3M™ Scotch-Weld™ Structural Adhesive Film AF 191XS

Product Description

3M™ Scotch-Weld™ Structural Adhesive Film AF 191XS is an epoxy surfacing film that consists of an expanded metal copper foil laminated with a thermosetting epoxy resin.

Advantages:

- Excellent, void-free surface quality on composites
- Co-cure capable with most epoxy composites
- Excellent performance with 250° F (120°C) or 350° F (177°C) cure cycles
- Low volatility – less surface porosity
- Minimal sanding required prior to painting operations
- Eliminates most filling operations before paint process

Typical Physical Properties and Performance Characteristics:

Film Weight/Color	AF 191XS .030 lb/ft. sq (Resin only) / Color Tan AF 191XS 220 to 146 g/sqm (Resin only)
Expanded Copper Foil Weight	.015 lbs/ft² expanded copper foil
Total Product Weight	0.045 lbs/ft² (220 g/sqm)
Protective Liners	Polyethylene (poly) on one side, paper on other
Shop Handling	Drape able and conformable at room temperature
Tack	Medium tack - adheres to release coated tooling
Work Life	10 to 14 days at 75° F (24°C)
Volatile Content	< 1% Volatile Content

AF 191XS Surfacing Film Cure Cycle

AF 191XS Surfacing Film is compatible with most epoxy composite materials. AF 191XS Surfacing film can be cured at 250° F (121°C) or 350° F (177° C).

1. Preferred 250° F (121 C) Cure Cycle
    a. 60-90 minutes at 250° F +/- 10 F (121° C +/- 5° C)
    b. Minimum of 10 psi (2.07 bar pressure). For better result use 30 psi or greater.
    c. Vent to atmosphere once pressure is applied.
    d. Temperature rise rate 2 – 10° F (1 – 5° C) per minute.
2. Preferred 350° F (177° C) Cure Cycle
    a. 60-90 minutes at 350° F +/- 5° F (177° C +/- 5° C)
    b. Minimum of 10 psi (2.07 bar pressure). For better result use 30 psi or greater.
    c. Vent to atmosphere once pressure is applied.
    d. Temperature rise rate 2 – 10° F (1 – 5° C) per minute.

Composite Surfacing Properties

1. AF 191XS surfacing film has been successfully used as a surfacing and lightning strike protection film for epoxy composites. It has been found to provide a very smooth void-free surface when processed according to the suggested Application Guidelines (below).
2. Resin bubbling or resin penetration of the prepreg resin through the film has not been experienced. There are no indications suggesting this phenomenon might occur.
3. Honeycomb mark-off or telegraphing through composite skins can be minimized by using AF 191XS surfacing film.
4. Exposure of AF 191XS surfaced painted panels to 102° F/100% relative humidity has not caused paint to blister or otherwise degrade the painted surface.

Product Application Guidelines

Proper application of AF 191XS surfacing film is key to achieving a smooth, void-free surface. The major objective of the following procedure is to minimize air entrapment between the surfacing film and the tooling surface. Improper lay-up or debulking could result in a rough, porous surface that may require additional finishing.

1. Allow AF 191XS surfacing film to warm to room temperature before removing the roll from the sealed poly bag. The bag should be dry and free of contamination before film is removed.
2. Unroll and cut AF 191XS surfacing film to desired size. This can be done on automated cutting tables as well.
3. Remove the paper liner form the film. Leave poly liner on film to minimize contamination and provide best handling characteristics.
4. Place the film on a released tool surface being very careful not to entrap air between film and 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 quickly help remove it when pulled.
7. Cover the AF 191XS film with a non-stick bleeder cloth, or release film 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 duration of five minutes minimum recommended.
8. Carefully remove the bleeder cloth.
9. Thoroughly debulk the entire part before initiating the cure cycle.

Suggested Finishing Techniques

Proper use of AF 191XS film can help reduce or eliminate most of the material labor involved in typical fill and sand operations. Simple light sanding to remove mold release agent is all that is normally required.

1. Wipe off the tool release coating from the cured AF 191XS film surface using cheese cloth and a suitable approved solvent. Wipe dry with none sized cheese cloth.
   *Note; When using solvents, follow the manufacturer's precautions and directions for use.

2. Composite parts surfaced with AF 191XS surfacing film can be finished with either hand sanding or machine (dual action) sanding methods.

   a. Hand Sanding
      I. Use light pressure and only 240 grit or finer open coat abrasives. Coarser grits may cause the formation of pin hole defects in the adhesive surface or expose the copper grid.
   b. Machine (Dual action) Sanding
      I. Use only 240 grit or finer open coat abrasives with light pressure. Coarser grit may cause the formation of pin hole defects in the adhesive surface or expose the copper grid.

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

III. Panel surfaced with AF 191XS surfacing film can be primed and painted using standard aerospace industry painting procedures.

Storage and Handling
AF 191XS surfacing film must be stored at 0° F (-18° C) or below in a sealed polyethylene bag. Standard shelf life of 3M AF 191XS surfacing film is 12 months from date of shipment when store at 0° F (-18° C) or below.

Precautionary Information
Refer to product label and Safety Data Sheet (SDS) for health and safety information before using this product. For SDS and/or other regulatory documents visit our website https://www.3m.com/3M/en_US/company-us/SDS-search/.

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 representative.

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

191XS
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