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SMI/REF: 2009-080

Product: **AEROTRON-AV** *(received 16-Oct-2020)*

Dilution: As received

Partial testing in accordance with:

ADS-61A-PRF

AERONAUTICAL DESIGN STANDARD
PERFORMANCE SPECIFICATION
FOR
ARMY AIRCRAFT CLEANERS, AQUEOUS AND SOLVENT

4.5.5 Effects on Unpainted Surfaces	Conforms
4.5.6 Total Immersion Corrosion	Conforms
4.5.8 Low Embrittling Cadmium Plate Corrosion	Conforms
4.5.9 Sandwich Corrosion	Conforms
4.5.10 Hydrogen Embrittlement[1]	Conforms[1]
4.5.11 Stress Corrosion[2]	Conforms[2]
4.5.12 Effects on Painted Surfaces	Conforms
4.5.14 Effects on Acrylics	Does not conform

[1]Note: Type 1c specimens were utilized instead of Type 1d.
[2]Note: Partial testing performed utilizing Method A of ASTM F945, AMS 4911 titanium only.

Respectfully submitted,

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(PARTIAL) TABLE I. Performance and requirements paragraphs

Characteristic	Type 1 Requirement	Type 2 Requirement	Type 2A Requirement	Conformance Paragraph
Effects on Unpainted Surfaces	No streaking, staining not easily removed by hand pressure and water			4.5.5
Total Immersion Corrosion	No staining, etching, pitting, no weight change exceeding Table II limits			4.5.6
Low-Embrittling Cadmium Plate Corrosion	No weight change > 0.14 mg/cm²/24 hrs			4.5.8
Sandwich Corrosion	No corrosion rating greater than reagent water			4.5.9
Hydrogen Embrittlement	No failures after 150 hours immersed			4.5.10
Stress Corrosion	No cracks in Table II alloys		No cracks in titanium alloy (6Al-4V)	4.5.11
Effects on Painted Surfaces	No discoloration or decrease >1 pencil hardness	No discoloration or decrease >1 pencil hardness	No discoloration or decrease >1 pencil hardness	4.5.12
Effects on Acrylic	No crazing or staining			4.5.14

4.5.5 Effects on unpainted surfaces. The alloys listed in Table II shall be verified per ASTM F-485. The maximum intended use concentration of the cleaner shall be used when testing dictates use concentration.

TABLE II. Alloys and total immersion corrosion requirements

ALLOYS	RESULT
AM-355 CRT	No evidence of streaks nor staining not easily removed by hand pressure and water
PH 13-8 Mo	No evidence of streaks nor staining not easily removed by hand pressure and water
Maraging C-250	No evidence of streaks nor staining not easily removed by hand pressure and water
Magnesium AZ31B-H24 (AMS 4377 / AMS-M-3171 Type III)	No evidence of streaks nor staining not easily removed by hand pressure and water
Aluminum 7075-T6 (Bare)	No evidence of streaks nor staining not easily removed by hand pressure and water
Titanium 6Al-4V	No evidence of streaks nor staining not easily removed by hand pressure and water
Steel 4340	No evidence of streaks nor staining not easily removed by hand pressure and water

Result Conforms

4.5.6 Total Immersion Corrosion: The test procedure in ASTM F-483 shall verify the cleaner's effect of total immersion corrosion. The alloys listed in Table II shall be used except that the maximum intended use concentration of the cleaner shall be used when the procedure calls for testing at the recommended use concentration.

TABLE III: Test Panel Alloys and Total Immersion Corrosion Requirements

Alloy	Weight Change (mg/cm²/168hrs)	
	Maximum Allowed	**RESULTS**
AM-355 CRT	0.49	**< 0.10**
PH 13-8 Mo	0.49	**< 0.10**
Maraging C-250	0.49	**< 0.10**
Magnesium AZ31B-H24 (AMS 4377 / AMS-M-3171 Type III)	0.70	**< 0.10**
Aluminum 7075-T6 (Bare)	0.49	**< 0.10**
Titanium 6Al-4V	0.35	**< 0.10**
Steel 4340	0.49	**< 0.10**

No evidence of staining, etching, or pitting.

Result Conforms

4.5.11 ***~~Stress Corrosion. The following procedures shall be used to verify the effects of the cleaner with regard to stress corrosion. 4.5.12.a~~ (sic) ~~shall be used for Type 1 cleaners, and 4.5.12.b~~ (sic) ~~shall be used for Type 2a cleaners.~~

4.5.11.a Procedures for Type 1 cleaners — Result Not performed

4.5.11.b Procedures for Type 2a cleaners — Result Not performed

*****NOTE: PARTIAL TESTING WILL BE PERFORMED UTILIZING ONLY AMS 4911 (6AI-4V) TITANIUM, PER METHOD A OF ASTM F945. NO OTHER ALLOYS OR TEST METHODS WIL BE UTILIZED FOR STRESS CORROSION**

*****ASTM F945 Method A (partial: AMS 4911 only)**

Alloy		OBSERVATION	RESULT
AMS 4911 Blank Control	# 1	No evidence of cracking.	AMS 4911 Titanium sheet meets acceptability and sensitivity criteria
	# 2	No evidence of cracking.	
	# 3	No evidence of cracking.	
AMS 4911 3% Salt Control	# 1	Cracking evident.	
	# 2	Cracking evident.	
	# 3	Cracking evident.	
AMS 4911 Candidate Solution	**# 1**	**No evidence of cracking.**	**Conforms**
	# 2	**No evidence of cracking.**	**Conforms**
	# 3	**No evidence of cracking.**	**Conforms**

Result Conforms

4.5.12 Effect on Painted Surfaces. *(ASTM F502, modified)* The cleaner's effect on painted surfaces shall be verified per ASTM F-502, for all paints listed in Table IV. The maximum intended use concentration of the cleaner shall be used when testing dictates use concentration. Aircraft green shall be considered a preferred color. All test panels shall be primed per MIL-PRF-23377, Type I, Class C.

Table IV. Paint systems for effects on painted surfaces

SPECIFICATION	DESCRIPTION
MIL-PRF-27750	*Epoxy Topcoat*
MIL-C-46168, Type IV	*Aliphatic Polyurethane Topcoat*
MIL-PRF-85285, Type I	Polyurethane, High Solids Topcoat
MIL-P-14105	*Heat Resistant Paint*

Concentrate: No streaking, discoloration, or blistering of the finish.
No pencil hardness change after 24 hour post-exposure dry time.

Result Conforms

4.5.8 Low-embrittling cadmium plate corrosion. The cleaner's effect on low-embrittling cadmium plate corrosion shall be verified per ASTM F-1111. The maximum intended use concentration of the cleaner shall be used when testing dictates use concentration.

Weight change: + 0.01 mg/cm²/24 hours

Result Conforms

4.5.9 Sandwich Corrosion: The sandwich corrosion for alloys listed in Table II, shall be verified per ASTM F -1110. The maximum intended use concentration of the cleaner shall be used when testing dictates use concentration.

Relative Corrosion Severity Rating System:
0 – No visible corrosion and no discoloration present
1 – Very slight corrosion or very slight discoloration, and/or 5% of area corroded
2 – Discoloration and/or up to 10% of area corroded
3 – Discoloration and/or up to 25% of area corroded
4 – Discoloration and/or more than 25% of area corroded, and/or pitting present

Alloy	Rating	
	Reagent Water Control (ASTM D 1193 Ty IV Water)	**Product**
AM-355 CRT (high strength steel)	**1**	**1**
PH 13-8 Mo (high strength steel)	**1**	**1**
Maraging C-250 (high strength steel)	**4**	**1**
Magnesium (AZ31B-H24) treated in accordance with AMS-M-3171 Type III	**4**	**1**
AMS 4045 non-clad aluminum; 7075-T6	**2**	**1**
AMS 4911 Titanium (6Al-4V)	**1**	**1**
Steel 4340	**4**	**1**

Requirement: No corrosion rating greater than reagent water

Result Conforms

4.5.10 Hydrogen Embrittlement. Hydrogen embrittlement of the cleaner shall be verified per ASTM F-519, using ~~Type 1d specimens~~ (Note: Type 1c specimens were used instead of Type 1d).

Parameters:
Specimens: ASTM F519, **Type 1c**
Plating: Cadmium plated per MIL-STD-870 Type I
Load: 45% of notched fracture strength
Number of specimens: Four
Duration: 150 hours
Immersion: Stressed specimen immersed for entire duration
Temperature: Room temperature (75° ± 4°F)
Requirement: No failures after 150 hours of immersion.

Specimen #1: No failures occurred within 150 hours.
Specimen #2: No failures occurred within 150 hours.
Specimen #3: No failures occurred within 150 hours.
Specimen #4: No failures occurred within 150 hours.

Result Conforms (Type 1c)

4.5.14 Effects on acrylic plastic. Stress crazing of acrylic plastic shall be verified by ASTM F-484 (Types A, B and C). The cleaner shall be tested at the maximum use concentration

Acrylic / Stress Level	**Observations after 8 hours exposure**
Type A MIL-P-5425 / 3000 psi	***Evidence of crazing*** **- Does not conform**
Type B MIL-P-8184 / 3500 psi	***Evidence of crazing*** **- Does not conform**
Type C MIL-P-25690 / 4500 psi	***Evidence of crazing*** **- Does not conform**

Result Does not conform