Product Innovations 3/20

Catalogue

Version 2019

2019 EN

ZCC Cutting Tools Europe GmbH

your Partner \ your Value

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.

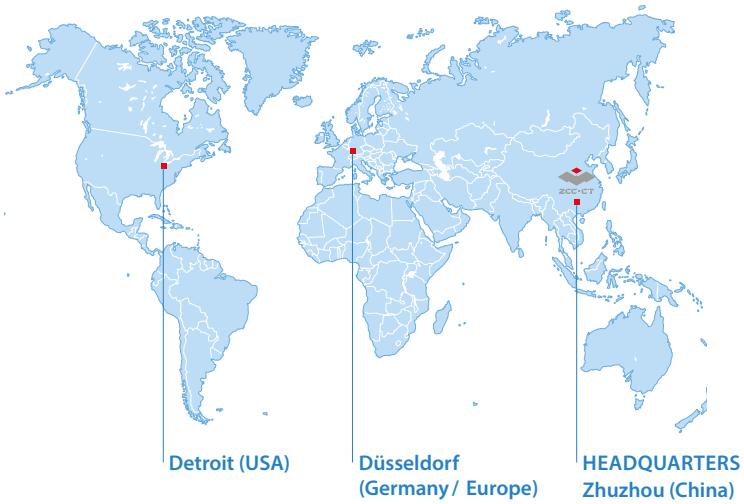
In order to meet our own high requirements for above-average customer service and in parallel with the growth of the company as a whole, the number of employees at ZCC Cutting Tools is growing in sales and internal sales, in technical support and application technology, research and development as well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



General turning

Parting & grooving

100% chip control

– **100% chip control** during machining of long chipping workpiece materials
– Economic design of the tool system with an **interchangeable cassette**, to minimize tool damage in case of crash
– Cassette available in alternative materials where needed
– The interlocking between cassette and base holder guarantuees maximum rigidity and security
– The clamping system additionally reduces vibrations
– Holders are available with any relevant machine tool interface

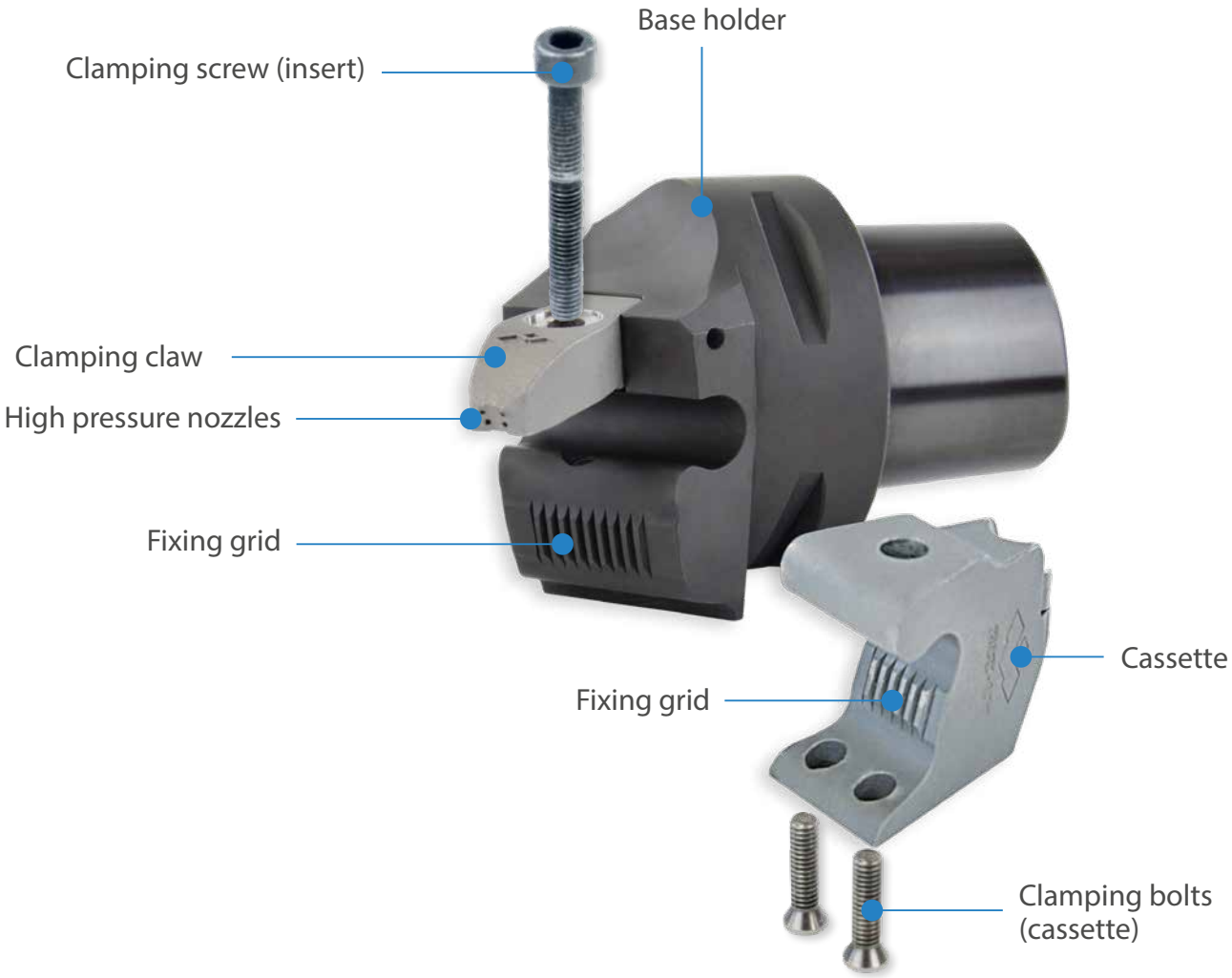
Primary workpiece materials

- Heat-resistant steels
- Titanium alloys
- Roller bearing steels

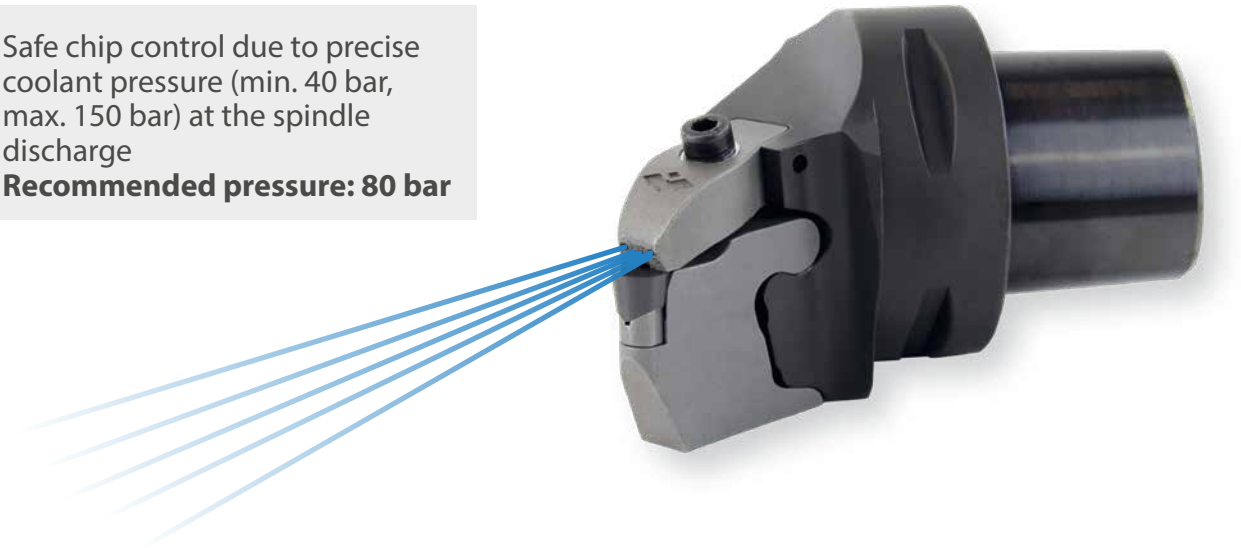
Main industry segments and components

- Aerospace (engine components)
- Energy technology (turbine components)
- Transportation (naval engine components)
- Large diameter bearing industry

Special tool system available on request.



Safe chip control due to precise coolant pressure (min. 40 bar, max. 150 bar) at the spindle discharge
Recommended pressure: 80 bar



Negative inserts

Medium machining

XM **P**

Double-sided chip breaker for semi-roughing in the P application range. Excellent chip control at high and low feed rates.

TK **K**

Double-sided chip breaker for semi-roughing in the K application range. Outstanding combination of cutting edge sharpness and impact resistance.

Coated cemented carbide CVD

Grade	ISO	Micro structure	Grade description
YBC103	P05–P15		P10 grade with excellent wear resistance at higher cutting speeds. Latest sinter processes and CVD coating technologies enable a wide range of applications in the P material range.
YB7305	K05–K10		New carbide substrate with improved sinter technology. The optimized combination of binder phase and hard phase improves the abrasion and impact resistance of the substrate. Highly effective cutting at high temperatures due to improved wear resistance.
YB7315	K10–K25		CVD coated K10–K25 carbide substrate. Optimized for medium to roughing operation of cast iron. Improved wear resistance and toughness at high cutting speed.

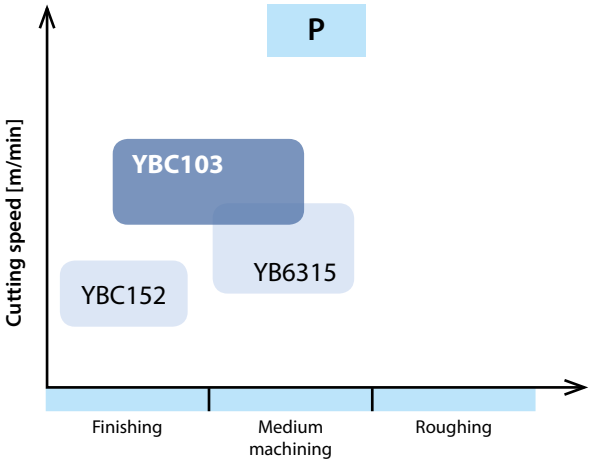
Coated cemented carbide PVD

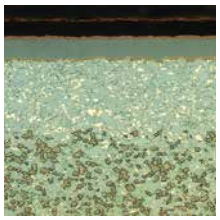
Grade	ISO	Micro structure	Grade description
YPD201	S20–S30		Carbide grade for semi-roughing to chip breaking of high-strength and high-alloy materials. High-performance grade with high wear resistance. Balanced hardness and internal stress ratio provide a wide range of applications.
YBS103	S10–S20		Turning grade for processing nickel-base materials. A special carbide substrate and the latest PVD coating technology enable a very good wear behaviour and high thermal stability.
YBS203	S15–S25		Turning and milling grades for processing heat-resistant materials. A special carbon substrate and the latest PVD coating technology enable a very good wear behaviour, high fracture toughness and high thermal stability.

YBC103

Maximum productivity

Application field





The **YBC103** is manufactured using a new sinter technology and therefore can be utilised in an additional application range. High wear resistance is due to the new CVD coating system.

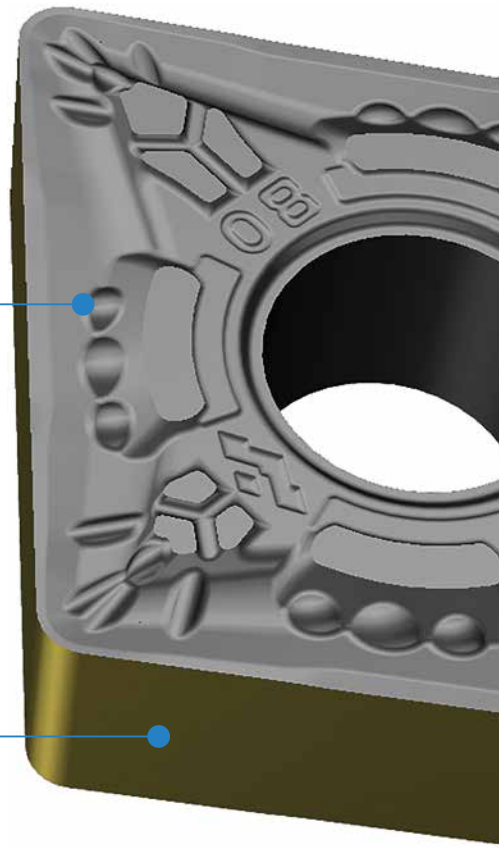
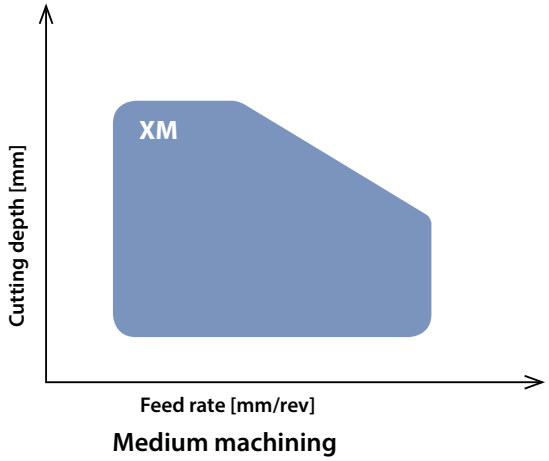


Fig.: CNMG120408-XM YBC103

XM chip breaker

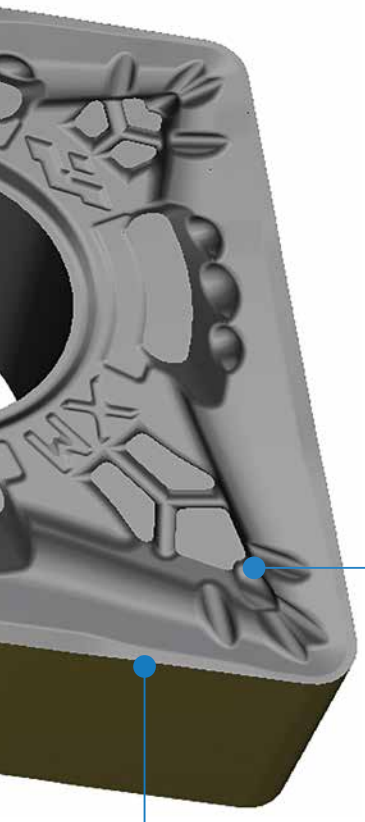
High performance all-rounder

Application field



Medium machining

a_p [mm]	f [mm/rev]
1,0–5,0	0,2–0,5



YOUR BENEFITS

– Highest productivity with maximum process reliability
– Outstanding wear resistance at high cutting speeds
– Wide range of applications in P materials
– Application identification on the tool flank

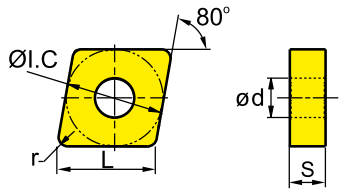
Excellent chip control at low and high feed rates

Soft cutting design provides for low cutting forces; recommended for machine tools with low spindle power

CNMG	L	I.C	S	d
09 03	9,7	9,525	3,18	3,81
12 04	12,9	12,7	4,76	5,16
16 06	16,1	15,875	6,35	6,35
19 06	19,3	19,05	6,35	7,94

Turning inserts

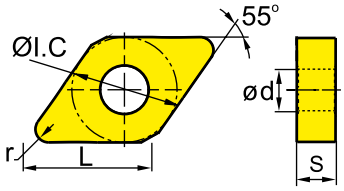
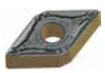
Ideal machining conditions
Normal machining conditions
Unfavourable machining conditions

CN** negative insert						HC¹ (CVD)	HC¹ (PVD)	HT	HC²	HW
					P	○				
					M					
					K					
					N					
					S					
					H					
	ISO		r	a_p	f	YBC103				
XM  Medium cut	**CNMG120404-XM**		0,4	1-4,2	0,2-0,4	○				
	CNMG120408-XM		0,8	1-4,2	0,2-0,4	○				
	CNMG120412-XM		1,2	1-4,2	0,2-0,6	○				
	CNMG120416-XM		1,6	1-4,2	0,2-0,8	○				
	CNMG160608-XM		0,8	1-5,6	0,2-0,4	○				
	CNMG160612-XM		1,2	1-5,6	0,2-0,6	○				
	CNMG160616-XM		1,6	1-5,6	0,2-0,8	○				
	CNMG190608-XM		0,8	1-6,65	0,2-0,4	○				
	CNMG190612-XM		1,2	1-6,65	0,2-0,6	○				
	CNMG190616-XM		1,6	1-6,65	0,2-0,8	○				

DNMG	L	I.C	S	d
11 04	11,6	9,525	4,76	3,81
15 04	15,5	12,7	4,76	5,16
15 06	15,5	12,7	6,35	5,16

Turning inserts

Ideal machining conditions
Normal machining conditions
Unfavourable machining conditions

DN** negative insert						HC¹ (CVD)	HC¹ (PVD)	HT	HC²	HW
					P	○				
					M					
					K					
					N					
					S					
					H					
	ISO		r	a_p	f	YBC103				
XM  Medium cut	**DNMG110404-XM**		0,4	1-3,85	0,2-0,2	○				
	DNMG110408-XM		0,8	1-3,85	0,2-0,4	○				
	DNMG110412-XM		1,2	1-3,85	0,2-0,6	○				
	DNMG150604-XM		0,4	1-5,25	0,2-0,4	○				
	DNMG150608-XM		0,8	1-5,25	0,2-0,4	○				
	DNMG150612-XM		1,2	1-5,25	0,2-0,6	○				
	DNMG150616-XM		1,6	1-5,25	0,2-0,8	○				

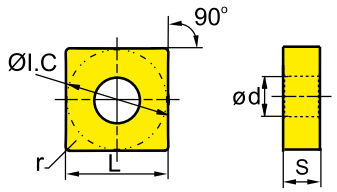
● Ex stock ○ On demand

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

SNMG	L	I.C	S	d
09 03	9,525	9,525	3,18	3,81
12 04	12,7	12,7	4,76	5,16
15 06	15,875	15,875	6,35	6,35
19 06	19,05	19,05	6,35	7,94

Turning inserts

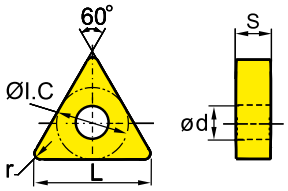
Ideal machining conditions
Normal machining conditions
Unfavourable machining conditions

SN** negative insert						HC¹ (CVD)	HC¹ (PVD)	HT	HC²	HW
					P	○				
					M					
					K					
					N					
					S					
					H					
	ISO	r	a_p	f	YBC103					
XM	**SNMG120404-XM**	0,4	1-4,2	0,2-0,4	○					
	SNMG120408-XM	0,8	1-4,2	0,2-0,4	○					
	SNMG120412-XM	1,2	1-4,2	0,2-0,6	○					
	SNMG120416-XM	1,6	1-4,2	0,2-0,8	○					
	SNMG150608-XM	0,8	1-5,25	0,2-0,4	○					
	SNMG150612-XM	1,2	1-5,25	0,2-0,6	○					
	SNMG150616-XM	1,6	1-5,25	0,2-0,8	○					
	**SNMG190608-XM**	0,8	1-6,65	0,2-0,4	○					
	SNMG190612-XM	1,2	1-6,65	0,2-0,6	○					
	SNMG190616-XM	1,6	1-6,65	0,2-0,8	○					
	SNMG190624-XM	2,4	1-6,65	0,2-1,0	○					
Medium cut										

TN**	L	I.C	S	d
16 04	16,5	9,525	4,76	3,81
22 04	22	12,7	4,76	5,16

Turning inserts

Ideal machining conditions
Normal machining conditions
Unfavourable machining conditions

TN** negative insert						HC¹ (CVD)	HC¹ (PVD)	HT	HC²	HW
					P	○				
					M					
					K					
					N					
					S					
					H					
	ISO	r	a_p	f	YBC103					
XM	**TNMG160404-XM**	0,4	1-5,6	0,2-0,4	○					
	TNMG160408-XM	0,8	1-5,6	0,2-0,4	○					
	TNMG160412-XM	1,2	1-5,6	0,2-0,6	○					
	TNMG160416-XM	1,6	1-5,6	0,2-0,8	○					
	TNMG220408-XM	0,8	1-7,7	0,2-0,4	○					
	TNMG220412-XM	1,2	1-7,7	0,2-0,6	○					
	**TNMG220416-XM**	1,6	1-7,7	0,2-0,8	○					
Medium cut										

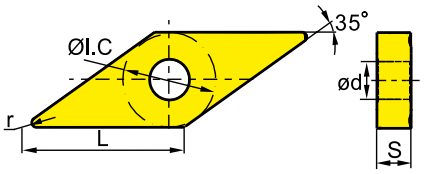
● Ex stock ○ On demand

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

Turning inserts

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

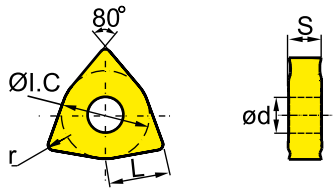
VNMG	L	I.C	S	d
16 04	16,6	9,525	4,76	3,81

VN** negative insert						HC¹ (CVD)	HC¹ (PVD)	HT	HC²	HW
					P	○				
					M					
					K					
					N					
					S					
					H					
	ISO	r	a_p	f	YBC103					
XM	**VNMG160404-XM**	0,4	1-5,6	0,2-0,4	○					
	**VNMG160408-XM**	0,8	1-5,6	0,2-0,4	○					
	VNMG160412-XM	1,2	1-5,6	0,2-0,6	○					
	VNMG160416-XM	1,6	1-5,6	0,2-0,8	○					
Medium cut										

Turning inserts

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

WNMG	L	I.C	S	d
06 T3	6,5	9,525	3,97	3,81
06 04	6,5	9,525	4,76	3,81
08 04	8,7	12,7	4,76	5,16

WN** negative insert						HC¹ (CVD)	HC¹ (PVD)	HT	HC²	HW
					P	○				
					M					
					K					
					N					
					S					
					H					
	ISO	r	a_p	f	YBC103					
XM	**WNMG060404-XM**	0,4	1-2,1	0,2-0,4	○					
	**WNMG060408-XM**	0,8	1-2,1	0,2-0,4	○					
	WNMG060412-XM	1,2	1-2,1	0,2-0,6	○					
	WNMG080404-XM	0,4	1-2,8	0,2-0,4	○					
	WNMG080408-XM	0,8	1-2,8	0,2-0,4	○					
	WNMG080412-XM	1,2	1-2,8	0,2-0,6	○					
Medium cut	**WNMG080416-XM**	1,6	1-2,8	0,2-0,8	○					

● Ex stock ○ On demand

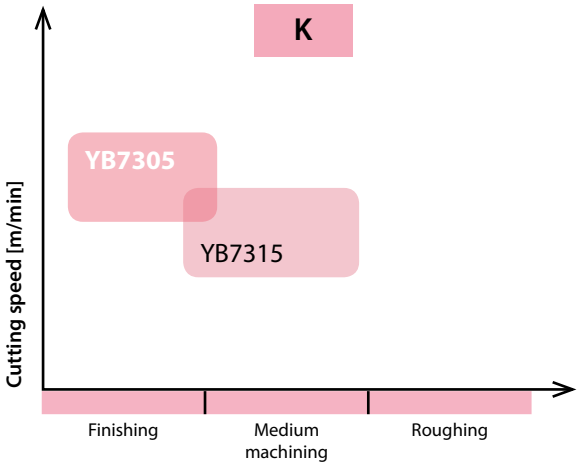
HC¹ Coated carbide
HT Uncoated cermet
HC² Coated cermet
HW Uncoated carbide

Notes

YB7305

Maximum performance for cast iron materials

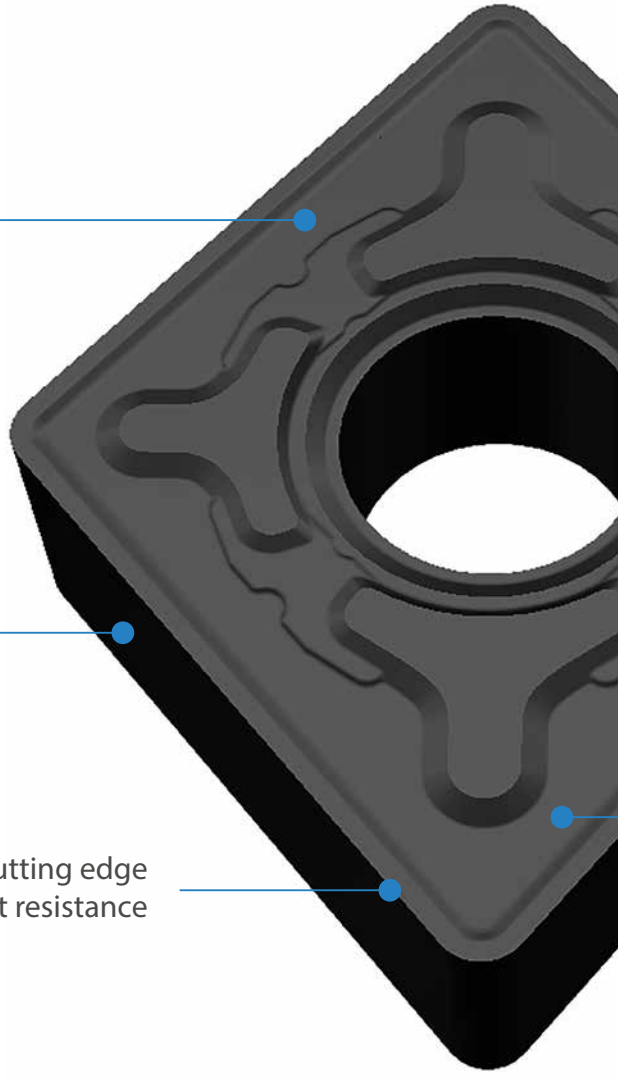
Application field



High temperature resistance due to the latest CVD coating technology

Ultramicron substrate and latest sinter technology

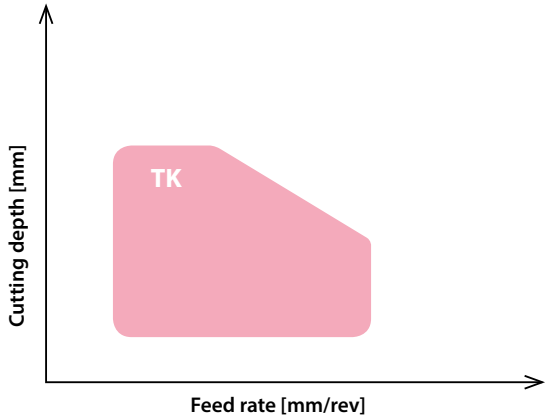
Outstanding combination of cutting edge sharpness and impact resistance



TK chip breaker

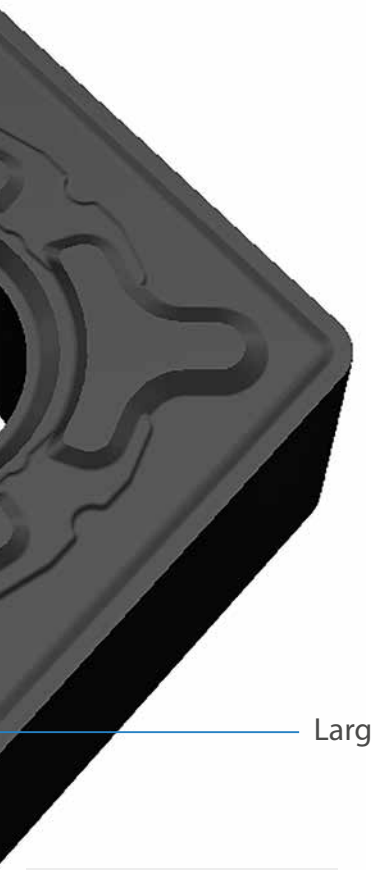
The universal tool for cast iron materials

Application field



Finishing to medium machining

a_p [mm]	f [mm/U]
1,0–4,0	0,2–0,4



Large chip space for improved chip removal

Fig.: CNMG120408-TK YB7305

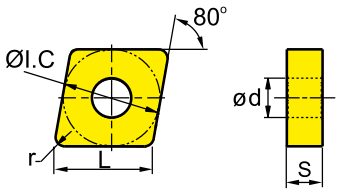
YOUR BENEFITS

– Highly efficient machining with maximum tool life
– Range of application: finishing to semi-roughing
– Increase in productivity
– Maximum process reliability
– Optimum wear resistance
– Problem solver for hardened steels

CN**	L	I.C	S	d
09 03	9,7	9,525	3,18	3,81
12 04	12,9	12,7	4,76	5,16
16 06	16,1	15,875	6,35	6,35
19 06	19,3	19,05	6,35	7,94

Turning inserts

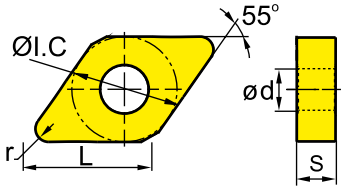
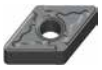
Ideal machining conditions
Normal machining conditions
Unfavourable machining conditions

CN** negative insert						HC¹ (CVD)		HC¹ (PVD)	HT	HC²	HW
					P						
					M						
					K						
					N						
					S						
					H						
	ISO		r	a_p	f		YB7305 YB7315				
TK	**CNMG120408-TK**		0,8	0,2-0,4	0,2-0,4		● ○				
	**CNMG120412-TK**		1,2	0,2-0,4	0,2-0,45		● ●				
	CNMG120416-TK		1,6	0,2-0,4	0,2-0,5		○ ●				
Medium cut											

DNMG	L	I.C	S	d
11 04	11,6	9,525	4,76	3,81
15 04	15,5	12,7	4,76	5,16
15 06	15,5	12,7	6,35	5,16

Turning inserts

Ideal machining conditions
Normal machining conditions
Unfavourable machining conditions

DN** negative insert						HC¹ (CVD)		HC¹ (PVD)	HT	HC²	HW
					P						
					M						
					K						
					N						
					S						
					H						
	ISO		r	a_p	f		YB7305 YB7315				
TK	**DNMG150608-TK**		0,8	0,2-0,4	0,2-0,4		○ ●				
	**DNMG150612-TK**		1,2	0,2-0,4	0,2-0,45		○ ●				
Medium cut											

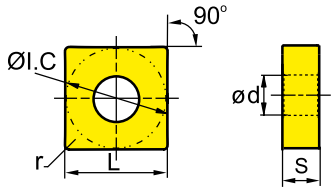
● Ex stock ○ On demand

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

Turning inserts

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

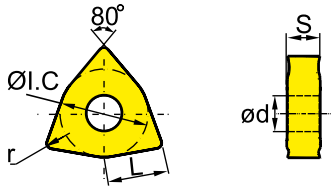
SNMG	L	I.C	S	d
09 03	9,525	9,525	3,18	3,81
12 04	12,7	12,7	4,76	5,16

SN** negative insert						HC¹ (CVD)		HC¹ (PVD)	HT	HC²	HW
					P						
					M						
					K		● ❁				
					N						
					S						
					H						
	ISO		r	a_p	f		YB7305 YB7315				
TK	**SNMG120412-TK**		1,2	0,2-0,4	0,2-0,45		○ ●				
											
Medium cut											

Turning inserts

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

WNMG	L	I.C	S	d
06 T3	6,5	9,525	3,97	3,81
06 04	6,5	9,525	4,76	3,81
08 04	8,7	12,7	4,76	5,16

WN** negative insert						HC¹ (CVD)		HC¹ (PVD)	HT	HC²	HW
					P						
					M						
					K		● ❁				
					N						
					S						
					H						
	ISO		r	a_p	f		YB7305 YB7315				
TK	**WNMG080408-TK**		0,8	0,2-0,4	0,2-0,4		● ●				
	**WNMG080412-TK**		1,2	0,2-0,4	0,2-0,45		○ ●				
	WNMG080416-TK		1,6	0,2-0,4	0,2-0,5		○ ●				
Medium cut											

● Ex stock ○ On demand

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

YBS103

PVD high performance grade for nickel-base alloys

YOUR BENEFITS

– Higher cutting speeds for higher productivity
– Outstanding wear resistance
– Reduced adhesion tendency
– High thermal stability

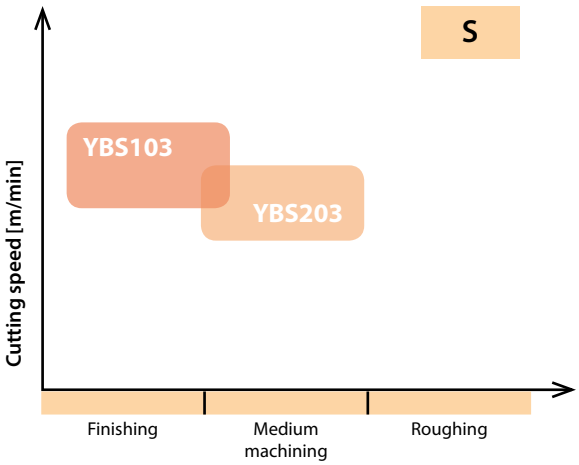
YBS203

PVD all round grade for turning and milling

YOUR BENEFITS

– Great impact resistance
– Outstanding thermal stability
– Well balanced wear resistance and fracture toughness

Application field



YBS103 and YBS203 – Highly efficient cutting with maximum tool life

Latest generation grades for heat-resistant and titanium alloys. Maximum productivity due to advanced sinter and coating technology.

YBS103 Wear-resistant grade for high-speed processing
YBS203 Universal grade with well-balanced wear resistance and fracture toughness

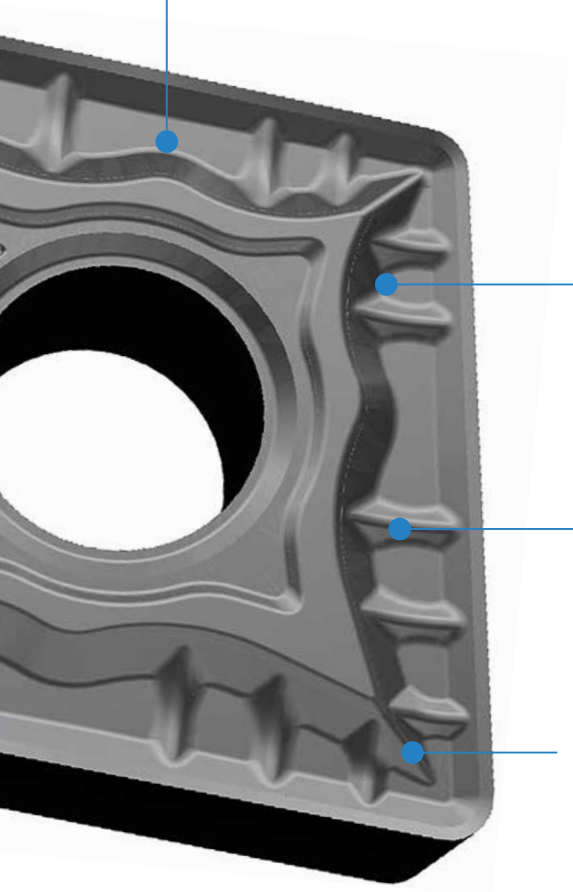
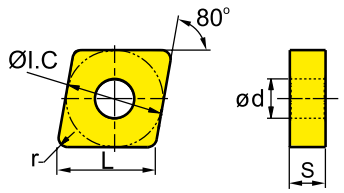


Fig.: CNMG120408-SNR YBS103

Turning inserts

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

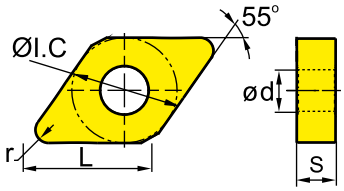
CNMG	L	I.C	S	d
12 04	12,9	12,7	4,76	5,16
16 06	16,1	15,875	6,35	6,35
19 06	19,3	19,05	6,35	7,94

CN** negative insert						HC¹ (CVD)	HC¹ (PVD)	HT	HC²	HW
					P					
					M		○ ○ ⊛			
					K					
					N					⊛
					S		○ ○ ⊛			⊛
					H					
ISO		r	a_p	f			YBS103 YBG105 YPD201			YD201
SNR	**CNMG120408-SNR**	0,8	1-3	0,1-0,4			● ● ●			
	**CNMG120412-SNR**	1,2	1-3	0,2-0,6			● ● ●			
	CNMG160608-SNR	0,8	2-6	0,1-0,4			● ● ○			
	CNMG190616-SNR	1,6	2-7	0,2-0,6			● ● ●			○
Roughing										

Turning inserts

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

DNMG	L	I.C	S	d
15 06	15,5	12,7	6,35	5,16

DN** negative insert						HC¹ (CVD)	HC¹ (PVD)	HT	HC²	HW
					P					
					M		○ ○ ⊛			
					K					
					N					⊛
					S		○ ○ ⊛			⊛
					H					
ISO		r	a_p	f			YBS103 YBG105 YPD201			YD201
SNR	**DNMG150608-SNR**	0,8	0,2-6,0	0,1-0,5			● ● ●			○
	**DNMG150612-SNR**	1,2	0,2-6,0	0,2-0,6			● ● ●			○
Roughing										

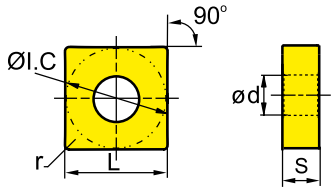
● Ex stock ○ On demand

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

Turning inserts

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

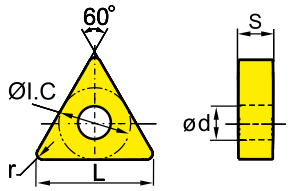
SNMM	L	I.C	S	d
19 06	19,05	19,05	6,35	7,94
25 09	25,4	25,4	9,525	9,12

SN** negative insert						HC¹ (CVD)	HC¹ (PVD)	HT	HC²	HW
					P					
					M		○ ○ ✲			
					K					
					N					✲
					S		○ ○ ✲			✲
					H					
ISO		r	a_p	f			YBS103 YBG105 YPD201			YD201
SNR	**SNMG120408-SNR**	0,8	1-4	0,2-0,6			● ●			○
										
Roughing										

Turning inserts

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

TNMG	L	I.C	S	d
11 03	11	6,35	3,18	2,26
16 04	16,5	9,525	4,76	3,81
22 04	22	12,7	4,76	5,16

TN** negative insert						HC¹ (CVD)	HC¹ (PVD)	HT	HC²	HW
					P					
					M		○ ○ ✲			
					K					
					N					✲
					S		○ ○ ✲			✲
					H					
ISO		r	a_p	f			YBS103 YBG105 YPD201			YD201
SNR	**TNMG160408-SNR**	0,8	1-5,6	0,1-0,5			● ○ ○			○
										
Roughing										

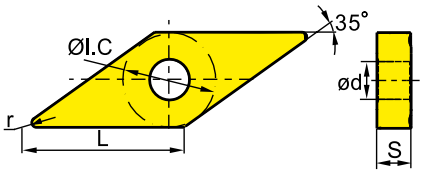
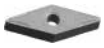
● Ex stock ○ On demand

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

Turning inserts

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

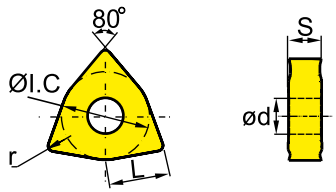
VNMG	L	I.C	S	d
16 04	16,6	9,525	4,76	3,81

VN** negative insert						HC¹ (CVD)	HC¹ (PVD)	HT	HC²	HW
					P					
					M		○ ○ ◎			
					K					
					N					◎
					S		○ ○ ◎			◎
					H					
	ISO		r	a_p	f		YBS103 YBG105 YPD201			YD201
SNR	**VNMG160408-SNR**		0,8	0,2-2,0	0,1-0,4		● ○ ○			○
	**VNMG160412-SNR**		1,2	0,2-2,0	0,1-0,5		● ● ○			○
Roughing										

Turning inserts

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

WNMG	L	I.C	S	d
06 T3	6,5	9,525	3,97	3,81
06 04	6,5	9,525	4,76	3,81
08 04	8,7	12,7	4,76	5,16

WN** negative insert						HC¹ (CVD)	HC¹ (PVD)	HT	HC²	HW
					P					
					M		○ ○ ◎			
					K					
					N					◎
					S		○ ○ ◎			◎
					H					
	ISO		r	a_p	f		YBS103 YBG105 YPD201			YD201
SNR	**WNMG080408-SNR**		0,8	1-3	0,1-0,5		● ● ○			○
	**WNMG080412-SNR**		1,2	1-3	0,2-0,6		● ○ ○			○
Roughing										

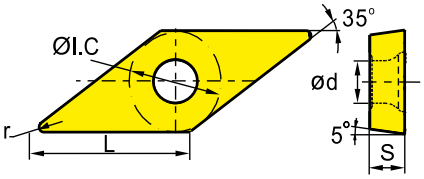
● Ex stock ○ On demand

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

Turning inserts

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

VBMT	L	I.C	S	d
16 04	16,5	9,525	4,76	4,4



VB** positive insert					HC¹ (CVD)	HC¹ (PVD)	HT	HC²	HW
				P					
				M		○ ○ ✲			
				K					
				N					✲
				S		○ ○ ✲			✲
				H					
ISO		r	a_p	f		YBS103 YBG105 YPD201			YD201
SNR	**VBMT160408-SNR**	0,8	0,5-2,5	0,15-0,3		● ● ●			○
	VBMT160412-SNR	1,2	0,5-2,5	0,15-0,35		○ ● ○			○
Roughing									

● Ex stock ○ On demand

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

Precision monoblock holder

With internal cooling

SC Grooving system (for sliding head lathe machines)

Shank sizes ranging from 10×10 to 20×20 mm
Grooving widths from 2.0 to 3.0 mm

DG(S)C Grooving system (for greater depths)

Shank sizes ranging from 16×16 to 25×25 mm
Grooving widths from 2.0 to 6.0 mm

YOUR BENEFITS

– Reduction of heat generation
– Increase of the cutting parameters
– Controlled chip removal rate
– Outstanding surface finish
– Coolant supplied directly to the cutting edge

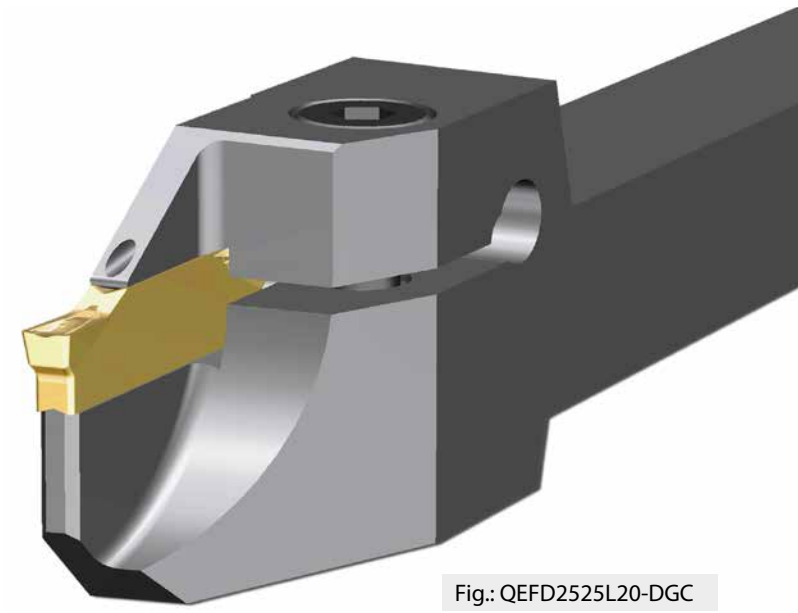


Fig.: QEFD2525L20-DGC

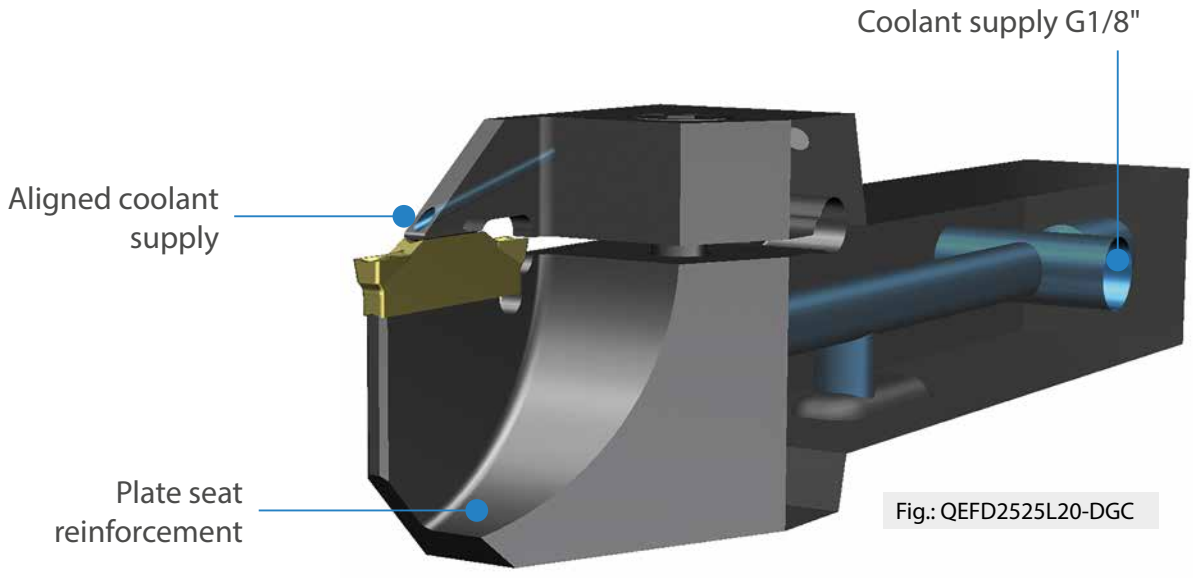


Fig.: QEFD2525L20-DGC

External tool holders

Q	E	G	D	2525	R	22	–	S	C
1	2	3	4	5	6	7		8	9

1

Holder for parting & grooving

2

Application	
Code	Description
E	External machining

3

Insert seat size [mm]	
Holder/cutting width	
Code	Description
B	2,0
E	2,5
F	3,0
G	4,0
H	5,0
K	6,0

4

Nomber of cutting edges	
Code	Description
S	Single
D	Double

5

Cross section of holder [mm] x [mm]

6

Type	
Code	Description
R	Right
L	Left

7

Max. cutting depth [mm]

8

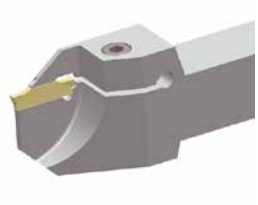
Serie	
Code	Description
S	Swiss turning holder
DG	Cut-off holder for greater grooving depths with reinforcement
DGS	Cut-off holder for greater grooving depths without reinforcement

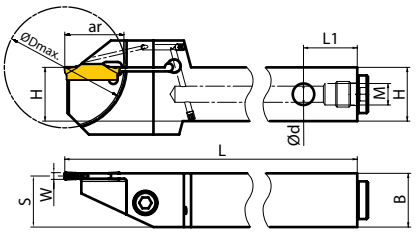
9

With internal cooling

Parting & grooving tool holder (external)

QE*DR/L-DGC





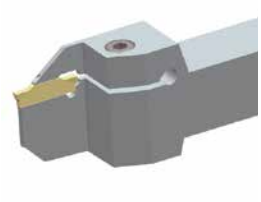
Article		Stock		Dimensions [mm]									kg	Inserts
	✻	R	L	HxB	L	S	W	ar	M	L1	d	ØD max		
QEBD1616R/L20-DGC	✻	●	●	16x16	96	15,00	2,00	20	G1/8	20	G1/8	40		Z*BD02002
QEBD2020R/L20-DGC	✻	●	●	20x20	111	19,00	2,00	20	G1/8	20	G1/8	40		Z*BD02002
QEBD2525R/L20-DGC	✻	●	●	25x25	126	24,00	2,00	20	G1/8	20	G1/8	40		Z*BD02002
QEBD1616R/L30-DGC	✻	●	●	16x16	105	15,00	2,00	30	G1/8	20	G1/8	60		Z*BD02002
QEBD2020R/L30-DGC	✻	●	●	20x20	120	19,00	2,00	30	G1/8	20	G1/8	60		Z*BD02002
QEBD2525R/L30-DGC	✻	●	●	25x25	135	24,00	2,00	30	G1/8	20	G1/8	60		Z*BD02002
QEED1616R/L20-DGC	✻	●	●	16x16	96	14,75	2,50	20	G1/8	20	G1/8	40		Z*ED02502
QEED2020R/L20-DGC	✻	●	●	20x20	111	18,75	2,50	20	G1/8	20	G1/8	40		Z*ED02502
QEED2525R/L20-DGC	✻	●	●	25x25	126	23,75	2,50	20	G1/8	20	G1/8	40		Z*ED02502
QEED1616R/L30-DGC	✻	●	●	16x16	105	14,75	2,50	30	G1/8	20	G1/8	60		Z*ED02502
QEED2020R/L30-DGC	✻	●	●	20x20	120	18,75	2,50	30	G1/8	20	G1/8	60		Z*ED02502
QEED2525R/L30-DGC	✻	●	●	25x25	135	23,75	2,50	30	G1/8	20	G1/8	60		Z*ED02502
QEFD1616R/L20-DGC	✻	●	●	16x16	96	14,50	3,00	20	G1/8	20	G1/8	40		Z*FD0303
QEFD2020R/L20-DGC	✻	●	●	20x20	111	18,50	3,00	20	G1/8	20	G1/8	40		Z*FD0303
QEFD2525R/L20-DGC	✻	●	●	25x25	126	23,50	3,00	20	G1/8	20	G1/8	40		Z*FD0303
QEFD1616R/L30-DGC	✻	●	●	16x16	105	14,50	3,00	30	G1/8	20	G1/8	60		Z*FD0303
QEFD2020R/L30-DGC	✻	●	●	20x20	120	18,50	3,00	30	G1/8	20	G1/8	60		Z*FD0303
QEFD2525R/L30-DGC	✻	●	●	25x25	135	23,50	3,00	30	G1/8	20	G1/8	60		Z*FD0303
QEGD1616R/L20-DGC	✻	●	●	16x16	96	18,00	4,00	20	G1/8	20	G1/8	40		Z*GD0404
QEGD2020R/L20-DGC	✻	●	●	20x20	111	23,00	4,00	20	G1/8	20	G1/8	40		Z*GD0404
QEGD2525R/L20-DGC	✻	●	●	25x25	126	23,00	4,00	20	G1/8	20	G1/8	40		Z*GD0404
QEGD1616R/L30-DGC	✻	●	●	16x16	105	18,00	4,00	30	G1/8	20	G1/8	60		Z*GD0404
QEGD2020R/L30-DGC	✻	●	●	20x20	120	23,00	4,00	30	G1/8	20	G1/8	60		Z*GD0404
QEGD2525R/L30-DGC	✻	●	●	25x25	135	23,00	4,00	30	G1/8	20	G1/8	60		Z*GD0404

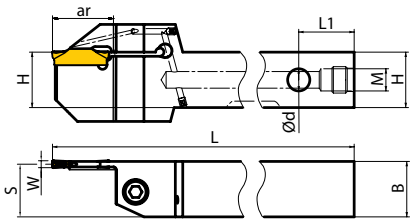
● Ex stock ○ On demand

✻ With internal cooling

Parting & grooving tool holder (external)

QE*DR/L-DGSC





Article		Stock		Dimensions [mm]										Inserts
	✻	R	L	HxB	L	S	W	ar	M	L1	d	ØD max	kg	
QEED1616R/L30-DGSC	✻	●	●	16x16	105	14,75	2,50	30	G1/8	20	G1/8	-		Z*ED02502
QEED2020R/L30-DGSC	✻	●	●	20x20	120	18,75	2,50	30	G1/8	20	G1/8	-		Z*ED02502
QEED2525R/L30-DGSC	✻	●	●	25x25	135	23,75	2,50	30	G1/8	20	G1/8	-		Z*ED02502
QEFD1616R/L30-DGSC	✻	●	●	16x16	105	14,50	3,00	30	G1/8	20	G1/8	-		Z*FD0303
QEFD2020R/L30-DGSC	✻	●	●	20x20	120	18,50	3,00	30	G1/8	20	G1/8	-		Z*FD0303
QEFD2525R/L30-DGSC	✻	●	●	25x25	135	23,50	3,00	30	G1/8	20	G1/8	-		Z*FD0303
QEGD1616R/L30-DGSC	✻	●	●	16x16	105	14,00	4,00	30	G1/8	20	G1/8	-		Z*GD0404
QEGD2020R/L30-DGSC	✻	●	●	20x20	120	18,00	4,00	30	G1/8	20	G1/8	-		Z*GD0404
QEGD2525R/L30-DGSC	✻	●	●	25X25	135	23,00	4,00	30	G1/8	20	G1/8	-		Z*GD0404
QEHD2525R/L30-DGSC	✻	●	●	25x25	135	22,50	5,00	30	G1/8	20	G1/8	-		Z*HD0504
QEKD2525R/L30-DGSC	✻	●	●	25x25	135	22,00	6,00	30	G1/8	20	G1/8	-		Z*KD0608

● Ex stock ○ On demand

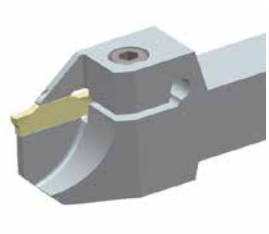
✻ With internal cooling

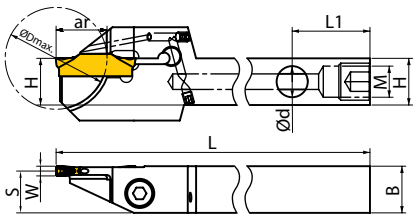
Spare parts

		Z*BD**	Z*ED**	Z*FD**	Z*GD**
	H	16-25	16-25	16-25	20-25
	Wrench	WH40L	WH40L	WH40L	WH40L
	Screw	GB70-85-M5x20	GB70-85-M5x20	GB70-85-M5x20	GB70-85-M5x20
	Grub screw (bottom)	PT1/8x4	PT1/8x4	PT1/8x4	PT1/8x4
	Grub screw	PT1/8x7	PT1/8x7	PT1/8x7	PT1/8x7
	Wrench	WH50L	WH50L	WH50L	WH50L

Parting & grooving tool holder (external)

QE*DR/L-SC





Article		Stock		Dimensions [mm]										Inserts
	✻	R	L	HxB	L	S	W	ar	M	L1	d	ØD max	kg	
QEBD1010R/L10-SC	✻	●	●	10x10	110	9,25	2,00	10	G1/16	20	G1/16	20		Z*BD02002
QEBD1212R/L13-SC	✻	●	●	12x12	110	11,25	2,00	13	G1/8	20	G1/8	26		Z*BD02002
QEBD1616R/L13-SC	✻	●	●	16x16	110	15,25	2,00	13	G1/8	20	G1/8	26		Z*BD02002
QEBD2020R/L13-SC	✻	●	●	20x20	110	19,25	2,00	13	G1/8	20	G1/8	26		Z*BD02002
QEED1010R/L10-SC	✻	●	●	10x10	110	9,25	2,50	10	G1/16	20	G1/16	20		Z*ED02503
QEED1212R/L13-SC	✻	●	●	12x12	110	11,25	2,50	13	G1/8	20	G1/8	26		Z*ED02503
QEED1616R/L17-SC	✻	●	●	16x16	110	15,25	2,50	17	G1/8	20	G1/8	34		Z*ED02503
QEED2020R/L17-SC	✻	●	●	20x20	110	19,25	2,50	17	G1/8	20	G1/8	34		Z*ED02503
QEFD1212R/L13-SC	✻	●	●	12x12	110	11,25	3,00	13	G1/8	20	G1/8	26		Z*FD0303
QEFD1616R/L17-SC	✻	●	●	16x16	110	15,25	3,00	17	G1/8	20	G1/8	34		Z*FD0303
QEFD2020R/L22-SC	✻	●	●	20x20	110	19,25	3,00	22	G1/8	20	G1/8	44		Z*FD0303

● Ex stock ○ On demand

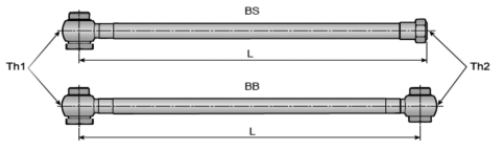
✻ With internal cooling

Spare parts

		ZTBD**	ZTBD**	ZTED**	ZTED**	ZTFD**	ZTFD**
	H	10-12	16-20	10-12	16-20	12	16-20
	Wrench	WH30L	WH40L	WH30L	WH40L	WH30L	WH40L
	Screw	GB70-85-M4X12	GB70-85-M6x20	GB70-85-M4X12	GB70-85-M6x20	GB70-85-M4X12	GB70-85-M5x20

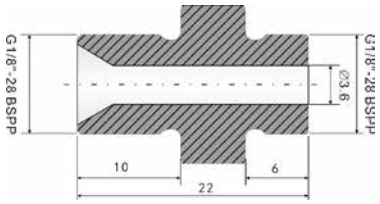
Accessoires

Coolant hose



Article	Dimensions [mm]			Stock
	L	Th1	Th2	
HOSE G1/8-7/16/200BS	200	G1/8"-28 BSPP	G1/8"-28 BSPP	○
HOSE G1/8-7/16/300BS	300	G1/8"-28 BSPP	G1/8"-28 BSPP	○
HOSE G1/8-7/16/200BB	200	G1/8"-28 BSPP	G1/8"-28 BSPP	○
HOSE G1/8-7/16/300BB	300	G1/8"-28 BSPP	G1/8"-28 BSPP	○

Coolant connection



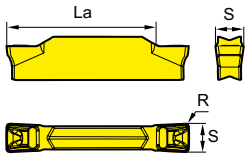
Article	Stock
NIPPLE G1/8- G1/8	○

● Ex stock ○ On demand

Parting inserts

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

Parting & grooving insert (double sided)



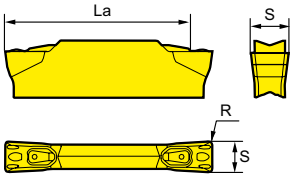
Double cutting edge

						HC[1] (CVD)	HC[1] (PVD)				HW
	ISO	S	R±0.1	La *max*	f		YB9320	YBG205	YBG202	YBG302	
P							⊛	⊛	⊛	⊛	
M							⊛	⊛	⊛	⊛	
K											
N											
S							⊛	⊛	⊛		
H											
	**ZTBD02002-MM**	2,0	0,2	13	0,02-0,07		●	●	○	○	
	ZTED02503-MM	2,5	0,3	17	0,03-0,1		●				
	ZTFD0303-MM	3,0	0,3	17	0,04-0,13		●				
	ZTGD0404-MM	4,0	0,4	22	0,06-0,18		●				
	ZTHD0504-MM	5,0	0,4	22	0,08-0,23		●				
	ZTKD0608-MM	6,0	0,8	22	0,12-0,27		●				
	ZTLD0808-MM	8,0	0,8	28	0,13-0,29		●	○			

Parting inserts

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

Parting & grooving insert (double sided)



Double cutting edge

						HC[1] (CVD)	HC[1] (PVD)	HW
	ISO	S	R±0.1	La *max*	f	YBC152	YBG205	
P						⊛	⊛	
M							⊛	
K								
N								
S							⊛	
H								
	**ZTFD0302-PL**	3	0.2	17	0,04-0,13	○	○	
	ZTFD0303-PL	3	0.3	17	0,04-0,13	○	○	
	ZTGD0402-PL	4	0.2	22	0,06-0,18	○	○	
	ZTGD0404-PL	4	0.4	22	0,06-0,18	○	○	
	ZTHD0504-PL	5	0.4	22	0,08-0,23	○	○	
	ZTHD0508-PL	5	0.8	22	0,08-0,23	○	○	
	ZTKD0604-PL	6	0.4	22	0,12-0,27	○	○	
	ZTKD0608-PL	6	0.8	22	0,12-0,27	○	○	

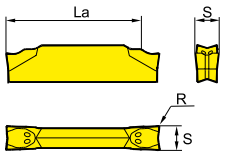
● Ex stock ○ On demand

HC[1] Coated carbide
HW Uncoated carbide

Parting inserts

Ideal machining conditions
Normal machining conditions
Unfavourable machining conditions

Parting & grooving insert (double sided)



Double cutting edge

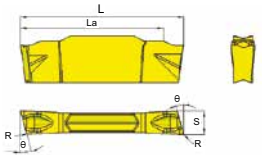
	HC[1] (CVD)		HC[1] (PVD)				HW
P	❁	❁	❁	❁	❁	❁	
M			❁	❁	❁	❁	
K							
N							❁
S			❁	❁	❁		
H							

	ISO	S±0.10	R±0.1	La *max*	f	YBC252	YBC251	YB9320	YBG205	YBG202	YBG302	YD201
	**ZPED02502-MG**	2,5	0,2	17	0,03-0,1		●	●		●	●	
	ZPFD0302-MG	3,0	0,2	17	0,04-0,13		●	●		●	●	
	ZPGD0402-MG	4,0	0,2	22	0,07-0,18		●	●		●	●	○
	ZPHD0503-MG	5,0	0,3	22	0,1-0,24			●		●	●	
	ZPKD0604-MG	6,0	0,4	22	0,12-0,29	○		●		●	●	

Parting inserts

Ideal machining conditions
Normal machining conditions
Unfavourable machining conditions

ZT parting & grooving insert (double sided)**



R type

	HC[1] (CVD)		HC[1] (PVD)				HW
P	❁		❁	❁	❁		
M			❁	❁	❁		
K							
N							
S			❁	❁			
H							

	ISO	L	S	θ	R	La max	f	YBC252	YB9320	YBG202	YBG302
	**ZPED02502-MG-6L**	20,0	2,35	6°	0,2	17	0,03-0,08			○	●
	ZPED02502-MG-6R	20,0	2,35	6°	0,2	17	0,03-0,08		●	○	●
	ZPED02502-MG-15L	20,0	2,35	15°	0,2	17	0,03-0,05			○	●
	ZPED02502-MG-15R	20,0	2,35	15°	0,2	17	0,03-0,05			●	●
	ZPFD0302-MG-6L	20,0	2,85	6°	0,2	17	0,04-0,1		●	●	●
	ZPFD0302-MG-6R	20,0	2,85	6°	0,2	17	0,04-0,1		●	●	●
	ZPFD0302-MG-15L	20,0	2,85	15°	0,2	17	0,04-0,08			●	●
	ZPFD0302-MG-15R	20,0	2,85	15°	0,3	17	0,04-0,08	○	●	●	●

● Ex stock ○ On demand

HC[1] Coated carbide
HW Uncoated carbide

„You expect technical trainings that meet your specific requirements? We design your individual program.“

Sandro M.
(Deputy Manager Product Management & Application Engineering)

DG(S)C – Parting & grooving tool holder with internal cooling

- Perfect for non-alloy, alloy and stainless materials
- Optimal chip control & low working temperature
- High cutting speeds in combination with superior tool life
- Coolant transfer directly via VDI interface

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B

Indexable milling

Solid carbide milling

Chip breaker overview

	Finishing	Medium machining	Roughing
P	DF	DM	DR
	APF	APM	–
	PF	PM	PR
	GF	GM	GR
	–	–	ZR
	–	**XR** New	–
	MO-2	MO-1	MO-3
M	EF	EM	–
	APF	APM	–
	DF	DM	–
	PF	PM	PR
	GF	GM	GR
	E	E	–
	–	–	ZR
	–	**XR** New	–
K	CF	CM	CR
	DF	DM	DR
	EDFR	DER	DER
	PF	PM	PR
	GF	GM	GR
	–	–	ZR
	–	**XR** New	–
	MO-2	MO-1	MO-3
S	EF	EM	–
	NM New	**NM** New	–
N	LH	LH	LH
	ALH	ALH	ALH

Coated cemented carbide PVD

Grade	ISO	Micro structure	Grade description
YBS203	S15–S25		Turning and milling grades for machining nickel-base material. A special carbide substrate and the latest PVD coating technology enable excellent wear behaviour and high thermal stability.
YBS303	S25–S35		Milling grade for machining titanium alloys. A tough carbide substrate and the latest PVD coating technology with increased impact resistance and high thermal stability.

YBS203

PVD high performance grade for nickel-base alloys

YOUR BENEFITS

– Higher cutting speeds for higher productivity
– Outstanding wear resistance
– Reduced adhesion tendency
– High thermal stability

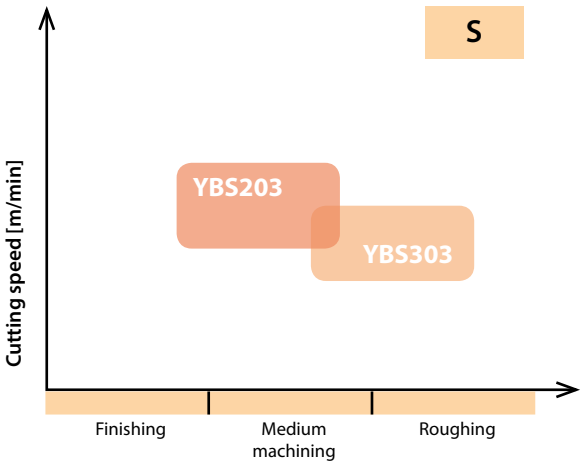
YBS303

PVD all round grade for titanium alloys in interrupted cut

YOUR BENEFITS

– Great impact resistance
– Outstanding thermal stability
– Well balanced wear resistance and fracture toughness

Application field



NM chip breaker

Reliable chip breaker

YOUR BENEFITS

– Highest productivity and maximum process reliability
– Outstanding wear resistance with large grade selection
– Wide range of applications for ISO S materials
– Available in many established basic insert shapes

Also available as high feed geometry

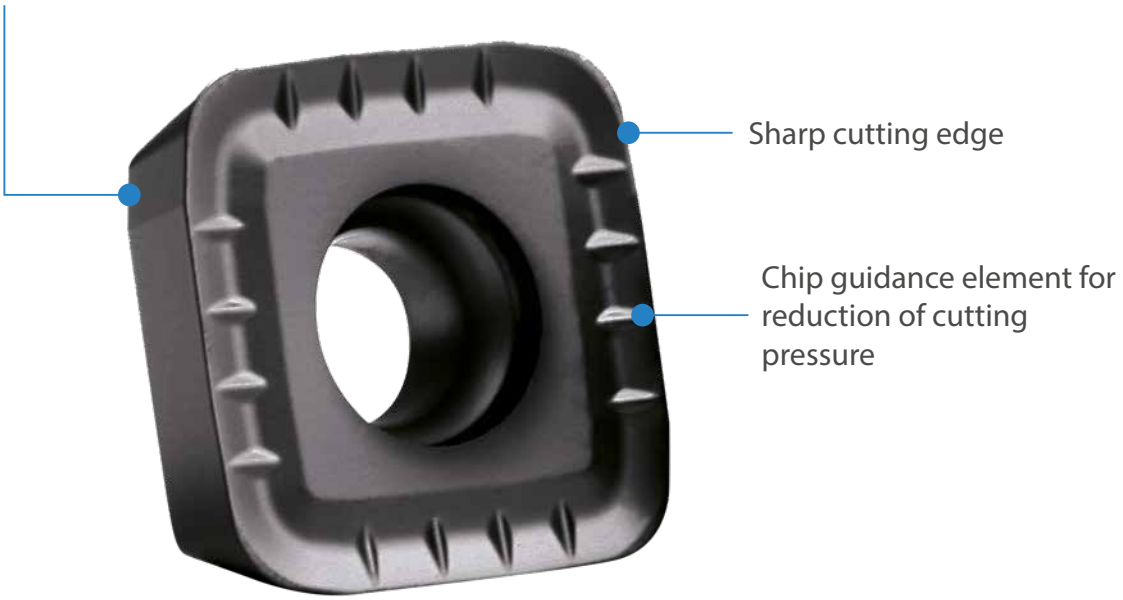


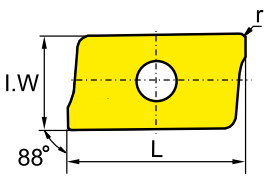
Fig.: SDMT09T312-NM YBS303

Application field	
a_p [mm]	f_z/mm
0,5–3,0	0,07–0,3

Milling inserts

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

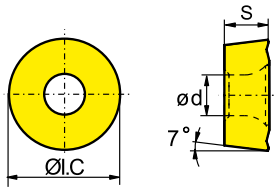
APKT	L	S	d
07 02	4,26	2,38	2
11 T3	12,24	3,6	2,8
16 04	17,877	5,76	4,4

AP** milling insert				HC¹ (CVD)	HC¹ (PVD)					HT	HC²	HW
			P		◉	◉						
			M		◉	◉						
			K									
			N									
			S		◉	◉						
			H									
ISO		r	I.W		YBS203	YBS303						
	**APKT11T308-NM**	0,8	6,5		●	●						
	APKT11T312-NM	1,2	6,5		●	●						

Milling inserts

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

RCKT	I.C	S	d
10 T3	10	3,97	4,4
12 04	12	4,76	4

RC** milling insert			HC¹ (CVD)	HC¹ (PVD)					HT	HC²	HW
		P	◉	◉	◉	◉	◉				
		M	◉	◉	◉	◉	◉				
		K									
		N									
		S	◉	◉	◉	◉					
		H									
ISO			YBM253	YB9320	YBS203	YBS303	YBG212	YBG302			
	**RCKT1204MO-NM**		●	●	●	●	●	●			
	RCKT1606MO-NM		●	●	●	●	●				
	RCKT2006MO-NM		●	●				●			

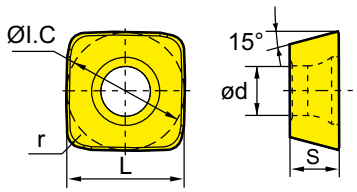
● Ex stock ○ On demand

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

SDMT	L	I.C	S	d
06 T2	6,35	6,35	2,58	2,5
09 T3	9,525	9,525	3,97	4
12 04	12,7	12,7	4,76	4,4
15 05	15,875	15,875	5,56	5,5

Ideal machining conditions
Normal machining conditions
Unfavourable machining conditions

Milling inserts

SD** milling insert				HC¹ (CVD)	HC¹ (PVD)				HT	HC²	HW
			P								
			M								
			K								
			N								
			S								
			H								
	ISO	r	α	YBM253	YB9320	YBS203	YBS303	YBG212			
	**SDMT09T312-NM**	1,2	15	●		●	●	●			
	SDMT120412-NM	1,2	15	●		●	●	●			

● Ex stock ○ On demand

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

XR chip breaker

Universal high feed geometry

YOUR BENEFITS

– Square shoulder milling and high feed geometry within one tooling system
– Steady operation with large feeds
– Outstanding wear resistance at high cutting speeds
– Wide range of applications for P, M and K materials
– Ideal for long reach and extended gauge lengths
– Available in grades YB9320, YBG205 and YBD252

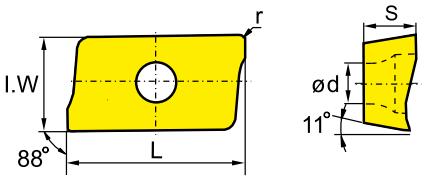
Fig.: APKT11T3-XR YBG205

Application field	
a_p [mm]	f_z/mm
0,3–1,0	0,4–1,5

Milling inserts

Ideal machining conditions
Normal machining conditions
Unfavourable machining conditions

APKT	L	S	d
07 02	4,26	2,38	2
11 T3	12,24	3,6	2,8
16 04	17,877	5,76	4,4

AP** milling insert				HC¹ (CVD)	HC¹ (PVD)		HT	HC²	HW
			**P**						
			M						
			K						
			N						
			S						
			H						
ISO		r	l.W	YBD252	YBG205	YB9320			
	**APKT11T3-XR**	0,6	6,5	●	●	●			

● Ex stock ○ On demand

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

Solid carbide milling System code – JIS series

PM	–	2	B	L	P	–	D12	R0.5	–	M08	–	W
1		2	3	4	5		6	7		8		9

Application	
Code	Description
GR	General roughing
GM	Semi-finishing
GF	Finishing
PM	High-performance machining
EPM	«Ecoline» – High-performance machining
HM	Hard machining
HH	High-speed 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
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
D8.0	8,0
D20.0	20,0

6

Radius [mm]	
Code	Description
R0.5	0,5
R1.0	1,5
R3.0	3,0
...	

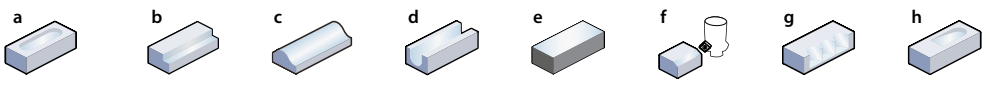
7

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

8

Weldon shank

9



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

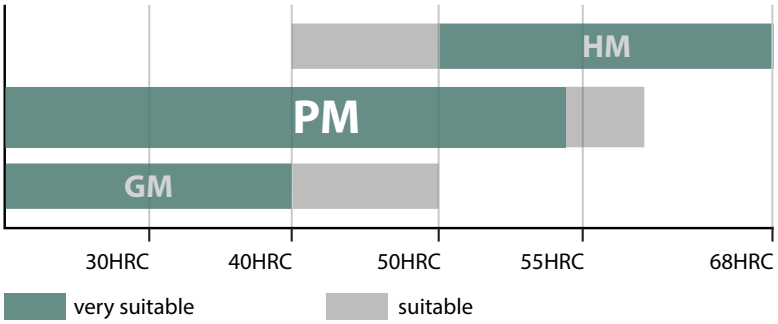
PM series

Program enhancement in the micro-machining range

New

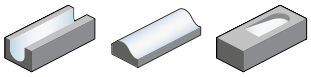
- For machining of steel as well as cast iron to max. 62 HRC
- Very solid cutting edge with high stiffness for higher cutting speeds and feed rates.
- End mills, ball nose cutters and torus mills
- Diameter range 0.3–20.0 mm

Application fields for machining of steel

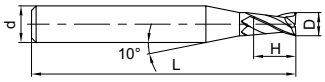


End mills High-performance machining

PM-2ES



– Factory standard
– Centre cutting
– Helix angle 35°



Article	✻	Dimensions [mm]				Teeth	Grade
		D	d (h6)	H	L		KMG405
PM-2ES-D0.3		0.3	4.0	0.6	50	2	○
PM-2ES-D0.4		0.4	4.0	0.8	50	2	○
PM-2ES-D0.5		0.5	4.0	1.0	50	2	○
PM-2ES-D0.6		0.6	4.0	1.2	50	2	○
PM-2ES-D0.7		0.7	4.0	1.4	50	2	○
PM-2ES-D0.8		0.8	4.0	1.6	50	2	○
PM-2ES-D0.9		0.9	4.0	1.8	50	2	○
PM-2ES-D1.0		1.0	4.0	2.0	50	2	○
PM-2ES-D1.1		1.1	4.0	2.0	50	2	○
PM-2ES-D1.2		1.2	4.0	2.5	50	2	○
PM-2ES-D1.3		1.3	4.0	2.5	50	2	○
PM-2ES-D1.4		1.4	4.0	3.0	50	2	○
PM-2ES-D1.5		1.5	4.0	3.0	50	2	○
PM-2ES-D1.6		1.6	4.0	3.5	50	2	○
PM-2ES-D1.7		1.7	4.0	3.5	50	2	○
PM-2ES-D1.8		1.8	4.0	4.0	50	2	○
PM-2ES-D1.9		1.9	4.0	4.0	50	2	○
PM-2ES-D2.0		2.0	4.0	4.0	50	2	○
PM-2ES-D2.1		2.1	4.0	4.0	50	2	○
PM-2ES-D2.2		2.2	4.0	4.5	50	2	○
PM-2ES-D2.3		2.3	4.0	4.5	50	2	○
PM-2ES-D2.4		2.4	4.0	5.0	50	2	○
PM-2ES-D2.5		2.5	4.0	5.0	50	2	○
PM-2ES-D2.6		2.6	4.0	5.0	50	2	○
PM-2ES-D2.7		2.7	4.0	5.5	50	2	○
PM-2ES-D2.8		2.8	4.0	5.5	50	2	○
PM-2ES-D2.9		2.9	4.0	6.0	50	2	○
PM-2ES-D3.0		3.0	4.0	6.0	50	2	○

● Ex stock ○ On demand
✻ With internal cooling

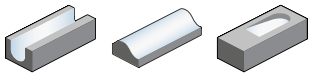
Application field

P	M	K	N	S	H
✔	✔	✔			✔

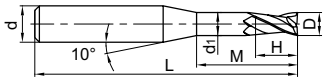
✔ Very suitable
✔ Suitable

End mills | High-performance machining

PM-2EP



– Factory standard
– Centre cutting
– Helix angle 35°



Article	✻	Dimensions [mm]						Teeth	Grade
		D	d_2	H	M	d_1	L		KMG405
PM-2EP-D0.5-M04		0,5	4.0	0.6	4	0.45	50	2	○
PM-2EP-D0.5-M06		0.5	4.0	0.7	6	0.45	50	2	○
PM-2EP-D0.5-M08		0.5	4.0	0.7	8	0.45	50	2	○
PM-2EP-D0.8-M04		0.8	4.0	1.2	4	0.75	50	2	○
PM-2EP-D0.8-M06		0.8	4.0	1.2	6	0.75	50	2	○
PM-2EP-D0.8-M08		0.8	4.0	1.2	8	0.75	50	2	○
PM-2EP-D0.8-M10		0.8	4.0	1.2	10	0.75	50	2	○
PM-2EP-D1.0-M04		1.0	4.0	1.5	4	0.95	50	2	○
PM-2EP-D1.0-M06		1.0	4.0	1.5	6	0.95	50	2	○
PM-2EP-D1.0-M08		1.0	4.0	1.5	8	0.95	50	2	○
PM-2EP-D1.0-M10		1.0	4.0	1.5	10	0.95	50	2	○
PM-2EP-D1.0-M12		1.0	4.0	1.5	12	0.95	50	2	○
PM-2EP-D1.0-M14		1.0	4.0	1.5	14	0.95	50	2	○
PM-2EP-D1.0-M16		1.0	4.0	1.5	16	0.95	60	2	○
PM-2EP-D1.0-M20		1.0	4.0	1.5	20	0.95	60	2	○
PM-2EP-D1.2-M06		1.2	4.0	1.8	6	1.15	50	2	○
PM-2EP-D1.2-M08		1.2	4.0	1.8	8	1.15	50	2	○
PM-2EP-D1.2-M10		1.2	4.0	1.8	10	1.15	50	2	○
PM-2EP-D1.2-M12		1.2	4.0	1.8	12	1.15	50	2	○
PM-2EP-D1.2-M16		1.2	4.0	1.8	16	1.15	60	2	○
PM-2EP-D1.5-M06		1.5	4.0	2.3	6	1.45	50	2	○
PM-2EP-D1.5-M08		1.5	4.0	2.3	8	1.45	50	2	○
PM-2EP-D1.5-M10		1.5	4.0	2.3	10	1.45	50	2	○
PM-2EP-D1.5-M12		1.5	4.0	2.3	12	1.45	50	2	○
PM-2EP-D1.5-M14		1.5	4.0	2.3	14	1.45	50	2	○
PM-2EP-D1.5-M16		1.5	4.0	2.3	16	1.45	50	2	○
PM-2EP-D1.5-M18		1.5	4.0	2.3	18	1.45	50	2	○
PM-2EP-D1.5-M20		1.5	4.0	2.3	20	1.45	50	2	○
PM-2EP-D2.0-M06		2.0	4.0	3.0	6	1.95	50	2	○
PM-2EP-D2.0-M08		2.0	4.0	3.0	8	1.95	50	2	○
PM-2EP-D2.0-M10		2.0	4.0	3.0	10	1.95	50	2	○
PM-2EP-D2.0-M12		2.0	4.0	3.0	12	1.95	50	2	○
PM-2EP-D2.0-M14		2.0	4.0	3.0	14	1.95	50	2	○
PM-2EP-D2.0-M16		2.0	4.0	3.0	16	1.95	50	2	○
PM-2EP-D2.0-M18		2.0	4.0	3.0	18	1.95	50	2	○
PM-2EP-D2.0-M20		2.0	4.0	3.0	20	1.95	50	2	○
PM-2EP-D2.5-M08		2.5	4.0	3.7	8	2.4	50	2	○
PM-2EP-D2.5-M10		2.5	4.0	3.7	10	2.4	50	2	○

● Ex stock ○ On demand
✻ With internal cooling

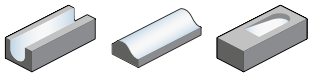
Application field

P	M	K	N	S	H
✔	✔	✔			✔

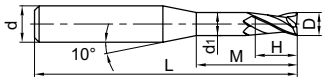
✔ Very suitable
✔ Suitable

End mills High-performance machining

PM-2EP



– Factory standard
– Centre cutting
– Helix angle 35°



Article	✻	Dimensions [mm]						Teeth	Grade
		D	d (h6)	H	M	d_1	L		KMG405
PM-2EP-D2.5-M12		2.5	4.0	3.7	12	2.4	50	2	○
PM-2EP-D2.5-M14		2.5	4.0	3.7	14	2.4	50	2	○
PM-2EP-D2.5-M16		2.5	4.0	3.7	16	2.4	60	2	○
PM-2EP-D2.5-M18		2.5	4.0	3.7	18	2.4	60	2	○
PM-2EP-D2.5-M20		2.5	4.0	3.7	20	2.4	60	2	○
PM-2EP-D3.0-M06		3.0	6.0	4.5	6	2.85	50	2	○
PM-2EP-D3.0-M08		3.0	6.0	4.5	8	2.85	50	2	○
PM-2EP-D3.0-M10		3.0	6.0	4.5	10	2.85	50	2	○
PM-2EP-D3.0-M12		3.0	6.0	4.5	12	2.85	50	2	○
PM-2EP-D3.0-M14		3.0	6.0	4.5	14	2.85	60	2	○
PM-2EP-D3.0-M16		3.0	6.0	4.5	16	2.85	60	2	○
PM-2EP-D3.0-M18		3.0	6.0	4.5	18	2.85	60	2	○
PM-2EP-D3.0-M20		3.0	6.0	4.5	20	2.85	60	2	○
PM-2EP-D4.0-M12		4.0	6.0	6.0	12	3.85	50	2	○
PM-2EP-D4.0-M14		4.0	6.0	6.0	14	3.85	60	2	○
PM-2EP-D4.0-M16		4.0	6.0	6.0	16	3.85	60	2	○
PM-2EP-D4.0-M20		4.0	6.0	6.0	20	3.85	60	2	○
PM-2EP-D4.0-M25		4.0	6.0	6.0	25	3.85	60	2	○
PM-2EP-D5.0-M12		5.0	6.0	7.5	12	4.85	60	2	○
PM-2EP-D5.0-M14		5.0	6.0	7.5	14	4.85	60	2	○
PM-2EP-D5.0-M16		5.0	6.0	7.5	16	4.85	60	2	○
PM-2EP-D5.0-M20		5.0	6.0	7.5	20	4.85	70	2	○
PM-2EP-D5.0-M25		5.0	6.0	7.5	25	4.85	70	2	○

● Ex stock ○ On demand
✻ With internal cooling

Application field

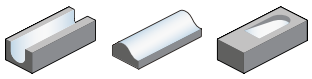
P	M	K	N	S	H
✔	✔	✔			✔

✔ Very suitable
✔ Suitable

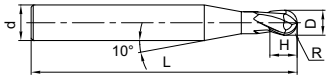
Ball nose cutters

High-performance machining

PM-2BS



– Factory standard
– Centre cutting
– Helix angle 35°



Article	✻	Dimensions [mm]					Teeth	Grade
		D	R	d (h6)	H	L		KMG405
PM-2BS-R0.15		0,3	0,15	4	0,5	50	2	●
PM-2BS-R0.20		0,4	0,2	4	0,6	50	2	●
PM-2BS-R0.25		0,5	0,25	4	0,8	50	2	●
PM-2BS-R0.30		0,6	0,3	4	0,9	50	2	●
PM-2BS-R0.35		0,7	0,35	4	1	50	2	○
PM-2BS-R0.40		0,8	0,4	4	1,2	50	2	●
PM-2BS-R0.45		0,9	0,45	4	1,3	50	2	○
PM-2BS-R0.50		1	0,5	4	1,5	50	2	●
PM-2BS-R0.60		1,2	0,6	4	1,8	50	2	●
PM-2BS-R0.70		1,4	0,7	4	2	50	2	○
PM-2BS-R0.75		1,5	0,75	4	2,3	50	2	●
PM-2BS-R0.80		1,6	0,8	4	2,5	50	2	○
PM-2BS-R0.90		1,8	0,9	4	2,7	50	2	○
PM-2BS-R1.00		2	1	4	3	50	2	●
PM-2BS-R1.25		2,5	1,25	4	3,7	50	2	○
PM-2BS-R1.50		3	1,5	4	4,5	50	2	●

● Ex stock ○ On demand
✻ With internal cooling

Application field

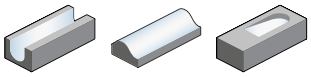
P	M	K	N	S	H
✔	✔	✔			✔

✔ Very suitable
✔ Suitable

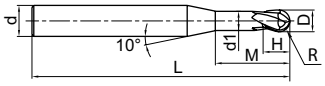
Ball nose cutters

High-performance machining

PM-2BP



– Factory standard
– Centre cutting
– Helix angle 35°



Article	✻	Dimensions [mm]							Teeth	Grade
		D	R	d (h6)	d_1	H	M	L		KMG405
PM-2BP-R0.25-M04		0,5	0,25	4	0,45	0,7	4	50	2	●
PM-2BP-R0.25-M06		0,5	0,25	4	0,45	0,7	6	50	2	●
PM-2BP-R0.3-M04		0,6	0,3	4	0,55	0,9	4	50	2	●
PM-2BP-R0.3-M06		0,6	0,3	4	0,55	0,9	6	50	2	●
PM-2BP-R0.3-M08		0,6	0,3	4	0,55	0,9	8	50	2	●
PM-2BP-R0.4-M04		0,8	0,4	4	0,75	1,2	4	50	2	●
PM-2BP-R0.4-M06		0,8	0,4	4	0,75	1,2	6	50	2	●
PM-2BP-R0.4-M08		0,8	0,4	4	0,75	1,2	8	50	2	●
PM-2BP-R0.4-M10		0,8	0,4	4	0,75	1,2	10	50	2	●
PM-2BP-R0.5-M04		1	0,5	4	0,95	1,5	4	50	2	●
PM-2BP-R0.5-M06		1	0,5	4	0,95	1,5	6	50	2	●
PM-2BP-R0.5-M08		1	0,5	4	0,95	1,5	8	50	2	●
PM-2BP-R0.5-M10		1	0,5	4	0,95	1,5	10	50	2	●
PM-2BP-R0.5-M12		1	0,5	4	0,95	1,5	12	50	2	●
PM-2BP-R0.5-M15		1	0,5	4	0,95	1,5	15	50	2	○
PM-2BP-R0.6-M06		1,2	0,6	4	1,15	1,8	6	50	2	●
PM-2BP-R0.6-M08		1,2	0,6	4	1,15	1,8	8	50	2	○
PM-2BP-R0.6-M12		1,2	0,6	4	1,15	1,8	12	50	2	○
PM-2BP-R0.6-M16		1,2	0,6	4	1,15	1,8	16	50	2	○
PM-2BP-R0.75-M06		1,5	0,75	4	1,45	2,3	6	50	2	○
PM-2BP-R0.75-M08		1,5	0,75	4	1,45	2,3	8	50	2	●
PM-2BP-R0.75-M12		1,5	0,75	4	1,45	2,3	12	50	2	●
PM-2BP-R0.75-M16		1,5	0,75	4	1,45	2,3	16	50	2	●

● Ex stock ○ On demand
✻ With internal cooling

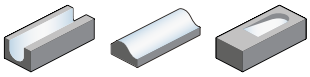
Application field

P	M	K	N	S	H
✔	✔	✔			✔

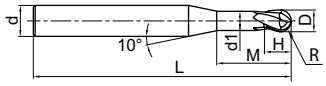
✔ Very suitable
✔ suitable

Ball nose cutters — High-performance machining

PM-2BP



– Factory standard
– Centre cutting
– Helix angle 35°



Article	✻	Dimensions [mm]							Teeth	Grade
		D	R	d (h6)	d_1	H	M	L		KMG405
PM-2BP-R1.0-M06		2	1	4	1,95	3	6	50	2	●
PM-2BP-R1.0-M08		2	1	4	1,95	3	8	50	2	●
PM-2BP-R1.0-M10		2	1	4	1,95	3	10	50	2	●
PM-2BP-R1.0-M12		2	1	4	1,95	3	12	50	2	●
PM-2BP-R1.0-M16		2	1	4	1,95	3	16	50	2	●
PM-2BP-R1.0-M20		2	1	4	1,95	3	20	50	2	●
PM-2BP-R1.25-M08		2,5	1,25	4	2,4	3,7	8	50	2	○
PM-2BP-R1.25-M10		2,5	1,25	4	2,4	3,7	10	50	2	○
PM-2BP-R1.25-M12		2,5	1,25	4	2,4	3,7	12	50	2	●
PM-2BP-R1.25-M16		2,5	1,25	4	2,4	3,7	16	60	2	○
PM-2BP-R1.25-M20		2,5	1,25	4	2,4	3,7	20	60	2	○
PM-2BP-R1.5-M08		3	1,5	6	2,85	4,5	8	50	2	●
PM-2BP-R1.5-M10		3	1,5	6	2,85	4,5	10	50	2	●
PM-2BP-R1.5-M12		3	1,5	6	2,85	4,5	12	50	2	●
PM-2BP-R1.5-M16		3	1,5	6	2,85	4,5	16	60	2	●
PM-2BP-R1.5-M20		3	1,5	6	2,85	4,5	20	60	2	●
PM-2BP-R2.0-M10		4	2	6	3,85	6	10	60	2	●
PM-2BP-R2.0-M16		4	2	6	3,85	6	16	60	2	●
PM-2BP-R2.0-M20		4	2	6	3,85	6	20	60	2	●
PM-2BP-R2.0-M25		4	2	6	3,85	6	25	60	2	○
PM-2BP-R2.5-M16		5	2,5	6	4,85	7,5	16	60	2	●
PM-2BP-R2.5-M25		5	2,5	6	4,85	7,5	25	70	2	●

● Ex stock ○ On demand
✻ With internal cooling

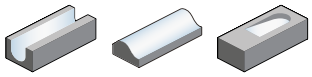
Application field

P	M	K	N	S	H
✔	✔	✔			✔

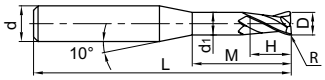
✔ Very suitable
✔ suitable

Torus mills — High-performance machining

PM-2RP



– Factory standard
– Centre cutting
– Helix angle 35°



Article	✻	Dimensions [mm]							Teeth	Grade
		D	R	d (h6)	H	M	d_1	L		KMG405
PM-2RP-D0.5-R0.05-M04		0,5	0,05	4.0	0.6	4	0.45	50	2	○
PM-2RP-D0.5-R0.05-M06		0.5	0,05	4.0	0.7	6	0.45	50	2	○
PM-2RP-D0.5-R0.05-M08		0.5	0,05	4.0	0.7	8	0.45	50	2	○
PM-2RP-D0.5-R0.1-M04		0,5	0,1	4.0	0.6	4	0.45	50	2	○
PM-2RP-D0.5-R0.1-M06		0.5	0,1	4.0	0.7	6	0.45	50	2	○
PM-2RP-D0.5-R0.1-M08		0.5	0,1	4.0	0.7	8	0.45	50	2	○
PM-2RP-D0.8-R0.1-M04		0.8	0,1	4.0	1.2	4	0.75	50	2	○
PM-2RP-D0.8-R0.1-M06		0.8	0,1	4.0	1.2	6	0.75	50	2	○
PM-2RP-D0.8-R0.1-M08		0.8	0,1	4.0	1.2	8	0.75	50	2	○
PM-2RP-D0.8-R0.1-M10		0.8	0,1	4.0	1.2	10	0.75	50	2	○
PM-2RP-D0.8-R0.2-M04		0.8	0,2	4.0	1.2	4	0.75	50	2	○
PM-2RP-D0.8-R0.2-M06		0.8	0,2	4.0	1.2	6	0.75	50	2	○
PM-2RP-D0.8-R0.2-M08		0.8	0,2	4.0	1.2	8	0.75	50	2	○
PM-2RP-D0.8-R0.2-M10		0.8	0,2	4.0	1.2	10	0.75	50	2	○
PM-2RP-D1.0-R0.1-M04		1.0	0,1	4.0	1.5	4	0.95	50	2	○
PM-2RP-D1.0-R0.1-M06		1.0	0,1	4.0	1.5	6	0.95	50	2	○
PM-2RP-D1.0-R0.1-M08		1.0	0,1	4.0	1.5	8	0.95	50	2	○
PM-2RP-D1.0-R0.1-M10		1.0	0,1	4.0	1.5	10	0.95	50	2	○
PM-2RP-D1.0-R0.1-M12		1.0	0,1	4.0	1.5	12	0.95	50	2	○
PM-2RP-D1.0-R0.1-M14		1.0	0,1	4.0	1.5	14	0.95	50	2	○
PM-2RP-D1.0-R0.1-M16		1.0	0,1	4.0	1.5	16	0.95	60	2	○
PM-2RP-D1.0-R0.1-M20		1.0	0,1	4.0	1.5	20	0.95	60	2	○
PM-2RP-D1.0-R0.2-M04		1.0	0,2	4.0	1.5	4	0.95	50	2	○
PM-2RP-D1.0-R0.2-M06		1.0	0,2	4.0	1.5	6	0.95	50	2	○
PM-2RP-D1.0-R0.2-M08		1.0	0,2	4.0	1.5	8	0.95	50	2	○
PM-2RP-D1.0-R0.2-M10		1.0	0,2	4.0	1.5	10	0.95	50	2	○
PM-2RP-D1.0-R0.2-M12		1.0	0,2	4.0	1.5	12	0.95	50	2	○
PM-2RP-D1.0-R0.2-M14		1.0	0,2	4.0	1.5	14	0.95	50	2	○
PM-2RP-D1.0-R0.2-M16		1.0	0,2	4.0	1.5	16	0.95	60	2	○
PM-2RP-D1.0-R0.2-M20		1.0	0,2	4.0	1.5	20	0.95	60	2	○
PM-2RP-D1.0-R0.3-M04		1.0	0,3	4.0	1.5	4	0.95	50	2	○
PM-2RP-D1.0-R0.3-M06		1.0	0,3	4.0	1.5	6	0.95	50	2	○
PM-2RP-D1.0-R0.3-M08		1.0	0,3	4.0	1.5	8	0.95	50	2	○
PM-2RP-D1.0-R0.3-M10		1.0	0,3	4.0	1.5	10	0.95	50	2	○
PM-2RP-D1.0-R0.3-M12		1.0	0,3	4.0	1.5	12	0.95	50	2	○
PM-2RP-D1.2-R0.1-M06		1.2	0,1	4.0	1.8	6	1.15	50	2	○
PM-2RP-D1.2-R0.1-M08		1.2	0,1	4.0	1.8	8	1.15	50	2	○
PM-2RP-D1.2-R0.1-M10		1.2	0,1	4.0	1.8	10	1.15	50	2	○

● Ex stock ○ On demand
✻ With internal cooling

Application field

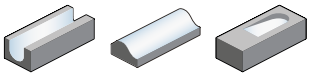
P	M	K	N	S	H
✔	✔	✔			✔

✔ Very suitable
✔ suitable

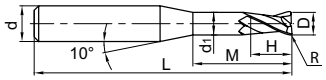
Torus mills

High-performance machining

PM-2RP



– Factory standard
– Centre cutting
– Helix angle 35°



Article	✻	Dimensions [mm]							Teeth	Grade
		D	R	d (h6)	H	M	d_1	L		KMG405
PM-2RP-D1.2-R0.1-M12		1.2	0,1	4.0	1.8	12	1.15	50	2	○
PM-2RP-D1.2-R0.1-M16		1.2	0,1	4.0	1.8	16	1.5	60	2	○
PM-2RP-D1.2-R0.2-M06		1.2	0,2	4.0	1.8	6	1.15	50	2	○
PM-2RP-D1.2-R0.2-M08		1.2	0,2	4.0	1.8	8	1.15	50	2	○
PM-2RP-D1.2-R0.2-M10		1.2	0,2	4.0	1.8	10	1.15	50	2	○
PM-2RP-D1.2-R0.2-M12		1.2	0,2	4.0	1.8	12	1.15	50	2	○
PM-2RP-D1.2-R0.2-M16		1.2	0,2	4.0	1.8	16	1.5	60	2	○
PM-2RP-D1.5-R0.2-M06		1.5	0,2	4.0	2.3	6	1.45	50	2	○
PM-2RP-D1.5-R0.2-M08		1.5	0,2	4.0	2.3	8	1.45	50	2	○
PM-2RP-D1.5-R0.2-M10		1.5	0,2	4.0	2.3	10	1.45	50	2	○
PM-2RP-D1.5-R0.2-M12		1.5	0,2	4.0	2.3	12	1.45	50	2	○
PM-2RP-D1.5-R0.2-M14		1.5	0,2	4.0	2.3	14	1.45	50	2	○
PM-2RP-D1.5-R0.2-M16		1.5	0,2	4.0	2.3	16	1.45	50	2	○
PM-2RP-D1.5-R0.2-M18		1.5	0,2	4.0	2.3	18	1.45	50	2	○
PM-2RP-D1.5-R0.2-M20		1.5	0,2	4.0	2.3	20	1.45	50	2	○
PM-2RP-D1.5-R0.3-M06		1.5	0,3	4.0	2.3	6	1.45	50	2	○
PM-2RP-D1.5-R0.3-M08		1.5	0,3	4.0	2.3	8	1.45	50	2	○
PM-2RP-D1.5-R0.3-M10		1.5	0,3	4.0	2.3	10	1.45	50	2	○
PM-2RP-D1.5-R0.3-M12		1.5	0,3	4.0	2.3	12	1.45	50	2	○
PM-2RP-D1.5-R0.3-M14		1.5	0,3	4.0	2.3	14	1.45	50	2	○
PM-2RP-D1.5-R0.3-M16		1.5	0,3	4.0	2.3	16	1.45	50	2	○
PM-2RP-D1.5-R0.3-M18		1.5	0,3	4.0	2.3	18	1.45	50	2	○
PM-2RP-D1.5-R0.3-M20		1.5	0,3	4.0	2.3	20	1.45	50	2	○
PM-2RP-D2.0-R0.2-M06		2.0	0,2	4.0	3.0	6	1.95	50	2	○
PM-2RP-D2.0-R0.2-M08		2.0	0,2	4.0	3.0	8	1.95	50	2	○
PM-2RP-D2.0-R0.2-M10		2.0	0,2	4.0	3.0	10	1.95	50	2	○
PM-2RP-D2.0-R0.2-M12		2.0	0,2	4.0	3.0	12	1.95	50	2	○
PM-2RP-D2.0-R0.2-M14		2.0	0,2	4.0	3.0	14	1.95	50	2	○
PM-2RP-D2.0-R0.2-M16		2.0	0,2	4.0	3.0	16	1.95	50	2	○
PM-2RP-D2.0-R0.2-M18		2.0	0,2	4.0	3.0	18	1.96	50	2	○
PM-2RP-D2.0-R0.2-M20		2.0	0,2	4.0	3.0	20	1.97	50	2	○
PM-2RP-D2.0-R0.5-M06		2.0	0,5	4.0	3.0	6	1.95	50	2	○
PM-2RP-D2.0-R0.5-M08		2.0	0,5	4.0	3.0	8	1.95	50	2	○
PM-2RP-D2.0-R0.5-M10		2.0	0,5	4.0	3.0	10	1.95	50	2	○
PM-2RP-D2.0-R0.5-M12		2.0	0,5	4.0	3.0	12	1.95	50	2	○
PM-2RP-D2.0-R0.5-M14		2.0	0,5	4.0	3.0	14	1.95	50	2	○
PM-2RP-D2.0-R0.5-M16		2.0	0,5	4.0	3.0	16	1.95	50	2	○
PM-2RP-D2.0-R0.5-M18		2.0	0,5	4.0	3.0	18	1.96	50	2	○

● Ex stock ○ On demand
✻ With internal cooling

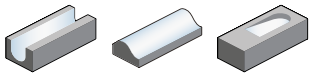
Application field

P	M	K	N	S	H
✔	✔	✔			✔

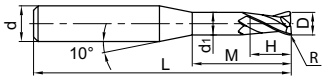
✔ Very suitable
✔ suitable

Torus mills High-performance machining

PM-2RP



– Factory standard
– Centre cutting
– Helix angle 35°



Article	✻	Dimensions [mm]							Teeth	Grade
		D	R	d (h6)	H	M	d_1	L		KMG405
PM-2RP-D2.0-R0.5-M20		2.0	0,5	4.0	3.0	20	1.97	50	2	○
PM-2RP-D2.5-R0.2-M08		2.5	0,2	4.0	3.7	8	2.4	50	2	○
PM-2RP-D2.5-R0.2-M10		2.5	0,2	4.0	3.7	10	2.4	50	2	○
PM-2RP-D2.5-R0.2-M12		2.5	0,2	4.0	3.7	12	2.4	50	2	○
PM-2RP-D2.5-R0.2-M14		2.5	0,2	4.0	3.7	14	2.4	50	2	○
PM-2RP-D2.5-R0.2-M16		2.5	0,2	4.0	3.7	16	2.4	60	2	○
PM-2RP-D2.5-R0.2-M18		2.5	0,2	4.0	3.7	18	2.4	60	2	○
PM-2RP-D2.5-R0.2-M20		2.5	0,2	4.0	3.7	20	2.4	60	2	○
PM-2RP-D2.5-R0.5-M08		2.5	0,5	4.0	3.7	8	2.4	50	2	○
PM-2RP-D2.5-R0.5-M10		2.5	0,5	4.0	3.7	10	2.4	50	2	○
PM-2RP-D2.5-R0.5-M12		2.5	0,5	4.0	3.7	12	2.4	50	2	○
PM-2RP-D2.5-R0.5-M14		2.5	0,5	4.0	3.7	14	2.4	50	2	○
PM-2RP-D2.5-R0.5-M16		2.5	0,5	4.0	3.7	16	2.4	60	2	○
PM-2RP-D2.5-R0.5-M18		2.5	0,5	4.0	3.7	18	2.4	60	2	○
PM-2RP-D2.5-R0.5-M20		2.5	0,5	4.0	3.7	20	2.4	60	2	○
PM-2RP-D3.0-R0.2-M06		3.0	0,2	6.0	4.5	6	2.85	50	2	○
PM-2RP-D3.0-R0.2-M08		3.0	0,2	6.0	4.5	8	2.85	50	2	○
PM-2RP-D3.0-R0.2-M10		3.0	0,2	6.0	4.5	10	2.85	50	2	○
PM-2RP-D3.0-R0.2-M12		3.0	0,2	6.0	4.5	12	2.85	50	2	○
PM-2RP-D3.0-R0.2-M14		3.0	0,2	6.0	4.5	14	2.85	60	2	○
PM-2RP-D3.0-R0.2-M16		3.0	0,2	6.0	4.5	16	2.85	60	2	○
PM-2RP-D3.0-R0.2-M18		3.0	0,2	6.0	4.5	18	2.85	60	2	○
PM-2RP-D3.0-R0.2-M20		3.0	0,2	6.0	4.5	20	2.85	60	2	○
PM-2RP-D3.0-R0.5-M06		3.0	0,5	6.0	4.5	6	2.85	50	2	○
PM-2RP-D3.0-R0.5-M08		3.0	0,5	6.0	4.5	8	2.85	50	2	○
PM-2RP-D3.0-R0.5-M10		3.0	0,5	6.0	4.5	10	2.85	50	2	○
PM-2RP-D3.0-R0.5-M12		3.0	0,5	6.0	4.5	12	2.85	50	2	○
PM-2RP-D3.0-R0.5-M14		3.0	0,5	6.0	4.5	14	2.85	60	2	○
PM-2RP-D3.0-R0.5-M16		3.0	0,5	6.0	4.5	16	2.85	60	2	○
PM-2RP-D3.0-R0.5-M18		3.0	0,5	6.0	4.5	18	2.85	60	2	○
PM-2RP-D3.0-R0.5-M20		3.0	0,5	6.0	4.5	20	2.85	60	2	○
PM-2RP-D4.0-R0.2-M12		4.0	0,2	6.0	6.0	12	3.85	50	2	○
PM-2RP-D4.0-R0.2-M14		4.0	0,2	6.0	6.0	14	3.85	60	2	○
PM-2RP-D4.0-R0.2-M16		4.0	0,2	6.0	6.0	16	3.85	60	2	○
PM-2RP-D4.0-R0.2-M20		4.0	0,2	6.0	6.0	20	3.85	60	2	○
PM-2RP-D4.0-R0.2-M25		4.0	0,2	6.0	6.0	25	3.85	60	2	○
PM-2RP-D4.0-R0.5-M12		4.0	0,5	6.0	6.0	12	3.85	50	2	○
PM-2RP-D4.0-R0.5-M14		4.0	0,5	6.0	6.0	14	3.85	60	2	○

● Ex stock ○ On demand
✻ With internal cooling

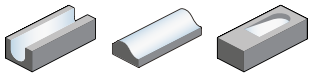
Application field

P	M	K	N	S	H
✔	✔	✔			✔

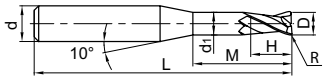
✔ Very suitable
✔ suitable

Torus mills — High-performance machining

PM-2RP



– Factory standard
– Centre cutting
– Helix angle 35°



Article	✻	Dimensions [mm]							Teeth	Grade
		D	R	d (h6)	H	M	d_1	L		KMG405
PM-2RP-D4.0-R0.5-M16		4.0	0,5	6.0	6.0	16	3.85	60	2	○
PM-2RP-D4.0-R0.5-M20		4.0	0,5	6.0	6.0	20	3.85	60	2	○
PM-2RP-D4.0-R0.5-M25		4.0	0,5	6.0	6.0	25	3.85	60	2	○
PM-2RP-D5.0-R0.5-M12		5.0	0,5	6.0	7.5	12	4.85	60	2	○
PM-2RP-D5.0-R0.5-M14		5.0	0,5	6.0	7.5	14	4.85	60	2	○
PM-2RP-D5.0-R0.5-M16		5.0	0,5	6.0	7.5	16	4.85	60	2	○
PM-2RP-D5.0-R0.5-M20		5.0	0,5	6.0	7.5	20	4.85	70	2	○
PM-2RP-D5.0-R0.5-M25		5.0	0,5	6.0	7.5	25	4.85	70	2	○
PM-2RP-D5.0-R1.0-M12		5.0	1	6.0	7.5	12	4.85	60	2	○
PM-2RP-D5.0-R1.0-M14		5.0	1	6.0	7.5	14	4.85	60	2	○
PM-2RP-D5.0-R1.0-M16		5.0	1	6.0	7.5	16	4.85	60	2	○
PM-2RP-D5.0-R1.0-M20		5.0	1	6.0	7.5	20	4.85	70	2	○
PM-2RP-D5.0-R1.0-M25		5.0	1	6.0	7.5	25	4.85	70	2	○

● Ex stock ○ On demand
✻ With internal cooling

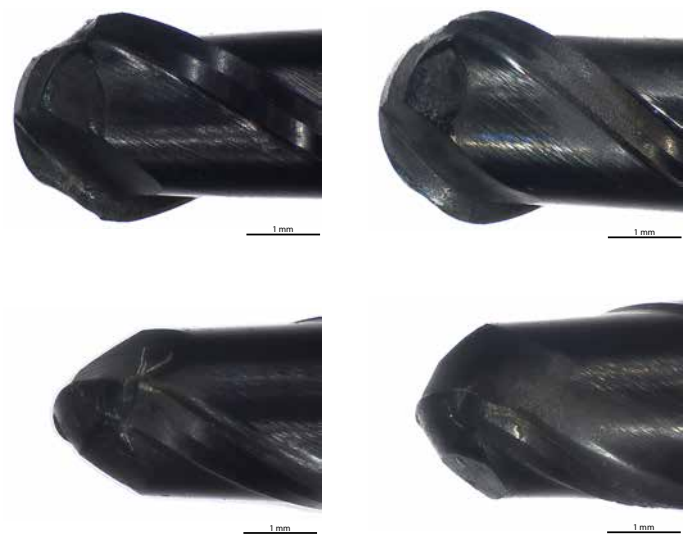
Application field

P	M	K	N	S	H
✔	✔	✔			✔

✔ Very suitable
✔ suitable

Material 60CrMoV18-5 (1.2358)

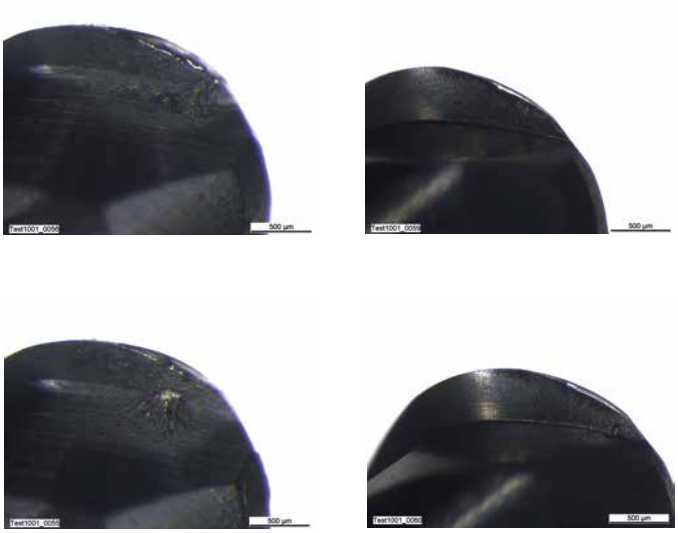
Coolant	air
Tool	PM-2BS-R1.5 KMG405 Ball nose cutter ø 3 mm
Angle of attack	65°
Cutting data	v_c = 100 m/min n = 18000 rpm f_z = 0.04 mm v_f = 1440 mm/min a_p = 0.3 mm a_e = 0.3 mm T = 35 min



Competition **PM-2BS-R1.5 KMG405**

Material S355JR (1.0045)

Coolant	air
Tool	PM-2BS-R1.5 KMG405 Ball nose cutter ø 3 mm
Angle of attack	45°
Cutting data	v_c = 85 m/min n = 18000 rpm f_z = 0.04 mm v_f = 1440 mm/min a_p = 0.3 mm a_e = 0.3 mm T = 120 min



Competition **PM-2BS-R1.5 KMG405**

Notes

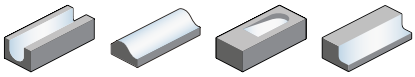
TM series

For machining titanium and super alloys

- Roughing and finishing of titanium, nickel and cobalt based alloys
- Specially ground for more cutting edge stability for demanding cutting jobs
- Latest coating technology for thermal stability and wear resistance
- Innovative substrate with optimized thermal conductivity and high level wear resistance
- TM multi series with up to 9 cutting edges for outstanding productivity
- Torus mills and ball nose cutters
- Diameter range 6.0–25.0 mm

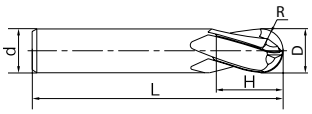
Ball nose cutters

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

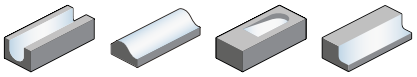
P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

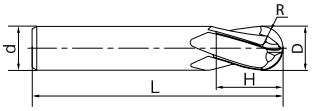
Ball nose cutters

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

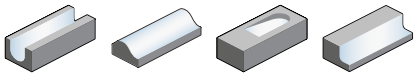
P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

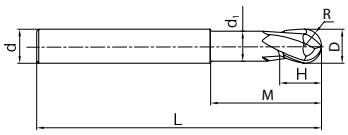
Ball nose cutters

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

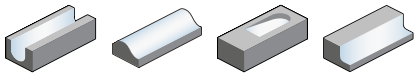
P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

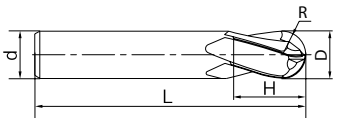
Ball nose cutters

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

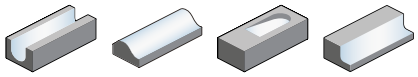
P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

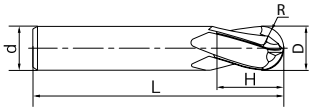
Ball nose cutters

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

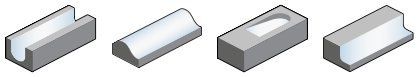
P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

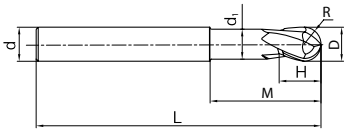
Ball nose cutters

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

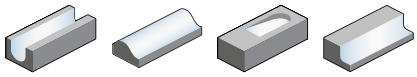
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

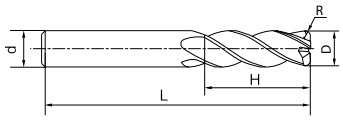
Torus mills

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

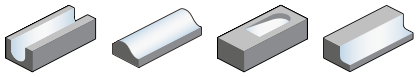
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

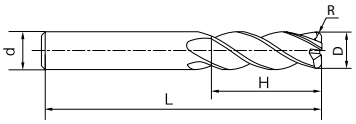
Torus mills

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

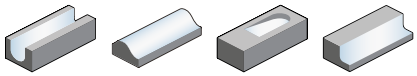
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

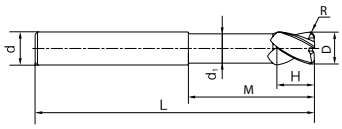
Torus mills

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

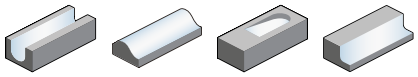
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

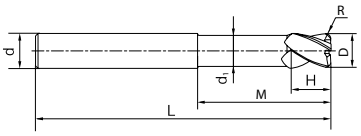
Torus mills

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

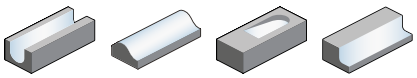
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

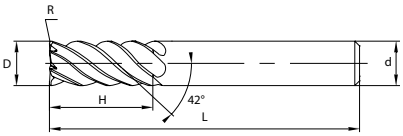
Torus mills

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

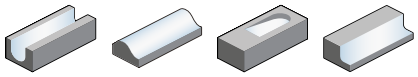
P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ Suitable

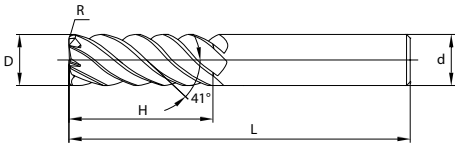
Torus mills

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

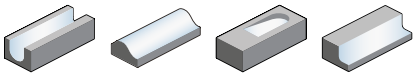
P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ Suitable

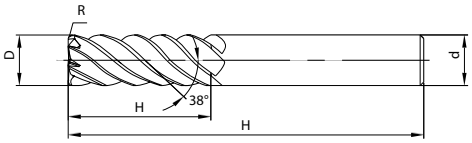
Torus mills

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

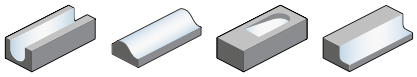
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

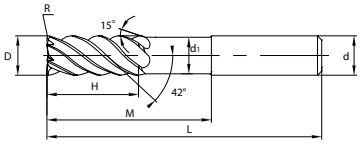
Torus mills

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

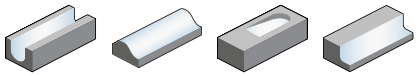
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

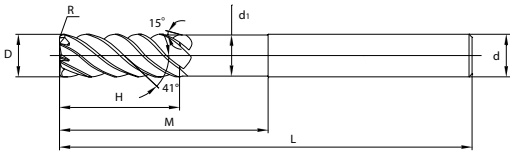
Torus mills

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

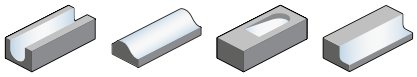
Application field

P	M	K	N	S	H
	✔			✔	

✔ Very suitable
✔ suitable

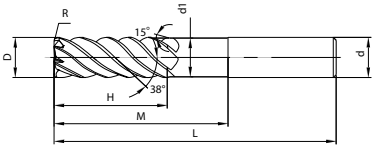
Torus mills

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

TM series – Milling cutters for demanding materials

- Perfect for titanium and high-temperature alloys
- High productivity due to up to 9 cutting edges
- Portfolio for the entire performance range of machine tools
- Specific radii for aerospace applications

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Solid carbide milling TM series – 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.

Recommended feed rate

Solid carbide milling group 10 – 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										

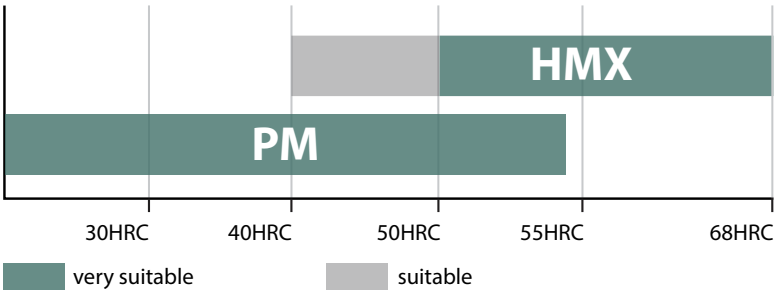
Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.

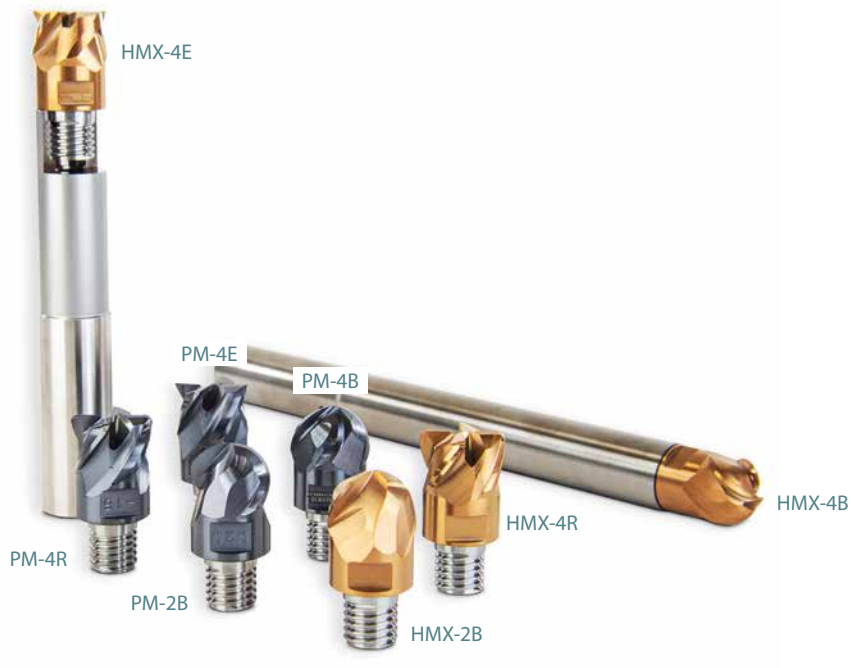
QCH series

Indexable solid carbide heads

- Universal program for a large variety of material groups
- PM screw-on heads for steel, stainless materials and cast iron
- HMX screw-on heads for hardened materials
- Special thread connection for high repeat accuracy and precise concentricity (<0.02mm)
- Maximum flexibility with a variety of shank lengths and geometries
- Cost effective reusable shank
- End mills, torus mills & ball nose cutters
- Diameter 12–32 mm

Application fields for machining of steel





Q08 – PM – 2 B – D12 R0.5

1	2	3	4	5	6

Thread diametre [mm]	
Code	Description
Q08	8,0
Q10	10,0
Q12	12,0
Q14	14,0
Q18	18,0

1

Application	
Code	Description
PM	High-performance machining
HMX	Hard machining

2

Number of teeth

3

Cutting edge type	
Code	Description
E	Square shoulder mill with protective chamfer
B	Ball nose cutter
R	Torus mill

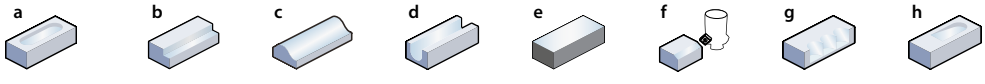
4

Diametre [mm]	
Code	Description
D3.0	3,0
D8.0	8,0
D20.0	20,0

5

Radius [mm]	
Code	Description
R0.5	0,5
R1.0	1,5
R3.0	3,0
...	

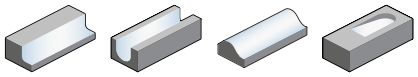
6



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

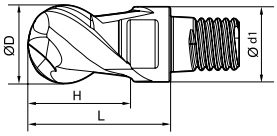
Ball nose cutter

High-performance machining



PM-2B

- Centre cutting
- Helix angle 38°



Article	Dimensions [mm]						Teeth	Grade
	D	R	d1	H	L	Thread		KMG405
Q08-PM-2B-D12.0	12	6	11,5	7	17	Q8	2	●
Q10-PM-2B-D16.0	16	8	15,2	9	21,5	Q10	2	●
Q12-PM-2B-D20.0	20	10	19	11	25,5	Q12	2	●
Q14-PM-2B-D25.0	25	12,5	24	13,5	31,5	Q14	2	●
Q18-PM-2B-D32.0	32	16	30	17	36	Q18	2	●

● Ex stock ○ On demand

✻ With internal cooling

Application field

P	M	K	N	S	H
✔	✔	✔			✔

✔ Very suitable
✔ Suitable

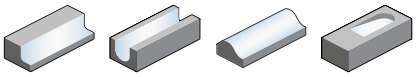
Spare parts

	Thread	Q8 / Q10	Q12 / Q14	Q18
	Wrench	QCH-10×13	QCH-16×20	QCH-26

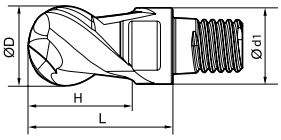
Ball nose cutter

High-performance machining

PM-4B



– Centre cutting
– Helix angle 30°



Article	Dimensions [mm]						Teeth	Grade
	D	R	d1	H	L	Thread		KMG405
Q08-PM-4B-D12.0	12	6	11,5	7	17	Q8	4	●
Q10-PM-4B-D16.0	16	8	15,2	9	21,5	Q10	4	●
Q12-PM-4B-D20.0	20	10	19	11	25,5	Q12	4	●
Q14-PM-4B-D25.0	25	12,5	24	13,5	31,5	Q14	4	●
Q18-PM-4B-D32.0	32	16	30	17	36	Q18	4	●

● Ex stock ○ On demand

✻ With internal cooling

Application field

P	M	K	N	S	H
✔	✔	✔			✔

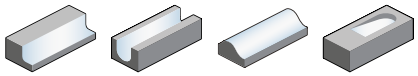
✔ Very suitable
✔ Suitable

Spare parts

	Thread	Q8 / Q10	Q12 / Q14	Q18
	Wrench	QCH-10×13	QCH-16×20	QCH-26

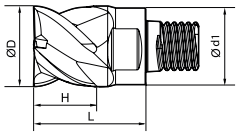
Square shoulder mill

Hard machining



PM-4E

- Centre cutting
- Helix angle 38°



Article	Dimensions [mm]					Teeth	Grade
	D	d1	H	L	Thread		KMG405
Q08-PM-4E-D12.0	12	11,5	7	17	Q8	4	●
Q10-PM-4E-D16.0	16	15,2	9	21,5	Q10	4	●
Q12-PM-4E-D20.0	20	19	11	25,5	Q12	4	●
Q14-PM-4E-D25.0	25	24	13,5	31,5	Q14	4	●
Q18-PM-4E-D32.0	32	30	17	36	Q18	4	●

● Ex stock ○ On demand

✲ With internal cooling

Application field

P	M	K	N	S	H
✔	✔	✔			✔

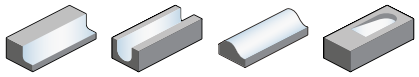
✔ Very suitable
✔ Suitable

Spare parts

	Thread	Q8 / Q10	Q12 / Q14	Q18
	Wrench	QCH-10×13	QCH-16×20	QCH-26

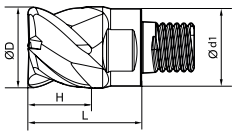
Torus mill

High-performance machining



PM-4R

- Centre cutting
- Helix angle 38°



Article	Dimensions [mm]						Teeth	Grade
	D	R	d1	H	L	Thread		KMG405
Q08-PM-4R-D12.0R1.0	12	1	11,5	7	17	Q8	4	●
Q08-PM-4R-D12.0R2.0	12	2	11,5	7	17	Q8	4	●
Q10-PM-4R-D16.0R1.0	16	1	15,2	9	21,5	Q10	4	●
Q10-PM-4R-D16.0R1.5	16	1,5	15,2	9	21,5	Q10	4	●
Q10-PM-4R-D16.0R2.0	16	2	15,2	9	21,5	Q10	4	●
Q12-PM-4R-D20.0R1.0	20	1	19	11	25,5	Q12	4	●
Q12-PM-4R-D20.0R2.0	20	2	19	11	25,5	Q12	4	●
Q14-PM-4R-D25.0R1.0	25	1	24	13,5	31,5	Q14	4	●
Q14-PM-4R-D25.0R2.0	25	2	24	13,5	31,5	Q14	4	●
Q14-PM-4R-D25.0R2.5	25	2,5	24	13,5	31,5	Q14	4	●
Q18-PM-4R-D32.0R1.0	32	1	30	17	36	Q18	4	●
Q18-PM-4R-D32.0R2.0	32	2	30	17	36	Q18	4	●
Q18-PM-4R-D32.0R3.0	32	3	30	17	36	Q18	4	●

● Ex stock ○ On demand

✻ With internal cooling

Application field

P	M	K	N	S	H
✔	✔	✔			✔

✔ Very suitable

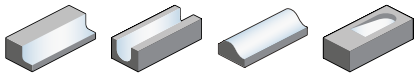
✔ Suitable

Spare parts

	Thread	Q8 / Q10	Q12 / Q14	Q18
	Wrench	QCH-10×13	QCH-16×20	QCH-26

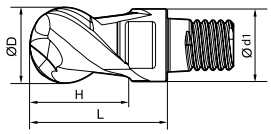
Ball nose cutter

Hard machining



HMX-2B

– Centre cutting
– Helix angle 35°



Article	Dimensions [mm]						Teeth	Grade
	D	R	d1	H	L	Thread		KMG5515
Q08-HMX-2B-D12.0	12	6	11,5	7	17	Q8	2	●
Q10-HMX-2B-D16.0	16	8	15,2	9	21,5	Q10	2	●
Q12-HMX-2B-D20.0	20	10	19	11	25,5	Q12	2	●
Q14-HMX-2B-D25.0	25	12,5	24	13,5	31,5	Q14	2	●
Q18-HMX-2B-D32.0	32	16	30	17	36	Q18	2	●

● Ex stock ○ On demand

✲ With internal cooling

Application field

P	M	K	N	S	H
					✔

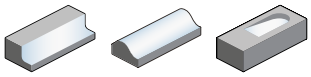
✔ Very suitable
✔ Suitable

Spare parts

	Thread	Q8 / Q10	Q12 / Q14	Q18
	Wrench	QCH-10×13	QCH-16×20	QCH-26

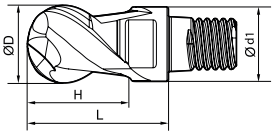
Ball nose cutter

Hard machining



HMX-4B

– Centre cutting
– Helix angle 35°



Article	Dimensions [mm]						Teeth	Grade
	D	R	d1	H	L	Thread		KMG5515
Q08-HMX-4B-D12.0	12	6	11,5	7	17	Q8	4	●
Q10-HMX-4B-D16.0	16	8	15,2	9	21,5	Q10	4	●
Q12-HMX-4B-D20.0	20	10	19	11	25,5	Q12	4	●
Q14-HMX-4B-D25.0	25	12,5	24	13,5	31,5	Q14	4	●
Q18-HMX-4B-D32.0	32	16	30	17	36	Q18	4	●

● Ex stock ○ On demand

✻ With internal cooling

Application field

P	M	K	N	S	H
					✔

✔ Very suitable
✔ Suitable

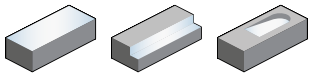
Spare parts

	Thread	Q8 / Q10	Q12 / Q14	Q18
	Wrench	QCH-10×13	QCH-16×20	QCH-26

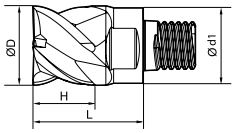
Square shoulder mill

Hard machining

HMX-4E



– Centre cutting
– Helix angle 45°



Article	Dimensions [mm]					Teeth	Grade
	D	d1	H	L	Thread		KMG5515
Q08-HMX-4E-D12.0	12	11,5	7	17	Q8	4	●
Q10-HMX-4E-D16.0	16	15,2	9	21,5	Q10	4	●
Q12-HMX-4E-D20.0	20	19	11	25,5	Q12	4	●
Q14-HMX-4E-D25.0	25	24	13,5	31,5	Q14	4	●
Q18-HMX-4E-D32.0	32	30	17	36	Q18	4	●

● Ex stock ○ On demand

✲ With internal cooling

Application field

P	M	K	N	S	H
					✔

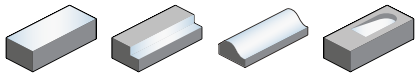
✔ Very suitable
✔ Suitable

Spare parts

	Thread	Q8 / Q10	Q12 / Q14	Q18
	Wrench	QCH-10×13	QCH-16×20	QCH-26

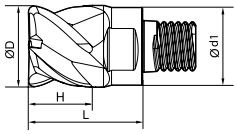
Torus mill

Hard machining



HMX-4R

– Centre cutting
– Helix angle 35°



Article	Dimensions [mm]						Teeth	Grade
	D	R	d1	H	L	Thread		KMG5515
Q08-HMX-4R-D12.0R1.0	12	1	11,5	7	17	Q8	4	●
Q08-HMX-4R-D12.0R2.0	12	2	11,5	7	17	Q8	4	●
Q10-HMX-4R-D16.0R1.0	16	1	15,2	9	21,5	Q10	4	●
Q10-HMX-4R-D16.0R1.5	16	1,5	15,2	9	21,5	Q10	4	●
Q10-HMX-4R-D16.0R2.0	16	2	15,2	9	21,5	Q10	4	●
Q12-HMX-4R-D20.0R1.0	20	1	19	11	25,5	Q12	4	●
Q12-HMX-4R-D20.0R2.0	20	2	19	11	25,5	Q12	4	●
Q14-HMX-4R-D25.0R1.0	25	1	24	13,5	31,5	Q14	4	●
Q14-HMX-4R-D25.0R2.0	25	2	24	13,5	31,5	Q14	4	●
Q14-HMX-4R-D25.0R2.5	25	2,5	24	13,5	31,5	Q14	4	●
Q18-HMX-4R-D32.0R1.0	32	1	30	17	36	Q18	4	●
Q18-HMX-4R-D32.0R2.0	32	2	30	17	36	Q18	4	●
Q18-HMX-4R-D32.0R3.0	32	3	30	17	36	Q18	4	●

● Ex stock ○ On demand

✻ With internal cooling

Application field

P	M	K	N	S	H
					✔

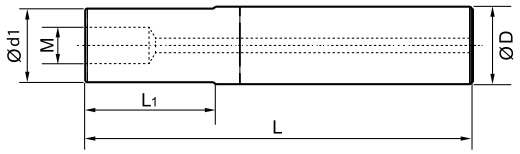
✔ Very suitable
✔ Suitable

Spare parts

	Thread	Q8 / Q10	Q12 / Q14	Q18
	Wrench	QCH-10x13	QCH-16x20	QCH-26

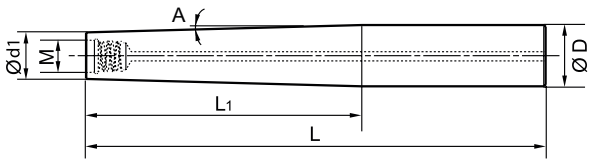
Accessories

Solid carbide shank, stepped



Article	Dimensions [mm]				Thread (M)
	D	d1	L	L1	
G12-QCH-Q08-80C	12	11,5	80	30	Q8
G12-QCH-Q08-100C	12	11,5	100	50	Q8
G12-QCH-Q08-120C	12	11,5	120	70	Q8
G16-QCH-Q10-90C	16	15,2	90	40	Q10
G16-QCH-Q10-120C	16	15,2	120	70	Q10
G16-QCH-Q10-150C	16	15,2	150	100	Q10
G20-QCH-Q12-100C	20	19	100	40	Q12
G20-QCH-Q12-140C	20	19	140	80	Q12
G20-QCH-Q12-180C	20	19	180	120	Q12
G25-QCH-Q14-120C	25	24	120	50	Q14
G25-QCH-Q14-170C	25	24	170	100	Q14
G25-QCH-Q14-220C	25	24	220	150	Q14
G32-QCH-Q18-140C	32	30	140	70	Q18
G32-QCH-Q18-200C	32	30	200	130	Q18
G32-QCH-Q18-260C	32	30	260	190	Q18
G32-QCH-Q18-320C	32	30	320	250	Q18

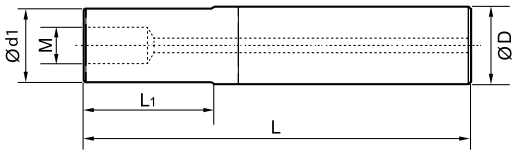
Solid carbide shank, tapered



Article	Dimensions [mm]				Thread (M)	Angle (A)
	D	d1	L	L1		
G16-QCH-Q08-140C-ZJ90	16	11,5	140	90	Q8	1°
G20-QCH-Q10-200C-ZJ140	20	15,2	200	140	Q8	0,8
G25-QCH-Q12-250C-ZJ180	25	19	250	180	Q8	0,8
G32-QCH-Q14-270C-ZJ200	32	30	270	200	Q10	0,8

Accessoires

Steel shank, stepped **New**



Article	Dimensions [mm]				Thread (M)
	D	d1	L	L1	
G12-QCH-Q08-65S	12	11,5	65	19	Q08
G16-QCH-Q10-100S	16	15,2	100	42	Q10
G20-QCH-Q12-110S	20	19	110	54	Q12

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**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.

	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]	$a_{p\,max}$	Ø [mm]	$a_{e\,max}$	Ø [mm]	$a_{p\,max}$	Ø [mm]	$a_{e\,max}$
			0 < x ≤ 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

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Recommended feed rate

Solid carbide milling group 1 – Square shoulder mills PM 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 3 – Square shoulder mills HM 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					
H	1/1	0,01	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,03	0,05	0,06	0,06	0,06	0,06	0,07					
	1/2	0,01	0,02	0,02	0,02	0,02	0,02	0,03	0,03	0,04	0,06	0,07	0,07	0,08	0,08	0,09					
	1/10	0,02	0,03	0,03	0,03	0,03	0,03	0,05	0,05	0,06	0,10	0,11	0,11	0,13	0,13	0,15					

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 5 – Ball nose cutters GM 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																				
	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					
	1/20	0,03	0,06	0,06	0,06	0,06	0,06	0,08	0,08	0,11	0,17	0,20	0,20	0,23	0,23	0,25					
M	1/1																				
	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					
	1/20	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	0,21					
K	1/1																				
	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					
	1/20	0,03	0,06	0,06	0,06	0,06	0,06	0,08	0,08	0,11	0,17	0,20	0,20	0,23	0,23	0,25					
H	1/1																				
	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					
	1/20	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	0,21					

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 7 – Ball nose cutters HM 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					
H	1/1																				
	1/2	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					
	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	0,21					

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

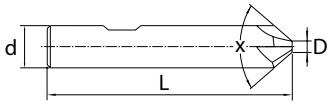
FM series

Deburring cutters

Deburring cutter 120° General machining

5501/5601R120*FM

– Type of shank DIN 6535HA
– Type of shank: DIN 6535HB
– Non-centre cutting
– Helix angle 0°



Article	✻	Dimensions [mm]					Teeth	Grade
		d(h6)	L	D	Schaft	X		KMG406
5501R1203FM-0300		3	48	0,2	HA	120	3	●
5501R1204FM-0400		4	48	0,2	HA	120	4	●
5501R1204FM-0600		6	55	0,2	HA	120	4	●
5501R1204FM-0800		8	58	0,5	HA	120	4	●
5501R1204FM-1000		10	65	0,5	HA	120	4	●
5501R1206FM-1000		10	65	0,7	HA	120	6	○
5501R1204FM-1200		12	75	0,5	HA	120	4	●
5501R1206FM-1200		12	75	0,7	HA	120	6	○
5501R1204FM-1600		16	85	0,7	HA	120	4	●
5501R1206FM-1600		16	85	0,7	HA	120	6	○
5601R1204FM-0600		6	55	0,2	HB	120	4	●
5601R1204FM-0800		8	58	0,5	HB	120	4	●
5601R1204FM-1000		10	65	0,5	HB	120	4	●
5601R1206FM-1000		10	65	0,7	HB	120	6	○
5601R1204FM-1200		12	75	0,5	HB	120	4	●
5601R1206FM-1200		12	75	0,7	HB	120	6	○
5601R1204FM-1600		16	85	0,7	HB	120	4	●
5601R1206FM-1600		16	85	0,7	HB	120	6	○

● Ex stock ○ On demand
✻ With internal cooling

Application field

P	M	K	N	S	H
✔	✔	✔	✔		

✔ Very suitable
✔ Suitable

Notes

Toolmanagement System

Cutting indirect tooling costs

YOUR BENEFITS

– Reduction of tool consumption
– Reduction of the variety of tools
– Reduction of the current stock
– Reduction of machine downtimes
– Less tool search time
– Optimizing the ordering system

Do you have any questions?
Sebastian Herrmann (Product Manager Tool Management)
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Tel.: 0211 989240-460

Is cutting indirect tooling cost your focus? Together we develop your specific plan and implement it by means of our Tool Management Systems.“

Sebastian H.
(Product Manager Tool Management)

QCH series – Indexable solid carbide heads

- Perfect for steel, cast iron, stainless steel and hard materials
- Great application flexibility through different shaft lengths and geometries
- End mills, torus mills and ball nose cutters in Ø12–32 mm
- Highest repeat accuracy and precise concentricity

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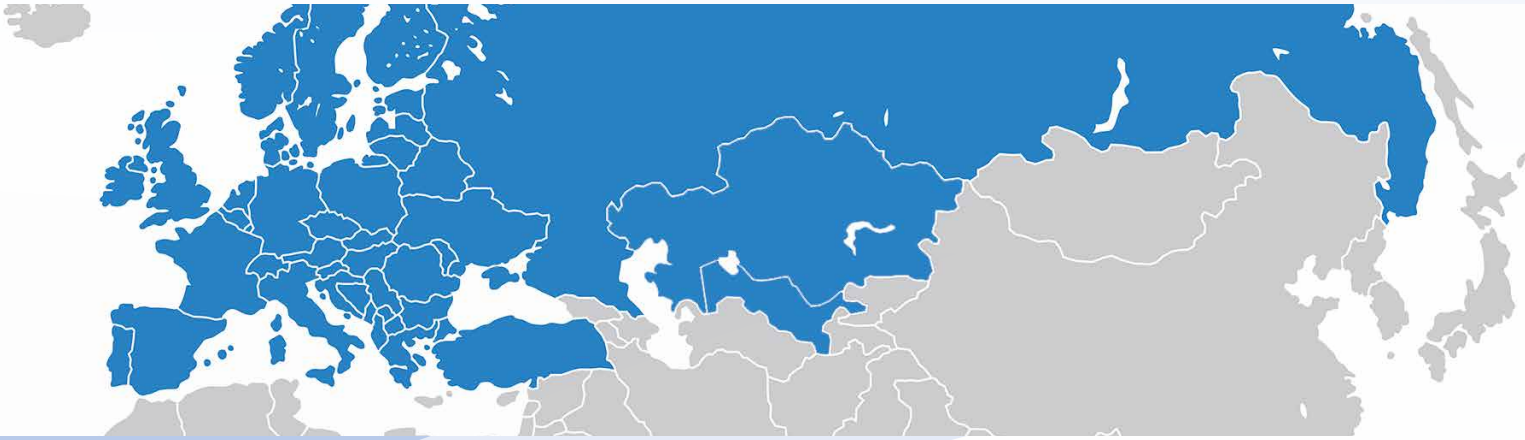

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