3M

Scotch-Weld™

Epoxy Adhesive

EC-2615 B/A • EC-2615 B/A LW

Technical Datasheet **July 2009**

Product Description

3M™ Scotch-Weld™ Epoxy Adhesive EC-2615 B/A and EC-2615 B/A LW (Long Worklife) are two-component epoxy adhesives which cure at room temperature or with heat to form a tough, impact-resistance bond. They have excellent adhesion to many metal and plastic substrates.

Features

- High shear strength
- High peel strength
- Outstanding environmental resistance
- Easy mixing (kit or pre-measured no-mix available)
- Non-Sag (thixotropic)
- 20 minute worklife (Scotch-Weld EC-2615 B/A Adhesive)
- 60 minute worklife (Scotch-Weld EC-2615 B/A LW Adhesive)

Typical Physical Properties

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

	Scotch-Weld EC-2615 B/A Adhesive		Scotch-Weld EC-2615 B/A LW Adhesive	
	Part B (Base)	**Part A (Accelerator)**	**Part B (Base)**	**Part A (Accelerator)**
Viscosity (Brookfield RVF): Approx.	800,000 cps	8,000 - 14,000 cps	800,000 cps	8,000 - 16,000 cps
Color:	Off White	Amber	Off White	Amber
Weight/Gallon:	9.3-9.7 lbs.	9.1-9.5 lbs.	9.3-9.7 lbs.	8.9-9.2 lbs.
Solids:	100%	100%	100%	100%
Mix Ratio: By Weight By Volume	100 100	49 50	100 100	48 50
Worklife at 72 ± 3°F (20 g mixed):	Over 20 minutes		Over 60 minutes	

Note: Both the Scotch-Weld EC-2615 B/A Adhesive and Scotch-Weld EC-2615 B/A LW Adhesive are available in charcoal gray.

3M™ Scotch-Weld™ Epoxy Adhesive EC-2615 XLW (Extra Long Worklife) has an 8 hour worklife and is similar in composition to Scotch-Weld EC-2615 B/A and EC-2615 B/A LW Adhesives; however, a separate data sheet is not available.

Typical Product Performance

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

Aluminum to Aluminum Bonds

A. Overlap Shear

The following data shows typical values obtained with 3M™ Scotch-Weld™ Epoxy Adhesive EC-2615 B/A and EC-2615 B/A LW in aluminum overlap shear bonds. All specimens were 2024-T3 alclad aluminum panels which had been FPL etched and primed with 3M™ Scotch-Weld™ Structural Adhesive Primer EC-3960. Bonds were cured for 7 days at 70°F-80°F under 2 psi pressure. Tests were conducted according to MMM-A-132 methods.

	Overlap Shear Strength	
Test Temperature	**Scotch-Weld EC-2615 B/A Adhesive**	**Scotch-Weld EC-2615 B/A LW Adhesive**
75°F	5500 psi	5800 psi
160°F (30 minutes at 160°F)	2800 psi	3500 psi
75°F (after 14 days exposure to 160°F and 100% relative humidity)	4400 psi	5400 psi

B. MMM-A-132D Type I, Class 3, Form P, (Selected Tests)

All tests conducted on unprimed, FPL etched 2024-T3 alclad aluminum.

Cure 1: cured for 7 days at room temperature under 2 psi pressure
Cure 2: cured for 1 day at room temperature under 2 psi pressure, plus 1 hour at 180°F

	Scotch-Weld EC-2615 B/A Adhesive		Scotch-Weld EC-2615 B/A LW Adhesive	
Description	**Cure 1**	**Cure 2**	**Cure 1**	**Cure 2**
1. 75°F Tensile Shear (psi)	4350	3850	5000	5250
2. 180°F Tensile Shear (psi)	460	950	700	1250
3. -67°F Tensile Shear (psi)	3650	6400	5350	3900
4. Fatigue Strength at 750 psi at 1800 cpm for 10^6 cycles	NF*	NF*	NF*	NF*
5. Creep Rupture 192 hours at 75°F at 1600 psi (in.)	0	0	0	0
6. Blister Detection (psi)	3800	3850	4150	4050
7. 75°F Tensile Shear after 30 days at 120°F 95-100% RH (psi)	3900	4050	4500	4350
8. 75°F Tensile Shear after 7 days in JP-4 (psi)	4000	4450	5100	4250
9. 75°F Tensile Shear after 7 days Hydraulic Oil (psi)	3300	4550	5250	4750

*No failures

Typical Product Performance *(continued)*

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

C. T-Peel

T-Peel specimens were made according to ASTM D1876-72 with 2024-T3 alclad aluminum sheets, 8 in. x 8 in. x .032 in. The surface preparation was the optimized FPL described below. The specimens were cured at a pressure of 2 psi for 7 days at 75°F. Typical bond line thicknesses were 0.010 in. - 0.018 inches. One inch wide specimens were cut from the 8 in. wide specimens and were tested at a jaw separation rate of 20 in./minute at 75°F.

Test Conditions	Scotch-Weld EC-2615 B/A Adhesive	Scotch-Weld EC-2615 B/A LW Adhesive
75°F	73 piw	61 piw

D. Floating Roller Peel

Floating Roller Peel specimens consist of one .063 in. x 8 in. x 8 in. 2024-T3 alclad aluminum panel bonded to one .020 in. x 8 in. x 10 in. 2024-T3 alclad aluminum panel. The panels were phosphoric acid anodized (3M Test Method C-2780), and primed with about 0.2 mils of 3M™ Scotch-Weld™ Structural Adhesive Primer EC-3960. The bonded panels were cured for 5 days at room temperature under 2 psi pressure. The panels were cut into one inch wide specimens, and tested using a jaw separation rate of 6 in./minute according to ASTM D-3167.

Scotch-Weld EC-2615 B/A Adhesive	Scotch-Weld EC-2615 B/A LW Adhesive
98 piw	95 piw

Product Application

Note: While this information is provided as a general application guideline based upon typical conditions, it is recognized that no two applications are identical due to differing assemblies, methods of heat and pressure application production equipment and other limitations. It is therefore suggested that experiments be run, within the actual constraints imposed to determine optimum conditions for your specific application and to determine suitability of product for particular intended use.

I. Surface Preparation

A thoroughly cleaned, dry, grease-free surface is essential for maximum performance. Cleaning methods which will produce a break free water film on metal surfaces are generally satisfactory.

A. Aluminum: Optimized FPL Etch – 3M Company Test Method C-2803 or ASTM D2651

1. Alkaline degrease – Oakite® Aluminum Cleaner 164 solution 9-11 oz./gallon of water at 190°F ± 10° F for 10 to 20 minutes. Rinse immediately in large quantities of cold running water (Test Method C-2802).
2. Acid Etch – Immerse panels in the following solution for 10 minutes at 150°F ± 5°F:

Sodium dichromate ($Na_2Cr_2O_7 \cdot 2H_2O$)	4.1 - 4.9 oz./gallon
Sulfuric Acid 66° Be	38.5 - 41.5 oz./gallon
2024-T3 aluminum (dissolved)	0.2 oz./gal. minimum
Tap Water as needed to balance	

   Note: Read and follow component supplier's environmental, health and safety recommendations before preparing this etch solution.
3. Rinse immediately in large quantities of clear running tap water.
4. Air dry approximately 15 minutes followed by a force dry at 150°F ± 10°F for 10 minutes.
5. Current theory suggests that both surface structure and chemistry play a significant role in determining the strength and performance of bonded structure. It is therefore advisable to bond or prime freshly cleaned surfaces as early as possible after preparing to avoid contamination and/or mechanical damage.

Product Application *(continued)*

B. Fiber Reinforced Epoxy Laminate Surface and Plastic Surfaces

1. Abrade surfaces to be bonded with 180 grit sandpaper or a Scotch-Brite® General Purpose Hand Pad 7447 (do not cut through resin into reinforcing fibers).
2. Wipe with clean rag or paper towel soaked with Ketone type solvent* such as Methyl Ethyl Ketone (MEK).*
3. Thoroughly dry before application of adhesive.

II. Primer Application

Although 3M™ Scotch-Weld™ Epoxy Adhesive EC-2615 B/A and EC-2615 B/A LW give excellent performance on unprimed surfaces, the use of 3M™ Scotch-Weld™ Structural Adhesive Primers EC-3960, EW5000 or EC-3924B corrosion inhibiting primers are suggested for maximum long-term durability and environmental resistance. See their data sheets for complete application instructions. These primers must be cured for one hour at 250°F prior to bonding. Review and follow MSDS prior to use.

Adhesive Application

A. Adhesive Mixing

Scotch-Weld EC-2615 B/A and EC-2615 B/A LW Adhesives are supplied in dual plastic cartridges. To use, insert the dual syringe cartridge into dispenser and advance the plungers into the cylinders using light pressure on the trigger. Next remove the cap from the cartridge and expel a small amount of adhesive to be sure both sides of the cartridge are flowing evenly and freely. If automatic mixing of Part A and Part B are desired, attach a 6 inch or longer mixing nozzle to the cartridge and dispense the adhesive. If nozzle mixing is not used, dispense both components into a container and thoroughly mix with a spatula until a uniform beige color is achieved.

Scotch-Weld EC-2615 B/A and EC-2615 B/A LW Adhesives are available in kit form consisting of Part B (Base) and Part A (Accelerator). To use, measure out base and accelerator on a weight or volume basis per typical physical properties. Mix thoroughly with spatula until it is a uniform beige color. CAUTION: Be careful mixing quantities larger than 50 grams (2 oz.) because an exothermic reaction will occur.

Apply adhesive to substrates and assemble bond before the work life expires, parts must be clamped or held together until cured.

B. Work Life

The work life of a 20 gram batch is over 20 minutes at 70°F-80°F for Scotch-Weld EC-2615 B/A Adhesive and over 60 minutes for Scotch-Weld EC-2615 B/A LW Adhesive. Larger quantities and/or higher temperatures will result in shorter work lives.

C. Curing Characteristics

It is suggested using a cure of 7 days at 70°F-80°F and 2 psi bonding pressure. At 70°F-80°F, bonds of Scotch-Weld EC-2615 B/A Adhesive generally reach handling strength in 2 to 3 hours. Scotch-Weld EC-2615 B/A LW Adhesive generally reaches handling strength in 5 to 6 hours. Full cure is reached in 1 to 7 days. If faster cures are desired, bonds may be heated. At 150°F full cure is reached in approximately 2 hours. For higher performance at elevated temperatures, a post cure of 1 hour at 180°F is suggested.

D. Cleanup

Excess adhesive and equipment may be cleaned prior to curing with toluene or Ketone solvents.*

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

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Storage and Shelf Life

These products have a shelf life of one year from date of shipment when stored at 60°F-80°F (15°C-27°C) in their original unopened container. Higher storage temperatures reduce shelf life, whereas lower temperatures cause increased viscosity of a temporary nature.

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, please visit www.3M.com/msds or call 1-800-364-3577 or (651) 737-6501.

For Additional Information

In the U.S., call toll free 1-800-235-2376, or fax 1-800-435-3082 or 651-737-2171. For U.S. Military, call 1-866-556-5714. If you are outside of the U.S., please contact your nearest 3M office or one of the following branches:

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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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These products were manufactured under a 3M quality standard registered under AS9100 standards.

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