AEROSPACE INFORMATION REPORT

AIR6130™	REV. B
Issued 2011-05 Revised 2023-01 Superseding AIR6130A	

Cadmium Plate Cyclic Corrosion Test

RATIONALE

Five-Year Review.

1. SCOPE

14-day material test to determine the cyclic effects of runway deicing compounds on cadmium plated parts.

2. APPLICABLE DOCUMENTS

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS1431 Solid Runway Deicing/Anti-Icing Product

AMS1435 Liquid Runway Deicing/Anti-Icing Product

3. TEST SPECIMEN PREPARATION

Substrate: 4130 steel.

Size: 1 x 2 x 0.048 inch (25.40 x 50.80 x 1.22 mm). (Specification ASTM F1111, Section 7).

Finish: Cadmium plating: 0.0005 to 0.0008 inch per side; do not exceed 0.0008 inch maximum plating. (Method: specification ASTM F1111, Section 7; quality: specification AMS-QQ-P-416 governs.)

There shall be no supplementary chromate treatment.

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For more information on this standard, visit
https://www.sae.org/standards/content/AIR6130B/

a. Three cadmium plated test specimens shall be used for each fluid to be tested.

b. Sample of AMS1435 shall be tested as received from the supplier.

c. Sample of AMS1431 shall be tested in a diluted form - diluted with ASTM D1193, Type IV, water to 15% by weight solids.

d. Procure soft flexible brushes for test (paintbrush type, 1.5 inches (3.8 cm) wide, with synthetic bristles approximately 1.5 inches (3.8 cm) long).

4. ENVIRONMENTAL EXPOSURE PREPARATION

Preset humidity chamber to 90 °F ± 5 °F (32 °C ± 3 °C) and 30% ± 5% humidity. Affix plastic ties or other inert material as hangers (hangers shall be made from an inert material that will not react with the sample; plastic, plastic coated metals, monofilament fishing line, or stainless steels are acceptable) in the chamber to hold specimens during the environmental exposure period.

Take the total area of the specimen as 27.67 cm^2. The ratio of the area of immersed metal to volume of solution shall be 25 mL of solution per 625 mm^2 of specimen surface area. The volume corresponds to 110 mL.

5. TEST PROCEDURE

a. Measure and record pH of solution to be tested. Record to one decimal place (e.g., pH = 7.3). This value is to be included in the final test report.

b. Solvent clean cadmium plated specimens with acetone; wipe gently with an acetone-soaked wiper. Without allowing the acetone to evaporate, gently remove excess acetone with a dry wiper. Allow samples to dry for 10 minutes in a desiccator. Do not accelerate drying of samples with oven drying.

NOTE: Care should be taken not to touch the cleaned specimen with bare hands; use stainless steel tweezers, clean gloves, or equivalent tool.

c. Weigh and record initial specimen weights in grams. Record all weights throughout the test to the nearest 0.0001 g. Return specimens to desiccator until Day 3.

Table 1

Test Schedule by Weekday				
Monday	Tuesday	Wednesday	Thursday	Friday
				Friday Start - Day 0
Day 3	Day 4	Day 5	Day 6	Day 7
Day 10	Day 11	Day 12	Day 13	Day 14

d. Friday Start: Fill glass containers with solution to be tested, one container for each coupon. See Section 3.b or 3.c for solution being used (consider filling one extra container to have extra conditioned fluid available). Containers shall be large enough so the solution completely covers the specimens. Cover the container with loose fitting cover and place filled container into the humidity chamber to environmentally condition the solution for a minimum of 24 hours ± 1 hour before the start of the test, up to 72 hours ± 1 hour.

NOTE: Containers should be covered with loose fitting covers at all times, with or without coupons in solution. If evaporation occurs such that coupons cannot be completely covered in solution, container should be topped off with solution conditioned per Section 5.d.

e. Day 3: Remove the solution container from the humidity chamber and the specimens from the desiccator. Place specimens in container oriented such that the specimens are not resting flush against the bottom or side of the container. Place the container with cover back into the humidity chamber for 24 hours ± 1 hour.

f. Day 4: After the 24 hour immersion in the solution, remove the specimens, but do not rinse them. Place them into the humidity chamber by hanging for 22.5 hours ± 0.5 hour. Hangers shall be made from an inert material that will not react with the sample (such as plastic, plastic coated metals, and stainless steels are acceptable).

g. Day 5/Day 10/Day 12: Remove specimens from the humidity chamber. Rinse the specimens with deionized water. Lightly brush (12 strokes per side) the specimen surface with the soft flexible brush while rinsing to remove loose corrosion products. Immerse samples into acetone for 10 seconds while agitating specimen. Allow samples to dry for 10 minutes in a desiccator. Weigh and record the specimen weights. Do not accelerate drying of samples with oven drying.

NOTE: If multiple solutions are being tested, use different brushes for each solution to avoid cross contamination.

Immediately after weighing the specimens, return them to their test solution container to soak for 90 minutes ± 5 minutes in the humidity chamber. Specimens shall be oriented such that they are not resting flush against the bottom or side of the container. After 90 minutes, remove the specimens but do not rinse them. Place them in the humidity chamber by hanging for 22.5 hours ± 0.5 hour, maintaining the specimen in the initial orientation throughout the cycle.

h. Day 6/Day 11/Day 13: Return the specimen to the test solution container to soak for 90 minutes ± 5 minutes in the humidity chamber. Specimens shall be oriented such that it is not resting flush against the bottom or side of the container. After 90 minutes, remove the specimen but do not rinse it. Replace it in the humidity chamber by hanging for 22.5 hours ± 0.5 hour, maintaining the specimen in the initial orientation throughout the cycle.

i. Day 7: Remove specimens from the humidity chamber. Rinse the specimens with deionized water. Lightly brush (12 strokes per side) the specimen surface with a soft flexible brush while rinsing to remove loose corrosion products. Immerse samples into acetone for 10 seconds while agitating specimen. Allow samples to dry for 10 minutes in a desiccator. Weigh and record the specimen weights. Do not accelerate drying of samples with oven drying.

NOTE: If multiple solutions are being tested, use different brushes for each solution to avoid cross contamination.

Immediately after weighing the specimens, return them to their test solution container in the humidity chamber. Specimens shall be oriented such that they are not resting flush against the bottom or side of the container. Specimens shall be left in the test solution container in the humidity chamber from DAY 7 to DAY 10.

j. Day 14: Remove specimens from the humidity chamber. Rinse the specimens with deionized water. Lightly brush (12 strokes per side) the specimen surface with a soft flexible brush while rinsing to remove loose corrosion products. Immerse samples into acetone for 10 seconds while agitating specimen. Allow samples to dry for 10 minutes in a desiccator. Weigh and record the specimen weights. Do not accelerate drying of samples with oven drying.

NOTE: If multiple solutions are being tested, use different brushes for each solution to avoid cross contamination.

k. Measure and record final pH of solution. Record to one decimal place (e.g., pH = 7.3). This value is to be included in the final test report.

l. Report the initial weight of the specimen, the weight after each periodic weighing, and the final weight. Calculate and report the value of the cumulative weight lost from each specimen after each periodic weighing procedure.

6. TEST RESULTS

The test report should include the type of fluid used (see Section 3.b or 3.c), the number and type of cadmium plated coupons used, the weight loss for each coupon, and the average weight loss for all three coupons used for each fluid tested. Also include the pH values recorded in Section 5.a and 5.k.

A runway deicing fluid or solid compound tested in accordance with this document that exhibits a weight loss of more than 0.3 mg/cm^2 may cause undesirable corrosion effects to airplane equipment and/or airport equipment.

Calculate the mg/cm^2 value by dividing the weight loss by the total surface area (surface area will be different for any bar that is not ASTM F1111 standard).