

ADDITIVE MANUFACTURING OF COPPER COMPONENTS WITH SELECTIVE LASER MELTING

Selective Laser Melting

The additive manufacturing process, Selective Laser Melting SLM enables the fabrication of complex components, which can, for example, have intricate internal structures. SLM uses laser radiation to process metals in powder form into components whose mechanical properties do not differ from those made conventionally.

Results

Standard laser plants commonly have a maximum output power of 200 W, which enables the processing of working alloys from aluminium, cobalt-chrome, titanium and a variety of steels. Due to the lower absorption of the laser radiation and the larger heat conductivity of copper and copper alloys - in comparison to, e. g., steel - greater laser power is required to process these substances than for the ones listed above. At the Fraunhofer Institute for Laser Technology, a laser system with a maximum laser power of 1,000 W has been integrated into an existing SLM plant by adapting the optics, mechanics and control system. For the first time, this plant, using this additive method, is now able to produce components made of various copper alloys having a density of 99.9 %.

1 *Tool insert with internal cooling structures
made from Hovadur K220 by SLM*



Applications

Through this new manufacturing method, the great heat conductivity of copper can be combined with any complex internal structure, such as cooling channels. This enables the production of tool inserts that can be efficiently cooled. In this way, so-called hot spots can be cooled more quickly. Thereby, the cycle time is reduced and any arising warpage minimised. Other applications in which heat should be effectively removed can be found, for example, in the cooling of high performance semiconductor devices.

Our Services

- Adaptation of the procedure to your substances and construction geometries.
- Application testing of the procedure for your manufacturing.
- Technical and economic evaluation

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