

ADDITIVE MANUFACTURING OF INDUCTORS AND QUENCHING SHOWERS

Additive manufacturing is rewriting today's world for inductors and quenching showers. With the high degree of freedom and innovative integration of functions, the design department dictates the manufacturing process. Due to the additive manufacturing process, the Inductor 4.0 can be produced not only with flow-optimised cooling channels, but also with a solder-free copper coil. Undesirable stalls at right-angled transitions, which previously often necessitated a soldered joint, can now be prevented. Both these potential optimisations have a significant effect on the durability of these heavily stressed tools.

The inductive hardening process is not only determined by complex and robust inductors but also by efficient quenching showers. The additive process also provides good potential for flow optimisation in this case.

ADVANTAGES

- Improvements regarding technical geometry (cooling channels, contour accuracy, topology optimisation, strength optimisation)
- Improvement with regards to fabrication by transfer of component groups into a common component.
- Cost reductions
- Specially suitable for inductors, quenching showers and workpiece-dependent components.
- High potential for optimisation of technical drawings which are, or were dependent, on older fabrication processes.
- Rapid implementation with high reproducibility
- Extended service life with associated increased productivity and reduced costs

SMS ELOTHERM GMBH

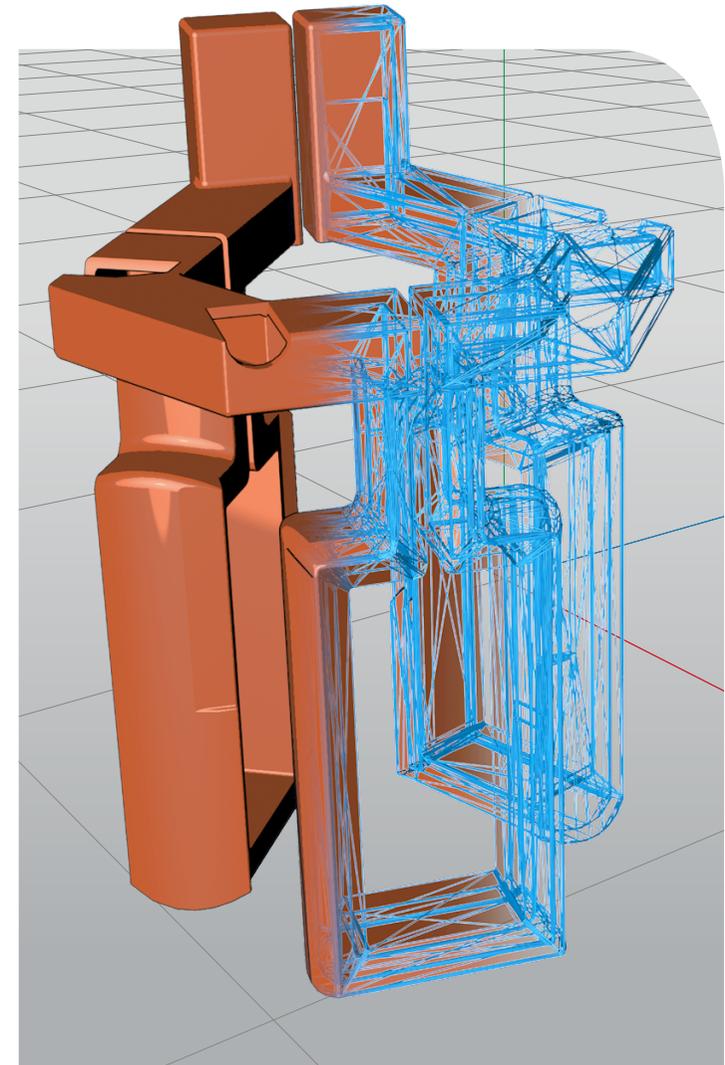
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Additive Inductor Manufacturing





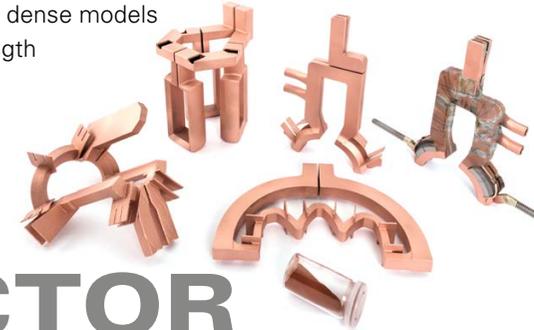
SELECTIVE LASER MELTING (SLM)

SMS Elotherm uses the SLM process which, with its high degree of detailing, high density and wide choice of materials has gained a strong position and permits every kind of optimisation in inductors and quenching showers.

In the SLM process the powder is distributed over the build platform with a coater – producing layer thicknesses of 20-50 µm. A laser source subsequently heats the particles locally up to melting point in order to bind them to the previous layer. Following the process, the build platform is lowered and the procedure repeated until the imported

CAD model has been completed. Overhangs and other design restrictions must be held in place by support structures during these micro-welding processes. The supporters are completely removed later on in an additional process. Final quality testing is a guarantee for SMS Elotherm's high manufacturing standards

- Variety of materials: Metal, plastics, ceramics
- Extremely dense models
- High strength



ADDITIVE INDUCTOR MANUFACTURING

Crankshaft inductor



Tulip inductor



Additive manufacturing of quenching showers

- Optimisation of fluid dynamics
- Reduced number of components

