**Table 1**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| MELT | DRIVE | DIAMETER | ORIFICE | MATERIAL | TEMP | LENGTH |
| Volcano | Direct | 1.75 mm | 1.2 mm | ABS | 240 C | 50 mm |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Flow Rate (mm3/min)** | **Speed**  **(mm2/min)** | **Trial 1** | **Trial 2** | **Trial 3** | **Trial 4** | **Trial 5** | **Avg.**  **Value** | **Deviation**  **Avg. Value** |
| **200** | 83.15 | 1 |  |  |  |  | 1 |  |
| **400** | 166.30 | 1 |  |  |  |  | 1 |  |
| **600** | 249.45 | 1 |  |  |  |  | 1 |  |
| **800** | 332.60 | 1 |  |  |  |  | 1 |  |
| **1000** | 415.75 | 1 |  |  |  |  | 1 |  |
| **1200** | 498.90 | 1 |  |  |  |  | 1 |  |
| **1400** | 582.05 | 1 |  |  |  |  | 1 |  |
| **1600** | 665.20 | 1 |  |  |  |  | 1 |  |
| **1800** | 748.35 | 2 | 2 | 2 | 2 | 2 | 2 |  |
| **2000** | 831.50 | 3 | 2 | 2 | 2 | 2 | 2.2 |  |
| **2200** | 914.65 | X | 3 | X | 3 | 3 | 3.4 |  |
| **2400** | 997.80 |  |  |  |  |  | - |  |
| **2600** | 1080.96 |  |  |  |  |  | - |  |
| **2800** | 1164.11 |  |  |  |  |  | - |  |
| **3000** | 1247.26 |  |  |  |  |  | - |  |

**Notes/Observations:**

* Spring Tension: (~58.70 mm for 3mm) (~58.90 mm for 1.75mm)
* Clicking noise 600 flow, bad extruder design/assembly maybe?
* Filament damaged by humidity, contains a lot of water, evident by blobs which are actually bubbles, makes hard to judge failure mode
* 850 mm/min skips steps
* No stripping at all, even in failure mode

**Specifications:**

* Octave 1.75mm Black ABS Filament @ 240 C
* E3D Volcano 1.75mm

**Failure Mode:** Stepper motor cannot exceed ~870 mm/min

* 1: Best extrusion, constant, even (despite air bubbles)
* 2: Failure mode beginning to show, somewhat constant extrusion (minor)
* 3: Does not function well, motor skips steps (not enough torque? Not enough power?) loud grinding­ noise, small spinning (major)
* X: Complete failure, does not extrude at all (fail)

**Table (1.75mm TEMPLATE)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| MELT | DRIVE | DIAMETER | ORIFICE | MATERIAL | TEMP | LENGTH |
| Volcano | Direct | 1.75 mm | 1.2 mm | ABS | 240 C | 50 mm |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Flow Rate (mm3/min)** | **Speed**  **(mm2/min)** | **Trial 1** | **Trial 2** | **Trial 3** | **Trial 4** | **Trial 5** | **Avg.**  **Value** | **Deviation**  **Avg. Value** |
| **200** | 83.15 |  |  |  |  |  |  |  |
| **400** | 166.30 |  |  |  |  |  |  |  |
| **600** | 249.45 |  |  |  |  |  |  |  |
| **800** | 332.60 |  |  |  |  |  |  |  |
| **1000** | 415.75 |  |  |  |  |  |  |  |
| **1200** | 498.90 |  |  |  |  |  |  |  |
| **1400** | 582.05 |  |  |  |  |  |  |  |
| **1600** | 665.20 |  |  |  |  |  |  |  |
| **1800** | 748.35 |  |  |  |  |  |  |  |
| **2000** | 831.50 |  |  |  |  |  |  |  |
| **2200** | 914.65 |  |  |  |  |  |  |  |
| **2400** | 997.80 |  |  |  |  |  |  |  |
| **2600** | 1080.96 |  |  |  |  |  |  |  |
| **2800** | 1164.11 |  |  |  |  |  |  |  |
| **3000** | 1247.26 |  |  |  |  |  |  |  |

**Notes/Observations:**

* Spring Tension: (~58.70 mm for 3mm) (~58.90 mm for 1.75mm)

**Specifications:**

**Failure Mode:** Stepper motor cannot exceed ~870 mm/min

* 1: Best extrusion
* 2: extrusion (minor)
* 3: (major)
* X: Complete failure, does not extrude at all (fail)

**Table (3.00mm TEMPLATE)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| MELT | DRIVE | DIAMETER | ORIFICE | MATERIAL | TEMP | LENGTH |
| Volcano | Direct | 1.75 mm | 1.2 mm | ABS | 240 C | 50 mm |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Flow Rate (mm3/min)** | **Speed**  **(mm2/min)** | **Trial 1** | **Trial 2** | **Trial 3** | **Trial 4** | **Trial 5** | **Avg.**  **Value** | **Deviation**  **Avg. Value** |
| **200** |  |  |  |  |  |  |  |  |
| **400** |  |  |  |  |  |  |  |  |
| **600** |  |  |  |  |  |  |  |  |
| **800** |  |  |  |  |  |  |  |  |
| **1000** |  |  |  |  |  |  |  |  |
| **1200** |  |  |  |  |  |  |  |  |
| **1400** |  |  |  |  |  |  |  |  |
| **1600** |  |  |  |  |  |  |  |  |
| **1800** |  |  |  |  |  |  |  |  |
| **2000** |  |  |  |  |  |  |  |  |
| **2200** |  |  |  |  |  |  |  |  |
| **2400** |  |  |  |  |  |  |  |  |
| **2600** |  |  |  |  |  |  |  |  |
| **2800** |  |  |  |  |  |  |  |  |
| **3000** |  |  |  |  |  |  |  |  |

**Notes/Observations:**

* Spring Tension: (~58.70 mm for 3mm)

**Specifications:**

**Failure Mode:** Stepper motor cannot exceed ~870 mm/min

* 1: Best extrusion
* 2: extrusion (minor)
* 3: (major)
* X: Complete failure, does not extrude at all (fail)