

Attn: Petra Tominac  
Nordix Chemicals Factory d.o.o.  
Radnička cesta 173L  
10000, Zagreb  
Croatia

Date: 06-Sep-2024

SMI/REF: 2406-100

Product: **D-ICE NF** (received 24-Jun-2024)

Dilution: Per specification

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**AMS 1431F**  
**SOLID RUNWAY DEICING/ANTI-ICING PRODUCT**  
**Periodic Tests**

4.2.2 Periodic Tests

|           |                                             |                                         |
|-----------|---------------------------------------------|-----------------------------------------|
| 3.2.5     | Effect on Transparent Plastics              | <u>Conforms</u>                         |
| 3.2.6     | Effect on Painted Surfaces                  | <u>Conforms</u>                         |
| 3.2.7     | Effect on Unpainted Surfaces                | <u>Conforms</u>                         |
| 3.2.8     | Effect on Runway Pavements                  |                                         |
| 3.2.8.1   | Runway Concrete Surface Scaling Resistance  | <u>Conforms</u>                         |
| 3.2.8.2   | Asphalt Concrete Degradation Resistance     | <u><sup>1</sup>Not performed by SMI</u> |
| 3.2.9     | Effect on Aircraft Metals:                  |                                         |
| 3.2.9.1   | Sandwich Corrosion                          | <u>Conforms</u>                         |
| 3.2.9.2   | Total Immersion Corrosion                   | <u>Conforms</u>                         |
| 3.2.9.3   | Low Embrittling Cadmium Plate               | <u>Conforms</u>                         |
| 3.2.9.3.1 | Cyclic Immersion Corrosion of Cadmium Plate | <u>Informational</u>                    |
| 3.2.9.4   | Hydrogen Embrittlement                      | <u>Conforms</u>                         |
| 3.2.9.5   | Stress Corrosion Resistance                 |                                         |
|           | AMS 4911                                    | <u>Conforms</u>                         |

<sup>1</sup>Testing required for deicer /anti-icer products used in Europe. This test is not performed by SMI.

  
Jeff Nottebaum, SMI Inc.  
Director

Respectfully submitted,

  
Rae-anne Nottebaum, SMI Inc.  
Senior Analyst

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4.2.2 Periodic Tests: Effect on transparent plastics (3.2.5), effect on painted surface (3.2.6), effect on unpainted surfaces (3.2.7), runway concrete scaling resistance (3.2.8.1), asphalt concrete degradation resistance (3.2.8.2, Appendix A, valid for runway deicing/anti-icing products used in Europe) and effect on aircraft metals (3.2.9) are periodic tests and shall be performed on or just prior to the second anniversary of initial testing and thereafter every four calendar years.

3.2.5 Effect on Transparent Plastics:

3.2.5.1 The product, diluted with ASTM D1193, Type IV, water to 15% by weight of solids taking into account water contained in the product, shall not craze, stain or discolor Type C stretched acrylic plastic conforming to MIL-P-25690, determined in accordance with ASTM F484

Result Conforms

3.2.5.2 The product, diluted with ASTM D1193, Type IV, water to 15% by weight of solids taking into account water contained in the product, shall not craze, stain, or discolor AMS-P-83310 polycarbonate plastic, determined in accordance with ASTM F484, except that the specimens shall be stressed for 30 minutes  $\pm$  2 minutes to an outer fiber stress of 2000 psi (13.8 MPa).

Result Conforms

3.2.6 Effect on Painted Surfaces: Product, diluted with ASTM D1193, Type IV, water to 15% by weight of solids taking into account water contained in the product, shall neither decrease the paint film hardness by more than two pencil hardness levels nor shall it produce any streaking, discoloration, or blistering of the paint film, determined in accordance with ASTM F502.

Result Conforms

3.2.7 Effect on Unpainted Surfaces: Product, diluted with ASTM D1193, Type IV, water to 15% by weight of solids taking into account water contained in the product, shall neither produce streaking nor leave any stains which require polishing to remove, determined in accordance with ASTM F485.

Result Conforms

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3.2.8 Effect on Runway Pavements

3.2.8.1 Runway Concrete Surface Scaling Resistance The condition of the runway concrete surface shall have a rating not greater than 1 for 50 freeze-thaw cycles, determined in accordance with ASTM C672, except that concrete shall

- Be air-entrained with an air content as specified in ASTM C 672.
- Have a minimum cement content of  $510 \text{ lb/yd}^3 \pm 10 \text{ lb/yd}^3$  ( $302 \text{ kg/m}^3 \pm 6 \text{ kg/m}^3$ ).
- Have a slump, 1.5 inches  $\pm$  0.5 inches (38 mm  $\pm$  13 mm).

A 25% by volume solution of the deicing/anti-icing product as supplied by the manufacturer in commercial concentration in tap water shall be substituted for calcium chloride. Performing more than one freeze-thaw cycle per day is acceptable.

**Rating: 1**

Result Conforms

3.2.8.2 Asphalt Concrete Degradation Resistance (Appendix A, valid for deicer/anti-icer products used in Europe)

Result <sup>1</sup>Not performed by SMI

<sup>1</sup>Testing required for deicer /anti-icer products used in Europe. This test is not performed by SMI.

3.2.9 Effect on Aircraft Metals: Product, diluted with ASTM D1193, Type IV, water to 5% and 15% by weight solids taking into account water contained in the product, shall meet the following requirements:

3.2.9.1 Sandwich Corrosion: Specimens, after testing in accordance with ASTM F1110, shall not have a rating greater (worse) than 1.

|                   | 2024-T3 Bare Anodized | 2024-T3 Alclad | 7075-T6 Bare Anodized | 7075-T6 Alclad |
|-------------------|-----------------------|----------------|-----------------------|----------------|
| <b>5 percent</b>  | <b>1</b>              | <b>1</b>       | <b>1</b>              | <b>1</b>       |
| <b>15 percent</b> | <b>1</b>              | <b>1</b>       | <b>1</b>              | <b>1</b>       |
| Control           | 1                     | 1              | 1                     | 1              |

Result Conforms

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3.2.9.2 Total Immersion Corrosion: The product, tested in accordance with ASTM F483, except that panels shall be AMS4376 tested for 24 hours, shall neither cause corrosion of test panels nor a weight change of any test panel greater than shown in Table I.

Table I

| ALLOY                                     | WEIGHT LOSS mg/cm <sup>2</sup> /24hrs |               |                  |
|-------------------------------------------|---------------------------------------|---------------|------------------|
|                                           | Allowed                               | 5%            | 15 %             |
| AMS 4037 Aluminum anodized per AMS 2470   | 0.3                                   | <b>0.02</b>   | <b>&lt; 0.01</b> |
| AMS 4041 Aluminum                         | 0.3                                   | <b>0.01</b>   | <b>&lt; 0.01</b> |
| AMS 4049 Aluminum                         | 0.3                                   | <b>+ 0.01</b> | <b>0.01</b>      |
| AMS 4376 Magnesium, dichromate (AMS 2475) | 0.2                                   | <b>0.05</b>   | <b>+ 0.09</b>    |
| AMS 4911 Titanium                         | 0.1                                   | <b>+ 0.03</b> | <b>0.02</b>      |
| AMS 5045 Carbon Steel                     | 0.8                                   | <b>0.10</b>   | <b>0.03</b>      |

"+" indicates a weight gain

Result Conforms

3.2.9.3 Low-Embrittling Cadmium Plate: Test panels, coated with low-embrittling cadmium plate, shall not show a weight change greater than 0.3 mg/cm<sup>2</sup> 24 hours, determined in accordance with ASTM F1111.

**5%: 0.02 mg/cm<sup>2</sup>/24hrs**

**15%: 0.03 mg/cm<sup>2</sup>/24hrs**

Result Conforms

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3.2.9.3.1 The product shall be tested for cyclic immersion corrosion of cadmium plate in accordance with AIR6130 and the results reported as specified in Section 6 of AIR6130.

Cadmium Plate Cyclic Corrosion Test

Initial pH of solution: 9.5

Final pH of solution: 9.5

**Note: Solution tested = 15% w/w**

The weight loss shall be no more than 0.3 mg/cm<sup>2</sup>.

| PANEL WEIGHTS                                                                                                                                                                                                                                            | REPLICATE # | Weight (g) |        |               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------|--------|---------------|
|                                                                                                                                                                                                                                                          |             | Initial    | Final  | Weight change |
|                                                                                                                                                                                                                                                          | 1           | 8.0874     | 8.0864 | 0.0010        |
|                                                                                                                                                                                                                                                          | 2           | 7.9667     | 7.9656 | 0.0011        |
|                                                                                                                                                                                                                                                          | 3           | 8.0440     | 8.0423 | 0.0017        |
| Average weight change = 0.0013 g (0.05 mg/cm <sup>2</sup> )<br>Note: "+" indicates weight gain                                                                                                                                                           |             |            |        |               |
| <i>AIR6130A: 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<sup>2</sup> may cause undesirable corrosion effects to airplane equipment and/or airport equipment.</i> |             |            |        |               |
| Result: <u>Informational</u>                                                                                                                                                                                                                             |             |            |        |               |
| See separate report for complete data tables                                                                                                                                                                                                             |             |            |        |               |

3.2.9.4 Hydrogen Embrittlement: The diluted product shall be non-embrittling, determined in accordance with ASTM F 519, Type 1a, 1c, or 2a specimens, cadmium plated in accordance with MIL-STD-870, Class 1 Type I. Type 1a and Type 1c specimens shall be loaded to 45% of the predetermined notch fracture strength and the 2a specimens loaded to 80% of the yield strength. The entire 2a stressed specimen or just the notched area of the 1a and 1c stressed specimen shall be immersed continuously in the solution under test for 150 hours at a temperature of 77°F ± 9°F (25°C ± 5°C)

Specimens: Four Type 1c, cadmium plated per MIL-STD-870 Class 1 Type I.  
Load: 45%, immersed for duration, 150 hours, temperature 25°C ± 5°C.

**Type 1c @ 5%: No failures occurred within 150 hours.**

**Type 1c @ 15%: No failures occurred within 150 hours.**

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3.2.9.5 Stress-Corrosion Resistance: The diluted product shall not cause cracks in AMS 4911 titanium alloy specimens, determined in accordance with ASTM F945, Method A.

**AMS 4911:**    **5%: No cracking evident.**  
                  **15%: No cracking evident.**

Result Conforms