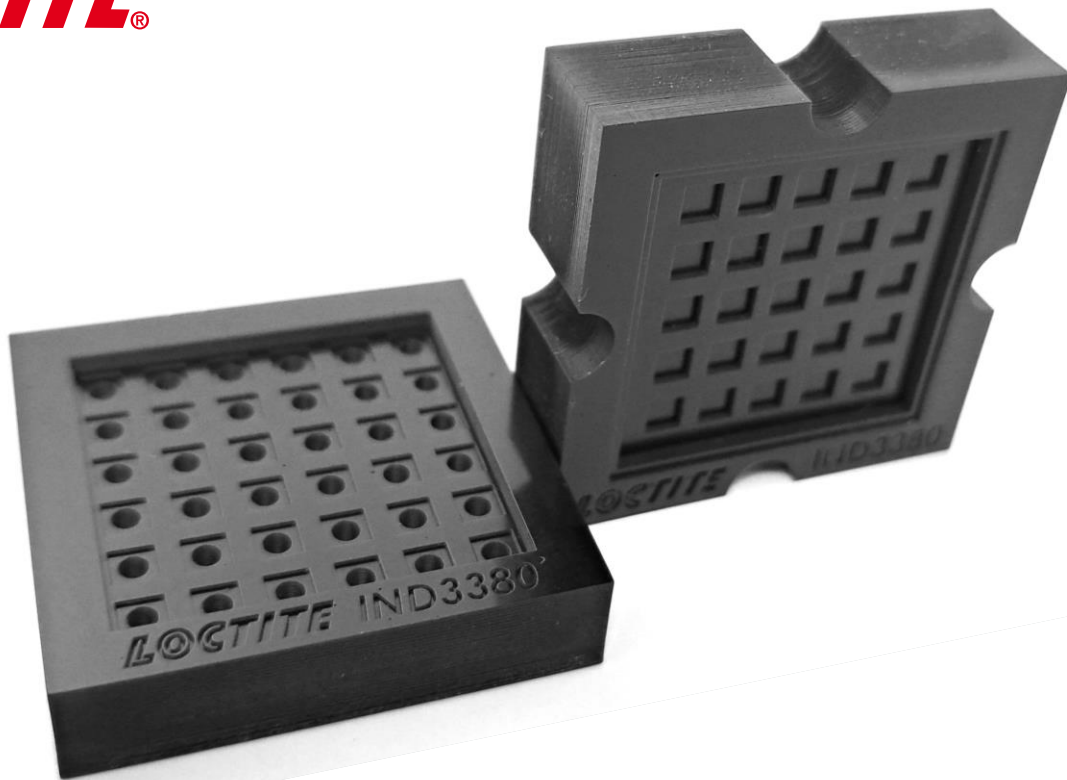


**LOCTITE®**



# LOCTITE 3D IND3380™

ESD

Black

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**IND3380™**  
ESD

## LOCTITE 3D IND3380™

LOCTITE 3D IND3380 BK is a high temperature resistant resin with HDT of 190°C, electrostatic dissipative properties (ESD), and high stiffness.

LOCTITE 3D IND3380 BK offers a smooth surface finish and high chemical resistance, making it an ideal choice for jigs and fixtures in general and electronic manufacturing. Additionally, its unique characteristics make it a reliable option for tooling applications, offering versatile solutions for manufacturing needs.

LOCTITE 3D IND3380 BK is compatible with a broad range of DLP and LCD machines.



### Benefits:

- Displays electrostatic dissipative properties (ESD)
- High HDT of 190°C
- High accuracy and fine detail printing



### Ideal for:

- Tooling at high temperature, low pressure
- Jigs and fixtures for electronic device manufacturing processes



### Markets:



Industry



Consumer Goods



Automotive

Tensile Stress at Break (MPa)

50

Young's Modulus (MPa)

3,000

Elongation at Break (%)

2

HDT at 0.455 (MPa)

190



### PROPERTIES

| Mechanical Properties    | Measure           | Method     | Green       | Post Processed             |
|--------------------------|-------------------|------------|-------------|----------------------------|
| Young's Modulus          | MPa               | ASTM D638  | 1300 – 1500 | 2800 – 3000 <sup>[1]</sup> |
| Tensile Stress at Break  | MPa               | ASTM D638  | 25 – 30     | 40 – 50 <sup>[1]</sup>     |
| Elongation at Break      | %                 | ASTM D638  | 2 – 3       | 1 – 2 <sup>[1]</sup>       |
| Flexural Modulus         | MPa               | ASTM D790  | 1250 – 1350 | 3200 – 3400 <sup>[2]</sup> |
| Flexural Strength        | MPa               | ASTM D790  | 40 – 50     | 75 – 85 <sup>[2]</sup>     |
| Flexural Strain at Break | %                 | ASTM D790  | 3.0 – 4.3   | 2.0 – 2.8 <sup>[2]</sup>   |
| IZOD Impact (Notched)    | J/m               | ASTM D256  |             | 11.5 – 12.5 <sup>[3]</sup> |
| Shore Hardness (3s)      | D                 | ASTM D2240 |             | 86.5 <sup>[4]</sup>        |
| <b>Other Properties</b>  |                   |            |             |                            |
| HDT at 0.455 MPa         | °C                | ASTM D648  |             | 180 – 190 <sup>[5]</sup>   |
| HDT at 1.82 MPa          | °C                | ASTM D648  |             | 100 – 110 <sup>[5]</sup>   |
| Water Absorption (24 hr) | %                 | ASTM D570  |             | <0.4 <sup>[6]</sup>        |
| Solid Density            | g/cm <sup>3</sup> | ASTM D1475 |             | 1.20 – 1.25 <sup>[7]</sup> |
| Thermal Conductivity     | W/(m·K)           | ASTM D5930 |             | 1.4 <sup>[8]</sup>         |
| Heat Capacity            | J/(g·K)           | ASTM D5930 |             | 0.2 <sup>[8]</sup>         |

| Liquid Properties        | Measure           | Method     | Value                         |
|--------------------------|-------------------|------------|-------------------------------|
| Viscosity at 25°C (77°F) | cP                | ASTM D7867 | 9,000 – 11,000 <sup>[9]</sup> |
| Liquid Density           | g/cm <sup>3</sup> | ASTM D1475 | 1.1 – 1.2 <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. D638-14 Type IV, 5 mm/min; D790-17 Method B, 1.5 mm/min; D648-18 Method A; D256-10 (18) - Machine Notched, 6 mm x 12 mm, 2.75 J Striker, D570-98 (18) - 0.125" x 2" Disc, 24hr @ 25°C; D2240-15 (21); D7867-13 (20); D1475-13 (20)

**Internal Data Sources:**

[1] GEN492458, [2] GEN492508, [3] FOR503640, [4] FOR504329, [5] GEN492558, [6] FOR415557, [7] FOR512821, [8] FOR515717, [9] FOR421227, [10] FOR415604.





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### PROPERTIES

| Electrical Properties | Measure                  | Method          | Green | Post Processed                     |
|-----------------------|--------------------------|-----------------|-------|------------------------------------|
| Surface Resistivity   | $\Omega$                 | DIN EN61340-2-3 |       | $10^4 - 10^{11}$ [1]               |
| Volume Resistivity    | $\Omega \cdot \text{cm}$ | DIN EN61340-2-3 |       | $4 \cdot 10^6 - 24 \cdot 10^6$ [2] |
| Dielectric Strength   | kV/mm                    | ASTM D149       |       | 3 – 5 [3]                          |

"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:**

[1] FOR504358, [2] FOR501814, [3] FOR514215



## 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 IND3380 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 gently to prevent foaming
- Print Temperature: 20°C to 45°C
- Intensity: 3 mW/cm<sup>2</sup> to 10 mW/cm<sup>2</sup>

### Recommended Printer Parameters

|                                   |          |
|-----------------------------------|----------|
| Print Temperature (°C):           | 25 - 45  |
| Printer Wavelengths (nm):         | 385, 405 |
| Irradiance (mW/cm <sup>2</sup> ): | 3 - 10   |

### Example Print Parameters: 5 mW/cm<sup>2</sup> at 385 nm, 35°C

|                        |       |
|------------------------|-------|
| Layer Thickness (µm):  | 100   |
| Burn-in Region (s)     | 40-50 |
| Transition Region (s): | 15-25 |
| Model Region (s):      | 7-8   |

## CLEANING

LOCTITE 3D IND3380 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 Step           | IPA   | Ultrasonic        | 2 min      | 1 or 2    | Allow parts to dry    |
| Dry                     | n.a.  | Compressed air    | 10 to 60 s | 1 or 2    | Air pressure (50 psi) |
| Wait before post curing | n.a.  | Ambient condition | 60 min     | 1         | Room temperature      |



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### WORKFLOW

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### POST CURING

**LOCTITE 3D IND3380 BK** requires post curing to achieve specified properties. It is recommended that either an LED or wide spectrum lamp be used to post cure parts.

After using a post curing unit, an additional heat cure at 170°C for 3 hours is required to reach the best properties. Allow the parts to rest one hour between UV cure and heat cure. To minimize risk of warpage place parts in cold oven before ramping up temperature to target value and cool down parts slowly in switched off oven after reaching the heat curing conditions.

| UV Curing Unit        | UV Source                         | Intensity                        | Cure time per side | Additional Settings (Shelf, Output Energy) | Heat Cure        |
|-----------------------|-----------------------------------|----------------------------------|--------------------|--|------------------|
| Dymax 5000 EC Flood   | Mercury Arc Bulb (broad spectrum) | 148 mW/cm <sup>2</sup> at 380 nm | 10 min             | 400W, Shelf K                              | 3 hours at 170°C |
| Loctite CL36          | 405nm LED                         | 80 mW/cm <sup>2</sup> at 405 nm  | 30 min             | 100% top & side                            | 3 hours at 170°C |
| Rapidshape RS Cure XL | Multiple LEDs                     | 150%                             | 30 min             | Third shelf from bottom                    | 3 hours at 170°C |

### STORAGE

Store **LOCTITE 3D IND3380 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.

### ESD PROPERTIES

**LOCTITE 3D IND3380 BK** provides ESD properties with a surface resistivity in the range of 10<sup>4</sup>Ω to 10<sup>11</sup>Ω accordingly to DIN EN61340-2-3.

The exact value of the surface resistivity depends on the print orientation and part geometry. Please note that the burn-in region can show higher surface resistivity outside of the ESD range. Due to that we recommend to print with parts on supports or to adjust the print orientation accordingly to ensure that the printed part provides ESD properties at the desired surface.



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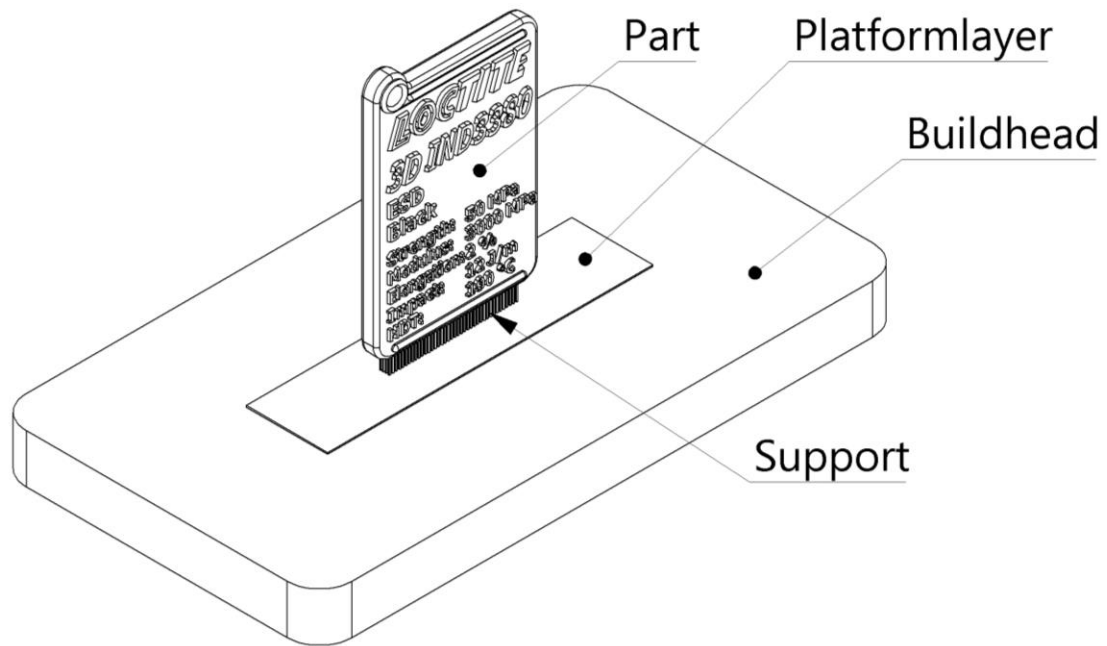
### TIPS & TRICKS

This section is a collection of useful advices, guides, and recommendations designed to help users of the **LOCTITE 3D IND3380 BK** deal with specific process tasks more efficiently.

#### PRINT ORIENTATION

To enhance the buildhead adhesion of **LOCTITE 3D IND3380 BK**, it is recommended to use an initial platform layer. The required part should be attached to this layer using supports. The burn-in region, which will be the initial platform layer, can be discarded afterwards. This also ensures that the printed part provides the desired ESD performance since the burn-in region can show higher surface resistivity outside of the ESD range.

The part should be orientated to have the smallest possible cross-sectional area in the z-direction to minimize detachment forces during the print process.





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## NOTE

The information provided in this Preliminary Technical Data Sheet (pTDS) 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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