

# 3M

## Scotch-Weld™

### Structural Adhesive Primer

#### EC-3960

Technical Data

August, 2002

#### Introduction

3M™ Scotch-Weld™ Structural Adhesive Primer EC-3960 is a sprayable corrosion inhibiting adhesive primer. It provides a high degree of protection against corrosive environments both inside and outside the adhesive bondline. It is suggested for use with 3M™ Scotch-Weld™ Bonding Films.

#### Advantages

- Capable of high transfer efficiency (less overspray waste)
- Provides corrosion protection inside and outside the bondline
- Provides long term durability to bonded joints
- Protects etched and anodized substrates for long term storage
- When cured at 250°F provides a solvent resistant coating
- Can be co-cured with adhesives at 250°F or 350°F

#### Application

A thoroughly cleaned, dry, grease-free surface is essential for maximum performance. Cleaning methods which will produce a breakfree water film on metal surfaces are generally satisfactory. Surface preparations should be fully evaluated with the adhesive primer, especially if resistance to specific environments are anticipated.

#### Description

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

|                         |                  |
|-------------------------|------------------|
| <b>Color:</b>           | Yellow           |
| <b>Base:</b>            | Epoxy resin      |
| <b>Solvent:</b>         | Solvent blend    |
| <b>Net Weight:</b>      | 7.3 ± 0.2 lb/gal |
| <b>Flash Point:</b>     | 6°F              |
| <b>Consistency:</b>     | Thin liquid      |
| <b>Solids Content:</b>  | 10.5 ± 1.0%      |
| <b>Pencil Hardness:</b> | 6H (minimum)     |
| <b>MEK Resistance:</b>  | Resistant        |

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#### Surface Preparation (ASTM D 2651)

#### Suggested Cleaning Procedure for Aluminum

1. Alkaline Degrease – Oakite 164 solution (9-11 oz. per gallon of water) at 190° ± 10°F (88° ± 5°C) for 15 ± 5 minutes. Rinse immediately in large quantities of cold running distilled or deionized water.
2. Acid Etch – Place panels in the following solution for 10 minutes at 150° ± 5°F [71° ± 5°C] (ASTM D 2651 or equivalent).

|   |  |
|---|--|
| Sodium Dichromate (Na <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> •2H <sub>2</sub> O) | 4.1-4.9 oz/gal (30.7-36.7 g/liter)     |
| Sulfuric Acid, 66° Be   | 38.5-41.5 oz/gal (288.4-310.8 g/liter) |
| 2024T-3 aluminum (dissolved)  | 0.2 oz/gal (1.5 g/liter) minimum       |
| Tap Water as needed to balance  |  |
3. Rinse – Rinse panels in clear running tap water.
4. Dry – Air dry 15 minutes. Force dry 10 minutes at 150° ± 10°F (71° ± 5°C).
5. It is advisable to coat the freshly cleaned surfaces with 3M™ Scotch-Weld™ Structural Adhesive Primer EC-3960 within four hours after surface preparation.
6. Care should be taken to avoid contaminating the cleaned aluminum by any substance which will hinder the wetting action of Scotch-Weld EC-3960.

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## Surface Preparation (continued)

3M™ Scotch-Weld™ Structural Adhesive Primer EC-3960 has been designed for spray application. Prior to use, Scotch-Weld EC-3960 must be warmed to ambient temperature and thoroughly agitated to redisperse the corrosion inhibitors which settle upon storage. Agitation of small containers on a vibrating paint shaker for approximately 5 minutes is suggested. Agitation should also be provided during application.

### Primer Application

The following spray procedure is suggested for evaluation to obtain optimum results. Stir well before and during use.

|                      |  |
|----------------------|--|
| Spray gun            | Binks No. 62, Siphon or equivalent                                       |
| Air Cap              | 66S  |
| Fluid Tip and Needle | 66-365   |
| Line Pressure        | 30-35 psi  |
| Cup Pressure         | O, Siphon Feed   |
| Fan Adjustment       | Wide Open  |
| Fluid Adjustment     | One turn open  |
| Distance from Panel  | 9-12 inches  |
| Primer Thickness     | (Inside Bond Line 0.15 - 0.25 mil)<br>(Outside Bond Line 0.15 - 0.4 mil) |

### Primer Cleanup:

Excess primer and equipment may be cleaned up prior to curing with ketone type solvents\*.

### Primer Dry and Cure

- A. Primer Bake Cycle (cure)      30 minutes at 75°F followed by 60 minutes at 250°F ± 10°F (120° ± 3°C).

For optimum long term adhesive bond durability, use the bake cycle.

The primed surface should be protected from contamination.

If extended periods of storage are necessary, wrap the parts in unplasticized Kraft paper. If the primed surface is contaminated with dust, it may be cleaned prior to bonding by wiping with clean unsized cheesecloth moistened with methyl ethyl ketone\*.

- B. Primer Air Dry Cycle      2 hours at 75°F (24°C) (minimum)

**Note:** Use of Scotch-Weld EC-3960 without a force dry is not recommended with 3M™ Scotch-Weld™ Structural Adhesive Film AF 163-2 and is subject to strict limitations. Contact 3M Technical Service representative if additional information is required.

**\*Note: When using solvents for cleanup, be sure to follow the manufacturer's precautions and directions for use for handling such materials.**

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#### Typical Mechanical Performance

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

| Treatment | Primer cure temp | Primer Thickness | T-peel | Bell Peel drum peel | Climbing | Overlap Shear Strength per ASTM D 1002 |       |        |       |
|-----------|------------------|------------------|--------|---------------------|----------|--|-------|--------|-------|
|           |                  |                  |        |                     |          | °F                                     | mils. | lb/in. | lb/in |
|           |                  |                  | 75     | 75                  | 75       | -67                                    | 75    | 180    | 250   |
| FPL       | 250              | 0.28             | 40     | 40                  | 84       | 6000                                   | 6100  | 3100   | 950   |
| PAA       | 250              | 0.15             | 40     | 80                  | 92       | 6250                                   | 6550  | 3100   | 1200  |
| PAA       | 250              | 0.28             | 40     | 50                  | 93       | 6300                                   | 6450  | 3000   | 1000  |
| PAA       | 250              | 0.36             | 40     | 50                  | 87       | 6150                                   | 6500  | 3150   | 1050  |
| PAA       | 275              | 0.28             | 40     | 60                  | 90       | 6000                                   | 6450  | 3000   | 1050  |
| PAA       | 275              | 0.36             | 40     | 60                  | 85       | 6150                                   | 6500  | 3100   | 1050  |

FPL etched per ASTM D 2651

PAA is phosphoric acid anodize per ASTM D 3933

**Substrates:** 2024-T3 Bare

**Preparation:** See Table

**Primer:** 3M™ Scotch-Weld™ Structural Adhesive Primer EC-3960, Lot 7384

**Thickness:** See Table (Isometer)

**Dry:** 30 minutes at 75°F

**Cure Temp:** See Table

**Cure Time:** 40 minutes (inserted into hot oven)

**Adhesive:** 3M™ Scotch-Weld™ Structural Adhesive Film AF 126-2 (.06 lb/ft²)

**Cure:** 250°F for 75 minutes

**Pressure:** 30 psi (autoclave)

**Ramp Rate:** 5°F/minute

| Wide Area Shear             | Typical Performance (psi)       |
|-----------------------------|---------------------------------|
| -67°F                       | 4839                            |
| 75°F                        | 5069                            |
| 250°F                       | 2416                            |
| Metal to Metal C. Drum Peel | Typical Performance (in-lbs/in) |
| 75°F                        | 80                              |

**Substrate:** 2024-T3 Alclad Aluminum

**Preparation:** FPL etch (ASTM D 2651) + phosphoric acid anodize (ASTM D 3933)

**Adhesive:** 3M™ Scotch-Weld™ Structural Adhesive Film AF 163-2 (0.06 lb/ft²)

Primer cured for 60 min. at 250°F

Adhesive cured for 90 min. at 235°F

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#### Storage

Store new shipments behind older lots. 3M™ Scotch-Weld™ Structural Adhesive Primer EC-3960 must be shipped and stored at 0°F or lower. Rotate stock on a “first-in – first-out” basis.

Standard shelf life of Scotch-Weld EC-3960 is 6 months from date of shipment when stored at 0°F or lower.

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#### 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.

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#### For Additional Information

To request additional product information or to arrange for sales assistance, call toll free (800) 235-2376. Our fax number is (417) 869-5219. Address correspondence to: 3M Aerospace Central, 3211 E. Chestnut Expressway, Springfield, MO 65802.

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ISO 9002

This Engineered Adhesives Division product was manufactured under a 3M quality system registered to ISO 9002 standards.



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