

Physical Properties and Microstructure Study of 316L SS Fabricated by Metal Injection Moulding Process

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Abstract. Metal injection moulding (MIM) has been practised to process alloy powders to become components with significant physical and mechanical properties. Dissimilar than other methods, MIM focuses on the production of high volume, a small, and complex shape of products. The performance of the compacts depends on the suitable sintering parameters that governs their strengths in the final phase which determines the excellent properties of the sintered compacts. Three different sintering temperatures were utilised; 1100, 1200, and 1300 °C with two different soaking times; 1 and 3 hours at 10 °C/min heating rate to study their effect on the physical properties and microstructure analysis of 316L SS alloy compacts. The shrinkage measurement, surface roughness, and density measurement had been conducted for physical properties study. Different sintering temperatures give an effect to the physical properties of the sintered compacts. The shrinkage measurement at 1300 °C and 3-hour sintering condition demonstrated the highest percentage reading which was 10.1 % compared to the lowest percentage reading of 6.4 % at 1100 °C and 1-hour sintering conditions. Whereas, the minimum percentage of density measurement can be found at sintering conditions of 1100 °C and 1-hour which is 83.9 % and the highest percentage is at 1300 °C and 3-hour sintering condition which is about 89.51 %. Therefore, it has been determined that there could be a significant relationship between sintering temperature and physical properties in which it can be found from the porosity of the compact based on the microstructure studies.

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