

**LOCTITE®**



# **LOCTITE® 3D 3843™**

HDT60 High Toughness  
Photoplastic  
Matte Black, White, Clear

**LOCTITE®**

Henkel Corporation

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**3843™**

HDT60 HIGH TOUGHNESS  
PHOTOPLASTIC



## LOCTITE 3D 3843™

Semi-flexible resin with moderate temperature resistance HDT60, high impact strength, and versatility for a broad range of applications.

LOCTITE 3D 3843 is a high-strength engineering plastic with good impact resistance and excellent surface finish. It is ideal for a wide variety of tooling applications on the production floor.

LOCTITE 3D 3843 displays high green strength and HDT enabling it to print accurately and function at room temperature. It is compatible with a broad range of DLP machines.



### Benefits:

- Moderate heat resistance, HDT 60° C
- Tough with outstanding surface finish
- Superior strength and impact resistant



### Ideal for:

- Manufacturing aids
- Jigs and fixtures
- Housings and covers
- Insoles



### Markets:



Industry



Automotive



Consumer  
Goods

Tensile Stress at Break (MPa)

51

Young's Modulus (MPa)

1800

Elongation at Break (%)

43

HDT at 0.455 MPa (°C)

63

IZOD Impact (Notched, J/m)

53

Shore Hardness (0s)

75

*\*Values shown are linked to LOCTITE 3843 Matte Black as reference, please refer to the specific mechanical properties for each of the colors shown in this document*



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## PROPERTIES

Mechanical Properties	Measure	Method	Green	Post Processed
Tensile Stress at Yield	MPa	ASTM D638	44 ± 1 <sup>[5]</sup>	53 ± 2 <sup>[1]</sup>
Tensile Stress at Break	MPa	ASTM D638	38 ± 1 <sup>[5]</sup>	51 ± 2 <sup>[1]</sup>
Young's Modulus	MPa	ASTM D638	1572 ± 31 <sup>[5]</sup>	1806 ± 47 <sup>[1]</sup>
Elongation at Break	%	ASTM D638	52 ± 10 <sup>[5]</sup>	43 ± 10 <sup>[1]</sup>
Flexural Modulus	MPa	ASTM D790	1113 ± 23 <sup>[6]</sup>	1783 ± 45 <sup>[2]</sup>
Flexural Elongation at Break	%	ASTM D790	>5 <sup>[6]</sup>	>5 <sup>[2]</sup>
Flexural Stress at Break	MPa	ASTM D790	-	-
<b>Other Properties</b>				
HDT at 0.455 MPa	°C	ASTM D648	-	63°C <sup>[3]</sup>
IZOD Impact (Notched)	J/m	ASTM D256	-	53 ± 4 <sup>[4]</sup>
Water Absorption (24hr)	%	ASTM D570	-	1.94 <sup>[7]</sup>
Water Absorption (72hr)	%	ASTM D570	-	3.21 <sup>[7]</sup>
Shore Hardness (0s, 3s)	D	ASTM D2240	68, 63 <sup>[11]</sup>	74, 67 <sup>[9]</sup>
Solid Density	g/cm <sup>3</sup>	ASTM D1475	1.18 <sup>[10]</sup>	1.18 <sup>[10]</sup>
Thermal Conductivity	mW/(m·K)	ASTM D5930	-	0.21 <sup>[12]</sup>
Heat Capacity	J/(g·K)	ASTM D5930	-	1.5 ± 0.1 <sup>[12]</sup>
<b>Biocompatibility</b>				
Irritation		ISO10993-23*	-	Comply <sup>[13]</sup>

\*All specimen are printed unless otherwise noted. All specimen were conditioned in ambient lab conditions at 19-23°C / 40-60% RH for at least 24 hours.\* ASTM Methods: D638 Type IV, 5 mm/min, D790-B, 2 mm/min, D648, D256 Notched IZOD (Machine Notched), 6 mm x 12 mm, D570 0.125" x 2" Disc 24hr@ 25°C, D2240, Type "D" (0, 3 seconds), D7867, D1475

\*The biological assessment has been performed based on the in vitro method according to ISO10993-23

### Internal Data Sources:

[1]FOR16424, [2]FOR16426, FOR17678, [3]FOR19725, [4]FOR16427, [5]FOR16425, [6]FOR19115, [7]FOR19118, [8]FOR21751, [9]FOR19117, [10]FOR19114, [11]FOR19119, [12]FOR26234, [13]FOR52814



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Liquid Properties	Measure	Method	Value
Viscosity at 25°C (77°F)	cP	ASTM D7867	720-870 [8]
Liquid Density	g/cm <sup>3</sup>	ASTM D1475	1.07 [10]

## PROPERTIES

Electrical Properties	Measure	Method	Green	Post Processed
Volume Resistivity	Ω·cm	ASTM D257	-	6.5E +14 [1]
Surface Resistivity	Ω	ASTM D257	-	5.7E +15 [1]
Dielectric Strength	kV/mm	ASTM D149	-	28.1± 1.8 [2]
AC Relative Permittivity (Dielectric Constant)[3]				
at 50 Hz (XY)	none	ASTM D150	-	4.8
at 1 kHz (XY)	none	ASTM D150	-	4.9
at 1 MHz (XY)	none	ASTM D150	-	4.4
AC Loss Characteristic (Dissipation Factor)[4]				
at 50 Hz (XY)	none	ASTM D150	-	0.021
at 1 kHz (XY)	none	ASTM D150	-	0.021
at 1 MHz (XY)	none	ASTM D150	-	0.041

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**Internal Data Sources:**

[1] FOR25869, [2] FOR25870, [3] FOR25870, [4] FOR25872





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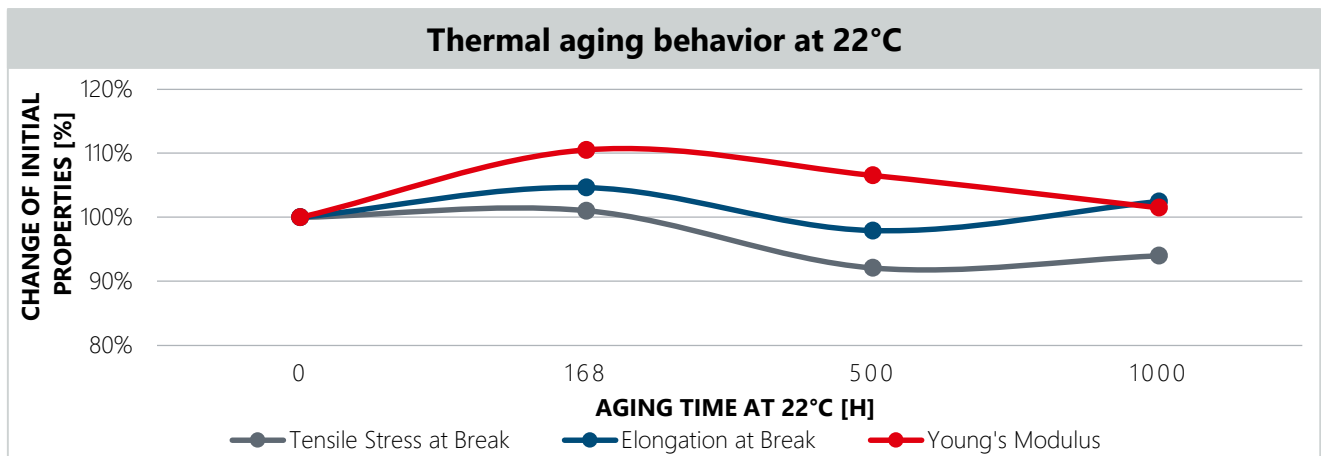


## AGING AND ENVIRONMENTAL EFFECTS

LOCTITE 3D 3843 BK has been tested in QUV exterior weathering conditions (ASTM G-154) for 800 hours with less than a 15% change in Tensile and IZOD Impact properties.

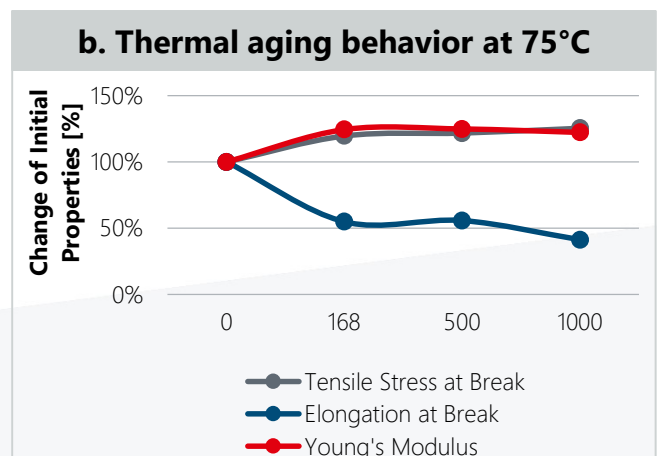
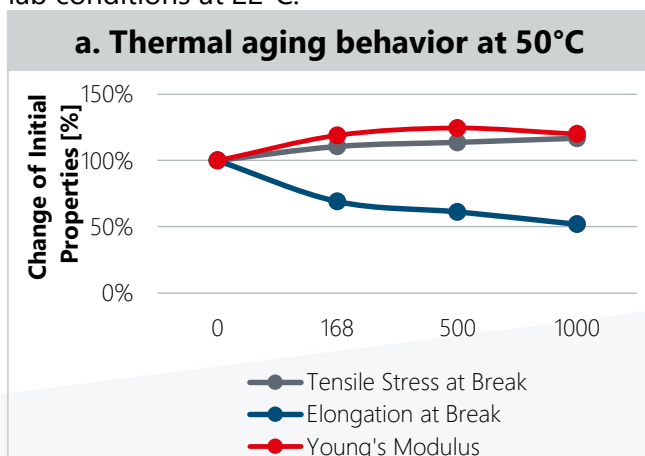
### CONTROL AGING AT 22°C (Tested at 22°C)

Samples were kept at standard laboratory conditions and were not exposed to elevated temperatures. Samples were tested accordingly to ASTM D638 at standard lab conditions at 22°C.



### HEAT AGING (Tested at 22°C)

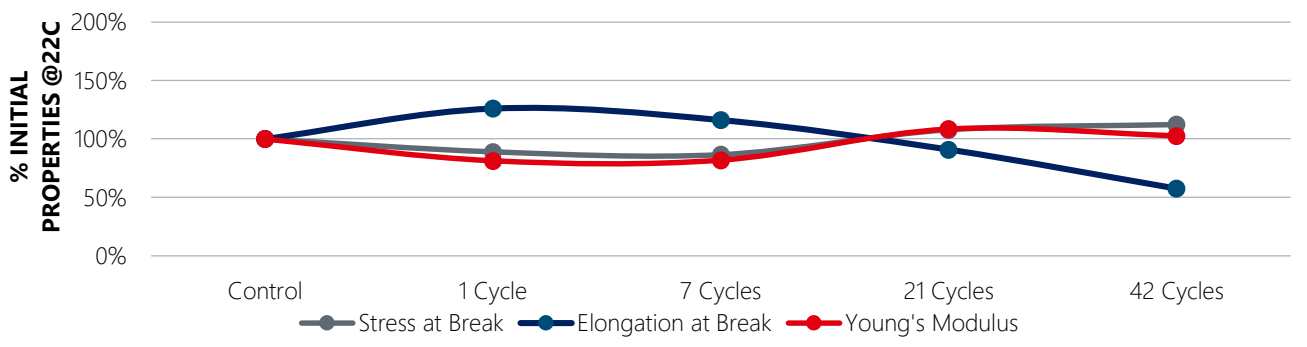
Samples were aged at (a) 50°C and (b) 75°C and were tested accordingly to ASTM D638 at standard lab conditions at 22°C.



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## AGING AND ENVIRONMENTAL EFFECTS

### Q-Sun (ASTM D2565) – Tested accordingly to ASTM D638



### Chemical Resistance - Tested accordingly to ASTM D638

Exposure Time 100 hours

% of initial strength

Chemical	Measure	Elongation at Break	Stress at Break	Young's Modulus
Water (22C°)	%	152	52	44
IPA	%	117	40	38
NaOCl	%	120	57	58
Salt Fog (22C°)	%	169	43	30
Motor Oil (87C°)	%	93	104	100
Hydrogen Peroxide	%	158	47	38

### Chemical Resistance - Tested accordingly to ASTM D638

Exposure Time 500 hours

% of initial strength

Chemical	Measure	Elongation at Break	Stress at Break	Young's Modulus
Water (22C°)	%	175	27	12
IPA	%	0	0	0
NaOCl 5	%	83	28	31
Salt Fog (22C°)	%	192	33	17
Motor Oil (87C°)	%	78	106	105
Hydrogen Peroxide	%	180	22	7



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## WORKFLOW

Validated workflows need to be followed to achieve properties as provided in the TDS. Examples of validated workflow steps are listed below. Users should defer to the most current workflow information for best results which can be found at <https://www.loctiteam.com/printer-validation-settings>

## PRINTER SETTINGS

**LOCTITE 3D 3843 Matte Black** is formulated to print optimally on industrial DLP printer. Read the safety data sheet carefully to get details about health and safety instructions. Recommended print parameters:

- Shake resin bottle well before usage
- Temperature: 20°C to 35°C
- Intensity: 3 mW/cm<sup>2</sup> to 7 mW/cm<sup>2</sup>

### Exposure time for an intensity of 5 mW/cm<sup>2</sup>

Layer Thickness (µm):	25	50	100	Ec (mJ/cm <sup>2</sup> )	11.16
First layer time (s)	45	45	50	Dp (mm):	0.21
Burn in region (s):	4	5	7.5		
Model Layer Exposure (s):			9.5		

## POST PROCESSING

**LOCTITE 3D 3843 Matte Black** requires post processing to achieve specified properties. Prior to post curing, support structures should be removed from the printed part, and the part should then be washed. Use compressed air to remove residual solvent from the surface of the material between intervals.

Post Process Step	Agent	Method	Duration	Intervals	Additional Info
Cleaning	IPA	Manual	2 min	1	
Dry	n.a.	Compressed air	10 to 60 s	1	Air pressure (30psi)
Wait before post curing	n.a.	Ambient condition	60 min	1	Room temperature

## POST CURING

**LOCTITE 3D 3843 Matte Black** requires post curing to achieve specified properties. It is recommended that either an LED or wide spectrum lamp be used to post cure parts.

UC Curing Unit	UV Source	Intensity	Cure time/ side	Additional Settings (Shelf, Output Energy)
Dymax 5000 EC Flood	Mercury Arc Bulb (broad spectrum)	148 mW/cm <sup>2</sup> at 380 nm	2 min	400W, Shelf K
Loctite CL36	405nm LED	80 mW/cm <sup>2</sup> at 405 nm	20 min	100% top & side
Uvitron Intelliray 600W	Mercury Arc Bulb (broad spectrum)	66% Intensity	2 min	





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## PROPERTIES

Mechanical Properties	Measure	Method	Green	Post Processed
Tensile Stress at Yield	MPa	ASTM D638	36.2 ± 1.0 <sup>[1]</sup>	52.6 ± 1 <sup>[2]</sup>
Tensile Stress at Break	MPa	ASTM D638	33.1 ± 2.6 <sup>[1]</sup>	49.0 ± 1 <sup>[2]</sup>
Young's Modulus	MPa	ASTM D638	1318 ± 31 <sup>[1]</sup>	1720 ± 72 <sup>[2]</sup>
Elongation at Break	%	ASTM D638	74.4 ± 9.9 <sup>[1]</sup>	47.6 ± 8 <sup>[2]</sup>
Flexural Modulus	MPa	ASTM D790	721 ± 36 <sup>[3]</sup>	1673 ± 44 <sup>[4]</sup>
Flexural Strain at Break	%	ASTM D790	>5 <sup>[3]</sup>	>5 <sup>[4]</sup>
Flexural Stress at Break	MPa	ASTM D790	-	-

### Other Properties

HDT at 0.455 MPa	°C	ASTM D648	50 <sup>[5]</sup>	60 <sup>[6]</sup>
IZOD Impact (Notched)	J/m	ASTM D256	-	58.3 ± 4.2 <sup>[7]</sup>
IZOD Impact (Unnotched)	J/m	ASTM D256	-	175.3 ± 12.8 <sup>[8]</sup>
Water Absorption (24hr)	%	ASTM D570	-	2.3 <sup>[9]</sup>
Water Absorption (72hr)	%	ASTM D570	-	3.5 <sup>[9]</sup>
Shore Hardness (0s, 3s)	D	ASTM D2240	68, 64 <sup>[10]</sup>	70, 76 <sup>[11]</sup>
Solid Density	g/cm	ASTM D1475	1.18 <sup>[13]</sup>	1.18 <sup>[11]</sup>

### Biocompatibility

Cytotoxicity		ISO 10993-5	-	Comply <sup>[6]</sup>
Irritation		ISO 10993-23	-	Comply <sup>[16]</sup>

Liquid Properties	Measure	Method	Value
Viscosity at 25°C (77°F)	cP	ASTM D7867	450 - 650 <sup>[14]</sup>
Liquid Density	g/cm <sup>3</sup>	ASTM D1475	1.07 <sup>[12]</sup>

\*All specimen are printed unless otherwise noted. All specimen were conditioned in ambient lab conditions at 19-23°C / 40-60% RH for at least 24 hours.\* ASTM Methods: D638 Type IV, 5 mm/min, D790-B, 2 mm/min, D648, D256 Notched IZOD (Machine Notched), 6 mm x 12 mm, D570 0.125" x 2" Disc 24hr@ 25°C, D2240, Type "D" (0, 3 seconds), D7867, D1475

\*The biological assessment has been performed based on the in vitro method according to ISO10993-23

#### Internal Data Sources:

[1]FOR17796, [2]FOR17795, [3]FOR17799, [4]FOR17797, [5]FOR17801, [6]FOR17800, [7]FOR17792, [8]FOR17793, [9]FOR17794, [10]FOR17790, [11]FOR17789, [12]FOR17791, [13]FOR17809, [14]FOR37133, [15] FOR38780, [16] FOR52785 (in-vitro)





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## WORKFLOW

Validated workflows need to be followed to achieve properties as provided in the TDS. Examples of validated workflow steps are listed below. Users should defer to the most current workflow information for best results which can be found at <https://www.loctiteam.com/printer-validation-settings>

## PRINTER SETTINGS

**LOCTITE 3D 3843 White** is formulated to print optimally on industrial DLP printer. Read the safety data sheet carefully to get details about health and safety instructions. Recommended print parameters:

- Shake resin bottle well before usage
- Temperature: 20°C to 35°C
- Intensity: 3 mW/cm<sup>2</sup> to 7 mW/cm<sup>2</sup>

### Exposure time for an intensity of 5 mW/cm<sup>2</sup>

Layer Thickness (μm):	25	50	100	Ec (mJ/cm <sup>2</sup> )	7.194
First layer time (s)	45	45	45	Dp (mm):	0.170
Burn in region (s):	2	3.5	6		
Model Layer Exposure (s):			4.5		

## POST PROCESSING

**LOCTITE 3D 3843 White** requires post processing to achieve specified properties. Prior to post curing, support structures should be removed from the printed part, and the part should then be washed. Use compressed air to remove residual solvent from the surface of the material between intervals.

Post Process Step	Agent	Method	Duration	Intervals	Additional Info
Cleaning	TPM	Ultrasonic	2 min	2	Dry after each interval
Dry	n.a.	Compressed air	20 s	2	Air pressure (55psi)
Wait before post curing	n.a.	Ambient condition	60 min	1	Room temperature

## POST CURING

**LOCTITE 3D 3843 White** requires post curing to achieve specified properties. It is recommended that either an LED or wide spectrum lamp be used to post cure parts.

UC Curing Unit	UV Source	Intensity	Cure time/ side	Additional Settings (Shelf, Output Energy)
Uvitron Intelliray 600W	Mercury Arc Bulb (broad spectrum)	66% Intensity	4 min	Shelf K
Dymax 5000 EC Flood	Mercury Arc Bulb (broad spectrum)	150 -175 mW/cm <sup>2</sup> at 380 nm	8 min	Shelf I



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CLEAR**

## PROPERTIES

Mechanical Properties	Measure	Method	Green	Post Processed
Tensile Stress at Yield	MPa	ASTM D638	43.8 ± 0.7 [6]	45.0 ± 1.5 [1]
Tensile Stress at Break	MPa	ASTM D638	38.0 ± 1.7 [6]	44.0 ± 2.7 [1]
Young's Modulus	MPa	ASTM D638	1,562 ± 36 [6]	1,752 ± 42 [1]
Elongation at Break	%	ASTM D638	58.0 ± 24 [6]	41.0 ± 6.7 [1]
Flexural Modulus	MPa	ASTM D790	-	1,878 ± 81 [2]
Flexural Strain at Break	%	ASTM D790	-	>5 [2]
Flexural Stress at Break	MPa	ASTM D790	-	-
<b>Other Properties</b>				
HDT at 0.455 MPa	°C	ASTM D648	-	63 [9]
IZOD Impact (Notched)	J/m	ASTM D256	-	65.0 ± 2.9 [3]
Water Absorption (24hr)	%	ASTM D570	-	2.13 [7]
Shore Hardness (0s, 3s)	D	ASTM D2240	-	68, 63 [8]
Solid Density	g/cm <sup>3</sup>	ASTM D1475	1.17 [4]	1.18 [4]

Liquid Properties	Measure	Method	Value
Viscosity at 25°C (77°F)	cP	ASTM D7867	400 – 600 [5]
Liquid Density	g/cm <sup>3</sup>	ASTM D1475	1.07 [4]

"All specimen are printed unless otherwise noted. All specimen were conditioned in ambient lab conditions at 19-23C / 40-60% RH for at least 24 hours." ASTM Methods: D638 Type IV, 5mm/min, D790-B, 2mm/min, D648, D256 Notched IZOD (Machine Notched), 6 mm x 12 mm, D570 0.125" x 2" Disc 24hr@ 25°C, D2240, Type "D" (0, 3 seconds), D7867, D1475

**Internal Data Sources:**

[1]FOR17386, [2]FOR17382, [3]FOR17385, [4]FOR17383, [5]FOR37129, [6]FOR17201, [7]FOR17380, [8]FOR19616, [9]FOR20038, [10]FOR20009, [11]FOR20010



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## CLEAR COLOR PROPERTIES

In order to assess clear properties, color variation is measured as Delta-E (dE) to define parts transmittance.

dE measures changes from  $L^*a^*b^*C^*h$ . The table below shows the color variation for two different workflows:

Method: ASTM E308, Total Transmission

Part State	L*	a*	b*	C*	h	dE
Green / no post-processing <sup>[10]</sup>	93.11	-1.06	2.28	2.52	114.9	-
Dymax 5000EC 5 min/side <sup>[10]</sup>	93.20	-0.46	1.14	1.22	111.89	1.29
Loctite CL36 60 min/side <sup>[11]</sup>	92.89	-0.36	1.28	1.33	105.85	1.24

The table below shows color variation after ageing for 650 hours

A dE of 1.0 - 2.0 change is the smallest color difference, in average, that the human eye can perceive

QUV exterior weathering conditions (ASTM G-154—Cycle 1): Clear color

Method: ASTM G-154—Cycle 1 & ASTM E308, Total Transmission

QUV Exposure Time (Hrs)	L*	a*	b*	C*	h	dE
0	93.82	-0.49	1.35	1.44	109.91	-
325	93.10	-0.61	1.68	1.79	109.96	0.80
650	93.40	-0.86	2.47	2.61	109.22	1.25



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## WORKFLOW

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## PRINTER SETTINGS

**LOCTITE 3D 3843 Clear** is formulated to print optimally on industrial DLP printer. Read the safety data sheet carefully to get details about health and safety instructions. Recommended print parameters:

- Shake resin bottle well before usage
- Temperature: 20°C to 35°C
- Intensity: 3 mW/cm<sup>2</sup> to 7 mW/cm<sup>2</sup>

### Exposure time for an intensity of 5 mW/cm<sup>2</sup>

Layer Thickness (µm):	25	50	100	Ec (mJ/cm <sup>2</sup> )	7.67
First layer time (s)	45	45	45	Dp (mm):	0.18
Burn in region (s):	2	3.5	6		
Model Layer Exposure (s):			5		

## POST PROCESSING

**LOCTITE 3D 3843 Clear** requires post processing to achieve specified properties. Prior to post curing, support structures should be removed from the printed part, and the part should then be washed. Use compressed air to remove residual solvent from the surface of the material between intervals.

Post Process Step	Agent	Method	Duration	Intervals	Additional Info
Cleaning	IPA	Ultrasonic	2 min	1	
Dry	n.a.	Compressed air	10 - 60 s	1	Air pressure (20psi)
Wait before post curing	n.a.	Ambient condition	60 min	1	Room temperature

## POST CURING

**LOCTITE 3D 3843 Clear** requires post curing to achieve specified properties. It is recommended that either an LED or wide spectrum lamp be used to post cure parts.

UC Curing Unit	UV Source	Intensity	Cure time/ side	Additional Settings (Shelf, Output Energy)
Dymax 5000 EC Flood	Mercury Arc Bulb (broad spectrum)	120 mW/cm <sup>2</sup> at 380 nm	4 min	Shelf I





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## NOTE

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.

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