PRODUCT DESCRIPTION

LOCTITE® DRI 2045™ provides the following product characteristics:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>Acrylic</td>
</tr>
<tr>
<td>Chemical Type</td>
<td>Methacrylate ester</td>
</tr>
<tr>
<td>Components</td>
<td>Two-component</td>
</tr>
<tr>
<td>Component Combinations</td>
<td>Part A + Part B, Part C + Part B</td>
</tr>
<tr>
<td>Appearance - Part A</td>
<td>Red, homogeneous, viscous liquid LMS</td>
</tr>
<tr>
<td>Appearance - Part C</td>
<td>Creamy-white, homogeneous, viscous liquid LMS</td>
</tr>
<tr>
<td>Appearance - Part B</td>
<td>Yellow, homogeneous, viscous liquid LMS</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Low</td>
</tr>
<tr>
<td>Cure</td>
<td>Anaerobic</td>
</tr>
<tr>
<td>Application</td>
<td>Threadlocking</td>
</tr>
</tbody>
</table>

LOCTITE® DRI 2045™ is a medium to high strength pre-applied threadlocker with good substrate compatibility specially designed to meet automotive specification requirements. It is suitable for use on plain and passivated metal surfaces. This product has good hot strength and heat aging capabilities up to 220°C as well as good solvent resistance properties. The pre-applied film is dry-to-the-touch and remains an inert coating until assembly. During assembly microcapsules, which are contained within the coating, are crushed thereby releasing an active ingredient which initiates the curing process. LOCTITE® DRI 2045™ prevents loosening of threaded fasteners. When cured, this product will also act as a thread sealant. It is particularly suitable in situations where threaded parts are required to be ready for immediate use in an adhesive joint in a high volume production environment where it may not be possible to apply a liquid product on line.

LOCTITE® DRI 2045™ is a two component product. Either Part A or Part C can be used with Part B, depending on local availability. When using the first combination (Part A + Part B), the resultant coating is red in color. Alternatively, when using the other possible combination (Part C + Part B), the color of the coating will be pale yellow unless a color pigment is added. Various color pigments are available to achieve desired colors.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Part A and Part C:
- Flash Point - See SDS
- Viscosity @ 25°C, mPa·s (cP):
  - Haake PK100 @ 36 S⁻¹: 600 to 3,000 LMS
- pH: 9 to 11

TYPICAL CURING PERFORMANCE

Cure Speed vs. Substrate

This product has a similar cure profile for various metal substrates. The graph below shows the breakaway strength developed with time on M10 X 1.5 black oxide bolts and steel nuts compared to different materials and tested at room temperature according to ISO 10964.

Cure Speed vs. Temperature

The rate of cure will depend on the ambient temperature. The graph below shows the breakaway strength developed with time at different temperatures on M10 X 1.5 black oxide bolts and steel nuts and tested according to ISO 10964.
TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties:
- Coefficient of Thermal Expansion, ISO 11359-2, $K^{-1}$: $1 \times 10^{-4}$
- Coefficient of Thermal Conductivity, ISO 8302, W/(m·K): 0.1
- Specific Heat, kJ/(kg·K): 0.3

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties
After 24 hours @ 22 °C:
- Breakaway Torque, ISO 10964:
  - M10 x 1.5 steel bolts: N·m $\geq 10^{\text{LMS}}$ (lb.in.) (≥88.5)
- Prevail Torque, ISO 10964:
  - M10 x 1.5 steel bolts: N·m $\geq 5^{\text{LMS}}$ (lb.in.) (≥44.2)

After 24 hours @ 22 °C followed by 5 hours @ 160 °C, tested @ 160 °C:
- Breakaway Torque, ISO 10964:
  - M10 x 1.5 steel bolts: N·m $\geq 10^{\text{LMS}}$ (lb.in.) (≥88.5)

Torque Augmentation
Breakloose torque of an uncoated fastener will normally be 15 to 30% less than the on-torque. The effect of LOCTITE® DRI 2045™ on the breakloose torque is shown in the graph below.

TYPICAL ENVIRONMENTAL RESISTANCE

After 24 hours @ 22 °C:
- Breakaway Torque, ISO 10964:
  - M10 x 1.5 steel bolts (unseated)

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.
- Breakaway Torque, DIN 267-27:
  - M10 black oxide bolts and steel nuts (unseated)

Note: This product meets the requirements of DIN 267-27 on seated and unseated grade 8.8 M10 mild steel, zinc dichromate and zinc phosphate bolts. LOCTITE® DRI 2045™ performs close to or surpasses the environmental resistance requirements of DIN 267-27.

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).

This product is not normally recommended for use on plastics (particularly thermoplastic materials where stress cracking of the plastic could result). Users are recommended to confirm compatibility of the product with such substrates.
Directions for use:

1. **LOCTITE® DRI 2045™** is applied to threaded parts by authorized process centers who have automatic fastener cleaning, feeding, coating, rust proofing and drying equipment. Quantities can be handled promptly with minimum turnaround time. Sample fittings should be sent to the nearest authorized process center where they will coat your parts and return them to you for evaluation. **SAMPLE TESTS ARE RECOMMENDED TO OBTAIN DESIRED RESULTS ON YOUR PARTS.** Contact the nearest Loctite Sales Representative for the authorized process center nearest to you.

**Loctite Material Specification**

LMS dated October 15, 2001 (Part A), LMS dated October 15, 2001 (Part B) and LMS dated August 20, 2003 (Part C). 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 Loctite Quality.

**Storage**

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

**Optimal Storage:** 8 °C to 21 °C. **Storage below 8 °C or greater than 28 °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**

\( ^{\circ}C \times 1.8 + 32 = ^{\circ}F \)

\( KV/mm \times 25.4 = V/mil \)

\( mm / 25.4 = inches \)

\( \mu m / 25.4 = mil \)

\( N \times 0.225 = lb \)

\( N/mm x 5.71 = lb/in \)

\( N/mm^2 \times 145 = psi \)

\( MPa \times 145 = psi \)

\( N \cdot m x 8.851 = lb\cdot in \)

\( N \cdot m x 0.738 = lb\cdot ft \)

\( N \cdot mm x 0.142 = oz\cdot in \)

\( mPa\cdot s = cP \)

**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, 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 Corporation, Resin Technology Group, Inc., or Henkel Canada Corporation, 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.

**Reference 0.4**