

Supporting information

1 Construction

Before any testing may commence, the imaging device must first be printed. The files can be found under this link: <https://github.com/S-Menke/Photobox>. In this instance, PLA was used, however materials such as ABS are also possible, with both materials having their own advantages. After printing, the electrical components need to be inserted. We chose Luxorparts 5 mm LED, Power switches and resistors from Kjell & Co Elektronik AB (Sweden) as the electrical components. A wiring diagram can be found in **Figure S1**. Additionally, a more detailed wiring schematic is included in the 3D files. Most of the wiring is simplistic in design to ensure ease of use. In order to keep the top and bottom separate, the two parts cannot be connected via the wires. To light the LEDs in the top lid, the wires coming from the switches were routed to the corners of the box where they make contact with wires from the top (when the lid is closed). The wire connecting to the battery is exposed in a similar way at the middle pin of the box. This can be further optimized with pogo pins in future design developments similar to our work on the printed of a melt electrowriting system.¹

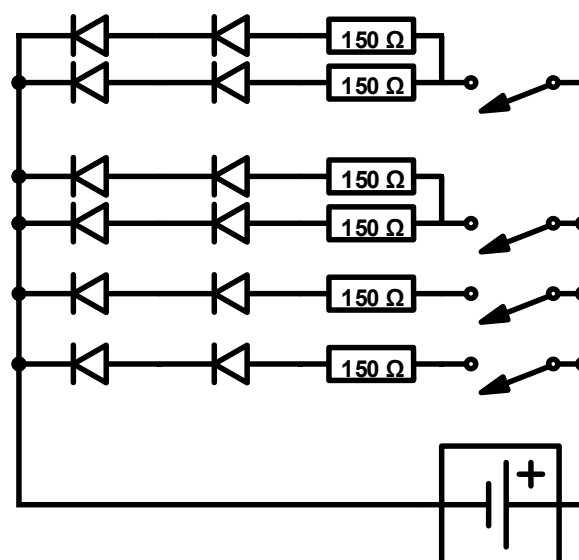


Figure S1: Schematic of the electrical circle used in the photo box. The battery has a voltage of 9 V.

Whenever a new mobile device is used for imaging, it must be calibrated in order to accurately determine the size of the final pictures. Therefore, pictures of millimetre paper laid on top of a glass slide were taken. With several individual measurements, the average pixel count per mm can be determined (see **Table S1**).

Table S1: Calibration values of different phones.

Phone	No. of Measurements	Total measured distance [mm]	Px/mm	SD
OnePlus 7T Pro	9	49	69.6360	1.57922
iPhone 13 Pro Max	9	45	54.5209	0.94613

2 Bioprinting

Printing was completed under the parameters outlined in **Table S2**. During printing, the relative humidity was between 18 and 22 %, while the temperature inside the print chamber for the Nivea print was 23 °C, and 25 – 27 °C during the Pluronic prints.

Table S2: Printing parameters of the Nivea and Pluronic inks. For the coloured Pluronic inks, the same parameters were used as for the colourless ones.

Ink	Nozzle [G]	Head Temp [°C]	Bed Temp [°C]	Speed [mm/s]	Pressure [kPa]
Nivea crème	20	-	-	5	45
Pluronic 22 wt%	20	35	37	5	40
Pluronic 35 wt%	20	35	37	5	120

When undergoing shape fidelity testing, three shapes were created in Fusion360 (Autodesk Inc., Dublin, Ireland) and sliced in Repetier host (Hot-World GmbH & Co. KG, Willich, Germany). The height of the cuboid was chosen in a way that the slicer created three layers (see **Figure S2**).

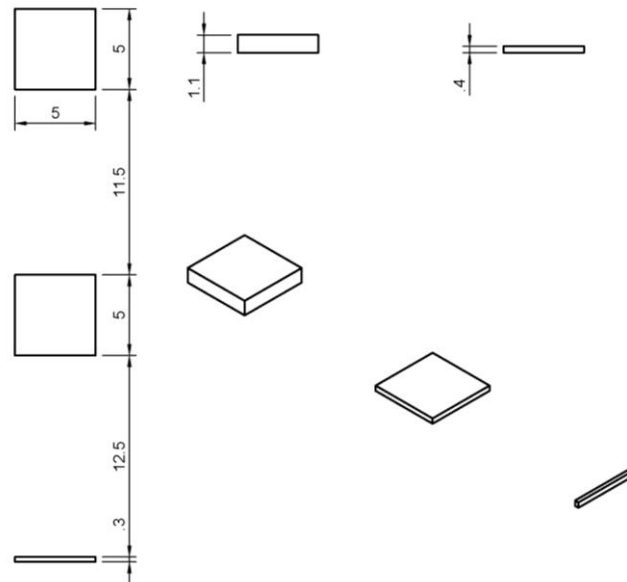




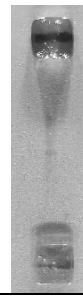



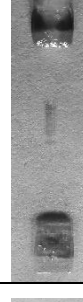



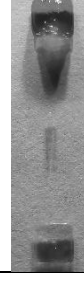





Figure S2: Shape fidelity test model. All specifications are in mm.

3 Images taken with the imaging box

16 lighting situations can be created with the imaging box. All of them can be found below in **Table S3**.

Table S3: Different lighting situations, created with the printed box. All pictures were created with 22wt% Pluronic and saved as 8-bit file.

	Top lights off	Top lights on	Front top light on	Back top light on
Bottom lights off				
Bottom lights on				
Left lights on				
Right lights on				

4 Codes

Code 1: Code for a single slide with 5 boxes and pressures ranging from 20 - 60 kPa (speed: 5 mm/s, temperature: off, height of the first layer: 2/3 of the needle size).

G90; absolute coord

G21; all in mm

M83; rel distance for extrusion

T0

G0 X0 Y0 Z30 E0

G0 X0 Y0 Z10 E0

G0 X-10 Y-35 Z10 E0

G92 X0 Y0 Z10

G1 X0 Y0 Z0.4 E0

M773 T0 P20; set pressure to 20kPa

G1 X0 Y10 Z0.4 E1 F300

G1 X20 Y10 Z0.4 E1 F300

G1 X20 Y0 Z0.4 E1 F300

G1 X0 Y0 Z0.4 E1 F300

G1 X5 Y10 Z0.4 E0 F300

G1 X5 Y0 Z0.4 E1 F300

G1 X10 Y10 Z0.4 E0 F300

G1 X10 Y0 Z0.4 E1 F300

G1 X15 Y10 Z0.4 E0 F300

G1 X15 Y0 Z0.4 E1 F300

G1 X20 Y5 Z0.4 E0 F300

G1 X0 Y5 Z0.4 E1 F300

M751 T0; stop extrusion

T0

M751 T0; stop extrusion

M773 T0 P0; set pressure to 0kPa

G1 Z10 E0 F600

G1 X0 Y15 E0 F600

G1 X0 Y15 Z0.4 E0 F600

G92 X0 Y0 Z0.4; this point is now 0/0/0.4

M773 T0 P30; set pressure to 30kPa

G1 X0 Y10 Z0.4 E1 F300

G1 X20 Y10 Z0.4 E1 F300

G1 X20 Y0 Z0.4 E1 F300

G1 X0 Y0 Z0.4 E1 F300

G1 X5 Y10 Z0.4 E0 F300

G1 X5 Y0 Z0.4 E1 F300

G1 X10 Y10 Z0.4 E0 F300

G1 X10 Y0 Z0.4 E1 F300

G1 X15 Y10 Z0.4 E0 F300

G1 X15 Y0 Z0.4 E1 F300

G1 X20 Y5 Z0.4 E0 F300

G1 X0 Y5 Z0.4 E1 F300

M751 T0; stop extrusion

T0

M751 T0; stop extrusion

M773 T0 P0; set pressure to 0kPa

G1 Z10 E0 F600

G1 X0 Y15 E0 F600

G1 X0 Y15 Z0.4 E0 F600

G92 X0 Y0 Z0.4; this point is now 0/0/0.4

M773 T0 P40; set pressure to 40kPa

G1 X0 Y10 Z0.4 E1 F300

G1 X20 Y10 Z0.4 E1 F300

G1 X20 Y0 Z0.4 E1 F300

G1 X0 Y0 Z0.4 E1 F300

G1 X5 Y10 Z0.4 E0 F300

G1 X5 Y0 Z0.4 E1 F300

G1 X10 Y10 Z0.4 E0 F300

G1 X10 Y0 Z0.4 E1 F300

G1 X15 Y10 Z0.4 E0 F300

G1 X15 Y0 Z0.4 E1 F300

G1 X20 Y5 Z0.4 E0 F300

G1 X0 Y5 Z0.4 E1 F300

M751 T0; stop extrusion

T0

M751 T0; stop extrusion

M773 T0 P0; set pressure to 0kPa

G1 Z10 E0 F600

G1 X0 Y15 E0 F600

G1 X0 Y15 Z0.4 E0 F600

G92 X0 Y0 Z0.4; this point is now 0/0/0.4

M773 T0 P50; set pressure to 50kPa

G1 X0 Y10 Z0.4 E1 F300

G1 X20 Y10 Z0.4 E1 F300
G1 X20 Y0 Z0.4 E1 F300
G1 X0 Y0 Z0.4 E1 F300
G1 X5 Y10 Z0.4 E0 F300
G1 X5 Y0 Z0.4 E1 F300
G1 X10 Y10 Z0.4 E0 F300
G1 X10 Y0 Z0.4 E1 F300
G1 X15 Y10 Z0.4 E0 F300
G1 X15 Y0 Z0.4 E1 F300
G1 X20 Y5 Z0.4 E0 F300
G1 X0 Y5 Z0.4 E1 F300
M751 T0; stop extrusion

T0
M751 T0; stop extrusion
M773 T0 P0; set pressure to 0kPa
G1 Z10 E0 F600
G1 X0 Y15 E0 F600
G1 X0 Y15 Z0.4 E0 F600

G92 X0 Y0 Z0.4; this point is now 0/0/0.4
M773 T0 P60; set pressure to 60kPa
G1 X0 Y10 Z0.4 E1 F300
G1 X20 Y10 Z0.4 E1 F300
G1 X20 Y0 Z0.4 E1 F300
G1 X0 Y0 Z0.4 E1 F300
G1 X5 Y10 Z0.4 E0 F300
G1 X5 Y0 Z0.4 E1 F300
G1 X10 Y10 Z0.4 E0 F300
G1 X10 Y0 Z0.4 E1 F300
G1 X15 Y10 Z0.4 E0 F300
G1 X15 Y0 Z0.4 E1 F300
G1 X20 Y5 Z0.4 E0 F300
G1 X0 Y5 Z0.4 E1 F300
M751 T0; stop extrusion

G92 X-5 Y30 Z0.4; set coordinates right again

G1 Z10; lower printbed
M84; disable motors

Code 2: Code for a single slide with 5 boxes and pressures ranging from 70 - 110 kPa (speed: 5 mm/s, temperature: off, height of the first layer: 2/3 of the needle size).

G90; absolute coord
G21; all in mm
M83; rel distance for extrusion

T0
G0 X0 Y0 Z30 E0
G0 X0 Y0 Z10 E0
G0 X-10 Y-35 Z10 E0
G92 X0 Y0 Z10

G1 X0 Y0 Z0.4 E0

M773 T0 P70; set pressure to 70kPa
G1 X0 Y10 Z0.4 E1 F300
G1 X20 Y10 Z0.4 E1 F300
G1 X20 Y0 Z0.4 E1 F300
G1 X0 Y0 Z0.4 E1 F300
G1 X5 Y10 Z0.4 E0 F300
G1 X5 Y0 Z0.4 E1 F300
G1 X10 Y10 Z0.4 E0 F300
G1 X10 Y0 Z0.4 E1 F300
G1 X15 Y10 Z0.4 E0 F300
G1 X15 Y0 Z0.4 E1 F300
G1 X20 Y5 Z0.4 E0 F300
G1 X0 Y5 Z0.4 E1 F300
M751 T0; stop extrusion

T0
M751 T0; stop extrusion
M773 T0 P0; set pressure to 0kPa
G1 Z10 E0 F600
G1 X0 Y15 E0 F600
G1 X0 Y15 Z0.4 E0 F600

G92 X0 Y0 Z0.4; this point is now 0/0/0.4
M773 T0 P80; set pressure to 80kPa
G1 X0 Y10 Z0.4 E1 F300
G1 X20 Y10 Z0.4 E1 F300
G1 X20 Y0 Z0.4 E1 F300
G1 X0 Y0 Z0.4 E1 F300
G1 X5 Y10 Z0.4 E0 F300
G1 X5 Y0 Z0.4 E1 F300
G1 X10 Y10 Z0.4 E0 F300
G1 X10 Y0 Z0.4 E1 F300
G1 X15 Y10 Z0.4 E0 F300
G1 X15 Y0 Z0.4 E1 F300
G1 X20 Y5 Z0.4 E0 F300
G1 X0 Y5 Z0.4 E1 F300
M751 T0; stop extrusion

T0
M751 T0; stop extrusion
M773 T0 P0; set pressure to 0kPa
G1 Z10 E0 F600
G1 X0 Y15 E0 F600
G1 X0 Y15 Z0.4 E0 F600

G92 X0 Y0 Z0.4; this point is now 0/0/0.4
M773 T0 P90; set pressure to 90kPa
G1 X0 Y10 Z0.4 E1 F300
G1 X20 Y10 Z0.4 E1 F300
G1 X20 Y0 Z0.4 E1 F300
G1 X0 Y0 Z0.4 E1 F300
G1 X5 Y10 Z0.4 E0 F300
G1 X5 Y0 Z0.4 E1 F300
G1 X10 Y10 Z0.4 E0 F300
G1 X10 Y0 Z0.4 E1 F300
G1 X15 Y10 Z0.4 E0 F300
G1 X15 Y0 Z0.4 E1 F300

G1 X20 Y5 Z0.4 E0 F300
G1 X0 Y5 Z0.4 E1 F300
M751 T0; stop extrusion

T0
M751 T0; stop extrusion
M773 T0 P0; set pressure to 0kPa
G1 Z10 E0 F600
G1 X0 Y15 E0 F600
G1 X0 Y15 Z0.4 E0 F600

G92 X0 Y0 Z0.4; this point is now 0/0/0.4
M773 T0 P100; set pressure to 100kPa
G1 X0 Y10 Z0.4 E1 F300
G1 X20 Y10 Z0.4 E1 F300
G1 X20 Y0 Z0.4 E1 F300
G1 X0 Y0 Z0.4 E1 F300
G1 X5 Y10 Z0.4 E0 F300
G1 X5 Y0 Z0.4 E1 F300
G1 X10 Y10 Z0.4 E0 F300
G1 X10 Y0 Z0.4 E1 F300
G1 X15 Y10 Z0.4 E0 F300
G1 X15 Y0 Z0.4 E1 F300
G1 X20 Y5 Z0.4 E0 F300
G1 X0 Y5 Z0.4 E1 F300
M751 T0; stop extrusion

T0
M751 T0; stop extrusion
M773 T0 P0; set pressure to 0kPa
G1 Z10 E0 F600
G1 X0 Y15 E0 F600
G1 X0 Y15 Z0.4 E0 F600

G92 X0 Y0 Z0.4; this point is now 0/0/0.4
M773 T0 P110; set pressure to 110kPa
G1 X0 Y10 Z0.4 E1 F300
G1 X20 Y10 Z0.4 E1 F300
G1 X20 Y0 Z0.4 E1 F300
G1 X0 Y0 Z0.4 E1 F300
G1 X5 Y10 Z0.4 E0 F300
G1 X5 Y0 Z0.4 E1 F300
G1 X10 Y10 Z0.4 E0 F300
G1 X10 Y0 Z0.4 E1 F300
G1 X15 Y10 Z0.4 E0 F300
G1 X15 Y0 Z0.4 E1 F300
G1 X20 Y5 Z0.4 E0 F300
G1 X0 Y5 Z0.4 E1 F300
M751 T0; stop extrusion

G92 X-5 Y30 Z0.4; set coordinates right again

G1 Z10; lower printbed
M84; disable motors

Code 3: Code for a single slide with 5 boxes and speed ranging from 1- 20 mm/s (height of the first layer: 2/3 of the needle size). All other parameters have to be entered on the printer.

G90; absolute coord
G21; all in mm
M83; rel distance for extrusion

T0
G0 X0 Y0 Z30 E0

;1 mm/s
G1 X0 Y0 Z0.4 E0
G1 X0 Y10 Z0.4 E1 F60
G1 X20 Y10 Z0.4 E1 F60
G1 X20 Y0 Z0.4 E1 F60
G1 X0 Y0 Z0.4 E1 F60
G1 X5 Y10 Z0.4 E0 F60
G1 X5 Y0 Z0.4 E1 F60
G1 X10 Y0 Z0.4 E0 F60
G1 X10 Y10 Z0.4 E1 F60
G1 X15 Y10 Z0.4 E0 F60
G1 X15 Y0 Z0.4 E1 F60
M751 T0; stop extrusion

T0
M751 T0; stop extrusion
G1 Z10 E0 F600
M751 T0; stop extrusion
G1 X0 Y15 E0 F600
G1 X0 Y15 Z0.4 E0 F600

;5 mm/s
G92 X0 Y0 Z0.4; this point is now 0/0/0.4
G1 X0 Y10 Z0.4 E1 F300
G1 X20 Y10 Z0.4 E1 F300
G1 X20 Y0 Z0.4 E1 F300
G1 X0 Y0 Z0.4 E1 F300
G1 X5 Y10 Z0.4 E0 F300
G1 X5 Y0 Z0.4 E1 F300
G1 X10 Y0 Z0.4 E0 F300
G1 X10 Y10 Z0.4 E1 F300
G1 X15 Y10 Z0.4 E0 F300
G1 X15 Y0 Z0.4 E1 F300
M751 T0; stop extrusion

T0
M751 T0; stop extrusion
G1 Z10 E0 F600
M751 T0; stop extrusion
G1 X0 Y15 E0 F600
G1 X0 Y15 Z0.4 E0 F600

;10 mm/s
G92 X0 Y0 Z0.4; this point is now 0/0/0.4
G1 X0 Y10 Z0.4 E1 F600
G1 X20 Y10 Z0.4 E1 F600
G1 X20 Y0 Z0.4 E1 F600

G1 X0 Y0 Z0.4 E1 F600
G1 X5 Y10 Z0.4 E0 F600
G1 X5 Y0 Z0.4 E1 F600
G1 X10 Y0 Z0.4 E0 F600
G1 X10 Y10 Z0.4 E1 F600
G1 X15 Y10 Z0.4 E0 F600
G1 X15 Y0 Z0.4 E1 F600
M751 T0; stop extrusion

T0
M751 T0; stop extrusion
G1 Z10 E0 F600
M751 T0; stop extrusion
G1 X0 Y15 E0 F600
G1 X0 Y15 Z0.4 E0 F600

;15 mm/s
G92 X0 Y0 Z0.4; this point is now 0/0/0.4
G1 X0 Y10 Z0.4 E1 F900
G1 X20 Y10 Z0.4 E1 F900
G1 X20 Y0 Z0.4 E1 F900
G1 X0 Y0 Z0.4 E1 F900
G1 X5 Y10 Z0.4 E0 F900
G1 X5 Y0 Z0.4 E1 F900
G1 X10 Y0 Z0.4 E0 F900
G1 X10 Y10 Z0.4 E1 F900
G1 X15 Y10 Z0.4 E0 F900
G1 X15 Y0 Z0.4 E1 F900
M751 T0; stop extrusion

T0
M751 T0; stop extrusion
G1 Z10 E0 F600
M751 T0; stop extrusion
G1 X0 Y15 E0 F600
G1 X0 Y15 Z0.4 E0 F600

;20 mm/s
G92 X0 Y0 Z0.4; this point is now 0/0/0.4
G1 X0 Y10 Z0.4 E1 F1200
G1 X20 Y10 Z0.4 E1 F1200
G1 X20 Y0 Z0.4 E1 F1200
G1 X0 Y0 Z0.4 E1 F1200
G1 X5 Y10 Z0.4 E0 F1200
G1 X5 Y0 Z0.4 E1 F1200
G1 X10 Y0 Z0.4 E0 F1200
G1 X10 Y10 Z0.4 E1 F1200
G1 X15 Y10 Z0.4 E0 F1200
G1 X15 Y0 Z0.4 E1 F1200
M751 T0; stop extrusion

G92 X15 Y60 Z0.4

G1 Z10; lower printbed
M84; disable motors

Code 4: Code for 8 squares (5 x 5 mm), which have a greek cross in the middle and consist of three layers. The speed is set to 5 mm/s. The height of the first layer is (f.l.t.r.): 0.38 (2/3 of the needle), 0.3, 0.2, 0.1, 0.4, 0.5, 0.6, 0.7 mm.

G90

G21

M83

G0 Z0.38

G7 X2.5 E1 F300

G7 Y5 E1 F300

G7 X-5 E1 F300

G7 Y-5 E1 F300

G7 X2.5 E1 F300

G7 Y5 E1 F300

G7 Z1

G7 X -2.5 Y-2.5 E0 F300

G7 Z-1

G7 X5 E1 F300

G7 Z0.58

G7 Y2.5 E1 F300

G7 X-5 E1 F300

G7 Y-5 E1 F300

G7 X5 E1 F300

G7 Y2.5 E1 F300

G7 X-5 E1 F300

G7 Z1

G7 X2.5 Y-2.5 E0 F300

G7 Z-1

G7 Y5 E1 F300

G7 Z0.58

G7 X-2.5 E1 F300

G7 Y-5 E1 F300

G7 X5 E1 F300

G7 Y5 E1 F300

G7 X-2.5 E1 F300

G7 Y-5 E1 F300

G7 Z1

G7 X-2.5 Y2.5 E0 F300

G7 Z-1

G7 X5 E1 F300

G7 Z1

G7 X5 Y-2.5

G0 Z0.3

G7 X2.5 E1 F300

G7 Y5 E1 F300

G7 X-5 E1 F300

G7 Y-5 E1 F300

G7 X2.5 E1 F300

G7 Y5 E1 F300
G7 Z1
G7 X -2.5 Y-2.5 E0 F300
G7 Z-1
G7 X5 E1 F300

G7 Z0.58

G7 Y2.5 E1 F300
G7 X-5 E1 F300
G7 Y-5 E1 F300
G7 X5 E1 F300
G7 Y2.5 E1 F300
G7 X-5 E1 F300
G7 Z1
G7 X2.5 Y-2.5 E0 F300
G7 Z-1
G7 Y5 E1 F300

G7 Z0.58

G7 X-2.5 E1 F300
G7 Y-5 E1 F300
G7 X5 E1 F300
G7 Y5 E1 F300
G7 X-2.5 E1 F300
G7 Y-5 E1 F300
G7 Z1
G7 X-2.5 Y2.5 E0 F300
G7 Z-1
G7 X5 E1 F300

G7 Z1
G7 X5 Y-2.5

;square 3 mit 0.2
G0 Z0.2

G7 X2.5 E1 F300
G7 Y5 E1 F300
G7 X-5 E1 F300
G7 Y-5 E1 F300
G7 X2.5 E1 F300
G7 Y5 E1 F300
G7 Z1
G7 X -2.5 Y-2.5 E0 F300
G7 Z-1
G7 X5 E1 F300

G7 Z0.58

G7 Y2.5 E1 F300
G7 X-5 E1 F300
G7 Y-5 E1 F300
G7 X5 E1 F300

G7 Y2.5 E1 F300
G7 X-5 E1 F300
G7 Z1
G7 X2.5 Y-2.5 E0 F300
G7 Z-1
G7 Y5 E1 F300

G7 Z0.58

G7 X-2.5 E1 F300
G7 Y-5 E1 F300
G7 X5 E1 F300
G7 Y5 E1 F300
G7 X-2.5 E1 F300
G7 Y-5 E1 F300
G7 Z1
G7 X-2.5 Y2.5 E0 F300
G7 Z-1
G7 X5 E1 F300

G7 Z1
G7 X5 Y-2.5

;square mit 0.1
G0 Z0.1

G7 X2.5 E1 F300
G7 Y5 E1 F300
G7 X-5 E1 F300
G7 Y-5 E1 F300
G7 X2.5 E1 F300
G7 Y5 E1 F300
G7 Z1
G7 X -2.5 Y-2.5 E0 F300
G7 Z-1
G7 X5 E1 F300

G7 Z0.58

G7 Y2.5 E1 F300
G7 X-5 E1 F300
G7 Y-5 E1 F300
G7 X5 E1 F300
G7 Y2.5 E1 F300
G7 X-5 E1 F300
G7 Z1
G7 X2.5 Y-2.5 E0 F300
G7 Z-1
G7 Y5 E1 F300

G7 Z0.58

G7 X-2.5 E1 F300
G7 Y-5 E1 F300
G7 X5 E1 F300
G7 Y5 E1 F300

G7 X-2.5 E1 F300
G7 Y-5 E1 F300
G7 Z1
G7 X-2.5 Y2.5 E0 F300
G7 Z-1
G7 X5 E1 F300

G7 Z1
G7 X5 Y-2.5

;Square mit 0.4
G0 Z0.4
G7 X2.5 E1 F300
G7 Y5 E1 F300
G7 X-5 E1 F300
G7 Y-5 E1 F300
G7 X2.5 E1 F300
G7 Y5 E1 F300
G7 Z1
G7 X -2.5 Y-2.5 E0 F300
G7 Z-1
G7 X5 E1 F300

G7 Z0.58

G7 Y2.5 E1 F300
G7 X-5 E1 F300
G7 Y-5 E1 F300
G7 X5 E1 F300
G7 Y2.5 E1 F300
G7 X-5 E1 F300
G7 Z1
G7 X2.5 Y-2.5 E0 F300
G7 Z-1
G7 Y5 E1 F300

G7 Z0.58

G7 X-2.5 E1 F300
G7 Y-5 E1 F300
G7 X5 E1 F300
G7 Y5 E1 F300
G7 X-2.5 E1 F300
G7 Y-5 E1 F300
G7 Z1
G7 X-2.5 Y2.5 E0 F300
G7 Z-1
G7 X5 E1 F300

G7 Z1
G7 X5 Y-2.5

;square mit 0.5
G0 Z0.5

G7 X2.5 E1 F300
G7 Y5 E1 F300
G7 X-5 E1 F300
G7 Y-5 E1 F300
G7 X2.5 E1 F300
G7 Y5 E1 F300
G7 Z1
G7 X -2.5 Y-2.5 E0 F300
G7 Z-1
G7 X5 E1 F300

G7 Z0.58

G7 Y2.5 E1 F300
G7 X-5 E1 F300
G7 Y-5 E1 F300
G7 X5 E1 F300
G7 Y2.5 E1 F300
G7 X-5 E1 F300
G7 Z1
G7 X2.5 Y-2.5 E0 F300
G7 Z-1
G7 Y5 E1 F300

G7 Z0.58

G7 X-2.5 E1 F300
G7 Y-5 E1 F300
G7 X5 E1 F300
G7 Y5 E1 F300
G7 X-2.5 E1 F300
G7 Y-5 E1 F300
G7 Z1
G7 X-2.5 Y2.5 E0 F300
G7 Z-1
G7 X5 E1 F300

G7 Z1
G7 X5 Y-2.5

;square mit 0.6
G0 Z0.6

G7 X2.5 E1 F300
G7 Y5 E1 F300
G7 X-5 E1 F300
G7 Y-5 E1 F300
G7 X2.5 E1 F300
G7 Y5 E1 F300
G7 Z1
G7 X -2.5 Y-2.5 E0 F300
G7 Z-1
G7 X5 E1 F300

G7 Z0.58

G7 Y2.5 E1 F300
G7 X-5 E1 F300
G7 Y-5 E1 F300
G7 X5 E1 F300
G7 Y2.5 E1 F300
G7 X-5 E1 F300
G7 Z1
G7 X2.5 Y-2.5 E0 F300
G7 Z-1
G7 Y5 E1 F300

G7 Z0.58

G7 X-2.5 E1 F300
G7 Y-5 E1 F300
G7 X5 E1 F300
G7 Y5 E1 F300
G7 X-2.5 E1 F300
G7 Y-5 E1 F300
G7 Z1
G7 X-2.5 Y2.5 E0 F300
G7 Z-1
G7 X5 E1 F300

G7 Z1
G7 X5 Y-2.5

;mit 0.7
G0 Z0.7

G7 X2.5 E1 F300
G7 Y5 E1 F300
G7 X-5 E1 F300
G7 Y-5 E1 F300
G7 X2.5 E1 F300
G7 Y5 E1 F300
G7 Z1
G7 X -2.5 Y-2.5 E0 F300
G7 Z-1
G7 X5 E1 F300

G7 Z0.58

G7 Y2.5 E1 F300
G7 X-5 E1 F300
G7 Y-5 E1 F300
G7 X5 E1 F300
G7 Y2.5 E1 F300
G7 X-5 E1 F300
G7 Z1
G7 X2.5 Y-2.5 E0 F300
G7 Z-1
G7 Y5 E1 F300

G7 Z0.58

G7 X-2.5 E1 F300
G7 Y-5 E1 F300
G7 X5 E1 F300
G7 Y5 E1 F300
G7 X-2.5 E1 F300
G7 Y-5 E1 F300
G7 Z1
G7 X-2.5 Y2.5 E0 F300
G7 Z-1
G7 X5 E1 F300

G7 Z1
G7 X5 Y-2.5

G0 Z10
M84

Code 5: Code to determine the shape fidelity. Here, on three slides, a line (5 mm), square (5 x 5 mm) and cuboid (three squares on top of each other) will be printed. All parameters (speed and temperature) have to be set manually. In the end, the printer will turn the lights red and a timer of 5 min starts. Afterwards the lights will turn white. After another 5 min the lights will turn blue.

; generated by Slic3r 1.3.1-dev (Build 18ddd3a36dc69d81fb9b7440498bff9e1dde8b7e) on 2021-10-18 at 14:27:59

; external perimeters extrusion width = 0.55mm (6.64mm³/s)
; perimeters extrusion width = 0.52mm (12.53mm³/s)
; infill extrusion width = 0.52mm (16.71mm³/s)
; solid infill extrusion width = 0.52mm (4.18mm³/s)
; top infill extrusion width = 0.52mm (3.13mm³/s)

M107
G92 E0
M104 S200 ; set temperature
G28 ; home all axes
G1 Z5 F5000 ; lift nozzle

; Filament gcode

M109 S200 ; set temperature and wait for it to be reached
G21 ; set units to millimeters
G90 ; use absolute coordinates
M82 ; use absolute distances for extrusion
G92 E0
G1 Z0.380 F7800.000
G1 E-2.00000 F2400.00000
G92 E0

G1 X34.100 Y14.600 F7800.000
G1 E2.00000 F2400.00000
G1 F1800.000
G1 X35.900 Y14.600 E2.05571
G1 X35.900 Y16.400 E2.11142
G1 X34.100 Y16.400 E2.16712
G1 X34.100 Y14.675 E2.22051
G1 X33.475 Y13.975 F7800.000
G1 F1800.000
G1 X36.525 Y13.975 E2.31489
G1 X36.525 Y17.025 E2.40927
G1 X33.475 Y17.025 E2.50365
G1 X33.475 Y14.050 E2.59570
G1 X32.850 Y13.350 F7800.000
G1 F1800.000
G1 X37.150 Y13.350 E2.72875
G1 X37.150 Y17.650 E2.86180
G1 X32.850 Y17.650 E2.99485
G1 X32.850 Y13.425 E3.12557
G1 X33.333 Y13.479 F7800.000
G1 E1.12557 F2400.00000
G92 E0
G1 X34.522 Y15.468 F7800.000
G1 E2.00000 F2400.00000

G1 F1800.000
G1 X34.482 Y15.468 E2.00152
G1 X34.482 Y15.508 E2.00303
G1 X35.008 Y14.982 E2.03070
G1 X35.518 Y14.982 E2.04963
G1 X35.518 Y15.532 E2.07007
G1 X35.032 Y16.018 E2.09560
G1 E0.09560 F2400.00000
G92 E0

G7 Z1 E0
G1 X34.100 Y-13.100 F7800.000
G7 Z-1 E0

G1 E2.00000 F2400.00000
G1 F1800.000
G1 X34.100 Y-14.900 E2.05571
G1 X35.900 Y-14.900 E2.11142
G1 X35.900 Y-13.100 E2.16712
G1 X34.175 Y-13.100 E2.22051
G1 X33.475 Y-12.475 F7800.000
G1 F1800.000
G1 X33.475 Y-15.525 E2.31489
G1 X36.525 Y-15.525 E2.40927
G1 X36.525 Y-12.475 E2.50365
G1 X33.550 Y-12.475 E2.59570
G1 X32.850 Y-11.850 F7800.000
G1 F1800.000
G1 X32.850 Y-16.150 E2.72875
G1 X37.150 Y-16.150 E2.86180
G1 X37.150 Y-11.850 E2.99485
G1 X32.925 Y-11.850 E3.12557
G1 X32.979 Y-12.333 F7800.000
G1 E1.12557 F2400.00000
G92 E0
G1 X35.032 Y-13.482 F7800.000
G1 E2.00000 F2400.00000
G1 F1800.000
G1 X35.518 Y-13.968 E2.02553
G1 X35.518 Y-14.518 E2.04597
G1 X35.008 Y-14.518 E2.06490
G1 X34.482 Y-13.992 E2.09257
G1 X34.482 Y-14.032 E2.09408
G1 X34.522 Y-14.032 E2.09560
G1 E0.09560 F2400.00000
G92 E0

G7 Z1
G1 X0.900 Y-13.100 F7800.000
G7 Z-1

G1 E2.00000 F2400.00000
G1 F1800.000
G1 X-0.900 Y-13.100 E2.05571
G1 X-0.900 Y-14.900 E2.11142
G1 X0.900 Y-14.900 E2.16712
G1 X0.900 Y-13.175 E2.22051

G1 X1.525 Y-12.475 F7800.000
G1 F1800.000
G1 X-1.525 Y-12.475 E2.31489
G1 X-1.525 Y-15.525 E2.40927
G1 X1.525 Y-15.525 E2.50365
G1 X1.525 Y-12.550 E2.59570
G1 X2.150 Y-11.850 F7800.000
G1 F1800.000
G1 X-2.150 Y-11.850 E2.72875
G1 X-2.150 Y-16.150 E2.86180
G1 X2.150 Y-16.150 E2.99485
G1 X2.150 Y-11.925 E3.12557
G1 X1.667 Y-11.979 F7800.000
G1 E1.12557 F2400.00000
G92 E0
G1 X0.032 Y-13.482 F7800.000
G1 E2.00000 F2400.00000
G1 F1800.000
G1 X0.518 Y-13.968 E2.02553
G1 X0.518 Y-14.518 E2.04597
G1 X0.008 Y-14.518 E2.06490
G1 X-0.518 Y-13.992 E2.09257
G1 X-0.518 Y-14.032 E2.09408
G1 X-0.478 Y-14.032 E2.09560
G1 E0.09560 F2400.00000
G92 E0

G7 Z1
G1 X0.900 Y14.600 F7800.000
G7 Z-1

G1 E2.00000 F2400.00000
G1 F1800.000
G1 X0.900 Y16.400 E2.05571
G1 X-0.900 Y16.400 E2.11142
G1 X-0.900 Y14.600 E2.16712
G1 X0.825 Y14.600 E2.22051
G1 X1.525 Y13.975 F7800.000
G1 F1800.000
G1 X1.525 Y17.025 E2.31489
G1 X-1.525 Y17.025 E2.40927
G1 X-1.525 Y13.975 E2.50365
G1 X1.450 Y13.975 E2.59570
G1 X2.150 Y13.350 F7800.000
G1 F1800.000
G1 X2.150 Y17.650 E2.72875
G1 X-2.150 Y17.650 E2.86180
G1 X-2.150 Y13.350 E2.99485
G1 X2.075 Y13.350 E3.12557
G1 X2.021 Y13.833 F7800.000
G1 E1.12557 F2400.00000
G92 E0
G1 X-0.478 Y15.468 F7800.000
G1 E2.00000 F2400.00000
G1 F1800.000
G1 X-0.518 Y15.468 E2.00152

G1 X-0.518 Y15.508 E2.00303
G1 X0.008 Y14.982 E2.03069
G1 X0.518 Y14.982 E2.04963
G1 X0.518 Y15.532 E2.07007
G1 X0.032 Y16.018 E2.09560
G1 E0.09560 F2400.00000
G92 E0

G7 Z1
G1 X-34.100 Y14.600 F7800.000
G7 Z-1

G1 E2.00000 F2400.00000
G1 F1800.000
G1 X-34.100 Y16.400 E2.05571
G1 X-35.900 Y16.400 E2.11142
G1 X-35.900 Y14.600 E2.16712
G1 X-34.175 Y14.600 E2.22051
G1 X-33.475 Y13.975 F7800.000
G1 F1800.000
G1 X-33.475 Y17.025 E2.31489
G1 X-36.525 Y17.025 E2.40927
G1 X-36.525 Y13.975 E2.50365
G1 X-33.550 Y13.975 E2.59570
G1 X-32.850 Y13.350 F7800.000
G1 F1800.000
G1 X-32.850 Y17.650 E2.72875
G1 X-37.150 Y17.650 E2.86180
G1 X-37.150 Y13.350 E2.99485
G1 X-32.925 Y13.350 E3.12557
G1 X-32.979 Y13.833 F7800.000
G1 E1.12557 F2400.00000
G92 E0
G1 X-35.478 Y15.468 F7800.000
G1 E2.00000 F2400.00000
G1 F1800.000
G1 X-35.518 Y15.468 E2.00152
G1 X-35.518 Y15.508 E2.00303
G1 X-34.992 Y14.982 E2.03069
G1 X-34.482 Y14.982 E2.04963
G1 X-34.482 Y15.532 E2.07007
G1 X-34.968 Y16.018 E2.09560
G1 E0.09560 F2400.00000
G92 E0

G7 Z1
G1 X35.350 Y3.250 F7800.000
G7 Z-1

G1 E2.00000 F2400.00000
G1 F1800.000
G1 X35.350 Y-1.750 E2.05568
G1 E0.05568 F2400.00000
G92 E0

G7 Z1
G1 X0.350 Y3.250 F7800.000
G7 Z-1

G1 E2.00000 F2400.00000
G1 F1800.000
G1 X0.350 Y-1.750 E2.05568
G1 E0.05568 F2400.00000
G92 E0

G7 Z1
G1 X-34.650 Y3.250 F7800.000
G7 Z-1

G1 E2.00000 F2400.00000
G1 F1800.000
G1 X-34.650 Y-1.750 E2.05568
G1 E0.05568 F2400.00000
G92 E0

G7 Z1
G1 X-34.100 Y-13.100 F7800.000
G7 Z-1

G1 E2.00000 F2400.00000
G1 F1800.000
G1 X-35.900 Y-13.100 E2.05571
G1 X-35.900 Y-14.900 E2.11142
G1 X-34.100 Y-14.900 E2.16712
G1 X-34.100 Y-13.175 E2.22051
G1 X-33.475 Y-12.475 F7800.000
G1 F1800.000
G1 X-36.525 Y-12.475 E2.31489
G1 X-36.525 Y-15.525 E2.40927
G1 X-33.475 Y-15.525 E2.50365
G1 X-33.475 Y-12.550 E2.59570
G1 X-32.850 Y-11.850 F7800.000
G1 F1800.000
G1 X-37.150 Y-11.850 E2.72875
G1 X-37.150 Y-16.150 E2.86180
G1 X-32.850 Y-16.150 E2.99485
G1 X-32.850 Y-11.925 E3.12557
G1 X-33.333 Y-11.979 F7800.000
G1 E1.12557 F2400.00000
G92 E0
G1 X-34.968 Y-13.482 F7800.000
G1 E2.00000 F2400.00000
G1 F1800.000
G1 X-34.482 Y-13.968 E2.02553
G1 X-34.482 Y-14.518 E2.04597
G1 X-34.992 Y-14.518 E2.06490
G1 X-35.518 Y-13.992 E2.09257
G1 X-35.518 Y-14.032 E2.09408
G1 X-35.478 Y-14.032 E2.09560
G1 Z0.960 F7800.000
G1 E0.09560 F2400.00000
G92 E0

G7 Z1
G1 X33.623 Y-12.623 F7800.000
G7 Z-1

G1 E2.00000 F2400.00000
G1 F900.000
G1 X33.623 Y-15.377 E2.08138
G1 X36.377 Y-15.377 E2.16275
G1 X36.377 Y-12.623 E2.24413
G1 X33.698 Y-12.623 E2.32329
G1 X33.205 Y-12.205 F7800.000
G1 F900.000
G1 X33.205 Y-15.795 E2.42935
G1 X36.795 Y-15.795 E2.53541
G1 X36.795 Y-12.205 E2.64147
G1 X33.280 Y-12.205 E2.74531
G1 X32.775 Y-11.775 F7800.000
G1 F900.000
G1 X32.775 Y-16.225 E2.88466
G1 X37.225 Y-16.225 E3.02401
G1 X37.225 Y-11.775 E3.16336
G1 X32.850 Y-11.775 E3.30036
G1 X32.904 Y-12.258 F7800.000
G1 X33.878 Y-13.203 F7800.000
G1 F1200.000
G1 X34.203 Y-12.878 E3.31506
G1 X34.843 Y-12.878 E3.33552
G1 X33.878 Y-13.843 E3.37916
G1 X33.878 Y-14.482 E3.39962
G1 X35.482 Y-12.878 E3.47220
G1 X36.122 Y-12.878 E3.49266
G1 X33.878 Y-15.122 E3.59417
G1 X34.518 Y-15.122 E3.61463
G1 X36.122 Y-13.518 E3.68720
G1 X36.122 Y-14.157 E3.70766
G1 X35.157 Y-15.122 E3.75130
G1 X35.797 Y-15.122 E3.77176
G1 X36.122 Y-14.797 E3.78647
G1 E1.78647 F2400.00000
G92 E0

G7 Z1
G1 X1.377 Y-12.623 F7800.000
G7 Z-1

G1 E2.00000 F2400.00000
G1 F900.000
G1 X-1.377 Y-12.623 E2.08138
G1 X-1.377 Y-15.377 E2.16275
G1 X1.377 Y-15.377 E2.24413
G1 X1.377 Y-12.698 E2.32329
G1 X1.795 Y-12.205 F7800.000
G1 F900.000
G1 X-1.795 Y-12.205 E2.42935
G1 X-1.795 Y-15.795 E2.53541
G1 X1.795 Y-15.795 E2.64147

G1 X1.795 Y-12.280 E2.74531
G1 X2.225 Y-11.775 F7800.000
G1 F900.000
G1 X-2.225 Y-11.775 E2.88466
G1 X-2.225 Y-16.225 E3.02401
G1 X2.225 Y-16.225 E3.16336
G1 X2.225 Y-11.850 E3.30036
G1 X1.742 Y-11.904 F7800.000
G1 X1.122 Y-14.797 F7800.000
G1 F1200.000
G1 X0.797 Y-15.122 E3.31506
G1 X0.157 Y-15.122 E3.33552
G1 X1.122 Y-14.157 E3.37916
G1 X1.122 Y-13.518 E3.39962
G1 X-0.482 Y-15.122 E3.47220
G1 X-1.122 Y-15.122 E3.49266
G1 X1.122 Y-12.878 E3.59417
G1 X0.482 Y-12.878 E3.61463
G1 X-1.122 Y-14.482 E3.68720
G1 X-1.122 Y-13.843 E3.70766
G1 X-0.157 Y-12.878 E3.75130
G1 X-0.797 Y-12.878 E3.77176
G1 X-1.122 Y-13.203 E3.78647
G1 E1.78647 F2400.00000
G92 E0

G7 Z1
G1 X-33.623 Y-12.623 F7800.000
G7 Z-1

G1 E2.00000 F2400.00000
G1 F900.000
G1 X-36.377 Y-12.623 E2.08138
G1 X-36.377 Y-15.377 E2.16275
G1 X-33.623 Y-15.377 E2.24413
G1 X-33.623 Y-12.698 E2.32329
G1 X-33.205 Y-12.205 F7800.000
G1 F900.000
G1 X-36.795 Y-12.205 E2.42935
G1 X-36.795 Y-15.795 E2.53541
G1 X-33.205 Y-15.795 E2.64147
G1 X-33.205 Y-12.280 E2.74531
G1 X-32.775 Y-11.775 F7800.000
G1 F900.000
G1 X-37.225 Y-11.775 E2.88466
G1 X-37.225 Y-16.225 E3.02401
G1 X-32.775 Y-16.225 E3.16336
G1 X-32.775 Y-11.850 E3.30036
G1 X-33.258 Y-11.904 F7800.000
G1 X-33.878 Y-14.797 F7800.000
G1 F1200.000
G1 X-34.203 Y-15.122 E3.31506
G1 X-34.843 Y-15.122 E3.33552
G1 X-33.878 Y-14.157 E3.37916
G1 X-33.878 Y-13.518 E3.39962
G1 X-35.482 Y-15.122 E3.47220
G1 X-36.122 Y-15.122 E3.49266

G1 X-33.878 Y-12.878 E3.59417
G1 X-34.518 Y-12.878 E3.61463
G1 X-36.122 Y-14.482 E3.68720
G1 X-36.122 Y-13.843 E3.70766
G1 X-35.157 Y-12.878 E3.75130
G1 X-35.797 Y-12.878 E3.77176
G1 X-36.122 Y-13.203 E3.78647
G1 Z1.540 F7800.000
G1 E1.78647 F2400.00000
G92 E0

G7 Z1
G1 X33.623 Y-12.623 F7800.000
G7 Z-1

G1 E2.00000 F2400.00000
G1 F900.000
G1 X33.623 Y-15.377 E2.08138
G1 X36.377 Y-15.377 E2.16275
G1 X36.377 Y-12.623 E2.24413
G1 X33.698 Y-12.623 E2.32329
G1 X33.205 Y-12.205 F7800.000
G1 F900.000
G1 X33.205 Y-15.795 E2.42935
G1 X36.795 Y-15.795 E2.53541
G1 X36.795 Y-12.205 E2.64147
G1 X33.280 Y-12.205 E2.74531
G1 X32.775 Y-11.775 F7800.000
G1 F900.000
G1 X32.775 Y-16.225 E2.88466
G1 X37.225 Y-16.225 E3.02401
G1 X37.225 Y-11.775 E3.16336
G1 X32.850 Y-11.775 E3.30036
G1 X32.904 Y-12.258 F7800.000
G1 E1.30036 F2400.00000
G92 E0
G1 X35.797 Y-12.878 F7800.000
G1 E2.00000 F2400.00000
G1 F900.000
G1 X36.122 Y-13.203 E2.01470
G1 X36.122 Y-13.843 E2.03516
G1 X35.157 Y-12.878 E2.07880
G1 X34.518 Y-12.878 E2.09926
G1 X36.122 Y-14.482 E2.17184
G1 X36.122 Y-15.122 E2.19230
G1 X33.878 Y-12.878 E2.29380
G1 X33.878 Y-13.518 E2.31426
G1 X35.482 Y-15.122 E2.38684
G1 X34.843 Y-15.122 E2.40729
G1 X33.878 Y-14.157 E2.45093
G1 X33.878 Y-14.797 E2.47139
G1 X34.203 Y-15.122 E2.48610
G1 E0.48610 F2400.00000
G92 E0

G7 Z1
G1 X1.377 Y-12.623 F7800.000

G7 Z-1

G1 E2.00000 F2400.00000
G1 F900.000
G1 X-1.377 Y-12.623 E2.08138
G1 X-1.377 Y-15.377 E2.16275
G1 X1.377 Y-15.377 E2.24413
G1 X1.377 Y-12.698 E2.32329
G1 X1.795 Y-12.205 F7800.000
G1 F900.000
G1 X-1.795 Y-12.205 E2.42935
G1 X-1.795 Y-15.795 E2.53541
G1 X1.795 Y-15.795 E2.64147
G1 X1.795 Y-12.280 E2.74531
G1 X2.225 Y-11.775 F7800.000
G1 F900.000
G1 X-2.225 Y-11.775 E2.88466
G1 X-2.225 Y-16.225 E3.02401
G1 X2.225 Y-16.225 E3.16336
G1 X2.225 Y-11.850 E3.30036
G1 X1.742 Y-11.904 F7800.000
G1 X0.797 Y-12.878 F7800.000
G1 F900.000
G1 X1.122 Y-13.203 E3.31506
G1 X1.122 Y-13.843 E3.33552
G1 X0.157 Y-12.878 E3.37916
G1 X-0.482 Y-12.878 E3.39962
G1 X1.122 Y-14.482 E3.47219
G1 X1.122 Y-15.122 E3.49265
G1 X-1.122 Y-12.878 E3.59416
G1 X-1.122 Y-13.518 E3.61462
G1 X0.482 Y-15.122 E3.68719
G1 X-0.157 Y-15.122 E3.70765
G1 X-1.122 Y-14.157 E3.75129
G1 X-1.122 Y-14.797 E3.77175
G1 X-0.797 Y-15.122 E3.78646
G1 E1.78646 F2400.00000
G92 E0

G7 Z1

G1 X-33.623 Y-12.623 F7800.000
G7 Z-1

G1 E2.00000 F2400.00000
G1 F900.000
G1 X-36.377 Y-12.623 E2.08138
G1 X-36.377 Y-15.377 E2.16275
G1 X-33.623 Y-15.377 E2.24413
G1 X-33.623 Y-12.698 E2.32329
G1 X-33.205 Y-12.205 F7800.000
G1 F900.000
G1 X-36.795 Y-12.205 E2.42935
G1 X-36.795 Y-15.795 E2.53541
G1 X-33.205 Y-15.795 E2.64147
G1 X-33.205 Y-12.280 E2.74531
G1 X-32.775 Y-11.775 F7800.000
G1 F900.000

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G1 X-37.225 Y-11.775 E2.88466
G1 X-37.225 Y-16.225 E3.02401
G1 X-32.775 Y-16.225 E3.16336
G1 X-32.775 Y-11.850 E3.30036
G1 X-33.258 Y-11.904 F7800.000
G1 X-34.203 Y-12.878 F7800.000
G1 F900.000
G1 X-33.878 Y-13.203 E3.31506
G1 X-33.878 Y-13.843 E3.33552
G1 X-34.843 Y-12.878 E3.37916
G1 X-35.482 Y-12.878 E3.39962
G1 X-33.878 Y-14.482 E3.47219
G1 X-33.878 Y-15.122 E3.49265
G1 X-36.122 Y-12.878 E3.59416
G1 X-36.122 Y-13.518 E3.61462
G1 X-34.518 Y-15.122 E3.68719
G1 X-35.157 Y-15.122 E3.70765
G1 X-36.122 Y-14.157 E3.75129
G1 X-36.122 Y-14.797 E3.77175
G1 X-35.797 Y-15.122 E3.78646
G1 E1.78646 F2400.00000
G92 E0
; Filament-specific end gcode
;END gcode for filament
```

```
G1 Z20; lower printbed
M810 R255 E0 B0 W0; set lights to red
G4 S300; wait 5 min
G1 Z30
M810 R0 E0 B0 W255; set lights to white
G4 S300; wait 5 min
G1 Z40
M810 R0 E0 B255 W0; set lights to blue
```

```
M104 S0 ; turn off temperature
G28 X0 ; home X axis
M84 ; disable motors
```

```
M140 S0 ; set bed temperature
; cog_x = 0.003733
; cog_y = -5.251413
; cog_z = 0.654979
; filament_length_m = 0.0263
; filament_volume_cm3 = 0.1857
; total_filament_cost = 0.0
```

```
; avoid_crossing_perimeters = 0
; bed_shape = 0x0,200x0,200x200,0x200
; bed_temperature = 0
; before_layer_gcode =
; between_objects_gcode =
; bridge_acceleration = 0
; bridge_fan_speed = 100
; brim_connections_width = 0
; brim_ears = 0
; brim_ears_max_angle = 125
```

```

; brim_width = 0
; complete_objects = 0
; cooling = 1
; default_acceleration = 0
; disable_fan_first_layers = 3
; duplicate_distance = 6
; end_filament_gcode = "; Filament-specific end gcode \n;END gcode for filament\n"
; end_gcode = M104 S0 ; turn off temperature\nG28 X0 ; home X axis\nM84 ; disable motors\n
; extruder_clearance_height = 20
; extruder_clearance_radius = 20
; extruder_offset = 0x0
; extrusion_axis = E
; extrusion_multiplier = 1
; fan_always_on = 0
; fan_below_layer_time = 60
; fan_percentage = 0
; filament_colour = #FFFFFF
; filament_cost = 0
; filament_density = 0
; filament_diameter = 3
; filament_max_volumetric_speed = 0
; filament_notes = ""
; first_layer_acceleration = 0
; first_layer_bed_temperature = 0
; first_layer_extrusion_width = 200%
; first_layer_speed = 30
; first_layer_temperature = 200
; gcode_arcs = 0
; gcode_comments = 0
; gcode_flavor = reprap
; has_heatbed = 1
; infill_acceleration = 0
; infill_first = 0
; interior_brim_width = 0
; label_printed_objects = 0
; layer_gcode =
; max_fan_speed = 100
; max_layer_height = 0.3
; max_print_speed = 80
; max_volumetric_speed = 0
; min_fan_speed = 35
; min_layer_height = 0.15
; min_print_speed = 10
; min_skirt_length = 0
; notes =
; nozzle_diameter = 0.5
; only_retract_when_crossing_perimeters = 1
; ooze_prevention = 0
; output_filename_format = [input_filename_base].gcode
; perimeter_acceleration = 0
; post_process =
; pressure_advance = 0
; printer_notes =
; resolution = 0
; retract_before_travel = 2
; retract_layer_change = 0
; retract_length = 2

```

```
; retract_length_toolchange = 10
; retract_lift = 0
; retract_lift_above = 0
; retract_lift_below = 0
; retract_restart_extra = 0
; retract_restart_extra_toolchange = 0
; retract_speed = 40
; skirt_distance = 6
; skirt_height = 1
; skirts = 1
; slowdown_below_layer_time = 5
; spiral_vase = 0
; standby_temperature_delta = -5
; start_filament_gcode = "; Filament gcode\n"
; start_gcode = G28 ; home all axes\nG1 Z5 F5000 ; lift nozzle\n
; temperature = 200
; threads = 12
; toolchange_gcode =
; travel_speed = 130
; use_firmware_retraction = 0
; use_relative_e_distances = 0
; use_set_and_wait_bed = 0
; use_set_and_wait_extruder = 0
; use_volumetric_e = 0
; vibration_limit = 0
; wipe = 0
; z_offset = 0
; z_steps_per_mm = 0
; adaptive_slicing = 0
; adaptive_slicing_quality = 75%
; dont_support_bridges = 1
; extrusion_width = 0
; first_layer_height = 0.35
; infill_only_where_needed = 0
; interface_shells = 0
; layer_height = 0.58
; match_horizontal_surfaces = 0
; raft_layers = 0
; regions_overlap = 0
; seam_position = aligned
; sequential_print_priority = 0
; support_material = 0
; support_material_angle = 0
; support_material_buildplate_only = 0
; support_material_contact_distance = 0.2
; support_material_enforce_layers = 0
; support_material_extruder = 1
; support_material_extrusion_width = 0
; support_material_interface_extruder = 1
; support_material_interface_extrusion_width = 0
; support_material_interface_layers = 3
; support_material_interface_spacing = 0
; support_material_interface_speed = 100%
; support_material_max_layers = 0
; support_material_pattern = pillars
; support_material_pillar_size = 2.5
; support_material_pillar_spacing = 10
```

```
; support_material_spacing = 2.5
; support_material_speed = 60
; support_material_threshold = 60%
; xy_size_compensation = 0
; bottom_infill_pattern = rectilinear
; bottom_solid_layers = 3
; bridge_flow_ratio = 1
; bridge_speed = 60
; external_perimeter_extrusion_width = 0
; external_perimeter_speed = 50%
; external_perimeters_first = 0
; extra_perimeters = 1
; fill_angle = 45
; fill_density = 2%
; fill_gaps = 1
; fill_pattern = rectilinear
; gap_fill_speed = 20
; infill_every_layers = 1
; infill_extruder = 1
; infill_extrusion_width = 0
; infill_overlap = 55%
; infill_speed = 80
; min_shell_thickness = 0
; min_top_bottom_shell_thickness = 0
; overhangs = 1
; perimeter_extruder = 1
; perimeter_extrusion_width = 0
; perimeter_speed = 60
; perimeters = 3
; small_perimeter_speed = 15
; solid_infill_below_area = 70
; solid_infill_every_layers = 0
; solid_infill_extruder = 1
; solid_infill_extrusion_width = 0
; solid_infill_speed = 20
; thin_walls = 1
; top_infill_extrusion_width = 0
; top_infill_pattern = rectilinear
; top_solid_infill_speed = 15
; top_solid_layers = 3
```

1.1 Macro code for ImageJ

To analyze the Images using ImageJ, the following macro code was used:

```
//this code was written to be used with an OnePlus 7T Pro, if another Phone is used, the //area of the  
rectangle has to be redefined as well as the distance value of the scale function  
//after running the code, enhancement of the contrast and or subtraction of the //background are  
recommended  
//lastly a threshold has to be set before the measurement can be done  
// 27.01.2022 Soenke Menke
```

```
makeRectangle(1000, 1000, 2756, 1000);  
run("Crop");  
run("Set Scale...", "distance=69.63602 known=1 unit=mm");  
run("8-bit");
```

5 References

1. Reizabal, A. *et al.* MEWron: An open-source melt electrowriting platform. *Additive Manufacturing* **71**, 103604; 10.1016/j.addma.2023.103604 (2023).