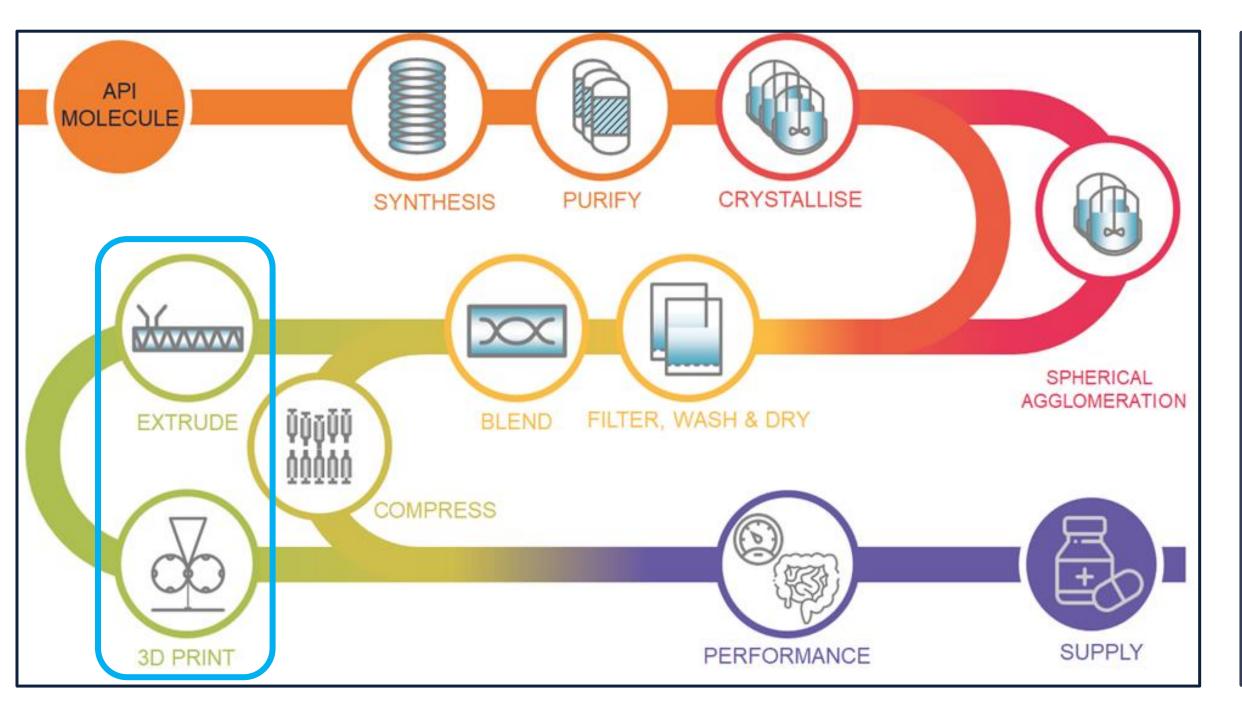


3D Printing MicroFactory

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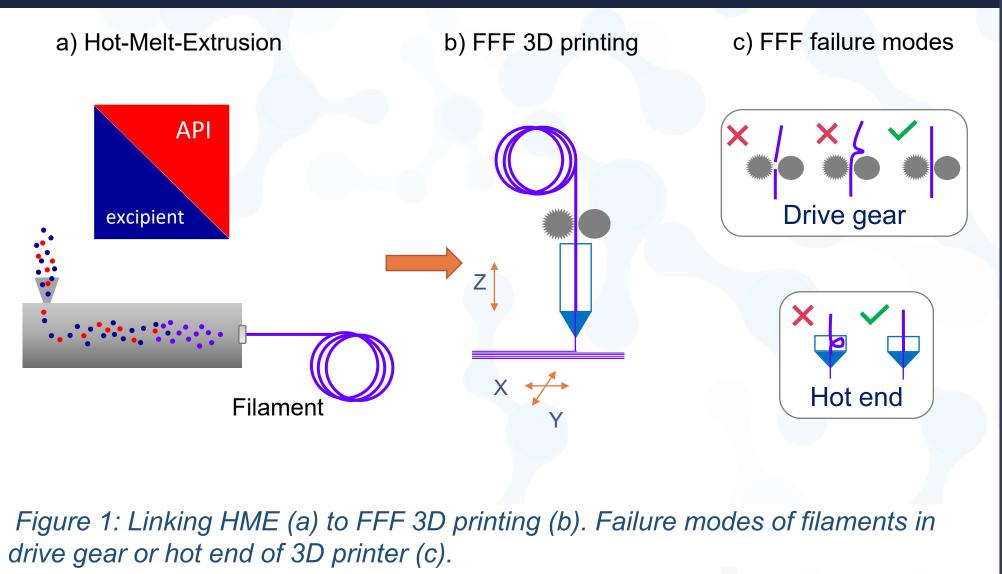
Context and Aim of Work

The aim of the HUB MicroFactory is to develop a continuous end to end process with as little material as possible.

The aims of this work are

- to identify and overcome limitations of pharmaceutical formulations for 3D printing,
- to implement an Additive Manufacturing **MicroFactory**,
- to define the operating space of a novel, filament free 3D Printer.

Linking HME with 3D printing



Non-printable Formulation

Filament Free Printing

3D Printing MicroFactory

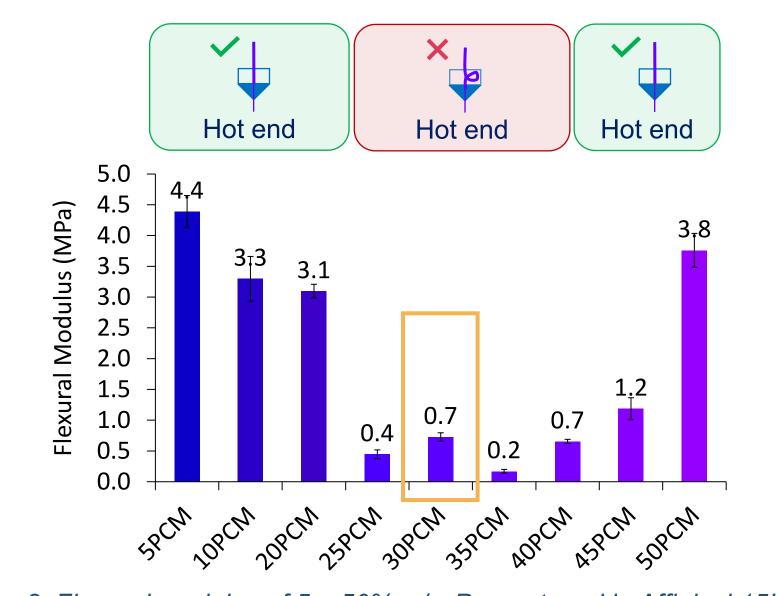


Figure 2: Flexural modulus of 5 – 50% w/w Paracetamol in Affinisol 15LV filaments for FDM 3D printing [1]. Associated filament failure modes are indicated.

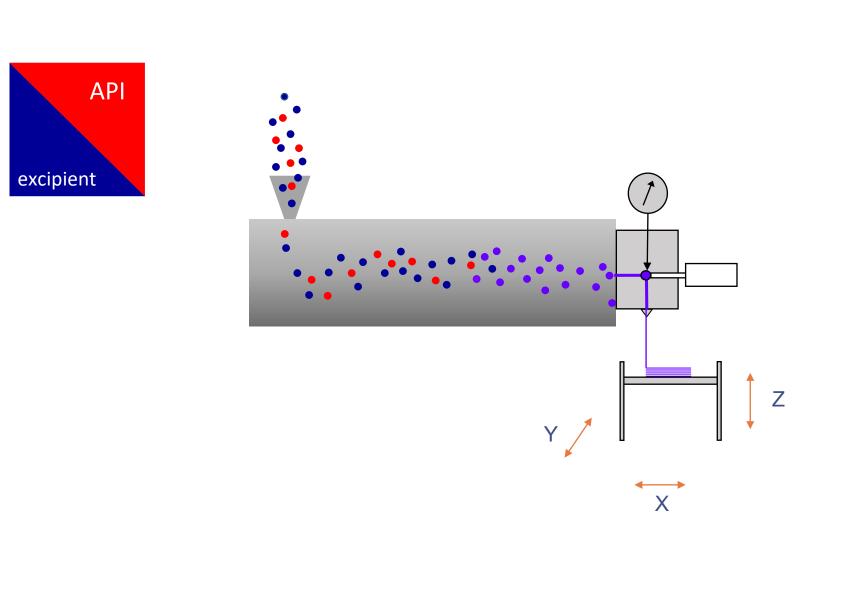


Figure 3: Schematic of Novel filament free Hot-Melt-Extrusion 3D printer.

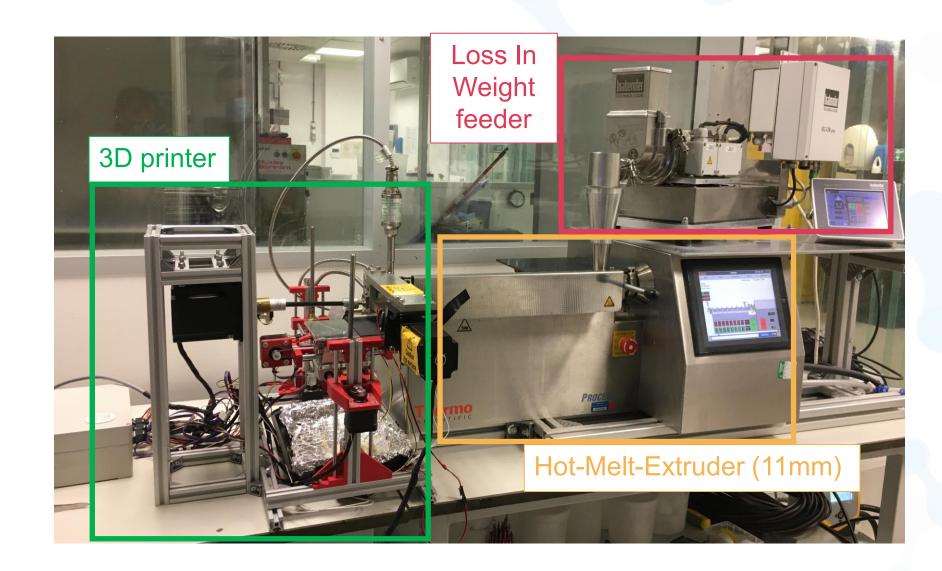
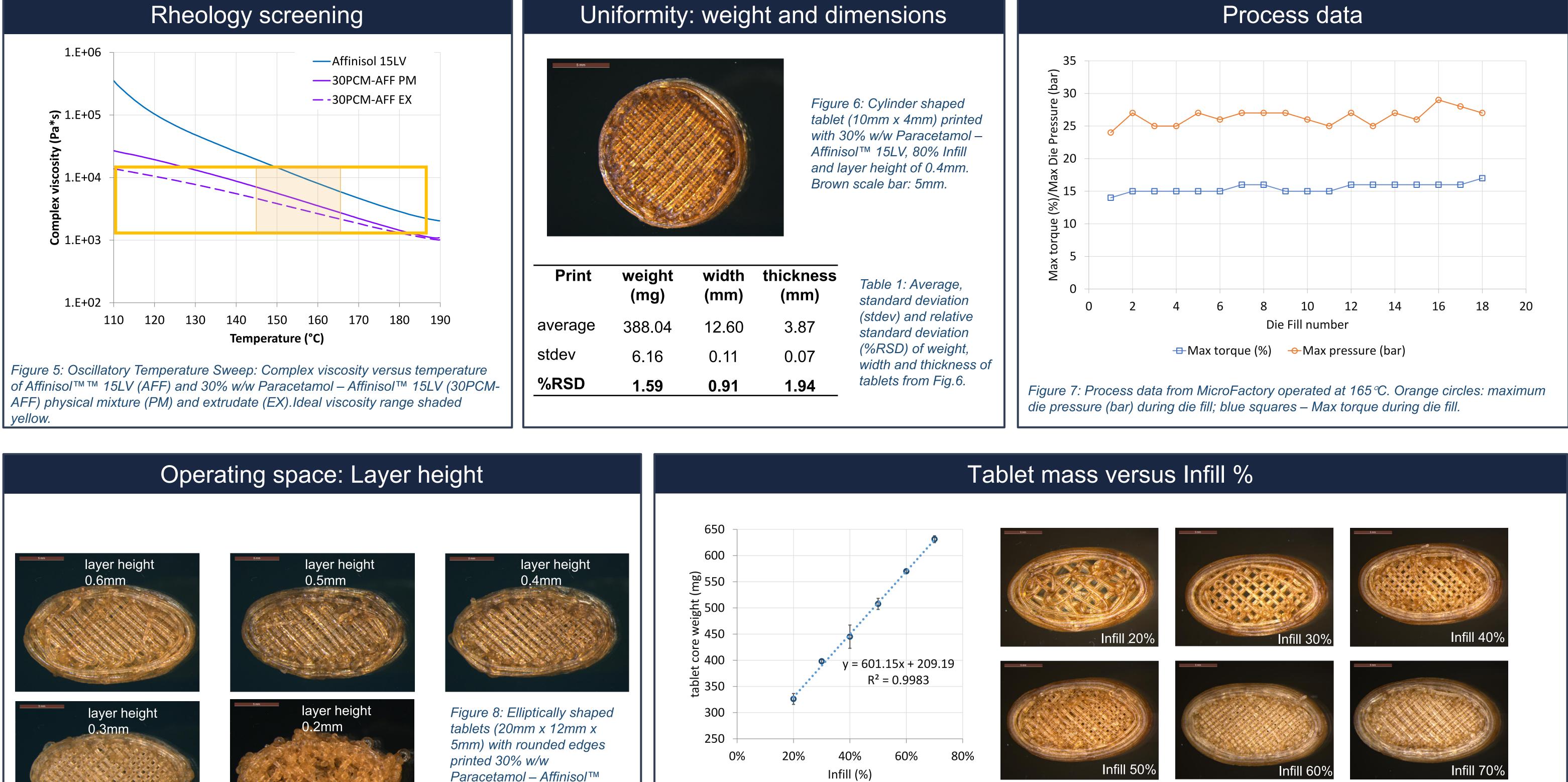
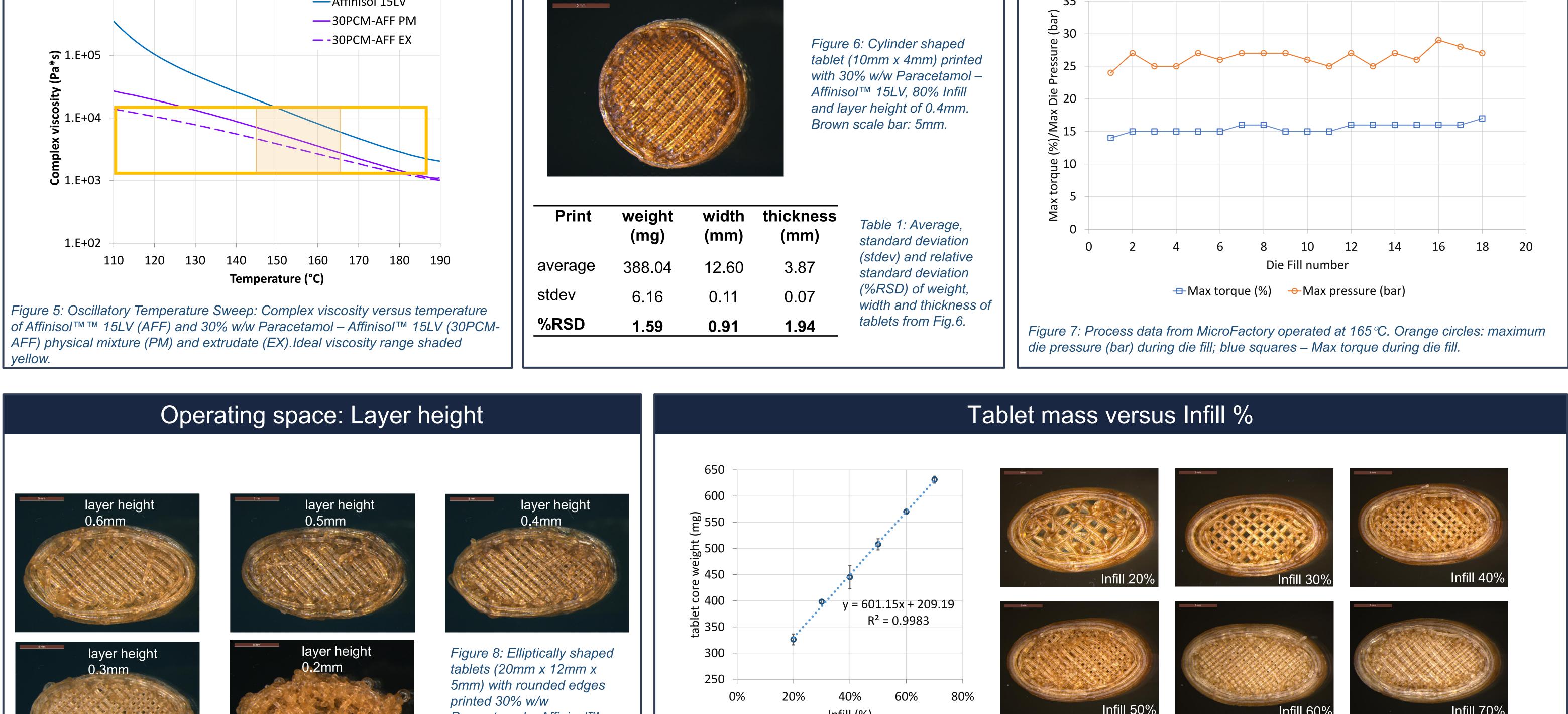
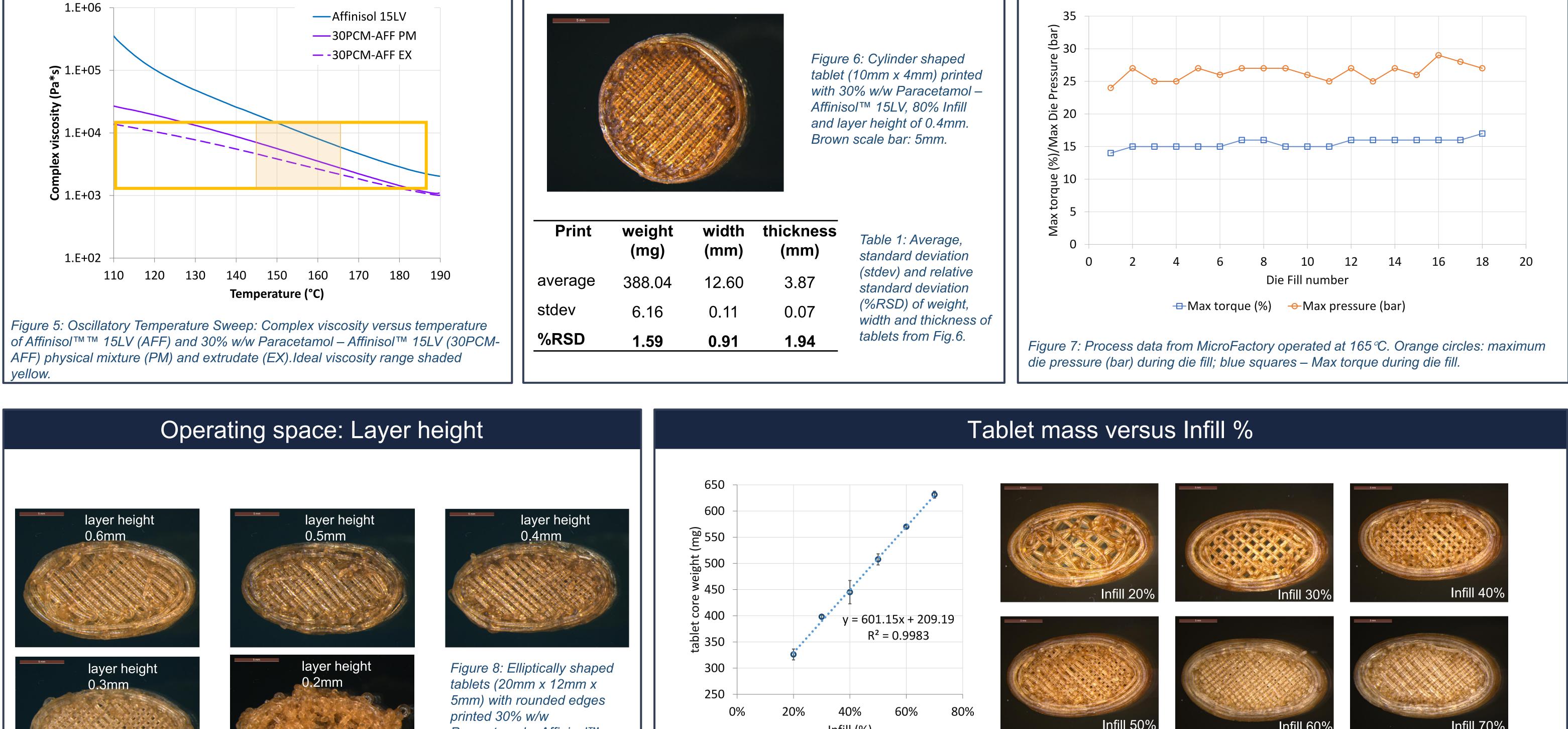


Figure 4: Novel filament free Hot-Melt-Extrusion 3D printer: Loss in Weight Feeder, HME (Process 11, Thermo Fisher) and 3D printer unit.







|--|

References	Conclusion
 Prasad E, Islam MT, Goodwin DJ, Megarry AJ, Halbert GW, Florence AJ, Robertson J 2019. Development of a hot-melt extrusion (HME) process to produce drug loaded Affinisol™ 15LV filaments for fused filament fabrication (FFF) 3D printing. Additive Manufacturing 29:100776. 	Limitations of pharmaceutical formulations for FFF have been identified and characterised. By implementing a novel integrated HME-3D printer, an intermediate feedstock filament in an FDM process is no longer required. This opens up the formulation space highly plasticised polymers in 3D printing of pharmaceutical dosage forms.

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