Test Plan: Flow Rate and Layer Height

Overview:

The main objective of this test plan is to verify that the mass flow rate and layer height of the printed material to make sure it is compatible with current 3D printing capabilities.

Testing Configuration:

In order to test the flow rate the following materials are required:

1. 3D Print head
2. Scale to weigh mass of extruded material
3. Stopwatch
4. Data sheet
5. Scissors or tongs to cut filament print time has been reached

Test Procedure:

1. Turn 3D print head on and set to appropriate temperature
2. Load 3D print head with pellets
3. Simultaneously, turn print head on and start the stopwatch
4. Print for known amount of time (Recommend: 30 seconds to a min)
5. Measure the amount of printed material on the scale and the diameter of the printed material and record data
6. Repeat steps 1-5 for at least four trials

Example of Data sheet:

Test #:	3				
Diameter of Nozzle:	1.5	mm	0.059	in	
Duration of test:	30	seconds			
Trial	Weight (g)	Diameter of extruded filament (in)			Avg Dia (in)
0	1.1	0.076	0.083	0.083	0.081
1	1.2	0.083	0.074	0.078	0.078
2	1.1	0.08	0.08	0.078	0.079
3	1.1	0.083	0.083	0.088	0.085
Average	1.13				
Mass flow rate (g/s)	0.038				

Pass/fail criteria:

Theoretically, the layer height should be the diameter of the nozzle. The pass criteria will be within 5% of the diameter of the nozzle. Another pass criteria will be an appropriate mass flow rate (need to do further research on what that might be… depends on density)

Responsibilities and the approval process

James Allen will be responsible for running and approving the testing results. A secondary opinion will be sought at to further validate the testing results

Risks and contingencies: