


Drawing Tools & Drawing Nibs



CERATIZIT is a high-tech engineering group specialised in tooling and hard material technologies.

Tooling the Future

www.ceratizit.com



Sarah-Jane Breitenreiter,
Customer Service Centre

**Together towards
profitable growth:
we can give you the
decisive competitive
advantage.**

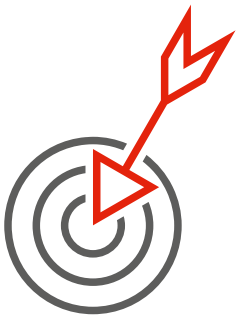
Perfectly customised and standard carbide solutions

Whether it is the production of tubes, bars or wires, they have one essential factor in common: the carbide grade for the drawing tool must offer the **optimal balance of hardness and fracture toughness**. Hard Material Solutions by CERATIZIT in Italy produces drawing tools that **guarantee drawn products with a high-quality surface finishing and close tolerances**. We are ready to support our customers throughout the whole process, beginning with the design of the tool and all the way up to the manufacturing in accordance with the highest quality standards.

CERATIZIT provides **tools and nibs for all drawing processes**. At the E-Techstore our ISO drawing nibs can be ordered with immediate

effect: 24 hours a day, 7 days a week. Individual tools and drawing nibs are manufactured either **on the basis of the customer's drawings or else based on drawings from Hard Material Solutions by CERATIZIT**. There are, however, differences between the specific fields of application. For wire drawing applications, Hard Material Solutions by CERATIZIT only supplies sintered nibs whereas ready-to-use tools can be supplied for the drawing of bars and tubes. Our engineers at CERATIZIT are looking forward to receiving your requests via e-mail (engineering.alserio@ceratizit.com) and will gladly put together a feasibility study and recommendation for you.





Advantages & benefits

Advantages

Carbide grades with an optimal ratio of hardness and fracture toughness

High surface quality thanks to modern grinding technology

Close tolerances for blanks

CERATIZIT as one supplier from raw material to the finished product

ISO nibs can be ordered from the E-Techstore

Benefits

Only minimal wear and long service life – less changing and less costs – higher productivity

Wires, tubes, and bars can be drawn at higher speeds, enabling short machining times and, therefore, higher production capacity

Minimal time to finish the tools

High and consistent quality of the tool

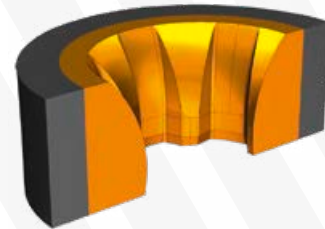
Order 24/7 with availability check and detailed up-to-date technical information, including quick and reliable delivery

Overview product portfolio



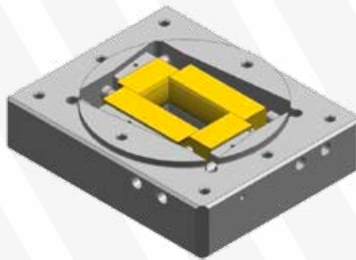
Sintered carbide nibs for wire diameters
from 0.10 mm to 10.00 mm

06-07



Standard drawing dies
Round and profiled

08-09



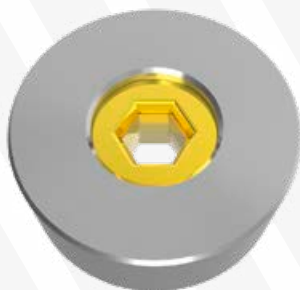
Adjustable dies for flat profiles
Insert type
Saddle types
Adjustment in both directions
Adjustment in one direction
Inserts, shoulders and saddles are available
as spare parts and can be ordered in solid
carbide or braze execution

10-11



Drawing mandrels for tubes
Screw mounted mandrels
Braze mandrels
Floating mandrels (solid carbide)

12-13



"Serie Oro", adjustable
(Italian Patent)

14-16



"MasterDie", exchangeable
(European Patent)

17-19

Drawing nibs

Hard Material Solutions by CERATIZIT produces sintered carbide nibs for wire drawing in large quantities and with consistent high quality. Customised nibs can be produced on demand, while our ISO nibs can be ordered from the E-Techstore.

Drawing nibs

Advantages

Benefits

High-quality carbide	→	Long tool life and consistent performance
Extremely precise geometry of the sintered nibs	→	Rapid die finishing and high die performance
Drawing cone and exit cone are made co-axial	→	Especially beneficial for maintaining dimensions and precision in smaller diameters
ISO nibs can be ordered from the E-Techstore	→	Order 24/7 with availability check and detailed up-to-date technical information, including quick and reliable delivery

Designation for drawing nibs

ISO - 20 x 17 / 4,00

ISO nib

$\varnothing D_2$
nib diameter

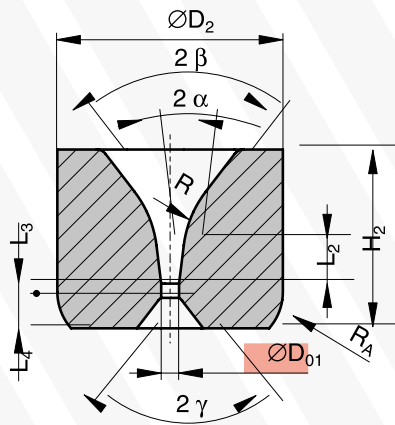
H_2
nib height

$\varnothing D_{01}$
hole as sintered 0.1 - 20.5 mm
(corresponds to nominal diameter
with negative tolerance)

Dimensions – ISO wire drawing nib blanks

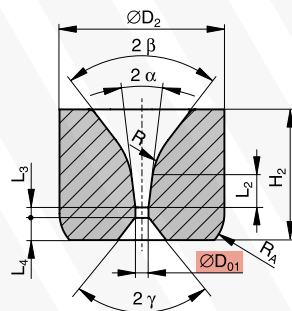
The dimensions of our Hard Material Solutions by CERATIZIT nibs for wire drawing are based on the current ISO recommendation. All of our

nibs are delivered with a variety of conveniently graded hole dimensions with the most frequently used drawing angle (2α) for each size.



Dimensions – ISO nibs

- 2α drawing angle
- 2β entrance angle
- 2μ exit angle
- R entrance radius
- R_A RA outer edge radius
- KON cone angle / 2
- F cylinder length



Programme – ISO drawing nib blanks

Availability in stock starting from hole diameters \varnothing 0.3 mm - 6.00 mm

ISO 10 x 8
ISO 16 x 13
ISO 20 x 17

Production upon customer order

ISO 25 x 20
ISO 30 x 24



Available from
the **E-Techstore**

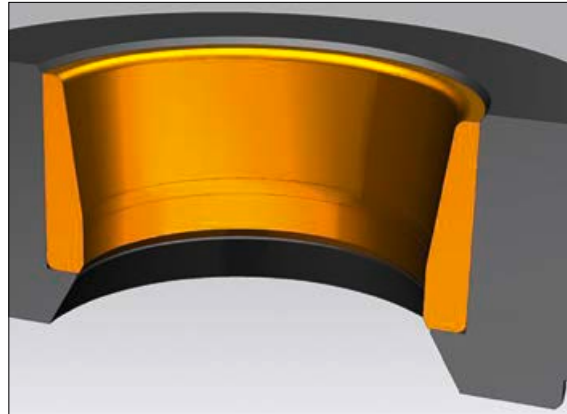
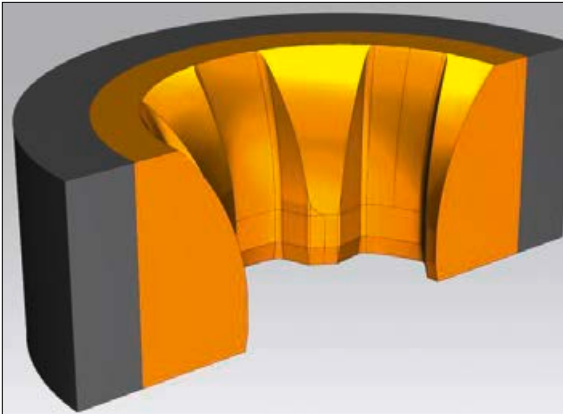
Standard drawing dies: round and profiled

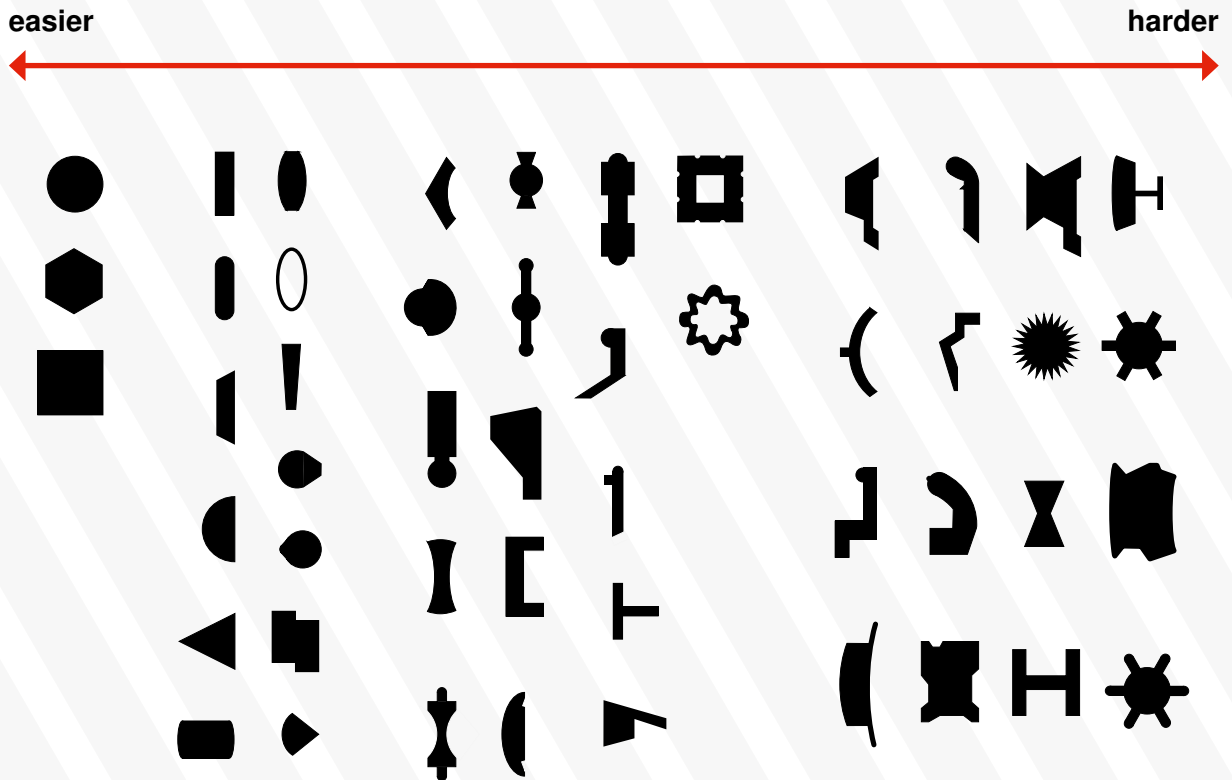
Hard Material Solutions by CERATIZIT is able to produce customised parts based on the customer's drawings and specifications within a short period of time. If neither customer drawings nor specifications are available, Hard Material Solutions by CERATIZIT can recommend, design, and manufacture the most suitable tool based on minimal, essential input from the customer.

Tools for profile drawing of all metals represent an absolute specialty of the production site in Italy. The range of metals that can be worked includes tool steel for machine tools, copper for special cables, brass for industrial and decorative applications and precious metals.

When it comes to producing profiles and preformed blanks, in-house carbide production plays an important role.

Electro erosion has also brought about significant improvements to the field of drawing tools. Today, it is even possible to produce parts in solid carbide that, as of just a couple of years ago, would have caused severe manufacturing problems. However, experience in the field of erosion and state-of-the-art facilities are necessary in the preparation of parts for the subsequent hand polishing procedure which requires know-how and precision.





An example of already tested profiles drawn with tools from the portfolio of Hard Material Solutions by CERATIZIT. Profiles are listed with increasing difficulty from left to right.

Ceratizit tools' design:

- ▲ **SPE profile** – suitable for the drawing of bars and high section reduction: we have dedicated SPE profiles for the drawing of different materials (steel, stainless steel, copper alloys etc).
- ▲ **ABU profile:** this modified SPE profile is suitable for tough ferrous metals such as medium and high carbon steel.
- ▲ **Dies for pipes:** Hard Material Solutions by CERATIZIT designs tailor-made tools based on the dimensions of the incoming drawn tubes.

Adjustable dies for flat profiles

Insert type (2 sides adjustable)

This is a drawing die (adjustable from both sides) which enables the manufacturing of all intermediate dimensions between the tool's

minimum and maximum dimensions ($l \times b$). This high-precision tool can be adjusted with wedges and screws.

Advantages

All dimensions between the tool's minimum and maximum can be drawn by simply adjusting the inserts (2+2 inserts)



Improved flexibility and cost savings

In the case of breakage there is no need to replace the whole carbide insert, but only the damaged segment



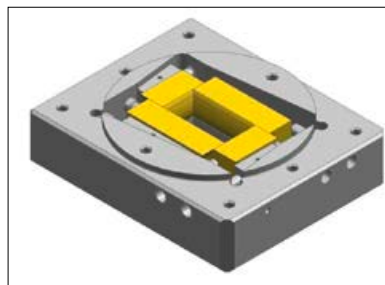
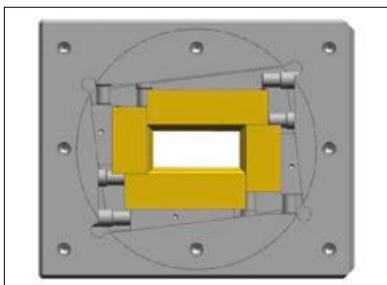
Cost savings

Hard Material Solutions by CERATIZIT can produce spare parts (inserts) and rework worn parts



Cost savings

Benefits



Dimensions

Profile dimensions				Case dimensions		
l_{max}	b_{max}	l_{min}	b_{min}	L	B	H
20	20	2	2	220	220	100
40	40	10	10	270	270	110
60	60	20	20	320	320	120
80	80	40	40	370	370	138
40	20	10	2	270	250	100
60	40	20	10	300	280	110
80	40	40	10	340	310	120
100	50	50	15	380	340	138

Saddle type (1 side adjustable)

The execution with saddles allows for easy adjustment, yet a separate pair of saddles is necessary for every thickness that has to be drawn. The precision drawing tool is provided with wedges and screws for adjustment, and is particularly suitable for drawing rectangular and square flat profiles for drawing benches with pusher. The dimension "l" can be adjusted by

moving the saddles forwards and backwards, even when the tool is on the drawing bench. Spare parts for adjustable drawing dies can be coated on customer request. Brazed spare parts (inserts, saddles and shoulders) can be PVD-coated. Solid spare parts (inserts, saddles, and shoulders) can be either PVD or CVD-coated.

Advantages

Various dimensions can be drawn with one tool



Improved flexibility and cost savings

In the case of breakage there is no need to replace the whole carbide insert, but only the damaged segment

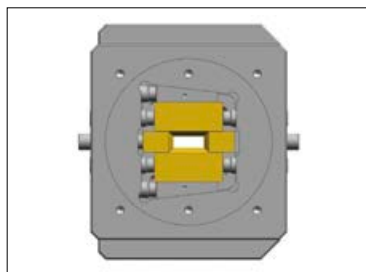
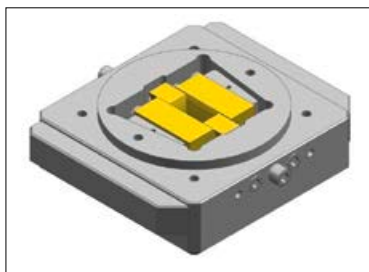


Cost savings

Hard Material Solutions by CERATIZIT can produce spare parts (saddles and shoulders) and rework worn parts



Cost savings



A suitable pair of saddles should be used to draw each width "b".

Dimensions

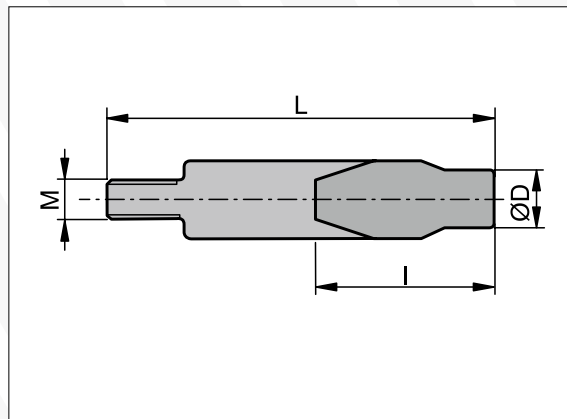
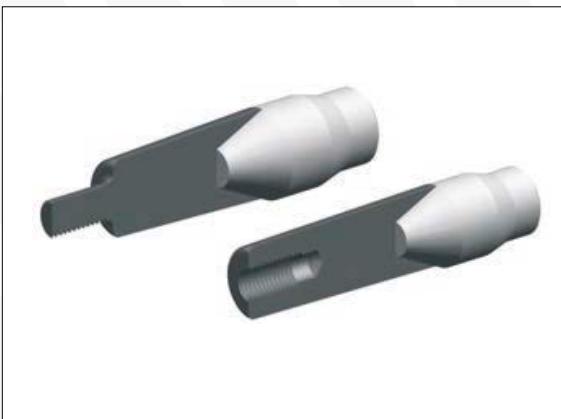
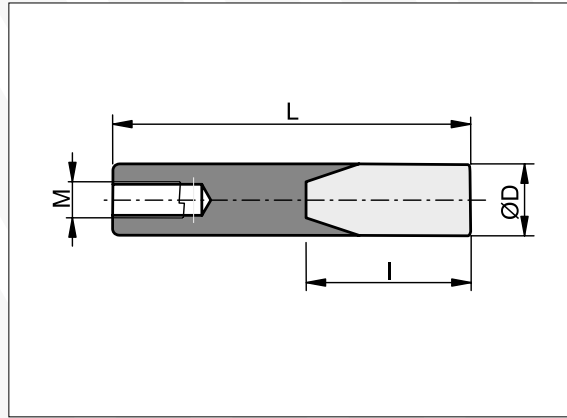
Profile dimensions				Case dimensions		
l_{max}	b_{max}	l_{min}	b_{min}	L	B	H
20	10	2	1	220	180	90
40	15	10	2	260	240	120
60	20	20	3	280	270	120
80	25	30	4	300	290	138
100	30	40	5	320	320	138
120	35	50	6	420	360	150
160	40	60	8	470	440	180
200	60	80	10	570	520	200
250	80	100	10	700	600	220
300	60	120	10	750	650	220

Drawing mandrels

Brazed drawing mandrel, round

This mandrel consists of a carbide part that is brazed onto a steel bar and is suitable for drawing small tube diameters.

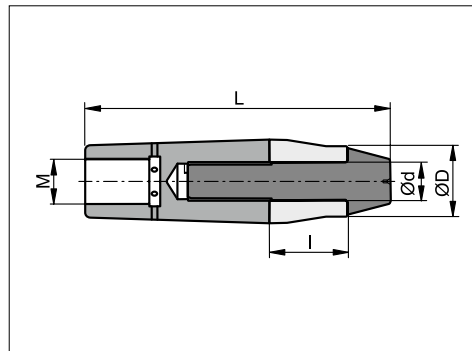
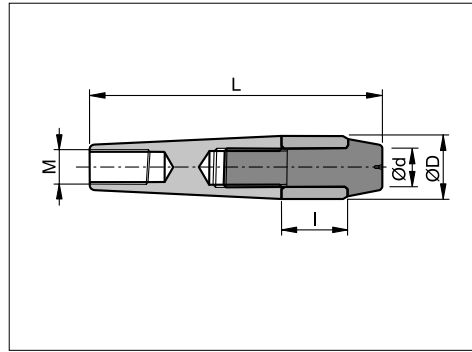
Available in cylindrical or semi-floating execution.



Drawing mandrel with thread, round

This mandrel consists of a carbide bush which is mounted on a heat-treated and grounded steel shank. The smallest diameter of this mandrel is 16 mm.

Available in cylindrical or semi-floating execution.



Solid carbide mandrel, floating

This mandrel consists of solid carbide and, due to its special geometry, centres itself during the drawing process. It is suitable for continuous drawing of tubes.



Innovative drawing tools

Hard Material Solutions by CERATIZIT can manufacture any kind of drawing tool for the bar and tube production. In addition to the standard drawing tools, Hard Material Solutions by CERATIZIT has developed some of the most innovative drawing tools available on the market today: **MasterDie** and **Serie Oro**.

These tools have been conceived and designed to be particularly efficient in the production of large quantities of full profiles such as bars of

common geometrical shapes (typically round, square or hexagonal). Other profiles can of course also be produced, but their feasibility needs to be assessed for each individual case. A common feature of MasterDie and Serie Oro is the special CVD coating of the surface which enables an impressive tool life compared to other standard tools.

CVD coating

Advantages

Improved tribological properties with a lower friction coefficient between the tool and the work piece to be worked

A longer tool life compared to a traditional, uncoated tool

Higher drawing speeds can be achieved

Benefits



The tendency of the metal to stick to the tool is greatly reduced, decreasing the maintenance effort for the drawing tool. The standard maintenance procedure of cleaning and polishing the profile of the tool to remove stuck material and to improve the surface finish has to be performed less frequently on a coated tool

Difficult materials or materials that cannot be processed with traditional tools are now possible to be worked. CVD coated drawing dies can work very hard steel grades (e.g. duplex stainless steels)



Reduced machine downtime and improved productivity



Improved productivity

Comparison

Serie Oro:

Can be reworked

More robust design thanks to a larger steel casing that prestresses the carbide core

Preferred for more critical applications (e.g. drawing large profiles, high reductions of area or drawing of hard and difficult materials)

CVD (Chemical Vapour Deposition) coating on the surface of the hard metal

MasterDie:

Cannot be reworked

More compact and economic tool

Highest profitability when drawing big volumes of the same profile

Extremely successful in the production of hexagonal bars made of stainless or free-machining steels

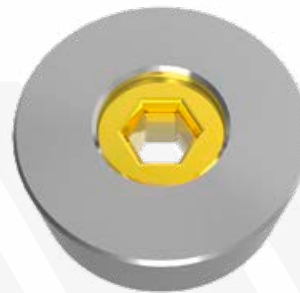
CVD (Chemical Vapour Deposition) coating on the surface of the carbide



Serie Oro

Serie Oro is a drawing tool with an adjustable, CVD coated carbide core. This component has a conical external surface which is designed to meet the internal surface of the steel casing that is inclined with the same angle. The core can be easily adjusted and is extractable for refurbishing. During the refurbishing process, the core is cleaned, polished, and newly coated. However, the core can only be refurbished a

limited number of times due to the maximum change in size that the casing can compensate for: generally, for the larger profiles, the steel casing can compensate for a decrease of size of up to about 0.1 mm. It goes without saying that the regeneration can only be performed on cores that still have sound mechanical properties and are neither cracked nor damaged.



Serie Oro drawing tool

Serie Oro Advantages

Core can be adjusted inside the casing with a hydraulic press



Easy regeneration of the carbide core by adjusting the internal size of the profile to its original dimensions



Benefits

Fine control of profile dimensions with narrow tolerances (only 0.01 mm for most profiles, 0.02 mm for larger profiles) which leads to a high quality and repeatability

Profitable working: time- and cost-saving process of regeneration while a high quality working process is ensured

MasterDie

The MasterDie is a drawing tool with a CVD-coated carbide core which is shrunk into a high-resistance steel sleeve. This wear part is mounted inside a steel box and held in place by a threaded ring. The outer casing does not affect the stress state inside the carbide, and it is able to provide an additional mechanical support to the core. The compressive prestress is only exercised by the high resistance steel

sleeve. MasterDie offers the highest profitability when big volumes of the same profile must be drawn. These tools have been extremely successful in the production of hexagonal bars made of stainless or free-machining steels.



MasterDie drawing tool

MasterDie Advantages

Benefits

High surface quality



High drawing speed, profitable working process

Outer casing



Additional mechanical support for the core

Standardised dimensions



More cost-effective; compact and efficient warehouse

6 forms with a hard metal core of smaller size than in traditional tools are available



Customised outer casing is possible

Tolerances for round, hexagonal, and square profiles for MasterDie tools.




Round [mm]	Min. tolerance [mm]	Hexagon [mm]	Min. tolerance [mm]	Square [mm]	Min. tolerance [mm]
8.01 - 18.00	0.01	8.00 - 8.00	0.015	8.00 - 18.00	0.015
18.01 - 30.00	0.015	18.01 - 18.01	0.02	18.01 - 30.00	0.02
30.01 - 50.00	0.02	30.01 - 30.01	0.03	30.01 - 50.00	0.03
50.01 - 72.00	0.03	50.01 - 62.00	0.04		

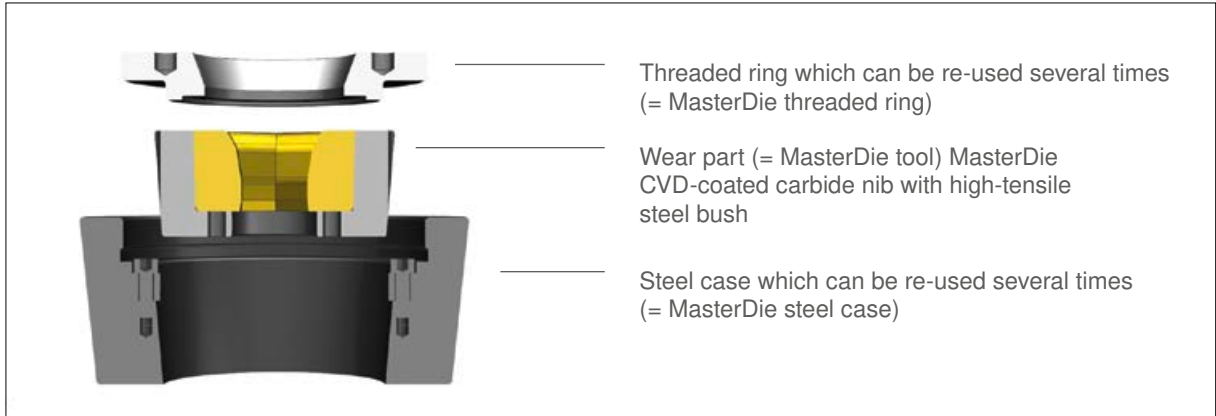
Further geometries which can be produced with MasterDie

Please send your enquiries to CERATIZIT Engineering and we will carry out a feasibility study for you.

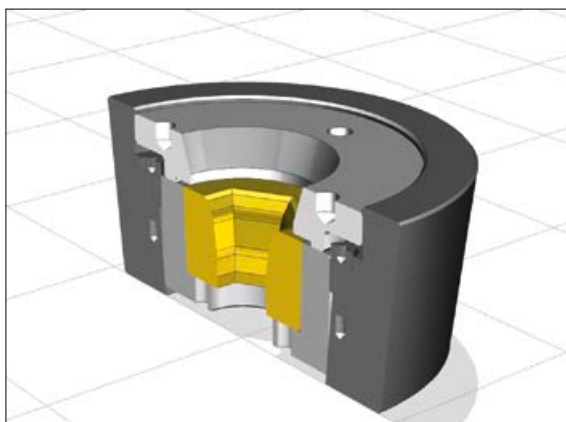
Taking into account the minimum dimensions and the respective geometry (see table) the

MasterDie steel case is designed according to customer specifications.

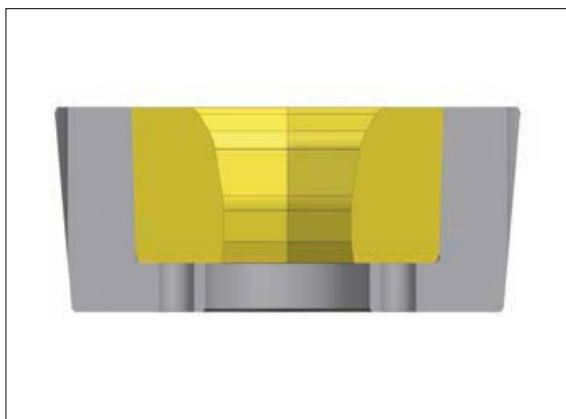
Form				Necessary minimum dimensions	
	Round Ø [mm]	Hexagonal SW [mm]	Square SW [mm]	Ø M (mm)	H (mm)
MasterDie-2	8.01 ÷ 13	8.01 ÷ 12	6.01 ÷ 10	72	45
MasterDie-3	13.01 ÷ 19	12.01 ÷ 17	10.01 ÷ 14	87	50
MasterDie-4	19.01 ÷ 25	17.01 ÷ 23	14.01 ÷ 18	103	55
MasterDie-5	25.01 ÷ 32	23.01 ÷ 29	18.01 ÷ 23	118	60
MasterDie-6	32.01 ÷ 40	29.01 ÷ 35	23.01 ÷ 29	133	65
MasterDie-7	40.01 ÷ 48	35.01 ÷ 41	29.01 ÷ 35	150	65



Increase the efficiency of your drawing process



MasterDie drawing tools



Every MasterDie tool with the same form can be mounted in the same MasterDie steel case



Application areas

- ▲ Wire production
- ▲ Standard wire – ISO programme
- ▲ Steel cord and saw wire

Particularly suited for materials such as:

- ▲ Steel
- ▲ Stainless steel
- ▲ Copper alloys
- ▲ Aluminium alloys
- ▲ Silver and gold



Our drawing tools in various end markets

- ▲ Automotive industry
- ▲ Construction and metal construction industry
- ▲ Electric and electronic industry
- ▲ Jewellery industry
- ▲ Tool production

Our carbide grades

Grade code	ISO code	Application	Binder (in %)	Hardness			Transverse rupture strength		Fracture toughness MPa*m ^{1/2}
				HV10	HV30	HRA	MPa	P.S.I.	
Submicron grain									
CTS10			4.8	1980	1940	93.7	3400	493,000	7.4
CTS12	K05-K10		6.0	1820	1790	93.0	3500	508,000	8.2
CTS20	K20-40		10.0	1610	1590	91.9	3700	537,000	10.1
CTS24	K40		12.0	1480	1460	91.0	3900	566,000	9.9
CTS30	>K40		15.0	1330	1320	89.7	3800	552,000	11.9
Fine / medium grain									
CTF12	K20	G10	6.0	1640	1640	92.1	2200	319,000	9.9
CTF18	K30		10.0	1490	1470	91.0	2500	363,000	11.2
CTF24	K40		12.0	1330	1320	89.7	3000	435,000	12.0
CTF30	>K40	G30	15.0	1250	1240	88.8	3100	450,000	13.1
CTF40		G40	20.0	1070	1060	86.8	3400	493,000	18.0
CTF54		>G50	27.0	920	910	84.8	3200	464,000	22.0
CTM12			6.0	1520	1500	91.2	2600	377,000	10.4
CTM30			15.0	1130	1120	87.6	3000	435,000	13.3
CTM40			20.0	950	940	85.3	3100	450,000	18.6
Coarse grain									
CTC50			25.0	770	760	82.4	2800	406,000	23.5
CTE40			20.0	850	840	84.2	2900	421,000	24.0

Hard Material Solutions by CERATIZIT

Wear protection for all application and industries



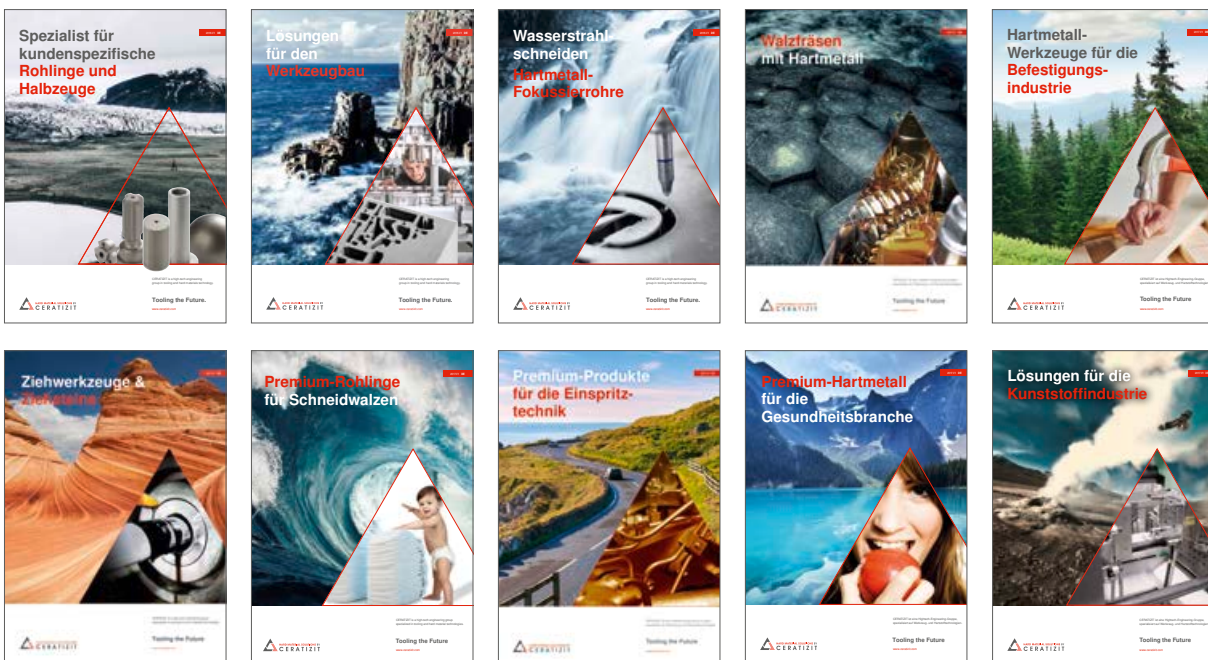
Individual carbide solutions

for your application

- ▲ **Tools** for metal forming
- ▲ **High-performance components** for tool construction



Our product portfolio



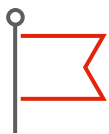
The CERATIZIT Group

For over **95 years**, CERATIZIT has been a **pioneer** developing exceptional hard material products for cutting tools and wear protection.

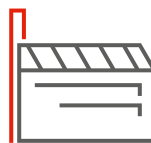
The privately owned company, based in Mamer, Luxembourg, develops and manufactures highly specialised carbide cutting tools, inserts and rods made of hard materials as well as wear parts.

The CERATIZIT Group is the **global market leader** in several wear part application areas, and successfully develops new types of cemented carbide, cermet and ceramic grades which are used for instance in the wood, metal and stone working industries.

Facts and figures



1 headquarters
Mamer (Luxembourg)



34
production sites



> 70
sales subsidiaries



> 9,000
employees



> 100,000
different products



> 1,000
patents and
utility models



> 200
employees in R&D



> 10
innovation awards



30%
of products developed
in the last 5 years

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