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Material Extrusion Report

In House Testing.

Test Technician: Jack Simpson

Test Number: ET201014JS01, ET2001014JS02 (Spool 1 & Spool 2) & ET201015JS03 (Spool 1).

Plastic Name: LX175

Plastic Grade: PLA

Manufacturer: Independent Plastics

Supplier: Filabot.

Additives: Not Applicable.

Material Form: Round Pellets, hard, white, small.

Machine Used: EX2.

Extrusion Test Notes

Material preparation: Drying.

Grinding: Not Applicable.

Drying: Yes, 175F/80C for 4 hours.

Extrusion Setup: Test Number: ET201014JS01
EX2

- Temp: 165C
- Speed: 90%
- Fan: Closed
- Standard Nozzle 1.75mm

Extrusion Setup: Test Number: ET201014JS02
EX2

- Temp: 167.5C
- Speed: 90%
- Fan: Closed
- Standard Melt Filter Nozzle 2.3mm

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Extrusion Setup: Test Number: ET201015JS03
EX2

- Temp: 175C
- Speed: 90%
- Fan: Closed
- 2X Melt Filter Nozzle 1.75mm

*Airpath

- With Magnet Guides (5)

Spooler

- Drive Speed: Mid
- Traverse Speed: (4)
- Filameasur with SPC unit.

*Airpath was 1in away from the EX2 nozzle. The Airpath and Spooler were 18inches apart. For all tests.

Extrusion Results:
With the above settings 1pt75mm filament with a tolerance of +/- 0.05mm was generated. The first test with the Standard Nozzle and the second test with the Standard Melt Filter provided the best results for filament production.

Notes on EX2: Machine was more than capable of extruding the material once in the correct range. The material flowed without issue and was very easy to clean.

Notes on Cleanup: It is very important that the material has been completely purged from the EX2 before using a lower temperature polymer. Failure to do so will result in inconsistent filament.

Further Research: Next steps will be taken to see how this polymer performs at 2.85mm with a +/-0.05mm tolerance; then we will test this polymer with different additives for compatibility.
Same steps will be provided for EX6 performance.

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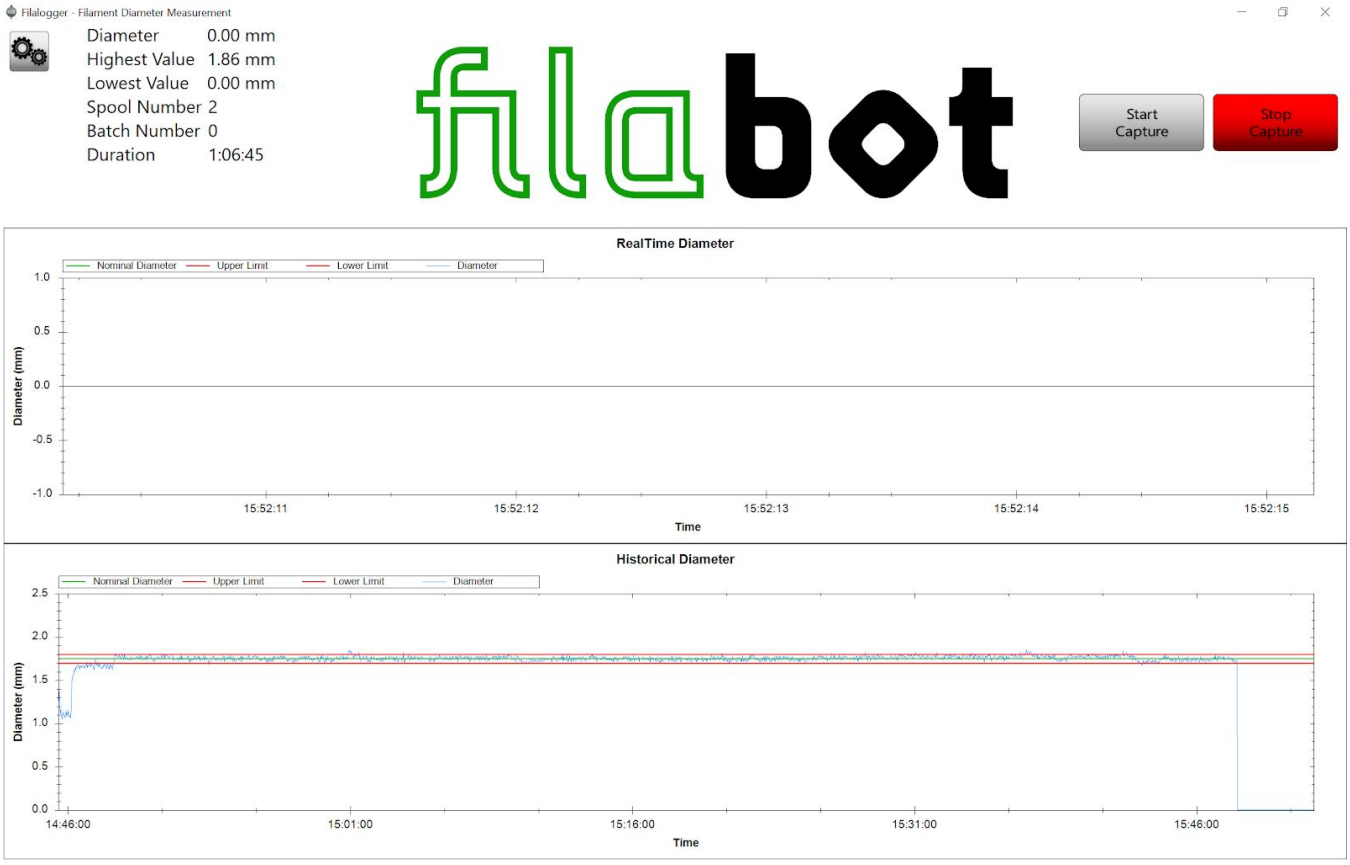
Graphs



Graph 1: Test ET201014JS01_STNozzle. Was able to run consistently for 1hour within spec of 1.75mm. The time stamp ‘14:46:00’ to ‘14:48:00’ was before the material was on the spool. Tick marker ‘15:48:00’ was when the test concluded.

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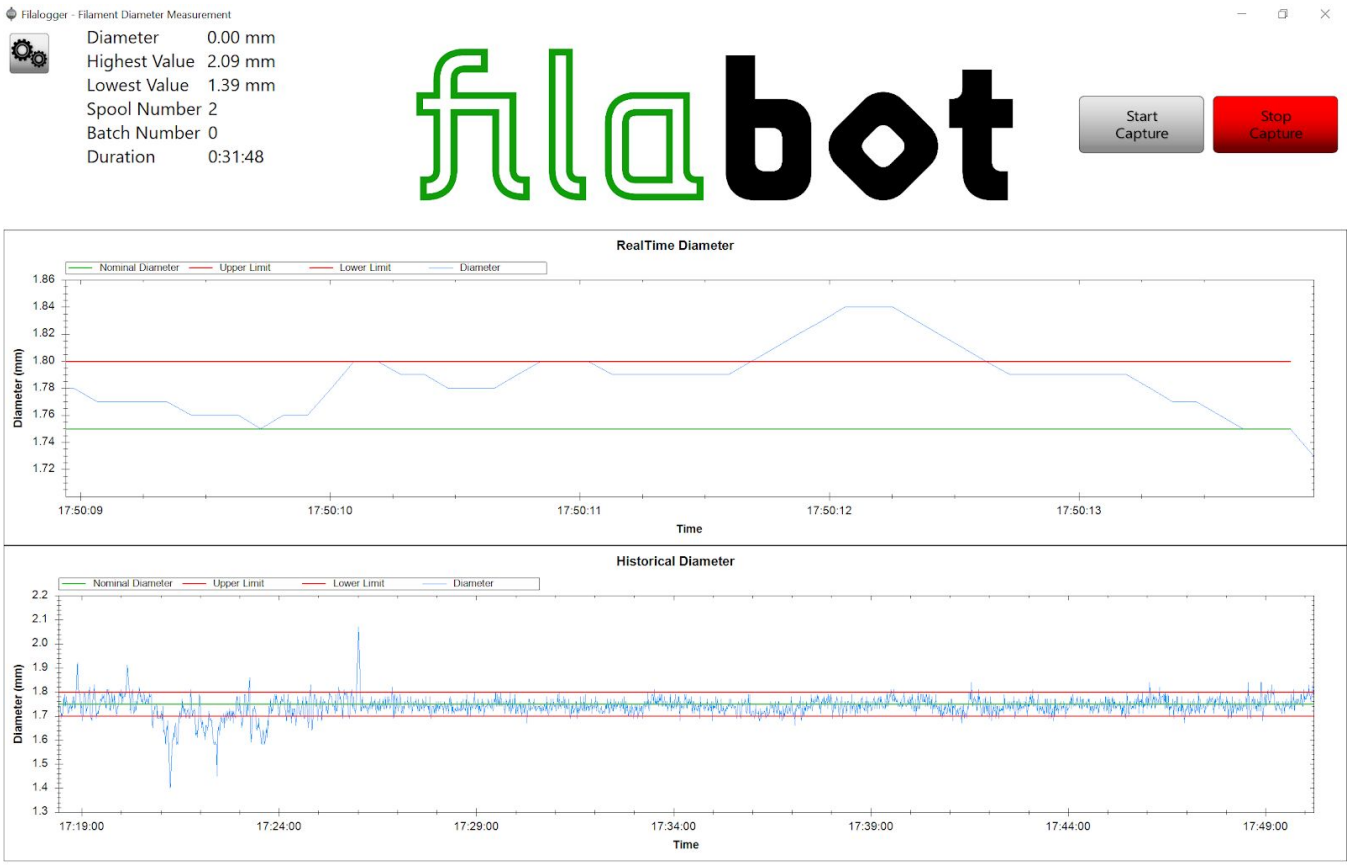

Graph 2: Test ET201014JS02_STMFNozzle. Was able to run consistently for 30min within spec of 1.75mm before concluding the test. The time stamp ‘17:19:00’ to ‘17:24:00’ was us tuning the drive of the spooler once the polymer was on the spool. Tick marker ‘17:26:00’ can be noted that there was a high peek of 2.09mm. When testing we could not identify the marker on the filament.

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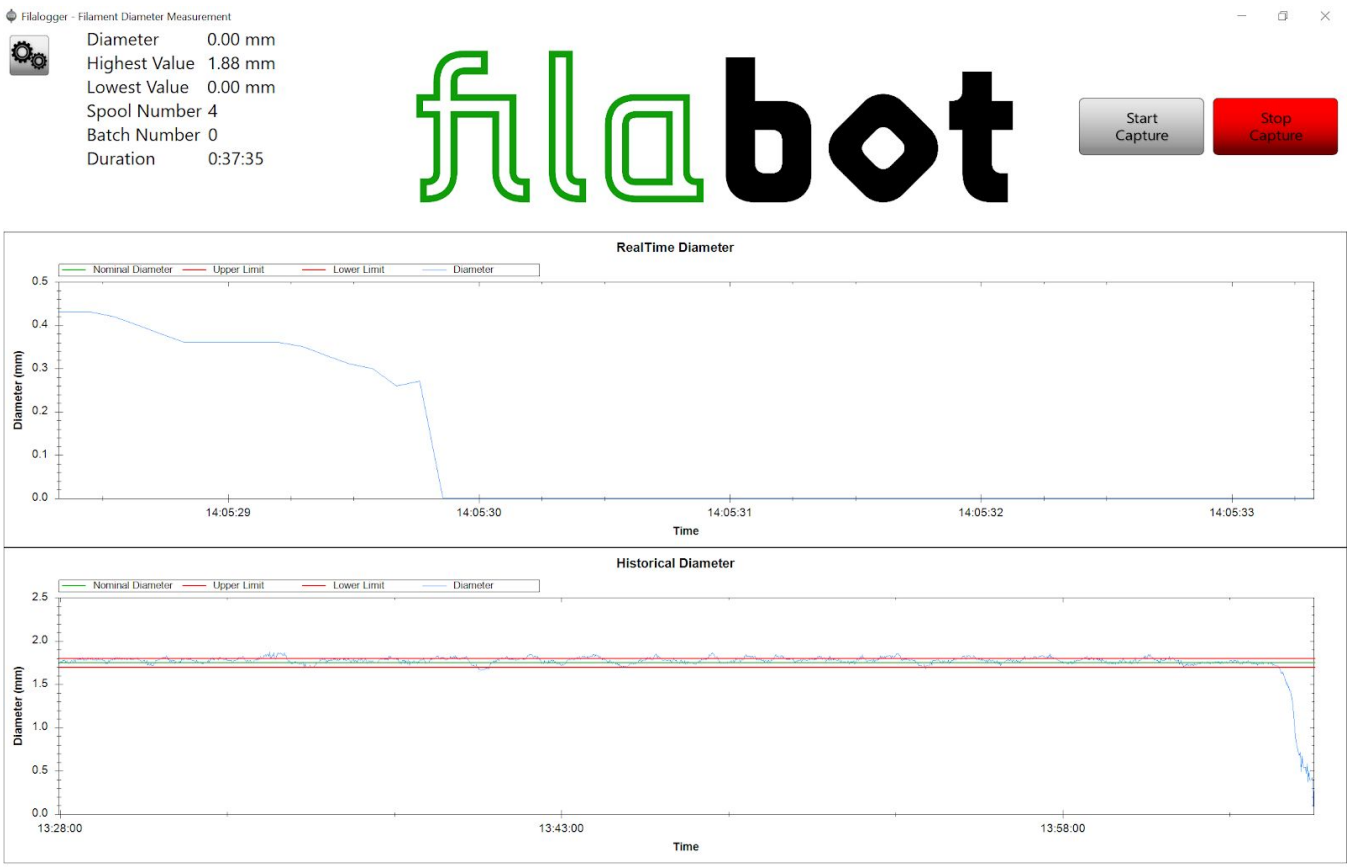

Graph 2: Test ET201015JS03_2XMFNozzle. Was able to run consistently for 30min within spec of 1.75mm before concluding the test. The time stamp ‘13:58:00’ to ‘the end’ was the end of the testing/removal of spool.

Further Research

Although the polymer worked, the next steps to find improvements would be the use of a standard melt filter nozzle to see if this could generate a tighter tolerance filament.