

**LOCTITE®**



# LOCTITE® 3D IND147™

HDT230 High Heat  
Photoplastic  
Black

**LOCTITE®**

Henkel Corporation

[loctite3dp@henkel.com](mailto:loctite3dp@henkel.com)



# LOCTITE®

## IND147™

HDT230 HIGH HEAT  
PHOTOPLASTIC  
BLACK



### LOCTITE 3D IND147™

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

LOCTITE 3D IND147 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*



# LOCTITE®

## IND147™

HDT230 HIGH HEAT  
PHOTOPLASTIC  
BLACK



## 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 Strength (Notched)	J/m	ASTM D256	-	14.6 ± 0.1 [7]
Shore Hardness (0 s)	D	ASTM D2240	-	94 [8]
<b>Thermal Properties</b>				
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]
<b>Other Properties</b>				
Water Absorption (24hr)	%	ASTM D570	-	0.25 [9]
Solid Density	g/cm <sup>3</sup>	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



# LOCTITE®

## IND147™

HDT230 HIGH HEAT  
PHOTOPLASTIC  
BLACK



## 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 <sup>3</sup>	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





## IND147™

HDT230 HIGH HEAT  
PHOTOPLASTIC  
BLACK



## 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 IND 147 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/cm<sup>2</sup> to 12 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> )	9.496
Base Cure Time (s)	25	25	25	Dp (mm):	0.119
Model Layer Exposure (s):	3	4	5		

## POST PROCESSING

LOCTITE 3D IND 147 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 IND 147 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 <sup>2</sup> (600W, 66%)	10 min	Shelf 3 (=2 <sup>nd</sup> from below)
Dymax 5000 EC Flood	Mercury Arc Bulb (broad spectrum)	150 mW/cm <sup>2</sup> at 380 nm	10 min	Shelf "K"



# LOCTITE®

## IND147™

HDT230 HIGH HEAT  
PHOTOPLASTIC  
BLACK



## 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.

Any liability in respect of the information in the Technical Data Sheet or any other written or oral recommendation(s) regarding the concerned product is excluded, except if otherwise explicitly agreed and except in relation to death or personal injury caused by our negligence and any liability under any applicable mandatory product liability law.

In case products are delivered by Henkel Belgium NV, Henkel Electronic Materials NV, Henkel Nederland BV, Henkel Technologies France SAS and Henkel France SA please additionally note the following:

In case Henkel would be nevertheless held liable, on whatever legal ground, Henkel's liability will in no event exceed the amount of the concerned delivery.

In case products are delivered by Henkel Colombiana, S.A.S. the following disclaimer is applicable:

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. Henkel is 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.

Any liability in respect of the information in the Technical Data Sheet or any other written or oral recommendation(s) regarding the concerned product is excluded, except if otherwise explicitly agreed and except in relation to death or personal injury caused by our negligence and any liability under any applicable mandatory product liability law.

In case products are delivered by Henkel Corporation, Resin Technology Group, Inc., or Henkel Canada, Inc. the following disclaimer is applicable:

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of **Henkel Corporation's products. Henkel Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Henkel Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.

### Trademark Usage

Except as otherwise noted, all trademarks in this document are trademarks of Henkel Corporation in the U.S. and elsewhere. ® denotes a trademark registered in the U.S. Patent and Trademark Office.



**LOCTITE®**



**FIND OUT MORE AT**

**LOCTITEAM.COM**

**LOCTITE®**

Henkel Corporation

[loctite3dp@henkel.com](mailto:loctite3dp@henkel.com)

