



# 3D PLATFORM TRAINING INSTRUCTION

## PRINTING THE INFILL BOX

3DPTI-0004

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APPROVALS			
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APPLICABLE MODELS	
Legacy	Work Series
<input checked="" type="checkbox"/> X1000	<input checked="" type="checkbox"/> 100
<input checked="" type="checkbox"/> X1000 CE	<input checked="" type="checkbox"/> 200
<input checked="" type="checkbox"/> WorkBench	<input checked="" type="checkbox"/> 300
	<input checked="" type="checkbox"/> 400

CONTROL STATUS
<input type="checkbox"/> Confidential
<input type="checkbox"/> Internal use only
<input checked="" type="checkbox"/> Uncontrolled

## Table of Contents

Introduction & Purpose .....	2
Tools & Materials .....	2
Process .....	2
Printing the part .....	2
Prepare the printer .....	2
Prepare the part.....	2
Start print .....	2
Inspecting the part.....	3
Visual inspection: .....	3
Tool inspection:.....	3
Correcting the part .....	4
Wrapping up .....	4
Conclusion.....	4

## Introduction & Purpose

The infill box is designed to test the dimensional accuracy of the print, and test the strength of various infill patterns. Ensuring dimensional accuracy and print strength is critical to a successful print.

This training instruction will instruct and prepare the user to successfully validate the infill patterns and proper extrusion.

## Tools & Materials

- Knife or razor scraper to remove completed prints.
- Calipers or micrometer.
- Print material (PLA material is recommended for calibration prints).
- Solid box gcode file
- SD card or network connection to the web interface ( WorkSeries and later ) to load print files.

## Process

### Printing the part

#### Prepare the printer

1. Prepare print bed. Clean the print area and apply adhesion agent if used.
2. Load material. Load print material and ensure extruder is extruding material properly.

#### Prepare the part

1. Prepare gcode file. Use supplied gcode if available. If using alternate nozzle sizes, slice the file using just a single perimeter and bottom layer, no infill.
2. Load file using SD card or web interface.

### Start print

Print the gcode file and observe during the print. Ask these questions during the print.

- Is the extruder moving too fast or over extruding?
- Are there blobs in the corners of the part when the print starts the next layer?

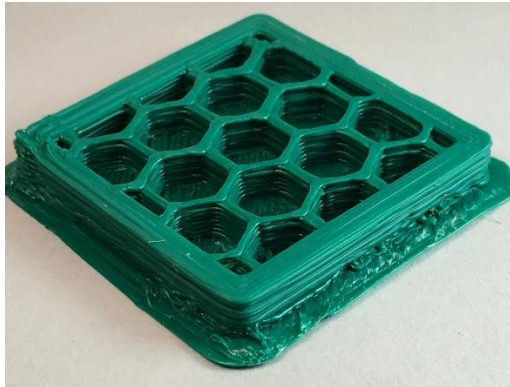
When the part completes, wait for print bed to cool down and then remove it, being careful not to damage the part. Removing a part when warm can warp the part and potentially affect measurements.

## Inspecting the part

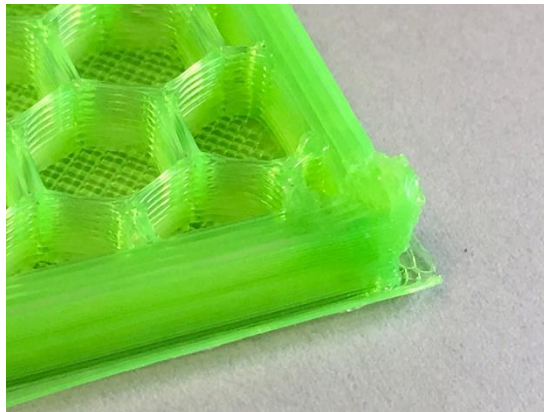
### Visual inspection:

Look at the infill box after removal. There are visual clues to indicate whether the box is printing correctly. There are a few possibilities

1. Material is over or under extruded: Material is extruded too much or too fast or too little. Results in sparse broken infill or too thick, uneven layers and wall thickness.



2. Blobs in the corners of the part: Improper settings for extruder movements and retracts can cause globs and zits on the outer walls of the material.



3. Good, connected infill patterns: Good material flow speeds and retract settings. Adjust retract settings to control material flow between layers. Adjusted feed rate and extrusion multiplier to control material flow while extruding.

### Tool inspection:

1. Use a set of calipers or a micrometer to measure the outer dimensions of the box, Desired measurement in XY is 40mm  $\pm$ .2mm (Due to material shrink after printing in the XY plane, measurements of 39.8 are normal for a 40mm box).

## Correcting the part

Corrections will depend on what is found during inspection.

1. **Material is over or under extruded.** Adjust the material flow to compensate for any over or under extrusion. Repeat the thin-wall box if the walls extrusion continues to over or under extrude.
2. **Blobs in the corner of the part.** Adjust the retract settings to avoid over extrusion in the corners. The toolhead will stop the extrusion flow and leave a smooth seam. Increase the retract settings to reduce the material excess in the corners.
3. **Good, connected infill patterns.** The print corners are accurate and the infill pattern is strong and connected.

If corrections are made to the prints or machine settings, the solid box print process must be repeated and the new part inspected.



## Wrapping up

The infill box print is complete when boxes from all nozzles adhere to bed properly, pass visual inspection, and measure within .2mm of nominal size.

## Conclusion

The infill box is a simple but powerful tool to validate part strength and retract settings. This print demonstrates the importance of the infill pattern and the strength of the end print.