# CASTING PARTS



# **Casting Visions –** From Idea To Shape



# Getting Precision on the Road

### WITH THE RIGHT COMPANION

strategic journey partner. From the first sketch to the produc- casting part – we will find the right way. Precisely and together. tion-ready component, we are at your side and offer comprehensive support in the planning and implementation of your projects. Our international team works hand in hand with you to develop innovative solutions that are precisely tailored to your needs. We rely on state-of-the-art technologies and proven processes to create the highest quality and reliability.

Grenzebach sees itself not only as a supplier, but also as a Whether you come to us with an initial idea, a sketch or a

### GRENZEBACH GROUP

Founded in 1960 in Hamlar as a craft business, Grenzebach Grenzebach has stood for innovation and reliability for more has developed over the years into a global market leader of than 60 years. Years of know-how and constant customer its core markets. In addition to automation solutions for the orientation are the key to success: building materials and glass industries, the company also offers applications such as various innovative recycling processes as » Ca. 1,600 employees worldwide well as digitalisation and service solutions. » Development and production sites in Germany, the

Grenzebach has also been manufacturing high-quality casting parts for industrial use for about 20 years. In the machining center at the Chinese site in Jiashan, the casting parts are machined in accordance with European and international quality requirements.



- USA, China, India, Greece and Romania
- » Export ratio more than 90 %
- » More than 22,000 tonnes of castings per year

# Grenzebach as a Companion From Start to Finish



## CASTINGS

Casting parts have become indispensable in many areas of industry and everyday life. Casting technology makes it possible to produce complex and dimensionally accurate components economically and in high quality. Liquid metals are poured into molds where they solidify and take on their final shape. The variety of casting processes and materials makes it possible to find the right solution for every application.

A major advantage of casting parts is their versatility. They can be produced in almost any shape and size imaginable, from tiny components for electronic devices to large structural components for machines and vehicles. Casting parts are characterized by their high strength and durability and are therefore particularly in demand for safety-critical applications. In addition, modern casting processes enable high surface quality and dimensional accuracy, which minimizes post-processing and increases efficiency.

We offer a wide range of manufacturing processes and casting materials so that you can achieve exactly the result you want. This enables us to meet almost any customer requirement and our customers benefit from maximum flexibility, speed, and quality.

Own Foundry

In addition to our reliable partners, we also have our own foundry, the CHR Changjian Huaxin Robot Parts Nantong Co. Ltd, and are therefore also part of the foundry industry. In Nantong, China, we produce castings for well-known companies in the robotics and automation industry - mostly iron castings as gray or nodular cast iron.



## MATERIALS

### **IRON CASTING**

A material with excellent compressive strength and good vibration damping. Ideal for applications in mechanical engineering and the automotive industry. Cast iron is also cost-effective and offers high wear resistance, making it particularly durable. We offer both gray cast iron and ductile cast iron.

#### STEEL CASTING

Offers high strength and toughness, suitable for components that are exposed to high mechanical loads. Cast steel is particularly resistant to high temperatures and mechanical stresses, making it a preferred material in heavy industry and plant engineering.

## MANUFACTURING PROCESS

Thanks to our long-standing partnerships with a large number of foundries, we are able to offer a wide range of casting processes. This means that we are the point of contact for our customers when it comes to casting parts for any application.

### SAND CASTING

Includes resin sand casting and green sand casting (Automatic line) and is used in iron casting, steel casting, and aluminum casting. Flexible and cost-effective. This also enables cost-effective pattern making so that sand casting is beneficial for small and medium-sized series and large components. Complex internal structures can also be realized through the use of sandcores.

#### CHILL CASTING

Widely used in aluminum alloy casting and includes gravity casting and low pressure casting. High dimensional accuracy and good surface quality, particularly suitable for medium-sized series. The advantage of these methods is that the molds can be reused, which reduces manufacturing costs for larger quantities. This process is particularly suitable for components that require high dimensional accuracy and strength.

#### DIE CASTING

Includes high-pressure die casting and low-pressure die casting, used in aluminum alloy casting. High productivity and precision, perfect for the series production of complex and thinwalled components. In die casting, the molten metal is forced into the mold under high pressure, which enables a very high level of detail and smooth surfaces. This process is ideal for the mass production of parts that require high dimensional accuracy and surface quality.

### Widely used in high-precision steel casting. Enables the production of very complex and delicate structures with high dimensional accuracy. Investment casting, also known as precision casting, uses wax-based models that are embedded in ceramic molds and then melted out. This process enables the production of highly detailed and complex parts that often require no further finishing.

#### ALUMINUM CASTING

Lightweight and corrosion resistant, particularly advantageous for aerospace and automotive applications where weight saving is critical. Aluminum also offers good electrical and thermal conductivity and is easy to machine, making it versatile.

#### INVESTMENT CASTING

### HOT MOLD FORGING

Widely used in steel forging and aluminum alloy forging. Combines the advantages of casting and forming technology, ideal for high-strength and tough components. In hot forging, the material is heated and formed into the desired shape, resulting in high strength and toughness of the parts. This process is often used for components that have to withstand extreme mechanical loads.



development process. Step by step.

CONCEPT DEVELOPMENT: Analysis of requirements and PROTOTYPING: Creation of prototypes to validate the design. development of initial designs. In this phase, our engineers work closely with you to understand your ideas and requirements and translate them into a concrete concept. We use the latest CAD software and simulation tools to provide a high level of accuracy and feasibility right from the planning phase.

MATERIAL AND PROCESS SELECTION: We provide expert advice on the optimal choice of materials and processes based on your specific requirements. Our team helps you identify the right material to achieve desired mechanical properties and equipment and strict quality controls, every part is crafted to performance, taking into account factors such as strength, the highest standards and delivered on time. weight, corrosion resistance, and costs. Additionally, we select

Our team of experts is by your side throughout the entire the most efficient casting process tailored to the properties of the desired component for high-quality production.

> By using rapid prototyping technologies (such as 3D sand printing), we can produce preliminary sample parts quickly and cost-effectively. These prototypes are used to check the design and make any necessary adjustments before series production starts.

SERIES PRODUCTION: Efficient and reliable production of casting parts. After the approval of design and prototypes, we start series production. By using automated production

### OUR EXPERTS ARE THERE FOR YOU - WHETHER IN EUROPE OR ASIA

Grenzebach customers not only have the entire range of materials, processes and mechanical processing – they also have a reliable companion at their side at every stage of their journey. Because our experts, whether in Germany or Asia, see themselves as true journey partners.

What does that mean? It means that even the vaguest idea takes on a concrete form. It also means that the finished sketch is quickly used as a casting in series production. Or that the finished casting is optimized and perfected. In short: our specialists think products and processes further for you and with you. Take the path to the future with Grenzebach and cast your visions – from idea to shape.



# Perfectly Shaped – Thanks to Many Years of Expertise and State-of-the-Art Technology



Grenzebach offers a comprehensive range of machining and finishing services to perfectly match castings to your requirements. Our modern machining centers and experienced specialists make sure that every component mentally friendly cleaning processes that gently and effectively is finished precisely and to the highest quality.

MACHINING: Thanks to precise machining every component meets the desired specifications. Our state-of-the-art CNC machines enable high dimensional accuracy and surface quality. We offer a variety of machining options, including turning, milling, and drilling, to optimize the machining of your components.

WASHING: Thorough cleaning of castings is crucial to meet the highest quality standards. Our washing service removes all residues providing clean, ready-to-install parts. We use environclean even the most sensitive components.

SURFACE TREATMENT: Our wide range for surface treatments improve the functionality and appearance of casting parts. These include processes such as sandblasting and coating. Through targeted surface treatments, we can significantly improve the wear resistance, corrosion resistance, and visual quality of your components.

# Hot Mold Forging Further Processing Pressure Die Casting Powder Coating Sand Casting Foam Seal

۵۵ Milling building Drilling building buil Investment Casting Mount Threaded Inserts Engraving Foundry 3D-printed sandmold Painting **S** NextTechnologies Journey k Partner **Chill Casting** Carbon **D** Impact Stamp Sustainability Neutrality 5 Laser Labeling Consulting **Initial Sample Development** 

ASSEMBLING THREAD INSERTS: For special applications, MACHINE APPLICATION OF A FOAM SEAL: Milling a we assemble precise threaded inserts in the casting parts for groove and inserting a custom-made seal is not only time-conhigh strength and durability. suming and cost-intensive, but also prone to errors. We have the solution.

LABELING: We offer various marking processes, including laser engraving, to provide your components with permanent and precise markings. Individual labeling facilitates the identification and tracking of parts throughout their life cycle.

# Preserving Logistics

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# Highest quality For High-Tech



Quality is the cornerstone of our success. At Grenzebach, we rely on state-of-the-art quality control procedures and adhere to strict norms to meet the highest standards. Our quality management systems are certified to international standards and are continuously developed to meet the increasing demands of our customers and of the industry.

## OUALITY MEASUREMENT PROCEDURES

geometries. By using the latest 3D measuring technology, we can detect even the smallest deviations from the target dimensions and correct them immediately resulting in high dimensional accuracy and component quality.

SPECTRAL ANALYSIS: Analysis of the chemical composition of the materials. We use spectral analysis to check the composition of the alloy so that it meets the required specifications. This is particularly important in order for the mechanical and physical properties of the casting parts.

TEST OF MECHANICAL PROPERTIES: Tensile testing machine, Metallographic analyzer, and Hardness analyzer to make sure the casting meets the requirements of material mechanical properties.

3D MEASUREMENT: High-precision measurement of complex X-RAY INSPECTION: Detection of internal defects and porosities. Our X-ray inspection methods make it possible to visualize the internal structures of components and detect possible defects at an early stage. This is particularly important for safety-relevant components.

> ULTRASONIC TESTING: Non-destructive testing for material defects. We use ultrasound to inspect components for internal cracks, cavities, and other defects without damaging the component. This process is fast and reliable and enables precise inspection of the parts produced.

> CMM MEASUREMENT: Various specifications of Coordinate Measuring Machine are used to check if the machining dimensions of the product meet the requirements of the drawings.

## **CERTIFIED STANDARDS**

Our processes and products comply with numerous international standards, including ISO 9001, ISO 14001, and ISO 45001.

ISO 9001:2015	This standard defines the and helps us to continuo satisfaction.
ISO 14001:2015	This standard specifies th management system (EMS comply with applicable law environmental performanc
ISO 45001:2018	This standard focuses on systems. It provides a fram place risks, and create bet ISO 45001 demonstrates of promoting a culture of heal

With Grenzebach as your partner, you don't just cast parts, you shape your visions. We accompany you on the path to success - from the initial idea to the perfectly shaped end product. Our expertise and our commitment to the highest quality make us your reliable journey partner in the world of casting parts. Let us work together to turn your visions into reality and shape the path to success.

requirements for a quality management system usly improve processes and increase customer

he requirements for an effective environmental S). It helps us minimize our environmental impact, ws and regulations, and continually improve our ce.

occupational health and safety management nework to improve employee safety, reduce worktter, safer working conditions. Our adherence to our commitment to protecting our employees and Ith and safety within our organization.

In the foundry industry, it is important to have more than just a supplier. This is because foundry and machining must work together optimally in order to achieve the best possible result. This is only possible with a reliable journey partner like Grenzebach: We combine diversity, expertise, and technology and always focus on the customer's needs.

## **THOMAS LIU**

**Director Casting** 

# GRENZEBACH WORLDWIDE



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