IND405™

HDT50

HIGH ELONGATION

CLEAR

Certified for Carbon® Printers
IND405™ HDT50 High Elongation Clear

Description

LOCTITE® 3D IND405™ is a high elongation and high toughness material with outstanding impact resistance and excellent surface finish. This stiff and durable high performance material is ideal for a wide variety of tools in the production floor, including manufacturing aids and final parts such as housings and consumer goods applications. The unique set of performance attributes makes it comparable to an unfilled thermoplastic like polypropylene. Parts can be machined, tapped, or polished for final finish.

<table>
<thead>
<tr>
<th>Mechanical Properties</th>
<th>Method</th>
<th>Liquid</th>
<th>Green</th>
<th>Post Process UV Cube</th>
<th>Post Process Dymax</th>
</tr>
</thead>
</table>

Other Properties

- HDT @ 0.455 MPa: ASTM D648
- Shore Hardness “D” (0s,3s): ASTM D2240
- Taber Abrasion: ASTM D4060-19
- Water Absorption (24hr): ASTM 570
- Solid Density (Green): ASTM D1475
- Solid Density (Post Processed): ASTM D1475

Liquid Properties

- Viscosity: ASTM D7867
- Liquid Density: ASTM D1475

"Specimen printed on Carbon M2 at 9 mW/cm2 and 100 um slicing and washed in IPA 5min (3+2 in fresh IPA) then allowed to air dry for 1 hour before post cure. All specimen were conditioned in ambient lab conditions at 19-23C / 40-60% RH for at least 24 hours. ASTM Methods: D638 Type IV, 50mm/min, D256 Notched IZOD (Machine Notched), 6 mm x 12 mm, D648, D2240, D4060-19, Type “D” (0, 3 seconds), D570 24hr, D7867 @ 25°C (77°F) D1475, G-154(1 cycle), E308

1) TaskID Reference: FOR19711
2) TaskID Reference: FOR21737
3) TaskID Reference: FOR21738
4) TaskID Reference: FOR21750
5) TaskID Reference: FOR18397
6) TaskID Reference: FOR16321
7) TaskID Reference: FOR16266
8) TaskID Reference: FOR16274
9) TaskID Reference: FOR16274
10) TaskID Reference: FOR18476
11) TaskID Reference: FOR18206
12) TaskID Reference: FOR17633
13) TaskID Reference: FOR18829
14) TaskID Reference: FOR23425
15) TaskID Reference: FOR23432
16) TaskID Reference: FOR23426

11/04/2020 Preliminary v1.9
## Clear Color Properties

**Method:** ASTM E308, Total Transmittance

<table>
<thead>
<tr>
<th>Part State</th>
<th>L*</th>
<th>a*</th>
<th>b*</th>
<th>C*</th>
<th>h</th>
<th>dE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green / no post-processing 🟢[7]</td>
<td>92.425</td>
<td>-1.205</td>
<td>2.195</td>
<td>2.5</td>
<td>118.735</td>
<td>NA</td>
</tr>
<tr>
<td>Dymax 5000EC 5 minutes / side 🟢[8]</td>
<td>92.255</td>
<td>-0.52</td>
<td>1.265</td>
<td>1.37</td>
<td>112.28</td>
<td>1.17</td>
</tr>
<tr>
<td>Loctite CL36 60 min/side 🟢[9]</td>
<td>92.18</td>
<td>-0.32</td>
<td>0.89</td>
<td>0.94</td>
<td>109.88</td>
<td>1.831366</td>
</tr>
</tbody>
</table>

## QUV exterior weathering conditions (ASTM G-154—Cycle 1): Clear color

**Method:** ASTM G-154—Cycle 1 & ASTM E308, Total Transmittance

<table>
<thead>
<tr>
<th>QUV Exposure Time (Hrs)</th>
<th>L*</th>
<th>a*</th>
<th>b*</th>
<th>C*</th>
<th>h</th>
<th>dE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>90.86</td>
<td>-0.65</td>
<td>1.03</td>
<td>1.22</td>
<td>122.49</td>
<td>NA</td>
</tr>
<tr>
<td>240</td>
<td>91.06</td>
<td>-0.47</td>
<td>1.42</td>
<td>1.49</td>
<td>108.47</td>
<td>0.47</td>
</tr>
</tbody>
</table>

## QUV exterior weathering conditions (ASTM G-154—Cycle 1): Clear color mechanical properties

**Method:** ASTM G-154—Cycle 1

<table>
<thead>
<tr>
<th>QUV Exposure Time (Hrs)</th>
<th>Tensile Stress at break (MPa)</th>
<th>Yield Stress (MPa)</th>
<th>Young’s Modulus (MPa)</th>
<th>Elongation at break (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>49 ± 3</td>
<td>42 ± 1</td>
<td>1412 ± 60</td>
<td>116 ± 12</td>
</tr>
<tr>
<td>300</td>
<td>41 ± 3</td>
<td>40 ± 1</td>
<td>1343 ± 103</td>
<td>78 ± 12</td>
</tr>
<tr>
<td>520</td>
<td>41 ± 2</td>
<td>44 ± 1</td>
<td>1469 ± 35</td>
<td>63 ± 16</td>
</tr>
<tr>
<td>800</td>
<td>38 ± 1</td>
<td>45 ± 1</td>
<td>1478 ± 51</td>
<td>46 ± 16</td>
</tr>
</tbody>
</table>
IND405™ HDT50 High Elongation Clear

Machine Settings

This resin is printed with the "Loctite IND405 Clear" dropdown on Carbon M series printers.

Post Processing

LOCTITE® 3D IND405™ requires post processing to achieve specified properties. Prior to post curing, support structures should be removed from the printed part, and the part should be washed in a compatible cleaner. LOCTITE® recommends one of the following cleaning procedures:

1. Agitated IPA bath in 3-minute wash cycle(s).
2. A 2-minute final wash in clean IPA.
   Or
1. Agitated Loctite® Cleaner C™ bath in 5-minute wash cycle(s).
2. A 2-minute final wash in clean IPA.
   Note: Loctite® Cleaner C™ may be used but has not been validated by Carbon®.
   Or
1. DPM in the Carbon Smart Part Washer.
2. After removal from the Smart Part Washer, dunk build platform and parts into a container of IPA 10 times, over 10 seconds total with an even cadence.

Use compressed air to remove residual solvent from the surface of the material between intervals. Exact times and methods can be found by contacting us at www.loctiteAM.com.

Post Curing

LOCTITE® 3D IND405™ requires post curing to achieve specified properties. A wide array of post cure equipment can be used to cure appropriately. Specific to the data reported are two validated workflows using the below post cure units.

- APM LED UV Cube II at 15min/per side
- Dymax 5000EC with Metal Halide, bulb part number 38560, at 5min/per side

Storage

Store LOCTITE® 3D IND405™ in the unopened container in a dry location. Optimal Storage: 8°C to 30°C, Storage below 8°C or greater than 30°C can adversely affect products 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.

Shelf Life

LOCTITE® 3D IND405™ shelf life is 12months from the date of manufacture. This date can be found on the label of each bottle.
IND405™ HDT50 High Elongation Clear

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.