3D PLATFORM

PRINTING THE HFE300 THIN WALL BOX

2018/01/03

Introduction and Purpose

The thin wall box is a standard calibration print that ensures layer to layer adhesion strength. This training instruction will guide the user through printing the thin wall calibration box. It will illustrate what a successful thin wall box looks like, and what can be learned from printing the thin wall box.

Tools and Materials Needed

- Knife or razor scraper
- Calipers
- Print material (PLA material is recommended for calibration prints)

Process

Prepare the printer:

1. Prepare the print bed.
    a. Clean the print area and apply adhesion agent, as needed.
2. Load material.
    a. Load print material and ensure extruder is extruding material properly.

Prepare the g-code file:

1. Slice the supplied STL for the nozzle diameter being used.
    a. Standard print settings for 1mm nozzle:
        i. 0.5mm layer height
        ii. 128mm/s print speed
        iii. 0% infill
        iv. 1 bottom layer
        v. 1 perimeter
        vi. 0 top layers
2. Save the g-code to a SD card or to the machine through the web interface.

Start the print:

Print the g-code file and observe during the print. Ask these questions during the print.

- Are the beads of filament adhering to the layer below on the thin wall?
- Is the printer moving too quickly?

When the part is done, wait for the print bed to cool down to room temperature and then remove the part. If the print bed is not cooled sufficiently before attempting to remove the part, the part may be damaged and will throw off any measurements.

Inspecting the part

Visual inspection:

Look at the thin wall box after removal. There are visual and tactile clues to indicate if the printer is working correctly and the slice is good.

1. If the material is under extruded the box will come off the print bed, but may break during removal. The layers will have holes and it will look like material is missing from the part.
2. The extruder is moving too quickly if the beads are not bonded together, and appear stretched. Possibly missing some material or material has fallen away from the rest of the part.

3. The walls of the box may be sagging down and causing the box walls to collapse.

If the print speed, extrusion multiplier, and extruder temperature are set correctly, the walls of the box will look consistent, smooth, and bonded together well.

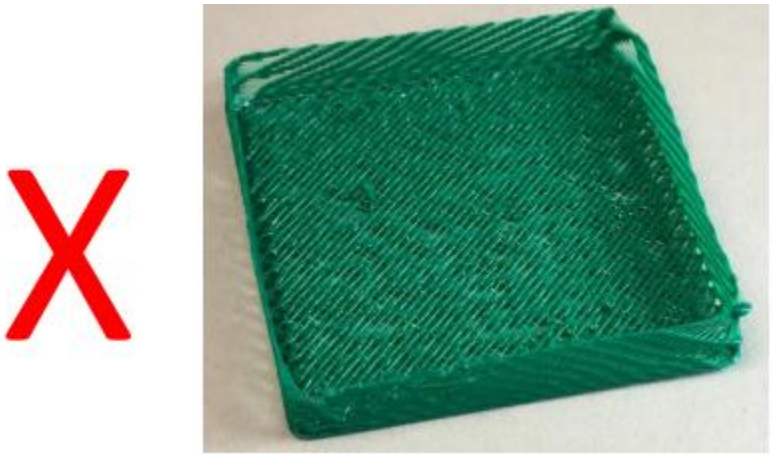
Tool inspection:

Use a set of calipers to measure the wall thickness of the box. The dimension of the wall thickness will depend on the nozzle size used for the print. When printing with the standard 1.0mm nozzle the wall should be between 1.0mm – 1.4mm thick.

Correcting the Part

Corrections will depend on what issue is found during inspection.

1. If the extruder appears to be under extruding, make sure that the extrusion multiplier is set to 100%, the nozzle size is correct in the slicer, and make sure the temperature is high enough to melt the filament completely before extrusion.



2. If the material is not bonded correctly to the layer below, slow down the print speed and observe the part. The print should recover, and the layers will bond together correctly.

3. If the walls are sagging and the walls collapsing, this may be a sign that the extruder temperature is too hot and needs to be lowered. This could also be a symptom of the print speed being too fast and not giving the previous layer sufficient time to cool.
4. If the walls of the box are not within tolerance, make sure the filament is getting up to temperature before being extruded, then adjust the extrusion multiplier in 5% increments until the desired dimension is achieved.

When attempting to correct a 3D print, only one adjustment should be made with each attempt to be sure of the cause and solution.

Wrapping up

The thin wall box print is complete when the part passes visual inspection and is within dimensional tolerances.

Conclusion

The thin wall box is a simple but powerful tool to validate layer adhesion. This print demonstrates the importance of print speed, cooling, and layer to layer adhesion.

Please contact the 3D Platform support team at support.3dplatform.com with any further questions about your HFE extruders.

We appreciate all feedback as it helps improve the user experience for all 3D Platform WorkSeries users.

The 3D Platform Team