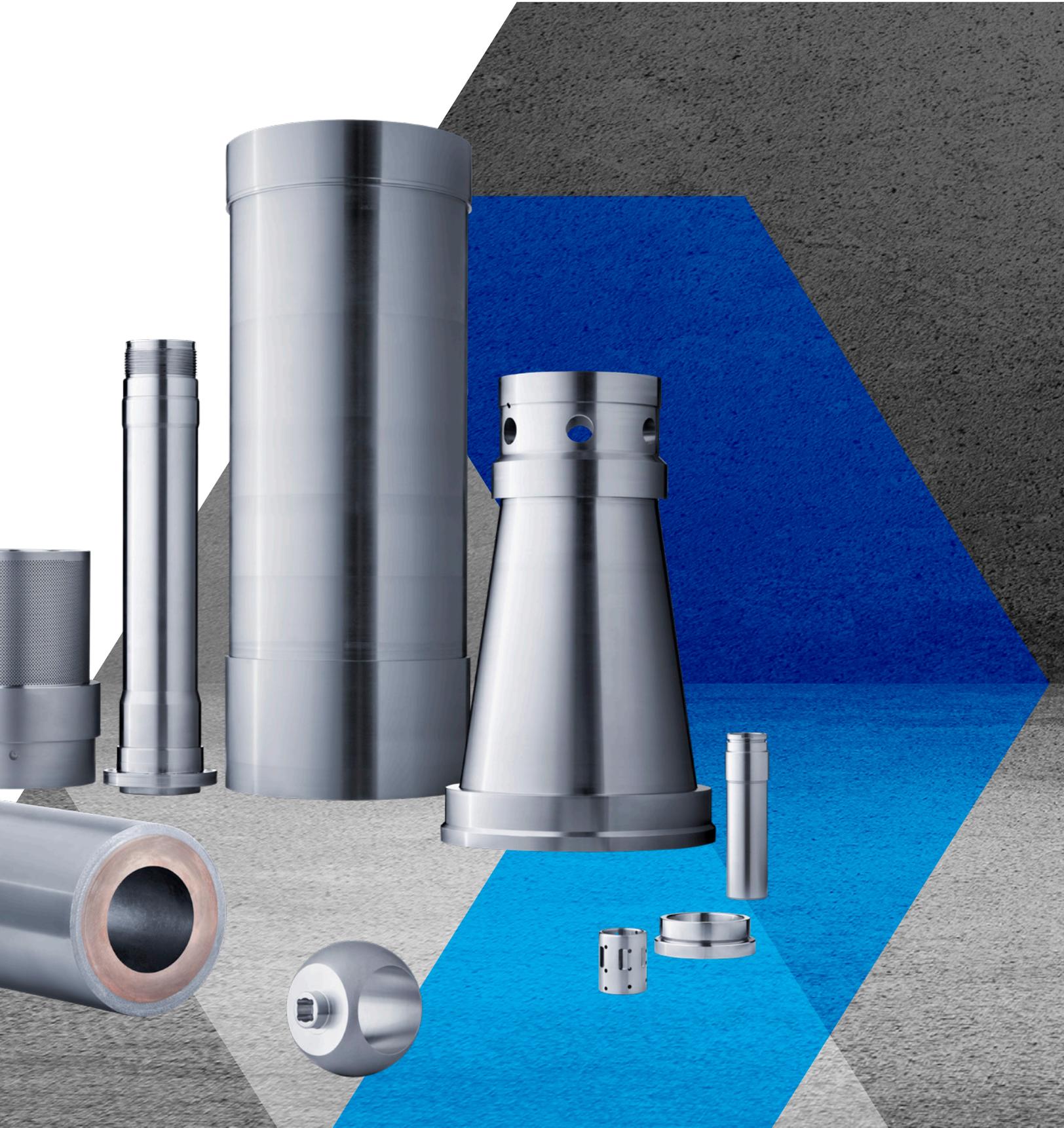


Kuhn Special Steel



High Performance Key Components





High Performance Key Components

Produced in Radevormwald, used worldwide

Kuhn Special Steel sets international benchmarks as a supplier of **ready-to-install key components**. Ever since its founding in **1960**, our family firm has been producing rotationally symmetrical components. The company is, thanks to its top quality standards and long experience, a **leading supplier** of **centrifugal castings**.

Our workforce of more than **300 employees** dedicates its knowledge, ideas and passion to the development of precision components that our customers can always rely on in terms of **safety and quality**. Customers from all over the world place their **trust** in us, and appreciate our one-to-one, partnership-based **cooperation**.

Even stronger when working together



Kuhn Special Steel is part of Kuhn Industrie Holding. This corporate group brings together all the competence, experience and know-why of **technology-leading organisations** in the centrifugal casting sector. The merger ensures the permanent **exchange** of technical expertise and highly qualified personnel, as well as additional **flexibility**, and guarantees the **further development** needed to meet the future challenges of our customers.



 **Kuhn Special Steel**
NORTH AMERICA 

 **M. JÜRGENSEN** 
A Promise Kept
Kuhn Special Steel 
High Performance Key Components

 **Kuhn Special Steel Asia** 
High Performance Key Components

CORPORATE FACTS AND FIGURES

- Founded in 1960
- A family business in its second generation
- Some 300 employees are engaged at our Radevormwald site:
 - 25 % of employees work in the foundry
 - 35 % of employees work in the machining operation
 - 13 % trainees
- Overall surface area: 563,600 sq ft
- Delivery to more than 40 countries worldwide



Long experience, short processes

We have been producing high-precision key components for the mechanical engineering and plant construction sectors for over 55 years. Thanks to the wide range of plant machinery at our disposal, we can complete **all the necessary steps** in the manufacturing of the finished product **on site**. This translates into minimum coordination expense and maximum processing reliability – and **saves both time and money**.

From initial idea to ready-to-fit component

We are always pleased to contribute our expertise when it comes to the **development** of new components. This starts with the selection of the right materials and continues with the design and configuration of the components concerned, the production of high-quality **centrifugal castings** and their precision **machining** – with our competence and expertise at your side throughout.

DEVELOPMENT





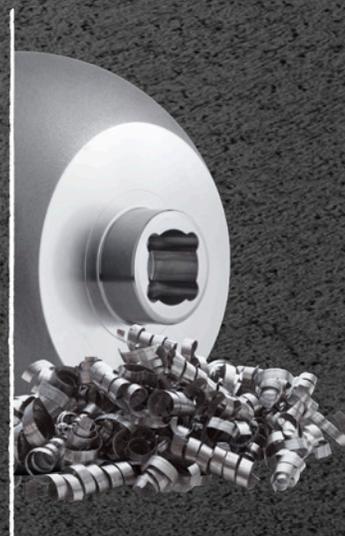
PRODUCTION FACTS AND FIGURES

- Maximum casting length: 197"
- Maximum welded length: 315"
- Smallest possible external diameter: 3"
- Largest possible external diameter:
 - horizontal: 47"
 - vertical: 90"
- Smallest possible internal diameter: 0.8"
- Maximum casting weight: 11,000 lb
- Heat-treatment at temperatures of up to 2,280 °F

CENTRIFUGAL CASTING



MACHINING





Constructive ideas

For our customers and us

Our long **experience** and **technical expertise** puts us in a unique position to **aid** our customers in the design, alloy selection and selection of casting process for their products. We are pleased to consult with customers' engineers and manufacturing personnel to offer potential **cost savings** and **product improvements**.



Internal testing procedures, from left to right:
tensile-strength testing, X-rays, ultrasound testing,
3D measurement machine





High-performance materials – we know why

Many of our stainless steel components are subjected to **extreme environments**. That's why Kuhn Special Steel focuses on alloy families characterized by their corrosion resistance, wear resistance, heat resistance or any combination of all three. While we pour **over 400 different alloys**, we are constantly striving to develop **new materials** to meet our customers' ever evolving design criteria. Our highly qualified material scientists offer both solid technical knowledge and many years of experience. They use this know-why to **support** our customers in their material selection, whether from our existing alloys or through the development of new alloys.

Certified quality

We are certified in accordance with:

- ISO 9001
- AD 2000 WO
- PED 2014-68-EU
- DIN EN ISO 3834
- Lloyd's Register
- Bureau Veritas
- DNV GL
- RINA
- ABS
- NORSOK M-650
- Achilles JQS
- Achilles Power & Tech

TESTING-RELATED FACTS

Mechanical test procedures

- Tensile testing
- High-temperature tensile testing
- Charpy impact testing
- Hardness testing

Corrosion test procedures

- Intergranular corrosion testing
- Huey test
- Pitting and crevice corrosion testing

Physical test procedures

- Permeability properties
- Ferrite measurement
- Spectroscopic chemical analysis
- Material analyses

Non-destructive test procedures

- Liquid penetration testing
- Ultrasonic testing
- X-ray testing

3D measuring technology





High-quality, durable, flawless

Stainless-steel components from a single casting

Kuhn Special Steel manufactures exclusively with the **centrifugal casting process**. This production process guarantees the maximum purity of the material. Mechanical and technological characteristics are **comparable with forged quality** and clearly superior to static castings.

As a **leader** in the centrifugal casting industry, we do not just track current developments; we drive them forward at our own initiative. Ever since the company was founded, we have been **developing and designing** centrifugal casting machines tailored to our specific needs. Thanks to our **technical expertise**, we can act on virtually any **customer request** in a quick and cost-effective manner.

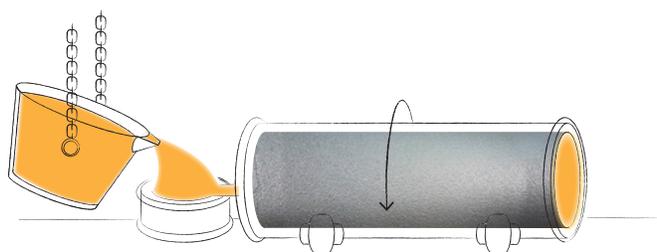


FORGING

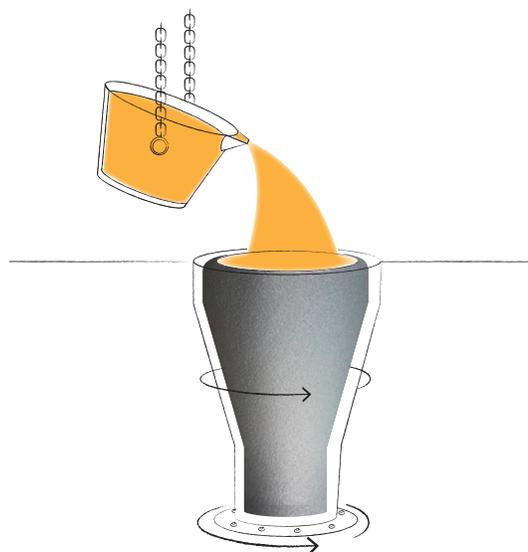


CENTRIFUGAL CASTING





Horizontal centrifugal casting



Vertical centrifugal casting

Centrifugal casting

This process is ideal for all **rotationally symmetrical** components. The molten steel is poured into the rotating mould at a temperature of up to 2,900 °F. Centrifugal force pushes the contents against the outer wall of the mould at up to **120 times gravity**. This forces all impurities and gas inclusions towards the inner surface, leaving behind a **pure, highly dense structure**. Any residues that do remain are then removed to create a **flawless component**.

All the advantages at a glance

- + Fewer working stages
- + Less in-house machining
- + Fewer oversize items
- + Material savings
- + Shorter processing times
- + Characteristics comparable with forged quality
- + Everything under one roof, right down to the ready-to-install component
- = **Shorter delivery times and corresponding cost-savings**

FOUNDRY FACTS AND FIGURES

- Vertical centrifugal casting machines: 4
- Horizontal centrifugal casting machines: 15
- Moulds: approx. 750
- Induction furnaces: 7
(total capacity: 17,650 lb)
- Heat-treatment furnaces: 8
(incl. a fully automatic heat-treatment furnace conforming to NORSOK M-650 standards)

Cutting, heating and forming | Hole-piercing | Rolling | Rolled ring | Mechanical processing | Hollow item

Hollow item



In operation for our customers

With the latest machines and flexible solutions

Machining and manufacturing equipment occupying more than 108,000 sq ft of floor space at our Radevormwald plant, constitutes one of the **world's biggest manufacturing facilities** to operate in conjunction with a centrifugal casting foundry. Whether customers need us to manufacture **individual components** based on their own drawings, or manufacture **production runs** involving large numbers of items, (virtually) nothing is impossible for Kuhn Special Steel.

Caring for the environment while reducing costs

Returns, chips and other scrap debris from the production process are sorted by material and level of purity, before being cleaned, weighed to the nearest gram and remelted. This practical approach to **sustainability** also pays off for our customers, as the recovery of raw materials **is offset against production costs** to make the overall manufacturing process less costly.





Production processes

CNC milling

Five-axis machining centres:

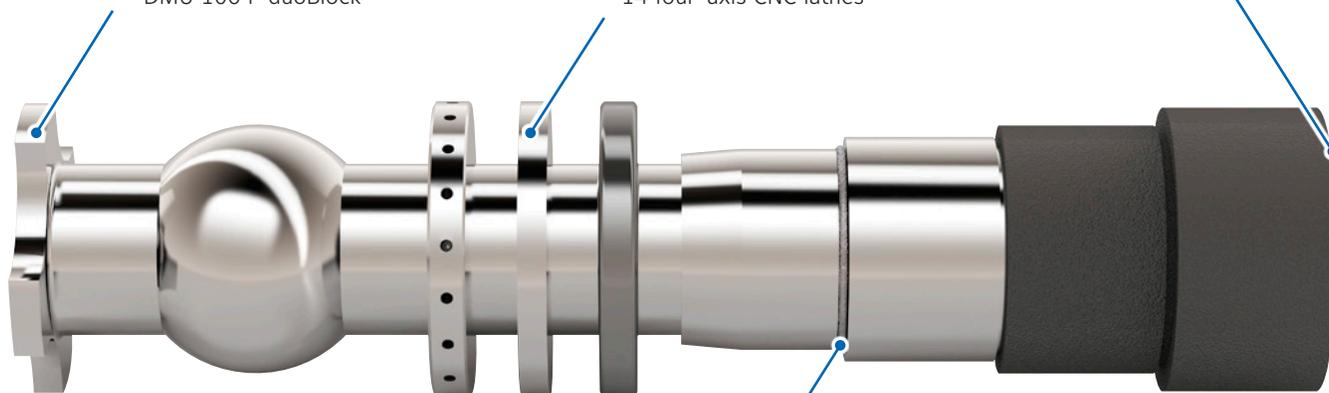
- Kekeisen UBF-R 2000
- DMU 160 P duoBlock®

CNC turning

- 12 heavy lathes
- 4 vertical lathes
- 14 four-axis CNC lathes

Separating/cutting

- 3 separating machines
- 3 band saws



Sample component for demonstration purposes

Honing

- 1 inside honing machine
- 1 outside honing machine
- 1 vertical honing machine

Welding

- Submerged arc welding
- Tungsten inert gas welding
- Manual arc welding
- Metal inert gas welding
- Metal active gas welding

Conventional turning

- 2 heavy lathes
- 9 Boehring DUE 800
- 6 deep hole boring machines

PRODUCTION FACTS AND FIGURES

- Large lathes with turning diameter of up to 63" above bed and 315" bed length
- Vertical lathe with turning diameter of up to 100"
- Latest five-axis machining centres for heavy-duty work
- Four-axis lathes for efficient, high-precision machining
- Deep-hole drilling machines
- External and internal honing machines
- Automated sub-arc-welding systems

A wide

We currently supply our products to more than 40 different markets and the figure is steadily growing.





variety of uses – a wide variety of solutions

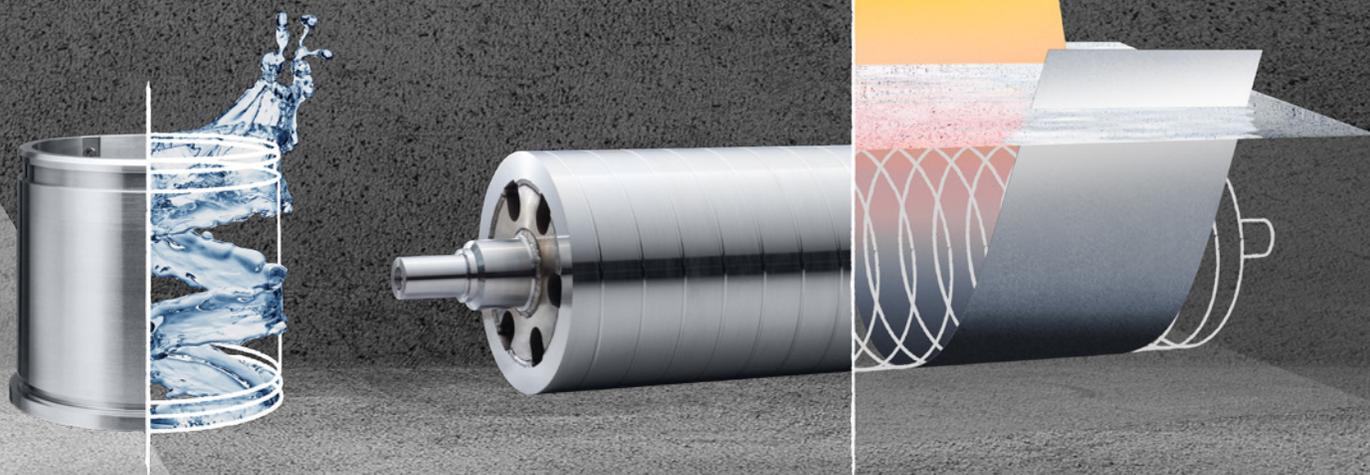
Forty markets, one commitment to quality:
always the best solution for you

High-performance key components from Kuhn Special Steel are used wherever there is a need for **reliability, quality** and especially **durability**. The range of applications of our components is virtually unlimited.

The **diverse requirements** of our customers regularly pose new challenges for us. With a range that runs from corrosion-resistant decanter components to valve-seat rings made of nickel-based alloy, we produce **top-quality** items that have been developed to tackle maximum mechanical, physical and chemical loads.

INDUSTRY FACTS

- Marine engineering and ship building
- Decanter and separation technology
- Pump and valve construction
- Galvanising and metallurgical technology
- Mill construction
- Compressor manufacturing
- Motor manufacture
- Sealing technology
- Food technology
- Filtration technology
- Paper machines
- Wear technology
- Industrial kilns
- ... and many other sectors and industries





Accepting responsibility

Social action

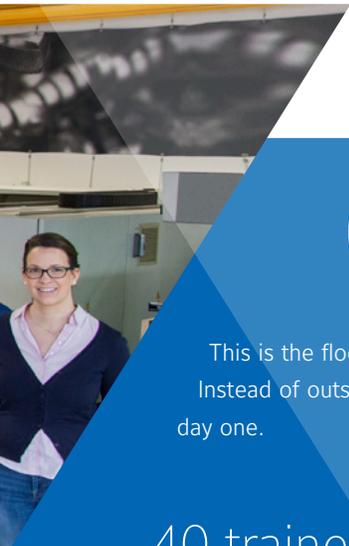
As a family-run business in its second generation, we know how important it is to cultivate social coexistence here at Kuhn Special Steel. We focus just as much on the nurturing of young talent as we do on the job-satisfaction of older members of our workforce. We do so because success is not only a question of technology; it also depends on the valuable contribution of each of our employees acting together - from trainees right up to the boardroom. All this makes itself felt in the company on a day-to-day basis, as the corresponding figures show.

12 years
with the company

€ 210,000
in donations

The above total corresponds to donations made over the past five years by committed employees, customers (as part of our "Donations instead of gifts" campaign) and of course the company itself. This has benefited local schools and kindergartens, as well as Kindernothilfe, an organisation that deals with child-related emergencies, along with other social projects in the region.

Our current employees have been with us for twelve years on average. Thanks to their high level of satisfaction, fluctuation is low. The average age of our workforce is 45, which confirms that we do not just allow young talent to show what it is made of. We also appreciate the experience of our more-seasoned employees!



6,975 square feet

This is the floor space occupied by our training centre, which provides our apprentices with basic training in metalworking. Instead of outsourcing training, we have been offering participants the chance, since 2008, to grow with the company from day one.

40 trainees

Approximately forty apprentices undergo training with us every year. The fact that trainees are 13 % of the workforce reflects our guiding principle that young people are our future, and that we as a company have the obligation to provide them with the solid training needed to get their career off to a good start.

14 areas of professional training

We offer a wide range of options – as properly qualified employees are vital to the continued expansion of our market position. We are also a co-founder and part-owner of the Hückeswagen training college, a private initiative of local businesses which offers a unique, nationwide programme of dual education and training that culminates in the Abitur, Germany’s university entrance examination.

Health care

We have been offering our employees a wide range of health services since 1999. These include regular information days on the prevention of colon cancer, one-day health events for trainees, flu vaccinations and health-awareness training.

since 1999

Over 900

further-training initiatives

Our employees have attended an above-average number of further training courses over the past five years. Knowledge is the key tool when it comes to delivering further developments in the field of centrifugal casting, and we keenly promote it with our comprehensive training programme.

7,647

creative ideas

Numerous ideas have been submitted, and implemented wherever possible, over the past twenty years in the context of our suggestion scheme and idea management system. A successful business like Kuhn Special Steel thrives on its innovation potential and the active participation of its workforce.

Kuhn Special Steel

High Performance Key Components

Klaus Kuhn Edelstahlgießerei GmbH
Otto-Hahn-Straße 12-14
42477 Radevormwald
Germany

Phone +49 2195 671 0
Fax +49 2195 671 49

info@kuhn-special-steel.com
www.kuhn-special-steel.com

Kuhn Special Steel

NORTH AMERICA

Kuhn Special Steel North America, Inc.
C/O Rödl Langford de Kock LLP
55 West Monroe Street, Suite 2900
Chicago, IL 60603, USA

Phone +49 2195 671 921
Fax +49 2195 671 15921

sales@kuhn-northamerica.com
www.kuhn-northamerica.com

Kuhn Special Steel Asia

High Performance Key Components

Kuhn Special Steel Asia Limited
NO. 6, Kegong 2nd Rd., Douliu City,
Yunlin County 64064,
Taiwan

Phone +886 5 5511232
Fax +886 5 5511561

asia@kuhn-special-steel.com
www.kuhn-special-steel-asia.com

M. JÜRGENSEN

A Promise Kept

M. JÜRGENSEN GmbH & Co. KG
Markschell 3
24966 Sörup
Germany

Phone +49 4635 299 0
Fax +49 4635 299 100

sales@m-juergensen.de
www.m-juergensen.de

