LEMMEDI

ENGINEERED SOLUTIONS
FOR THE TUBE,
PIPE AND WIRE INDUSTRY

INDUSTRY 4.0
READY

INDUCTION IS

FAST - Induction generates heat directly into the work-piece with no need to waste time for conduction and system thermal inertia.
This means increasing efficiency and improving throughput by reducing process times.

PRECISE - The right mix of frequency, power and inductor's geometry can be designed to heat just a specific part of your work-piece in a fully automated, stable and software controlled way.
This means obtaining the perfect thermal profile, the desired hardening or the right relieving, quality and repeatability.

GREEN - Efficient and fast: induction technology is the way to increase primary energy saving and hence reduce CO_2 emissions in the atmosphere. Moreover compared with other thermo-chemical treatment, induction technology is clean and safe both for people and environment.

ONE TECHNOLOGY, MANY APPLICATIONS

Oil and Gas
Automotive
Tubular Goods
Wire
Agricultural
Door and window
Heat Treating
Cable

INDUCTION IS A VERSATILE TECHNOLOGY USED FOR MANY DIFFERENT HEATING PROCESSES THAT REQUIRE RELIABLE, FAST AND EFFICIENT PRODUCTIVITY.

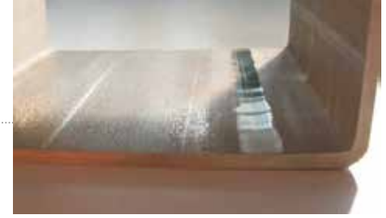
This heating process involves parameters like power, frequency and heating time that allow repeatability and accuracy in every step of the process. Induction heating can be applied to parts with different shapes and sizes ranging from few millimeters to substantial diameters and thicknesses depending on final application: from the smallest tubes of the medical market to the biggest ones of the Oil and Gas.

ENGINEERED SOLUTIONS

IN DECEMBER 2014 SAET S.P.A., OWNER OF THE **EMMEDI** BRAND SINCE 2006, HAS JOINED THE AJAX TOCCO MAGNETHERMIC CORPORATION GROUP OF COMPANIES:

THE ACQUISITION HAS CONFIRMED THE **ATM** GROUP COMMITMENT TO THE PIPE AND TUBE INDUSTRY SUPPORTING THE CONSOLIDATION AND EXPANSION OF THE **EMMEDI** BRAND AS A LEADING PROVIDER ON THE MARKET.

In addition to the products focused on welding and heating treatments, thanks to the strong backing from the corporate Park Ohio Holdings, the group gathers companies and products that span far beyond just the induction equipment. Today the commitment to the pipe and tube industry encumbrances a family of providers in an effort to become more of a universal resource to the tube and pipe market, including pipe threading machines (PMC Colinet) and tube and pipe bending and processing machinery (Pines).
Combination of these technological leaders will provide great opportunities to the tube and pipe industry and will bring value to customers' organization and businesses.



Thousands of units are up and running worldwide, and important investments have been made to confirm the leadership of **EMMEDI** in the supply and after sales services for customized processes and solutions for the Tube industry.
With more than fifty years of experience in the development of innovative and tailor-made processes based on induction heating, **SAET** and **EMMEDI** are high quality players in the design and manufacturing of equipment for different applications.
A wide range of **Power supplies** is available to meet almost any production requirement:

iPower

- Based on a strong IGBT transistor design this is a parallel tuned type solution. Output Power from 25 to 2500 kW and Frequency up to 200kHz.

MPower

- Based on MOSFET transistor is a parallel tuned type solution, the high frequency version of our solid state converters. Output Power goes up to 600 kW and Frequency up to 500kHz.

TPower

- This is the family based on Vacuum Tube Class C grounded grid solution dedicated to applications that need very high frequencies. Power goes up to 1200 kW and frequency to 800kHz.

ABOUT WELDING PROCESS

EMMEDI WELDERS ARE BEING USED SUCCESSFULLY THROUGHOUT THE WORLD SINCE THE LATE '60 AND THEY'RE RENOWNED FOR THEIR ROBUST AND RELIABLE DESIGN.

Our technical staff assures the highest equipment performances by carefully studying production parameters in order to grant the best in class results:

- Power and working frequency are defined according to production parameters (ODs, THs, Working Speed and type of material). Hence, when austenitic and ferritic stainless steel are manufactured on the same tube mill, a special variable frequency device is supplied to provide the proper working frequency.
- The inductor is customized according to the tube shape (round, square, rectangular or other shapes) and the impeder is properly sized to concentrate the magnetic field in the welding area to apply the minimum energy required.

HF SOLID STATE WELDERS

Based on M-Power system, MOSWELD is the ultimate solid state power supply devoted to continuous welding of tube and pipes.
Typical layout includes one power supply cabinet containing transformer, DC inductance, SCRs bridge and auxiliary circuits; a second cabinet is the welding head where the mosfet modules, capacitors and bus-bar are contained.

> ADVANTAGES

- Very Compact cabinets - less floor space is needed
- Efficiency higher than 88% = welding power Vs power consumption
- Load short circuit proof
- Modular MOSFET Based Inverter with a Robust Design
- Very simple design of inductor coils
- Easy Maintenance - need for skilled labor is eliminated
- Remote Process Checking
- Reduced Maintenance costs using branded power components not subject to obsolescence
- More than 40 years of experiences in solid state converters

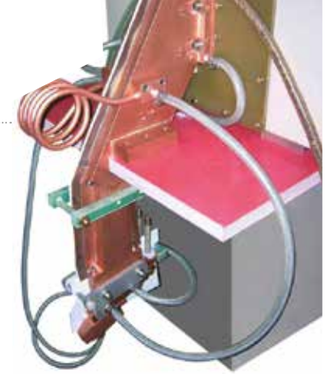
"CLASSIC" VACUUM TUBE WELDERS

With a very good customers reference world-wide the High Frequency Vacuum Tube is the "Classic" Welder, appreciated by the Tube industry throughout the decades for its extremely robust design and strong reliability.
Having an overall efficiency around 70% it is provided with a patented Ripple Filter granting less than 1% of residual ripple.
Oscillator tube MTBF 35.000 to 50.000 working hours. The peculiarity of HF Classic Welders is the extremely compact welding head, composed by a small cabinet containing the output transformer and the capacitors.

> ADVANTAGES

- Easy adaptation of any load features
- Intrinsically protected from short circuits on the load
- No limits for required working frequencies
- Strong response in limit conditions
- High reliability
- Easy for standard maintenance level
- Drastic line down time reduction

For pipe mill with a capability over 14 inches OD, especially when producing high carbon and yield strength materials as for API requirements, **conduction welding** allows considerable energy saving.



Dual or contact options allow:

- Common high welding quality on a wide range of tubes and pipes gauges
- Opportunity to weld large OD pipes with ID scarfing tools, without impeder
- Shorter Vee length and easier strip edges mechanical management
- Energy saving: around 50% less energy required compared to coil usage
- Reduced down time to switch from contact to induction welding: quick and easy set-up changes of coils and impeder

When welding pipes with severe range of wall thickness and OD, or for stainless steel tubes, **Variable output frequency** is a strategic choice.

This solution grants:

- Power range from 100 to 450 kW
- Frequency range:
  - 1:1,3 (i.e. 160-210kHz) for austenitic stainless steel only
  - 1:2 (i.e. 150-300 kHz) for both austenitic and ferritic steel
- Ideal managing of the heat affected zone versus material OD and thickness ratio
- Best quality of external and internal welding beads with relevant benefits for inner and outer scarfing tools
- Improved welding quality for finite tube mechanical operation
- An active control of spume effects, typical of non ferrous material welding process
- Possibility to weld galvanised magnetic products
- Welding of ferritic and austenitic stainless steel family on the same tube mill
- Dedicated PLC software that acts a complementary inductive and capacitive adaptation upon operator's frequency selection

OPTIONS

- The **Automatic High Frequency Welding Head Adjustable Table** has been designed to hold the welding head next to the tube mill.
  The support is equipped with three motorised movement controls along axes X, Y and Z, and allows the operator an accurate inductor positioning directly from Welder Control Desk.
  Maintenance and production changes are therefore easier and faster.
- As an alternative to standard alphanumeric touch-screen panel which displays all the operating and fault messages to the operator EMMEDI has developed a specific software platform installed in an industrial PC installed on the control desk.
  The **Welding Management System** allows a real time checking of all main welding functions and the memorizing of all welding parameters and events. Working data stored can be used to repeat the best welding performances or to analyze events in the recipes database.

HEATING SOLUTIONS

INDUCTION WELDING EQUIPMENT ARE ONLY PART OF THE OFFERING EMMEDI PROVIDES TO THE MARKET.

MANY HEAT TREATMENTS SOLUTIONS ARE AVAILABLE TO MEET ANY PRODUCTION REQUIREMENT FOR TUBE, PIPE AND WIRE.

HEAT AFFECTED ZONE NORMALIZATION - SEAM ANNEALING

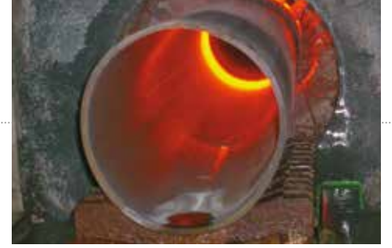
Is dedicated to the normalization of the Heat Affected Zone (HAZ) required to meet API standards for Oil and Gas applications.

> MAIN FEATURES

- I-Power converter optimized according to production requirements
- Special and robust inductor design using copper bars and magnetic flux concentrators cores to focus the magnetic field on the tube seam area
- Pyrometer for temperature control

> ADVANTAGES

- Independent heating units for increased operational flexibility
- Possibility to treat pipes from 30 to 660mm OD by adopting the new linear coil with reduced width
- Precise temperature management thanks to closed loop PID system comparing the requested set point with the actual temperature read by the pyrometer
- Independent power control for each heating head (PID)
- Manual or automatic seam tracking device



FULL BODY ANNEALING

Is a generic heating process used for various applications ranging from API tubes quench and tempering, Oil and Gas tubes polyethylene coating, construction tubes painting, hardening, bending and swaging.

- I-Power or M-Power converter according to material and production specifications
- Power range from 30kW up to 3.000kW
- Pyrometer for temperature control
- Temperature range from 60 to 1.200°C according to material and application

> ADVANTAGES

- Fully customizable configuration to meet production requirements
- Precise temperature management thanks to closed loop PID system comparing the requested set point with the actual temperature read by the pyrometer
- Turnkey solutions with mechanical loading-motorised rolls and unloading stages for off-line solutions

WIRE HEATING

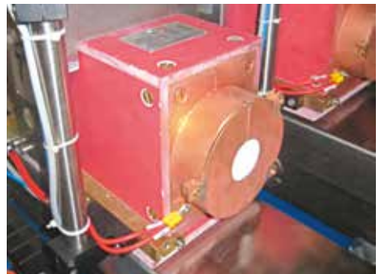
Is a continuous heating process used for a wide range of metallic materials and sizes from 1 up to 30mm diameter.

> MAIN FEATURES

- Availability of different Power Supply able to provide the ideal combination of power and frequency to match any production requirement
- Customized inductor, robust design
- Pyrometer for temperature control

> ADVANTAGES

- Fully customizable configuration
- Easy integration in the production line
- Precise temperature and process management



HEATING FOR POLYETHYLENE (PET) COATING

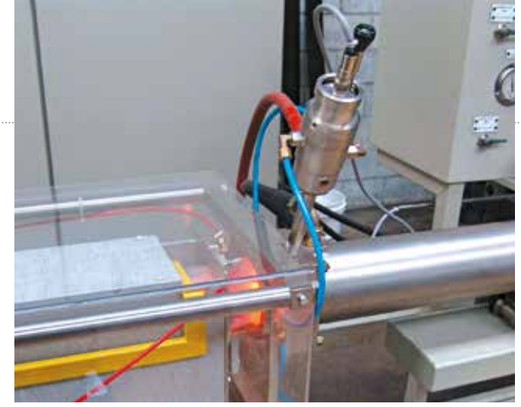
An example of a dedicated application is Polyethylene (PET) coating for Oil & Gas market: after heating up to 270°C a primer is preliminarily applied on the heated surface, then a polyethylene film is extruded as coater. This is considered an excellent modern process to protect tubes surface against chemical aggression due to soil acidity, corrosion due to the leakage currents, and mechanical aggression due to the ballast.

IN-LINE BRIGHT ANNEALING FOR REFRIGERATION TUBES

The equipment is based upon an inverter with a working frequency higher than 200kHz in order to normalize the tube to work basket-to-basket. The material (in-line reduced) coming from the draw bench is heated in progression up to 950 to 980°C.
The heating stage is applied progressively respecting the soak time until the magnetic/non magnetic transition point of the tube.
Normally, a series of 2 HF (220 to 330kHz) inductors is for the complete OD tubes annealing.
An optical pyrometer is targeting the final process temperature at the end of the last inductor to guarantee process goals.

IN-LINE DOUBLE WALL COPPER BRAZING

It is mainly applied in the automotive industry for breaking system circuits and fuelling distribution.
Tubes are made from strips of carbon steel with both faces copper plated.
The tubes ODs sizes go from 4 to 6 to 8-10mm.
The process is normally based on 8 in-line inductors in-line.
The first batch of four inductors are connected to the MF inverter (15 to 30kHz) and the four last inductors are connected to an HF inverter (200 to 250kHz).
The first inverter is IGBTs based whereas the second station can be based again on IGBTs or MOSFET according to the process goals.
Double pyrometer temperature control system is compulsory (intermediate 700°C - final 1.200°C max), whereas the PID system is an option.



IN-LINE BRIGHT ANNEALING

The in-line bright annealing process in mainly used with AISI 300, AISI 400, duplex, superduplex and titanium pipes for various application such as petrochemical, furniture, automotive, food and beverage.
The main goal of the process is the annealing which is responsible of the decreasing of hardness. Due to the lower heating time, a partial solubilisation of chromium carbides obtained with respect to the one reached with traditional furnaces.
Consequently the resistance to corrosion is increased, especially in the welded zone.

> MAIN FEATURES

- IGBT inverter
- Heating section with quartz or copper box
- Controlled heating temperature (Pyrometer)
- Cooling in hydrogen controlled atmosphere up to a temperature allowing water shower
- Integrated gas safety management

> ADVANTAGES

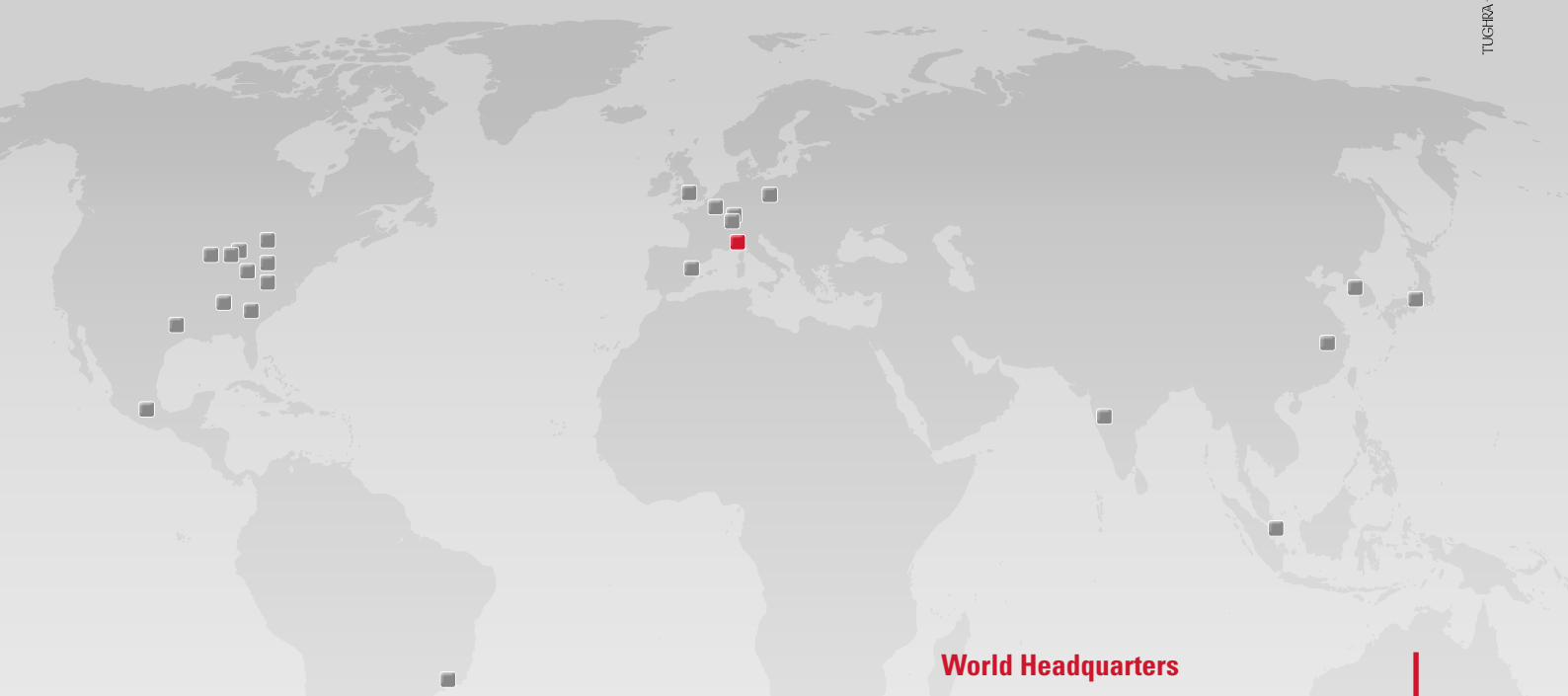
- No warm up time
- Fast and precise process
- Reduced floor space required
- Automatic safety control system in case of tube bending
- Limited gas consumption
- In-line system
- Easy machine set-up

> CUSTOMIZED SOLUTIONS

Throughout the years EMMEDI has increased competences and skills in the design and manufacture of customized solutions and is able to answer the most demanding requirements thanks to SAET metallurgic laboratory and expertise in mechanical handling. EMMEDI is now taking advantage of the new synergies with Ajax TOCCO Magnethermic Corporation, one of the oldest and most experienced manufacturers of induction heating equipment, to offer tailored state-of-the-art solutions and worldwide sales and service assistance.

OPTION

- A specific **Process Management System** with **PID** control can be integrated on all heating solutions.



Worldwide Service

SAET and EMMEDI customers can benefit from the resources of a global corporation.
We provide worldwide assistance through our network of regional sales and service engineers.
Our experienced service team is strategically placed for quick response to customers wherever they are located.
Our commitment to customer support means that SAET and EMMEDI are available to deal with emergencies at any location worldwide.

World Headquarters

Leinì, Turin (Italy)	39-011-99-77-999
Birmingham (England)	44-121-322-8000
Hirschhorn (Germany)	49-6272-9217-500
Valencia (Spain)	34-961-352020
Le Roeulx (Belgium)	32-64-67-37-77
Warren, OH (Usa)	1-330-372-8511
Albertville, AL (Usa)	1-256-279-1200
Wickliffe, OH (Usa)	1-440-833-0386
North Canton, OH (Usa)	1-330-818-8080
Longview, TX (Usa)	1-903-297-2526
Madison Heights, MI (Usa)	1-248-399-8601
Sterling Heights, MI (Usa)	1-586-254-8470
Brookfield, WI (Usa)	1-262-317-5300
Rochester (Usa)	1-585-368-2120
Ajax, Ontario (Canada)	1-905-683-4980
Queretaro (Mexico)	52-44-2221-5415
Cotia (Brazil)	55-11-4617 2710
Shanghai (China)	86-21-3760-1498
Pune (India)	91-20-6634-6100
Tokyo (Japan)	81-3-3647-7661
Seoul (Korea)	82-2-837-0413
Singapore	65-9699-4089

SAET S.p.A ▪ Via Torino, 213 ▪ 10040 Leinì (To) Italy
Phone (+39) 011 99.77.999 ▪ Fax (+39) 011 99.74.328
www.saetemmedi.com