

3M™ Scotch-Weld™ Composite Surfacing and Lightning Protection Film AF 536

Technical Data Sheet

Introduction

3M™ Scotch-Weld™ Composite Surfacing and Lightning Protection Film AF 536 is a thermosetting, modified epoxy Composite Surfacing Film, designed for general purpose surfacing of composite structures.

- Excellent compatibility with most composite materials. Cure temperature: 120°C (250°F) - 177°C (350°F).
- Provides a smooth void-free surface minimizing pre-paint preparation.
- Paint stripper resistance maintains superior surface quality.
- Smooth, glossy finish, and translucent for easy examination of underlying composite materials.
- Excellent handling traits and repositioning ability.
- Available with or without lightning protection conductor.

AF 536 Product Description

Product Description	
Color	Translucent white
Protective Liners	Blue polypropylene on one side, paper on the other
Shop Handling	Drapeable and conformable at room temperature
Tack	Will adhere to release coated tools at room temperature
Repositionable	Does not adhere to itself for several seconds

Properties

Product Configuration	Film and Veil Weight	Conductor Weight	Prepreg Weight	Nominal Thickness	Electrical Resistance	
					Down-Web (mΩ)	Cross-Web (mΩ)
AF 536, 100 SUR 000	100 g/m² (0.02 lb/ft²)	-	100 g/m² (0.02 lb/ft²)	0.11 mm (0.004")	-	-
AF 536, 077 SUR 000	77 g/m² (0.016 lb/ft²)	-	77 g/m² (0.016 lb/ft²)	0.08 mm (0.003")	-	-
AF 536, 173 ECF 073	100 g/m² (0.02 lb/ft²)	73 g/m² (0.015 lb/ft²)	173 g/m² (0.035 lb/ft²)	0.12 mm (0.005")	12.0	3.1
AF 536, 223 ECF 073	150 g/m² (0.031 lb/ft²)	73 g/m² (0.015 lb/ft²)	223 g/m² (0.046 lb/ft²)	0.17 mm (0.007")	12.0	3.1
AF 536, 150 ECF 073	77 g/m² (0.016 lb/ft²)	73 g/m² (0.015 lb/ft²)	150 g/m² (0.031 lb/ft²)	0.09 mm (0.004")	12.0	3.1
AF 536, 137 PCF 060*	77 g/m² (0.016 lb/ft²)	60 g/m² (0.012 lb/ft²)	137 g/m² (0.028 lb/ft²)	0.08 mm (0.003")	6.0	3.1
AF 536, 292 ECF 142	150 g/m² (0.031 lb/ft²)	142 g/m² (0.029 lb/ft²)	292 g/m² (0.06 lb/ft²)	0.18 mm (0.007")	4.8	1.6
AF 536, 215 PCF 115**	100 g/m² (0.02 lb/ft²)	115 g/m² (0.024 lb/ft²)	215 g/m² (0.043 lb/ft²)	0.12 mm (0.005")	3.2	1.6

*Compare to AF 536, 173 ECF 073

**Compare to AF 536, 292 ECF 142

For custom conductors or film weight, contact 3M.

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Product Application Guidelines

Where the AF 536 includes a conductor, it is intended to be applied so the surface of the film adjacent to the paper liner becomes the exterior surface of the cured part.

Proper application of AF 536 surfacing film is a key factor in achieving a smooth, void-free surface. The major objective of the following procedure is to minimize air entrapment between the surfacing film and the tool surface or composite material. Improper lay-up or debulking could result in a rough surface that may require additional finishing.

AF 536 Preparation

1. Allow AF 536 surfacing film to warm to room temperature before removing the roll from the sealed poly bag. Bag should be dry and free of condensation before opening.
2. AF 536 is provided in roll form. This material may be cut on automated cutting equipment designed for composite kit cutting.
3. Completely remove the paper liner from cut pieces at a 180 degree angle in one motion to prevent wrinkling and transfer of adhesive to the paper liner. This will minimize damage and provide optimal handling characteristics.



Guidelines for Application on a Tool Surface

1. After removing the paper liner, apply the film to a tool surface treated with mold release agent. A gradual rolling out technique is suggested. Remove entrapped air with a rubber roller. Use firm pressure and roll from the center of the film toward the edges, gradually working air out from under the film. Remove enough poly liner for adjacent films to overlap as needed. Repeat as needed to cover the designated area.
2. Cover AF 536 surfacing film with a release film, breather cloth, and vacuum bag. Debulk using standard vacuum bagging procedures. A minimum of 635 mm (25 in.) Hg and a temperature of 16 to 27°C (60 to 80°F) for duration of five minutes is suggested.
3. Carefully remove the bag, breather cloth and release film.
4. Remove remaining liners. Complete the layup and cure.



Guidelines for Application on a Debulked Prepreg Layup

1. If the AF 536 film includes a conductor, replace the paper liner with a conformable polymer liner (not supplied). Remove the blue poly liner that was provided with the AF 536 film and apply the film to the debulked prepreg layup surface. A gradual rolling out technique is suggested. Remove entrapped air with a rubber roller. Use firm pressure and roll from the center of the film toward the edges, gradually working air out of the part. Remove enough poly liner for adjacent films to overlap as needed. Repeat as needed to cover the designated area.
2. Cover AF 536 surfacing film with a release film, breather cloth, and vacuum bag. Debulk using standard vacuum bagging procedures. A minimum of 635 mm (25 in.) Hg and a temperature of 16 to 27°C (60 to 80°F) for duration of five minutes is suggested.
3. Carefully remove the bag, breather cloth and release film.
4. Remove remaining liners. Complete the layup and cure.

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, method 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.

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Suggested Cure Cycle

Curable in cycles used to cure most epoxy prepgs. Temperature rise rate between 1-10°C per minute (2-20°F per minute). Allowable to vent vacuum when the autoclave pressure reaches approximately 0.10-0.14MPa (15-20 PSI). Hold at least 60 minutes at 121°C (250°F) or 177°C (350°F) with at least 0.07MPa (10 PSI) pressure.

Suggested Finishing Techniques

Proper use of AF 536 film will help reduce or eliminate most of the materials and labor involved in typical fill and sand operations prior to painting. AF 536 will give a glossy, smooth pin hole free finish. Light sanding is suggested to remove mold release agent and to dull the glossy finish for adhesion of the paint.

1. Remove any residual tool release coating from the cured AF 536 surfacing film by wiping with an unsized cheese cloth lightly saturated with 3M General Purpose Cleaner #0898.

Wipe dry with unsized cheesecloth.

*Note: When using solvents, follow the manufacturer's precautions and directions for use.

2. Composite parts surfaced with AF 536 surfacing film can be finished with either hand sanding or machine sanding methods.
 - a. Suggested sanding instructions
Use 360 grit or finer abrasive to scuff the surface lightly to remove gloss. If the AF 536 film includes a conductor, a veil protects the conductor from damage; however, heavier grits or high pressure on the abrasive may expose the underlying conductor.
3. Panels surfaced with AF 536 surfacing film can be primed and painted using standard aerospace painting procedures for composite parts.

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Shelf Life and Storage Conditions:

Standard Shelf Life for 3M™ Scotch-Weld™ Composite Surfacing and Lightning Protection Film AF 536 is 12 months from date of shipment when stored at -18°C (0°F) or below in original unopened container.

The suggested maximum out-time of AF 536 is 45 days when stored below 27°C (80°F).

Note: AF 536 film should be permitted to thoroughly warm to room temperature before being used in order to prevent moisture condensation. (Do not open protective container prior to reaching ambient conditions.)

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