

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

Pokolm
Frästechnik GmbH & Co. KG

Adam-Opel-Straße 5
33428 Harsewinkel
Germany

fon: +49 5247 9361-0

fax: +49 5247 9361-99

E-Mail: info@pokolm.com

Internet: www.pokolm.com

WWW.POKOLM.COM

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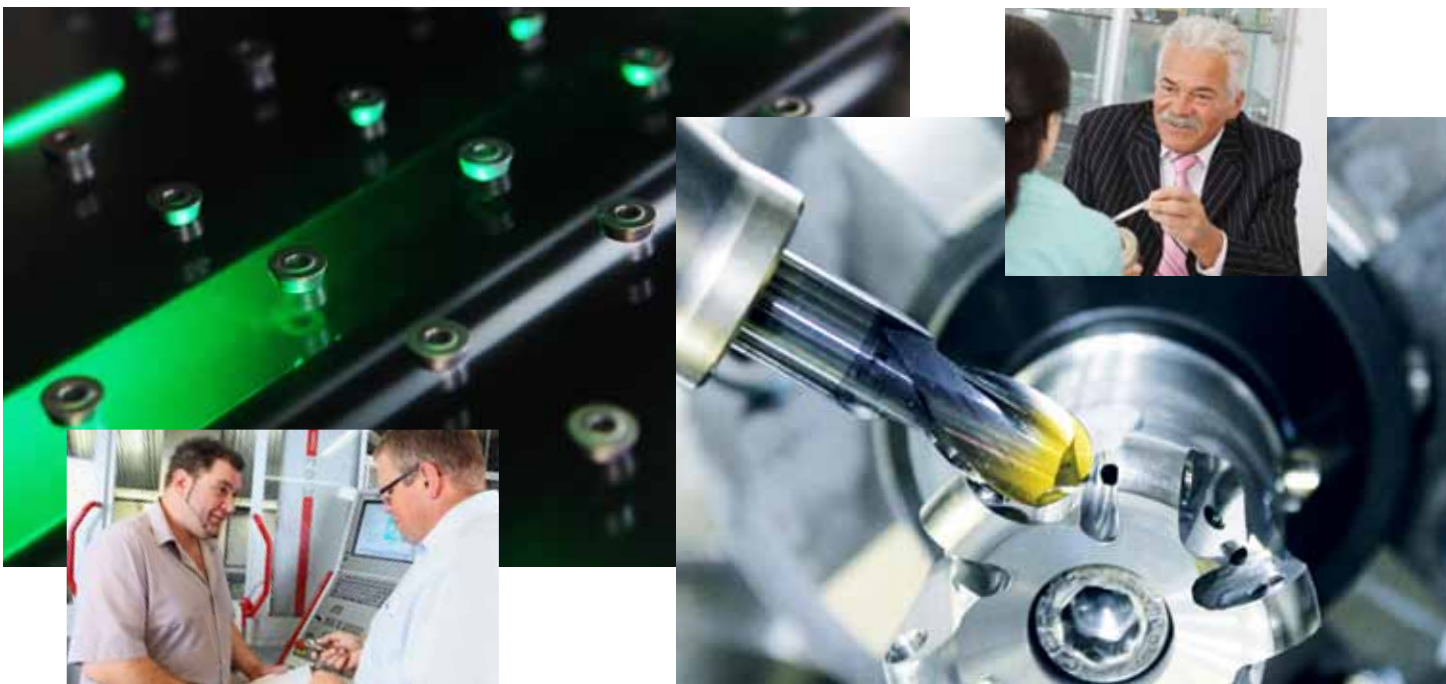
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BENEFIT FROM OUR SUCCESS STORY

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.

SOLID CARBIDE END MILLS

PRODUCT OVERVIEW

PAGE 1/2

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

Major application

-  roughing
-  pre-finishing
-  finishing

Minor application

-  roughing
-  pre-finishing
-  finishing

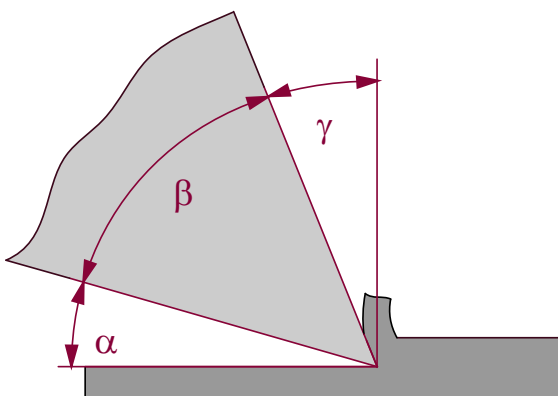
Machining modes

-  plunging
-  chamfering
-  face milling
-  circular milling
-  axial plunging
-  slotting
-  pocketing
-  square shoulder milling
-  tapping
-  cladding

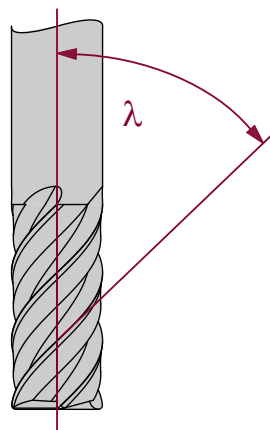
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 **pokorm**
PRECISION IN TOOLING

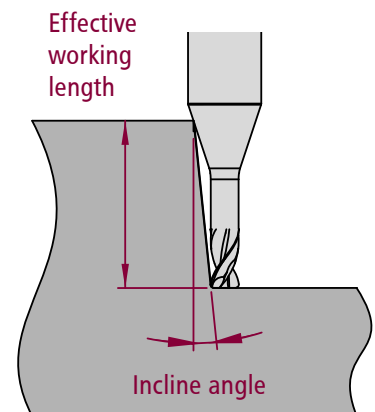
- ① Cutter group
- ② Cutter shape
- ③ Types of machining
- ④ Example photo
- ⑤ Available designs with page references
- ⑥ Material to be machined
- ⑦ Key



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!

[illegible]

- 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 (f_z) and d.o.c. - depth of cut (a_p)
- 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



+49 5247 9361-0



+49 5247 9361-99



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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

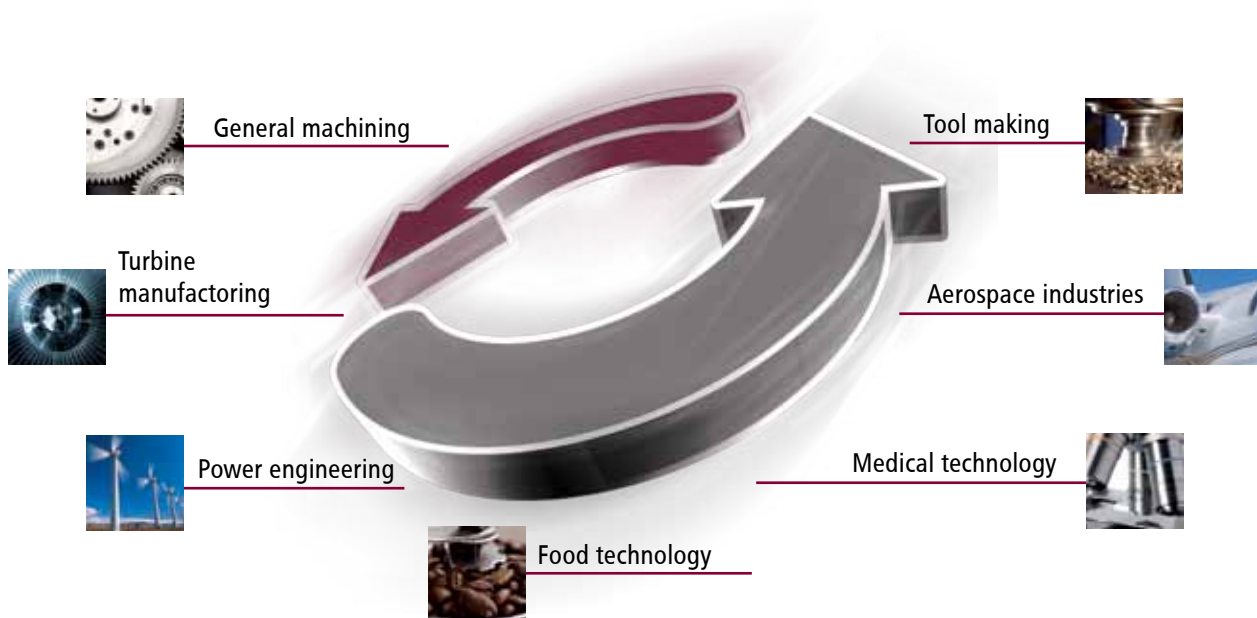
from page 148

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.

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

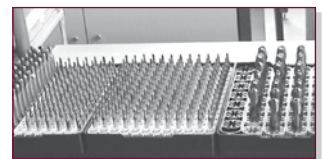
Minor application

-  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
Frästechnik GmbH**

Adam-Opel-Straße 5
33428 Harsewinkel
Germany

fon: +49 5247 9361-0
fax: +49 5247 9361-99

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



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

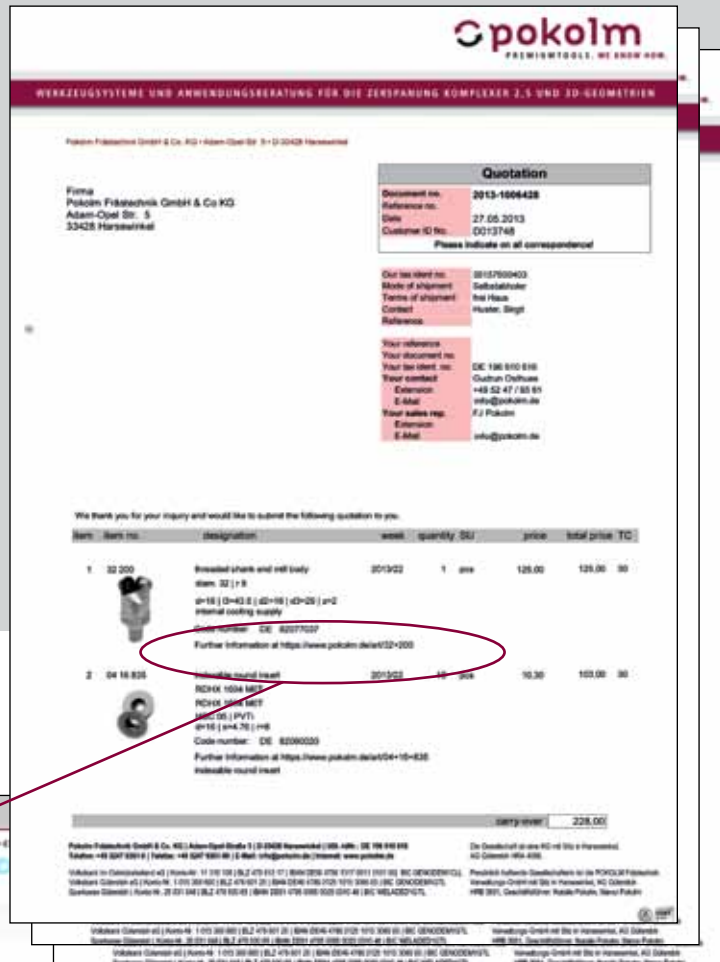
Machining modes

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

Your electronic quotation per 'click'

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

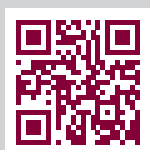
- All you need is internet connection!



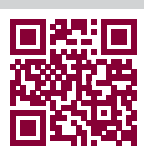
THE POKOLM BOX – THE INNOVATIVE CATALOGUE-SYSTEM



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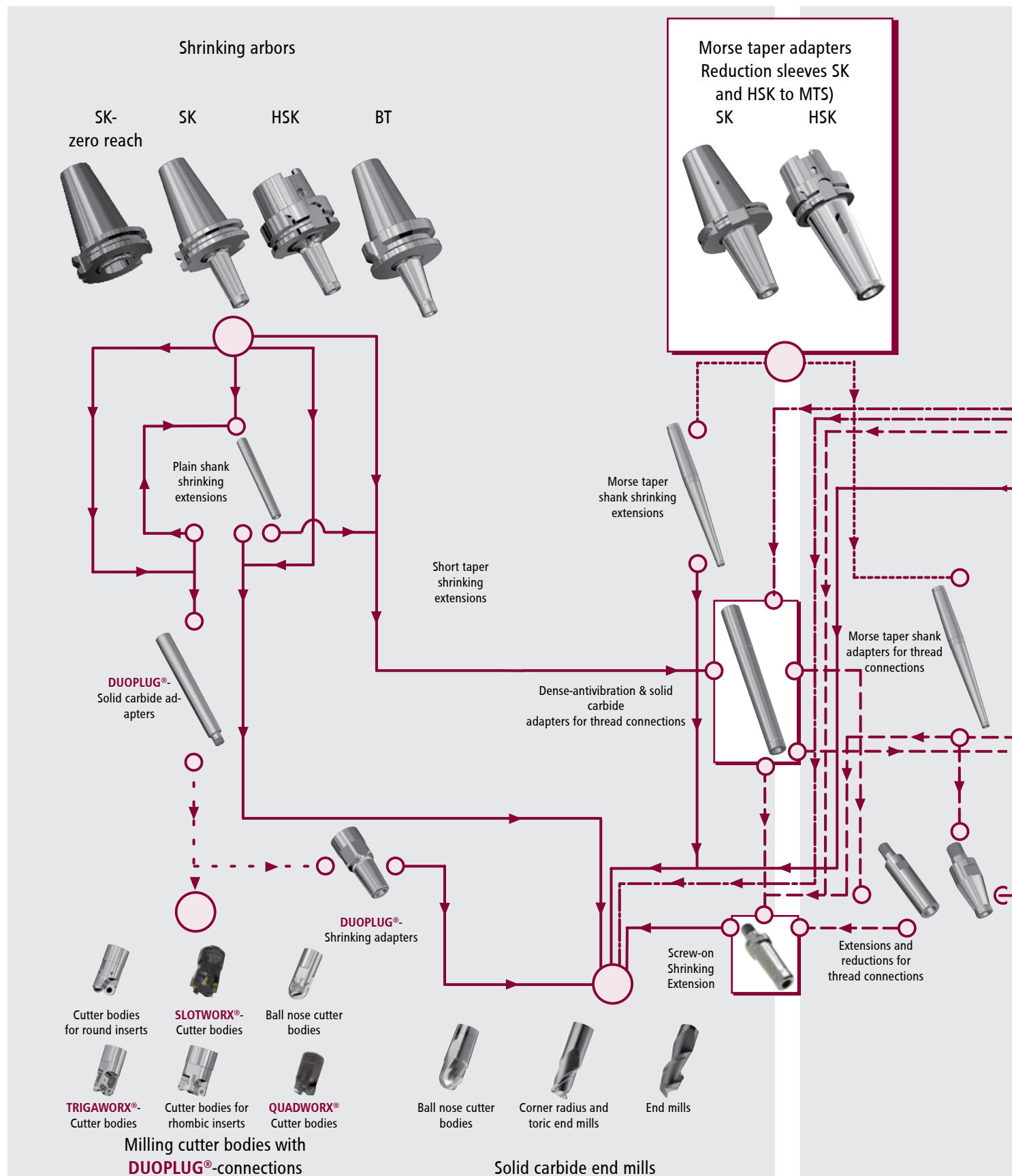


youtube.com



THE POKOLM TOOL SYSTEM

over 500000 combination possibilities

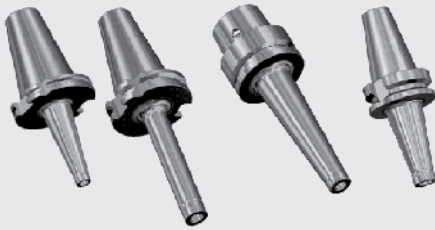


—————	Shrinking combinations	—————
- - - - -	Morse taper combinations	- - - - -
—————	Thread connected combinations	—————
- - - - -	Shell-type combinations	- - - - -
—————	ER-Collet combinations	—————
- - - - -	DUOPLUG® -combinations	- - - - -

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

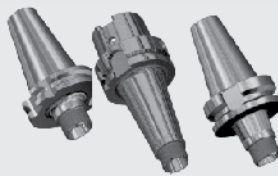
Arbors for thread connections

SK HSK BT



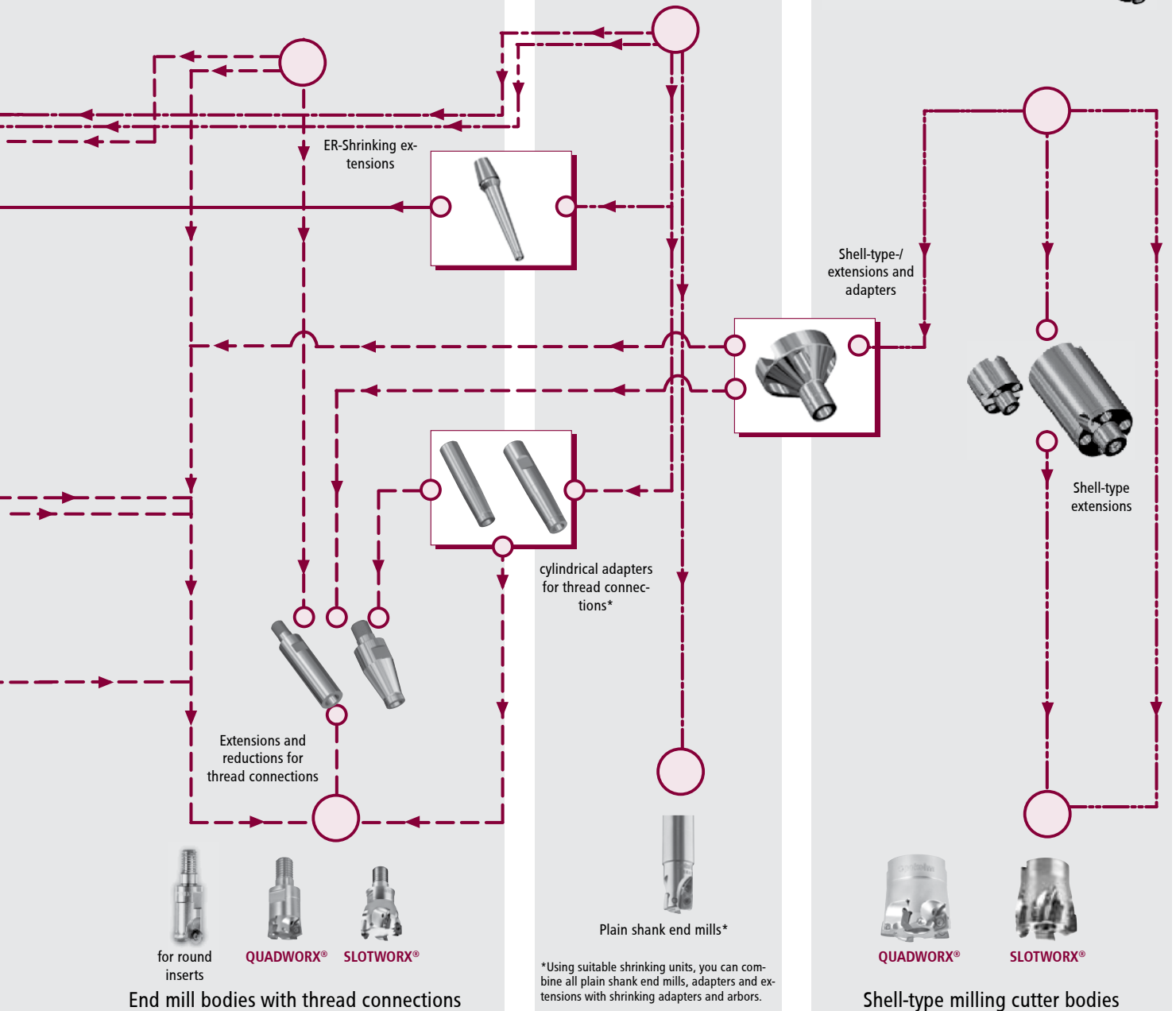
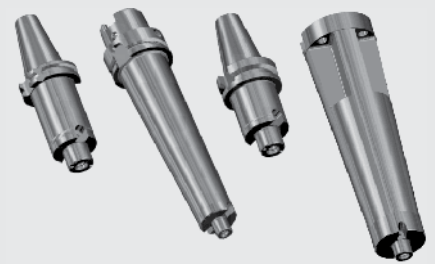
ER-Collet chucks arbors

SK HSK BT



Arbors for shell-type milling cutter bodies

SK HSK BT Direct spindle mounting



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

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

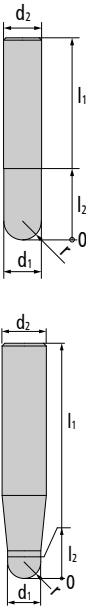


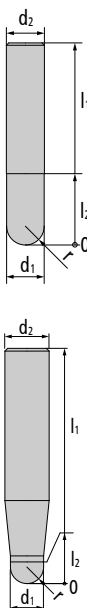
END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

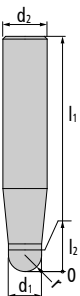
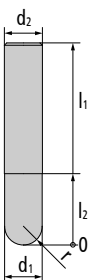
Ball nose end mills | 2 flutes

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

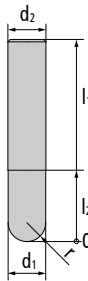
Ball nose end mills		catalogue no.											Effective working length at X° of draft					γ (chip angle) λ (helix angle) Features Q/C			
			d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						
			no wd. short long extra long																		
	NW 1222 56 0041	0.4	0.6	-	-	50	0.2	4	2	0.84	0.97	1.08	1.19	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 56 011	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)		Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°	λ	(helix angle)				
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		

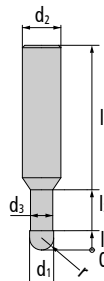


Ball nose end mills	catalogue no.													Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	QC
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°								

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) a _p (mm)	0.005-0.0125 0.005-0.055	-	0.005-0.02 0.01-0.1	-	-	0.005-0.015 0.005-0.05
1-2	f _z (mm) a _p (mm)	0.01-0.025 0.05-0.13	-	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)	0.08-0.15 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
16	f _z (mm) a _p (mm)	0.1-0.25 0.2-1.6	-	0.1-0.25 0.3-1.6	-	-	0.08-0.25 0.2-0.8
20	f _z (mm) a _p (mm)	0.1-0.25 0.2-2	-	0.1-0.25 0.3-2	-	-	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

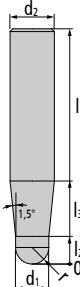


END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

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							
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	f _z (mm) a _p (mm)	0.005-0.0125 0.005-0.055	-	0.005-0.02 0.01-0.1	-	-	0.005-0.015 0.005-0.05
1-2.5	f _z (mm) a _p (mm)	0.01-0.025 0.05-0.13	-	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)	0.08-0.15 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	 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																			
	NV 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	
	NV 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	
	NV 1342 56 050	5	6	20	4.8	100	2.5	6	2	20.35	20.51	20.67	-	-	8	-1		MGC PVTi	
	NV 1342 56 060	6	7	24	5.8	100	3	6	2	-	-	-	-	-	8	-1		MGC PVTi	
	NV 1342 56 080	8	9	32	7.8	100	4	8	2	-	-	-	-	-	8	-1		MGC PVTi	
	NV 1342 56 100	10	11	40	9.8	125	5	10	2	-	-	-	-	-	8	-1		MGC PVTi	
	NV 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

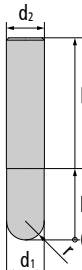
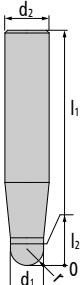
END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

Ball nose end mills | 4 flutes

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

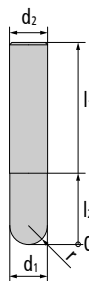
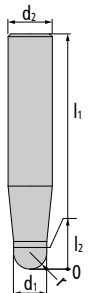
- center cutting end mill
- ball nose
- short | long | extra long version
- with and without clearance between shank and flute



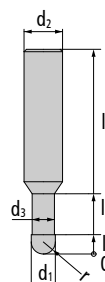
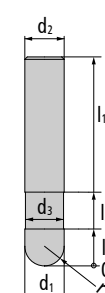
Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						
no wd. short long extra long																				
 	NV 1224 56 020	2	3	-	-	57	1	6	4	3.46	3.68	3.87	4.03	4.31	9	30		MGC PVTi		
	NV 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		
	NV 1224 56 0301	3	6	-	-	57	1.5	6	4	6.67	6.97	7.22	7.44	7.92	9	30		MGC PVTi		
	NV 1134 56 030	3	30	-	-	60	1.5	3	4	-	-	-	-	-	8	30		MGC PVTi		
	NV 1134 56 031	3	30	-	-	75	1.5	3	4	-	-	-	-	-	8	30		MGC PVTi		
	NV 1224 56 040	4	6	-	-	57	2	6	4	6.64	6.93	7.16	7.36	7.80	9	30		MGC PVTi		
	NV 1134 56 040	4	30	-	-	60	2	4	4	-	-	-	-	-	8	30		MGC PVTi		
	NV 1134 56 041	4	30	-	-	75	2	4	4	-	-	-	-	-	8	30		MGC PVTi		
	NV 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		
	NV 1134 56 050	5	35	-	-	70	2.5	5	4	-	-	-	-	-	8	30		MGC PVTi		
	NV 1134 56 051	5	40	-	-	100	2.5	5	4	-	-	-	-	-	8	30		MGC PVTi		
	NV 1224 56 060	6	9	-	-	57	3	6	4	-	-	-	-	-	9	30		MGC PVTi		
	NV 1224 56 0601	6	12	-	-	57	3	6	4	-	-	-	-	-	9	30		MGC PVTi		
	NV 1134 56 060	6	40	-	-	100	3	6	4	-	-	-	-	-	8	30		MGC PVTi		
	NV 1134 56 061	6	50	-	-	150	3	6	4	-	-	-	-	-	8	30		MGC PVTi		
	NV 1224 56 080	8	12	-	-	63	4	8	4	-	-	-	-	-	9	30		MGC PVTi		
	NV 1134 56 080	8	40	-	-	100	4	8	4	-	-	-	-	-	8	30		MGC PVTi		
	NV 1134 56 081	8	50	-	-	150	4	8	4	-	-	-	-	-	8	30		MGC PVTi		
	NV 1224 56 100	10	15	-	-	72	5	10	4	-	-	-	-	-	9	30		MGC PVTi		
	NV 1224 56 1001	10	20	-	-	72	5	10	4	-	-	-	-	-	9	30		MGC PVTi		
	NV 1134 56 100	10	45	-	-	100	5	10	4	-	-	-	-	-	8	30		MGC PVTi		
	NV 1134 56 101	10	60	-	-	150	5	10	4	-	-	-	-	-	8	30		MGC PVTi		
	NV 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	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 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							
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)	0.01-0.025 0.05-0.13	-	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)	0.08-0.15 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
16	f _z (mm) a _p (mm)	0.1-0.25 0.2-1.6	-	0.1-0.25 0.3-1.6	-	-	0.08-0.25 0.2-0.8
20	f _z (mm) a _p (mm)	0.1-0.25 0.2-2	-	0.1-0.25 0.3-2	-	-	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

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							
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)	0.08-0.15	-	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

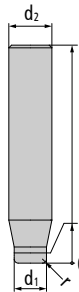
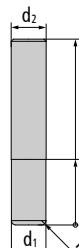


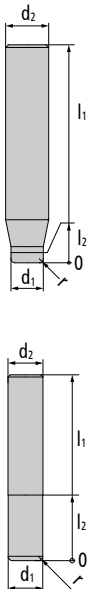
END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

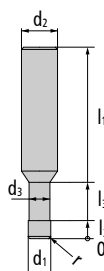
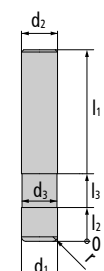
Toric / corner radius end mills | 2 flutes

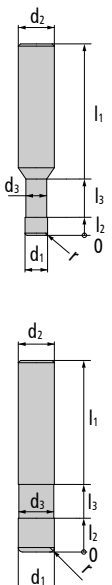
2 flutes, plain shank, 30° right hand helix angle

- 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																				
 	NVW 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		
	NVW 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		
	NVW 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		
	NVW 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		
	NVW 0332 56 02002	2	3	-	-	50	0.2	4	2	3.54	3.79	3.99	4.17	4.50	9	30		MGC PVTi		
	NVW 0332 56 02003	2	3	-	-	50	0.3	4	2	3.53	3.78	3.98	4.15	4.48	9	30		MGC PVTi		
	NVW 0332 56 020	2	3	-	-	50	0.5	4	2	3.51	3.75	3.95	4.12	4.43	9	30		MGC PVTi		
	NVW 0172 56 020	2	3	-	-	57	0.6	6	2	3.50	3.74	3.93	4.10	4.41	2	30		MGC PVTi		
	NVW 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		
	NVW 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		
	NVW 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		
	NVW 0332 56 031	3	4.5	-	-	50	1	4	2	5.10	5.37	5.59	5.78	6.18	9	30		MGC PVTi		
	NVW 0332 56 0311	3	4.5	-	-	57	1	6	2	5.10	5.37	5.59	5.78	6.18	9	30		MGC PVTi		
	NVW 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		
	NVW 0332 56 040	4	6	-	-	50	0.5	4	2	-	-	-	-	-	9	30		MGC PVTi		
	NVW 0332 56 0401	4	6	-	-	57	0.5	6	2	6.74	7.07	7.33	7.58	8.16	9	30		MGC PVTi		
	NVW 0332 56 041	4	6	-	-	50	1	4	2	-	-	-	-	-	9	30		MGC PVTi		
	NVW 0332 56 0411	4	6	-	-	57	1	6	2	6.70	7.02	7.27	7.51	8.04	9	30		MGC PVTi		
	NVW 0172 56 040	4	6	-	-	57	1.5	6	2	6.67	6.97	7.22	7.44	7.92	2	30		MGC PVTi		
	NVW 0332 56 05002	5	7.5	-	-	57	0.2	6	2	8.34	8.71	9.02	9.35	-	9	30		MGC PVTi		
	NVW 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		
	NVW 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
no wd. short		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°	9	30				
	NV 0332 56 06003	6	9	-	-	57	0.3	6	2	-	-	-	-	-	9	30			MGC PVTi	
	NV 0332 56 060	6	9	-	-	57	0.5	6	2	-	-	-	-	-	9	30			MGC PVTi	
	NV 0332 56 061	6	9	-	-	57	1	6	2	-	-	-	-	-	9	30			MGC PVTi	
	NV 0332 56 062	6	9	-	-	57	1.5	6	2	-	-	-	-	-	9	30			MGC PVTi	
	NV 0172 56 060	6	9	-	-	57	2	6	2	-	-	-	-	-	2	30			MGC PVTi	
	NV 0172 56 061	6	9	-	-	57	2.5	6	2	-	-	-	-	-	2	30			MGC PVTi	
	NV 0332 56 080	8	12	-	-	63	0.5	8	2	-	-	-	-	-	9	30			MGC PVTi	
	NV 0332 56 081	8	12	-	-	63	1	8	2	-	-	-	-	-	9	30			MGC PVTi	
	NV 0332 56 082	8	12	-	-	63	1.5	8	2	-	-	-	-	-	9	30			MGC PVTi	
	NV 0332 56 083	8	12	-	-	63	2	8	2	-	-	-	-	-	9	30			MGC PVTi	
	NV 0172 56 080	8	12	-	-	63	2.5	8	2	-	-	-	-	-	2	30			MGC PVTi	
	NV 0332 56 100	10	15	-	-	72	0.5	10	2	-	-	-	-	-	9	30			MGC PVTi	
	NV 0332 56 101	10	15	-	-	72	1	10	2	-	-	-	-	-	9	30			MGC PVTi	
	NV 0332 56 102	10	15	-	-	72	1.5	10	2	-	-	-	-	-	9	30			MGC PVTi	
	NV 0332 56 103	10	15	-	-	72	2	10	2	-	-	-	-	-	9	30			MGC PVTi	
	NV 0172 56 100	10	15	-	-	72	2.5	10	2	-	-	-	-	-	2	30			MGC PVTi	
	NV 0172 56 101	10	15	-	-	72	3	10	2	-	-	-	-	-	2	30			MGC PVTi	
	NV 0172 56 103	10	15	-	-	72	4	10	2	-	-	-	-	-	2	30			MGC PVTi	
	NV 0332 56 120	12	18	-	-	83	0.5	12	2	-	-	-	-	-	9	30			MGC PVTi	
	NV 0332 56 1206	12	18	-	-	83	0.6	12	2	-	-	-	-	-	9	30			MGC PVTi	
	NV 0332 56 121	12	18	-	-	83	1	12	2	-	-	-	-	-	9	30			MGC PVTi	
	NV 0332 56 122	12	18	-	-	83	1.5	12	2	-	-	-	-	-	9	30			MGC PVTi	
	NV 0332 56 123	12	18	-	-	83	2	12	2	-	-	-	-	-	9	30			MGC PVTi	
	NV 0172 56 121	12	18	-	-	83	3	12	2	-	-	-	-	-	2	30			MGC PVTi	
	NV 0172 56 123	12	18	-	-	83	4	12	2	-	-	-	-	-	2	30			MGC PVTi	
	NV 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°
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					
	SW 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																			
	NW 0362 56 103	10	15	31	9.8	100	2	10	2	-	-	-	-	-	9	30		MGC PVTi	
	NW 0182 56 100	10	15	31	9.8	100	2.5	10	2	-	-	-	-	-	1	30		MGC PVTi	
	NW 0182 56 101	10	15	31	9.8	100	3	10	2	-	-	-	-	-	1	30		MGC PVTi	
	NW 0182 56 103	10	15	31	9.8	100	4	10	2	-	-	-	-	-	1	30		MGC PVTi	
	NW 0362 56 120	12	18	37	11.8	110	0.5	12	2	-	-	-	-	-	9	30		MGC PVTi	
	NW 0362 56 121	12	18	37	11.8	110	1	12	2	-	-	-	-	-	9	30		MGC PVTi	
	NW 0362 56 122	12	18	37	11.8	110	1.5	12	2	-	-	-	-	-	9	30		MGC PVTi	
	NW 0362 56 123	12	18	37	11.8	110	2	12	2	-	-	-	-	-	9	30		MGC PVTi	
	SVW 0362 56 12370	12	18	37	11.8	110	2	12	2	-	-	-	-	-	9	30		MGC PVTi	
	NW 0182 56 123	12	18	37	11.8	110	4	12	2	-	-	-	-	-	1	30		MGC PVTi	
	NW 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		steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
Diameter	Feed per tooth d.o.c.						
copy milling 3D							
0.5	f _z (mm) a _p (mm)	0.005-0.02 0.005-0.1	-	0.005-0.02 0.01-0.1	-	-	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 0.06-0.2	-	-	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

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) 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

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																		
	NV 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
	NV 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
	NV 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
	NV 1362 56 050	5	5	20	4.8	100	1.25	6	2	20.27	20.44	-	-	-	6	-1		MGC PVTi
	NV 1362 56 060	6	6	24	5.8	100	1.5	6	2	-	-	-	-	-	6	-1		MGC PVTi
	NV 1362 56 080	8	8	32	7.8	100	2	8	2	-	-	-	-	-	6	-1		MGC PVTi
	NV 1362 56 100	10	10	40	9.8	125	2.5	10	2	-	-	-	-	-	6	-1		MGC PVTi
	NV 1362 56 120	12	12	48	11.8	125	3	12	2	-	-	-	-	-	6	-1		MGC PVTi
	NV 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) a_p (mm)	0.01-0.04 0.05-0.2	-	0.01-0.025 0.06-0.13	-	-	0.01 0.04
3-4	f_z (mm) a_p (mm)	0.04-0.07 0.08-0.4	-	0.04-0.055 0.06-0.26	-	-	0.04 0.08
5-6	f_z (mm) a_p (mm)	0.08-0.12 0.1-0.6	-	0.08-0.1 0.12-0.375	-	-	0.08-0.1 0.1-0.2
8	f_z (mm) a_p (mm)	0.08-0.15 0.15-0.8	-	0.08-0.115 0.15-0.525	-	-	0.08-0.1 0.15-0.275
10	f_z (mm) a_p (mm)	0.08-0.15 0.2-1	-	0.08-0.115 0.3-0.65	-	-	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 0.3-0.75	-	-	0.08-0.115 0.2-0.4
16	f_z (mm) a_p (mm)	0.1-0.175 0.2-0.95	-	0.1-0.175 0.3-0.95	-	-	0.08-0.115 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							
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 0.12-0.375	-	-	-
8	f _z (mm) a _p (mm)	0.08-0.15 0.15-0.8	-	0.08-0.115 0.15-0.525	-	-	-
10	f _z (mm) a _p (mm)	0.08-0.15 0.2-1	-	0.08-0.115 0.3-0.65	-	-	-
12	f _z (mm) a _p (mm)	0.08-0.15 0.2-1.2	-	0.08-0.115 0.3-0.75	-	-	-
16	f _z (mm) a _p (mm)	0.1-0.175 0.2-0.95	-	0.1-0.175 0.3-0.95	-	-	-

Cutting speed (Vc in m/min)

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

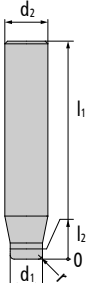
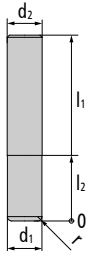


END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

Toric / corner radius end mills | 4 flutes

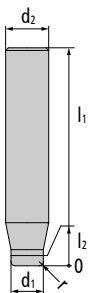
4 flutes, plain shank, 30° right hand helix angle

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

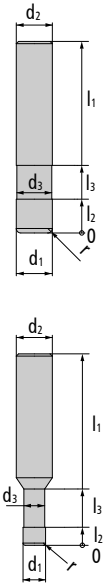
Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						
										no wd. short										
 	NVW 0334 56 02002	2	3	-	-	50	0.2	4	4	3.54	3.79	3.99	4.17	4.50	9	30		MGC PVTi		
	NVW 0334 56 020	2	3	-	-	50	0.5	4	4	3.51	3.75	3.95	4.12	4.43	9	30		MGC PVTi		
	NVW 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		
	NVW 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		
	NVW 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		
	NVW 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		
	NVW 0334 56 031	3	4.5	-	-	50	1	4	4	5.10	5.37	5.59	5.78	6.18	9	30		MGC PVTi		
	NVW 0334 56 04002	4	6	-	-	50	0.2	4	4	-	-	-	-	-	9	30		MGC PVTi		
	NVW 0334 56 040	4	6	-	-	50	0.5	4	4	-	-	-	-	-	9	30		MGC PVTi		
	NVW 0334 56 041	4	6	-	-	50	1	4	4	-	-	-	-	-	9	30		MGC PVTi		
	NVW 0334 56 05002	5	7.5	-	-	57	0.2	6	4	8.34	8.71	9.02	9.35	-	9	30		MGC PVTi		
	NVW 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		
	NVW 0334 56 051	5	7.5	-	-	57	1	6	4	8.30	8.65	8.94	9.23	9.91	9	30		MGC PVTi		
	NVW 0334 56 06002	6	9	-	-	57	0.2	6	4	-	-	-	-	-	9	30		MGC PVTi		
	NVW 0334 56 06003	6	9	-	-	57	0.3	6	4	-	-	-	-	-	9	30		MGC PVTi		
	NVW 0334 56 060	6	9	-	-	57	0.5	6	4	-	-	-	-	-	9	30		MGC PVTi		
	NVW 0334 56 061	6	9	-	-	57	1	6	4	-	-	-	-	-	9	30		MGC PVTi		
	NVW 0334 56 062	6	9	-	-	57	1.5	6	4	-	-	-	-	-	9	30		MGC PVTi		
	NVW 0334 56 080	8	12	-	-	63	0.5	8	4	-	-	-	-	-	9	30		MGC PVTi		
	NVW 0334 56 081	8	12	-	-	63	1	8	4	-	-	-	-	-	9	30		MGC PVTi		
	NVW 0334 56 082	8	12	-	-	63	1.5	8	4	-	-	-	-	-	9	30		MGC PVTi		
	NVW 0334 56 083	8	12	-	-	63	2	8	4	-	-	-	-	-	9	30		MGC PVTi		
	NVW 0334 56 100	10	15	-	-	72	0.5	10	4	-	-	-	-	-	9	30		MGC PVTi		

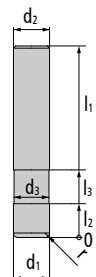
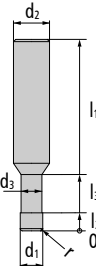
Toric / corner radius end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						

no wd. | short

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

wd. | long

	NV 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
	NV 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
	NV 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
	NV 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
	NV 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
	NV 0364 56 050	5	7.5	15	4.8	75	0.5	6	4	16.53	16.95	17.37	-	-	9	30			MGC PVTi
	NV 0364 56 051	5	7.5	15	4.8	75	1	6	4	16.52	16.92	17.33	-	-	9	30			MGC PVTi
	NV 0364 56 060	6	9	20	5.8	75	0.5	6	4	-	-	-	-	-	9	30			MGC PVTi
	NV 0364 56 061	6	9	20	5.8	75	1	6	4	-	-	-	-	-	9	30			MGC PVTi
	NV 0364 56 062	6	9	20	5.8	75	1.5	6	4	-	-	-	-	-	9	30			MGC PVTi
	NV 0364 56 080	8	12	26	7.8	90	0.5	8	4	-	-	-	-	-	9	30			MGC PVTi
	NV 0364 56 081	8	12	26	7.8	90	1	8	4	-	-	-	-	-	9	30			MGC PVTi
	NV 0364 56 082	8	12	26	7.8	90	1.5	8	4	-	-	-	-	-	9	30			MGC PVTi
	NV 0364 56 083	8	12	26	7.8	90	2	8	4	-	-	-	-	-	9	30			MGC PVTi
	NV 0364 56 100	10	15	31	9.8	100	0.5	10	4	-	-	-	-	-	9	30			MGC PVTi
	NV 0364 56 101	10	15	31	9.8	100	1	10	4	-	-	-	-	-	9	30			MGC PVTi
	NV 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	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 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

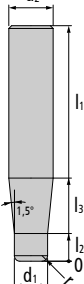
Toric / corner radius end mills | 4 flutes | taper neck

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

- center cutting end mill
- long version
- 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																		
	NVW 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
	NVW 0164 56 031	3	4.5	50	-	100	1	6	4	8.50	16.01	50.87	-	-	9	30		MGC PVTi
	NVW 0164 56 040	4	6	25	-	75	1	6	4	10.75	20.51	26.07	26.56	-	9	30		MGC PVTi
	NVW 0164 56 041	4	6	50	-	100	1	6	4	10.75	20.51	-	-	-	9	30		MGC PVTi
	NVW 0164 56 050	5	7.5	25	-	75	1	6	4	13.75	25.34	-	-	-	9	30		MGC PVTi
	NVW 0164 56 051	5	7.5	50	-	90	1	8	4	13.75	26.51	51.21	-	-	9	30		MGC PVTi
	NVW 0164 56 052	5	6	25	-	75	1.5	6	4	-	-	-	-	-	9	30		MGC PVTi
	NVW 0164 56 060	6	9	35	-	75	1	8	4	16.00	31.01	36.30	-	-	9	30		MGC PVTi
	NVW 0164 56 061	6	9	50	-	100	1	10	4	16.00	31.01	51.21	52.00	-	9	30		MGC PVTi
	NVW 0164 56 080	8	12	50	-	100	2	10	4	20.00	38.03	-	-	-	9	30		MGC PVTi
	NVW 0164 56 081	8	12	90	-	150	2	12	4	20.00	38.03	-	-	-	9	30		MGC PVTi
	NVW 0164 56 100	10	15	50	-	110	2	12	4	24.50	47.02	-	-	-	9	30		MGC PVTi
	NVW 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) 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

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	

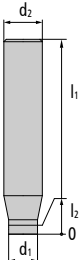
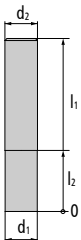
END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

End mills | 2 flutes

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

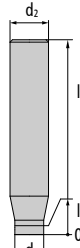
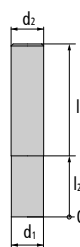
- center cutting end mill
- straight face
- with chamfer
- short | long | extra long version
- with and without clearance between shank and flute



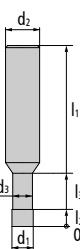
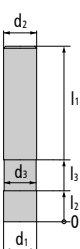
End mills		catalogue no.											Effective working length at X° of draft					γ (chip angle) λ (helix angle) Features Q/C			
			d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°						
no wd. short extra long																					
 	NVW 0222 56 0041	0.4	0.6	-	-	50	-	4	2	0.88	1.02	1.14	1.26	1.47	9	30		MGC PVTi			
	NVW 0222 56 0051	0.5	0.75	-	-	50	-	4	2	1.05	1.21	1.34	1.46	1.68	9	30		MGC PVTi			
	NVW 0222 56 0061	0.6	0.9	-	-	50	-	4	2	1.23	1.39	1.53	1.66	1.89	9	30		MGC PVTi			
	NVW 0222 56 0081	0.8	1.2	-	-	50	-	4	2	1.60	1.75	1.90	2.04	2.29	9	30		MGC PVTi			
	NVW 0222 56 0101	1	1.5	-	-	50	-	4	2	1.91	2.10	2.27	2.41	2.67	9	30		MGC PVTi			
	NVW 0222 56 0152	1.5	2.5	-	-	50	-	4	2	2.74	2.97	3.15	3.32	3.61	9	30		MGC PVTi			
	NVW 0222 56 0151	1.5	2.5	-	-	57	-	6	2	3.01	3.25	3.44	3.62	3.92	9	30		MGC PVTi			
	NVW 0222 56 020	2	3	-	-	50	-	4	2	3.55	3.81	4.02	4.20	4.54	9	30		MGC PVTi			
	NVW 0222 56 022	2	3	-	-	57	-	6	2	3.55	3.81	4.02	4.20	4.54	9	30		MGC PVTi			
	NVW 0222 56 0251	2.5	4	-	-	50	-	4	2	4.63	4.92	5.15	5.35	5.78	9	30		MGC PVTi			
	NVW 0222 56 025	2.5	4	-	-	57	-	6	2	4.63	4.92	5.15	5.35	5.78	9	30		MGC PVTi			
	NVW 0222 56 030	3	4.5	-	-	50	-	4	2	5.17	5.47	5.71	5.93	6.40	9	30		MGC PVTi			
	NVW 0222 56 031	3	4.5	-	-	57	-	6	2	5.17	5.47	5.71	5.93	6.40	9	30		MGC PVTi			
	NVW 0132 56 030	3	30	-	-	60	-	3	2	-	-	-	-	-	8	30		MGC PVTi			
	NVW 0132 56 031	3	30	-	-	75	-	3	2	-	-	-	-	-	8	30		MGC PVTi			
	NVW 0222 56 041	4	6	-	-	50	-	4	2	-	-	-	-	-	9	30		MGC PVTi			
	NVW 0222 56 040	4	6	-	-	57	-	6	2	6.76	7.10	7.38	7.65	8.27	9	30		MGC PVTi			
	NVW 0132 56 040	4	30	-	-	60	-	4	2	-	-	-	-	-	8	30		MGC PVTi			
	NVW 0132 56 041	4	30	-	-	75	-	4	2	-	-	-	-	-	8	30		MGC PVTi			
	NVW 0222 56 050	5	7.5	-	-	57	-	6	2	8.35	8.72	9.04	9.38	-	9	30		MGC PVTi			
	NVW 0132 56 050	5	35	-	-	70	-	5	2	-	-	-	-	-	8	30		MGC PVTi			
	NVW 0132 56 051	5	40	-	-	100	-	5	2	-	-	-	-	-	8	30		MGC PVTi			
	NVW 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) a _p (mm)	0.005-0.01 0.02-0.1	-	0.005-0.01 0.02-0.1	-	-	0.005-0.01 0.02-0.05
1-2.5	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							
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

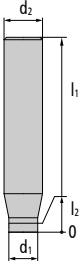
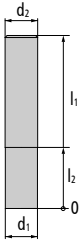


END MILLS FOR STEEL UNIVERSAL UP TO 52 HRC

End mills | 4 flutes

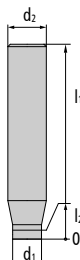
4 flutes, plain shank, 30° right hand helix angle

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

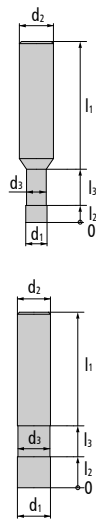
End mills	catalogue no.										Effective working length at X° of draft					γ (chip angle)		λ (helix angle)		Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°	γ	λ					
no wd. short extra long																					
 	NW 0224 56 015	1.5	2.5	-	-	50	-	4	4	3.01	3.25	3.44	3.62	3.92	9	30		MGC	PVTi		
	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							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
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							
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 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

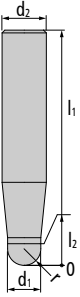
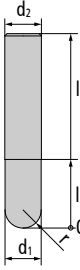


END MILLS FOR STEEL UP TO 58 HRC

Ball nose end mills | 2 flutes

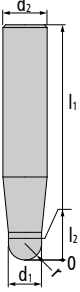
2 flutes, plain shank, right hand helix angle

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

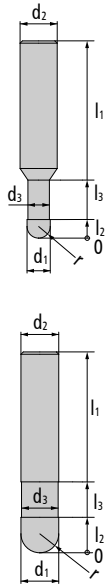
Ball nose end mills	catalogue no.											Effective working length at X° of draft					γ (chip angle)		λ (helix angle)		Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°	γ	λ						
no wd. high precise																						
 	NW 1722 85 001	0.1	0.1	-	-	50	0.05	4	2	0.22	0.32	0.41	0.49	0.67	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			

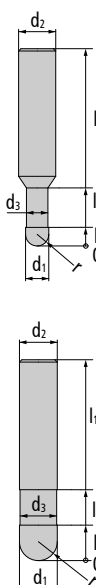
Ball nose end mills	catalogue no.	Effective working length at X° of draft										γ (chip angle)	λ (helix angle)	Features	Q/C
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°				

no wd. | high precise

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

wd. | high precise

	NV 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
	NV 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
	NV 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
	NV 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
	NV 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
	NV 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
	NV 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
	NV 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
	NV 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
	NV 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
	NV 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
	NV 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
	NV 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
	NV 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
	NV 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
	NV 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
	NV 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	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 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				
	NW 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				
	NW 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				
	NW 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				
	NW 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				
	NW 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				
	NW 1192 85 0204	2	2	20	1.95	75	1	4	2	21.25	21.72	22.25	23.29	-	4	20		UMGC PVTiH				
	NW 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				
	NW 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				
	NW 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				
	NW 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				
	NW 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				
	NW 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				
	NW 1192 85 0404	4	4	20	3.9	75	2	6	2	21.30	21.73	22.16	23.15	-	4	20		UMGC PVTiH				
	NW 1192 85 0405	4	4	25	3.9	75	2	6	2	26.43	26.91	27.86	29.14	-	4	20		UMGC PVTiH				
	NW 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				
	NW 1192 85 0503	5	5	15	4.9	57	2.5	6	2	16.15	16.51	16.80	-	-	4	20		UMGC PVTiH				
	NW 1192 85 0504	5	5	20	4.9	75	2.5	6	2	21.29	21.71	-	-	-	4	20		UMGC PVTiH				
	NW 1192 85 0505	5	5	25	4.9	75	2.5	6	2	26.42	26.89	-	-	-	4	20		UMGC PVTiH				
	NW 1192 85 0602	6	6	10	5.85	57	3	6	2	-	-	-	-	-	4	20		UMGC PVTiH				
	NW 1192 85 0603	6	6	15	5.85	57	3	6	2	-	-	-	-	-	4	20		UMGC PVTiH				
	NW 1192 85 0604	6	6	20	5.85	75	3	6	2	-	-	-	-	-	4	20		UMGC PVTiH				
	NW 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							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
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	-	0.005-0.02 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	-	0.01-0.04 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	-	0.04-0.07 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	-	0.08-0.12 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
16	f _z (mm) a _p (mm)	0.1-0.21 0.4-1.6	0.1-0.175 0.3-1.2	0.1-0.21 0.45-1.6	-	0.1-0.175 0.3-1.2	0.08-0.165 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
UMGC PVTiH	roughing finishing	 120 235 350	 110 130 150	 100 250 400	-	 50 65 80	 150 170 190 80 165 250

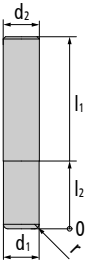
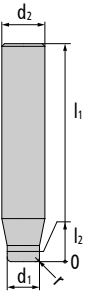


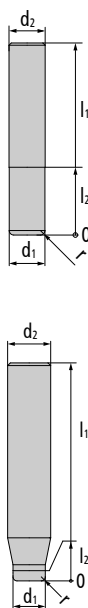
END MILLS FOR STEEL UP TO 58 HRC

Toric / corner radius end mills | 2 flutes

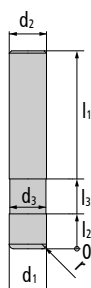
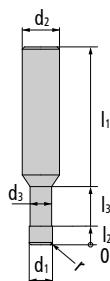
2 flutes, plain shank, right hand helix angle

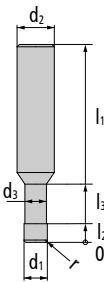
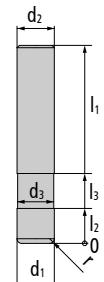
- center cutting end mill
- with and without clearance between shank and flute up to 20 x d
- high precise $r = \pm 0.005$; $d_1 = -0.015$

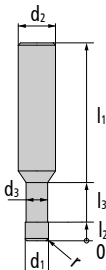
Toric / corner radius end mills		catalogue no.											Effective working length at X° of draft					γ (chip angle) λ (helix angle) Features Q/C			
			d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z											
											0.5°	1°	1.5°	2°	3°						
no wd. high precise																					
 	NW 0722 85 001	0.1	0.1	-	-	50	0.02	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 QC			
		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																				
	NVW 0722 85 05002	5	5	-	-	57	0.2	6	2	5.61	5.87	6.10	6.29	6.61	4	20		UMGC PVTiH		
	NVW 0722 85 05102	5	5	-	-	75	0.2	6	2	5.61	5.87	6.10	6.29	6.61	4	20		UMGC PVTiH		
	NVW 0722 85 05005	5	5	-	-	57	0.5	6	2	5.59	5.86	6.07	6.25	6.56	4	20		UMGC PVTiH		
	NVW 0722 85 05105	5	5	-	-	75	0.5	6	2	5.59	5.86	6.07	6.25	6.56	4	20		UMGC PVTiH		
	NVW 0722 85 06002	6	6	-	-	57	0.2	6	2	-	-	-	-	-	4	20		UMGC PVTiH		
	NVW 0722 85 06102	6	6	-	-	75	0.2	6	2	-	-	-	-	-	4	20		UMGC PVTiH		
	NVW 0722 85 06005	6	6	-	-	57	0.5	6	2	-	-	-	-	-	4	20		UMGC PVTiH		
	NVW 0722 85 06105	6	6	-	-	75	0.5	6	2	-	-	-	-	-	4	20		UMGC PVTiH		
	NVW 0722 85 06010	6	6	-	-	57	1	6	2	-	-	-	-	-	4	20		UMGC PVTiH		
	NVW 0722 85 06110	6	6	-	-	75	1	6	2	-	-	-	-	-	4	20		UMGC PVTiH		
	NVW 0722 85 08005	8	8	-	-	63	0.5	8	2	-	-	-	-	-	4	20		UMGC PVTiH		
	NVW 0722 85 08105	8	8	-	-	90	0.5	8	2	-	-	-	-	-	4	20		UMGC PVTiH		
	NVW 0722 85 08010	8	8	-	-	63	1	8	2	-	-	-	-	-	4	20		UMGC PVTiH		
	NVW 0722 85 08110	8	8	-	-	90	1	8	2	-	-	-	-	-	4	20		UMGC PVTiH		
	NVW 0722 85 10010	10	10	-	-	72	1	10	2	-	-	-	-	-	4	20		UMGC PVTiH		
	NVW 0722 85 10110	10	10	-	-	100	1	10	2	-	-	-	-	-	4	20		UMGC PVTiH		
	NVW 0722 85 10015	10	10	-	-	72	1.5	10	2	-	-	-	-	-	4	20		UMGC PVTiH		
	NVW 0722 85 10115	10	10	-	-	100	1.5	10	2	-	-	-	-	-	4	20		UMGC PVTiH		
	NVW 0722 85 12010	12	12	-	-	83	1	12	2	-	-	-	-	-	4	20		UMGC PVTiH		
	NVW 0722 85 12110	12	12	-	-	110	1	12	2	-	-	-	-	-	4	20		UMGC PVTiH		
	NVW 0722 85 12020	12	12	-	-	83	2	12	2	-	-	-	-	-	4	20		UMGC PVTiH		
	NVW 0722 85 12120	12	12	-	-	110	2	12	2	-	-	-	-	-	4	20		UMGC PVTiH		

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°	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



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				
wd. high precise																				
 	NVW 0192 85 02025	2	2	25	1.95	75	0.2	4	2	26.40	26.92	28.06	-	-	4	20	UMGC PVTiH			
	NVW 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			
	NVW 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			
	NVW 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			
	NVW 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			
	NVW 0192 85 02055	2	2	25	1.95	75	0.5	4	2	26.40	26.91	28.02	-	-	4	20	UMGC PVTiH			
	NVW 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			
	NVW 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			
	NVW 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			
	NVW 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			
	NVW 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			
	NVW 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			
	NVW 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			
	NVW 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			
	NVW 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			
	NVW 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			
	NVW 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			
	NVW 0192 85 04024	4	4	25	3.9	75	0.2	6	2	26.47	26.97	28.11	-	-	4	20	UMGC PVTiH			
	NVW 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			
	NVW 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			
	NVW 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			
	NVW 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																					
	NVV 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		
	NVV 0192 85 05023	5	5	20	4.9	75	0.2	6	2	21.35	21.80	-	-	-	4	20			UMGC PVTiH		
	NVV 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		
	NVV 0192 85 05053	5	5	20	4.9	75	0.5	6	2	21.34	21.79	-	-	-	4	20			UMGC PVTiH		
	NVV 0192 85 06021	6	6	10	5.85	57	0.2	6	2	-	-	-	-	-	4	20			UMGC PVTiH		
	NVV 0192 85 06023	6	6	20	5.85	75	0.2	6	2	-	-	-	-	-	4	20			UMGC PVTiH		
	NVV 0192 85 06051	6	6	10	5.85	57	0.5	6	2	-	-	-	-	-	4	20			UMGC PVTiH		
	NVV 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							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
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							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
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

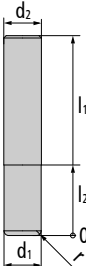
END MILLS FOR STEEL UP TO 58 HRC

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°						
no wd. short																				
	NWV 0280 56 060	6	12	-	-	57	1	6	6	-	-	-	-	-	6	50		MGC PVTi		
	NWV 0280 56 080	8	16	-	-	63	1	8	6	-	-	-	-	-	6	50		MGC PVTi		
	NWV 0280 56 100	10	20	-	-	72	1.5	10	6	-	-	-	-	-	6	50		MGC PVTi		
	NWV 0280 56 120	12	24	-	-	83	1.5	12	6	-	-	-	-	-	6	50		MGC PVTi		
	NWV 0280 56 160	16	32	-	-	92	2	16	6	-	-	-	-	-	6	50		MGC PVTi		
	NWV 0280 56 200	20	40	-	-	104	2	20	8	-	-	-	-	-	6	50		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
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 a_e of 2 % of the cutting diameter d₁.

Cutting speed (V_c 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	-	-	-	-	100 175 250

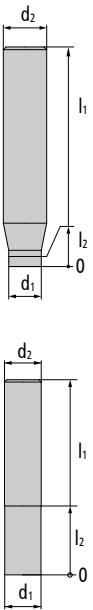


END MILLS FOR STEEL UP TO 58 HRC

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																			
	NVW 0259 56 040	4	8	-	-	57	-	6	4	8.88	9.26	9.60	9.96	10.76	6	50		MGC PVTi	
	NVW 0359 56 040	4	12	-	-	57	-	6	4	13.06	13.54	14.03	14.56	15.74	6	50		MGC PVTi	
	NVW 0259 56 050	5	10	-	-	57	-	6	5	10.97	11.40	11.81	12.26	-	6	50		MGC PVTi	
	NVW 0359 56 050	5	15	-	-	57	-	6	5	16.18	16.75	17.35	-	-	6	50		MGC PVTi	
	NVW 0259 56 060	6	12	-	-	57	-	6	6	-	-	-	-	-	6	50		MGC PVTi	
	NVW 0258 56 061	6	12	-	-	57	-	6	6	-	-	-	-	-	6	50		MGC PVTi	
	NVW 0359 56 060	6	18	-	-	57	-	6	6	-	-	-	-	-	6	50		MGC PVTi	
	NVW 0259 56 080	8	16	-	-	63	-	8	6	-	-	-	-	-	6	50		MGC PVTi	
	NVW 0359 56 080	8	24	-	-	63	-	8	6	-	-	-	-	-	6	50		MGC PVTi	
	NVW 0259 56 100	10	20	-	-	72	-	10	6	-	-	-	-	-	6	50		MGC PVTi	
	NVW 0258 56 101	10	20	-	-	72	-	10	6	-	-	-	-	-	6	50		MGC PVTi	
	NVW 0359 56 100	10	30	-	-	72	-	10	6	-	-	-	-	-	6	50		MGC PVTi	
	NVW 0259 56 120	12	24	-	-	83	-	12	6	-	-	-	-	-	6	50		MGC PVTi	
	NVW 0258 56 121	12	24	-	-	83	-	12	6	-	-	-	-	-	6	50		MGC PVTi	
	NVW 0359 56 120	12	36	-	-	83	-	12	6	-	-	-	-	-	6	50		MGC PVTi	
	NVW 0359 56 140	14	42	-	-	100	-	14	6	-	-	-	-	-	6	50		MGC PVTi	
	NVW 0259 56 160	16	32	-	-	92	-	16	6	-	-	-	-	-	6	50		MGC PVTi	
	NVW 0359 56 160	16	48	-	-	92	-	16	6	-	-	-	-	-	6	50		MGC PVTi	
	NVW 0259 56 200	20	40	-	-	104	-	20	8	-	-	-	-	-	6	50		MGC PVTi	
	NVW 0359 56 200	20	60	-	-	125	-	20	8	-	-	-	-	-	6	50		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
contour milling							
4	f _z (mm) a _p (mm)	0.03 8	-	0.03 8	-	-	0.01 8
5-6	f _z (mm) a _p (mm)	0.03 10	-	0.03 10	-	-	0.02 10
8	f _z (mm) a _p (mm)	0.04 16	-	0.04 16	-	-	0.02 16
10	f _z (mm) a _p (mm)	0.04 20	-	0.04 20	-	-	0.03 20
12	f _z (mm) a _p (mm)	0.05 24	-	0.05 24	-	-	0.03 24
14	f _z (mm) a _p (mm)	0.05 42	-	0.05 42	-	-	0.03 42
16	f _z (mm) a _p (mm)	0.05 32	-	0.05 32	-	-	0.04 32
20	f _z (mm) a _p (mm)	0.06 40	-	0.06 40	-	-	0.04 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							
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 MORE THAN 58 HRC

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



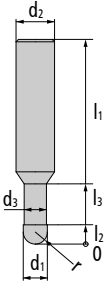
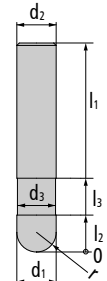
END MILLS FOR STEEL MORE THAN 58 HRC

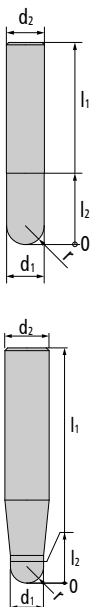
Ball nose end mills | 2 flutes

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																					
	NV 1312 59 011	1	1	-	-	57	0.5	6	2	1.26	1.40	1.52	1.63	1.84	0	15		MGC PVAT			
	NV 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			
	NV 1312 59 021	2	2	-	-	57	1	6	2	2.34	2.52	2.66	2.79	3.03	0	15		MGC PVAT			
	NV 1312 59 031	3	3	-	-	57	1.5	6	2	3.41	3.61	3.77	3.92	4.19	0	15		MGC PVAT			
	NV 1312 59 041	4	4	-	-	57	2	6	2	4.46	4.69	4.87	5.03	5.32	0	15		MGC PVAT			
	NV 1312 59 051	5	5	-	-	57	2.5	6	2	5.51	5.75	5.95	6.13	6.44	0	15		MGC PVAT			
	NV 1312 59 061	6	6	-	-	57	3	6	2	-	-	-	-	-	0	15		MGC PVAT			
	NV 1312 59 081	8	8	-	-	63	4	8	2	-	-	-	-	-	0	15		MGC PVAT			
	NV 1312 59 101	10	10	-	-	72	5	10	2	-	-	-	-	-	0	15		MGC PVAT			
	NV 1312 59 121	12	12	-	-	83	6	12	2	-	-	-	-	-	0	15		MGC PVAT			

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							
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							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
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																	
	NW 0275 59 060	6	4.5	-	-	57	2	6	5	-	-	-	-	-	2	30	MGC PVAT
	NW 0275 59 080	8	5.5	-	-	63	2.5	8	5	-	-	-	-	-	2	30	MGC PVAT
	NW 0275 59 101	10	7.5	-	-	72	3	10	5	-	-	-	-	-	2	30	MGC PVAT
	NW 0275 59 100	10	7.5	-	-	72	3.5	10	5	-	-	-	-	-	2	30	MGC PVAT
	NW 0275 59 120	12	9	-	-	83	3.5	12	5	-	-	-	-	-	2	30	MGC PVAT
	NW 0275 59 160	16	10.5	-	-	92	5	16	5	-	-	-	-	-	2	30	MGC PVAT

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							
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							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
MGC PVAT	roughing finishing	 120 235 350	-	-	-	-	80 150 220 100 175 250

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																		
	NV 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
	NV 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
	NV 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
	NV 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
	NV 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
	NV 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
	NV 1142 56 010	1	3	-	-	39	0.5	3	2	2.59	2.70	2.81	2.94	3.24	9	30		MGC PVTi
	NV 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
	NV 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
	NV 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	-

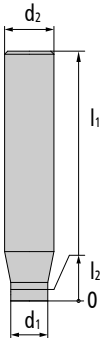
END MILLS FOR MICRO MACHINING UP TO 2.5 MM

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						
no wd. short																						
	NW 0142 56 001	0.1	0.2	-	-	39	-	3	2	0.38	0.49	0.59	0.69	0.88	9	30		MGC PVTi				
	NW 0142 56 002	0.2	0.5	-	-	39	-	3	2	0.94	0.99	1.04	1.10	1.23	9	30		MGC PVTi				
	NW 0142 56 003	0.3	1	-	-	39	-	3	2	1.23	1.39	1.53	1.66	1.89	9	30		MGC PVTi				
	NW 0142 56 004	0.4	1	-	-	39	-	3	2	1.57	1.75	1.90	2.04	2.29	9	30		MGC PVTi				
	NW 0142 56 005	0.5	1.5	-	-	39	-	3	2	1.91	2.11	2.27	2.41	2.68	9	30		MGC PVTi				
	NW 0142 56 006	0.6	1.5	-	-	39	-	3	2	2.24	2.45	2.63	2.78	3.06	9	30		MGC PVTi				
	NW 0142 56 008	0.8	2	-	-	39	-	3	2	2.90	3.14	3.33	3.50	3.80	9	30		MGC PVTi				
	NW 0142 56 010	1	3	-	-	39	-	3	2	3.56	3.81	4.02	4.20	4.55	9	30		MGC PVTi				
	NW 0142 56 012	1.2	3	-	-	39	-	3	2	4.21	4.48	4.70	4.90	5.29	9	30		MGC PVTi				
	NW 0142 56 015	1.5	4	-	-	39	-	3	2	5.17	5.47	5.71	5.93	6.41	9	30		MGC PVTi				
	NW 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) a _p (mm)	0.005-0.02 0.01-0.1	0.005-0.02 0.005-0.08	0.005-0.02 0.01-0.1	-	-	-
1-2	f _z (mm) a _p (mm)	0.02-0.04 1-1.5	0.02-0.04 0.3-0.7	0.02-0.04 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 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

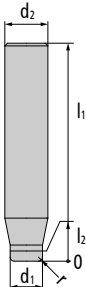


END MILLS FOR STAINLESS STEEL | TITANIUM ALLOYS

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																				
	NVW 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		
	NVW 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		
	NVW 0514 56 050	5	12	-	-	57	0.4	6	4	13.05	13.51	13.99	14.50	-	10	37.5		UMGC PVST		
	NVW 0514 56 060	6	16	-	-	57	0.5	6	4	-	-	-	-	-	10	37.5		UMGC PVST		
	NVW 0514 56 080	8	20	-	-	63	0.5	8	4	-	-	-	-	-	10	37.5		UMGC PVST		
	NVW 0514 56 100	10	26	-	-	72	1	10	4	-	-	-	-	-	10	37.5		UMGC PVST		
	NVW 0514 56 120	12	30	-	-	83	1	12	4	-	-	-	-	-	10	37.5		UMGC PVST		
	NVW 0514 56 160	16	37	-	-	92	2	16	4	-	-	-	-	-	10	37.5		UMGC PVST		
	NVW 0514 56 200	20	44	-	-	104	2	20	4	-	-	-	-	-	10	37.5		UMGC PVST		
	NVW 0514 56 250	25	50	-	-	104	3	25	4	-	-	-	-	-	10	37.5		UMGC PVST		

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							
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							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
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.

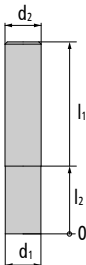


END MILLS FOR STAINLESS STEEL | TITANIUM ALLOYS

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

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							
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							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
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

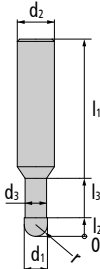
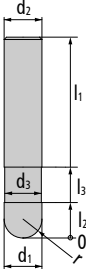


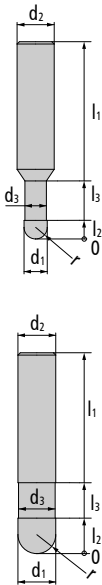
END MILLS FOR ALUMINIUM | COPPER | PLASTIC | SYNTHETIC

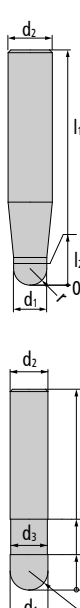
Ball nose end mills | 2 flutes

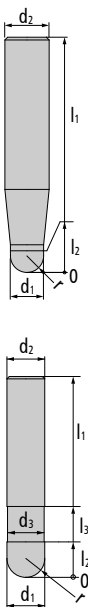
2 flutes, plain shank, 30° right hand helix angle

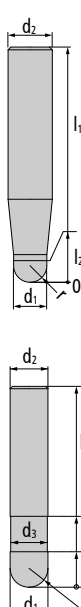
- center cutting end mill
- short | long version
- with and without clearance between shank and flute

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									Features	Q/C		
			d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°	γ (chip angle)	λ (helix angle)								
wd. short long																									
	NVV 1432 47 0306	3	4.5	40	2.9	75	1.5	6	2	42.00	43.01	44.08	-	-	9	30		KAC PVAS							
	NVV 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							
	NVV 1432 47 0404	4	6	20	3.8	57	2	6	2	21.63	22.12	22.64	23.19	-	9	30		KAC PVAS							
	NVV 1432 47 0405	4	6	30	3.8	75	2	6	2	31.87	32.63	33.42	-	-	9	30		KAC PVAS							
	NVV 1432 47 0406	4	6	40	3.8	75	2	6	2	42.12	43.13	-	-	-	9	30		KAC PVAS							
	NVV 1432 47 0604	6	6	20	5.8	57	3	6	2	-	-	-	-	-	9	30		KAC PVAS							
	NVV 1432 47 0605	6	6	30	5.8	75	3	6	2	-	-	-	-	-	9	30		KAC PVAS							
	NVV 1432 47 0606	6	6	40	5.8	75	3	6	2	-	-	-	-	-	9	30		KAC PVAS							
	NVV 1432 47 0607	6	6	50	5.8	100	3	6	2	-	-	-	-	-	9	30		KAC PVAS							
	NVV 1432 47 0608	6	6	70	5.8	100	3	6	2	-	-	-	-	-	9	30		KAC PVAS							
	NVV 1432 47 08051	8	12	35	7.8	90	4	8	2	-	-	-	-	-	9	30		KAC PVAS							
	NVV 1432 47 0807	8	12	50	7.8	100	4	8	2	-	-	-	-	-	9	30		KAC PVAS							
	NVV 1432 47 0808	8	12	70	7.8	100	4	8	2	-	-	-	-	-	9	30		KAC PVAS							
	NVV 1432 47 1006	10	15	40	9.8	72	5	10	2	-	-	-	-	-	9	30		KAC PVAS							
	NVV 1432 47 1007	10	15	50	9.8	100	5	10	2	-	-	-	-	-	9	30		KAC PVAS							
	NVV 1432 47 1008	10	15	70	9.8	100	5	10	2	-	-	-	-	-	9	30		KAC PVAS							
	NVV 1432 47 1009	10	15	100	9.8	150	5	10	2	-	-	-	-	-	9	30		KAC PVAS							
	NVV 1432 47 1206	12	18	40	11.8	83	6	12	2	-	-	-	-	-	9	30		KAC PVAS							
	NVV 1432 47 1207	12	18	50	11.8	110	6	12	2	-	-	-	-	-	9	30		KAC PVAS							
	NVV 1432 47 1208	12	18	70	11.8	110	6	12	2	-	-	-	-	-	9	30		KAC PVAS							
	NVV 1432 47 1209	12	18	100	11.8	150	6	12	2	-	-	-	-	-	9	30		KAC PVAS							
	NVV 1432 47 1609	16	24	100	15.8	150	8	16	2	-	-	-	-	-	9	30		KAC PVAS							
	NVV 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				1° (chip angle)	2° (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							
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	f _z (mm) a _p (mm)	-	-	-	0.01-0.03 0.01-0.3	0.005 0.005	-
1-2.5	f _z (mm) a _p (mm)	-	0.01-0.025 0.05-0.1	-	0.02-0.08 0.1-0.7	0.01 0.05	-
3-4	f _z (mm) a _p (mm)	-	0.04-0.055 0.08-0.19	-	0.04-0.1 0.15-1.4	0.04 0.08	-
5-6	f _z (mm) a _p (mm)	-	0.08-0.1 0.1-0.25	-	0.06-0.15 0.2-2	0.08 0.1	-
8	f _z (mm) a _p (mm)	-	0.08-0.115 0.15-0.375	-	0.08-0.2 0.3-2.8	0.08 0.15	-
9-10	f _z (mm) a _p (mm)	-	0.08-0.115 0.2-0.45	-	0.08-0.25 0.4-3.5	0.08 0.2	-
12	f _z (mm) a _p (mm)	-	0.08-0.115 0.2-0.5	-	0.1-0.3 0.4-4.2	0.08 0.2	-
14	f _z (mm) a _p (mm)	-	-	-	0.1-0.3 0.4-5	0.08 0.2	-
16	f _z (mm) a _p (mm)	-	0.1-0.175 0.2-0.7	-	0.1-0.3 0.4-5.6	0.1 0.2	-
18	f _z (mm) a _p (mm)	-	-	-	0.1-0.3 0.4-6.5	0.1 0.2	-
20	f _z (mm) a _p (mm)	-	0.1-0.175 0.2-0.8	-	0.1-0.35 0.4-7	0.1 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	-

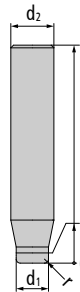
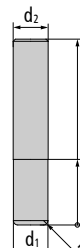


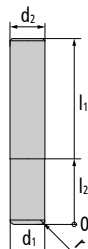
END MILLS FOR ALUMINIUM | COPPER | PLASTIC | SYNTHETIC

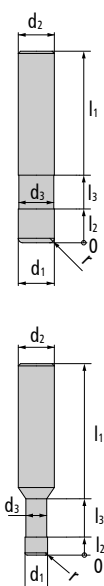
Toric / corner radius end mills | 2 flutes

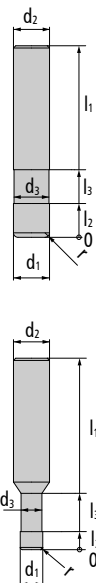
2 flutes, plain shank, 30° right hand helix angle

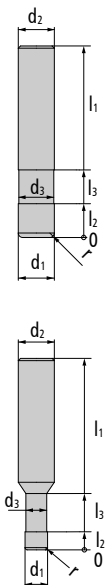
- center cutting end mill
- corner radius end mill
- short | long version
- with and without clearance between shank and flute

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 long																					
 	NVW 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			
	NVW 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			
	NVW 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			
	NVW 0462 43 011	1	1	-	-	50	0.2	4	2	1.31	1.47	1.61	1.73	1.96	9	30		KAC PVCN			
	NVW 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			
	NVW 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			
	NVW 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			
	NVW 0462 43 021	2	2	-	-	50	0.2	4	2	2.44	2.65	2.83	2.98	3.26	9	30		KAC PVCN			
	NVW 0432 47 021	2	2	-	-	50	0.2	4	2	2.44	2.65	2.83	2.98	3.26	9	30		KAC PVAS			
	NVW 0432 47 02011	2	2	-	-	50	0.5	4	2	2.41	2.61	2.77	2.92	3.18	9	30		KAC PVAS			
	NVW 0462 43 02105	2	2	-	-	50	0.5	4	2	2.41	2.61	2.77	2.92	3.18	9	30		KAC PVCN			
	NVW 0442 47 020	2	3	-	-	50	0.5	4	2	3.51	3.75	3.95	4.12	4.43	9	30		KAC PVAS			
	NVW 0462 43 031	3	3	-	-	50	0.2	4	2	3.54	3.79	4.00	4.17	4.50	9	30		KAC PVCN			
	NVW 0432 47 031	3	3	-	-	50	0.2	4	2	3.54	3.79	4.00	4.17	4.50	9	30		KAC PVAS			
	NVW 0462 43 03105	3	3	-	-	50	0.5	4	2	3.51	3.75	3.95	4.12	4.43	9	30		KAC PVCN			
	NVW 0432 47 03011	3	3	-	-	50	0.5	4	2	3.51	3.75	3.95	4.12	4.43	9	30		KAC PVAS			
	NVW 0442 47 030	3	4	-	-	50	0.5	4	2	4.60	4.87	5.09	5.28	5.67	9	30		KAC PVAS			
	NVW 0432 47 041	4	4	-	-	50	0.2	4	2	-	-	-	-	-	9	30		KAC PVAS			
	NVW 0462 43 041	4	4	-	-	50	0.2	4	2	-	-	-	-	-	9	30		KAC PVCN			
	NVW 0432 47 04011	4	4	-	-	50	0.5	4	2	-	-	-	-	-	9	30		KAC PVAS			
	NVW 0462 43 04105	4	4	-	-	50	0.5	4	2	-	-	-	-	-	9	30		KAC PVCN			
	NVW 0442 47 040	4	6	-	-	50	0.5	4	2	-	-	-	-	-	9	30		KAC PVAS			
	NVW 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 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 0432 47 0401	4	4	15	3.8	50	0.5	4	2	-	-	-	-	-	9	30		KAC PVAS		
	NVW 0462 43 04005	4	4	15	3.8	50	0.5	4	2	-	-	-	-	-	9	30		KAC PVCN		
	NVW 0432 47 050	5	5	21	4.8	57	0.2	6	2	22.70	23.26	-	-	-	9	30		KAC PVAS		
	NVW 0462 43 050	5	5	21	4.8	57	0.2	6	2	22.70	23.26	-	-	-	9	30		KAC PVCN		
	NVW 0462 43 05005	5	5	21	4.8	57	0.5	6	2	22.69	23.25	-	-	-	9	30		KAC PVCN		
	NVW 0432 47 0501	5	5	21	4.8	57	0.5	6	2	22.69	23.25	-	-	-	9	30		KAC PVAS		
	NVW 0432 47 060	6	6	21	5.8	57	0.2	6	2	-	-	-	-	-	9	30		KAC PVAS		
	NVW 0432 47 0601	6	6	21	5.8	57	0.5	6	2	-	-	-	-	-	9	30		KAC PVAS		
	NVW 0462 43 06005	6	6	21	5.8	57	0.5	6	2	-	-	-	-	-	9	30		KAC PVCN		
	NVW 0462 43 060	6	6	21	5.8	57	0.7	6	2	-	-	-	-	-	9	30		KAC PVCN		
	NVW 0462 43 06010	6	6	21	5.8	57	1	6	2	-	-	-	-	-	9	30		KAC PVCN		
	NVW 0432 47 0612	6	6	21	5.8	57	1	6	2	-	-	-	-	-	9	30		KAC PVAS		
	NVW 0432 47 0613	6	6	30	5.8	75	1	6	2	-	-	-	-	-	9	30		KAC PVAS		
	NVW 0432 47 081	8	8	27	7.8	63	0.5	8	2	-	-	-	-	-	9	30		KAC PVAS		
	NVW 0462 43 0801	8	8	27	7.8	63	0.5	8	2	-	-	-	-	-	9	30		KAC PVCN		
	NVW 0462 43 080	8	8	27	7.8	63	0.7	8	2	-	-	-	-	-	9	30		KAC PVCN		
	NVW 0462 43 0802	8	8	27	7.8	63	1	8	2	-	-	-	-	-	9	30		KAC PVCN		
	NVW 0432 47 080	8	8	30	7.8	63	1	8	2	-	-	-	-	-	9	30		KAC PVAS		
	NVW 0432 47 0805	8	8	50	7.8	90	1	8	2	-	-	-	-	-	9	30		KAC PVAS		
	SWV 0432 47 101135	10	10	-	9.8	72	0.5	10	2	-	-	-	-	-	9	30		KAC PVAS		
	NVW 0432 47 1011	10	10	32	9.8	72	0.5	10	2	-	-	-	-	-	9	30		KAC PVAS		
	NVW 0462 43 100	10	10	32	9.8	72	0.7	10	2	-	-	-	-	-	9	30		KAC PVCN		
	NVW 0462 43 1002	10	10	32	9.8	72	1	10	2	-	-	-	-	-	9	30		KAC PVCN		
	NVW 0432 47 101	10	10	32	9.8	72	1	10	2	-	-	-	-	-	9	30		KAC PVAS		
	NVW 0432 47 1014	10	10	40	9.8	100	1	10	2	-	-	-	-	-	9	30		KAC PVAS		
	NVW 0432 47 1016	10	10	60	9.8	100	1	10	2	-	-	-	-	-	9	30		KAC PVAS		
	NVW 0432 47 100	10	10	32	9.8	72	1.5	10	2	-	-	-	-	-	9	30		KAC PVAS		
	NVW 0432 47 1201	12	12	38	11.8	83	0.5	12	2	-	-	-	-	-	9	30		KAC PVAS		
	NVW 0462 43 120	12	12	38	11.8	83	0.7	12	2	-	-	-	-	-	9	30		KAC PVCN		
	NVW 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°						
			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							
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) a _p (mm)	-	0.005-0.02 0.005-0.08	-	0.01-0.03 0.01-0.3	0.005 0.005	-
1-2	f _z (mm) a _p (mm)	-	0.01-0.04 0.05-0.15	-	0.02-0.08 0.1-0.7	0.01-0.04 0.05-0.15	-
3-4	f _z (mm) a _p (mm)	-	0.04-0.07 0.08-0.3	-	0.04-0.1 0.15-1.4	0.04-0.07 0.08-0.3	-
5-6	f _z (mm) a _p (mm)	-	0.08-0.12 0.1-0.4	-	0.06-0.15 0.2-2	0.08-0.12 0.1-0.4	-
8	f _z (mm) a _p (mm)	-	0.08-0.15 0.15-0.6	-	0.08-0.2 0.3-2.8	0.08-0.115 0.15-0.375	-
10	f _z (mm) a _p (mm)	-	0.08-0.15 0.2-0.7	-	0.08-0.25 0.4-3.5	0.08-0.115 0.2-0.45	-
12	f _z (mm) a _p (mm)	-	0.08-0.15 0.2-0.8	-	0.1-0.3 0.4-4.2	0.08-0.115 0.2-0.5	-
16	f _z (mm) a _p (mm)	-	0.1 0.2	-	0.1-0.3 0.4-5.6	0.1 0.2	-
20	f _z (mm) a _p (mm)	-	0.1 0.2	-	0.1-0.35 0.4-7	0.1 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	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 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							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
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							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
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							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
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							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
KAC polished	roughing finishing	-	-	-	 200 300 400 350 425 500	-	-

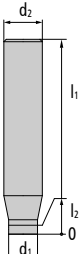
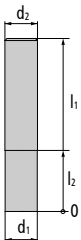
END MILLS FOR ALUMINIUM | COPPER | PLASTIC | SYNTHETIC

End mills | 2 flutes

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

- center cutting end mill
- straight face
- short I 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																								
 	NVV 0412 47 010	1	2	-	-	50	-	4	2	2.46	2.68	2.86	3.02	3.31	16	45		KAC PVAS						
	NVV 0412 47 015	1.5	3	-	-	50	-	4	2	3.56	3.81	4.02	4.20	4.52	16	45		KAC PVAS						
	NVV 0412 47 021	2	4	-	-	50	-	4	2	4.64	4.92	5.15	5.36	5.79	16	45		KAC PVAS						
	NVV 0412 47 020	2	4	-	-	57	-	6	2	4.64	4.92	5.15	5.36	5.79	16	45		KAC PVAS						
	NVV 0412 47 030	3	6	-	-	57	-	6	2	9.62	10.31	10.52	10.92	11.80	16	45		KAC PVAS						
	NVV 0422 47 030	3	15	-	-	60	-	3	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0422 47 031	3	15	-	-	75	-	3	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0412 47 041	4	8	-	-	50	-	4	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0412 47 040	4	8	-	-	57	-	6	2	11.99	12.29	12.74	13.21	14.28	16	45		KAC PVAS						
	NVV 0422 47 040	4	20	-	-	60	-	4	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0422 47 041	4	20	-	-	75	-	4	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0422 47 042	4	20	-	-	100	-	4	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0412 47 050	5	10	-	-	57	-	6	2	14.60	15.12	15.67	-	-	16	45		KAC PVAS						
	NVV 0422 47 050	5	20	-	-	70	-	5	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0412 47 060	6	12	-	-	57	-	6	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0422 47 060	6	20	-	-	100	-	6	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0412 47 080	8	16	-	-	63	-	8	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0422 47 080	8	25	-	-	100	-	8	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0412 47 100	10	20	-	-	72	-	10	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0422 47 100	10	25	-	-	100	-	10	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0422 47 101	10	25	-	-	150	-	10	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0412 47 120	12	24	-	-	83	-	12	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0422 47 120	12	30	-	-	100	-	12	2	-	-	-	-	-	16	45		KAC PVAS						



major application



minor application



roughing



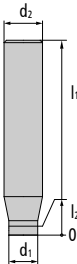
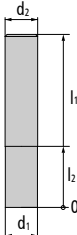
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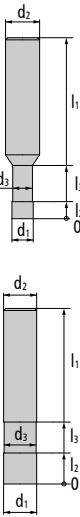
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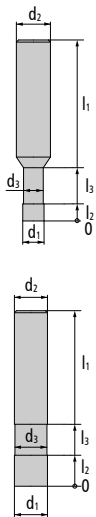
End mills	catalogue no.													Effective working length at X° of draft					γ (chip angle)	λ (helix angle)	Features	QC
		d ₁	l ₂	l ₃	d ₃	l ₁	r	d ₂	z	0.5°	1°	1.5°	2°	3°								

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								
wd. short long																								
	NVV 0412 47 1006	10	20	40	9.8	100	-	10	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0412 47 1008	10	20	60	9.8	100	-	10	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0412 47 1205	12	24	30	11.8	83	-	12	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0412 47 1207	12	24	60	11.8	110	-	12	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0412 47 1208	12	24	80	11.8	110	-	12	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0412 47 1605	16	32	50	15.8	92	-	16	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0412 47 1606	16	32	70	15.8	120	-	16	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0412 47 1607	16	32	100	15.8	150	-	16	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0412 47 1608	16	32	110	15.8	150	-	16	2	-	-	-	-	-	16	45		KAC PVAS						
	NVV 0412 47 2006	20	40	60	19.8	104	-	20	2	-	-	-	-	-	16	45		KAC PVAS						
NVV 0412 47 2008	20	40	100	19.8	150	-	20	2	-	-	-	-	-	16	45		KAC PVAS							

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							
1-2	f_z (mm)	-	0.01-0.02	-	0.01-0.03	0.01-0.02	-
	a_p (mm)						
3-4	f_z (mm)	-	0.03-0.05	-	0.04-0.09	0.03-0.05	-
	a_p (mm)						
5-6	f_z (mm)	-	0.03-0.05	-	0.05-0.1	0.03-0.05	-
	a_p (mm)						
8	f_z (mm)	-	0.04-0.06	-	0.06-0.15	0.04-0.06	-
	a_p (mm)						
10	f_z (mm)	-	0.05-0.08	-	0.08-0.17	0.05-0.08	-
	a_p (mm)						
12	f_z (mm)	-	0.06-0.1	-	0.09-0.2	0.06-0.1	-
	a_p (mm)						
16	f_z (mm)	-	0.06-0.1	-	0.1-0.27	0.06-0.1	-
	a_p (mm)						
20	f_z (mm)	-	0.07-0.12	-	0.12-0.35	0.07-0.12	-
	a_p (mm)						

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	-	 200 400 600 700 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 polis-hed
	NW 0423 40 040	4	10	-	-	38	-	4	3	-	-	-	-	-	-	30		KAC polis-hed
	NW 0423 40 080	8	16	-	-	60	-	8	3	-	-	-	-	-	-	30		KAC polis-hed
	NW 0423 40 100	10	20	-	-	65	-	10	3	-	-	-	-	-	-	30		KAC polis-hed
	NW 0423 40 120	12	24	-	-	75	-	12	3	-	-	-	-	-	-	30		KAC polis-hed
	NW 0423 40 160	16	32	-	-	88	-	16	3	-	-	-	-	-	-	30		KAC polis-hed

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							
2	f _z (mm) a _p (mm)	-	-	-	0.01-0.03 0.1-0.7	-	-
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	-

Cutting speed (Vc in m/min)

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



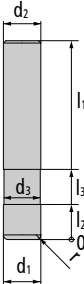
END MILLS FOR ALUMINIUM | COPPER | PLASTIC | SYNTHETIC

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

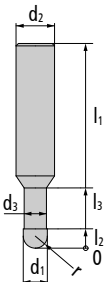
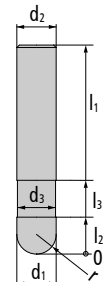


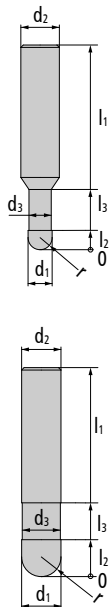
END MILLS FOR GRAPHITE | GRP | CFRP

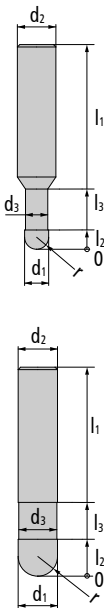
Ball nose end mills | 2 flutes

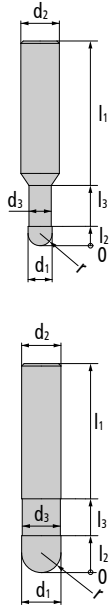
2 flutes, plain shank, 30° right hand helix angle

- center cutting end mill
- short | long version
- with and without clearance between shank and flute
- < Ø 3 mm: PVDiaG-Diamond treated
- ≥ 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°						
 	NWV 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		
	NWV 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		
	NWV 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		
	NWV 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		
	NWV 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		
	NWV 1462 49 011	1	1	5	0.98	50	0.5	4	2	5.66	5.91	6.11	6.29	6.59	4	30		KAC PVDiaG		
	NWV 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		
	NWV 1462 49 021	2	2	10	1.95	50	1	4	2	10.94	11.26	11.52	11.75	12.46	4	20		KAC PVDiaG		
	NWV 1462 49 031	3	3	10	2.95	57	1.5	6	2	10.92	11.23	11.49	11.71	12.30	4	20		KAC PVDiaN		
	NWV 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		
	NWV 1462 49 0511	5	5	20	4.9	57	2.5	6	2	21.29	21.71	-	-	-	4	20		KAC PVDiaN		
	NWV 1462 49 0611	6	6	20	5.85	57	3	6	2	-	-	-	-	-	4	20		KAC PVDiaN		
	NWV 1462 49 0614	6	6	40	5.85	75	3	6	2	-	-	-	-	-	4	20		KAC PVDiaN		
	NWV 1462 49 0811	8	8	20	7.85	63	4	8	2	-	-	-	-	-	4	20		KAC PVDiaN		
	NWV 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																				
	SVV 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		
	SVV 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		
	NWV 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		
	SVV 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		
	NWV 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		
	SVV 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		
	NWV 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		
	SVV 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		
	SVV 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		
	SVV 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		
	SVV 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		
	NWV 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		
	NWV 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		
	NWV 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		
	NWV 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		
	NWV 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		
	NWV 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		
	NWV 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		
	NWV 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		
	NWV 1452 48 0200	2	3	-	-	50	1	4	2	3.46	3.68	3.86	4.03	4.31	9	30		KAC PVDiaG		
	NWV 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		
	NWV 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		
	NWV 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		
	NWV 1452 48 0204	2	3	20	1.9	75	1	4	2	21.50	22.03	22.57	23.15	-	9	30		KAC PVDiaG		
	NWV 1452 48 0205	2	3	25	1.9	75	1	4	2	26.63	27.28	27.96	28.68	-	9	30		KAC PVDiaG		
	NWV 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																				
	NW 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		
	NW 1452 48 0303	3	4.5	15	2.9	50	1.5	4	2	16.33	16.75	17.15	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0304	3	4.5	20	2.9	75	1.5	4	2	21.48	22.00	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0305	3	4.5	25	2.9	75	1.5	4	2	26.62	27.26	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0306	3	4.5	30	2.9	100	1.5	4	2	31.74	-	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0402	4	6	10	3.8	50	2	4	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0403	4	6	15	3.8	50	2	4	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0404	4	6	20	3.8	75	2	4	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0405	4	6	25	3.8	75	2	4	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0406	4	6	45	3.8	100	2	4	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0502	5	7.5	10	4.8	57	2.5	5	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0503	5	7.5	25	4.8	75	2.5	5	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0504	5	7.5	45	4.8	100	2.5	5	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0601	6	9	10	5.8	57	3	6	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0603	6	9	15	5.8	57	3	6	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0604	6	9	20	5.8	75	3	6	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0605	6	9	25	5.8	75	3	6	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0606	6	9	30	5.8	75	3	6	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0607	6	9	45	5.8	100	3	6	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0608	6	9	60	5.8	150	3	6	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NW 1452 48 0800	8	12	-	-	63	4	8	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NW 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																				
	NVV 1452 48 0802	8	12	25	7.8	63	4	8	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NVW 1452 48 081	8	12	45	7.8	100	4	8	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NVW 1452 48 082	8	12	60	7.8	150	4	8	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NVV 1452 48 1009	10	15	25	9.8	72	5	10	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NVW 1452 48 1010	10	15	45	9.8	100	5	10	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NVV 1452 48 1209	12	18	25	11.8	83	6	12	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NVW 1452 48 1210	12	18	45	11.8	110	6	12	2	-	-	-	-	-	9	30		KAC PVDiaN		
	NVW 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							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
copy milling 3D							
0.3-0.8	f _z (mm) a _p (mm)	-	0.005-0.0125 0.005-0.0425	-	0.01-0.03 0.01-0.3	-	-
1-2	f _z (mm) a _p (mm)	-	0.01-0.025 0.05-0.1	-	0.02-0.08 0.1-0.7	-	-
3-4	f _z (mm) a _p (mm)	-	0.04-0.055 0.08-0.19	-	0.04-0.1 0.15-1.4	-	-
5-6	f _z (mm) a _p (mm)	-	0.08-0.1 0.1-0.25	-	0.06-0.15 0.2-2	-	-
8	f _z (mm) a _p (mm)	-	0.08-0.115 0.15-0.375	-	0.08-0.2 0.3-2.8	-	-
10	f _z (mm) a _p (mm)	-	0.08-0.115 0.2-0.45	-	0.08-0.25 0.4-3.5	-	-
12	f _z (mm) a _p (mm)	-	0.08-0.115 0.2-0.5	-	0.1-0.3 0.4-4.2	-	-

Cutting speed (Vc in m/min)

Material							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
KAC 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	-	-

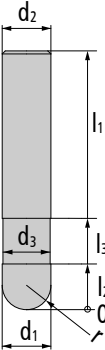


END MILLS FOR GRAPHITE | GRP | CFRP

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
- $\geq \varnothing 3$ 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. and no wd. short long																				
	NVW 1453 48 1009	10	15	25	9.8	72	5	10	3	-	-	-	-	-	9	30		KAC PVDiaN		
	NVW 1453 48 1010	10	15	45	9.8	100	5	10	3	-	-	-	-	-	9	30		KAC PVDiaN		
	NVW 1453 48 1020	10	15	60	9.8	150	5	10	3	-	-	-	-	-	9	30		KAC PVDiaN		
	NVW 1453 48 1209	12	18	25	11.8	83	6	12	3	-	-	-	-	-	9	30		KAC PVDiaN		
	NVW 1453 48 1210	12	18	45	11.8	100	6	12	3	-	-	-	-	-	9	30		KAC PVDiaN		
	NVW 1453 48 1220	12	18	60	11.8	150	6	12	3	-	-	-	-	-	9	30		KAC PVDiaN		
	NVW 1453 48 1610	16	24	45	15.8	100	8	16	3	-	-	-	-	-	9	30		KAC PVDiaN		
	NVW 1453 48 162	16	24	60	15.8	150	8	16	3	-	-	-	-	-	9	30		KAC PVDiaN		
	NVW 1453 48 2000	20	30	45	19.8	100	10	20	3	-	-	-	-	-	9	30		KAC PVDiaN		
	NVW 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							
Diameter	Feed per tooth d.o.c.	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
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 -	-	-

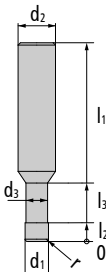
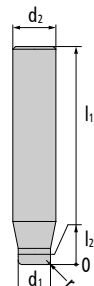


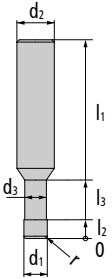
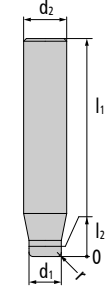
END MILLS FOR GRAPHITE | GRP | CFRP

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
- < Ø 3 mm: PVDiaN-Diamond treated
- ≥ Ø 3 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	Effective working length at X° of draft										
											0.5°	1°	1.5°	2°	3°						
no wd. short long																					
 	SVW 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			
	SVW 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			
	SVW 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			
	NVW 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			
	SVW 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			
	SVW 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			
	SVW 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			
	SVW 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			
	NVW 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			
	NVW 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			
	NVW 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			
	NVW 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			
	NVW 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			
	SWW 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			
	NVW 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			
	NVW 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			
	NVW 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			
	SVW 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			
	NVW 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			
	SWW 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			
	SWW 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			
	NVW 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		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 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							
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) 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							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
KAC PVDiaG	roughing finishing	-	-	-	 200 550 900 400 700 1000	-	-
KAC PVDiaN	roughing finishing	-	-	-	 200 400 600 400 700 1000	-	-

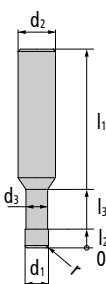
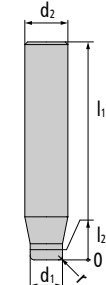


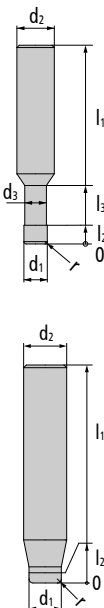
END MILLS FOR GRAPHITE | GRP | CFRP

Toric / corner radius end mills | 3 flutes

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

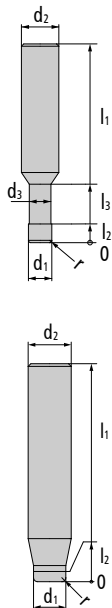
- center cutting end mill
- short | long version
- with and without clearance between shank and flute
- < Ø 3 mm: PVDiaG-Diamond treated
- ≥ Ø 3 mm: PVDiaN-Diamond

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	Effective working length at X° of draft								
											0.5°	1°	1.5°	2°	3°				
wd. and no wd. short long																			
 	NWV 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		
	NWV 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		
	NWV 0453 48 0303	3	4.5	15	2.9	50	0.3	4	3	16.37	16.81	17.24	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 0304	3	4.5	20	2.9	75	0.3	4	3	21.52	22.06	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 0305	3	4.5	25	2.9	75	0.3	4	3	26.65	27.32	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 031	3	30	-	-	100	0.3	4	3	-	-	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 0400	4	6	-	-	50	0.3	4	3	-	-	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 0402	4	6	10	3.8	50	0.3	4	3	-	-	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 0403	4	6	15	3.8	50	0.3	4	3	-	-	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 0404	4	6	20	3.8	75	0.3	4	3	-	-	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 0405	4	6	25	3.8	75	0.3	4	3	-	-	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 0406	4	6	45	3.8	100	0.3	4	3	-	-	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 04020	4	6	10	3.8	50	0.5	4	3	-	-	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 04001	4	6	-	-	50	1	4	3	-	-	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 04021	4	6	10	3.8	50	1	4	3	-	-	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 04031	4	6	15	3.8	50	1	4	3	-	-	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 04041	4	6	20	3.8	75	1	4	3	-	-	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 04051	4	6	25	3.8	75	1	4	3	-	-	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 04061	4	6	45	3.8	100	1	4	3	-	-	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 0502	5	7.5	10	4.8	57	0.3	5	3	-	-	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 0503	5	7.5	20	4.8	75	0.3	5	3	-	-	-	-	-	9	30	KAC PVDiaN		
	NWV 0453 48 050	5	35	-	-	75	0.3	5	3	-	-	-	-	-	9	30	KAC PVDiaN		
	NWV 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																				
	NV 0108 48 030	3	10	-	-	50	-	3	2	-	-	-	-	-	-	-	-	-	-	KAC PVDiaN
	NV 0108 48 040	4	10	-	-	50	-	4	2	-	-	-	-	-	-	-	-	-	-	KAC PVDiaN
	NV 0108 48 060	6	20	-	-	57	-	6	2	-	-	-	-	-	-	-	-	-	-	KAC PVDiaN
	NV 0108 48 080	8	20	-	-	60	-	8	2	-	-	-	-	-	-	-	-	-	-	KAC PVDiaN
	NV 0108 48 100	10	25	-	-	70	-	10	2	-	-	-	-	-	-	-	-	-	-	KAC PVDiaN
	NV 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

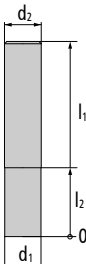


END MILLS FOR EXTREME MACHINING | HPC

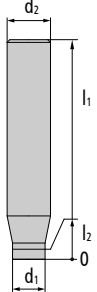
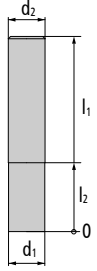
3 and 4 flutes

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
- < Ø 12 mm clamping surface is available on demand, ≥ Ø 12 mm 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							

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 0290 56 161	16	48	-	-	140	-	16	4	-	-	-	-	-	-15	50	【	MGC PVTi	
	NW 0370 56 200	20	40	-	-	104	-	20	4	-	-	-	-	-	-15	50	【	MGC PVTi	
	NW 0290 56 201	20	60	-	-	150	-	20	4	-	-	-	-	-	-15	50	【	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
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							
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
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
- < Ø 12 mm clamping surface is available on demand, ≥ Ø 12 mm 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																					
	NVV 0380 56 030	3	6	-	-	57	0.3	6	4	6.75	7.08	7.35	7.61	8.21	-15	50		MGC PVTi			
	NVV 0380 56 040	4	8	-	-	57	0.3	6	4	8.86	9.24	9.56	9.91	10.69	-15	50		MGC PVTi			
	NVV 0380 56 050	5	10	-	-	57	0.3	6	4	10.96	11.38	11.78	12.21	-	-15	50		MGC PVTi			
	NVV 0380 56 060	6	12	-	-	57	0.3	6	4	-	-	-	-	-	-15	50		MGC PVTi			
	NVV 0390 56 061	6	18	-	-	75	0.3	6	4	-	-	-	-	-	-15	50		MGC PVTi			
	NVV 0380 56 080	8	16	-	-	63	0.5	8	4	-	-	-	-	-	-15	50		MGC PVTi			
	NVV 0390 56 081	8	24	-	-	90	0.5	8	4	-	-	-	-	-	-15	50		MGC PVTi			
	NVV 0380 56 100	10	20	-	-	72	0.5	10	4	-	-	-	-	-	-15	50		MGC PVTi			
	NVV 0390 56 101	10	30	-	-	100	0.5	10	4	-	-	-	-	-	-15	50		MGC PVTi			
	NVV 0380 56 120	12	24	-	-	83	1	12	4	-	-	-	-	-	-15	50	【	MGC PVTi			
	NVV 0390 56 121	12	36	-	-	110	1	12	4	-	-	-	-	-	-15	50	【	MGC PVTi			
	NVV 0380 56 160	16	32	-	-	92	1	16	4	-	-	-	-	-	-15	50	【	MGC PVTi			
	NVV 0390 56 161	16	48	-	-	140	1	16	4	-	-	-	-	-	-15	50	【	MGC PVTi			
	NVV 0380 56 200	20	40	-	-	104	1	20	4	-	-	-	-	-	-15	50	【	MGC PVTi			
	NVV 0390 56 201	20	60	-	-	150	1	20	4	-	-	-	-	-	-15	50	【	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
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 a_e of 2 % of the cutting diameter d_1 .

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 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
- < Ø 12 mm clamping surface is available on demand, ≥ Ø 12 mm 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							
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) 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							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
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

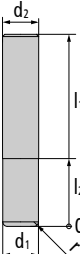
- center cutting end mill
- straight face
- short version
- with corner radius
- unequal division
- < Ø 12 mm clamping surface is available on demand, ≥ Ø 12 mm with clamping surface by default
- with clearance between shank and flute on demand



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																				
	NVV 0384 56 060	6	12	-	-	57	0.5	6	4	-	-	-	-	-	8	50			UMGC PVTi	
	NVV 0384 56 061	6	12	-	-	57	1	6	4	-	-	-	-	-	8	50			UMGC PVTi	
	NVV 0384 56 080	8	16	-	-	63	0.5	8	4	-	-	-	-	-	8	50			UMGC PVTi	
	NVV 0384 56 081	8	16	-	-	63	1	8	4	-	-	-	-	-	8	50			UMGC PVTi	
	NVV 0384 56 100	10	20	-	-	72	0.5	10	4	-	-	-	-	-	8	50			UMGC PVTi	
	NVV 0384 56 101	10	20	-	-	72	1	10	4	-	-	-	-	-	8	50			UMGC PVTi	
	NVV 0384 56 120	12	24	-	-	83	1	12	4	-	-	-	-	-	8	50			UMGC PVTi	
	NVV 0384 56 121	12	24	-	-	83	2	12	4	-	-	-	-	-	8	50			UMGC PVTi	
	NVV 0384 56 160	16	32	-	-	92	1	16	4	-	-	-	-	-	8	50			UMGC PVTi	
	NVV 0384 56 161	16	32	-	-	92	2	16	4	-	-	-	-	-	8	50			UMGC PVTi	
	NVV 0384 56 200	20	40	-	-	104	1	20	4	-	-	-	-	-	8	50			UMGC PVTi	
	NVV 0384 56 201	20	40	-	-	104	2	20	4	-	-	-	-	-	8	50			UMGC PVTi	

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

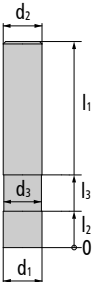
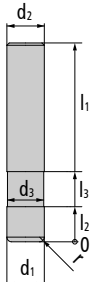
END MILLS FOR EXTREME MACHINING | HPC

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
- < Ø 12 mm clamping surface is available on demand, ≥ Ø 12 mm 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°
with chamfer																									
	NVV 0350 56 060	6	6	21	5.8	57	-	6	4	-	-	-	-	-	-15	50		MGC PVTi							
	NVV 0350 56 080	8	8	27	7.8	63	-	8	4	-	-	-	-	-	-15	50		MGC PVTi							
	NVV 0350 56 100	10	10	32	9.8	72	-	10	4	-	-	-	-	-	-15	50		MGC PVTi							
	NVV 0350 56 120	12	12	38	11.8	83	-	12	4	-	-	-	-	-	-15	50	■	MGC PVTi							
	NVV 0350 56 160	16	16	44	15.8	92	-	16	4	-	-	-	-	-	-15	50	■	MGC PVTi							
	NVV 0350 56 200	20	20	54	19.8	104	-	20	4	-	-	-	-	-	-15	50	■	MGC PVTi							
with corner radius																									
	NVV 0360 56 060	6	6	21	5.8	57	0.3	6	4	-	-	-	-	-	-15	50		MGC PVTi							
	NVV 0360 56 080	8	8	27	7.8	63	0.5	8	4	-	-	-	-	-	-15	50		MGC PVTi							
	NVV 0360 56 100	10	10	32	9.8	72	0.5	10	4	-	-	-	-	-	-15	50		MGC PVTi							
	NVV 0360 56 120	12	12	38	11.8	83	1	12	4	-	-	-	-	-	-15	50		MGC PVTi							
	NVV 0360 56 160	16	16	44	15.8	92	1	16	4	-	-	-	-	-	-15	50		MGC PVTi							
	NVV 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							
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) a _p (mm)	0.035-0.08 2.5-4.8	0.02-0.04 1.2-4.8	0.035-0.08 2.5-4.8	-	-	-
8	f _z (mm) a _p (mm)	0.045-0.08 3.5-6.4	0.03-0.05 1.6-6.4	0.045-0.08 3.5-6.4	-	-	-
10	f _z (mm) a _p (mm)	0.055-0.1 4.5-8	0.04-0.06 2-8	0.055-0.1 4.5-8	-	-	-
12	f _z (mm) a _p (mm)	0.06-0.12 5-9.6	0.045-0.7 2.4-9.6	0.06-0.12 5-9.6	-	-	-
16	f _z (mm) a _p (mm)	0.075-0.12 6-12.8	0.06-0.85 3.2-12.8	0.075-0.12 6-12.8	-	-	-
20	f _z (mm) a _p (mm)	0.08-0.15 6-16	0.07-0.1 4-16	0.08-0.15 6-16	-	-	-

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	 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°	2°	3°						

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)	0.08-0.25 0.1-0.2	-	0.08-0.25 0.1-0.2	-	-	0.08-0.25 0.1-0.2
	a _p (mm)						
5-6	f _z (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
	a _p (mm)						
8	f _z (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
	a _p (mm)						
10	f _z (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
	a _p (mm)						
12	f _z (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
	a _p (mm)						
16	f _z (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
	a _p (mm)						

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 -



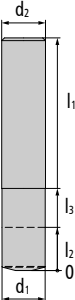
END MILLS FOR HIGH FEED MACHINING | TRIGAWORX® | HSC

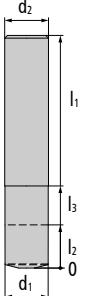
4 flutes

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																		
	NW 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
	NW 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
	NW 0374 55 052	5	5	21	4.8	57	0,4°	6	4	22.69	23.25	-	-	-	5	5		MGC PVALSA
	NW 0374 55 062	6	6	21	5.8	57	0,5°	6	4	-	-	-	-	-	5	5		MGC PVALSA
	NW 0374 55 0622	6	6	64	5.8	100	0,5°	6	4	-	-	-	-	-	5	5		MGC PVALSA
	NW 0374 55 082	8	8	27	7.8	63	0,7°	8	4	-	-	-	-	-	5	5		MGC PVALSA
	NW 0374 55 0822	8	8	64	7.8	100	0,7°	8	4	-	-	-	-	-	5	5		MGC PVALSA
	NW 0374 55 102	10	10	32	9.8	72	0,85°	10	4	-	-	-	-	-	5	5		MGC PVALSA
	NW 0374 55 1022	10	10	60	9.8	100	0,85°	10	4	-	-	-	-	-	5	5		MGC PVALSA
	NW 0374 55 122	12	12	38	11.8	83	1°	12	4	-	-	-	-	-	5	5		MGC PVALSA
	NW 0374 55 1222	12	12	65	11.8	110	1°	12	4	-	-	-	-	-	5	5		MGC PVALSA
	NW 0374 55 162	16	16	50	15.8	92	1,4°	16	4	-	-	-	-	-	5	5		MGC PVALSA
	NW 0374 55 1622	16	16	65	15.8	150	1,4°	16	4	-	-	-	-	-	5	5		MGC PVALSA

wd. real corner radius																			
	NV 0274 55 06015	6	6	21	5.8	57	1,5	6	4	-	-	-	-	-	5	5		MGC PVALSA	
	NV 0274 55 08020	8	8	27	7.8	63	2	8	4	-	-	-	-	-	5	5		MGC PVALSA	
	NV 0274 55 10020	10	10	32	9.8	72	2	10	4	-	-	-	-	-	5	5		MGC PVALSA	
	NV 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							
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)	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							
Quality Coating	Application	steel	stainless steel	cast iron	non-ferrous materials	high-temperature alloys	hardened steel
MGC PVALSA	roughing finishing	120  300 -	70  120 -	100  350 -	-	30  70 -	80  200 -



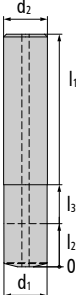
HIGH FEED MACHINING | TRIGAWORX® | HSC

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																		
	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 (f_z) | d.o.c. (a_p)

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							
4	f _z (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	-	0.08-0.25 0.1-0.2	0.08-0.25 0.1-0.2
	a _p (mm)						
6	f _z (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	-	0.1-0.35 0.1-0.3	0.1-0.35 0.1-0.3
	a _p (mm)						
8	f _z (mm)	0.1-0.5 0.1-0.3	0.1-0.4 0.1-0.3	0.1-0.5 0.1-0.3	-	0.1-0.5 0.1-0.3	0.1-0.5 0.1-0.3
	a _p (mm)						
10	f _z (mm)	0.1-0.7 0.1-0.3	0.1-0.4 0.1-0.3	0.1-0.7 0.1-0.3	-	0.1-0.7 0.1-0.3	0.1-0.7 0.1-0.3
	a _p (mm)						
12	f _z (mm)	0.1-0.8 0.1-0.3	0.1-0.6 0.1-0.3	0.1-0.8 0.1-0.3	-	0.1-0.8 0.1-0.3	0.1-0.8 0.1-0.3
	a _p (mm)						
16	f _z (mm)	0.1-0.8 0.1-0.4	0.1-0.6 0.1-0.3	0.1-0.8 0.1-0.4	-	0.1-0.8 0.1-0.4	0.1-0.8 0.1-0.4
	a _p (mm)						

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.

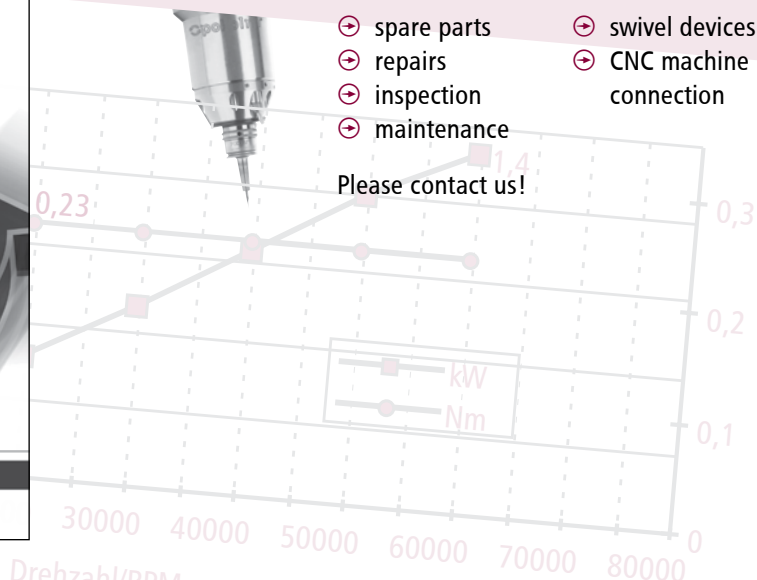
Get the maximum speed from your machines with Pokolm-spindle systems. The result: You save time!



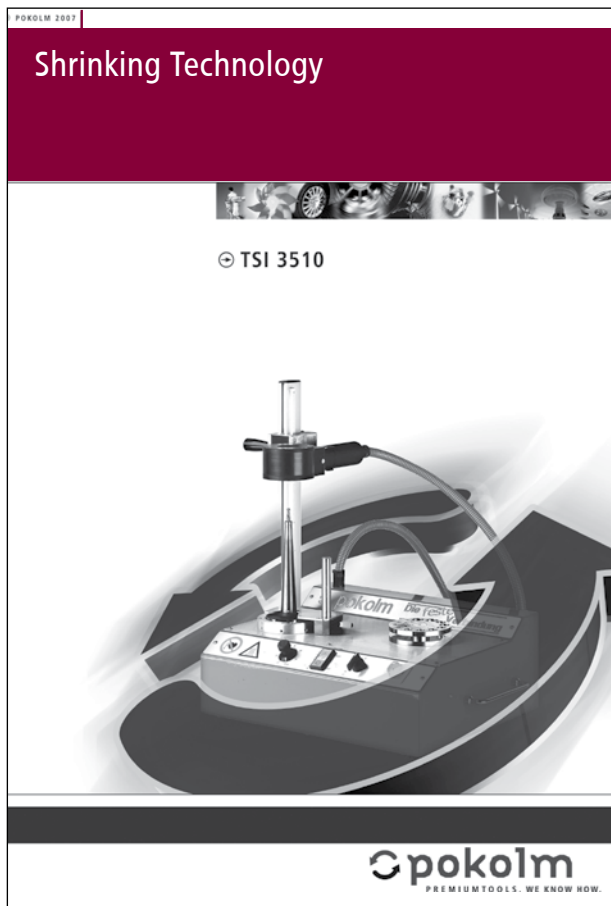
Ask our service centre about spindles:

- ⊕ 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

HPC

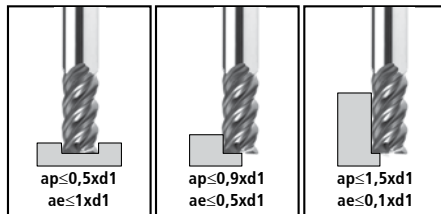
UGT-end mills for pocket-, slot- and copy-milling

0504/0514



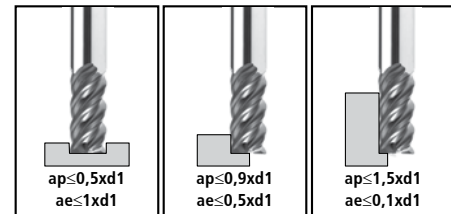
Stainless steel

1.4301, 1.4541, 1.4307 etc.:



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

1.4401, 1.4571, 1.4404 etc.:

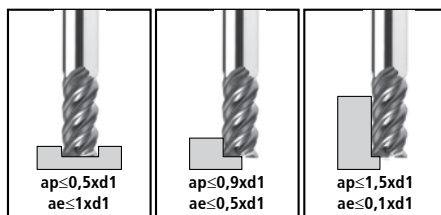


feed per tooth f_z
speed $V_c = 40$ m/min

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

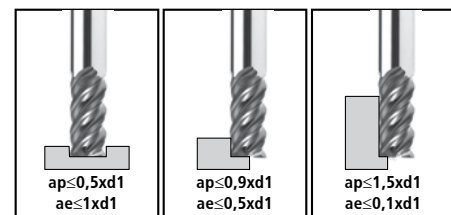
High-temperature alloys:

1.4542 etc.:



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

Inconel 718 etc.:



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

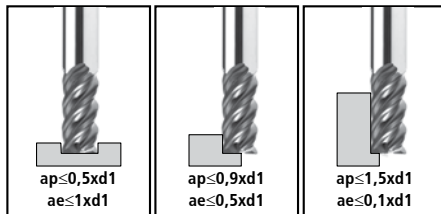
HGT-end mills for pocket- and slot-milling

0384/0394

HPC



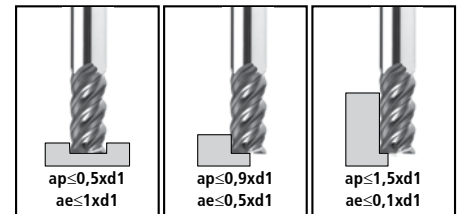
High-temperature alloys:
1.4542 etc.:



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

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

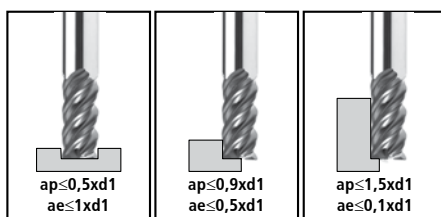
High-nickel alloys (inconel):
718 etc.:



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

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

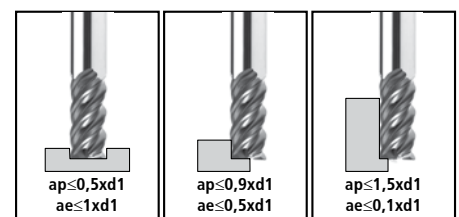
Stainless steel
1.4401, 1.4571, 1.4404 (Cr-Ni-Mo) etc.:



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

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

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



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

d_1	f_z	f_z	f_z
6	0.025	0.025	0.040
8	0.035	0.035	0.055
10	0.045	0.045	0.075
12	0.050	0.050	0.085
16	0.075	0.075	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
High-temperature Alloys	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	-	-	-	-	-	-	-
	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 (Almerit 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	(2HR201; 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
			2.4856	NiCr22Mo9Nb (Inconel 625)	NiCr22MO9Nb	NC22FeDNb	NA 43/Na 21	NCF 625	NiCr22MO9Nb	NiCr22MO9Nb	NiCr22MO9Nb
	Titanium Alloys		-	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	EN-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
Hardened Steel	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	X37CrMo V51 KUa	X37CrMoV5-1	F.520.G	H 11
		1.2344	X40CrMoV51	X40CrMoV5-1	Z40CDV 5	BH 13	SKD 61	X40CrMo V 5 1 1 KU	2242	X40CrMo V 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	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																			
Calculation of revolutions of main spindle in [min-1]:* $n = \frac{V_c \cdot 1000}{\pi \cdot D_{c/eff}}$	Calculation of feed per tooth in [mm/tooth]: $f_z = \frac{V_f}{n \cdot z}$	Calculation of feed per min. in [mm/min.]: $V_f = n \cdot z \cdot f_z$	Calculation of power requirement in [kW]:* $P = \frac{a_e \cdot a_p \cdot V_f}{18000}$																
Calculation of cutting speed in [m/min]:* $V_c = \frac{\pi \cdot D_{c/eff} \cdot n}{1000}$ * Please note: For flat contours use true mill diameter to calculate cutting speed (see Surface Finish section).	Calculation of machining time in [min]: $f_n = z \cdot f_z$ $f_n = \frac{V_f}{n}$	Calculation of machining time in [min]: $T = \frac{l_f}{V_f}$	Calculation of chip volume in [cm3/min]: $Q = \frac{a_e \cdot a_p \cdot V_f}{1000}$ * Please note: The formula given for calculating the power requirement is valid for machining steel only.																
Definitions: <table> <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 [cm3/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 [cm3/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	
Milling cutter: NVV 1192 85 0602 Milling cutter diam.: 6 mm no. of effective teeth: 2 Depth of cut (a_p): 0.2 mm Width of cut: $a_e = f_z$ Material to be machined: 1.2343 Selected cutting speed (V_c): 100 m/min Selected feed per tooth (f_z): 0.1 mm	Calculation of true cutting diameter: $d_{eff} = 2\sqrt{0.2 \cdot (6 - 0.2)} = 2.15 \text{ mm}$ Calculation of revolutions $n = \frac{100 \cdot 1,000}{\pi \cdot 2.15} = 14,805 \text{ U/min}$ Calculation of feed per min.: $V_f = 14,805 \cdot 2 \cdot 0.1 = 2,961 \text{ mm/min}$

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☐ PKD

☐ UMGC

☐ left-hand cutting

Shank Style DIN 6535:

☐ Form HA (plain)
☐ Form HB (with clamping flats)

☐ Qty. required

Coating:

☐ PVAT
☐ PVAS
☐ PVCC
☐ PVCN
☐ PVDiaG

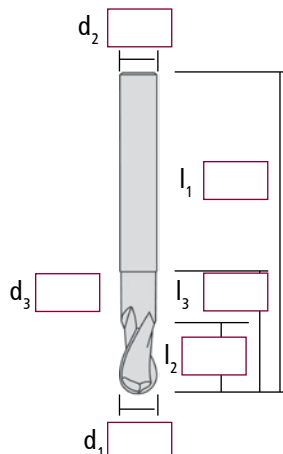
☐ PVCS
☐ PVALSA
☐ PVTi
☐ PVDiaN
☐ PVTiH
☐ Other: _____

Material to be machined:

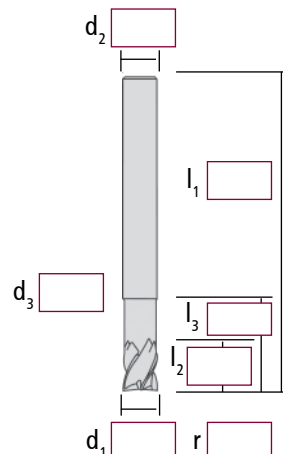
Further details:

☐ No. of teeth
☐ Angle of helix
☐ Straight teeth

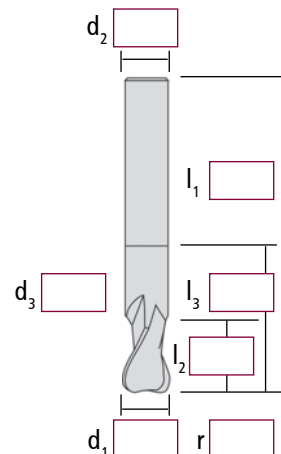
Ball Nose End Mills:



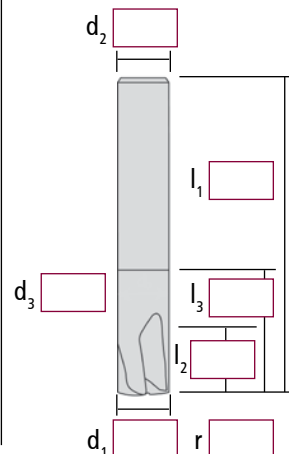
Corner Radius End Mills:



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		NWV013456101	126	NVV016256100	112
NWV010848030	130	NWV013456120	127	NVV016256101	112
NWV010848040	130	NWV013456121	127	NVV016357060	116
NWV010848060	130	NWV013456160	127	NVV016357080	116
NWV010848080	130	NWV013456161	127	NVV016357100	116
NWV010848100	130	NWV013456200	127	NVV016357120	116
NWV010848120	130	NWV013456201	127	NVV016357160	116
NWV013256030	123	NWV014256001	85	NVV016456030	121
NWV013256031	123	NWV014256002	85	NVV016456031	121
NWV013256040	123	NWV014256003	85	NVV016456040	121
NWV013256041	123	NWV014256004	85	NVV016456041	121
NWV013256050	123	NWV014256005	85	NVV016456050	121
NWV013256051	123	NWV014256006	85	NVV016456051	121
NWV013256060	124	NWV014256008	85	NVV016456052	121
NWV013256061	124	NWV014256010	85	NVV016456060	121
NWV013256080	124	NWV014256012	85	NVV016456061	121
NWV013256081	124	NWV014256015	85	NVV016456080	121
NWV013256100	124	NWV014256020	85	NVV016456081	121
NWV013256101	124	NWV016256020	112	NVV016456100	121
NWV013256120	124	NWV0162560206	112	NVV016456101	121
NWV013256121	124	NWV016256021	112	NVV017256020	108
NWV013256160	124	NWV016256022	112	NVV017256040	108
NWV013256161	124	NWV0162560221	112	NVV017256060	109
NWV013256200	124	NWV016256030	112	NVV017256061	109
NWV013256201	124	NWV01625603005	112	NVV017256080	109
NWV013456030	126	NWV0162560301	112	NVV017256100	109
NWV013456031	126	NWV016256031	112	NVV017256101	109
NWV013456040	126	NWV016256040	112	NVV017256103	109
NWV013456041	126	NWV01625604005	112	NVV017256121	109
NWV013456050	126	NWV016256041	112	NVV017256123	109
NWV013456051	126	NWV016256050	112	NVV017256124	109
NWV013456060	126	NWV016256051	112	NVV018256060	110
NWV013456061	126	NWV016256060	112	NVV018256061	110
NWV013456080	126	NWV016256061	112	NVV018256080	110
NWV013456081	126	NWV016256080	112	NVV018256081	110
NWV013456100	126	NWV016256081	112	NVV018256100	111

Catalogue no.	Page
NVV018256101	111
NVV018256103	111
NVV018256123	111
NVV018256124	111
NVV018357060	116
NVV018357061	116
NVV018357080	116
NVV018357081	116
NVV018357100	116
NVV018357101	116
NVV018357103	116
NVV018357120	116
NVV018357123	116
NVV018357124	116
NVV01928500411	136
NVV01928500412	136
NVV01928500413	136
NVV01928500511	136
NVV01928500512	136
NVV01928500513	136
NVV01928500514	136
NVV01928500612	136
NVV01928500613	136
NVV01928500614	136
NVV01928500811	136
NVV01928500812	136
NVV01928500813	136
NVV01928500814	136
NVV01928501021	136
NVV01928501022	136
NVV01928501023	136
NVV01928501024	136
NVV01928501521	136
NVV01928501522	136
NVV01928501523	136
NVV01928501524	136
NVV01928502021	136
NVV01928502022	136

Catalogue no.	Page
NVV01928502023	136
NVV01928502024	136
NVV01928502025	137
NVV01928502051	137
NVV01928502052	137
NVV01928502053	137
NVV01928502054	137
NVV01928502055	137
NVV01928503021	137
NVV01928503022	137
NVV01928503023	137
NVV01928503024	137
NVV01928503051	137
NVV01928503052	137
NVV01928503053	137
NVV01928503054	137
NVV01928504021	137
NVV01928504022	137
NVV01928504023	137
NVV01928504024	137
NVV01928504051	137
NVV01928504052	137
NVV01928504053	137
NVV01928504054	137
NVV01928505021	138
NVV01928505023	138
NVV01928505051	138
NVV01928505053	138
NVV01928506021	138
NVV01928506023	138
NVV01928506051	138
NVV01928506053	138
02	
NVV0222560041	123
NVV0222560051	123
NVV0222560061	123
NVV0222560081	123
NVV0222560101	123

Catalogue no.	Page
NWV0222560151	123
NWV0222560152	123
NWV022256020	123
NWV022256022	123
NWV022256025	123
NWV0222560251	123
NWV022256030	123
NWV022256031	123
NWV022256040	123
NWV022256041	123
NWV022256050	123
NWV022256060	123
NWV022256080	124
NWV022256100	124
NWV022256120	124
NWV022256160	124
NWV022256200	124
NWV022456015	126
NWV022456021	126
NWV022456022	126
NWV022456030	126
NWV022456031	126
NWV022456040	126
NWV022456050	126
NWV022456060	126
NWV022456080	126
NWV022456100	126
NWV022456120	126
NWV022456160	127
NWV022456200	127
NWV025856061	140
NWV025856101	140
NWV025856121	140
NWV025956040	140
NWV025956050	140
NWV025956060	140
NWV025956080	140
NWV025956100	140

Catalogue no.	Page
NVV025956120	140
NVV025956160	140
NVV025956200	140
NVV02745506015	146
NVV02745508020	146
NVV02745510020	146
NVV02745512030	146
NVV027559060	82
NVV027559080	82
NVV027559100	82
NVV027559101	82
NVV027559120	82
NVV027559160	82
NVV028056060	139
NVV028056080	139
NVV028056100	139
NVV028056120	139
NVV028056160	139
NVV028056200	139
NVV029056061	132
NVV029056081	132
NVV029056101	132
NVV029056121	132
NVV029056161	133
NVV029056201	133
NVV029456060	132
NVV029456080	132
NVV029456100	132
NVV029456120	132
NVV029456160	132
03	
NVV032256020	124
NVV032256030	124
NVV032256040	124
NVV032256050	124
NVV032256060	124
NVV032256080	124
NVV032256100	124

Catalogue no.	Page
NVV032256120	124
NVV032256160	124
NVV032256200	124
NVV032456020	127
NVV032456030	127
NVV032456040	127
NVV032456050	127
NVV032456060	127
NVV032456080	127
NVV032456100	127
NVV032456120	127
NVV032456160	127
NVV032456200	127
NVV03325600501	108
NVV03325601001	108
NVV03325601002	108
NVV03325601502	108
NVV033256020	108
NVV03325602002	108
NVV03325602003	108
NVV033256030	108
NVV03325603002	108
NVV03325603003	108
NVV033256031	108
NVV0332560311	108
NVV033256040	108
NVV03325604002	108
NVV033256040021	108
NVV0332560401	108
NVV033256041	108
NVV0332560411	108
NVV033256050	108
NVV03325605002	108
NVV033256051	108
NVV033256060	109
NVV03325606003	109
NVV033256061	109
NVV033256062	109

Catalogue no.	Page
NVV033256080	109
NVV033256081	109
NVV033256082	109
NVV033256083	109
NVV033256100	109
NVV033256101	109
NVV033256102	109
NVV033256103	109
NVV033256120	109
NVV0332561206	109
NVV033256121	109
NVV033256122	109
NVV033256123	109
NVV033456020	118
NVV03345602002	118
NVV033456030	118
NVV03345603002	118
NVV03345603003	118
NVV03345603005	118
NVV033456031	118
NVV033456040	118
NVV03345604002	118
NVV033456041	118
NVV033456050	118
NVV03345605002	118
NVV033456051	118
NVV033456060	118
NVV03345606002	118
NVV03345606003	118
NVV033456061	118
NVV033456062	118
NVV033456080	118
NVV033456081	118
NVV033456082	118
NVV033456083	118
NVV033456100	118
NVV033456101	119
NVV033456102	119

Catalogue no.	Page
NVV033456103	119
NVV033456120	119
NVV033456121	119
NVV033456122	119
NVV033456123	119
NVV033456163	119
NVV035056060	141
NVV035056080	141
NVV035056100	141
NVV035056120	141
NVV035056160	141
NVV035056200	141
NVV035956040	140
NVV035956050	140
NVV035956060	140
NVV035956080	140
NVV035956100	140
NVV035956120	140
NVV035956140	140
NVV035956160	140
NVV035956200	140
NVV036056060	141
NVV036056080	141
NVV036056100	141
NVV036056120	141
NVV036056160	141
NVV036056200	141
NVV036256020	110
NVV036256030	110
NVV036256031	110
NVV036256040	110
NVV036256041	110
NVV036256050	110
NVV036256051	110
NVV036256060	110
NVV036256061	110
NVV0362560611	110
NVV036256062	110

Catalogue no.	Page
NVV036256080	110
NVV036256081	110
NVV036256082	110
NVV036256083	110
NVV036256100	110
NVV036256101	110
NVV036256102	110
NVV036256103	110
NVV036256120	111
NVV036256121	111
NVV036256122	111
NVV036256123	111
NVV036456020	119
NVV036456030	119
NVV036456031	119
NVV036456040	119
NVV036456041	119
NVV036456050	119
NVV036456051	119
NVV036456060	119
NVV036456061	119
NVV036456062	119
NVV036456080	119
NVV036456081	119
NVV036456082	119
NVV036456083	119
NVV036456100	119
NVV036456101	119
NVV036456102	119
NVV036456103	120
NVV036456120	120
NVV036456121	120
NVV036456122	120
NVV036456123	120
NVV037056020	132
NVV037056025	132
NVV037056030	132
NVV037056035	132

Catalogue no.	Page
NWV037056040	132
NWV037056045	132
NWV037056050	132
NWV037056060	132
NWV037056070	132
NWV037056080	132
NWV037056090	132
NWV037056100	132
NWV037056120	132
NWV037056160	132
NWV037056200	133
NWV037355023	144
NWV037355032	144
NWV037355042	144
NWV037355052	144
NWV037355062	144
NWV037355082	144
NWV037355102	144
NWV037355122	144
NWV037355162	144
NWV037455032	146
NWV037455042	146
NWV037455052	146
NWV037455062	146
NWV0374550622	146
NWV037455082	146
NWV0374550822	146
NWV037455102	146
NWV0374551022	146
NWV037455122	146
NWV0374551222	146
NWV037455162	146
NWV0374551622	146
NWV038056030	135
NWV038056040	135
NWV038056050	135
NWV038056060	135
NWV038056080	135

Catalogue no.	Page
NVV038056100	135
NVV038056120	135
NVV038056160	135
NVV038056200	135
NVV038445060	139
NVV038445061	139
NVV038445080	139
NVV038445081	139
NVV038445100	139
NVV038445101	139
NVV038445120	139
NVV038445121	139
NVV038445160	139
NVV038445161	140
NVV038445200	140
NVV038445201	140
NVV038456060	139
NVV038456061	139
NVV038456080	139
NVV038456081	139
NVV038456100	139
NVV038456101	139
NVV038456120	139
NVV038456121	139
NVV038456160	139
NVV038456161	139
NVV038456200	139
NVV038456201	139
NVV039056061	135
NVV039056081	135
NVV039056101	135
NVV039056121	135
NVV039056161	135
NVV039056201	135
NVV03944506005	114, 137
NVV03944506010	114, 137
NVV03944508005	114, 137
NVV03944508010	114, 137

Catalogue no.	Page
NVV03944510005	114, 137
NVV03944510010	114, 137
NVV03944512010	114, 137
NVV03944512020	114, 137
NVV03944516010	114, 137
NVV03944516020	114, 137
NVV03945606005	137
NVV03945606010	137
NVV03945608005	137
NVV03945608010	137
NVV03945610005	137
NVV03945610010	137
NVV03945612010	137
NVV03945612020	137
NVV03945616010	137
NVV03945616020	137
04	
NVV040140010	105
NVV040140020	105
NVV040140030	105
NVV040140040	105
NVV040140050	105
NVV040140060	105
NVV040140080	105
NVV040140100	105
NVV040140120	105
NVV041140010	107
NVV041140015	107
NVV041140020	107
NVV041140030	107
NVV041140040	107
NVV041140050	107
NVV041140060	107
NVV041140080	107
NVV041247010	109
NVV0412470102	110
NVV0412470103	110
NVV041247015	109

Catalogue no.	Page
NVV0412470152	110
NVV0412470153	110
NVV041247020	109
NVV041247021	109
NVV0412470212	110
NVV0412470214	110
NVV041247030	109
NVV0412470302	110
NVV0412470304	110
NVV0412470305	110
NVV041247040	109
NVV0412470404	110
NVV0412470405	110
NVV0412470406	110
NVV041247041	109
NVV041247050	109
NVV0412470505	110
NVV041247060	109
NVV0412470604	110
NVV0412470605	110
NVV0412470606	110
NVV041247080	109
NVV0412470804	110
NVV0412470805	110
NVV0412470807	110
NVV041247100	109
NVV0412471006	111
NVV0412471008	111
NVV041247120	109
NVV0412471205	111
NVV0412471207	111
NVV0412471208	111
NVV041247160	110
NVV0412471605	111
NVV0412471606	111
NVV0412471607	111
NVV0412471608	111
NVV041247200	110

Catalogue no.	Page
NVV0412472006	111
NVV0412472008	111
NVV042247030	109
NVV042247031	109
NVV042247040	109
NVV042247041	109
NVV042247042	109
NVV042247050	109
NVV042247060	109
NVV042247080	109
NVV042247100	109
NVV042247101	109
NVV042247120	109
NVV042247121	110
NVV042247161	110
NVV042247201	110
NVV0423400201	112
NVV042340040	112
NVV042340080	112
NVV042340100	112
NVV042340120	112
NVV042340160	112
NVV043247020	101
NVV0432470201	101
NVV04324702011	100
NVV043247021	100
NVV043247030	101
NVV0432470301	101
NVV04324703011	100
NVV043247031	100
NVV043247040	101
NVV0432470401	102
NVV04324704011	100
NVV043247041	100
NVV043247050	102
NVV0432470501	102
NVV043247060	102
NVV0432470601	102

Catalogue no.	Page
NVV0432470612	102
NVV0432470613	102
NVV043247080	102
NVV0432470805	102
NVV043247081	102
NVV043247100	102
NVV043247101	102
NVV0432471011	102
NVV0432471014	102
NVV0432471016	102
NVV043247120	102
NVV0432471201	102
NVV0432471206	103
NVV0432471208	103
NVV043247160	103
NVV0432471615	103
NVV0432471619	103
NVV043247200	103
NVV0432472009	103
NVV044247004	100
NVV044247006	100
NVV044247008	100
NVV044247010	100
NVV044247015	100
NVV044247020	100
NVV044247030	100
NVV044247040	100
NVV044247050	101
NVV044247060	101
NVV044247080	101
NVV044247100	101
NVV044247120	101
NVV0452480052	124
NVV04524801000	124
NVV04524801010	124
NVV04524801011	124
NVV0452480102	124
NVV04524801020	124

Catalogue no.	Page
NWV0452480151	124
NWV0452480152	124
NWV04524801520	124
NWV04524801521	124
NWV0452480200	124
NWV0452480201	125
NWV0452480202	125
NWV0452480203	125
NWV0452480204	125
NWV0452480205	125
NWV045248021	125
NWV0452480214	125
NWV0452480301	125
NWV0453480300	126
NWV0453480302	126
NWV0453480303	126
NWV0453480304	126
NWV0453480305	126
NWV045348031	126
NWV0453480400	126
NWV04534804001	126
NWV0453480402	126
NWV04534804020	126
NWV04534804021	126
NWV0453480403	126
NWV04534804031	126
NWV0453480404	126
NWV04534804041	126
NWV0453480405	126
NWV04534804051	126
NWV0453480406	126
NWV04534804061	126
NWV045348050	126
NWV0453480502	126
NWV0453480503	126
NWV0453480504	126
NWV045348051	127
NWV045348060	127

Catalogue no.	Page
NVV0453480600	127
NVV04534806001	127
NVV0453480603	127
NVV04534806030	127
NVV04534806031	127
NVV0453480604	127
NVV04534806041	127
NVV0453480605	127
NVV04534806051	127
NVV0453480606	127
NVV04534806061	127
NVV0453480607	127
NVV04534806071	127
NVV0453480608	127
NVV04534806081	127
NVV045348067	127
NVV0453480800	127
NVV04534808001	127
NVV0453480801	127
NVV04534808011	127
NVV0453480810	127
NVV04534808101	127
NVV0453480820	127
NVV04534808201	127
NVV045348083	127
NVV0453481000	127
NVV0453481001	128
NVV0453481002	128
NVV0453481009	127
NVV0453481010	128
NVV0453481011	128
NVV045348102	128
NVV0453481021	128
NVV0453481200	128
NVV0453481201	128
NVV0453481202	128
NVV0453481209	128
NVV04534812091	128

Catalogue no.	Page
NVV0453481210	128
NVV0453481211	128
NVV0453481220	128
NVV0453481221	128
NVV045348160	128
NVV0453481610	128
NVV046243010	101
NVV046243011	100
NVV046243015	101
NVV0462430151	100
NVV046243020	101
NVV04624302005	101
NVV046243021	100
NVV04624302105	100
NVV046243030	101
NVV04624303005	101
NVV046243031	100
NVV04624303105	100
NVV046243040	101
NVV04624304005	102
NVV046243041	100
NVV04624304105	100
NVV046243050	102
NVV04624305005	102
NVV046243051	100
NVV04624305105	101
NVV046243060	102
NVV04624306005	102
NVV04624306010	102
NVV046243061	101
NVV04624306105	101
NVV04624306110	101
NVV046243080	102
NVV0462430801	102
NVV0462430802	102
NVV046243081	101
NVV0462430811	101
NVV0462430812	101

Catalogue no.	Page
NVV046243100	102
NVV0462431002	102
NVV046243101	101
NVV046243120	102
NVV0462431203	102
NVV046243121	101
NVV0462431213	101
NVV046243160	103
NVV046243161	101
NVV046243200	103
NVV046243201	101
NVV047455041	148
NVV047455061	148
NVV0474550611	148
NVV047455081	148
NVV0474550811	148
NVV047455101	148
NVV0474551011	148
NVV047455121	148
NVV0474551211	148
NVV047455162	148
NVV0474551621	148
05	
NVV050456030	90
NVV050456040	90
NVV050456050	90
NVV050456060	90
NVV050456080	90
NVV050456100	90
NVV050456120	90
NVV050456160	90
NVV050456200	90
NVV050456250	90
NVV051456030	88
NVV051456040	88
NVV051456050	88
NVV051456060	88
NVV051456080	88

Catalogue no.	Page
NVV051456100	88
NVV051456120	88
NVV051456160	88
NVV051456200	88
NVV051456250	88
07	
NVV072285001	134
NVV072285002	134
NVV072285003	134
NVV072285004	134
NVV072285005	134
NVV072285006	134
NVV072285008	134
NVV072285010	134
NVV0722850101	134
NVV072285015	134
NVV0722850151	134
NVV07228502002	134
NVV07228502005	134
NVV07228502102	134
NVV07228502105	134
NVV07228503002	134
NVV07228503005	134
NVV07228503102	134
NVV07228503105	134
NVV07228504002	134
NVV07228504005	134
NVV07228504102	134
NVV07228504105	134
NVV07228505002	135
NVV07228505005	135
NVV07228505102	135
NVV07228505105	135
NVV07228506002	135
NVV07228506005	135
NVV07228506010	135
NVV07228506102	135
NVV07228506105	135

Catalogue no.	Page
NVW07228506110	135
NVW07228508005	135
NVW07228508010	135
NVW07228508105	135
NVW07228508110	135
NVW07228510010	135
NVW07228510015	135
NVW07228510110	135
NVW07228510115	135
NVW07228512010	135
NVW07228512020	135
NVW07228512110	135
NVW07228512120	135
11	
NVW113256030	96
NVW113256031	96
NVW113256040	97
NVW113256041	97
NVW113256050	97
NVW113256051	97
NVW113256060	97
NVW113256061	97
NVW113256080	97
NVW113256081	97
NVW113256100	97
NVW113256101	97
NVW113256120	97
NVW113256121	97
NVW113256160	97
NVW113256161	97
NVW113256200	97
NVW113256201	98
NVW113446160	104
NVW113456030	103
NVW113456031	103
NVW113456040	103
NVW113456041	103
NVW113456050	103

Catalogue no.	Page
NWV113456051	103
NWV113456060	103
NWV113456061	103
NWV113456080	103
NWV113456081	103
NWV113456100	103
NWV113456101	103
NWV113456120	104
NWV113456121	104
NWV113456160	104
NWV113456161	104
NWV113456200	104
NWV113456201	104
NWV114256002	84
NWV114256003	84
NWV114256004	84
NWV114256005	84
NWV114256006	84
NWV114256008	84
NWV114256010	84
NWV114256012	84
NWV114256015	84
NWV114256020	84
NWV1162560041	100
NWV116256010	100
NWV1162560101	100
NWV116256015	100
NWV116256020	100
NWV116256021	100
NWV116256025	100
NWV116256030	100
NWV116256031	100
NWV116256040	100
NWV1162560401	100
NWV116256041	100
NWV116256050	100
NWV116256051	100
NWV116256060	100

Catalogue no.	Page
NV116256061	100
NV116256080	100
NV116256081	100
NV116256100	100
NV116256101	100
NV116256121	100
NV116456030	106
NV116456031	106
NV116456040	106
NV116456041	106
NV116456050	106
NV116456051	106
NV116456060	106
NV116456061	106
NV116456080	106
NV116456081	106
NV116456100	106
NV116456101	106
NV1192850033	131
NV1192850041	131
NV1192850042	131
NV1192850043	131
NV1192850051	131
NV1192850052	131
NV1192850053	131
NV1192850061	131
NV1192850062	131
NV1192850063	131
NV1192850081	131
NV1192850082	131
NV1192850083	131
NV1192850101	131
NV1192850102	131
NV1192850103	131
NV1192850151	131
NV1192850152	132
NV1192850153	132
NV1192850154	132

Catalogue no.	Page
NV1192850201	132
NV1192850202	132
NV1192850203	132
NV1192850204	132
NV1192850302	132
NV1192850303	132
NV1192850304	132
NV1192850305	132
NV1192850402	132
NV1192850403	132
NV1192850404	132
NV1192850405	132
NV1192850502	132
NV1192850503	132
NV1192850504	132
NV1192850505	132
NV1192850602	132
NV1192850603	132
NV1192850604	132
NV1192850605	132
12	
NV1222560041	96
NV1222560051	96
NV1222560061	96
NV1222560081	96
NV1222560101	96
NV122256011	96
NV1222560121	96
NV1222560151	96
NV1222560152	96
NV1222560161	96
NV1222560181	96
NV1222560201	96
NV122256021	96
NV122256030	96
NV1222560301	96
NV122256040	96
NV1222560401	96

Catalogue no.	Page
NV122256050	97
NV122256060	97
NV122256080	97
NV122256100	97
NV122256120	97
NV122256160	97
NV122256200	97
NV122456020	103
NV122456030	103
NV1224560301	103
NV122456040	103
NV122456050	103
NV122456060	103
NV1224560601	103
NV122456080	103
NV122456100	103
NV1224561001	103
NV122456120	103
NV1224561201	104
NV122456160	104
NV122456200	104
NV123256010	96
NV123256020	96
NV123256030	96
NV123256040	97
NV123256050	97
NV123256055	97
NV123256060	97
NV123256080	97
NV123256100	97
NV123256120	97
NV123256160	97
NV123256200	98
13	
NV131259011	81
NV131259016	81
NV131259021	81
NV131259031	81

Catalogue no.	Page
NWV131259041	81
NWV131259051	81
NWV131259061	81
NWV131259081	81
NWV131259101	81
NWV131259121	81
NWV131359011	80
NWV131359016	80
NWV131359021	80
NWV131359031	80
NWV131359041	80
NWV131359051	80
NWV131359061	80
NWV131359081	80
NWV131359101	80
NWV131359121	80
NWV132256020	98
NWV132256030	98
NWV132256040	98
NWV132256050	98
NWV132256060	98
NWV132256080	98
NWV132256100	98
NWV132256120	98
NWV132256160	98
NWV132456020	104
NWV132456030	104
NWV132456040	104
NWV132456050	104
NWV132456060	104
NWV132456061	104
NWV132456080	104
NWV132456100	104
NWV132456120	104
NWV132456160	104
NWV132456200	104
NWV134256030	102
NWV134256040	102

Catalogue no.	Page
NWV134256050	102
NWV134256060	102
NWV134256080	102
NWV134256100	102
NWV134256120	102
NWV136256020	114
NWV136256030	114
NWV136256040	114
NWV136256050	114
NWV136256060	114
NWV136256080	114
NWV136256100	114
NWV136256120	114
NWV136256160	114
14	
NWV141247010	96
NWV141247015	96
NWV141247020	96
NWV141247021	96
NWV141247030	96
NWV141247040	96
NWV141247050	96
NWV141247060	97
NWV141247080	97
NWV141247100	97
NWV141247120	97
NWV141247140	98
NWV141247160	98
NWV141247180	98
NWV141247200	98
NWV142247020	96
NWV142247030	96
NWV142247031	96
NWV142247040	96
NWV142247041	96
NWV1422470501	96
NWV1422470511	96
NWV142247060	97

Catalogue no.	Page
NWV142247061	97
NWV142247080	97
NWV142247081	97
NWV142247100	97
NWV142247101	97
NWV142247120	97
NWV142247121	97
NWV142247140	98
NWV142247141	98
NWV142247160	98
NWV142247161	98
NWV142247201	98
NWV1432470101	94
NWV1432470102	94
NWV1432470103	94
NWV1432470104	94
NWV1432470105	94
NWV1432470106	94
NWV1432470152	94
NWV1432470153	94
NWV1432470154	94
NWV1432470155	94
NWV1432470156	94
NWV1432470212	94
NWV1432470213	94
NWV1432470214	94
NWV14324702141	94
NWV1432470215	94
NWV14324702151	94
NWV1432470253	94
NWV1432470254	94
NWV14324702551	94
NWV1432470302	94
NWV1432470304	94
NWV1432470305	95
NWV1432470306	95
NWV1432470402	95
NWV1432470404	95

Catalogue no.	Page
NWV1432470405	95
NWV1432470406	95
NWV1432470604	95
NWV1432470605	95
NWV1432470606	95
NWV1432470607	95
NWV1432470608	95
NWV14324708051	95
NWV1432470807	95
NWV1432470808	95
NWV1432471006	95
NWV1432471007	95
NWV1432471008	95
NWV1432471009	95
NWV1432471206	95
NWV1432471207	95
NWV1432471208	95
NWV1432471209	95
NWV1432471609	95
NWV1432472009	95
NWV1452480050	119
NWV14524800510	119
NWV1452480052	119
NWV145248010	119
NWV14524801000	119
NWV1452480101	119
NWV1452480102	119
NWV1452480103	119
NWV14524801510	119
NWV1452480152	119
NWV1452480153	119
NWV1452480200	119
NWV1452480201	119
NWV1452480202	119
NWV1452480203	119
NWV1452480204	119
NWV1452480205	119
NWV1452480301	120

Catalogue no.	Page
NWV1452480302	120
NWV1452480303	120
NWV1452480304	120
NWV1452480305	120
NWV1452480306	120
NWV1452480402	120
NWV1452480403	120
NWV1452480404	120
NWV1452480405	120
NWV1452480406	120
NWV1452480502	120
NWV1452480503	120
NWV1452480504	120
NWV1452480601	120
NWV1452480603	120
NWV1452480604	120
NWV1452480605	120
NWV1452480606	120
NWV1452480607	120
NWV1452480608	120
NWV1452480800	120
NWV1452480801	120
NWV1452480802	121
NWV145248081	121
NWV145248082	121
NWV1452481009	121
NWV1452481010	121
NWV1452481209	121
NWV1452481210	121
NWV1452481220	121
NWV1453481009	122
NWV1453481010	122
NWV1453481020	122
NWV1453481209	122
NWV1453481210	122
NWV1453481220	122
NWV1453481610	122
NWV145348162	122

Catalogue no.	Page
NWV1453482000	122
NWV1453482010	122
NWV146243004	96
NWV146243010	96
NWV146243015	96
NWV146243020	96
NWV146243025	96
NWV146243030	96
NWV146243040	96
NWV146243050	96
NWV146243060	97
NWV146243080	97
NWV146243090	97
NWV146243100	97
NWV146243120	97
NWV146243140	98
NWV146243160	98
NWV146243180	98
NWV146243200	98
NWV1462490031	118
NWV1462490041	118
NWV1462490051	118
NWV1462490061	118
NWV1462490081	118
NWV146249011	118
NWV1462490151	118
NWV146249021	118
NWV146249031	118
NWV1462490411	118
NWV1462490511	118
NWV1462490611	118
NWV1462490614	118
NWV1462490811	118
NWV1462491001	118
NWV14723081	97
NWV147243041	96
NWV147243051	96
NWV147243060	97

Catalogue no.	Page
NW147243061	97
NW147243080	97
NW147243081	97
NW147243101	97
NW147243121	97
NW147243141	98
NW147243161	98
NW147243181	98
NW147243201	98
17	
NW172285001	130
NW172285002	130
NW172285003	130
NW172285004	130
NW172285005	130
NW172285006	130
NW172285008	130
NW172285010	130
NW1722850101	130
NW172285015	130
NW1722850151	130
NW172285020	130
NW1722850201	130
NW172285030	130
NW1722850301	130
NW172285040	130
NW1722850401	130
NW172285050	130
NW1722850501	130
NW172285060	130
NW1722850601	130
NW172285080	130
NW1722850801	131
NW172285100	131
NW1722851001	131
NW172285120	131
NW1722851201	131
NW172285160	131

Catalogue no.	Page
NW1722851601	131
A-Z	
SVV025345030	112
SVV025345040	112
SVV025345050	112
SVV025345060	112
SVV025345080	112
SVV025345100	112
SVV025345120	112
SVV025345160	112
SVV04524800403	124
SVV04524800404	124
SVV04524800503	124
SVV04524800603	124
SVV04524800604	124
SVV04524800803	124
SVV04524800804	124
SVV0452480152	124
SVV04524801521	124
SVV0452480154	124
SVV0452480202	124
SVV04534806073	127
SVV04534810102	128
SVV116256034	100
SVV14524800403	119
SVV14524800404	119
SVV14524800503	119
SVV14524800504	119
SVV14524800603	119
SVV14524800604	119
SVV14524800803	119
SVV14524800804	119

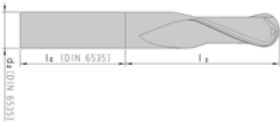
Catalogue no.	Page
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QUICKFINDER

General-purpose tolerances for Solid Carbide End Mills

Type	d_1	d_2	r
FGT	h_8	h_5	$\pm 0,005$
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_s and l_s :

	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.

