

## **Design of 3D filament extruder for Fused Deposition Modeling (FDM) additive manufacturing**

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### ***Abstract:***

Filament extruder produces plastic filaments with specified diameter by using corresponding dies. Input materials (thermoplastics) are used in the form of granules and pellets and waste plastic materials can be used. Rod heaters are used to melt the input materials and Screw is used to feed the input raw materials longitudinally along the barrel. Screw is consisted of three zones namely feed, melt, and transition zone. Input raw material is melted by using rod heater. Two temperature zone with six rod heaters are used to acquire maximum efficiency. Analog temperature controller is used to control the temperature of the two heaters zone. This article describes a filament extruder, which is a plastic extruder capable of making commercial quality 3D printing filament. Specifically, this paper describes the design, fabrication and operation of a filament extruder. A 2.5 mm die was used to extrude the filament at the diameter of 1.75mm. Diameter of the filament can be further reduced by using DC-motor to draw the filament coming out of the die. Production can be further increased by increasing the barrel diameter above 45mm and screw diameter above 16 mm. Mechanical and thermal properties were improved by adding different fillers to the input raw material

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