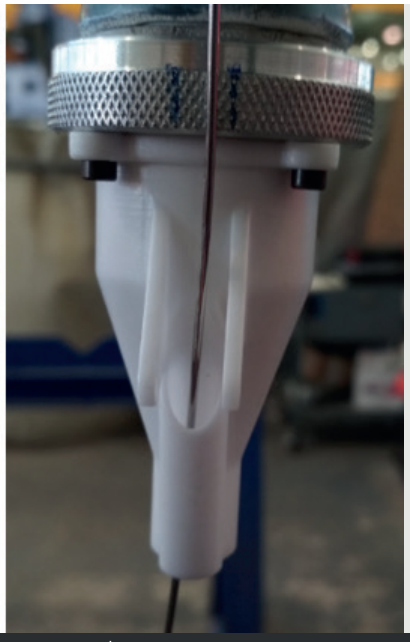
Ceramic nozzle for industrial equipment

IDONIAL CENTRO TECNOLÓGICO



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Sector: Equipment goods
Challenge: The original nozzle (metal) had operational issues due to the high working temperature and projection of slag particles.

Solution: Additive manufacturing using LCM technology for ceramic materials is used to produce a redesigned version of nozzle in alumina.

CHALLENGE

The customer had operational problems with the nozzle, suffering from a very high wear rate due to extremely aggressive working conditions (temperatures and projection of slag particles). In addition, there was a issue associated with the feeding of material (in wire format) which was not inserted correctly on the nozzle and produced continuous jams, which required stop of the equipment.

SOLUTION

The original nozzle design is provided by the customer. It is redesigned to incorporate a cable feed channel. On the final design, manufacturing engineering for the LCM process is carried out; this is a technology based on a photosensitive binder system cured by a LED light source (analogous to DLP technology for resins). Therefore, construction supports must be implemented to support the part during printing. Once the part has been consolidated, an additional cleaning process is carried out to remove excess material, and subjected to a consecutive thermal debinding and sintering cycle. With this, all the support resin is eliminated and totally dense components are obtained in the chosen ceramic. The process is iterated to achieve geometric tolerances according to the system settings requirements. With this, the final piece is manufactured without the need of other additional post processes. The component is tested in service with satisfactory results.

ADVANTAGES

Reduction of costs associated with the need to replace the original component with high frequency due to wear. Incorporation of auxiliary geometry for wire feeding by design, without the need for subsequent assemblies.