

# SMI, Inc.

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Date: 26-Mar-2012

SMI/REF: 1201-215

Product: **TOUGHGUARD "STEP 2 PAINT PROTECTION SYSTEM"**  
(received 02-Feb-2012 / 23-Feb-2012)

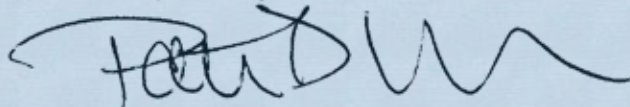
Dilution: As received

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Douglas Aircraft Company Customer Service Document  
CSD #1, Revised July 1997  
Type V: Materials and Procedures for Polishing Aluminum Surfaces

Residue	<u>Does not conform</u>
Sandwich Corrosion	<u>Conforms</u>
Stress Cracking Test on Acrylic Plastics	<u>Conforms</u>
Immersion Corrosion, Aluminum	<u>Conforms</u>
Hydrogen Embrittlement	<u>Conforms</u>

Respectfully submitted,



Patricia D. Viani, SMI Inc.

Client: HR Toughguard, LLC  
 Product: TOUGHGUARD "STEP 2 PAINT PROTECTION SYSTEM"  
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**Residue Test:** The material shall leave no residue or stain when tested in accordance with ASTM F 485.

*Note: This test method, ASTM F485, is used to ensure that candidate aircraft surface cleaners do not leave a residue which, on drying, would leave a permanent stain requiring polishing to remove. Polishes sometimes leave a residue that does not rinse off with water, and but can be wiped off without leaving a stain, but this condition will be reported as non conformance based on the wording of the requirement, "...shall leave no residue...".*

Alloy	Visible residue after water-rinsing?	Visible residue after wiping?	Visible stain after rinsing or wiping?
AMS 4911	*Yes (Does not conform)	None	None
AMS 4049	*Yes (Does not conform)	None	None

Result \*Does not conform

**Sandwich Corrosion Test:** The compound shall not cause significant corrosion of aluminum alloy faying surfaces when tested in accordance with the following conditions of temperature and humidity:

- \* Alternate intervals of 16 hours in the humidity cabinet and eight hours in an oven. Beginning with the humidity cabinet exposure, the cycling test shall be continued for a total of seven days.
- \* The humidity cabinet shall be maintained at 100° ±2°F (37.8° ± 1.1°C) and 98 to 100 percent relative humidity.
- \* The oven shall be maintained at 100° ± 5°F (37.8° ± 2.8°C)

Corrosion Rating:

- 0 = No visible corrosion
- 1 = Very slight corrosion or discoloration
- 2 = Slight corrosion
- 3 = Moderate corrosion
- 4 = Extensive corrosion

Corrosion on any panel exceeding that obtained using tap water shall be considered excessive.

ALLOY	Tap Water Control	PRODUCT
2024-T3 Bare/Alodined per MIL-C-5541	1	1
2024-T3 Bare/Anodized per MIL-A-8625	1	1
2024-T3 Clad/Alodined per MIL-C-5541	1	1
2024-T3 Clad/Anodized per MIL-A-8625	1	1
7075-T6 Clad/Alodined per MIL-C-5541	1	1
7075-T6 Clad/Anodized per MIL-A-8625	1	1

Result Conforms

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Stress Cracking Test on Acrylic Plastics: The compound shall not cause crazing, cracking, or other attack on acrylic based plastics when tested in accordance with ASTM F 484, using Type C material at a stress level of 4500 psi.

**As received: No crazing, cracking, or other attack.**

Result Conforms

Immersion Corrosion Test: The average weight loss of aluminum alloy specimens shall not exceed 10 milligrams per coupon when tested per ASTM F 483. The aluminum alloy 7075-T6 alclad coupons shall conform to Federal Specification QQ-A-250/13 Temp-T6, with corners and edges smoothed.

**As received: + 0.7 mg after 168 hours (no visible corrosion)**

Result Conforms

Hydrogen Embrittlement: Hydrogen Embrittlement testing shall be in accordance with ASTM F 519, Type 1c.

*Specimens: Type 1C, cadmium plated per MIL-STD-870*

*Load: 45%, 23°C, notch immersed in product for 150 hours*

**As received:**

**Specimen 1: No failure within 150 hours.**

**Specimen 2: No failure within 150 hours.**

**Specimen 3: No failure within 150 hours.**

**Specimen 4: No failure within 150 hours.**

Result Conforms