

## 3M™ Scotch-Weld™ EC-3960

### Structural Adhesive Primer

#### Product Description

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.

#### Key Features

- 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 121°C provides a solvent resistant coating

Can be co-cured with adhesive at 125°C & 175°C



#### Product Characterization

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

General Properties	Material
Colour	Yellow
Base	Epoxy resin
Solvent	Solvent blend
Net weight	0.87 Kg / l
Flash point	-14°C
Consistency	Thin liquid
Solids content	10.5 ± 1.0 %
Pencil hardness	6H ( minimum )
MEK Resistance	Resistant

#### Product Performance

The following product performance data were obtained under the conditions specified

## 1. Metal to Metal –T-Peel, Floating roller peel, Climbing Drum peel, Overlap Shear

All data reported in this section is typical obtained on EC-3960 primed aluminium surfaces. Substrate, 2024-T3 Bare aluminium. Prior to priming, the metal was etched per ASTM D 2651. Where noted, the etch was followed by PAA Phosphoric chromic acid anodization per ASTM 3933. After primer application, dry 30 minutes at 23°C and cured 40 minutes (inserted into hot oven). Then the bonds were assembled and cured for 75 minutes at 121 °C for the 3M™ Scotch-Weld™ Film Adhesive AF 126 2 (.060Lbs/ft<sup>2</sup>). Ramp up 2.8 °C / minute, Pressure 206KPa in autoclave.

Treatment	Primer Cure temp.	Primer Thickness	T-Peel	Beel peel	Climbing Drum peel	Overlap Shear Strength			
	0°C	µm	N/25mm.	N/25mm	In-Lb/in mN/m	MPa			
Test temp.			24°C	24°C	24°C	-55°C	24°C	82°C	121°C
FPL	121	7	178	178	84 -374	41.3	42	21.3	6.5
PAA	121	3.8	178	356	92-409	43.1	45.1	21.3	8.2
PAA	121	7	178	222	93-414	43.4	44.4	20.6	6.8
PAA	121	9	178	222	87-387	42.4	44.8	21.7	7.2
PAA	121	7	178	267	90-400	41.3	44.4	20.6	7.2
PAA	121	9	178	356	85-378	42.4	44.8	21.3	7.2

## 2. Metal to Metal –Wide Area Shear, Metal to Metal climbing drum peel

All data reported in this section is typical obtained on EC-3960 primed aluminium surfaces. Substrate, 2024-T3 Alclad aluminium. Prior to priming, the metal was etched per ASTM D 2651 followed by PAA Phosphoric chromic acid anodization per ASTM 3933. After primer application, cured 60 minutes at 121°C. Then the bonds were assembled and cured for 90 minutes at 112 °C for the 3M™ Scotch-Weld™ Film Adhesive AF 163-2K (.060Lbs/ft<sup>2</sup>).

Wide Area Shear	Typical Performance MPa
-55°C	33.3
23°C	34.9
121°C	16.6

Metal to metal C. Drum peel	Typical Performance in.lb/in.
23°C	80

## Handling, Application, Storage

### Precautionary Information

See product Label and Material Data Sheet for health and safety information before using this product.

## Instructions for use

The product performance data were developed using the following suggested procedures

Process step	Instruction																				
<b>Surface preparation</b>	<p>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 preparation should be fully evaluated with the adhesive, especially if resistance to specific environments is anticipated.</p> <ol style="list-style-type: none"><li>1) Alkaline Degrease- Oakite 164 solution 67.4 – 82.4 g / litter at 87 ± 5.6 °C for 10-20 minutes. Rinse immediately in large quantities of cold running water.</li><li>2) Acid FPL Etch Solution (1 liter)<table border="1"><thead><tr><th>Material</th><th>Amount</th></tr></thead><tbody><tr><td>Distilled Water</td><td>700 ml plus balance of liter (see below)</td></tr><tr><td>Sodium Dichromate</td><td>28 to 67.3 grams</td></tr><tr><td>Sulfuric Acid</td><td>287.9 to 310.0 grams</td></tr><tr><td>Aluminium Chips</td><td>1.5 grams / liter of mixed solution</td></tr></tbody></table><p>To prepare 1 liter of this solution, dissolve sodium dichromate in 700 ml of distilled water. Add sulfuric acid and mix well. Add additional distilled water to fill to 1 liter. Heat mixed solution to 66 to 71 °C. Dissolve 1.5 grams of 2024 bare aluminium chips per liter of mixed solution. Gentle agitation will help aluminium dissolve in about 24 hours.</p><p>Note: Review and follows safety and health information provided by suppliers of these materials prior to preparation of this solution.</p><p>To FPL etch panels; place them in the above solution at 66 to 71 °C for 12 to 15 minutes.</p></li><li>3) Rinse- Rinse panels in clear running water.</li><li>4) Dry- Air dry 15 minutes; force dry 10 minutes at 71 °C</li><li>5) It is advisable to coat the freshly cleaned surfaces with EC-3960 within four (4) hours after surface preparation.</li><li>6) Care should be taken to avoid contaminating the cleaned aluminium by any substance which will hinder the wetting action of EC-3960 primer.</li></ol>	Material	Amount	Distilled Water	700 ml plus balance of liter (see below)	Sodium Dichromate	28 to 67.3 grams	Sulfuric Acid	287.9 to 310.0 grams	Aluminium Chips	1.5 grams / liter of mixed solution										
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<b>Application</b>	<p>EC-3960 has been design for spray application. Prior to use, EC-3960 primer must be warmed to ambient temperature and thoroughly agitated to redispense the corrosion inhibitors witch settle upon storage. Agitation of small container on vibration shaker for approximately 5 minutes is suggested. Agitation should also be provided during application.</p> <p><u>Primer application</u></p> <p>The following spray procedure is suggested for evaluation to obtain optimum results. Stir well before and during use.</p> <table border="1"><tbody><tr><td>Spray Gun</td><td>Binks No. 62</td></tr><tr><td>Air Cap</td><td>66SD</td></tr><tr><td>Fluid Tip and Needle</td><td>66-365</td></tr><tr><td>Cup Pressure</td><td>O, Siphon Feed</td></tr><tr><td>Line Pressure</td><td>2 to 2.5 bars</td></tr><tr><td>Fan Adjustment</td><td>Wide open</td></tr><tr><td>Fluid adjustment</td><td>One turn open</td></tr><tr><td>Distance from Panel</td><td>150-300 mm</td></tr><tr><td>Primer Thickness</td><td>0.5 - 4 micron</td></tr><tr><td>Primer Weight</td><td>140-420 mg / sq. ft.</td></tr></tbody></table> <p><b>Primer thickness &amp; tolerance (0.5µ to 2µ) is important to be followed, to achieve best peel performance.</b></p> <p><u>Primer clean up</u></p> <p>Excess primer and equipment may be cleaned up prior to curing with Ketone type solvent*</p> <p><u>Primer dry and cure</u></p>	Spray Gun	Binks No. 62	Air Cap	66SD	Fluid Tip and Needle	66-365	Cup Pressure	O, Siphon Feed	Line Pressure	2 to 2.5 bars	Fan Adjustment	Wide open	Fluid adjustment	One turn open	Distance from Panel	150-300 mm	Primer Thickness	0.5 - 4 micron	Primer Weight	140-420 mg / sq. ft.
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A. Primer Bake cycle ( cure ) 30 minutes at 24°C following by 60 minutes at 121°C+/-5°C

**Cure at 150°C during 60 minute, is also possible to achieve best peel performance**

For optimum long term adhesive bond durability, uses bake cycle.

The Primed surface should be protected from contamination.

If extended periods of storage are necessary, wrap the part in unplasticized Kraft paper.

If the primed surface is contaminated with dust, it may be cleaned prior to bonding by wiping clean unsized cheesecloth moistened with methyl ethyl Ketone\*.

B. Primer Air dry Cycle 2 hours at 24°C ( minimum)

Note: use of EC-3960 Primer without a force dry is not recommended with AF163-2 films 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.

**Storage**

Stored New shipment behind older lots. EC-3960 Primer must be shipped and stored at -18°C or lower. Rotate stock on a "first-in – first-out" basis.

Caution: Primer should be permitted to thoroughly warm to room temperature before being used in order to prevent moisture condensation.

3M Standard shelf life of EC-3960 primer is 6 months from date of shipment from 3M when stored at -18°C or below in its original unopened container

## Further Information

For additional information on this product contact your local 3M Aerospace Sales Representative or visit our homepage at [www.3m.com/aerospace](http://www.3m.com/aerospace).

**Important notice:** All statements, technical information and recommendations in this data sheet are based on tests 3M believes to be reliable, but the accuracy or completeness of those tests is not guaranteed. All technical data and information should be considered typical or representative only and should not be used for specification purposes. Given the variety of factors that affect the use and performance of a 3M product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product before use to determine the suitability of the 3M product for the intended use and method of application. All questions of liability relating to the 3M product are governed by the terms of the sale subject to, where applicable, the prevailing law.



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