

OFFICIAL ABSTRACT and CERTIFICATION

Building an Injection Molding Machine for Low-Temperature Thermoplastics

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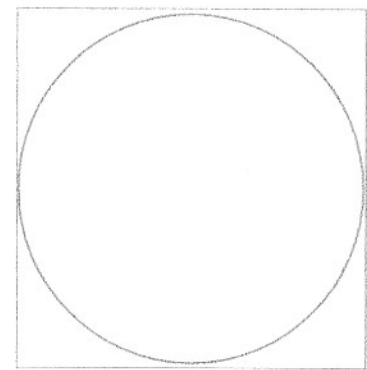
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The engineering goal of this project was to construct an injection molding machine for creating polycaprolactone moldings of three-dimensional shapes. The molding machine is constructed mostly of aluminum, PVC pipe, and concrete, and rests on a wooden base. It has three main components: the melter, which melts the thermoplastic pellets; the body, which conducts the molten plastic; and the mold, which shapes the plastic into a half-cylinder before it cools. Unfortunately, the injection molding machine was unable to successfully mold the polycaprolactone from pellets to a finished piece. The heater was the most problematic part of the device, since it would electrically short every time it was supplied with even a low voltage. The rubber-coated eye hook mounts through which the heating element was threaded began to burn from the heat, until eventually the element made contact with the eye hook itself, shorting through an aluminum cover. This prevented current from flowing through the heating element, so no further heat was produced. The heater was unable to melt the plastic pellets, so the machine was unable to function as intended. However, it could be made functional with a different heater design, as the rest of the device would likely only require minor modifications to make work.

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