SCHNEIDER ELECTRIC

COPPER INDUCTION HEATING COIL

HISTORY

An induction heating coil is a production tool which allows to perform a local heat-treatment on metallic parts; in this case, it is used to braze contact tips on copper or brass parts, which are then assembled into circuit breakers and contactors.

Schneider Electric's Plant 4.0 in Le Vaudreuil, Normandy (France), is a showcase for the new industrial revolution. Identified as one of the most developed factories in the world, it uses the latest technological advances in IIoT, mobility, sensing, cloud, analytics, and cyber security. This plant manufactures 40,000 contactors per day.

CHALLENGES

Schneider Electric redesigned an inductor to maximize its technical and industrial performance. This new inductor was designed to reach the right temperature at the solder without damaging the pellet or the support, and all while reaching the expected cycle time.

This new inductor was impossible to manufacture using conventional processes, but additive manufacturing made it possible to overcome these manufacturing constraints. Schneider Electric called on AddUp to provide ease of production for this complex part and short lead times.

INDUSTRY

Energy

CHALLENGE

3D print a "Plug & play" inductor with short lead time

KEY BENEFITS

- Part with complex geometries
- Improve metal part performance
- Reduction of production time

CREATIVE SHAPE

LEAD TIME

WEIGHT

PERFORMANCE

Schneider Electric was in search of a new inductor that could meet the following requirements:

- Be a good conductor of current (it is the current flowing in the inductor that induces the electromagnetic field responsible for the heating)
- Watertight (water flows through the inductor to cool it)
- Be robust and durable (dimensional stability, service life, ability to change tools, etc.).

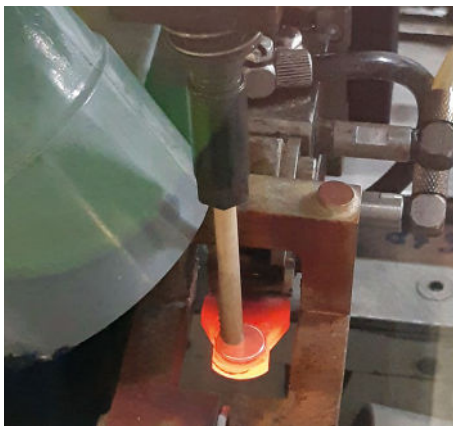
SOLUTION

Using the FormUp 350, AddUp was able to provide an inductor based on Schneider Electric's needs and in a fraction of the time it would have taken to conventionally manufacture the previous version of an inductor

Schneider Electric integrated this inductor into their production line to perform the following tests:

- Leak test and water flow measurement
- Power up and soldering of parts, while analysing hot spots with an infrared camera
- Cycle time measurement

Following these tests, Schneider then checked the manufactured parts. In particular, the quality of the solder joints were inspected visually as well as via a pull-off test, ultrasonic inspection, micrographic section and hardness sampling.



The copper inductor installed and tested

RESULTS

The final result was an additively manufactured inductor which has been successfully integrated into the Schneider Electric production line.

The inductor has met all quality specifications and its industrial performance has surpassed initial expectations.

"Additive manufacturing technology has enabled us to obtain a disruptive, innovative, and high-performance design, and a real "plug-&-play" inductor. The inductor supplied by AddUp was easily integrated into our system, directly, without any rework on the part. The production time was reduced which offers a very interesting reactivity, especially for parts with complex geometry. Finally, the industrial performance exceeded our initial expectations and the inductor has not been changed in the past 4 months. This is significant because a conventionally manufactured inductor typically is changed every 6 months"

Guillaume Fribourg,
Materials and Processes Expert,
Additive Manufacturing Project Manager,
Schneider Electric

Schneider Electric

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