Technical Data Sheet

# LOCTITE® 4014™

September 2020

## PRODUCT DESCRIPTION

LOCTITE® 4014™ provides the following product characteristics:

| | |
|---|---|
| **Technology** | Cyanoacrylate |
| Appearance (uncured) | Transparent, colorless to slightly yellow liquid[LMS] |
| Components | One part - requires no mixing |
| Viscosity | Very low |
| **Cure** | Humidity |
| **Application** | Bonding |
| Key Substrates | Plastics and Metals |

LOCTITE® 4014™ is designed to provide fast room temperature fixturing and is also suitable for applications where heat resistance is required. Suitable for use in the assembly of **disposable medical devices**.

## ISO-10993

LOCTITE® 4014™ 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 | 1.1 |
| Flash Point - See SDS | |
| Viscosity, Cone & Plate, mPa·s (cP): | |
| Temperature: 25 °C, Shear Rate: 100 $s^{-1}$ | 1 to 4[LMS] |
| Viscosity, Brookfield - LVF, 25 °C, mPa·s (cP): | |
| Spindle 1, speed 30 rpm | 1 to 5 |

## TYPICAL CURING PERFORMANCE

Under normal conditions, the atmospheric moisture initiates the curing process. Although full functional strength is developed in a relatively short time, curing continues for at least 24 hours before full chemical/solvent resistance is developed.

### Cure Speed vs. Substrate

The rate of cure will depend on the substrate used.

Fixture Time, seconds:

| | |
|---|---|
| PVC to PVC | 60 to 80 |
| ABS to ABS | 5 to 10 |
| Polycarbonate to Polycarbonate | 20 to 25 |
| Polyurethane to Polyurethane | 8 to 10 |
| G-10 Epoxy to G-10 Epoxy | 25 to 30 |
| Stainless steel to PVC | 5 to 10 |
| Stainless steel to ABS | 5 to 10 |
| Stainless steel to Polycarbonate | 5 to 8 |
| Stainless steel to Polyurethane | 20 to 25 |
| Stainless steel to G-10 Epoxy | 6 to 10 |

### Cure Speed vs. Bond Gap & Humidity

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. The rate of cure is also influenced by the ambient relative humidity; the higher the relative humidity, the greater the cure speed.

### Cure Speed vs. Activator

Where cure speed is unacceptably long due to large gaps, applying activator to the surface will 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 24 hours @ 22 °C

**Physical Properties**:

| | |
|---|---|
| Shore Hardness, ISO 868 | 65 |
| Elongation, ISO 527-2, % | 2 |
| Tensile Strength, ISO 527-3 | 28 (4,000) |

## TYPICAL PERFORMANCE OF CURED MATERIAL

**Adhesive Properties**

Cured for 10seconds @ 22 °C

Tensile Strength, ISO 6922:

| | | |
|---|---|---|
| Buna-N | N/mm² (psi) | ≥6.9[LMS] (≥1,000) |

Cured for 24 hours @ 22 °C

Lap Shear Strength, :

| | | |
|---|---|---|
| PVC to PVC | N/mm² (psi) | >7.5 (>1,100) |
| ABS to ABS | N/mm² (psi) | >4 (>580) |
| Polycarbonate to Polycarbonate | N/mm² (psi) | >7.5 (>1,100) |
| Stainless steel to ABS | N/mm² (psi) | >5.5 (>800) |
| Stainless steel to PVC | N/mm² (psi) | >4 (>580) |
| Stainless steel to Polycarbonate | N/mm² (psi) | >4 (>580) |
| Stainless steel to Polyurethane | N/mm² (psi) | 1.5 (220) |

Cured for 24 hours @ 22 °C, followed by 24 hours @ 121 °C, tested @ 22 °C

Lap Shear Strength, :

| | | |
|---|---|---|
| Steel (grit blasted) | N/mm² (psi) | ≥12[LMS] (≥1,740) |

## TYPICAL ENVIRONMENTAL RESISTANCE

### Humidity Resistance

38°C - 85% Relative Humidity

**Adhesive Properties**

Lap Shear Strength, , N/mm² :

| Substrates | 1* | 2* | 3* | 4* |
|---|---|---|---|---|
| PVC to PVC | >8 | >5 | >5 | >5 |
| ABS to ABS | >4 | >3.5 | >3 | >2.5 |
| Polycarbonate to polycarbonate | >8 | >6.5 | >6 | >5.5 |
| Stainless Steel to PVC | >6 | >6 | >5.5 | >5.5 |
| Stainless Steel to ABS | >4 | >4 | >5 | >4 |
| Stainless Steel to Polycarbonate | >4 | >4 | >4 | >2 |
| Stainless Steel to Polyurethane | 1.5 | 1.4 | 2.2 | 2.0 |

* **1** - Control
* **2** - Aged 1 Week
* **3** - Aged 4 weeks
* **4** - Aged 8 weeks

### Effects of Sterilization

In general, products similiar in composition to LOCTITE® 4014™ subjected to standard sterilization methods, such as EtO and Gamma Radiation (25 to 50 kiloGrays cumulative) show excellent bond strength retention. LOCTITE® 4014™ maintains bond strength after 1 cycle of steam autoclave. It is recommended that customers test specific parts after subjecting them to the preferred sterilization method. Consult with Loctite® for a product recommendation if your device will see more than 3 sterilization cycles.

## 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. For best performance bond surfaces should be clean and free from grease.
2. This product performs best in thin bond gaps (0.05 mm).
3. Excess adhesive can be dissolved with Loctite cleanup solvents, nitromethane or acetone.

### Loctite Material Specification[LMS]

LMS dated October 11, 2002. 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 / 25.4 = 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·mm x 0.142 = oz·in
mPa·s = cP

any production methods mentioned
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Reference 1.4