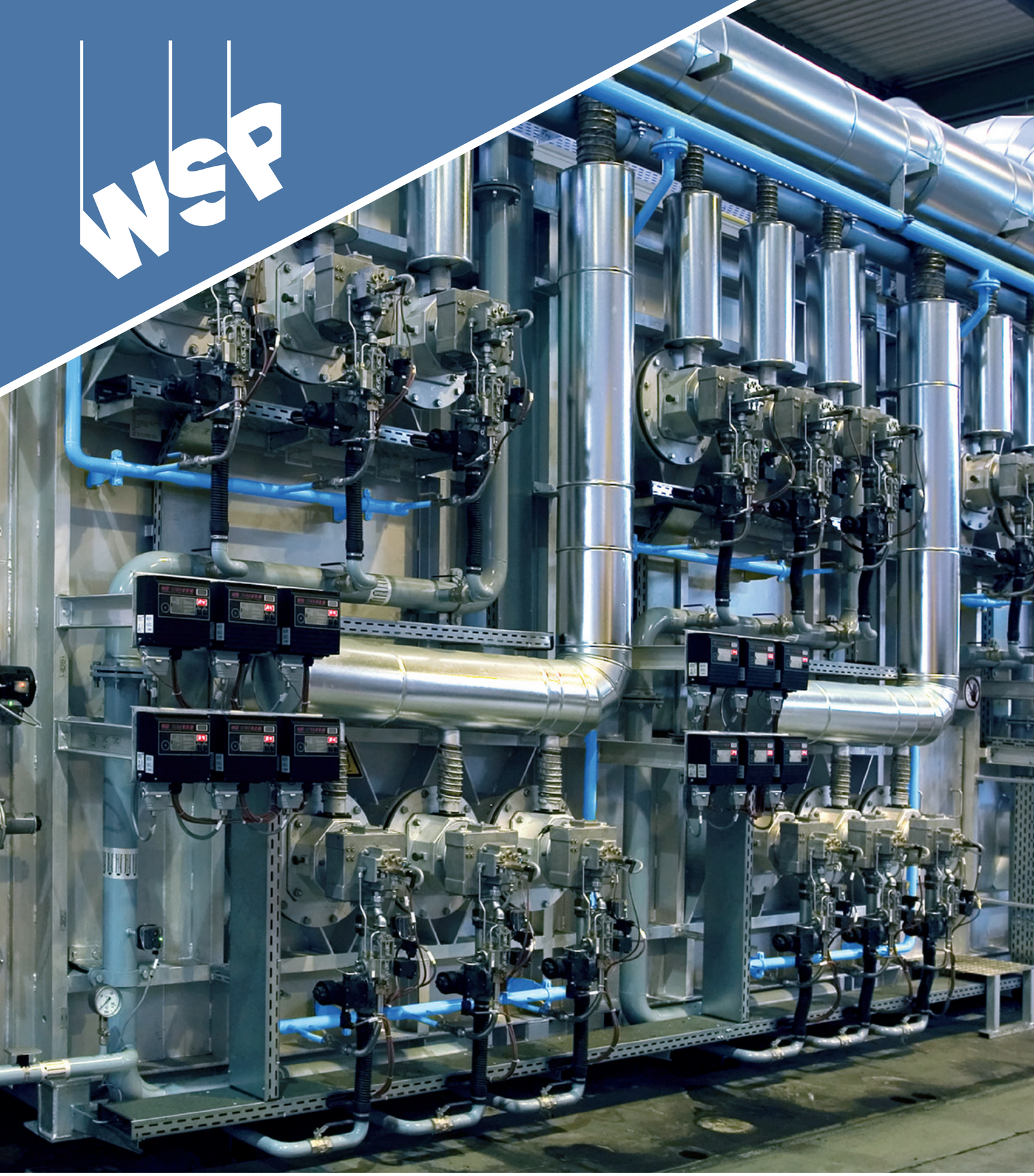


HEAT TREATMENT PLANTS

THE MANAGING DIRECTOR INTRODUCES HIMSELF

Dipl.-Ing. Johannes Wissen
General Manager

I started working for WSP 15 years ago as a project manager. The complexity of the plant engineering, but also within the project execution was everytime challinging, but at the same time always fascinated me. However, the sense of achievement in finally reaching the project goals and satisfying the customer is above all.

In my second phase at WSP, I was no longer only responsible for standard machines as a project manager, but now in particular for prototypes, individually with a high degree of new development. Here I was able to benefit considerably from Prof. Kramer's creativity and approach.

During this time, we have always expanded or improved our product portfolio as well as the state of the art of existing products.

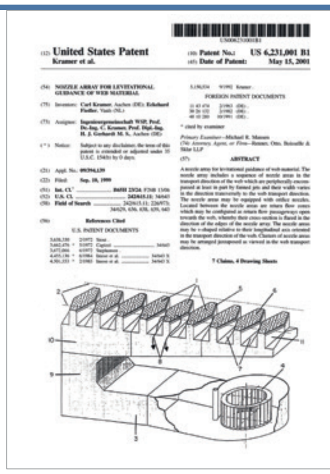
These two points, the achievement of all project goals through high project management quality and at the same time great innovation, distinguish WSP and generate added value for our customers. We would like to offer you this added value also in the future.

To ensure this, with optimal structures and experienced employees is now, in my third phase as managing director, my task.

Your Dipl.-Ing. Johannes Wissen

General Manager

Prof. Dr.-Ing. Carl Kramer, Founder of WSP GmbH in front of one of the first WSP floatation furnaces



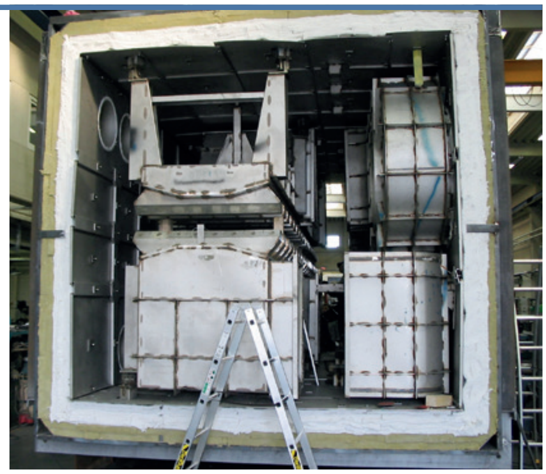
(12) United States Patent
Kramer et al.

(10) Patent No.: US 6,231,001 B1
(45) Date of Patent: May 15, 2001

(57) ABSTRACT

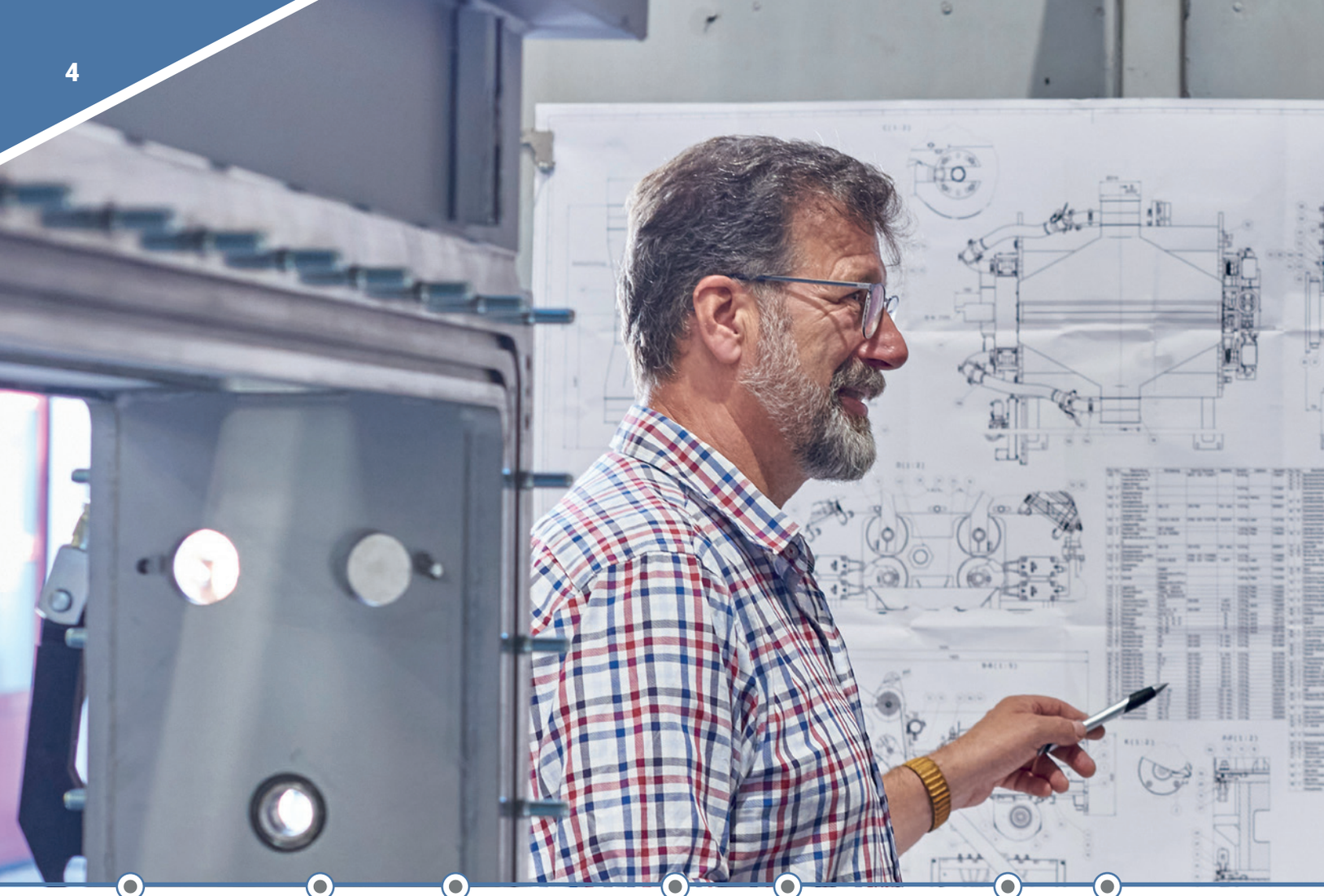
7 Claims, 4 Drawing Sheets

One of many patents by Prof. Dr.-Ing. Kramer



Structure of a modern strip floatation furnace

FOREWORD



1989 WSP GmbH is founded as an engineering company.

1999 WSP delivery the first floatation furnace for copper and copper alloys to S+T copper, Taiwan

2002 WSP delivers the first plant using hydrogen as protective gas including the complete safety technology

2004 WSP delvelops own high performance impellers exceeding state of the art technology

2005 WSP delivers the 10th strip floatation furnace to the customer Wieland-Werke AG.

2007 WSP delivers the first wet treatment parts: degreasing and brushing machines. Additionally we enhance our manufacturing capacities by an additional workshop.

2008 WSP delivers the first complete strip annealing line as the general contractor.

2009 WSP enhances state of the art floatation forces substantially, now at 850 °C, copper strip up to 2,0 mm can be produced (3,0 mm at 700 °C).

2010 WSP delivers the first floatation furnace to China.

2011 WSP delivers the first roller hearth furnace. WSP buils a thirs workshop for research and development activities.

2015 WSP delivers the 25th floatation furnace.

2019 WSP delivers the 10th complete strip line for treatment and annealing of strips.

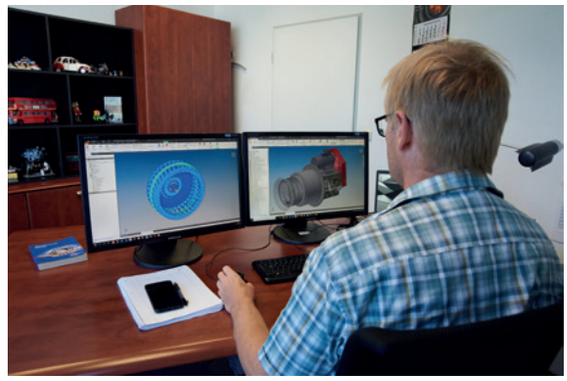
2022 WSP enhances manufacturing capabilities again, by integration of VULKAN Edelstahlkomponenten GmbH. This company specialized in manufacturing of parts for heat treatment.

VULKAN
Heat Resistant Equipment

WORK **WITH US**

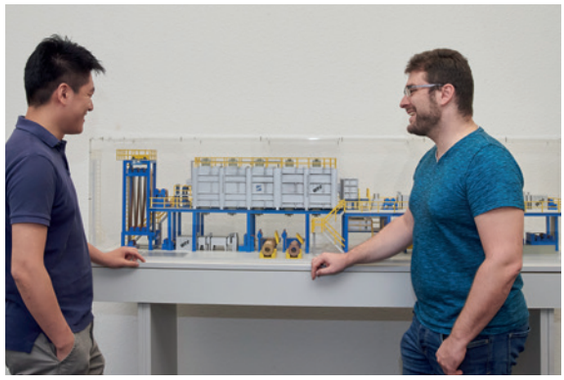
PROJECT MANAGEMENT

From the quotation to the acceptance of the plant, one of our project managers is your permanent contact for all questions and requests concerning your plant.



PREPARATIONS / BUDGET QUOTATION

You tell us your requirements for your new plant. We then develop initial ideas and drafts and prepare a budget quotation.



BASIC ENGINEERING

The origins of our company lie in engineering, and we have retained this strength to this day. Challenging tasks are our our specialty. Each plant is individually designed individually so that it can fulfill its tasks.

DESIGN AND ELECTRIC

Planning is followed by detailed design. We develop new plants or adapt already existing concepts to individual requirements. Our electrical department is responsible for the complete electric scope of supply.

COMMISSIONING AND AFTER SALES

06

We are also there for you after delivery. We carry out commissioning on site, train employees, carry out maintenance and remain your contact for your system throughout its entire life.

MANUFACTURING

05

Once the design is complete, it is followed by fabrication. This takes place at our site in Aachen, Germany in two workshops with crane capacities of up to 20 tons.

INSTALLATION

07

After delivery, we continue to accompany you and and your plant. The final installation is typically within scope of supply of WSP. We take over completely or accompany you in the form of supervision.

SUSTAINABLE & DURABLE

WSP STRIP FLOATATION FURNACES

Decades of research and continuous development have gone into our strip floatatation furnaces. Each of those is designed for the specific customer requirement.

The most important feature of WSP floatation furnaces is their long service life. Compared to older designs, the service life of the heating technology (gas burners electric heating elements) has been considerably improved.

The same applies to all internal metal parts, such as shingles, spiral casings and nozzle systems. These also achieve operation lives of 20 years and more without any problems, even at high furnace temperatures, thanks to the choice of materials, geometry and ribbing.

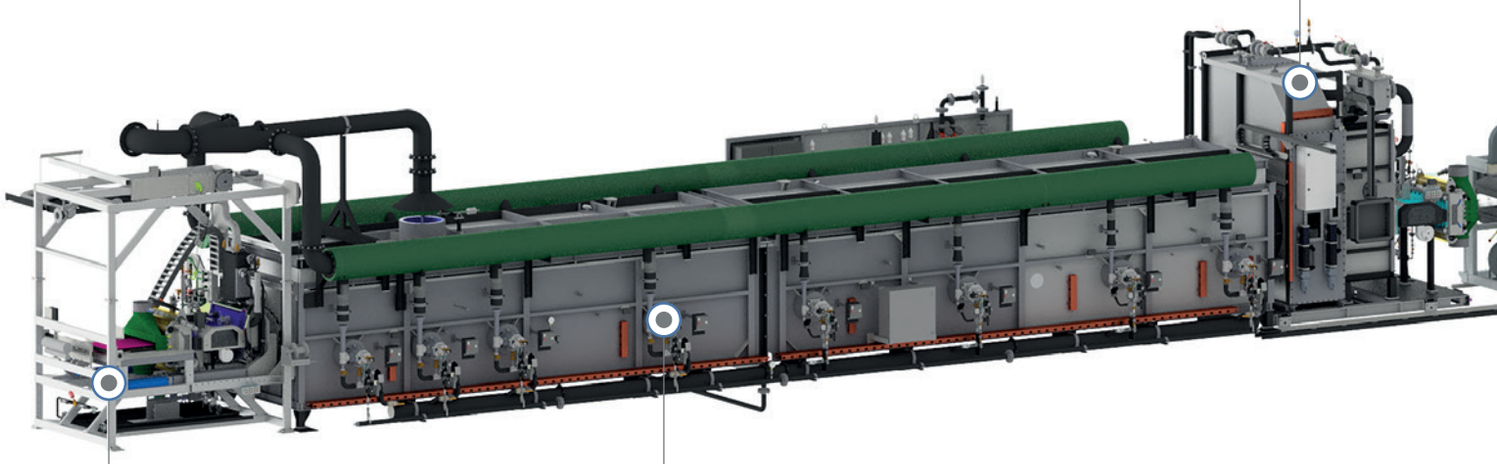
In addition, the WSP furnaces achieve the highest floatation forces, temperature homogeneity and excellent strip flatness thanks to state-of-the-art squirrel cage impellers, which blow out on one side for optimum efficiency.

HARDENING AND TEMPERING

We supply the complete heat treatment for continuous steel strip tempering. In In recent years, we have significantly improved the technology. Thus, with WSP plants, in particular, it is possible to carry out quench cooling without a lead bath. The plants typically consist of the following components:

JET COOLING

realizes highest cooling rates between 200 - 1,000 K/s and allows highest flexibility to achieve optimum results for all alloys and strip thicknesses.



INLET SEALING

assures separation of atmospheres up to 100 % hydrogen inside the austenitizing furnace.

AUSTENITIZING FURNACE

heats strips to temperatures > 1,000 °C

PLATE OF ROLL COOLING UNIT

inside this unit, the transformation to martensite phase takes place while an optimum strip flatness is enforced by fixed position due to rollers or plates.

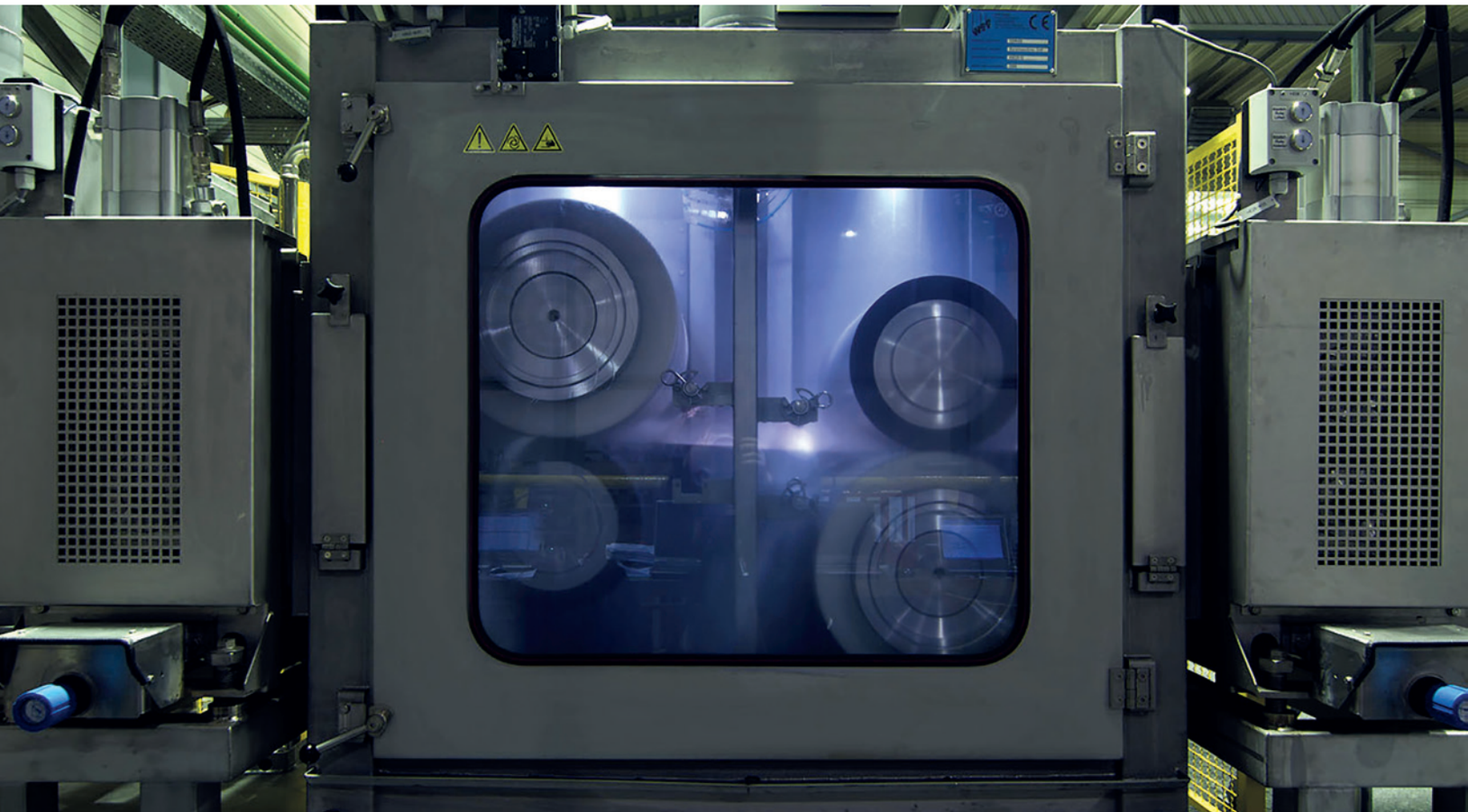
IRONING FURNACE

with precise temperature adjustment

TEMPERING FURNACE WITH COOLING

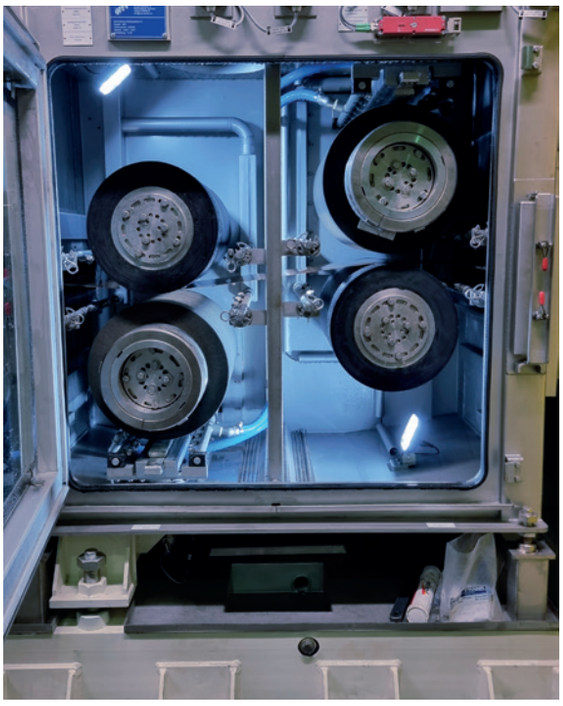
can also be used for strip coloring

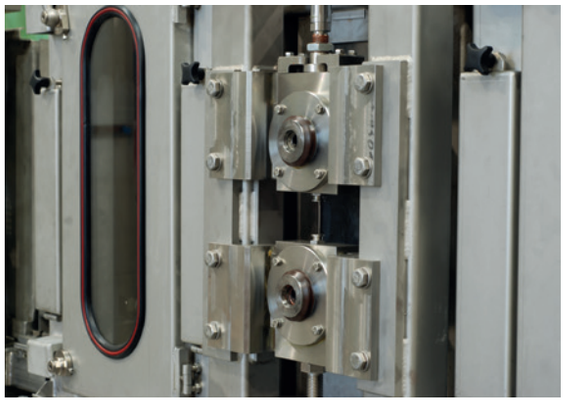

WSP



WET TREATMENT

WSP manufactures equipment for the wet treatment of metal strips. With these plants the strips can be degreased, pickled, brushed and dried again.





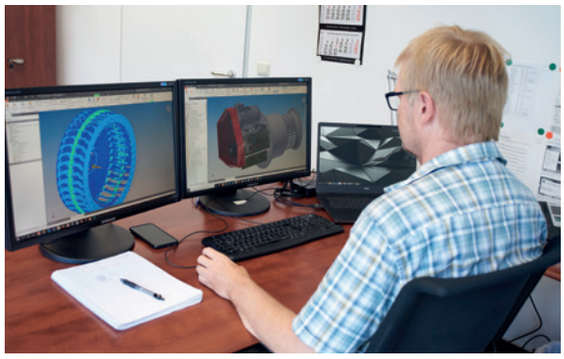
Our degreasing plants reliably remove rolling oil from strip surfaces.

WSP dryers are reliable, efficient, quiet and dry even under difficult conditions. The dryers are electrically heated and equipped with a precisely tuned WSP fan impeller. WSP plants unse spray pickling for optimum results. The WSP brushing machine is optimized using FEM analysis and the machine housings are filled with a damping concrete compound specially developed by us.

ENGINEERING TO THE POINT

WSP can typically distinguish itself from its market competitors by the fact that we are able to adapt our plants individually to the customer's requirements. Historically, this is also due to the fact that WSP was originally founded by Prof. Dr.-Ing. Carl Kramer as a pure engineering service provider.

In many cases, we already intensively investigate your requirements and possible solutions before preparing an offer. For this purpose, our engineers have all possibilities at their disposal according to the state of the art.



This enables us to present you with an optimal plant concept. Often also, especially if joint tests are carried out, we can assure you of certain product characteristics.

MOST MODERN CAE TOOLS

- Simulation of flow and heat transfer systems by CFD
- Calculation of stresses and deformations by using FEM

DIVERSE TESTING POSSIBILITIES

- Laboratory furnace for defined temperature sequences
- Nozzle system and fan test benches

In the upper picture: simulation of a high-temperature impeller up to 1,000 °C.

These possibilities are used to continuously improve our products. In addition, also in order to clarify new questions, with which customers approach WSP, so reliably that one can design a suitable plant reliably on this basis. In particular, WSP has further developed hot gas fans, which WSP is manufacturing in house since 2005.

HAND IN HAND TO SUCCESS

We are committed to keeping our team constant. We are constantly working to improve our equipment. To this end, we often invest several years in research projects. Our plants are particularly durable. That is why we stay in contact with our customers for many years. Both aspects benefit from a consistent team that works hand in hand. Our employees see it the same way. Our company has a very low employee turnover. Those who apply for a job with us come to stay.

For our customers, this means that their contact person stays with them. WSP cooperates closely with the Aachen universities. Bachelor's and master's theses are regularly supervised in order to answer new questions and improve our products. Not infrequently, this is also the beginning of an employment relationship at WSP. However, even then it typically takes several years before an employee has experienced a sufficient number of project cycles and has gained enough experience to be able to take on responsible tasks.

Employees particularly appreciate the varied tasks and the opportunity to directly influence WSP products and processes.

M. Eng. Michael Kahlen
Project Management

Many companies differentiate between sales and project management. At WSP, however, almost all plants are designed according to individual customer requirements. End-to-end project management by a project manager has proven very successful and is appreciated by our customers. Responsibility lies in one hand for project control, scheduling and process engineering right through to installation.

A special project was the heat treatment of thin bars at high annealing temperatures with a roller hearth furnace. The process could not be carried out on existing equipment because the bars deformed unacceptably. Only after WSP R&D had found a solution did we prepare a binding offer.

Dr.-Ing. Thomas Berrenberg
Head of Technology and R&D

For this project, initially various considerations were made as to how the inadmissibly large deformations could be reduced. This was conceivable on the one hand by reducing the roller spacing, but also by optimizing the operation of the rods during the annealing process. However, it was not possible to derive any statements with sufficient certainty from purely theoretical calculations. Therefore, various tests were carried out in the WSP technical center and with third parties to check whether these solutions would ultimately be sufficient to achieve the required straightness. Here we came to the conclusion that this would be possible and that we would be able to give the customer sufficient assurances. It is through such approaches that WSP can set itself apart from its market competitors.

„AT WSP WE ARE ALWAYS DEVELOPING FURTHER!“

Dipl.-Ing. Ralf Wirtz
Head of Electrical Department

Our task is to provide comprehensive support for the automation technology. We are involved in every project at an early stage in order to record and specify the often individual requirements of the customer. The switchgear construction itself is carried out by experienced external partners, but is very closely supervised by us. Here we are the interface between the WSP departments project management/design and the hardware planning third party. During the execution phase, we then program the PLC control system and usually also the visualization software. Before delivery, we check the control technology as well as the pre-cabling before we then commission the system at the end customer together with the project management.

Frank Stefan
Installation

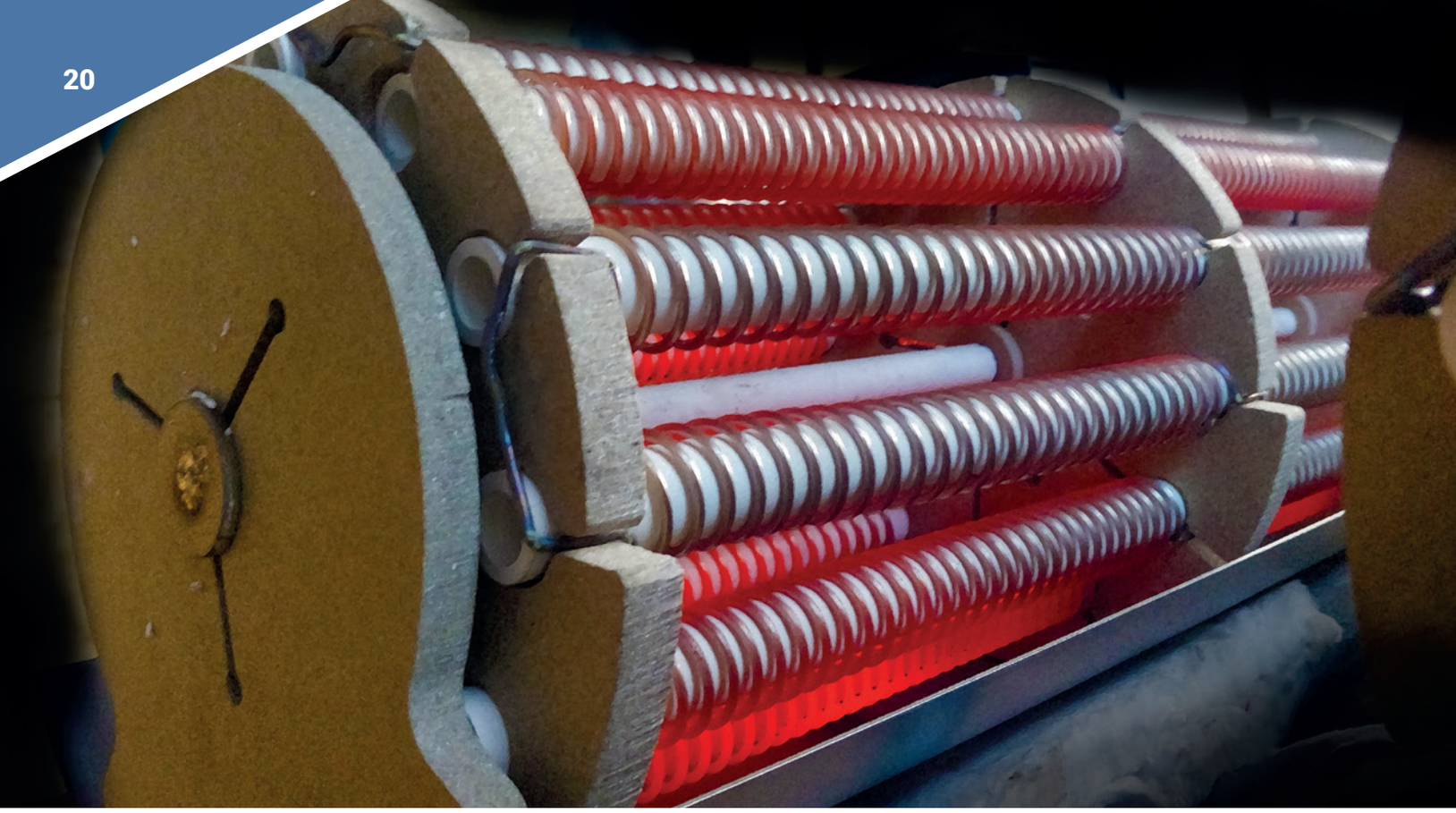
In the early project phase it is important to clarify how the plant can be transported to the later installation site. During the project it is our responsibility to plan the installation including material and manpower requirements. We also plan packaging and transport, which can be costly, especially for our overseas projects. After the plant has arrived at the customer's site, we carry out the installation. We are also responsible for inspection and repair work at our end customers.

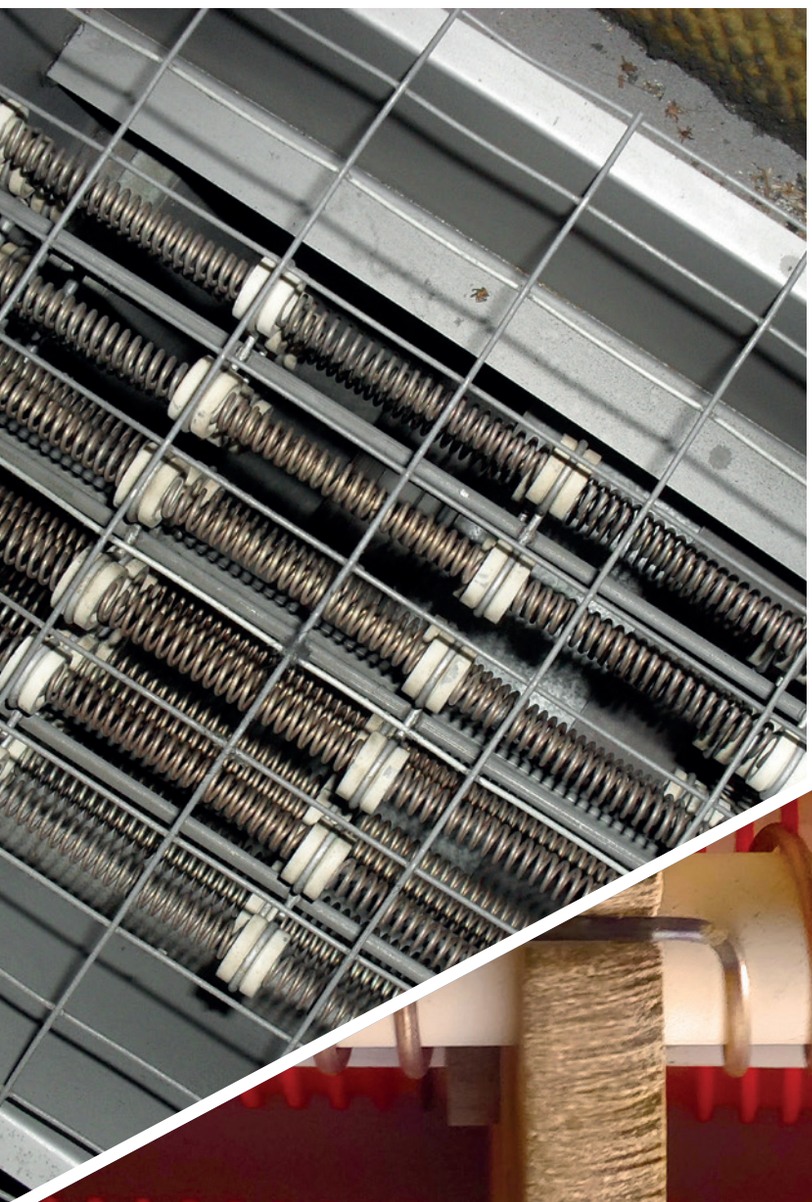
Dipl.-Ing. Ralf Peiffer
Head of Development Design

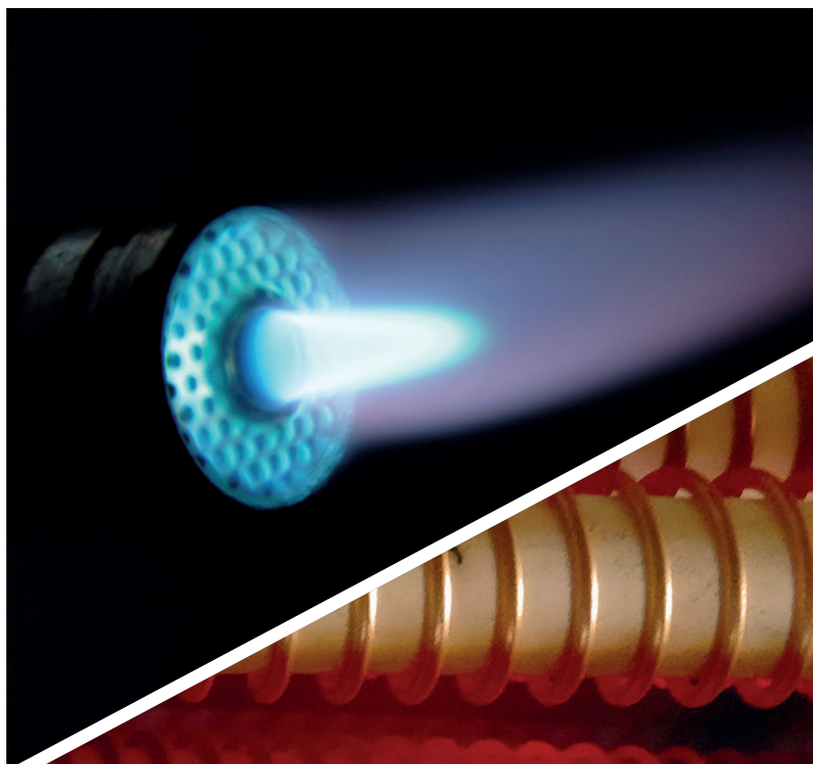
Even before an order is placed, we have had to clarify how we can modify nozzle systems, rollers and their bearings so that the difficult specifications can be achieved. We often benefit from the fact that we can draw on a wealth of experience. This is because WSP has developed a large number of solutions over the past 30 years. In this way, we have also been able to adapt solutions that have already been implemented for the nozzle system and thus achieve our goal more quickly.

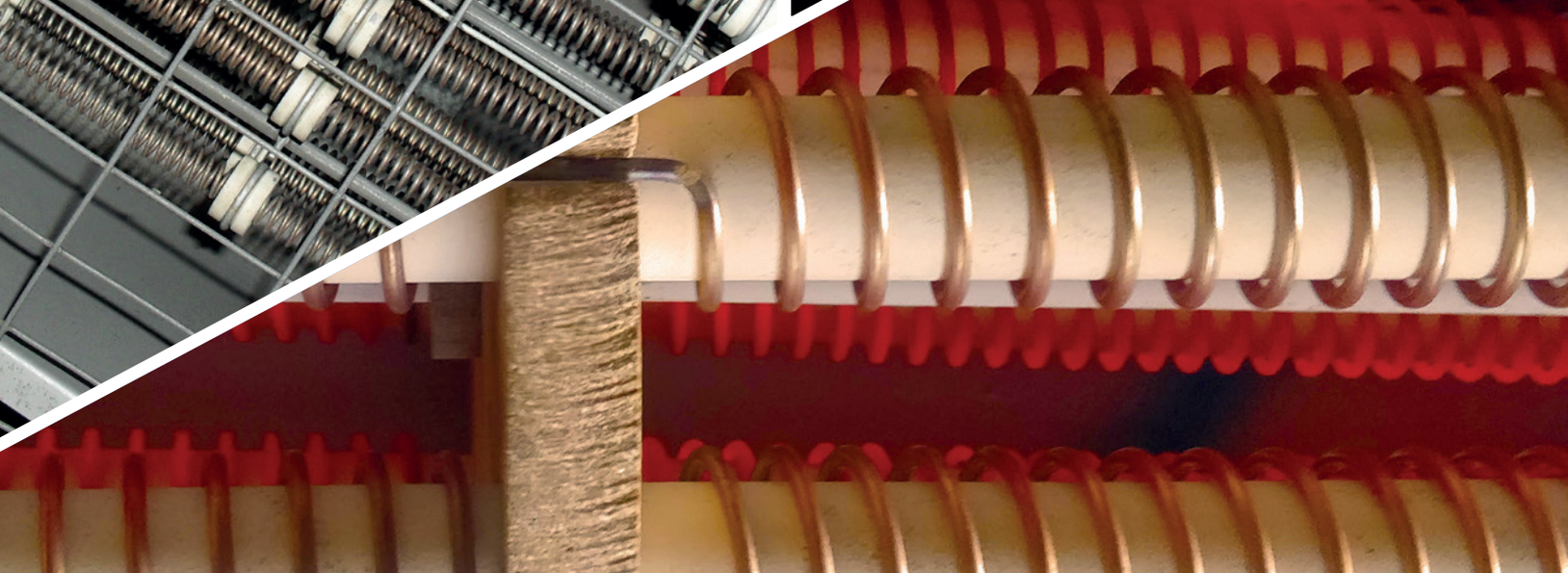
Birgit Borchert
Technical Documentation

Technical documentation requirements have increased steadily in recent years. However, WSP's claim has always been that we provide the customer with the best possible information for understanding the equipment itself, but also for maintenance and servicing. We therefore supply very detailed documents, far more than required by the European Machinery Directive. For example, all type designations of the standard components, but also, if desired, the complete risk assessments.









REDUCING CO_2 FOOTPRINT

FROM GAS TO ELECTRIC

For over 30 years, we have been developing industrial equipment and constantly improving our products. We want to continue this in the future. In order to be able to live on a beautiful earth in this future as well, the sustainability of our plants is very important to us. We are constantly researching how we can make our plants more efficient and offer new developments for existing plants. If you would like to invest in a clean future, please contact us to convert your gas-fired furnace to electric heating.

In particular, we are currently receiving more and more inquiries about converting existing plants to electric heating. WSP has had experience with these for many years, as natural gas is sometimes not available, especially in Asia, and thus various furnaces there have already been designed with electric heating. In the case of floatation furnaces, which are indirectly heated, such a conversion is usually possible without any problems.

Dr.-Ing. Thomas Berrenberg, Technical manager, at WSP also responsible for heating technologies

In the case of directly heated furnaces, on the other hand, the power per burner is sometimes considerably higher, so that it must be checked exactly whether the surface load of the electric heating elements is still within the permissible range. If not, additional positions for heating elements must be found. We would be pleased to work out a concept for your plant, please contact us!

PROCESS AUTOMATION & CONTROL

OF ROLLING MILLS AND STRIP PROCESSING LINES

CSE Seekamp Elektroausrüstungen GmbH & Co. KG is specialized in automation of cold and hot rolling mills, slitting lines, annealing and pickling lines and strip treatment plants as well as customized switch cabinet and console design.
The internationally active customers process strips made of steel, stainless steel, aluminum, copper, non-ferrous metals and special materials. The company's success is based on continuous development and structured concepts for practical applications. Employees are working for the company since many years and have comprehensive know-how in process automation and technology.

Detailed and structured documentation is part of every CSE delivery. CSE recognized the need for specialists many years ago already and properly prepared themselves through continuous training of young engineers and technicians.
The particular strength of CSE besides their extensive know-how in the metals business is their commitment to success of each project. Maintenance and service by remote control are a common way for CSE to act across the globe and is appreciated by all customers.

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