16.91	17.52	19.41	9	30	KAC PVDiaG			
	NVW 0452 48 0204	2	3	20	1.9	75	0.2	4	2	21.35	21.80	22.41	23.50	-	9	30	KAC PVDiaG			
	NVW 0452 48 0205	2	3	25	1.9	75	0.2	4	2	26.47	26.97	28.11	29.48	-	9	30	KAC PVDiaG			
	NVW 0452 48 021	2	3	10	1.9	50	0.3	4	2	11.05	11.37	11.63	11.85	12.74	9	30	KAC PVDiaG			
	NVW 0452 48 0214	2	3	20	1.9	75	0.3	4	2	21.35	21.80	22.39	23.48	-	9	30	KAC PVDiaG			
	NVW 0452 48 0301	3	4.5	15	2.9	75	0.2	4	2	16.37	16.82	17.25	-	-	9	30	KAC PVDiaN			

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
copy milling 3D							
0.4-0.8	f _z (mm) a _p (mm)	-	-	-	0.01-0.03 0.01-0.3	-	-
1-2	f _z (mm) a _p (mm)	-	-	-	0.02-0.08 0.1-0.7	-	-
3	f _z (mm) a _p (mm)	-	-	-	0.04-0.1 0.15-1.4	-	-

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
KAC PVDiaG	roughing finishing	-	-	-	200 550 900 400 700 1000	-	-
KAC PVDiaN	roughing finishing	-	-	-	200 400 600 400 700 1000	-	-



END MILLS FOR GRAPHITE | GRP | CFRP

Toric / corner radius end mills | 3 flutes

3 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- short | long version
- with and without clearance between shank and flute
- $\lt; \varnothing 3 \text{ mm}$: PVDiaG-Diamond treated
- $\geq \varnothing 3 \text{ mm}$: PVDiaN-Diamond

Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d_1	l_2	l_3	d_3	l_1	r	d_2	z	0.5°	1°	1.5°	2°	3°						

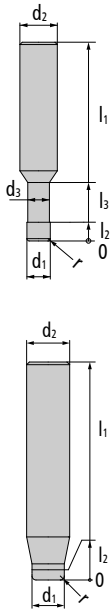
wd. and no wd. | short | long

	NVV 0453 48 0300	3	4.5	-	-	50	0.3	4	3	5.15	5.44	5.68	5.88	6.24	9	30	KAC PVDiaN
	NVV 0453 48 0302	3	4.5	10	2.9	50	0.3	4	3	11.20	11.55	11.85	12.16	-	9	30	KAC PVDiaN
	NVV 0453 48 0303	3	4.5	15	2.9	50	0.3	4	3	16.37	16.81	17.24	-	-	9	30	KAC PVDiaN
	NVV 0453 48 0304	3	4.5	20	2.9	75	0.3	4	3	21.52	22.06	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 0305	3	4.5	25	2.9	75	0.3	4	3	26.65	27.32	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 031	3	30	-	-	100	0.3	4	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 0400	4	6	-	-	50	0.3	4	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 0402	4	6	10	3.8	50	0.3	4	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 0403	4	6	15	3.8	50	0.3	4	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 0404	4	6	20	3.8	75	0.3	4	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 0405	4	6	25	3.8	75	0.3	4	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 0406	4	6	45	3.8	100	0.3	4	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 04020	4	6	10	3.8	50	0.5	4	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 04001	4	6	-	-	50	1	4	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 04021	4	6	10	3.8	50	1	4	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 04031	4	6	15	3.8	50	1	4	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 04041	4	6	20	3.8	75	1	4	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 04051	4	6	25	3.8	75	1	4	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 04061	4	6	45	3.8	100	1	4	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 0502	5	7.5	10	4.8	57	0.3	5	3	-	-	-	-	-	9	30	KAC PVDiaN
NVV 0453 48 0503	5	7.5	20	4.8	75	0.3	5	3	-	-	-	-	-	9	30	KAC PVDiaN	
NVV 0453 48 050	5	35	-	-	75	0.3	5	3	-	-	-	-	-	9	30	KAC PVDiaN	
NVV 0453 48 0504	5	7.5	45	4.8	100	0.3	5	3	-	-	-	-	-	9	30	KAC PVDiaN	

Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

wd. and no wd. | short | long

	NV 0453 48 051	5	40	-	-	100	0.3	5	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 067	6	50	-	-	150	0.2	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 0600	6	9	-	-	57	0.3	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 0603	6	9	15	5.8	57	0.3	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 0604	6	9	20	5.8	75	0.3	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 0605	6	9	25	5.8	75	0.3	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 0606	6	9	30	5.8	75	0.3	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 0607	6	9	45	5.8	100	0.3	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 0608	6	9	60	5.8	150	0.3	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 060	6	60	-	-	150	0.3	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 06030	6	9	15	5.8	57	0.5	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	SV 0453 48 06073	6	9	45	5.8	100	0.7	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 06001	6	9	-	-	57	1	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 06031	6	9	15	5.8	57	1	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 06041	6	9	20	5.8	75	1	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 06051	6	9	25	5.8	75	1	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 06061	6	9	30	5.8	75	1	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 06071	6	9	45	5.8	100	1	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 06081	6	9	60	5.8	150	1	6	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 0800	8	12	-	-	63	0.5	8	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 0801	8	12	20	7.8	63	0.5	8	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 0810	8	12	45	7.8	100	0.5	8	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 0820	8	12	60	7.8	150	0.5	8	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 08001	8	12	-	-	63	1	8	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 08011	8	12	20	7.8	63	1	8	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 083	8	20	-	-	75	1	8	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 08101	8	12	45	7.8	100	1	8	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 08201	8	12	60	7.8	150	1	8	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 1000	10	15	-	-	72	0.5	10	3	-	-	-	-	-	9	30	KAC PVDiaN
	NV 0453 48 1009	10	15	25	9.8	100	0.5	10	3	-	-	-	-	-	9	30	KAC PVDiaN



Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft				γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°					


wd. and no wd. | short | long

	NVV 0453 48 1010	10	15	45	9.8	100	0.5	10	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 102	10	15	60	9.8	150	0.5	10	3	-	-	-	-	-	9	30	KAC PVDiaN
	SVV 0453 48 10102	10	15	45	9.8	100	0.7	10	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 1001	10	15	-	-	72	1	10	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 1002	10	15	25	9.8	100	1	10	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 1011	10	15	45	9.8	100	1	10	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 1021	10	15	60	9.8	150	1	10	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 1200	12	18	-	-	83	0.5	12	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 1209	12	18	25	11.8	83	0.5	12	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 1210	12	18	45	11.8	100	0.5	12	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 1220	12	18	60	11.8	150	0.5	12	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 12091	12	18	25	11.8	83	0.7	12	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 1201	12	18	-	-	83	1	12	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 1202	12	18	25	11.8	83	1	12	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 1211	12	18	45	11.8	100	1	12	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 1221	12	18	60	11.8	150	1	12	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 160	16	24	-	-	92	1	16	3	-	-	-	-	-	9	30	KAC PVDiaN
	NVV 0453 48 1610	16	24	45	15.8	100	1	16	3	-	-	-	-	-	9	30	KAC PVDiaN

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
copy milling 3D							
3-4	f _z (mm) a _p (mm)	-	-	-	0.04-0.1 0.15-1.4	-	-
5-6	f _z (mm) a _p (mm)	-	-	-	0.06-0.15 0.2-2	-	-
8	f _z (mm) a _p (mm)	-	-	-	0.08-0.2 0.3-2.8	-	-
10	f _z (mm) a _p (mm)	-	-	-	0.08-0.25 0.4-3.5	-	-
12	f _z (mm) a _p (mm)	-	-	-	0.1-0.3 0.4-4.2	-	-
16	f _z (mm) a _p (mm)	-	-	-	0.1-0.3 0.4-5.6	-	-

Cutting speed (Vc in m/min)

Material							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
KAC PVDiaN	roughing finishing	-	-	-	 350 675 1000	-	-



END MILLS FOR GRAPHITE | GRP | CFRP

End mills | 2 flutes

X-Cut flutes, for machining graphite and composites, plain shank

- center cutting end mill
- straight face
- 2 cutting face teeth
- without clearance between shank and flute

End mills	catalogue no.	Effective working length at X° of draft													γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°				

no wd. short																		
	NW 0108 48 030	3	10	-	-	50	-	3	2	-	-	-	-	-	-	-	-	KAC PVDiaN
	NW 0108 48 040	4	10	-	-	50	-	4	2	-	-	-	-	-	-	-	-	KAC PVDiaN
	NW 0108 48 060	6	20	-	-	57	-	6	2	-	-	-	-	-	-	-	-	KAC PVDiaN
	NW 0108 48 080	8	20	-	-	60	-	8	2	-	-	-	-	-	-	-	-	KAC PVDiaN
	NW 0108 48 100	10	25	-	-	70	-	10	2	-	-	-	-	-	-	-	-	KAC PVDiaN
	NW 0108 48 120	12	30	-	-	85	-	12	2	-	-	-	-	-	-	-	-	KAC PVDiaN

Cutting speed (Vc in m/min)

d1	V _c (m/min) graphite with fine grain size	V _c (m/min) graphite with mean grain size	V _c (m/min) graphite with coarse grain size	V _f (mm/min)	a _p max.	a _e max.
3	400	600	800	3000 - 5000	10	3
4	400	600	800	3500 - 5500	10	4
5	400	600	800	3750 - 6250	10	5
6	400	600	800	4000 - 7000	20	6
8	400	600	800	4500 - 8000	20	8
10	400	600	800	5000 - 8500	25	10
12	400	600	800	6000 - 9000	30	10

END MILLS FOR EXTREME MACHINING

| HPC

		Page
3 and 4 flutes	no wd. short long	118
4 flutes with corner radius, Steel Cast iron	no wd. short long	121
4 flutes with corner radius, RSH Non ferrous materials	wd. short long	123
	wd. short	100
4 flutes for HPC machining	no wd. short	125
	no wd. short	125
4 flutes with working depth	with chamfer	127
	with corner radius	127



END MILLS FOR EXTREME MACHINING | HPC

3 and 4 flutes

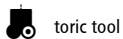
3 and 4 flutes, plain shank, 50° right hand helix angle

- center cutting end mill
- straight face
- short | long version
- without clearance between shank and flute
- $\varnothing 12\text{ mm}$ clamping surface is available on demand, $\geq \varnothing 12\text{ mm}</math> with clamping surface by default$

3 and 4 flutes	catalogue no.	Effective working length at X° of draft													γ (chip angle)	λ (helix angle)	Features	Q/C
		d_1	l_2	l_3	d_3	l_1	r	d_2	z	0.5°	1°	1.5°	2°	3°				

no wd. | short | long

	NW 0370 56 020	2	4	-	-	57	-	6	3	4.64	4.92	5.15	5.36	5.79	-15	50		MGC PVTi
	NW 0370 56 025	2.5	5	-	-	57	-	6	3	5.70	6.02	6.27	6.51	7.03	-15	50		MGC PVTi
	NW 0370 56 030	3	6	-	-	57	-	6	4	6.77	7.11	7.38	7.66	8.28	-15	50		MGC PVTi
	NW 0370 56 035	3.5	7	-	-	57	-	6	4	7.82	8.19	8.49	8.81	9.52	-15	50		MGC PVTi
	NW 0370 56 040	4	8	-	-	57	-	6	4	8.88	9.26	9.60	9.96	10.76	-15	50		MGC PVTi
	NW 0370 56 045	4.5	9	-	-	57	-	6	4	9.93	10.33	10.70	11.11	12.01	-15	50		MGC PVTi
	NW 0370 56 050	5	10	-	-	57	-	6	4	10.97	11.40	11.81	12.26	-	-15	50		MGC PVTi
	NW 0294 56 060	6	6	21	5.8	57	-	6	4	-	-	-	-	-	-15	50		UMGC PVTi
	NW 0370 56 060	6	12	-	-	57	-	6	4	-	-	-	-	-	-15	50		MGC PVTi
	NW 0290 56 061	6	18	-	-	75	-	6	4	-	-	-	-	-	-15	50		MGC PVTi
	NW 0370 56 070	7	14	-	-	63	-	8	4	15.14	15.68	16.25	-	-	-15	50		MGC PVTi
	NW 0294 56 080	8	8	27	7.8	63	-	8	4	-	-	-	-	-	-15	50		UMGC PVTi
	NW 0370 56 080	8	16	-	-	63	-	8	4	-	-	-	-	-	-15	50		MGC PVTi
	NW 0290 56 081	8	24	-	-	90	-	8	4	-	-	-	-	-	-15	50		MGC PVTi
	NW 0370 56 090	9	18	-	-	72	-	10	4	19.29	19.91	-	-	-	-15	50		MGC PVTi
	NW 0294 56 100	10	10	32	9.8	72	-	10	4	-	-	-	-	-	-15	50		UMGC PVTi
	NW 0370 56 100	10	20	-	-	72	-	10	4	-	-	-	-	-	-15	50		MGC PVTi
	NW 0290 56 101	10	30	-	-	100	-	10	4	-	-	-	-	-	-15	50		MGC PVTi
	NW 0294 56 120	12	12	38	11.8	83	-	12	4	-	-	-	-	-	-15	50		UMGC PVTi
	NW 0370 56 120	12	24	-	-	83	-	12	4	-	-	-	-	-	-15	50		MGC PVTi
NW 0290 56 121	12	36	-	-	110	-	12	4	-	-	-	-	-	-15	50		MGC PVTi	
NW 0294 56 160	16	16	44	15.8	92	-	16	4	-	-	-	-	-	-15	50		MGC PVTi	
NW 0370 56 160	16	32	-	-	92	-	16	4	-	-	-	-	-	-15	50		MGC PVTi	



toric tool



clamping flat

3 and 4 flutes	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. | short | long

	NVW 0290 56 161	16	48	-	-	140	-	16	4	-	-	-	-	-	-15	50	【	MGC PVTi		
	NVW 0370 56 200	20	40	-	-	104	-	20	4	-	-	-	-	-	-15	50	【	MGC PVTi		
	NVW 0290 56 201	20	60	-	-	150	-	20	4	-	-	-	-	-	-15	50	【	MGC PVTi		

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
contour milling							
2-2.5	f _z (mm) a _p (mm)	0.05-0.09 4	-	0.05-0.09 4	-	-	0.03-0.045 4
3-4.5	f _z (mm) a _p (mm)	0.09-0.12 6	-	0.05-0.12 6	-	-	0.07-0.085 6
5-6	f _z (mm) a _p (mm)	0.12-0.18 6	-	0.09-0.18 6	-	-	0.1-0.125 6
7-8	f _z (mm) a _p (mm)	0.12-0.18 8	-	0.12-0.18 8	-	-	0.1-0.125 8
9-10	f _z (mm) a _p (mm)	0.15-0.2 10	-	0.12-0.2 10	-	-	0.12-0.145 10
12	f _z (mm) a _p (mm)	0.15-0.2 12	-	0.15-0.2 12	-	-	0.12-0.145 12
16	f _z (mm) a _p (mm)	0.2-0.25 16	-	0.15-0.25 16	-	-	0.17-0.195 16
20	f _z (mm) a _p (mm)	0.25-0.3 40	-	0.2-0.3 40	-	-	0.2-0.225 40
pocket and slot milling							
2-2.5	f _z (mm) a _p (mm)	0.02-0.04 1-1.5	-	0.02-0.04 1-1.5	-	-	0.02-0.03 0.04-0.07
3-4.5	f _z (mm) a _p (mm)	0.03-0.06 1.5-2	-	0.03-0.06 1.5-2	-	-	0.03-0.045 0.08-0.14
5-6	f _z (mm) a _p (mm)	0.05-0.08 2.5-3	-	0.05-0.08 2.5-3	-	-	0.05-0.065 0.1-0.2
7-8	f _z (mm) a _p (mm)	0.05-0.08 3.5-4	-	0.05-0.08 3.5-4	-	-	0.05-0.065 0.15-0.275
9-10	f _z (mm) a _p (mm)	0.06-0.1 4.5-5	-	0.06-0.1 4.5-5	-	-	0.06-0.08 0.2-0.35
12	f _z (mm) a _p (mm)	0.07-0.12 5-6	-	0.07-0.12 5-6	-	-	0.07-0.095 0.2-0.4
16	f _z (mm) a _p (mm)	0.08-0.12 6-8	-	0.08-0.12 6-8	-	-	0.08-0.1 0.2-0.5
20	f _z (mm) a _p (mm)	0.08-0.12 6-8	-	0.08-0.12 6-8	-	-	0.08-0.1 0.2-0.5

The data above refer to a maximum cutting width ae of 2 % of the cutting diameter d1.

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
MGC PVTi	roughing finishing	120 210 300 200 275 350	-	100 225 350 180 290 400	-	-	120 160 200 100 175 250
UMGC PVTi	roughing finishing	120 185 250 200 240 280	-	100 225 350 180 290 400	-	-	-

END MILLS FOR EXTREME MACHINING | HPC

4 flutes with corner radius, Steel | Cast iron



4 flutes, plain shank, 50° right hand helix angle, Steel | Cast iron

- center cutting
- straight face
- short | long version
- without clearance between shank and flute
- $\varnothing 12\text{ mm}$ clamping surface is available on demand, $\geq \varnothing 12\text{ mm}</math> with clamping surface by default$

4 flutes with corner radius, Steel Cast iron	catalogue no.	Effective working length at X° of draft													γ (chip angle)	λ (helix angle)	Features	Q/C
		d_1	l_2	l_3	d_3	l_1	r	d_2	z	0.5°	1°	1.5°	2°	3°				




no wd. short long																			
	NV 0380 56 030	3	6	-	-	57	0.3	6	4	6.75	7.08	7.35	7.61	8.21	-15	50		MGC PVTi	
	NV 0380 56 040	4	8	-	-	57	0.3	6	4	8.86	9.24	9.56	9.91	10.69	-15	50		MGC PVTi	
	NV 0380 56 050	5	10	-	-	57	0.3	6	4	10.96	11.38	11.78	12.21	-	-15	50		MGC PVTi	
	NV 0380 56 060	6	12	-	-	57	0.3	6	4	-	-	-	-	-	-15	50		MGC PVTi	
	NV 0390 56 061	6	18	-	-	75	0.3	6	4	-	-	-	-	-	-15	50		MGC PVTi	
	NV 0380 56 080	8	16	-	-	63	0.5	8	4	-	-	-	-	-	-15	50		MGC PVTi	
	NV 0390 56 081	8	24	-	-	90	0.5	8	4	-	-	-	-	-	-15	50		MGC PVTi	
	NV 0380 56 100	10	20	-	-	72	0.5	10	4	-	-	-	-	-	-15	50		MGC PVTi	
	NV 0390 56 101	10	30	-	-	100	0.5	10	4	-	-	-	-	-	-15	50		MGC PVTi	
	NV 0380 56 120	12	24	-	-	83	1	12	4	-	-	-	-	-	-15	50	【	MGC PVTi	
	NV 0390 56 121	12	36	-	-	110	1	12	4	-	-	-	-	-	-15	50	【	MGC PVTi	
	NV 0380 56 160	16	32	-	-	92	1	16	4	-	-	-	-	-	-15	50	【	MGC PVTi	
	NV 0390 56 161	16	48	-	-	140	1	16	4	-	-	-	-	-	-15	50	【	MGC PVTi	
	NV 0380 56 200	20	40	-	-	104	1	20	4	-	-	-	-	-	-15	50	【	MGC PVTi	
	NV 0390 56 201	20	60	-	-	150	1	20	4	-	-	-	-	-	-15	50	【	MGC PVTi	

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
contour milling							
3-4	f _z (mm) a _p (mm)	0.09-0.12 6	-	0.05-0.12 6	-	-	0.07-0.085 6
5-6	f _z (mm) a _p (mm)	0.12-0.18 10	-	0.09-0.18 10	-	-	0.1-0.125 10
8	f _z (mm) a _p (mm)	0.12-0.18 16	-	0.12-0.18 16	-	-	0.1-0.125 16
10	f _z (mm) a _p (mm)	0.15-0.2 20	-	0.12-0.2 20	-	-	0.12-0.145 20
12	f _z (mm) a _p (mm)	0.15-0.2 24	-	0.15-0.2 24	-	-	0.12-0.145 24
16	f _z (mm) a _p (mm)	0.2-0.25 32	-	0.15-0.25 32	-	-	0.17-0.195 32
20	f _z (mm) a _p (mm)	0.25-0.3 40	-	0.2-0.3 40	-	-	0.2-0.225 40
pocket and slot milling							
3-4	f _z (mm) a _p (mm)	0.03-0.06 1.5-2	-	0.03-0.06 1.5-2	-	-	0.03-0.045 0.08-0.14
5-6	f _z (mm) a _p (mm)	0.05-0.08 2.5-3	-	0.05-0.08 2.5-3	-	-	0.05-0.065 0.1-0.2
8	f _z (mm) a _p (mm)	0.05-0.08 3.5-4	-	0.05-0.08 3.5-4	-	-	0.05-0.065 0.15-0.275
10	f _z (mm) a _p (mm)	0.06-0.1 4.5-5	-	0.06-0.1 4.5-5	-	-	0.06-0.08 0.2-0.35
12	f _z (mm) a _p (mm)	0.07-0.12 5-6	-	0.07-0.12 5-6	-	-	0.07-0.095 0.2-0.4
16	f _z (mm) a _p (mm)	0.08-0.12 6-8	-	0.08-0.12 6-8	-	-	0.08-0.1 0.2-0.5
20	f _z (mm) a _p (mm)	0.08-0.12 6-8	-	0.08-0.12 6-8	-	-	0.08-0.1 0.2-0.5

The data above refer to a maximum cutting width ae of 2 % of the cutting diameter d1.

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
MGC PVTi	roughing finishing	 120 210 300 200 275 350	-	 100 225 350 180 290 400	-	-	 120 160 200 100 175 250

END MILLS FOR EXTREME MACHINING | HPC

4 flutes with corner radius, RSH | Non ferrous materials

4 flutes, plain shank, 50° right hand helix angle, RSH | Non ferrous materials

- center cutting
- straight face
- short | long version
- with clearance between shank and flute
- $\varnothing 12\text{ mm}$ clamping surface is available on demand, $\geq \varnothing 12\text{ mm}</math> with clamping surface by default$



4 flutes corner radius, RSH Non ferrous materials	catalogue no.	Effective working length at X° of draft														γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°					

wd. short long																		
	NW 0394 56 06005	6	6	21	5.8	57	0.5	6	4	-	-	-	-	-	8	50	UMGC PVTi	
	NW 0394 56 06010	6	6	21	5.8	57	1	6	4	-	-	-	-	-	8	50	UMGC PVTi	
	NW 0394 56 08005	8	8	27	7.8	63	0.5	8	4	-	-	-	-	-	8	50	UMGC PVTi	
	NW 0394 56 08010	8	8	27	7.8	63	1	8	4	-	-	-	-	-	8	50	UMGC PVTi	
	NW 0394 56 10005	10	10	32	9.8	72	0.5	10	4	-	-	-	-	-	8	50	UMGC PVTi	
	NW 0394 56 10010	10	10	32	9.8	72	1	10	4	-	-	-	-	-	8	50	UMGC PVTi	
	NW 0394 56 12010	12	12	38	11.8	83	1	12	4	-	-	-	-	-	8	50	UMGC PVTi	
	NW 0394 56 12020	12	12	38	11.8	83	2	12	4	-	-	-	-	-	8	50	UMGC PVTi	
	NW 0394 56 16010	16	16	44	15.8	92	1	16	4	-	-	-	-	-	8	50	UMGC PVTi	
	NW 0394 56 16020	16	16	44	15.8	92	2	16	4	-	-	-	-	-	8	50	UMGC PVTi	

wd. short																		
	NW 0394 45 06005	6	6	21	5.8	57	0.5	6	4	-	-	-	-	-	8	50	UMGC PVCS	
	NW 0394 45 06010	6	6	21	5.8	57	1	6	4	-	-	-	-	-	8	50	UMGC PVCS	
	NW 0394 45 08005	8	8	27	7.8	63	0.5	8	4	-	-	-	-	-	8	50	UMGC PVCS	
	NW 0394 45 08010	8	8	27	7.8	63	1	8	4	-	-	-	-	-	8	50	UMGC PVCS	
	NW 0394 45 10005	10	10	32	9.8	72	0.5	10	4	-	-	-	-	-	8	50	UMGC PVCS	
	NW 0394 45 10010	10	10	32	9.8	72	1	10	4	-	-	-	-	-	8	50	UMGC PVCS	
	NW 0394 45 12010	12	12	38	11.8	83	1	12	4	-	-	-	-	-	8	50	UMGC PVCS	
	NW 0394 45 12020	12	12	38	11.8	83	2	12	4	-	-	-	-	-	8	50	UMGC PVCS	
	NW 0394 45 16010	16	16	44	15.8	92	1	16	4	-	-	-	-	-	8	50	UMGC PVCS	
	NW 0394 45 16020	16	16	44	15.8	92	2	16	4	-	-	-	-	-	8	50	UMGC PVCS	

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
pocket and slot milling							
6	f _z (mm) a _p (mm)	-	0.05-0.08 1.5-1.8	-	0.05-0.1 0.15-2	0.025-0.05 0.2-1	-
8	f _z (mm) a _p (mm)	-	0.05-0.08 2-2.5	-	0.06-0.15 0.15-2.8	0.04-0.06 0.3-1	-
10	f _z (mm) a _p (mm)	-	0.06-0.1 2.5-3	-	0.08-0.17 0.2-3.5	0.05-0.08 0.4-1	-
12	f _z (mm) a _p (mm)	-	0.07-0.12 3-3.5	-	0.09-0.2 0.2-4.2	0.06-0.1 0.5-1	-
16	f _z (mm) a _p (mm)	-	0.08-0.12 4-4.5	-	0.1-0.27 0.2-5.6	0.06-0.1 0.5-1.5	-

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
UMGC PVTi	roughing finishing	-	70 90 110 110 130 150	-	200 350 500 400 500 600	15 33 50 40 60 80	-
UMGC PVCS	roughing finishing	-	- 70 95 120	-	220 410 600 400 700 1000	- 30 50 70	-

Detailed technical information on page 139.

END MILLS FOR EXTREME MACHINING | HPC

4 flutes for HPC machining

4 flutes, plain shank, 50° right hand helix angle

- center cutting end mill
- straight face
- short version
- with corner radius
- unequal division
- $\varnothing 12\text{ mm}$ clamping surface is available on demand, $\geq \varnothing 12\text{ mm}</math> with clamping surface by default$
- with clearance between shank and flute on demand



4 flutes for HPC machining	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d_1	l_2	l_3	d_3	l_1	r	d_2	z	0.5°	1°	1.5°	2°	3°						

no wd. short																	
	NV 0384 56 060	6	12	-	-	57	0.5	6	4	-	-	-	-	-	8	50	UMGC PVTi
	NV 0384 56 061	6	12	-	-	57	1	6	4	-	-	-	-	-	8	50	UMGC PVTi
	NV 0384 56 080	8	16	-	-	63	0.5	8	4	-	-	-	-	-	8	50	UMGC PVTi
	NV 0384 56 081	8	16	-	-	63	1	8	4	-	-	-	-	-	8	50	UMGC PVTi
	NV 0384 56 100	10	20	-	-	72	0.5	10	4	-	-	-	-	-	8	50	UMGC PVTi
	NV 0384 56 101	10	20	-	-	72	1	10	4	-	-	-	-	-	8	50	UMGC PVTi
	NV 0384 56 120	12	24	-	-	83	1	12	4	-	-	-	-	-	8	50	UMGC PVTi
	NV 0384 56 121	12	24	-	-	83	2	12	4	-	-	-	-	-	8	50	UMGC PVTi
	NV 0384 56 160	16	32	-	-	92	1	16	4	-	-	-	-	-	8	50	UMGC PVTi
	NV 0384 56 161	16	32	-	-	92	2	16	4	-	-	-	-	-	8	50	UMGC PVTi
	NV 0384 56 200	20	40	-	-	104	1	20	4	-	-	-	-	-	8	50	UMGC PVTi
	NV 0384 56 201	20	40	-	-	104	2	20	4	-	-	-	-	-	8	50	UMGC PVTi

no wd. short																	
	NV 0384 45 060	6	12	-	-	57	0.5	6	4	-	-	-	-	-	8	50	UMGC PVCS
	NV 0384 45 061	6	12	-	-	57	1	6	4	-	-	-	-	-	8	50	UMGC PVCS
	NV 0384 45 080	8	16	-	-	63	0.5	6	4	-	-	-	-	-	8	50	UMGC PVCS
	NV 0384 45 081	8	16	-	-	63	1	6	4	-	-	-	-	-	8	50	UMGC PVCS
	NV 0384 45 100	10	20	-	-	72	0.5	10	4	-	-	-	-	-	8	50	UMGC PVCS
	NV 0384 45 101	10	20	-	-	72	1	10	4	-	-	-	-	-	8	50	UMGC PVCS
	NV 0384 45 120	12	24	-	-	83	1	12	4	-	-	-	-	-	8	50	UMGC PVCS
	NV 0384 45 121	12	24	-	-	83	2	12	4	-	-	-	-	-	8	50	UMGC PVCS

4 flutes for HPC machining	catalogue no.	Effective working length at X° of draft														γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°					
no wd. short																			
	NW 0384 45 160	16	32	-	-	92	1	16	4	-	-	-	-	-	8	50	UMGC	PVCS	
	NW 0384 45 161	16	32	-	-	92	2	16	4	-	-	-	-	-	8	50	UMGC	PVCS	
	NW 0384 45 200	20	40	-	-	104	1	20	4	-	-	-	-	-	8	50	UMGC	PVCS	
	NW 0384 45 201	20	40	-	-	104	2	20	4	-	-	-	-	-	8	50	UMGC	PVCS	

Feed per tooth (fz) | d.o.c. (ap)

Material		Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
contour milling									
6	f _z (mm) a _p (mm)		0.12-0.18 12	0.12-0.18 12	-	0.08-0.14 12	0.03-0.05 12	-	
8	f _z (mm) a _p (mm)		0.12-0.18 16	0.12-0.18 16	-	0.12-0.19 16	0.04-0.055 16	-	
10	f _z (mm) a _p (mm)		0.15-0.2 20	0.15-0.2 20	-	0.14-0.22 20	0.045-0.06 20	-	
12	f _z (mm) a _p (mm)		0.15-0.2 24	0.15-0.2 24	-	0.16-0.24 24	0.05-0.065 24	-	
16	f _z (mm) a _p (mm)		0.2-0.25 32	0.2-0.25 32	-	0.2-0.3 32	0.055-0.075 32	-	
20	f _z (mm) a _p (mm)		0.25-0.3 40	0.25-0.3 40	-	0.22-0.35 40	0.065-0.095 40	-	
pocket and slot milling									
6	f _z (mm) a _p (mm)		0.035-0.08 2.5-4.8	0.02-0.04 1.2-4.8	-	0.06-0.1 0.4-2	0.02-0.04 3-7.5	-	
8	f _z (mm) a _p (mm)		0.045-0.08 3.5-6.4	0.03-0.05 1.6-6.4	-	0.08-0.15 0.4-2.8	0.03-0.05 4-10	-	
10	f _z (mm) a _p (mm)		0.055-0.1 4.5-8	0.04-0.06 2-8	-	0.11-0.17 0.4-3.5	0.035-0.055 6-12.5	-	
12	f _z (mm) a _p (mm)		0.06-0.12 5-9.6	0.045-0.07 2.4-9.6	-	0.12-0.2 0.4-4.2	0.04-0.06 8-15	-	
16	f _z (mm) a _p (mm)		0.075-0.12 6-12.8	0.06-0.085 3.2-12.8	-	0.13-0.27 0.4-5.6	0.045-0.065 11-20	-	
20	f _z (mm) a _p (mm)		0.08-0.15 6-16	0.07-0.1 4-16	-	0.15-0.3 0.5-6.5	0.055-0.085 15-25	-	

The data above refer to a maximum cutting width ae of 2 % of the cutting diameter d1.

Cutting speed (Vc in m/min)

Material		Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
UMGC PVTi	roughing finishing				120 185 250 200 240 280	70 90 110 110 130 150	-	200 350 500 400 500 600	15 33 50 40 60 80
UMGC PVCS	roughing finishing		90 155 220 170 210 250	50 75 100 90 105 120	-	400 500 600 500 750 1000	15 33 50 30 50 70	-	

Detailed technical information on page 139.



toric tool



clamping flat

END MILLS FOR EXTREME MACHINING | HPC

4 flutes | with working depth



4 flutes, plain shank, 50° right hand helix angle

- center cutting end mill
- straight face
- short version
- 1 x d cuttingedge length
- with corner radius or chamfer
- unequal division
- $\varnothing 12\text{ mm}$ clamping surface is available on demand, $\geq \varnothing 12\text{ mm}</math> with clamping surface by default$

4 flutes with working depth	catalogue no.	Effective working length at X° of draft													γ (chip angle)	λ (helix angle)	Features	Q/C
		d_1	l_2	l_3	d_3	l_1	r	d_2	z	0.5°	1°	1.5°	2°	3°				

with chamfer

	NV 0350 56 060	6	6	21	5.8	57	-	6	4	-	-	-	-	-	-15	50		MGC PVTi
	NV 0350 56 080	8	8	27	7.8	63	-	8	4	-	-	-	-	-	-15	50		MGC PVTi
	NV 0350 56 100	10	10	32	9.8	72	-	10	4	-	-	-	-	-	-15	50		MGC PVTi
	NV 0350 56 120	12	12	38	11.8	83	-	12	4	-	-	-	-	-	-15	50	【	MGC PVTi
	NV 0350 56 160	16	16	44	15.8	92	-	16	4	-	-	-	-	-	-15	50	【	MGC PVTi
	NV 0350 56 200	20	20	54	19.8	104	-	20	4	-	-	-	-	-	-15	50	【	MGC PVTi




with corner radius

	NV 0360 56 060	6	6	21	5.8	57	0.3	6	4	-	-	-	-	-	-15	50		MGC PVTi
	NV 0360 56 080	8	8	27	7.8	63	0.5	8	4	-	-	-	-	-	-15	50		MGC PVTi
	NV 0360 56 100	10	10	32	9.8	72	0.5	10	4	-	-	-	-	-	-15	50		MGC PVTi
	NV 0360 56 120	12	12	38	11.8	83	1	12	4	-	-	-	-	-	-15	50		MGC PVTi
	NV 0360 56 160	16	16	44	15.8	92	1	16	4	-	-	-	-	-	-15	50		MGC PVTi
	NV 0360 56 200	20	20	54	19.8	104	1	20	4	-	-	-	-	-	-15	50	【	MGC PVTi

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
pocket and slot milling							
6	f _z (mm)	0.035-0.08	0.02-0.04	0.035-0.08	-	-	-
	a _p (mm)	2.5-4.8	1.2-4.8	2.5-4.8	-	-	-
8	f _z (mm)	0.045-0.08	0.03-0.05	0.045-0.08	-	-	-
	a _p (mm)	3.5-6.4	1.6-6.4	3.5-6.4	-	-	-
10	f _z (mm)	0.055-0.1	0.04-0.06	0.055-0.1	-	-	-
	a _p (mm)	4.5-8	2-8	4.5-8	-	-	-
12	f _z (mm)	0.06-0.12	0.045-0.7	0.06-0.12	-	-	-
	a _p (mm)	5-9.6	2.4-9.6	5-9.6	-	-	-
16	f _z (mm)	0.075-0.12	0.06-0.85	0.075-0.12	-	-	-
	a _p (mm)	6-12.8	3.2-12.8	6-12.8	-	-	-
20	f _z (mm)	0.08-0.15	0.07-0.1	0.08-0.15	-	-	-
	a _p (mm)	6-16	4-16	6-16	-	-	-

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
MGC PVTi	roughing finishing	 120 210 300 200 275 350	 70 95 120 120 135 150	 100 225 350 180 290 400	-	-	-

END MILLS FOR HIGH FEED MACHINING

| TRIGAWORX® | HSC

		Page
3 flutes	wd. short	130
4 flutes	wd. short long	132
	wd. real corner radius	132
4 flutes with internal coolant supply	wd. short long	134



END MILLS FOR HIGH FEED MACHINING | TRIGAWORX® | HSC

3 flutes

3 flutes, plain shank, special style of face teeth

- short version
- roughing at great depths possible, extremely smooth operation
- with clearance between shank and flute
- **Note:** r* = corner radius to be programmed




3 flutes	Catalogue no.	Effective working length at X° of draft											γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r*	d ₂	z	0.5°	1°	1.5°				

wd. short																	
	NW 0373 55 023	2	2	10	1.9	57	0,15'	6	3	11.20	11.56	11.86	12.17	12.85	5	5	MGC PVALSA
	NW 0373 55 032	3	3	16	2.9	57	0,2'	6	3	17.40	17.87	18.32	18.64	19.85	5	5	MGC PVALSA
	NW 0373 55 042	4	4	18	3.8	57	0,3'	6	3	19.62	20.11	20.62	21.16	-	5	5	MGC PVALSA
	NW 0373 55 052	5	5	21	4.8	57	0,4'	6	3	22.69	23.25	-	-	-	5	5	MGC PVALSA
	NW 0373 55 062	6	6	21	5.8	57	0,5'	6	3	-	-	-	-	-	5	5	MGC PVALSA
	NW 0373 55 082	8	8	27	7.8	63	0,7'	8	3	-	-	-	-	-	5	5	MGC PVALSA
	NW 0373 55 102	10	10	32	9.8	72	0,85'	10	3	-	-	-	-	-	5	5	MGC PVALSA
	NW 0373 55 122	12	12	38	11.8	83	1'	12	3	-	-	-	-	-	5	5	MGC PVALSA
	NW 0373 55 162	16	16	50	15.8	92	1,4'	16	3	-	-	-	-	-	5	5	MGC PVALSA

Feed per tooth (fz) | d.o.c. (ap)

Material							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
		roughing operations 2D/3D					
3-4	f _z (mm) a _p (mm)	0.08-0.25 0.1-0.2	-	0.08-0.25 0.1-0.2	-	-	0.08-0.25 0.1-0.2
5-6	f _z (mm) a _p (mm)	0.1-0.35 0.1-0.3	-	0.1-0.35 0.1-0.3	-	-	0.1-0.35 0.1-0.3
8	f _z (mm) a _p (mm)	0.1-0.5 0.1-0.3	-	0.1-0.5 0.1-0.3	-	-	0.1-0.5 0.1-0.3
10	f _z (mm) a _p (mm)	0.1-0.7 0.1-0.3	-	0.1-0.7 0.1-0.3	-	-	0.1-0.7 0.1-0.3
12	f _z (mm) a _p (mm)	0.1-0.8 0.1-0.3	-	0.1-0.8 0.1-0.3	-	-	0.1-0.8 0.1-0.3
16	f _z (mm) a _p (mm)	0.1-0.8 0.1-0.4	-	0.1-0.8 0.1-0.4	-	-	0.1-0.8 0.1-0.4

Cutting speed (Vc in m/min)

Material							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
MGC PVALSA	roughing finishing	 120 210 300 -	-	 100 225 350 -	-	-	 80 140 200 -



END MILLS FOR HIGH FEED MACHINING | TRIGAWORX® | HSC

4 flutes

4 flutes, plain shank, special style of face teeth

- short version | long version
- roughing at great depths possible, extremely smooth operation
- with clearance between shank and flute
- **Note NVV 0374 ... : r* = corner radius to be programmed**

4 flutes	Catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						






wd. short long																	
	NVV 0374 55 032	3	3	16	2.9	57	0,2°	6	4	17.40	17.87	18.32	18.64	19.85	5	5	MGC PVALSA
	NVV 0374 55 042	4	4	18	3.8	57	0,3°	6	4	19.62	20.11	20.62	21.16	-	5	5	MGC PVALSA
	NVV 0374 55 052	5	5	21	4.8	57	0,4°	6	4	22.69	23.25	-	-	-	5	5	MGC PVALSA
	NVV 0374 55 062	6	6	21	5.8	57	0,5°	6	4	-	-	-	-	-	5	5	MGC PVALSA
	NVV 0374 55 0622	6	6	64	5.8	100	0,5°	6	4	-	-	-	-	-	5	5	MGC PVALSA
	NVV 0374 55 082	8	8	27	7.8	63	0,7°	8	4	-	-	-	-	-	5	5	MGC PVALSA
	NVV 0374 55 0822	8	8	64	7.8	100	0,7°	8	4	-	-	-	-	-	5	5	MGC PVALSA
	NVV 0374 55 102	10	10	32	9.8	72	0,85°	10	4	-	-	-	-	-	5	5	MGC PVALSA
	NVV 0374 55 1022	10	10	60	9.8	100	0,85°	10	4	-	-	-	-	-	5	5	MGC PVALSA
	NVV 0374 55 122	12	12	38	11.8	83	1°	12	4	-	-	-	-	-	5	5	MGC PVALSA
	NVV 0374 55 1222	12	12	65	11.8	110	1°	12	4	-	-	-	-	-	5	5	MGC PVALSA
	NVV 0374 55 162	16	16	50	15.8	92	1,4°	16	4	-	-	-	-	-	5	5	MGC PVALSA
	NVV 0374 55 1622	16	16	65	15.8	150	1,4°	16	4	-	-	-	-	-	5	5	MGC PVALSA

wd. real corner radius																	
	NVV 0274 55 06015	6	6	21	5.8	57	1,5	6	4	-	-	-	-	-	5	5	MGC PVALSA
	NVV 0274 55 08020	8	8	27	7.8	63	2	8	4	-	-	-	-	-	5	5	MGC PVALSA
	NVV 0274 55 10020	10	10	32	9.8	72	2	10	4	-	-	-	-	-	5	5	MGC PVALSA
	NVV 0274 55 12030	12	12	38	11.8	83	3	12	4	-	-	-	-	-	5	5	MGC PVALSA

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
roughing operations 2D/3D							
3-4	f _z (mm)	0.08-0.25	0.08-0.25	0.08-0.25	-	0.08-0.25	0.08-0.25
	a _p (mm)	0.1-0.2	0.1-0.2	0.1-0.2	-	0.1-0.2	0.1-0.2
5-6	f _z (mm)	0.1-0.35	0.1-0.35	0.1-0.35	-	0.1-0.35	0.1-0.35
	a _p (mm)	0.1-0.3	0.1-0.3	0.1-0.3	-	0.1-0.3	0.1-0.3
8	f _z (mm)	0.1-0.5	0.1-0.4	0.1-0.5	-	0.1-0.5	0.1-0.5
	a _p (mm)	0.1-0.3	0.1-0.3	0.1-0.3	-	0.1-0.3	0.1-0.3
10	f _z (mm)	0.1-0.7	0.1-0.4	0.1-0.7	-	0.1-0.7	0.1-0.7
	a _p (mm)	0.1-0.3	0.1-0.3	0.1-0.3	-	0.1-0.3	0.1-0.3
12	f _z (mm)	0.1-0.8	0.1-0.6	0.1-0.8	-	0.1-0.8	0.1-0.8
	a _p (mm)	0.1-0.3	0.1-0.3	0.1-0.3	-	0.1-0.3	0.1-0.3
16	f _z (mm)	0.1-0.8	0.1-0.6	0.1-0.8	-	0.1-0.8	0.1-0.8
	a _p (mm)	0.1-0.4	0.1-0.3	0.1-0.4	-	0.1-0.4	0.1-0.4

Cutting speed (Vc in m/min)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Quality Coating	Application						
MGC PVALSA	roughing finishing	120  210 300 -	70  95 120 -	100  225 350 -	-	30  50 70 -	80  140 200 -



HIGH FEED MACHINING | TRIGAWORX® | HSC

4 flutes | with internal coolant supply

4 flutes, plain shank, special style of face teeth

- short version | long version
- roughing at great depths possible, extremely smooth operation
- with clearance between shank and flute
- with internal coolant supply
- **Note:** r* = corner radius to be programmed

4 flutes with internal coolant supply	Catalogue no.	Effective working length at X° of draft													γ (chip angle)	λ (helix angle)	Features	QC
		d ₁	l ₂	l ₃	d ₃	l ₁	r*	d ₂	z	0.5°	1°	1.5°	2°	3°				

wd. short long		d ₁	l ₂	l ₃	d ₃	l ₁	r*	d ₂	z	0.5°	1°	1.5°	2°	3°	γ	λ	Features	QC
	NVV 0474 55 041	4	4	12	3.8	57	0,3'	6	4	13.45	13.80	14.15	14.52	15.32	5	5		MGC PVALSA
	NVV 0474 55 061	6	6	21	5.8	57	0,5'	6	4	-	-	-	-	-	5	5		MGC PVALSA
	NVV 0474 55 0611	6	6	64	5.8	100	0,5'	6	4	-	-	-	-	-	5	5		MGC PVALSA
	NVV 0474 55 081	8	8	27	7.8	63	0,7'	8	4	-	-	-	-	-	5	5		MGC PVALSA
	NVV 0474 55 0811	8	8	64	7.8	100	0,7'	8	4	-	-	-	-	-	5	5		MGC PVALSA
	NVV 0474 55 101	10	10	32	9.8	72	0,85'	10	4	-	-	-	-	-	5	5		MGC PVALSA
	NVV 0474 55 1011	10	10	60	9.8	100	0,85'	10	4	-	-	-	-	-	5	5		MGC PVALSA
	NVV 0474 55 121	12	12	38	11.8	83	1'	12	4	-	-	-	-	-	5	5		MGC PVALSA
	NVV 0474 55 1211	12	12	65	11.8	110	1'	12	4	-	-	-	-	-	5	5		MGC PVALSA
	NVV 0474 55 162	16	16	50	15.8	92	1,4'	16	4	-	-	-	-	-	5	5		MGC PVALSA
	NVV 0474 55 1621	16	16	65	15.8	150	1,4'	16	4	-	-	-	-	-	5	5		MGC PVALSA

Feed per tooth (fz) | d.o.c. (ap)

Material		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
roughing operations 2D/3D							
4	f _z (mm)	0.08-0.25	0.08-0.25	0.08-0.25	-	0.08-0.25	0.08-0.25
	a _p (mm)	0.1-0.2	0.1-0.2	0.1-0.2	-	0.1-0.2	0.1-0.2
6	f _z (mm)	0.1-0.35	0.1-0.35	0.1-0.35	-	0.1-0.35	0.1-0.35
	a _p (mm)	0.1-0.3	0.1-0.3	0.1-0.3	-	0.1-0.3	0.1-0.3
8	f _z (mm)	0.1-0.5	0.1-0.4	0.1-0.5	-	0.1-0.5	0.1-0.5
	a _p (mm)	0.1-0.3	0.1-0.3	0.1-0.3	-	0.1-0.3	0.1-0.3
10	f _z (mm)	0.1-0.7	0.1-0.4	0.1-0.7	-	0.1-0.7	0.1-0.7
	a _p (mm)	0.1-0.3	0.1-0.3	0.1-0.3	-	0.1-0.3	0.1-0.3
12	f _z (mm)	0.1-0.8	0.1-0.6	0.1-0.8	-	0.1-0.8	0.1-0.8
	a _p (mm)	0.1-0.3	0.1-0.3	0.1-0.3	-	0.1-0.3	0.1-0.3
16	f _z (mm)	0.1-0.8	0.1-0.6	0.1-0.8	-	0.1-0.8	0.1-0.8
	a _p (mm)	0.1-0.4	0.1-0.3	0.1-0.4	-	0.1-0.4	0.1-0.4

Cutting speed (Vc in m/min)

Material		steel		stainless steel		cast iron		non-ferrous materials		high-temperature alloys		hardened steel	
Quality Coating	Application												
MGC PVALSA	roughing finishing	120 210 300	-	70 95 120	-	100 225 350	-	-	-	30 50 70	-	80 140 200	-

HIGH-SPEED SPINDLE SYSTEMS

MODERN SPINDLE UNITS FOR EFFECTIVE MILLINGS RESULTS

Many milling machines – both old and new – have a relatively low maximum speed. Low maximum speed does have advantages in roughing operations, but are a big drawback for achieving effective feed rates. Low speed also greatly limits the advantages of modern CNC applications. The results: much longer machining times and loss of valuable production capacities.

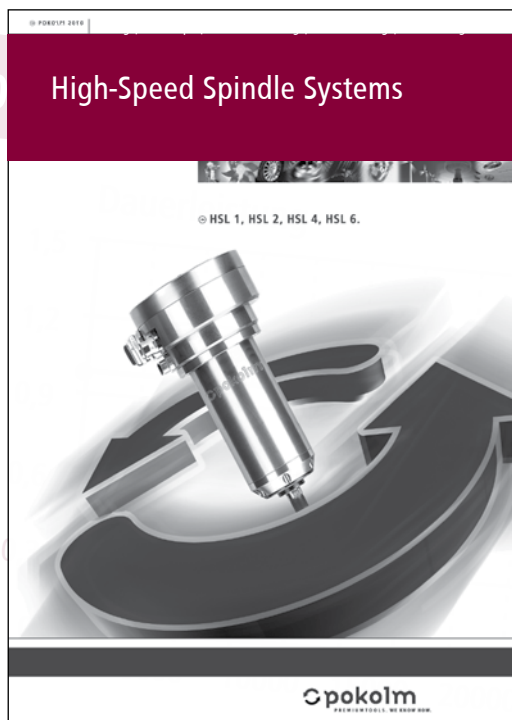
We offer a convincing solution for this situation: Pokolm high-speed spindle systems for the most profitable machining results.

BETTER SURFACE FINISH RESULTS AND GREATLY IMPROVED CYCLE TIME

The advantages are impressive: higher cutting speeds, utilization of maximum feed rates – even with the smallest end mills – better surface finish and a great reduction in the need for EDM. Results: much shorter machining times and full utilization of the CNC advantages.

Pokolm provides various spindle systems for individual adaptation to existing machines and operation requirements. Operating with an approach angle of these spindles in A and C direction by using our swivel device, increases the variety of applications of your milling machine.

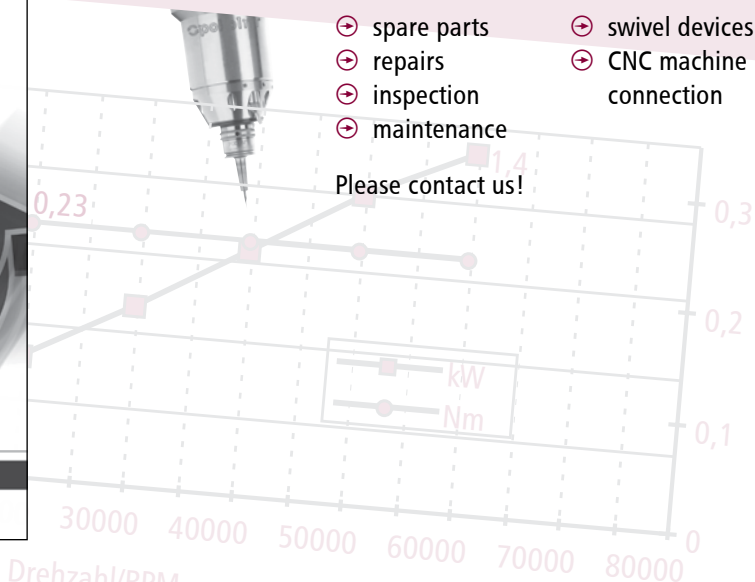
Get the maximum speed from your machines with Pokolm-spindle systems. The result: You save time!



Ask our service centre about spindles:

- ⊕ spare parts
- ⊕ repairs
- ⊕ inspection
- ⊕ maintenance
- ⊕ swivel devices
- ⊕ CNC machine connection

Please contact us!



INDUCTIVE SHRINKING TECHNOLOGY



FIRST OPERATION: SHRINKING, THEN MILLING

Shrinking Technology convinces everybody compared with conventional chucking methods from the past. What counts? Absolute concentricity and highest precision with extensive extended tool life. Shrinking technology offers a safe friction-locked connection between tool and tool holder and provides an increased transferable torque. And the qualification for maximum revolutions is the best precondition for an optimum surface finish and for reducing costs for expensive finishing processes.

Compared to conventional milling chucks, shrinking arbors allow the use of distinctly slim adaptors for machining components with narrow situations, which would be unexecutable with other tool-holding systems.

Pokolm offers a substantial range of tooling for shrinking technology: several top-class Induction Shrinking Units, shrinking arbors for all possible machine connections and our patent-protected connection system **DUOPLUG®** in combination with our "zero-reach"-shrinking arbors. (Additional information about the Pokolm **DUOPLUG®** System can be found under chapter "Milling Cutter Bodies" of this catalogue.)

SPEED / FEED PER TOOTH / DEPTH OF CUT

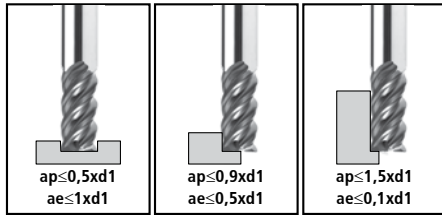


UGT-end mills for pocket-, slot- and copy-milling

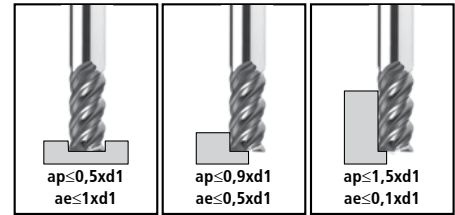
0504/0514

Stainless steel
1.4301, 1.4541, 1.4307 etc.:

1.4401, 1.4571, 1.4404 etc.:



feed per tooth f_z
speed $V_c = 80$ m/min

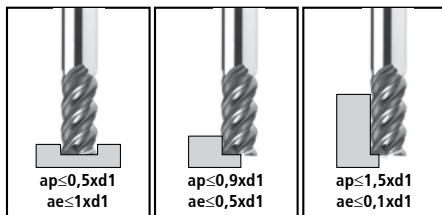


feed per tooth f_z
speed $V_c = 40$ m/min

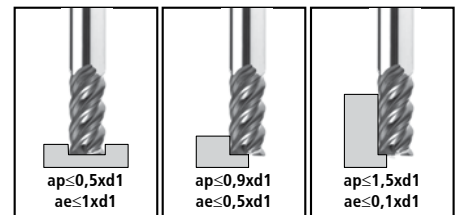
d_1	f_z	f_z	f_z	d_1	f_z	f_z	f_z
3	0.015	0.018	0.015	3	0.010	0.015	0.018
4	0.020	0.023	0.020	4	0.013	0.020	0.025
5	0.025	0.029	0.025	5	0.019	0.025	0.031
6	0.030	0.035	0.040	6	0.024	0.030	0.036
8	0.040	0.047	0.054	8	0.034	0.040	0.053
10	0.055	0.064	0.073	10	0.044	0.055	0.071
12	0.065	0.075	0.085	12	0.056	0.065	0.077
16	0.085	0.100	0.115	16	0.071	0.085	0.089
20	0.105	0.120	0.135	20	0.087	0.095	0.100
25	0.120	0.140	0.160	25	0.100	0.120	0.140

High-temperature alloys:
1.4542 etc.:

Inconel 718 etc.:



feed per tooth f_z
speed $V_c = 25$ m/min



feed per tooth f_z
speed $V_c = 15$ m/min

d_1	f_z	f_z	f_z	d_1	f_z	f_z	f_z
3	0.004	0.007	0.010	3	0.004	0.007	0.010
4	0.006	0.010	0.015	4	0.006	0.010	0.015
5	0.010	0.014	0.020	5	0.010	0.014	0.020
6	0.015	0.020	0.025	6	0.015	0.020	0.025
8	0.025	0.030	0.035	8	0.025	0.030	0.035
10	0.030	0.035	0.040	10	0.030	0.035	0.040
12	0.040	0.045	0.050	12	0.040	0.045	0.050
16	0.050	0.060	0.065	16	0.050	0.060	0.065
20	0.060	0.070	0.075	20	0.060	0.070	0.075
25	0.070	0.080	0.085	25	0.070	0.080	0.850

These speed and feed values are approximate. Customer specific factors such as input power, machine stability, tool overhang, etc. are not taken into account. In order to guarantee optimum and economic cutting conditions with our tools, please ask our office or one of our application engineers.

SPEED / FEED PER TOOTH / DEPTH OF CUT

HPC

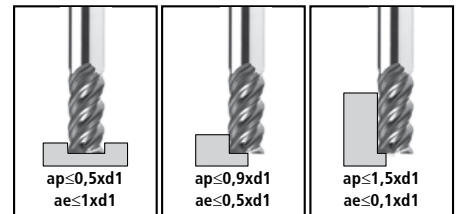
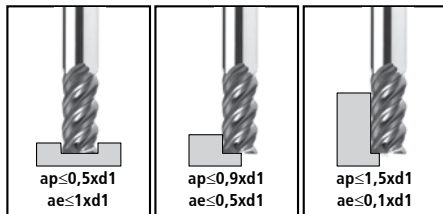
HGT-end mills for pocket- and slot-milling

0384/0394



High-temperature alloys:
1.4542 etc.:

High-nickel alloys (inconel):
718 etc.:



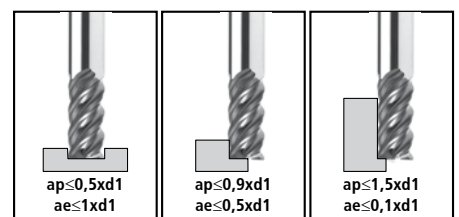
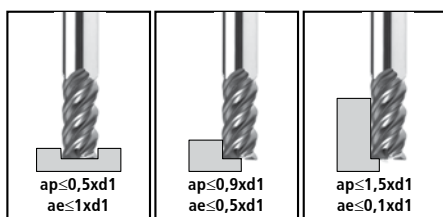
feed per tooth f_z
speed $V_c=25$ m/min

feed per tooth f_z
speed $V_c=15$ m/min

d_1	f_z	f_z	f_z		d_1	f_z	f_z	f_z
6	0.020	0.025	0.025		6	0.020	0.025	0.025
8	0.030	0.035	0.035		8	0.030	0.035	0.035
10	0.035	0.045	0.045		10	0.035	0.045	0.045
12	0.040	0.050	0.050		12	0.040	0.050	0.050
16	0.060	0.075	0.070		16	0.060	0.075	0.070
20	0.070	0.080	0.075		20	0.070	0.080	0.075

Stainless steel
1.4401, 1.4571, 1.4404 (Cr-Ni-Mo) etc.:

Stainless steel
1.4301, 1.4541, 1.4307 (Cr-Ni) etc.:



feed per tooth f_z
speed $V_c=40$ m/min

feed per tooth f_z
speed $V_c=80$ m/min

d_1	f_z	f_z	f_z		d_1	f_z	f_z	f_z
6	0.025	0.025	0.035		6	0.025	0.025	0.040
8	0.035	0.035	0.050		8	0.035	0.035	0.055
10	0.045	0.045	0.070		10	0.045	0.045	0.075
12	0.050	0.050	0.080		12	0.050	0.050	0.085
16	0.075	0.075	0.090		16	0.075	0.075	0.100
20	0.080	0.080	0.100		20	0.080	0.080	0.125

These speed and feed values are approximate. Customer specific factors such as input power, machine stability, tool overhang, etc. are not taken into account. In order to guarantee optimum and economic cutting conditions with our tools, please ask our office or one of our application engineers.

MATERIAL GROUP CROSS REFERENCES

	M. No.	DIN	European Standard	France AFNOR	Great Britain BS	Japan JIS	Italia UNI	Sweden SS	Spain U.N.E./I.H.A	USA AISI/SAE	
Steel	Free Machining Steel/ Mild Steel	1.0037	St37-2	S235JR	E34-2	37/23 HR	SN 400 B	Fe 360 B FU	1311	AE 235 B	1015
		1.0044	St44-2	S275JR	E28-2	43/25 HR	SN 400 B	Fe 430 B FN	1412	AE 275 B	1020
		1.0050	St50-2G	E295	A50-2	4360	SS 490	Fe 490	1550/2172	A 490	-
		1.0070	St70-2G	E360	A70-2	4360	-	Fe 690	1655	A 690	-
		1.0570	St52-3	S355J2G3	E36-3	50/35 HR	SM490 A;B;C;YA;YB	Fe 510/Fe52B FN/Fe52 CFN	2132/2134	AE 355 D	1024
		1.1141	Ck15	C15E	XC 18	080 M 15	S15C	C16	1370	C15K	1015 / 1017
		1.1191	Ck45	C45E	XC 45	080 M 46	S45C	C45	1672	C45E	1042 / 1045
		1.1730	C45W	C45U	Y3 42 / Y3 48	EN 43 B	-	-	1672	F.114	1045
		1.7131	16MnCr5	16MnCr5	16 MC 5	527 M 17	-	16MnCr5	2173/2511	F.1516	5115 / 5117
	Normal Tool Steels/ Steel Castings	1.2067	100Cr6	102Cr6	Y100C6	BL 3	SUJ 2	-	-	100Cr6	L3
		1.2162	21MnCr5	21MnCr5	-	-	-	-	-	-	-
		1.2307	29CrMoV9	29CrMoV9	-	-	-	-	-	-	-
		1.2311	40CrMnMo7	35CrMo 8	-	-	-	35CrMo8KU	-	F.5263	P20
		1.2312	40CrMn MoS8-6	-	-	-	-	-	-	X210CrW12	P20+1
		1.2323	48CrMoV6-7	-	-	-	-	-	-	-	-
		1.2341	6CrMo15-5	5CrMo16	-	-	-	-	-	-	P4
		1.2343	X37CrMoV5-1	X37CrMoV5-1	Z38CDV5	BH 11	SKD 6	X37Cr MoV51KU	X37CrMo V5-1	X37Cr MoV5-1	H11
		1.2344	X40CrMoV5-1	X40CrMoV5-1	Z40CDV5	BH 13	SKD 61	X40CrMo V511KU	2242	X40Cr MoV5-1	H13
		1.2842	90MnCrV8	90MnCrV8	90MV 8	BO 2	-	90 MnCrV 8 KU	-	F.5229	O2
Tools Steels, Chrome-Nickel Alloys, Steel castings, difficult to machine	1.2080	X210Cr12	X210Cr12	Z200C12	BD 3	SKD 1	-	X210Cr12	X210Cr12	D3	
	1.2363	X100CrMoV5	X100CrMoV5	Z100CDV5	BA 2	SKD 12	X205 Cr12KU	2260	X100CrMoV5	A2	
	1.2369	81MoCr V42-16	-	-	-	-	X100CrMoV5 1KU	-	-	613	
	1.2379	X153CrMoV12	X153CrMoV12	Z 160 CDV 12	BD 2	SKD10/ SKD11	X155CrV Mo121KU	2310	X153CrMoV12	D2	
	1.2567	30WCrV17-2	X30WCrV53	-	-	SKD 4	-	-	-	-	
	1.2708	54NiCrMoS 6	-	-	-	-	-	-	-	-	
	1.2713	55NiCrMoV6	55 NiCrMoV 7	-	-	(SKT4)	-	-	F.520.S	L6	

		M.-No.	DIN	European Standard	France AFNOR	Großbritanni-en BS	Japan JIS	Italia UNI	Sweden SS	Spain U.N.E./I.H.A	USA AISI/SAE	
Steel	Tools Steels, Chrome-Ni-ckel/Alloys, Steel castings	1.2738	40CrMnNi Mo8-6-4	40CrMnNi Mo8-6-4	-	-	-	-	-	-	-	
		1.2767	45NiCrMo16	45NiCrMo16	-	-	SKT 6	40NiCrMo V16KU	-	-	-	
		1.6358	XNiCo Mo18-9-5	-	-	-	-	-	-	-	-	
High-temperature Alloys	Heat-resistance Alloys	1.3401	X120Mn12	-	Z120M12	BW 10	SCMnH 1	G-X120Mn12	2183	F.8251	-	
		1.4865	GX40NiCr Si38-19	GX40NiCr Si38-19	GX40NiCr Si38-19	3330 C 11 / 331 C 40	SCH 15	GX40NiCr Si38-19	GX40NiCr Si38-19	GX40NiCr Si38-19	-	
		2.4375	NiCu30Al (Monel K-500)	-	(NU30AT)	NA 18	-	-	-	-	-	Monel K-500
		2.4610	NiMo16Cr16Ti (Almenit 4610)	-	-	NA 45	-	-	-	-	-	Hastelloy C-4
		2.4619	NiCr22Mo7Cu (Coralloy 4619)	-	-	-	-	-	-	-	-	Hastelloy G-3
		2.4631	NiCr20TiAl (Nimonic 80A)	Ni-P95-HAT (AECMA)	NC 20 TA	(ZHR201; HR401,601)	NCF 80A	-	-	-	-	Nimonic 80 A; HEV 5
		2.4636	NiCo15Cr15Mo AlTi (Dux 4636)	-	-	HR 4	-	-	-	-	-	Nimonic 115
		2.4648	EL-NiCr19Nb (FoxNibas 70/20)	-	-	-	-	-	-	-	-	-
		2.4668	NiCr19NbMo (Inconel 718)	NiCr19Fe19 Nb5Mo3	NC19FeNb	NiCr19Fe19 Nb5Mo3	NCF 718	NiCr19Fe19 Nb5Mo3	NiCr19Fe19 Nb5Mo3	NiCr19Fe19 Nb5Mo3	NiCr19Fe19 Nb5Mo3	Inconel 718 XEV-I
		2.4856	NiCr22Mo9Nb (Inconel 625)	NiCr22MO9Nb	NC22FeDnb	NA 43/Na 21	NCF 625	NiCr22MO9Nb	NiCr22MO9Nb	NiCr22MO9Nb	NiCr22MO9Nb	Inconel 625
	-	Ti99,5 HB 30-200	-	-	-	-	-	-	-	-	-	
	-	Ti99,6 HB 30-170	-	-	-	-	-	-	-	-	-	
	-	Ti99,7 HB 30-150	-	-	-	-	-	-	-	-	-	
	-	Ti99,8 HB 30-120	-	-	-	-	-	-	-	-	-	
	-	TiAl6V4ELI	-	-	TA11	-	-	-	-	-	AMS R56401	
	-	TiAl5Sn2.5	-	T-A5E	TA14/17	-	-	-	-	-	AMS 54520	
	3.7025	Ti 1	-	-	2 TA 1	-	-	-	-	-	AMS R50250	
	3.7124	TiCu2	-	-	2 TA21-24	-	-	-	-	-	-	
	3.7145	TiAl6Sn2 Zr4Mo2Si	-	-	-	-	-	-	-	-	AMS R54620	
	3.7165	TiAl6V4	-	T-A6V	TA10-13 / TA28	-	-	-	-	-	AMS R56400	
	3.7175	TiAl6V6Sn2	-	-	-	-	-	-	-	-	-	
	3.7184	TiAl4Mo4Sn2	-	-	-	-	-	-	-	-	-	
3.7185	TiAl4Mo4Sn2	-	-	TA 45-51; TA57	-	-	-	-	-	-		
3.7225	Ti 1 Pd	-	-	TP1	-	-	-	-	-	AMS 52250		

MATERIAL GROUP CROSS REFERENCES (continued)

	M.-No.	DIN	European Standard	France AFNOR	Great Britain BS	Japan JIS	Italia UNI	Sweden SS	Spain U.N.E./I.H.A	USA AISI/SAE	
Stainless Steel	all sorts	1.2316	X36CrMo17	X38CrMo16	Z38CD16-01	X38CrMo16	-	X38CrMo16	-	F.5267	-
		1.2367	X38CrMoV5-3	X38CrMoV5-3	Z38CDV5-3	X38CrMoV5-3	-	X38CrMoV5-3	X38CrMoV5-3	X38CrMoV5-3	-
		1.3543	X102CrMo17	X108CrMo17	Z100CD17	X108CrMo17	SUS 440C	X105CrMo17	X108CrMo17	F.3425	440 C
		1.4059	GX22CrNi17	-	Z20CN 17.2M	ANC 2	-	-	-	-	-
		1.4122	GX35CrMo17	X39CrMo17-1	Z38CD 16.1CI	X39CrMo17-1	-	X39CrMo17-1	X39CrMo17-1	X39CrMo17-1	-
		1.4301	X5CrNi18-10	X5CrNi18-10	Z6CN18.09	304 S 15	SUS 304	X5CrNi1810	2332	F.3504	304
		1.4305	X12CrNiS18-8	X8CrNiS18-9	Z8CNF18-09	303 S 31	SUS 303	X10CrNiS18-9	2346	F.310.C	303
		1.4340	GX40CrNi27-4	-	-	-	-	G X 35 CrNi 28 05	-	-	-
		1.4401	X5CrNiMo 17-12-2	X5CrNiMo 17-12-2	Z7CND 17-11-02	316 S 33	SUS 316	X5CrNiMo 17 12	2347	F.3534	316
		1.4462	X2CrNiMoN 22-5-3	X2CrNiMoN 22-5-3	Z2CND 22-06-03	318 S 13	SUS 329J3L	X2CrNiMoN 22-5-3	2377	X2CrNiMoN 22-5-3	S31803/ S32205
		1.4541	X10CrNiTi18-9	X6CrNiTi18-10	Z6CNT 18-10	321 S 31	SUS 321	X6CrNiTi18-10	2337	F.3523	321
		1.4551	X10CrNi 18-9	X5CrNiNb 20 10 KE	Z6CNNb 20-10	-	SUS Y 374	-	-	-	-
		1.4571	X10CrNiMo Ti18-10	X6CrNiMo Ti17-12-2	Z6 CNDT 17-12	320 S 31	SUS 316Ti	X6CrNiMo Ti17-12	2350	F.3535	316Ti
		1.4712	X10CrSi6	-	-	-	-	-	-	-	-
		1.4742	X10CrAl18	X10CrSi18	Z10CAS18	430 S 15	SUS 430	X8Cr17	-	F.3113	430
Cast Iron	Grey Cast Iron	0.6010	GG10	EN-GJL-100	Ft10D	GRADE100	FC 10	G10	0110-00	FG 10	No 20 B
		0.6020	GG20	EN-GJL-200	Ft20D	GRADE200	FC 20	G20	0120-00	FG 20	No 30 B
		0.6030	GG30	EN-GJL-300	Ft30D	GRADE300	FC 30	G30	0130-00	FG 30	No 45 B
		0.6040	GG40	EN-GJL-350	Ft35D	GRADE350	FC 35	G35	0135-00	FG 35	-
	Spheroidal Graphite	0.7040	GGG-40	EN-GJS-400-15	FGS 400-12	SNG 420/12	FCD 400	GS 400/12	07 17-02	FGE 38-17	60-40-18
		0.7050	GGG-50	EN-GJS-500-7	FGS 500-7	SNG 500/7	FCD 500	GS 500/7	07 27-02	FGD 50-7	65-45-12
		0.7060	GGG-60	EN-GJS-600-3	FGS 600-7	SNG 600/3	FCD 600	GS 600/3	07 32-03	FGE 60-2	80-55-06
		0.7070	GGG-70	EN-GJS-700-2U	FGS 700-2	SNG 700/2	FCD 700	GS 700/2	07 37-01	FGS 70-2	100-70-03
		0.7080	GGG-80	E8N-GJS-800-2	FGS 800-2	SNG 800/2	FCD 800	GS 800/2	-	-	120-90-02
	Tempered Castings	GTS 35-10	EN-GJMB-350-10	MN 35-10	B 340/12	-	-	08 15	-	32510	-
		GTS 45-06	EN-GJMB-450-6	-	P 440/7	-	-	08 52	-	40010	-
		GTS 55-04	EN-GJMB-550-4	MP 50-5	P 510/4	-	-	08 54	-	50005	-
GTS 65-02		EN-GJMB-650-2	MP 60-3	P 570/3	-	-	08 85	-	70003	-	

		M.-No.	DIN	European Standard	France AFNOR	Great Britain BS	Japan JIS	Italia UNI	Sweden SS	Spain U.N.E./I.H.A	USA AISI/SAE
Non-ferrous Materials	Aluminum	3.0255	Al99.5	EN-AW-1050A	A59050C	L31/L34/L36	-	-	-	-	1000
		3.1325	AlCuMg1	EN-AW-2017A	-	-	-	-	-	-	-
		3.2163	G-ALSi9Cu3	EN-AC-46200	-	-	-	-	-	-	-
		3.2315	AlMgSi1	EN-AW-6082	-	-	-	-	-	-	-
		3.2383	G-ALSi10Mg	-	-	LM 9	-	-	4253	-	A 360.2
		3.2581	G-ALSi12	EN-AW-2017A	-	LM 6	-	-	4261	-	A 413.2
		3.3535	AlMg3	EN-AW-5754	-	-	-	-	-	-	-
		3.4345	AlZnMgCu0,5	EN-AW-7022	AZ4GU/9051	L 86	-	-	-	-	7050
		3.5105	GMgZn4 SE1Zr1	-	G-Z4TR	MAG 5	-	-	-	-	ZE 41
		3.5812	G-MgAl8Zn1	-	G-A9	MAG 1	-	-	-	-	AZ 81
	Copper	-	CuMn5F36	-	-	-	-	-	-	-	-
		-	CuSi2MnF34	-	-	-	-	-	-	-	-
		-	E-Cu57	-	-	-	-	-	-	-	-
		-	CuZn15	-	CuZn 15	CZ 102	-	-	-	-	C 23000
		-	CuZn30	-	CuZn 30	CZ 106	-	-	-	-	C 26000
		-	CuZn37	-	CuZn 37	CZ 108	-	C2720	-	-	C 27700
		-	CuZn36Pb3	-	-	-	-	-	-	-	-
		-	G-CuZn34Al2	-	U-Z36N 3	HTB 1	-	-	-	-	C 86200
		-	G-CuSn5ZnPb	-	U-E5Pb5Z5	LG 2	-	-	-	-	C 83600
		-	G-CuPb10Sn	-	U-E10Pb10	LB 2	-	-	-	-	C 93700
		-	CuCrZr	-	U-Cr 0,8 Zr	CC 102	-	-	-	-	C 18200
	Graphite	-	ISO-63	-	-	-	-	-	-	-	-
		-	ISO-90	-	-	-	-	-	-	-	-
		-	ISO-93	-	-	-	-	-	-	-	-
		-	ISO-95	-	-	-	-	-	-	-	-
	Plastics	-	Ureol® 5211 A/B	-	-	-	-	-	-	-	-
		-	Ureol® 5212 A/B	-	-	-	-	-	-	-	-
		-	Ureol® 5213 A/B	-	-	-	-	-	-	-	-
		-	Ureol® 5214 A/B	-	-	-	-	-	-	-	-
		-	Ureol® 5215 A/B	-	-	-	-	-	-	-	-
		-	Ureol® 5216 A/B	-	-	-	-	-	-	-	-
		-	Ureol® 5217 A/B	-	-	-	-	-	-	-	-
		-	Ureol® 5218 A/B	-	-	-	-	-	-	-	-
-		Ureol® 5219 A/B	-	-	-	-	-	-	-	-	

MATERIAL GROUP CROSS REFERENCES (continued)

	M.-No.	DIN	European Standard	France AFNOR	Great Britain BS	Japan JIS	Italia UNI	Sweden SS	Spain U.N.E./I.H.A	USA AISI/SAE	
up to 48HRC	1.2311	40CrMnMo7	35CrMo 8	-	-	-	35CrMo 8 KU	-	-	-	
	1.2312	40CrMn-MoS8-6	-	-	-	-	-	-	-	-	
	1.2323	48CrMoV6-7	-	-	-	-	-	-	-	-	
	1.2343	X38CrMoV5-1	X37CrMoV5-1	Z38CDV 5	BH 11	SKD 6	X37CrMoV51 KUa	X37CrMoV5-1	F.520.G	H 11	
	1.2344	X40CrMoV51	X40CrMoV5-1	Z40CDV 5	BH 13	SKD 61	X40CrMoV 5 1 1 KU	2242	X40CrMoV 5-1	H 13	
	1.2708	54NiCrMoS6	-	-	-	-	-	-	-	-	
	1.2842	90MnCrV8	90MnCrV8	90Mv8	BO 2	-	90MnVCr 8 KU	90MnCrV8	F.5229	O 2	
	up to 55HRC	1.2080	X210Cr12	X210Cr12	Z200C12	BD 3	SKD 1	X210Cr12	X210Cr12	F.521	D 3
		1.2323	48CrMoV6-7	-	-	-	-	-	-	-	-
		1.2344	X40CrMoV5-1	X40CrMoV5-1	Z40CDV5	BH 13	SKD 61	X40CrMoV5-1	2242	X40CrMoV5-1	H 13
		1.2363	X100CrMoV51	X100CrMoV5	Z100CDV5	BA 2	SKD 12	X100CrMoV5	2260	X100CrMoV5	A 2
		1.2369	81MoCrV 42-16	-	-	-	-	-	-	-	613
		1.2379	X155CrV-Mo12-1	X153CrMoV12	Z160CDV12	BD 2	SKD 11	X153CrMoV12	2310	X153CrMoV12	D 2
		1.2567	30WCrV17-2	X30WCrV53	-	-	SKD 4	-	-	-	-
1.2708		54NiCrMoS6	-	-	-	-	-	-	-	-	
1.2713		55NiCrMoV6	55NiCrMoV7	55NCDV7	-	SKT 4	-	-	F.520.S	L 6	
1.2738		40CrMnNi Mo8-6-4	40CrMnNi Mo8-6-4	40CrMnNi Mo8-6-4	40CrMnNi Mo8-6-4	40CrMnNi Mo8-6-4	40CrMnNi Mo8-6-4	40CrMnNi Mo8-6-4	40CrMnNi Mo8-6-4	40CrMnNi Mo8-6-4	
1.2767		X45NiCrMo4	45NiCrMo16	45NiCrMo16	45NiCrMo16	SKT 6	45NiCrMo16	45NiCrMo16	45NiCrMo16	-	
1.2842		90MnCrV8	90MnCrV8	90MnCrV8	BO 2	-	90MnCrV8	90MnCrV8	90MnCrV8	O 2	
up to 65HRC		1.2080	X210Cr12	X210Cr12	Z200C12	BD 3	SKD 1	X210Cr12	X210Cr12	X210Cr12	D 3
		1.2363	X100CrMoV5	X100CrMoV5	Z100CDV5	BA 2	SKD 12	X100CrMoV5	2260	X100CrMoV5	A 2
	1.2369	81MoCrV 42-16	-	-	-	-	-	-	-	613	
	1.2379	X153CrMoV12	X153CrMoV12	Z160CDV12	BD 2	SKD 10	X153CrMoC12	2310	X153CrMoC12	D 2	
	1.2767	45NiCrMo16	45NiCrMo16	45NiCrMo16	45NiCrMo16	SKT 6	45NiCrMo16	45NiCrMo16	45NiCrMo16	-	
	1.2842	90MnCrV8	90MnCrV8	90MnCrV8	BO 2	-	90MnCrV8	90MnCrV8	90MnCrV8	O2	

HARDNESS CONVERSION TABLE

Tensile Strength, Vickers-, Brinell- und Rockwell Hardness

Tensile Strength R_m N/mm ²	Vickers Hardness HV10	Brinell Hardness HB	Rockwell Hardness HRC
255	80	76,0	
270	85	80,7	
285	90	85,5	
305	95	90,2	
320	100	95,0	
335	105	99,8	
350	110	105	
370	115	109	
385	120	114	
400	125	119	
415	130	124	
430	135	128	
450	140	133	
465	145	138	
480	150	143	
495	155	147	
510	160	152	
530	165	156	
545	170	162	
560	175	166	
575	180	171	
595	185	176	
610	190	181	
625	195	185	
640	200	190	
660	205	195	
675	210	199	
690	215	204	
705	220	209	
720	225	214	
740	230	219	
755	235	223	
770	240	228	20,3
785	245	233	21,3
800	250	238	22,2
820	255	242	23,1
835	260	247	24,0
850	265	252	24,8
865	270	257	25,6
880	275	261	26,4
900	280	266	27,1
915	285	271	27,8
930	290	276	28,5
950	295	280	29,2
965	300	285	29,8
995	310	295	31,0
1030	320	304	32,2
1060	330	314	33,3
1095	340	323	34,4
1125	350	333	35,5

Tensile Strength R_m N/mm ²	Vickers Hardness HV10	Brinell Hardness HB	Rockwell Hardness HRC
1155	360	342	36,6
1190	370	352	37,7
1220	380	361	38,8
1255	390	371	39,8
1290	400	380	40,8
1320	410	390	41,8
1350	420	399	42,7
1385	430	409	43,6
1420	440	418	44,5
1455	450	428	45,3
1485	460	437	46,1
1520	470	447	46,9
1555	480	456*	47,7
1595	490	466*	48,4
1630	500	475*	49,1
1665	510	485*	49,8
1700	520	494*	50,5
1740	530	504*	51,1
1775	540	513*	51,7
1810	550	523*	52,3
1845	560	532*	53,0
1880	570	542*	53,6
1920	580	551*	54,1
1955	590	561*	54,7
1995	600	570*	55,2
2030	610	580*	55,7
2070	620	589*	56,3
2105	630	599*	56,8
2145	640	608*	57,3
2180	650	618*	57,8
	660		58,3
	670		58,8
	680		59,2
	690		59,7
	700		60,1
	720		61,0
	740		61,8
	760		62,5
	780		63,3
	800		64,0
	820		64,7
	840		65,3
	860		65,9
	880		66,4
	900		67,0
	920		67,5
	940		68,0

COATINGS AND CUTTING MATERIALS

COATING SUMMARY

Description		Colour	Vickers Hardness HV	Maximum Temperature in Centigrade	Type of Coating	Thickness of Coating in µm
PVTi	TiAlN	blue/grey	3600	up to 850°	PVD	2 to 4
PVAT	Modified Titanium-Aluminium-Nitride	metallic/golden	3600	up to 1000°	PVD	2 to 4
PVCC	Titanium-Aluminium-Nitride + lubricating properties	black	800	up to 850°	PVD	2 to 4
PVCN	CrNi	metallic/silver	1800	up to 700°	PVD	2 to 3
PVAS	Special Coating for Aluminium	light grey	2800	up to 700°	PVD	2 to 3
PVDiaN	Diamond-coating, normal	dull grey	10000	up to 600°	CVD	6 to 8
PVDiaG	Diamond-coating, thin	bright grey	10000	up to 700°	CVD	4 to 6
PVALSA	TiAlN	blue/grey	3600	up to 950°	PVD	2 to 4
PVTiH	TiAlN Multilayer	violet/brown	3600	up to 1100°	PVD	4 to 5
PVST	AlTiN	blue/grey	3300	up to 950°	PVD	2 to 4
PVC5	CrN-mod	spectral colors	2700	up to 700°	PVD	1 to 1,5

CUTTING MATERIALS

Material	Material							
	Coatings	Steel	High-temperature Alloys	Stainless Steel	Cast Iron	Non-ferrous Materials	Hardened Steel	
MGC	PVTi PVAT PVCC							Coated micrograin carbide for high-speed, high-performance Roughing, pre-finishing and finishing of steel, hardened steel, Stainless steel, high-temperature-alloys and Aluminium-alloys.
KAC UKAC	PVCN PVAS PVDiaN PVDiaG							Coated ultra-micrograin and micrograin carbide for high speed, high performance roughing, pre-finishing and finishing of cast iron, non-ferrous materials, graphites and titanium-alloys.
UMGC	PVTiH PVAT							Coated ultra-micrograin carbide for high-speed, high-performance roughing, pre-finishing and finishing of steel, hardened steel, stainless steel, and high-temperature alloys.

FORMULAS AND CALCULATION EXAMPLES

Formulas																			
<p>Calculation of revolutions of main spindle in [min-1]:*</p> $n = \frac{V_c \cdot 1000}{\pi \cdot D_{c/eff}}$	<p>Calculation of feed per tooth in [mm/tooth]:</p> $f_z = \frac{V_f}{n \cdot z}$	<p>Calculation of feed per min. in [mm/min.]:</p> $V_f = n \cdot z \cdot f_z$	<p>Calculation of power requirement in [kW]:*</p> $P = \frac{a_e \cdot a_p \cdot V_f}{18000}$																
<p>Calculation of cutting speed in [m/min]:*</p> $V_c = \frac{\pi \cdot D_{c/eff} \cdot n}{1000}$ <p>* Please note: For flat contours use true mill diameter to calculate cutting speed (see Surface Finish section).</p>	<p>Calculation of machining time in [min]:</p> $f_n = z \cdot f_z$ $f_n = \frac{V_f}{n}$	<p>Calculation of machining time in [min]:</p> $T = \frac{l_f}{V_f}$	<p>Calculation of chip volume in [cm³/min]:</p> $Q = \frac{a_e \cdot a_p \cdot V_f}{1000}$ <p>* Please note: The formula given for calculating the power requirement is valid for machining steel only.</p>																
<p>Definitions:</p> <table border="0"> <tr> <td>a_e width of cut [mm]</td> <td>D_{eff} true tool diameter in [mm]</td> <td>n revolution in [rpm]</td> <td>V_c cutting speed in [m/min]</td> </tr> <tr> <td>a_p depth of cut in [mm]</td> <td>f_z feed per tooth in [mm]</td> <td>P power requirement in [kW]</td> <td>V_f feed per min. in [mm/min]</td> </tr> <tr> <td>D_c cutter diameter in [mm]</td> <td>l_f milling length in [mm]</td> <td>Q chip volume in [cm³/min]</td> <td>z no. of effective teeth</td> </tr> <tr> <td></td> <td>f_n feed per revolution in [mm/U]</td> <td>T machining time in [min]</td> <td></td> </tr> </table>				a_e width of cut [mm]	D_{eff} true tool diameter in [mm]	n revolution in [rpm]	V_c cutting speed in [m/min]	a_p depth of cut in [mm]	f_z feed per tooth in [mm]	P power requirement in [kW]	V_f feed per min. in [mm/min]	D_c cutter diameter in [mm]	l_f milling length in [mm]	Q chip volume in [cm ³ /min]	z no. of effective teeth		f_n feed per revolution in [mm/U]	T machining time in [min]	
a_e width of cut [mm]	D_{eff} true tool diameter in [mm]	n revolution in [rpm]	V_c cutting speed in [m/min]																
a_p depth of cut in [mm]	f_z feed per tooth in [mm]	P power requirement in [kW]	V_f feed per min. in [mm/min]																
D_c cutter diameter in [mm]	l_f milling length in [mm]	Q chip volume in [cm ³ /min]	z no. of effective teeth																
	f_n feed per revolution in [mm/U]	T machining time in [min]																	

formulas for calculating the true mill diameter can be found in the Surface Finish selection.

Calculation Example	
<p>Milling cutter: NVV 1192 85 0602</p> <p>Milling cutter diam.: 6 mm</p> <p>no. of effective teeth: 2</p> <p>Depth of cut (a_p): 0.2 mm</p> <p>Width of cut: $a_e = f_z$</p> <p>Material to be machined: 1.2343</p> <p>Selected cutting speed (V_c): 100 m/min</p> <p>Selected feed per tooth (f_z): 0.1 mm</p>	<p>Calculation of true cutting diameter:</p> $d_{eff} = 2\sqrt{0.2 \cdot (6 - 0.2)} = 2.15 \text{ mm}$ <p>Calculation of revolutions</p> $n = \frac{100 \cdot 1,000}{\pi \cdot 2.15} = 14,805 \text{ U/min}$ <p>Calculation of feed per min.:</p> $V_f = 14,805 \cdot 2 \cdot 0.1 = 2,961 \text{ mm/min}$

PURCHASE

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Company: _____

Address: _____

Department: _____ person in charge: _____

Phone: _____ Fax: _____ Email: _____

Requested delivery date

We adapt our basic substrate and coating optimally to your requirements and to the material to be machined. Please mark any special requirements:

Solid Carbide:

- KAC CBN UMGC
 MGC PKD

left-hand cutting

Shank Style DIN 6535:

- Form HA (plain)
 Form HB (with clamping flats)
 Qty. required

Coating:

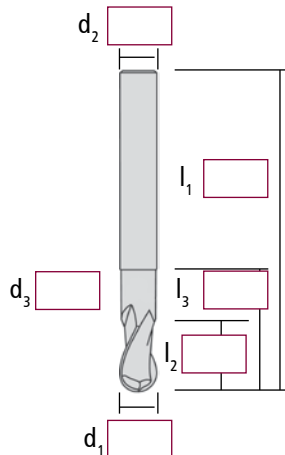
- PVAT PVCS
 PVAS PVALSA
 PVCC PVTi
 PVCN PVDiaN
 PVDiaG PVTiH
 Other: _____

Material to be machined: _____

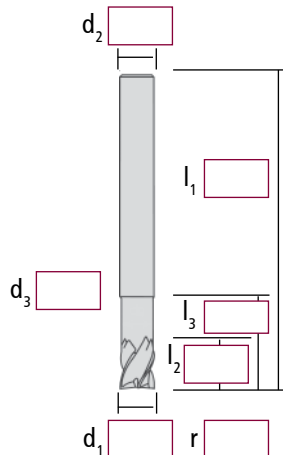
Further details:

- No. of teeth Straight teeth
 Angle of helix

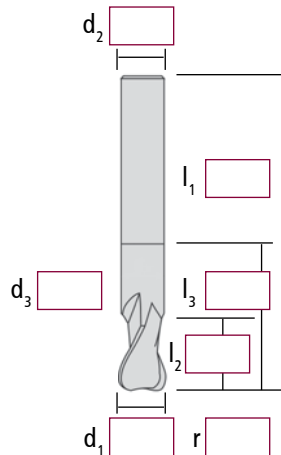
Ball Nose End Mills:



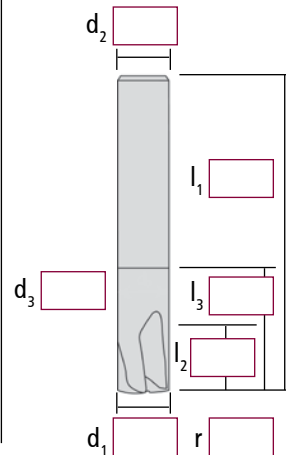
Corner Radius End Mills:



Toric End Mills:



TRIGAWORX®:



Please fill in your required dimensions.

Indoor service:

Field service:

TEST REPORT OF MILLING CONDITIONS

Company: _____
 Street: _____
 City: _____
 Contact: _____
 Machine: HP: [kW]
 Type: n(s): [min-1]
 Arbor System: V_f : [mm/min]

Material No.:						Date:					
DIN Code:						Analysis [%]					
C	Si	Mn	P	S	Cr	Ni	Mo	V	W		
N/mm ²			HB			HV			HRC		

CNC Control: _____

	Test	Actual Status	Test 1	Test 2	Test 3
Tool	Milling conditions				
	Manufacturer				
	Type				
	Arbor				
	Overhang				
	Kind of cooling (air / water?)				
Cutting Mater.	Kind				
	Manufacturer				
	Cutting Material Code				
	Coating				
Operation Data	V_c [m/min]				
	V_f [mm/min]				
	n(s) [min ⁻¹]				
	D_c [mm]				
	f_z [mm/Zahn]				
	a_p [mm]				
	a_e [mm]				
	T [min]				
Results	No. of tests				
	Tool life [min]				
	Life in length [m]				
	Chip volume [cm ³ /min]				
	Energy consumption [kW]				
	Performance Evaluation:	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10

Illustration / Remarks:

NUMERICAL INDEX

Catalogue no.		Page		Catalogue no.		Page		Catalogue no.		Page	
01		NW013456101	48	NW016256100	34	NW010848030	116	NW013456120	49	NW016256101	34
NW010848040	116	NW013456121	49	NW016357060	38	NW010848060	116	NW013456160	49	NW016357080	38
NW010848080	116	NW013456161	49	NW016357100	38	NW010848100	116	NW013456200	49	NW016357120	38
NW010848120	116	NW013456201	49	NW016357160	38	NW013256030	45	NW014256001	71	NW016456030	43
NW013256031	45	NW014256002	71	NW016456031	43	NW013256040	45	NW014256003	71	NW016456040	43
NW013256041	45	NW014256004	71	NW016456041	43	NW013256050	45	NW014256005	71	NW016456050	43
NW013256051	45	NW014256006	71	NW016456051	43	NW013256060	46	NW014256008	71	NW016456052	43
NW013256061	46	NW014256010	71	NW016456060	43	NW013256080	46	NW014256012	71	NW016456061	43
NW013256081	46	NW014256015	71	NW016456080	43	NW013256100	46	NW014256020	71	NW016456081	43
NW013256101	46	NW016256020	34	NW016456100	43	NW013256120	46	NW0162560206	34	NW016456101	43
NW013256121	46	NW016256021	34	NW017256020	30	NW013256160	46	NW016256022	34	NW017256040	30
NW013256161	46	NW0162560221	34	NW017256060	31	NW013256200	46	NW016256030	34	NW017256061	31
NW013256201	46	NW01625603005	34	NW017256080	31	NW013456030	48	NW0162560301	34	NW017256100	31
NW013456031	48	NW016256031	34	NW017256101	31	NW013456040	48	NW016256040	34	NW017256103	31
NW013456041	48	NW01625604005	34	NW017256121	31	NW013456050	48	NW016256041	34	NW017256123	31
NW013456051	48	NW016256050	34	NW017256124	31	NW013456060	48	NW016256051	34	NW018256060	32
NW013456061	48	NW016256060	34	NW018256061	32	NW013456080	48	NW016256061	34	NW018256080	32
NW013456081	48	NW016256080	34	NW018256081	32	NW013456100	48	NW016256081	34	NW018256100	33

Catalogue no.	Page
NW018256101	33
NW018256103	33
NW018256123	33
NW018256124	33
NW018357060	38
NW018357061	38
NW018357080	38
NW018357081	38
NW018357100	38
NW018357101	38
NW018357103	38
NW018357120	38
NW018357123	38
NW018357124	38
NW01928500411	58
NW01928500412	58
NW01928500413	58
NW01928500511	58
NW01928500512	58
NW01928500513	58
NW01928500514	58
NW01928500612	58
NW01928500613	58
NW01928500614	58
NW01928500811	58
NW01928500812	58
NW01928500813	58
NW01928500814	58
NW01928501021	58
NW01928501022	58
NW01928501023	58
NW01928501024	58
NW01928501521	58
NW01928501522	58
NW01928501523	58
NW01928501524	58
NW01928502021	58
NW01928502022	58

Catalogue no.	Page
NW01928502023	58
NW01928502024	58
NW01928502025	59
NW01928502051	59
NW01928502052	59
NW01928502053	59
NW01928502054	59
NW01928502055	59
NW01928503021	59
NW01928503022	59
NW01928503023	59
NW01928503024	59
NW01928503051	59
NW01928503052	59
NW01928503053	59
NW01928503054	59
NW01928504021	59
NW01928504022	59
NW01928504023	59
NW01928504024	59
NW01928504051	59
NW01928504052	59
NW01928504053	59
NW01928504054	59
NW01928505021	60
NW01928505023	60
NW01928505051	60
NW01928505053	60
NW01928506021	60
NW01928506023	60
NW01928506051	60
NW01928506053	60
02	
NW0222560041	45
NW0222560051	45
NW0222560061	45
NW0222560081	45
NW0222560101	45

Catalogue no.	Page
NW0222560151	45
NW0222560152	45
NW022256020	45
NW022256022	45
NW022256025	45
NW0222560251	45
NW022256030	45
NW022256031	45
NW022256040	45
NW022256041	45
NW022256050	45
NW022256060	45
NW022256080	46
NW022256100	46
NW022256120	46
NW022256160	46
NW022256200	46
NW022456015	48
NW022456021	48
NW022456022	48
NW022456030	48
NW022456031	48
NW022456040	48
NW022456050	48
NW022456060	48
NW022456080	48
NW022456100	48
NW022456120	48
NW022456160	49
NW022456200	49
NW025856061	62
NW025856101	62
NW025856121	62
NW025956040	62
NW025956050	62
NW025956060	62
NW025956080	62
NW025956100	62

Catalogue no.	Page	Catalogue no.	Page	Catalogue no.	Page
NWV025956120	62	NWV032256120	46	NWV033256080	31
NWV025956160	62	NWV032256160	46	NWV033256081	31
NWV025956200	62	NWV032256200	46	NWV033256082	31
NWV02745506015	132	NWV032456020	49	NWV033256083	31
NWV02745508020	132	NWV032456030	49	NWV033256100	31
NWV02745510020	132	NWV032456040	49	NWV033256101	31
NWV02745512030	132	NWV032456050	49	NWV033256102	31
NWV027559060	68	NWV032456060	49	NWV033256103	31
NWV027559080	68	NWV032456080	49	NWV033256120	31
NWV027559100	68	NWV032456100	49	NWV0332561206	31
NWV027559101	68	NWV032456120	49	NWV033256121	31
NWV027559120	68	NWV032456160	49	NWV033256122	31
NWV027559160	68	NWV032456200	49	NWV033256123	31
NWV028056060	61	NWV03325600501	30	NWV033456020	40
NWV028056080	61	NWV03325601001	30	NWV03345602002	40
NWV028056100	61	NWV03325601002	30	NWV033456030	40
NWV028056120	61	NWV03325601502	30	NWV03345603002	40
NWV028056160	61	NWV033256020	30	NWV03345603003	40
NWV028056200	61	NWV03325602002	30	NWV03345603005	40
NWV029056061	118	NWV03325602003	30	NWV033456031	40
NWV029056081	118	NWV033256030	30	NWV033456040	40
NWV029056101	118	NWV03325603002	30	NWV03345604002	40
NWV029056121	118	NWV03325603003	30	NWV033456041	40
NWV029056161	119	NWV033256031	30	NWV033456050	40
NWV029056201	119	NWV0332560311	30	NWV03345605002	40
NWV029456060	118	NWV033256040	30	NWV033456051	40
NWV029456080	118	NWV03325604002	30	NWV033456060	40
NWV029456100	118	NWV033256040021	30	NWV03345606002	40
NWV029456120	118	NWV0332560401	30	NWV03345606003	40
NWV029456160	118	NWV033256041	30	NWV033456061	40
		NWV0332560411	30	NWV033456062	40
	03	NWV033256050	30	NWV033456080	40
NWV032256020	46	NWV03325605002	30	NWV033456081	40
NWV032256030	46	NWV033256051	30	NWV033456082	40
NWV032256040	46	NWV033256060	31	NWV033456083	40
NWV032256050	46	NWV03325606003	31	NWV033456100	40
NWV032256060	46	NWV033256061	31	NWV033456101	41
NWV032256080	46	NWV033256062	31	NWV033456102	41
NWV032256100	46				

Catalogue no.	Page	Catalogue no.	Page	Catalogue no.	Page
NW033456103	41	NW036256080	32	NW037056040	118
NW033456120	41	NW036256081	32	NW037056045	118
NW033456121	41	NW036256082	32	NW037056050	118
NW033456122	41	NW036256083	32	NW037056060	118
NW033456123	41	NW036256100	32	NW037056070	118
NW033456163	41	NW036256101	32	NW037056080	118
NW035056060	127	NW036256102	32	NW037056090	118
NW035056080	127	NW036256103	33	NW037056100	118
NW035056100	127	NW036256120	33	NW037056120	118
NW035056120	127	NW036256121	33	NW037056160	118
NW035056160	127	NW036256122	33	NW037056200	119
NW035056200	127	NW036256123	33	NW037355023	130
NW035956040	62	NW036456020	41	NW037355032	130
NW035956050	62	NW036456030	41	NW037355042	130
NW035956060	62	NW036456031	41	NW037355052	130
NW035956080	62	NW036456040	41	NW037355062	130
NW035956100	62	NW036456041	41	NW037355082	130
NW035956120	62	NW036456050	41	NW037355102	130
NW035956140	62	NW036456051	41	NW037355122	130
NW035956160	62	NW036456060	41	NW037355162	130
NW035956200	62	NW036456061	41	NW037455032	132
NW036056060	127	NW036456062	41	NW037455042	132
NW036056080	127	NW036456080	41	NW037455052	132
NW036056100	127	NW036456081	41	NW037455062	132
NW036056120	127	NW036456082	41	NW0374550622	132
NW036056160	127	NW036456083	41	NW037455082	132
NW036056200	127	NW036456100	41	NW0374550822	132
NW036256020	32	NW036456101	41	NW037455102	132
NW036256030	32	NW036456102	41	NW0374551022	132
NW036256031	32	NW036456103	42	NW037455122	132
NW036256040	32	NW036456120	42	NW0374551222	132
NW036256041	32	NW036456121	42	NW037455162	132
NW036256050	32	NW036456122	42	NW0374551622	132
NW036256051	32	NW036456123	42	NW038056030	121
NW036256060	32	NW037056020	118	NW038056040	121
NW036256061	32	NW037056025	118	NW038056050	121
NW0362560611	32	NW037056030	118	NW038056060	121
NW036256062	32	NW037056035	118	NW038056080	121

Catalogue no.	Page
NW038056100	121
NW038056120	121
NW038056160	121
NW038056200	121
NW038445060	125
NW038445061	125
NW038445080	125
NW038445081	125
NW038445100	125
NW038445101	125
NW038445120	125
NW038445121	125
NW038445160	125
NW038445161	126
NW038445200	126
NW038445201	126
NW038456060	125
NW038456061	125
NW038456080	125
NW038456081	125
NW038456100	125
NW038456101	125
NW038456120	125
NW038456121	125
NW038456160	125
NW038456161	125
NW038456200	125
NW038456201	125
NW039056061	121
NW039056081	121
NW039056101	121
NW039056121	121
NW039056161	121
NW039056201	121
NW03944506005	100, 123
NW03944506010	100, 123
NW03944508005	100, 123
NW03944508010	100, 123

Catalogue no.	Page
NW03944510005	100, 123
NW03944510010	100, 123
NW03944512010	100, 123
NW03944512020	100, 123
NW03944516010	100, 123
NW03944516020	100, 123
NW03945606005	123
NW03945606010	123
NW03945608005	123
NW03945608010	123
NW03945610005	123
NW03945610010	123
NW03945612010	123
NW03945612020	123
NW03945616010	123
NW03945616020	123
04	
NW040140010	91
NW040140020	91
NW040140030	91
NW040140040	91
NW040140050	91
NW040140060	91
NW040140080	91
NW040140100	91
NW040140120	91
NW041140010	93
NW041140015	93
NW041140020	93
NW041140030	93
NW041140040	93
NW041140050	93
NW041140060	93
NW041140080	93
NW041247010	95
NW0412470102	96
NW0412470103	96
NW041247015	95

Catalogue no.	Page
NW0412470152	96
NW0412470153	96
NW041247020	95
NW041247021	95
NW0412470212	96
NW0412470214	96
NW041247030	95
NW0412470302	96
NW0412470304	96
NW0412470305	96
NW041247040	95
NW0412470404	96
NW0412470405	96
NW0412470406	96
NW041247041	95
NW041247050	95
NW0412470505	96
NW041247060	95
NW0412470604	96
NW0412470605	96
NW0412470606	96
NW041247080	95
NW0412470804	96
NW0412470805	96
NW0412470807	96
NW041247100	95
NW0412471006	97
NW0412471008	97
NW041247120	95
NW0412471205	97
NW0412471207	97
NW0412471208	97
NW041247160	96
NW0412471605	97
NW0412471606	97
NW0412471607	97
NW0412471608	97
NW041247200	96

Catalogue no.	Page	Catalogue no.	Page	Catalogue no.	Page
NW0412472006	97	NW0432470612	88	NW0452480151	110
NW0412472008	97	NW0432470613	88	NW0452480152	110
NW042247030	95	NW043247080	88	NW04524801520	110
NW042247031	95	NW0432470805	88	NW04524801521	110
NW042247040	95	NW043247081	88	NW0452480200	110
NW042247041	95	NW043247100	88	NW0452480201	111
NW042247042	95	NW043247101	88	NW0452480202	111
NW042247050	95	NW0432471011	88	NW0452480203	111
NW042247060	95	NW0432471014	88	NW0452480204	111
NW042247080	95	NW0432471016	88	NW0452480205	111
NW042247100	95	NW043247120	88	NW045248021	111
NW042247101	95	NW0432471201	88	NW0452480214	111
NW042247120	95	NW0432471206	89	NW0452480301	111
NW042247121	96	NW0432471208	89	NW0453480300	112
NW042247161	96	NW043247160	89	NW0453480302	112
NW042247201	96	NW0432471615	89	NW0453480303	112
NW0423400201	98	NW0432471619	89	NW0453480304	112
NW042340040	98	NW043247200	89	NW0453480305	112
NW042340080	98	NW0432472009	89	NW045348031	112
NW042340100	98	NW044247004	86	NW0453480400	112
NW042340120	98	NW044247006	86	NW04534804001	112
NW042340160	98	NW044247008	86	NW0453480402	112
NW043247020	87	NW044247010	86	NW04534804020	112
NW0432470201	87	NW044247015	86	NW04534804021	112
NW04324702011	86	NW044247020	86	NW0453480403	112
NW043247021	86	NW044247030	86	NW04534804031	112
NW043247030	87	NW044247040	86	NW0453480404	112
NW0432470301	87	NW044247050	87	NW04534804041	112
NW04324703011	86	NW044247060	87	NW0453480405	112
NW043247031	86	NW044247080	87	NW04534804051	112
NW043247040	87	NW044247100	87	NW0453480406	112
NW0432470401	88	NW044247120	87	NW04534804061	112
NW04324704011	86	NW0452480052	110	NW045348050	112
NW043247041	86	NW04524801000	110	NW0453480502	112
NW043247050	88	NW04524801010	110	NW0453480503	112
NW0432470501	88	NW04524801011	110	NW0453480504	112
NW043247060	88	NW0452480102	110	NW045348051	113
NW0432470601	88	NW04524801020	110	NW045348060	113

Catalogue no.	Page	Catalogue no.	Page	Catalogue no.	Page
NVW0453480600	113	NVW0453481210	114	NVW046243100	88
NVW04534806001	113	NVW0453481211	114	NVW0462431002	88
NVW0453480603	113	NVW0453481220	114	NVW046243101	87
NVW04534806030	113	NVW0453481221	114	NVW046243120	88
NVW04534806031	113	NVW045348160	114	NVW0462431203	89
NVW0453480604	113	NVW0453481610	114	NVW046243121	87
NVW04534806041	113	NVW046243010	87	NVW0462431213	87
NVW0453480605	113	NVW046243011	86	NVW046243160	89
NVW04534806051	113	NVW046243015	87	NVW046243161	87
NVW0453480606	113	NVW0462430151	86	NVW046243200	89
NVW04534806061	113	NVW046243020	87	NVW046243201	87
NVW0453480607	113	NVW04624302005	87	NVW047455041	134
NVW04534806071	113	NVW046243021	86	NVW047455061	134
NVW0453480608	113	NVW04624302105	86	NVW0474550611	134
NVW04534806081	113	NVW046243030	87	NVW047455081	134
NVW045348067	113	NVW04624303005	87	NVW0474550811	134
NVW0453480800	113	NVW046243031	86	NVW047455101	134
NVW04534808001	113	NVW04624303105	86	NVW0474551011	134
NVW0453480801	113	NVW046243040	87	NVW047455121	134
NVW04534808011	113	NVW04624304005	88	NVW0474551211	134
NVW0453480810	113	NVW046243041	86	NVW047455162	134
NVW04534808101	113	NVW04624304105	86	NVW0474551621	134
NVW0453480820	113	NVW046243050	88	05	
NVW04534808201	113	NVW04624305005	88	NVW050456030	76
NVW045348083	113	NVW046243051	86	NVW050456040	76
NVW0453481000	113	NVW04624305105	87	NVW050456050	76
NVW0453481001	114	NVW046243060	88	NVW050456060	76
NVW0453481002	114	NVW04624306005	88	NVW050456080	76
NVW0453481009	113	NVW04624306010	88	NVW050456100	76
NVW0453481010	114	NVW046243061	87	NVW050456120	76
NVW0453481011	114	NVW04624306105	87	NVW050456160	76
NVW045348102	114	NVW04624306110	87	NVW050456200	76
NVW0453481021	114	NVW046243080	88	NVW050456250	76
NVW0453481200	114	NVW0462430801	88	NVW051456030	74
NVW0453481201	114	NVW0462430802	88	NVW051456040	74
NVW0453481202	114	NVW046243081	87	NVW051456050	74
NVW0453481209	114	NVW0462430811	87	NVW051456060	74
NVW04534812091	114	NVW0462430812	87	NVW051456080	74

Catalogue no.	Page
NW051456100	74
NW051456120	74
NW051456160	74
NW051456200	74
NW051456250	74
07	
NW072285001	56
NW072285002	56
NW072285003	56
NW072285004	56
NW072285005	56
NW072285006	56
NW072285008	56
NW072285010	56
NW0722850101	56
NW072285015	56
NW0722850151	56
NW07228502002	56
NW07228502005	56
NW07228502102	56
NW07228502105	56
NW07228503002	56
NW07228503005	56
NW07228503102	56
NW07228503105	56
NW07228504002	56
NW07228504005	56
NW07228504102	56
NW07228504105	56
NW07228505002	57
NW07228505005	57
NW07228505102	57
NW07228505105	57
NW07228506002	57
NW07228506005	57
NW07228506010	57
NW07228506102	57
NW07228506105	57

Catalogue no.	Page
NW07228506110	57
NW07228508005	57
NW07228508010	57
NW07228508105	57
NW07228508110	57
NW07228510010	57
NW07228510015	57
NW07228510110	57
NW07228510115	57
NW07228512010	57
NW07228512020	57
NW07228512110	57
NW07228512120	57
11	
NW113256030	18
NW113256031	18
NW113256040	18
NW113256041	19
NW113256050	19
NW113256051	19
NW113256060	19
NW113256061	19
NW113256080	19
NW113256081	19
NW113256100	19
NW113256101	19
NW113256120	19
NW113256121	19
NW113256160	19
NW113256161	19
NW113256200	19
NW113256201	20
NW113446160	26
NW113456030	25
NW113456031	25
NW113456040	25
NW113456041	25
NW113456050	25

Catalogue no.	Page
NW113456051	25
NW113456060	25
NW113456061	25
NW113456080	25
NW113456081	25
NW113456100	25
NW113456101	25
NW113456120	26
NW113456121	26
NW113456160	26
NW113456161	26
NW113456200	26
NW113456201	26
NW114256002	70
NW114256003	70
NW114256004	70
NW114256005	70
NW114256006	70
NW114256008	70
NW114256010	70
NW114256012	70
NW114256015	70
NW114256020	70
NW1162560041	22
NW116256010	22
NW1162560101	22
NW116256015	22
NW116256020	22
NW116256021	22
NW116256025	22
NW116256030	22
NW116256031	22
NW116256040	22
NW1162560401	22
NW116256041	22
NW116256050	22
NW116256051	22
NW116256060	22

Catalogue no.	Page
NW116256061	22
NW116256080	22
NW116256081	22
NW116256100	22
NW116256101	22
NW116256121	22
NW116456030	28
NW116456031	28
NW116456040	28
NW116456041	28
NW116456050	28
NW116456051	28
NW116456060	28
NW116456061	28
NW116456080	28
NW116456081	28
NW116456100	28
NW116456101	28
NW1192850033	53
NW1192850041	53
NW1192850042	53
NW1192850043	53
NW1192850051	53
NW1192850052	53
NW1192850053	53
NW1192850061	53
NW1192850062	53
NW1192850063	53
NW1192850081	53
NW1192850082	53
NW1192850083	53
NW1192850101	53
NW1192850102	53
NW1192850103	53
NW1192850151	53
NW1192850152	54
NW1192850153	54
NW1192850154	54

Catalogue no.	Page
NW1192850201	54
NW1192850202	54
NW1192850203	54
NW1192850204	54
NW1192850302	54
NW1192850303	54
NW1192850304	54
NW1192850305	54
NW1192850402	54
NW1192850403	54
NW1192850404	54
NW1192850405	54
NW1192850502	54
NW1192850503	54
NW1192850504	54
NW1192850505	54
NW1192850602	54
NW1192850603	54
NW1192850604	54
NW1192850605	54
12	
NW1222560041	18
NW1222560051	18
NW1222560061	18
NW1222560081	18
NW1222560101	18
NW122256011	18
NW1222560121	18
NW1222560151	18
NW1222560152	18
NW1222560161	18
NW1222560181	18
NW1222560201	18
NW122256021	18
NW122256030	18
NW1222560301	18
NW122256040	18
NW1222560401	18

Catalogue no.	Page
NW122256050	19
NW122256060	19
NW122256080	19
NW122256100	19
NW122256120	19
NW122256160	19
NW122256200	19
NW122456020	25
NW122456030	25
NW1224560301	25
NW122456040	25
NW122456050	25
NW122456060	25
NW1224560601	25
NW122456080	25
NW122456100	25
NW1224561001	25
NW122456120	25
NW1224561201	26
NW122456160	26
NW122456200	26
NW123256010	18
NW123256020	18
NW123256030	18
NW123256040	19
NW123256050	19
NW123256055	19
NW123256060	19
NW123256080	19
NW123256100	19
NW123256120	19
NW123256160	19
NW123256200	19
13	
NW131259011	67
NW131259016	67
NW131259021	67
NW131259031	67

Catalogue no.	Page
NW131259041	67
NW131259051	67
NW131259061	67
NW131259081	67
NW131259101	67
NW131259121	67
NW131359011	66
NW131359016	66
NW131359021	66
NW131359031	66
NW131359041	66
NW131359051	66
NW131359061	66
NW131359081	66
NW131359101	66
NW131359121	66
NW132256020	20
NW132256030	20
NW132256040	20
NW132256050	20
NW132256060	20
NW132256080	20
NW132256100	20
NW132256120	20
NW132256160	20
NW132456020	26
NW132456030	26
NW132456040	26
NW132456050	26
NW132456060	26
NW132456061	26
NW132456080	26
NW132456100	26
NW132456120	26
NW132456160	26
NW132456200	26
NW134256030	24
NW134256040	24

Catalogue no.	Page
NW134256050	24
NW134256060	24
NW134256080	24
NW134256100	24
NW134256120	24
NW136256020	36
NW136256030	36
NW136256040	36
NW136256050	36
NW136256060	36
NW136256080	36
NW136256100	36
NW136256120	36
NW136256160	36
14	
NW141247010	82
NW141247015	82
NW141247020	82
NW141247021	82
NW141247030	82
NW141247040	82
NW141247050	82
NW141247060	83
NW141247080	83
NW141247100	83
NW141247120	83
NW141247140	84
NW141247160	84
NW141247180	84
NW141247200	84
NW142247020	82
NW142247030	82
NW142247031	82
NW142247040	82
NW142247041	82
NW1422470501	82
NW1422470511	82
NW142247060	83

Catalogue no.	Page
NW142247061	83
NW142247080	83
NW142247081	83
NW142247100	83
NW142247101	83
NW142247120	83
NW142247121	83
NW142247140	84
NW142247141	84
NW142247160	84
NW142247161	84
NW142247201	84
NW1432470101	80
NW1432470102	80
NW1432470103	80
NW1432470104	80
NW1432470105	80
NW1432470106	80
NW1432470152	80
NW1432470153	80
NW1432470154	80
NW1432470155	80
NW1432470156	80
NW1432470212	80
NW1432470213	80
NW1432470214	80
NW14324702141	80
NW1432470215	80
NW14324702151	80
NW1432470253	80
NW1432470254	80
NW14324702551	80
NW1432470302	80
NW1432470304	80
NW1432470305	80
NW1432470306	81
NW1432470402	81
NW1432470404	81

Catalogue no.	Page	Catalogue no.	Page	Catalogue no.	Page
NW1432470405	81	NW1452480302	106	NW1453482000	108
NW1432470406	81	NW1452480303	106	NW1453482010	108
NW1432470604	81	NW1452480304	106	NW146243004	82
NW1432470605	81	NW1452480305	106	NW146243010	82
NW1432470606	81	NW1452480306	106	NW146243015	82
NW1432470607	81	NW1452480402	106	NW146243020	82
NW1432470608	81	NW1452480403	106	NW146243025	82
NW14324708051	81	NW1452480404	106	NW146243030	82
NW1432470807	81	NW1452480405	106	NW146243040	82
NW1432470808	81	NW1452480406	106	NW146243050	82
NW1432471006	81	NW1452480502	106	NW146243060	82
NW1432471007	81	NW1452480503	106	NW146243080	83
NW1432471008	81	NW1452480504	106	NW146243090	83
NW1432471009	81	NW1452480601	106	NW146243100	83
NW1432471206	81	NW1452480603	106	NW146243120	83
NW1432471207	81	NW1452480604	106	NW146243140	84
NW1432471208	81	NW1452480605	106	NW146243160	84
NW1432471209	81	NW1452480606	106	NW146243180	84
NW1432471609	81	NW1452480607	106	NW146243200	84
NW1432472009	81	NW1452480608	106	NW1462490031	104
NW1452480050	105	NW1452480800	106	NW1462490041	104
NW14524800510	105	NW1452480801	106	NW1462490051	104
NW1452480052	105	NW1452480802	107	NW1462490061	104
NW145248010	105	NW145248081	107	NW1462490081	104
NW14524801000	105	NW145248082	107	NW146249011	104
NW1452480101	105	NW1452481009	107	NW1462490151	104
NW1452480102	105	NW1452481010	107	NW146249021	104
NW1452480103	105	NW1452481209	107	NW146249031	104
NW14524801510	105	NW1452481210	107	NW1462490411	104
NW1452480152	105	NW1452481220	107	NW1462490511	104
NW1452480153	105	NW1453481009	108	NW1462490611	104
NW1452480200	105	NW1453481010	108	NW1462490614	104
NW1452480201	105	NW1453481020	108	NW1462490811	104
NW1452480202	105	NW1453481209	108	NW1462491001	104
NW1452480203	105	NW1453481210	108	NW14723081	83
NW1452480204	105	NW1453481220	108	NW147243041	82
NW1452480205	105	NW1453481610	108	NW147243051	82
NW1452480301	105	NW145348162	108	NW147243060	83

Catalogue no.	Page
NW147243061	83
NW147243080	83
NW147243081	83
NW147243101	83
NW147243121	83
NW147243141	84
NW147243161	84
NW147243181	84
NW147243201	84
17	
NW172285001	52
NW172285002	52
NW172285003	52
NW172285004	52
NW172285005	52
NW172285006	52
NW172285008	52
NW172285010	52
NW1722850101	52
NW172285015	52
NW1722850151	52
NW172285020	52
NW1722850201	52
NW172285030	52
NW1722850301	52
NW172285040	52
NW1722850401	52
NW172285050	52
NW1722850501	52
NW172285060	52
NW1722850601	52
NW172285080	52
NW1722850801	52
NW172285100	53
NW1722851001	53
NW172285120	53
NW1722851201	53
NW172285160	53

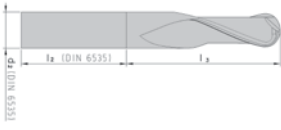
Catalogue no.	Page
NW1722851601	53
A-Z	
SW025345030	98
SW025345040	98
SW025345050	98
SW025345060	98
SW025345080	98
SW025345100	98
SW025345120	98
SW025345160	98
SW03625610061	32
SW03625612370	33
SW043247101135	88
SW04524800403	110
SW04524800404	110
SW04524800503	110
SW04524800603	110
SW04524800604	110
SW04524800803	110
SW04524800804	110
SW0452480152	110
SW04524801521	110
SW0452480154	110
SW0452480202	110
SW04534806073	113
SW04534810102	114
SW116256034	22
SW14524800403	105
SW14524800404	105
SW14524800503	105
SW14524800504	105
SW14524800603	105
SW14524800604	105
SW14524800803	105
SW14524800804	105

QUICKFINDER

General-purpose tolerances for Solid Carbide End Mills

Type	d_1	d_2	r
FGT	h_8	h_5	+/- 0,005
CGT	+0 / -0,12	h_6	
UGT / HGT	e_8	h_6	+0,02 / -0,025 / -0,035
Ball nose- and corner radius end mills	f_8	h_6	f_8
straight face	e_8	h_6	


Theoretical d_2 and l_2 :

	diam. of shank (DIN 6535) d_2 h_5	2 - 5	6 + 8	10	12 + 14	16 + 18
	length of shank (DIN 6535) l_2 $\begin{smallmatrix} +2 \\ -0 \end{smallmatrix}$	28	36	40	45	48
	diam. of shank (DIN 6535) d_2 h_5	20	25	32 + 36		
	length of shank (DIN 6535) l_2 $\begin{smallmatrix} +2 \\ -0 \end{smallmatrix}$	50	56	60		
*this usable length appears through deduction of the DIN-shank-length (l2 according to DIN 6535) from the overall length l1 of the end mill or of the solid carbide adapters. See table above.						

Dimensions according DIN

d_1 = cutting diameter	d_2 = diameter of shank	d_3 = working depth diameter (neck)	r = radius
l_1 = total length	l_2 = cutting length	l_3 = working depth length	z = number of teeth

Features:

 toric tool	 clamping flat
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Tip:

CAM-Data of all listed Solid carbide End Mills are available in the product data base on our website www.pokolm.de/en/vollhartmetallfraeser. The QR-Code is the quickest way to our website.





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