

Tentative Testing Plan

Heating Cartridge:

What

- Temperature
- Wattage

How

- Simulate operating conditions.
 - Temperature:
 - Use thermocouples to measure temperature of heater after steady state conditions
 - Wattage:
 - Power heat cartridge until the output is at the proper level, then measure the voltage and current to calculate wattage

Stepper Motor/Auger Screw:

What

- RPM
- Mass/Volumetric Flow rate

How

- RPM
 - Visually identify the number of rotations in a given minute.
- Flow rate:
 - Extrude filament for a certain amount of time onto a scale to measure the weight of material coming out.

Thermal Feedback

- Thermocouples should be calibrated before use.
- A common way to calibrate thermocouples is to place them in a heated bath at 30°C and measure the voltage.
- Voltages are measured at 5 degree increments up to 60°C, and then again at room temperature.
- A voltage-temperature plot can be created and compared to known values.
- There should be programmable methods of cutting power once the desired temperature is attained.

Printhead

What:

- Print time
- Flow consistency

How:

- Print Time
 - Load printer and set run time for 10 hours, check for any failures and add additional material as necessary.
- Flow consistency
 - Setup printhead and visually inspect material leaving the nozzle for air bubbles, surface texture, color, uniformity, etc., to ensure consistent flow.
 - Measure mass flow rate coming out of nozzle