

## LOCTITE® 4310™

September 2020

### PRODUCT DESCRIPTION

LOCTITE® 4310™ provides the following product characteristics:

|                       |   |
|-----------------------|---|
| <b>Technology</b>     | Cyanoacrylate/UV  |
| <b>Chemical Type</b>  | Ethyl cyanoacrylate with photoinitiator                   |
| <b>Appearance</b>     | Transparent, light yellow-green to dark blue-green liquid |
| <b>Fluorescence</b>   | Positive under UV light                                   |
| <b>Components</b>     | One part - requires no mixing                             |
| <b>Cure</b>           | Ultraviolet (UV) / Visible light                          |
| <b>Secondary Cure</b> | Humidity  |
| <b>Application</b>    | Bonding   |
| <b>Key substrates</b> | Plastics, rubbers and metals                              |

LOCTITE® 4310™ is designed for bonding applications that require very rapid fixturing, fillet cure or surface cure. The UV light cure properties facilitate rapid curing of exposed surface areas thereby minimizing blooming and providing an alternative to solvent borne accelerators. Suitable for use in the assembly of **disposable medical devices**.

### ISO-10993

LOCTITE® 4310™ has been tested to Henkel's test protocols based on ISO-10993 biocompatibility standards, as a means to assist in the selection of products for use in the medical device industry.

### TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25°C 1.06

Flash Point - See SDS

Viscosity, Cone & Plate, mPa·s (cP):

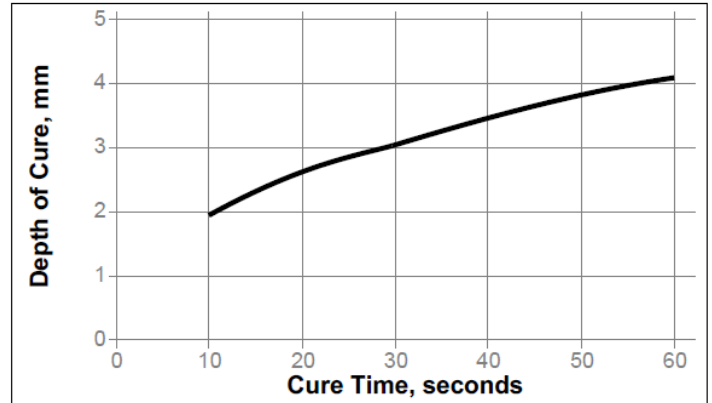
Physica MC100, Cone MK 22, shear rate 100 s<sup>-1</sup> 100 to 250

### TYPICAL CURING PERFORMANCE

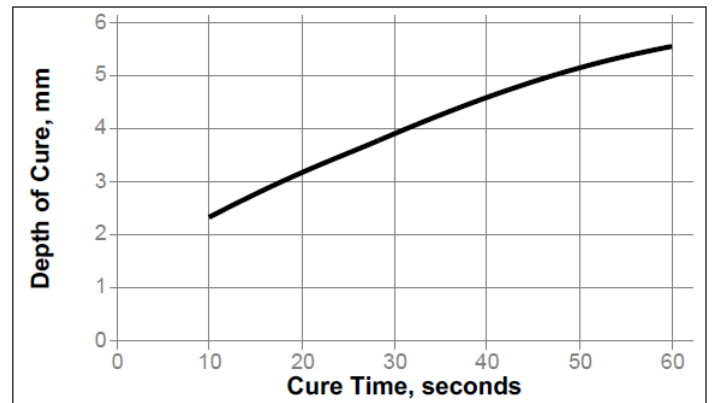
#### Primary Cure Mechanism, UV

#### Depth of Cure

Electrodeless, D bulb, 100 mW/cm<sup>2</sup>, measured @ 365 nm



LED Flood Array 405nm, 100 mW/cm<sup>2</sup>, measured @ 405nm



#### Tack Free Time / Surface Cure

Tack Free Time is the time in seconds required to achieve a tack free surface

#### UV/Visible light sources

| Light Source          | Intensity (mW/cm <sup>2</sup> ) | Wavelength (nm) | Tack Free Time (seconds) |
|-----------------------|---------------------------------|-----------------|--------------------------|
| Electrodeless, H bulb | 30                              | 365             | ≤10                      |
| Zeta® 7411-S          | 30                              | 365             | ≤5                       |
| CUREJET 405 LED       | 65                              | 365             | ≤5                       |
| LED Flood Array 405nm | 65                              | 365             | ≤5                       |

**Cure Speed vs. Substrate**

The rate of cure will depend on the substrate used. The table below shows the fixture time achieved on different materials at 22 °C / 50% relative humidity. This is defined as the time to develop a shear strength of 0.1 N/mm<sup>2</sup>. Fixture time measurements relate to non-UV cure.

## Fixture time, seconds

|                                |            |
|--------------------------------|------------|
| ABS                            | <5         |
| Aluminum (grit blasted)        | 5 to 15    |
| Neoprene                       | 15 to 25   |
| Phenolic                       | 250 to 290 |
| Polycarbonate                  | 10 to 20   |
| Polyethylene                   | >300       |
| Polyethylene (Primer 770)      | 5 to 10    |
| Polypropylene                  | >300       |
| Polypropylene (plasma treated) | 270 to 300 |
| PVC                            | 90 to 105  |
| Steel (degreased)              | 20 to 30   |

**TYPICAL PROPERTIES OF CURED MATERIAL**

Cured @ 100 mW/cm<sup>2</sup>, measured @ 365nm, for 30 seconds per side using an Electroless system, D bulb.

**Physical Properties**

|  |                            |                     |
|--|----------------------------|---------------------|
| Coefficient of Thermal Expansion, ISO 11359-2, K <sup>-1</sup> |                            |                     |
| Pre Tg   |                            | 56×10 <sup>-6</sup> |
| Glass Transition Temperature, ASTM E 228, °C                   |                            | 102                 |
| Shore Hardness, ISO 868, Durometer D                           |                            | 84                  |
| Linear Shrinkage, in/in  |                            | 6                   |
| Water Absorption, ISO 62, %                                    |                            |                     |
| 2 hours in boiling water                                       |                            | 2.2                 |
| 7 days in water @ 22 °C  |                            | 1.3                 |
| Elongation, at break, ISO 527-3, %                             |                            | 7.3                 |
| Tensile Strength, ISO 527-3                                    | N/mm <sup>2</sup><br>(psi) | 50<br>(7,250)       |
| Tensile Modulus, ISO 527-3                                     | N/mm <sup>2</sup><br>(psi) | 1,950<br>(282,900)  |

**TYPICAL PERFORMANCE OF CURED MATERIAL****Adhesive Properties**

Cured @ 30 mW/cm<sup>2</sup>, measured @ 365 nm, for 10 seconds using a Zeta® 7400 light source

Block Shear Strength, ISO 13445:

|               |                            |                  |
|---------------|----------------------------|------------------|
| Polycarbonate | N/mm <sup>2</sup><br>(psi) | ≥9.0<br>(≥1,305) |
|---------------|----------------------------|------------------|

Cured @ 100 mW/cm<sup>2</sup>, measured @ 365 nm, for 30 seconds using a Zeta® 7411-S light source

Block Shear Strength, ISO 13445:

|                                       |                            |                 |
|---------------------------------------|----------------------------|-----------------|
| Acrylic to Acrylic                    | N/mm <sup>2</sup><br>(psi) | 14.4<br>(2,090) |
| Polycarbonate to Polycarbonate        | N/mm <sup>2</sup><br>(psi) | 22<br>(3,190)   |
| Polycarbonate to Steel (grit blasted) | N/mm <sup>2</sup><br>(psi) | 12<br>(1,740)   |

Cured @ 100 mW/cm<sup>2</sup>, measured @ 405 nm, for 30 seconds using a LED Flood Array 405nm

Block Shear Strength, ISO 13445:

|                                       |                            |                 |
|---------------------------------------|----------------------------|-----------------|
| Acrylic to Acrylic                    | N/mm <sup>2</sup><br>(psi) | 10.6<br>(1,540) |
| Polycarbonate to Polycarbonate        | N/mm <sup>2</sup><br>(psi) | 16.4<br>(2,380) |
| Polycarbonate to Steel (grit blasted) | N/mm <sup>2</sup><br>(psi) | 12.6<br>(1,830) |

Cured @ 1,000 mW/cm<sup>2</sup>, for 10 seconds using an Electroless system, D bulb

Needle Pullout Strength:

| Material                       | 22 Gauge cannula   | 27 Gauge cannula  |
|--------------------------------|--------------------|-------------------|
| Polycarbonate                  | N 139<br>(lb) (31) | N 38<br>(lb) (9)  |
| Polyethylene                   | N 11<br>(lb) (2)   | N 24<br>(lb) (6)  |
| Polyethylene (plasma treated)  | N 128<br>(lb) (27) | N 53<br>(lb) (12) |
| Polypropylene                  | N 24<br>(lb) (5)   | N 18<br>(lb) (4)  |
| Polypropylene (plasma treated) | N 87<br>(lb) (20)  | N 41<br>(lb) (9)  |

Cured for 24 hours @ 22°C (non-UV cure)

Lap Shear Strength, :

|                                       |                              |                 |
|---------------------------------------|------------------------------|-----------------|
| Steel (grit blasted)                  | N/mm <sup>2</sup><br>(lb/in) | 20.4<br>(2,950) |
| Block Shear Strength, ISO 13445:      |                              |                 |
| Acrylic to Acrylic                    | N/mm <sup>2</sup><br>(psi)   | 8<br>(1,160)    |
| Polycarbonate to Polycarbonate        | N/mm <sup>2</sup><br>(psi)   | 6<br>(870)      |
| Polycarbonate to Steel (grit blasted) | N/mm <sup>2</sup><br>(psi)   | 10.4<br>(1,510) |



Cured for 48 hours @ 22°C (non-UV cure)

180° Peel Strength, ISO 8510-2:

|                      |                              |           |
|----------------------|------------------------------|-----------|
| Steel (grit blasted) | N/mm <sup>2</sup><br>(lb/in) | 3<br>(17) |
|----------------------|------------------------------|-----------|

**TYPICAL ENVIRONMENTAL RESISTANCE**

Cured @ 30 mW/cm<sup>2</sup>, measured @ 365 nm, for 10 seconds.

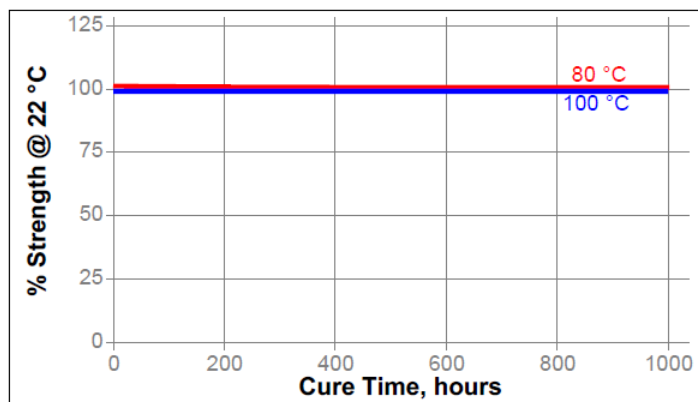
Block Shear Strength, ISO 13445:

Polycarbonate

**Heat Aging**

Aged at temperature indicated and tested @ 22 °C.

\* **Note:** Substrate failure for all test specimens\*



**Chemical/Solvent Resistance**

Aged under conditions indicated and tested @ 22 °C.

\* **Note:** Substrate failure for all test specimens\*

| Environment | % of initial strength |      |       |       |        |
|-------------|-----------------------|------|-------|-------|--------|
|             | °C                    | 24 h | 100 h | 500 h | 1000 h |
| Water       | 22                    | 100  | 100   | 100   | 100    |
| 95% RH      | 40                    | 100  | 100   | 100   | 100    |
| Heptane     | 22                    | 100  | 100   | 100   | 100    |
| Isopropanol | 22                    | 100  | 100   | 100   | 100    |

**Thermal Stability of Needle Assemblies**

Aged @ 60°C and tested @ 22 °C

| Needle pullout strength, % of initial strength | 4 weeks | 8 weeks |
|--|---------|---------|
| Polycarbonate                                  |         |         |
| 22 Gauge Cannula                               | 65      | 50      |
| 27 Gauge Cannula                               | 90      | 90      |
| Polypropylene (plasma treated)                 |         |         |
| 22 Gauge Cannula                               | 70      | 80      |
| 27 Gauge Cannula                               | 75      | 70      |

**Sterilization Resistance of Needle Assemblies**

Sterilized as indicated and tested @ 22 °C

Needle Pullout Strength, % of initial strength:

|                                | Gamma  | ETO     | Autoclave |          |
|--------------------------------|--------|---------|-----------|----------|
|                                | 30 kGy | 1 Cycle | 1 Cycle   | 5 Cycles |
| Polypropylene (plasma treated) |        |         |           |          |
| 22 Gauge Cannula               | 50     | 55      | 40        | 45       |
| 27 Gauge Cannula               | 65     | 60      | 70        | 70       |

**GENERAL INFORMATION**

**This product is not recommended for use in pure oxygen and/or oxygen rich systems and should not be selected as a sealant for chlorine or other strong oxidizing materials.**

**For safe handling information on this product, consult the Safety Data Sheet (SDS).**

**Directions for use:**

1. This product is light sensitive; exposure to daylight, UV light and artificial lighting should be kept to a minimum during storage and handling.
2. For best performance bond surfaces should be clean and free from grease.
3. Excess adhesive can be dissolved with Loctite cleanup solvents, nitromethane or acetone.

**Product specification:**

The technical data contained herein are intended as reference only and are not considered specifications for the product. Product specifications are located on the Certificate of Analysis or please contact Henkel representative.

**Data ranges**

The data contained herein may be reported as a typical value. Values are based on actual test data and are verified on a periodic basis.

Temperature/Humidity Ranges: 23°C / 50% RH = 23±2°C / 50±5% RH

**Approval and certificate**

Please contact Henkel representative for related approval or certificate of this product.



**Conversions**

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$   
 $\text{kV/mm} \times 25.4 = \text{V/mil}$   
 $\text{mm} / 25.4 = \text{inches}$   
 $\mu\text{m} / 25.4 = \text{mil}$   
 $\text{N} \times 0.225 = \text{lb}$   
 $\text{N/mm} \times 5.71 = \text{lb/in}$   
 $\text{N/mm}^2 \times 145 = \text{psi}$   
 $\text{MPa} \times 145 = \text{psi}$   
 $\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$   
 $\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$   
 $\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$   
 $\text{mPa}\cdot\text{s} = \text{cP}$

**Storage**

Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.

**Optimal storage: 2°C to 8°C. Storage below 2°C or greater than 8°C can adversely affect product properties.**

Material removed from containers may be contaminated during use. Do not return product to the original container. Henkel Corporation cannot assume responsibility for product which has been contaminated or stored under conditions other than those previously indicated. If additional information is required, please contact your local Henkel representative.

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Reference 0.4