



Scotch-Weld™

Toughened Epoxy Adhesives LSB360NS Green

Technical Data Sheet

September 2014

Product Description 3M™ Scotch-Weld™ Toughened Epoxy Adhesive LSB360NS Green is a two-part, 1:1 mix ratio, toughened epoxy structural adhesives which exhibits a 10 hour work life. It exhibits excellent shear and peel strengths along with good impact, durability and bonds extremely well to many surfaces including slightly oily metal and SMC. It is formulated to be non-sagging on vertical surfaces.

Features

- Excellent shear and peel strengths
- 10 hour work life
- Non-Sag
- Easy mixing
- Color Indication of Mixing
- 1:1 mix ratio

Typical Uncured Physical Properties

NOTE: The following data is taken from tests conducted on limited production runs. 3M will continue to test samples from additional product runs and will issue a new data page if the test results change

Note: the following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Product		3M™ Scotch-Weld™ Epoxy Adhesive LSB360NS Green
Color	Base (B) Accelerator (A)	Yellow Blue
Net Weight (lbs./gallon)	Base (B) Accelerator (A)	9.9 10.0
Viscosity¹ @ 73°F (23°C)	Base (B) Accelerator (A)	>274 Pa•s >103 Pa•s
Mix Ratio (B:A)	By volume By weight	1:1 1:1
Work Life² @ 73°F (23°C)	Nozzle mixed	~10 hours
Applied Open Time³	73°F	~10 hours
Applied Open Time³	120°F	>70 Minutes
Time to Handling Strength⁴	73°F	16 hours

1. Cone and Plate at 23°F; 57 RPM

2. Approximate time during which material can remain in a mixer nozzle and still be expelled without undue force on the applicator.

3. Approximate time after application of adhesive that bonds can be made without adversely affecting wetting out of adhesive and ultimate performance levels.

4. Time to achieve approximate 50 psi of Overlap Shear Strength (OLS) when cured at 73°F (23°C).

Note: The data in this sheet were generated using the 3M™ EPX™ Applicator System equipped with an EPX static mixer, according to manufacturer's directions. Thorough hand-mixing will afford comparable results.

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Typical Cured Properties

Note: the following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Product	3M™ Scotch-Weld™ Toughened Epoxy Adhesive LSB360NS Green
Color	Bright Green
Full Cure Time	7 days @ 73°F (23°C)

Typical Adhesive Performance Characteristics

Overlap Shear, (OLS) to Various Substrates (PSI) (ASTM D1002)

Substrate	3M™ Scotch-Weld™ Toughened Epoxy Adhesive LSB360NS Green
Aluminum – MEK/abrade/MEK	3525 CF
CRS – MEK/abrade/MEK	2730 CF
Stainless Steel – MEK/abrade/MEK	3110 CF
Galvanized Steel – MEK/abrade/MEK	3210 CF
FRP (Epoxy) – IPA/abrade/IPA	3000 CF
SMC (raw side) – IPA/abrade/IPA	1280 SF

AF: adhesive failure CF: cohesive failure SF: substrate failure

Aluminum, etched, Overlap Shear, at Temperature (PSI) (ASTM D1002)

Temperature	3M™ Scotch-Weld™ Toughened Epoxy Adhesive LSB360NS Green
-67°F (-55°C)	3800 CF
73°F (23°C)	4300 CF
180°F (82°C); 15 minutes ¹	720 CF
180°F (82°C); 4 hours ¹	760 CF
250°F (121°C); 15 minutes ¹	400 CF

¹Represents time in test chamber oven before test.

AF: adhesive failure CF: cohesive failure SF: substrate failure

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Typical
Adhesive
Performance
Characteristics
(continued)

Note: the following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Aluminum, etched, Bell Peel Adhesion (PIW) at 75°F (ASTM D3167)

	3M™ Scotch-Weld™ Toughened Epoxy Adhesive LSB360NS Green
-67°F (-55°C)	8 CF
73°F (23°C)	31 CF
180°F (82°C) (4 hr) ¹	12 CF

AF: adhesive failure CF: cohesive failure SF: substrate failure

Aluminum, etched, Overlap Shear Retention (PSI) (ASTM D1002)

Environmental Condition (30 day dwell in condition)	3M™ Scotch-Weld™ Toughened Epoxy Adhesive LSB360NS Green
73°F (23°C)	4660 CF
Water soak at 73°F (23°C)	4380 CF
150°F (65°C)/80% Relative Humidity	4340 CF
IPA soak at 73°F (23°C)	4020 CF
Gasoline soak at 73°F (23°C)	3580 CF

AF: adhesive failure CF: cohesive failure SF: substrate failure

**Substrates
And
Testing**

Overlap Shear (ASTM D1002)

Overlap Shear (ASTM D-1002, 3M Test Method C-236) strength was measured on 1" wide X ½" overlap specimen. These bonds were made individually using 1" X 4" pieces of substrates except for Aluminum. Two panels 0.063 in. thick, 4 in. x 7 in of 2024T-3 clad aluminum were bonded and cut into 1 in. wide samples after 24 hours. The thickness of the adhesive bond line was approximately 0.005". All strengths were measured at 73°F (23°C) except when noted.

The separation rate of the testing jaws was 0.1 in. per minute for metals, 2 in. per minute for plastics and 20 in. per minute for rubbers. The thickness of the substrates were: steel, 0.060 in.; other metals, 0.05-0.064 in.; rubbers, 0.125in.; plastics, 0.125 in.

and samples were allowed to cure at 75°F and approximately 50% RH for 1 week before tested. The separation rate of the testing jaws was 0.1 inch per minute for metals and 2 inches per minute for plastics.

A. Bell Peel

Bell peel strengths were measured on 1 in. wide bonds at the temperatures noted. The testing jaw separation rate was 6 in. per minute. The bonds were made with 0.065 in. bonded to 0.020 in. thick adherends.

B. Cure Cycle

With the exception of Rate of Strength Build-Up Tests, all bonds were cured 7 days at 73°F (23°C) at 50% RH before testing or subjected to further conditioning or environmental aging.

**Handling/Curing
Information**

Directions for Use

1. For highest strength structural bonds, paint, oxide films, oils, dust, mold release agents and all other surface contaminants must be completely removed. The amount of surface preparation depends on the required bond strength, environmental aging resistance desired by user. For suggested surface preparations on common substrates, see the section on surface preparation.

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Handling/Curing Information (continued)

2. Mix thoroughly by weight or volume in the proportions specified on the product label or in the typical uncured properties section. Mix approximately 15 seconds after a uniform color is obtained.
3. For maximum bond strength, apply adhesive evenly to both surfaces to be joined.
4. Application to the substrates should be made within 15-20 minutes. Larger quantities and/or higher temperatures will reduce this working time.
5. Join the adhesive coated surfaces and allow to cure at 60°F (16°C) or above until completely firm. Heat up to 120°F - 150°F (49°C - 66°C) will speed curing.
6. Keep parts from moving during cure. Apply contact pressure if necessary. Maximum shear strength is obtained with a 3-5 mil bond line.
7. Excess **uncured** adhesive can be cleaned up with ketone type solvents*.

***Note:** when using solvents, extinguish all ignition sources, including pilot lights, and follow the manufacturer's precautions and directions for use.

Surface Preparation

3M™ Scotch-Weld™ Toughened Epoxy Adhesives LSB360NS is designed to be used on plastic or metal surfaces. For high strength structural bonds, paint, oxide films, oils, dust, mold release agents and all other surface contaminants must be completely removed. The amount of surface preparation depends on the required bond strength, environmental aging resistance desired by the user. The following cleaning methods are suggested for common surfaces:

Steel:

1. Wipe free of dust with oil-free solvent such as acetone or isopropyl alcohol solvents*.
2. Sandblast or abrade using clean fine grit abrasives.
3. Wipe again with solvent to remove loose particles*.
4. If a primer is used, it should be applied within 4 hours after surface preparation.

Aluminum:

1. Wipe free of dust with oil-free solvent such as acetone or isopropyl alcohol solvents*.
2. Sandblast or abrade using clean fine grit abrasives
3. Wipe again with oil-free solvent such as acetone or isopropyl alcohol solvents*

Plastics/Rubber:

1. Wipe with isopropyl alcohol*.
2. Abrade using fine grit abrasives.
3. Wipe with isopropyl alcohol*

Glass:

1. Solvent wipe surface using acetone or MEK*.
2. Apply a thin coating (0.0001 in. or less) of 3M™ Scotch-Weld™ Metal Primer EC3901 to the glass surfaces to be bonded and allow the primer to dry before bonding.

***Note:** When using solvents, extinguish all ignition sources, including pilot lights, and follow the manufacturer's precautions and directions for use.

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Storage Store products at 60-80°F (15-27°C) for maximum shelf life.

Precautionary Information Refer to Product Label and Material Safety Data Sheet for health and safety information before using this product. For additional health and safety information, call 1-800-364-

For Additional Information

To request additional product information or to arrange for sales assistance, call toll free 1-800-362-3550 or visit www.3M.com/structuraladhesives. Address correspondence to 3M Industrial Adhesives and Tapes Division, Building 21-1W-10, 900 Bush Avenue, St. Paul, MN 55144-1000. Our fax number is 651-778-4244.

Technical Information

The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use

Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

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