

# Fly High and Dry: Advanced Sub-Floor Corrosion Prevention for Aircraft Structures

Date: October 23, 2024



# Steve Falteisek Work History

- 42 years of aircraft MRO experience
- USAF, Electro-Environmental 4 years
- USAF, Air National Guard, 6 years
- Master Fighter Jet Electrician
- McDonnell Douglas, F-15 Maintenance Trainer Saudi Arabia - 3 years
- Northwest Airlines FAA rated A and P Technician, 7 years performing heavy structures, rigging, engine and general maintenance on 747'S/A320's
- Northwest Airlines Maintenance Manager, Light, Heavy and Major Checks on A320/A319, 7 years
- Aerospace MRO Segment Leader, 3M Aerospace, 22 years



# 3M™ Corrosion Prevention Sealing Tape 9143FR



## Easy to Install and Remove

- Repositionable during application and can be separated if stuck together
- Easy to cut with scissors and common tools
- Single-side tacky tape designed to be removed cleanly from typical aircraft coatings after service

## Excellent Corrosion Resistance

- Withstands salt fog environment to effectively protect aluminum substrate
- Protects aluminum structures from corrosive effects caused by exposure to fluids inside cabin environment

## Flame Resistant

- Flame resistant per 14 CFR / CS 25.853 (a), Appendix F, Part I (a) (1) (ii), 12-second vertical burn\*

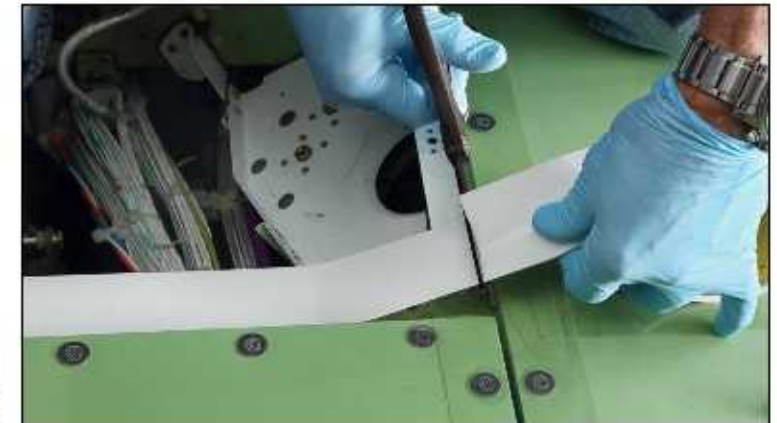
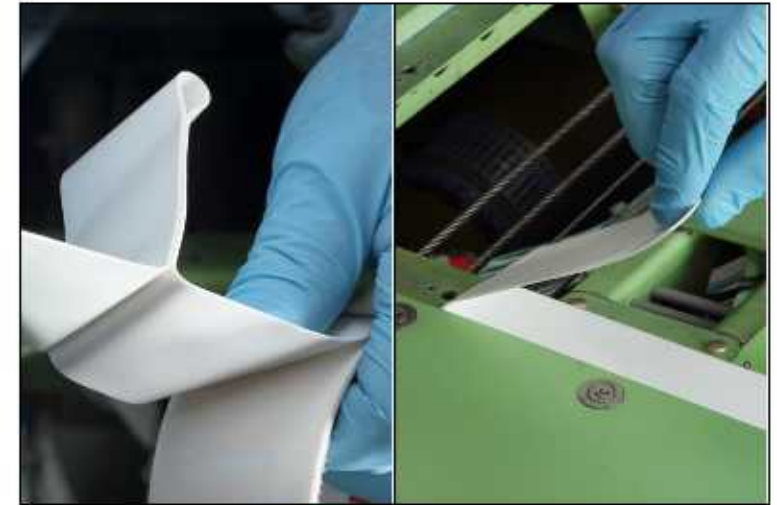
## Attractively Priced

- 3M material and process technologies enable customers to realize immediate cost reduction

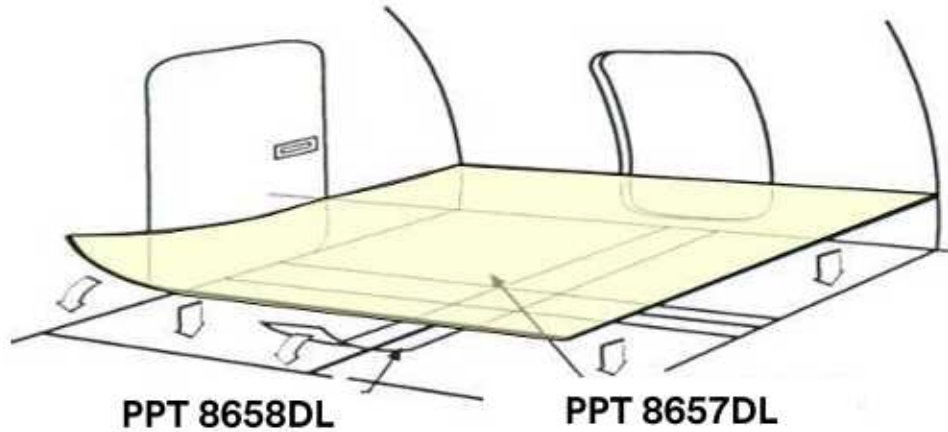
## FAA PMA Authorization, (FAA PMA No. PQ04414CE, Supplement No. 4)

- 9143FR is approved as a minor modification - We do **NOT** need to replace another product in order to be installed on applicable aircraft
- Will provide documentation to assist in the implementation of 9143FR - NO additional engineering certification work is required to use the product, PMA approval provides the installation eligibility

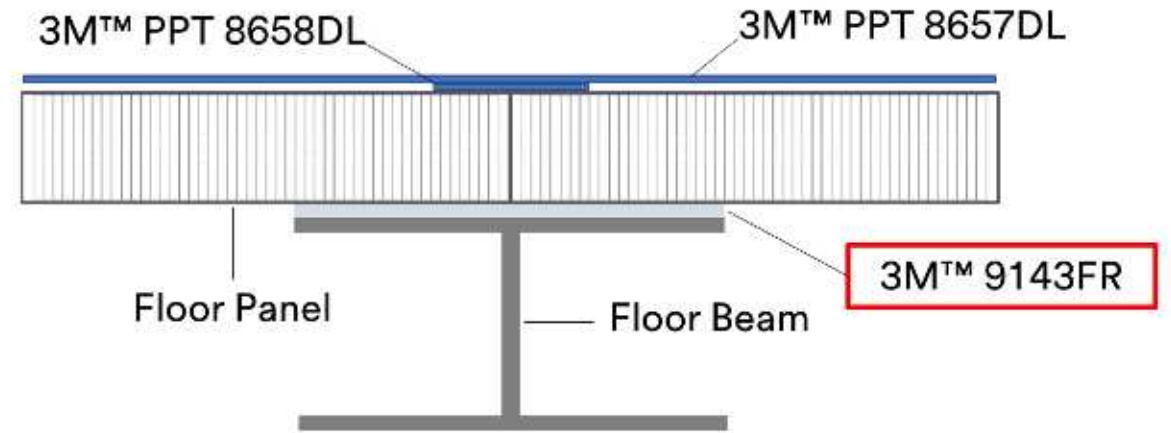
\* Tested in accordance with 14 CFR 25.853 (a) Appendix F, Part 1 (a)(1)(ii), 12-second vertical burn per FAA Policy Statement PS-ANM-25.853-01-R2, Reference 21, Option 1 (in a stand-alone mode, cut tape sample of nominal size: 3" x 12") and FAA Policy Statement PS-ANM-25.853-01-R2, Reference 21, Option 3 (bonded to a worst case substrate). Installation approval is the responsibility of the design approval holder or the aircraft owner/operator



# Where to use 3M™ 9143FR?



3M™ 9143FR is a 43 mil thick tape designed to provide a corrosion preventative sealing layer between aircraft floor beams and floorboards. When applied to aluminum floor beams and structures, the tape protects the structural member from corrosion caused by repeated exposure to various fluids, particularly around doors, galleys, and lavatories.



- PPT alone can reduce your corrosion operating costs by up to 75%
- Using 9143FR AND PPT can reduce your corrosion operating costs by up to 90%



# 9143FR SKUs

SKU	Material Description (Part Number)	Width	Length	Total Area
7100283413	9143FR-0075	0.75 inch	4 yd	0.083 sqyd
7100283419	9143FR-0125	1.25 inch	4 yd	0.139 sqyd
7100283420	9143FR-0225	2.25 inch	4 yd	0.25 sqyd
7100283401	9143FR-0250	2.50 inch	4 yd	0.278 sqyd
7100283403	9143FR-0300	3.00 inch	4 yd	0.333 sqyd
7100283416	9143FR-0375	3.75 inch	4 yd	0.417 sqyd
7100283421	9143FR-2400	24.00 inch	4 yd	2.67 sqyd
7100284584	9143FR	Variable, per customer order		



# Technical Datasheet



April 2024

## Corrosion Prevention Sealing Tape 9143FR

### Technical Data Sheet

#### Product Description

3M™ Corrosion Prevention Sealing Tape 9143FR is a 43 mil thick tape designed to provide a corrosion preventative sealing layer between aircraft floor beams and floorboards. When applied to aluminum floor beams and other floor support structures, the tape protects the metallic support structure from corrosion caused by repeated exposure to various fluids, particularly around doors, galleys, lavatories, and cargo compartments. 9143FR is comprised of a polyester backing and a flame retardant acrylic adhesive that cuts easily, is repositionable, and removes cleanly after service. The product is available in a variety of widths in roll form without a release liner.

Coming Soon: For 3M recommended application and removal procedures, please see 3M™ Corrosion Prevention Sealing Tape 9143FR Installation, Maintenance, and Removal Instructions available from <https://www.3m.com/AerospaceFAAPMA>.

#### Dimensions

Approximate Thickness	0.043 in (1.09 mm)
Standard Roll Length	4 yd (3.7 m)
Available Roll Widths	Maximum 24 in (61 cm)
Approximate Weight	2.43 lb/eqyd (1318 g/eqm)

#### Typical Physical Properties and Performance Characteristics

Notes: 1) The following technical information and data should be considered representative or typical only and should not be used for specification purposes. 2) ASTM = American Society for Testing and Materials. 3) Metric values are listed in parenthesis.

Property	Test Method	Units	Results
Tensile Strength @ Break	ASTM D882	lb/in (N/100mm)	36 (830)
Elongation @ Break		%	43
90° Peel Adhesion @ 73°F (23°C) to:	ASTM D3330 Method F*, with the following conditioning:		
AkzoNobel 10P4-2NF Epoxy Primer	24 hr dwell at 73°F / 50% RH	oz/in (N/100mm)	27 (30)
	1 week dwell at 180°F**		171 (187)
	1 week dwell at 140°F / 95% RH**		132 (145)
AkzoNobel 448-22-1000 High Solids Epoxy Enamel	24 hr dwell at 73°F / 50% RH		17 (19)
	1 week dwell at 180°F**		83 (91)
	1 week dwell at 140°F / 95% RH**		25 (27)
Chemetall Ardrox® AV-8 Corrosion Inhibiting Compound (1 hour cure)	24 hr dwell at 73°F / 50% RH		34 (37)
Chemetall Ardrox® AV-8 Corrosion Inhibiting Compound (24 hour cure)	24 hr dwell at 73°F / 50% RH		30 (33)
Water Vapor Transmission Rate	ASTM F1249 (100°F / 100% RH)	g/(m <sup>2</sup> -day)	7.8
Flame Resistance	12-second vertical burn***	-	Pass
	12-second vertical burn - Applied on 0.020 inch thick 7075-T6 aluminum****	-	Pass
	15-second horizontal burn****	-	Pass

\* Peel adhesion conducted at 90° angle and peel rate of 10 in/min

\*\* Samples allowed to dwell for 24 hours at 73°F / 50% RH prior to conditioning and another 24 hours at 73°F / 50% RH after conditioning and before testing

\*\*\* Tested in accordance with 14 CFR 25.853 (a), Appendix F, Part I (a) (1) (ii), 12-second vertical burn per FAA Policy Statement PS-ANM-25.853-01-R2, Reference 21, Option 1 (in a stand-alone mode, out tape sample of nominal size: 3" x 12") and FAA Policy Statement PS-ANM-25.853-01-R2, Reference 21, Option 3 (bonded to a worst case substrate). Installation approval is the responsibility of the design approval holder or the aircraft owner/operator.

\*\*\*\* Tested in accordance with 14 CFR 25.853 (a), Appendix F, Part I (a) (1) (iv), 15-second horizontal burn. Material self-extinguished before reaching the 1.5" timing zone for burn rate calculation. Installation approval is the responsibility of the design approval holder or the aircraft owner/operator.

#### Environmental Health and Safety

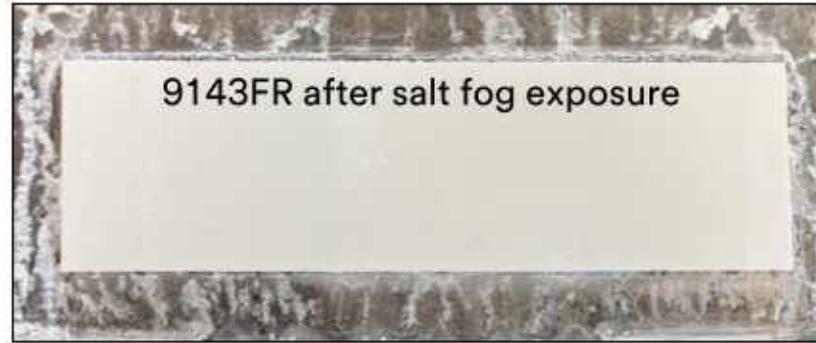
- 3M™ Corrosion Prevention Sealing Tape 9143FR is 100% solids and considered to be an article.

#### Shipping and Storage

- No special/hazardous labeling or packaging is required.
- Keep tape in a clean area, away from excessive moisture and out of direct sunlight. Store rolls in the shipping carton. Return partially used rolls to the shipping carton.
- Shelf Life: Two (2) years from the date of manufacture or as expressly certified by 3M.

# Salt Spray Corrosion Resistance – 9143FR Bare 7075-T6 Aluminum x 1 week

- 9143FR applied to 7075-T6 bare aluminum panels and salt spray per ASTM B117 (35 °C x 100% RH) for 1 week
- 9143FR removed from panels and the panels were inspected for corrosion



9143FR

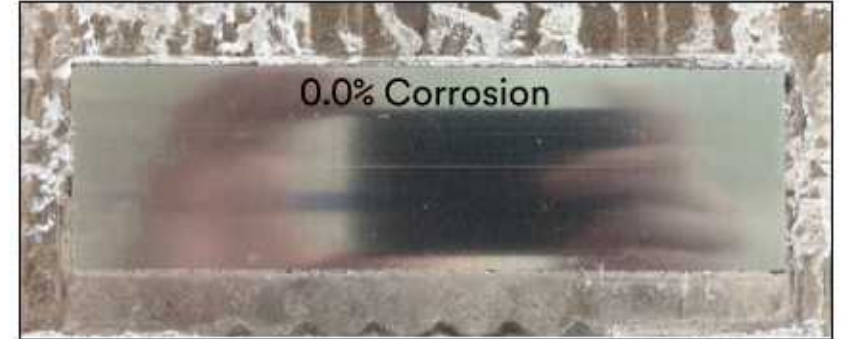
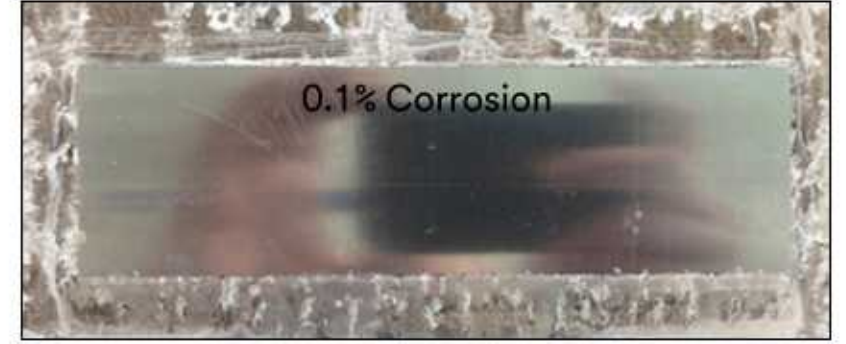
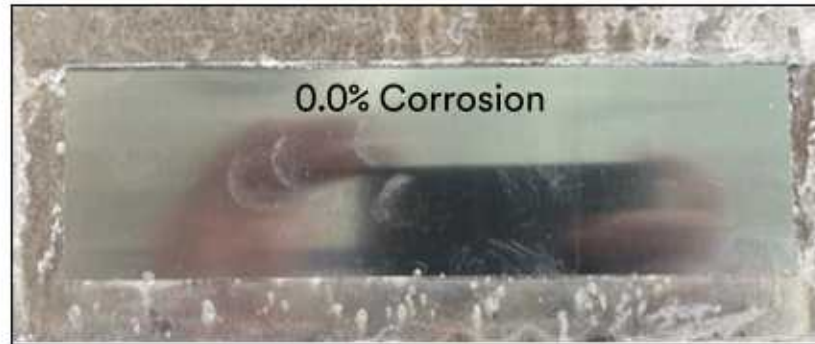
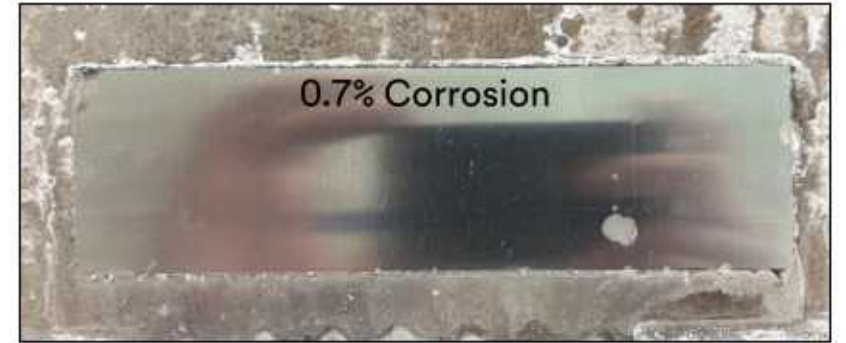
Corroded aluminum





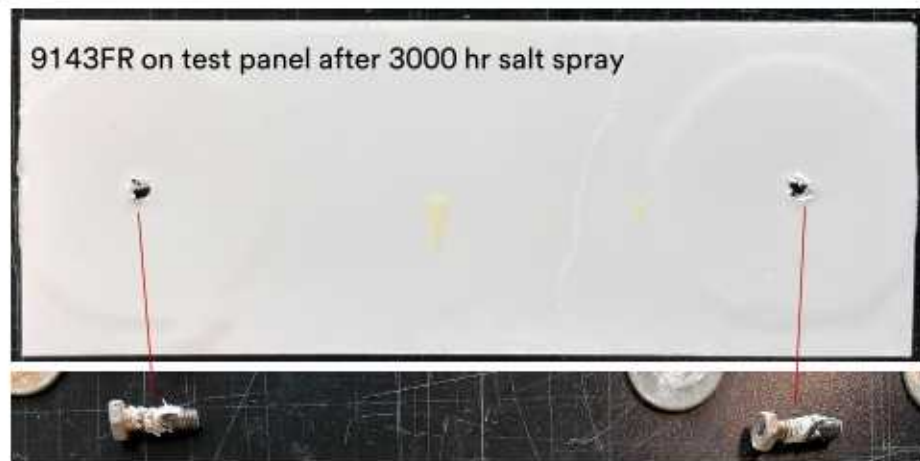
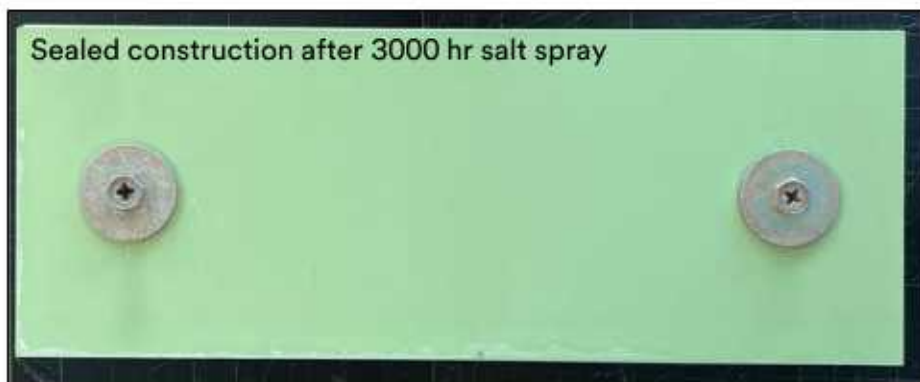
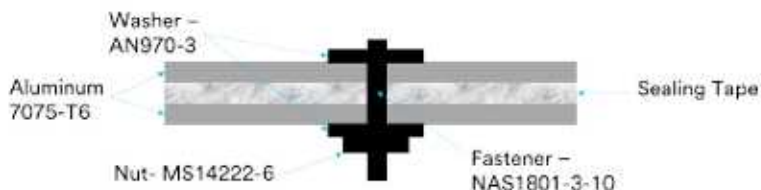
# Salt Spray Corrosion Resistance – 9143FR Bare 7075-T6 Aluminum x 1 week

- 9143FR applied to 7075-T6 bare aluminum panels and salt spray per ASTM B117 (35 °C x 100% RH) for 1 week
- 9143FR removed from panels and the panels were inspected for corrosion





# 3000 Hour Salt Fog on Boric/Sulfuric Acid Anodized 7075-T6 Bare Aluminum in Construction



9143FR "gums" up the screws, providing an effective fluid barrier

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Final Test Surface after 3000 hr - 9143FR Removed - Boric/sulfuric acid anodized bare 7075-T6



# Typical Cabin Fluid Soaks

- 9143FR was applied onto 7075-T6 clad and bare aluminum and allowed to dwell in common fluids found within the aircraft interior for 2 weeks at 35 °C.
- After aging, samples were removed from the liquid, cleaned off, and the tape was removed to inspect for corrosion under the tape.

Fluid	PH
Sea Salt Environment	8
Salt Spray Test (ASTM D117)	7
Condensate	5.4
DI Water	4.5-5
Coffee	4.5
Bottled water	4.5
Urine	4.5
Red Wine	3
Orange Juice	3
Coca-Cola	2.5





# 9143FR Corrosion Resistance in Common Liquids

## 35 °C x 2 week immersion

9143FR effectively resists ingress from common liquids present in cabin environment, protecting the aluminum substrate from corrosion.



\*Post-Exposure Photos



# 9143FR Corrosion Resistance in Common Liquids

## 35 °C x 2 week immersion

9143FR effectively resists ingress from common liquids present in cabin environment, protecting the aluminum substrate from corrosion.

DI Water

Tap Water

Synthetic Urine

Coke

Red Wine

Clad 7075-T6



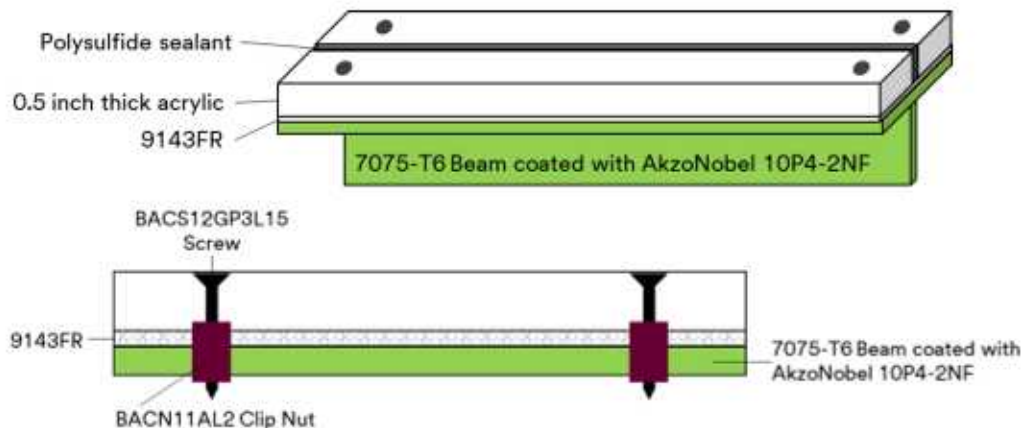
Bare 7075-T6



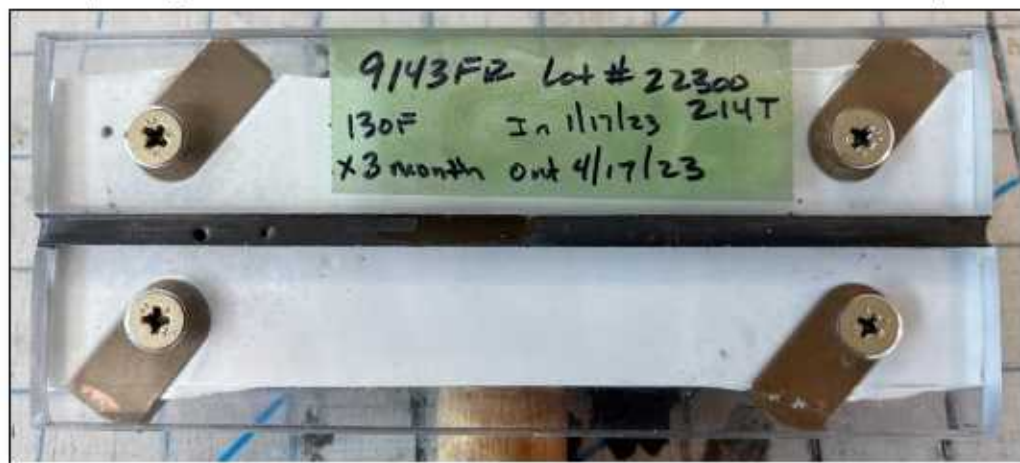
\*Post-Exposure Photos with 9143FR removed

# Clean Removal after 130 °F x 3 months in Simulated Floor Construction

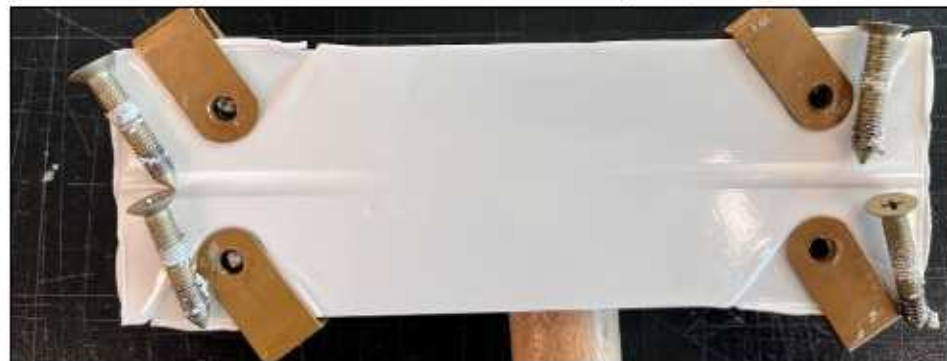
## Simulated floor construction



Sample aged at 130 °F for 3 months before disassembly



9143FR surface after removal of acrylic panel



9143FR removed from beam surface

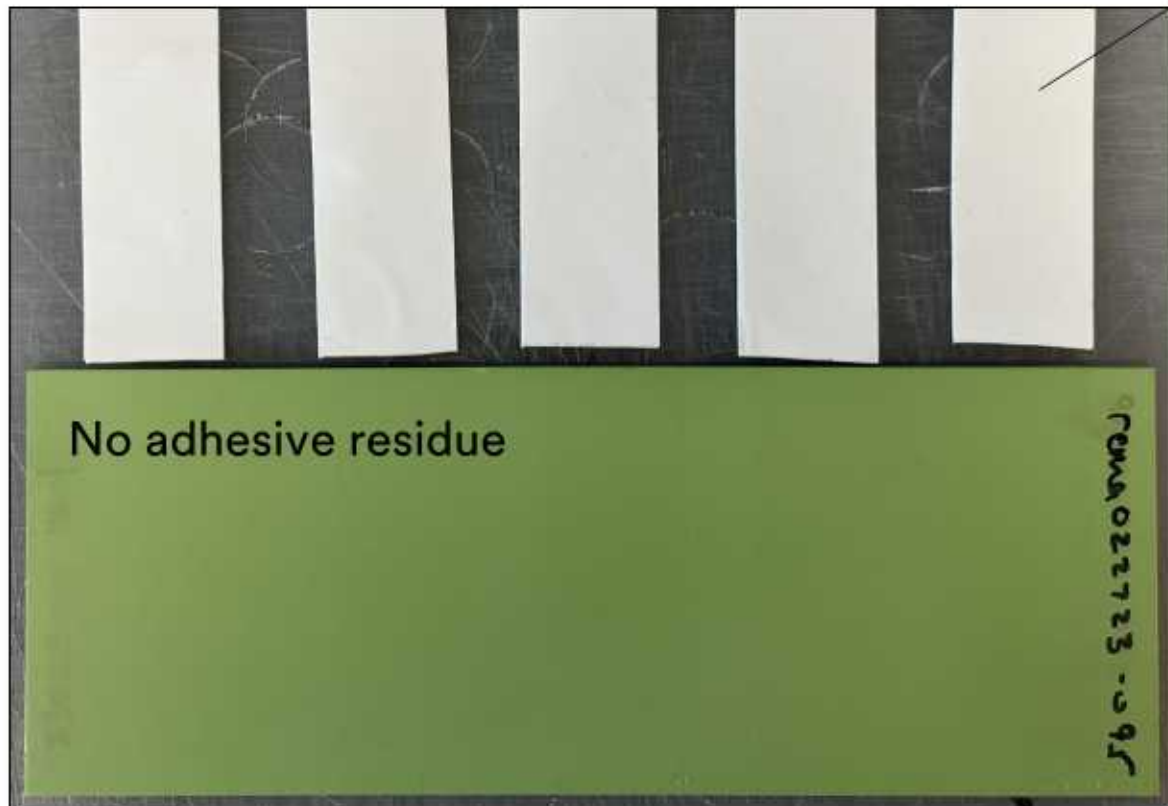




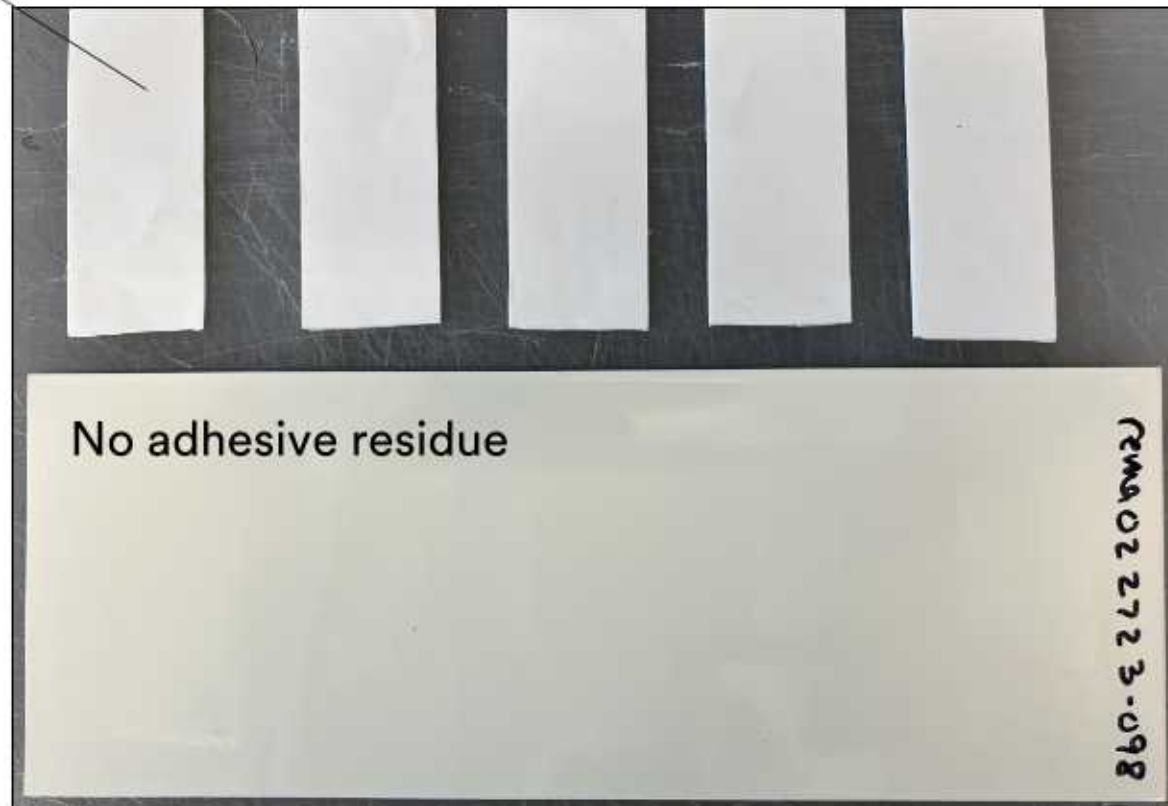
# Clean Removal After 130 °F x 6 Months

## Simulates approximately 5 years of in-service room temp aging

9143FR strips after removal



Clean removal of 9143FR after 6 months at 130°F on AkzoNobel 10P4-2NF Epoxy Primer




Clean removal of 9143FR after 6 months at 130°F on AkzoNobel 446-22-1000 High Solids Epoxy Enamel



# Flame Resistant

## 14 CFR / CS 25.853 (a), Appendix F, Part I (a) (1) (ii), 12-second vertical burn

  
**Vertical Flammability Test Results - 12 Second Test**  
FAR 25.853(a) Appendix F Part I (a) (1) (ii)

Material: 9143FR Lot#: 23023119

Conditioning Room: Date In: 3/5/24 Time In: 8:00 am  
Date Out: 3/6/24 Time Out: 2:00 pm

Number	Flame Time (Seconds)	Burn Length (Inches)	Drippings (Seconds)
1	2.3	3.0	0
2	1.1	2.5	0
3	2.0	2.2	0
AVERAGE:	1.8	2.6	0

**Vertical 12 Second Burn Test Requirements:**  
Average Self-Extinguish times may not exceed 15 seconds.  
Average Burn Length may not exceed 8 inches.  
Average Dripping may not exceed 5 seconds after falling.  
Additional Comments/Observations:

PASSED: XXX FAIL:


Tested by: *Mary Colson* Date: 3/6/24

*This test data only represents the material and lot number listed above.*

Aeoro Technologies LLC - a 3M company

### 9143FR Free-standing

**Note** - The Aeoro Technologies and 3M test results in this presentation are for informational use only and installation approval is the responsibility of the aircraft owner/operator. The data provided are specific to the lot tested on the date specified and cannot be relied upon for future customer installation approvals.

  
**Vertical Flammability Test Results - 12 Second Test**  
FAR 25.853(a) Appendix F Part I (a) (1) (ii)

Material: 9143FR Lot#: 23023119  
Bonded to 7075-T6 Aluminum

Conditioning Room: Date In: 3/5/24 Time In: 8:00 am  
Date Out: 3/6/24 Time Out: 2:00 pm

Coupon Number	Flame Time (Seconds)	Burn Length (Inches)	Drippings (Seconds)
06-844106-4a	1.7	1.7	0
06-844106-4b	1.7	1.6	0
06-844106-4c	1	1.8	0
AVERAGE:	1.5	1.7	0

**Vertical 12 Second Burn Test Requirements:**  
Average Self-Extinguish times may not exceed 15 seconds.  
Average Burn Length may not exceed 8 inches.  
Average Dripping may not exceed 5 seconds after falling.  
Additional Comments/Observations:


PASSED: XXX FAIL:

Tested by: *Mary Colson* Date: 3/6/24

*This test data only represents the material and lot number listed above.*

Aeoro Technologies LLC - a 3M company

### 9143FR Bonded to 0.020 inch thick aluminum per FAA Policy Statement PS-ANM-25.853-01- R2, Reference 21, Option 3 (bonded to a worst case substrate)

  
**Statement of Compliance with Federal Aviation Flammability Requirements**

Date Tested: 3/6/24  
Material: 9143FR Lot #: 23023119

The above material has been tested and complies with the flammability requirements of:

FAR 25.853(a) Appendix F Part I (a) (1) (i)  
 FAR 25.853(a) Appendix F Part I (a) (1) (ii)

Tested by: *Mary Colson*

Aeoro Technologies LLC - a 3M company

### Statement of Compliance to Federal Aviation Flammability Requirements

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Applied to Life.™

**Thank you!**

