

**ELOTHERM**

SMS group

**TemperLine™**

Induction: Quench & Temper



# SMS GROUP

## Leaders in plant construction and mechanical engineering

The SMS group ranks among leading companies in the field of plant construction and mechanical engineering for the industrial processing of steel, aluminum and nonferrous metals. It consists of the two Business Areas SMS Siemag and SMS Meer. Both areas offer integrated solutions for metallurgical process technology, casting and rolling technology as well as other shaping and refining processes.

### FAMILY-OWNED AND WORLDWIDE PRESENT

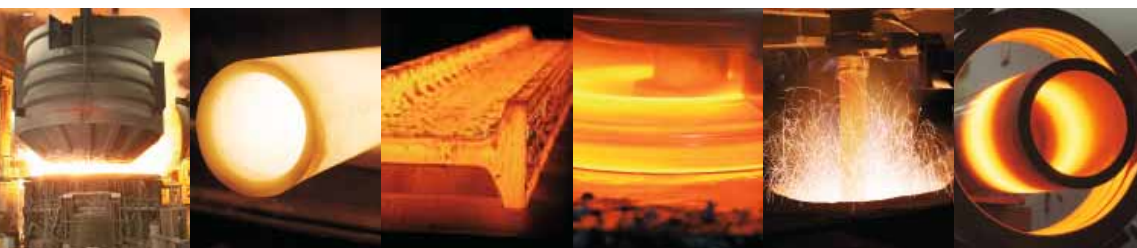
As a family-owned company, the SMS group has built on solid values and a culture of responsibility for four generations. It holds a strong market position while its decentralized structure ensures a fast and efficient response to individual customer demands. The SMS group combines the flexibility of company units that operate as medium-sized enterprises and the broad resources of an internationally active company – all for the customer's benefit. The decentralized corporate culture ensures that not only the individual units but also the employees themselves always think and act in an entrepreneurial manner.

### BUILDING ON A STRONG BASIS

A long-term view, careful financial management, focus on values, plus knowledge about the cycles of the machine and plant construction market have, for decades, informed the group's strategic planning. Also high on the agenda is investment in the areas of energy and environment technology, service and modernization of plants as well as on-the-job training and qualification of core employees. On this basis, the SMS group creates tailor-made plant solutions, which enable the customers to keep well ahead of the competition.

**SMS  
SIEMAG**

SMS group



**SMS  
MEER**

SMS group

# SMS ELOTHERM

Your partner for induction heating solutions

With its developments and system solutions, Elotherm has set standards in induction technology for decades. The medium-sized internationally operating company is part of the SMS group. As a technology leader, Elotherm combines all competences when it comes to induction.

- Induction heating of metals for forging and rolling
- Induction hardening and quench & temper
- Laser technology
- Induction welding, annealing and special technology for tubes
- Continuous induction strip heating
- Induction kinetics

## **CUSTOMIZED SYSTEMATIC SOLUTIONS**

Elotherm's technology is based on compatible modular plant components, which can be efficiently combined into individual configurations. This enables economic industrial heating solutions – irrespective of whether it is a single unit or a complete manufacturing line.





# CORE COMPETENCES

All your benefits at a glance

## RAPID AND PRECISE HEATING

When applying the induction heating method a metal workpiece is exposed to an electromagnetic field in a non-contact manner by means of a coil. As a result, a current is generated in the material which produces heat, i.e. directly in the workpiece itself. Therefore, the workpiece must not be heated by heat transfer as in a conventional furnace. Consequently, the heating times are very short and the temperature can be set precisely.

## INTEGRATED OFFER

Elotherm combines all competences of the induction technology under one roof and thus offers its customers tailor-made, integrated services from one source with a responsible contact person. The spectrum of services ranges from giving advice via engineering, plant construction up to commissioning, training courses and comprehensive customer care.

## RISE IN QUALITY, REDUCTION OF COSTS

In modern production lines the Q & T plants of Elotherm are the standard facilities for quenching and tempering of tubes and bars.

In the field of induction quenching and tempering, Elotherm is the market leader and combines the entire expert know-how from the induction hardening and heating technology for long products.

## SOLUTIONS FROM A SINGLE SOURCE

Together with our sister companies of the SMS group, we offer our customers integrated solutions for the whole process chain.

## TECHNOLOGY LEADER WITH OUTSTANDING PROCESS COMPETENCE

- Experience spanning more than 70 years
- Innovative system partner for the automotive and supplier industry as well as the steel, rolling mill, and pipe production industry
- More than 6000 plants worldwide in continuous operation for decades
- Sales and service around the globe
- Fast delivery by local manufacturing and stock-keeping facilities

## INDIVIDUAL CUSTOMER CONFIGURATIONS

- High efficiency thanks to modularized plant components
- Tailor-made manufacturing solutions

## ENERGY-EFFICIENT, ECONOMIC INDUCTION

- Minimized energy consumption through intelligent technologies
- Sustainable and eco-friendly due to reduction of CO<sub>2</sub>
- Quick change of production and increased productivity
- Low manufacturing costs
- Integrated effective power measurement for efficient quality control

## IN-HOUSE INDUCTOR AND CONVERTER MANUFACTURING

- All competences under one roof
- Optimal technical interfaces to existing customer systems
- Individual design and layout to attain optimum results
- Innovative converter development with low and resource-saving energy demand

## PRECISION IN PROCESSING

- All relevant certificates, e.g. VDA, DIN/ISO
- Continuous project and quality management from the initial enquiry through field service

# FOR TOP GRADES

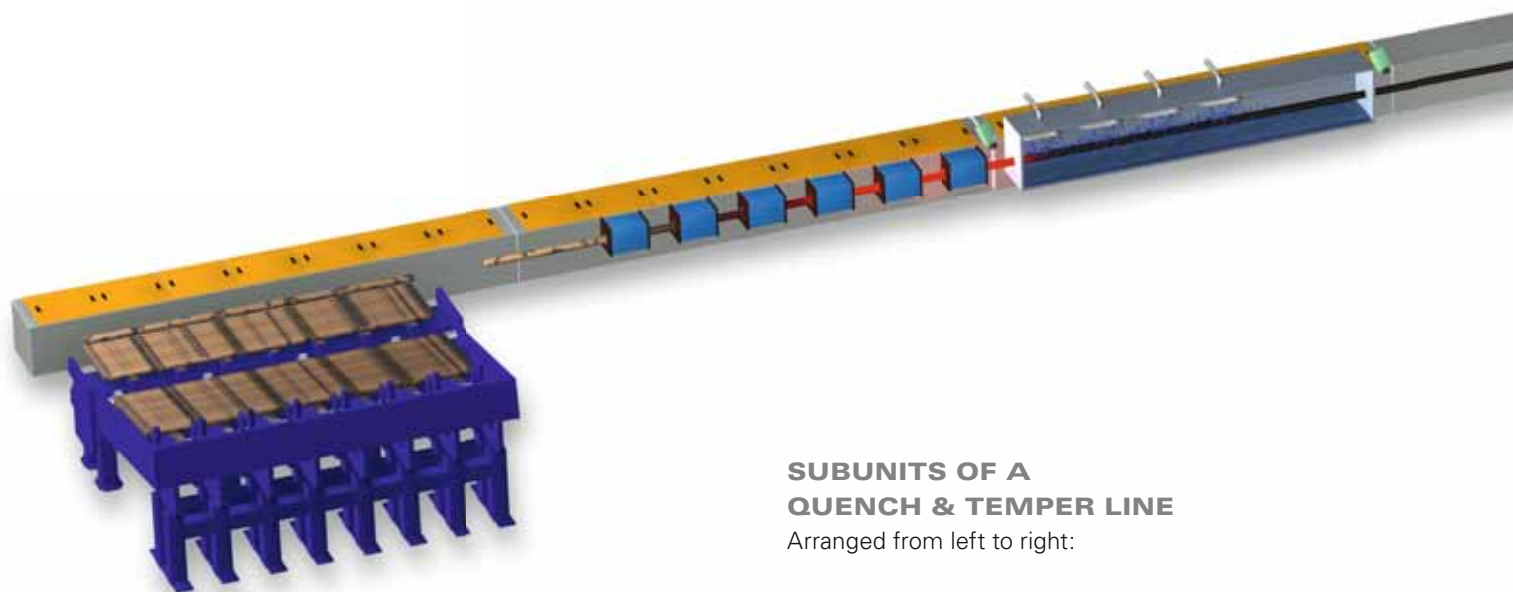
## Quench & temper lines

### QUENCH & TEMPER FOR TUBES

The induction plants of Elotherm for quenching and tempering of tubes consist of an induction heating section with subsequent quenching facility followed by a tempering section for the setting of the desired hardening parameters. The quench & temper lines of Elotherm are above all convincing by their high efficiency, precision and flexibility compared to conventional gas- or oil-fired furnaces.

### QUENCH & TEMPER FOR BAR STEEL

The quench & temper lines for long products such as bar steel likewise provide an induction heating section, a cooling section and downstream tempering induction coils. Heating and tempering coils are subdivided into several controllable zones. This has the advantage that each final zone is usable for homogenizing, austenitizing, solution annealing (stainless steels) or for hardness adjustment.



### SUBUNITS OF A QUENCH & TEMPER LINE

Arranged from left to right:

- Loading station
- Induction heating, austenitizing
- Quenching station
- Tempering and holding section
- Cooling bed



### **MORE PRODUCTIVE AND MORE FLEXIBLE**

Within minutes the quench & temper lines of Elotherm can be adjusted to new dimensions, steel grades or special features such as tubes with upset ends. Even if lengths and diameters are different, the production rate (tons per hour) is significantly higher with induction technology than with conventional furnace technology which requires long changeover times and time-consuming adjustments. Due to a high flexibility of the Elotherm induction systems, the availability is many times higher than for conventional furnace technology.

### **MORE HOMOGENEOUS AND MORE HIGH-GRADE**

Thanks to the highly precise induction processes of Elotherm, a very high homogeneity is achieved with regard to the hardness, the mechanical properties and the microstructure when quenching and tempering is performed. After the induction heat treatment, for example, a tolerance range of  $\pm 1$  HRC (Rockwell C) over the entire material length is available.

### **MORE EFFICIENT AND MORE ECO-FRIENDLY**

Quench & temper lines of Elotherm will only consume energy when they are in use. Gas- and oil-fired furnaces by contrast consume an enormous amount of energy also during idling phases. In addition, harmful CO<sub>2</sub> and NO<sub>x</sub> emissions are released during the combustion, whereby the average annual quantity is comparable to the emissions of several thousand passenger cars. Induction quench & temper lines work free of emissions.

### **FASTER RETURN OF INVESTMENT**

Normally, the induction quench & temper lines of Elotherm are assembled at the customer much faster than the lines with conventional furnace technology. Additionally, the induction lines are convincing due to problem-free commissioning and the production of salable products can be resumed correspondingly sooner. With the induction quench & temper lines of Elotherm, new processes can be developed quickly, enabling a simple representation of prototype manufacturing for the end customer.





- Through warpage-free quenching and tempering, cost-intensive processes such as sizing or straightening become unnecessary
- Low operating costs and maintenance
- Compact design and modular plant concept
- Quenching and tempering without decarburization which negatively affects the material hardness

#### KEY FEATURES

#### FROM A CUSTOMER PERSPECTIVE

*"We decided to complete our alloy steel long products new Finishing Department with a flexible and high performance Quench & Temper Line by SMS Elotherm."*

*We are convinced that only SMS Elotherm has enough capability and expertise to be our technology partner for developing the highly flexible heat treatment line suitable for the wide range of steel grades and processes required by the growing Indian specific market"*



Mr. Rahul Yenurkar, Executive Director of Bhushan Power and Steel Ltd.

# CONVERTERS AND INDUCTORS

## Knowing what is important

### COMPETENCE FOR BETTER PROFITABILITY

Converter, oscillating circuit, inductor – together they are the heart of every induction plant. These factors substantially determine the process reliability and economy for the customer. For that purpose, Elotherm has brought together all core competences under one roof – from in-house development to in-plant production.

### OPEN FOR THE FUTURE

Modular design and standardizations of the EloMat™ converters make sure that efficiency, durability and serviceability are achieved. For any application, the EloMat™ converters for LLC, series and parallel oscillating circuits provide an optimum power source. Frequencies of up to 600kHz and an output of 4500kHz for each converter unit are realized by modern transistor circuits. EloMat™ converters stand out thanks to their modern digital control and a user-friendly operating concept. Very flexible interfaces enable a harmonic integration into process control systems and higher-level plant controls.

### PERFECT WORKPIECE ADAPTATION

Inductors of Elotherm are combining highest precision and high efficiency with process reliability. As interface between machine and workpiece, surrounding round, shape or line inductors are used. Calculation and simulation programs developed by Elotherm ensure application-specific implementations and proper dimensioning and thus a high level of process quality.

- Converters and inductors of our own manufacture
- Durable, easy-to-service components
- Future-oriented continuous development through our own research

### KEY FEATURES



# SERVICE

For top customer satisfaction

## CUSTOMER-ORIENTED ORGANIZATION

For the service area, Elotherm has created an organizational structure which optimally supports the customers. In addition, Elotherm provides a worldwide service network which is continuously further extended. Current locations are in Germany, France, North America, China and Brazil. The result for the customers: highest availability and shortest reaction times.

## SERVICE FROM PLANT MANUFACTURER

The service customers of Elotherm benefit from an in-depth know-how of the plant manufacturer. The advantages:

- Rise in productivity
- Increase in plant availability
- Improvement in product quality
- Reduction in operational costs
- Safeguarding of plant value
- New fields of application for older facilities

## ALL-INCLUSIVE SERVICE OFFERING

Depending on customer needs, Elotherm provides appropriate services. Similar to the actual plants, the customer can economically use individual or several harmonized modules.

- Assembly and commissioning
- Production assistance
- OEM spare parts service
- Consignment stores
- Repairs
- Maintenance
- Operating advice
- Modernizations
- Maintenance services
- Quality checking
- After-sales service
- Training courses
- Service hotline



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**MEETING your EXPECTATIONS**