

# IN<sup>©</sup>turn

Interior hard and soft machining





### **PEOPLE**

Cooperate in fair partnership



### **AMBITION**

Question yesterday to provide new solutions for today and tomorrow



### **SYNERGY**

Share our strength

## Corporate philosophy

### **PEOPLE – AMBITION – SYNERGY**

These 3 components are the foundation for the success of MAS GmbH.

Trust the experts with more than 40 years of experience in cutting technologies. The specialists with the most modern equipment for the development, design and manufacture of tools. The partners who discover synergies between man and technology and who are able to harness them for your success.

The utmost objective of every project is our customers' and partners' success. Our own success goes hand in hand.

This is and will remain our guide for the future!





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IN<sup>®</sup>turn

## Benefits and Features

- Interior turning for diameters over 1.00mm

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- High changing accuracy and rigidity

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- Variable use with holder system from Ø2.00 mm to Ø6.00 mm

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- Wear-resistant CBN and carbide metal grades also for stainless steel

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- Smallest possible diameter: tailored to the component;  
even Ø0.50 mm can be implemented

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- Vibration-dampening holders with hydraulic expansion direct clamping

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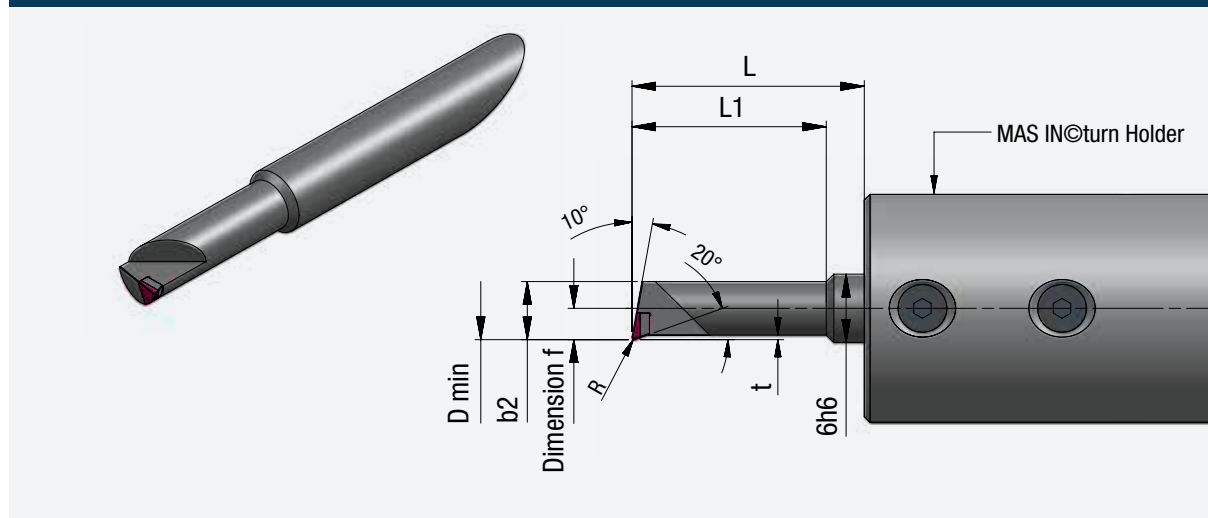
- Perfect price-performance ratio

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# IN<sup>©</sup>turn product range

## Boring bar

### CBN brazed



Order number	Cutting material	Dmin	L1	R	t	Dimension F	b2	L
IN6.020.031	CBN120	2.0	3.1	0.1	0.2	1.00	1.8	7
IN6.020.062	CBN120	2.0	6.2	0.1	0.2	1.00	1.8	14
IN6.025.038	CBN120	2.5	3.8	0.1	0.2	1.25	2.3	7
IN6.025.077	CBN120	2.5	7.7	0.1	0.2	1.25	2.3	14
IN6.030.047	CBN120	3.0	4.7	0.1	0.2	1.50	2.8	7
IN6.030.092	CBN120	3.0	9.2	0.1	0.2	1.50	2.8	14
IN6.035.054	CBN120	3.5	5.4	0.2	0.3	1.75	3.2	8
IN6.035.107	CBN120	3.5	10.7	0.2	0.3	1.75	3.2	16
IN6.040.061	CBN120	4.0	6.1	0.2	0.3	2.00	3.7	8
IN6.040.122	CBN120	4.0	12.2	0.2	0.3	2.00	3.7	16
IN6.045.068	CBN120	4.5	6.8	0.2	0.3	2.25	4.2	8
IN6.045.137	CBN120	4.5	13.7	0.2	0.3	2.25	4.2	16
IN6.050.076	CBN120	5.0	7.6	0.2	0.4	2.50	4.6	11
IN6.050.152	CBN120	5.0	15.2	0.2	0.4	2.50	4.6	20
IN6.055.083	CBN120	5.5	8.3	0.2	0.4	2.75	5.1	11
IN6.055.167	CBN120	5.5	16.7	0.2	0.4	2.75	5.1	20
IN6.060.092	CBN120	6.0	9.2	0.2	0.4	3.00	5.6	11
IN6.060.182	CBN120	6.0	18.2	0.2	0.4	3.00	5.6	20

- Cutting inserts can be produced to meet your requirements.
- Minimum ordering quantity 5 pieces - over Ø0.50mm
- Available in PKD on request

### System of order numbers

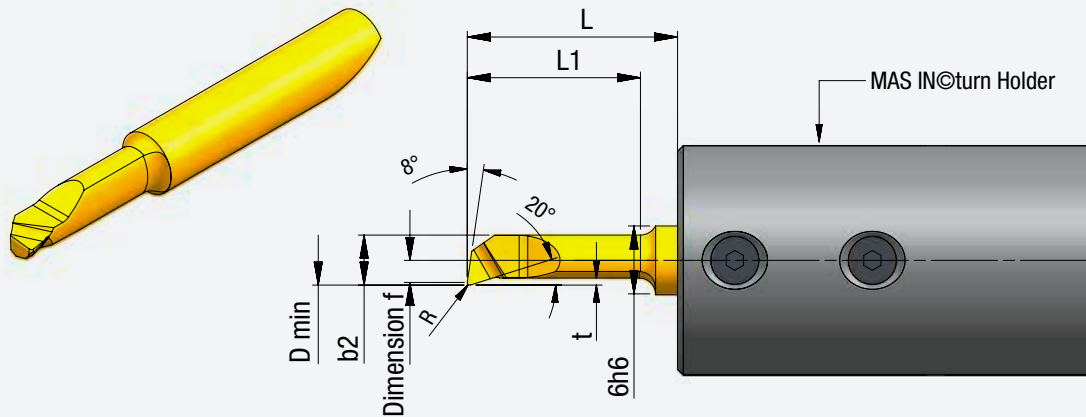
#### Ordering Example

Interface	Dmin	L1	Cutting material
IN6.	020.	031	CBN120

# IN<sup>©</sup>turn product range

## Boring bar

### Carbide metal



Order number	Cutting material	Dmin	L1	R	t	Dimension F	b2	L
IN6.010.030.003	HM120C	1.0	3.0	0.03	0.10	0.50	0.95	7.0
IN6.010.030.010	HM120C	1.0	3.0	0.10	0.10	0.50	0.95	7.0
IN6.010.050.003	HM120C	1.0	5.0	0.03	0.10	0.50	0.95	7.0
IN6.010.050.010	HM120C	1.0	5.0	0.10	0.10	0.50	0.95	7.0
IN6.015.045.003	HM120C	1.5	4.5	0.03	0.15	0.75	1.35	6.5
IN6.015.045.010	HM120C	1.5	4.5	0.10	0.15	0.75	1.35	6.5
IN6.015.075.003	HM120C	1.5	7.5	0.03	0.15	0.75	1.35	9.5
IN6.015.075.010	HM120C	1.5	7.5	0.10	0.15	0.75	1.35	9.5
IN6.020.060.010	HM120C	2.0	6.0	0.10	0.20	1.00	1.75	8.0
IN6.020.100.003	HM120C	2.0	10.0	0.03	0.20	1.00	1.75	12.0
IN6.020.100.010	HM120C	2.0	10.0	0.10	0.20	1.00	1.75	12.0
IN6.025.075.010	HM120C	2.5	7.5	0.10	0.20	1.25	2.25	9.5
IN6.025.125.010	HM120C	2.5	12.5	0.10	0.20	1.25	2.25	14.5
IN6.025.175.010	HM120C	2.5	17.5	0.10	0.20	1.25	2.25	19.5
IN6.030.090.015	HM120C	3.0	9.0	0.15	0.20	1.50	2.75	11.0
IN6.030.150.015	HM120C	3.0	15.0	0.15	0.20	1.50	2.75	17.0
IN6.030.210.015	HM120C	3.0	21.0	0.15	0.20	1.50	2.75	23.0
IN6.035.105.015	HM120C	3.5	10.5	0.15	0.20	1.75	3.25	12.5
IN6.035.175.015	HM120C	3.5	17.5	0.15	0.20	1.75	3.25	19.5
IN6.035.245.015	HM120C	3.5	24.5	0.15	0.20	1.75	3.25	26.5

Order number	Cutting material	Dmin	L1	R	t	Dimension F	b2	L
IN6.040.120.015	HM120C	4.0	12.0	0.15	0.30	2.00	3.75	14.0
IN6.040.200.015	HM120C	4.0	20.0	0.15	0.30	2.00	3.75	22.0
IN6.040.280.015	HM120C	4.0	28.0	0.15	0.30	2.00	3.75	30.0
IN6.045.135.015	HM120C	4.5	13.5	0.15	0.30	2.25	4.25	15.5
IN6.045.225.015	HM120C	4.5	22.5	0.15	0.30	2.25	4.25	24.5
IN6.045.315.015	HM120C	4.5	31.5	0.15	0.30	2.25	4.25	33.5
IN6.050.150.020	HM120C	5.0	15.0	0.20	0.50	2.50	4.75	17.0
IN6.050.250.020	HM120C	5.0	25.0	0.20	0.50	2.50	4.75	27.0
IN6.050.350.020	HM120C	5.0	35.0	0.20	0.50	2.50	4.75	37.0
IN6.055.165.020	HM120C	5.5	16.5	0.20	0.50	2.75	5.25	18.5
IN6.055.275.020	HM120C	5.5	27.5	0.20	0.50	2.75	5.25	29.5
IN6.055.385.020	HM120C	5.5	38.5	0.20	0.50	2.75	5.25	40.5

- Cutting inserts can be produced to meet your requirements.
- Minimum ordering quantity 5 pieces - over Ø0.50mm

## System of order numbers

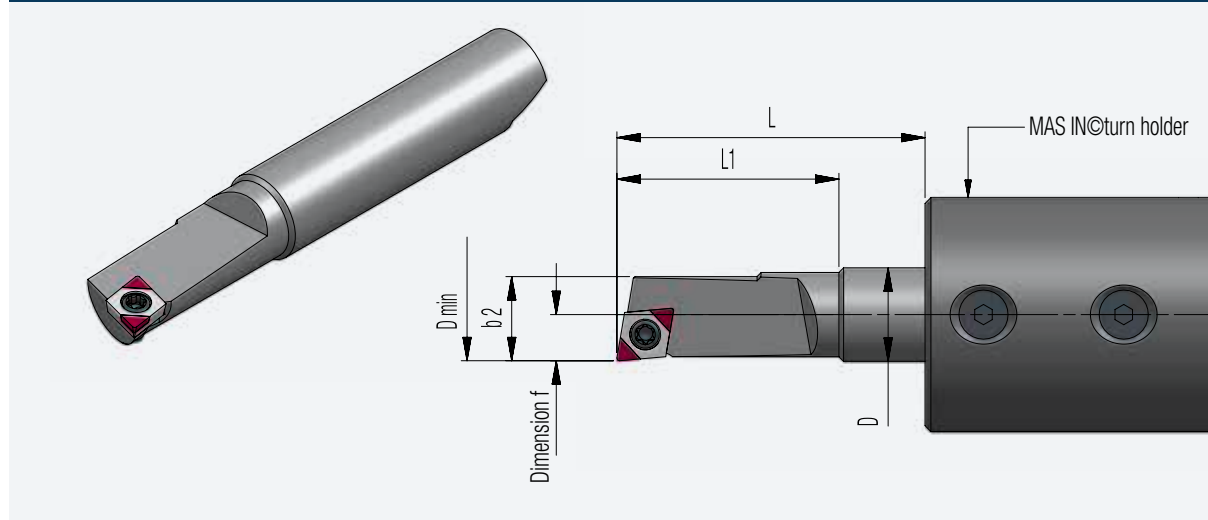
### Ordering Example

Interface	Dmin	L1	Radius	Cutting material
IN6.	010.	030	003	HM120C

# IN<sup>©</sup>turn product range

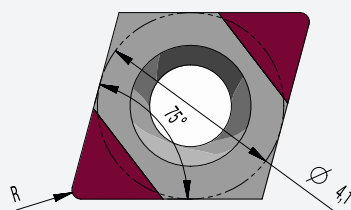
## Boring bar

### With indexable insert CBN



Order number	Dmin	L1	Dimension F	b2	L	Indexable insert screw	Tightening torque
IN6.060.092-SEXBR04	6.0	9.2	3.0	5.5	11	WPS016030-06TX	0.2 Nm
IN6.060.182-SEXBR04	6.0	18.2	3.0	5.5	20	WPS016030-06TX	0.2 Nm
IN8.070.107-SEXBR04	7.0	10.7	3.5	6.4	12	BFTX016033	0.2 Nm
IN8.070.212-SEXBR04	7.0	21.2	3.5	6.4	23	BFTX016033	0.2 Nm
IN8.080.122-SEXBR04	8.0	12.2	4.0	7.2	14	BFTX016033	0.2 Nm
IN8.080.242-SEXBR04	8.0	24.2	4.0	7.2	26	BFTX016033	0.2 Nm

### Indexable inserts



Order number	Radius
EBGW040101CBN120	0.1
EBGW040102CBN120	0.2
EBGW040104CBN120	0.4

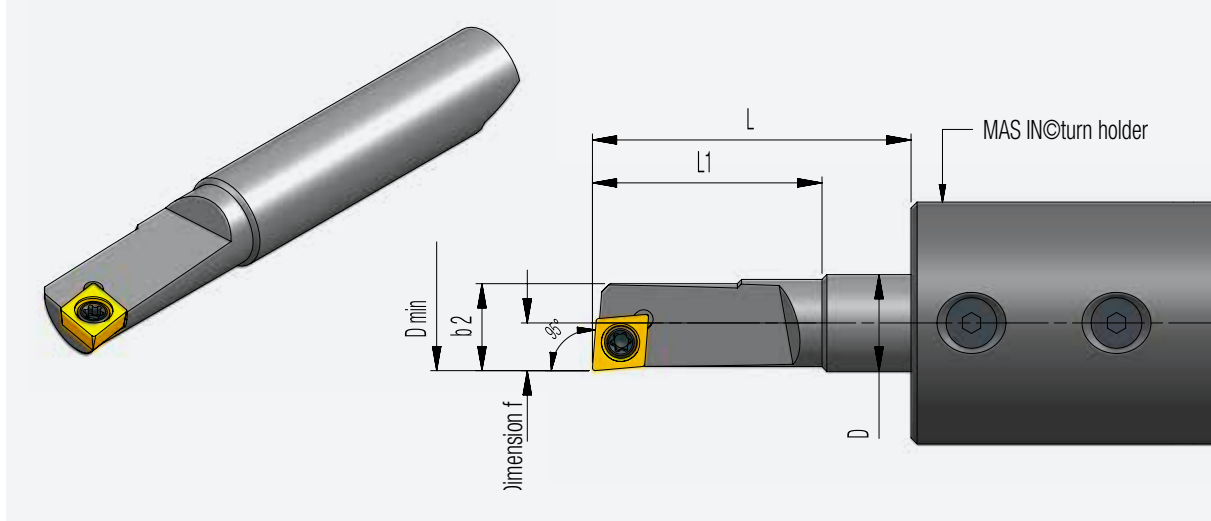
- Indexable inserts can be produced to meet your requirements.
- Minimum ordering quantity 5 pieces
- Available in PKD on request



# IN<sup>©</sup>turn product range

## Boring bar

With indexable insert carbide metal



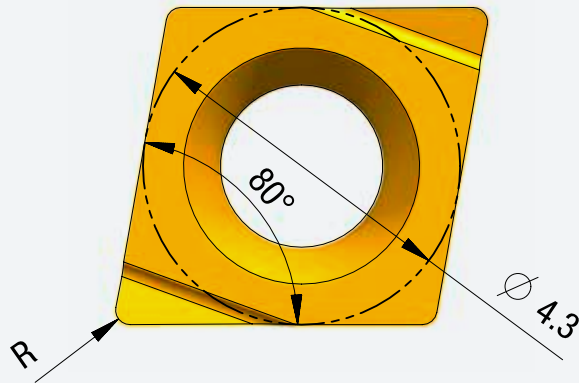
Order number	Dmin	L1	Dimension F	b2	L	Indexable insert screw	Tightening torque
IN6.060.092-SCLCR04	6.0	9.2	3.0	5.5	11	WPS016030-06TX	0.2Nm
IN6.060.182-SCLCR04	6.0	18.2	3.0	5.5	20	WPS016030-06TX	0.2Nm
IN6.060.302-SCLCR04	6.0	30.2	3.0	5.5	32	WPS016030-06TX	0.2Nm
IN8.070.107-SCLCR04	7.0	10.7	3.5	6.4	12	BFTX016033	0.2Nm
IN8.070.212-SCLCR04	7.0	21.2	3.5	6.4	23	BFTX016033	0.2Nm
IN8.070.352-SCLCR04	7.0	35.2	3.5	6.4	37	BFTX016033	0.2Nm
IN8.080.122-SCLCR04	8.0	12.2	4.0	7.2	14	BFTX016033	0.2Nm
IN8.080.242-SCLCR04	8.0	24.2	4.0	7.2	26	BFTX016033	0.2Nm
IN8.080.402-SCLCR04	8.0	40.2	4.0	7.2	42	BFTX016033	0.2Nm

- Boring bars can be produced to meet your requirements.
- Minimum ordering quantity 2 pieces

# IN<sup>®</sup>turn product range

## Indexable insert

With indexable inserts



Order number	Chip groove	Cutting material	R
CCET04X101	L-FY	ACZ150	0.1
CCET04X102	L-FY	ACZ150	0.2
CCET04X104	L-FY	ACZ150	0.4
CCET04X101	R-FY	ACZ150	0.1
CCET04X102	R-FY	ACZ150	0.2
CCET04X104	R-FY	ACZ150	0.4

- Indexable inserts can be produced to meet your requirements.
- Minimum ordering quantity 10 pieces

## System of order numbers

### Ordering Example

Order number	Orientation chip groove		Workmanship chip groove	Cutting material
	L = left	R = right		
<b>CCET04X101</b>	<b>L -</b>		<b>FY</b>	<b>ACZ150</b>

# NOTES

A large rectangular area filled with a grid of small, light gray dotted lines, intended for writing notes. The grid consists of approximately 25 columns and 40 rows of dots.

# IN<sup>©</sup>turn product range

## Recommended cutting data

CBN 120				
IN <sup>©</sup> turn product range	D mm	Vc m/min	f mm/U	ap mm
IN6.020.031 IN6.020.062	2.0	50-150	0.005-0.02	0.01 - 0.05
IN6.025.038 IN6.025.077	2.5	50-150	0.005-0.02	0.01 - 0.05
IN6.030.047 IN6.030.092	3.0	50-150	0.005-0.02	0.01 - 0.05
IN6.035.054 IN6.035.107	3.5	50-150	0.005-0.04	0.01 - 0.10
IN6.040.061 IN6.040.122	4.0	50-150	0.005-0.04	0.01 - 0.10
IN6.045.068 IN6.045.137	4.5	50-150	0.005-0.04	0.01 - 0.10
IN6.050.076 IN6.050.152	5.0	50-150	0.005-0.07	0.01 - 0.10
IN6.055.083 IN6.055.167	5.5	50-150	0.005-0.07	0.01 - 0.10
IN6.060.092 IN6.060.182	6.0	50-150	0.005-0.07	0.01 - 0.10
EBGW040101CBN120		50-150	0.005-0.07	0.01 - 0.10
EBGW040102CBN120		50-150	0.005-0.07	0.01 - 0.10
EBGW040104CBN120		50-150	0.005-0.07	0.01 - 0.10

- Multi-grade fine grain CBN grade
- Machining of smooth and interrupted cuts
- Even in hardened stainless material

**Recommended cutting data**

HM120C and ACZ150				
In <sup>©</sup> turn-Programm	D mm	Vc m/min	f mm/U	ap mm
IN6.010.030 IN6.010.050	1.0	30-120	0.005-0.02	0.01 - 0.08
IN6.015.045 IN6.015.075	1.5	30-120	0.005-0.02	0.01 - 0.08
IN6.020.060 IN6.020.100	2.0	30-120	0.005-0.02	0.01 - 0.08
IN6.025.075 IN6.025.125 IN6.025.175	2.5	30-120	0.005-0.03	0.01 - 0.10
IN6.030.090 IN6.030.150 IN6.030.210	3.0	30-120	0.005-0.03	0.01 - 0.10
IN6.035.105 IN6.035.175 IN6.035.245	3.5	30-120	0.005-0.05	0.01 - 0.15
IN6.040.120 IN6.040.200 IN6.040.280	4.0	30-120	0.005-0.05	0.01 - 0.15
IN6.045.135 IN6.045.225 IN6.045.315	4.5	30-120	0.005-0.05	0.01 - 0.15
IN6.050.150 IN6.050.250 IN6.050.350	5.0	30-120	0.005-0.07	0.01 - 0.25
IN6.055.165 IN6.055.275 IN6.055.385	5.5	30-120	0.005-0.07	0.01 - 0.25
CCET04X101LFYACZ150 CCET04X101RFYACZ150		30-120	0.01-0.10	0.01 - 0.35
CCET04X102LFYACZ150 CCET04X102RFYACZ150		30-120	0.01-0.10	0.01 - 0.35
CCET04X104LFYACZ150 CCET04X104RFYACZ150		30-120	0.01-0.10	0.01 - 0.35

- Ultra fine grain carbide metal grade
- Machining of smooth and interrupted cuts
- Even in stainless material

# Rectangular shank holder

IN6

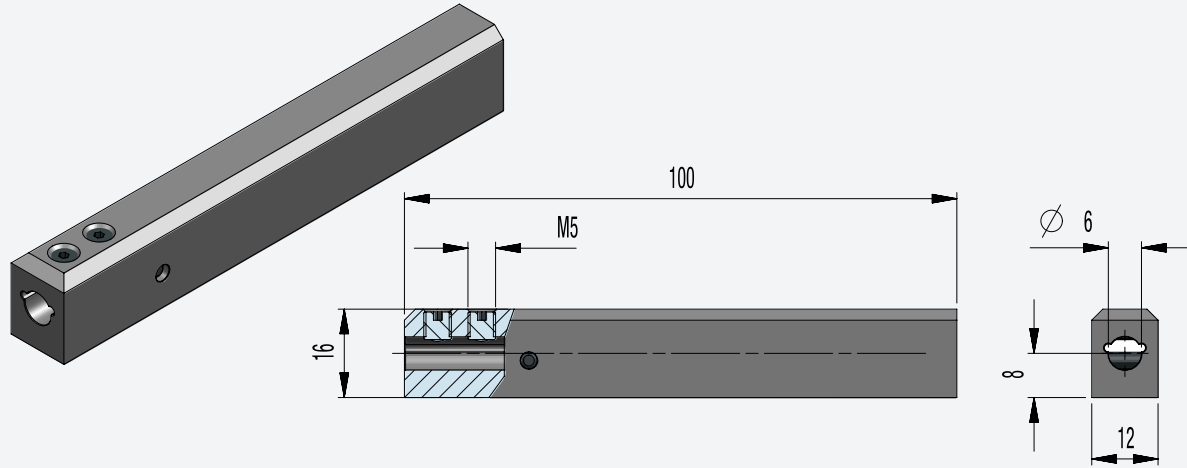


Fig.: 1612-IN6

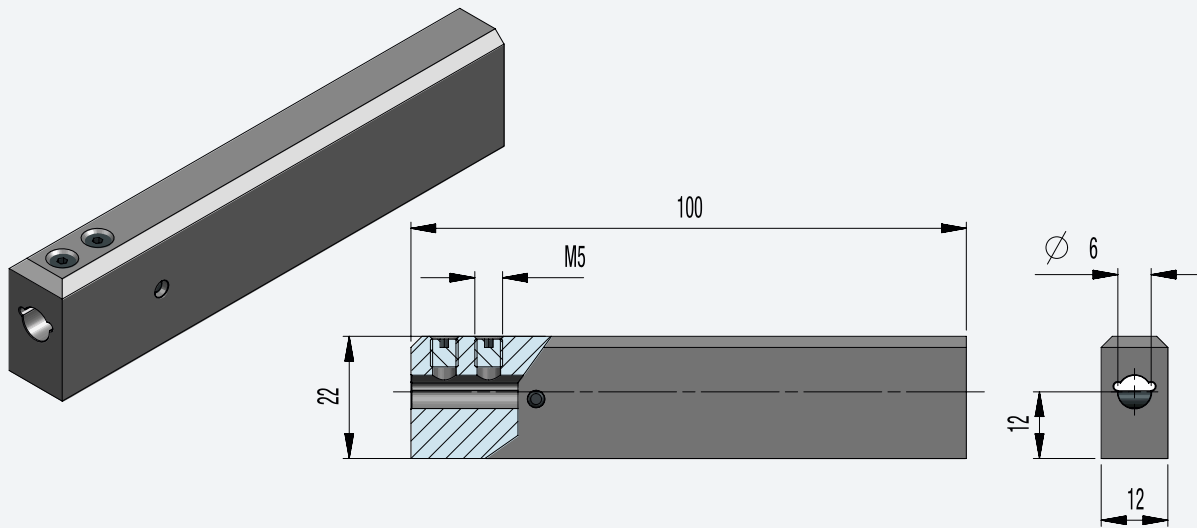


Fig.: 2212-IN6

Order number	Clamping screw
1612-IN6	M050.005-S633
2212-IN6	M050.005-S633

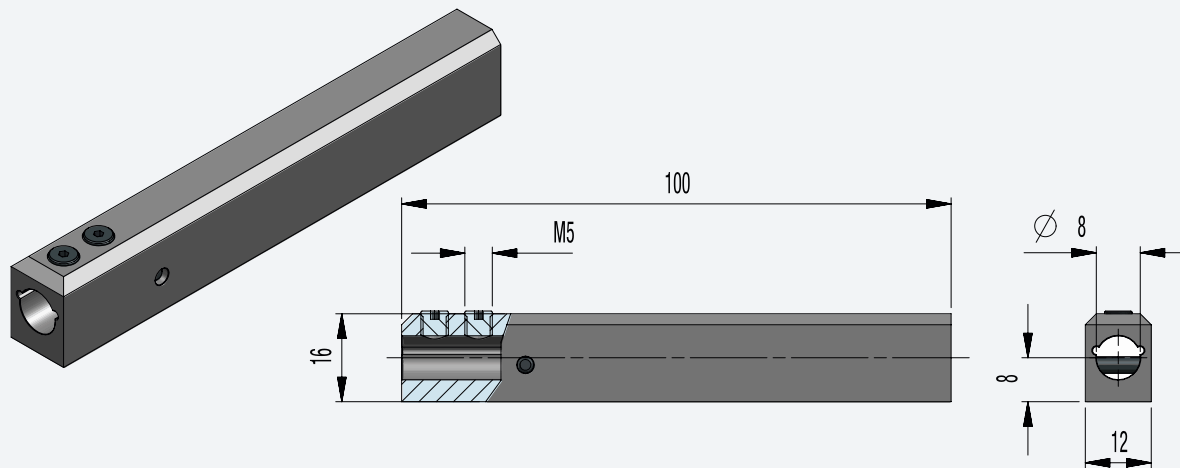


Fig.: 1612-IN8

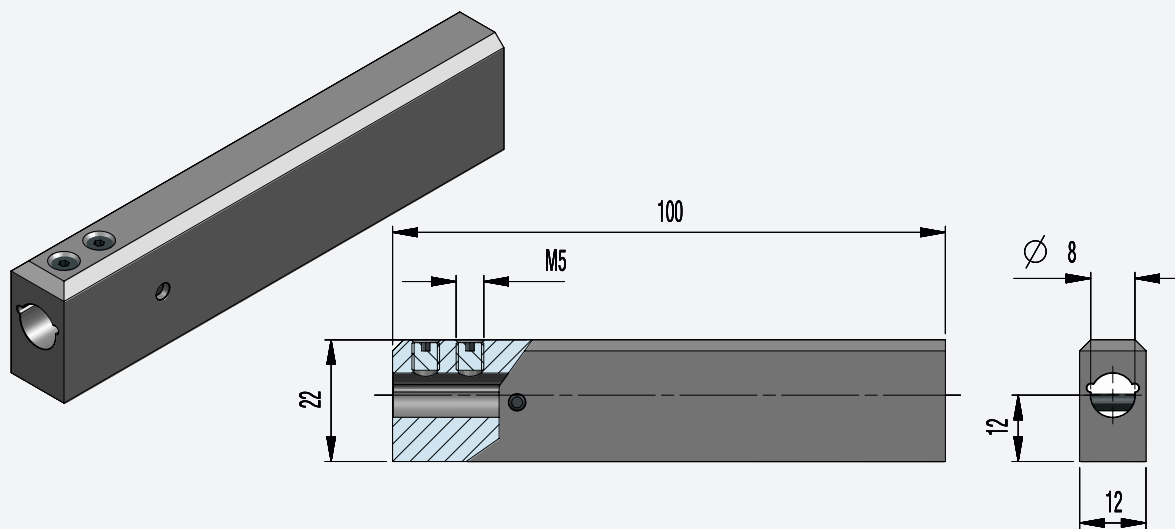


Fig.: 2212-IN8

Order number	Clamping screw
1612-IN8	M050.005-S633
2212-IN8	M050.005-S633

# Holders

## Round shank holder with clamping surface

IN6

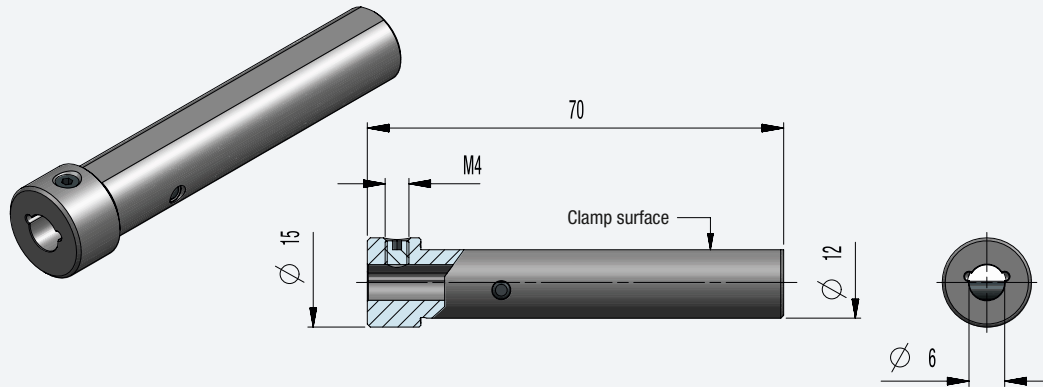


Fig.: RDF12-IN6

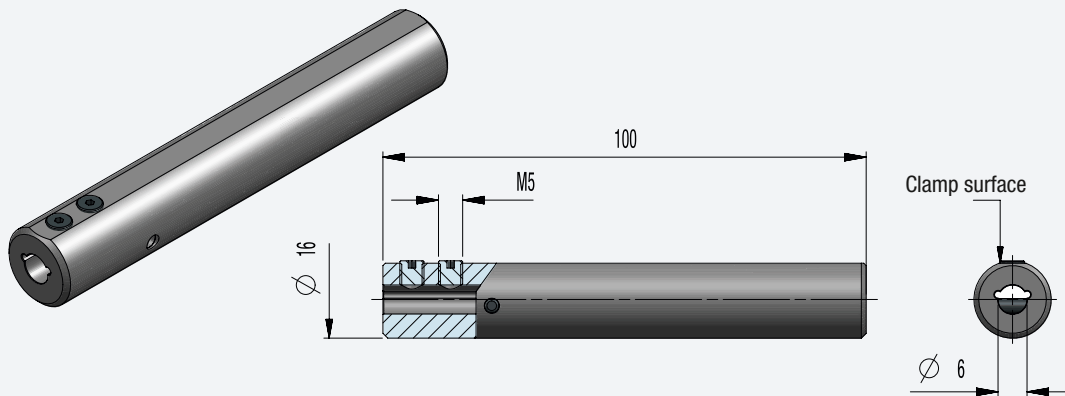


Fig.: RDF16-IN6

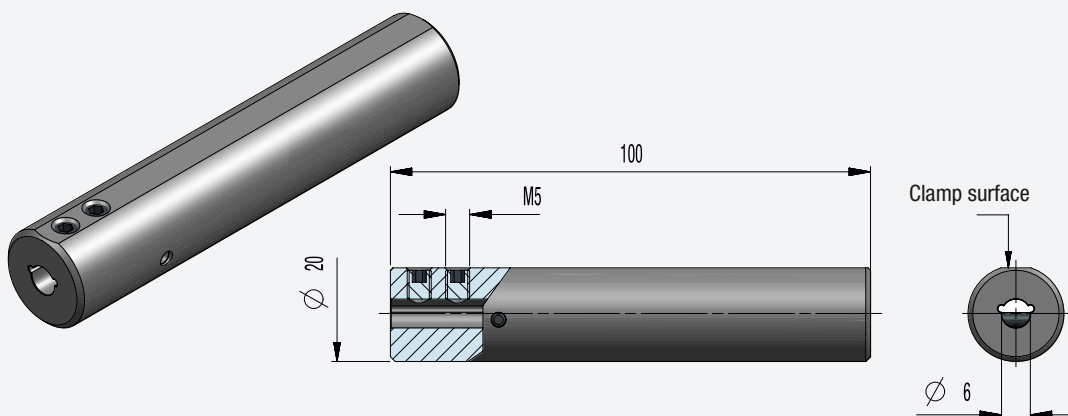


Fig.: RDF20-IN6

Order number	Clamping screw
RDF12-IN6	M040.004-S34
RDF16-IN6	M050.005-S633
RDF20-IN6	M050.005-S633



# IN8

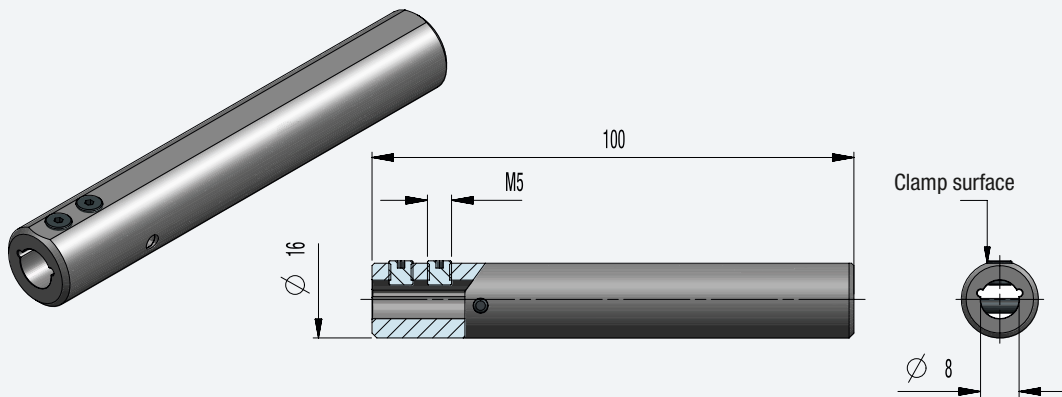


Fig.: RDF16-IN8

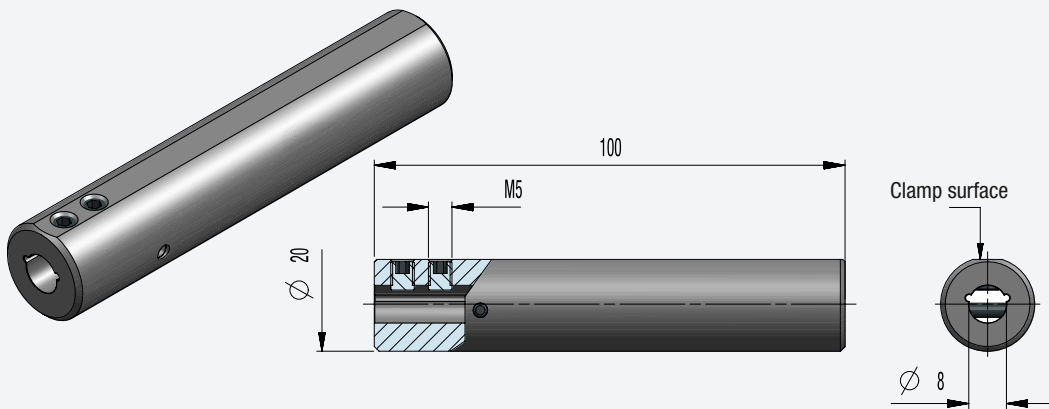


Fig.: RDF20-IN8

Order number	Clamping screw
RDF16-IN8	M050.005-S633
RDF20-IN8	M050.005-S633

# MEX<sup>®</sup>turn round shank holder

IN6

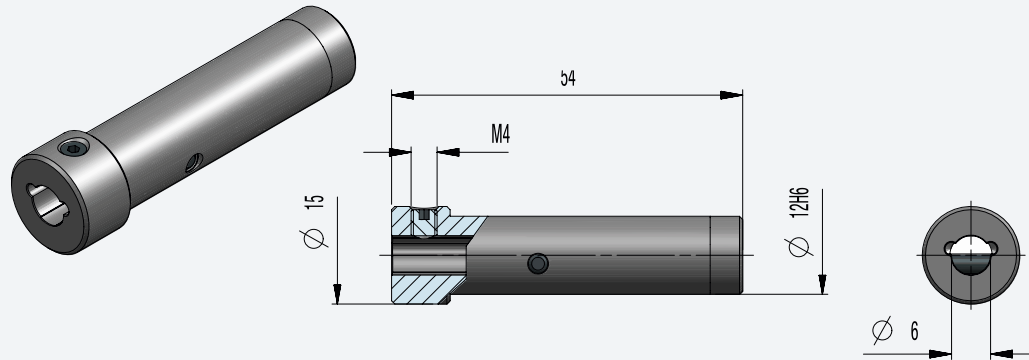


Fig.: MEX12-IN6

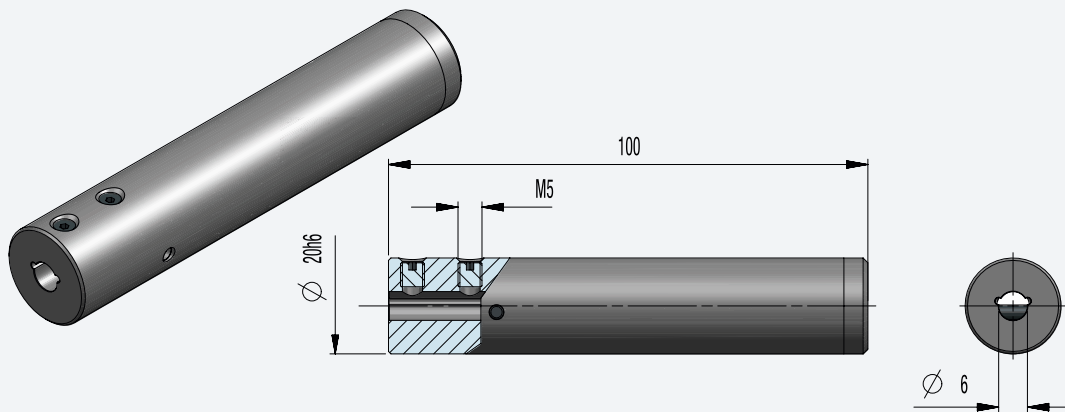


Fig.: MEX20-IN6

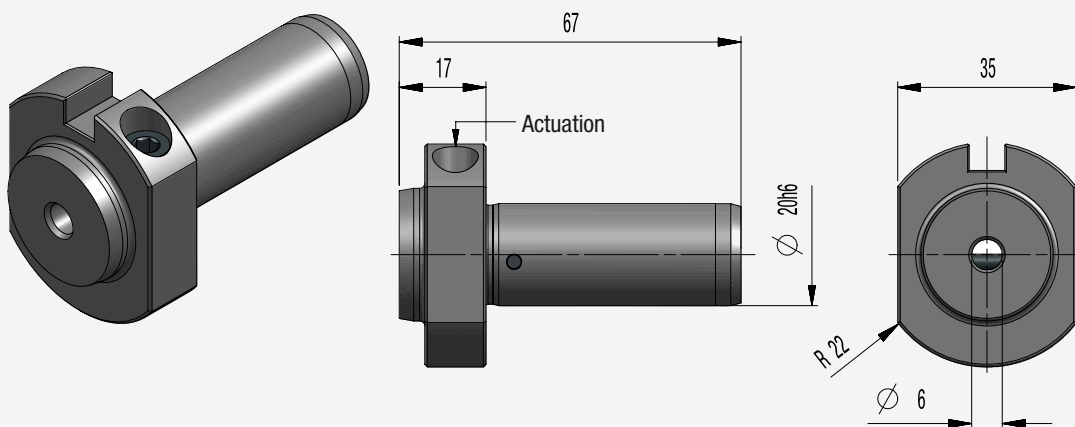


Fig.: MEX20-IN6-HD-E949

Order number	Clamping screw
MEX12-IN6	M040.004-S34
MEX20-IN6	M050.005-S633
MEX20-IN6-HD-E949	—

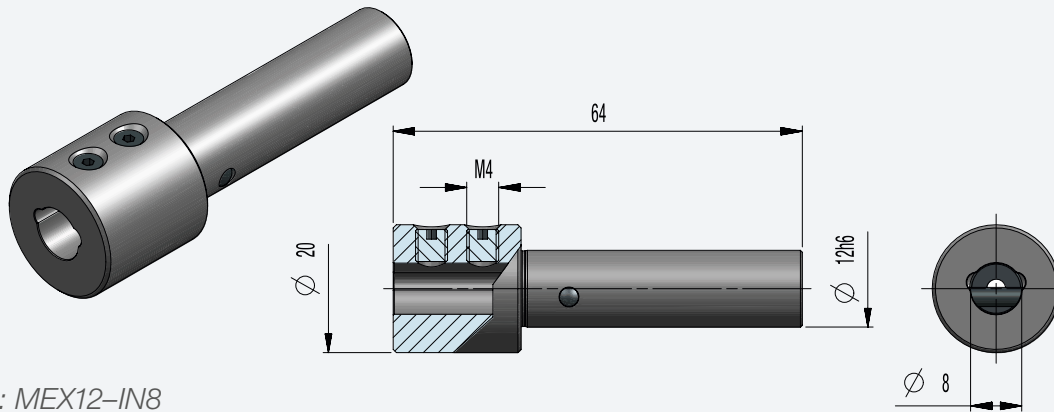


Fig.: MEX12-IN8

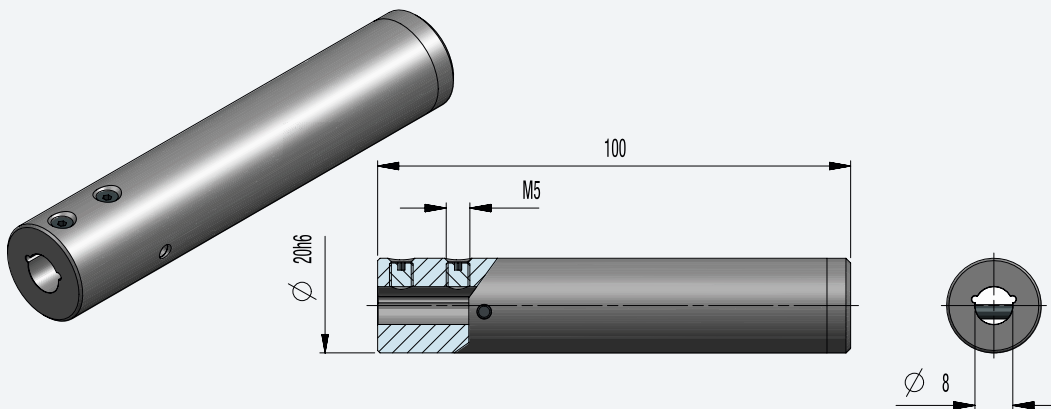


Fig.: MEX20-IN8

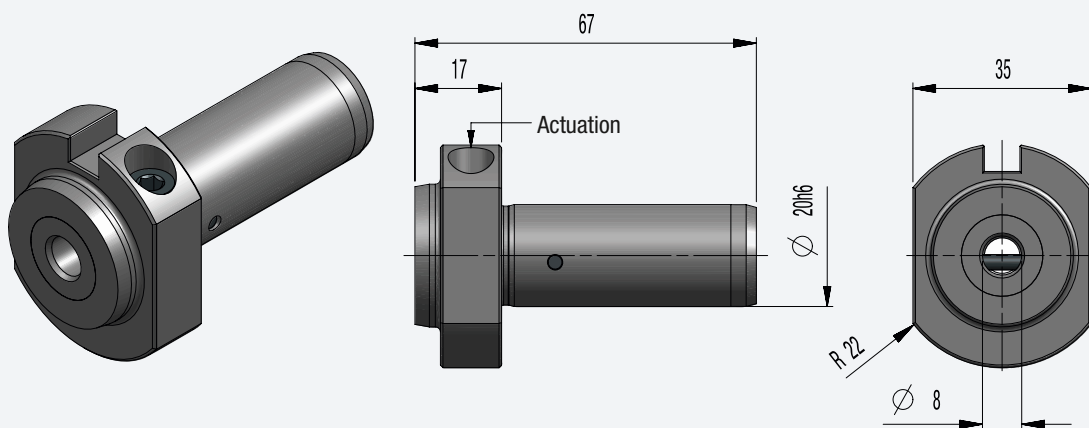


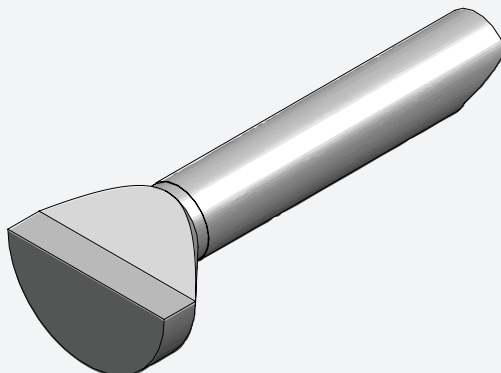
Fig.: MEX20-IN8-HD-E4315

Order number	Clamping screw
MEX12-IN8	M040.005-S624
MEX20-IN8	M050.005-S633
MEX20-IN8-HD-E4315	—

## Setting gauges

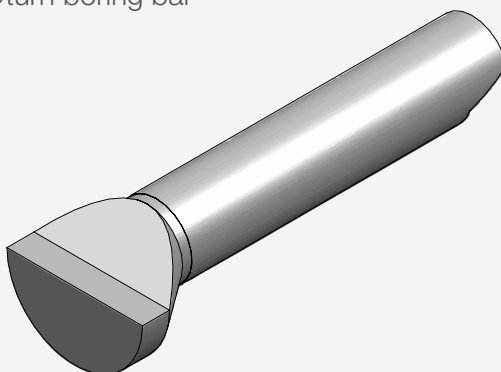
for MEX IN<sup>®</sup>turn boring bar holders

- For alignment of IN<sup>®</sup>turn boring bar



*Fig.: IN6 gauge*

- For alignment of IN<sup>®</sup>turn boring bar



*Fig.: IN8 gauge*

Order number
IN6 gauge
IN8 gauge

# Accessories and special solutions

## VDI hydraulic expansion chucks

### IN6 and IN8

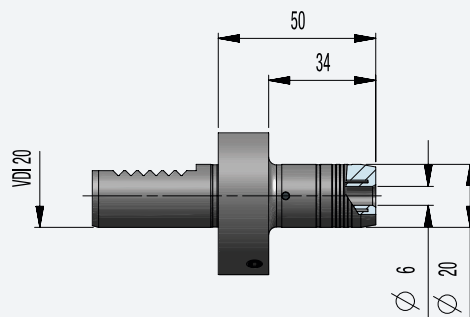
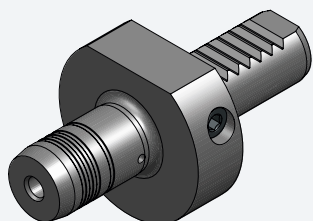


Fig.: VDI20-IN6X50-HD

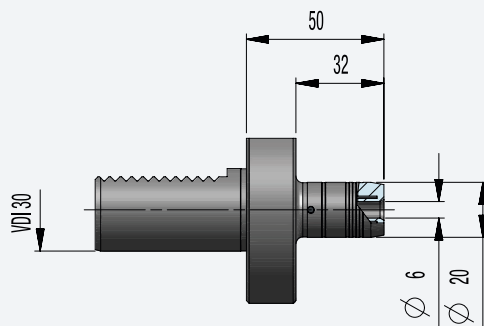
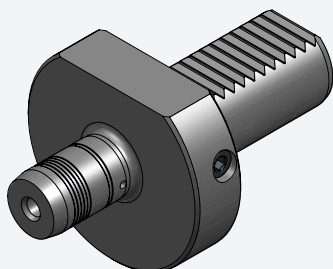


Fig.: VDI30-IN6X50-HD

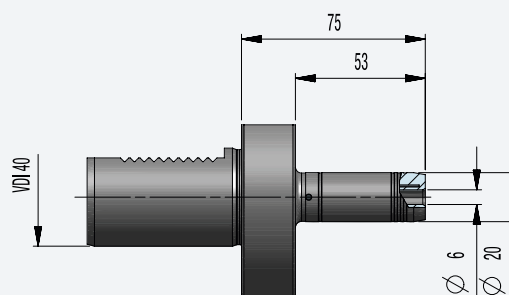
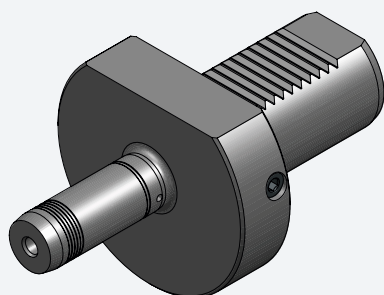


Fig.: VDI40-IN6X75-HD

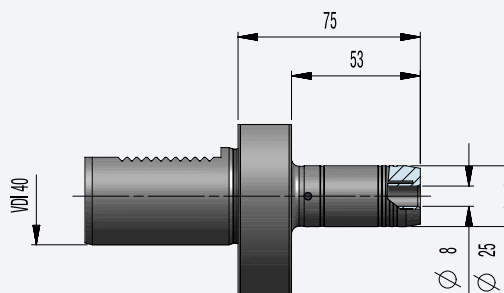
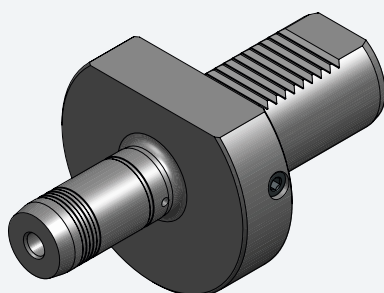


Fig.: VDI40-IN8X75-HD

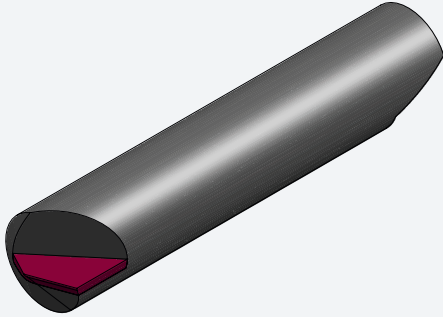
#### Order number

- VDI20-IN6X50-HD
- VDI30-IN6X50-HD
- VDI40-IN6X75-HD
- VDI40-IN8X75-HD

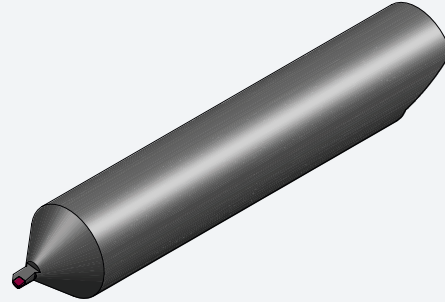
# Accessories and special solutions

## IN<sup>®</sup>turn special solutions

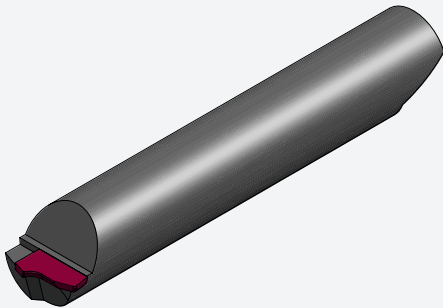
### Examples



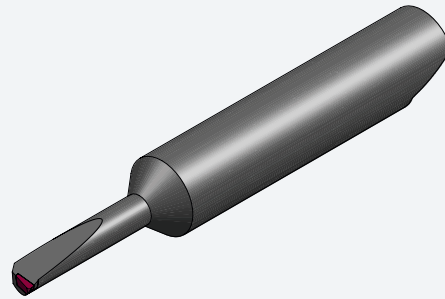
*Taper cutter 140°*



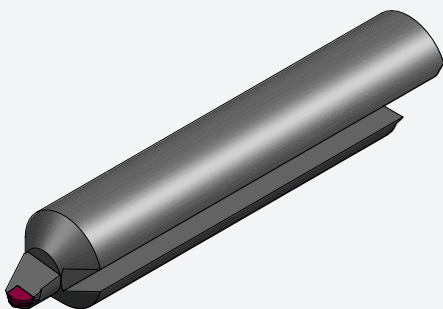
*Milling out tool Ø 0.86mm*



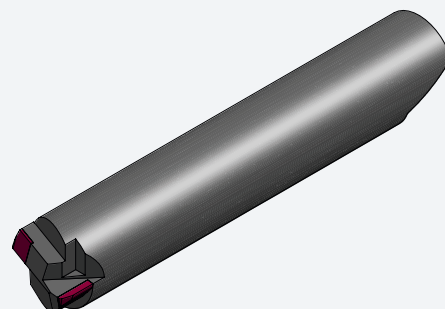
*Axial form-cutting tool*



*Milling-out tool 4xD*



*Taper turning tool R0.8*



*Burr-free grooving tool*

- Many other special solutions are possible!
- Available also in carbide metal and PKD on request

# FOCUS ON TOOLS

## Internal Hard Part Turning with a Systematic Approach

### Internal CBN turning tools and matching clamping shanks

Our extensive INturn tool system is specially designed for the hard turning of small and ultra-small internal diameters using CBN cutting inserts. These tools are ideally used in the machining of high-grade injection nozzles for common rail technology. A choice of rectangular clamping shanks with dimensions of 16 x 12 mm or 22 x 12 mm or round clamping shanks with diameters of 12 or 20 mm are used to secure the boring rods with a standardized shank diameter of 6 mm. For maximum stability and precision when reliably machining using CBN cutting implements, the clamping shanks are made of cold-formed steel hardened to 54+3 HRC. Repetition following tool changes is possible with 0.05 mm precision in the Z-axis, 0.04 mm precision in the X-axis and 0.03 mm in center height.

The optimized form of the boring rod holders in the clamping shanks contributes to the high level of precision. Suitable clamping shanks with diameters of 12 mm and 20 mm are specifically available for our MEXturn hydraulic clamping system ([www.mexturn.de](http://www.mexturn.de)). A variety of special-purpose clamping shanks, for instance for HSK and Capto holders, is also optionally available, making the INturn internal turning tools suitable for hard part turning on any standard turning machine with linear stages and turret lathes. The standard range includes boring rods with a boring diameter of 2 mm to 6 mm. Customized internal turning tools with turning diameters from 0.65 mm and special holders are optionally available.



The INturn range offers internal turning tools with CBN cutting implements for turning diameters from 0.65 mm.



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Cooperate in fair partnership



**AMBITION**

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**SYNERGY**

Share our strength

# IN<sup>©</sup>turn



**MAS GmbH**

Schmigalla Straße 1 · 71229 Leonberg

Tel. +49 7152-6065-0  
Fax +49 7152-6065-65

zentrale@mas-tools.de  
www.mas-tools.de

