

## Ultracur3D® ST 45

### User Guideline



*Note: Packaging shown is a mock-up; actual design may vary as updates are underway.*

### Introduction

The following user guideline is for professionals who use: Ultracur3D® ST 45.

The safety data given in this publication is for information purposes only and does not constitute a legally binding Material Safety Data Sheet (MSDS). The relevant MSDS can be obtained upon request from your supplier or you may contact Forward AM directly at [sales@forward-am.com](mailto:sales@forward-am.com).

**For more information, please refer to the country specific MSDS for advice.**

Are you looking for an updated User Guideline version? [Check out the latest online version here.](#)

### Storage conditions and disposal considerations

Keep container tightly closed in a room temperature, well-ventilated place. Keep container dry. If material is not being used, fill it back through a filter in the corresponding material bottle. The filter prevents cured pieces or failed prints from going back into the bottle. Ultracur3D® ST 45 must be disposed of in accordance with local regulations.

**For more information, please refer to the country specific MSDS for advice.**

## Intended use

Ultracur3D® ST 45 is a technical material based on (meth-)acrylate resin for suggested LCD and DLP systems. Working wavelength: 385 nm or 405 nm. Below, you can find some suggested 3D printers and printing parameters. For more information contact Forward AM directly at [sales@forward-am.com](mailto:sales@forward-am.com).

## Examples of suitable 3D-Printers and settings

	Wavelength	Power	Curing time	Voxel depth
<b>MiiCraft Ultra 125</b>	405 nm	4 mW / cm <sup>2</sup>	2 s	75 µm
<b>MiiCraft Ultra 125 Y</b>	385 nm	4 mW / cm <sup>2</sup>	2 s	100 µm
<b>Nexa3D XiP</b>	405 nm	3.5 mW / cm <sup>2</sup>	2.8 s	200 µm
<b>Prusa SL 1</b>	405 nm	0.45 mW / cm <sup>2</sup>	17 s	100 µm
<b>Rapidshape i30+®</b>	385 nm	2 mW / cm <sup>2</sup>	2 s	100 µm
<b>Stratasys Origin One</b>	385 nm	5 mW / cm <sup>2</sup>	2.35 s	100 µm

If you cannot find your printer in the table or using the [3D Printing and Post Processing Settings Navigator](#) you can use the values below as starting parameters. These are only approximations, different 3D printers may require different curing times and further optimization, but these values should be a good starting point.

The given values are all for printing at a layer thickness / voxel depth of 100 µm. If you need starting parameters for a different layer thickness, please contact us.

### 405 nm Wavelength 3D Printer

<b>Power*</b>	5 mW / cm <sup>2</sup>	4 mW / cm <sup>2</sup>	3 mW / cm <sup>2</sup>	2 mW / cm <sup>2</sup>
<b>Suggested curing time</b>	1.6 s	2 s	2.7 s	4 s

### 385 nm Wavelength 3D Printer

<b>Power*</b>	5 mW / cm <sup>2</sup>	4 mW / cm <sup>2</sup>	3 mW / cm <sup>2</sup>	2 mW / cm <sup>2</sup>
<b>Suggested curing time</b>	1.5 s	1.9 s	2.5 s	3.7 s

\* Power measured directly on the glass

## Printing process

The material should be processed at room temperature. Before usage, the material should be shaken well. Pour it slowly into the vat and wait a couple of minutes, until a smooth, bubble-free surface is obtained before starting the print job.

The 3D printer examples and settings stated above are only for general guidance. The fully optimized settings should always be determined by the users themselves, according to their specific needs. Please always refer to the user manual of the employed 3D printer for instructions on printer settings and handling.

Remove the parts carefully from the build platform with a suitable tool, for more information, refer to the user manual of the used 3D printer.

## Cleaning and post curing process

Ultracur3D® ST 45 can be cleaned with a Glycol Ether based solvent like Ultracur3D® Cleaner and 2-propanol, please refer to the following cleaning procedure.

### Cleaning with Ultracur3D® Cleaner and 2-propanol (IPA)

- Step 1: Place the parts in a container filled with Ultracur3D® Cleaner and place this container in an Ultrasonic bath filled with water for 2 minutes. The cleaning time can vary depending on the complexity of the printed geometry.
- Step 2: Rinse the parts with 2-propanol for a few seconds. Fine structures or holes may be better cleaned by using 2-propanol and a syringe or by separate brushing. Next, place the parts in a container filled with 2-propanol and place this container in an Ultrasonic bath filled with water for 2 minutes.
- Step 3: Blow dry the parts with pressurized air or nitrogen, until the parts are clean.
- Step 4: Place the parts into a warming cabinet at 40°C (104°F) for 30 minutes to dry off any remaining cleaning solvent.

## Example of post curing procedures

Ultracur3D® ST 45 parts require adequate post-curing to achieve the optimal mechanical properties. After each post-curing cycle, the parts need to be flipped to achieve an even curing. After post-curing, remove any support structures and smoothen the surface if required.

	UV lamp	Power in mW / cm <sup>2</sup>	Duration of post-curing	Notes
<b>Dymax ECE 2000 flood</b>	Hg Metal Halide Bulb (broad spectrum)	Ca. 140 mW / cm <sup>2</sup> at 405 nm	2 x 600 seconds	Shelf height K
<b>OtoFlash G 171</b>	Flash-bulbs (broad spectrum)	Ca. 3.5 mW / cm <sup>2</sup> at 405 nm	2 x 6000 flashes	With Nitrogen
<b>Phrozen Cure</b>	405 nm LED	Ca. 12 mW / cm <sup>2</sup> at 405 nm	2 x 30 minutes	
<b>Zortrax Curing Station</b>	405 nm LED	Ca. 35 mW / cm <sup>2</sup> at 405 nm	2x 21 minutes	

These proceedings are only general guidelines. In the end, the user has to determine the optimum post-curing procedure based on their specific requirements and the equipment used.

## Frequently asked questions and other tips and tricks

### 1. What is the difference between Ultracur3D® ST 45 and Ultracur3D® ST 45 M?

- Ultracur3D® ST 45 is more reactive than Ultracur3D® ST 45 M. So depending on the printer, Ultracur3D® ST 45 M may be slower but also have less through-cure issues and be more accurate. In addition, depending on the process used, Ultracur3D® ST 45 M often looks a bit less yellow, but can show stronger yellowing after long-term UV exposure.

### 2. My material shows “bleeding / through cure” on overhangs / holes, what should I do?

- Usually this is a problem with LCD printers rather than DLP ones. It is recommended to use Ultracur3D® ST 45 M on LCD printers rather than Ultracur3D® ST 45 since the material is less reactive in comparison and should work better. Alternatively, Ultracur3D® ST 45 can be colored with our color kit to help counteracting this problem

### 3. My parts look quite yellow after post-curing.

- Ultracur3D® ST 45 looks clear after printing but becomes yellowish after post-curing, that is normal. The material can become lighter over time.

### 4. Ultracur3D® ST 45 is difficult to clean, what should I do?

- Make sure to follow the User Guideline for properly cleaning Ultracur3D® ST 45. Using only 2-propanol (IPA) might not be enough to get your parts clean.

### 5. Why do my parts have surface defects (e.g. small holes)?

- Make sure all bubbles are gone before starting a print job.
- Check your material vat/ foil if there are any defects.
- Depending on the machine and geometry reduce the printing speed and increasing the lift distance will give the material a chance to flow properly.

## 6. Why do my parts have flakes?

- Make sure that your machine parts are all clean, smeared surfaces (e.g. on the glass, foils, covers etc.) can scatter the light and that can lead to flakes in the final printed parts
- Follow the 3D printer manual to see if your machine needs regular maintenance
- In case of a DLP printer, make sure the projector lens is being cleaned according to the 3D printer manual
- In case of a LCD printer, make sure that the screen is being cleaned according to the 3D printer manual

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*The data contained in this publication are based on our current knowledge and experience. They do not constitute an agreed contractual quality of the product and, in view of the many factors that may affect processing and application of our products, do not relieve processors from carrying out their own investigations and tests. The agreed contractual quality of the product at the time of transfer of risk is based solely on the data in the specification data sheet. Any descriptions, drawings, photographs, data, proportions, weights, etc. given in this publication may change without prior information. The customer and/or user is responsible to consider and respect all hazard and safety issues according to the MSDS of Ultracur3D® ST 45 and take, implement and/or install adequate measures and precautions to avoid any personal injuries, property damages and/or environmental pollution. Therefore, Forward AM Technologies GmbH shall not be liable for any personal injury, property damages and/or environmental emissions arising out of or related to the testing, handling or usage, storage and possession of Ultracur3D® ST 45. It is the sole responsibility of the recipient of our product to ensure that any proprietary rights and existing laws and legislation are observed (02/2020)*