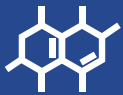




Technical Datasheet

# Durable UV SuperClear



3D Polymer

Photocentric

## Durable UV SuperClear

Transparency (Low – High)



Impact Strength (Soft – Hard)



Compatible Printers



Liquid Crystal  
**OPUS**

& 3<sup>rd</sup> party UV printers

Colour



Clear

Available in  
1kg bottles



A pair of Ski Goggles

Photocentric's LCD Durable UV SuperClear is ideal for making clear, strong objects with only minimal shrinkage. Durable UV SuperClear has been specifically developed to allow the fabrication of extremely clear objects with adjustable surface finish, to suit a variety of end-user requirements. Printed parts display a high accuracy and minimal shrinkage, allowing for the production of highly accurate clear models.

The solid material is strong, durable and long lasting, provided it is stored in dry conditions away from strong UV light. In order to increase the clearness and shine, the printed parts can be polished, and a clear acrylic spray lacquer applied.

### Optimised for:

- Clear and durable models
- Durable end-parts like push-fits
- Transparent components like fluidics and microfluidics

## Unique features



Crystal Clear



Accurate



Impact Resistant



## UV Crystal Clear Properties

Tensile Properties	Green	Post-cured*	Method
Tensile Modulus	1960 MPa	2270 MPa	ASTM D638
Tensile Strength (Break)	31.5 MPa	45 MPa	ASTM D638
Tensile Strength (Yield)	32 MPa	46 MPa	ASTM D638
Elongation at Break	18 %	16.5 %	ASTM D638
Flexural Properties			Method
Flexural Strength		62 MPa	ASTM D790
Flexural Modulus*		1730 MPa	ASTM D790
Impact Properties			
Impact Strength Notched Izod		90 J/m	ASTM D256
General Properties			
Shore Hardness		85 Shore D	ASTM D2240
Heat Deflection Temperature (@ 0.45 MPa)		71°C	ASTM D648
Water Absorption -Short Term (24hr)		0.33%	ASTM D570
Viscosity		662 cPs	At 25°C, Brookfield spindle 3
Liquid Density		1.10 g/cm <sup>3</sup>	Internal
Storage		10<T<50°C	-

\*Post cured for 4 hrs at 60°C in Photocentric Cure M+.



## Design & Print Orientation Consideration Parameters

Printed on Photocentric LC Opus (100 µm layer height)

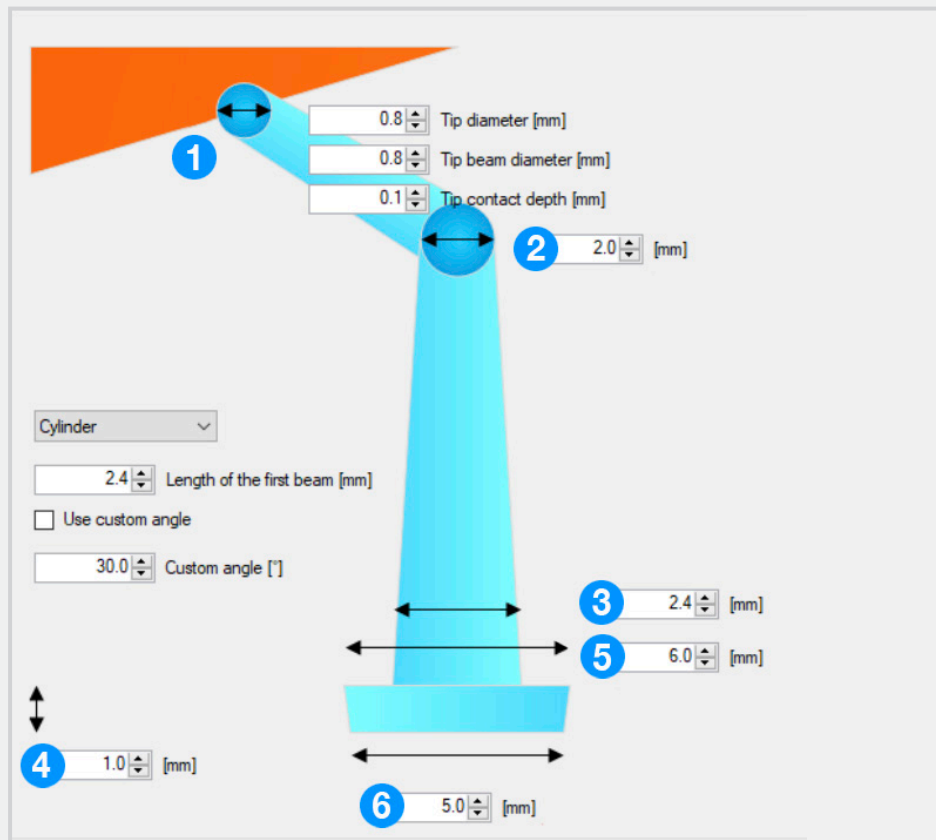
Properties	Parameters
Minimum feature size (pins)	0.7mm
Minimum hole diameter	0.7mm
Minimum slot thickness	0.5mm
Minimum wall thickness	0.5mm
Overhangs	Successful for overhangs $\leq 30^\circ$
Minimum wall thickness unsupported	Minimum wall thickness unsupported is 3.0 mm with maximum height of 60.0 mm.



We are constantly reviewing and improving our range of high-performance materials. For the very latest information, please visit the Photocentric website



## 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
1	Tip Diameter (mm)	0.8	Tip Diameter (mm)	0.8
-	Critical Build Angle (°)	47.0	Critical Build Angle (°)	47.0
2	Pole Diameter (mm)	2.0	Pole Diameter (mm)	1.5
3	Pole Widening Factor	2.0	Pole Widening Factor	1.0
-	Model Height from Base (mm)	10.0	Model Height from Base (mm)	1.0
4	Height of Support Foot (mm)	2.0	Height of Support Foot (mm)	2.0
5	Top of Foot Diameter (mm)	7.0	Top of Foot Diameter (mm)	7.0
6	Bottom of Foot Diameter (mm)	5.0	Bottom of Foot Diameter (mm)	5.0

- Recommended orientation around all axes is 45°.



## Printer and Resin Profiling

### Photocentric UV Printers

To print with Photocentric UV printers, choose 'Durable UV SuperClear', the desired layer thickness when preparing your print file in Photocentric Studio.

### 3<sup>rd</sup> 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:



## 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)	25	50	100
A UV 3D printer with 5mW/cm <sup>2</sup> light output intensity	-	3.5sec	4.5 sec
Ec(mJ/cm <sup>2</sup> )	16,428.0		
Dp(mm)	100.0		



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

1. To print with Photocentric Liquid Crystal Opus, choose 'Durable UV SuperClear' and the desired layer thickness when preparing your print file in Photocentric Studio.
2. Warm the resin bottle to 30 °C before use.
3. Shake the resin bottle for 2 minutes before pouring into the Opus resin vat.



## Post-Print Instructions

1. It is recommended to drain and clean the vat after each print. Liquid resin can be filtered back into the original resin bottle.
2. Place the platform into the Photocentric Wash 15 unit, and wash printed parts for up to 10 minutes in Photocentric Resin Cleaner 30.
3. Rinse printed parts thoroughly in warm water for up to 2 minutes.
4. Dry well with compressed air to remove any remaining water. Alternatively, leave to dry naturally until no water is present.
5. Place printed parts into the preheated Cure M+ at 60 °C for 20 minutes without turning on the UV LEDs. This ensures parts are dry and at an even temperature before curing.
6. Turn on the UV LEDs and cure for 4 hours at 60 °C in Cure M+. Thick parts may require longer cure times to reduce colour.



## Post-Processing Instruction

Parts after print are matt and not clear. This is due to the nature of 3D printing, layers steps and pixelation. To achieve clear finish, the parts should be post-processed as below:

**For a Crystal Clear (Gloss) effect**, parts can be finished with wet sanding to achieve a very smooth surface. It is recommended to start sanding Durable UV SuperClear parts with 320-360 grit sandpaper to remove layer lines from the print process, moving to higher grit sandpaper for polishing. A suitable polishing compound can also be used. Once the surface is as smooth as desired, the part should be cleaned well with soap and water and fully dried. An appropriate gloss clear acrylic lacquer can then be applied to reveal a glass-like finish.



Part after Crystal Clear finish



Part after print