

**LOCTITE®**



# LOCTITE 3D MED9851™

General Purpose  
Clear

**LOCTITE®**  
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# MED9851™ GENERAL PURPOSE



## LOCTITE 3D MED9851™

LOCTITE 3D MED9851 CL a high-performance, high modulus material with excellent flexural and tensile physical properties. Stiffness combined with toughness make this material ideal for use in a wide variety of impact resistant medical device applications.

LOCTITE 3D MED9851 CL is capable of meeting ISO 10993-5, -10 and -23 standards for biocompatibility when processed using a validated workflow. Certificates of Compliance are available upon request.

LOCTITE 3D MED9851 CL is compatible with a broad range of DLP machines.



### Benefits:

- Capable of meeting ISO 10993-5, 10993-10 & 10993-23 standards
- Parts can function at body temperature
- Outstanding surface finish
- Excellent machineability



### Ideal for:

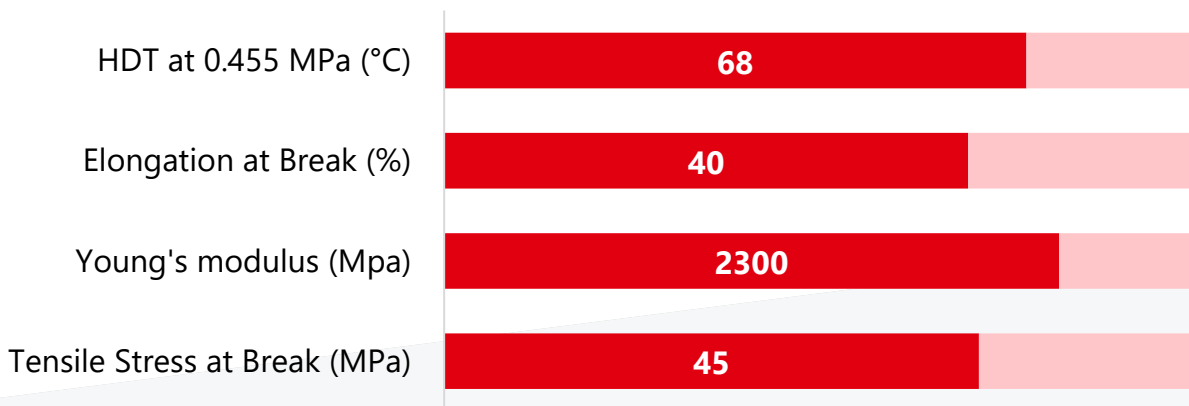
- Medical devices
- Orthotics & Prosthetics
- Eyewear
- Medical equipment components



### Markets:



Healthcare



*\*Values shown are linked to LOCTITE MED9851 CL as reference, please refer to the specific mechanical properties for each of the colors shown in this document*





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**PROPERTIES**

<b>Mechanical Properties</b>	<b>Measure</b>	<b>Method</b>	<b>Green</b>	<b>Post Processed</b>
Young's Modulus	MPa	ASTM D638	1600 – 1750 <sup>[1]</sup>	2100 – 2300 <sup>[1]</sup>
Tensile Stress at Yield	MPa	ASTM D638	32 - 38 <sup>[1]</sup>	50 - 55 <sup>[1]</sup>
Elongation at Yield	%	ASTM D638	4.4 – 4.6 <sup>[1]</sup>	4.6 – 4.8 <sup>[1]</sup>
Tensile Stress at Break	MPa	ASTM D638	30 -34 <sup>[1]</sup>	40 - 45 <sup>[1]</sup>
Elongation at Break	%	ASTM D638	-	35-40 <sup>[1]</sup>
IZOD Impact (Notched)	J/m	ASTM D256	54 - 68 <sup>[2]</sup>	40 - 50 <sup>[2]</sup>
Shore Hardness (3s)	D	ASTM D2240	-	80 – 81 <sup>[3]</sup>
<b>Other Properties</b>				
HDT at 0.455 MPa	°C	ASTM D648	-	65 - 68 <sup>[4]</sup>
HDT at 1.82 MPa	°C	ASTM D648	-	52 - 57 <sup>[4]</sup>
Water Absorption (24hr)	%	ASTM D570	-	1.84 <sup>[5]</sup>
Water Absorption (72hr)	%	ASTM D570	-	3.82 <sup>[5]</sup>
Solid Density	g/cm <sup>3</sup>	ASTM D1475	1.18 <sup>[6]</sup>	1.18 <sup>[6]</sup>
<b>Biocompatibility</b>				
Cytotoxicity		ISO10993-5	-	Comply <sup>[7]</sup>
Sensitization		ISO10993-10	-	Comply <sup>[11]</sup>
Irritation		ISO10993-23	-	Comply <sup>[8]</sup>

**Test parameters:**

"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" (3 seconds), D7867, D1475

**Internal Data Sources:**

[1]GEN4915421, [2]FOR390791, [3]FOR515851, [4]GEN516194, [5]FOR417077, [6]FOR525660, [7]GEN516201 [8]FOR482698 [11]FOR622885





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## PROPERTIES

Liquid Properties	Measure	Method	Value
Viscosity at 25°C (77°F)	cP	ASTM D7867	450 - 530 [8]
Liquid Density	g/cm <sup>3</sup>	ASTM D1475	1.06 [9]

Eyewear properties	Measure	Method	Green	Post Processed
Resistance to perspiration	-	ISO 12870	-	Comply <sup>[10]</sup>
Mechanical stability	-	ISO 12870	-	Comply <sup>[10]</sup>
Resistance to ignition	-	ISO 12870	-	Comply <sup>[10]</sup>
Resistance to optical radiation	-	ISO 12870	-	Comply <sup>[10]</sup>

**Test parameters:**

"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

**Internal Data Sources:**

[8]FOR481014, [9] FOR395792, [10]GEN519016





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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 MED9851 CL 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 8 mW/cm<sup>2</sup>

Settings: 385nm at 5mW/cm <sup>2</sup>	Measure	Method	Value
Layer Thickness	µm	Internal	100
Burn-In region	s	Internal	12
Transition region	s	Internal	8
Model region	s	Internal	5

Settings: 385nm at 5mW/cm <sup>2</sup>	Measure	Method	Value
E <sub>C</sub>	mJ/cm <sup>2</sup>	Internal	3.1 <sup>[9]</sup>
D <sub>p</sub>	mm	Internal	0.18 <sup>[9]</sup>

Settings: 385nm at 5mW/cm <sup>2</sup>	Measure	Method	Exposure time
D <sub>C</sub> = 50µm	s	Internal	2.5
D <sub>C</sub> = 100µm	s	Internal	5

**Test parameters:**  
Exposure times are calculated without a safety factor

Internal data source:  
<sup>[9]</sup> FOR425136







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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>

### CLEANING

**LOCTITE 3D MED9851 CL** 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 Step #1	TPM or IPA	Ultrasonic	2 min	1 or 2	Dry after each interval
Cleaning Step #2	TPM or IPA	Ultrasonic	1 min	1	
Dry	n.a.	Compressed air	10 to 60 s	1	Air pressure (50psi)
Wait before post curing	IPA	Ambient condition	60 min	1	Room temperature
Wait before post curing	TPM	Oven	60 min	1	50°C

### POST CURING

**LOCTITE 3D MED9851 CL** requires post curing to achieve specified properties. It is recommended that either an LED or wide spectrum lamp be used to post cure parts.

UV Curing Unit	UV Source	Intensity	Cure time per side	Additional Settings (Shelf, Output Energy)
Loctite CL36	405nm LED	80 mW/cm <sup>2</sup> at 405 nm	10 min	100% top & side

### STORAGE

Store **LOCTITE MED9851 Clear** in the unopened container in a dry location. Optimal Storage: 8°C to 30°C. Storage below 8°C or above 30°C can adversely affect product properties. Material removed from containers may be contaminated during use. For this reason, filter used resin with 190µm mesh filter before placing back into proper storage container.





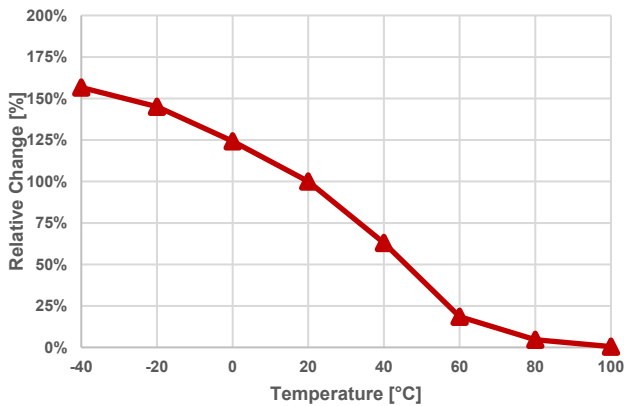
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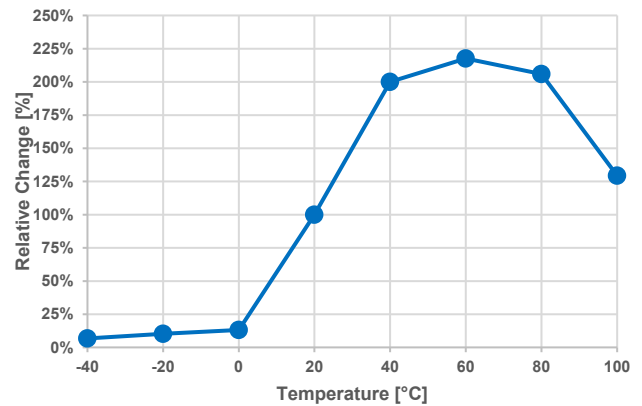
## THERMAL INFLUENCE ON MECHANICAL PROPERTIES

LOCTITE 3D MED9851 CL has been tested according to ASTM D638 at varied environmental temperatures, from -40°C to 100°C. All samples were printed in the same print job using a validated workflow. Mechanical testing was conducted according to ASTM D638. Before each test series samples were conditioned for 60 minutes at the specific test temperature.

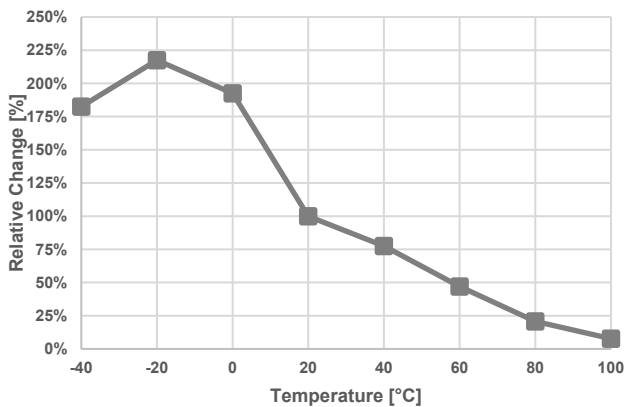
Young's Modulus at -40°C to 100 °C



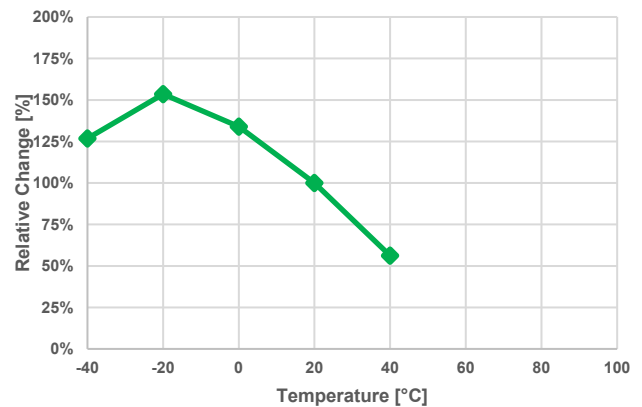
Elongation at Break at -40°C to 100 °C



Stress at Break at -40°C to 100 °C



Stress at Yield at -40°C to 100 °C



### Test parameters:

ASTM D638, Type IV, Pull speed: 5 mm/min, Young's modulus measured at 0.1-1% (regression),

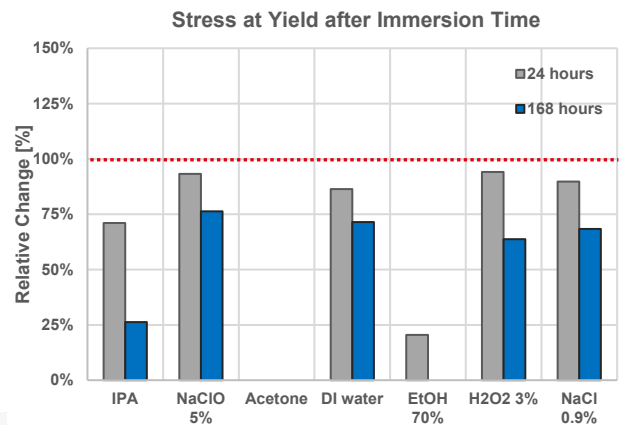
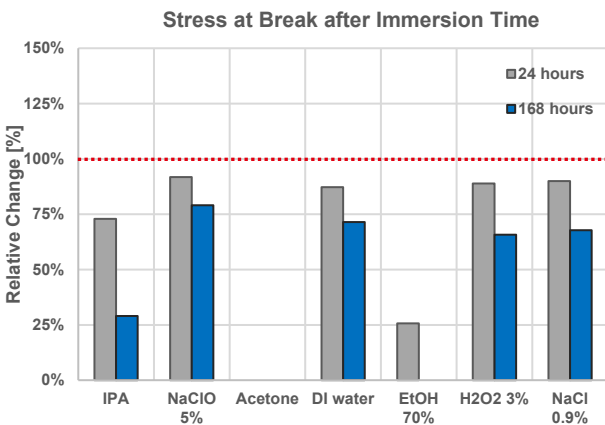
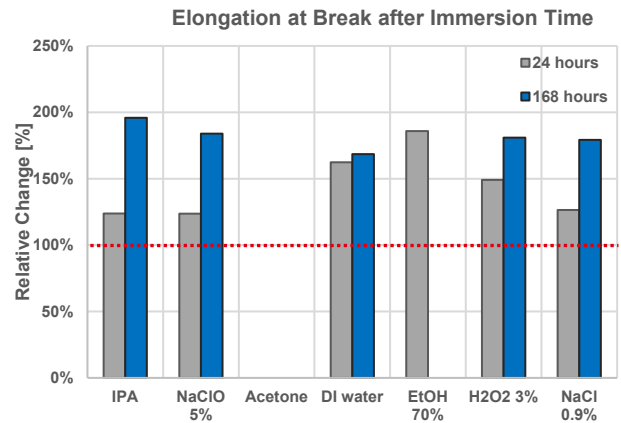
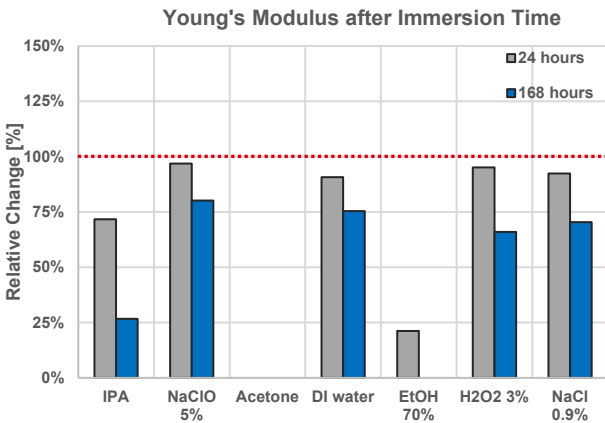
Internal Data Sources:  
[1] FOR446342





### AGEING AND ENVIRONMENTAL EFFECTS – CHEMICAL RESISTANCE MEDICAL

LOCTITE 3D MED9851 CL has been tested after chemical ageing according to ASTM D543. The influence of chemicals was tested by measuring mechanical properties after different test times (Immersion test for 24 and 168 hours). Exposed samples were stored in containers and fully immersed in different chemicals. Samples were stirred every 24 hours using a shaker. After removal, exposed samples were washed and conditioned for 24 hours at 22°C before mechanical testing. All samples were printed using a validated workflow. Mechanical testing was conducted according to ASTM D638 at standard lab conditions (22°C). The 100% value represents the initial weight 24 hours after post-processing.



**Test parameters:**  
ASTM D638, Type IV, Pull speed: 5 mm/min, Young's modulus measured at 0.1-1% (regression),

Internal Data Sources:  
[1] FOR680425







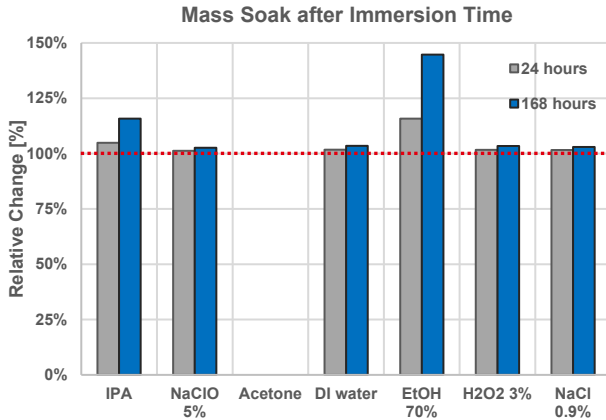
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## AGEING AND ENVIRONMENTAL EFFECTS – CHEMICAL RESISTANCE MASS SOAK

LOCTITE 3D MED9851 CL has been tested after chemical ageing according to ASTM D543. The influence of chemicals was tested by measuring the mass change after different test times (Immersion test for 24 and 168 hours). Exposed samples were stored in containers and fully immersed in different chemicals. Samples were stirred every 24 hours using a shaker. After removal exposed samples were washed, dried and immediately weighed. All samples were printed using a validated workflow.

The 100% value represents the initial weight 24 hours after post-processing.



### Test parameters:

ASTM D638, Type IV, Pull speed: 5 mm/min, Young's modulus measured at 0.1-1% (regression),

### Internal Data Sources:

[1] FOR680425



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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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