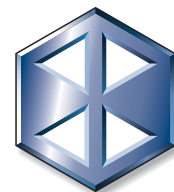




# **Metal Solutions** for any Challenge

**SCHMOLZ + BICKENBACH**  
Metal Solutions



# Metal Solutions for extensive requirements

History of our production sites in Krefeld and Ennepetal dates back to the early twentieth century. As leading steel and special steel foundry, we have extended our product range and thus additionally offer solutions in metal materials under the trade mark of SCHMOLZ+BICKENBACH Metal Solutions. Due to our long-term know-how, the enormous material variety, the broad scope of procedures and state-of-the-art machining technologies, we meet the widespread requirements of our customers.



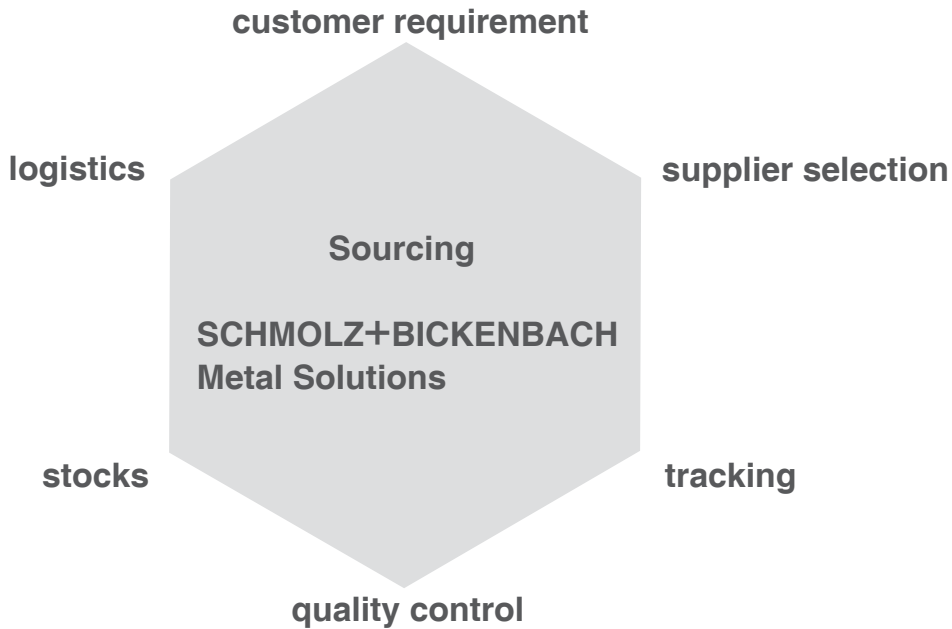
Tap of an inductive-molten heat

## **Competence and Commitment as Basics for Quality**

Our customers build and operate state-of-the-art plants and systems in a wide variety of industrial sectors. One of the most critical factors for their significant competitive advance is their product quality. We have therefore placed our focus on assuring their lead through superior quality of our products.

One decisive advantage SCHMOLZ+BICKENBACH Metal Solutions customers can profit from is our high competence covering a wide fabrication spectrum. We offer an extensive scope – from fabrication procedures, heat treatments and mechanical machining up to the corresponding quality controls.

Firm contact persons, direct communication and close-to-market activities allow us to realise flexibly and promptly custom-tailored solutions for our customers. Our business partners do not only profit from the highly qualified and committed employees, but also from our international sourcing network which offers solutions for cost-sensitive products and thus serves for a purchase from one hand.



Heat treatment of a turbine component

## Manufacturing processes

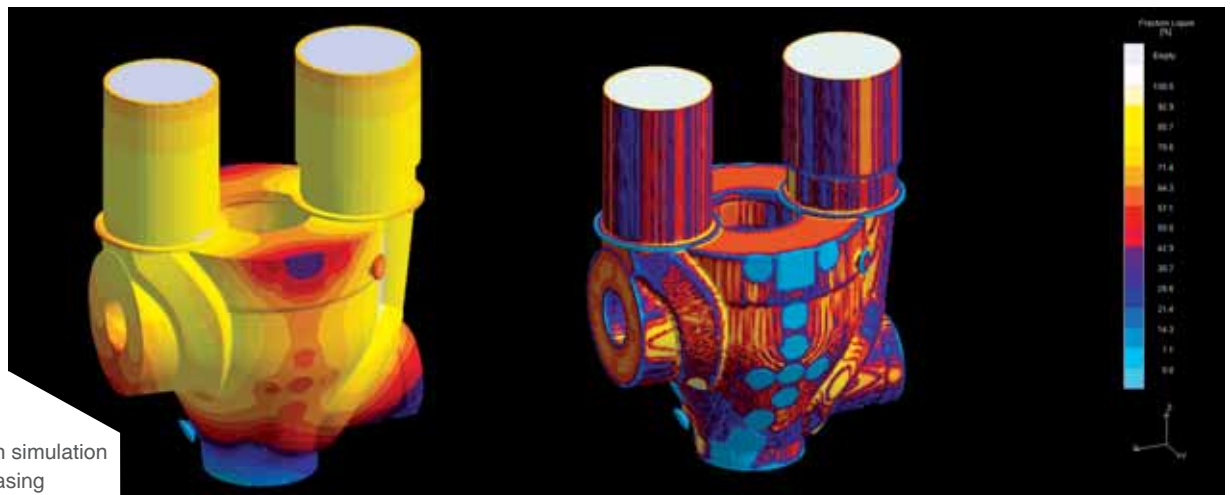
Thanks to the variety of manufacturing processes, we are able to cover a very wide spectrum of options:

- » In sand-moulding, we produce castings up to a finished unit weight of about 25 t; corresponding to a liquid weight of 45 t. Here, we produce complex high-quality elements up to finished components, ready for use.
- » In automatized processes, we fabricate small and medium series. Also extensive geometries and extremely brittle and wear resistant materials can be realized.
- » The *CONTURA*<sup>®</sup> procedure allows us to produce castings fulfilling particular demands in view of geometry, accuracy and surface quality which are essentially better than those for sand casting. Tolerances similar to those of investment castings can be achieved by this procedure.
- » In our state-of-the-art investment casting line, we fabricate single parts and small series with unit weights of some grams only up to 70 kg for an especially high-leveled dimensional exactness.
- » We offer centrifugally cast tubes – vertical and horizontal method – as well as bushes in diameters from 60 to 1,500 mm.



# Listen, Understand, Develop, Simulate, Cast, Check, Machine, Deliver – All-around packages

Highly extensive component geometries are for us a welcome challenge. We meet our customers' expectations by individual solutions.



Solidification simulation of a valve casing

## Material Selection

Our broad range of materials accrued from our long-term experience covers more than 400 different materials. Basic components of our programme are steels for high and low temperature service, corrosion-, acid-, and heat-resistant steels (ferritic, austenitic, super-austenitic steels as well as Duplex and Super-Duplex steels), Ni and Co base alloys as well as tool steels for warm and cold working. Furthermore, low-alloyed and high-quality steels, high-speed steels, wear-resistant special materials and ferrous materials with special physical characteristics (a-magnetic and Invar steel) are included in our product scope. Besides that, we give top priority to the new and further development of materials which we realise in close cooperation with our customers. Our Research & Development Department attends to these tasks with high commitment.

## Simulation Technology

Especially for castings with complex geometries and many heat centres, the solidification simulation today is indispensable. It allows defining an optimum ingate and feeding technique, which guarantees an impeccable casting and complete saturation of the part.

## Mechanical Machining

One decisive factor for our fabrication scope is the long-term experience with mechanical machining of various components. We offer a very high range of pre-and finish-machining possibilities up to completely machined units, ready for use. Thanks to our welding benches, we are in the position to fabricate also complex components by construction and joint welding.

## Heat Treatment

The entire spectrum from hardening and tempering up to solution and diffusion annealing is realised in our in-house facilities. Controlled parameters in the heat treatment process assure the perfect achievement of the desired microstructure and mechanical properties. For this purpose, various cooling processes such as direct water-quenching or also furnace cooling are applied.

**Complex geometrie**  
**Solidification simulation**  
Long-term experience  
**Wide range of materials**  
**Construction weldings**  
Integrated quality assurance system  
**Duplex and Super-Duplex steels**

## Quality Control

In order to meet the high quality requirements of our customers, we follow a sophisticated integrated quality assurance system. Various chemical, physical and mechanical- technological inspections, as well as non-destructive testings (dye penetration test, magnetic particle inspection, quantitative microstructure analyses, radiographic tests and ultrasonic inspection) are executed by our qualified specialists. By the individual test and control procedures, we constantly ensure the required quality level of our products.



High-pressure tested  
steam valve casing

# SCHMOLZ+BICKENBACH

## Metal Solutions focusses on the following business activities

It allows to focus product groups on their individual markets and guarantees expertise in consulting and product development.



Combustion Chamber Outer Shell (ø 4,130 mm) for gas turbine finished at S+B GUSS

### Energy

Power generation still has a worldwide high significance. Fabrication of power generation plants, despite a steadily increasing total demand, undergoes a special cost pressure. More than ever, elements, components and finally complete plants with an optimum cost level have to be designed and developed. Optimizing of complex components can be achieved best when all process phases are concentrated in one responsibility. Therefore, SCHMOLZ+BICKENBACH Metal Solutions supplies elements for gas turbines which are finish-machined and ready for use.

High or low temperatures, permanent or changing pressures as well as corrosive gases are only some of the influences to which turbines are permanently exposed.

SCHMOLZ+BICKENBACH Metal Solutions meet all of these extreme requirements by selecting appropriate materials and, above all, through assuring the required quality grades - no matter which part or component. This guarantees maximum durability, employment reliability and safety. Long-term experience, high commitment and a multitude of certifications have made us one of the important suppliers, in the field of power generation, for components for gas and steam turbines, compressors and generators, hydropower plants as well as for nuclear technology.

# Machine and plant engineering

Heavy machine and special machine building

## Food industry

Paper and pulp industry

Waste incineration

Cement plants

Furnace construction and thermal process technology

Shipbuilding and marine engineering

### Engineering

General mechanical engineering puts the most various requirements on units and their applications. The materials must permanently withstand corrosion, wear, heat as well as the most different mechanical stresses. Basic premise for the fabrication of efficient parts is the cost - benefit evaluation. Relevant parameter is for example the selection of the optimal material taking into consideration its suitability for the intended process - as e.g. cutting properties and weldability. In order to achieve this aim, we develop, in close cooperation with our customers, the optimized technological and geometrical execution for this specific unit. Furthermore, we define the relevant control parameters for the required quality level and, on this basis, establish the necessary specifications. Our program comprises parts in rough, pre- and finished-machined condition as well as welded components. These can also be assembled to complete components by combinations of semi-finished products and castings.



Finished cutter bowl  
( $\varnothing$  1,500 mm)  
for the food industry



## Liquids

Production of components for transport and further treatment of liquids and viscid material are another important field of activity of SCHMOLZ+BICKENBACH Metal Solutions. High and altering pressures, various kinds of corrosion, low and high temperatures as well as abrasion or even any combination of such stresses are characteristic requirements to which components in this industrial sector must be designed. Therefore, besides low- to high-alloyed parts for special employments, we also cast Duplex and Super-Duplex materials with a higher resistance compared to the well-known corrosion-resistant materials.



Double-flow impeller with polished blade geometry

Our components such as boiler water feeding pumps for nuclear power stations or measuring sensors for high-pressure natural gas pipelines are used worldwide. As manufacturer of components for nuclear plants, we are certified according to KTA 1401 and the European Code RCC-M. Furthermore, we are certified in accordance with AD 2000 and the EU Pressure Equipment Directive for all components liable to acceptance; special classifications are also available such as the Norsok certification for corrosion resistant components in seawater. A specific area of expertise in this sector is the separation technology. For this mechanical process of solid/fluid separation, we produce centrifuges and decanter components designed for the most diverse requirements for well-known manufacturers.



Hub bearing for a decanter drum



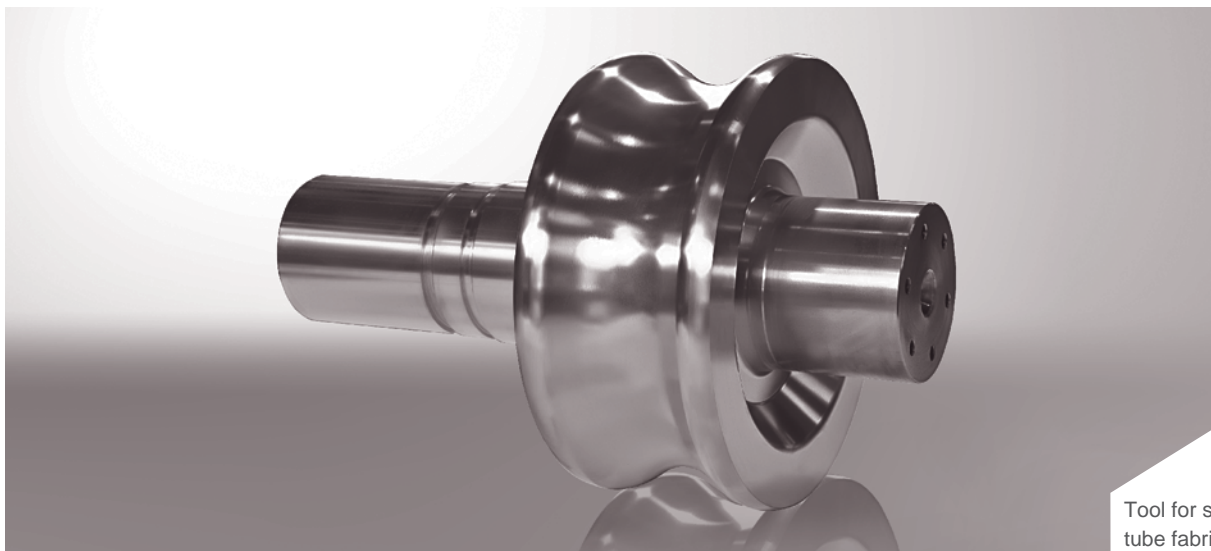
## Tools

Since the very beginnings of our company history, we have specialised in the manufacture of spare and wear parts and their further treatment in the field of steel production for steel plants, tube and rolling mills.

# Hones fittings Measuring sensors Components of nuclear plants Steel works, tube- and rolling mills Pumps and accessories Separator techniques Rolling rings

For the steel industry, SCHMOLZ+BICKENBACH Metal Solutions have been producing for decades a whole variety of parts. Innovative developments have contributed their share over the years to the ongoing optimization of the parts and their adaptation to the production conditions. We produce all tools required in tube-making plants for the manufacture of seamless and longitudinal seam-welded tubes. On the one hand, these are tools of mould casting which we manufacture in our Ennepetal and Krefeld works. On the other hand, these are rolls cast against chill at Messrs *Walzengießerei* und Hartgusswerk Lobberich. The material range varies from chilled casting via indefinite chill up to pearlitic and acicular nodular cast iron.

For rolling mills, SCHMOLZ+BICKENBACH Metal Solutions produce a considerable number of optimised roll fittings with excellent wear resistance for the various production steps. With our *Hones-Armaturen* (special fittings), we are the internationally active company in the fields of sections-, steel bar- and wire- lines. For custom-tailored applications, new individual fittings are designed and matched to the prevailing conditions at the customer's premises.



Tool for seamless tube fabrication

## Mobility

In the mobility sector, the SCHMOLZ + BICKENBACH Metal Solutions focus is laid on the production of auxiliaries for the automotive industry and their suppliers as well as of elements for land, rail or sea crafts.



Forming die  
for sheets

A large part covers the fabrication of pressing shop tools for autobody elements which are produced in the so-called natural mould method. 3D-cut patterns in polystyrene for single use are fabricated. During the casting procedure, they are transformed into high-efficiency cast tools. The material scope ranges from cast - and nodular iron to high-strength tool steels.

Further auxiliaries comprise among others furnace grids or charging equipment for hardening processes. Those are used for a defined positioning of the relevant elements during the requested hardening operation. SCHMOLZ + BICKENBACH Metal Solutions can rely on a long-term experience in the field of individual 3D-construction and material selection for efficient components with long lifetime. Materials like PYROTHERM are employed which are heat resistant brand steels and meet the utmost requirements.

For the car industry, we produce components in steel qualities with first-class mechanical properties. The castings are mounted to the chassis and to bearing parts of land and rail engines. Besides that, our works produce compact case units for highly thermal-charged turbo loaders or channeling systems in the exhaust flow of high-efficiency aggregates.

Extension parts for water crafts are realized in seawater-proof materials reaching also special applications in a-magnetic steel.

## Quality Management

The cornerstones of our integrated quality management system are the customers' requirements, the state-of-the-art techniques as well as the valid legal and safety regulations. The uncompromising development of improved and refined solutions in material technology and systems engineering combined with anticipatory and responsible acting in the fields of environment and ergonomic workplace engineering form the basis for our high and consistent quality level.

DIN EN ISO 14001  
**DIN EN ISO 9001 : 2015**  
NORSOK MDS R15/D46/D56  
Lloyd's Register  
AD2000 HP0 DIN EN ISO 3834-2  
DIN EN 15085-2  
RCC-M Code



Final inspection of a finished Combustion Chamber Outer Shell

SCHMOLZ+BICKENBACH GUSS GmbH and Carp+Hones Guss GmbH are certified according to DIN EN ISO 9001 and comply with the requirements of the environment management certificate DIN EN ISO 14001. In our quality management, we employ the following tools and methods: casting related project planning, casting simulation, product, process and system audits, benchmarking, continuous improvement processes as well as first sample routines (PPAP).

In addition to this, however, quality management also means the continued optimisation of internal work and production processes. No matter whether we are talking about the reduction of cycle times, intensification of existing co-operations or the qualification of employees - the focus of our endeavours lies at the elaboration of optimised casting solutions adapted to the individual requirements of our customers.



**SCHMOLZ+BICKENBACH Metal Solutions**

SCHMOLZ+BICKENBACH GUSS GmbH / Hülser Straße 810 / 47803 Krefeld

Tel.: +49 2151 764 - 0 / kontakt@sbmetal.de / www.sbmetal.de