

LOCTITE[®] EA 11C[™]

September 2020

PRODUCT DESCRIPTION

LOCTITE[®] EA 11C[™] provides the following product characteristics:

Technology	Epoxy
Chemical Type	Epoxy
Appearance (Resin)	Black ^{LMS}
Appearance (Hardener)	green ^{LMS}
Appearance (Mixture)	Black ^{LMS}
Components	Two part - Resin & Hardener
Mix Ratio, by weight - Resin : Hardener	100 : 38
Mix Ratio, (by volume) Resin : Hardener	2.5 : 1
Cure	Room temperature cure after mixing
Secondary Cure	Heat
Application	Bonding
Specific Benefits	<ul style="list-style-type: none"> • Machineable • Sandable • High service temperature • Low outgassing properties • Withstands severe environments • Room Temp or Heat Cure

LOCTITE[®] EA 11C[™] is a general purpose adhesive and sealant that bonds, seals, and repairs a wide variety of materials including metals, most plastics, and wood.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Resin:

Specific Gravity @ 25 °C	1.6
Flash Point - See SDS	
Viscosity, Brookfield - RV, 25 °C, mPa·s (cP):	
Spindle 7, speed 10 rpm	140,000 to 330,000

Hardener:

Specific Gravity @ 25 °C	1.67
Flash Point - See SDS	
Viscosity, Brookfield - RV, 25 °C, mPa·s (cP):	
Spindle 7, speed 2 rpm	500,000 to 900,000

Mixed Properties:

Pot life 100 grams, @ 25°C, minutes $\geq 20^{\text{LMS}}$

TYPICAL PROPERTIES OF CURED MATERIAL

Cured for 1 hour @ 90°C

Outgassing Properties:

Total Mass Loss, %	0.47
Collected Volatile Condensable Material, %	0.02

Cured for 2 hours @ 60°C

Physical Properties:

Shore Hardness, ISO 868, Durometer D	$\geq 65^{\text{LMS}}$
--------------------------------------	------------------------

Cured for 3 hours @ 120°C

Physical Properties:

Glass Transition Temperature (T _g) by DSC, °C	114
---	-----

Cured for 3 days @ 25 °C, tested @ 100 °C

Physical Properties:

Coefficient of Thermal Conductivity, ASTM E 1530, W/(m·K)	0.75
---	------

Cured for 3 days @ 25°C

Physical Properties:

Coefficient of Thermal Expansion, ISO 11359-2, K ⁻¹ :	
Pre Tg	38×10^{-6}
Post Tg	134×10^{-6}

Electrical Properties:

Dielectric Breakdown Strength, IEC 60243-1, kV/mm	18.5
Dielectric Constant / Dissipation Factor, IEC 60250: 1 kHz	5.0 / 0.05
Volume Resistivity, IEC 60093, Ω·cm	5.0×10^{14}
Surface Resistivity, IEC 60093, Ω	$\geq 9.47 \times 10^{16}$

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured for 3days @ 25°C

Lap Shear Strength, :

Aluminum (etched):

Tested @ -55 °C	N/mm ²	7.8
	(psi)	(1,130)
Tested @ 25 °C	N/mm ²	16.5
	(psi)	(2,390)
Tested @ 82 °C	N/mm ²	15.6
	(psi)	(2,270)
Tested @ 121 °C	N/mm ²	10.5
	(psi)	(1,520)
Tested @ 149 °C	N/mm ²	4.1
	(psi)	(600)

Cured for 2 hours @ 60°C

Lap Shear Strength, :

Aluminum (etched):

Tested @ -55 °C	N/mm ²	17.3
	(psi)	(2,510)
Tested @ 25 °C	N/mm ²	12.4
	(psi)	(1,800)
Tested @ 82 °C	N/mm ²	13.6
	(psi)	(1,970)
Tested @ 121 °C	N/mm ²	10
	(psi)	(1,460)
Tested @ 149 °C	N/mm ²	4.1
	(psi)	(600)

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:

Mixing:

1. **When mixing by hand**, combine Part A (Resin) and Part B (Hardener) in the correct ratio and mix thoroughly until the color and consistency are uniform. EPOXI-PATCH® Tube Kits have been designed so that squeezing **EQUAL LENGTH BEADS of Part A & Part B** will give the proper ratio.
2. Mixing the adhesive just prior to use is recommended. The temperature of the separate components prior to mixing is not critical, but should be close to room temperature: °C (°F).
3. Heat buildup during and after mixing is normal. To reduce the likelihood of exothermic reaction or excessive heat buildup, mix less than 1,000 grams at a time. Mixing smaller amounts will minimize heat buildup..

Applying

1. Bonding surfaces should be clean, dry, and free of contamination.
2. Once the adhesive is applied, the bonded parts should be held in contact until the part has developed handling strength (3 to 4 hours @ 25°C) *note: this can vary with different bond configurations*. It is not necessary to clamp the parts unless movement during cure is likely.

Cure

1. Complete cure is obtained after 72 hours @ 25°C. LOCTITE® EA 11C™ can also be fully cured with heat such as; 2 hours at a maximum temperature of 60 °C.
2. After 24 hours, approximately 90% of full cure properties are attained at room temperature.
3. This product can also be cured for 1 hour @ 82°C or 20 to 30 minutes @ 121°C.
4. Heat cures can be modified to achieve a desired degree of cure from handling strength to full cure.

Clean up

1. It is important to clean up excess adhesive from the work area and application equipment before it hardens.
2. Denatured alcohol and many common industrial solvents are suitable for removing uncured adhesive.

Loctite Material Specification^{LMS}

LMS dated August 31, 2009 (Resin) and LMS dated August 30, 2009 (Hardener). 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 Henkel Representative.

Conversions

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

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, 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 0.3