ZCC Cutting Tools
Europe GmbH

Product Innovations 05/2022

miniTURN – YBG205H – FMP06 – FMA17 – FMP17 – FMR04 – TM series – VPM series – UD series

– EN –

The Company

Zhuzhou Cemented Carbide Cutting Tools Co., Ltd. (ZCC-CT) is located in Zhuzhou, Hunan in the People's Republic of China is the largest Chinese manufacturer of carbide tools. ZCC-CT belongs to the Zhuzhou Cemented Carbide Group (ZCC), which manufactures carbide products and carbide powders. Both companies are part of the Minmetals Corporation, which Trades in mining metals and minerals.

Since its founding in 1953, ZCC Cutting Tools has become one of the world's leading carbide manufacturers and has more than 2,000 employees, thanks to its highly qualified staff and use of the latest technologies. As a Minmetals Corporation company, ZCC-CT can completely cover the entire value-added chain of modern carbide tool production from the extraction of raw materials to the coated final product and all the steps in between.

Based on the latest European production technologies, it is possible for us to offer products with a consistent high quality at all times. The extensive product range includes carbide indexable inserts, indexable inserts made from cermet, CBN, PKD and ceramic, solid carbide tools as well as turning tool holders and suitable tool systems. The products are produced in accordance with the current international standards, such as ISO, DIN, ANSI, JIS and BSI. In addition, ZCC Cutting Tools offer customer-specific solutions and special carbide products in accordance with specifications.

Research and development are a very high priority at ZCC-CT. In this area ZCC-CT use the world's most modern equipment and advanced machinery from Germany and Switzerland, for which the investments are higher than average. With highly trained engineers and a qualified international team, ZCC Cutting Tools researches the necessary foundations and is constantly developing new and improved products based on them. The company continuously strives to improve quality in order to meet customers' growing demands for new and innovative products and to be able to individually enhance customer benefits.

Both production and administration in China are subject to the ISO 9001:2008 standard. Environmental management is subject to the ISO 14001:2004 standard.

Since 2003, ZCC Cutting Tools has had a branch office in Europe.

The European head office and central warehouse are located in Düsseldorf, Germany. All European countries as well as Russia and Turkey are serviced from there. The company's quality management system is certified in the area of sales and logistics of tools for metal processing in accordance with DIN EN ISO 9001:2008.

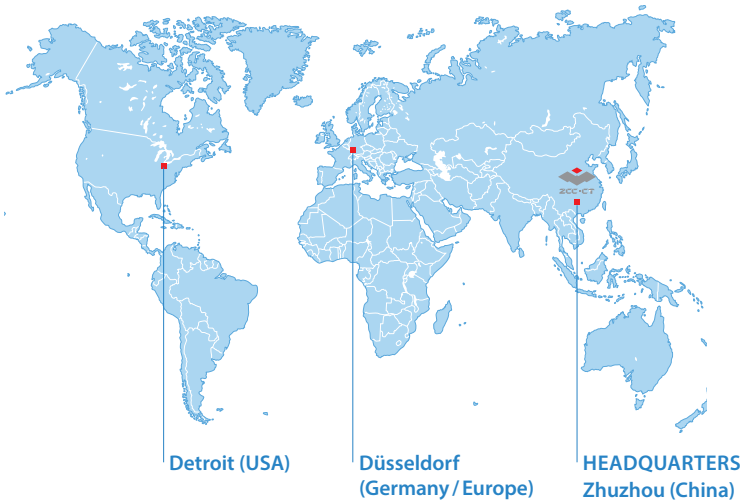
In order to meet our own high requirements for above-average customer service and in parallel with the growth of the company as a whole, the number of employees at ZCC Cutting Tools is growing in sales and internal sales, in technical support and application technology, research and development as well as in the areas of logistic, marketing, IT, human resources and accounting.

Our sales representatives and our sales partners in Europe together serve customers on site. ZCC-CT application engineers are furthermore available with all their expertise and experience by phone, email or personally in your production environment.

The internal sales team handles enquiries throughout Europe with native speakers and ensures together with the employees in logistics that all orders are delivered to you and all our customers as fast as possible.

All of us at ZCC Cutting Tools Europe are here for you and will support you as your competent partner in all questions of machining production. That is our definition of added value through partnership.

Member of Minmetals Group



This brochure will be presenting the following new products:

Product Innovations 05/2022

A glimpse inside: Highlights from previous Product Innovations brochures

Product Innovations 11/2021

GENERAL TURNING
XF chip breaker – For maximum control
XM chip breaker – High-performance all-round tool
YBC grade – For unrivalled productivity and reliability
RF / RH chip breaker – Specialised chip breakers for rail applications
LNUX inserts – Specialised inserts for rail applications
CNMM / CNMG inserts – Specialised inserts for rail applications
External tool holders for rail applications
ZNEX compact boring system – Specialised tool for cutting hard metals

PARTING & GROOVING
zFlex – Extension: now also available for deep parting off operations

SOLID CARBIDE MILLING
UM series – Extension: end mills with five cutting edges and neck
UMC series – Short chips despite long cutting edges

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Product Innovations 05/2021

PARTING & GROOVING
zFlex – Modular grooving system

INDEXABLE MILLING
FMA04 – Ideal choice when working under unstable conditions or on thin components
FMWX – Maximum precision and ultra-high surface qualities
EMP09 – Extension: GL chip breaker for LNKT inserts

SOLID CARBIDE MILLING
ALP / ALG series – Extension: single-edged tools (for full-slot machining and profiling)

SOLID CARBIDE DRILLS
GD series – Extension: Now also available in 3xD with Weldon surface

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Product Innovations 09/2020

GENERAL TURNING
zRay – Extension: now available with dual coolant supply

INDEXABLE MILLING
FMA12 – Extension: GL/GH/W chip breakers now available in combination with YB9320 grade (for ONHU/ONMU)
QCH series – Indexable interchangeable head milling cutters

SOLID CARBIDE MILLING
HPC series – Extension: KMG406 grade

INDEXABLE DRILLS
ZSD series – For optimum surface quality

SOLID CARBIDE DRILLS
UD series – Solid carbide drills for difficult-to-machine materials
GD series – Solid carbide drills for high feeds

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Product Innovations 03/2020

GENERAL TURNING

zRay – 100% chip control
YBC103 grade – Maximum productivity
XM chip breaker – High-performance all-rounder
YB7305 grade – Maximum performance for cast iron materials
TK chip breaker – The universal tool for cast iron materials
YBS103 grade – High-performance PVD grade for nickel-based alloys
YBS203 grade – Universal PVD grade for turning and milling operations

PARTING & GROOVING

Precision monoblock tool holder – Extension: Now available with internal cooling

INDEXABLE MILLING

YBS203 grade – High-performance PVD grade for nickel-based alloys
YBS303 grade – Universal PVD grade for titanium alloys with an interrupted cut
NM chip breaker – For reliable machining operations
XR chip breaker – Universal high-feed geometry

SOLID CARBIDE MILLING

PM series – Program extension in the field of micro-machining
TM series – For machining titanium and superalloys
QCH series – Solid carbide interchangeable head milling cutters
FM series – Extension: 120° deburring cutter

Go to PDF online

Notes

General turning

A

miniTURN *Solid Carbide*

New YPG202 grade for enhanced performance New

YOUR BENEFITS

– Chip-forming elements for optimum chip control
– Precision-ground cutting edges for low cutting forces
– New **YPG202** grade with enhanced heat resistance for maximum tool life
– Ultra-smooth coating surface for minimal heat transfer

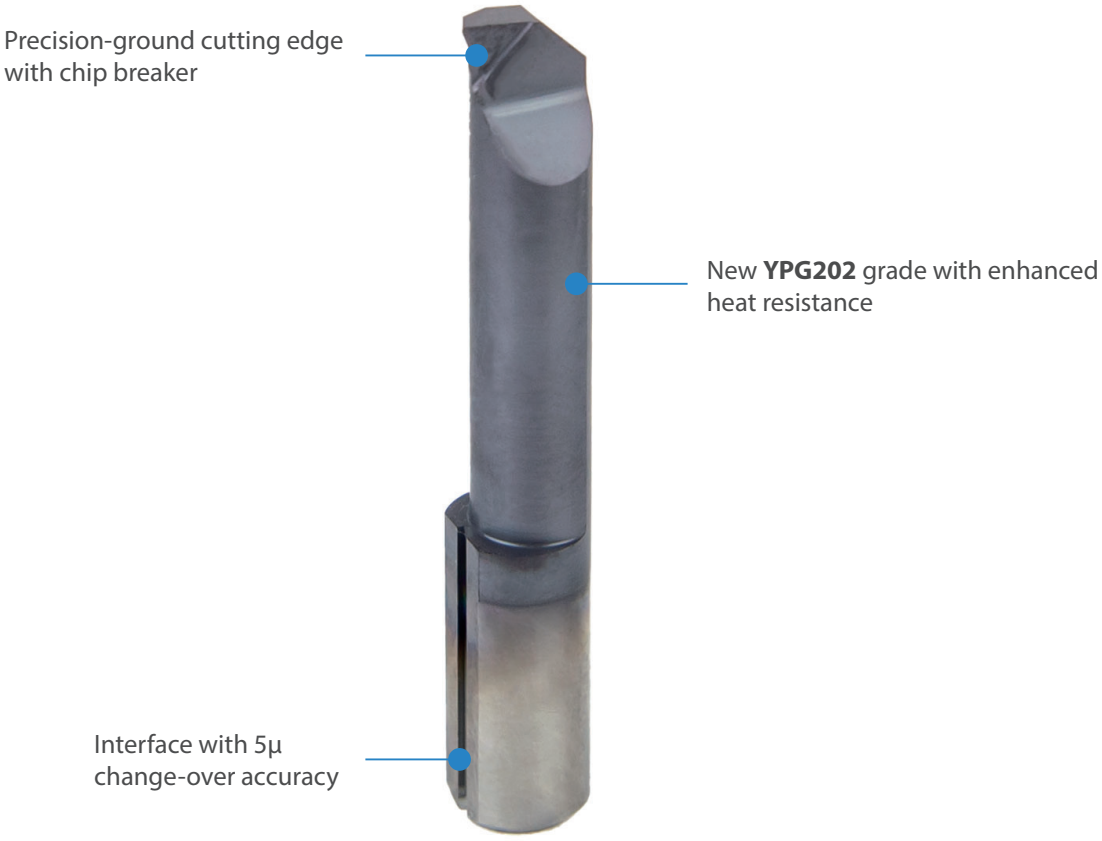


Fig.: T1.7.68.31.020R YPG202

All inserts are now available in the **new YPG202 grade** in our **online ordering system**. Order now!

https://www.zccct-europe.com/en/services/tools-order

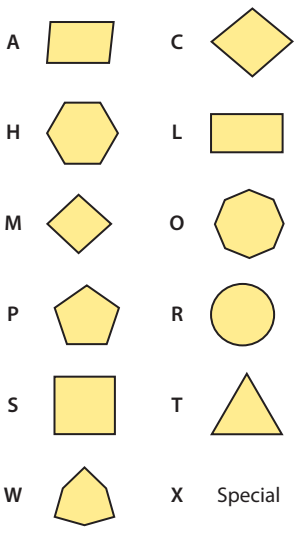
Indexable milling

B

Indexable milling ISO code – inserts

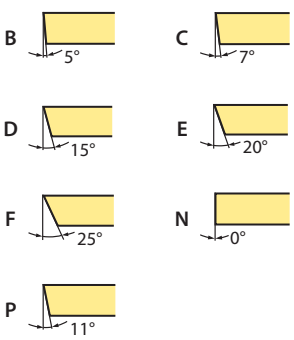
S	P	K	N	12	04	ED	T21K	R	–	DM
1	2	3	4	5	6	7	8	9		10

Insert shape



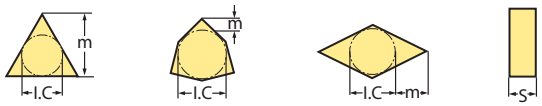
1

Clearance angle



2

Tolerance class

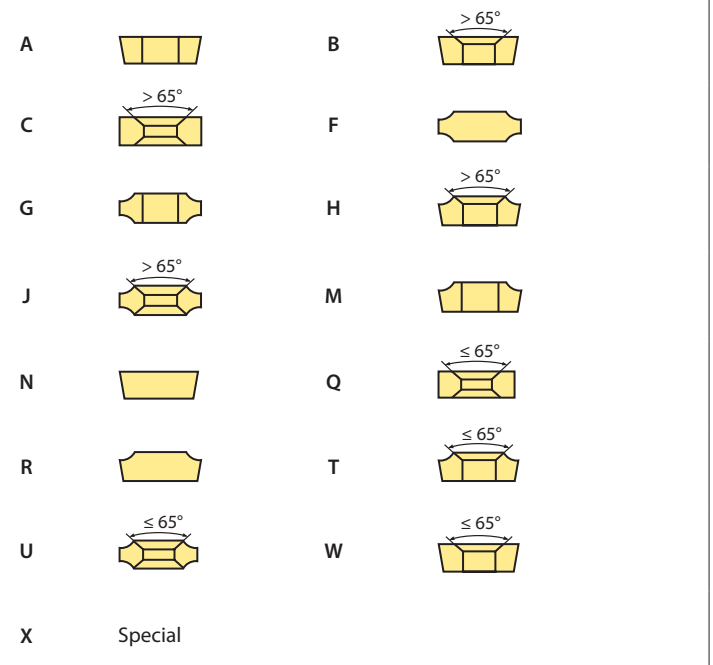


Code	I.C [mm]	m [mm]	S [mm]
A	±0,025	±0,005	±0,025
C	±0,025	±0,013	±0,025
E	±0,025	±0,025	±0,025
F	±0,013	±0,005	±0,025
G	±0,025	±0,025	±0,130
H	±0,013	±0,013	±0,025
J	±0,05–0,13	±0,005	±0,025
K	±0,05–0,13	±0,013	±0,025
L	±0,05–0,13	±0,025	±0,025
M	±0,05–0,13	±0,08–0,18	±0,130
N	±0,05–0,13	±0,08–0,18	±0,025
U	±0,08–0,25	±0,13–0,38	±0,130

3

Fastening features (metric)

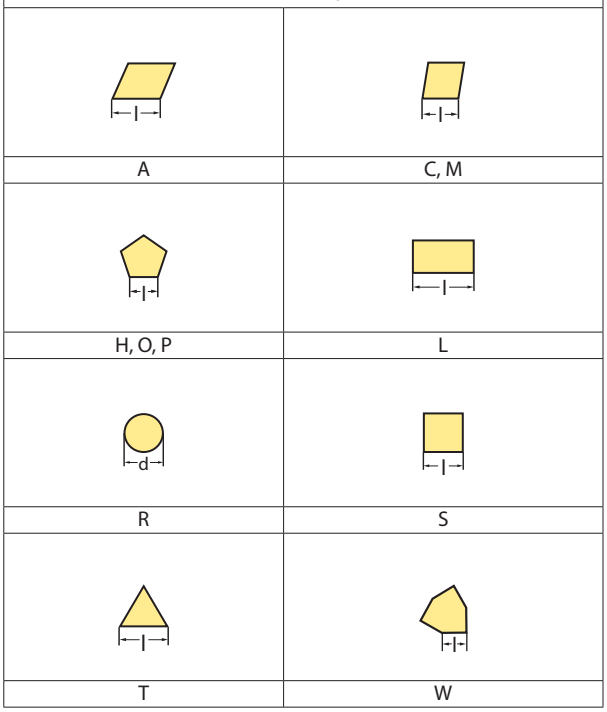
Insert shape



4

Cutting edge length l [mm]

Insert shape



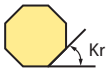
5

Insert thickness S [mm]

Code	S	Code	S
00	0,79	**05**	5,56
T0	0,99	**T5**	5,95
01	1,59	**06**	6,35
T1	1,98	**T6**	6,75
02	2,38	**07**	7,94
T2	2,58	**09**	9,52
03	3,18	**T9**	9,72
T3	3,97	**11**	11,11
04	4,76	**12**	12,70
T4	4,96		

6

Angle



Code	Kr	Code	αn
A	45°	**A**	3°
D	60°	**B**	5°
E	75°	**C**	7°
F	85°	**D**	15°
P	90°	**E**	20°
Z	Special	**F**	25°
		G	30°
		N	0°
		P	11°
		Z	Special

7

Chamfer

Code	Type
F	
E	
T	
S	

Code	Angle
0	5°
1	10°
2	15°
3	20°
4	25°
5	30°

Code	Width [mm]
0	0,10
1	0,15
2	0,20
3	0,25
4	0,30
5	0,35
6	0,40
7	0,45

Code	Position
K	
P	
W	
–	

8

Cutting direction

Code	Description
R	Right
L	Left
N	Right and left

9

Chip breakers

10

Indexable milling

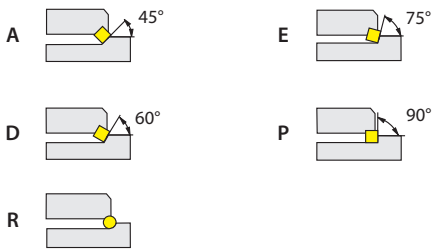
System code – milling bodies

FM	A	12	050	–	A22	O	–	N	06	–	04	(L)	(C)
1	2	3	4		5	6		7	8		9	10	11

Type	
Code	Description
BM	Profile milling
CM	Chamfer milling
EM	Square shoulder milling
FM	Face milling
HM	Helical milling
SM	Slot milling
TM	T-slot milling
XM	Special

1

Entering angle



2

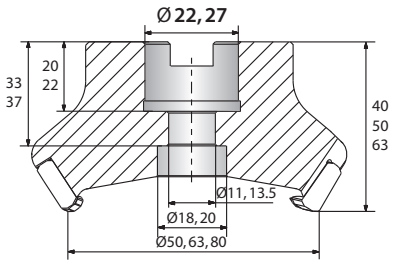
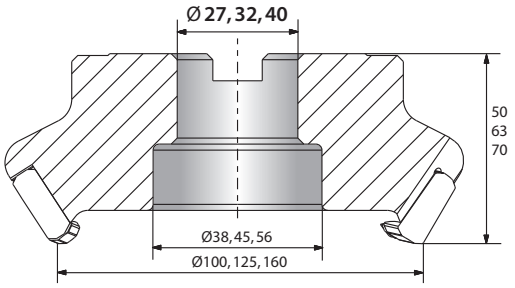
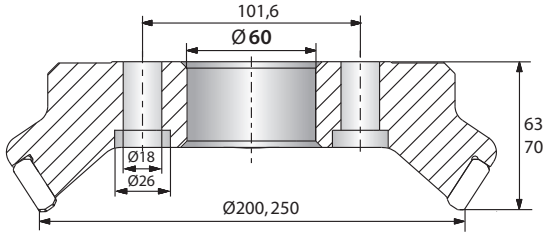
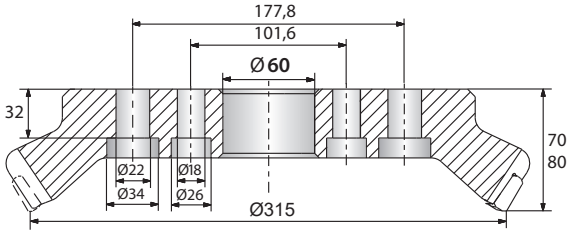
Serial number

3

Nominal diameter [mm]	
Code	Description
025	25
050	50
160	160
315	315
...	

4

Type and size of tool holders

Code	Type	Code	Type
A	Nominal diameter Ø50 – 80 mm 	**B**	Nominal diameter Ø100 – 160 mm 
C	Nominal diameter Ø200 – 250 mm 	**D**	Nominal diameter Ø315 mm 
G	Straight shank	**XP**	Weldon shank
K	Bore with keyway		

5

With respect to mounting please adhere to the information provided by the tool holder manufacturer.

Insert shape			
A		C	
H		L	
M		O	
P		R	
S		T	
W		X	Special
Z	Special		

6

Clearance angle			
B	5°	C	7°
D	15°	E	20°
F	25°	N	0°
P	11°		

7

Cutting edge length l [mm]	
Insert shape	
	
A	C, M
	
H, O, P	L
	
R	S
	
T	W

8

Number of teeth

9

Cutting direction	
Code	Description
L	Left

10

With inner cooling

11

Tools with B coupling and inner coolant supply require the following spare parts:

Coolant clamp screw

Coolant shower plate

Spare parts (B coupling with inner coolant supply)

		B27	B32	B40	B40
	Ø	**80**	**100**	**125**	**160**
	**Coolant clamp screw**	LDB27C	LDB32C	LDB40C	LDB40C
	**Coolant shower plate**	B27-002-CP	B32-002-CP	B40-002-CP	B40-003-CP

When purchasing tools with inner coolant supply and B coupling these spare parts are included in delivery.

YBG205H grade

Optimal for high-temperature applications

YOUR BENEFITS

– Ultra-modern TiAlSiN PVD coating with optimal stability for a long tool life
– Well suited for machining steel, stainless steel, aluminium and hardened steel up to HRC 58.
– Thin layer structure for optimally defined and prepared cutting edges
– Ideal for dry machining operations

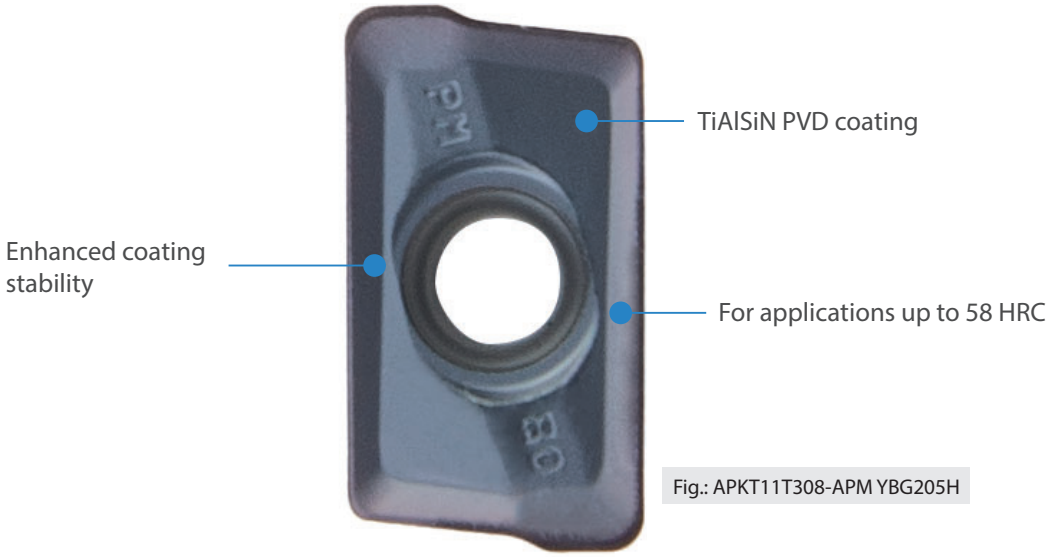


Fig.: APKT11T308-APM YBG205H

The following articles are currently available with the new YBG205H grade:

Article	Stock
APKT0702-XR YBG205H	●
APKT11T308-APM YBG205H	●
APKT160408-APM YBG205H	●
LNKT080408PNR-GM YBG205H	●
LNKT120608PNR-GM YBG205H	●
ONHU09T508ANN-GM YBG205H	●
RDKT1204MO-MM YBG205H	●
RDKW1003MO-1 YBG205H	●
RDKW12T3MO-1 YBG205H	●
RDMT10T3MO-MM YBG205H	●
RDMT10T3MO-M YBG205H	●
RDMT1204MO-MM YBG205H	●
RDMT1204MO-M YBG205H	●
RDMW10T3MO-H YBG205H	●
RDMW1204MO-H YBG205H	●
SDMT06T208-PM YBG205H	●
SDMT09T312-DM YBG205H	●

● Ex stock ○ On demand

Article	Stock
SDMT09T312-PM YBG205H	●
SDMT120412-DM YBG205H	●
SDMT120412-NM YBG205H	○
SDMT120412-PM YBG205H	●
SEET120308PER-APR YBG205H	●
SEET12T3-DF YBG205H	●
SEET12T3-DM YBG205H	●
SNEG1205ANR-GM YBG205H	●
SNEG1506ANR-GM YBG205H	●
SNGX1205ANN-GH YBG205H	●
SNGX1205ANN-GL YBG205H	●
SNGX1205ANN-GM YBG205H	●
SNGX1205PNN-GH YBG205H	●
SNGX1205PNN-GL YBG205H	●
SNGX1205PNN-GM YBG205H	●
SNMX120512-GH YBG205H	●
SNMX120512-GM YBG205H	●

● Ex stock ○ On demand

Notes

FMP06 face milling system

High-performance hard machining with 88° approach angle

YOUR BENEFITS

– Milling system for high-performance values
– Milling system for solid carbide and ceramic inserts
– Inserts with S geometry for high feed rates and machining capacities
– Safe and easy to use thanks to screw and wedge clamping
– Eight-edged inserts for efficient machining operations

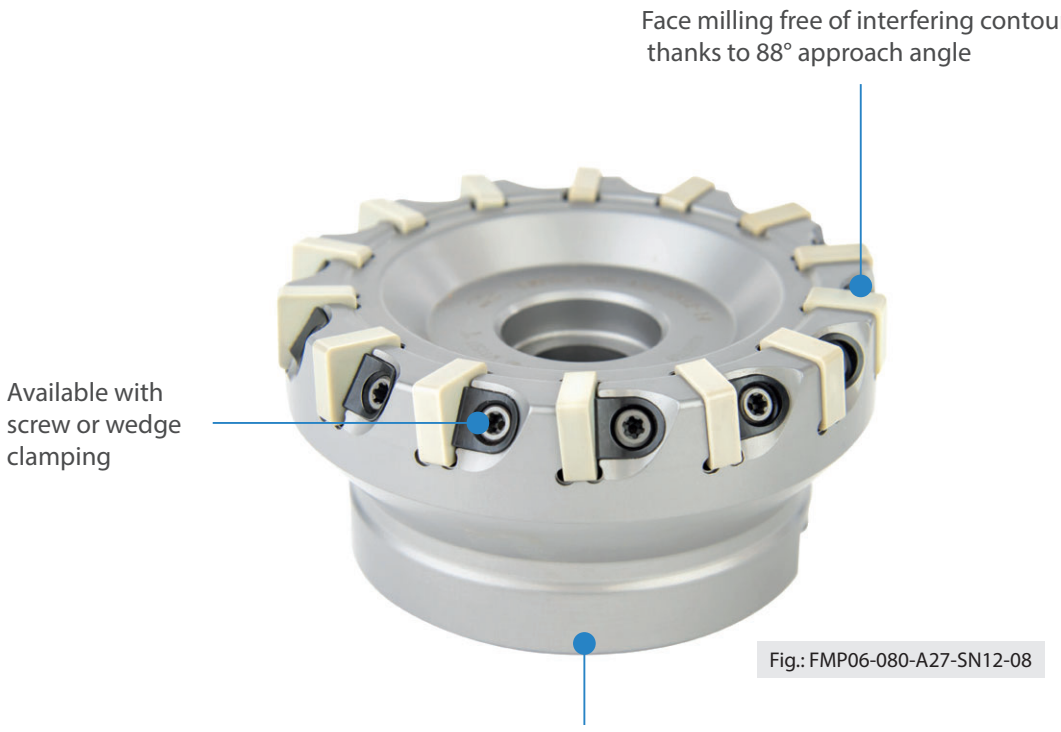


Fig.: FMP06-080-A27-SN12-08

Insert grades

YBM253	YBG102	YBD152	YBD252	CN1000	CM1000
PVD *P20–P40* *M15–M35*	*PVD* *S05–S15*	*CVD* *K15–K35*	*CVD* *K20–K35*	*Si_3N_4 ceramic* –	*Mixed ceramic* –

Chip breaker

SNCU-CF	SNCU-CM	SNCU-W	SNGA	SNGN
				
Finishing	General machining	Finishing	Medium machining	Medium machining

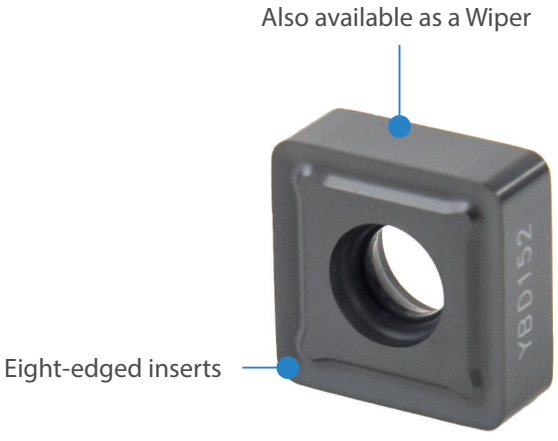


Fig.: SNCU120412-CF YBD152

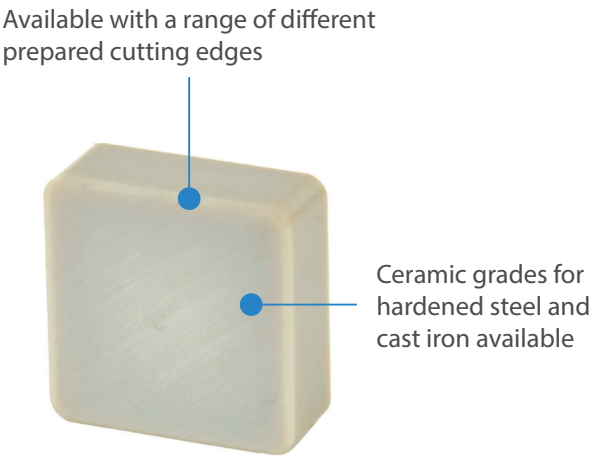
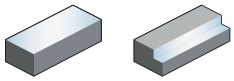
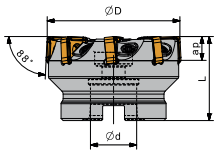


Fig.: SNGA120408T02020 CM1000

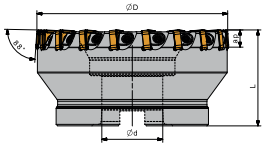
Face milling

FMP06 Kr: 88°

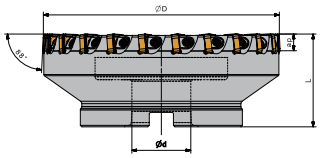




A



B



C

Article	✻	Stock	Dimensions [mm]					Teeth	Coupling	kg	Inserts
			ØD	$ØD_1$	ød	L	$a_{p\,max}$				
FMP06-050-A22-SN12-04		●	50	51.3	22	40	9.8	4	A	0.46	
FMP06-063-A22-SN12-06		○	63	64.3	22	40	9.8	6	A	0.55	
FMP06-063-A22-SN12-08		●	63	64.3	22	50	9.8	8	A	0.5	
FMP06-080-A27-SN12-08		○	80	81.3	27	40	9.8	8	A	1.1	
FMP06-100-A32-SN12-10		○	100	101.3	32	50	9.8	10	A	1.4	
FMP06-080-A27-SN12-11		●	80	81.3	27	50	9.8	11	A	1.2	
FMP06-100-A32-SN12-14		●	100	101.3	32	50	9.8	14	A	1.8	
FMP06-125-B40-SN12-12		○	125	126.3	40	63	9.8	12	B	3.2	SN**1204
FMP06-125-B40-SN12-18		●	125	126.3	40	63	9.8	18	B	3.5	
FMP06-160-C40-SN12-14		○	160	161.3	40	63	9.8	14	C	4	
FMP06-200-C60-SN12-16		○	200	201.2	60	63	9.8	16	C	6.5	
FMP06-250-C60-SN12-18		○	250	251.2	60	63	9.8	18	C	11.5	
FMP06-160-C40-SN12-22		●	160	161.3	40	63	9.8	22	C	4.7	
FMP06-200-C60-SN12-28		○	200	201.2	60	63	9.8	28	C	6.6	
FMP06-250-C60-SN12-36		○	250	251.2	60	63	9.8	36	C	13	

● Ex stock ○ On demand

✻ With internal cooling

Spare parts

	Insert	**SN**1204**	**SN**1204**
	ØD	**50-250**	**63-250**
	Screw (insert)	l60M4×10 (3.4 Nm)	
	Screw (wedge)		DM6×20A (7.0 Nm)
	Wedge		W18N
	Wrench (insert)	WT15IT	WT15IT

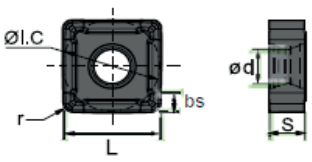
SNCU	L	I.C	S	d
12 04	12,7	12,7	4,76	4,68

SNGA	L	I.C	S	d
12 04	12,7	12,7	4,76	5,16

SNGN	L	I.C	S	d
12 04	12,7	12,7	4,76	–

Milling inserts

Ideal machining conditions
Normal machining conditions
Unfavourable machining conditions



SN** negative insert				HC¹ (CVD)				HC¹ (PVD)	CN	CM
			P	◌	◌		◌			
			M		◌					
			K			◌	◌	●	●	
			N							
			S		◌			●		
			H							●
	ISO	r	bs	YBC302	YBM253	YBD152	YBD252	YBG102	CN1000	CM1000
	**SNCU1204-W**	–	4		○	○		○		
	**SNCU120412-CF**	1,2	1,5	○		○	○			
	**SNCU120412-CM**	1,2	1,5	○		○	○			
	**SNGA120404T02020**	0,4	–						○	
	SNGA120408S02020	0,8	–							○
	SNGA120408T02020	0,8	–						○	○
	SNGA120412T02020	1,2	–						○	
	**SNGN120408S02020**	0,8	–							○
	SNGN120408T00520	0,8	–						○	
	SNGN120408T02020	0,8	–						●	
	SNGN120412T02020	1,2	–						○	
	SNGN120416T02020	1,6	–						○	

● Ex stock ○ On demand

HC¹ Coated carbide
HT Uncoated cermet
HC² Coated cermet
HW Uncoated carbide

FMA17 face milling system

Versatile milling system for efficient facing operations

YOUR BENEFITS

– The 45° milling system with negative inserts ensures a stable cutting edge
– Available for a wide range of finishing and roughing applications
– The newly developed chip breakers feature a positive insert geometry and generate lower cutting forces
– The **SNMX120512-**** insert can be used in combination with the **FMA17** and **FMP17** systems
– Highly economical thanks to eight-edged inserts

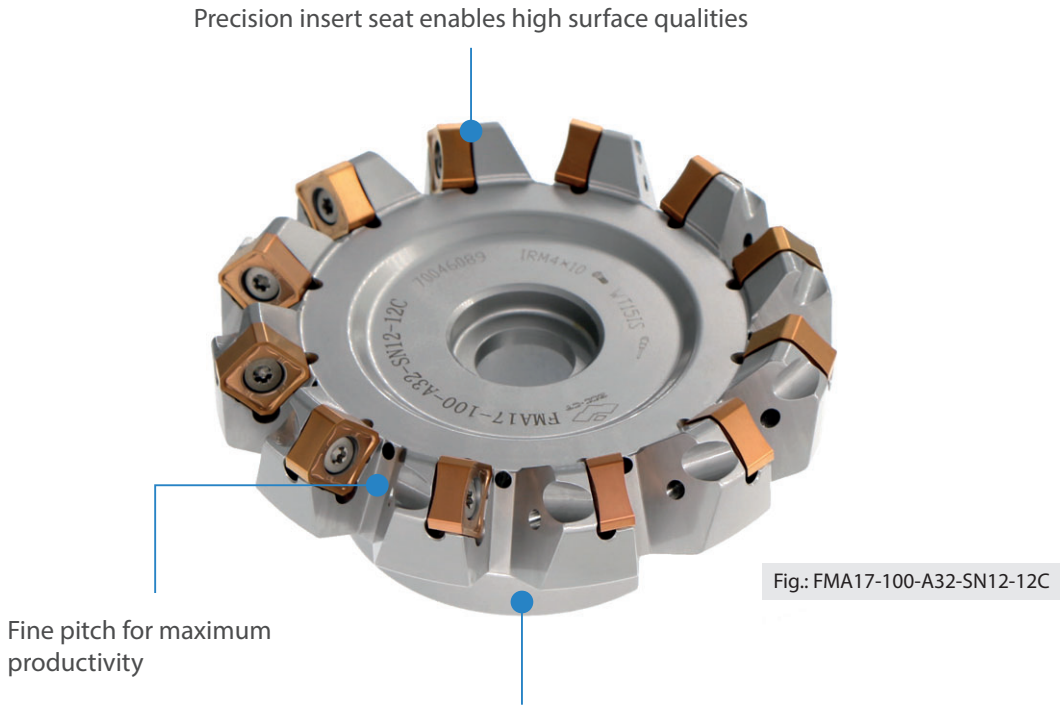


Fig.: FMA17-100-A32-SN12-12C

Note: The FMA17 milling system can be used in combination with SNGX1205**ANN** and SNMX120512 inserts.

Insert grades

YBM253	YBG205H	YBD252	YBS303
CVD	*PVD*	*CVD*	*PVD*
P20 – P40	*P10 – P30*	*K20 – K35*	*S25 – S35*
M15 – M35	*M20 – M40*		

Chip breaker

SN*X-GL	SN*X-GM	SN*X-GH
		
Finishing	General machining	Roughing

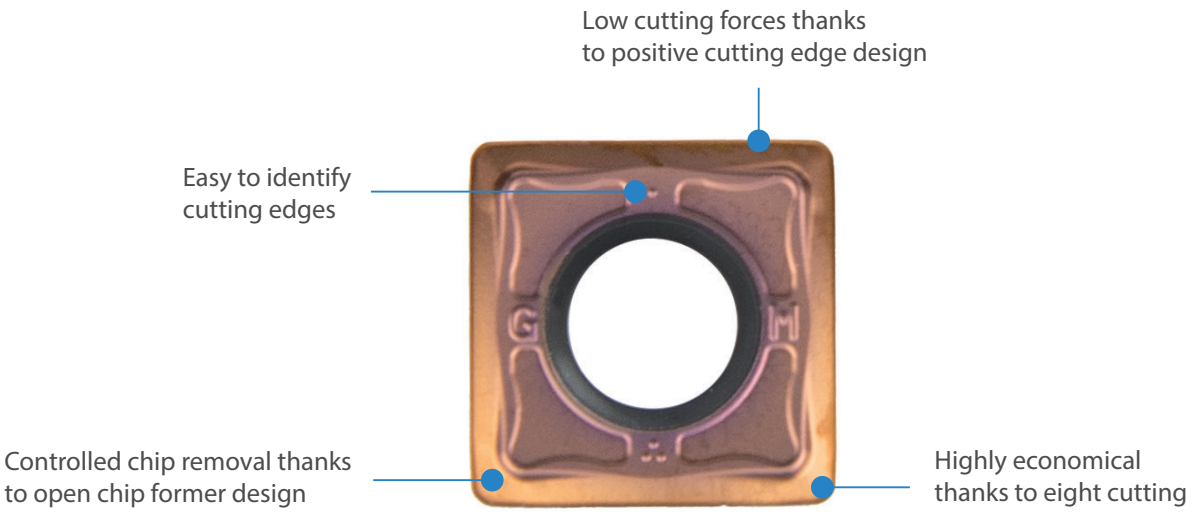
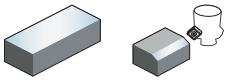
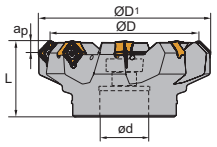


Fig.: SNGX1205**ANN**-GM YB9320

Face milling

FMA17 Kr: 45°





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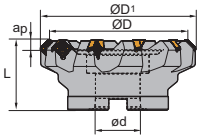

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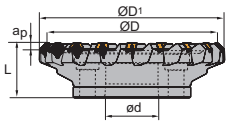

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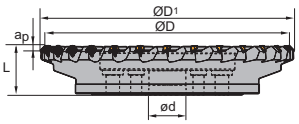


D

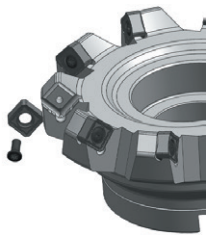
Article	✻	Stock R	Stock L	Dimensions [mm] ØD	ØD1	ød	L	ap max	Teeth	Coupling	kg	Inserts
FMA17-050-A22-SN12-04C	✻	○	○	50	65	22	40	6.5	4	A	0.384	SNGX1205
FMA17-050-A22-SN12-06C	✻	●		50	65	22	40	6.5	6	A	0.381	
FMA17-063-A22-SN12-06C	✻	●	○	63	78	22	50	6.5	6	A	0.717	
FMA17-080-A27-SN12-07C	✻	●	○	80	95	27	63	6.5	7	A	1.085	
FMA17-100-A32-SN12-08			○	100	115	32	63	6.5	8	A	1.558	
FMA17-063-A22-SN12-08C	✻	●		63	78	22	50	6.5	8	A	0.717	
FMA17-100-A32-SN12-08C	✻	●		100	115	32	63	6.5	8	A	1.558	
FMA17-080-A27-SN12-10C	✻	●		80	95	27	63	6.5	10	A	1.105	
FMA17-100-A32-SN12-12C	✻	●		100	115	32	63	6.5	12	A	1.656	
FMA17-125-B40-SN12-10		●	○	125	140	40	63	6.5	10	B	3.012	
FMA17-125-B40-SN12-16		●		125	140	40	63	6.5	16	B	3.103	
FMA17-160-C40-SN12-12		●	○	160	175	40	63	6.5	12	C	4.358	
FMA17-200-C60-SN12-18		●		200	215	60	63	6.5	18	C	6.337	
FMA17-160-C40-SN12-20		○		160	175	40	63	6.5	20	C	4.6	
FMA17-250-C60-SN12-20		●		250	265	60	63	6.5	20	C	12.36	
FMA17-200-C60-SN12-24		○		200	215	60	63	6.5	24	C	6.569	
FMA17-315-D60-SN12-22		○		315	330	60	80	6.5	22	D	21.224	
FMA17-400-D60-SN12-28		○		400	415	60	80	6.5	28	D	39.535	

● Ex stock ○ On demand

✻ With internal cooling

Spare parts

	Insert	SNGX1205	SNGX1205	SNGX1205
	ØD	50-78	80-180	200-400
	Screw (insert)	IRM4×10 (3.4 Nm)	IRM4×10 (3.4 Nm)	IRM4×10 (3.4 Nm)
	Wrench (insert)	WT15IP		
	Wrench (insert)		WT15IS	
	Wrench (insert)			WT15IT

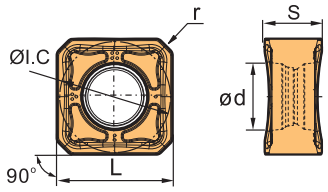


Ideal machining conditions
Normal machining conditions
Unfavourable machining conditions

SN**	L	I.C	S	d
12 05	12,7	12,7	6,5	5,9

Milling inserts

SN** negative insert



			HC¹ (CVD)	HC¹ (PVD)		HT	HC²	HW
		P						
		M						
		K						
		N						
		S						
		H						
	ISO	r	YBD252	YBG205H	YBS303			
	SNGX1205ANN-GH	–	●	●				
	SNGX1205ANN-GL	–	●	●				
	SNGX1205ANN-GM	–	●	●	●			
	SNMX120512-GH	1,2	●	●				
	SNMX120512-GM	1,2	●	●				

● Ex stock ○ On demand

HC¹ Coated carbide
HT Uncoated cermet
HC² Coated cermet
HW Uncoated carbide

FMP17 face/square shoulder milling system

Highly efficient universal tool for machining end faces and contours

YOUR BENEFITS

– The 88° milling system with negative inserts ensures a stable cutting edge
– Available for a wide range of finishing and roughing applications
– The newly developed chip breakers feature a positive insert geometry and generate lower cutting forces
– The **SNMX120512-**** insert can be used in combination with the **FMA17** and **FMP17** systems
– Highly economical thanks to eight-edged inserts

Precision insert seat enables high surface qualities

New insert design provides for increased resistance to breaking and greater process reliability

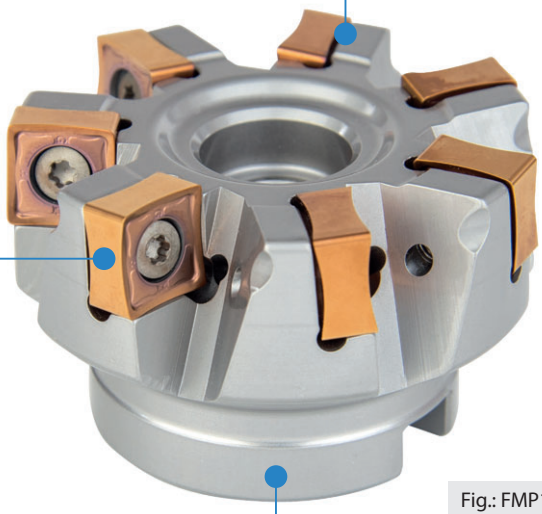


Fig.: FMP17-080-A27-SN12-07C

Diameter range: 50–400 mm

Note: The FMP17 milling system can be used in combination with SNGX1205**PNN** and SNMX120512 inserts.

Insert grades

YBM253	YBG205H	YBD252	YBS303
CVD *P20 – P40* *M15 – M35*	*PVD* *P10 – P30* *M20 – M40*	*CVD* *K20 – K35*	*PVD* *S25 – S35*

Chip breaker

SN*X-GL	SN*X-GM	SN*X-GH
		
Finishing	General machining	Roughing

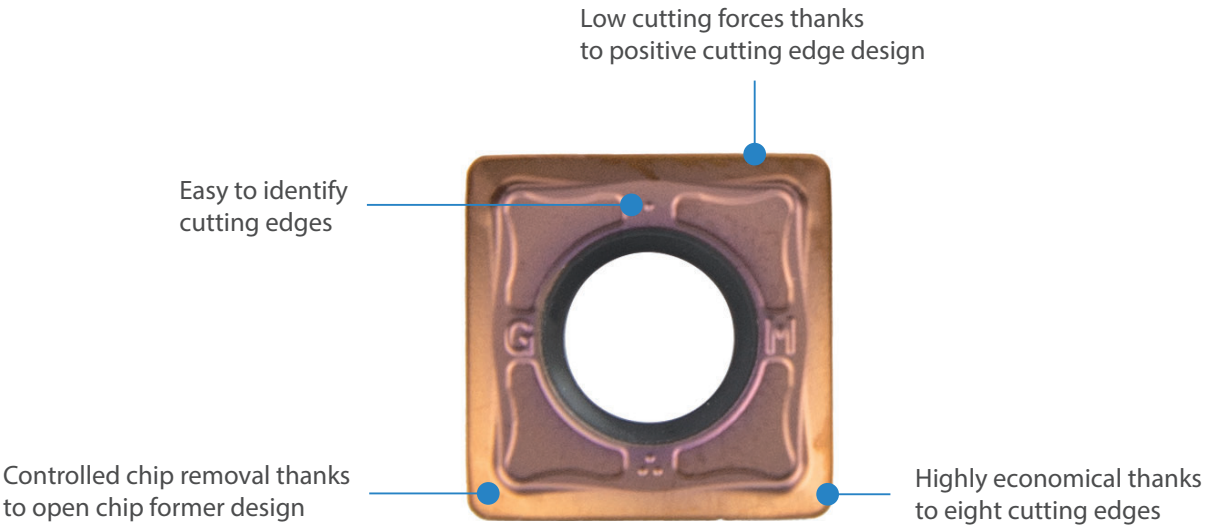
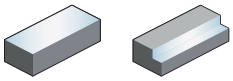
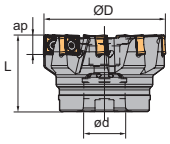


Fig.: SNGX1205**PNN**-GM YB9320

Face milling

FMP17 Kr: 88°





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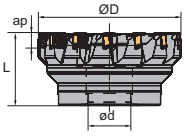

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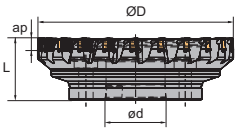

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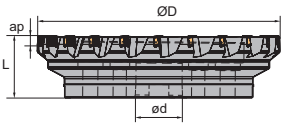


D

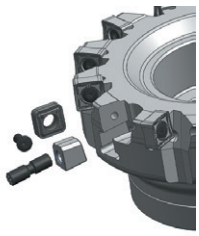
Article	✻	Stock R	Stock L	Dimensions [mm] ØD	ød	L	$a_{p\ max}$	Teeth	Coupling	kg	Inserts
FMP17-050-A22-SN12-04C	✻	○	○	50	22	40	10.5	4	A	0.296	SNGX1205
FMP17-050-A22-SN12-05C	✻	●		50	22	40	10.5	5	A	0.288	
FMP17-063-A22-SN12-05C	✻	●	○	63	22	50	10.5	5	A	0.462	
FMP17-063-A22-SN12-07C	✻	●		63	22	50	10.5	7	A	0.466	
FMP17-080-A27-SN12-07C	✻	●	○	80	27	63	10.5	7	A	1	
FMP17-100-A32-SN12-08			○	100	32	63	10.5	8	A	1.577	
FMP17-100-A32-SN12-08C	✻	●		100	32	63	10.5	8	A	1.577	
FMP17-080-A27-SN12-09C	✻	●		80	27	63	10.5	9	A	1.02	
FMP17-100-A32-SN12-11C	✻	●		100	32	63	10.5	11	A	1.592	
FMP17-125-B40-SN12-10		●	○	125	40	63	10.5	10	B	3.043	
FMP17-125-B40-SN12-14		●		125	40	63	10.5	14	B	3.033	
FMP17-160-C40-SN12-12		●	○	160	40	63	10.5	12	C	4.344	
FMP17-200-C60-SN12-14		●		200	60	63	10.5	14	C	6.552	
FMP17-160-C40-SN12-18		○		160	40	63	10.5	18	C	4.431	
FMP17-250-C60-SN12-18		○		250	60	63	10.5	18	C	13.025	
FMP17-200-C60-SN12-22		○		200	60	63	10.5	22	C	6.711	
FMP17-315-D60-SN12-22		○		315	60	80	10.5	22	D	21.935	
FMP17-400-D60-SN12-28		○		400	60	80	10.5	28	D	41.661	

● Ex stock ○ On demand

✻ With internal cooling

Spare parts

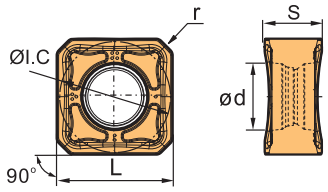
	Insert	SNGX1205	SNGX1205	SNGX1205
	ØD	50-63	80-180	200-400
	Screw (insert)	IRM4×10 (3.4 Nm)	IRM4×10 (3.4 Nm)	IRM4×10 (3.4 Nm)
	Wrench (insert)	WT15IP		
	Wrench (insert)		WT15IS	
	Wrench (insert)			WT15IT



- Ideal machining conditions
- Normal machining conditions
- Unfavourable machining conditions

SN**	L	I.C	S	d
12 05	12,7	12,7	6,5	5,9

Milling inserts



SN** negative insert		HC¹ (CVD)		HC¹ (PVD)		HT	HC²	HW
P								
M								
K								
N								
S								
H								
ISO	r		YBD252		YBG205H YBS303			
	SNGX1205PNN-GH	–	●		●			
	SNGX1205PNN-GL	–	●		●			
	SNGX1205PNN-GM	–	●		● ●			
	SNMX120512-GH	1,2	●		●			
	SNMX120512-GM	1,2	●		●			

● Ex stock ○ On demand

HC¹ Coated carbide
HT Uncoated cermet
HC² Coated cermet
HW Uncoated carbide

FMR04 round insert milling cutter

Maximum cutting performance

Now with new inserts and chip breakers New

YOUR BENEFITS

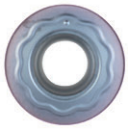
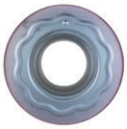
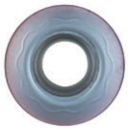
– Heavy-duty round insert mill for a wide range of applications
– Well suited for die and mould making
– Round insert for high feed rates and machining capacities
– Optimal chip removal because chip pocket free of interfering contours
– Safe and easy to use thanks to screw clamping

Fig.: FMR04-063-A22-RD12-04

Insert grades

YBG205H New	YB9320	YBD252	YBS303
PVD *P10 – P30* *M20 – M40*	*PVD* *P10 – P30* *M10 – M25*	*CVD* *K20 – K35*	*PVD* *S25 – S35*

Chip breaker

RDKW	RDMT-M New	RDMT-MM New	RDMW-H New
			
General machining	General machining	Soft cutting geometry	Roughing

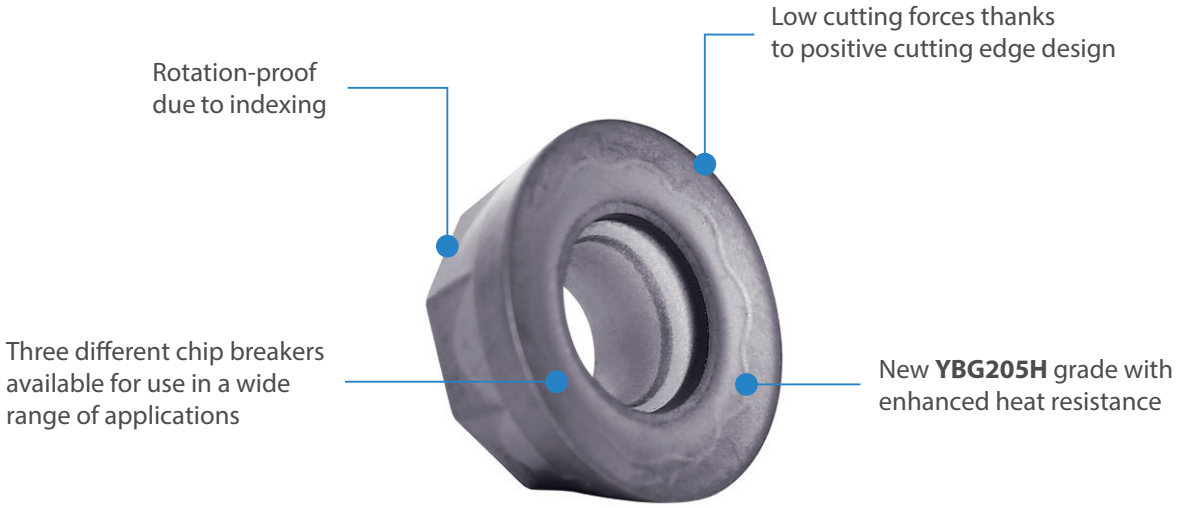
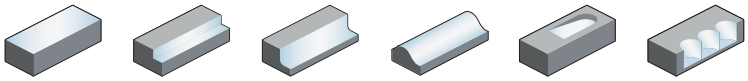
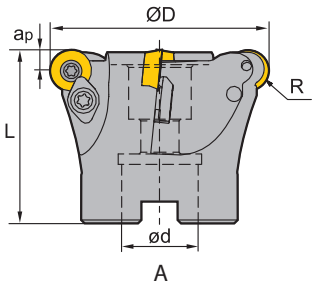


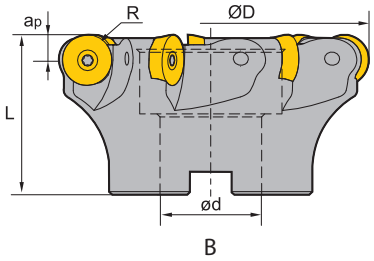
Fig.: RDMT1204-MO-M YBG205H

Face milling

FMR04







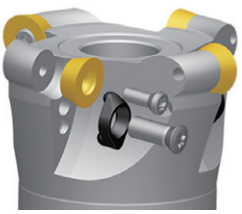
Article	✻	Stock	Dimensions [mm] R	ØD	ød	L	$a_{p\,max}$	Teeth	Coupling	kg	Inserts
FMR04-050-A22-RD12-03		●	6	50	22	40	6	3	A	0.3	RDKW1204
FMR04-063-A22-RD12-04		●	6	63	22	50	6	4	A	0.5	
FMR04-080-B27-RD16-05		●	8	80	27	50	8	5	B	1.2	RDKW1605
FMR04-100-B32-RD16-06		●	8	100	32	50	8	6	B	1	
FMR04-125-B40-RD20-06		○	10	125	40	63	10	6	B	1.9	RDKW2006
FMR04-125-B40-RD20-06C	✻	○	10	125	40	63	10	6	B	1.9	
FMR04-160-B40-RD20-07		○	10	160	40	63	10	7	B	3.7	

● Ex stock ○ On demand

✻ With internal cooling

Spare parts

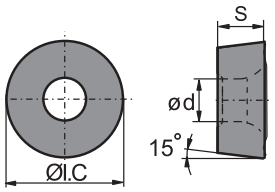
	Insert	RDKW1204	RDKW1605	RDKW2006
	ØD	**50-63**	**80-100**	**125 -160**
	Clamp	WD-204	WD-207	
	Screw (clamp)	I60M4*10 (3.4 Nm)	I60M5*13 (6.7 Nm)	
	Screw (insert)	I60M3.5*10 (2.7 Nm)	I60M5*13 (6.7 Nm)	I43M6*16 (9.1 Nm)
	Wrench (clamp)	WT15IP		
	Wrench (clamp)		WT20IT	
	Wrench (insert)	WT15IP		
	Wrench (insert)		WT20IT	WT25IT



Milling inserts

- Ideal machining conditions
- Normal machining conditions
- Unfavourable machining conditions

RDMW	I.C	S	d
10 T3	10,00	3,97	4,10
12 04	12,00	4,76	4,40

RD** milling insert		HC¹ (CVD)	HC¹ (PVD)	HT	HC²	HW
	P		⊛ ⊛			
	M					
	K	⊛				
	N					
	S					
	H		●			
ISO		YBD252	YBG205H YB9320			
 RDMW10T3MO-H		●	● ○			
RDMW1204MO-H		●	● ○			

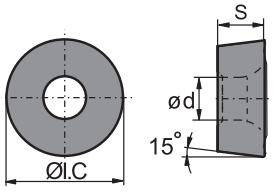
● Ex stock ○ On demand

HC¹ Coated carbide
HT Uncoated cermet
HC² Coated cermet
HW Uncoated carbide

Milling inserts

- Ideal machining conditions
- Normal machining conditions
- Unfavourable machining conditions

RDMT	I.C	S	d
10 T3	10,00	3,97	4,10
12 04	12,00	4,76	4,40

RD** milling insert		HC¹ (CVD)	HC¹ (PVD)	HT	HC²	HW
	P		⊛ ⊛			
	M		⊛ ⊛			
	K	⊛				
	N					
	S		⊛ ⊛ ⊛			
	H		●			
ISO		YBD252	YBG205H YB9320 YBS303			
 RDMT10T3MO-M		●	● ○ ●			
RDMT1204MO-M		●	● ○ ●			
 RDMT10T3MO-MM			● ○ ●			
RDMT1204MO-MM			● ○ ●			

● Ex stock ○ On demand

HC¹ Coated carbide
HT Uncoated cermet
HC² Coated cermet
HW Uncoated carbide

Indexable milling – group 1 (FMA07/11/12/17, FMP12/17, FMD02, EMP09/13)

Material group		Composition / structure / heat treatment			Machining group	Starting values for cutting speed v_c [m/min]							
						HC (CVD)							
						YBC302		YBC401		YBD152		YBD252	
						a_e / D		a_e / D		a_e / D		a_e / D	
						1/1 | 3/4	1/5	1/1 | 3/4	1/5	1/1 | 3/4	1/5	1/1 | 3/4	1/5
P	Unalloyed steel	approx. 0,15 % C	annealed	125	1	260	300	225	260				
		approx. 0,45 % C	annealed	190	2	225	255	195	225				
		approx. 0,45 % C	tempered	250	3	210	240	180	210				
		approx. 0,75 % C	annealed	270	4	185	210	160	185				
		approx. 0,75 % C	tempered	300	5	170	195	150	170				
	Low-alloyed steel		annealed	180	6	225	255	195	225				
			tempered	275	7	185	210	160	185				
			tempered	300	8	170	195	150	170				
			tempered	350	9	145	165	125	145				
	High-alloyed steel and high-alloyed tool steel		annealed	200	10	130	150	115	130				
			hardened and tempered	325	11	95	105	80	95				
M	Stainless steel	ferritic/martensitic	annealed	200	12								
		martensitic	tempered	240	13								
		austenitic	quench hardened	180	14								
		austenitic-ferritic		230	15								
K	Grey cast iron	perlitic/ferritic		180	16					370	430	320	370
		perlitic (martensitic)		260	17					220	255	190	220
	Cast iron with spheroidal graphite	ferritic		160	18					255	295	220	255
		perlitic		250	19					170	200	145	170
	Malleable cast iron	ferritic		130	20					305	355	265	305
		perlitic		230	21					205	240	175	205
N	Aluminium wrought alloys	cannot be hardened		60	22								
		hardenable	hardened	100	23								
	Cast aluminium alloys	≤ 12 % Si, cannot be hardened		75	24								
		≤ 12 % Si, hardenable	hardened	90	25								
		> 12 % Si, cannot be hardened		130	26								
	Copper and copper alloys (bronze/brass)	machining steel, PB> 1%		110	27								
		CuZn, CuSnZn		90	28								
		CuSn, Pb-free copper, electrolytic copper		100	29								
S	Heat-resistant alloys	Fe-based alloys	annealed	200	30								
			hardened	280	31								
		Ni or Co bass	annealed	250	32								
			hardened	350	33								
			cast	320	34								
	Titanium alloys	pure titanium		R_m 400	35								
		α and β alloys	hardened	R_m 1050	36								
H	Hardened steel		hardened and tempered	55 HRC	37								
			hardened and tempered	60 HRC	38								
	Hard cast iron		cast	400	39								
	Hardened cast iron		hardened and tempered	55 HRC	40								
X	Non-metallic materials	Thermoplasts			41								
		Thermosetting plastics			42								
		Plastic, glass-fibre reinforced GFRP			43								
		Plastic, carbon fibre reinforced CFRP			44								
		Graphite			45								
		Wood			46								

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.
Feed rate recommendations on page B38–B43.

Starting values for cutting speed v_c [m/min]																					
HC (CVD)		HC (PVD)														HW					
YBM253		YBG102		YB9320		YBG205		YBG205H		YBG252		YBG302		YBS303		YD101		YD201			
a_e / D		a_e / D		a_e / D		a_e / D		a_e / D		a_e / D		a_e / D		a_e / D		a_e / D		a_e / D			
1/1 | 3/4	1/5	1/1 | 3/4	1/5	1/1 | 3/4	1/5	1/1 | 3/4	1/5	1/1 | 3/4	1/5	1/1 | 3/4	1/5	1/1 | 3/4	1/5	1/1 | 3/4	1/5	1/1 | 3/4	1/5	1/1 | 3/4	1/5	
260	300	270	315	245	285	235	275	235	275	230	265	225	260								
225	255	230	270	210	245	200	235	200	235	200	230	195	225								
210	240	220	255	200	230	190	220	190	220	185	215	180	210								
185	210	190	225	175	200	165	195	165	195	165	190	160	185								
170	195	180	205	160	190	155	180	155	180	150	175	150	170								
225	255	230	270	210	245	200	235	200	235	200	230	195	225								
185	210	190	225	175	200	165	195	165	195	165	190	160	185								
170	195	180	205	160	190	155	180	155	180	150	175	150	170								
145	165	150	175	135	160	130	155	130	155	130	150	125	145								
130	150	135	160	125	145	120	140	120	140	115	135	115	130								
95	105	95	115	90	100	85	100	85	100	85	95	80	95								
130	150	135	160	125	145	120	140			115	135	115	130	140	185						
110	130	115	135	105	120	100	120			100	115	95	110	120	155						
140	160	145	170	130	155	125	150			125	145	120	140	150	195						
110	130	115	135	105	120	100	120			100	115	95	110	120	155						
		300	345	270	315	260	300	270	315	255	295	250	290								
		180	205	160	190	155	180	160	190	150	175	150	170								
		205	240	185	215	180	210	185	215	175	200	170	195								
		135	160	125	145	120	140	125	145	115	135	115	130								
		245	285	225	260	215	250	225	260	210	240	205	235								
		165	190	150	175	145	165	150	175	140	160	135	160								
																1505	1735	1450	1670		
																1225	1420	1180	1370		
																540	620	515	600		
																435	505	420	485		
																220	255	215	250		
																170	195	160	190		
																210	245	205	235		
																385	445	370	430		
								90	150												
								80	120												
								90	120												

HC Coated carbide
HT Uncoated carbide, primary component (TiC) or (TiN), cermet
HW Uncoated carbide, primary component (WC)
BL Cubic boron nitride with low BN content
BH Cubic boron nitride with high BN content
CN Si3N4 ceramic
CM Mixed ceramic
HC_1 Coated cermet
BC CBN with coating
CC Coated cutting ceramic
CR Cutting ceramic, primary component aluminium oxide (Al_2O_3), reinforced
DP Polycrystalline diamond

Indexable milling – group 3 (FMR01/02/03/04)

Material group		Composition / structure / heat treatment			Machining group	Starting values for cutting speed v_c [m/min] HC (PVD) YBG205H a_e / D			YBG212 a_e / D		
						1/1 | 3/4	1/5	1/20	1/1 | 3/4	1/5	1/20
P	Unalloyed steel	approx. 0,15 % C	annealed	125	1	235	275		240	280	365
		approx. 0,45 % C	annealed	190	2	200	235		205	240	315
		approx. 0,45 % C	tempered	250	3	190	220		195	225	295
		approx. 0,75 % C	annealed	270	4	165	195		170	200	260
		approx. 0,75 % C	tempered	300	5	155	180		160	185	245
	Low-alloyed steel		annealed	180	6	200	235		205	240	315
			tempered	275	7	165	195		170	200	260
			tempered	300	8	155	180		160	185	245
			tempered	350	9	130	155		135	155	205
	High-alloyed steel and high-alloyed tool steel		annealed	200	10	120	140		120	140	185
			hardened and tempered	325	11	85	100		85	100	130
M	Stainless steel	ferritic/martensitic	annealed	200	12				120	140	185
		martensitic	tempered	240	13				105	120	155
		austenitic	quench hardened	180	14				130	150	195
		austenitic-ferritic		230	15				105	120	155
K	Grey cast iron	perlitic/ferritic		180	16	270	315		265	305	400
		perlitic (martensitic)		260	17	160	190		160	185	245
	Cast iron with spheroidal graphite	ferritic		160	18	185	215		180	210	275
		perlitic		250	19	125	145		120	140	185
	Malleable cast iron	ferritic		130	20	225	260		220	255	335
		perlitic		230	21	150	175		145	170	225
N	Aluminium wrought alloys	cannot be hardened		60	22						
		hardenable	hardened	100	23						
	Cast aluminium alloys	≤ 12 % Si, cannot be hardened		75	24						
		≤ 12 % Si, hardenable	hardened	90	25						
		> 12 % Si, cannot be hardened		130	26						
	Copper and copper alloys (bronze/brass)	machining steel, PB> 1%		110	27						
		CuZn, CuSnZn		90	28						
		CuSn, Pb-free copper, electrolytic copper		100	29						
S	Heat-resistant alloys	Fe-based alloys	annealed	200	30						
			hardened	280	31						
		Ni or Co bass	annealed	250	32						
			hardened	350	33						
			cast	320	34						
	Titanium alloys	pure titanium		R_m 400	35						
		α and β alloys	hardened	R_m 1050	36						
H	Hardened steel		hardened and tempered	55 HRC	37	90	150				
			hardened and tempered	60 HRC	38	80	120				
	Hard cast iron		cast	400	39						
	Hardened cast iron		hardened and tempered	55 HRC	40	90	120				
X	Non-metallic materials	Thermoplasts			41						
		Thermosetting plastics			42						
		Plastic, glass-fibre reinforced GFRP			43						
		Plastic, carbon fibre reinforced CFRP			44						
		Graphite			45						
		Wood			46						

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.
Feed rate recommendations on page B38–B43.

Starting values for cutting speed v_c [m/min]														
HC (PVD)										HW				
YBG252			YBG302			YBS303				YD101		YD201		
a_e / D			a_e / D			a_e / D				a_e / D		a_e / D		
1/1 | 3/4	1/5	1/20	1/1 | 3/4	1/5	1/20	1/1 | 3/4	1/5	1/20		1/1 | 3/4	1/5	1/1 | 3/4	1/5	
230	265	345	225	260	340									
200	230	300	195	225	295									
185	215	280	180	210	275									
165	190	250	160	185	245									
150	175	230	150	170	225									
200	230	300	195	225	295									
165	190	250	160	185	245									
150	175	230	150	170	225									
130	150	195	125	145	190									
115	135	180	115	130	170									
85	95	125	80	95	125									
115	135	175	115	130	170	140	185							
100	115	145	95	110	145	120	155							
125	145	185	120	140	185	150	195							
100	115	145	95	110	145	120	155							
255	295	385	250	290	380									
150	175	230	150	170	225									
175	200	260	170	195	255									
115	135	180	115	130	170									
210	240	315	205	235	310									
140	160	210	135	160	210									
										1505	1735	1450	1670	
										1225	1420	1180	1370	
										540	620	515	600	
										435	505	420	485	
										220	255	215	250	
										170	195	160	190	
										210	245	205	235	
										385	445	370	430	

HC	Coated carbide
HT	Uncoated carbide, primary component (TiC) or (TiN), cermet
HW	Uncoated carbide, primary component (WC)
BL	Cubic boron nitride with low BN content
BH	Cubic boron nitride with high BN content
CN	Si3N4 ceramic
CM	Mixed ceramic
HC_1	Coated cermet
BC	CBN with coating
CC	Coated cutting ceramic
CR	Cutting ceramic, primary component aluminium oxide (Al_2O_3), reinforced
DP	Polycrystalline diamond

Indexable milling – group 8 (FMP06)

Material group		Composition / structure / heat treatment			Machining group	Starting values for cutting speed v_c [m/min]							
						HC (CVD)				HC (PVD)		CN	
						YBM253		YBD252		YB9320		CN1000	
						a_e / D		a_e / D		a_e / D		a_e / D	
						1/1 | 3/4	1/5	1/1 | 3/4	1/5	1/1 | 3/4	1/5	1/1 | 3/4	1/5
P	Unalloyed steel	approx. 0,15 % C	annealed	125	1	260	300	280	360	245	285		
		approx. 0,45 % C	annealed	190	2	225	255	280	320	210	245		
		approx. 0,45 % C	tempered	250	3	210	240	260	300	200	230		
		approx. 0,75 % C	annealed	270	4	185	210	220	280	175	200		
		approx. 0,75 % C	tempered	300	5	170	195	220	280	160	190		
	Low-alloyed steel		annealed	180	6	225	255	280	320	210	245		
			tempered	275	7	185	210	240	280	175	200		
			tempered	300	8	170	195	240	280	160	190		
			tempered	350	9	145	165	220	240	135	160		
	High-alloyed steel and high-alloyed tool steel		annealed	200	10	130	150	200	260	125	145		
			hardened and tempered	325	11	95	105	200	220	90	100		
M	Stainless steel	ferritic/martensitic	annealed	200	12	130	150			125	145		
		martensitic	tempered	240	13	11	130			105	120		
		austenitic	quench hardened	180	14	140	160			130	155		
		austenitic-ferritic		230	15	110	130			105	120		
K	Grey cast iron	perlitic/ferritic		180	16			320	370	270	315	600	800
		perlitic (martensitic)		260	17			220	260	160	190	450	600
	Cast iron with spheroidal graphite	ferritic		160	18			240	280	185	215	600	800
		perlitic		250	19			220	260	125	145	450	600
	Malleable cast iron	ferritic		130	20			280	305	225	260	–	–
		perlitic		230	21			180	220	150	175	–	–
N	Aluminium wrought alloys	cannot be hardened		60	22								
		hardenable	hardened	100	23								
	Cast aluminium alloys	≤ 12 % Si, cannot be hardened		75	24								
		≤ 12 % Si, hardenable	hardened	90	25								
		> 12 % Si, cannot be hardened		130	26								
	Copper and copper alloys (bronze/brass)	machining steel, PB> 1%		110	27								
		CuZn, CuSnZn		90	28								
		CuSn, Pb-free copper, electrolytic copper		100	29								
S	Heat-resistant alloys	Fe-based alloys	annealed	200	30								
			hardened	280	31								
		Ni or Co bass	annealed	250	32								
			hardened	350	33								
			cast	320	34								
	Titanium alloys	pure titanium		R_m 400	35								
		α and β alloys	hardened	R_m 1050	36								
H	Hardened steel		hardened and tempered	55 HRC	37								
			hardened and tempered	60 HRC	38								
	Hard cast iron		cast	400	39								
	Hardened cast iron		hardened and tempered	55 HRC	40								
X	Non-metallic materials	Thermoplasts			41								
		Thermosetting plastics			42								
		Plastic, glass-fibre reinforced GFRP			43								
		Plastic, carbon fibre reinforced CFRP			44								
		Graphite			45								
		Wood			46								

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.
Feed rate recommendations on page B38–B43.

	Starting values for cutting speed v_c [m/min]																					
	CM				CR																	
	CA1000		CM1000		CW1400		CW1800															
	a_e / D		a_e / D		a_e / D		a_e / D															
	1/1 | 3/4	1/5	1/1 | 3/4	1/5	1/1 | 3/4	1/5	1/1 | 3/4	1/5														
					150	360	–	–														
					150	360	–	–														
					–	–	150	400														
					–	–	150	400														
					–	–	150	400														
	140	200	140	200																		
	120	180	120	180																		
	–	–	–	–																		
	120	180	120	180																		

HC Coated carbide
HT Uncoated carbide, primary component (TiC) or (TiN), cermet
HW Uncoated carbide, primary component (WC)
BL Cubic boron nitride with low BN content
BH Cubic boron nitride with high BN content
CN Si3N4 ceramic
CM Mixed ceramic
HC_1 Coated cermet
BC CBN with coating
CC Coated cutting ceramic
CR Cutting ceramic, primary component aluminium oxide (Al_2O_3), reinforced
DP Polycrystalline diamond

A Turning
B Milling
C Drilling
D Technical Information
E Index

Recommended feed rate

Indexable milling – group1 (FMA07/11/12/17, FMP12/17, FMD02, EMP09/13)

Material group		Feed rate per cutting edge [mm]																		
		EMP09			EMP09			EMP13			EMP13			FMA07			FMA07			
		LNKT08/12			LNKT16			ANGX11			ANGX15			ONHU06			ONHU08			
		Application																		
		F	M	R	F	M	R	F	M	R	F	M	R	F	M	R	F	M	R	
P	Unalloyed steel		0,25	0,50		0,28	0,55		0,23			0,25		0,19	0,23		0,19	0,23		
	Low-alloyed steel		0,23	0,47		0,26	0,51		0,22			0,23		0,17	0,22		0,17	0,22		
	High-alloyed steel and high-alloyed tool steel		0,22	0,44		0,24	0,48		0,20			0,22		0,16	0,20		0,16	0,20		
M	Stainless steel		0,18	0,35		0,19	0,39		0,16			0,18								
K	Grey cast iron		0,28	0,55		0,30	0,61		0,26			0,28		0,20	0,26		0,20	0,26		
	Cast iron with spheroidal graphite		0,25	0,50		0,28	0,55		0,23			0,25		0,19	0,23		0,19	0,23		
	Malleable cast iron		0,25	0,50		0,28	0,55		0,23			0,25		0,19	0,23		0,19	0,23		
N	Aluminum wrought alloys								0,20			0,21								
	Aluminum cast alloys								0,20			0,21								
	Copper and copper alloys (bronze/brass)								0,18			0,19								
S	Heat-resistant alloys																			
	Titanium alloys																			
H	Hardened steel																			
	Hard cast iron																			
	Hardened cast iron																			
X	Non-metallic materials																			

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.

Recommended feed rate

Indexable milling – group1 (FMA07/11/12/17, FMP12/17, FMD02, EMP09/13)

Material group		Feed rate per cutting edge [mm]																		
		FMP12			FMP17															
		WNHU08			SNGX12															
		Application																		
		F	M	R	F	M	R													
P	Unalloyed steel		0,25			0,23														
	Low-alloyed steel		0,23			0,22														
	High-alloyed steel and high-alloyed tool steel		0,22			0,20														
M	Stainless steel		0,18			0,16														
K	Grey cast iron		0,28			0,26														
	Cast iron with spheroidal graphite		0,25			0,23														
	Malleable cast iron		0,25			0,23														
N	Aluminum wrought alloys					0,20														
	Aluminum cast alloys					0,20														
	Copper and copper alloys (bronze/brass)					0,18														
S	Heat-resistant alloys																			
	Titanium alloys																			
H	Hardened steel																			
	Hard cast iron																			
	Hardened cast iron																			
X	Non-metallic materials																			

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.

	Feed rate per cutting edge [mm]																							
	FMA11			FMA11			FMA11			FMA12			FMA17			FMD02			FMD02			FMP12		
	SNEG12			SNEG15			SNEG19			ONHU08			SNGX12			PNEG11			HNEX09			WNHU06		
	Application																							
	F	M	R	F	M	R	F	M	R	F	M	R	F	M	R	F	M	R	F	M	R	F	M	R
		0,20	0,23		0,22	0,25			0,29		0,23			0,20	0,23	0,15	0,20	0,30					0,23	
		0,19	0,21		0,20	0,24			0,27		0,22			0,19	0,21	0,14	0,19	0,28					0,22	
		0,18	0,20		0,19	0,22			0,26		0,20			0,18	0,20	0,13	0,18	0,26					0,20	
		0,14	0,16		0,15	0,18			0,20		0,16			0,14	0,16								0,16	
		0,22	0,25		0,24	0,28			0,32		0,26			0,22	0,25	0,17	0,22	0,33	0,17	0,22	0,33		0,26	
		0,20	0,23		0,22	0,25			0,29		0,23			0,20	0,23	0,15	0,20	0,30	0,15	0,20	0,30		0,23	
		0,20	0,23		0,22	0,25			0,29		0,23			0,20	0,23	0,15	0,20	0,30	0,15	0,20	0,30		0,23	

F Finishing
M Medium machining
R Roughing

	Feed rate per cutting edge [mm]																							
	Application																							

F Finishing
M Medium machining
R Roughing

Recommended feed rate

Indexable milling – group 3 (FMR01/02/03/04) Face milling

Material group		Feed rate per cutting edge [mm]																	
		FMR01 RCKT10			FMR01 RC*12			FMR02 RC*12			FMR02 RCKT16			FMR02 RCKT20			FMR03 RDKW07		
		Application																	
		F	M	R	F	M	R	F	M	R	F	M	R	F	M	R	F	M	R
P	Unalloyed steel		0,20	0,25		0,20	0,25		0,20	0,25		0,23	0,29		0,26	0,33		0,17	
P	Low-alloyed steel		0,19	0,23		0,19	0,23		0,19	0,23		0,21	0,27		0,25	0,31		0,16	
P	High-alloyed steel and high-alloyed tool steel		0,18	0,22		0,18	0,22		0,18	0,22		0,20	0,25		0,23	0,29		0,15	
M	Stainless steel		0,14	0,18		0,14	0,18		0,14	0,18		0,16	0,20		0,19	0,23		0,12	
K	Grey cast iron		0,22	0,28		0,22	0,28		0,22	0,28		0,25	0,32		0,29	0,36		0,19	
K	Cast iron with spheroidal graphite		0,20	0,25		0,20	0,25		0,20	0,25		0,23	0,29		0,26	0,33		0,17	
K	Malleable cast iron		0,20	0,25		0,20	0,25		0,20	0,25		0,23	0,29		0,26	0,33		0,17	
N	Aluminum wrought alloys					0,17	0,21		0,17	0,21									
N	Aluminum cast alloys					0,17	0,21		0,17	0,21									
N	Copper and copper alloys (bronze/brass)					0,15	0,19		0,15	0,19									
S	Heat-resistant alloys																		
S	Titanium alloys																		
H	Hardened steel																		
H	Hard cast iron																		
H	Hardened cast iron																		
X	Non-metallic materials																		

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.

Indexable milling – group 3 (FMR01/02/03/04) Circular milling

Material group		Feed rate per cutting edge [mm]							
		FMR01 RCKT10	FMR01 RC*12	FMR02 RC*12	FMR02 RCKT16		FMR02 RCKT20		FMR03 RDKW07
		Tool diameter [mm]							
		25-32	40-50	50-100	63-125	160-200	80-125	160-250	15
P	Unalloyed steel	0,12	0,16	0,18	0,24	0,32	0,26	0,35	0,07
P	Low-alloyed steel	0,11	0,14	0,16	0,21	0,28	0,23	0,31	0,06
P	High-alloyed steel and high-alloyed tool steel	0,10	0,13	0,14	0,19	0,26	0,21	0,28	0,06
M	Stainless steel	0,07	0,09	0,10	0,14	0,18	0,15	0,20	0,04
K	Grey cast iron	0,11	0,14	0,16	0,22	0,29	0,23	0,32	0,06
K	Cast iron with spheroidal graphite	0,10	0,13	0,14	0,19	0,26	0,21	0,28	0,06
K	Malleable cast iron	0,10	0,13	0,14	0,19	0,26	0,21	0,28	0,06
N	Aluminium wrought alloys								
N	Aluminum cast alloys								
N	Copper and copper alloys (bronze/brass)								
S	Heat-resistant alloys								
S	Titanium alloys								
H	Hardened steel								
H	Hard cast iron								
H	Hardened cast iron								
X	Non-metallic materials								

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.

	Feed rate per cutting edge [mm]																				
	FMR03			FMR03			FMR04			FMR04			FMR04			FMR04			FMR04		
	RDKW08			RD*10			RD*12			RDKW16			RDKW20			RD**10			RD**12		
	Application																				
	F	M	R	F	M	R	F	M	R	F	M	R	F	M	R		M		F	M	R
		0,17			0,20		0,15	0,20	0,25	0,17	0,23	0,29	0,2	0,26	0,33		0,20		0,15	0,20	0,25
		0,16			0,19		0,14	0,19	0,23	0,16	0,21	0,27	0,19	0,25	0,31		0,19		0,14	0,19	0,23
		0,15			0,18		0,13	0,18	0,22	0,15	0,20	0,25	0,18	0,23	0,29		0,18		0,13	0,18	0,22
		0,12			0,14		0,11	0,14	0,18	0,12	0,16	0,20	0,14	0,19	0,23		0,14		0,11	0,14	0,18
		0,19			0,22		0,17	0,22	0,28	0,19	0,25	0,32	0,22	0,29	0,36		0,22		0,17	0,22	0,28
		0,17			0,20		0,15	0,20	0,25	0,17	0,23	0,29	0,20	0,26	0,33		0,20		0,15	0,20	0,25
		0,17			0,20		0,15	0,20	0,25	0,17	0,23	0,29	0,20	0,26	0,33		0,20		0,15	0,20	0,25
					0,17		0,13	0,17	0,21								0,17		0,13	0,17	0,21
					0,17		0,13	0,17	0,21								0,17		0,13	0,17	0,21
					0,15		0,11	0,15	0,19								0,15		0,11	0,15	0,19

F Finishing
M Medium machining
R Roughing

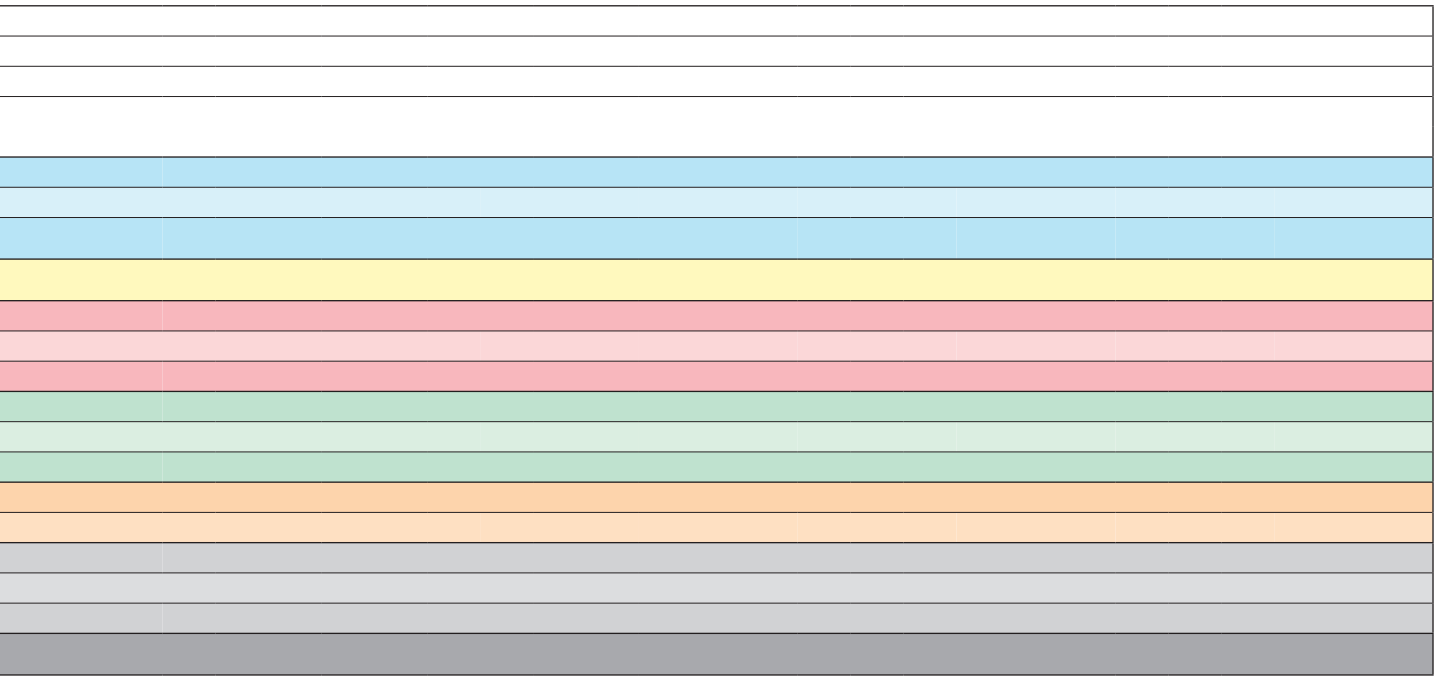
	Feed rate per cutting edge [mm]						
	FMR03	FMR03	FMR04	FMR04	FMR04	FMR04	FMR04
	RDKW08	RD*10	RD*12	RDKW16	RDKW20	RD**10	RD**12
	Tool diameter [mm]						
	16-25	32	50-63	80-100	125-160	32-40	40-80
	0,07	0,12	0,17	0,24	0,30	0,12	0,17
	0,06	0,11	0,15	0,21	0,26	0,11	0,15
	0,06	0,10	0,14	0,19	0,24	0,10	0,14
	0,04	0,07	0,10	0,14	0,17	0,07	0,10
	0,06	0,11	0,15	0,22	0,27	0,11	0,15
	0,06	0,10	0,14	0,19	0,24	0,10	0,14
	0,06	0,10	0,14	0,19	0,24	0,10	0,14
		0,10	0,11			0,10	0,11
		0,10	0,11			0,10	0,11
		0,10	0,11			0,10	0,11

Recommended feed rate

Indexable milling – group 8 (FMP06)

Material group		Feed rate per cutting edge [mm]																		
		FMP06 SNCU12 (HC)			FMP06 SNGN12 (CN)			FMP06 SNGN12 (CM)												
		Application																		
		F	M	R	F	M	R	F	M	R										
P	Unalloyed steel		0,23																	
	Low-alloyed steel		0,22																	
	High-alloyed steel and high-alloyed tool steel		0,20																	
M	Stainless steel		0,16																	
K	Grey cast iron		0,26			0,10	0,25													
	Cast iron with spheroidal graphite		0,23			0,10	0,25													
	Malleable cast iron		0,23			0,10	0,25													
N	Aluminum wrought alloys																			
	Aluminum cast alloys																			
	Copper and copper alloys (bronze/brass)																			
S	Heat-resistant alloys																			
	Titanium alloys																			
H	Hardened steel								0,05	0,10										
	Hard cast iron																			
	Hardened cast iron								0,05	0,10										
X	Non-metallic materials																			

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.



HC Coated carbide
CN Si3N4 ceramic
CM Mixed ceramic

F Finishing
M Medium machining
R Roughing

Notes

Solid carbide milling

B

Solid carbide milling System code – JIS

GM	–	2	E	L	P	–	D12	R0.5	–	M08
1		2	3	4	5		6	7		8

Application	
Code	Description
GR	General roughing
GM	Semi-finishing
GF	Finishing
PM	High-performance machining
EPM	«Ecoline» – High-performance machining
VPM	Full-slot applications
HM	Hard machining
NM	General machining of non-ferrous metals
AL	General machining of Al and Al alloys
ALP	High-performance machining of Al and Al alloys
ALG	General machining of Al and Al alloys
UM	HSC/HPC machining
UMC	HSC machining with chip splitter geometry
VSM	General machining of heat-resistant alloys
TM	General machining of heat-resistant alloys

1

Number of teeth

2

Cutting edge type	
Code	Description
E	Square shoulder mill with protective chamfer
F	Square shoulder mill with sharp cutting edges
B	Ball nose cutter
R	Torus mill
W	Ripper
H	High-feed mill

3

Cutting edge length	
Code	Description
L	Long
X	Extra long
F	Short

4

Type	
Code	Description
S	Mini diameter
P	Ground neck
C	Conical neck

5

Diameter [mm]	
Code	Description
D3.0	3,0
D20.0	20,0
...	

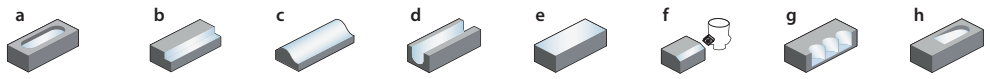
6

Radius [mm]	
Code	Description
R0.5	0,5
R3.0	3,0
...	

7

Features	
Code	Description
G	Spiral angle 30°
M	Neck length [mm]
S	Thin shank
AIR	For aerospace industry

8



a Groove milling b Square shoulder milling c Profile milling d Slot milling e Face milling f Chamfer milling g Plunge milling h Circular milling/Ramping

TM series

The perfect choice for machining titanium and superalloys

Expanded line with compact torus milling cutters featuring diameters from 1.0 mm New

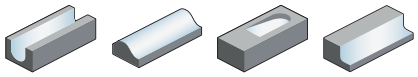
YOUR BENEFITS

– Extremely well suited for roughing/finishing titanium, as well as nickel- and cobalt-based alloys
– Reliable results thanks to high cutting edge stability in difficult machining applications
– Extended tool life thanks to new substrate featuring cutting-edge coating technology

Fig.: TM-3R-D5.0R0.1 KMS405

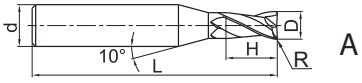
Torus mills

High-performance machining

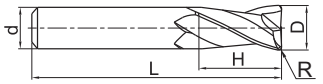


TM-2R New

– Factory standard
– Centre cutting
– Helix angle 38°



A



B

Article	✲	Dimensions [mm]					Teeth	Geometry	Grade
		D	R	d (h5)	H	L			KMS405
TM-2R-D1.0R0.05		1	0,05	4	3	50	2	A	●
TM-2R-D1.0R0.30		1	0,3	4	3	50	2	A	●
TM-2R-D2.0R0.05		2	0,05	4	6	50	2	A	●
TM-2R-D2.0R0.30		2	0,3	4	6	50	2	A	●
TM-2R-D2.5R0.05		2,5	0,05	4	8	50	2	A	○
TM-2R-D2.5R0.30		2,5	0,3	4	8	50	2	A	○
TM-2R-D3.0R0.05		3	0,05	4	8	50	2	A	●
TM-2R-D3.0R0.30		3	0,3	4	8	50	2	A	○
TM-2R-D4.0R0.10		4	0,1	4	11	50	2	B	●
TM-2R-D4.0R0.30		4	0,3	4	11	50	2	B	○
TM-2R-D4.0R0.50		4	0,5	4	11	50	2	B	○
TM-2R-D5.0R0.10		5	0,1	6	13	50	2	A	●
TM-2R-D5.0R0.30		5	0,3	6	13	50	2	A	○
TM-2R-D5.0R0.50		5	0,5	6	13	50	2	A	○

● Ex stock ○ On demand

✲ With internal cooling

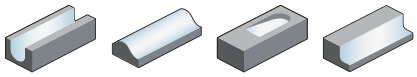
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

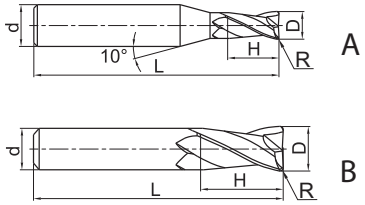
Torus mills

High-performance machining



TM-3R New

– Factory standard
– Centre cutting
– Helix angle 38°



Article	✲	Dimensions [mm]					Teeth	Geometry	Grade
		D	R	d (h5)	H	L			KMS405
TM-3R-D3.0R0.1		3	0,1	4	8	50	3	A	●
TM-3R-D3.0R0.3		3	0,3	4	8	50	3	A	○
TM-3R-D3.0R0.5		3	0,5	4	8	50	3	A	●
TM-3R-D4.0R0.1		4	0,1	4	11	50	3	B	●
TM-3R-D4.0R0.3		4	0,3	4	11	50	3	B	○
TM-3R-D4.0R0.5		4	0,5	4	11	50	3	B	●
TM-3R-D5.0R0.1		5	0,1	6	13	50	3	A	●
TM-3R-D5.0R0.3		5	0,3	6	13	50	3	A	○
TM-3R-D5.0R0.5		5	0,5	6	13	50	3	A	●

● Ex stock ○ On demand

✲ With internal cooling

Application field

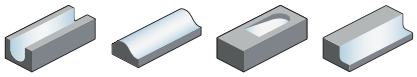
P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

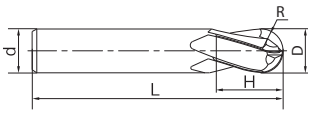
Ball nose cutters

High-performance machining

TM-4B



– Factory standard
– Centre cutting
– Helix angle 38°



Article	✻	Dimensions [mm]					Teeth	Grade
		D	R	d (h6)	H	L		KMS405
TM-4B-R3.0		6	3	6	9	50	4	●
TM-4B-R4.0		8	4	8	12	60	4	●
TM-4B-R5.0		10	5	10	15	75	4	●
TM-4B-R6.0		12	6	12	18	75	4	●
TM-4B-R8.0		16	8	16	24	85	4	●
TM-4B-R10.0		20	10	20	30	100	4	●

● Ex stock ○ On demand

✻ With internal cooling

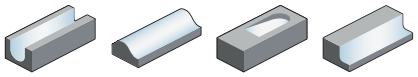
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

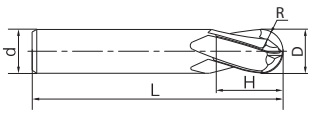
Ball nose cutters

High-performance machining



TM-4BL

– Type of shank DIN 6535HA
– Centre cutting
– Helix angle 38°



Article	✻	Dimensions [mm]					Teeth	Grade
		D	R	d (h6)	H	L		KMS405
TM-4BL-R3.0		6	3	6	16	57	4	●
TM-4BL-R4.0		8	4	8	20	63	4	●
TM-4BL-R5.0		10	5	10	22	72	4	●
TM-4BL-R6.0		12	6	12	25	83	4	●
TM-4BL-R8.0		16	8	16	32	92	4	●
TM-4BL-R10.0		20	10	20	38	104	4	●

● Ex stock ○ On demand

✻ With internal cooling

Application field

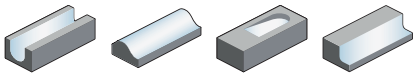
P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

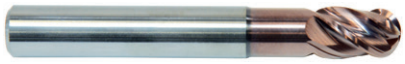
Ball nose cutters

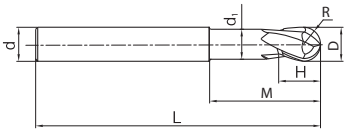
High-performance machining

TM-4BP



– Factory standard
– Centre cutting
– Helix angle 38°





Article	✻	Dimensions [mm]							Teeth	Grade
		D	R	d (h6)	d_1	H	M	L		KMS405
TM-4BP-R3.0		6	3	6	5.5	9	18	60	4	●
TM-4BP-R4.0		8	4	8	7.4	12	24	75	4	●
TM-4BP-R5.0		10	5	10	9.4	15	30	75	4	●
TM-4BP-R6.0		12	6	12	11.4	18	35	90	4	●
TM-4BP-R8.0		16	8	16	15.4	24	40	90	4	●
TM-4BP-R10.0		20	10	20	19.4	35	50	110	4	●

● Ex stock ○ On demand
✻ With internal cooling

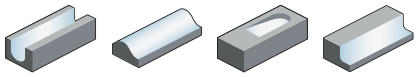
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

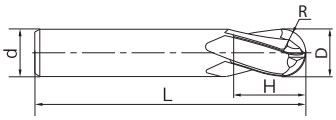
Ball nose cutters

High-performance machining



TM-5B

– Factory standard
– Helix angle 38°



Article	✻	Dimensions [mm]					Teeth	Grade
		D	R	d (h6)	H	L		KMS405
TM-5B-R3.0		6	3	6	9	50	5	●
TM-5B-R4.0		8	4	8	12	60	5	●
TM-5B-R5.0		10	5	10	15	75	5	●
TM-5B-R6.0		12	6	12	18	75	5	●
TM-5B-R8.0		16	8	16	24	85	5	●
TM-5B-R10.0		20	10	20	30	100	5	●

● Ex stock ○ On demand

✻ With internal cooling

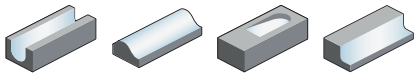
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

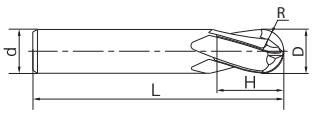
Ball nose cutters

High-performance machining



TM-5BL

– Type of shank DIN 6535HA
– Helix angle 38°



Article	✻	Dimensions [mm]					Teeth	Grade
		D	R	d (h6)	H	L		KMS405
TM-5BL-R3.0		6	3	6	16	57	5	●
TM-5BL-R4.0		8	4	8	20	63	5	●
TM-5BL-R5.0		10	5	10	22	72	5	●
TM-5BL-R6.0		12	6	12	25	83	5	●
TM-5BL-R8.0		16	8	16	32	92	5	●
TM-5BL-R10.0		20	10	20	38	104	5	●

● Ex stock ○ On demand
✻ With internal cooling

Application field

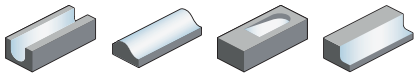
P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

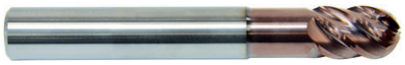
Ball nose cutters

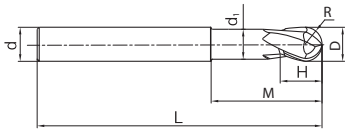
High-performance machining

TM-5BP



– Factory standard
– Helix angle 38°





Article	✻	Dimensions [mm]							Teeth	Grade
		D	R	d (h6)	d_1	H	M	L		KMS405
TM-5BP-R3.0		6	3	6	5.5	9	18	60	5	●
TM-5BP-R4.0		8	4	8	7.4	12	24	75	5	●
TM-5BP-R5.0		10	5	10	9.4	15	30	75	5	●
TM-5BP-R6.0		12	6	12	11.4	18	35	90	5	●
TM-5BP-R8.0		16	8	16	15.4	24	40	90	5	●
TM-5BP-R10.0		20	10	20	19.4	35	50	110	5	●

● Ex stock ○ On demand

✻ With internal cooling

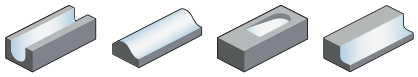
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

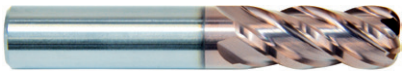
Torus mills

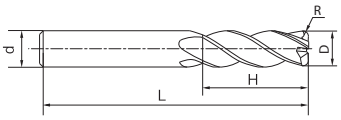
High-performance machining



TM-4R

– Factory standard
– Centre cutting
– Helix angle 38°





Article	✻	Dimensions [mm]					Teeth	Grade
		D	R	d (h6)	H	L		KMS405
TM-4R-D6.0R0.3		6	0.3	6	16	50	4	●
TM-4R-D6.0R0.5		6	0.5	6	16	50	4	●
TM-4R-D6.0R 0.75		6	0.75	6	16	50	4	○
TM-4R-D6.0R1.0		6	1.0	6	16	50	4	●
TM-4R-D8.0R0.3		8	0.3	8	20	60	4	●
TM-4R-D8.0R0.5		8	0.5	8	20	60	4	●
TM-4R-D8.0R0.75		8	0.75	8	20	60	4	○
TM-4R-D8.0R1.0		8	1.0	8	20	60	4	●
TM-4R-D10.0R0.5		10	0.5	10	25	75	4	●
TM-4R-D10.0R0.75		10	0.75	10	25	75	4	○
TM-4R-D10.0R1.0		10	1.0	10	25	75	4	●
TM-4R-D10.0R1.25		10	1.25	10	25	75	4	○
TM-4R-D10.0R1.5		10	1.5	10	25	75	4	●
TM-4R-D10.0R1.6		10	1.6	10	25	75	4	●
TM-4R-D10.0R2.0		10	2.0	10	25	75	4	●
TM-4R-D10.0R2.5		10	2.5	10	25	75	4	○
TM-4R-D10.0R3.0		10	3.0	10	25	75	4	●
TM-4R-D12.0R0.5		12	0.5	12	30	75	4	●
TM-4R-D12.0R0.75		12	0.75	12	30	75	4	○
TM-4R-D12.0R1.0		12	1.0	12	30	75	4	●
TM-4R-D12.0R1.25		12	1.25	12	30	75	4	○
TM-4R-D12.0R1.5		12	1.5	12	30	75	4	●
TM-4R-D12.0R1.6		12	1.6	12	30	75	4	●
TM-4R-D12.0R2.0		12	2.0	12	30	75	4	●
TM-4R-D12.0R2.5		12	2.5	12	30	75	4	●
TM-4R-D12.0R3.0		12	3.0	12	30	75	4	●
TM-4R-D12.0R3.2		12	3.2	12	30	75	4	●
TM-4R-D12.0R4.0		12	4.0	12	30	75	4	●
TM-4R-D16.0R1.0		16	1.0	16	35	90	4	●
TM-4R-D16.0R1.25		16	1.25	16	35	90	4	●
TM-4R-D16.0R1.5		16	1.5	16	35	90	4	●
TM-4R-D16.0R1.6		16	1.6	16	35	90	4	●

● Ex stock ○ On demand

✻ With internal cooling

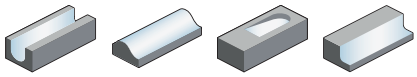
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

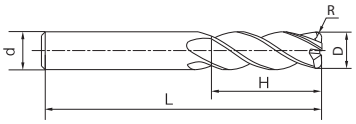
Torus mills

High-performance machining



TM-4R

– Factory standard
– Centre cutting
– Helix angle 38°



Article	✻	Dimensions [mm]					Teeth	Grade
		D	R	d (h6)	H	L		KMS405
TM-4R-D16.0R2.0		16	2.0	16	35	90	4	●
TM-4R-D16.0R2.5		16	2.5	16	35	90	4	●
TM-4R-D16.0R3.0		16	3.0	16	35	90	4	●
TM-4R-D16.0R3.2		16	3.2	16	35	90	4	●
TM-4R-D16.0R4.0		16	4.0	16	35	90	4	●
TM-4R-D16.0R5.0		16	5.0	16	35	90	4	●
TM-4R-D16.0R6.3		16	6.3	16	35	90	4	○
TM-4R-D20.0R1.0		20	1.0	20	45	100	4	●
TM-4R-D20.0R1.25		20	1.25	20	45	100	4	●
TM-4R-D20.0R1.5		20	1.5	20	45	100	4	●
TM-4R-D20.0R1.6		20	1.6	20	45	100	4	●
TM-4R-D20.0R2.0		20	2.0	20	45	100	4	●
TM-4R-D20.0R2.5		20	2.5	20	45	100	4	●
TM-4R-D20.0R3.0		20	3.0	20	45	100	4	●
TM-4R-D20.0R3.2		20	3.2	20	45	100	4	●
TM-4R-D20.0R4.0		20	4.0	20	45	100	4	●
TM-4R-D20.0R5.0		20	5.0	20	45	100	4	●
TM-4R-D20.0R6.3		20	6.3	20	45	100	4	●
TM-4R-D25.0R1.0		25	1.0	25	50	110	4	●
TM-4R-D25.0R1.25		25	1.25	25	50	110	4	○
TM-4R-D25.0R1.5		25	1.5	25	50	110	4	●
TM-4R-D25.0R1.6		25	1.6	25	50	110	4	●
TM-4R-D25.0R2.0		25	2.0	25	50	110	4	●
TM-4R-D25.0R2.5		25	2.5	25	50	110	4	○
TM-4R-D25.0R3.0		25	3.0	25	50	110	4	●
TM-4R-D25.0R3.2		25	3.2	25	50	110	4	●
TM-4R-D25.0R4.0		25	4.0	25	50	110	4	●
TM-4R-D25.0R5.0		25	5.0	25	50	110	4	●
TM-4R-D25.0R6.3		25	6.3	25	50	110	4	●

● Ex stock ○ On demand
✻ With internal cooling

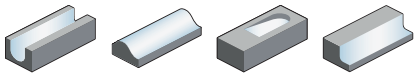
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

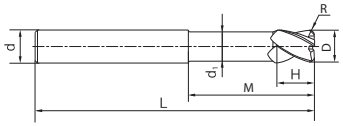
Torus mills

High-performance machining



TM-4RP

– Factory standard
– Centre cutting
– Helix angle 38°



Article	✻	Dimensions [mm]							Teeth	Grade
		D	R	d (h6)	d_1	H	M	L		KMS405
TM-4RP-D8.0R0.3		8	0.3	8	7.4	16	25	75	4	●
TM-4RP-D8.0R0.5		8	0.5	8	7.4	16	25	75	4	●
TM-4RP-D8.0R0.75		8	0.75	8	7.4	16	25	75	4	○
TM-4RP-D8.0R1.0		8	1.0	8	7.4	16	25	75	4	●
TM-4RP-D10.0R0.5		10	0.5	10	9.4	20	32	75	4	●
TM-4RP-D10.0R0.75		10	0.75	10	9.4	20	32	75	4	○
TM-4RP-D10.0R1.0		10	1.0	10	9.4	20	32	75	4	●
TM-4RP-D10.0R1.25		10	1.25	10	9.4	20	32	75	4	●
TM-4RP-D10.0R1.5		10	1.5	10	9.4	20	32	75	4	●
TM-4RP-D10.0R1.6		10	1.6	10	9.4	20	32	75	4	●
TM-4RP-D10.0R2.0		10	2.0	10	9.4	20	32	75	4	●
TM-4RP-D10.0R2.5		10	2.5	10	9.4	20	32	75	4	○
TM-4RP-D10.0R3.0		10	3.0	10	9.4	20	32	75	4	●
TM-4RP-D12.0R0.5		12	0.5	12	11.4	24	40	90	4	●
TM-4RP-D12.0R0.75		12	0.75	12	11.4	24	40	90	4	○
TM-4RP-D12.0R1.0		12	1.0	12	11.4	24	40	90	4	●
TM-4RP-D12.0R1.25		12	1.25	12	11.4	24	40	90	4	●
TM-4RP-D12.0R1.5		12	1.5	12	11.4	24	40	90	4	●
TM-4RP-D12.0R1.6		12	1.6	12	11.4	24	40	90	4	●
TM-4RP-D12.0R2.0		12	2.0	12	11.4	24	40	90	4	●
TM-4RP-D12.0R2.5		12	2.5	12	11.4	24	40	90	4	○
TM-4RP-D12.0R3.0		12	3.0	12	11.4	24	40	90	4	●
TM-4RP-D12.0R3.2		12	3.2	12	11.4	24	40	90	4	●
TM-4RP-D12.0R4.0		12	4.0	12	11.4	24	40	90	4	●
TM-4RP-D16.0R1.0		16	1.0	16	15	32	50	100	4	●
TM-4RP-D16.0R1.25		16	1.25	16	15	32	50	100	4	●
TM-4RP-D16.0R1.5		16	1.5	16	15	32	50	100	4	●
TM-4RP-D16.0R1.6		16	1.6	16	15	32	50	100	4	●
TM-4RP-D16.0R2.0		16	2.0	16	15	32	50	100	4	●

● Ex stock ○ On demand
✻ With internal cooling

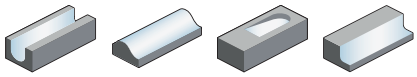
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

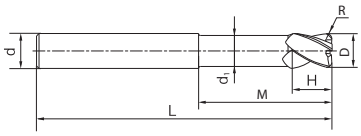
Torus mills

High-performance machining



TM-4RP

– Factory standard
– Centre cutting
– Helix angle 38°



Article	✻	Dimensions [mm]							Teeth	Grade
		D	R	d (h6)	d_1	H	M	L		KMS405
TM-4RP-D16.0R2.5		16	2.5	16	15	32	50	100	4	○
TM-4RP-D16.0R3.0		16	3.0	15	14	32	50	100	4	●
TM-4RP-D16.0R3.2		16	3.2	16	15	32	50	100	4	●
TM-4RP-D16.0R4.0		16	4.0	16	15	32	50	100	4	●
TM-4RP-D16.0R5.0		16	5.0	16	15	32	50	100	4	●
TM-4RP-D16.0R6.3		16	6.3	16	15	32	50	100	4	○
TM-4RP-D20.0R1.0		20	1.0	20	19	35	60	110	4	●
TM-4RP-D20.0R1.25		20	1.25	20	19	35	60	110	4	●
TM-4RP-D20.0R1.5		20	1.5	20	19	35	60	110	4	●
TM-4RP-D20.0R1.6		20	1.6	20	19	35	60	110	4	●
TM-4RP-D20.0R2.0		20	2.0	20	19	35	60	110	4	●
TM-4RP-D20.0R2.5		20	2.5	20	19	35	60	110	4	○
TM-4RP-D20.0R3.0		20	3.0	20	19	35	60	110	4	●
TM-4RP-D20.0R3.2		20	3.2	20	19	35	60	110	4	●
TM-4RP-D20.0R4.0		20	4.0	20	19	35	60	110	4	●
TM-4RP-D20.0R5.0		20	5.0	20	19	35	60	110	4	●
TM-4RP-D20.0R6.3		20	6.3	20	19	35	60	110	4	●
TM-4RP-D25.0R1.0		25	1.0	25	24	45	75	150	4	●
TM-4RP-D25.0R1.25		25	1.25	25	24	45	75	150	4	○
TM-4RP-D25.0R1.5		25	1.5	25	24	45	75	150	4	●
TM-4RP-D25.0R1.6		25	1.6	25	24	45	75	150	4	●
TM-4RP-D25.0R2.0		25	2.0	25	24	45	75	150	4	●
TM-4RP-D25.0R2.5		25	2.5	25	24	45	75	150	4	●
TM-4RP-D25.0R3.0		25	3.0	25	24	45	75	150	4	●
TM-4RP-D25.0R3.2		25	3.2	25	24	45	75	150	4	●
TM-4RP-D25.0R4.0		25	4.0	25	24	45	75	150	4	●
TM-4RP-D25.0R5.0		25	5.0	25	24	45	75	150	4	●
TM-4RP-D25.0R6.3		25	6.3	25	24	45	75	150	4	●

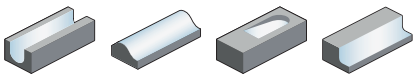
● Ex stock ○ On demand
✻ With internal cooling

Application field

P	M	K	N	S	H
	✔			✔	

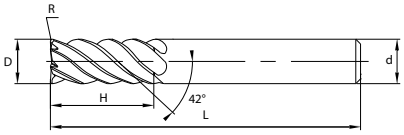
✔ Very suitable
✔ suitable

Torus mills High-performance machining



TM-5R

– Factory standard
– Helix angle 42°



Article	✻	Dimensions [mm]					Teeth	Grade
		D	R	d (h6)	H	L		KMS405
TM-5R-D6.0R0.3		6	0.3	6	16	50	5	●
TM-5R-D6.0R0.5		6	0.5	6	16	50	5	●
TM-5R-D6.0R 0.75		6	0.75	6	16	50	5	○
TM-5R-D6.0R1.0		6	1.0	6	16	50	5	●
TM-5R-D8.0R0.3		8	0.3	8	20	60	5	●
TM-5R-D8.0R0.5		8	0.5	8	20	60	5	●
TM-5R-D8.0R0.75		8	0.75	8	20	60	5	○
TM-5R-D8.0R1.0		8	1.0	8	20	60	5	●
TM-5R-D10.0R0.5		10	0.5	10	25	75	5	●
TM-5R-D10.0R0.75		10	0.75	10	25	75	5	○
TM-5R-D10.0R1.0		10	1.0	10	25	75	5	●
TM-5R-D10.0R1.25		10	1.25	10	25	75	5	○
TM-5R-D10.0R1.5		10	1.5	10	25	75	5	●
TM-5R-D10.0R1.6		10	1.6	10	25	75	5	●
TM-5R-D10.0R2.0		10	2.0	10	25	75	5	●
TM-5R-D10.0R2.5		10	2.5	10	25	75	5	○
TM-5R-D10.0R3.0		10	3.0	10	25	75	5	●

● Ex stock ○ On demand
✻ With internal cooling

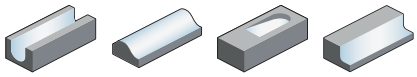
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ Suitable

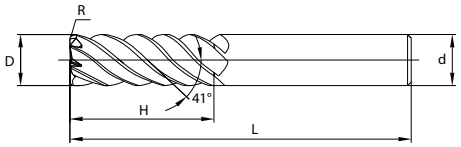
Torus mills

High-performance machining



TM-7R

– Factory standard
– Helix angle 41°



Article	✻	Dimensions [mm]					Teeth	Grade
		D	R	d (h6)	H	L		KMS405
TM-7R-D12.0R0.5		12	0.5	12	30	75	7	●
TM-7R-D12.0R0.75		12	0.75	12	30	75	7	○
TM-7R-D12.0R1.0		12	1.0	12	30	75	7	●
TM-7R-D12.0R1.25		12	1.25	12	30	75	7	○
TM-7R-D12.0R1.5		12	1.5	12	30	75	7	●
TM-7R-D12.0R1.6		12	1.6	12	30	75	7	●
TM-7R-D12.0R2.0		12	2.0	12	30	75	7	●
TM-7R-D12.0R2.5		12	2.5	12	30	75	7	●
TM-7R-D12.0R3.0		12	3.0	12	30	75	7	●
TM-7R-D12.0R3.2		12	3.2	12	30	75	7	●
TM-7R-D12.0R4.0		12	4.0	12	30	75	7	●
TM-7R-D16.0R1.0		16	1.0	16	35	90	7	●
TM-7R-D16.0R1.25		16	1.25	16	35	90	7	○
TM-7R-D16.0R1.5		16	1.5	16	35	90	7	●
TM-7R-D16.0R1.6		16	1.6	16	35	90	7	●
TM-7R-D16.0R2.0		16	2.0	16	35	90	7	●
TM-7R-D16.0R2.5		16	2.5	16	35	90	7	●
TM-7R-D16.0R3.0		16	3.0	16	35	90	7	●
TM-7R-D16.0R3.2		16	3.2	16	35	90	7	●
TM-7R-D16.0R4.0		16	4.0	16	35	90	7	●
TM-7R-D16.0R5.0		16	5.0	16	35	90	7	●
TM-7R-D16.0R6.3		16	6.3	16	35	90	7	○
TM-7R-D20.0R1.0		20	1.0	20	45	100	7	●
TM-7R-D20.0R1.25		20	1.25	20	45	100	7	○
TM-7R-D20.0R1.5		20	1.5	20	45	100	7	●
TM-7R-D20.0R1.6		20	1.6	20	45	100	7	●
TM-7R-D20.0R2.0		20	2.0	20	45	100	7	●
TM-7R-D20.0R2.5		20	2.5	20	45	100	7	●
TM-7R-D20.0R3.0		20	3.0	20	45	100	7	●
TM-7R-D20.0R3.2		20	3.2	20	45	100	7	●
TM-7R-D20.0R4.0		20	4.0	20	45	100	7	●
TM-7R-D20.0R5.0		20	5.0	20	45	100	7	●
TM-7R-D20.0R6.3		20	6.3	20	45	100	7	●

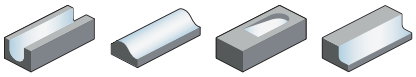
● Ex stock ○ On demand
✻ With internal cooling

Application field

P	M	K	N	S	H
	✔			✔	

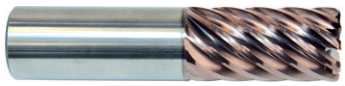
✔ Very suitable
✔ Suitable

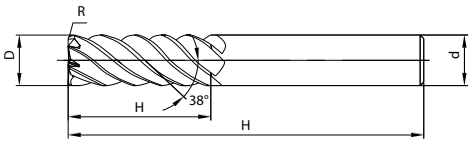
Torus mills High-performance machining



TM-9R

– Factory standard
– Helix angle 38°





Article	✻	Dimensions [mm]					Teeth	Grade
		D	R	d (h6)	H	L		KMS405
TM-9R-D25.0R1.0		25	1.0	25	50	110	9	●
TM-9R-D25.0R1.25		25	1.25	25	50	110	9	○
TM-9R-D25.0R1.5		25	1.5	25	50	110	9	●
TM-9R-D25.0R1.6		25	1.6	25	50	110	9	●
TM-9R-D25.0R2.0		25	2.0	25	50	110	9	●
TM-9R-D25.0R2.5		25	2.5	25	50	110	9	○
TM-9R-D25.0R3.0		25	3.0	25	50	110	9	●
TM-9R-D25.0R3.2		25	3.2	25	50	110	9	●
TM-9R-D25.0R4.0		25	4.0	25	50	110	9	●
TM-9R-D25.0R5.0		25	5.0	25	50	110	9	●
TM-9R-D25.0R6.3		25	6.3	25	50	110	9	●

● Ex stock ○ On demand
✻ With internal cooling

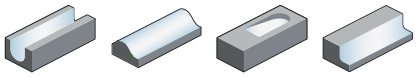
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

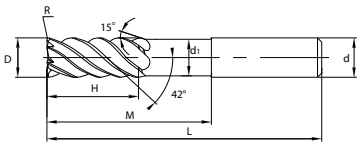
Torus mills

High-performance machining



TM-5RP

– Factory standard
– Helix angle 41°



Article	✻	Dimensions [mm]							Teeth	Grade
		D	R	d (h6)	d_1	H	M	L		KMS405
TM-5RP-D8.0R0.3		8	0.3	8	7.4	16	25	75	5	●
TM-5RP-D8.0R0.5		8	0.5	8	7.4	16	25	75	5	●
TM-5RP-D8.0R0.75		8	0.75	8	7.4	16	25	75	5	○
TM-5RP-D8.0R1.0		8	1.0	8	7.4	16	25	75	5	●
TM-5RP-D10.0R0.5		10	0.5	10	9.4	20	32	75	5	●
TM-5RP-D10.0R0.75		10	0.75	10	9.4	20	32	75	5	○
TM-5RP-D10.0R1.0		10	1.0	10	9.4	20	32	75	5	●
TM-5RP-D10.0R1.25		10	1.25	10	9.4	20	32	75	5	○
TM-5RP-D10.0R1.5		10	1.5	10	9.4	20	32	75	5	●
TM-5RP-D10.0R1.6		10	1.6	10	9.4	20	32	75	5	●
TM-5RP-D10.0R2.0		10	2.0	10	9.4	20	32	75	5	●
TM-5RP-D10.0R2.5		10	2.5	10	9.4	20	32	75	5	●
TM-5RP-D10.0R3.0		10	3.0	10	9.4	20	32	75	5	●

● Ex stock ○ On demand

✻ With internal cooling

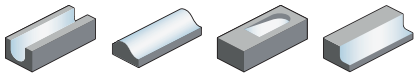
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

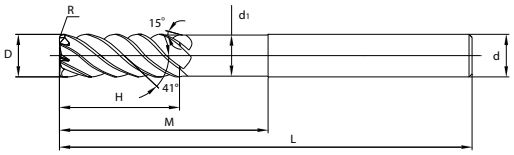
Torus mills

High-performance machining



TM-7RP

– Factory standard
– Helix angle 42°



Article	✻	Dimensions [mm]							Teeth	Grade
		D	R	d (h6)	d_1	H	M	L		KMS405
TM-7RP-D12.0R0.5		12	0.5	12	11.4	24	40	90	7	●
TM-7RP-D12.0R0.75		12	0.75	12	11.4	24	40	90	7	○
TM-7RP-D12.0R1.0		12	1.0	12	11.4	24	40	90	7	●
TM-7RP-D12.0R1.25		12	1.25	12	11.4	24	40	90	7	○
TM-7RP-D12.0R1.5		12	1.5	12	11.4	24	40	90	7	●
TM-7RP-D12.0R1.6		12	1.6	12	11.4	24	40	90	7	●
TM-7RP-D12.0R2.0		12	2.0	12	11.4	24	40	90	7	●
TM-7RP-D12.0R2.5		12	2.5	12	11.4	24	40	90	7	●
TM-7RP-D12.0R3.0		12	3.0	12	11.4	24	40	90	7	●
TM-7RP-D12.0R3.2		12	3.2	12	11.4	24	40	90	7	●
TM-7RP-D12.0R4.0		12	4.0	12	11.4	24	40	90	7	●
TM-7RP-D16.0R1.0		16	1.0	16	15	32	50	100	7	●
TM-7RP-D16.0R1.25		16	1.25	16	15	32	50	100	7	○
TM-7RP-D16.0R1.5		16	1.5	16	15	32	50	100	7	●
TM-7RP-D16.0R1.6		16	1.6	16	15	32	50	100	7	●
TM-7RP-D16.0R2.0		16	2.0	16	15	32	50	100	7	●
TM-7RP-D16.0R2.5		16	2.5	16	15	32	50	100	7	●
TM-7RP-D16.0R3.0		16	3.0	16	15	32	50	100	7	●
TM-7RP-D16.0R3.2		16	3.2	16	15	32	50	100	7	●
TM-7RP-D16.0R4.0		16	4.0	16	15	32	50	100	7	●
TM-7RP-D16.0R5.0		16	5.0	16	15	32	50	100	7	●
TM-7RP-D16.0R6.3		16	6.3	16	15	32	50	100	7	○
TM-7RP-D20.0R1.0		20	1.0	20	19	35	60	110	7	●
TM-7RP-D20.0R1.25		20	1.25	20	19	35	60	110	7	○
TM-7RP-D20.0R1.5		20	1.5	20	19	35	60	110	7	●
TM-7RP-D20.0R1.6		20	1.6	20	19	35	60	110	7	●
TM-7RP-D20.0R2.0		20	2.0	20	19	35	60	110	7	●
TM-7RP-D20.0R2.5		20	2.5	20	19	35	60	110	7	●
TM-7RP-D20.0R3.0		20	3.0	20	19	35	60	110	7	●
TM-7RP-D20.0R3.2		20	3.2	20	19	35	60	110	7	●
TM-7RP-D20.0R4.0		20	4.0	20	19	35	60	110	7	●
TM-7RP-D20.0R5.0		20	5.0	20	19	35	60	110	7	●
TM-7RP-D20.0R6.3		20	6.3	20	19	35	60	110	7	●

● Ex stock ○ On demand
✻ With internal cooling

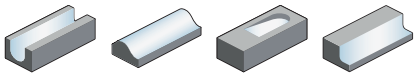
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

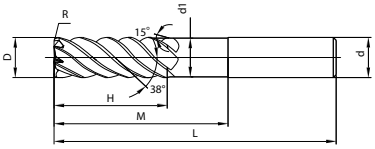
Torus mills

High-performance machining



TM-9RP

– Factory standard
– Helix angle 38°



Article	✻	Dimensions [mm]							Teeth	Grade
		D	R	d (h6)	d_1	H	M	L		KMS405
TM-9RP-D25.0R1.0		25	1.0	25	24	45	75	150	9	●
TM-9RP-D25.0R1.25		25	1.25	25	24	45	75	150	9	○
TM-9RP-D25.0R1.5		25	1.5	25	24	45	75	150	9	●
TM-9RP-D25.0R1.6		25	1.6	25	24	45	75	150	9	●
TM-9RP-D25.0R2.0		25	2.0	25	24	45	75	150	9	●
TM-9RP-D25.0R2.5		25	2.5	25	24	45	75	150	9	●
TM-9RP-D25.0R3.0		25	3.0	25	24	45	75	150	9	●
TM-9RP-D25.0R3.2		25	3.2	25	24	45	75	150	9	●
TM-9RP-D25.0R4.0		25	4.0	25	24	45	75	150	9	●
TM-9RP-D25.0R5.0		25	5.0	25	24	45	75	150	9	●
TM-9RP-D25.0R6.3		25	6.3	25	24	45	75	150	9	●

● Ex stock ○ On demand
✻ With internal cooling

Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

VPM series

High-speed full-slot milling

YOUR BENEFITS

– Well suited for full-slot milling and applications involving large contact widths
– Short machining times thanks to high stock removal rate
– Low-vibration machining even under extreme conditions

Excellent ramping properties
thanks to large side clearance angle

New geometry for
increased chip volume
with no loss of stability

KMG406
AlCrN PVD coating well
suited for steel and cast iron

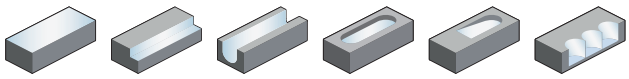
Fig.: VPM-4E-D12.0 KMG406

Available with optional Q
thread for added flexibility
in real-world applications

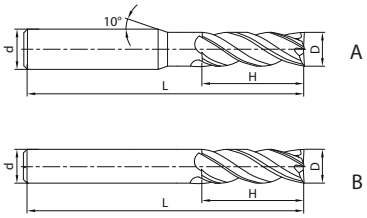
Fig.: Q14-VPM-4E-D25.0 KMG406

End mill High-performance machining

VPM-4E



– Factory standard
– Centre cutting
– Helix angle 36°/38°



Article	✻	Dimensions [mm]				Teeth	Geometry	Grade
		D	d (h6)	H	L			KMG406
VPM-4E-D3.0		3	6	8	50	4	A	●
VPM-4E-D4.0		4	6	11	50	4	A	●
VPM-4E-D5.0		5	6	13	50	4	A	●
VPM-4E-D6.0		6	6	16	50	4	B	●
VPM-4E-D7.0		7	8	20	60	4	A	●
VPM-4E-D8.0		8	8	20	60	4	B	●
VPM-4E-D9.0		9	10	22	75	4	A	●
VPM-4E-D10.0		10	10	25	75	4	B	●
VPM-4E-D11.0		11	12	26	75	4	A	●
VPM-4E-D12.0		12	12	30	75	4	B	●
VPM-4E-D14.0		14	14	32	75	4	B	●
VPM-4E-D16.0		16	16	45	100	4	B	●
VPM-4E-D18.0		18	18	45	100	4	B	●
VPM-4E-D20.0		20	20	45	100	4	B	●

● Ex stock ○ On demand
✻ With internal cooling

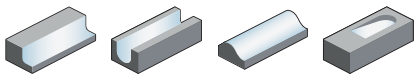
Application field

P	M	K	N	S	H
✔	✔	✔			✔

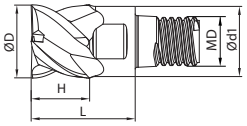
✔ Very suitable
✔ Suitable

Square shoulder mill | High-performance machining

VPM-4E



– Centre cutting
– Helix angle 38°



Article	✲	Dimensions [mm] D	d1	H	L	MD	Teeth	Grade KMG406
Q08-VPM-4E-D12.0		12	11.5	7	17	8	4	●
Q10-VPM-4E-D16.0		16	15.2	9	21.5	10	4	●
Q12-VPM-4E-D20.0		20	19	11	25.5	12	4	●
Q14-VPM-4E-D25.0		25	24	13.5	31.5	14	4	●

● Ex stock ○ On demand
✲ With internal cooling

Application field

P	M	K	N	S	H
✔	✔	✔			✔

✔ Very suitable
✔ Suitable

Notes

Solid carbide milling Recommended cutting data

End mill – PM series, VPM series

Material group		Composition / structure / heat treatment		Brinell hardness HB	Machining group	Starting values for cutting speed v_c [m/min]							
						PM-2R PM-4R				PM-4RL			
						Slot milling		Shoulder milling		Slot milling		Shoulder milling	
						Ø [mm]	$a_{p\,max}$	Ø [mm]	$a_{e\,max}$	Ø [mm]	$a_{p\,max}$	Ø [mm]	$a_{e\,max}$
						0 < x < 3	0,1 5x D	0 < x ≤ 20	0.15 x D	0 < x < 3	0,1 5x D	0 < x ≤ 20	0.15 x D
						3 ≤ x < 6	0,3 x D			3 ≤ x < 6	0,3 x D		
						6 ≤ x ≤ 20	0,5 x D			6 ≤ x ≤ 20	0,5 x D		
						KMG405				KMG405			
						a_e / D				a_e / D			
						1/1	1/2	1/10	f-group	1/1	1/2	1/10	f-group
P	Unalloyed steel	approx. 0,15 % C	annealed	125	1	165	220	300	1	150	200	265	1
		approx. 0,45 % C	annealed	190	2	160	210	285	1	145	190	255	1
		approx. 0,45 % C	tempered	250	3	120	155	210	1	105	140	190	1
		approx. 0,75 % C	annealed	270	4	100	135	180	1	90	120	160	1
		approx. 0,75 % C	tempered	300	5	95	125	165	1	85	110	150	1
	Low-alloyed steel		annealed	180	6	125	165	225	1	115	150	200	1
			tempered	275	7	100	135	180	1	90	120	160	1
			tempered	300	8	95	125	165	1	85	110	150	1
			tempered	350	9	90	115	160	1	80	105	140	1
	High-alloyed steel and high-alloyed tool steel		annealed	200	10	120	155	210	1	105	140	190	1
			hardened and tempered	325	11	90	120	160	1	80	110	145	1
M	Stainless steel	ferritic/martensitic	annealed	200	12	55	75	100	1	50	65	85	1
		martensitic	tempered	240	13	50	65	85	1	45	60	75	1
		austenitic	quench hardened	180	14	60	75	105	1	55	70	95	1
		austenitic-ferritic		230	15	50	65	85	1	45	60	75	1
K	Grey cast iron	perlitic/ferritic		180	16	125	165	220	1	110	150	195	1
		perlitic (martensitic)		260	17	100	135	180	1	90	120	160	1
	Cast iron with spheroidal graphite	ferritic		160	18	150	200	270	1	135	180	240	1
		perlitic		250	19	120	155	210	1	105	140	190	1
	Malleable cast iron	ferritic		130	20	165	220	300	1	150	200	265	1
		perlitic		230	21	135	180	240	1	120	160	215	1
N	Aluminium wrought alloys	cannot be hardened		60	22								
		hardenable	hardened	100	23								
	Cast aluminium alloys	≤ 12 % Si, cannot be hardened		75	24								
		≤ 12 % Si, hardenable	hardened	90	25								
		> 12 % Si, cannot be hardened		130	26								
	Copper and copper alloys (bronze/brass)	machining steel, PB> 1%		110	27								
		CuZn, CuSnZn		90	28								
		CuSn, Pb-free copper, electrolytic copper		100	29								
S	Heat-resistant alloys	Fe-based alloys	annealed	200	30								
			hardened	280	31								
		Ni or Co bass	annealed	250	32								
			hardened	350	33								
			cast	320	34								
	Titanium alloys	pure titanium		R_m 400	35								
		α and β alloys	hardened	R_m 1050	36								
H	Hardened steel		hardened and tempered	55 HRC	37	85	110	145	1	70	95	125	1
			hardened and tempered	60 HRC	38	–	–	–	–	–	–	–	–
	Hard cast iron		cast	400	39	115	145	190	1	95	125	165	1
	Hardened cast iron		hardened and tempered	55 HRC	40	–	–	–	–	–	–	–	–
X	Non-metallic materials	Thermoplasts			41								
		Thermosetting plastics			42								
		Plastic, glass-fibre reinforced GFRP			43								
		Plastic, carbon fibre reinforced CFRP			44								
		Graphite			45								
		Wood			46								

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.
Feed rate recommendations on page B76.

	Starting values for cutting speed v_c [m/min]								
	PM-4H PM-4HL				VPM-4E				
			Shoulder milling						
			Ø [mm]	$a_{e\,max}$					
			0 < x ≤ 20	0.15 x D	0 < x < 3	0,5x D	0 < x < 3	0.15 x D	
					3 ≤ x < 12	1,5x D	3 ≤ x < 20	0,5 x D	
					12≤x≤20	2,0x D			
	KMG405				KMG406				
	a_e / D				a_e / D				
	1/1	1/2	1/10	f-group	1/1	1/2	1/10		
	–	210	270	6	230	280	350	9	
	–	200	260	6	220	270	340	9	
	–	150	190	6	160	190	250	9	
	–	130	165	6	140	160	210	9	
	–	120	150	6	130	150	200	9	
	–	160	205	6	180	215	270	9	
	–	130	165	6	130	170	220	9	
	–	120	150	6	125	150	190	9	
	–	110	145	6	120	150	190	9	
	–	150	190	6	160	190	250	9	
	–	115	145	6	115	140	190	9	
	–	70	90	6	70	90	110	9	
	–	60	80	6	60	80	100	9	
	–	75	95	6	75	90	120	9	
	–	60	80	6	65	80	100	9	
	–	155	200	6	160	200	260	9	
	–	130	165	6	140	170	220	9	
	–	190	245	6	215	250	330	9	
	–	150	190	6	160	200	250	9	
	–	210	270	6	230	280	360	9	
	–	170	220	6	180	230	290	9	
	–	100	125	1	100	120	150	9	
	–	–	–	–	–	–	–	–	
	–	130	165	1	110	150	180	9	
	–	–	–	–	–	–	–	–	

End mill – QCH series

Material group		Composition / structure / heat treatment		Brinell hardness HB	Machining group	Starting values for cutting speed v_c [m/min]							
						Q**-PM-4E Q**-PM-4R Q**-VPM-4E				Q**PM-2B Q**PM-4B			
						Slot milling		Shoulder milling					
						Ø [mm]	$a_{p\,max}$	Ø [mm]	$a_{e\,max}$				
						0 < x < 3	0,3 x D	0 < x < 20	0,15xD				
						3 ≤ x < 6	0,3 x D						
						6 ≤ x ≤ 20	0,5 x D						
						KMG405				KMG405			
						a_e / D				a_e / D			
						1/1	1/2	1/10	f-group	1/1	1/2	1/10	f-group
P	Unalloyed steel	approx. 0,15 % C	annealed	125	1	165	220	300	1		270	300	5
		approx. 0,45 % C	annealed	190	2	160	210	285	1		260	285	5
		approx. 0,45 % C	tempered	250	3	120	155	210	1		190	210	5
		approx. 0,75 % C	annealed	270	4	100	135	180	1		165	180	5
		approx. 0,75 % C	tempered	300	5	95	125	165	1		150	165	5
	Low-alloyed steel		annealed	180	6	125	165	225	1		205	225	5
			tempered	275	7	100	135	180	1		165	180	5
			tempered	300	8	95	125	165	1		150	165	5
			tempered	350	9	90	115	160	1		145	160	5
	High-alloyed steel and high-alloyed tool steel		annealed	200	10	120	155	210	1		190	210	5
			hardened and tempered	325	11	90	120	160	1		145	160	5
M	Stainless steel	ferritic/martensitic	annealed	200	12	55	75	100	1		90	100	5
		martensitic	tempered	240	13	50	65	85	1		80	85	5
		austenitic	quench hardened	180	14	60	75	105	1		95	105	5
		austenitic-ferritic		230	15	50	65	85	1		80	85	5
K	Grey cast iron	perlitic/ferritic		180	16	125	165	220	1		200	220	5
		perlitic (martensitic)		260	17	100	135	180	1		165	180	5
	Cast iron with spheroidal graphite	ferritic		160	18	150	200	270	1		245	270	5
		perlitic		250	19	120	155	210	1		190	210	5
	Malleable cast iron	ferritic		130	20	165	220	300	1		270	300	5
		perlitic		230	21	135	180	240	1		220	240	5
N	Aluminium wrought alloys	cannot be hardened		60	22								
		hardenable	hardened	100	23								
	Cast aluminium alloys	≤ 12 % Si, cannot be hardened		75	24								
		≤ 12 % Si, hardenable	hardened	90	25								
		> 12 % Si, cannot be hardened		130	26								
	Copper and copper alloys (bronze/brass)	machining steel, PB> 1%		110	27								
		CuZn, CuSnZn		90	28								
		CuSn, Pb-free copper, electrolytic copper		100	29								
S	Heat-resistant alloys	Fe-based alloys	annealed	200	30								
			hardened	280	31								
		Ni or Co bass	annealed	250	32								
			hardened	350	33								
			cast	320	34								
	Titanium alloys	pure titanium		R_m 400	35								
		α and β alloys	hardened	R_m 1050	36								
H	Hardened steel		hardened and tempered	55 HRC	37	80	105	140	1				
			hardened and tempered	60 HRC	38	–	–	–	–				
	Hard cast iron		cast	400	39	105	140	185	1				
	Hardened cast iron		hardened and tempered	55 HRC	40	–	–	–	–				
X	Non-metallic materials	Thermoplasts			41								
		Thermosetting plastics			42								
		Plastic, glass-fibre reinforced GFRP			43								
		Plastic, carbon fibre reinforced CFRP			44								
		Graphite			45								
		Wood			46								

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.
Feed rate recommendations on page B76.

	Starting values for cutting speed v_c [m/min]																			
	Q**-HMX-4E Q**-HMX-4R				Q**-HMX-2B Q**-HMX-4B															
			Shoulder milling																	
			Ø [mm]	$a_{e\,max}$																
			$0 < x \leq 20$	0.15 x D																
	KMG5515				KMG5515															
	a_e / D				a_e / D															
	1/1	1/2	1/10	f-group	1/1	1/2	1/10	f-group												
	55	100	125	3	–	130	145	7												
	55	95	120	3	–	80	90	7												
	70	125	160	3	–	163	181	7												
	55	100	125	3	–	109	145	7												

Solid carbide milling Recommended cutting data

End mill – TM series

Material group		Composition / structure / heat treatment		Brinell hardness HB	Machining group	Starting values for cutting speed v_c [m/min]							
						TM-4R / TM-4RP TM-5R / TM-5RP TM-7R / TM-7RP TM-9R / TM-9RP				TM-4B / TM-4BP TM-5B / TM-5BP			
						Slot milling		Shoulder milling		Slot milling		Shoulder milling	
						0 < x < 3	0,3 x D	0 < x < 3					
						3 ≤ x < 12	0,7 x D	3 ≤ x < 20	0,3 x D				
						12 ≤ x ≤ 20	1,5 x D						
						KMS405				KMS405			
						a_e / D				a_e / D			
						1/1	1/2	1/10	f-group	1/1	1/10	1/20	f-group
P	Unalloyed steel	approx. 0,15 % C	annealed	125	1								
		approx. 0,45 % C	annealed	190	2								
		approx. 0,45 % C	tempered	250	3								
		approx. 0,75 % C	annealed	270	4								
		approx. 0,75 % C	tempered	300	5								
	Low-alloyed steel		annealed	180	6								
			tempered	275	7								
			tempered	300	8								
			tempered	350	9								
	High-alloyed steel and high-alloyed tool steel		annealed	200	10								
			hardened and tempered	325	11								
M	Stainless steel	ferritic/martensitic	annealed	200	12								
		martensitic	tempered	240	13								
		austenitic	quench hardened	180	14								
		austenitic-ferritic		230	15								
K	Grey cast iron	perlitic/ferritic		180	16								
		perlitic (martensitic)		260	17								
	Cast iron with spheroidal graphite	ferritic		160	18								
		perlitic		250	19								
	Malleable cast iron	ferritic		130	20								
		perlitic		230	21								
N	Aluminium wrought alloys	cannot be hardened		60	22								
		hardenable	hardened	100	23								
	Cast aluminium alloys	≤ 12 % Si, cannot be hardened		75	24								
		≤ 12 % Si, hardenable	hardened	90	25								
		> 12 % Si, cannot be hardened		130	26								
	Copper and copper alloys (bronze/brass)	machining steel, PB> 1%		110	27								
		CuZn, CuSnZn		90	28								
		CuSn, Pb-free copper, electrolytic copper		100	29								
S	Heat-resistant alloys	Fe-based alloys	annealed	200	30	45	55	85	10	–	85	90	10
			hardened	280	31	25	30	45	10	–	45	50	10
		Ni or Co bass	annealed	250	32	45	55	85	10	–	85	90	10
			hardened	350	33	25	30	45	10	–	45	50	10
			cast	320	34	25	30	45	10	–	45	50	10
	Titanium alloys	pure titanium		R_m 400	35	75	90	135	10	–	135	145	10
		α and β alloys	hardened	R_m 1050	36	45	55	85	10	–	85	90	10
H	Hardened steel		hardened and tempered	55 HRC	37								
			hardened and tempered	60 HRC	38								
	Hard cast iron		cast	400	39								
	Hardened cast iron		hardened and tempered	55 HRC	40								
X	Non-metallic materials	Thermoplasts			41								
		Thermosetting plastics			42								
		Plastic, glass-fibre reinforced GFRP			43								
		Plastic, carbon fibre reinforced CFRP			44								
		Graphite			45								
		Wood			46								

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.
Feed rate recommendations on page B76.

Recommended feed rate

Solid carbide milling group 1 – Square shoulder mills PM series, QCH series, EPM series

	a_e / D	Feed rate per cutting edge (f_z) [mm]																		
		Ø0,5	Ø0,8	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 18	Ø 20				
P	1/1	0,01	0,02	0,02	0,02	0,02	0,02	0,03	0,03	0,05	0,07	0,08	0,08	0,09	0,09	0,10				
	1/2	0,01	0,03	0,03	0,03	0,03	0,03	0,04	0,04	0,06	0,09	0,10	0,10	0,12	0,12	0,13				
	1/10	0,02	0,05	0,05	0,05	0,05	0,05	0,07	0,07	0,09	0,14	0,16	0,16	0,18	0,18	0,20				
M	1/1	0,01	0,02	0,02	0,02	0,02	0,02	0,03	0,03	0,04	0,05	0,06	0,06	0,07	0,07	0,08				
	1/2	0,01	0,02	0,02	0,02	0,02	0,02	0,04	0,04	0,05	0,07	0,08	0,08	0,10	0,10	0,11				
	1/10	0,02	0,04	0,04	0,04	0,04	0,04	0,05	0,05	0,07	0,11	0,13	0,13	0,15	0,15	0,16				
K	1/1	0,01	0,02	0,02	0,02	0,02	0,02	0,03	0,03	0,05	0,07	0,08	0,08	0,09	0,09	0,10				
	1/2	0,01	0,03	0,03	0,03	0,03	0,03	0,04	0,04	0,06	0,09	0,10	0,10	0,12	0,12	0,13				
	1/10	0,02	0,05	0,05	0,05	0,05	0,05	0,07	0,07	0,09	0,14	0,16	0,16	0,18	0,18	0,20				
H	1/1	0,01	0,02	0,02	0,02	0,02	0,02	0,03	0,03	0,04	0,05	0,06	0,06	0,07	0,07	0,08				
	1/2	0,01	0,02	0,02	0,02	0,02	0,02	0,04	0,04	0,05	0,07	0,08	0,08	0,10	0,10	0,11				
	1/10	0,02	0,04	0,04	0,04	0,04	0,04	0,05	0,05	0,07	0,11	0,13	0,13	0,15	0,15	0,16				

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.

Solid carbide milling group 9 – Square shoulder mills UM/UMC series, VPM series HSC/HPC

	a_e / D	Feed rate per cutting edge (f_z) [mm]																		
		Ø 4	Ø 5	Ø 6	Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 18	Ø 20									
P	1/1	0,06	0,06	0,06	0,07	0,07	0,07	0,07	0,08	0,08	0,08									
	1/2	0,08	0,08	0,08	0,09	0,09	0,09	0,09	0,10	0,10	0,10									
	1/10	0,14	0,14	0,16	0,18	0,22	0,25	0,27	0,3	0,32	0,36									
M	1/1	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,06	0,06	0,06									
	1/2	0,06	0,06	0,06	0,07	0,07	0,07	0,07	0,08	0,08	0,08									
	1/10	0,10	0,10	0,10	0,12	0,12	0,14	0,16	0,16	0,18	0,18									
K	1/1	0,06	0,06	0,06	0,07	0,07	0,07	0,07	0,08	0,08	0,08									
	1/2	0,08	0,08	0,08	0,09	0,09	0,09	0,09	0,10	0,10	0,10									
	1/10	0,14	0,14	0,16	0,18	0,22	0,25	0,27	0,3	0,32	0,36									
H	1/1	0,045	0,045	0,045	0,053	0,053	0,053	0,053	0,06	0,06	0,06									
	1/2	0,06	0,06	0,06	0,07	0,07	0,07	0,07	0,08	0,08	0,08									
	1/10	0,10	0,10	0,10	0,12	0,12	0,14	0,16	0,16	0,18	0,18									

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.

Solid carbide milling group 10 – Square shoulder mills VSM series, TM series

	a_e / D	Feed rate per cutting edge (f_z) [mm]																		
		Ø 4	Ø 5	Ø 6	Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 18	Ø 20									
P	1/1	0,03	0,04	0,05	0,05	0,05	0,05	0,06	0,06	0,07	0,08									
	1/2	0,04	0,06	0,07	0,07	0,07	0,07	0,08	0,09	0,10	0,11									
	1/10	0,05	0,08	0,09	0,09	0,09	0,09	0,11	0,12	0,14	0,15									
M	1/1	0,02	0,03	0,04	0,04	0,04	0,04	0,04	0,05	0,05	0,06									
	1/2	0,03	0,05	0,05	0,05	0,05	0,05	0,06	0,07	0,08	0,08									
	1/10	0,04	0,06	0,07	0,07	0,07	0,07	0,08	0,09	0,10	0,11									
S	1/1	0,02	0,03	0,04	0,04	0,04	0,04	0,04	0,05	0,05	0,06									
	1/2	0,03	0,05	0,05	0,05	0,05	0,05	0,06	0,07	0,08	0,08									
	1/10	0,04	0,06	0,07	0,07	0,07	0,07	0,08	0,09	0,10	0,11									

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.

Solid carbide drilling

C

Solid carbide drills

System code – solid carbide drills

1	5	3	6	SU	05	(C)	–	0850	(S)
1	2	3	4	5	6	7		8	9

Type	
Code	Description
1	Forets

1

Shank type	
Code	Description
1	Straight shank
2	Square shank DIN 10
3	Double flattened straight shank DIN 1809
5	Straight shank DIN 6535 HA
6	Weldon shank DIN 6535 HB
7	Whistle Notch shank DIN 6535 HE
9	Morse taper shank

2

Drill type	
Code	Description
0	Twist drill
3	Universal twist drill
4	NC tapping device
5	Step drill
6	Three-lips drill
7	Straight flute drill
8	Deep hole drill

3

Tool length	
Code	Description
1	DIN 338
2	DIN 1897
3	QJ/ZZQ(TO)01.001.002
4	DIN 6537 K
5	DIN 6539
6	DIN 6537 L
7	Factory standard ZCC-C
8	Factory standard ZCC-D
9	Factory standard ZCC-E

4

Application	
Code	Description
UD	Twist drills for tough materials
GD	Twist drills for high feeds
SU	Twist drill for general machining
SUK	Twist drill for cast iron
SL	Twist drill for deep hole drilling
SLK	Deep hole drill for cast iron
SP	Pilot drill
SH	Twist drill for hardened materials
SC	Twist drill for non-ferrous metals and cast iron
PA	Three-lips drill for non-ferrous metals and cast iron
PC	Straight flute drill for non-ferrous metals and cast iron

5

L/D relation		Angle	
Drill		NC tapping device	
Code	Description	Code	Description
03	3 x D	**90**	90°
05	5 x D	**120**	120°
08	8 x D		
10	10 x D		
12	12 x D		
15	15x D		
20	20 x D		
30	30 x D		

6

With inner cooling

7

Bore diameter [mm]	
Code	Description
0200	2,0
0850	8,5
1800	18,0
...	

8

Shank diameter [mm]	
Code	Description
S	4,0

9

a Boring **b** Drilling **c** Profile drilling **d** Centering

UD series

Solid carbide drills for difficult-to-machine materials

Now available in diameters of 1.0 mm and higher with internal cooling New

YOUR BENEFITS

– Minimal cutting forces thanks to new cutting edge design
– Larger clearance angle for higher productivity
– Enhanced chip breaking for optimal process reliability

Fig.: 1536UD05C-0230 KDG305

Diameter range: 1,0–20,0 mm (3xD, 5xD)

Feed calculator

ISO group	Material	Cutting speed v_c (m/min)	Feed factor F_m
M	Stainless steels	80	0,02
S	Ni- / Co-based alloys	40	0,01
S	Titanium alloys	60	0,012

Formula:	feed per revolution (F_n)	$D \times F_m$
Example:	drill diameter (D)	10 mm
	material	stainless steel

$$F_n = 10\ mm \times 0{,}02 = 0{,}2\ mm/r$$

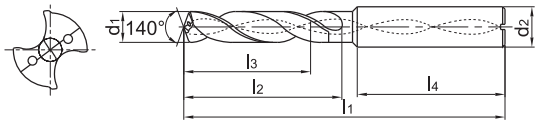
UD drill 3xD

Stainless steel, heat-resistant alloys

1534UD03C New

– Shank type: DIN 6535HA
– Coolant exit, axial concentric

Internal coolant



Article	✻	Dimensions [mm]						Grade
		d_1 (m7)	d_2 (h6)	l_1	l_2	l_3	l_4	KDG305
1534UD03C-0100XS	✻	1	3	45	6	4	37	○
1534UD03C-0110XS	✻	1,1	3	45	6,5	4	36,5	○
1534UD03C-0120XS	✻	1,2	3	45	7	5	36	○
1534UD03C-0130XS	✻	1,3	3	45	8	5	35	○
1534UD03C-0140XS	✻	1,4	3	45	8,5	5	34,5	○
1534UD03C-0150XS	✻	1,5	3	50	9	6	39	○
1534UD03C-0160S	✻	1,6	4	50	9,5	6	38,5	●
1534UD03C-0170S	✻	1,7	4	50	10	6	38	●
1534UD03C-0180S	✻	1,8	4	50	11	7	37	●
1534UD03C-0190S	✻	1,9	4	50	11,5	7	36,5	●
1534UD03C-0200S	✻	2	4	50	12	8	36	●
1534UD03C-0210S	✻	2,1	4	55	12,5	8	40,5	●
1534UD03C-0220S	✻	2,2	4	55	13	9	40	●
1534UD03C-0230S	✻	2,3	4	55	14	9	39	●
1534UD03C-0240S	✻	2,4	4	55	14,5	10	38,5	●
1534UD03C-0250S	✻	2,5	4	55	15	10	38	●
1534UD03C-0260S	✻	2,6	4	55	15,5	10	37,5	●
1534UD03C-0270S	✻	2,7	4	55	16	11	37	●
1534UD03C-0280S	✻	2,8	4	55	17	11	36	●
1534UD03C-0290S	✻	2,9	4	55	17,5	12	35,5	●

● Ex stock ○ On demand
✻ With internal cooling

Application field

Type	P	M	K	N	S	H
1534UD*	✔	✔			✔	

✔ Very suitable
✔ Suitable

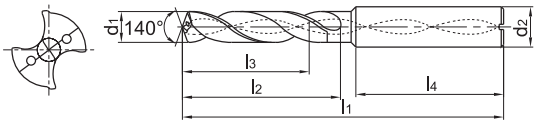
UD drill 3xD

Stainless steel, heat-resistant alloys

1534UD03C

– Shank type: DIN 6535HA
– Coolant exit, axial concentric

Internal coolant



Article	✻	Dimensions [mm]						Grade
		d_1 (m7)	d_2 (h6)	l_1	l_2	l_3	l_4	KDG305
1534UD03C-0300	✻	3	6	62	20	14	36	●
1534UD03C-0310	✻	3,1	6	62	20	14	36	●
1534UD03C-0320	✻	3,2	6	62	20	14	36	●
1534UD03C-0330	✻	3,3	6	62	20	14	36	●
1534UD03C-0340	✻	3,4	6	62	20	14	36	●
1534UD03C-0350	✻	3,5	6	62	20	14	36	●
1534UD03C-0360	✻	3,6	6	62	20	14	36	●
1534UD03C-0370	✻	3,7	6	62	20	14	36	●
1534UD03C-0380	✻	3,8	6	66	24	17	36	●
1534UD03C-0390	✻	3,9	6	66	24	17	36	●
1534UD03C-0400	✻	4	6	66	24	17	36	●
1534UD03C-0410	✻	4,1	6	66	24	17	36	●
1534UD03C-0420	✻	4,2	6	66	24	17	36	●
1534UD03C-0430	✻	4,3	6	66	24	17	36	●
1534UD03C-0440	✻	4,4	6	66	24	17	36	●
1534UD03C-0450	✻	4,5	6	66	24	17	36	●
1534UD03C-0460	✻	4,6	6	66	24	17	36	●
1534UD03C-0465	✻	4,65	6	66	24	17	36	●
1534UD03C-0470	✻	4,7	6	66	24	17	36	●
1534UD03C-0480	✻	4,8	6	66	28	20	36	●
1534UD03C-0490	✻	4,9	6	66	28	20	36	●
1534UD03C-0500	✻	5	6	66	28	20	36	●
1534UD03C-0510	✻	5,1	6	66	28	20	36	●
1534UD03C-0520	✻	5,2	6	66	28	20	36	●
1534UD03C-0530	✻	5,3	6	66	28	20	36	●
1534UD03C-0540	✻	5,4	6	66	28	20	36	●
1534UD03C-0550	✻	5,5	6	66	28	20	36	●
1534UD03C-0560	✻	5,6	6	66	28	20	36	●
1534UD03C-0570	✻	5,7	6	66	28	20	36	●
1534UD03C-0580	✻	5,8	6	66	28	20	36	●
1534UD03C-0590	✻	5,9	6	66	28	20	36	●
1534UD03C-0600	✻	6	6	66	28	20	36	●
1534UD03C-0610	✻	6,1	8	79	34	24	36	●
1534UD03C-0620	✻	6,2	8	79	34	24	36	●
1534UD03C-0630	✻	6,3	8	79	34	24	36	●

● Ex stock ○ On demand
✻ With internal cooling

Application field

Type	P	M	K	N	S	H
1534UD*	✔	✔			✔	

✔ Very suitable
✔ Suitable

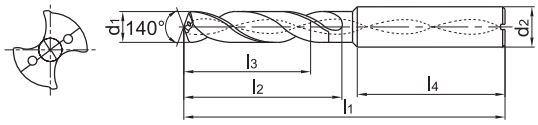
UD drill 3xD

Stainless steel, heat-resistant alloys

1534UD03C

– Shank type: DIN 6535HA
– Coolant exit, axial concentric

Internal coolant



Article	✻	Dimensions [mm]						Grade
		d_1 (m7)	d_2 (h6)	l_1	l_2	l_3	l_4	KDG305
1534UD03C-0640	✻	6,4	8	79	34	24	36	●
1534UD03C-0650	✻	6,5	8	79	34	24	36	●
1534UD03C-0660	✻	6,6	8	79	34	24	36	●
1534UD03C-0670	✻	6,7	8	79	34	24	36	●
1534UD03C-0680	✻	6,8	8	79	34	24	36	●
1534UD03C-0690	✻	6,9	8	79	34	24	36	●
1534UD03C-0700	✻	7	8	79	34	24	36	●
1534UD03C-0710	✻	7,1	8	79	41	29	36	●
1534UD03C-0720	✻	7,2	8	79	41	29	36	●
1534UD03C-0730	✻	7,3	8	79	41	29	36	●
1534UD03C-0740	✻	7,4	8	79	41	29	36	●
1534UD03C-0750	✻	7,5	8	79	41	29	36	●
1534UD03C-0760	✻	7,6	8	79	41	29	36	●
1534UD03C-0770	✻	7,7	8	79	41	29	36	●
1534UD03C-0780	✻	7,8	8	79	41	29	36	●
1534UD03C-0790	✻	7,9	8	79	41	29	36	●
1534UD03C-0800	✻	8	8	79	41	29	36	●
1534UD03C-0810	✻	8,1	10	89	47	35	40	●
1534UD03C-0820	✻	8,2	10	89	47	35	40	●
1534UD03C-0830	✻	8,3	10	89	47	35	40	●
1534UD03C-0840	✻	8,4	10	89	47	35	40	●
1534UD03C-0850	✻	8,5	10	89	47	35	40	●
1534UD03C-0860	✻	8,6	10	89	47	35	40	●
1534UD03C-0870	✻	8,7	10	89	47	35	40	●
1534UD03C-0880	✻	8,8	10	89	47	35	40	●
1534UD03C-0890	✻	8,9	10	89	47	35	40	●
1534UD03C-0900	✻	9	10	89	47	35	40	●
1534UD03C-0910	✻	9,1	10	89	47	35	40	●
1534UD03C-0920	✻	9,2	10	89	47	35	40	●
1534UD03C-0930	✻	9,3	10	89	47	35	40	●
1534UD03C-0940	✻	9,4	10	89	47	35	40	●
1534UD03C-0950	✻	9,5	10	89	47	35	40	●
1534UD03C-0960	✻	9,6	10	89	47	35	40	●
1534UD03C-0970	✻	9,7	10	89	47	35	40	●
1534UD03C-0980	✻	9,8	10	89	47	35	40	●

● Ex stock ○ On demand
✻ With internal cooling

Application field

Type	P	M	K	N	S	H
1534UD*	✔	✔			✔	

✔ Very suitable
✔ Suitable

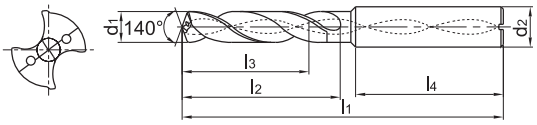
UD drill 3xD

Stainless steel, heat-resistant alloys

1534UD03C

– Shank type: DIN 6535HA
– Coolant exit, axial concentric

Internal coolant



Article	✲	Dimensions [mm]						Grade
		d_1 (m7)	d_2 (h6)	l_1	l_2	l_3	l_4	KDG305
1534UD03C-0990	✲	9,9	10	89	47	35	40	●
1534UD03C-1000	✲	10	10	89	47	35	40	●
1534UD03C-1020	✲	10,2	12	102	55	40	45	●
1534UD03C-1050	✲	10,5	12	102	55	40	45	●
1534UD03C-1100	✲	11	12	102	55	40	45	●
1534UD03C-1150	✲	11,5	12	102	55	40	45	●
1534UD03C-1200	✲	12	12	102	55	40	45	●
1534UD03C-1250	✲	12,5	14	107	60	43	45	●
1534UD03C-1300	✲	13	14	107	60	43	45	●
1534UD03C-1350	✲	13,5	14	107	60	43	45	●
1534UD03C-1400	✲	14	14	107	60	43	45	●
1534UD03C-1450	✲	14,5	16	115	65	45	48	●
1534UD03C-1500	✲	15	16	115	65	45	48	●
1534UD03C-1550	✲	15,5	16	115	65	45	48	●
1534UD03C-1600	✲	16	16	115	65	45	48	●
1534UD03C-1650	✲	16,5	18	123	73	51	48	●
1534UD03C-1700	✲	17	18	123	73	51	48	●
1534UD03C-1750	✲	17,5	18	123	73	51	48	●
1534UD03C-1800	✲	18	18	123	73	51	48	●
1534UD03C-1850	✲	18,5	20	131	79	55	50	●
1534UD03C-1900	✲	19	20	131	79	55	50	●
1534UD03C-1950	✲	19,5	20	131	79	55	50	●
1534UD03C-2000	✲	20	20	131	79	55	50	●

● Ex stock ○ On demand
✲ With internal cooling

Application field

Type	P	M	K	N	S	H
1534UD*	✔	✔			✔	

✔ Very suitable
✔ Suitable

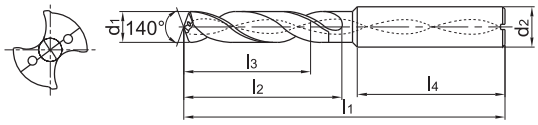
UD drill 3xD

Stainless steel, heat-resistant alloys

1536UD05C New

– Shank type: DIN 6535HA
– Coolant exit, axial concentric

Internal coolant



Article	✲	Dimensions [mm]						Grade
		d_1 (m7)	d_2 (h6)	l_1	l_2	l_3	l_4	KDG305
1536UD05C-0100XS	✲	1	3	45	8	6	35	○
1536UD05C-0110XS	✲	1,1	3	45	9	7	34	○
1536UD05C-0120XS	✲	1,2	3	45	9,5	7	33,5	○
1536UD05C-0130XS	✲	1,3	3	45	10,5	8	32,5	○
1536UD05C-0140XS	✲	1,4	3	45	11	8	32	○
1536UD05C-0150XS	✲	1,5	3	50	12	9	36	○
1536UD05C-0160S	✲	1,6	4	50	13	10	35	●
1536UD05C-0170S	✲	1,7	4	50	13,5	10	34,5	●
1536UD05C-0180S	✲	1,8	4	50	14,5	11	33,5	●
1536UD05C-0190S	✲	1,9	4	50	15	11	33	●
1536UD05C-0200S	✲	2	4	50	16	12	32	●
1536UD05C-0210S	✲	2,1	4	55	17	13	36	●
1536UD05C-0220S	✲	2,2	4	55	17,5	13	35,5	●
1536UD05C-0230S	✲	2,3	4	55	18,5	14	34,5	●
1536UD05C-0240S	✲	2,4	4	55	19	14	34	●
1536UD05C-0250S	✲	2,5	4	55	20	15	33	●
1536UD05C-0260S	✲	2,6	4	55	21	16	32	●
1536UD05C-0270S	✲	2,7	4	55	21,5	16	31,5	●
1536UD05C-0280S	✲	2,8	4	55	22,5	17	30,5	●
1536UD05C-0290S	✲	2,9	4	55	23	17	30	●

● Ex stock ○ On demand
✲ With internal cooling

Application field

Type	P	M	K	N	S	H
1536UD*	✔	✔			✔	

✔ Very suitable
✔ Suitable

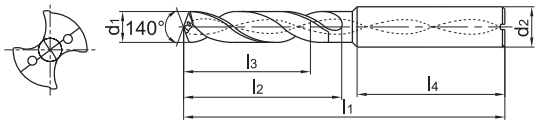
UD drill 3xD

Stainless steel, heat-resistant alloys

1536UD05C

– Shank type: DIN 6535HA
– Coolant exit, axial concentric

Internal coolant



Article	✲	Dimensions [mm]						Grade
		d_1 (m7)	d_2 (h6)	l_1	l_2	l_3	l_4	KDG305
1536UD05C-0300	✲	3	6	66	28	23	36	●
1536UD05C-0310	✲	3,1	6	66	28	23	36	●
1536UD05C-0320	✲	3,2	6	66	28	23	36	●
1536UD05C-0330	✲	3,3	6	66	28	23	36	●
1536UD05C-0340	✲	3,4	6	66	28	23	36	●
1536UD05C-0350	✲	3,5	6	66	28	23	36	●
1536UD05C-0360	✲	3,6	6	66	28	23	36	●
1536UD05C-0370	✲	3,7	6	66	28	23	36	●
1536UD05C-0380	✲	3,8	6	74	36	29	36	●
1536UD05C-0390	✲	3,9	6	74	36	29	36	●
1536UD05C-0400	✲	4	6	74	36	29	36	●
1536UD05C-0410	✲	4,1	6	74	36	29	36	●
1536UD05C-0420	✲	4,2	6	74	36	29	36	●
1536UD05C-0430	✲	4,3	6	74	36	29	36	●
1536UD05C-0440	✲	4,4	6	74	36	29	36	●
1536UD05C-0450	✲	4,5	6	74	36	29	36	●
1536UD05C-0460	✲	4,6	6	74	36	29	36	●
1536UD05C-0465	✲	4,65	6	74	36	29	36	●
1536UD05C-0470	✲	4,7	6	74	36	29	36	●
1536UD05C-0480	✲	4,8	6	82	44	35	36	●
1536UD05C-0490	✲	4,9	6	82	44	35	36	●
1536UD05C-0500	✲	5	6	82	44	35	36	●
1536UD05C-0510	✲	5,1	6	82	44	35	36	●
1536UD05C-0520	✲	5,2	6	82	44	35	36	●
1536UD05C-0530	✲	5,3	6	82	44	35	36	●
1536UD05C-0540	✲	5,4	6	82	44	35	36	●
1536UD05C-0550	✲	5,5	6	82	44	35	36	●
1536UD05C-0560	✲	5,6	6	82	44	35	36	●
1536UD05C-0570	✲	5,7	6	82	44	35	36	●
1536UD05C-0580	✲	5,8	6	82	44	35	36	●
1536UD05C-0590	✲	5,9	6	82	44	35	36	●
1536UD05C-0600	✲	6	6	82	44	35	36	●
1536UD05C-0610	✲	6,1	8	91	53	43	36	●
1536UD05C-0620	✲	6,2	8	91	53	43	36	●
1536UD05C-0630	✲	6,3	8	91	53	43	36	●

● Ex stock ○ On demand
✲ With internal cooling

Application field

Type	P	M	K	N	S	H
1536UD*	✔	✔			✔	

✔ Very suitable
✔ Suitable

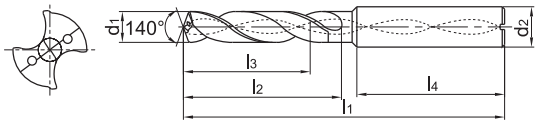
UD drill 3xD

Stainless steel, heat-resistant alloys

1536UD05C

– Shank type: DIN 6535HA
– Coolant exit, axial concentric

Internal coolant



Article	✲	Dimensions [mm]						Grade
		d_1 (m7)	d_2 (h6)	l_1	l_2	l_3	l_4	KDG305
1536UD05C-0640	✲	6,4	8	91	53	43	36	●
1536UD05C-0650	✲	6,5	8	91	53	43	36	●
1536UD05C-0660	✲	6,6	8	91	53	43	36	●
1536UD05C-0670	✲	6,7	8	91	53	43	36	●
1536UD05C-0680	✲	6,8	8	91	53	43	36	●
1536UD05C-0690	✲	6,9	8	91	53	43	36	●
1536UD05C-0700	✲	7	8	91	53	43	36	●
1536UD05C-0710	✲	7,1	8	91	53	43	36	●
1536UD05C-0720	✲	7,2	8	91	53	43	36	●
1536UD05C-0730	✲	7,3	8	91	53	43	36	●
1536UD05C-0740	✲	7,4	8	91	53	43	36	●
1536UD05C-0750	✲	7,5	8	91	53	43	36	●
1536UD05C-0760	✲	7,6	8	91	53	43	36	●
1536UD05C-0770	✲	7,7	8	91	53	43	36	●
1536UD05C-0780	✲	7,8	8	91	53	43	36	●
1536UD05C-0790	✲	7,9	8	91	53	43	36	●
1536UD05C-0800	✲	8	8	91	53	43	36	●
1536UD05C-0810	✲	8,1	10	103	61	49	40	●
1536UD05C-0820	✲	8,2	10	103	61	49	40	●
1536UD05C-0830	✲	8,3	10	103	61	49	40	●
1536UD05C-0840	✲	8,4	10	103	61	49	40	●
1536UD05C-0850	✲	8,5	10	103	61	49	40	●
1536UD05C-0860	✲	8,6	10	103	61	49	40	●
1536UD05C-0870	✲	8,7	10	103	61	49	40	●
1536UD05C-0880	✲	8,8	10	103	61	49	40	●
1536UD05C-0890	✲	8,9	10	103	61	49	40	●
1536UD05C-0900	✲	9	10	103	61	49	40	●
1536UD05C-0910	✲	9,1	10	103	61	49	40	●
1536UD05C-0920	✲	9,2	10	103	61	49	40	●
1536UD05C-0930	✲	9,3	10	103	61	49	40	●
1536UD05C-0940	✲	9,4	10	103	61	49	40	●
1536UD05C-0950	✲	9,5	10	103	61	49	40	●
1536UD05C-0960	✲	9,6	10	103	61	49	40	●
1536UD05C-0970	✲	9,7	10	103	61	49	40	●
1536UD05C-0980	✲	9,8	10	103	61	49	40	●

● Ex stock ○ On demand
✲ With internal cooling

Application field

Type	P	M	K	N	S	H
1536UD*	✔	✔			✔	

✔ Very suitable
✔ Suitable

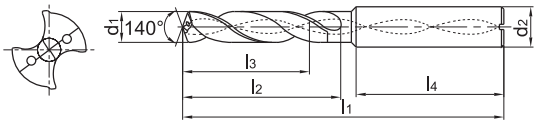
UD drill 3xD

Stainless steel, heat-resistant alloys

1536UD05C

– Shank type: DIN 6535HA
– Coolant exit, axial concentric

Internal coolant



Article	✻	Dimensions [mm]						Grade
		d_1 (m7)	d_2 (h6)	l_1	l_2	l_3	l_4	KDG305
1536UD05C-0990	✻	9,9	10	103	61	49	40	●
1536UD05C-1000	✻	10	10	103	61	49	40	●
1536UD05C-1020	✻	10,2	12	118	71	56	45	●
1536UD05C-1050	✻	10,5	12	118	71	56	45	●
1536UD05C-1100	✻	11	12	118	71	56	45	●
1536UD05C-1150	✻	11,5	12	118	71	56	45	●
1536UD05C-1200	✻	12	12	118	71	56	45	●
1536UD05C-1250	✻	12,5	14	124	77	60	45	●
1536UD05C-1300	✻	13	14	124	77	60	45	●
1536UD05C-1350	✻	13,5	14	124	77	60	45	●
1536UD05C-1400	✻	14	14	124	77	60	45	●
1536UD05C-1450	✻	14,5	16	133	83	63	48	●
1536UD05C-1500	✻	15	16	133	83	63	48	●
1536UD05C-1550	✻	15,5	16	133	83	63	48	●
1536UD05C-1600	✻	16	16	133	83	63	48	●
1536UD05C-1650	✻	16,5	18	143	93	71	48	●
1536UD05C-1700	✻	17	18	143	93	71	48	●
1536UD05C-1750	✻	17,5	18	143	93	71	48	●
1536UD05C-1800	✻	18	18	143	93	71	48	●
1536UD05C-1850	✻	18,5	20	153	101	77	50	●
1536UD05C-1900	✻	19	20	153	101	77	50	●
1536UD05C-1950	✻	19,5	20	153	101	77	50	●
1536UD05C-2000	✻	20	20	153	101	77	50	●

● Ex stock ○ On demand
✻ With internal cooling

Application field

Type	P	M	K	N	S	H
1536UD*	✔	✔			✔	

✔ Very suitable
✔ Suitable

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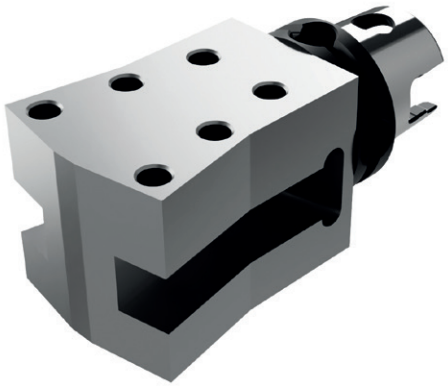
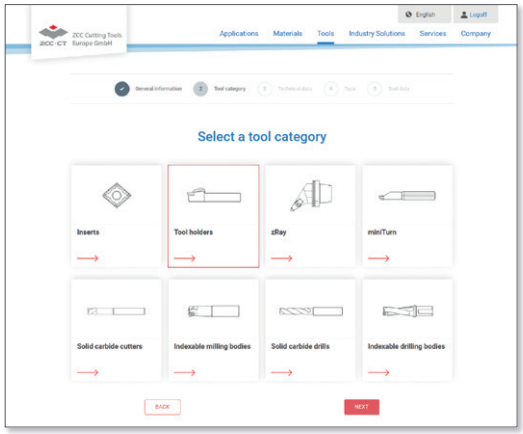


Example: Special tool holder

Example: Special solid carbide step drill

The easy way to order your custom-made special tool New

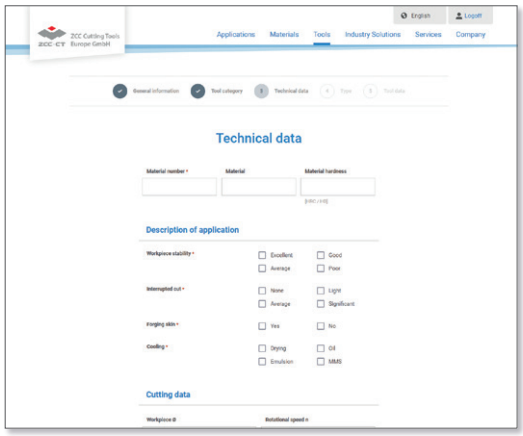
Are there specific applications at your company where having custom tools tailored to your unique needs would deliver real benefits both in terms of logistics and at a technical and commercial level? ZCC Cutting Tools is there to advise and assist you during the planning, development and ordering process. Use our new online tool to request a special tool and get your personal quotation in just a few short steps (www.zccct-europe.com).



'Online tool for special tools' launch page where you can select the tool category

Selecting the tool category

Scan the QR code on this page to go directly to the launch page of our online tool where you can request the special tool you need. You can begin by selecting the tool category you need. It's that easy.



Define the relevant tool parameters

Defining the tool parameters

You are now guided step by step through the process. You can also securely upload your drawings, diagrams and 3D models (where available).

The fast and direct way to order your special tool from ZCC Cutting Tools Europe.

Now go directly to the new **special tool form** on our website and get started.

Notes

Go to PDF online

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