



AEROSPACE STANDARD	AS6286™/3	REV. A
	Issued	2016-12
	Cancelled	2019-11
Superseded by AS6286A		
Fluids		

RATIONALE

SAE G-12T, Training and Quality Programs Committee recommends AS6286/1 to AS6286/6 be cancelled since the requirements in this AS have been superseded by and re-introduced into Aerospace Standard AS6286 "Training and Qualification Program for Deicing/Anti-icing of Aircraft on the Ground" (which now includes the six corresponding Slash Sheets). All of these documents address training for aircraft ground de/anti-icing. AS6286 was developed as a global standard and the slash sheets caused confusion in some areas. As a result, all the appropriate requirements in AS6286 Slash Sheets 1 to 6 have been carried over to the new AS (i.e., there are no aspects of the slash sheets that are not covered by the superseding AS). As such, AS6286/1 to AS6286/6 should be cancelled and considered for "Archival Use Only". This proposal to cancel SAE AS6286/1 to AS6286/6 is based on the guidance provided in the SAE Aerospace Council document "Organization and Operating Procedures", section 7.4.2, which identifies that one of the grounds for cancelling a document is "when its technical requirements are totally superseded by another document."

CANCELLATION NOTICE

This Technical Report has been declared "CANCELLED" as of November 2019 and has been superseded by AS6286A. By this action, this document will remain listed in the respective index, if applicable. Cancelled Technical Reports are available from SAE.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2019 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
http://www.sae.org

SAE WEB ADDRESS:

Full document details: SAE AS6286_3A

SAE values your input. To provide feedback on this Technical Report, please visit <http://standards.sae.org/AS6286/3A>

Documents
Document Sharing Hub

FOREWORD

This manual is divided in two parts:

1. Training and qualification standards, including the scope of training
and
2. Overview and background information about deicing/anti-icing procedures and related subjects.

RESPONSIBILITIES

This manual is intended to provide a common basis for deicing/anti-icing training and qualification for de-icing providers and airlines. Each organization involved is responsible for complying with local regulations and requirements imposed by manufacturers of aircraft, equipment, and fluids, by regulatory and environmental authorities.

TABLE OF CONTENTS

1.	SCOPE	3
1.1	Field of Application	3
2.	REFERENCES	3
2.1	Applicable Documents	3
2.2	Definitions and Abbreviations	3
3.	FLUID STORAGE AND HANDLING	3
3.1	Fluid Storage	3
3.2	Fluid Handling	4
3.3	Fluid Transfer Systems	4
3.4	Application Equipment	4
3.5	Heating	4
3.6	Fluid Sampling from a Storage Tank	5
3.6.1	Equipment Required	5
3.6.2	Using a Specialized Tank Sampling Device	5
3.6.3	Using a Tank Sampling Valve	5
3.6.4	Sample Labeling	6
3.6.5	Care of Fluid Samples	6
3.7	Fluid Testing	6
3.7.1	Quality Assurance Checks	6
3.7.2	Periodic Testing	7
3.7.3	Concentration Checks	7
3.8	Fluid Blending	7
4.	HOLDOVER TIME (HOT)	8
4.1	Type I Properties	8
4.2	Type II, III, and IV Properties	8
4.3	Precipitation Chart Use	8
5.	BACKGROUND INFORMATION	9
5.1	Deicing/Anti-Icing Fluids	9
5.1.1	WSET/HHET/Holdover Time	9
5.1.2	Aerodynamic Acceptance	10
5.1.3	Material Compatibility and Other Tests	10
5.1.4	Non-Thickened Fluids	10
5.1.5	Thickened Fluids	11
5.1.6	Fluid Handling and Storage	11
5.1.7	Pumping and Heating	13
5.1.8	Storage Tanks	13
5.1.9	Field/Periodical Quality Testing of Fluids	13
5.1.10	Interpreting Deicing/Anti-Icing Fluid and Hold-Over-Time Tables	14
5.2	Type I (AMS1428/1 Only)	14
5.3	Type II/III/IV	15
5.3.1	Type I/II/III/IV Frost Holdover Time Table	16
5.4	Local Frost Prevention	17
TABLE 1		15
TABLE 2		16
TABLE 3		17

1. SCOPE

1.1 Field of Application

This document shall be used in conjunction with:

AS6286	Training and Qualification Program for Deicing/Anti-icing of Aircraft on the Ground
AS6286/1	Processes including Methods
AS6286/2	Equipment
AS6286/4	Weather
AS6286/5	Health, Safety and First Aid
AS6286/6	Aircraft Deicing/Anti-icing Diagrams, No-Spray-Zones

2. REFERENCES

2.1 Applicable Documents

Refer to AS6286 main document Section 2 for all applicable and related publications.

2.2 Definitions and Abbreviations

Refer to AS6285 Aircraft Ground Deicing/Anti-icing Processes.

3. FLUID STORAGE AND HANDLING

3.1 Fluid Storage

- Tanks should be dedicated to storage of the deicing and/or anti-icing fluid to avoid contamination with other fluids.
- Storage tanks shall be constructed of materials compatible with the deicing/anti-icing fluid, as specified by the fluid manufacturer. If heated fluid is stored, care should be taken with plastic tanks, to ensure that they are suitable at the highest and lowest temperatures to which they will be exposed.

NOTE: If any ultraviolet transparent vessel is used, cover with an opaque material or an opaque coating, preferably light in color (dark colors tend to generate higher temperatures inside the container when exposed to sunlight).

- Tanks shall be conspicuously labeled to avoid contamination and to comply with applicable regulatory requirements.
- Tanks shall be examined annually for corrosion and/or contamination. If corrosion or contamination is evident, tanks shall be repaired or replaced. To minimize corrosion at the liquid/vapor interface and in the vapor space, a high liquid level in the tanks is recommended.

NOTE: Although deicing/anti-icing fluids are generally non-corrosive, their vapor can be corrosive.

- Storage temperature limits for the fluid shall comply with manufacturer's requirements.
- Storage tanks should be located away from heat and exposed flames.
- If a new tank is to be used, it should be appropriately cleaned and water washed before deicing/anti-icing fluid is introduced into it.

3.2 Fluid Handling

- The performance characteristics of deicing/anti-icing fluids may be degraded by factors such as excessive mechanical shearing, chemical contamination, or overheating. Therefore, only compatible pumps, control valves, piping and application devices shall be used.
- Fluid handling systems should be tested periodically or when modified to confirm that fluid meets manufacturer's use specifications in accordance AS6332.

3.3 Fluid Transfer Systems

- The design of fluid transfer systems shall be in accordance with the fluid manufacturer's recommendations.
- Fluid transfer systems shall be dedicated to the specific fluid being handled to prevent inadvertently mixing fluids of different types or manufacturers. Different hose or connection types and sizes should be used to differentiate between the two fluids. Confirm that hose connections are compatible with fluid carrier's equipment: adapters may be required.

NOTE: Totes used in the shipment of deicing/anti-icing fluid may not be rated for pressure. In this case, do not pressurize tote to transfer product. A low shear pump or gravity should be used.

- All fill ports and discharge points shall be conspicuously labeled to prevent contamination due to inadvertent product mixing.

3.4 Application Equipment

- Application equipment shall be clean before being initially filled with deicing/anti-icing fluid in order to prevent fluid contamination.
- Requirements for suitable equipment are described in ARP1971.
- Special considerations for SAE Type II, III, and IV deicing/anti-icing fluids:
- The performance characteristics of SAE Type II, III, and IV deicing/anti-icing fluids may be degraded by excessive mechanical shearing or chemical contamination. Therefore, only compatible pumps, control valves, piping, and application devices shall be used. The design of fluid transfer systems shall be in accordance with the fluid manufacturer's recommendations.

3.5 Heating

SAE Type II, III, or IV deicing/anti-icing fluids, if heated, shall be heated in a manner to preclude fluid degradation in storage or application. The integrity of the fluid following heating shall be checked periodically. Factors like heating rate and heating time cycles should be considered in determining frequency of fluid inspections. Refer to fluid manufacturer's recommendations.

When heating, the fluid must be circulated. Depending on tank configuration, a slow moving stirrer, e.g., paddle or impeller or a low shear pump is acceptable. With a low shear pump, tank outlet and inlet points should be placed at opposite ends of the tank to aid fluid circulation. Circulation through a heater should continue for a few minutes after the heater has been shut off, to protect fluid from overheating. When fluid is heated, manufacturers recommendations on maximum temperature for storage should be followed. Overheating may cause degradation of the fluid and loss of performance. If fluid is diluted for deicing, it should not be stored above 60 °C (140 °F) for more than 2 weeks.

3.6 Fluid Sampling from a Storage Tank

The following procedures will permit sampling without damage or contamination of fluids.

3.6.1 Equipment Required

- Fluid sampling device.
- Clean sample bottles, preferably new. Bottles must be plastic, high-density polyethylene or polycarbonate, to prevent contamination and permit safe storage and shipment to other locations. The bottles must have a tightly sealed plastic or plastic lined lid. The bottles should be of suitable size to satisfy testing requirements. There must also be a means of labeling the bottles.
- Container for spills and to purge fluid.
- Shop towels.

3.6.2 Using a Specialized Tank Sampling Device

- Clean the sampling device thoroughly, inside and out, with tap water. If necessary, when visible dirt exists on the device, a mild detergent or abrasive may be used for further cleaning but all traces of detergent or cleaner must be completely rinsed from the device prior to use. Dry the device thoroughly after cleaning.
- Make sure that the lid of the sampling device forms a tight seal, so that fluid does not enter before it reaches the desired sampling level in the storage tank.
- Open a hatch at the top of the storage tank. Insert the device into the tank to the desired level with the lid closed. Holding the device at the desired sampling level, open the lid and allow the container to fill. Close the lid and withdraw the device. Ideally obtain a total of three samples: one each from near the bottom, middle, and top of the fluid in the tank. The bottom sample should be taken as close to the bottom of the tank as possible; but the top sample should be taken at least 15 cm (6 inches) below the surface of the fluid. Fluid on the surface should not be sampled, as natural evaporation of water into the tank's headspace from a very thin boundary layer on the fluid surface could give false quality measurements. The middle sample should be at least 30 cm (1 foot) above the tank bottom and 1 foot (30 cm) below the surface. Close the hatch of the storage tank.
- Pour the fluid sample into a sample bottle. Immediately seal the bottle to avoid evaporation, contamination, or spillage.
- Clean and dry the sampling device thoroughly.

3.6.3 Using a Tank Sampling Valve

NOTE: This method can only be used to sample the fluid level at the valve, it cannot be used as a representative tank sample.

- If more than one valve is available on the storage tank, select a valve that is small enough to provide a reasonable and controllable flow of fluid when opened fully, but is not so small that the fluid squirts out in a spray stream due to head pressure.
- Place a container under the sampling valve.
- Open the sampling valve fully as quickly as possible.

NOTE: Opening the valve partially or trying to control the fluid flow by throttling the sampling valve may shear the fluid and invalidate subsequent tests.