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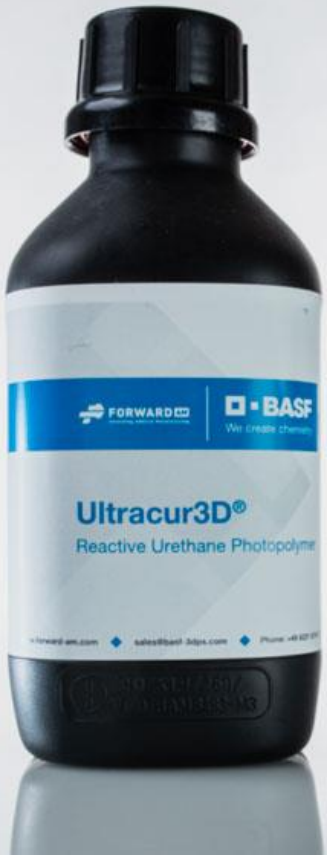
Ultracur3D® EL 4000 B

User Guideline



INTRODUCTION

The following user guideline is for professionals who use: Ultracur3D® EL 4000 B.

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 BASF directly at sales@basf-3dps.com.

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

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® EL 4000 B must be disposed of in accordance with local regulations.

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

Version 2.0

INTENDED USE

Ultracur3D® EL 4000 B 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 BASF directly at sales@basf-3dps.com.

EXAMPLES OF SUITABLE 3D-PRINTERS AND SETTINGS

	Wavelength	Power	Curing time	Voxel depth
MiiCraft Ultra 125 Y	385 nm	4 mW / cm²	2.5 s	100 µm
Phrozen Sonic Mini 8k	405 nm	1.5 mW / cm²	8 s	100 µm

If you cannot find your printer in the table, 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

Power*	5 mW / cm²	4 mW / cm²	3 mW / cm²	2 mW / cm²
Suggested curing time	2.4 s	3 s	4 s	6 s

385 nm Wavelength 3D Printer

Power*	5 mW / cm²	4 mW / cm²	3 mW / cm²	2 mW / cm²
Suggested curing time	3.6 s	4.5 s	6 s	9 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

Most flexible photopolymer materials are very sensitive to chemical changes in the green state. To obtain the highest consistency in final part performance, especially for lattices, we recommend to keep the post-processing procedure as constant as possible. This includes the washing and drying methods and time, but also the time kept between printing, washing, drying and UV post-curing steps. In addition, to achieve the mechanical properties listed in our TDS, it is best to stay as close as possible to the exact post-processing methods listed in this User Guideline.

For Ultracur3D® EL 4000 B we recommend to use a combination of a Glycol Ether based solvent like Ultracur3D® Cleaner and 2-propanol. We do not recommend to use only 2-propanol as this usually leads to insufficient cleaning. Please refer to the following cleaning procedure.

Cleaning with Ultracur3D® Cleaner and 2-propanol

- Step 1: Place the parts in a container filled with Ultracur3D® Cleaner and place this container in an Ultrasonic bath filled with water for 5 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 5 minutes.
- Step 3: Blow dry the parts with pressurized air or nitrogen, until the parts are clean.
- Remark: whichever cleaning method is applied, keep the exposure to the cleaning solvent as short as possible, maximum 10 minutes in total (= 2x5 min). Longer cleaning can lead to instable material properties.
- Option 1: Place the parts into a warming cabinet @40°C for 30 minutes. Important: do not dry for longer than 30 minutes at 40°C, as longer drying may affect the final material properties.
- Option 2: Dry the parts at room temperature for 1h. At room temperature, the material is less sensitive. Drying up to 24h is possible without affecting the final material properties.

EXAMPLES OF POST CURING PROCEDURES

Ultracur3D® EL 4000 B 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 / cm²	Duration of post-curing	Notes
Dymax ECE 2000 flood	Hg Metal Halide Bulb (broad spectrum)	Ca. 140 mW / cm² at 405 nm	2 x 900 seconds	Shelf height K
OtoFlash G 171	Flash-bulbs (broad spectrum)	Ca. 3.5 mW / cm² at 405 nm	2 x 9000 flashes	With Nitrogen
Phrozen Cure	405 nm LED	Ca. 12 mW / cm² at 405 nm	2 x 10 minutes	
Zortrax Curing Station	405 nm LED	Ca. 35 mW / cm² at 405 nm	2 x 31 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.