

3M™ Scotch-Weld™ EC-3917

Structural Adhesive Primer

Product Description

3M™ Scotch-Weld™ Structural Adhesive Primer EC-3917 is a primer for 3M™ Scotch-Weld™ epoxy based film adhesives. EC-3917 primer contains a corrosion inhibitive pigment for added corrosion protection.

Key Features

- Insures complete wetting of the adhesive to the adherents
- Improves durability of bonded joint
- Protects cleaned surfaces
- Can be brushed or sprayed
- Can be used as a corrosion resistant coating



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	Description
Color	Yellow - green
Base	Synthetic Resin
Net weight	0.86 kg / litre [approximate]
Solids Content	12 ± 1 %
Flash Point	-6.67 °C [Closed Cup]
Note: EC-3917 primer must be thoroughly stirred prior to use.	

Product Performance

The following product performance data were obtained under the conditions specified

All data reported in this section is typical obtained on EC-3917 primed aluminium surfaces. Prior to priming the metal was etched as described in the surface preparation section of this data sheet. Where noted, the etch was followed by chromic acid anodization.

After primer application and dry, the bonds were assembled and cured for 60 minutes at 177 °C and at 121 °C for the 3M™ Scotch-Weld™ Film Adhesive AF 126 series and AF 163-2 series. A 2.2 – 2.8 °C / minute rise rate to temperature and 3.1 – 3.4 bar pressure was used. Parts were cooled to below 93 °C before the pressure was removed.

1. Metal to Metal – Overlap Shear

All properties were measured on 25.4 mm wide, 12.7 mm overlap specimens cut from 1.6 mm thick, 101 mm x 178 mm bonded panels of 2024-T3 alclad aluminium. Tests were conducted per MMM-A-132.

Note: AF 163-2K (.06 wt) tests were conducted on unsealed chromic acid anodized panels. (See 3M Test Method C-2801).

Test Temperature	3M Adhesive AF 126-2 (.06 wt)	AF 147 (.075 wt)	AF 143-2 (.10 wt)	AF 163-2K (.06 wt)
-55 °C	20.7 MPa	24.1 MPa	17.9 MPa	41.3 MPa
24 °C	27.6 MPa	31.0 MPa	22.4 MPa	40.0 MPa
121 °C	4.8 MPa	24.1 MPa	18.6 MPa	10.3 MPa
149 °C	not tested	15.2 MPa	18.6 MPa	not tested

2. Metal to Metal- T-Peel

T-Peel strength was measured on 25.4 mm wide specimen cut from unsealed, chromic acid anodized, 203 mm x 203 mm x 0.5 mm bonded panels of 2024-T3 alclad aluminium. Tests were conducted per MMM-A-132.

Test Temperature	3M Adhesive AF 126-2 (.06 wt.)	AF 147 (.075 wt.)	AF 143-2 (.10 wt.)
-55 °C	111.2 N / 25 mm	111.2 N / 25 mm	133.4 N / 25 mm
24 °C	133.4 N / 25 mm	133.4 N / 25 mm	200.2 N / 25 mm
82 °C	111.2 N / 25mm	111.2 N / 25 mm	155.7 N / 25 mm

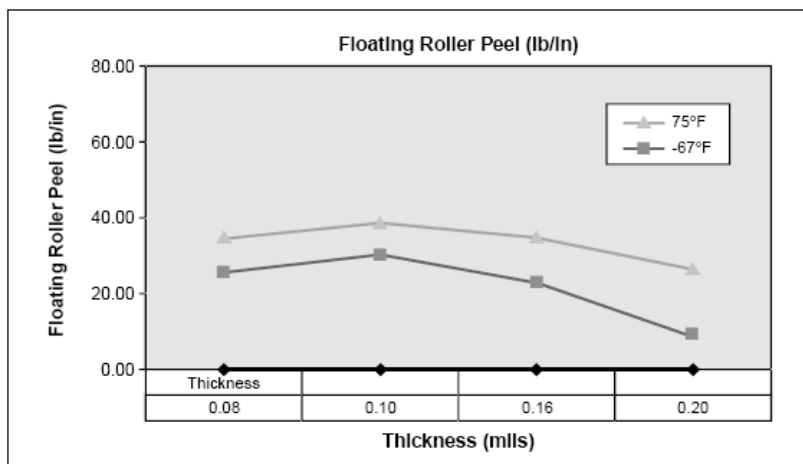
3. Metal to Metal Floating Roller Peel

Peel strength was measured on 1” wide specimens cut from a 76mm x 203 mm x 1.6 mm 2024-T3 bare aluminium panel bonded to a 76 mm x 254 mm x 0.6mm 2024-T3 bare panel. Tests were conducted per ASTM D-3167.

Test Temperature	3M Adhesive AF 126-2 (.06 wt.)	AF 147 (.075 wt.)	AF 143-2 (.10 wt.)
24 °C	222.4 N / 25 mm	133.4 N / 25 mm	26.7 N / 25 mm

EC-3917 with 3M™ Scotch-Weld™ Structural Adhesive Film AF 191M (.035 wt.) Floating Roller Peel Result at -- 55 °C and 24 °C versus Primer Thickness.

Primer Thickness (mil) (µm)	(lb / in) -55 °C	(lb / in) RT
2	26	37
2.5	31	39
4	23	36
5	9	28



4. Resistance to Environment Exposure

When used as a primer, EC-3917 resists attack by salt spray, high humidity, and aircraft test fluids.

Given below is typical data obtained on AF 126-3 (.06wt.) on EC-3917 primed aluminium prepared as in section 1. Metal to Metal- Overlap Shear.

The overlap shear and environmental tests were conducted according to MMM-A-132.

Test at 24 °C overlap shear	AF 126-3 (.06 wt.) / EC-3917
Unexposed control	31.0 MPa
After 30 days at 49 °C and 95 – 100 % Rel. Humidity	26.2 MPa
After 30 days exposure to Salt Water Spray	28.3 MPa
After 30 days immersion in Tap Water at 24 °C	31.7 MPa
After 7 days immersion in JP-4 Fuel at 24 °C	34.6 MPa
After 7 days immersion in MIL-F-5566 Anti Icing Fluid	31.0 MPa
After 7 days immersion in MIL-H-5606 Hydraulic Oil	35.6 MPa
After 7 days immersion in Type III Hydrocarbon Fluid	34.3 MPa

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										
Surface preparation	<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">1) Alkaline Degrease- Oakite 164 solution 67.4 – 82.4 g / liter water at 87 ± 5.6 °C for 10-20 minutes. Rinse immediately in large quantities of cold running water.2) Optimized 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 b 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>3) Rinse- Rinse panels in clear running water.4) Dry- Air dry 30 minutes; force dry 30 minutes at 60 °C5) It is advisable to coat the freshly cleaned surfaces with EC-3917 within four (4) hours after surface preparation.6) Care should be taken to avoid contaminating the cleaned aluminium by any substance which will hinder the wetting action of EC-3917.	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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Distilled Water	700 ml plus balance of liter (see below)										
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Application

EC-3917 is satisfactorily by brush coating to spraying.
Primer must be thoroughly stirred just prior to application.

a)	Spray Procedure	DeVILBISS JGA	Binks No. 62
	Air Cap	30	66SD
	Fluid Tip and Needle	AV-15-FX	66-365
	Cup Pressure	2-4 psi (13.78-27.56 MPa)	Siphon Feed
	Line Pressure	2 bar	2 bar
	Distance from Panel	228.6 ± 76.2 mm	152.4-228.6 mm
	Primer Thickness	1.27- 3.81 micron	
	Primer Weight	140-420 mg / sq. ft.	

b) Primer dry and cure

Air dry for 30 minutes minimum at 24 °C followed by force cure for 60 minutes at 121 °C

Note: The above primer application procedures will give satisfactory performance with 3M™ Scotch-Weld™ Epoxy Adhesives. However, review the particular product technical sheet for the optimum primer application to be used with that product.

The Primed surface should be protected from contamination introduced by dust, fingerprints, oil, etc. If extended periods of storage are required, wrap the parts in unplasticized Kraft paper. If the cured, primed surface is contaminated with dust, it may be cleaned prior to bonding by wiping the clean unsized cheesecloth and ketone* type solvents.

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

*When using solvents, extinguish all sources of ignition in the area, review and follow suppliers precautionary information prior to handling these materials.

Adhesive: EC-3917 primer performs satisfactory with AF 126, AF 126-2, AF 143-2, AF147, AF 453-2, AF 191, AF 163-2 and AF 163-3M™ Scotch-Weld™ Structural Adhesives. See respective technical data sheet for adhesive application.

Storage

Storing and Aging Precautions- Avoid heat and dampness in storage. Store new shipments behind older lots. Refrigerated or freezer storage, 4.4 °C or below is recommended for EC-3917. 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-3917 primer is 6 months from date of shipment from 3M when stored at 4.4 °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.

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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European Aerospace Laboratory**

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