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## **Analysis of Dimensional and Geometrical Performance of Makerbot Replicator 2x Experimental 3D Printer**

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**Abstract:** The aim of this research is to evaluate the performance of a Makerbot replicator 2x experimental 3D printer, making a dimensional and geometrical analysis of samples printed using fused deposit modeling technique (FDM) and polylactic acid (PLA) as the print material. Settings and parameters were adjusted according to Printer's manufacturer for PLA material. A 3D digital model with basic geometric internal features was generated using computer aided design (CAD) software; this model was used to print physical samples in order to be analyzed. The samples were measured and compared against dimensional specifications on the drawing, all differences were documented. Automotive Industry Action Group's measurement system analysis concepts are used as a new application of these tools in order to complete the study; it was found that most geometries and dimensions were below drawing specification, due to temperature changes on the PLA that tend to shrink during the cooling process until it reaches room temperature. This variation may be reduced using a correction factor in order to improve dimensional and geometric accuracy.

*Keywords:* 3D Printer, Dimensional Analysis, Geometric Analysis, Additive Manufacture