



SUPPORT SERVICES

## Aftermarket Support Services

### Continuous Improvement of Induction System Uptime



# Ajax TOCCO's Aftermarket



**Any brand, type or application**

*Induction system parts, field service, maintenance, repairs*

**Ajax TOCCO is committed to provide services, parts, and equipment solutions for induction heating and melting users regardless of the original manufacturer.**

## **Global Presence / Markets Served**

As a leading OEM of thermal processing equipment used for melting and heating metals and materials, Ajax TOCCO Magnethermic (ATM) is well known as the provider of unsurpassed support for thousands of Ajax TOCCO installations worldwide. We are also the qualified alternative for repair, refurbishment, parts supply, system reliability enhancement, and field services for induction systems and components regardless of original equipment manufacturer. With offices strategically located in major worldwide market centers, we have a service center near you that stands ready to handle all of your induction system service, repair and support needs.

## **Induction Coil and Furnace Maintenance, Repair and Overhaul**

Whether your need is for new, rebuilt or redesigned equipment, Ajax TOCCO Magnethermic remains committed to continuous improvement of your induction system reliability. Utilizing advanced techniques of "forensic analysis," Ajax TOCCO provides comprehensive failure analysis and diagnosis of factors that reduce your manufacturing uptime. By continuously working to uncover the "weakest link" in an induction heating or melting coil and providing enhancements to OEM designs, Ajax TOCCO finds ways to optimize the service life and productive throughput of your equipment. We rebuild, repair and redesign all types of induction melting and heating coils, up to and including complete furnace replacement.

## **System Reliability Services (SRS)**

No matter who built your induction heating or melting system, you can achieve optimum dependability with help from Ajax TOCCO's System Reliability Services group. Continuous improvement of system uptime is made possible through diligent execution of six primary elements: coil repair/reconditioning, coil installation services, spare parts supply, predictive maintenance services, training programs, and field service. All six of these elements are available to you through our SRS group, regardless of the original equipment manufacturer. Ajax TOCCO's System Reliability Services are the key to continuous improvement of your induction equipment's uptime and throughput.

## **Field Service and Parts Supply**

Technical assistance is available at any time of the day or night using our 24-hour hotline. Our experienced service team is tactically placed for quick response to customers wherever they are located. Field service and factory certified replacement parts are available not only for Ajax TOCCO Magnethermic systems, but for other induction original equipment manufacturers as well. Our commitment to customer support means that Ajax TOCCO is available to handle emergencies any time of day, any day of the week, at any location worldwide.

# Support Services

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- Induction Coil and Furnace Repair
- Factory Reconditioned Induction Systems
- Used Equipment
- Induction System Upgrades
- Field Services
- Spare Parts
- Rush Turnaround Available
- **24-Hour** Technical Support Hotline  
Call 1-800-547-1527

**Ajax TOCCO Magnethermic®  
Corporation**

*The Global Force in Induction Technology*

# I. System Reliability Services (SRS)

**A**ny brand, type or application  
*Induction system parts, field service, maintenance, repairs*



As a full service company serving the world's metal and heat processing industries, we at Ajax TOCCO view your induction equipment as a *system* designed for a particular application. As with any system, the failure of any one component could take the entire system off-line, costing you tens of thousands in lost revenue.

To maintain peak reliable performance, your electric induction system depends on a number of services we offer that fit together like pieces in a puzzle. Ajax TOCCO is the only induction company having an exclusive *System Reliability Services* Group whose primary mission is to assist all users of induction in putting together this puzzle for continuous improvement of induction system uptime. Experienced SRS group advisors who understand your application are available to explain how each piece of the puzzle will benefit your operations through increased uptime and the elimination of costly, unscheduled emergency repairs.

SRS maintains a technical staff providing helpful troubleshooting expertise for any induction user, regardless of the original manufacturer or the type of equipment. This free telephone service helps the user get back into production, often without the need for field service assistance. And whenever field service is required, we will dispatch one of our district service engineers who is trained to quickly get your system up and running again.

SRS develops customized preventative maintenance programs that consider every component of your system.

| SYSTEM SERVICES                  | MECHANICAL P.M. | ELECTO-MECH. P.M. | MAGNE-CLEAN FLUSH | INFRA-RED THERM-SCAN | VIBRATION ANALYSIS | HOSE REPLACEMENT | FIELD SERVICE | FACTORY RECONDITIONING | ENGINEERED UPGRADES |
|----------------------------------|-----------------|-------------------|-------------------|----------------------|--------------------|------------------|---------------|------------------------|---------------------|
| INPUT POWER TRANSFORMER          | ●               | ●                 | ●                 | ●                    | ●                  | ●                | ●             | ●                      | ●                   |
| INPUT POWER INTERCONNECTION      | ●               | ●                 |                   | ●                    | ●                  |                  | ●             | ●                      | ●                   |
| POWER SUPPLY                     | ●               | ●                 | ●                 | ●                    | ●                  | ●                | ●             | ●                      | ●                   |
| CAPACITOR MODULE                 | ●               | ●                 | ●                 | ●                    | ●                  | ●                | ●             | ●                      | ●                   |
| WATER-COOLED INTERCONNECTION BUS | ●               | ●                 | ●                 | ●                    | ●                  | ●                | ●             | ●                      | ●                   |
| WATER-COOLED POWER CABLES        | ●               | ●                 | ●                 | ●                    | ●                  | ●                | ●             | ●                      | ●                   |
| INDUCTOR / COIL                  | ●               | ●                 | ●                 | ●                    | ●                  | ●                | ●             | ●                      | ●                   |
| FURNACE / FIXTURE STRUCTURE      | ●               | ●                 | ●                 | ●                    | ●                  | ●                | ●             | ●                      | ●                   |
| FURNACE REFRACTORY SYSTEM        | ●               | ●                 |                   | ●                    |                    |                  | ●             | ●                      | ●                   |
| HYDRAULIC SYSTEM                 | ●               | ●                 |                   | ●                    | ●                  | ●                | ●             | ●                      | ●                   |
| WATER RECIRCULATION SYSTEM       | ●               | ●                 | ●                 | ●                    | ●                  | ●                | ●             | ●                      | ●                   |
| WATER COOLING TOWER              | ●               | ●                 | ●                 | ●                    | ●                  |                  | ●             | ●                      | ●                   |
| PIPING INTERCONNECTION           | ●               | ●                 | ●                 |                      | ●                  | ●                | ●             |                        | ●                   |
| INTERCONNECTION WIRING           | ●               | ●                 |                   | ●                    |                    |                  | ●             |                        | ●                   |
| CONTROL SYSTEM                   |                 | ●                 |                   | ●                    |                    |                  | ●             | ●                      | ●                   |

# Continuous Improvement of Induction System Uptime



Your uptime can be improved when you ask SRS to recommend the best choice of application-specific Ajax TOCCO aftermarket programs and services. We will work with you by developing a solution for strengthening the "weakest link" in your induction system and propose a customized continuous improvement plan.

**24-hour Hotline** for all induction users of any equipment brand.  
**800-547-1527**

## II. Repair / Reconditioning Services

No matter the application or the OEM, Ajax TOCCO Magnethermic is the leading source for repairs, maintenance, and overhaul services for any induction system component. From coreless induction furnaces and coils used for melting metals to high-end inductors operating in heat treating systems, Ajax TOCCO is fully staffed and equipped to meet your needs. With service centers located strategically throughout North America, Europe and Asia, our technicians have the tools and equipment to handle your reconditioning needs wherever you are.

### Comprehensive Failure Analysis and Diagnostics

We employ the latest techniques for thoroughly diagnosing the causes of induction equipment failure or reduced uptime. Once the potential root causes for reduced uptime are identified, recommendations for improvements are made and implemented. Detailed records are maintained regarding the scope of repair or overhaul, thus providing traceability and a useful history of equipment maintenance.

The use of these practices enables the process of continuous service life improvement, because as each design enhancement is made, new failure modes are disclosed that would otherwise never have an opportunity to surface. New failure modes are avoided with new improvements to the overhaul process or component design, and the cycle continues until optimum reliability is achieved.



Reconditioning and replacement of coreless coils



128,000 square foot repair and reconditioning service center

### Coil Repair, Reconditioning and Overhaul

With an ongoing commitment to materials science research and process improvement, Ajax TOCCO Magnethermic ensures the selection of the best materials and procedures for the reconditioning of your induction coil. When your coil arrives at one of our regional service centers for repair or overhaul, we employ the evaluation techniques described above and help you decide the best course of action for your particular application. This is done in a way that ensures we aren't just settling for repairing the coil the same way it came in. Instead, we look for ways to improve the operational service life of your coil so that your maintenance cost per unit of manufacture is minimized. This is true for coils utilized in all induction heating and melting applications.

#### Induction Heating and Melting Applications Served:

- Melting
- Molten metal holding (Channel furnaces)
- Vacuum melting, heating and processing
- Graphitizing and coating
- Forging
- Mass heating
- Extrusion
- Heat treating
- Annealing



Manufacturer of 65 ton coreless frame furnace coil

Patented Latch T™ tie bolt replacement device



## II. Repair/Reconditioning Services

# Coreless Induction Furnaces and Coils

Typically exceeding all OEM specifications, experienced Ajax TOCCO personnel employ innovative problem solving techniques to extend the life of the furnace or coil and enhance performance. Ajax TOCCO can meet the needs of all types of induction melting and heating furnaces as well as replace existing coils and furnaces with more reliable and efficient designs on all furnace applications including:

- Steel shell
- Open frame
- Composite box
- Crucible
- Complete furnace/coil replacement
- High voltage
- Vacuum induction melting/heating
- High power density
- Complete coil resize/reforming and tubing repair/replacement
- Silica and alumina grout installations, including tapered designs for quick lining removal (QLR) systems
- Comprehensive coil design and material science improvements

We also handle all aspects of coil installation. You're back in operation quickly when skilled technicians at Ajax TOCCO install coils into your furnaces.

New furnaces of any style are designed and manufactured by Ajax TOCCO whether the need is for ferrous or nonferrous, open air, or vacuum melting. In addition, our personnel routinely service systems manufactured by all major equipment producers including:

- Ajax TOCCO
- Inductotherm
- Asea Brown Boveri
- Lindberg
- Junker
- Pillar
- ABP

**A**ny brand, type or application  
*Induction system parts, field service, maintenance, repairs*



Reconditioned 70 ton coreless induction melting coil



Manufacture and overhaul of complete coreless induction furnaces



Complete power supply and transformer reconditioning service

# Channel Induction Furnaces

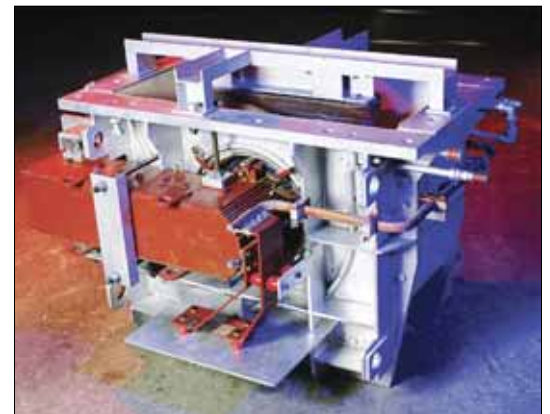
With more than 2500 channel furnace installations worldwide, Ajax TOCCO is well known as the premier supplier of channel furnace equipment for all applications. This experience also makes us the leaders in upgrade technology, repairs, and parts for all types of inductors (lower cases) and channel furnaces (upper cases), for all major OEMs.



Refurbished Inductotherm line melt inductor

Ajax TOCCO routinely provides channel induction parts and services for the following furnace OEMs:

- Ajax Magnethermic
- Inductotherm
- Asea
- Brown Boveri
- Whiting
- Lindberg
- Induga
- Georg Fischer
- Junker
- ABP
- Wyatt

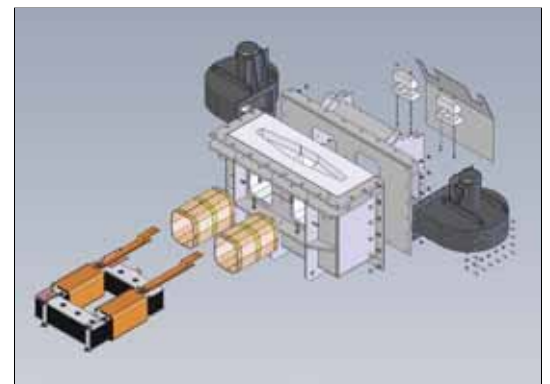


Factory reconditioned Junker inductor assembly



## Increase your uptime with Ajax TOCCO's System Reliability Services:

- Reconditioning services are available for all single and twin loop inductors. From repairing damaged steel welded structures to re-insulating and replacing components, Ajax TOCCO does it all.
- Examples of Ajax TOCCO engineered furnace performance enhancements include adding or modifying a lid, increasing hearth capacity, supplying new and used replacement inductor assemblies, and updating the hydraulic and water cooling systems. Oftentimes existing inductors can be replaced with performance-proven Ajax TOCCO inductors
- Power unit reliability enhancements including preventative maintenance, factory reconditioning and performance upgrades. In many cases, ATM can replace old tap changer units with brand new solid state power units and updated operator controls.
- Ajax TOCCO often provides completely reconditioned inductors that are ready to install using proven refractory systems. Our **Installation Services Team** is often relied upon for furnace inductor changes that include molten metal removal, inductor removal and installation, refractory repairs, firing, refilling, and system restart.



Complete twin loop lower case assembly



## II. Repair/Reconditioning Services

# Heat Treating

We have developed the special expertise to design, build, and repair any size, shape, or form of coil used for hardening, annealing, tempering and other heat treating or selective heating processes. State of the art machine tools, materials, and skilled craftsmen all work together to provide the best coil repair and design enhancement services available in the industry today. Coils and tooling for all types of induction heat treating applications are processed regularly:

- Quick disconnect coil adapters and water cooled bus can be supplied to suit your existing equipment.
- Coil laminations and other flux concentrator materials can be designed and fabricated for your specific application.
- Quench chambers, rings and blocks are all repaired and or replaced as necessary.

After an inductor has been rebuilt or manufactured, we can offer a variety of sophisticated "coil shot" counting alternatives to facilitate tracking of inductor life.

# Mass Heating

Bar and billet heating coils that last longer save you money and reduce downtime. In-line heating coils for tube, wire, coating, annealing, etc. are rebuilt using a variety of construction methods. All types and manufacturers' coils can be repaired, rebuilt or modified. All styles of coils including cast refractory block, 60 Hz tie-rod type, replaceable cast liners, and open winding with aluminum framework are regularly rebuilt. Our extensive experience and research in insulation coatings and refractories allow us to quickly rebuild and or recommend improvements for increased efficiency and maximum uptime.



**Fully encapsulated cast forging coil**



**Titanium billet-heating coils for extrusion process**



**5-axis CNC vertical machining center**



**Remanufactured crankshaft inductor coil**



**Heat treating inductor design and build work cells**



**Quick change inductor tooling and enhancements to quench are available for all heat treating applications.**



# Electromagnetic Devices

## Electromagnetic Stirring

Ajax TOCCO assures the application of innovative problem solving approaches to maximize the reliability of these highly complex, low frequency devices. Additionally, we offer design enhancement of ladle and caster stirring devices as well as all OEM units including:

- Asea Brown Boveri
- Danieli Rotelec
- A.B.B./JME
- AEG Elotherm
- Concast

Warranted for performance, our enhancements are designed to:

- Prolong the life of the unit
- Improve performance
- Increase reliability
- Incorporate quality workmanship and continually work with customers to meet individual needs

We are also experienced in the repair and enhancement of:

- Large ladle stirring units
- Units for continuous casting applications
- Mold stirrers
- Strand stirrers
- Final stirrers
- Electromagnetic brakes

## Electric Lifting Magnets

Our personnel have a wealth of experience in designing, manufacturing, repairing and servicing electric lifting magnets. Computer aided design capability allows us to manufacture deep field and increase duty cycle for cooler operating, more efficient designs. Experienced in round, rectangular, bi-polar and specialty application lifting magnets, Ajax TOCCO offers a rugged fabricated design to withstand the rigorous environment in which these devices must perform. We are a cost competitive solution for all of your lifting magnet needs.



Reconditioning, overhaul and replacement of ladle stirring units



Mold stirring unit overhaul



Final stirrer rebuild



Rebuilt 55 inch scrap handling magnet

II. Repair/Reconditioning Services

# Water-Cooled Power Cables

Power cables fabricated at Ajax TOCCO are constructed with performance and reliability in mind. Designed to withstand the rigors of induction processes, our cables are guaranteed water-tight because of our unique 2-tube, 4-ply construction and specially designed machined terminal barrel. Thermoglass or FyreJacket sleeving can be applied to power cables for added ambient heat protection and increased abrasion resistance.

Thermoglass is a woven fiberglass material withstanding up to 1000°F for everyday thermal protection.

FyreJacket is constructed from a high bulk fiberglass sleeve, heavily coated with a special silicone rubber designed to shed any sparks or molten splash, thus preventing penetration and damage. It provides excellent protection for hoses, tubing, and cable. It has a continuous temperature rating of 500°F and a 2000°F rating for fifteen (15) minutes.

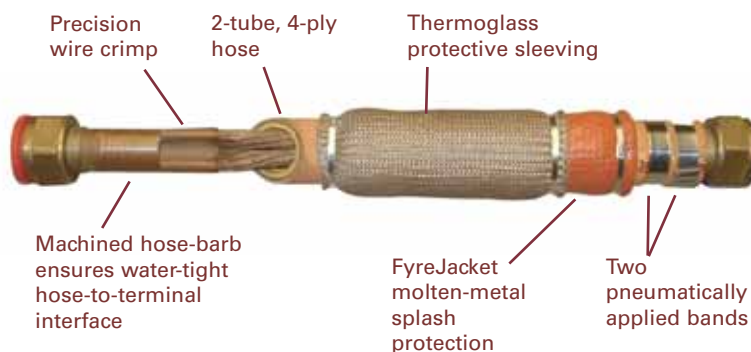
Whether you need new, rebuilt, or redesigned power cables, we remain committed to using and developing quality materials and techniques.



Available features:

- Enhanced coolant and current carrying designs.
- Same day shipping on most requests (normal turnaround 2-3 days).
- Build or rebuild leads, regardless of original manufacturer.
- Protective sleeving for molten and metal splash abrasion resistance.
- All cables are flow and pressure tested.
- Standard and custom molded vacuum plug designs.

Available Enhanced Water Cooled Power Cable Options



Service centers are fully equipped for rush delivery of your power cables

| Lead Size | Hose Diameter |          | Terminal X Dim. | D.C. Resistance | Conductor X-Sectional Area | Minimum Clearance Centers |
|-----------|---------------|----------|-----------------|-----------------|----------------------------|---------------------------|
|           | I.D.          | Nut O.D. |                 |                 |                            |                           |
| 12        | 0.75"         | 1.31"    | 2.00"           | 78 μ-ohm/ft.    | 133 M C M                  | 2.00"                     |
| 16        | 1.00"         | 1.56"    | 2.50"           | 40 μ-ohm/ft.    | 266 M C M                  | 2.50"                     |
| 20        | 1.25"         | 1.75"    | 3.00"           | 20 μ-ohm/ft.    | 533 M C M                  | 3.00"                     |
| 24        | 1.50"         | 2.00"    | 3.50"           | 15 μ-ohm/ft.    | 799 M C M                  | 3.50"                     |
| 32        | 2.00"         | 2.75"    | 3.50"           | 11 μ-ohm/ft.    | 1064 M C M                 | 4.25"                     |
| 1500      | 2.50"         | 3.13"    | 4.00"           | 5 μ-ohm/ft.     | 1500 M C M                 | 5.75"                     |

# III. Field Services

## Aftermarket Support Team Service Centers Strategically Located Worldwide



Ajax TOCCO's worldwide locations, including Service Centers and Sales Offices



### Comprehensive In-field Diagnostics, Troubleshooting and Repair for Your Induction Systems – Regardless of OEM

#### Help is just a phone call away!

With a separate service group operating in conjunction with service centers located around the globe, Ajax TOCCO can often dispatch an engineer to your door the same day you call. Our factory trained service engineers are required to undergo annual re-certification and travel fully equipped to handle everything from new system startup to your emergency field repairs.

Our service assistance Hotline is answered 24 hours a day, every day. Many times, callers are able to resume production by resolving problems using our call-in technical assistance service.

**A**ny brand, type or application  
*Induction system parts, field service, maintenance, repairs*

#### Increase your uptime with Ajax TOCCO's System Reliability Services, including:

- Field troubleshooting and repairs
- Preventative maintenance
- Coil/inductor change out
- Power supply tune up and meter calibration
- Implement engineered system updates, upgrades, and improvements
- Energy audits
- Safety and technical training schools on-site

**Call 1-800-547-1527, 24/7 for Service Assistance.**

III. Field Services

**System Reliability Services - Multi-Brand Induction Capability**

| FIELD SERVICE<br>O.E.M. BRAND | Furnace | Coil / Inductor | Bus & Cables | Power Supply | Input Power Switchgear | Cooling System | Hydraulic Power | Fixture / Controls |
|-------------------------------|---------|-----------------|--------------|--------------|------------------------|----------------|-----------------|--------------------|
| ABP                           | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| Ajax Magnathemic              | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| AJAX TOCCO                    | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Yes                |
| American Induction            | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| Bone Frontier                 | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| ASEA Brown Boveri             | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| Duca                          | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| Elotherm                      | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| IEH                           | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| Inductoheat                   | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| Inductotherm                  | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| Induga                        | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| Inter-Power                   | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| Junker                        | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| Lepel                         | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| Newelco                       | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| Pillar                        | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| Pachydyne                     | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| Radyne                        | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |
| TOCCO                         | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Yes                |
| Welduction                    | Yes     | Yes             | Yes          | Yes          | Yes                    | Yes            | Yes             | Most               |



Field service diagnostics available for all major induction OEMs

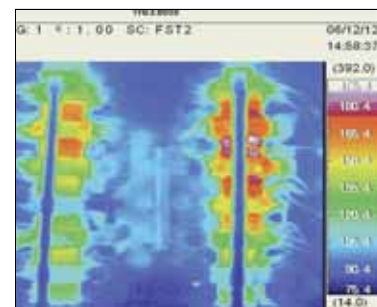
## Preventative Maintenance

Production managers know their cost per ton and how it relates to each hour and day of equipment down time. Many induction users find that tens of thousands of dollars are gained by simply investing in a good preventative maintenance program (PM). Ajax TOCCO provides induction users with a variety of PM programs, each developed to focus on specific segments that will result in continuous improvement of induction system uptime. In fact, our

*System Reliability Services Group* is available to help you understand the advantages of each of our PM programs, how they will increase your system uptime, and eliminate costly emergency repairs. At Ajax TOCCO, our proactive maintenance approach goes a step further with our *predictive maintenance program*. This program utilizes thermal imaging technology that when combined with our engineering service experience will spot problems with your system so they can be corrected long before a breakdown occurs.



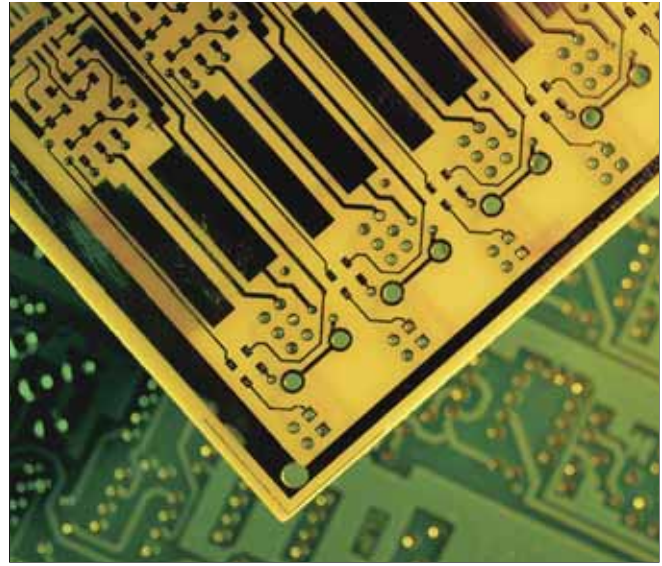
On-site water system clean and flush



Thermal imagery of water-restricted inverter SCR assemblies

# IV. Spare Parts

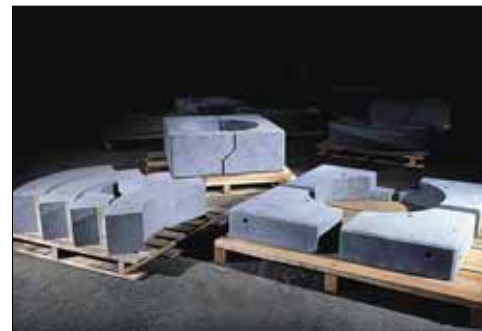
Ajax TOCCO offers an extensive computerized inventory of replacement parts for all induction heating and melting equipment regardless of its original manufacturer, type, or application. Our commitment to support all users of induction goes well beyond being simply a supplier of parts and components. Ensuring that you get the right part when you need it remains one of the key ingredients to continuous improvement of induction system uptime. In addition, Ajax TOCCO is available to handle your part emergencies any time of the day and any day of the week. We routinely ship everything from circuit boards to heavy pre-cast refractory shapes to more than 100 countries.



We work with manufacturers and vendors who supply us with both standard and special items for your electrical and mechanical induction system components. Our engineering staff will inspect and test each component to verify that all parameters and characteristics meet our exact standards prior to qualifying any supplier. Many replacement parts and system components are engineered and manufactured at Ajax TOCCO specifically for your equipment and application or made to your exact specifications. Often, we find areas where improvements in materials and manufacturing techniques could provide greater system uptime. All parts and components are inspected, tested, and carefully packed to ensure they will arrive ready for use.



**A**ny brand, type or application  
*Induction system parts, field service, maintenance, repairs*



Supply pre-cast refractory shapes

Shunt repair, replacement, re-design

# V. Process Development / Commercial Services

## Commercial Heat Treating

Ajax TOCCO enhances successful laboratory development with on-site production equipment, and offers an ISO/TS16949:2002 certified production heat treating division capable of producing thousands of parts a day.

Think of us as your second source for overcoming capacity constraints, unexpected equipment failure, or difficult selective heat treating requirements.

## Coil Design & Build

Our ISO 9001 Madison Heights, Michigan, location is equipped with a full-service metallurgical lab to assist with arriving at the very best possible design solution for your application. As a leader in the design and manufacture of induction heat treating systems, ATM has developed world-class process development capabilities for a wide variety of thermal applications. That expertise is put to use every day with design enhancements and reconditioning services for existing heat-treat inductors regardless of original equipment manufacturer.

## Process Development Expertise / Meeting Critical Timing Objectives

Ajax TOCCO provides the metallurgical, technical and product expertise to develop the tooling and process that will meet your product performance objectives in today's fast paced environment. Tooling can be often manufactured and modified within days to ensure rapid trials and pilot programs.

## Experience and Skills

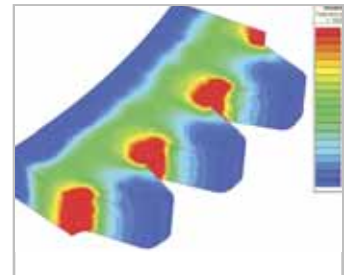
The rapid heating cycles and precise temperature control that make induction so attractive also offer new challenges for the metallurgist and process engineer. Ajax TOCCO Magnethermic's development and process engineering group has the induction experience and know how to develop processes and equipment that are robust, productive and at the forefront of technology.



Madison Heights, Michigan, commercial heat treating facility

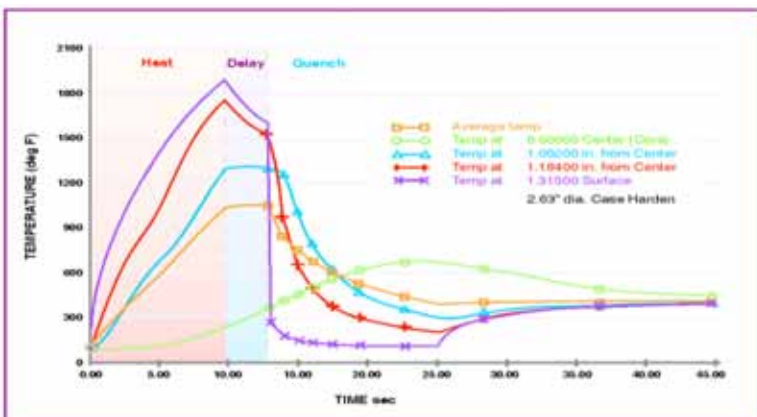


Fully equipped and staffed metallurgical lab



Comprehensive FEA modeling capabilities

## Typical Temperature Profiles through Heat Treating



Time-temperature cycle for case hardened 2.63 in. diameter part showing temperature changes with time at indicated distances from center to surface of piece. Also illustrated is average temperature for various times during this surface hardening treatment.

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