

Characterization of the resistance to abrasive chemical agents of test specimens of thermoplastic elastomeric polyurethane composite materials produced by additive manufacturing

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Abstract-

Currently the development of additive manufacturing and the emerging of new materials allows to manufacturing process obtaining functional models with properties and geometries adapted to each particular case with low production times and costs. Specifically, 3D printing by fused deposition modeling (FDM) that operates with polymers, is one of the most widespread and popular techniques. Among the numerous materials available, the elastomeric polymers, whose base composition is polyurethane, are becoming increasingly important since allow to obtain flexible pieces with good mechanical and chemical resistance. The objective of this work is to study the effect of an abrasive fluid (commercial automotive petrol) on test specimens made of two different elastomeric filaments commonly used in 3D printing, thermoplastic polyurethane and thermoplastic elastomers. To do this, some of the main physical and mechanical properties - hardness, weigh variation and tensile and bending tests ? of these materials were analyzed after immersion of the samples in petrol for different periods of time. Specimens with different volume of material inside their structure were designed in order to determine the effect of the volume filling on the mechanical properties and the petrol effect.

Index Terms- applications, manufacturing, synthesis and processing techniques, thermoplastics

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