FORMLABS FORM3 PRINTER

STUDENT INNOVATION CENTER
ROOM 2222

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VERSION 1.0

7/2/2021

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OVERVIEW

The purpose of this document is to provide standard operating procedures for the use of the **Formlabs Form3 printers** in room 2222 of the Student Innovation Center

Prior to engaging in hands-on training and operation, these required training modules MUST be completed:

- Shop Safety Fundamentals
- Fire Safety and Fire Extinguisher Training
- Hazard Communication Training (aka Worker Right to Know)
- Portable Power Tool Safety

HEALTH & SAFETY INFO

Chemical Spill/contact: Photopolymer resin can cause skin and severe eye irritation. Ensure all PPE protocols are observed including gloves and safety glasses.

Chemical Vapors: Inhaling Isopropyl Alcohol can irritate the nose and throat causing coughing and wheezing. Avoid direct inhalation and only use in a well ventilated environment.

Hot Surfaces: The print head block and UV lamp generate heat. Such surfaces must be guarded and labeling must warn users of the hazards.

Mechanical Hazards: Moving parts must be guarded to prevent accidental contact. Guards must never be bypassed.

Ultraviolet Light (UV): UV light poses a radiation hazard that can cause damage to vision and skin. Do not look at the lamp and ensure the UV screen is intact before use.

Electrical: Contact with energized parts can lead to injury or even death. Before each use, inspect for any damaged wiring and safeguards. Do not use if problems are found. Ensure the machine is properly grounded and plugged directly into an outlet.

HAZARD CONTROL MEASURES AND REQUIRED PPE

REQUIRED PPE:

- Safety glasses
- Closed toed shoes
- Gloves

Hazard Control Measures:

- Wait until the printer is completely finished printing before removing parts/material
- Tie long hair back
- The scraper used to remove prints is sharp! Be very careful and ONLY scrape *away* from your body!
- Wash your hands after using the printers
- If your skin comes into contact with uncured resin, wash the area thouroughly with hot, soapy water
- If your eyes come into contact with uncured resin, flush eyes immediately and, if needed, seek medical attention
- Make sure to use any and all Isopropyl Alchohol in a well ventilated environment and proptly clean any surface of spills

FIRST AID PROCEDURES

BURNS: Minor burns are typically small, red, have swelling, and can blister. Cool burns with cold water and continue until the pain lessens. After cooling, cover with a dry, sterile bandage or clean dressing. Consult a physician as needed.

CUTS/SCRAPES: Minor cuts and scrapes usually stop bleeding on their own. If needed, apply gentle pressure with a clean bandage or cloth and elevate the wound until bleeding stops. Clean the wound and apply bandages. Consult a physician as needed.

PINCH/CRUSH: Consult a physician as needed.

INHALATION: Ensure there is proper ventilation prior to use. If needed, stop the procedure and move to a well ventilated area. Consult a physician as needed.

EYES: Immediately irrigate the eyes at an eyewash station for at least 15 minutes. Hold the eyelids away from the eyeball, moving eye in all directions to wash thoroughly behind the eyelids. Consult a physician as needed.

All accidents and injuries occurring at work or in the course of employment must be reported to the employee's supervisor as soon as possible (even if no medical attention is required). http://www.ehs.iastate.edu/occupational/accidents-injuries

WASTE DISPOSAL

UNCURED RESIN: Use safey gloves and paper towels to wipe up large resin spills. Then, wipe all surfaces thouroughly with Isopropyl Alcohol and allow to dry. Dispose of paper towels in garbage. If uncured resin is contained (not a spill), place the container in direct sunlight for 24-48 hours to cure. Upon curing, dispose of in garbage.

ISOPROPYL ALCHOHOL (IPA): Wipe all spills thouroughly using paper towels. If IPA has evaporated, dispose of paper towels in garbage.

CURED RESIN: Dispose of in garbage

SPILL/CLEAN UP PROCEDURES

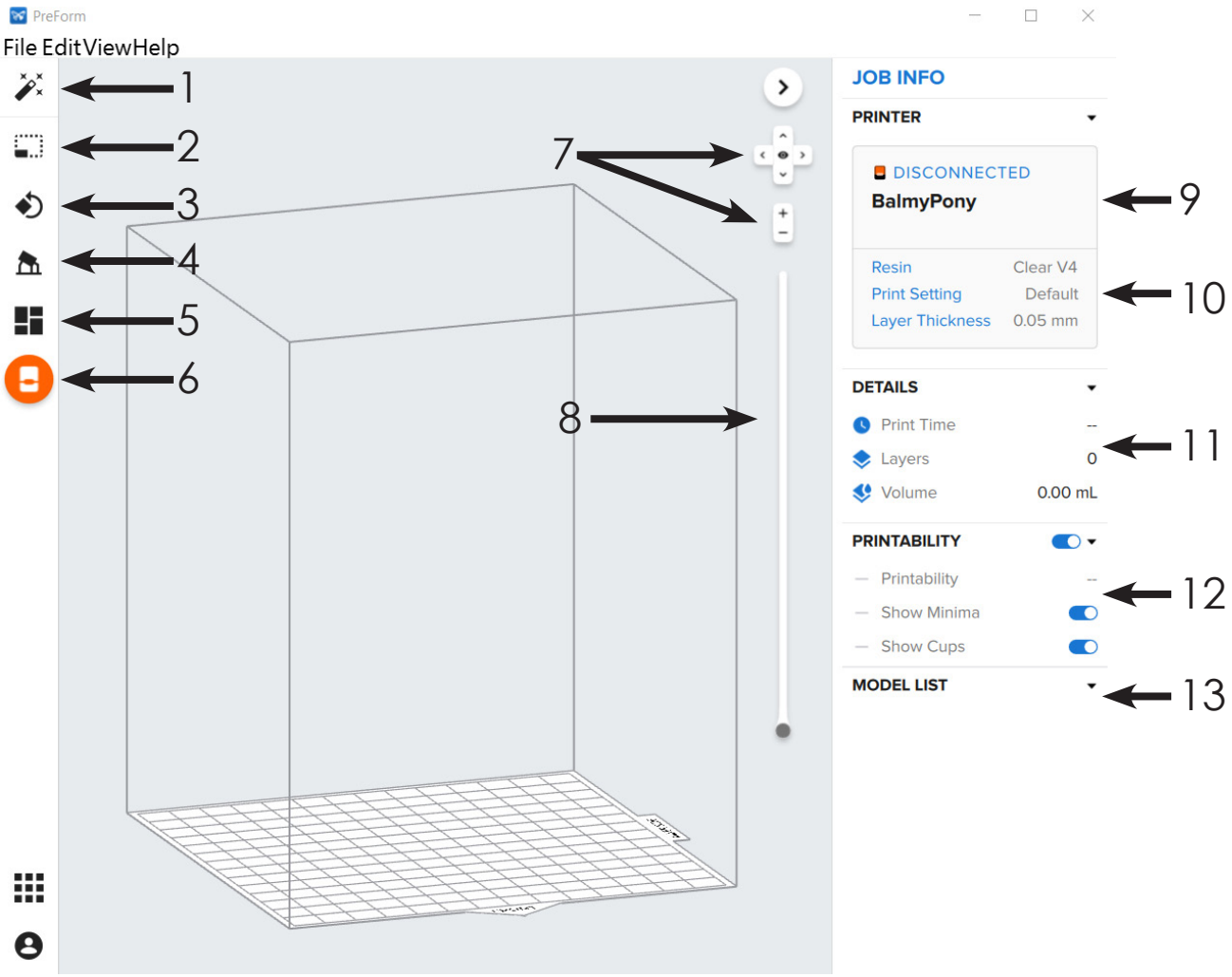
UNCURED RESIN: Use safey gloves and paper towels to wipe up large resin spills. Then, wipe all surfaces thouroughly with Isopropyl Alcohol and allow to dry. Dispose of paper towels in garbage.

ISOPROPYL ALCHOHOL: Wipe all spills thouroughly using paper towels and dispose of in garbage.

CURED RESIN: Dispose of in garbage

OPERATIONS GUIDE

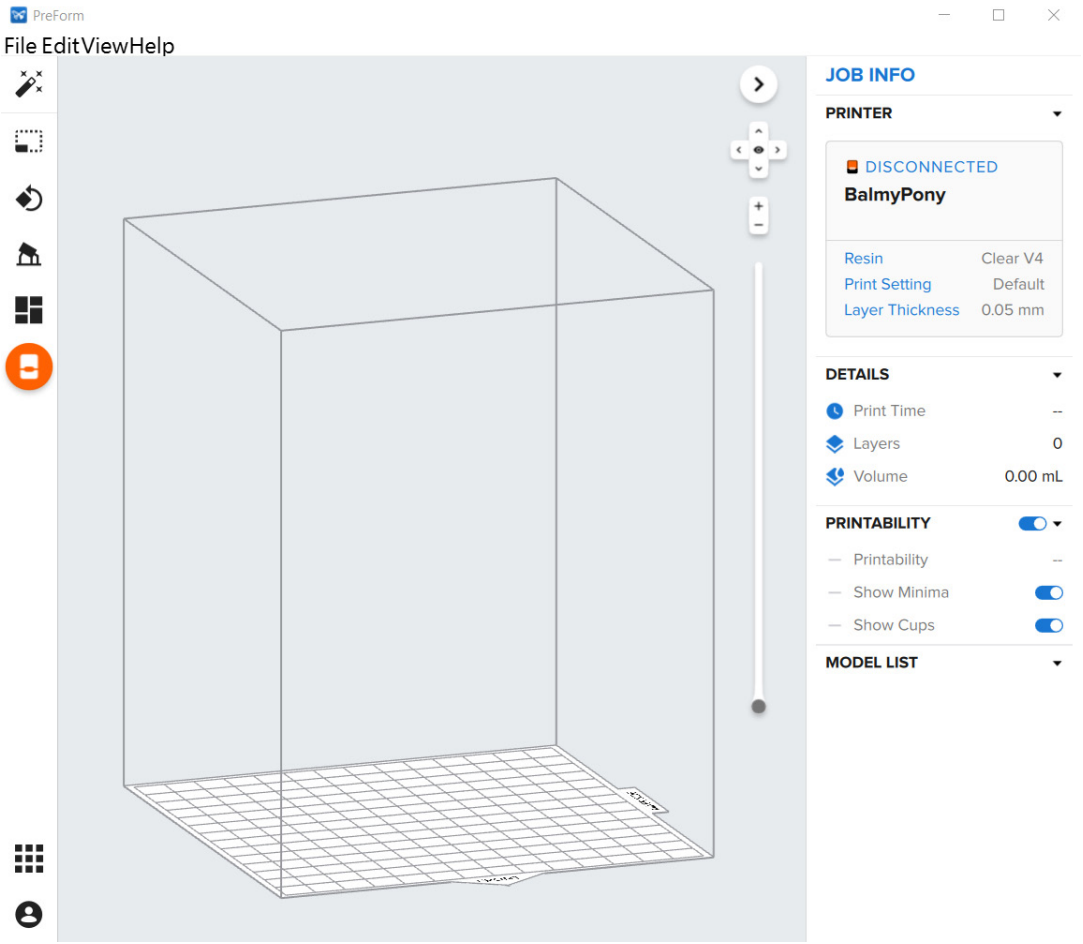
SOFTWARE INTERFACE



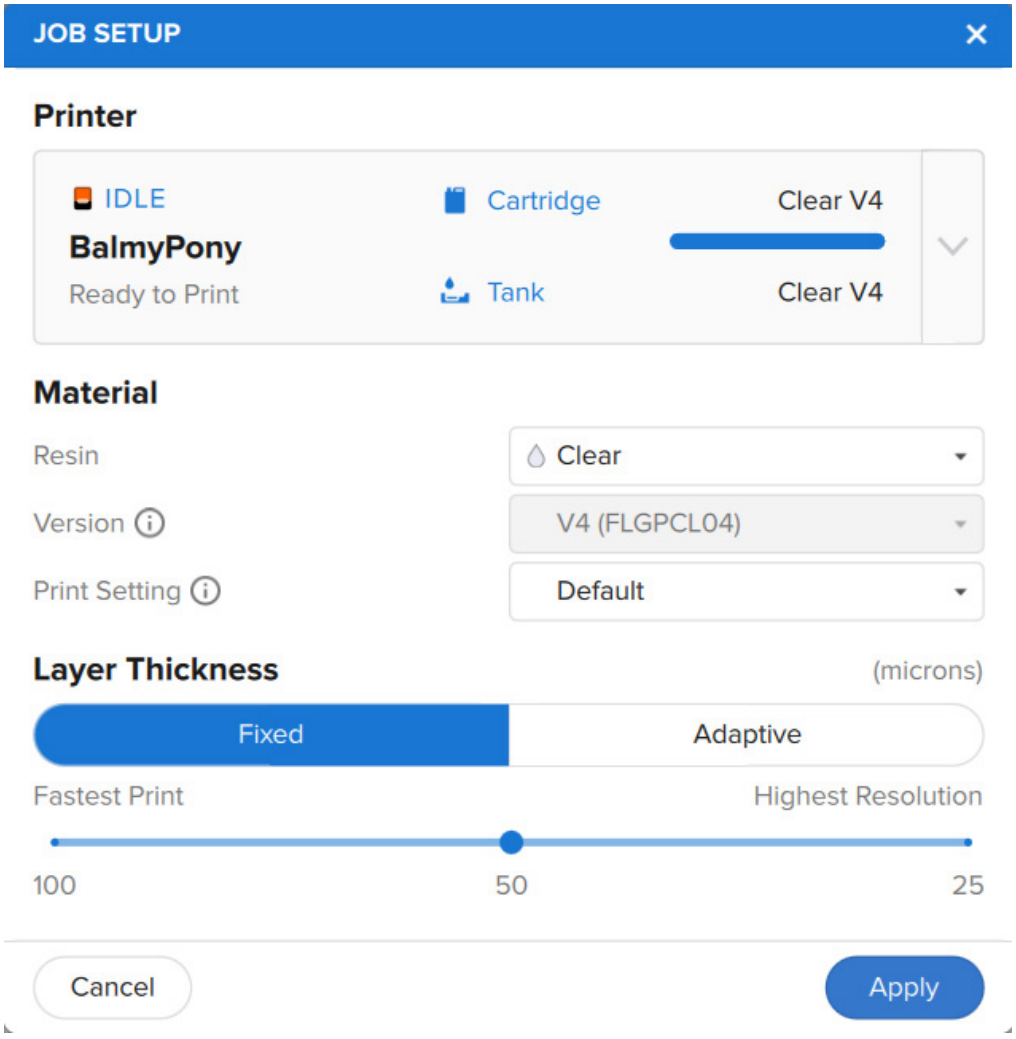
1. One-Click-Printing
2. Scale
3. Rotate
4. Support
5. Layout
6. Start A Print
7. Camera Controls
8. Slicer Tool
9. Printer Selected
10. Resin Info
11. Print Details
12. Printability Info
13. Model List

SOFTWARE OPERATION

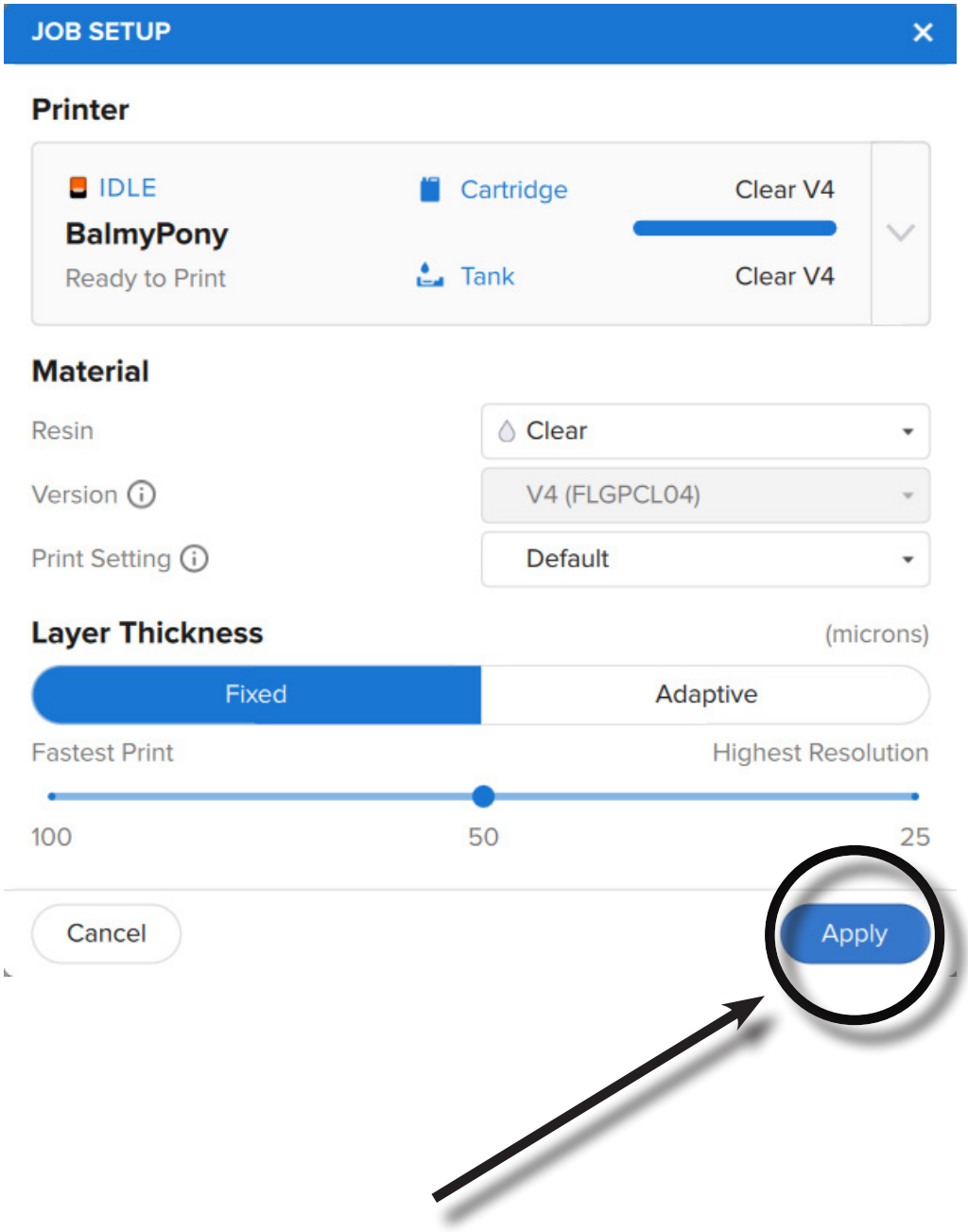
1. Open Preform



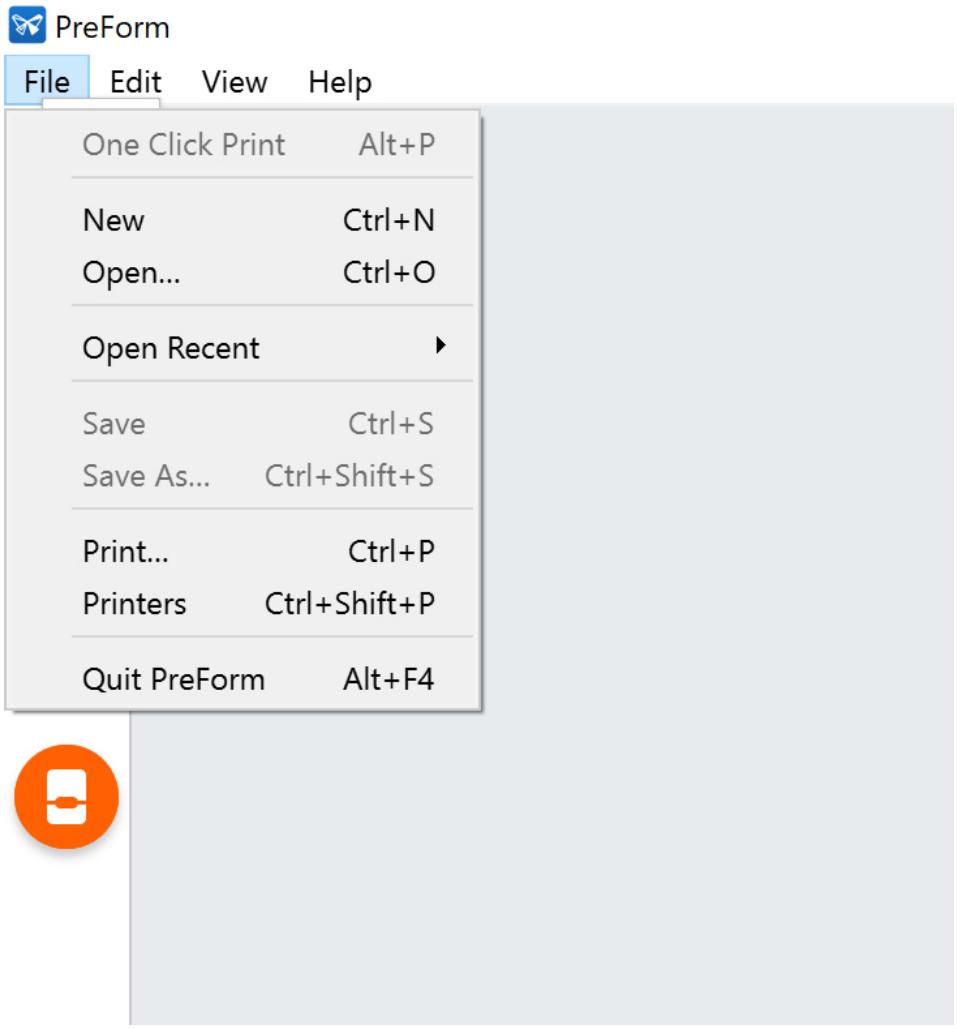
2. In the pop-up window, select the:
    a. Printer you wish to use
    b. The material you are using (including the version)
    c. The layer thickness (resolution)



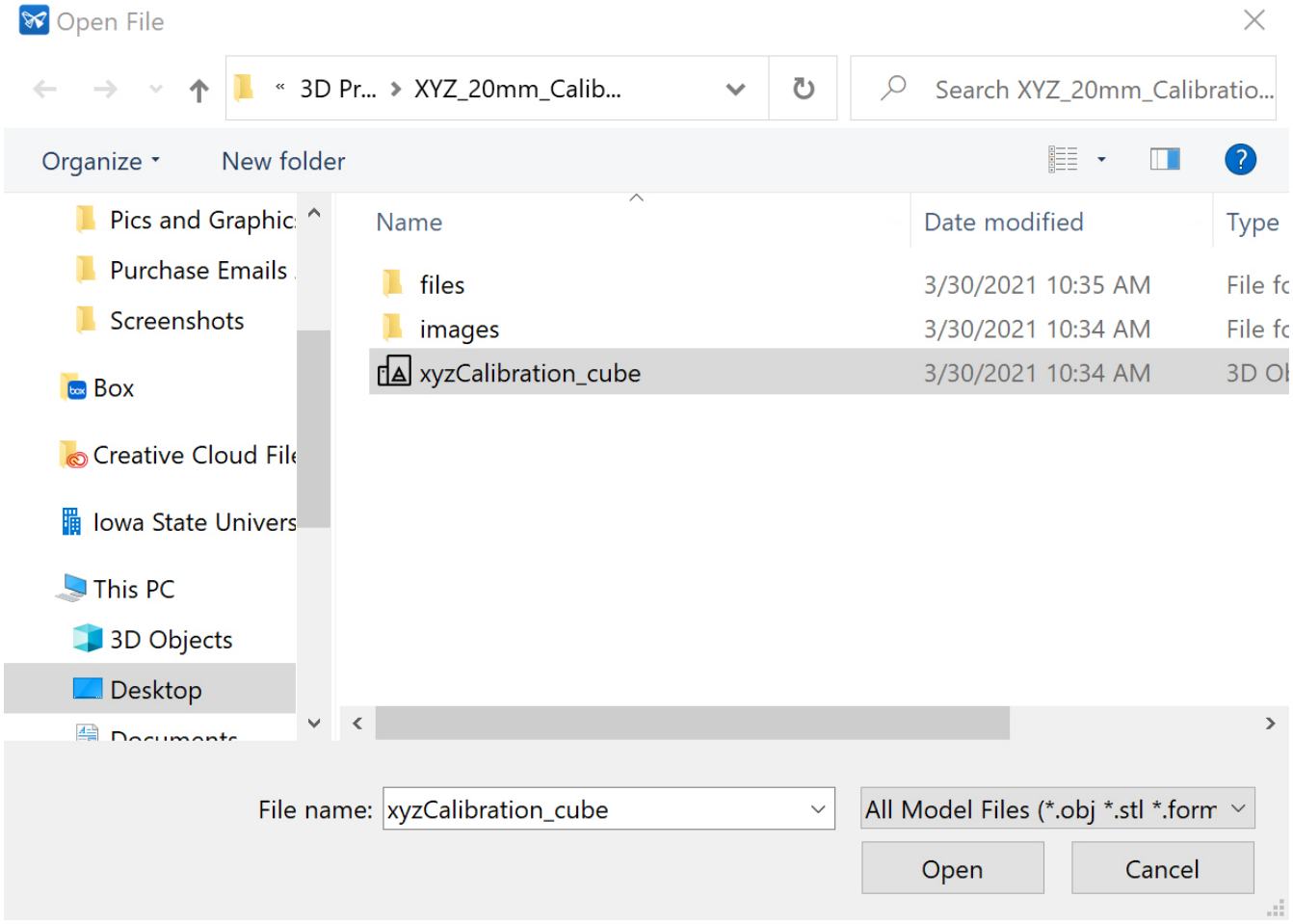
3. Click the “Apply” button



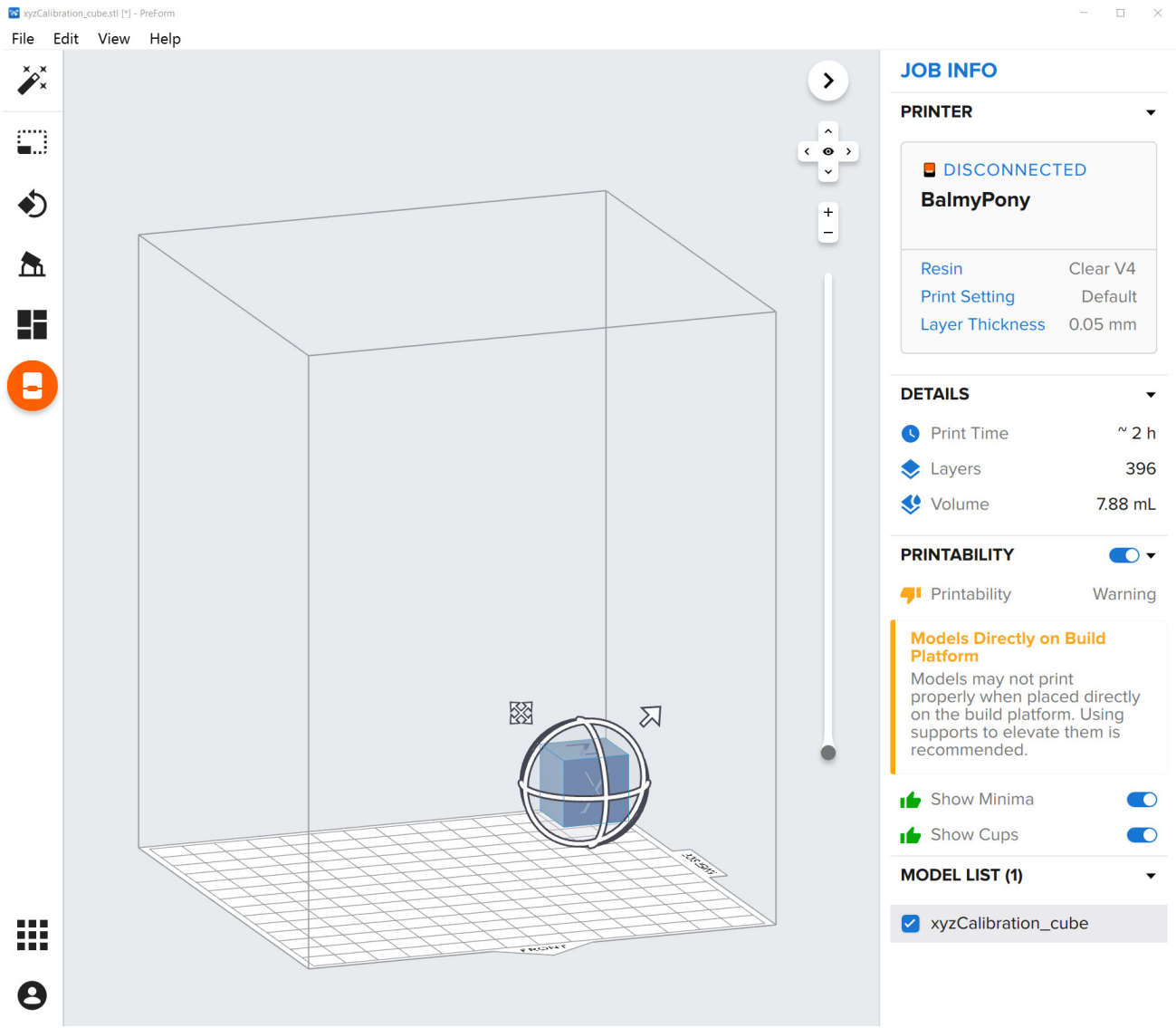
4. In the top toolbar, click “File”, then click “Open”



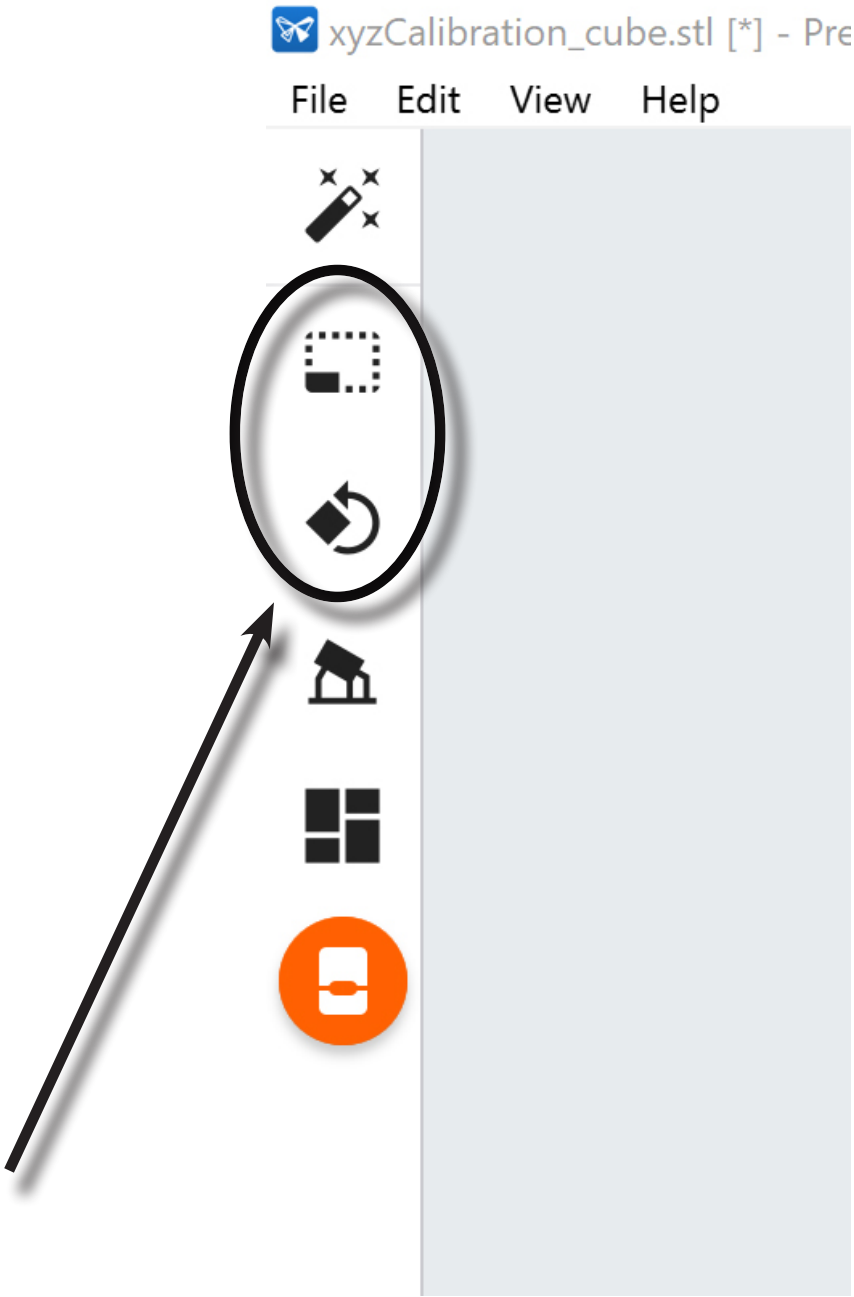
5. Locate the file you wish to print with and click “Open”



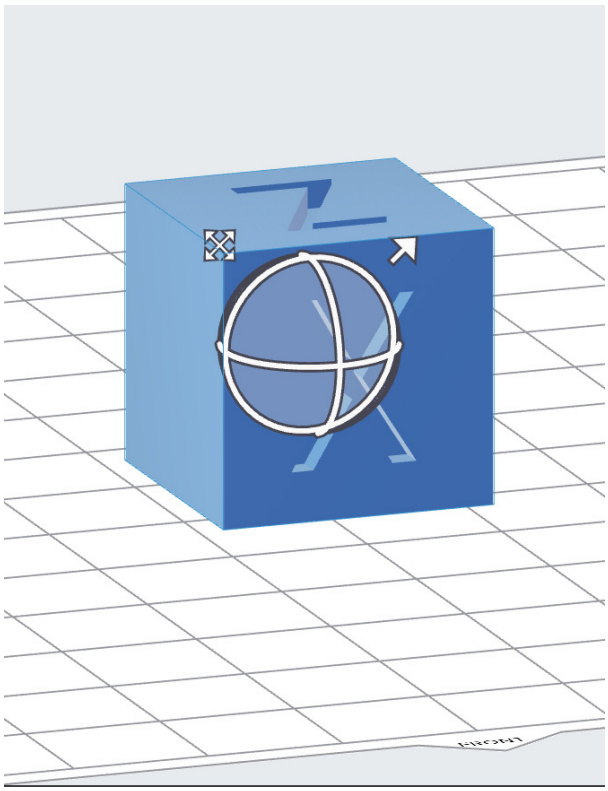
6. Your object will appear in the virtual build platform

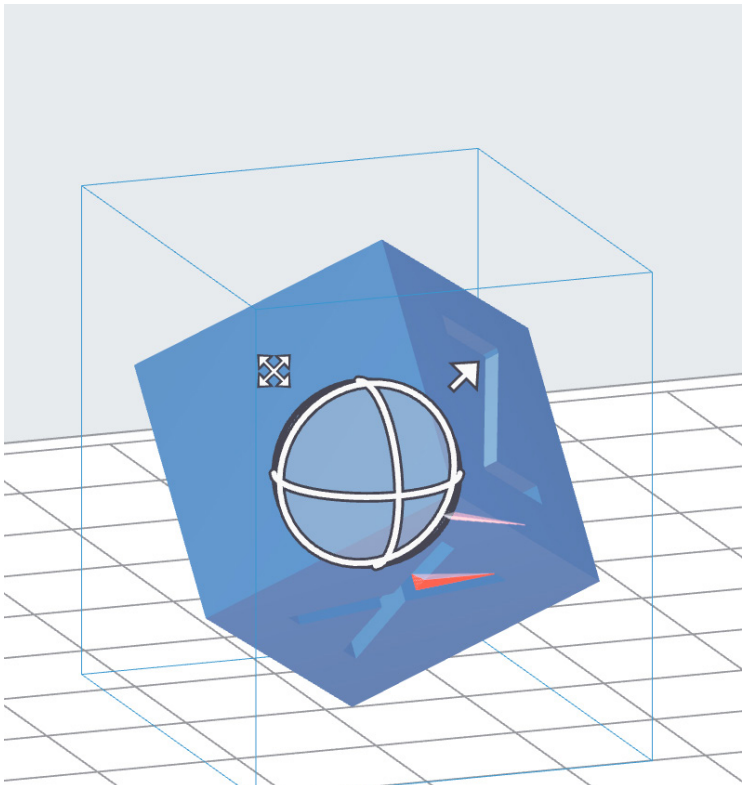


7. In the left toolbar, you can change the orientation and scale.

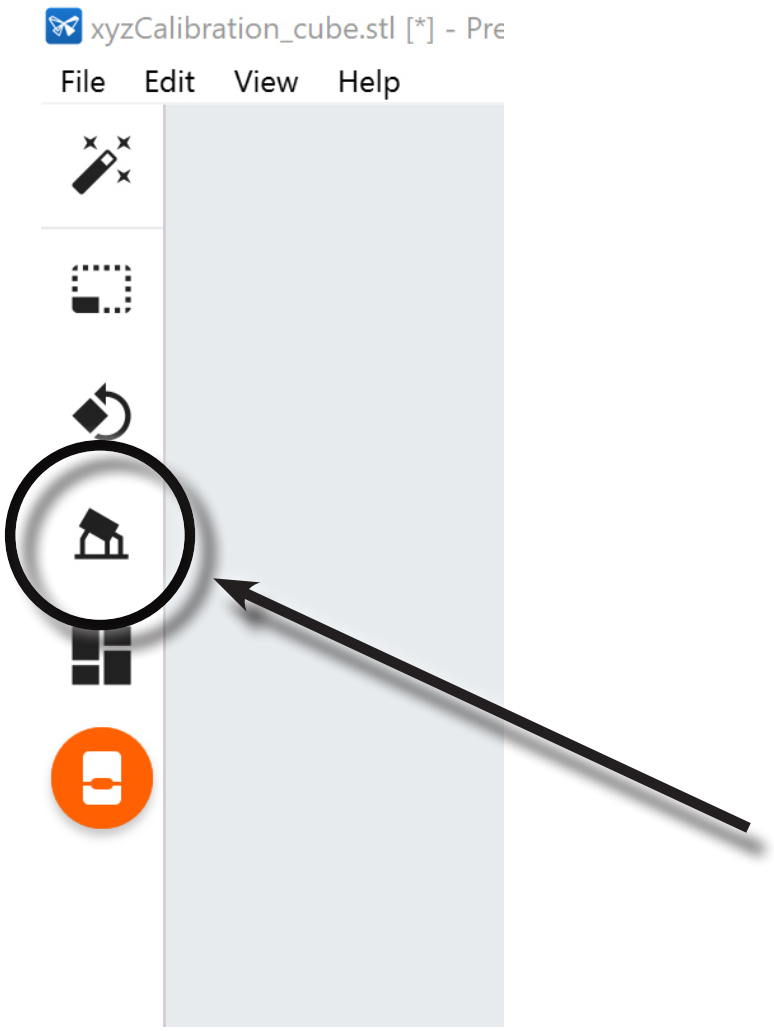


8. IMPORTANT! Unlike other printers, your model should be oriented at a compound angle! Doing this will help reduce failed prints and help prevent possible damage to the machine

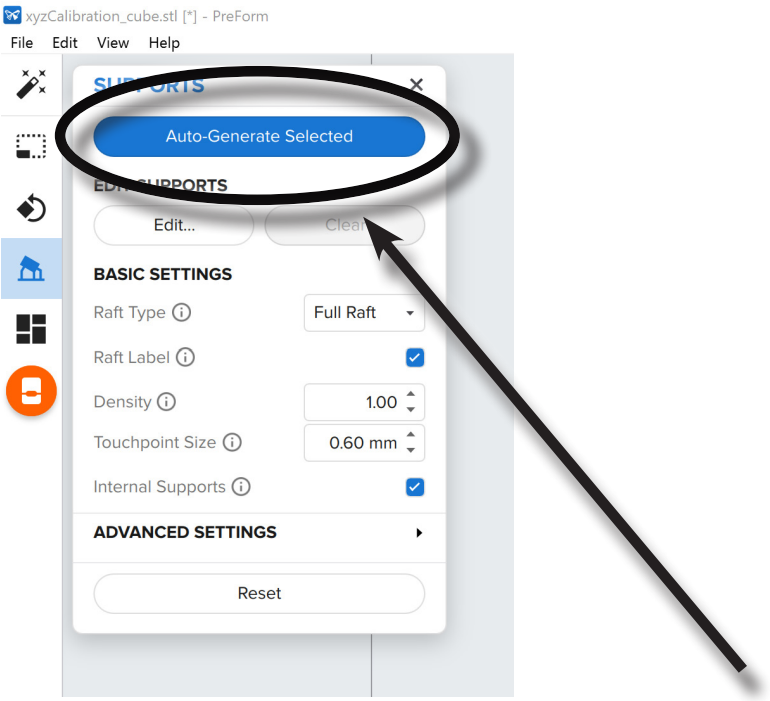


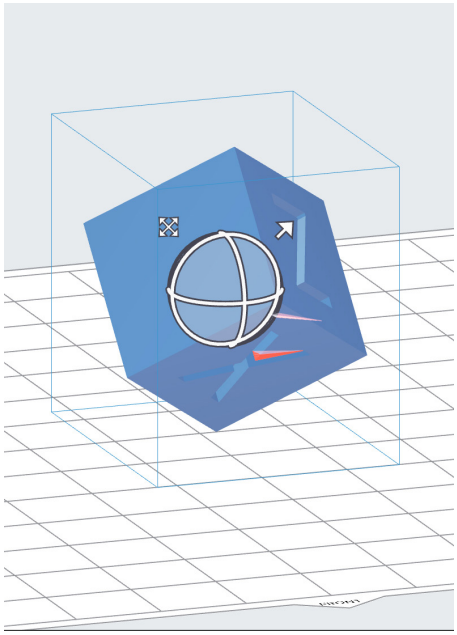


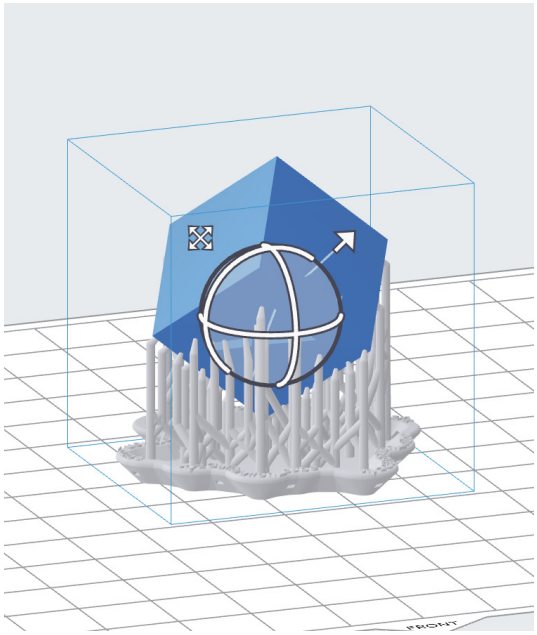
9. After you have adjusted the orientation and scale of your model, click the “Supports” icon in the left toolbar.



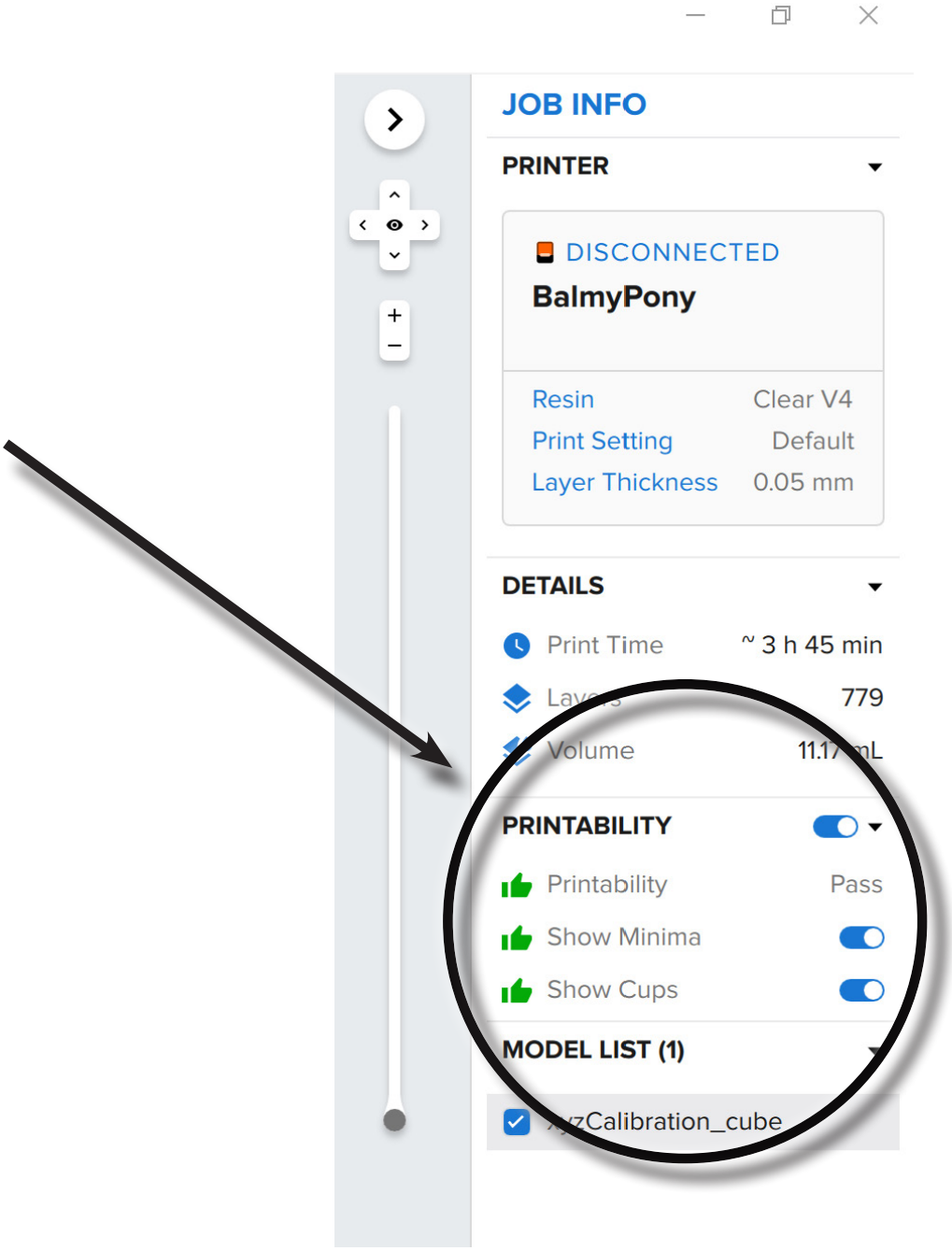
10. In most cases, the default settings are good to use, so simply click “Auto Generate Supports”



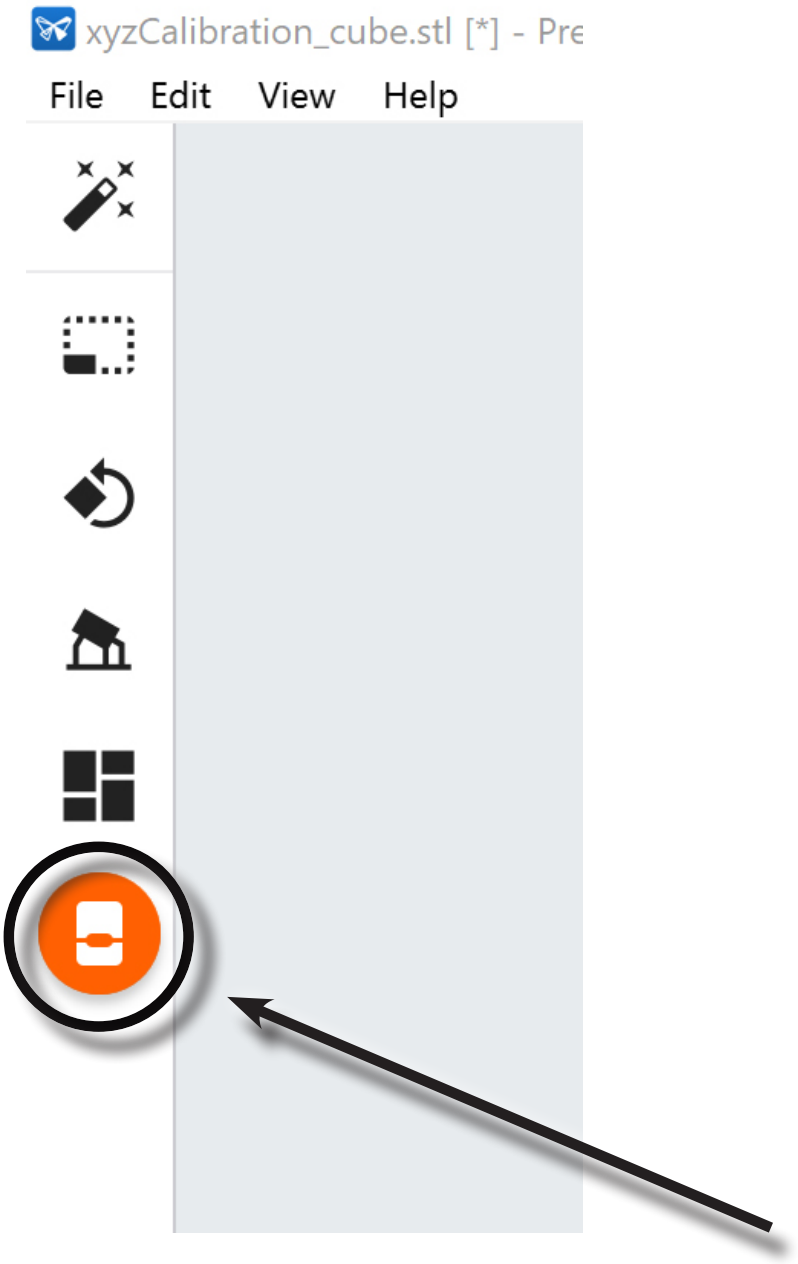




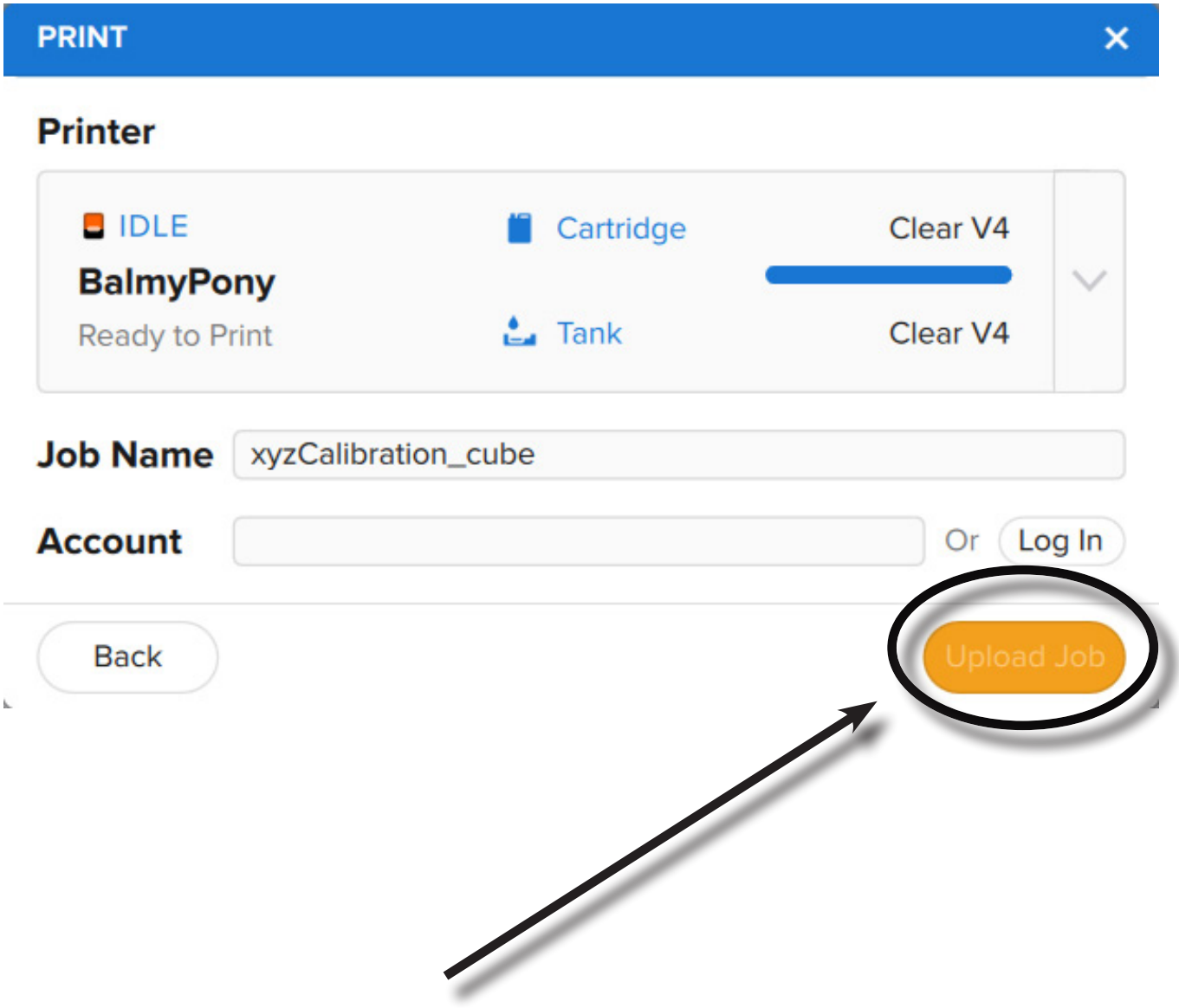
11. In the right toolbar, be sure to check the “Printability” status. Your print should have thumbs-up icons next to each item. If they do not, adjust your model, the supports, or the orientation



12. If Printability status is good, click the “Start a Print” icon in the left toolbar

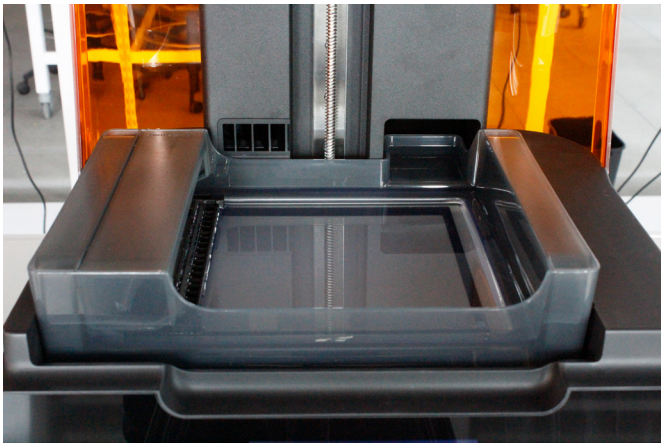


13. In the pop-up window, double check that the correct printer is selected. If it is correct, click “Upload Job”



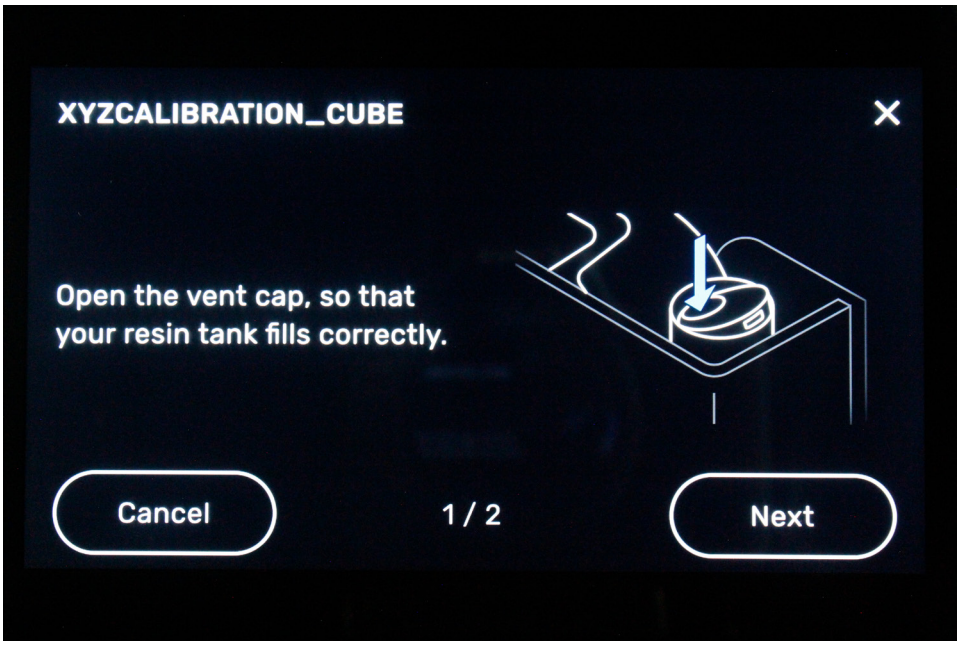
MACHINE OPERATION

1. Make sure the printer has:
    a. A clean build platform
    b. A tank
    c. A resin cartridge

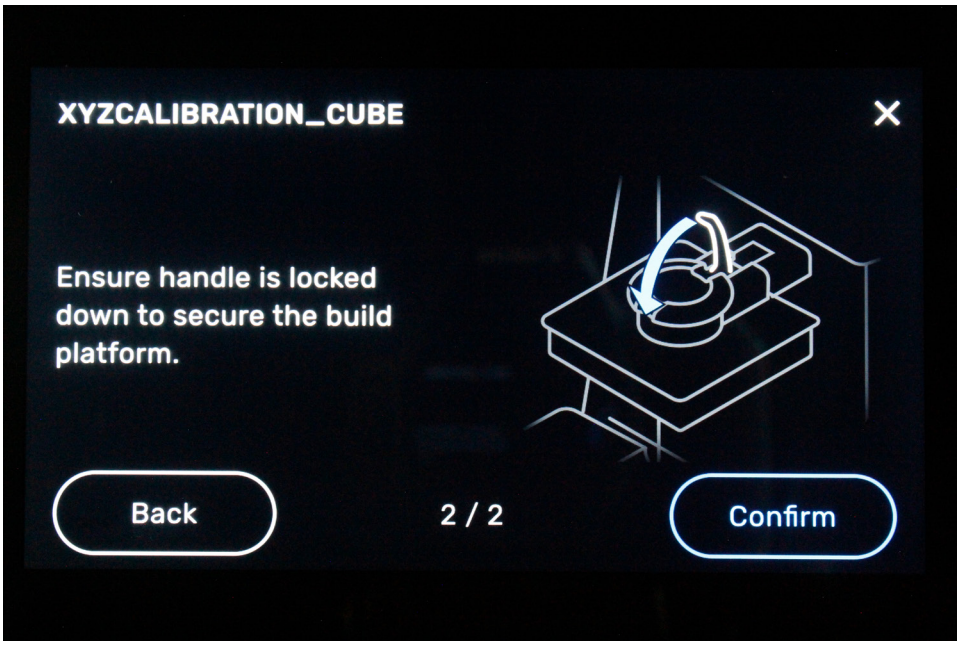


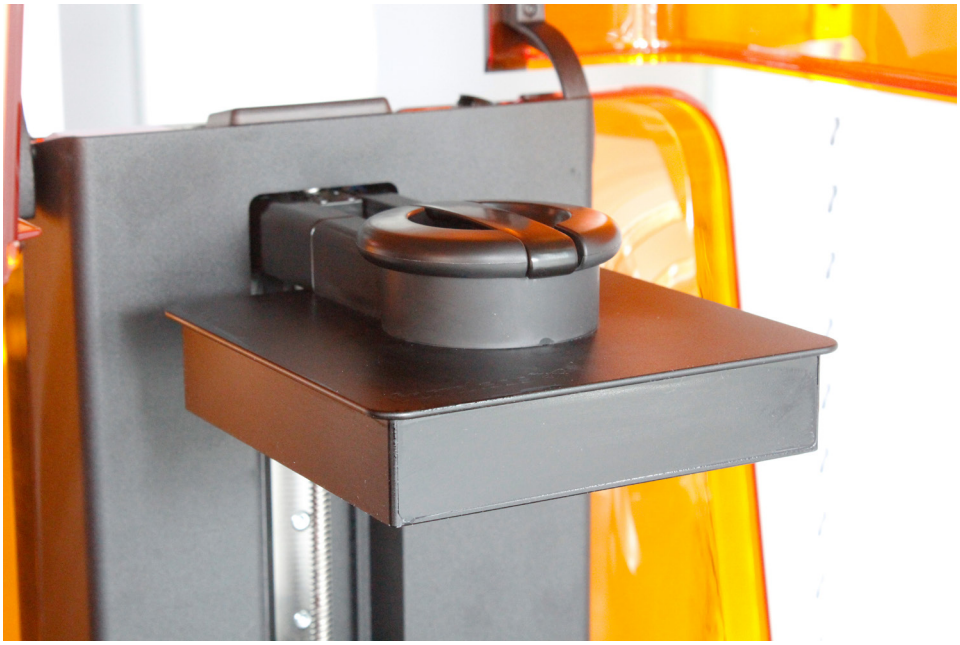
2. On the touchscreen, tap “Print”

3. The touchscreen will prompt you to check first to see if the vent cap is open. Ensure that it is and tap “Next”



4. The printer will then prompt you to ensure the build platform is properly secured and locked. If it is, tap “Confirm”

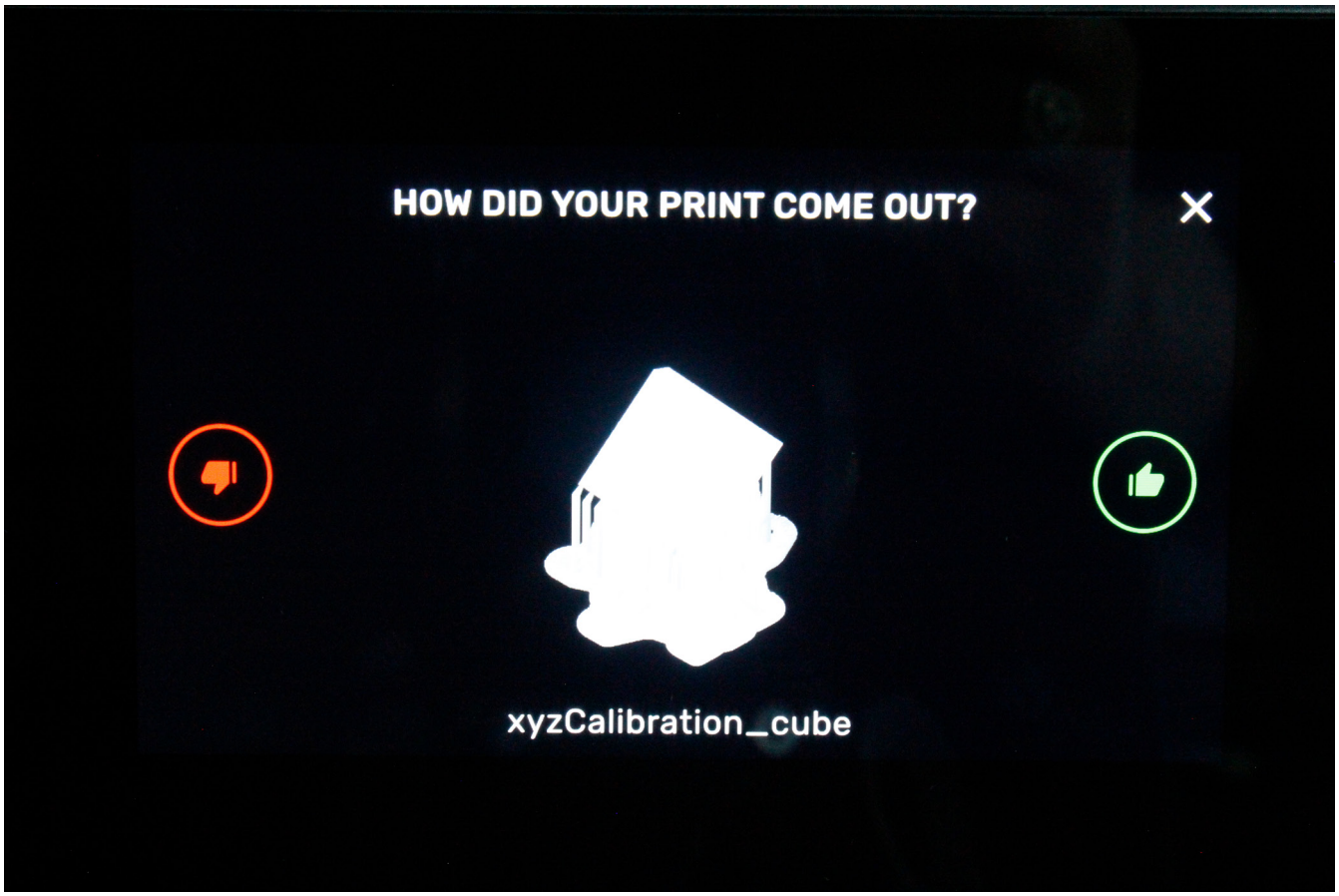




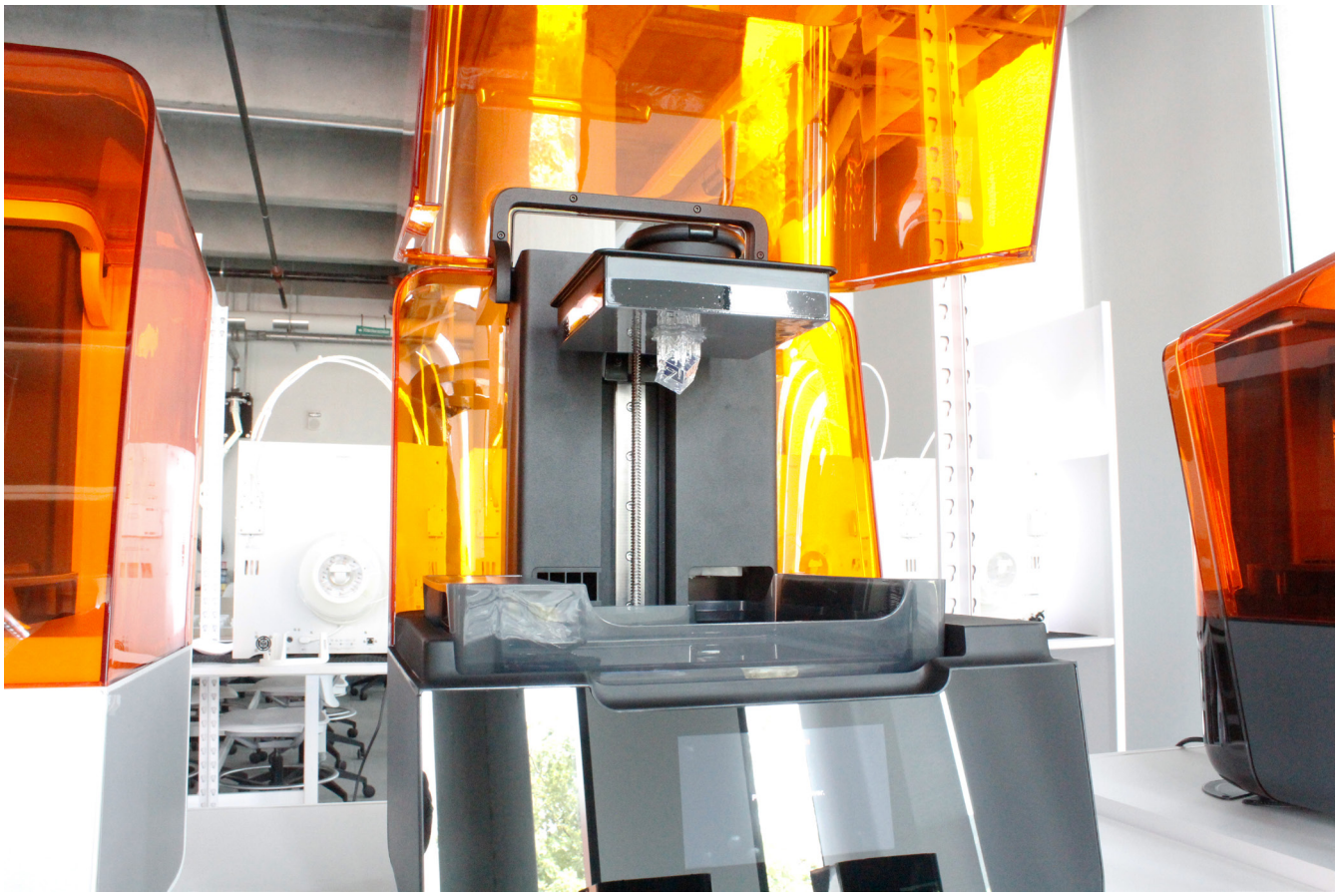
5. The printer will initialize and then begin the print job

AFTER PRINTING (WASH)

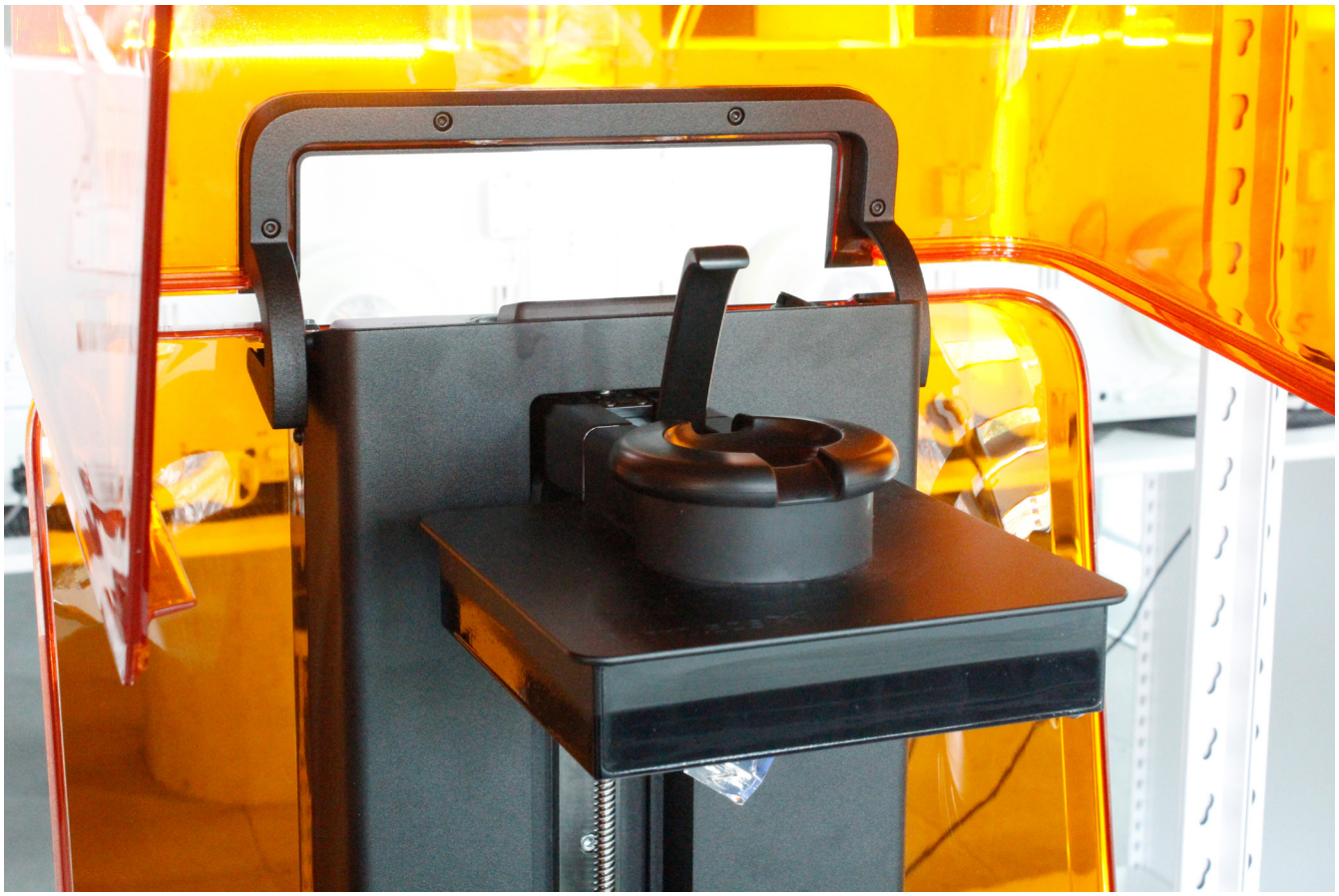
1. Upon completion, the printer will ask how the print came out. Tap either the thumbs-up or thumbs-down



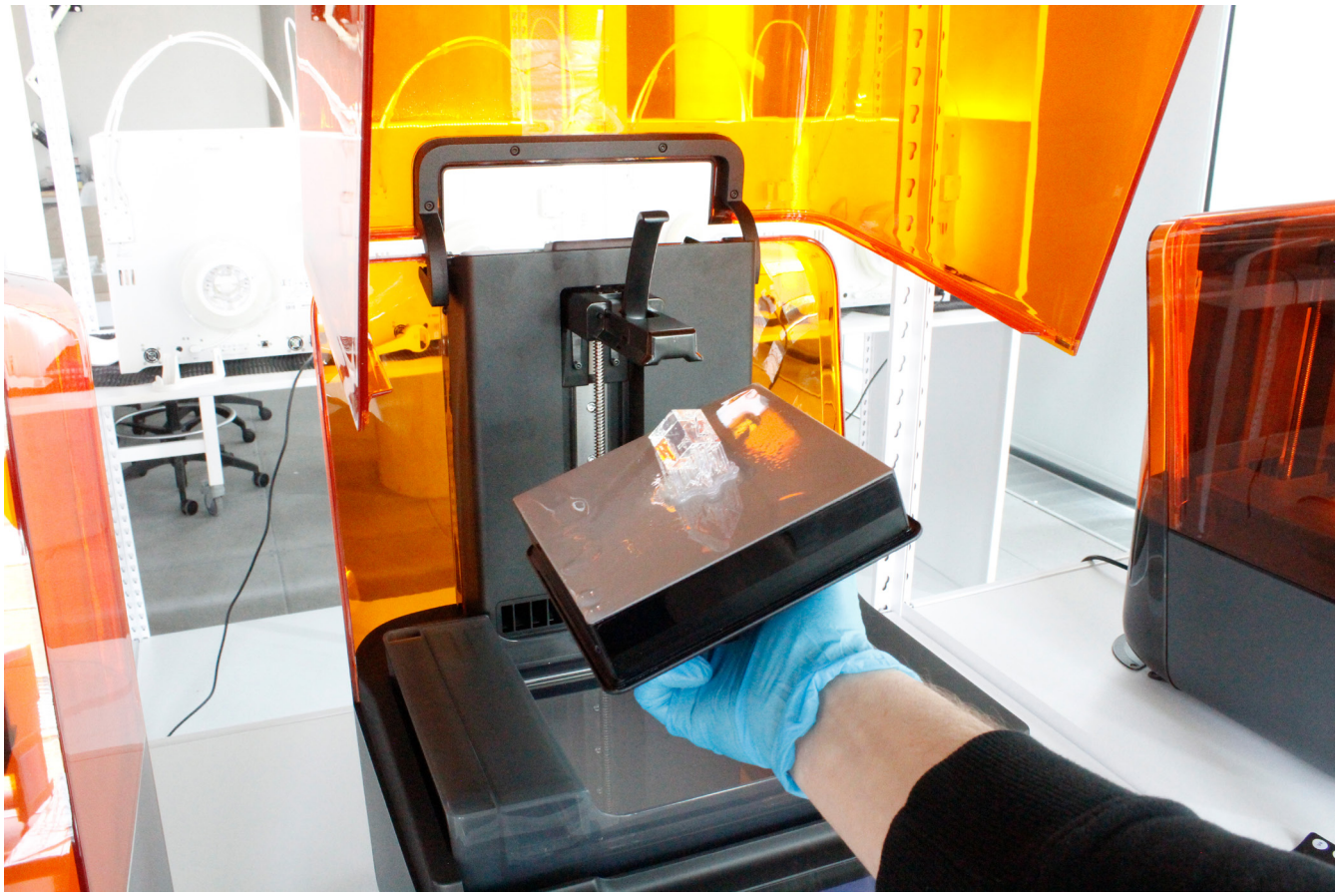
2. Open the cover



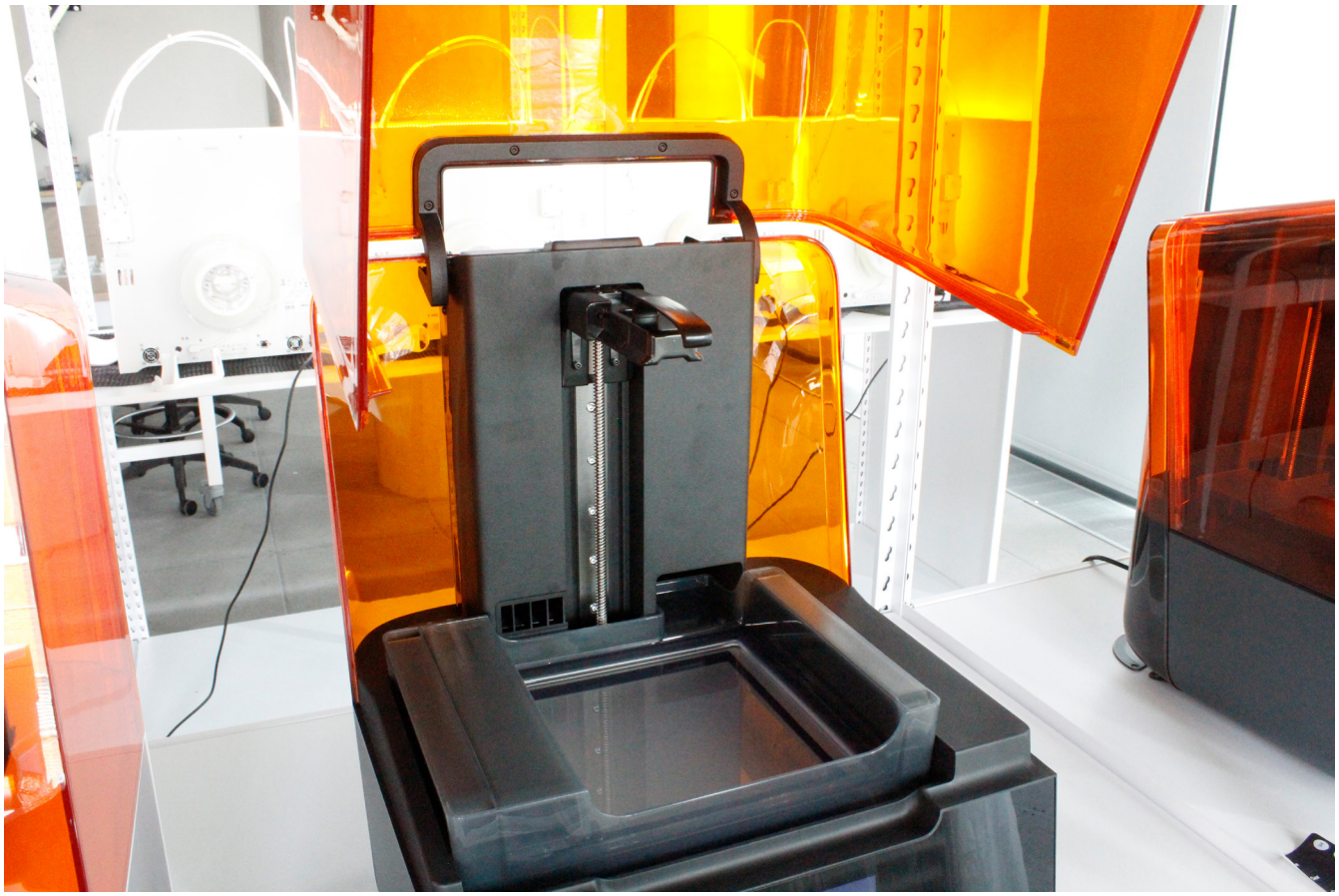
3. Lift the locking lever



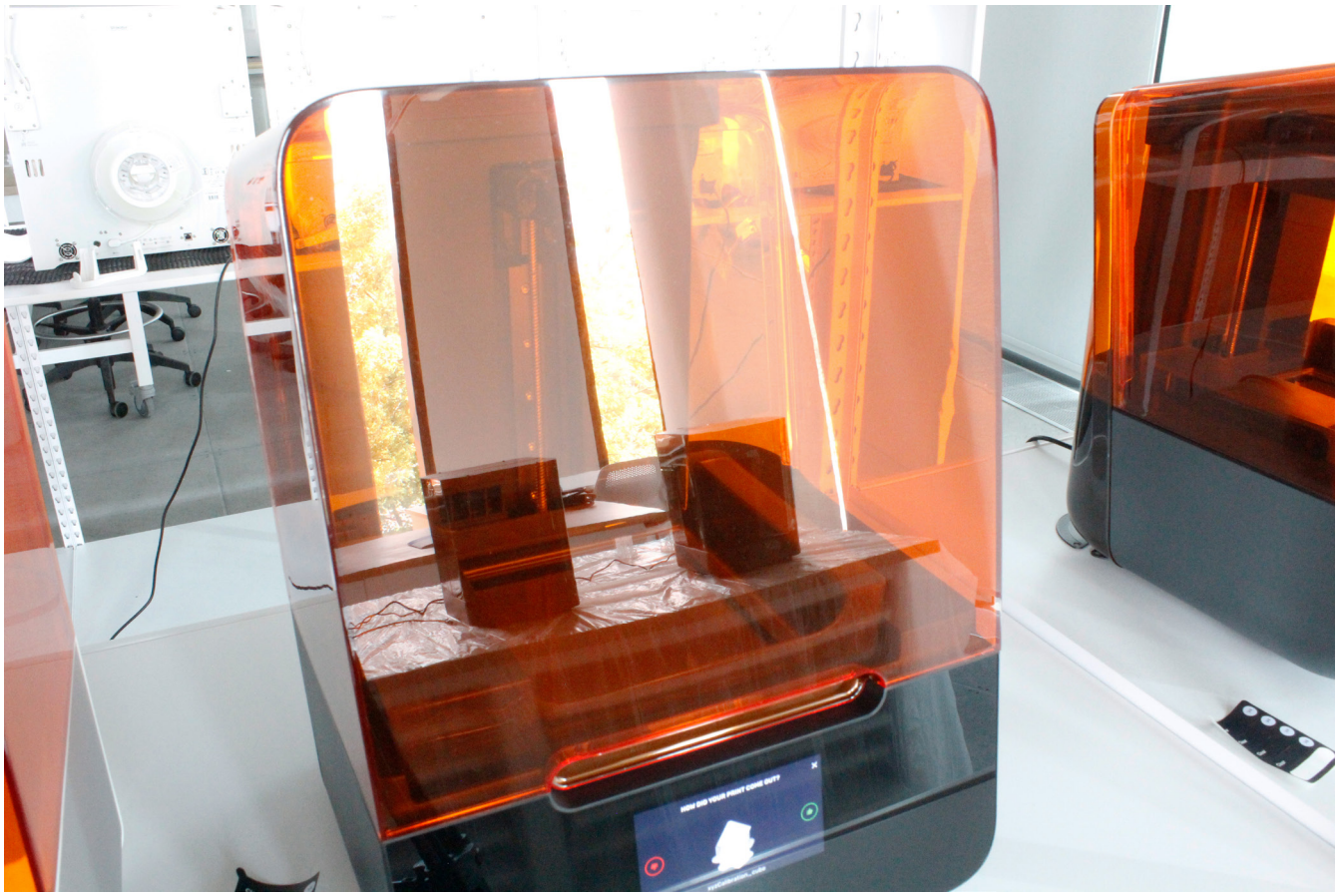
4. Pull the build platform directly towards you and immediately turn it over to prevent resin spills



5. Close the locking lever



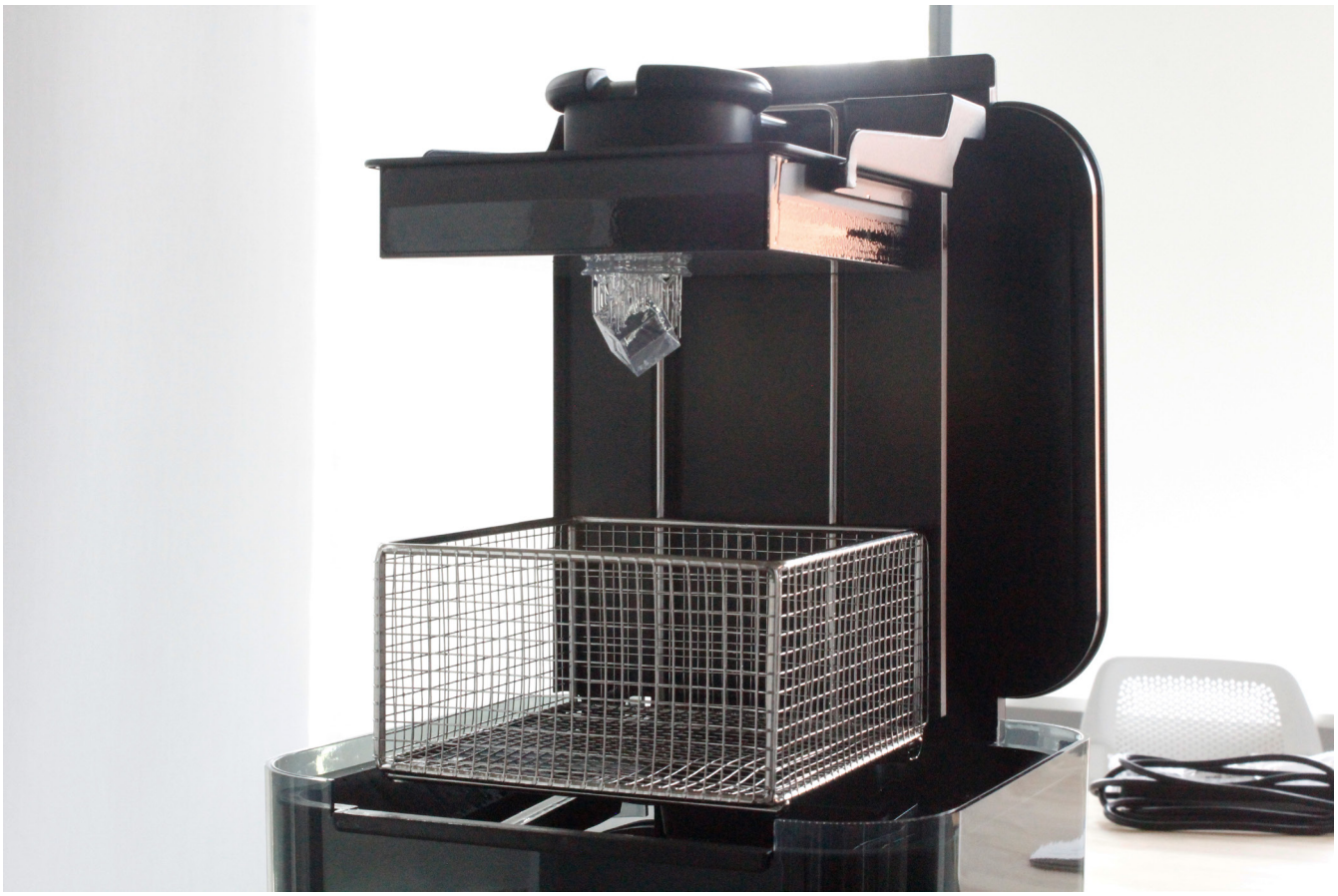
6. Close the printer cover



7. Wake up the wash by turing the dial button

8. Select “Open” and press the button

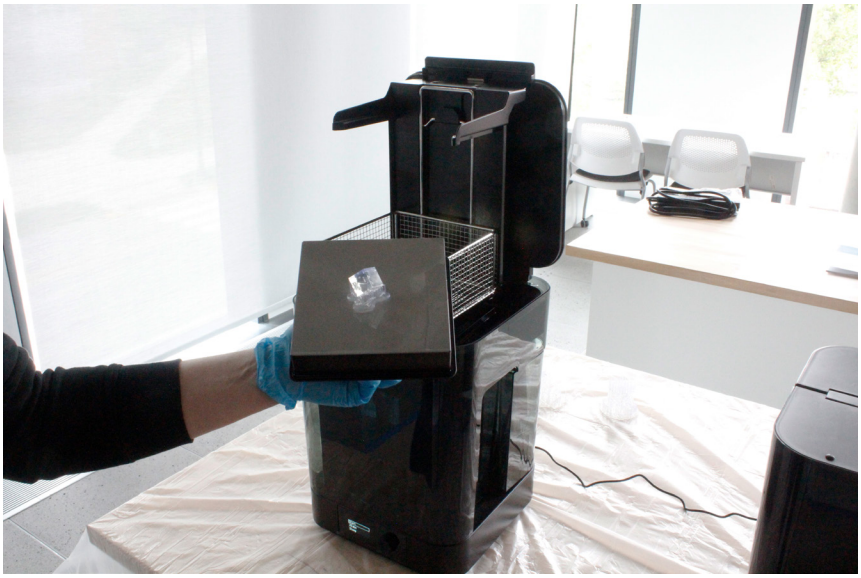
9. Place the build platform containing your print on the wash fixture



10. Using the dial button, select “Start” and press the dial button to begin

AFTER PRINTING (CURE)

1. After the wash finishes, it will raise the platform. Remove the build platform from the wash station

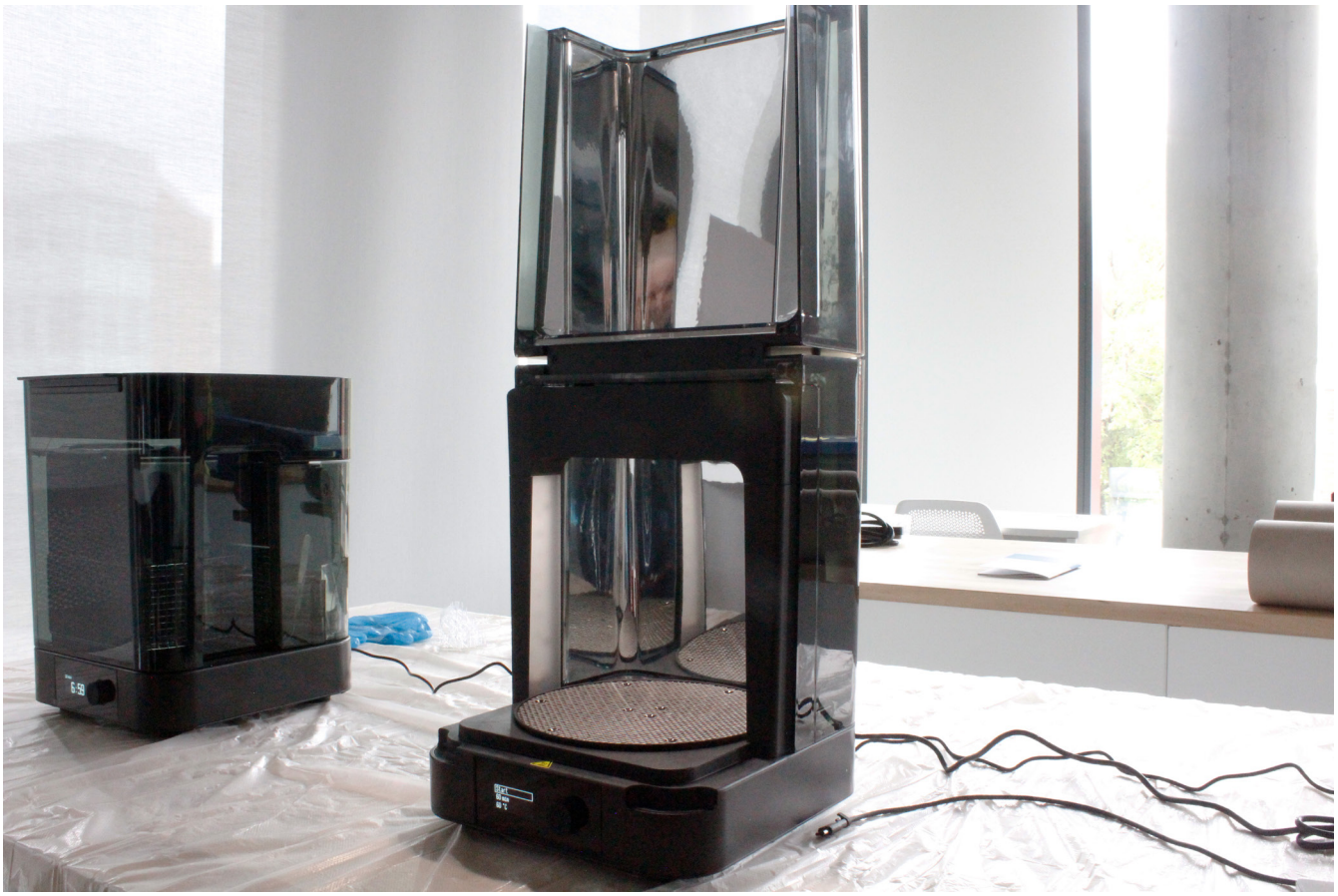


2. Turn the dial button to select “Sleep” and press the button to close the wash station cover

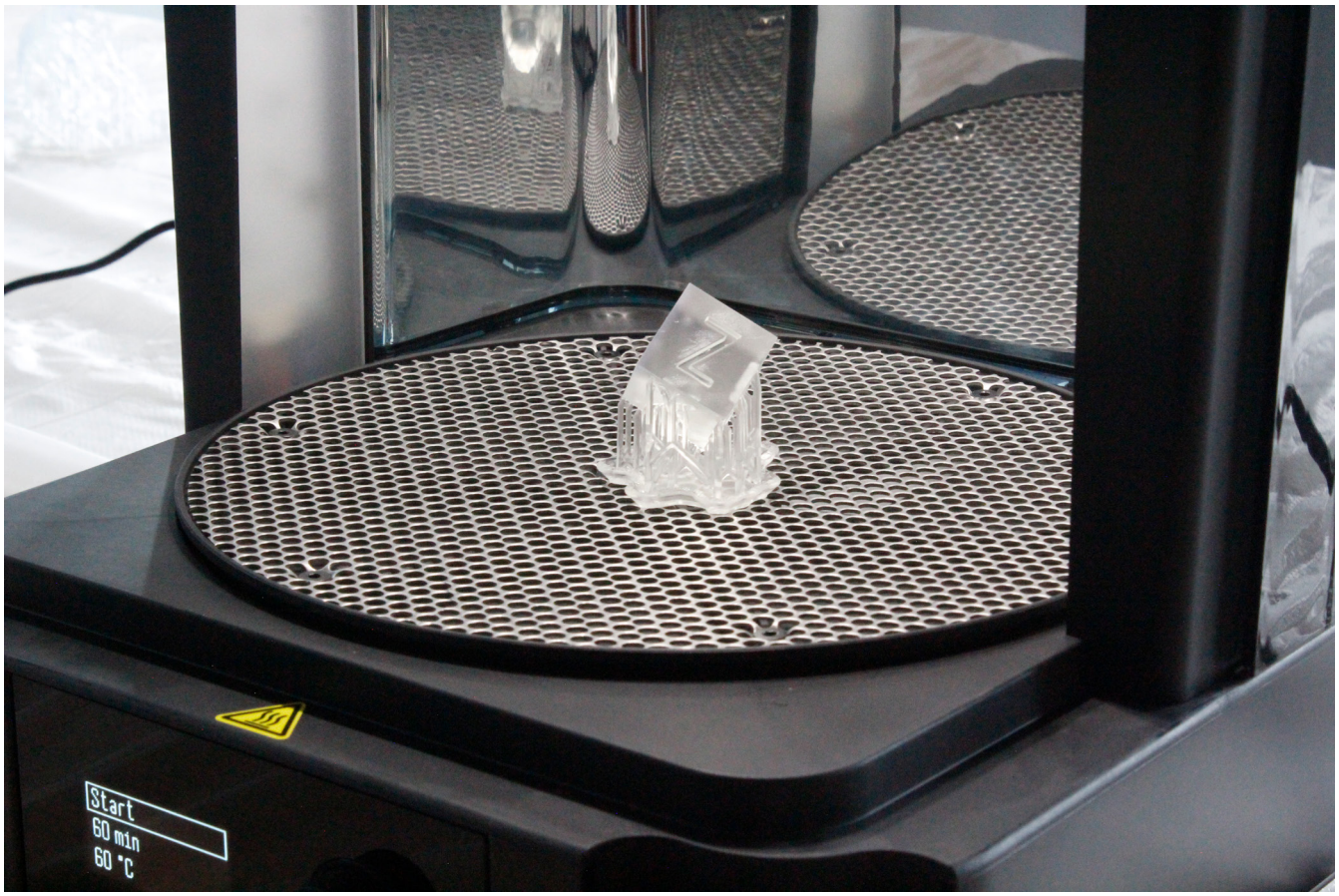
3. While holding the build platform, carefully scrape your print off the build platform. CAUTION! Always scrape away from body parts! The scraper can cut you badly!

4. Wake up the cure station by rotating the dial button

5. Open the cover



6. Place your print on the turn table



7. Select “Start” and press the dial button

8. Wash the build platform thoroughly using Isopropyl Alcohol and a paper towel

9. Return the build platform to the printer. Don’t forget to close the cover to the printer!