



Technical Datasheet

# Rigid UV240 Plant-Based

 UV Resin

Photo**centric**

## Rigid UV240 Plant Based

Accuracy (Low – High)



Shore Hardness (Low – High)



Compatible Printers

UV LCD & DLP 3D  
Printers



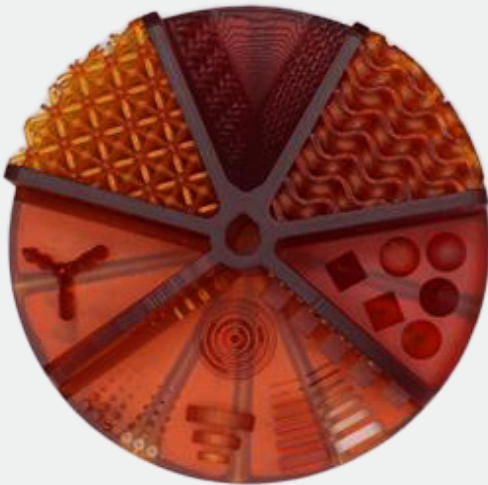
Liquid Crystal  
**OPUS**

Colour



Dark Amber

Available in  
1kg bottle



Print sample, Volume knob &  
Dental model aligner

Rigid DL240 Plant-Based is a high-performance rigid 3D printing resin which consists of 50% bio-based raw materials, offering a substantial reduction on net CO<sub>2</sub> emission compared to conventional resins. It is remarkably easy to handle and process, along with exhibiting outstanding properties.

Rigid DL240 Plant-Based have high accuracy, with over 98% of scanned data within +/- 100µm for dental models printed horizontally and over 90% of scanned data within +/- 100µm for dental models printed vertically, increasing output for overnight production\*. It enables quick design iterations by offering 250 and 350µm layer thickness print profiles.

\*Printed with Photocentric Liquid Crystal Opus

Optimised for:

Fast & Accurate Prototyping

Dental Models for Aligner manufacturing

## Unique features:



High accuracy



Exceptional surface finish and smooth feel



Quick design iterations



Rigid



50% of components from plant-based materials



Dry to touch



Fast post curing



## Rigid UV240 Plant-Based Properties

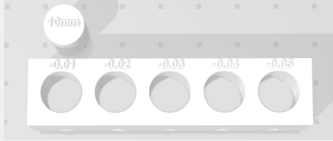

Tensile Properties	Green	Post-Cured	Method
Tensile Modulus	851 MPa	2080 MPa	ASTM D638
Tensile Strength (Break)	19.7 MPa	52 MPa	ASTM D638
Tensile Strength (Yield)	19.7 MPa	54 MPa	ASTM D638
Elongation at Break	17.1%	5.4%	ASTM D638
<b>Flexural Properties</b>			
Flexural Strength	-	108 MPa	ASTM D790
Flexural Modulus	-	2656 MPa	ASTM D790
<b>Impact Properties</b>			
Impact Strength Notched Izod	-	12.2 J/m	ASTM D256
Impact Strength Notched Izod	-	2.2 kJ/m <sup>2</sup>	ISO 180
<b>General Properties</b>			
Shore Hardness	-	84 Shore D	ASTM D2240
HDT (@ 0.455 MPa)	-	78.4°C	ASTM D648
HDT (@ 1.82 MPa)	-	62.6°C	ASTM D648
Water absorption (%)* after 24 hrs	-	0.470%	ASTM D570
Water absorption (%)* after 72 hrs	-	0.625%	ASTM D570
Water absorption (%)* after 7 days	-	0.933%	ASTM D570
<b>Liquid Properties</b>			
Viscosity	580 cPs	At 25°C Brookfield spindle 3	
Density	1.10 g/cm <sup>3</sup>	-	
Storage	10<T>50°C	-	

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



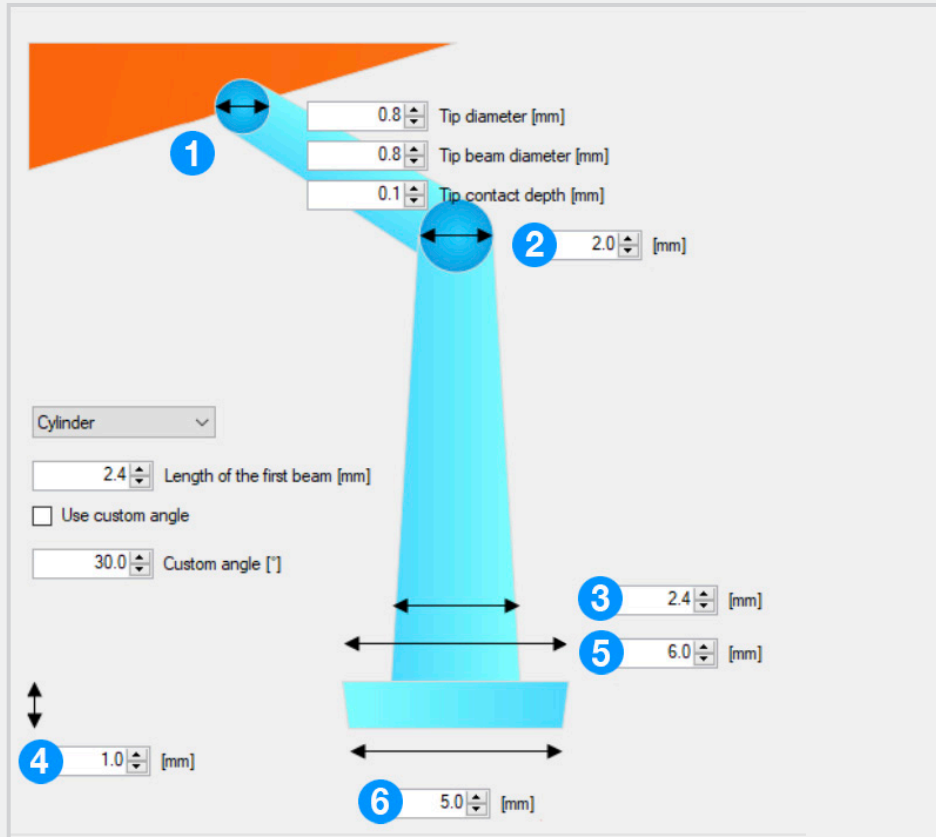
## Design & Print Orientation Consideration Parameters

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

Properties	Parameters
Minimum feature size (pins)	0.2mm
Minimum hole diameter	0.4mm
Minimum slot thickness	0.4mm
Minimum wall thickness	0.3mm
Overhangs	Successful for overhangs $\leq 15^\circ$
Round Dim Fit	Parts fit with no resistance at 0.09mm offset <a href="#">Click to view sample</a>
	
Square Dim Fit	Parts fit perfectly with no resistance at 0.06mm offset <a href="#">Click to view sample</a>
	
Minimum wall thickness unsupported	Minimum wall thickness unsupported is 1mm with maximum height of 100mm.
Scaling factor	X 0.6% Y0.6% Z+0.7%



## 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 Ref. Nr	Parameters	Values	Parameters	Values
-	Denisty (%)	60	Denisty (%)	60
1	Tip Diameter (mm)	0.8	Tip Diameter (mm)	0.6
-	Critical Build Angle (°)	47	Critical Build Angle (°)	47
2	Pole Diameter (mm)	2	Pole Diameter (mm)	1.5
3	Pole Widening Factor	1.5	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)	5	Top of Foot Diameter (mm)	5
6	Bottom of Foot Diameter (mm)	3	Bottom of Foot Diameter (mm)	3

• Recommended orientation around all axes is 45°.



## Printer and Resin Profiling

### Photocentric UV Printers

To print with Photocentric UV printers, choose ‘Rigid UV240Bio’ 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



## Layer Exposure Guidelines

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)	25	50	100
A UV 3D printer with 5mW/cm <sup>2</sup> light output intensity	-	-	3.3 sec
Ec(mJ/cm <sup>2</sup> )	13.31		
Dp(mm)	200		



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.



## Pre-Print Instructions

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



## Post-Print Instructions

To reach the full mechanical properties of the material, parts printed using 'Rigid UV240Bio' resin will need to be post-processed.

1. Remove the print platform from the printer and place in to the wash unit. You can use 'Photocentric Wash15' or 'Photocentric Air Wash L' as Wash units.
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 warm water for 1-2 minutes.
5. Where possible, use 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+' for 1-2 hours at 60°C depending on the size of parts.
  - If only 'dry to touch' finish is required, for example for dental models, 30 minutes post curing should be adequate.
7. Remove the platform from the Cure M+ and immediately leave it for 2 minutes under running cold water below 14°C for thermal shocking. Parts can be removed from the platform with minimal effort.

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