

LOCTITE®



LOCTITE® 3D IND147™

HDT230 High Heat
Photoplastic
Black



Carbon®

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IND147™

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LOCTITE 3D IND147™

LOCTITE 3D IND147 BK is a high temperature resistant resin with HDT 230°C, and good dimensional stability for low loads processes in molding applications

LOCTITE 3D IND147 BK shows good surface finish and sufficient toughness to withstand mechanical stresses from molding processes. Its unique properties make it ideal for applications such as polyurethane and silicone molding



Benefits:

- High HDT >230 °C
- Tough with good dimensional stability
- Good surface finish



Ideal for:

- Tooling at high temperature, low pressure
- Prototyping of high temperature parts
- Customized Molds



Markets:



Industry



Consumer Goods



Automotive

Tensile Stress at Break (MPa)

67

Young's Modulus (MPa)

3,190

Elongation at Break (%)

2

HDT at 0.455 (MPa)

291

**Values shown are linked to LOCTITE IND147 Black as reference, please refer to the specific mechanical properties for each of the colors shown in this document*



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PHYSICAL PROPERTIES

Mechanical Properties	Measure	Method	Green	Post Processed
Tensile Stress at Break	MPa	ASTM D638	31 ± 2 [2]	67 ± 16 [1]
Young's Modulus	MPa	ASTM D638	1150 ± 160 [2]	3190 ± 80 [1]
Elongation at Break	%	ASTM D638	6 ± 2 [2]	2.4 ± 0.7 [1]
Flexural Modulus	MPa	ASTM D790	1170 ± 100 [11]	3690 ± 60 [12]
Flexural Stress at Break	MPa	ASTM D790	60 ± 4 [11]	120 ± 4 [12]
Flexural Strain at Break	%	ASTM D790	9.7 ± 0.5 [11]	3.5 ± 0.2 [12]
IZOD Impact (Notched)	J/m	ASTM D256	-	14.6 ± 0.1 [7]
Shore Hardness (0 s)	D	ASTM D2240	-	94 [8]
Thermal Properties				
HDT @ 0.455 MPa	°C	ASTM D648	-	291 ± 15 [13]
HDT @ 1.82 MPa	°C	ASTM D648	-	163 ± 4 [14]
Thermal Conductivity	W/(m·K)	ASTM D5930	-	0.20 [5]
Heat Capacity	J/(g·K)	ASTM D5930	-	1.3 [5]
Coef. Thermal Expansion	µm/(m·°C)	ASTM E831	-	114 [6]
Other Properties				
Water Absorption (24hr)	%	ASTM D570	-	0.25 [9]
Solid Density	g/cm ³	ASTM D1475	1.25 [10]	1.26 [10]

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., D256 Notched IZOD (Machine Notched), 6 mm x 12 mm, D648, D2240, Type "D" (0 seconds), D570 0.125" x 2" Disc 24hr@ 25°C, D7867@ 25°C (77°F), D1475

Internal Data Sources:

[1] FOR27962, [2] FOR8167, [3]FOR46762, [4] FOR46761, [5] FOR26267, [6] FOR8169, [7] FOR8157, [8] FOR8160, [9] FOR12288, [10] FOR19479, [11] FOR48828, [12] FOR48829, [13] FOR48840, [14] FOR50508



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PHYSICAL PROPERTIES

Electrical Properties	Measure	Method	Green	Post Processed
Dielectric Strength	kV/mm	ASTM D149	-	29 ± 2 ^[1]
Dielectric Constant (50 Hz)	-	ASTM D150	-	3.0 ^[2]
Dielectric Constant (1 kHz)	-	ASTM D150	-	3.0 ^[2]
Dielectric Constant (1 MHz)	-	ASTM D150	-	2.8 ^[2]
Dissipation Factor (50 Hz)	-	ASTM D150	-	-0.002 ^[2]
Dissipation Factor (1 kHz)	-	ASTM D150	-	0.008 ^[2]
Dissipation Factor (1 MHz)	-	ASTM D150	-	0.016 ^[2]
Volume Resistivity	Ω·cm	ASTM D257	-	3.56 E+16 ^[3]
Surface Resistivity	Ω	ASTM D257	-	3.38 E+16 ^[3]

Liquid Properties	Measure	Method	Value
Viscosity @ 25°C (77°F)	cP	ASTM D7867	2,100 ± 200 ^[4]
Liquid Density	g/cm ³	ASTM D1475	1.15 ^[5]

"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, D256 Notched IZOD (Machine Notched), 6 mm x 12 mm, D648, D2240, Type "D" (0, 3 seconds), D570 0.125" x 2" Disc 24hr@ 25°C, D7867@ 25°C (77°F), D1475

Internal Data Sources:

[1] FOR25926, [2] FOR25927, [3] FOR25925, [4] FOR20535, [5] FOR8163





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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 IND147 BK 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: 2 mW/cm² to 12 mW/cm²

Exposure time for an intensity of 5 mW/cm²

Layer Thickness (µm):	25	50	100	Ec (mJ/cm ²)	9.496
Base Cure Time (s)	25	25	25	Dp (mm):	0.119
Model Layer Exposure (s):	3	4	5		

POST PROCESSING

LOCTITE 3D IND147 BK 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	20 s	1	Air pressure (20 psi)
Wait before post curing	n.a.	Ambient condition	60 min	1	Room temperature

POST CURING

LOCTITE 3D IND147 BK requires post curing to achieve specified properties. It is recommended that a wide spectrum lamp is used to post cure parts. If a lower energy LED or other post cure unit is used, a post bake at 170°C for 3 hours may be required to realize highest HDT performance.

UC Curing Unit	UV Source	Intensity	Cure time/ side	Additional Settings (Shelf, Output Energy)
Uvitron – Intelliray 600 W	Metal Halide	120 mW/cm ² (600W, 66%)	10 min	Shelf 3 (=2 nd from below)
Dymax 5000 EC Flood	Mercury Arc Bulb (broad spectrum)	150 mW/cm ² at 380 nm	10 min	Shelf "K"



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STORAGE

Store **LOCTITE 3D IND147 BK** in the unopened container in a dry location. Optimal storage: 20°C to 30°C, storage below 20°C or greater than 30°C can adversely affect products properties. More specific information is given in the Safety Data Sheet. Material removed from container may be contaminated during use. For this reason, filter used resin with 190µm mesh filter before placing back into proper storage container.

If **LOCTITE 3D IND147 BK** is exposed to temperature below 20°C compounds in the resin might crystallize. If crystals are observed during storage, place the closed bottle in a 60°C oven for 24 hours, then remove from the oven and shake the bottle vigorously. Allow the bottle and resin to cool to room temperature.



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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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