Innovative heat treatment technologies

Field proven reliability and cutting-edge technology for every application
CMI Industry Metals provides heat treat products (continuous, semi-continuous and batch) to heat treat a wide range of materials (steel, copper, brass, stainless steel, aluminum, zirconium, tungsten, titanium, beryllium, etc.) in a multitude of sizes, shapes and thermal cycles.

CMI Industry Metals’s heat treatment furnaces and integrated systems set the standard for product quality and combustion efficiency, and are most effectively addressing environmental and operational concerns, allowing for lower fuel consumption by reducing heat losses from the furnace to the minimum and increase availability and flexibility of operations.

Based on its great historical knowledge and experience, and evidenced by numerous worldwide references, heat treatment products supplied by CMI comply with local, national and international safety and quality standards, including:

- NFPA 86
- NEC (NFPA 70)
- UL508a
- AMS 2750
- NADCAP

Over the years, CMI Industry Metals has developed a wide range of furnace models. Furnace solutions are simulated numerically in order to ensure the best design and to calculate the final performances of the equipment. Automation systems allow operators to easily control the system while maintaining environmental and efficiency standards. CMI’s control models allow customers to reach the optimum heating curves and optimize production to reach the lowest operating expense. Mathematical models with specialized algorithms guarantee the precision of the heating process and thus improve furnace efficiency.

CMI Industry Metals has built a number of furnaces dedicated to research and testing, and is an active partner in several international research programs. Additionally, CMI belongs to a worldwide network of technical partners including professional associations, universities and technical centers, providing the knowledge platform which is necessary to ensure continuous innovation and development for its high end heat treatment solutions. One of the principal objectives is the analysis of the energy consumption of its different furnace designs and the implementation of the results helping to further reduce fuel consumption while ensuring optimum product quality. With the final goal to continuously lower operating costs and improve customers’ return on investment.

Next to mechanical and maintenance repairs and maintenance training, CMI also offers the turning, milling, drilling, polishing and straightening of parts, the welding of various metals and parts, as well as their fabrication and assembly out of its machine workshop in Salem, Ohio, USA.
Batch Furnaces

Our furnaces offer a high flexibility at optimum cost to heat treat various products and material. The proposed solutions are tailor made to meet the specific requirements for our Customers. They adapt to various layouts and ways to load products with either vertical, lateral or swing out doors.

Sizes:
1 m³ to very large capacity depending on customer needs.

Production Capacities:
500 kg (1100 Lbs) to 200 metric tons.

Treatments:
Annealing, stress relieving, preheating, tempering and other various thermal processes.

Tilt Top Furnaces

Tilt Top Furnaces meet both heat only cycles and heating and cooling cycles in either a controlled atmosphere or air only. Tilt Tops have continuous heating of various products and materials.

Sizes:
Tilt Tops can be designed to fit in the space that the customer has available.

Production Capacities:
Furnaces are custom designed for individual requirement of the specific customer. Capacity ranges from 1 to 200 metric tons and a maximum temperature of 1300°C (2370°F).

Treatments:
Stress Relieving and Annealing.

Type of Atmosphere:
Air and various protected atmospheres.

Type of Heaters:
Natural Gas Fired Radiant Tubes, Direct Fired and Electrically Heated.

Materials:
Brass, Copper, Carbon Steel, Cast Iron, Stainless Steel, Titanium, Aluminum, Nickel Based Alloys, and Cast Steel.

Material Forms:
Almost any semi-finished or finished forms, either directly on pedestals, racks or trays, forgings, sheets, plates, coils, alloy steel castings and alloy bar stock.

Box Furnaces

Our furnaces offer a high flexibility at optimum cost to heat treat various products and material. The proposed solutions are tailor made to meet the specific requirements for our Customers. They adapt to various layouts and ways to load products with either vertical, lateral or swing out doors.

Sizes:
Sizes:
1 m³ to very large capacity depending on customer needs.

Production Capacities:
500 kg (1100 Lbs) to 200 metric tons.

Treatments:
Annealing, stress relieving, preheating, tempering and other various thermal processes.

Type of Atmosphere:
Air and various protected atmospheres.

Type of Heaters:
Natural Gas Fired Radiant Tubes, Direct Fired and Electrically Heated.

Materials:
Brass, Copper, Carbon Steel, Cast Iron, Stainless Steel, Titanium, Aluminum, Nickel Based Alloys, and Cast Steel.

Material Forms:
Almost any semi-finished or finished forms, either directly on pedestals, racks or trays, forgings, sheets, plates, coils, alloy steel castings and alloy bar stock.

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Production Capacities:
Furnaces are custom designed for individual requirement of the specific customer. Capacity ranges from 1 to 200 metric tons and a maximum temperature of 1300°C (2370°F).

Treatments:
Stress Relieving and Annealing.

Type of Atmosphere:
Air and various protected atmospheres.

Type of Heaters:
Natural Gas Fired Radiant Tubes, Direct Fired and Electrically Heated.

Materials:
Steel, titanium, special alloy, cast iron, heavy castings, plate, weldments, coils or spools of rod, wire or strip either ferrous or non-ferrous.

Material Forms:
Almost any semi-finished or finished forms such as forgings, sheets, plates, coils, alloy steel castings and alloy bar stock.
Car Bottom Furnaces

This type of furnace ensures an automatic loading of the products to be heated on a car. The movement is controlled by a motor directly mounted on the car or through a motor, rack and pinion. The furnace seal is made through a water, sand or fiber mechanism.

Sizes:
- Furnace length — from 150 mm to 135 m (6' to 44').
- Hearth Width — from 305 mm to 4.9 m (12' to 192').

Production Capacities:
- Varying sizes depending on the capacity, and workflow required by the customer.

Production Capacities:
- From 500 kg (1100 Lbs) to 200 metric tons.

Treatments:

Atmosphere Bell Furnace

This technology developed by CMI Industry Metals applies mainly to applications requiring an atmosphere to protect products undergoing heat treatment. The load is stand-alone or packaged in a basket. Loading can be completed by fork truck or other charging device, or through a built-in car-bottom technology.

Sizes:
- Varying sizes depending on the capacity, and workflow required by the customer.

Production Capacities:
- 1 ton to 16 metric tons gross load.

Treatments:
- Annealing, annealing globular ageing.

Type of Atmosphere:
- Combustion atmosphere with $O_2 < 2\%$, $N_2 + C_3H_8$, $N_2 + H_2$.

Type of Heaters:
- Direct Fired, Natural Gas Fired Radiant Tubes, and Electrically Heated.

Materials:
- Special steels, super alloys, cast steel, and cast iron.

Material Forms:
- Automotive parts, gearboxes, bearing rings, cylinder heads, and all types of castings.
Continuous Furnaces

Roller Hearth Furnaces

Our Roller Hearth Furnaces address a large variety of heat treatment for various products. They allow a continuous production with a high flexibility both in terms of atmosphere and product type.

Sizes:
Furnace length — from 1.8 m to 275 m (6’ to 900’).
Hearth Width — from 305 mm to 3050 mm (12” to 120”).

Production Capacities:
Furnaces are custom designed for individual requirement of the specific customer. Capacity range from 230 Kg/h (500 lbs/hr) to 15 metric tons per hour, temperatures from 150°C to 1260°C (300°F to 2300°F).

Treatments:
Oxidizing, Bright Annealing, Drying, Preheating, Normalizing, Hardening, Drawing, Tempering, Carburizing, Decarburizing, Bending, Flattening, Stress Relieving, Spheroidizing, Solution Heat Treat, Normalizing, Tempering, and Bluing.

Type of Atmosphere:
Air, Combustion Products, Disassociated Ammonia, Hydrogen, Nitrogen, Exothermic lean or rich ratio, Endothermic or any combination of the above.

Type of Heaters:
Natural Gas Fired Radiant Tubes, Direct Fired, and Electrically Heated.

Type Cooling:
Jet Cool, Pipe Cool, Water Jacketed, Water Spray, Water, Air Spray, Air Tubes, Static Cool, and Forced Convection in controlled atmosphere or air as required

Materials:
Here are a few of the many materials which can be heat treated in a Roller Hearth Furnace: Brass, Copper, Carbon Steel, Cast iron, Titanium, Stainless Steel, Aluminum, Nickel Based Alloys, and Silicon Steels.

Material Forms:
Almost any semi-finished form or finished form can be handled in a Roller Hearth Furnace, either directly on rolls or trays. Here are some of the forms for which CMI Industry Metals has built furnaces for: Coiled Tubing; Coiled Rod; Bars; Plate; Sheet; Slabs; Gears; Battery Cells; Straight Tubes; Stampings; Hubs; Discs; Blanks; Castings; Forgings; Weldments; Wire Reels; Wire Loops; Automotive Components.
Flexible Heat Treatment Line

The system is intended to perform heat treatments before quenching (oil, water or polymers). Operations are in full automatic mode with a high speed transfer time from the furnace to the tank. The furnace can be of the bell, tilt up or box type. The loading device feeds the furnace, the tank and storage areas.

The installation includes:
- 1 heating furnace before quenching
- 2 quench tanks, water and oil
- 1 loading device
- 2 storage areas
- 1 loading/unloading area
- 1 PLC/supervision control system

Sizes:
- From 500 kg (1100 Lbs) to 6 metric tons net.

Production Capacities:
- Temperature: from 730°C (1350°F) to 1150°C (2100°F).
- Temperature uniformity: +/− 5°C (40°F) over the range.
- Transfer time: 20 to 30 seconds from the opening furnace doors to complete immersion of the load.

Treatments:
- Solution, Annealing, and Ageing.

Type of Atmosphere:
- Air with adapted combustion for gas heating solution or air for electrical heating.

Type of Heaters:
- Electrical or gas.

Materials:
- Super alloys and titanium.

Material Forms:
- Semi finished or finished parts, typically for the aeronautic, defense, rails and automotive.

Rotary Hearth Furnace

Rotary Heart Furnaces offer wide productivity for many different types of applications and materials. They can be used standalone or integrated in complete heat treatment lines.

Sizes:
- CMI Industry Metals has designed Rotary Hearth Furnaces up to 25 m (80') in Diameter.

Production Capacities:
- The custom design for the type of application can be up to 60 metric tons per hour with a maximum temperature of 1300°C (2370°F).

Treatments:
- Oxidizing, Forging, Drying, Preheating, Normalizing, Hardening, Drawing, Tempering, Carburizing, Decarburizing, Bending, Flattening, Stress Relieving, Spheroidizing, Solution Heat Treat, Normalizing, and Tempering.

Type of Atmosphere:
- Air, Combustion Products, Disassociated Ammonia, Hydrogen, Nitrogen, Exothermic lean or rich ratio, Endothermic or any combination of the above.

Type of Heaters:
- Natural Gas Fired Radiant Tubes, Direct Fired, and Electrically Heated.

Materials:
- Brass, Copper, Carbon Steel, Cast Iron, Titanium, Stainless Steel, Aluminum, Nickel Based Alloys, and Silicon Steels.

Material Forms:
- Almost any semi-finished form or finished form, Coiled Tubing, Coiled Rod, Bars, Plate, Sheet, Slabs, Gears, Battery Cells, Straight Tubes, Stampings, Hubs, Discs, Blanks, Castings, Forgings, Weldments, Wire Reels, Wire Loops, and Automotive Components.
Vertical Quench Furnaces

Flexible Heat Treatment Lines allow for a full heat treat cycle from solution heating to quenching.

The installation includes:
• 1 vertical solution oven set
• 1 quenching tank
• 1 loading device with 2 slot baskets
• 1 PLC/supervision control system

Sizes:
CMI Industry Metals has designed Flexible Heat Treat Lines to accept loads from 1 to 4 m³.

Production Capacities:
Maximum load from 1000 kg (2200 Lbs) to 4000 kg (8800 Lbs).

Treatments:
Solution; Annealing; Ageing. Quenching transfer in 6 seconds, from furnace opening to complete immersion of the load.

Temperature accuracy: +/- 2°C (35°F) from 300°C (570°F) to 550°C (1020°F).

Quenching with pure water or polymers, between 20°C (68°F) to 99°C (210°F).

Type of Atmosphere:
Air

Type of Heaters:
Electrical

Materials:
Brass, Copper, Carbon Steel, Cast Iron, Titanium, Stainless Steel, Aluminum, Nickel Based Alloys, and Silicon Steels.

Material Forms:
Semi finished or finished parts, typically for the aeronautic, defense, and medical sectors.

Aluminum Melting Furnaces

Aluminum Melting Furnaces present a dry hearth furnace with or without a retention basin. The transfer of the molten liquid is made by tilting the furnace (furnace shown in tilting position on left below). Loading is achieved at the front with a metal manipulator.

Sizes:
The dimensions and design features are tailored to customer needs.

Production Capacities:
Preferred melt flow rate of 500 to 3100 kg/hr (1100 to 6830 lbs/hr) of aluminum at 770°C (1400°F).

Treatments:
Melting and holding of aluminum.

Type of Atmosphere:
Combustion atmosphere.

Type of Heaters:
Direct flame burners, with or without energy recovery system.

Materials:
Shades of aluminum.

Material Forms:
Sizes of ingots according to the raw material supplier.
Continuous or Batch Line with Tray for Aluminum

Combined thermal cycles for aluminum: Solution and ageing continuous or batch line with motorized rollers, parts in baskets, fully automatic, boiling water quenching, load follow up with heat treatment validation report. Stocking area, cooling area, homogeneity: ±/− 5°C for solution furnaces and ±/− 3°C for ageing furnaces.

Sizes:
- U-shape installation approximately 45 m (148,-) x 15 m (50,-).
- On line installation approximately 41 m (135,-) x 20 m (66,-).

Production Capacities:
- 2000 kg aluminum net load.

Treatments:
- Solution and ageing.

Wire Mesh Belt Furnaces and Continuous Chain Belt Furnaces

OMI builds Wire Mesh Belt and Continuous Belt Furnaces for heat treating of ferrous and non-ferrous materials in controlled atmospheres for a wide range of finished or semi-finished products and many materials ranging for Wire Mesh Belt Furnaces from Brass, Copper, Cast Iron, Titanium and Aluminum, to Carbon, Stainless and Silicon Steels, and Nickel Based Alloys to only name some, while Continuous Chain Belt Furnaces are merely used for materials such as carbon steel and alloy steels.

Sizes:
- Belt width: Wire Mesh Belt - 6” to 36”; Continuous Chain Belt: 18” to 36”

Production Capacities:
- Furnaces are custom designed for individual requirement of the specific customer. Capacity and hourly output range from 100 pounds per hour to 2000 pounds per hour, temperatures up to 2100°F for the Wire Mesh Belt Furnace and range from 450 pounds per hour to over 10,000 pounds per hour or the Chain Belt Furnace

Type Cooling:
- Wire Mesh Belt: Jet Cool; Pipe Cool; Water Jacketed; Air Tubes; Static Cool; Forced Convection in controlled atmosphere or air as required. Continuous Chain Belt: Oil and Water Quench or Forced Air

Treatments:
- Wire Mesh Belt: Brazing, aging, carbon restoration, ceramic decorating, normalizing, drawing, hardening, homogenizing, nitriding, sintering, solution treating, stress relieving, bright annealing, and low temperature heat treatment. Continuous Chain Belt: Hardening, carburizing, clean hardening and carbonitriding, scale-free hardening, drawing, non-decarb hardening, tempering, annealing, and carbon restoration.

Type of Atmosphere:
- Various protected atmospheres are available.

Type of Heaters:
- Natural Gas Fired Radiant Tubes, Direct Fired and Electrically Heated.

Materials Forms:
- Wire Mesh Belt: Small sized and low weight steel parts requiring heat treatment - bearing rollers, small forgings, bearing cups and cones, washers, roller bits, springs, valve parts, chain parts, tractor links, sprockets and pinions, screw machine parts, gears.... and many more. Continuous Chain Belt: For small and medium sized parts, this type of furnace can handle the widest variety of parts through the greatest range of treatments. Typical parts are bolts, bearings, rollers, nuts, small forgings, bearing cups and cones, rivets, pins, rock bits, washers, roller bits, springs, valve plates, chain parts, tractor links, sprockets and pinions, screw machine parts, gears and many others.
CMI designs, installs, upgrades and services equipment for energy, defense, steelmaking, the environment and any other industry in general. CMI numbers 4,500 experienced employees in Africa, Brazil, China, Europe, India, New Caledonia, Russia and the United States, and assists clients throughout the whole of the life-cycle of their equipment in order to improve the economic, technical and environmental performance of this equipment.

Proud of its past and aware of its own capacities to invent the processes of the future, CMI intends to contribute to meeting the challenges of today’s society and to generate sustainable industrial progress for the benefit of its customers, employees, the communities in which it is established, and the planet.

As an international specialist in industrial processes and technologies,

CMI Industry Metals designs, supplies and modernizes cold rolling mills, processing lines, chemical and thermal treatment installations for the steel and the non-ferrous industry, as well as state-of-the-art heat treatment technologies for the aviation, forging and casting industry.

Based on decades of experience and successfully running references all over the world, CMI Industry Metals not only supplies Green- and Brownfield installations and equipment, but also provides the related services, as well as training and technical assistance.

CMI’s reliable and cost-effective, yet innovative solutions are always adapted to the specific needs of each and every customer.

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