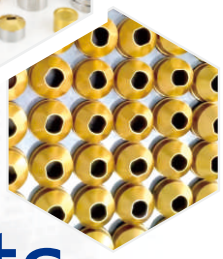
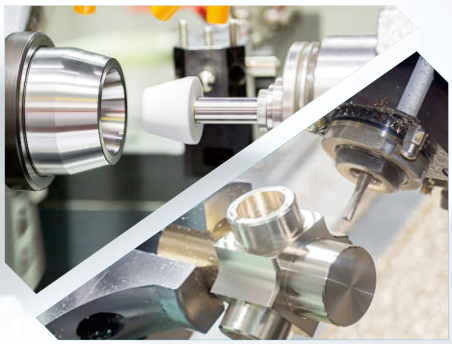
WJH
WERKZEUGTECHNIK



Tools
Material
Components

WJH Werkzeugtechnik GmbH

Welcome to WJH



Our Goals

- Offer our entire product portfolio worldwide and make suitable offers in line with the market
- Customised and high-quality tool manufacture
- Achieving a high level of customer satisfaction

Mission of WJH

- Production of high quality tool components for our customers
- Contribution to the success of our customers
- Establishment as a reliable and professional manufacturer of tools and components

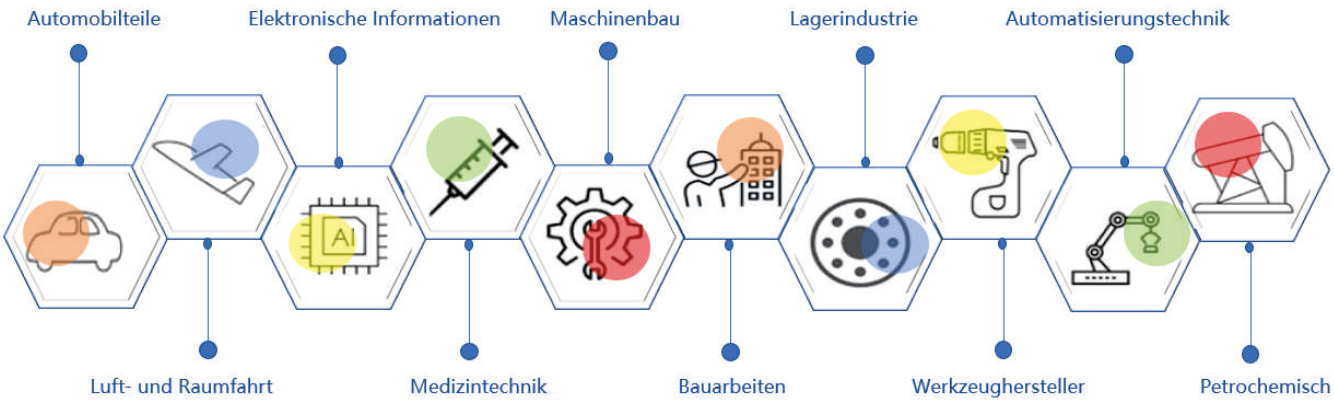
Our values and principles

- **Customer orientation**
  Our focus lies on the needs and wishes of our customers. We share the technical knowledge gained through exchanges with our customers to build trust in a solution- and service-oriented manner.
- **Innovation and quality**
  We are convinced that we can achieve sustainable competitiveness through our focus on innovation and the quality of our products.
- **Reliability**
  We want to contribute to the success of our customers with our products and offer constant technical support as a reliable business partner.

WJH areas of work

We offer tooling solutions for cold forming, stamping technology, general machine technology and plant technology as well as for the plastics industry.

- **Forming tools:** for cold forming and stamping technology
- **Components:** manufactured by CNC machining technology
- **Materials:** Carbides, ceramics, WEDM-WIRE and titanium alloys



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Forming tools for cold forming

The classic forming tool for conventional cold forming is one of our core competences. From series tools to the development of complete tool sets, we offer our customers a wide range of individual forming tools. Our customers in this product segment are mainly from the automotive industry, telecommunications, construction engineering, aerospace, medicine, etc.

- **Technology**

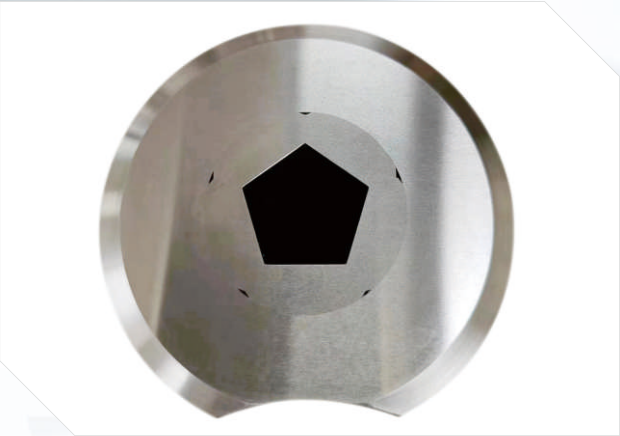
For WJH, constant technical innovation is the key that drives the company forward. Thanks to our modern machines (WEDM, EDM, CNC, turning, milling, grinding) and the experienced team, WJH is able to produce even the most complicated forming tools at the customer's request.

- **Delivery time**

Delivery time and ability to deliver is an important factor for WJH. Products are usually delivered within 5 - 6 weeks. In urgent cases, within 3 - 4 weeks for an additional charge based on the extra work required for this.

- **Price**

High quality and prices in line with the market, coupled with a high ability to deliver, are our most important cornerstones and in the interests of all our customers.



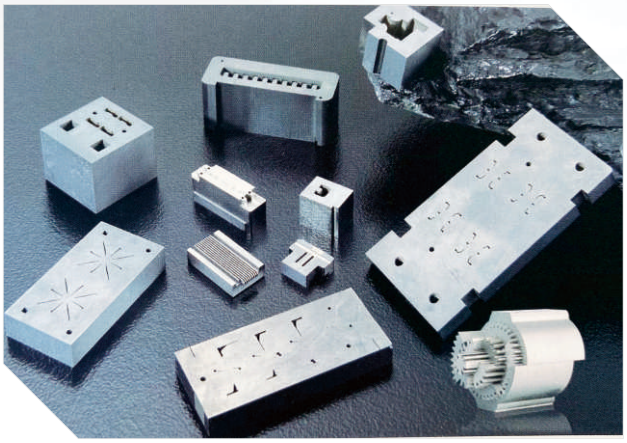
Design up to 6-part tools

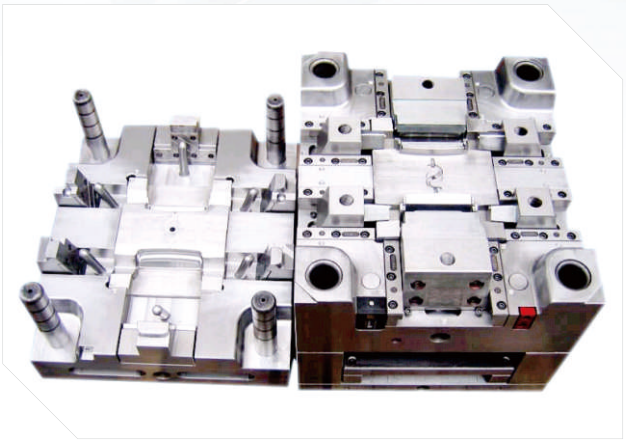
WJH's forming tool construction, which is divided into sections, is used in the production of high-strength screws in the automotive production and electrical engineering. The WJH tool structure increases the service life for our customers. We can also produce tools in 4-part, 6-part, 8-part and 12-part compound for our customers.

An innovation in the design of the oil drain within the tool sets not only improves the strength of the forming tool and at the same time the fine grinding (roughness up to Ra 0.05), but also the service life of the forming tools is noticeably increased.

Advantages:

- The technology, which is divided into sections, makes it easier to change the cores of the forming tools and reduces costs.
- The design of the oil drain increases the strength of the forming tools and distributes the pressure on the forming tools.
- The combination of WEDM's technology with fine grinding ensures higher precision.





Components of WJH Precision Tools

The respective components of the precision tools manufactured by us represent one of the core competences.

Our customers in this area are from the following sectors, such as stamping technology, electrical engineering, semiconductors, injection moulding, medical technology, machinery and automotive.

Precision tools from WJH have the advantage of greater precision and a longer service life. These advantages are based on the properties of the materials used (1.3343, ASP30, ASP60, tungsten carbide alloy, ceramic material) and our own special surface treatment (PVD, CVD, DLC).

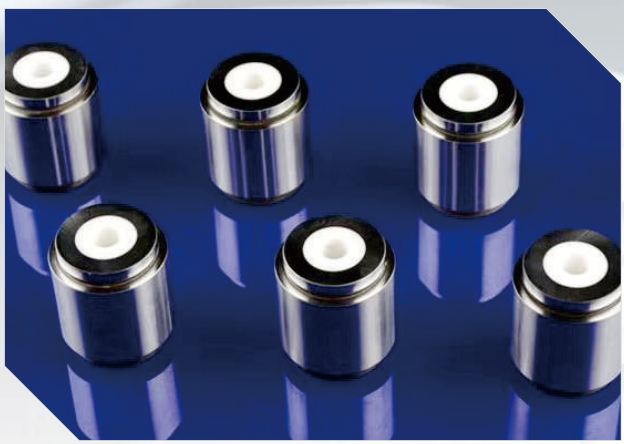
With our modern machinery (WAIDA grinding machine for optical curves, SARIX 3D Micro EDM Machining, WEDM, EDM), a high-quality standard is achieved.

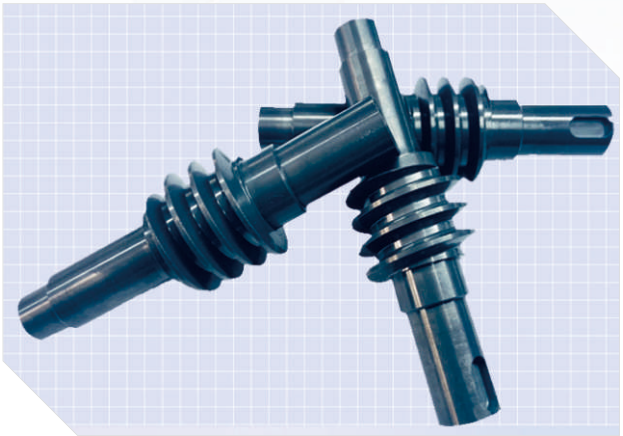
Carbide tools

Carbide has a wide variety of shapes and a very large range of applications. Thanks to our expertise, we are able to offer our customers a wide range of applications for carbide tools.

Thanks to the modern mechanical equipment (grinding machine for optical curves, WEDM, EDM, CNC, grinding machine for inner and outer radii) and our technical team, we are well qualified to design and manufacture carbide tools.

- µm – range
- Surface roughness: Ra 0.03
- short delivery time
- competitive prices





The use of high-performance ceramic

Would you like to improve the service life of your tools and thus the reliability of your products? We offer our customers individual solutions and recommend the use of high-performance ceramics.

- **Aluminium oxide (Al2O3)**
Aluminium oxide has better abrasion resistance, heat resistance and corrosion resistance. As a frequently used material it is regularly used in the production of technical ceramics.

- **Zirconium oxide (ZrO2)**
Zirconium oxide not only possesses a high degree of hardness, abrasion resistance and toughness, but also a higher coefficient of thermal expansion and significantly reduced thermal conductivity. Because of these properties, it is used as a joining material for ceramics and steel.

- **Silicon carbide (SiC)**
Silicon carbide is almost as hard as diamond and not only the lightest but also the hardest material. It has a perfectly low coefficient of thermal expansion and strong acid and alkali resistance. It is used as the ideal material when handling under extreme conditions of temperature fluctuations.

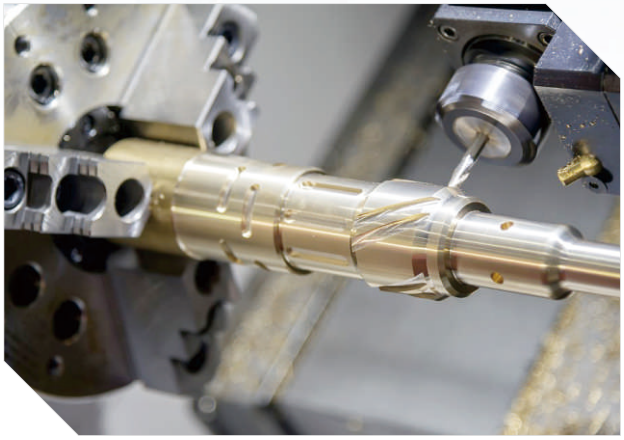
- **Silicon nitride (Si3N4)**
Because of its perfect abrasion resistance, shock resistance, toughness against fractures and heat resistance, silicon nitride is suitable as a material for precision ball bearings and forming tools of heavy-duty ceramics. It is distinguished as the ideal material for rollers and other moving parts under extreme conditions and high loads.

Stamped parts

We offer stamping production in various precise metal components. In mass production as well as in specific small quantities, we can meet the high demands of our customers.

As a reliable business partner with many years of experience in the production of stamped parts, top quality and fast delivery time are our strengths.

Our products are often used in the electrical sector, automotive and mechanical engineering.



Turned parts production CNC

Our precise metal parts are used in almost all branches of industry. We respond to the needs of our customers and produce standardised components with micro dimensions as well as with large external dimensions.

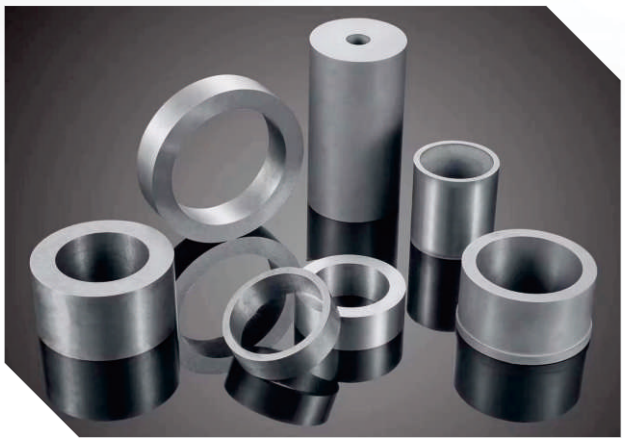
We are the right business partner for our customers for both small quantities and regular series requirements.

With our high efficiency, a market-driven price and the achievement and internalisation of the prescribed quality we help our customers to achieve their goals in the fastest possible way.

In addition, we want to help our customers as a reliable business partner and support them in achieving their own success.

Materials used:
Steel, stainless steel, titanium alloy, brass, aluminium, plastic, etc.

Treatments and services applied:
- Heat treatment (induction hardening, nitriding, etc.)
- Surface finishing (anodising, nickel plating, powder coating, etc.)



Carbide material

WJH specialises in carbide for the tool industry.
Quality · Stability · Professional

With 20 years of experience in the development and manufacture of carbide, our processes work in full compliance with the management system ISO 9001-2015 (TÜV).

Consistency in quality and traceability are our commitment to our customers. Furthermore, with our professional and versatile production capabilities, we are able to offer our customers additional value-added services:

- Material design for specific applications
- Design of product geometries for specific tasks
- Prototype service in any quantity
- 2D/3D - Drawing creation
- Processing of finished products

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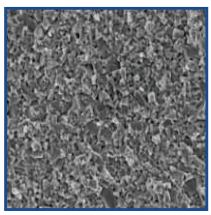
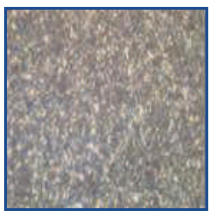
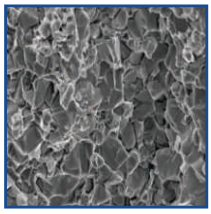
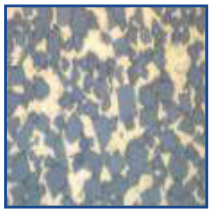
GRADE	ISO-Code	WC Grain size (µm)	Binder Content (wt%)	WC Content (wt%)	Density (g/cm³)	Hardness			Bending strength TRS (MPa)	Fracture toughness (MPa*m$^{1/2}$)	Properties and Applications
						HRA	HV10	HV30			
MH 8	K10-K20	0,6 ~ 0,8	8	92	14,65	92,4	1700	1680	3000	10	Ultra-fine grain alloy with very high hardness for ultra-fine machining, e.g., semiconductors, IC casings, leadframe tools
MH 10F	K20-K40		10	90	14,45	91,8	1600	1580	3800	10,2	
CD 20	K40	0,8 ~ 1,2	12,5	87,5	14,15	90,7	1450	1430	3700	11,1	Fine grain alloy, very good wear resistance, suitable for connectors, punching of terminals and motor cores, continuous punching tools, powder metallurgical tools, drawing tools
CD 30	> K40		15	85	13,95	89,8	1340	1330	3800	11,9	
CG 10	K10-K15	1,3 ~ 2,5	6	94	14,85	90,6	1440	1420	2800	12,8	Medium grain alloy, good wear resistance, suitable for punching tools, powder metallurgy tools, drawing tools, forging die tools
CG 35	K20-K30		9,5	90,5	14,55	89,3	1290	1280	3400	14,1	
CG 50	K40		12	88	14,2	88,2	1190	1180	3500	15,3	
CG 50A	G30		15	85	13,8	88,2	1190	1180	3300	16,4	
CG 65	G30		15	85	13,95	87	1080	1070	3600	17	
CT 55	G30-G40	2,5 ~ 6,0	15	85	13,95	86	1000	990	2800	22,1	Coarse-grained alloy with very good toughness for deep-drawing tools, shearing tools, dies and forming tools
CT 70	G40-G50		18	82	13,6	85	920	910	2700	23,2	
CT 80	G50-G55		20	80	13,45	84	840	830	2600	24	
CT 90	G55		22	78	13,25	83	760	750	2500	24,7	
CT 95	G55		25	75	13	82,5	640	630	2400	25,5	

Photos of the micro - structures


MH - series


CD - series


CG - series


CT - series

1. Metallographic microscope (Leica – Germany) 2. Video measurement system
3. Roundness measuring device 4. SEM-Tester (JEOL - Japan) 5. Hardness tester (Future Tech - Japan) 6. Magnetometer

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