



Scotch-Weld™

Epoxy Adhesive

1838 B/A Green • 1838 B/A Tan • 1838-L B/A Translucent

Technical Data

June, 2002

Product Description

- 3M™ Scotch-Weld™ Epoxy Adhesives 1838 B/A Green and Tan are controlled flow products; Scotch-Weld 1838-L B/A Translucent Adhesive is flowable.
- These epoxy adhesives are two-part, room temperature curing structural adhesives with high shear strengths and excellent environmental resistance.
- Excellent for bonding many metals, woods, rubbers and some plastics.

Typical Uncured Physical Properties

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

Product		Scotch-Weld 1838 B/A Green Adhesive	Scotch-Weld 1838 B/A Tan Adhesive	Scotch-Weld 1838-L B/A Translucent Adhesive
Viscosity (approx). @ 80°F (27°C)	Base Accelerator	70,000-600,000 cps 300,000-1,000,000 cps	100,000-600,000 cps 100,000-600,000 cps	11,000-15,000 cps 6,000-12,000 cps
Base	Base Accelerator	Modified Epoxy Polyamide	Modified Epoxy Polyamide	Synthetic Resin Modified Amine
Color	Base Accelerator	White Green	Tan Tan	Clear Amber
Net Weight lbs./gal.	Base Accelerator	10.8 ± .2 8.7 ± .2	9.3 ± .2 7.9 ± .2	9.6 ± .2 8.3 ± .2
Mix Ratio (B:A)	By Weight By Volume	1:1 4:5	1:1 5:6	6:5 1:1
Worklife 73°F (23°C)	Mixed 100 gms	60 minutes	60 minutes	60 minutes

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Typical Cured Physical Properties

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Product	Scotch-Weld 1838 B/A Green Adhesive	Scotch-Weld 1838 B/A Tan Adhesive	Scotch-Weld 1838-L B/A Translucent Adhesive
Color	Green	Tan	Clear/Amber
Shore D Hardness (Approx.)	80-85	80-85	80-85
Elongation (Approx.)	2-3%	2-3%	3-7%
Ultimate Tensile	4290 psi	—	—
Modulus of Elasticity	344,000 psi	—	—

Typical Cured Thermal Properties

Product	Scotch-Weld 1838 B/A Green Adhesive	Scotch-Weld 1838 B/A Tan Adhesive	Scotch-Weld 1838-L B/A Translucent Adhesive
Thermal Conductivity (Btu/Hr/Ft ² /°F/Ft)	.169	—	.116
Coefficient of Thermal Expansion (in/in/°C)	79 x 10 ⁻⁶ Between 32-40°F (0-40°C)	—	301 x 10 ⁻⁶ Between 68-184°F (20-120°C)
Glass Transition Temp.	131°F (55°C)	—	90°F (32°C)

Typical Cured Electrical Properties

Product	Scotch-Weld 1838 B/A Green Adhesive	Scotch-Weld 1838 B/A Tan Adhesive	Scotch-Weld 1838-L B/A Translucent Adhesive
Dielectric Strength (Volts/MIL)	585	—	600
Volume Resistivity @ 75°F (24°C) (ohms-cm)	1.5 x 10 ¹⁵	—	5.0 x 10 ¹²
Dissipation Factor 1 Khz @ 75°F (24°C)	.012	—	.088
Dielectric Constant 1 Khz @ 75°F (24°C)	6.06	—	6.1

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Handling/Curing Information

Directions for Use

1. 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 directly depends on the user's required bond strength and environmental aging resistance. For suggested surface preparations on common substrates, see the section on Surface Preparation.
2. These products consist of two parts. Mix thoroughly by weight or volume in proportions specified on product label or in Typical Uncured Physical Properties section below. Resulting color should be uniform. Properly reseal containers.
3. For maximum bond strength apply product evenly to both surfaces to be joined.
4. Application to the substrates should be made within 1 hour for 3M™ Scotch-Weld™ Epoxy Adhesives 1838 B/A Green and Tan and 90 minutes for Scotch-Weld 1838-L B/A adhesive. Larger quantities and/or higher temperatures will reduce this working time.
5. Join the adhesive coated surfaces and allow to cure until completely firm. Overnight curing @75°F (24°C) is usually sufficient. Heat, up to 200°F (100°C), will speed curing.

6. The following times and temperatures will result in **handling strength** for these products:

<u>Temperature</u>	<u>Time</u>
RT	6-10 hrs.
150°F (65°C)	15-20 mins.

7. The following times and temperatures will result in a **full cure** of these products:

<u>Temperature</u>	<u>Time</u>
75°F (24°C)	7 days
150°F (65°C)	2 hours
200°F (100°C)	30 minutes

8. Keep parts from moving during cure. Contact pressure is necessary. Maximum shear strength is obtained with a 3-5 mil bond line.

Surface Preparation

The following cleaning methods are suggested for common surfaces.

Steel:

1. Wipe free of dust with oil-free solvent such as Methyl Ethyl Ketone (MEK).*
2. Sandblast or abrade using clean fine grit abrasives.
3. Wipe again with solvents to remove loose particles.

Aluminum:

1. Vapor Degrease – Perchloroethylene condensing vapors for 5-10 minutes.*
2. Alkaline Degrease – Oakite 164 solution (9-11 oz./gallon water) at 190°F ± 10°F (88°C ± 5°C) for 10-20 minutes. Rinse immediately in large quantities of cold running water.

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Surface Preparation (continued)

3. Acid Etch – Place panels in the following solution for 10 minutes at 150°F ± 5°F (66°C ± 2°C).*

Sodium Dichromate	4.1 - 4.9 oz./gallon
Sulfuric Acid, 66°	38.5 - 41.5 oz./gallon
2024-T3 aluminum (dissolved)	0.2 oz./gallon minimum
Tap Water as needed to balance	

4. Rinse – Rinse panels in clear running tap water.
5. Dry – Air dry 15 minutes; force dry 10 minutes at 150°F ± 10°F (66°C ± 5°C).
6. If primer is to be used, it should be applied within 4 hours after surface preparation.

Plastics:

1. Solvent wipe with Isopropyl Alcohol.*
2. Abrade using clean fine grit abrasives.
3. Solvent wipe with Isopropyl Alcohol.*

Rubbers:

1. Solvent wipe with MEK.*
2. Abrade using clean fine grit abrasives.
3. Solvent wipe with MEK.*

Glass:

1. Solvent wipe with acetone or MEK.*

For glass applications which will be subjected to high moisture/humidity conditions, EC-3901 primer or equivalent should be used to prime the glass.

***Note:** When using solvents or chemicals, be sure to extinguish all ignition sources and follow the manufacturer's precautions and directions for use when handling such materials.

Application and Equipment Suggestions

These products may be applied with spatula, trowel, or flow equipment.

Two part mixing/proportioning/dispensing equipment is available for intermittent or production line use. These systems are ideal because of their variable shot size and flow rate characteristics and are adaptable to most applications.

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Typical Performance Characteristics

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

A. Aluminum Overlap Shear

Overlap shear strength was measured on FPL etched 1 in. wide by 1/2 in. overlap specimens. The bonds were made from 2 panels of 4 in. x 7 in. x .063 in., 2024 T3 clad aluminum bonded together and cut into 1 in. wide specimens. The separation rate of the testing jaws was .1 in./minute. Tests similar to ASTM D-1002.

Test Temperature	Scotch-Weld 1838 B/A Green Adhesive	Scotch-Weld 1838 B/A Tan Adhesive	Scotch-Weld 1838-L B/A Translucent Adhesive
-67°F (-55°C)	1500	1500	2000
75°F (24°C)	3000	2000	2500
180°F (82°C)	500	500	300

B. Aluminum T-Peel

T-Peel bonds were measured on 1 in. wide specimens cut from two FPL etched 8 in. x 8 in. x .032 in., 2024 T3 clad aluminum panels bonded together. The separation rate of the testing jaws was 20 in./minute. Tests similar to ASTM D-1876

Test Temperature	Scotch-Weld 1838 B/A Green Adhesive	Scotch-Weld 1838 B/A Tan Adhesive	Scotch-Weld 1838-L B/A Translucent Adhesive
-67°F (-55°C)	2	4	5
75°F (24°C)	4	4	4
180°F (82°C)	4	4	4

C. Cold Rolled Steel Overlap Shear

Note: The following data have been developed for 3M™ Scotch-Weld™ Epoxy Adhesive 1838 B/A Green; similar results would be expected for Scotch-Weld 1838 B/A Tan Adhesive and Scotch-Weld 1838-L B/A Translucent Adhesive.

Data are overlap shear on cold rolled steel (20 gauge), 302 stainless steel (50 mils thick), and 2024 T3 clad aluminum (63 mils thick) in various environments after 365 days aging. All substrates were sandblasted prior to bonding. Data are in psi and tested at 75°F (24°C)

	Cold Rolled Steel	Stainless Steel	Aluminum
Control – Scotch-Weld 1838 B/A Green Adhesive	2000-2200	3400-3800	2400-2500
Tap Water @ 75°F (24°C)	1950	2750	2250
100% Relative Humidity at 120°F (49°C)	2200	1250	1050
Hydraulic Oil (Mil-0-5606) @ 75°F (24°C)	2250	3600	2900
White Gas @ 75°F (24°C)	1100	3250	2150

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Storage and Shelf Life

Storage: Store products at 80°F (27°C) or below for maximum shelf life. Higher temperatures reduce normal shelf life.

Shelf Life: These products have a shelf life of 2 years from date of manufacture when properly stored in their unopened containers. Lower temperatures can cause increased viscosity of a temporary nature. Rotate stock on a “first in-first out” basis.

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 1-800-364-3577 or (651) 737-6501.

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/adhesives. Address correspondence to: 3M Engineered Adhesives Division, 3M Center, Building 220-7E-01, St. Paul, MN 55144-1000. Our fax number is 651-733-9175. In Canada, phone: 1-800-364-3577. In Puerto Rico, phone: 1-787-750-3000. In Mexico, phone: 52-70-04-00.

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Engineered Adhesives Division

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