
TENSILE BEHAVIOR OF DIFFERENT COMMERCIAL FILAMENTS USED IN 3D PRINTED PARTS

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Abstract

Recent advancement in 3D printing technology has allowed cheap manufacturing of highly complex parts, especially for prototyping purposes. Aerospace industry accounts for 18.2% of the total AM market today and is considered one of the most promising fields in the future. Nowadays a lot of different 3D technologies are available on the market such as SLA, DLP, FDM etc., with Fused Deposition Modelling (FDM) of thermoplastic materials being one of the most widely used three-dimensional (3D) printing techniques. Therefore, it is essential to investigate the mechanical properties of such FDM processed materials. Most commonly used materials in the FDM process are PLA and ABS, although there are many other commercial filaments available on the market. The main objective of this paper is to investigate the tensile behaviour of PLA (Polylactic Acid), ABS (Acrylonitrile Butadiene Styrene), PET-G (Polyethylene Terephthalate with a glycol modification) and HIPS (High Impact Polystyrene). All specimens were prepared according to ISO 527-2 standard and printed with the same printing parameters where the infill density was set at 100%. SHIMADZU AGS-X 100 kN tensile testing machine was used to determine the tensile properties.

Keywords

3D Printer, FDM, Tensile Properties, Additive Manufacturing