Laser Finishing – Improving the Surface Quality of Additively Manufactured Components

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Abstract

Additive manufacturing (AM) processes provide a highly flexible route to creating complex three-dimensional structures via a layer-by-layer building process. Unfortunately AM components show poor surface quality e.g. due to partially fused particles of the metal powder used in the AM process. Post processing is therefore essential to improve the quality of the surface to suit specific industrial needs. The laser polishing process is based on the melting and subsequent solidification of a micro-layer of material, using a laser beam as the heat source for a smooth topography. In contrast to a manual or chemical polishing process, laser polishing is a highly repeatable, short duration process that is capable of selective polishing of small areas. We are therefore investigating the possibility of using both pulsed and CW lasers to improve the surface quality of titanium alloys to suit specific aesthetic and tribological requirements.