GUIDE

DIY Large Format Cure

Adding post-curing to your stereolithography (SLA) 3D printing process helps you get the most out of your parts, improving strength and performance. These are instructions on how to use off-the-shelf parts to build a simple, large format post-curing chamber suitable for parts printed on the Form 3L. The parts required to build this curing chamber can be purchased at Amazon, Home Depot, and McMaster-Carr. The assembly process will take a few hours with basic tools.

For more information about post-curing SLA 3D prints, visit An Introduction to Post-Curing SLA 3D Prints.

WARNING

This guide provides a do-it-yourself (DIY) project that is inherently hazardous, and includes but is not limited to, instructions on the use of potentially dangerous tools, and directions requiring exposure to high heat and high wattage components. As with any DIY project, unfamiliarity with the tools and process can cause injury. **This DIY project poses inherent risks,** and Formlabs Inc. and its affiliates ("Formlabs") will not be held responsible for any damage or harm you suffer as a result of your actions arising out of or in connection with the use of this guide or its content, or use of your finished product. **You are using this DIY guide and the finished product you may produce using the guide purely at your own risk.** If you are at all uncomfortable or inexperienced working on projects yourself (especially projects involving dangerous tools or materials), please reconsider doing the job yourself. It is your responsibility to ensure the printed part, including the validation of design, materials, and post-processing equipment, **are safe** and meet your expectations.

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Table of contents

Tech Specs

Dimensions	15 x 13.5 x 19 inches 38.1 x 34.3 x 48.3 cm
Maximum Part Size	12 x 12 x 13 inches 30.5 x 30.5 x 33 cm
Maximum Cure Temperature	75 °C
LED Power	65 W
LED Radiant Flux	30 W
LED Wavelength	395–405nm

Curing Performance

The heating and lighting capabilities of this device are similar to the Form Cure and should provide similar post-curing performance. However, Formlabs has not validated 3D prints cured with this device for mechanical properties, biocompatibility, or sterilization compatibility.

A NOTE ABOUT BIOCOMPATIBLE MATERIALS

Material performance and biocompatibility results may vary depending on the equipment, testing conditions, part geometry, and protocol used. For full compliance, post-process parts for biocompatible applications in accordance with the Instructions for Use or Instructions for Printing for the specific resin. If a manufacturer chooses to deviate from recommended instructions, it is the manufacturer's responsibility to confirm performance and biocompatibility for their applications. **This DIY Large Format Cure has not been validated as part of the Instructions for Use or Instructions for Printing for any Formlabs resin.**

Safety

Allow parts to fully dry after washing. Check surfaces and interior spaces for trapped solvent. Curing parts that contain solvent and dissolved resin may cure solvent inside the part, prevent parts from strengthening, and affect material properties.

A NOTE ABOUT FLAMMABLE SOLVENTS FOR WASHING PARTS

Isopropyl alcohol (IPA) and some other wash solvents are flammable. Make sure any IPA or wash solvent has evaporated from your 3D print before post-curing in the DIY Large Format Cure. The off-the-shelf food dehydrator used in this design should not be used around isopropyl alcohol or other flammable solvents, in liquid or vapor form.

Materials

Item	Quantity	Recommended Supplier	Price[1]
Dehydrator oven	1	Amazon	$199.99
25 ft 405nm UV LEDs	2	Amazon	$29.99 ea.
Adhesive-backed LED clips	1 pack	Amazon	$12.88
1” x ½” Nylon standoffs	4 standoffs	McMaster-Carr	$14.25 / 25 pack
11” x 12” x ¼” Polycarbonate sheet[2]	1	Tap Plastics	$10.00
Step drill bit[3]	1	Amazon	$31.76
Center Punch[4]	1	Amazon	$10.99
Total Cost			$339.85

1 Price taken at time of writing

2 If you have a bandsaw you can also purchase a 12”x12” sheet from McMaster-Carr and trim 1” inch off one side of the sheet.

3 If you don’t want to purchase a step drill bit, step slowly through a sequence of twist drill bits leading up to the ½” size.

4 If you don’t want to purchase a center punch, use a strong metal Phillips head screwdriver and a mallet to mark the hole.

Tools and Equipment

- Cordless power drill
- Needle nose pliers
- File/deburring tool
- Power strip
- Outlet timer (optional)

Assembly Instructions

1. Empty the oven completely. Remove the metal shelves from the oven.

2. Install the clips inside the oven at the locations shown in Figure 1. Orient each clip to face toward the oven door. This will make it easier to open and close the clips as you install the LED strip.

2.1 The top and bottom of the oven should have two columns of clips, with 12 clips in each column and each clip spaced 2.5 cm (1 in) apart.

2.2 For the left and right sides of the oven, install the clips in a line along the flat section of the oven wall. Each line should have 12 clips spaced 2.5 cm (1 in) apart. Orient the clips vertically.

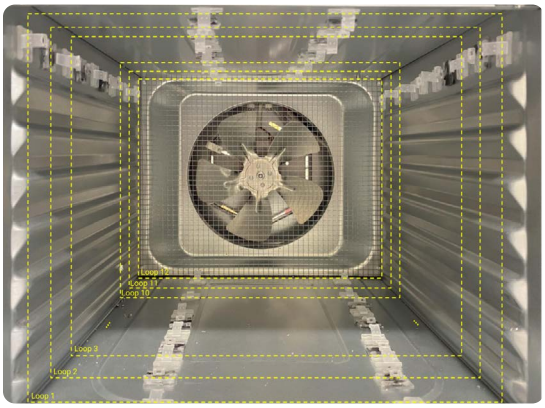

Figure 1. *Image of all clips placed on the inside of the oven.*

3. Start from the barrel jack connector end of one LED strip. Loop the LED strip clockwise through the clips, from the front of the oven to the rear, skipping one loop each time. The LED strip should run through loops 1, 3, 5, 7, 9, and 11.

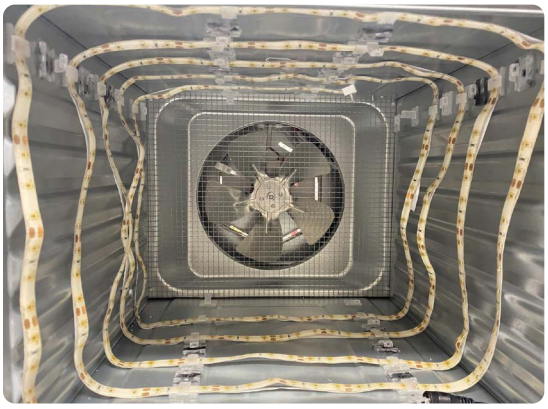

Figure 2. *Image of first LED strip in place. Note skipped clips on sides bottom and top.*

4. Start from the non-barrel jack end of the second LED strip. Loop the LED strip counterclockwise through the clips, from the rear of the oven to the front. The second LED strip should run through loops 2, 4, 6, 8, 10, and 12. Be sure not to cross over the first LED strip. Leave enough slack so that the barrel jack connector resides outside of the dehydrator box.

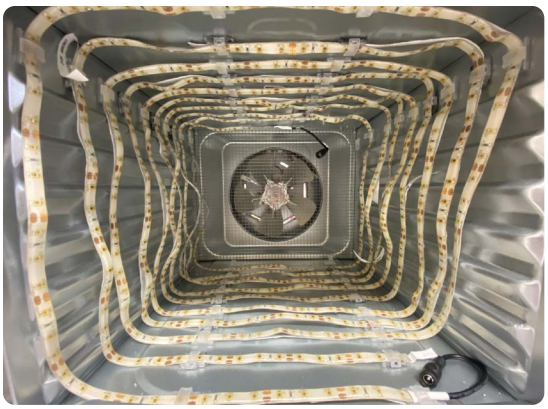

Figure 3. *Image of second LED strip in place. Note the placement of the barrel jack connector for the second strip at the back.*

5. Drill two access holes for the barrel jack connectors.

5.1 Mark the locations for two barrel jack access holes. One should be located on the bottom panel of the dehydrator placed at least 3.8 cm (1.5 in) from the front edge and the second should be located at the top back of the right panel.

5.2 Using a center punch, punch the locations for the holes.

5.3 Drill two 1.25 cm (½ in) holes using the step drill bit. Start slowly and let the drill do the work while building to full speed.

5.4 File or deburr to remove any sharp edges or shards from the hole.

5.5 Thread the barrel jack connectors through the holes. The connector itself should reside outside of the dehydrator unit.

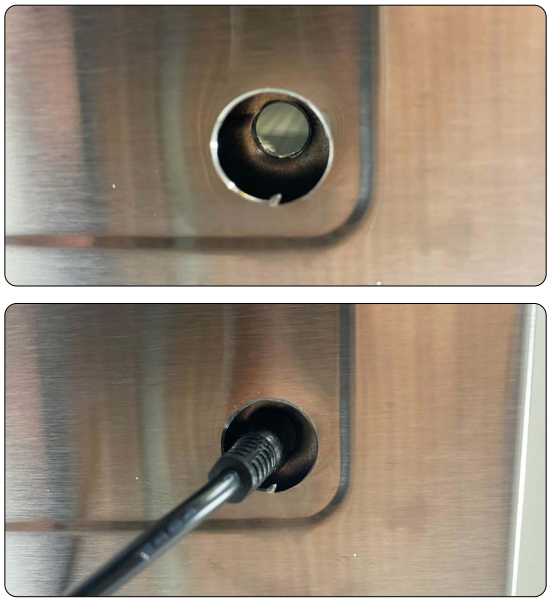

Figure 4. *Holes with barrel jack connector threaded through.*

6. Flip the oven back over and stick standoffs to the inside bottom of the oven using VHB as shown in Figure 5.

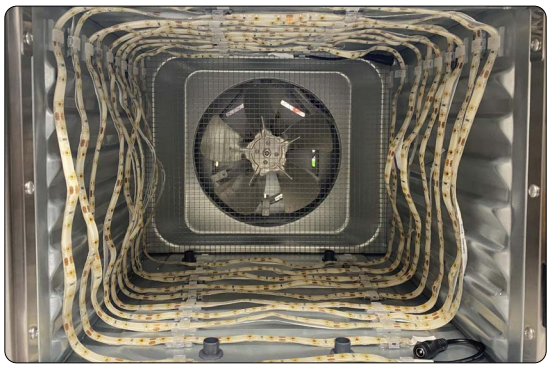

Figure 5. *Standoffs placed on the bottom of the oven*

7. Remove any protective film and place the polycarbonate sheet inside such that it sits on the standoffs.

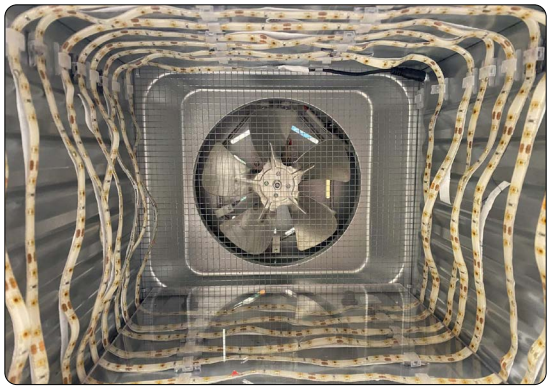

Figure 6. *Polycarbonate sheet placed on standoffs*

8. Plug LEDs and oven into a power strip, plug the power strip into a wall, and turn on.

Using the DIY Large Format Cure

1. Check your resin's recommended post-cure time and temperature before beginning a post-cure cycle. This curing chamber was designed to have similar heating and lighting capabilities to Form Cure, so you can use the Form Cure time and temperature settings with your DIY Large Format Cure. If you notice your 3D prints are still tacky or otherwise undercured, try post-curing them for a longer time. For materials that require 80 °C, set the dehydrator oven to max temperature (75 °C) and increase cure time by 10%.
2. Allow your 3D print to fully dry after washing.
3. Place your 3D print in the oven. **Make sure the part is completely dry and has no residual solvent.**
4. Turn on the power strip that is connected to the LED strip.
5. Press the **On/Off** button on the oven to turn on the heater.
6. Press the **Temp** button and set the desired temperature for post-curing using the + and - buttons. Temperature is displayed in °F.
7. Press the **Time** button and set the desired time for post-curing using the + and - buttons.

   Note: the lowest the timer will go is 30 min. For shorter post-curing times be sure to set a timer on a computer, phone, or standard kitchen timer. This is also a situation in which a timer outlet would help.
8. Wait a few seconds, the oven will beep and the display will stop blinking to let you know the timer has started.
9. When the timer goes off, make sure to turn off the power strip to shut off the lights and oven. **Be careful, parts will be hot.**