



COAX HIGH POWDER FEED NOZZLE »COAX-HighNo«

Task

The coaxial powder feed nozzles previously used for laser material deposition (LMD) have a drawback: They have to be completely replaced or extensively reworked if they are mechanically damaged or worn out by the powder. These nozzles have an outer and an inner cone in their lower area, which are aligned to each other and, thus, create a gap for the coaxial powder supply.

Method

In order to reduce the required maintenance, Fraunhofer ILT has developed a new type of powder nozzle, whose tip, when damaged, is significantly easier to replace. This tip consists of an inner and an outer cone and can be exchanged as a monolithic unit. The gap size of the tip can be varied, based on the powder mass flow required and the particle size distribution of the powder conveyed. This way, the nozzle does not need additional adjustment.

Results

The use of replaceable, monolithic powder nozzle tips (inner and outer cone) minimizes the need for repairs as the nozzle tip can be replaced quickly and without readjustment. This significantly reduces production downtimes. Users can replace the nozzle tips on their own.

Specially coated nozzle tips increase the wear resistance so that the range of application is significantly extended both for large powder mass flows, as characteristic for extreme high-speed laser material deposition (EHLA), and for abrasive powders, such as carbides.

Applications

The newly developed powder feed nozzle with exchangeable nozzle tips as a monolithic unit can be used in all fields of application of both conventional and extreme high-speed laser material deposition.

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1 Coaxial powder feed nozzle COAX-HighNo.

2 Exchangeable tip for the coaxial
COAX-HighNo powder nozzle.