

 An SAE International Group	<b>AEROSPACE                  RECOMMENDED                  PRACTICE</b>	<b>SAE ARP5660</b>	<b>REV. A</b>
		Issued 2009-06 Revised 2011-01	
		Superseding ARP5660	
Deicing Facility Operational Procedures			

### RATIONALE

ARP5660 has been revised to include updated procedures, most notably related to the requirement for visual hold procedures to supplement verbal communication procedures during aircraft "engines-on" deicing/anti-icing on the ground.

### FOREWORD

This document establishes the minimum recommended practices for the standardization of operational procedures at Designated Deicing Facilities (Central Deicing Facilities/Remote Deicing Facilities), to ensure the safe operation of aircraft, equipment and personnel during ground icing conditions

### TABLE OF CONTENTS

1.	SCOPE.....	4
1.1	Purpose.....	4
1.2	Infrastructure.....	4
1.3	Field of Application.....	4
2.	REFERENCES.....	5
2.1	Applicable Documents.....	5
2.2	Abbreviations.....	7
2.3	Recommended DDF Terminology.....	8
3.	DDF OPERATING PROCEDURES.....	9
3.1	Management Plan.....	9
3.2	DDF Operations.....	10
3.3	Alternative Contamination Removal.....	10
3.4	Specific Aircraft Procedures and Precautions.....	10
3.5	Critical Surface Check.....	10
3.6	Anti-icing Fluid Condition.....	11
3.7	Aircraft and vehicle movement procedures.....	11
3.8	Fluid application.....	11
3.9	Fluid Blending.....	11
3.10	Pre- Dispatch Procedures.....	11
3.11	Preventive Anti-icing.....	11
3.12	Contingency plans.....	11
3.13	Weather monitoring and reporting sources:.....	11
4.	COMMUNICATIONS.....	12

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 reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2011 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  
 SAE WEB ADDRESS: http://www.sae.org

**SAE values your input. To provide feedback on this Technical Report, please visit**  
<http://www.sae.org/technical/standards/ARP5660A>

4.1	Communication Protocols .....	12
4.2	Communications – Deicers and Facility Operators .....	12
4.3	Communications: DDF Essential Information .....	14
5.	DEICING/ANTI-ICING FLUIDS – ENVIRONMENTAL CONSIDERATIONS .....	16
5.1	Environmental Impact .....	16
5.2	Environmental Standards and Guidelines .....	16
5.3	Collection and Disposal of Effluent from Deicing Operations .....	17
5.4	Drain Valves .....	17
5.5	Fluid Run-Off Testing and Reporting .....	17
5.6	Environmental Operations .....	18
5.7	Glycol Management/Mitigation Plan .....	19
5.8	Environmental Emergency/Spill Response Plan .....	20
5.9	Handling Spent Fluid .....	20
5.10	Design Considerations for Management of Spent Fluid .....	21
5.11	Glycol Mitigation Methods .....	21
5.12	New Deicing Fluid .....	22
6.	TRAINING .....	23
6.1	Training Course Content and Training Frequency .....	23
6.2	Regulatory Compliance Requirements .....	23
6.3	Training Program .....	23
6.4	Examinations .....	24
6.5	Ground/Maintenance Personnel Training .....	24
6.6	Training for Deicing Aircraft of Another Operator .....	24
7.	DDF EMERGENCY ACTION PLANS .....	25
7.1	Fire .....	25
7.2	Adverse Weather Conditions .....	25
7.3	Communications - Emergencies .....	25
8.	SNOW REMOVAL .....	28
8.1	Overview .....	28
8.2	Surface Areas to be considered .....	28
8.3	Snow Removal Responsibilities and Operations .....	28
8.4	Snow Removal Methods .....	30
8.5	Communication Protocols .....	30
8.6	Closing Deicing Facilities .....	30
8.7	Cleanup .....	30
9.	SAFETY .....	31
9.1	General .....	31
9.2	Deicing Vehicles .....	31
9.3	Aircraft Operators .....	32
9.4	Personnel .....	32
9.5	DDF Operators .....	32
10.	EQUIPMENT .....	32
10.1	General Deicing Equipment: .....	32
10.2	Equipment Maintenance .....	32
10.3	Fixed Equipment .....	33
10.4	Mobile Equipment .....	33

SAE	ARP5660A	Page 3 of 47
10.5	Portable Equipment.....	33
10.6	Personal Protective Equipment.....	33
11.	DOCUMENTATION .....	34
11.1	Record Keeping .....	34
11.2	DDF Operator.....	35
12.	FLUIDS MANAGEMENT .....	35
12.1	Fluid Management .....	35
12.2	Fresh Fluids .....	36
13.	QUALITY CONTROL .....	37
13.1	Objectives .....	37
13.2	Scope .....	38
13.3	OPS Debriefing .....	38
13.4	Internal Audits .....	38
13.5	Fluid Testing.....	38
14.	APPROVALS .....	38
14.1	Regulatory.....	38
14.2	Airport Authority Permits or Agreements .....	38
14.3	Air Operator(s) Program Acceptance .....	38
14.4	Environmental Mitigation Plans.....	38
15.	GENERAL .....	39
15.1	Pre-Storm Planning.....	39
15.2	Establish Control Boundaries.....	40
15.3	Special Requirements.....	41
15.4	Information Dissemination .....	41
15.5	Deice Hold Procedures .....	41
15.6	Facility Operation .....	41
16.	NOTES.....	41
APPENDIX A	COMMUNICATION PROTOCOLS .....	42
APPENDIX B	SAMPLE PILOT BRIEF SHEET – SINGLE SERVICE PROVIDER .....	47
TABLE 1	PRE-STORM PLANNING – CONFERENCE CALL FORMAT .....	40
TABLE A1	ICEHOUSE COMMUNICATION – SAMPLE .....	42
TABLE A2 (A)	ICEHOUSE COMMUNICATION – SAMPLE .....	42
TABLE A2 (B)	ICEHOUSE/PIC COMMUNICATION FLOW - SAMPLE .....	43
TABLE A2 (C)	ICEHOUSE / DE-ICIER COMMUNICATION – SAMPLE .....	44
TABLE A3	EMERGENCY COMMUNICATION PROTOCOLS.....	46

## 4. COMMUNICATIONS

### 4.1 Communication Protocols

Communication plays a key role in the overall safety of passengers, aircraft, flight crew and ground crew during the deicing/anti-icing operation.

Following an approved communication protocol ensures that the PIC is provided with all the correct information during the deicing/anti-icing operation. The communication protocol should be used for all deicing and anti-icing operations whether with running engines or with engines shut down.

Sample communication protocols are given in Appendix A.

Complex operations may require modification of these protocols.

#### 4.1.1 Standardized Terminology/Phraseology

The terminology and phraseology used in this Recommended Practice should be used at all times. Wherever possible standard names for specific contact functions should be used, e.g. Pad Control, Iceman, etc.

#### 4.1.2 Time References

Different time references are in common use, e.g. Local time, and 24 hour clock. In all communications between ground personnel and the flight crew, the time reference in use should be made clear as given in ARP4737.

#### 4.1.3 Standardized Aircraft Identification Call Sign

Communications should be consistent with respect to aircraft identification by company, flight number, and/or registration markings.

#### 4.1.4 Visual Communication

Markings and visual message board displays should be consistent with SAE standard AS5635. Where illuminated guidance is provided, e.g. for pad lead-in, the applicable lights should be on. During "Engines On" deicing/anti-icing operation both verbal and visual communications are required to hold aircraft until all equipment and personnel are clear.

#### 4.1.5 Radio Frequencies and Call Signs

Standardized radio frequencies should be used. The deicing crew's call signs should include "ice" in the name. It is the responsibility of the deicing crew (Ground Personnel, Pad Commander/Controller, or Ice House) to establish direct communication with the PIC by flight inter-phone or VHF radio, before, during and after the deicing/anti-icing process. Where airports have separate DDFs, use of a unique VHF frequency for each DDF is recommended.

#### 4.1.6 Electronic Communications

Use of electronic communications and electronic data links including ACARS/DATALINK can be utilized to reduce radio congestion

### 4.2 Communications – Deicers and Facility Operators

To ensure clear, concise communication the protocol for communication between deicers, PIC, and facility operators is divided into several phases (see Appendix A).

## 10.2.2 Concentration Checks

Fluids or fluid/water mixture samples shall be taken on a daily basis when the equipment is in use. Procedures to perform concentration checks shall be established following the guidelines in ARP4737 Aircraft Deicing/Anti-icing Methods.

## 10.3 Fixed Equipment

### 10.3.1 Requirements for Fixed Equipment

Fixed application equipment may be used to accomplish the deicing/anti-icing process, provided that the requirements in ARP4737 Aircraft Deicing/Anti-icing Methods are accomplished

### 10.3.2 Environmental Considerations

Recommendations pertinent to fixed equipment for spent fluid collection, storage and disposal are given in Section 5 'Deicing/Anti-icing Fluids – Environmental Considerations.

### 10.3.3 Fixed Equipment Communication

Communications and control equipment should be provided necessary for conduct of communications, data recording, transmission, storage and retrieval covered by Section 4. Provision should be made to ensure reliable communication software and hardware operation at all times.

**Visual message boards for communication with flight crews should conform to AS5635 'Message Boards'.**

## 10.4 Mobile Equipment

### 10.4.1 Requirements for Mobile Equipment

Mobile application equipment shall comply with the recommendations of ARP1971 'Aircraft Deicing Vehicle – Self-Propelled, Large and Small Capacity'.

### 10.4.2 Mobile Equipment Safety Standards

Glycol Recovery vehicles, vehicles for under-wing frozen contamination removal, snow removal vehicles and all other service vehicles should comply with the Motor Vehicle Safety Standards of the country where the DDF is located, should be legal for highway operation, shall be capable of operation such that personnel safety is not compromised, and should be operable safely and efficiently under all operating conditions.

## 10.5 Portable Equipment

Portable equipment, e.g. VHF radios, refractometers etc., should be readily available and correctly maintained to ensure a safe and efficient facility operation.

## 10.6 Personal Protective Equipment

The DDF operator should ensure that personnel are provided with necessary Personal Protective Equipment (PPE) that fits properly and comfortably, and protects against hazardous exposure or potential hazard. This includes but is not limited to:

- a. Body protective clothing (coveralls, rainwear, gloves, footwear and head-gear);
- b. Reflective safety vests;
- c. Eye and face protective devices (masks, goggles);
- d. Respiratory protective devices, as required;
- e. Fall protection systems (harness, lanyards); and
- f. Hearing Protection.