

Laser polishing of additive manufactured 316L SST cylindrical samples

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Abstract. This study is focused on the laser surface polishing of additive manufactured parts by using CO₂ laser beam irradiation. Despite the fact that several researchers have investigated the traditional abrasive polishing method, there is still a lack of information reporting the laser surface polishing of metal parts. 3D printed engineering parts produced by selective laser melting (SLM) usually exhibit high surface roughness of few tens of microns which quantitatively depends on the metal powder initial particle size, laser beam power, scanning speed and building layer thickness. For some applications such as in biomedical, aerospace and automotive industry, it is necessary to reduce the surface roughness to some specific values to reduce the friction. Laser polishing offers benefits represented by high repeatability, low labour cost and short processing time compared to conventional methods. This study presents an approach for the optimization of the main laser processing parameters and to establish their correlation with the resulting surface roughness. The characterization of the measured surface roughness was carried out by using optical 3D microscope and scanning electron microscope (SEM).

References

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