3M Scotch-Weld™ Low Density Composite Surfacing Film AF 325 • AF 325LS

Technical Datasheet **January 2011**

Introduction

3M™ Scotch-Weld™ Low Density Composite Surfacing Film AF 325 and AF 325LS offer the following advantages:

- Excellent for surfacing composite parts.
- Available in both white and blue to provide color contrast to underlying composite prepreg.
- Co-cure compatible with most epoxy composite pre-preg systems at both 250°F (121°C) and 350°F (177°C).
- Provides a smooth surface with minimal pinholes and other surface imperfections.
- Reduces the need for subsequent surface filling, fairing and sanding operations.
- Low density formulation aids in pre-paint surface preparation.
- Operational performance range from -67°F (-55°C) to 300°F (149°C).
- Resistant to effects of humidity exposure before and after cure.
- Available with copper mesh for applications requiring both surfacing and lightning strike performance.

Product Description

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

Film Weight / Color	3M™ Scotch-Weld™ Low Density Composite Surfacing Film AF 325M White 0.03 lbs./ft^2 (147 g/m^2) 3M™ Scotch-Weld™ Low Density Composite Surfacing Film AF 325LS White 0.056 lbs./ft^2 (273 g/m^2) 3M™ Scotch-Weld™ Low Density Composite Surfacing Film AF 325M Blue 0.035 lbs./ft^2 (171 g/m^2) 3M™ Scotch-Weld™ Low Density Composite Surfacing Film AF 325LS Blue 0.064 lbs./ft^2 (313 g/m^2)
Reinforcing Carrier	Scotch-Weld AF 325M Films are matte, non-woven scrim supported composite surfacing films. The LS versions have an integral expanded copper foil mesh. The density of the copper mesh is 0.029 lbs./ft^2 (142 g/m^2)
Protective Liners	Polyethylene (poly) on one side, paper on the other.
Typical Film Thickness	0.006 - 0.008" (0.15 - 0.20 mm)
Shop Handling Characteristics	Drapeable and conformable at room temperature.
Tack	Adheres to cold or release coated tools.
Out Time	Approximately 30 days at 75°F (24°C)
Gel Time	5 minutes at 250°F (121°C) (ASTM D3532)
% Flow	LS Versions: 10% (minimum) per ASTM D 3531 M Versions: 50% (minimum) using a 250°F (121°C) cure cycle for 50 minutes and 5°F (2°C)/minute rise rate (ASTM D 3531)
Volatile Loss	LS Versions: 1.5% (maximum) per ASTM D 3530 M Versions: Less than 1.5% using a 250°F (121°C) cure cycle for 60 minutes (ASTM D 3530)
Glass Transition Temperature (Tg) of Cured Product	306°F (152°C) by RDA

Composite Surfacing Properties

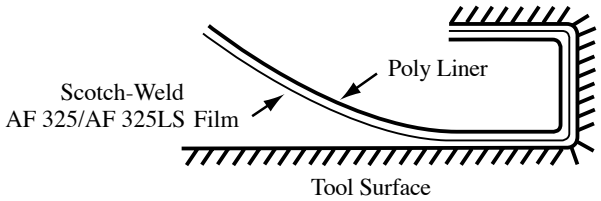
Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

1. Resin bubbling or resin penetration of the prepreg resin through the film has not been seen. There are no indications of this phenomenon occurring.
2. Both 3M™ Scotch-Weld™ Low Density Composite Surfacing Film AF 325 and AF 325LS are used in the manufacture of composite parts where both surfacing and lightning strike performance are required. In these applications, it has been found to provide a smooth, void-free surface when processed according to the product application guidelines below.
3. Finished parts that were surfaced using the Scotch-Weld AF 325 Film that were subsequently exposed to 120°F (49°C)/100% RH did not show degradation of the surfacing film.

Product Application Guidelines

Proper application of the 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. Improper lay-up or debulking could result in a rough, porous surface that may require additional finishing.

1. Allow film to warm to room temperature before removing the roll from the sealed poly bag. Bag should be dry and free of condensation before film is removed.
2. Unroll and cut film to the desired size.
3. Remove the paper liner from the film. Leave poly liner on film to minimize contamination and provide best handling characteristics for conformability.
4. Place the film on a release coated tool surface being careful not to entrap air between film and the tool. A gradual rolling out technique is suggested.



5. Remove any entrapped air with a rubber roller. Use firm pressure and roll from the center of the tool toward the outside of the tool, gradually working air out of the part.
6. Remove the protective poly liner. A piece of tape attached to the liner will assist in removal.
7. Cover the film with a non-stick bleeder cloth or release liner and debulk using standard prepreg vacuum bagging procedures. A minimum of 25 in. (635 mm) Hg and a temperature of 60-80°F (16-27°C) for a duration of 5 minutes minimum is suggested.
8. Carefully remove the bleeder cloth or release liner.
9. Complete prepreg lay-up directly onto the film.
10. Thoroughly debulk the entire part before initiating the cure cycle.

Cure Cycle

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

Suggested Cure Cycle

Temperature rise rate between 2-20°F per minute (1-10°C per minute) Vent vacuum when the autoclave pressure reaches approximately 15-20 PSI (0.10-0.14) Hold 60 - 90 minutes at 250°F (121°C) or 350°F (177°C) with 10 PSI (0.07MPa) pressure.

Suggested Finishing Techniques

Proper use of the film can help reduce or eliminate most of the material and labor involved in typical fill and sand operations. Simple sanding to remove mold release agents is all that is normally required prior to application of filler primer.

1. Wipe off the tool release coating from the cured film surface using unsized cheesecloth and a general purpose cleaner.* Wipe dry with unsized cheesecloth.

   ***Note:** When using solvents, extinguish all ignition sources, including pilot lights. Read and follow manufacturer's precautions and directions for use.

2. Composite parts surfaced with the film can be finished with either hand sanding or machine (dual-action) sanding methods.

   a. **Hand Sanding**

      i. Use only 320 grit or finer open coat abrasives. Coarser grits may cause the formation of pinhole defects in the adhesive surface.

      ii. Wet sand with water using moderate pressure until the desired finish is achieved. 10-20 strokes is typical.

   b. **Machine (Dual Action) Sanding**

      i. Use only 320 grit or finer open coat abrasives. Coarser grits may cause the formation of pinhole defects in the adhesive surface.

      ii. Wet sand with water using moderate pressure until the desired finish is achieved. 1-2 passes will be typical.

3. Panels surfaced with the film can be primed and painted using standard aerospace painting and finishing procedures.

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Shelf Life

3M™ Scotch-Weld™ Low Density Composite Surfacing Film AF 325 and AF 325LS must be stored at 0°F (-18°C) or below in a sealed polyethylene bag.

Standard shelf life of Scotch-Weld AF 325 and AF 325LS Film is 6 months from date of shipment when stored at 0°F (-18°C) or below.

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, please visit www.3M.com/msds or call 1-800-364-3577 or (651) 737-6501.

For Additional Information

In the U.S., call toll free 1-800-235-2376, or fax 1-800-435-3082 or 651-737-2171. For U.S. Military, call 1-866-556-5714. If you are outside of the U.S., please contact your nearest 3M office or one of the following branches:

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Technical Information

The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use

Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

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These products were manufactured under a 3M Quality Management System registered to the AS9100 standard.

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