

Influence of Selected Finishing Technologies on the Roughness Parameters of Stainless Steel Manufactured by Selective Laser Melting Method

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Abstract : The new progressive method of 3D metal printing SLM (Selective Laser Melting) is increasingly expanded into the normal operation. As a result, greater demands are placed on the surface quality of the parts produced in this way. The article deals with research of selected finishing methods (tumbling, face milling, sandblasting, shot peening and brushing) and their impact on the final surface roughness. The 20 x 20 x 7 mm produced specimens using SLM additive technology on the Renishaw AM400 were subjected to testing of these finishing methods by adjusting various parameters. Surface parameters of roughness Sa, Sz were chosen as the evaluation criteria and profile parameters Ra, Rz were used as additional measurements. Optical measurement of surface roughness was performed on Alicona Infinite Focus 5. An experiment conducted to optimize the surface roughness revealed, as expected, that the best roughness parameters were achieved through a face milling operation. Tumbling is particularly suitable for 3D printing components, as tumbling media are able to reach even complex shapes and, after changing to polishing bodies, achieve a high surface gloss. Surface quality after tumbling depends on the process time. Other methods with satisfactory results are shot peening and tumbling, which should be the focus of further research.

Keywords : additive manufacturing, selective laser melting, SLM, surface roughness, stainless steel

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