**Table 6 - Extruded Filament Length at Varying Speeds**

**Data**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| MELT | DRIVE | DIAMETER | ORIFICE | MATERIAL | TEMP | LENGTH |
| Volcano | Direct | 3.00 mm | 1.2 mm | PLA | 240 C | 50 mm |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Speed (mm/min)** | **Trial 1** | **Trial 2** | **Trial 3** | **Trial 4** | **Trial 5** | **Trial 6** | **Trial 7** | **Trial 8** | **Deviation**  **Measurement** |
| **50** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |
| **75** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |
| **100** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |
| **125** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |
| **150** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |
| **175** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |
| **200** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |
| **225** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |
| **250** | 1 | 1 | 2 | 2 | 2 |  |  |  |  |
| **275** | 3 | 3 |  |  |  |  |  |  |  |
| **300** | 3 | 3 |  |  |  |  |  |  |  |
| **325** | 3 | 3 |  |  |  |  |  |  | 2.41mm, 1.37mm |
| **350** | 3 | 3 |  |  |  |  |  |  | 1.65mm,.99mm |
| **375** |  |  |  |  |  |  |  |  |  |
| **400** |  |  |  |  |  |  |  |  |  |

**Observations:**

* Initially minor blobbing occurred at 250, but after replacing the stepper controller with a heat sink the blobbing occurs a few times beginning at 225, so the maximum speed for consistent extrusion occurs 200.
* Failure is that extrusions starts thin and then gets thicker
* 1 = extrusion feed rate and extrusion is fine, 2 = very minor blobbing, 3 = major difference in thickness of extrusions roughly 25% deviation

Specifications

* 3.00 mm Unknown Red PLA @ 190
* 1.2mm E3D Volcano nozzle
* Spring Tension: (~58.70 mm for 3mm) (~58.90 mm for 1.75mm)

Findings

* Findings initially minor blobbing occurred at 250, but after replacing the stepper controller with a heat sink the blobbing occurs a few times beginning at 225, so the maximum speed for consistent extrusion occurs 200.
* Failure is that extrusions starts thin and then gets thicker
* 1 = extrusion feed rate and extrusion is fine, 2 = very minor blobbing, 3 = major difference in thickness of extrusions roughly 25% deviation

**Failure Mode:**

* 1: Best extrusion
* 2: Minimal Blobbing (minor)
* 3: Severe grinding, motor moves very slow(major)
* X: Complete failure, does not extrude at all (fail)