



Ceramic Institute

Clausthal GmbH

Additive Manufacturing of Porcelain

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Selective Laser Sintering (SLS) assisted by Layerwise Slurry Deposition (LSD) is a new way to produce ceramic components without any tools just based on 3D-data. Similar to a 3D printer working with synthetic materials, LSD technology can build up complex geometries with ceramic materials. A 3D model has to be uploaded to the machine. The software will slice the model according to the thickness of the ceramic slurry deposition. (Fig. 1)



Fig. 1: Sliced model of a porcelain cup

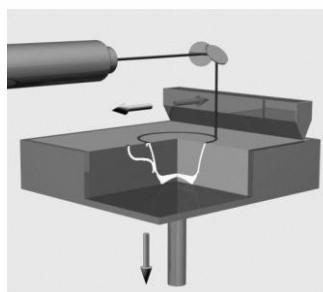


Fig. 2: Layerwise Slurry Deposition (LSD) followed by Selective Laser Sintering (SLS) to build up a three dimensional product

The laser will follow the slices' 2D geometry to sinter the product (Fig.2). Cups and plates can be designed according to individual ideas. Different laser systems may be used for different ceramic materials. LSD-system is produced by Tools and Technologies GmbH in cooperation with Ceramic Institut Clausthal GmbH, Germany.

Applications in the Field of Ceramics

Besides porcelain and sanitary ware, LSD technology can be used for the production of ceramic components with complicated shapes and from almost all ceramic materials. This allows the development of ceramic components and their integrative design within complex industrial solutions, in order to realize sustainable, economic applications in the wide range of user segments. (Fig. 3 and 4).



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11th Biennial Congress of the Iranian Ceramic Society

The 2nd International Conference on Ceramics



Fig. 3: Diamond structure made out of piezo ceramic

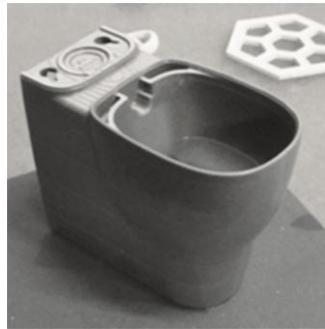


Fig. 4: Porcelain lavatory

By using LSD technology, the density of laser sintered components is usually higher than 80 % of its theoretical density. In this biscuit fired condition, porcelain and sanitary ware can be conventionally glazed and decorated. Therefore, no difference can be seen in the appearance of articles manufactured with those different technologies.



Fig. 5 Porcelain cups, glazed and conventionally post sintered

The LSD technology is a choice to reduce the time to market launch, ensure the product's function and dramatically reduce the costs for product development. Following these requirements we can adapt both, the size of the machine as well as the laser system for almost all ceramic materials and components.



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