LOCTITE®

# LOCTITE® 3D IND6845™

## Tough
## Matte Black

**LOCTITE®**
Henkel Corporation
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## LOCTITE 3D IND6845™

LOCTITE 3D IND6845 offers a solid balance of moderately high Heat Deflection Temperature (HDT) and toughness.

LOCTITE 3D IND6845 produces parts with smooth surfaces and fine details. In addition to its toughness, it has excellent impact resistance making it suitable for parts that are subject to wear and mechanical stress.

LOCTITE 3D IND6845 is TPO-free which contributes to better safety ratings in manufacturing environments.

### Benefits:

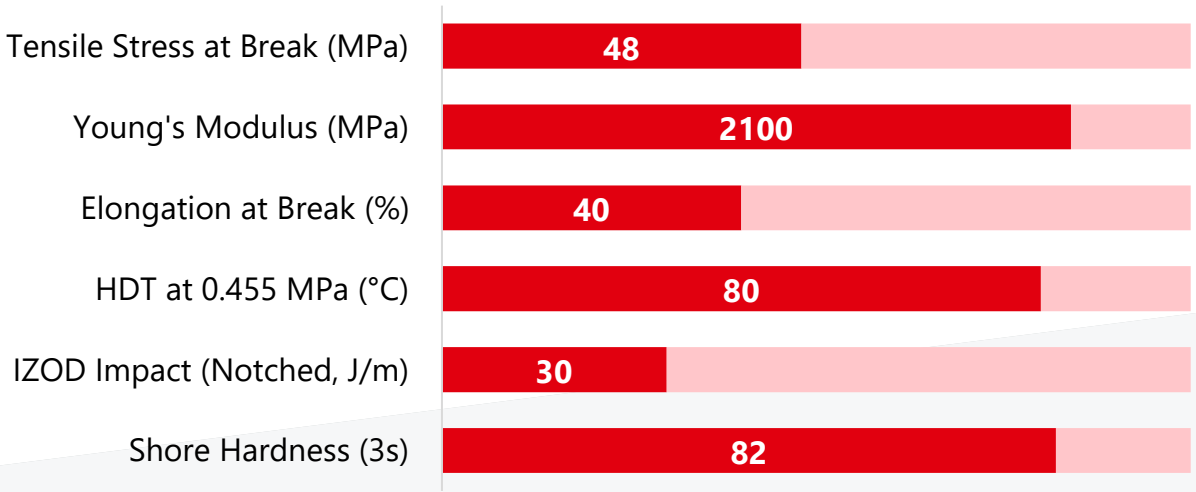
- TPO-free and excellent H&S rating
- Unique balance of HDT and toughness
- Increased print speed

### Ideal for:

- General industrial applications
- General end-use plastic parts
- Jigs, tooling, fixtures

### Markets:

Industry | Automotive | Consumer Goods




*Values shown are linked to LOCTITE IND6845 BK as reference.*

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## PROPERTIES

| Mechanical Properties | Measure | Method | Green | Post Processed |
|---|---|---|---|---|
| Young's Modulus | MPa | ASTM D638 | 1680 – 1830[1] | 1980 - 2200[1] |
| Tensile Stress at Yield | MPa | ASTM D638 | 41 – 43[1] | 55 - 59[1] |
| Elongation at Yield | % | ASTM D638 | 4.1 – 4.6[1] | 4.4 – 5.6[1] |
| Tensile Stress at Break | MPa | ASTM D638 | 32 – 34[1] | 47 – 49[1] |
| Elongation at Break | % | ASTM D638 | 56 – 64[1] | 35 – 45[1] |
| Flexural Modulus | MPa | ASTM D790 | - | 1960 – 2300[1] |
| Flexural Stress at Break | MPa | ASTM D790 | - | 80 – 95[1] |
| Flexural Elongation at Break | % | ASTM D790 | - | >5[1] |
| IZOD Impact (Notched) | J/m | ASTM D256 | - | 28 – 35[5] |
| Shore Hardness (3s) | D | ASTM D2240 | - | 81 – 83[2] |
| **Other Properties** | | | | |
| HDT at 0.455 MPa | °C | ASTM D648 | - | 80 – 85[3,4] |
| HDT at 1.82 MPa | °C | ASTM D648 | - | 62 – 68[3,4] |
| Water Absorption (24hr) | % | ASTM D570 | - | 2.1 – 2.5[2] |
| Water Absorption (48hr) | % | ASTM D570 | - | 2.7 – 3.1[2] |
| Water Absorption (72hr) | % | ASTM D570 | - | 3.3 – 3.7[2] |
| Solid Density | g/cm$^3$ | ASTM D1475 | - | 1.16 - 1.20[2] |
| Thermal Conductivity | W/(m·K) | ASTM D5930 | - | 0.20 – 0.21[12] |
| Heat Capacity | J/(g·K) | ASTM D5930 | - | 1.2 – 1.3[12] |
| Horizontal Burning Test | - | UL94 | - | HB at 1.6 mm [13] |

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

**Internal Data Sources:**
[1] GEN730945 [2] FOR727326, [3] FOR716969, [4] FOR727226, [5] FOR729752, [12] FOR729029 [13] FOR728833

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## PROPERTIES

| Liquid Properties | Measure | Method | | Value |
|---|---|---|---|---|
| Viscosity at 25°C (77°F) | cP | ASTM D7867 | | 719 - 769 [7,9] |
| Liquid Density | g/cm$^3$ | ASTM D1475 | | 1.07 [8] |
| **Biocompatibility** | | | | |
| Cytotoxicity | | ISO10993-5 | - | Pending[13] |

| Electrical Properties | Measure | Method | Green | Post Processed |
|---|---|---|---|---|
| Volume Resistivity | Ω·cm | ASTM D257 | - | 5.1E+15 – 3.7E+15[10] |
| Surface Resistivity | Ω | ASTM D257 | - | 9.9E+15 – 8.1E+15[10] |
| Dielectric Strength | kV/mm | ASTM D149 | - | 14.4 – 13.8[10] |
| AC Relative Permittivity (Dielectric Constant) | | | | |
| at 50 Hz (XY) | none | ASTM D150 | - | Pending[10] |
| at 1 kHz (XY) | none | ASTM D150 | - | Pending[10] |
| at 1 MHz (XY) | none | ASTM D150 | - | Pending[10] |
| AC Loss Characteristic (Dissipation Factor) | | | | |
| at 50 Hz (XY) | none | ASTM D150 | - | Pending[10] |
| at 1 kHz (XY) | none | ASTM D150 | - | Pending[10] |
| at 1 MHz (XY) | none | ASTM D150 | - | Pending[10] |

"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:**
[7] FOR724418 [8] FOR698029, [9] FOR723322, [10] FOR728734, [13] FOR740852

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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 IND6845 BK is formulated to print optimally on DLP and LCD printers. 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: 1.5 mW/cm² to 5 mW/cm²

| Printer Settings | | | 385 nm and 5.0 mW/cm² | 405 nm and 1.75 mW/cm² |
|---|---|---|---|---|
| **Parameter** | **Measure** | **Method** | **Exposure time** | **Exposure time** |
| Layer Thickness | µm | Internal | 100 | 100 |
| Burn-in Region | s | Internal | 5 | 25 |
| Transition Region | s | Internal | - | 16 |
| Model Region | s | Internal | 5.5 | 8 |

| **Parameter** | **Measure** | **Method** | **Value** | **Value** |
|---|---|---|---|---|
| $E_C$ | mJ/cm2 | Internal | 9.3[11] | 5.1[12] |
| $D_P$ | mm | Internal | 0.16[11] | 0.16[12] |

| **Settings** | **Measure** | **Method** | **Exposure time** | **Exposure time** |
|---|---|---|---|---|
| $D_C$ = 50 µm | s | Internal | 1.76*[11] | 3.6*[12] |
| $D_C$ = 100 µm | s | Internal | 2.80*[11] | 5.3*[12] |

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

**Internal data source:**
[11] FOR723725, [12] FOR718034

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### CLEANING

LOCTITE 3D IND6845 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 #1 | Cleaner C | Ultrasonic | 2 min | 1 or 2 | Dry after each interval |
| Cleaning Step #2 | IPA | Ultrasonic | 1 min | 1 | |
| Dry | n.a. | Compressed air | 10 s to 60 s | 1 | Air pressure (50psi) |
| Wait before post curing | n.a. | Ambient condition | 60 min | 1 | Room temperature |

### POST CURING

LOCTITE 3D IND6845 BK requires a two-step post curing to achieve specified properties. In the first step it is recommended that either an LED or wide spectrum lamp be used to UV post cure parts. In the second step the UV post cured parts require an additional Heat post cure to achieve final properties.

**STEP 1: UV post cure**

| UV Curing Unit | UV Source | Intensity | Cure time per side | Additional Settings (Shelf, Output Energy) |
|---|---|---|---|---|
| Loctite CL36 | 405nm LED | 80 mW/cm² at 405 nm | 30 min | 100% top and side |
| Prusa CW1S | 405nm LED | 15 mW/cm² at 405 nm | 30 min | 100% |

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### POST CURING

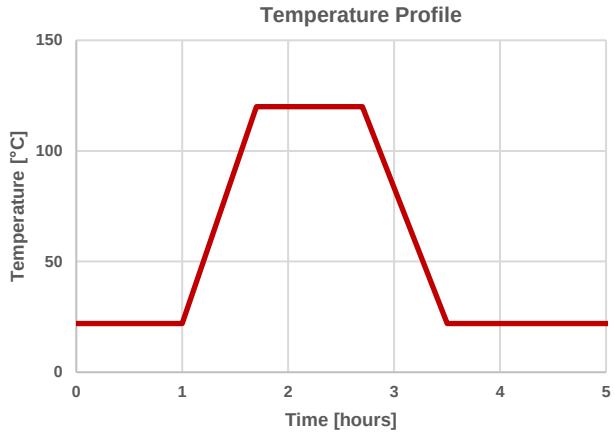
LOCTITE 3D IND6845 BK requires a two-step post curing to achieve specified properties.

**STEP 2: Heat post cure – Using a printer at 385 nm**

After UV post curing, an additional Heat post cure at 120°C for 1 hours is required to reach final properties. Let parts rest one hour between UV post cure and Heat post cure.

To minimize risk of warpage place parts in the oven at standard lab conditions with $T_{start}$ = 22°C before ramping temperature with are rate of $R_T \leq 5$°C/min to target value of $T_{cure}$ = 120°C.

After 1 hour at $T_{cure}$ = 120°C cool down parts slowly in the switched off oven to standard lab conditions with $T_{end}$ = 22°C . Do not remove the parts from the oven before they reached lab temperature to prevent thermal stress and warpage.

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### POST CURING

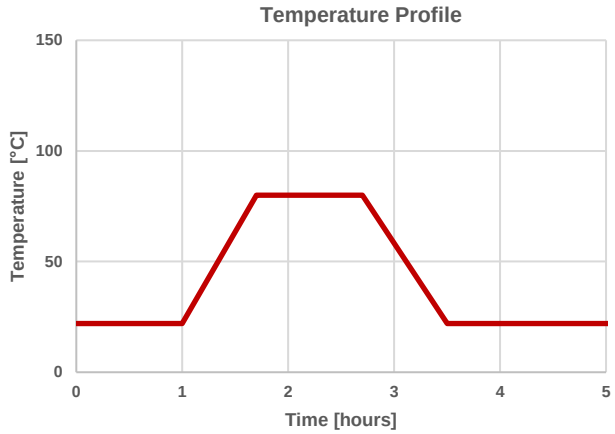
LOCTITE 3D IND6845 BK requires a two-step post curing to achieve specified properties.

**STEP 2: Heat post cure – Using a printer at 405 nm**

After UV post curing, an additional Heat post cure at 80°C for 1 hours is required to reach final properties. Let parts rest one hour between UV post cure and Heat post cure.

To minimize risk of warpage place parts in the oven at standard lab conditions with $T_{start}$ = 22°C before ramping temperature with are rate of $R_T \leq 5$°C/min to target value of $T_{cure}$ = 80°C.

After 1 hour at $T_{cure}$ = 80°C cool down parts slowly in the switched off oven to standard lab conditions with $T_{end}$ = 22°C. Do not remove the parts from the oven before they reached lab temperature to prevent thermal stress and warpage.



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## TIPS & TRICKS

This section is a collection of useful advices, guides, and recommendations designed to help users of LOCTITE 3D IND6845 BK deal with specific process tasks more efficiently.

### STORAGE

Store LOCTITE 3D IND6845 BK in the unopened container in a dry location. Optimal Storage: 20°C to 30°C. Storage below 20°C or above 30°C can adversely affect product properties. .

### RESIN USE

Use LOCTITE 3D IND6845 BK within two weeks after having opened the bottle to assure stable mechanical properties. Material removed from containers may be contaminated during use. For this reason, filter used resin with 190 µm mesh filter before placing back into proper storage container. Please use a separate container for used resin.

Reduce exposure to ambient light to achieve best resin performance.

### POST PROCESSING

Please start the post processing of LOCTITE 3D IND6845 BK within 24 hours after the print is finished. Gently remove green parts from the platform to achieve best part performance.

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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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