

Inductors from Ajax Tocco Magnethermic

Optimal quality and reliability guaranteed



3D printing

From Powder to Precision Tool



Ajax Tocco focuses on laser sintering (selective laser melting = SLM) of copper and stainless steel materials for 3D printing. Additive manufacturing is carried out using a powder bed process. The inductors and showerheads to be manufactured are built up layer by layer from powder and fused together by a laser.

The impossible becomes possible.

Contours and processes that were previously unimaginable are now possible. With 3D printing, complex and delicate inductors and showerheads can be manufactured that were difficult or even impossible to produce conventionally—and all within a few days.

Reproducibility



The soldering process depends on the accuracy of the inductor, which precisely covers the area of the workpiece. 3D printing guarantees the production of identical inductors.

Longer service life and cost-effective manufacturing



Welding and brazing in conventional processes can lead to weak points in the material of inductors and cooling nozzles. These do not occur when printing using the powder-bed process with lasers. 3D components have a longer service life than conventionally manufactured parts. This reduces costs and saves time.

Shortening and optimizing development times

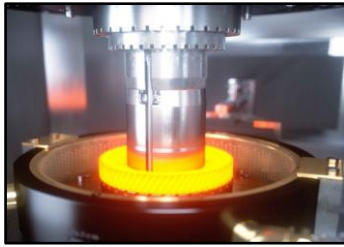


The internal and external geometries of the inductor are easier to modify and thus optimize. This allows for significant improvements in current distribution and cooling efficiency. Newly developed inductors can therefore be produced more quickly, just like replacement inductors.

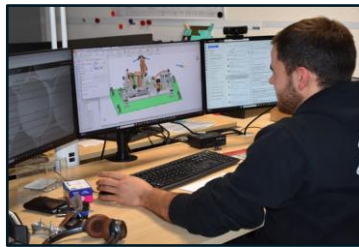
Research, development, design, production, service,
repair, training



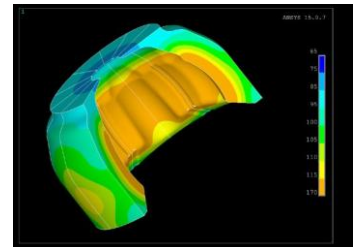
Research and
Development



Process development

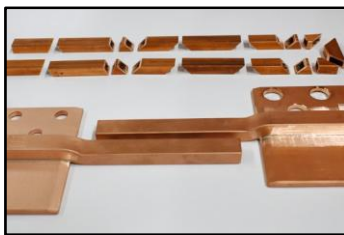


Development, design



Simulation, inductor design

Production



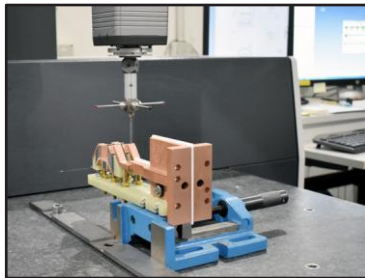
Machining



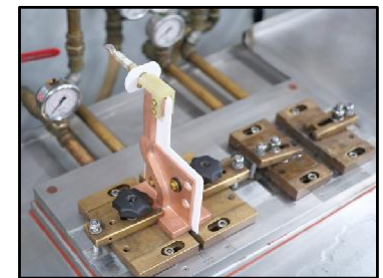
TIG welding

Everything
from a single
source

Quality assurance



Dimensional inspection



Leak and flow testing

After-sales service



Repair, including of 3D-
printed inductors



After-sales



Service

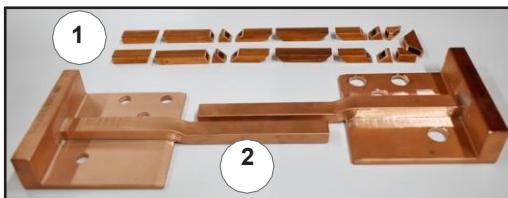
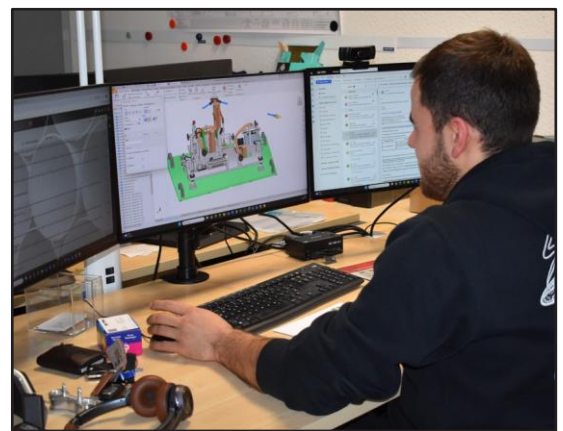
High-quality inductor manufacturing

An inductor consists of various components:

- Inductor jaws in versions for high frequency (HF) or medium frequency (MF)
- Heating conductors in various wall thicknesses, shapes, and dimensions
- Magnetic field concentrators made of Ferrotron®, Fluxtrol®, or core sheets
- Holders and supports for heating conductors and showers
- Spray nozzles for the cooling medium
- Inert gas feed systems

Ajax Tocco manufactures inductors for induction heating systems in-house, for third-party systems as new developments or as replacement parts.

Our development department is equipped with several workstations featuring state-of-the-art 3D CAD and simulation software.



In our "Inductor Construction" department, production proceeds according to precisely defined steps. As with the hairpin inductor selected here, it begins with the machining of the required parts (1) according to drawing specifications.

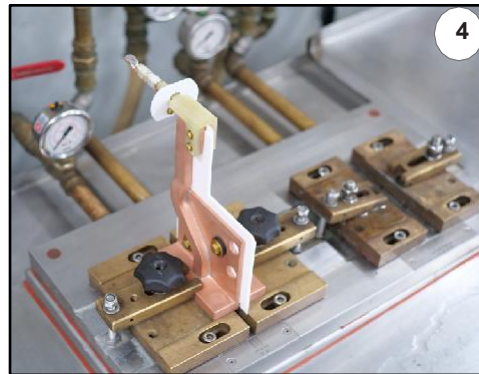
The required parts (1) are first tack-welded to the holders (3) manufactured by Ajax Tocco using a TIG welder to form a heating conductor. The heating conductor is then connected to the intermediate jaws (2).



A jig developed by Ajax Tocco is used to ensure precise manufacturing of the inductor. In addition, only the workpiece-specific alignment aids are required for assembling the inductor. This ensures high precision and repeatability for both new parts and repairs.

The brazing of the tack-welded parts is then performed outside the assembly jig, as the jig would become too hot during this process. The inductor is subsequently ground and glass bead blasted.

On the test bench (4), the pressure resistance and flow tightness are then tested at 10 bar. The flow rate is later measured at a pressure of 3 bar.

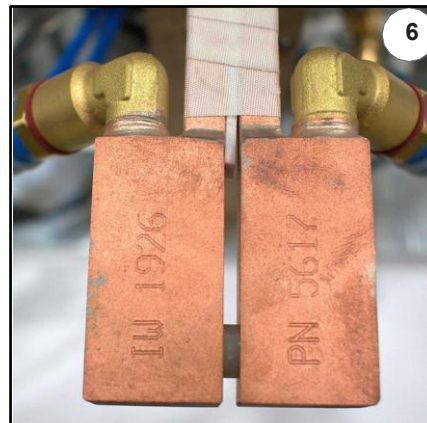


In the next step, the dimensional accuracy of the inductor is checked in our own 3D measuring room using a precision measuring machine from Zeiss (5).



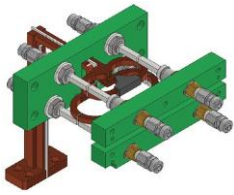
For reliable identification, the inductors are labeled with the following information (7):

- Drawing number
- Serial number



Inspection and storage jigs are designed for our customers' inductors. With the help of the jig, the inductor can also be shipped safely. Furthermore, customers can use the gauge to inspect their inductors and determine whether they have become bent, e.g., after a crash. Additionally, the inductor can be stored safely, preventing any unintended deformation. Inductors are best stored in a dedicated inductor cabinet designed for this purpose.

Types of Inductors



Folding inductor



Flat inductor



Multi-turn ring inductor



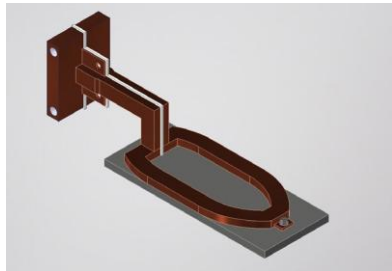
Special ring inductor



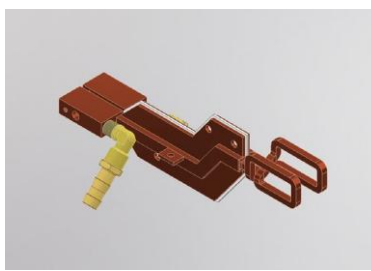
Shaped inductor



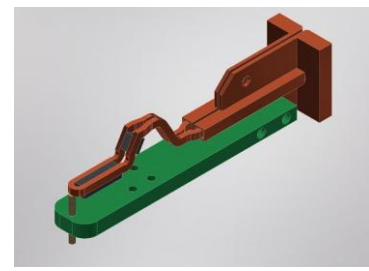
Double-ring inductor



Fish-shaped inductor



Fork inductor



Hairpin inductor



Line inductor



Ring inductor



Cloverleaf inductor



Fork inductor, double soldering



Tubular cable



Round inductor

Our training courses



Fundamentals of Induction Technology

How can you overcome reservations about induction technology? What exactly is induction, and how does induction brazing work?

What should be considered when induction brazing?

Basic Training in Induction Technology – Theory (1-day course)

Theory:

- Induction Theory
- Electromagnetic Properties
- Materials Science
- Induction brazing
- Types of inductors
- Inductor design – field-carrying elements
- Care and Handling of Inductors

Advanced Training – Theory and Practice as a 2-Day Course

Theory:

- Induction theory
- Electromagnetic Properties
- Materials Science
- Inductive soldering
- Types of inductors
- Inductor design – field-conducting elements
- Maintenance and Handling of Inductors

Practical Application:

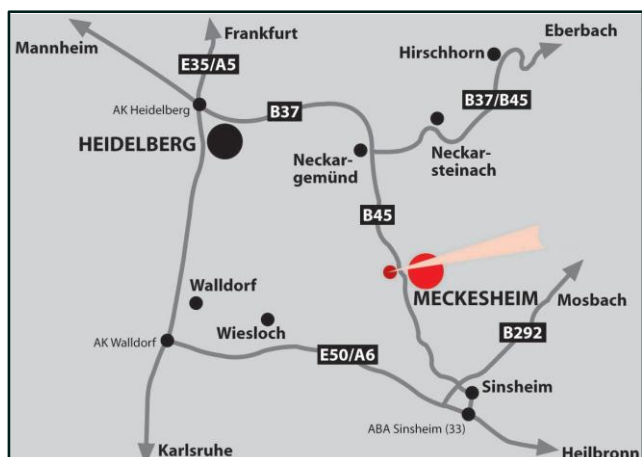
- Experiments with various inductor concepts on one of our laboratory machines
- Evaluation of the experiments in the lab
- Discussion of the results

Prerequisites:

- Basic knowledge of electrical engineering
- Basic knowledge of soldering techniques

Training locations

Ajax Tocco Magnethermic GmbH in Meckesheim or on-site at the customer's location



Complete solutions for heat treatment

Induction heating and brazing systems

- Cost-effective and highly reliable systems
- Low energy consumption per workpiece
- Precise and reproducible soldering results
- High throughput
- Precise heating zones and times
- Heat treatment processes with minimal distortion
- Scale-free soldering areas thanks to heat treatment under inert gas
- Easy integration into production lines
- Reduction of unit production costs
- Custom-designed induction systems
- User-friendly setup, changeover, and maintenance
- State-of-the-art engineering with FEM simulation
- Applications: Soldering/Shrinking/Heating

IGBT inverters

- Digital inverter control
- Power ratings from 10 kW up to several megawatts
- Frequencies from 5 Hz up to 400 kHz
- Soldering/shrinking/heating
- High energy efficiency
- High efficiency
- Easy integration into existing production lines
- Custom solutions and special systems
- Quick replacement of old and third-party equipment

After-sales service

- High-performance and expert service center
- Service hotline for troubleshooting
- Preventive maintenance
- Smart remote control solutions
- Efficient spare parts concepts
- customized system retrofits
- Inductor development, construction, and repair services
- Training for operators, maintenance personnel, and induction experts (also on-site)

Top quality from a single source

- Over 35 years of experience in heat treatment
- Induction systems in continuous operation worldwide
- In-house development and manufacturing
- DIN EN ISO 9001:2015 certified
- Efficient project and quality management from inquiry to service



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