**PRODUCT DESCRIPTION**

LOCTITE® 4902 FL™ provides the following product characteristics:

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>Cyanoacrylate</td>
</tr>
<tr>
<td>Chemical Type</td>
<td>Ethyl and octyl cyanoacrylate</td>
</tr>
<tr>
<td>Appearance</td>
<td>Clear colorless liquid</td>
</tr>
<tr>
<td>Fluorescence</td>
<td>Positive under UV light</td>
</tr>
<tr>
<td>Components</td>
<td>One part - requires no mixing</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Low</td>
</tr>
<tr>
<td>Cure</td>
<td>Humidity</td>
</tr>
<tr>
<td>Application</td>
<td>Assembly of disposable medical devices.</td>
</tr>
<tr>
<td>Key Substrates</td>
<td>Plastics, Rubbers and Metals</td>
</tr>
</tbody>
</table>

LOCTITE® 4902 FL™ is a fluorescent, highly flexible cyanoacrylate adhesive designed for the assembly of flexible medical devices. This product facilitates the use of dissimilar and opaque substrates while improving device performance. LOCTITE® 4902 FL™ offers significant performance enhancements compared to standard cyanoacrylates, including strength in flexing bond lines and resistance to leaks with excellent sealing capability. Known performance advantages of cyanoacrylates are maintained, including speed, ease of use and strength.

**ISO-10993**

LOCTITE® 4902 FL™ 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: 1.03

Flash Point - See SDS

Viscosity, Cone & Plate, mPa·s (cP): Temperature: 25 °C, Shear Rate: 100 s⁻¹ 150 to 250°MS

**TYPICAL CURING PERFORMANCE**

**Cure Speed vs. Substrate**

The rate of cure will depend on the substrate used. The time to develop a shear strength of 0.1 N/mm² on different materials at 22 °C and 50% relative humidity

<table>
<thead>
<tr>
<th>Fixture Time, seconds:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium</td>
</tr>
<tr>
<td>ABS</td>
</tr>
<tr>
<td>Acrylic</td>
</tr>
<tr>
<td>Neoprene</td>
</tr>
<tr>
<td>Nitrile</td>
</tr>
<tr>
<td>Polycarbonate</td>
</tr>
<tr>
<td>PVC</td>
</tr>
<tr>
<td>Steel</td>
</tr>
</tbody>
</table>

**Cure Speed vs. Bond Gap**

The rate of cure will depend on the bondline gap. Thin bond lines result in high cure speeds, increasing the bond gap will decrease the rate of cure.

**Cure Speed vs. Humidity**

The rate of cure will depend on the ambient relative humidity. Higher relative humidity levels result in more rapid speed of cure.

**Cure Speed vs. Activator**

Where cure speed is unacceptably long due to large gaps, applying activator to the surface may improve cure speed. However, this can reduce ultimate strength of the bond and therefore testing is recommended to confirm effect.

**TYPICAL PROPERTIES OF CURED MATERIAL**

Cured for 7days @ 22°C

**Physical Properties:**

<table>
<thead>
<tr>
<th>Coefficient of Thermal Expansion, ISO 11359-2, K⁻¹:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below Tg</td>
</tr>
<tr>
<td>Above Tg</td>
</tr>
</tbody>
</table>

| Glass Transition Temperature ISO 11359-2, °C:         | 50       |
| Shore Hardness, ISO 868 , Shore A:                   | 65       |
| Tensile Modulus                                      | N/mm²: 400 (psi): (57,900) |

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Electrical Properties:
- Surface Resistivity, IEC 60093, ohms: $1.45 \times 10^{15}$
- Volume Resistivity, IEC 60093, ohm-cm: $11 \times 10^{15}$
- Dielectric Breakdown Strength: 32 kV/mm
- Dielectric Constant / Dissipation Factor, IEC 60250:
  - @ 1 KHz: 3.34/0.04
  - @ 1 MHz: 2.86/0.04
  - @ 10 MHz: 2.76/0.04

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties
Cured for 24 hours @ 22°C / 50% RH
- Lap Shear Strength, GBMS
  - Grit Blasted Mild Steel (GBMS) N/mm² ≥10.3 (1,495 psi)

Cured for 72 hours @ 22°C / 50% RH
- Tensile Strength, ISO 6922:
  - Buna-N N/mm² 16 N/mm² 12 (psi) 2,250 (psi) 1,745
  - Aluminum (etched) N/mm² 14 (psi) 2,000
  - Nitrile N/mm² 0.4 (psi) 65
  - Neoprene N/mm² 0.6 (psi) 83
  - ABS * N/mm² 8 (psi) 1,160
  - PMMA * N/mm² 4.3 (psi) 625
  - Polycarbonate N/mm² 7.9 (psi) 1,150
  - PVC * N/mm² 5.8 (psi) 840
  * substrate failure

- Lap Shear Strength, GBMS
  - Grit Blasted Mild Steel (GBMS) N/mm² 12 (psi) 1,745
  - Aluminum (etched) N/mm² 14 (psi) 2,000
  - Nitrile N/mm² 0.4 (psi) 65
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  - PMMA * N/mm² 4.3 (psi) 625
  - Polycarbonate N/mm² 7.9 (psi) 1,150
  - PVC * N/mm² 5.8 (psi) 840
  * substrate failure

- Block Shear Strength, ISO 13445:
  - ABS N/mm² 25 (psi) 3,675
  - PVC N/mm² 4 (psi) 575
  - Acrylic N/mm² 8 (psi) 1,190
  - Polycarbonate N/mm² 15 (psi) 2,220

TYPICAL ENVIRONMENTAL RESISTANCE
Cured for 72 hours @ 22°C / 50% RH
- Lap Shear Strength, GBMS
  - Grit Blasted Mild Steel (GBMS)

Hot Strength
Tested at temperature

Heat Aging
Aged at temperature indicated and tested @ 22 °C

Chemical/Solvent Resistance
Aged under conditions indicated and tested @ 22 °C

Sterilization Resistance of Needle Assemblies
Sterilized as indicated and tested @ 22 °C

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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. Bond areas should be clean and free from grease. Clean all surfaces with a Loctite® cleaning solvent and allow to dry.
2. To improve bonding on low energy plastic surfaces, Loctite® Primer may be applied to the bond area. Avoid applying excess Primer. Allow the Primer to dry.
3. LOCTITE® Activator may be used if necessary. Apply the LOCTITE® Activator to one bond surface (do not apply activator to the primed surface where Primer is also used). Allow the Activator to dry.
4. Apply adhesive to one of the bond surfaces (do not apply the adhesive to the activated surface). Do not use items like tissue or a brush to spread the adhesive. Assemble the parts within a few seconds. The parts should be accurately located, as the short fixture time leaves little opportunity for adjustment.
5. LOCTITE® Activator can be used to cure fillets of product outside the bond area. Spray or drop the activator on the excess product.
6. Bonds should be held fixed or clamped until adhesive has fixed.
7. Product should be allowed to develop full strength before subjecting to any service loads (typically 24 to 72 hours after assembly, depending on bond gap, materials and ambient conditions).
8. This product performs best in thin bond gaps (0.05 mm / 2 mil ).

Loctite Material Specification LMS
LMS dated October 30, 2013. Test reports for each batch are available for the indicated properties. LMS test reports include selected QC test parameters considered appropriate to specifications for customer use. Additionally, comprehensive controls are in place to assure product quality and consistency. Special customer specification requirements may be coordinated through Henkel Quality.

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 Technical Service Center or Customer Service Representative.

Conversions
(°C x 1.8) + 32 = °F
kV/mm x 25.4 = V/mil
mm / 25.4 = inches
μm / 2.54 = mil
N x 0.225 = lb
N/mm x 5.71 = lb/in
N/mm² x 145 = psi
MPa x 145 = psi
N·m x 8.851 = lb·in
N·m x 0.738 = lb·ft
N·m x 0.142 = oz·in
mPa·s = cP

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Henkel Americas
+860.571.5100

Henkel Europe
+49.89.320800.1800

Henkel Asia Pacific
+86.21.2891.8000

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