INDUCTOHEAT

Solutions Dedicated to World of Induction Heating

(Induction Heating, Heat Treating & Forge Heating)

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Group *Who We Are*

Partnership • Coalition • Alliance

Inductoheat, Inc. An Inductotherm Group Company

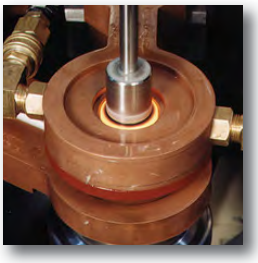
Inductoheat is one of 40 companies making up the Inductotherm Group. Inductotherm Group offers advanced technology for the engineering, manufacturing and service of thermal processing equipment used in the melting, heating, heat treating, forging, galvanizing, coating, cutting and welding of metals. Bringing together 40 companies with 37 manufacturing facilities located in 18 countries, Inductotherm Group delivers innovative products throughout the world. Customers rely on Inductotherm, Inductoheat, Thermatool, Radyne, Consarc and other trusted brands in the Inductotherm Group to provide outstanding machinery and services.

- **Melting & refining system**
- **Mass heating systems**
- **Heating & heat treating systems**
- **Brazing & resistance heating**
- **Worldwide service & support**
- **Foundry automation**
- **Forging, extrusion & forming**
- **Tube, pipe & wire heating equipment**
- **Vacuum & controlled atmosphere systems**
- **Engineering services for the metals industry**

Dedicated *to meeting your production needs*

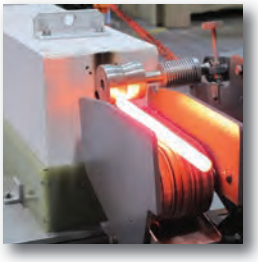
With effective induction heating solutions

More than 50 years

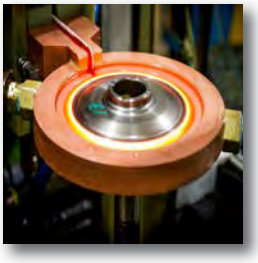


For over 50 years, Inductoheat has been serving the industry. Our dedicated staff members provide customers with patented technologies, high quality induction equipment and exceptional customer support.

Our team of scientists, engineers and maintenance experts blend a variety of techniques to establish the ideal heating solution specifically suited for your processing needs. Our full service capabilities include:



- **Comprehensive process development and metallurgical laboratory**
- **Complete engineering design and equipment manufacturing**
- **Large induction coil build and repair department**
- **In-house and on-site customer training classes**
- **Experienced ield service engineers**
- **Dedicated aftermarket spare parts support**



Customers get all the Advantages Plus Flexibility in One Company

A single point of contact gives customers global expertise on a variety of thermal processing applications, including:

- **Hardening, tempering and annealing**
- **Billet and bar forging and warm forming**
- **Shrink fitting, stress relieving and pre-heating**
- **10” or less strip and slab heating**
- **Copper tube annealing (sections and inline)**
- **Bonding, brazing and joining**
- **Epoxy and paint curing and coating**

Success *How We Serve You*

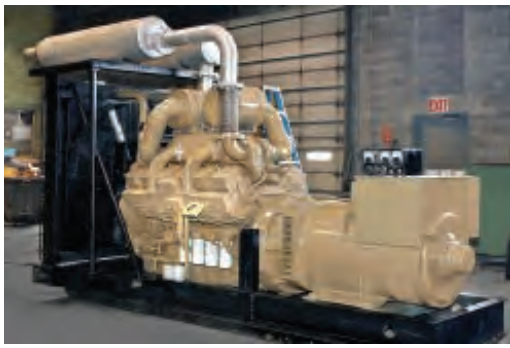
Leading the world in induction heating technologies

Inductoheat is leading the world in induction heating technologies by offering product lines ranging from general purpose machines to custom engineered, fully automated induction heating systems. With global technical support, our engineering excellence has no boundaries.

Inductoheat's manufacturing plant, located in Ahmedabad, offers full service capabilities similar to a "one-stop" shop. Services include a comprehensive Process Development and Metallurgical Laboratory, complete engineering design and equipment manufacturing, a large induction coil build and repair department, customer training, and an aftermarket support and service group. Customers get all the advantages plus flexibility in one company.

A single point of contact gives customers global expertise on induction heat treating, heating for forging and power supplies for hardening, tempering, shrink fitting, low-frequency heating, strip heating, tube and pipe heating and much more.

Inductoheat has been engineering, designing and manufacturing induction equipment for over 50 years. Whether you're performing heat treating, forging or another thermal process, Inductoheat can put the heat where you need it for quality parts.



Global Yet Local

Inductotherm Group India

State-of-the-Art Manufacturing Facility

The manufacturing plant is spread across an area of 100,000 sq. mts. and is fully equipped with the latest state-of-the-art machines to achieve global quality norms. Every step in manufacturing is followed according to the standards set by Inductotherm. Each piece of Inductotherm equipment, from concept to completion, is designed for reliable and trouble-free operation year after year.

Capacity *Power Supplies*

Frequency • Power • Current

Since 1972, Inductoheat has continued to develop the design and manufacture of ÿeld proven power supplies. By providing e°cient, controlled and accurately focused ideas, we make a valuable contribution to a diverse range of industrial processes. Our power supplies have the latest electronics and inverter technology circuitry.

The ultimate power supplies tailored to your application;

- Hardening
- Tempering
- Annealing
- Tube Heating
- Strip & Wire Heating
- Gear Hardening
- Forge Heating
- Low-Frequency Heating
- Shrink-Fitting
- Coating & Curing
- Brazing & Soldering
- Non Ferrous Heating

We offer an extensive collection of power supplies ranging from 2. 5 kW to 24 MW operate over frequency ranges between 50 Hz and 5 Mhz. A wide variety of heating coils canbe properly matched to these power supplies to meet customer requirements.

Simply connect 3phase input power, cooling water and heating coil and you're ready to begin heating.

Formation *Forge Heating Systems*

Press • Hammer

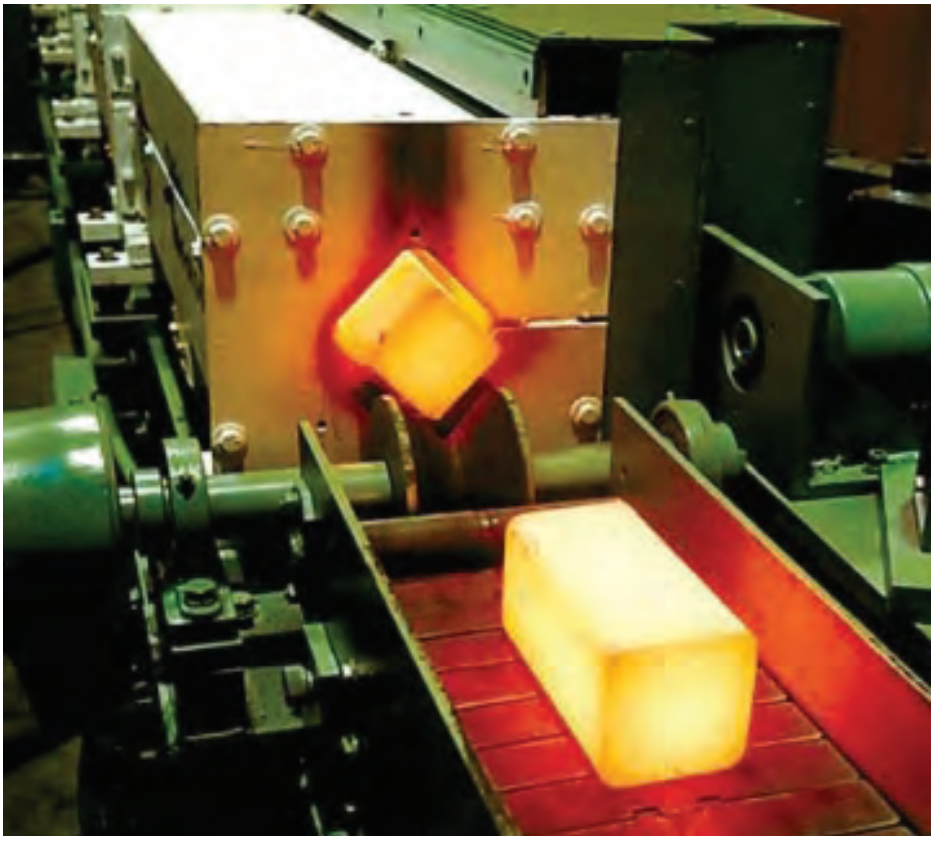
Inductoheat's unitized concept billet heating system is a revolutionary product and is designed to meet the needs of modern forging industry.

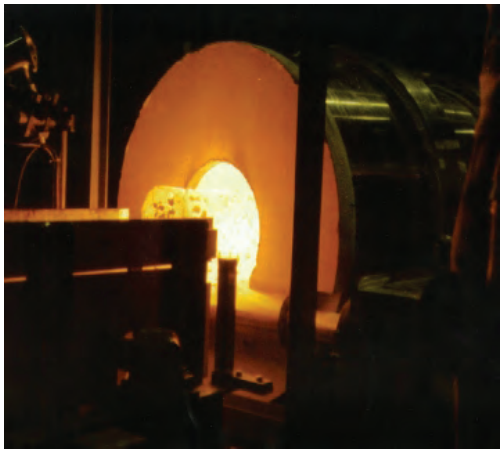
It is compact design incorporating feed system, Solid state power supply packaged in unitized concept.

The integrated concept of the equipment eliminates the need for inter connections between separate component typical of conventional heating systems, saving floor space and installation time. Forging equipments are available with output from 25KW to 14000 KW & frequency ranges from 50 Hz to 50 kHz.

Inductoheat provides IGBT transistorized solid state equipment for forging application, which is latest state-of-the-art technology equipment for getting higher performance output.

A significant advantage of this innovative technology is reduced energy, utility and operating costs, ultimately increasing your productivity and profitability





Performance *Long Bar & End Bar Heating Systems*

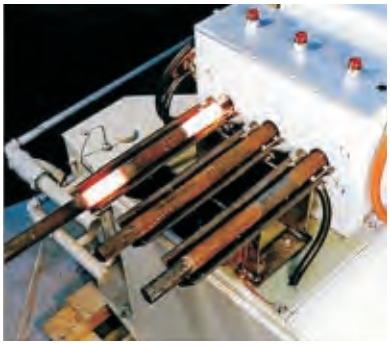
Hot Former • Upsetter • Piercing

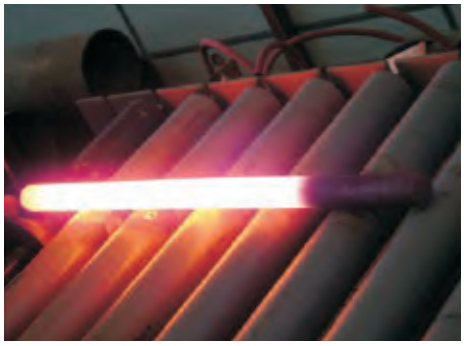
Inductoheat's unmatched experience, design ability and manufacturing resources ensure that our customers are provided with the ultimate in heating capability to produce the most cost effective forgings, minimal energy costs combined with optimum temperatures / control, long die life and minimal down-time. In addition, the compact Inductoheat bar heaters require minimal space.

Inductoheat bar heater, designed and built to feed automatic forging machines, hot shear lines and rolling mills are used by leading forging manufacturers throughout India.

Inductoheat's unique continuous bar delivery systems and induction coil design combined with state of the art frequency converters and computer technology which provide our customers with the most efficiently heated bar stock for their forging presses.

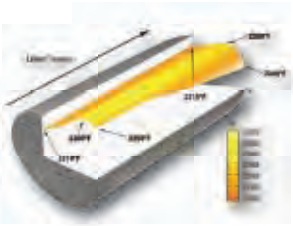
Also for bar end heating system, Inductoheat's expert hands are available and with the supply of maximum number of systems in India, Inductoheat is market leader in the process.





Inductoforge® *Modular Induction Billet Heaters*

Modular • Energy Efficient



Designed to fit the flexible manufacturing requirements of today's forge shop.

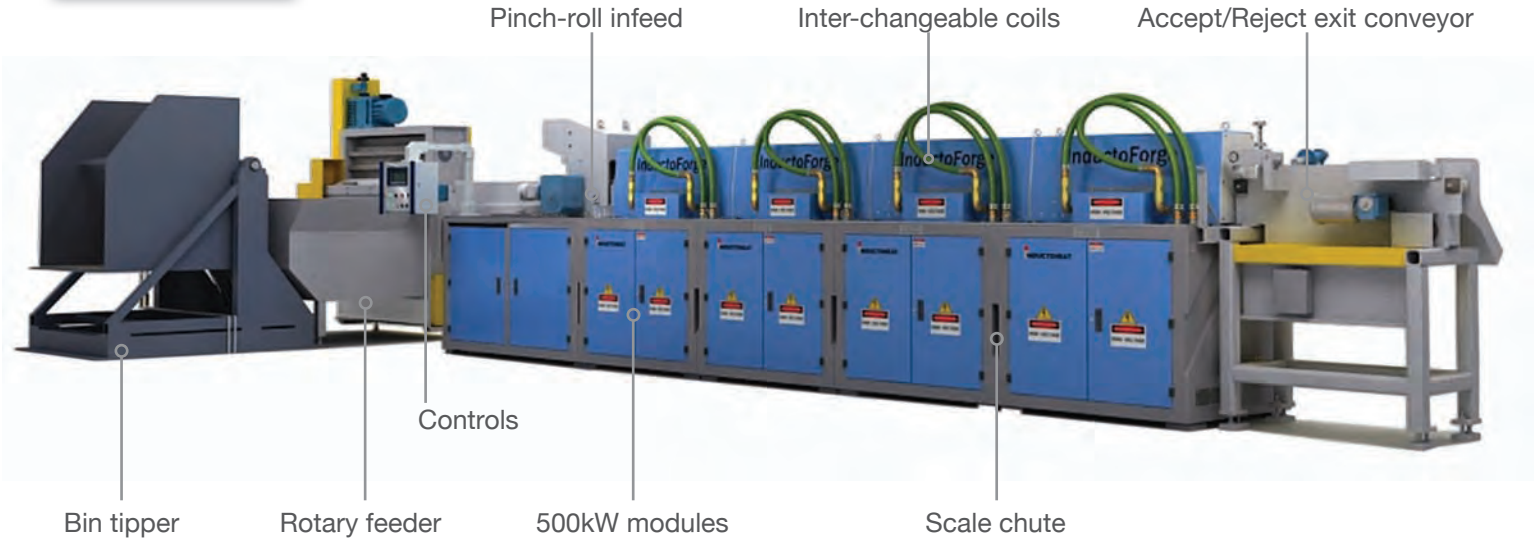
The powerful combination of advanced engineering, product innovation and over 50 years experience in induction heating has helped Inductoheat become a world leader in the production of billet and bar heating equipment for the forging industry.

The InductoForge® Modular Billet Heating System offers flexibility and efficiency with its individually controled (500Hz-6000Hz) power modules. The flexible modular design results in a much finer and more accurate control of the billet temperature.

The iHAZ™ Temperature Profile Modeling Software enables advanced temperature control of the billet heating process. iHAZ™ software allows you to customize a billet temperature profile (Induction Heat Affected Zone) to best suit your billet or bar heating application. It can also generate the optimum-running parameters and set points for Standby and Rapid Start which are stored as a recipe in the billet heater's PLC.

Additional Features & Benefits:

- **Optimized utility costs** • **Replacement coil liners** • **Highest possible efficiency**
- **Quick release connections** • **Compact, heavy-duty modular design**
- **Variable in-feed drive speeds** • **Reduced downtime & maintenance costs**

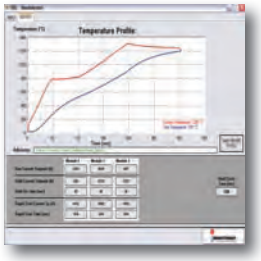


Infeed Systems – Heavy Duty Pinch Roll and Tractor Chain drive infeed systems push the billets through the InductoForge® coil line at a very accurate rate controlled by a variable frequency AC motor. Both systems automatically adjust for the diameter of the billet (for quick change-over). A lost motion detector will auto-matically shut down power to the system if the billets stop moving for any reason.

Hot Billet Extraction – The Fastextractor equipment is manufactured to provide many years of low maintenance operation. Heavy-duty, multi-strand chain works with the gravity pinch wheel to quickly extract parts to insure uniform heating from the front to the back of the billet (also acting as a weld breaker). The Fastextractor comes standard with an infrared temperature activated accept/reject system. Optional over/under temperature gate is available.

Automatic Billet Feed – Heavy-duty step feeders, bowl feeders, feeder loaders and bin tippers can be added to increase the productivity of the heater by automatically feeding billets from a bin into the coil line. An optional billet weigh system rejects parts that do not meet the acceptable weight range.

Advanced System Control – The PLC "Recipe Control" system works in conjunction with the IHAZ™ Temperature Profile Modeling computer software to make the billet heater simple to run. The operator can access stored recipes from the part number or die number identifier. The billet heater operating parameters are stored in the recipe, together they run the system, thus improving quality control and speeding up the system set up. A true "stopped line" Standby system is available for two or more module systems. Manual operation is available for the smaller Inductoheat billet or bar heating systems.



Productivity Enhancements – Optional billet push-out chains or bars and coil shuttles can be included. The billet push out chain allows almost all of the billets in the line to be heated.

The coil shuttle provides a quick method of switching to a different coil size or to a backup coil.

Optimum *Heat Treat Systems & SPM*

Intensity • Extreme • Energy

Many metals require heating and /or heat treating to achieve their optimum physical properties. Our focus is to provide a family of high quality induction heating systems that meet your process and application requirements.

No matter the size or geometry of your part, we supply standardized and custom induction systems that produce superior long lasting parts time and time again.

Advances in our technology include new standardized modular heat treating equipment such as, the UltraScan system with CNC program storage and touch screen controls.

Inductoheat Induction heat treatment systems are of particular interest to produces of high volume, low cost component which require heat treatment. The high speed, reliability and repeatability of the Inductoheat UltraScan satisfies the latest automotive industries standards.

InductoScan® modular induction heating system 25 - 300kW @ 0.5 - 200 kHz

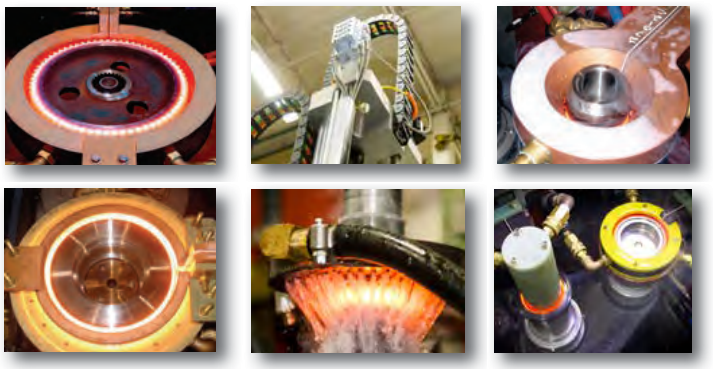
Perfect for almost all automotive components, the InductoScan® System has a compact design that allows for a wide range of power supplies, user-friendly controls and material handling components to be integrated onto a common base to better match your part design and production needs.

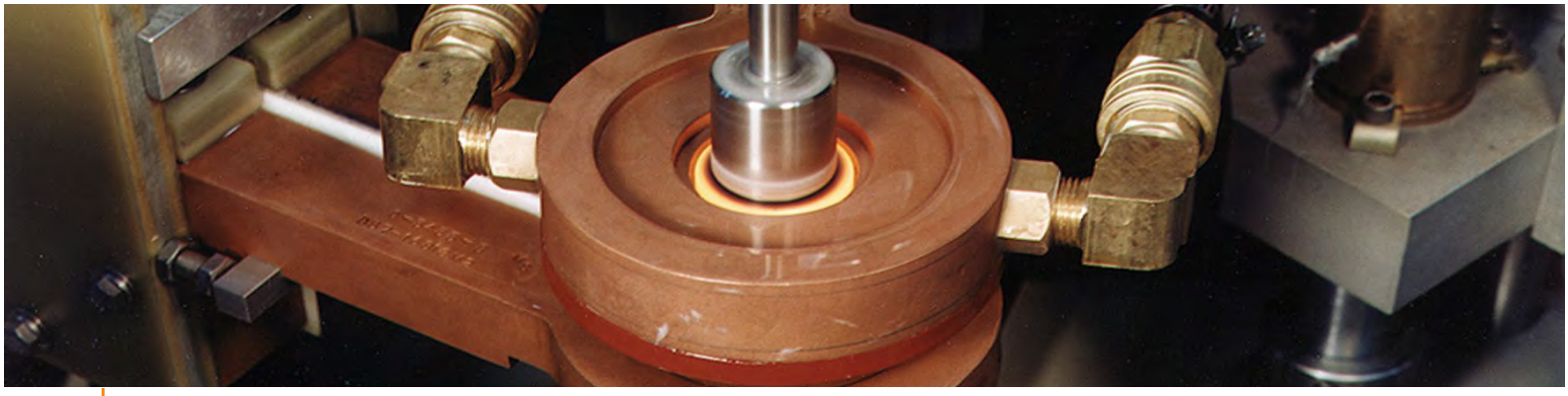
VSM-95® heavy-duty induction hardening machine 50 - 750kW @ 0.5 - 400 kHz

The VSM-95® system is ruggedly designed for high-volume scan hardening of most cylindrical parts up to 180 kg and as long as 2000 mm.

Customized induction heating systems

Inductoheat has product lines for all your heat treating needs. From our vertical scanners to fully automated horizontal lines, we manufacture equipment to match your process requirements.





Proven • High Speed • Exclusive

Axle heat treating: Inductoheat has supplied induction equipment for car axles, truck axles, trailer axles, lawn mower axles and a broad range of other axle shafts. Inductoheat offers single shot or scan hardening for axles.

Camshaft & crankshaft heat treating: Inductoheat has supplied equipment for heat treating cars, trucks and other camshafts. This image shows a dual coil, 4 lobe scan hardening process. We also have experience with single coil, single lobe and dual coil, dual lobe designs.

Shaft heat treating: Scan or single shot hardening and tempering your shafts. Inductoheat has developed both processes to handle most shaft applications. Case hardening shafts positively influences torsion and bending strength.

Bearings, joints, hubs & many more heat treated parts: Inductoheat has supplied processes and equipment for nearly every type of bearing, cv joint, clutch, hub and tulip design. Inner/outer races, clutch plates, roller pins, spindles, and the list goes on and on.

With increase in complexity in building induction heat treatment machines for occurred geometric components, our expert team members along with most reliable technology equipment is available with Inductoheat and customers get one stop solution for their heat treatment.

With huge number of SPMs working in the field, Inductoheat is largest provider of heat treatment solution. With full fledged Metallurgical Laboratory and Tooling department with experts available at manufacturing plant, Inductoheat can give solution of your occurred hardening requirements by providing fastest, most accurate and optimum solution of your requirement.

Specialized applications are for customers needing that inductoheat refined treatment.

Allieviate *Tube & Pipe Heating Systems*

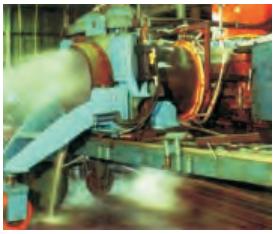
Hollow • Near net • Stress relieve

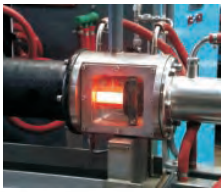
Inductoheat, offers a variety of induction heating systems for the pipe and tube industry.

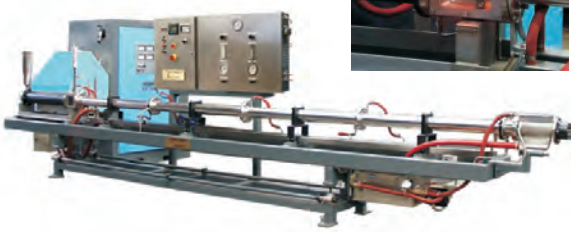
For 8' or shorter lengths of tube, Inductoheat offers quench and temper lines for automotive, oil and gas, and special applications.

For Pipe end heating prior to spinning operation, mainly for cylinder forming industry, Inductoheat is master manufacturer and have wide varieties of machines.

When forming or swaging tube or pipe, the annealing and / or stress relieving processes enhance your product properties by removing the residual stresses associated with these processes.





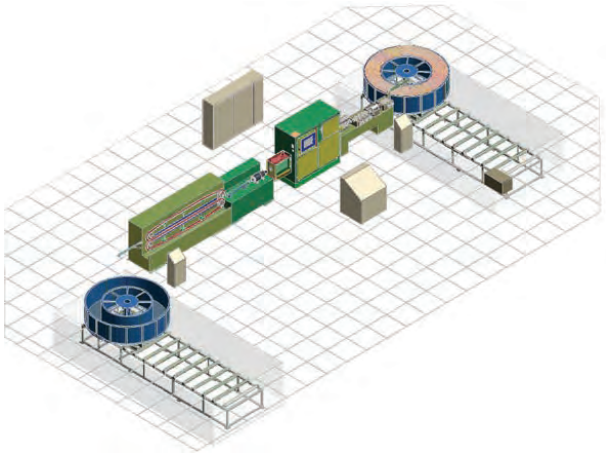


Dull and Bright Tube Annealers

Induction tube annealing equipment ranges from standalone units that anneal small tube sections, to systems designed for integration into existing lines.

ACR Copper Annealers

For copper producers a variety of feeder systems for the annealing process are available, including basket to basket, basket to layer-wound pack or cut length bundle, and capillary tube spool to spool.



Induction tube annealing equipment ranges from:

- Standalone units that anneal small tube sections
- High speed in-line annealing systems for copper tubing
- Systems designed for integration into existing lines

For copper producers, a variety of feeder systems for the annealing process are available, including:

- Basket to basket
- Basket to layer-wound pack
- Cut length bundle
- Capillary tube spool to spool

Additional induction process include : Pipe end normalizing after swaging • Curing of paint, plastics and other coatings • Friction / arc weld pre-heat or normalizing • Pre-heat for hard banding or upset forging • Austenitizing, quenching, tempering • Surface or through hardening • Heating for bending

Protection *Coating & Curing Systems*

Rugged

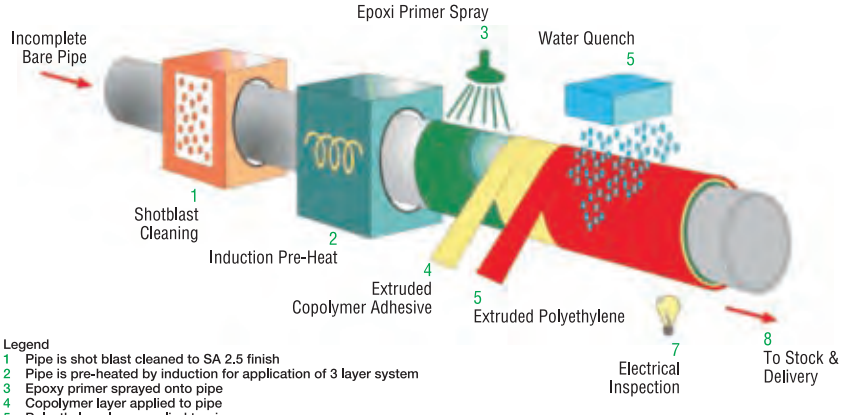
Inductoheat can supply complete installations for specific processes incorporating induction power supplies, heating coils, controls, automatic powder applicators, mechanics and cooling system.

Inductoheat can design, manufacture and supply complete fixed and portable coating systems for both on and offshore installations. Coating system for pipes and Re-bars (construction bars) is expertise of Inductoheat.

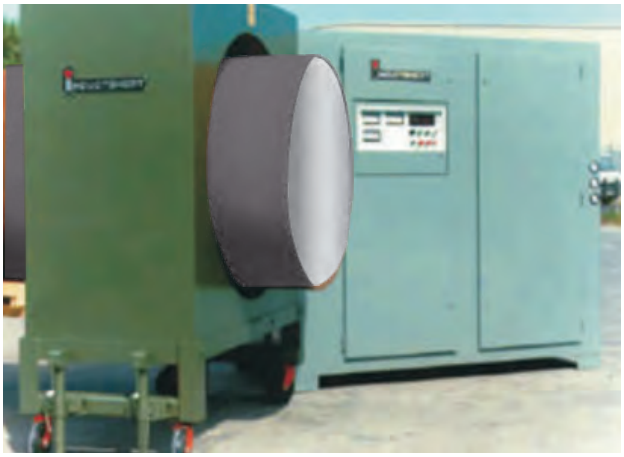
Having disregarded the traditional methods of effecting pipe heat treatment and coatings, Inductoheat customers benefit from innovative solution that allow them to complete their application in less time, with vastly improved quality assurance – the result being hugely superior end products.

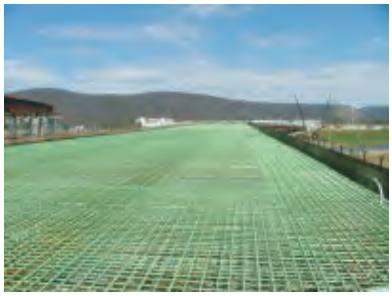
ADVANCES IN PIPELINE COATING USING INDUCTION HEATING

INDUCTION PRE-HEATING OF STEEL PIPE PRIOR TO APPLICATION OF 3 LAYER POLYETHYLENE COATING



Legend
1 Pipe is shot blast cleaned to SA 2.5 finish
2 Pipe is pre-heated by induction for application of 3 layer system
3 Epoxy primer sprayed onto pipe
4 Copolymer layer applied to pipe
5 Polyethylene layer applied to pipe
6 Pipe is water quenched
7 Coating is inspected by applying electrical current
8 Pipe is ready for shipment





Controlled *Non Ferrous Heating*

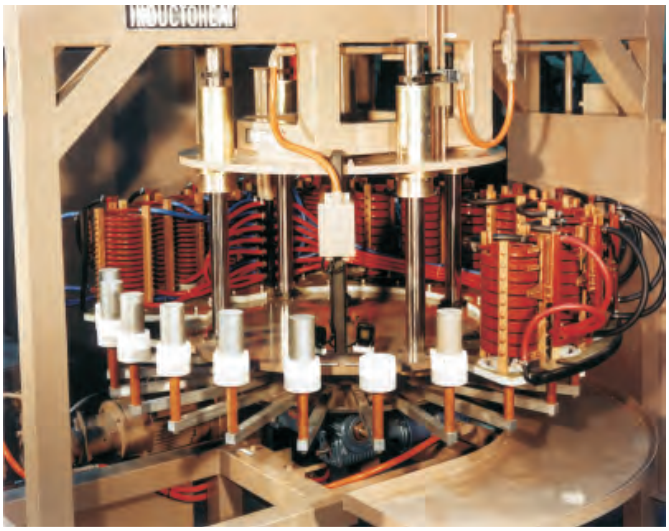
Precise • Repeatable • Multi- Zone

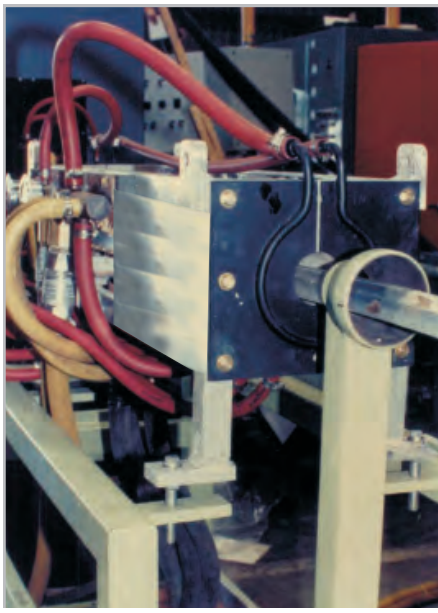
Today's manufacturers demand billets of the high quality at the press. This can only be achieved by precise control of the manufacturing process. Inductoheat non ferrous billet heating equipment achieves this with multiple control zones by both "static" and "dynamic" heating.

For copper and brass the rapid heating rate available by induction also reduce oxide formation and surface burnout of alloying elements ensuring improved product quality.

Inductoheat non ferrous systems are working with the following process.

Heating of :
- Aluminum Alloys
- Magnesium
- Brass- Copper
- Cupro -Nickel
- Silver & Gold
- Platinum
- Zirconium
- Titanium





Non ferrous : Billet heating • Taper heating • Aluminum trapezoidal cast bar heating

Induction *Wire and Cable Processing Systems*

Manufacturing • Sales • Service

Committed to promoting the very real benefits of induction heating technology, across a whole range of wire and cable process requirements, we offer a total spectrum of application solutions that are widely acknowledged as providing the "industry standard". The versatility of our solutions, combined with the considerable experience of our engineers, means that there are quite literally hundreds of systems in operation worldwide. With the capability to meet the requirements of virtually any application, the considerable experience in working with other specialist partners to ensure that appropriate solutions are available, no-matter how demanding the process. We have many application specific solutions, including those for rod preparation and drawing, spring steel hardening and tempering, PSC wire and strand and ferrous / non-ferrous annealing systems.

Multi-Wire Furnace Technology

For those processes and applications where single wire treatment is not enough, we can offer a multi-wire solution tailored to your application, regardless of whether it involves two or more.

Applications include:

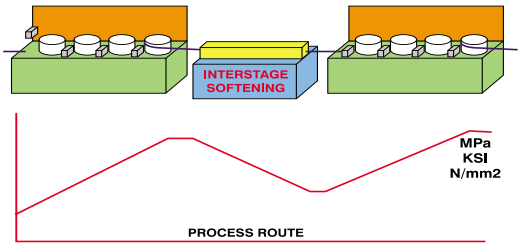
• Pre-heating • Diffusion • Annealing • Tempering • Wire coating

PSC Low Relaxation Wire & Strand

Continuous induction stress relieving of single wire or 3-wire, 7-wire and 19-wire strand for applications in low relaxation, pre-stressed concrete structures.

Single Wire In-line Annealing

In-line annealing at drawing and rolling speeds allows manufacturers to process wire to size with inter-stage or final anneal without the wire having to go offline.



Spring Wire

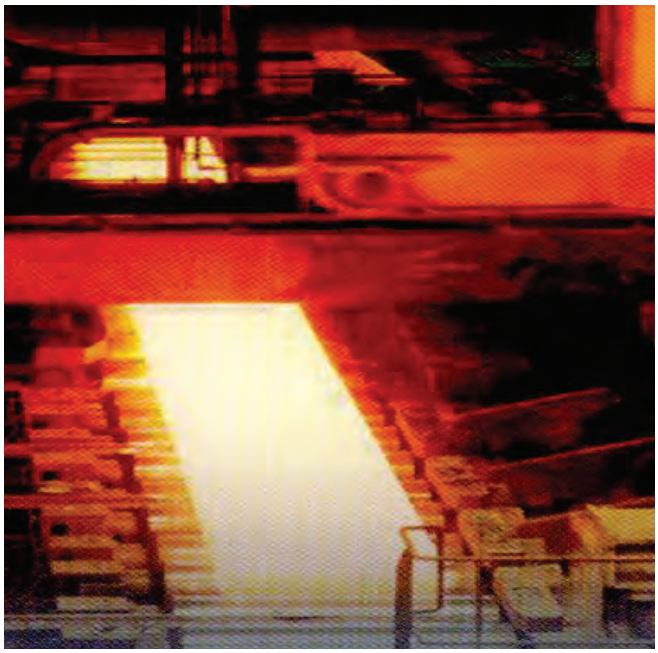
With standard lines ranging from 1 - 3 tonnes per hour, covering diameters from 2 - 18mm, we have solutions to cover all requirements.

Induction *Heating for Bars, Blooms & Billets*

Static • progressive • Oscillatory

Before a bar, bloom or billet moves from the continuous caster to the rolling mill, it must be reheated. Induction heaters for bars, blooms, and billets are typically used prior to a forming, rolling or forging operation.

The complete view of World's Largest 14000 kW Induction bar heater prior to rolling.



- In-line induction heaters often incorporate dual frequencies, a˜ording a more controlled rate of heating.
- Static, progressive, and oscillatory heaters are available.
- The selection of optimum frequency, heating power density, and line length is veriÿed by ÿnite element modeling of the product's temperature proÿles to meet the customer's requirements.
- Providing the rolling mill with a continuous supply of uniformly heated steel billets, bars and blooms at the proper temperature is crucial to e¸cient mill operations.
- Temperature control and consistency from the surface to the core, as well as over the length of the product, is usually a prime requirement.
- These heaters use high efficiency electro-magnetically shunted coils which are supplied with electrical energy by high-efficiency solid-state power units.
- Standard units are available in frequencies between 50 Hz and 10000 Hz.

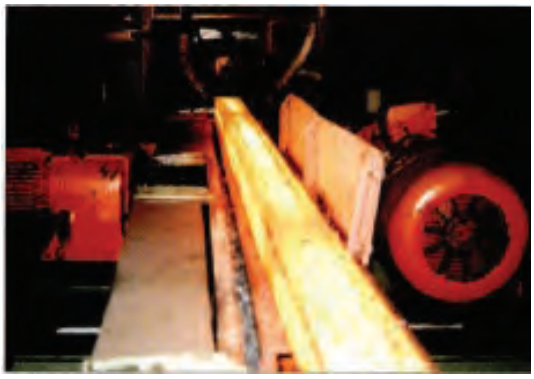
Induction *Booster Heater for Slabs*

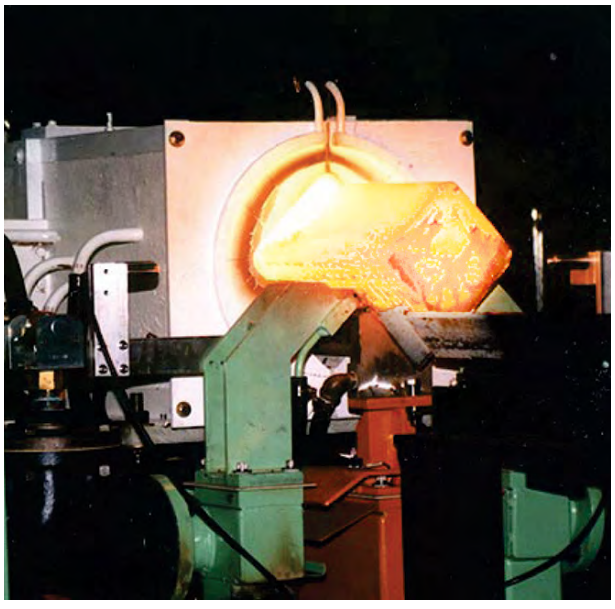
Static • progressive • Oscillatory

Induction Technology to Reduce the Cost of Heating or Reheating Steel Slabs for Rolling

Inductotherm's high-power density induction systems provide mill operators with the most efficient and cost effective technology for bringing even the largest steel slabs to the optimal temperatures required for rolling.

- Induction reheating systems are designed to reduce fuel by taking over the slab heating process at the point in the thermal curve where gas-fired furnaces rapidly lose efficiency, about 1000°C.
- High efficiency electro-magnetically shunted coils and high-efficiency solidstate power units maintain the efficiency of these induction heating systems throughout their operating range.
- Generally, induction-based reheating systems require just 10 percent of the floor space needed for comparable gas-fired furnaces.
- Metals which are susceptible to oxidation and scale formation if heated above certain temperatures can be accurately heated using induction heating, thus increasing yield and reducing associated steps such as pickling.



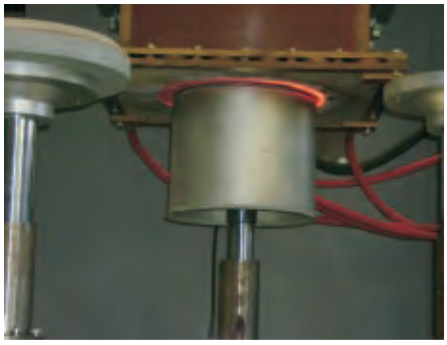


Genuine *Specialized Applications*

Unique • Exclusive • Precise

Our metallurgical, technical and product expertise assure reliable and efficient performance when dealing with customized heating and specialized heat treating applications.

- *Brazing & Soldering*
- *Shrink fitting*
- *Strip heating*
- *Non – rotational crankshaft heating*
- *Fillet hardening*
- *Titanium heating*
- *Semi-solid heating*
- *Large gear heating*
- *Laboratory applications*
- *Aluminum cast bar re-heating*
- *Small susceptor heating*
- *Various defence heating applications.*
- *Heating of Rotors & Stators*



Bonding • Curing • Motor rotors • Stators • Crystal growing • Fibre optic

Premier *Expert Design*

Exclusive • Resourcefull • Integration

Tooling Department

We're experts in inductor design, manufacture and repair of simple fabricated designs to complex, induction coil types, including forge coils.

Our in-house induction coil and tooling departments o˜er six new machining centers for high quality workmanship of prototype and production coils.

Inductors are designed with the help of CAD systems and built speciÿcally to meet the needs of our customers. We also provide component design, build and repair as well as trouble-shooting for entire systems.

A wide variety of inductor services ensure that each tool, whether new or repaired will produce parts with consistent quality. Inductors and variable ratio isolation transformers are rebuilt to like-new conditions that meet their original speciÿcations. We design, build and completely re-build our own and all designs of medium frequency and RF-transformers and inductors.

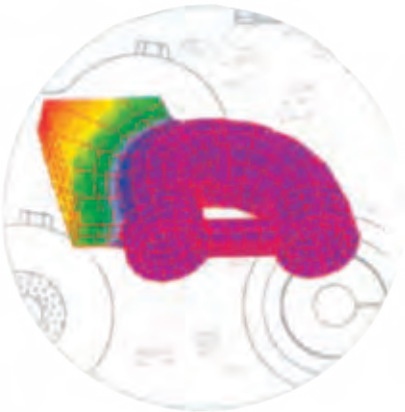
Our induction coil and Engineering Departments combined with After market support specialists, provide continuous quality assurance throughout your Inductoheat experience.

Aftermarket Support

Inductoheat's Aftermarket Team o˜ers the industry's highest level of technical support and services for when you need it the most. Fast ! A large inventory of spare parts is ready for immediate delivery.

- *Inductors*
- *Capacitors*
- *Power Supply Electronics*
- *QRS & WRS Components*
- *Transformers,*
- *Tooling & Buses*
- *Insta-Change Quick Disconnects*
- *Transistors, Mosfets, SCRs & Diodes*

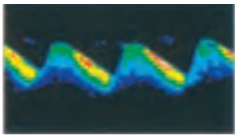
Field service engineers are available for repair, rebuild, and preventive maintenance of induction heating equipment. “Hands – On” training is available at the customers location. Customized format training classes can also be provided. When you require complete service any time call us on at 02717-231961

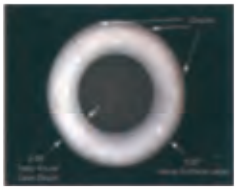


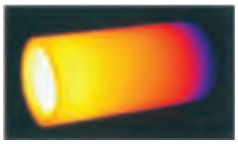
We perform prototype heat treatment on parts with over a dozen of our own processing machines, using machining & tooling that is similar or identical to the ones used in production.

Service *Metallurgical & Process Lab*

Knowledge • Experience • Development



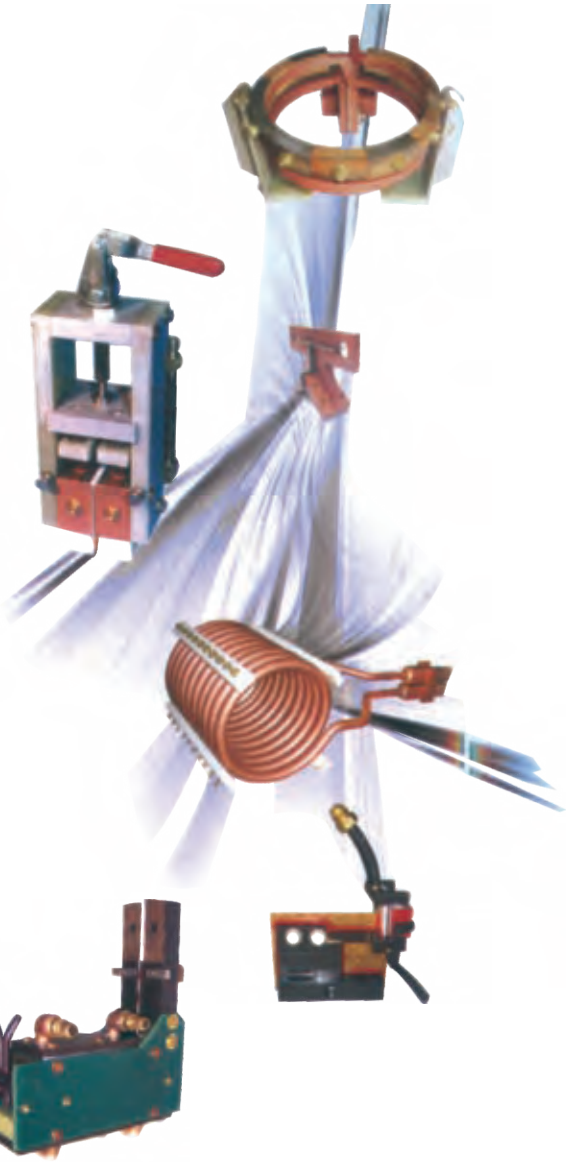




Inductoheat's in house- Metallurgial Laboratory and Process Development Departments provide expertise on the developement of induction heating and hat tratmentfor ferrous and Process Development Departments non-ferrous-based alloys to improve product lift.

Process feasibility along with computer modeling and process simulation studies aid in the development of induction heat treatment of your part design.

Our trained metallurgists, sta˜ and state-of-the-art lab equipmentensures quality craftsmanship at all levels of your products life cycle.

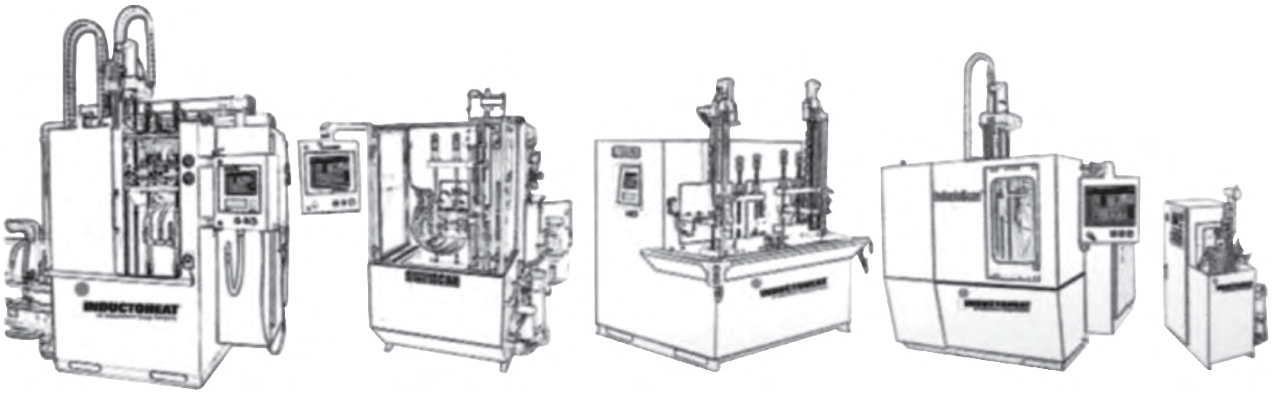


Equipment capabilities include:

Micro Hardness testers, Metallography systems, Image analyzers, Electron microscope, Specialized instruments.

Inductoheat is equipped with a fully ratiometric thermal imager with visual and thermal composite image functionality.

We perform prototype heat treatment on parts with over a dozen of our own processing machines, using machining &tooling that is similar or identical to the ones used in production.



Global Presence

Inductotherm Group Worldwide

Manufacturing • Sales • Service

North America

Alpha 1

Clinton Machine

Consarc

EMSCO Installations

EMSCO North

EMSCO South

EMSCO West

Inductoheat

Inductotherm

Inductotherm Group Canada

Lepel

PVT

Radyne

T&H Lemont

Thermatool

Central America

Inductotherm Group Mexico

Inductotherm Group Brasil

South America

ServMelt

Europe

Consarc Engineering

EMSCO UK

Inductoheat Europe

Inductotherm Coating Equipment

Inductotherm Group Deutschland

Inductotherm Group Europe

Inductotherm Group France

Inductotherm Group Iberia

Inductotherm Group Italy

Inductotherm Group Russia

Inductotherm Group Turkey

Asia

Inductotherm Group China - Wuxi

Inductotherm Group China - Shanghai

Inductotherm Group Indonesia

Inductotherm Group Japan

Inductotherm Heating & Welding

Inductotherm Group Korea

Inductotherm Group Taiwan - Changhua

Inductotherm Group Taiwan - Taoyuan

Inductotherm Group Thailand

Australia

Inductotherm Group Australia

India

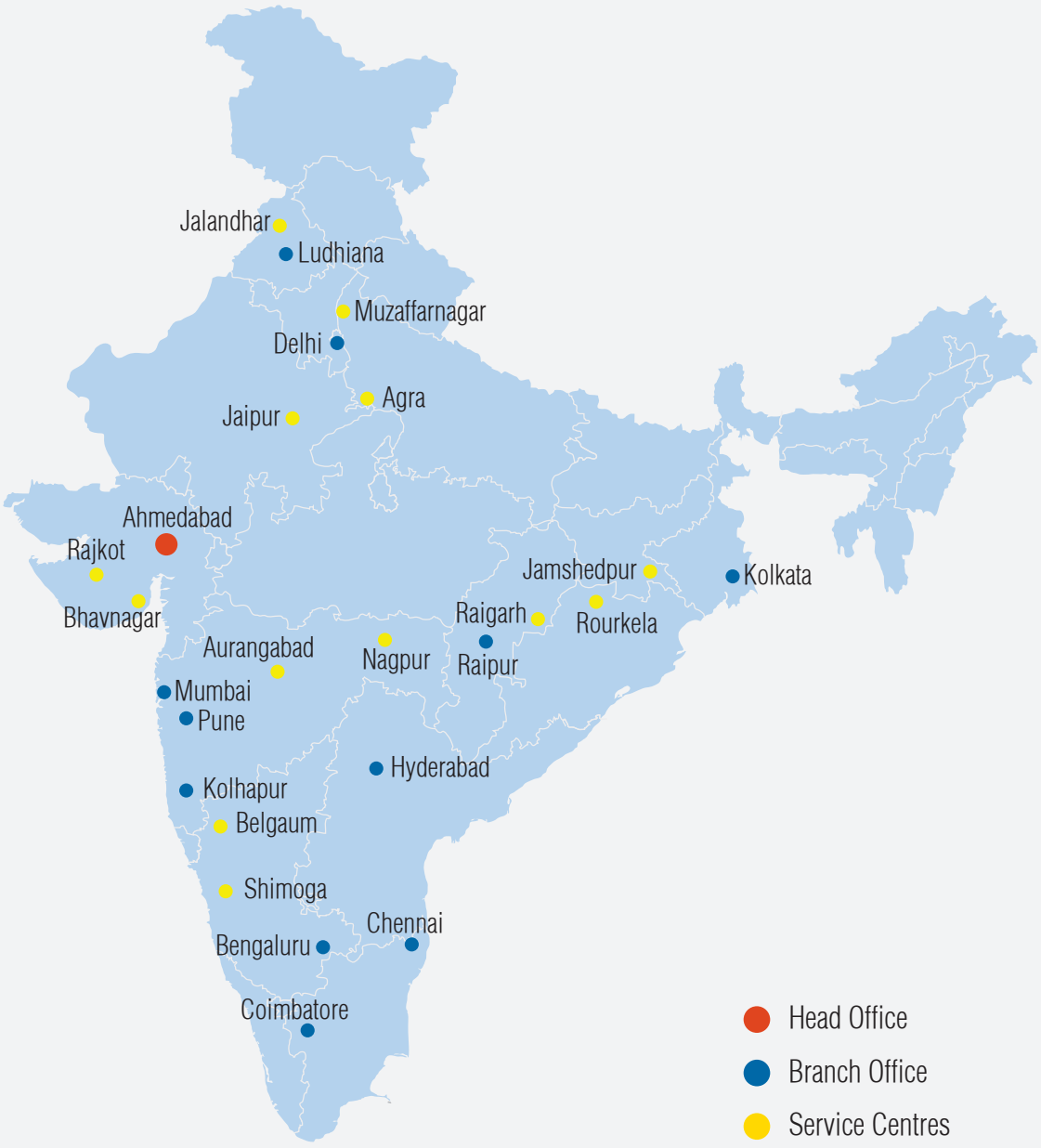
Inductotherm Group India - Ahmedabad

Inductotherm Group India - Pune

USA • Europe • Africa • Asia • Australia

Where you'll find us

Twenty five service centres
spread across India



INDUCTOTHERM GROUP | INDIA

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Email: iil@inductothermindia.com | www.inductothermindia.com

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