Furnaces and Services for Metals
LOI Italimpianti – Furnaces and Services for Metals

LOI Italimpianti is the leading global supplier of reheating and heat treatment plants for advanced materials and provides a full range of industrial furnace systems for almost all applications in the metal industry. The LOI Italimpianti Group includes a worldwide network of individual companies present on all key markets. Through strong synergy effects, the Group is in a position to offer solutions to all problems arising in connection with thermal processing technology.

LOI Italimpianti is a member of the Tenova Group with subsidiaries such as Tenova Pomini and divisions such as Tenova Strip Processing. This affiliation results in further positive synergy effects for the iron, steel, automotive and aluminium industries.
The entrance of LOI in Tenova and its merging with Italimpianti has created the most important world player in the sector of industrial furnaces.

Founded in 1970, LOI is a German Group with its headquarters in Essen. Over the years, it has built up subsidiaries in key countries which made the Group to become one of the major industrial furnace companies in the market. LOI is a benchmark in the industrial furnace industry. Thanks to its profound knowledge in the heat treatment furnace technology it has brought innovation and development to many products.

Italimpianti, an Italian engineering company, founded in Genoa in 1957, has been a leading integrated supplier of technology and turnkey industrial plants and is specialized in reheating furnaces.

<table>
<thead>
<tr>
<th>Materials</th>
<th>Steel Strip</th>
<th>Automotive Parts, Tubes, Rods</th>
<th>Aluminium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Furnaces and Components</td>
<td>H$_2$-Batch Annealing (HPH®)</td>
<td>Continuous Carburizing</td>
<td>Melting, Holding and Casting</td>
</tr>
<tr>
<td></td>
<td>Continuous Annealing Lines for Si-Steel (horizontal)</td>
<td>Tube Bright Annealing (high alloyed steel, steel, non-ferrous)</td>
<td>Twin-Chamber Melting / Recycling</td>
</tr>
<tr>
<td></td>
<td>Continuous Galvanizing Lines (horizontal)</td>
<td>Wire Coil Annealing (H$_2$-Batch, continuous)</td>
<td>Strip, Coil and Foils Annealing</td>
</tr>
<tr>
<td></td>
<td>Hot Formed Materials</td>
<td>Heat Treatment of Components</td>
<td>Heat Treatment of Components</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hot-Dip Galvanizing</td>
</tr>
</tbody>
</table>
Reheating Furnaces

LOI Italimpianti Reheating Furnaces provide excellent quality and productivity for processing slabs, billets, blooms, beam blanks and rounds.

LOI Italimpianti designs include:
- Walking Beam and Walking Hearth Furnaces
- Roller Hearth Furnaces for Thin Slab
- Pusher Type Furnaces
- Rotary Hearth Furnaces
- Pipe Reheating Furnaces
- Car Bottom Furnaces

WALKING BEAM FURNACES

As a long-time player in Reheating Furnaces, LOI Italimpianti has installed some of the world’s largest Walking Beam Furnaces.

Walking Beam Furnaces
(reheating for hot forming)
Material: C-steel, stainless steel, copper, grain oriented steel, titanium, special alloys
ROLLER HEARTH FURNACES FOR THIN SLABS

The latest plants implementing direct rolling technology use a new furnace concept suitable for slab lengths up to 30-50 m and, in special cases, endless rolling for bar lengths up to 300 m. LOI Italimpianti Roller Hearth Furnaces for these applications are designed to meet the requirements of direct rolling technology, with a special focus on critical components such as rollers and burners.

ROTARY HEARTH FURNACES

LOI Italimpianti is the worldwide leading supplier of Rotary Hearth Furnaces for several process applications and product types. LOI Italimpianti has installed some of the largest diameters and highest capacity Rotary Hearth Furnaces in the world.

- Highest capacity for reheating of blooms and billets
- Charging equipment for high frequency of loading and unloading
- Increase of productivity and energy savings by using regenerative burners

Material: C-steel, stainless steel
Heat Treatment and Quenching of Heavy Plates

Market success in the future-oriented sector of quenching and tempering lines for high-quality steel plate is only possible with furnaces and quench facilities designed on the basis of comprehensive in-depth process expertise in combination with an effective overall automation concept based on mathematical modelling. For LOI Italimpianti, many years of experience in the construction of reheating and quenching and tempering plants for the automotive and machinery industries laid ideal foundations for the development of single-source solutions including plants and harmonized process models tailored to customers’ individual applications.

- Austenitizing, Quenching, Tempering as well as Normalizing
- Capacity up to 100 t/h
- Batch and continuous type quench systems
- Wide range of plate dimensions

Roller Hearth Furnace with continuous quench (quenching and tempering)

Heavy Plate Heat Treatment Line (austenitizing, quenching, tempering)
Material: C-steel, stainless steel
Double Walking Beam Furnaces are suitable for heavy-gauge plates and heavy loads, especially if quenching is required.

Material: stainless and carbon steel plates
Heat treatment for pipes and tubes

From stand-alone heat treatment furnaces to complete heat treating lines, LOI Italimpianti provides reliable equipment for the processing of pipe products. Tempering furnaces, hardening furnaces and innovative quenching systems are designed to meet the strict processing requirements of the modern pipe producing plant.

WALKING BEAM FURNACE
FOR AUSTENITIZING, QUenchING
And TEMPerING PIPES AnD TUbES

Walking Beam Furnace for austenitizing, quenching and tempering pipes
Material: structural steels, alloyed case hardening or quenching and tempering steels, high-strength microalloyed fine-grain steels, oilfield tubular steels, high temperature steels

CONTINUOUS ROLLER HEARTH FURNACES
FOR PIPES AnD RODS

- High capacity and easy adaption of conveyor systems to annealing process
- Gas-tight furnace space, designed for atmospheres of up to 100% H₂, and dew points as low as -60°C
- Low maintenance requirements
- High availability

Continuous Roller Hearth Furnace for bright annealing of LWC (level wound copper tubing)
Continuous Roller Hearth Furnace for the soft annealing of hot-rolled tool steel rods in a nitrogen atmosphere
Heat Treatment for railway wheels

Targeted hardening in a short space of time
Our quench facility for the targeted hardening of railway wheels for high velocity trains is one of our latest innovations. On the basis of many years of experience with heavy-gauge steel plate and continuous development, we are in a position to create new technologies even for the most arduous requirements in a very short space of time.

Continuous Heat Treatment Plants for forgings

The LOI Italimpianti products range has been developed continuously and now includes not only conventional individual furnaces for the heat treatment of forgings but also a number of compact plants developed to meet client’s requirements.

Fully automated twin-track quenching and tempering line with water/polymer quench
During the past years Electrical Steel, also called Si-Steel, has gained an extraordinary attention. The building up of huge capacities for the supply and transportation of electrical energy and the requirement of reducing the losses in transportation and transformation of electrical energy has created a huge demand for the production of grain-oriented and non-grain-oriented silicon steel. Especially the production of grain-oriented silicon steel requires highly specialized processing of a whole series of large-size continuous processing lines and a high-temperature batch annealing system. LOI Italimpianti is the only company able to supply the whole transformation process for silicon steel production.
Annealing & Pickling Line (APL)
Material: grain-oriented and non-grain oriented silicon steel strip

Annealing & Coating Line (ACL)
Material: non-grain oriented silicon steel strip

Continuous Galvanizing Lines (CGL)

Special Features:
- Directly fired furnaces for cleaning the strip surface
- Exact control of gas/air ratio
- Post combustion to meet the highest environmental standards
- Superior roll design avoids deformation of the strip surface
- Effective rapid cooling
- Mathematical model

Horizontal Galvanizing Line
Material: carbon steel
**HPH® Bell-Type Annealing Plants for Steel Strip**

- World-wide market share approx. 50%
- Annealing bases with long service lives, with no need for continuous maintenance
- Sturdy cast diffusor system
- Highly effective base recirculation fans with speeds up to 3000 rpm

**Typical installation of an HPH® Bell-Type Annealing Plant for steel strip with BYPASS + JET COOLING**

- Dew point below -60°C
- Different cooling systems available
- Fully automated control systems
- Various software modules available for optimization
- Useful diameter up to 2700 mm
- Stack height up to 6600 mm

*HPH* = High Performance Hydrogen

**HPH® Bell-Type Annealing Plant for steel strip**
Material: carbon steel, stainless steel
References: >3500 HPH® bases (and >5000 HNX bases)
Bell-Type Annealing Plants for Silicon Steel Strip

- Multi-Stack Plants (up to four stacks per heating hood)
- Process temperatures up to 1250 °C
- Several coils may be stacked over each other thanks to effective, high-temperature-resistant support systems
- Electrically powered heating hoods
- Annealing in a hydrogen atmosphere
- Cooling by cooling systems integrated in heating hood

Multistack Bell-Type Annealing Plant for grain oriented silicon steel strip (GO) with annealing temperatures up to 1250 °C and two different designs, (single and double-layer coil support design)

References: >400 bases
**HPH® Bell-Type Annealing Plants**

**for Wire**

- LOI market share over the past 10 years approx. 50%
- Both multi-stack and single-stack plants available
- Multi-stack plants with recirculation up to material temperature of 900 °C
- High performance atmosphere gas recirculation system
- Hydrogen or nitrogen atmosphere
- Sturdy cast diffuser system
- Dew point below -60°C
- Annealing without decarburizing
- Useful diameter up to 4600 mm
- Stack height up to 5600 mm

**Bell-Type Annealing Plant for Wire**

Material: wire & rod
References: >300 HPH® bases
(and >500 HN bases)

**HPH® Bell-Type Annealing Plants**

**for Non-Ferrous Metals**

- First reference from 1949
- Both single-stack and multi-stack plants available for non-ferrous wire and non-ferrous strip
- High-performance atmosphere gas recirculation system
- Hydrogen, nitrogen or other atmosphere gases possible
- Advanced vacuum technology for evacuation
- Very high process quality; dew points below -60°C
- Sophisticated plant design and process technology for high plant productivity and material quality
- Useful diameters 800 to 2400 mm

**HPH® Bell-Type Annealing Plant**

for non-ferrous metals
Material: non-ferrous metals, mainly copper and copper alloys
References: >60 HPH® bases
Heat Treatment Plants for Wire

CONTINUOUS ROLLER HEARTH FURNACE FOR WIRE COIL ANNEALING

Semi-continuous Roller Hearth Furnaces with a reactive atmosphere embody the roller-hearth technology and process combined with the flexibility of a bell-type annealing system.
Material: carbon, alloy and stainless steel, copper

SHORT TIME CYCLE FURNACE FOR SPHEROIDIZE ANNEALING OF ROD AND WIRE COILS

Rotary Table Furnace for solution annealing of high alloyed wire coils
Special features:
- full automatic operation
- charging without trays
Material: stainless steel wire coils

Continuous Roller Hearth Furnace with protective gas atmosphere for very high annual output and excellent quality
Material: carbon, alloy and stainless steel, copper

ROTARY TABLE FURNACE FOR WIRE COILS

AUTOMOTIVE
Since 1950 several hundred case hardening lines for automotive parts (with carburizing furnace, quench, washing machine, tempering furnace and fully-automated material handling; customers are all large automotive companies)

Many other hardening lines built for axles, crank shafts, wire coils etc.
Full practical knowledge for carburizing, decarburizing, quenching, nitriding and other processes combined with massive own mathematical models

ROTARY HEARTH FURNACE WITH ZONE SEPARATION

The LOI Italimpianti Rotary Hearth Furnace is just as simple as it is revolutionary. LOI Italimpianti’s original heat treatment technology for case hardening and quenching and tempering steels has been continuously developed and optimized from application to application.

Benefits:
- Short treatment cycles
- Lower energy costs
- Completely automated
- Low maintenance and repair costs
- High reproducibility
All the well-known innovative manufacturers of large components for the automobile industry already use our rotary hearth gas carburizing furnaces with zone separation at their product plants. Our experience and more than 150 references for LOI Italimpianti Rotary Hearth Furnaces for reheating with diameters up to 50 m confirm the high availability and product quality which can be obtained with our plants at low energy and maintenance costs.

Benefits:
- Higher capacities through continuous heat treatment
- Precise process control through zone separation and compliance with cycle times for all treatment stages
- Significant quality improvements with oil bath quenching in a protective controlled atmosphere and setting of cooling temperatures
- Considerable energy savings
- Extremely high plant and process availability

HEAT TREATMENT FOR GEARS AND SHAFTS

Continuous Heat Treatment of Automotive Parts

Roller Hearth Furnace for austenitizing of metal blanks to be press-hardened
- Highly efficiency heating system
- Very precise transport of blanks
- Low-maintenance operation, easy replacement of rollers
- Fully automatix processes
- Extremely high equipment and process availability
Melting and Casting of Aluminium

The technical expertise of LOI Italimpianti is verified by hundreds of notable references in the aluminium industry. Technical solutions of LOI Italimpianti are represented in the Aluminium processing industry all around the world by state-of-the-art melting and casting furnaces with sizes up to 120MT of liquid metal and related vertical direct chill casting machines.

- Tilting Melting/Casting Furnace for melting aluminium block metal and production return scrap
- Low specific energy consumption
- Low emissions
- High melting rate

- Melting furnaces
- Casting furnaces
- Aluminium recycling plants
- Ingot casting plants incl. automatic stacking
- Vertical direct chill casting machines for rolling slabs and extrusion billets

Rolling slabs of up to 9,200 mm length on vertical direct chill casting machine
Aluminium Recycling Plants

The Twin-Chamber Melting Furnace TCF and its related process technology are signs of the well-known competence of LOI Italimpianti for the efficient and environmental-friendly recycling of any kind of Aluminium scrap. Since years, LOI Italimpianti has continuously optimised the recycling processes for Aluminium scrap for the benefit of the recyclers. In doing so, environment-saving technologies and processes are of the utmost importance.

- Recycling of nearly any kind of contaminated scrap
- Continuous metal circulation
- Sealing charging system
- Automatic charging of chips and lumpy scrap
- Integrated automatic process control system
- Safe operation
- Environmental-friendly operation
Heat Treatment Furnaces for Aluminium components

- Processing of components and structural parts
- Integrated production lines
- Flexible heat treatment
- Flexible quench processes
- Diverse quenching media
- Highly effective air quench

- Fully-automatic recipe management
- Reliable processing
- Integrated automatic control system
- Process documentation AMS 2750 D
- Reduced distortion of the parts
- Less residual stress
Annealing Furnaces for Aluminium Coils

- Flexible annealing concept
- Short production cycle
- Automatic metal temperature control
- Protective atmosphere
- Integrated fully-automatic charging
- Automatic batch tracing

Single-Coil Lifting Hearth Furnace for Aluminium coils

Multi-Chamber Furnace for aluminium foil rolls
Controls for Furnaces and Thermal Processes

Fully automated control systems are indispensable. Modern control systems ensure:

- High safety
- Optimized processes
- Constant, high product quality
- High plant availability
- High productivity
- Optimum conditions for operation and maintenance
- Minimal energy and utility consumption
- Lower pollutant emissions

LOI offers control systems including all the hardware and software required from the switchgear assembly to the supervisory control system.

- Comprehensive expertise in process electronics, control system engineering and in-house automation
- Switchgears, assemblies, components
- Automation
- Supervisory systems
- Mathematical modelling online and offline
- Throughput and material flow optimization
We focus on your needs. Our portfolio includes individual services to ensure optimum product quality, maximum productivity and high reliability at your plant:

- **Spare parts service**
  Individual parts are available for delivery within 24 hours upon enquiry.

- **Maintenance/repair**
  Our specialists are available for maintenance work on systems including:
  - Mechanical furnace systems
  - Burner systems
  - Heating systems
  - Control systems

- **Maintenance contracts**, global spare parts service and assignment of maintenance technicians; regular technological updates

- **Modem & phone service**
  Control systems and connected plants can also be inspected online by modem-service. This approach allows any problems to be identified and eliminated and new program tools or software updates to be loaded onto customers’ systems.

- **Advice**
  Our process engineering, commissioning and control systems specialists are always available to provide advice to customers. They can also visit your plant and provide advice on site.