



Ultra-Tough Bonder™

June 2009

PRODUCT DESCRIPTION

Ultra-Tough Bonder™ provides the following product characteristics:

Technology	Epoxy
Chemical Type	Epoxy
Appearance (Resin)	Yellow paste
Appearance (Hardener)	Dark purple paste
Appearance (Mixed)	Dark Purple ^{LMS}
Components	Two component - requires mixing
Viscosity	High
Mix Ratio, by volume - Resin : Hardener	2 : 1
Mix Ratio, by weight - Resin : Hardener	100 : 45.5
Cure	Room temperature cure after mixing
Application	Bonding

Ultra-Tough Bonder™ is a high viscosity, industrial grade epoxy adhesive with extended work life. Once mixed, the two component epoxy cures at room temperature to form a tough, purple bondline with excellent resistance to shear, peel, and impact forces. Ultra-Tough Bonder™ develops strong, tough bonds on aluminum, steel and other metals, as well as glass, ceramics and plastics. This product also withstands exposure to a wide variety of solvents and chemicals.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Resin:

Specific Gravity @ 25 °C	1.18
Viscosity, Cone & Plate, mPa·s (cP):	
Cone CP50-1 @ shear rate 100 s ⁻¹	42,500
Flash Point - See MSDS	

Hardener:

Specific Gravity @ 25 °C	1.08
Viscosity, Cone & Plate, mPa·s (cP):	
Cone CP50-1 @ shear rate 100 s ⁻¹	2,300
Flash Point - See MSDS	

Mixed:

Specific Gravity @ 25 °C	1.15
Viscosity, Cone & Plate, mPa·s (cP):	
Cone CP52 @ shear rate 10 min ⁻¹	≥65,000 ^{LMS}
Non-Sag Test, cm:	
2 Grams, 90° Angle	≤0.5 ^{LMS}
Flash Point - See MSDS	

TYPICAL CURING PERFORMANCE

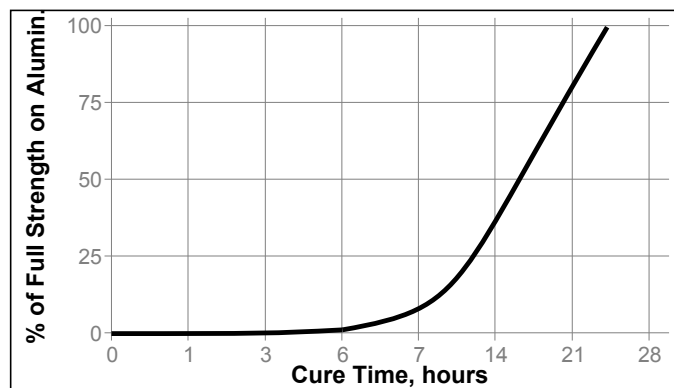
Fixture Time

Fixture time is defined as the time to develop a shear strength of 0.1 N/mm².

Fixture Time, ISO 4587, minutes:	
Steel (grit blasted), @ 22 °C	165 to 180

Cure Speed vs. Time

The graph below shows shear strength developed with time on Aluminum (acid etched) lapshears @ 25 °C with an average bondline gap of 0.1 to 0.2 mm and tested according to ISO 4587.



TYPICAL PROPERTIES OF CURED MATERIAL

Cured @ 22 °C for 5 days

Physical Properties:

Glass Transition Temperature (Tg)	45
ISO 11359-2, °C	
Shore Hardness, ISO 868, Durometer D	80
Coefficient of Thermal Expansion, ISO 11359-2, K ⁻¹ :	
Pre Tg	58×10 ⁻⁶
Post Tg	252×10 ⁻⁶
Linear Shrinkage, ASTM D 792, %	2.1
Volume Shrinkage, ASTM D 792, %	6.1

Electrical Properties:

Dielectric Breakdown Strength,	32
IEC 60243-1, kV/mm	

Cured @ 22 °C for 3 days

Physical Properties:

Elongation, at break, ISO 527-3, %	3.1
Tensile Strength, at break, ISO 527-3	N/mm ² 37
	(psi) (5,330)
Tensile Modulus, ISO 527-3	N/mm ² 1,850
	(psi) (268,100)

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured for 5 days @ 22 °C and 0.13 mm gap

Lap Shear Strength, ISO 4587:

Steel (grit blasted)	N/mm ² 29
	(psi) (4,200)
Aluminum (abraded)	N/mm ² 19
	(psi) (2,830)
Aluminum (anodised)	N/mm ² 27
	(psi) (3,920)

Stainless steel	N/mm ² 16 (psi) (2,360)
Polycarbonate	N/mm ² 2 (psi) (310)
Nylon to Steel (grit blasted)	N/mm ² 2 (psi) (180)
Wood (Pine) to Steel (grit blasted)	N/mm ² 7 (psi) (1,030)

Block Shear Strength, ISO 13445:

PVC	N/mm ² 5 (psi) (670)
ABS	N/mm ² 25 (psi) (3,660)
Epoxy	N/mm ² 34 (psi) (5,000)
Acrylic	N/mm ² 2 (psi) (330)
Glass	N/mm ² 10 (psi) (1,400)

Impact Strength, ISO 9653, J:

Steel (grit blasted)	10
Aluminum (etched)	12

Cured for 18 hours @ 22 °C followed by 4 hours @ 65 °C

Lap Shear Strength, ISO 4587:

Aluminum (acid etched) 0.13 mm gap	N/mm ² ≥27.0 ^{LMS} (psi) (≥3,915)
------------------------------------	--

TYPICAL ENVIRONMENTAL RESISTANCE

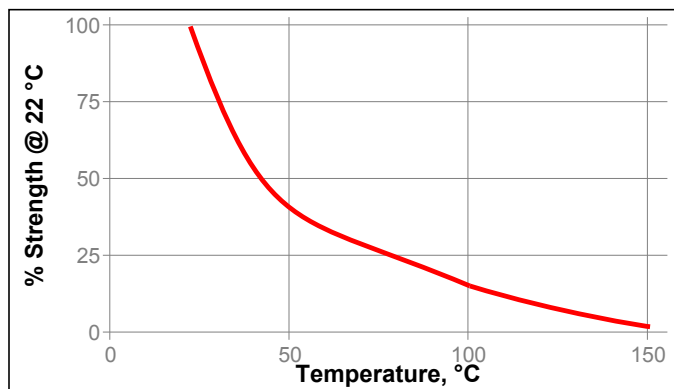
Cured for 5 days @ 22 °C

Lap Shear Strength, ISO 4587:

Steel (grit blasted), 0.13 mm gap

Hot Strength

Tested at temperature



Heat Aging

Aged at temperature indicated and tested @ 22 °C

Temperature, °C	% of initial strength 1000h
66	125
93	125
120	130
150	135
177	125

Chemical/Solvent Resistance

Aged under conditions indicated and tested @ 22 °C.

Environment	°C	% of initial strength	
		500 h	1000 h
Air	87	115	115
Motor oil (10W30)	87	115	117
Unleaded gasoline	87	67	91
Water/glycol 50/50	87	82	47
Water	22	92	41
Acetone	22	102	106
Isopropanol	22	113	93
Salt fog	22	67	71
Condensing Humidity	49	83	39
95% RH	40	85	86

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 Material Safety Data Sheet (MSDS).

Directions for use:

1. For high strength structural bonds, remove surface contaminants such as paint, oxide films, oils, dust, mold release agents and all other surface contaminants.
2. Use gloves to minimize skin contact. DO NOT use solvents for cleaning hands.

3. **Dual Cartridges:** To begin using a new cartridge, remove cartridge cap and dispense a small amount of adhesive, making sure both parts A&B are extruding. Attach nozzle and dispense approximately 25 to 50mm, before applying onto part to be bonded. Partially used cartridges can be stored with the mixing nozzle attached. To reuse, remove and discard old nozzle, attach the new nozzle, dispense approximately 25 to 50mm, before applying onto part to be bonded. **NOTE:** Ultra-Tough Bonder™ requires use of specific mix nozzles. Please note that small diameter mix nozzles may exhibit low dispense flowrates and possible clogging from the fillers contained in this product. Consult your local Henkel® sales representative or technical information service center for recommended mix nozzles

Hand Mixing: Combine Part A & Part B in the correct ratio and mix thoroughly. Be sure to scrape both the sides and bottom of mixing container. Mix for approximately 15 seconds after uniform color is obtained. Heat build-up during or after mixing is normal. Do not mix quantities greater than 4kg as excessive exotherm or heat build up will develop. Mixing smaller amounts will minimize heat build-up.

Bulk Containers: Normally material is dispensed through volumetric metered mixing equipment, attached to static mix nozzles. It may also be mixed by weight or volume as described above.

4. For maximum bond strength apply adhesive evenly to both surfaces to be joined.
5. Application to the substrates should be made within 30 minutes. Larger quantities and/or higher temperatures will reduce this working time.
6. Join the adhesive coated surfaces and allow to cure. Higher temperatures will speed up curing.
7. Keep assembled parts from moving during cure. The bond should be allowed to develop full strength before subjecting to any service load.
8. Excessive uncured adhesive can be cleaned up with ketone type solvents.

Loctite Material Specification^{LMS}

LMS dated June 25, 2007. 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: 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

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

Note

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 0.0