

LOCTITE® 412™

December 2008

PRODUCT DESCRIPTION

LOCTITE® 412™ provides the following product characteristics:

Technology	Cyanoacrylate
Chemical Type	Plasticized ethyl cyanoacrylate
Appearance (uncured)	Transparent, colorless liquid ^{LMS}
Components	One part - requires no mixing
Viscosity	Very low
Cure	Humidity
Application	Temporary bonding
Key Substrates	Metals and Glass

LOCTITE® 412™ is designed for temporary bonding applications. It is a high strength product used in applications where maximum adhesion is required. Bonded parts can be debonded ultrasonically by immersion in detergent solution; by heat or, in some cases, by impact.

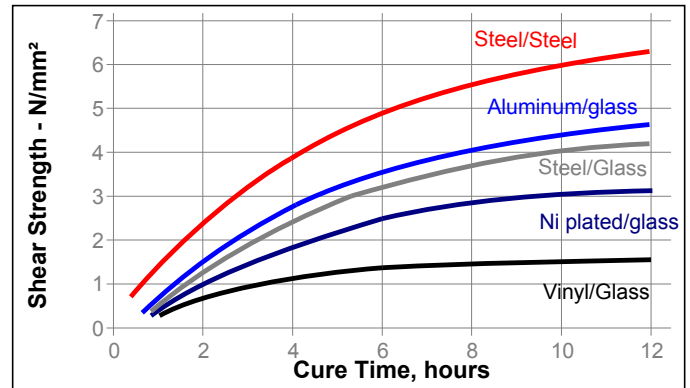
TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.05
Viscosity, Cone & Plate, mPa·s (cP):	
Temperature: 25 °C, Shear Rate: 3,000 s ⁻¹	2.5 to 6 ^{LMS}
Flash Point - See SDS	

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. The rate of cure will depend on the substrate used, on the ambient relative humidity and on the bond line gap. Higher relative humidity levels result in more rapid speed of cure. Thin bond lines result in high cure speeds; increasing the bond gap will decrease the rate of cure.

Product Strength



TYPICAL PROPERTIES OF CURED MATERIAL

Cured for 24 hours @ 22 °C

Physical Properties:

Shore Hardness, ISO 868, Durometer C	70
Melting Point, °C	143 to 153

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured for 1 hour @ 22 °C

Lap Shear Strength, ISO 4587:

Steel (grit blasted)	N/mm²	≥4.1 ^{LMS}
	(psi)	(≥595)

Cured for 24 hours @ 22 °C

Lap Shear Strength, ISO 4587:

Steel (grit blasted)	N/mm²	≤10.3 ^{LMS}
	(psi)	(≤1,495)

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. Parts must be cleaned and dried.
2. Spread a thin film of adhesive on one bonding surface. This can be achieved by applying one or several drops to the surface and allowing the mating pressure to spread the adhesive.
3. Do not disturb parts after mating.
4. For small parts, the adhesive can be wicked in by

applying the adhesive at the edge of the mating parts.

5. Allow adhesive to cure for 15 - 20 minutes minimum before processing.

Debonding Methods

Ultrasonic Immersion Debonding:

1. Mix a 10% to 15% solution of detergent and water.
2. Heat solution to 80°C to 88°C for best results.
3. Use an ultrasonic tank having a power rating of 13W/l minimum for best results. Consult an ultrasonic tank supplier for the most efficient tank, depending on part and holder mass.
4. Place an adequate amount of solution in ultrasonic tank to cover area where debonding is required.
5. For maximum exposure, parts may be suspended in solution.
6. Ultrasonically vibrate parts until debonding occurs, generally within five minutes. Debonding time varies with type of mass materials, ultrasonic power and solution temperature.
7. Periodically verify solution pH is greater than 10.

Heat Debonding:

1. Place parts in a radiant heat oven or induction heat until bondline temperature reaches 135°C. Parts should be separated at elevated temperature.
2. If excess adhesive remains, clean parts with acetone.

Impact:

Structurally rigid parts may be separated by being impacted with a rubber or wooden mallet. This technique, however, is limited to parts which will not be structurally or visually damaged by the impacting tool

Clean-up

When large quantities of cyanoacrylate adhesive are accidentally spilled, the area should be flooded with water which will cause the liquid cyanoacrylate to cure. The cured material can then be scraped from the surface

Loctite Material Specification^{LMS}

LMS dated November 15, 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

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.

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Reference 1.2