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Date: 03-Apr-2012
SMI/REF: 1201-227

Product: **TOUGHGUARD "STEP 1 POLARIZING WASH"** (received 02-Feb-2012)

Dilution: Concentrate (neat) and 2 ounces per gallon Page 1 of 4

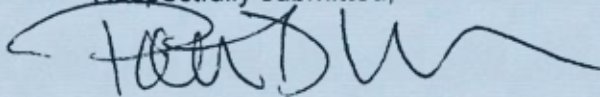
**Douglas Aircraft Company Customer Service Document
CSD No. 1**

Reissued July 1997

Type I: Materials and Procedures for General Exterior
Cleaning of Painted and Unpainted Surfaces
(General Purpose Cleaner)

Effect on Painted Surfaces	<u>Conforms</u>
Residue	<u>Conforms</u>
Sandwich Corrosion	<u>Conforms</u>
Stress Cracking Test on Acrylic Plastics	<u>Conforms</u>
Immersion Corrosion, Aluminum	<u>Conforms</u>
Cadmium Removal	<u>Conforms</u>
Hydrogen Embrittlement	<u>Conforms</u>

Respectfully submitted,



Patricia D. Viani, SMI Inc.

1. Effect on Painted Surfaces Test: The material shall not produce a decrease in paint film hardness greater than one pencil; that is the number of the next softer pencil, or any discoloration or staining when tested in accordance with ASTM F 502. At least two panels shall be used per test.

As received: *No softening or discoloration of polyurethane topcoat when checked 24 hours after exposure per ASTM F 502.*

Dilute: *No softening or discoloration of polyurethane topcoat when checked 24 hours after exposure per ASTM F 502.*

Result Conforms

2. Residue Test: The material shall leave no residue or stain when tested in accordance with ASTM F 485.

AMS 4911: (As received): **PASS** Dilute: **PASS**

AMS 4049: (As received): **PASS** Dilute: **PASS**

Result Conforms

3. 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 |

Client: HR Toughguard, LLC
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 Douglas CSD #1, Type I General Purpose Cleaner

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3. Sandwich Corrosion Test: continued

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

ALLOY	CONTROL	AS RECEIVED	DILUTE
2024-T3 Bare/Alodined per MIL-C-5541	1	1	1
2024-T3 Bare/Anodized per MIL-A-8625	1	1	1
2024-T3 Clad/Alodined per MIL-C-5541	1	1	1
2024-T3 Clad/Anodized per MIL-A-8625	1	1	1
7075-T6 Clad/Alodined per MIL-C-5541	1	1	1
7075-T6 Clad/Anodized per MIL-A-8625	1	1	1

Result Conforms

4. 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.*

Dilute: *No crazing, cracking, or other attack.*

Result Conforms

5. 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*

Dilute: *0.3 mg after 168 hours*

Result Conforms

6. Cadmium Removal Test: The average weight loss of cadmium from low hydrogen embrittlement cadmium plated steel shall not exceed 10 milligrams per coupon when tested per ASTM F 483. The test duration shall be 24 hours. The test specimens shall be 1 x 2 x 0.040 inch 4130 steel panels (MIL-S-18729) with corners and edges smoothed and then plated with 0.003 to 0.006 inch of low hydrogen embrittlement cadmium plating (P/N 7452876-23)

Note: Specimens were cadmium plated in accordance with ASTM F1111.

As received: < 0.1 mg after 24 hours

Dilute: 5.8 mg after 24 hours

Result Conforms

7. 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% of notched fracture strength, 150 hours, 24°C

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.

DILUTE:

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