



## Flexible UV160TR



### Compatible Printers

UV LCD & DLP 3D Printers



### Colours

 Translucent

Available in 1kg & 500g bottle

Lattice parameters of 1.5mm pole diameter and 10mm cell size with external dimension of 50x50x50mm

### Introduction

Creating complex geometries like lattices, with 'Flexible' materials, allows the user to maximise the benefits of 3D printing, making a part with dynamic properties with only one step manufacturing instead of several.

Photocentric is introducing 'Flexible UV160TR', which is a highly elastic stiff resin with an 86A shore hardness suitable for end user functional parts, presenting TPU properties. Extremely easy to process as it is a low viscosity resin in comparison with other flexible UV resins in the market. Also, quick to post-cure due to its translucency.

### Best Used for:

- Seals, gaskets
- Grips, handles, cushioning
- Footwear

### USPs

- High hardness (Shore 86A)
- Tear resistant and high energy return
- Highly elastic with significant elongation
- Low viscosity
- Quick post-curing
- Properties similar to TPU

## Properties

Tensile Properties	Green	Post-cured*	Method
Tensile Modulus	3.1 MPa	66.5 MPa	ASTM D412
Tensile Strength (Break)	1.4 MPa	14.5 MPa	ASTM D412
Elongation at Break	82%	160%	ASTM D412

## Properties

Mechanical Properties			
Tear Strength	-	54 kN/m	ASTM 624 Type C
Rebound Resilience	-	30%	ASTM D412

General Properties			
Shore Hardness	-	86 Shore A	ASTM D2240
Water absorption (%)* after 24 hrs	-	1.74%	ASTM D570
Water absorption (%)* after 72 hrs	-	2.65%	ASTM D570
Water absorption (%)* after 7 days	-	4.5%	ASTM D570

\* Post cured for 2 hours at 60°C with Photocentric Cure M+

Liquid Properties	Value	Method
Viscosity	470 cPs	At 25°C Brookfield spindle 3
Density	1.10 g/cm <sup>3</sup>	
Storage	10<T>50°C	

## Design Consideration Parameters

These are example parameters in relation to a UV LCD Printer with 81µm XY resolution

Properties	Parameters
Minimum feature size (pins)	0.7mm
Minimum hole diameter	0.9mm
Minimum slot thickness	1mm
Minimum wall thickness	0.8mm
Overhangs	Successful for overhangs $\leq 45^\circ$
Minimum wall thickness unsupported	Minimum wall thickness unsupported is 3mm, while the Z height should be $< 30\text{mm}$
Scaling factor	-1.5% XYZ

## Lattice Parameters

Photocentric Applications team designed the following different lattices test piece as a recommendation for user's first print with any flexible resin.

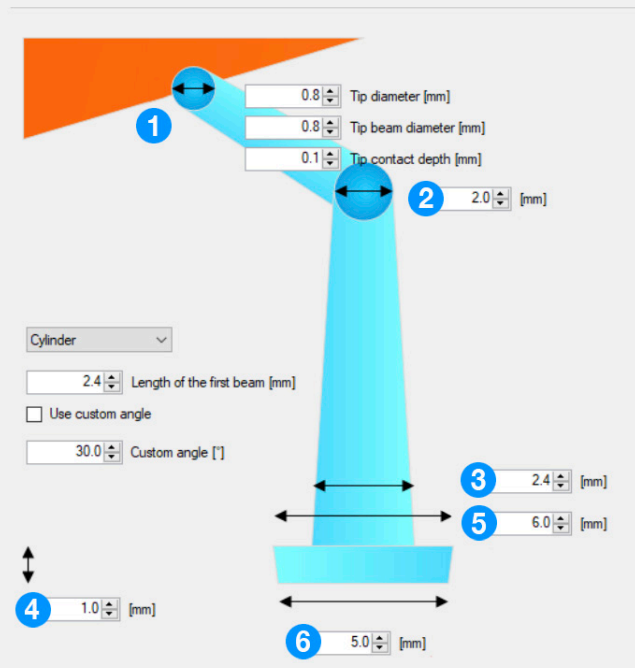
By doing so, user will understand resin properties in relation to design parameters and assist them to design their next parts accordingly.

[Click to download the file](#)



## Recommended Support Parameters & Orientation:

These are recommended support settings in relation to a UV LCD printer with 81µm XY resolution.



	Large Models		Small Models	
Diagram reference numbers	Parameters	Values	Parameters	Values
-	Density (%)	60	Density (%)	60
1	Tip Diameter (mm)	0.8	Tip Diameter (mm)	0.8
-	Critical Build Angle (°)	45	Critical Build Angle (°)	45
2	Pole Diameter (mm)	2	Pole Diameter (mm)	2
3	Pole Widening Factor	2	Pole Widening Factor	1.5
-	Model Height from Base (mm)	10	Model Height from Base (mm)	10
4	Height of Support Foot (mm)	2	Height of Support Foot (mm)	2
5	Top of Foot Diameter (mm)	6	Top of Foot Diameter (mm)	6
6	Bottom of Foot Diameter (mm)	4	Bottom of Foot Diameter (mm)	4

## Printer and Resin Profiling

### Photocentric UV Printers

- To print with Photocentric UV printers, choose 'Flexible UV160TR' and the desired layer thickness when preparing your print file in Photocentric Studio.

### 3rd Party UV Printers

- Photocentric UV high-performance resins have been formulated to be compatible with a wide range of 3rd Party Printers. This list is continually updated, for the most up-to-date information, please visit our UV Resin Compatibility Page. All resins are functional at a wavelength of 385-405 nm.
- Please see below instruction on how to calculate appropriate exposure time with regards to your 3rd party UV printer and purchased resin:

## UV Resin Layer Exposure Guidelines

### Overview

This guide will assist you in establishing a layer exposure time for a desired resin and layer thickness based on the characteristics of Photocentric's UV Resin range and your UV 3D printer.

Each resin requires a specific energy to cure a certain layer thickness. 'Energy' is defined by multiplying 'light output intensity' of your printer and a 'given time of exposure'. The equation below simply explains the matter:

$$\text{Energy [mJ/cm}^2\text{]} = \text{Light Output Intensity [mW/cm}^2\text{]} \times \text{Exposure Time [s]}$$

Your UV 3D printer manufacturer will provide you with light output intensity value.

Layer Thickness (µm)	50	100
A UV 3D printer with 5mW/cm <sup>2</sup> light output intensity	1.5 secs	2 secs
Ec(mJ/cm <sup>2</sup> )	17.23	
Dp(µm)	260	

**NOTE:** Bear in mind the exposure time vs energy is not a linear trend, and this data is intended strictly as a guideline. Settings may need to be further optimised to suit each printer.

## Processing Instructions

- Heat the resin to 30°C in the bottle.
- Shake the resin bottle for 2 minutes before pouring into the resin vat.

## Post-Processing Instructions

To reach the full mechanical properties of the material, parts printed using 'Flexible UV160TR' will need to be post-processed.

- 1- Remove the print platform from the printer and place into a wash unit. You can use 'Photocentric Wash15' or 'Photocentric Air Wash L'.
- 2- Follow resin cleaner/solvent TDS for relevant wash cycles. You can use 'Photocentric Resin Cleaner's as the cleaning mediums. For 'Photocentric Resin Cleaner 30' washing cycle is 10 minutes.
- 3- Make sure you do not exceed the recommended wash cycles as it might have adverse effect on the mechanical properties.
- 4- Rinse parts with cool water for 1-2 minutes.
- 5- Where possible, use gentle compressed air to dry the parts, if not, leave them to dry naturally.
- 6- The parts printed can be cured in any UV post-curing unit. You can use 'Photocentric Cure M+' at 60°C for 2-4 hours for small parts, 4-6 hours for larger parts.
- 7- Remove the platform from the cure unit and place on to a suitable flat surface. use a scraper or suitable cutters and take care to not damage the part/(s) when removing them from the platform.