



AEROSPACE RECOMMENDED PRACTICE

ARP5718™**REV. C**Issued 2008-03
Revised 2025-07

Superseding ARP5718B

Qualifications Required for SAE Type II/III/IV Aircraft Deicing/Anti-Icing Fluid

RATIONALE

This document has been updated to reflect the most current practices for obtaining holdover times for SAE Type II, III, and IV fluids.

Additional revisions have been made to meet the document harmonization and quality criteria issued by the SAE G-12 Steering Committee in October 2023.

FOREWORD

Meeting all of the technical requirements of AMS1428 is not sufficient for a Type II, III, or IV deicing/anti-icing fluid to be used on an aircraft. For such a fluid to be used commercially, it must also have a holdover time guideline and be identified on a list of fluids published by regulators.¹ Before commercialization, it is further recommended that a field spray trial be conducted with the fluid to demonstrate acceptable operational performance.

The intent of this ARP is to help fluid manufacturers and users understand the overall process that a Type II, III, or IV fluid must go through to obtain holdover time guidelines and be included on the Federal Aviation Administration (FAA) and Transport Canada lists of fluids.

¹ The aircraft manufacturers typically identify the types of fluids which can be applied to their aircraft type. This information is usually located in the maintenance manual winter operations section or in the Aircraft Operating Manual (AOM).

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TABLE OF CONTENTS

1.	SCOPE.....	4
2.	REFERENCES.....	4
2.1	Applicable Documents	4
2.1.1	SAE Publications.....	4
2.1.2	FAA Publications.....	5
2.1.3	Transport Canada Publications.....	5
2.1.4	ASTM Publications.....	5
2.2	Acronyms	5
2.3	Definitions	6
3.	LABORATORY TESTING AND SAMPLE SELECTION	7
3.1	Preliminary Work.....	7
3.2	Fluid Testing According to AMS1428.....	7
3.2.1	Purpose	7
3.2.2	Sample Selection	7
3.2.3	AMS1428 Appendix A Samples.....	8
3.3	Endurance Time Testing According to ARP5485	8
3.3.1	Purpose	8
3.3.2	Sample Selection	8
3.4	Wind Tunnel Testing	8
3.4.1	Purpose	8
3.4.2	General Description	8
3.4.3	Sample Selection	9
3.5	Water Spray Endurance Test Time Requirements	9
4.	FIELD SPRAY TESTING	9
4.1	Reason for Field Spray Test	9
4.2	Sample Selection	9
4.3	Test Protocol	9
4.4	Test Report	9
5.	PREPARATION OF DRAFT HOLDOVER TIME GUIDELINES AND FLUID LISTS	10
5.1	Holdover Time Guideline Format.....	10
5.1.1	Columns	10
5.1.2	Rows	10
5.1.3	Cells	10
5.1.4	Notes.....	11
5.1.5	Cautions	11
5.1.6	Date.....	11
5.2	Restrictions	11
5.3	Holdover Time Guidelines per Fluid.....	11
5.4	Holdover Time Values from Endurance Time Data	12
5.4.1	Rounding of Holdover Time Values	12
5.4.2	Capping of Holdover Time Values	12
5.4.3	Calculation of Adjusted Holdover Time Values.....	12
5.5	Lowest and Highest Usable Precipitation Rates from Natural Snow Endurance Time Data.....	12
5.5.1	Purpose	12
5.5.2	Analysis Methodology	13
5.6	Product Names	14
5.7	Development of Fluid-Specific Holdover Time Guidelines.....	14
5.7.1	New Fluids	14
5.7.2	LOWV.....	15
5.7.3	Holdover Times for Temperatures Below -14 °C (Type II/IV Fluids Only).....	15
5.7.4	Fluid Retesting	15
5.7.5	Addition of Fluid-Specific Holdover Time Guidelines for Licensee.....	16
5.8	Development of Generic Holdover Time Guidelines.....	



5.9	Obligation of Fluid Manufacturers to Provide Information to the FAA/Transport Canada	16
5.9.1	Obligation of Fluid Manufacturers to Notify on Commercial Products	16
5.9.2	Obligation of Fluid Manufacturers to Provide Original Preproduction AMS1428 Test Data for New Fluids	16
5.9.3	Obligation of Fluid Manufacturers to Provide Periodic AMS1428 Test Data	17
5.9.4	Additional Data Required by the FAA and Transport Canada	18
5.10	FAA and Transport Canada Lists of Fluids	18
5.11	Removal of Obsolete Fluids/Data from the FAA and Transport Canada Holdover Time Guidelines	18
6.	ROLE OF THE SAE G-12 AIRCRAFT DEICING FLUIDS COMMITTEE	19
7.	ROLE OF THE SAE G-12 HOLDOVER TIME COMMITTEE	19
7.1	Holdover Time Committee Co-Chairs	19
7.2	Holdover Time Committee Advisory Role	19
7.3	Holdover Time Committee Meeting Mandatory Agenda Items	19
8.	PUBLICATION OF HOLDOVER TIME GUIDELINES AND FLUID LISTS	19
9.	TIMELINE	19
10.	NOTES	20
10.1	Revision Indicator	20
Table 1	Factors used in LUPR/HUPR calculations	13
Table 2	LUPR/HUPR factor ratings	14
Table 3	Rounding rules for LOWV	15

1. SCOPE

This document describes:

- a. The preparatory steps to test experimental Type II, III, and IV fluids according to AMS1428
- b. The recommendations for the preparation of samples for endurance time testing according to ARP5485
- c. A short description of wind tunnel testing
- d. A short description of the recommended field spray test
- e. The protocol to generate draft holdover time guidelines from endurance time data obtained from ARP5485
- f. The protocol for inclusion of Type II, III, and IV fluids on the FAA and Transport Canada lists of fluids and the protocol for updating the lists of fluids
- g. The role of the SAE G-12 Aircraft Deicing Fluids Committee
- h. The role of the SAE G-12 Holdover Time Committee
- i. The process for the publication of Type II, III, and IV holdover time guidelines

This document does not describe laboratory testing procedures.

This document does not include the qualification requirements for AMS1424 Type I fluids (these are provided in ARP6207).

2. REFERENCES

2.1 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.

2.1.1 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.

AMS1424	Fluid, Aircraft Deicing/Anti-Icing, SAE Type I
AMS1428 ²	Fluid, Aircraft Deicing/Anti-Icing, Non-Newtonian (Pseudoplastic), SAE Types II, III, and IV
AMS1428/1	Fluid, Aircraft Deicing/Anti-Icing, Non-Newtonian (Pseudoplastic), SAE Types II, III, and IV Glycol (Conventional and Nonconventional) Based
AMS1428/2	Fluid, Aircraft Deicing/Anti-Icing, Non-Newtonian (Pseudoplastic), SAE Types II, III, and IV Non-Glycol Based
ARP5485	Endurance Time Test Procedures for SAE Type II/III/IV Aircraft Deicing/Anti-icing Fluids
ARP5945	Endurance Time Test Procedures for SAE Type I Aircraft Deicing/Anti-Icing Fluids

² AMS1428 section numbers throughout this document are from AMS1428L.

ARP6207	Qualifications Required for SAE Type I Aircraft Deicing/Anti-Icing Fluids
AS5900	Standard Test Method for Aerodynamic Acceptance of AMS1424 and AMS1428 Aircraft Deicing/Anti-Icing Fluids
AS5901	Water Spray and High Humidity Endurance Test Methods for AMS1424 and AMS1428 Aircraft Deicing/Anti-Icing Fluids

2.1.2 FAA Publications

Available from Federal Aviation Administration, 800 Independence Avenue, SW, Washington, DC 20591, Tel: 866-835-5322, www.faa.gov.

FAA Holdover Time Guidelines. (These are published every winter. Always use the latest issue; search for "FAA Holdover Time" at www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/deicing/.)

FAA Ground Deicing Program General Information. (This document is published every winter. Always use the latest issue. Available at https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/deicing/.)

2.1.3 Transport Canada Publications

Available from Transport Canada, Tower C, Place de Ville, 330 Sparks Street Ottawa, Ontario K1A 0N5, Tel: 1-800-305-2059, www.tc.canada.ca.

Transport Canada Holdover Time Guidelines. (These are published every winter. Always use the latest issue. Available at <https://tc.canada.ca/en/aviation/general-operating-flight-rules/holdover-time-hot-guidelines-icing-anti-icing-aircraft>.)

Guidelines for Aircraft Ground Icing Operations, TP 14052E. (This document is updated periodically. Always use the latest issue. Available at <https://tc.canada.ca/en/aviation/publications/guidelines-aircraft-ground-icing-operations-tp-14052>.)

2.1.4 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM D1177 Standard Test Method for Freezing Point of Aqueous Engine Coolants

2.2 Acronyms

FAA	United States Department of Transportation, Federal Aviation Administration
HOT	holdover time
HOWV	highest on-wing viscosity
HUPR	highest usable precipitation rate
LOUT	lowest operational use temperature
LOWV	lowest on-wing viscosity
LUPR	lowest usable precipitation rate
OAT	outside air temperature
WSET	water spray endurance test or water spray endurance time

2.3 Definitions

ADJUSTED ALLOWANCE TIME: A reduced allowance time required by the occurrence of accelerated fluid drainage from wings when flaps and slats are extended (deployed) during taxi, reducing the allowance time of Type III/IV fluids (there are no allowance times for Type I/II fluids).

ADJUSTED HOLDOVER TIME: A reduced holdover time required by the occurrence of accelerated fluid drainage from wings when flaps and slats are extended (deployed) during taxi, reducing the holdover time of Type I/II/III/IV fluids

AERODYNAMIC ACCEPTANCE: A performance test required under 3.2.5 of AMS1428 and defined in AS5900.

ALLOWANCE TIME: Time, from the initial application of fluid, that a fluid is expected to provide protection of an aircraft against contamination from conditions of or mixed with ice pellets or small hail. Allowance times are derived from aerodynamic fluid flow-off performance data and visual inspection of fluids exposed to these precipitation types.

ENDURANCE TIME: Time that a fluid can endure defined and controlled temperature and precipitation conditions before visual failure. Endurance time tests are defined in ARP5485.

FAA/TRANSPORT CANADA LISTS OF FLUIDS: Lists published by the FAA and Transport Canada in their Holdover Time Guidelines, which include fluids that have been tested for endurance times (according to ARP5485), anti-icing performance (according to 3.2.4 of AMS1428 using the test method in AS5901), and aerodynamic acceptance (3.2.5 of AMS1428 using the test method in AS5900) only.

FLUID-SPECIFIC HOLDOVER TIME (HOT) GUIDELINE: A holdover time guideline that contains holdover times for a specific Type II, III, or IV fluid. A fluid-specific holdover time guideline can only be used with the specific fluid it is intended for; it cannot be used with any other fluid.

GENERIC HOLDOVER TIME (HOT) GUIDELINE: A holdover time guideline that contains holdover times for a given fluid type (i.e., AMS1428 Type II, Type III, or Type IV). A generic holdover time guideline can be used with any fluid that is qualified to be the same fluid type as the generic guideline. In the case of Type II, III, and IV fluids, the holdover times in the generic holdover time guideline represent the lowest holdover time performance (worst case) of all fluids separated by fluid type under all conditions (see [5.8](#)).

HIGHEST ON-WING VISCOSITY (HOWV): (a) The viscosity result as measured on the high viscosity sample, as defined in AMS1428 during the initial Type II/III/IV qualification, subjected to several requirements, including the aerodynamic acceptance test; (b) the upper limit of viscosity that must not be exceeded for sales specifications of Type II/III/IV fluids.

HIGHEST USABLE PRECIPITATION RATE (HUPR): The highest precipitation rate at which an endurance time dataset can be used to determine holdover times.

HOLDOVER TIME (HOT): Time, from the initial application of fluid, that an anti-icing fluid is expected to provide protection of an aircraft against freezing or frozen precipitation. Holdover times are derived primarily from visual inspection of fluids exposed to freezing and frozen precipitation.

HOLDOVER TIME GUIDELINE: A table giving the holdover time for various precipitation conditions and temperatures with cautions and notes giving guidance to ground deicing/anti-icing crews and pilots. The “holdover time guideline” is also often referred to as “holdover time table.”

LOWER SALES SPECIFICATION VISCOSITY LIMIT: Viscosity set by the fluid manufacturer for its sales specification. This viscosity must be equal to or higher than the AMS1428 low viscosity and must be higher than the lowest on-wing viscosity (LOWV).

LOWEST ON-WING VISCOSITY (LOWV): Viscosity reported by the laboratory performing the testing under 3.1.3 of ARP5485. The LOWV is published with the specific holdover time guideline for that fluid. Fluids having an on-wing viscosity less than the LOWV cannot be used with holdover time guidelines. The LOWV must be below the lower sales specification viscosity limit.