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Aerospace — Aircraft de-icing/anti-icing non-Newtonian fluids, ISO type II

Aéronautique et espace — Liquides non newtoniens ISO type II de dégivrage/antigivrage des aéronefs

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 11078 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 9, *Air cargo and ground equipment*.

Annexes A and B form an integral part of this International Standard.

Aerospace — Aircraft de-icing/anti-icing non-Newtonian fluids, ISO type II

1 Scope

This International Standard establishes the requirements for non-Newtonian fluids used in the removal and prevention of frozen deposits of frost, ice and snow on exterior surfaces of parked aircraft.

It establishes the minimum requirements for an environmental test chamber and test procedure to carry out anti-icing performance tests according to the current materials specification for ISO type II aircraft de-icing/anti-icing non-Newtonian fluids.

WARNING — Products meeting the requirements of this International Standard can be adversely affected by mixing with other de-icing/anti-icing fluids.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1518:1992, *Paints and varnishes — Scratch test.*

ISO 2719:1988, *Petroleum products and lubricants — Determination of flash point — Pensky-Martens closed cup method.*

ISO 3013:1974, *Aviation fuels — Determination of freezing point.*

ISO 9002:1994, *Quality systems — Model for quality assurance in production, installation and servicing.*

ISO 11076:1993, *Aerospace — Aircraft de-icing/anti-icing methods with fluids.*

ISO 11077:1993, *Aerospace — Self-propelled de-icing/anti-icing vehicles — Functional requirements.*

OECD, *Guidelines for testing of chemicals. Section 3 — Degradation and Accumulation. Ready Biodegradability, 301 D Closed Bottle Test.*[1)]

AMS 2470H, *Anodic Treatment, Aluminium Alloys, Chromic Acid Process.*[2)]

AMS 2475D, *Protective Treatment, Magnesium Base Alloys.*

AMS 4037L, *Aluminium Alloy Sheet and Plate, 4.4Cu — 1.5Mg — 0.60Mn (2024,-T3 Flat Sheet,-T351 Plate), Solution Heat Treated, UNS A92024.*

AMS 4041M, *Aluminium Alloy Sheet and Plate, Alclad, 4.4Cu — 1.5Mg — 0.6Mn, (Alclad 2024 and 1-1/2 % Alclad 2024,-T3 Flat Sheet; 1-1/2 % Alclad 2024-T351 Plate).*

AMS 4049H, *Aluminium Alloy Sheet and Plate, Alclad, 5.6Zn — 2.5Mg — 1.6Cu — 0.23Cr (Alclad 7075-T6 Sheet,-T651 Plate), Solution and Precipitation Heat Treated.*

AMS 4376E, *Magnesium Alloy Plate, 3.0Al — 1.0Zn (AZ31B-H26), Cold Rolled and Partially Annealed.*

1) This publication is available from OECD, 2, rue André-Pascal, 75 775 Paris cedex 16, France.

2) AMS Standards are available from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096, USA.

AMS 4911F, *Titanium Alloy Sheet, Strip, and Plate, — 6Al-4V, Annealed.*

ASTM A 109M-90a, *Specification for Steel, Carbon, Cold-Rolled Strip [Metric].*[3]

ASTM C 672-91, *Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals.*

ASTM D 891-89, *Test Methods for Specific Gravity of Liquid Industrial Chemicals.*

ASTM D 1193-77 (1983), *Specification for Reagent Water.*

ASTM D 1331-89, *Test Methods for Surface and Interfacial Tension of Solutions of Surface-Active Agents.*

ASTM D 1747-89, *Test Method for Refractive Index of Viscous Materials.*

ASTM D 2196-86, *Test Method for Rheological Properties of Non-Newtonian Materials by Rotational (Brookfield) Viscometer.*

ASTM E 70-90, *Test Method for pH of Aqueous Solutions with the Glass Electrode.*

ASTM F 483-90, *Method for Total Immersion Corrosion Test for Aircraft Maintenance Chemicals.*

ASTM F 484-83, *Test Method for Stress Crazing of Acrylic Plastics in Contact with Liquid and Semi-liquid Compounds.*

ASTM F 485-90, *Test Method for Effects of Cleaners on Unpainted Aircraft Surfaces.*

ASTM F 502-83, *Test Method for Effects of Cleaning and Chemical Maintenance Material on Painted Aircraft Surfaces.*

ASTM F 519-77, *Method for Mechanical Hydrogen Embrittlement Testing of Plating Processes and Aircraft Maintenance Chemicals.*

ASTM F 945-85, *Test Method for Stress-Corrosion of Titanium Alloys by Aircraft Engine Cleaning Materials.*

ASTM F 1105-90, *Test Method for Preparing Aircraft Cleaning Compounds, Liquid Type, Solvent Base, for Storage Stability Testing.*

ASTM F 1110-90, *Test Method for Sandwich Corrosion Test.*

ASTM F 1111-88, *Test Method for Corrosion of Low-Embrittling Cadmium Plate by Aircraft Maintenance Chemicals.*

MIL-A-8243D, *Anti-Icing and De-Icing Defrosting Fluids.*

MIL-P-83310, *Plastic Sheet, polycarbonate, transparent.*[4]

DIN 65 321:1989, *Aerospace; Acrylic sheets, panes and moulded parts; Technical specification.*[5]

WL 5.1416:1992, *Aerospace; acrylic material, cast, crosslinked, in 5.1415 material, biaxially stretched and crack propagation resistant.*

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 non-Newtonian fluid: Fluid whose viscosity is shear dependent and time dependent.

3.2 pseudoplastic behaviour: Decrease of viscosity with an increase in shear rate.

3.3 lot: All compound produced in a single production run from the same batches of raw materials under the same fixed conditions and presented for vendor's inspection at one time.

NOTE 1 The compound may be packaged in smaller quantities under the basic lot approval provided lot identification is maintained.

3.4 preproduction test: Test to determine conformance to all technical requirements of this International Standard.

3.5 acceptance test: Test to determine conformance to the requirements given in 4.2.4, 4.2.8, 4.2.10 and 6.1.

3) ASTM standards are available from American Society of Testing and Materials, 1916 Race Street, Philadelphia, PA 19103, USA.

4) US Government Publications are available from the Commanding Officer, Naval Publications and Forms Center, 5801 Tabot Avenue, Philadelphia, PA 19120, USA.

5) Available from DIN (Deutsches Institut für Normung, e.V.), D-10772 Berlin, Germany.