SAE Aerospace
An SAE International Group

AEROSPACE RECOMMENDED PRACTICE

SAE ARP5660 | REV. A

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

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

1. SCOPE

1.1 Purpose

The purpose of this document is to provide guidelines for the standardization of safe operating procedures to be used in performing the services and maintenance at Designated Deicing Facilities (Central Deicing Facilities/Remote Deicing Facilities) that are necessary for proper deicing/anti-icing of aircraft on the ground and performing of associated checks in accordance with the various approved ground icing programs, while considering applicable local environmental, operational and economic requirements.

This document should be used by regulators and airport authorities to develop and standardize approvals and permits for the establishment and operation of a DDF.

The coordination of stakeholders is required prior to the approval of design plans for a deicing facility.

Operating procedures must be agreed to, in writing, by all air operators, airport authorities, regulators and service providers prior to commencing deicing operations.

1.2 Infrastructure

During the design phase of a Designated Deicing Facilities (DDF) careful attention must be given to ensure that the infrastructure is in place to support the operating procedures outlined in this document.

Designers of a DDF should refer to ARP4902 for guidance.

1.3 Field of Application

1.3.1 Regulatory Considerations

Regulations governing aircraft operations in icing conditions shall be followed. Specific rules for aircraft are set forth in United States Federal Aviation Regulations (FARs) European Air Safety Agency (JAR/EASA) Regulations, Canadian Air Regulations (CARs), and others. Paraphrased, these rules state that NO ONE SHOULD DISPATCH OR TAKE OFF AN AIRCRAFT WITH FROZEN DEPOSITS ON COMPONENTS OF THE AIRCRAFT THAT ARE CRITICAL TO SAFE FLIGHT.

The ultimate responsibility for the determination that the aircraft is “clean” (i.e. no frozen deposits on critical surfaces) and meets airworthiness requirements rests with the pilot in command of the aircraft.

1.3.2 Agreements and Contracts

The information contained in this document is recommended as a basis for deicing pad operations, maintenance operations and service support agreements.

1.3.3 Safety – Hazardous Materials

While the materials, methods, applications, and processes described or referenced in this document may involve the use of hazardous materials, the document does not address the hazards that may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and processes and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

1.3.4 Applicability of Guidelines

All guidelines referred to herein are applicable only in conjunction with the referenced sae specifications. Specific requirements for airplane model type are not included. Due to aerodynamic and other concerns application of deicing/anti-icing fluids shall be carried out in compliance with engine and aircraft manufacturers’ requirements

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 supersedes applicable laws and regulations unless a specific exemption has been obtained.

NOTE: Particular airline or aircraft manufacturers' published manuals, procedures, or methods supplement the information contained in this document.

2.1.1 SAE Publications

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS1424 Deicing/Anti-icing Fluid, Aircraft SAE Type I

AMS1428 Fluid, Aircraft Deicing/Anti-Icing, Non-Newtonian (Pseudoplastic), SAE Types II, III, and IV

ARD50102 Forced Air or Forced Air/Fluid Equipment for Removal of Frozen Contaminants

ARP4902 Design and Operation of Aircraft Deicing Facilities

ARP1971 Aircraft Deicing Vehicle - Self-Propelled, Large and Small Capacity

ARP4737 Aircraft Deicing/Anti-icing Methods

ARP5149 Training Program Guidelines for Deicing/Anti-Icing of Aircraft on Ground

AS5635 Message Boards (Deicing Facilities)

AIR9968 Viscosity Test of Thickened Aircraft Deicing/Anti-icing Fluids

ARP5646 Quality Program Guidelines for Deicing / Anti-icing of Aircraft on the Ground

2.1.2 ICAO Publications

Available from ICAO, Document Sales Unit, 999 University Street, Montreal, Quebec, Canada H3C 5H7, Tel: +1-514-954-8022, http://icaodsu.openface.ca/mainpage.ch2.

Annex 6, Part 1 ICAO

Annex 14, Volume 1 ICAO

Document 9157, Part 2

Document 9376

Doc 9640-AN/940 Manual of aircraft ground deicing/anti-icing operations

2.1.3 ISO Publications

Available from International Organization for Standardization, 1 rue de Varembe, Case postale 56 CH-1211 Geneva 20, Switzerland, Tel: +41-22-749-01-11, www.iso.org.

ISO 11076 (*) Aircraft Deicing/Anti-icing Methods with fluids

ISO 11077 (*) Self Propelled Deicing/Anti-icing Vehicles Functional Requirements

(*) means as the revision period of ISO documents in general is several years, even in the case of fast-tracking, updating procedures, these documents may not reflect the latest industry standards.

2.1.4 Other Publications

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

TP 14052 Guidelines for Aircraft Ground Icing Operations

TP 312 Aerodrome Standards and Recommended Practices

2.1.4.2 Available from the Association of European Airlines (AEA), Avenue Louise 350, B-1050, Brussels, Belgium, Tel: +32-(0)-2-639-89-89, www.aea.be.

AEA Recommendations for Deicing/Anti-icing of Aircraft on the Ground

AEA Training Recommendations and Background Information for Deicing /Anti-Icing of Aircraft on the Ground

2.1.4.3 Available from EUROCAE, 17, rue Hamelin 75783 PARIS, Cedex 16, France, Tel: +33-1-45-05-71-88, eurocae@compuserve.com.

EUROCAE ED-104/SAE AS 5116 Minimum Operational Performance Specification for Ground Ice Detection Systems.

2.1.4.4 Available from the United Kingdom Civil Aviation Authority (CAA), CAA House, 45-59 Kingsway, London, WC2B 6TE, UK, Tel: +44-(0)-20-7453-6213, www.caa.co.uk.

CAA (UK) document: Ground deicing of aircraft

2.1.4.5 Available from the New Zealand Civil Aviation Authority (CAA), P O Box 31 441, Lower Hutt, New Zealand, 5040, Tel: +64-4-560-9400, www.caa.govt.nz/.

Aircraft Icing Handbook (Guidance Document)

2.1.4.6 FAA Publications

Available from the Federal Aviation Administration, 800 Independence Avenue, SW Washington, DC 20591, Tel: 1-866-835-5322, www.faa.gov.

FAA AC 120-60 Ground Deicing and Anti-icing Program

FAA AC 150/5300-14 Design of Aircraft Deicing Facilities

FAA AC 120-89 Ground Deicing Using Infrared Energy

2.2 Abbreviations

AAF	Aircraft Anti-Icing Fluid
ADF	Aircraft Deicing Fluid
ACARS	Aircraft Communication Addressing and Reporting System
AIP	Aeronautical Information Publication (issued by local ATC, or related agencies)
AIRAC	Aeronautical Information Regulation and Control
ATC	Air Traffic Control
BOD	Biological Oxygen Demand
CAR	Canadian Air Regulations
CDF	Central Deicing Facility
CTM	Coordinator Traffic and Movement
COD	Chemical Oxygen Demand
DDF	Designated Deicing Facility
ERD	Emergency Response Deployment
ERL	Environmental Release Limit
FAR	Federal Aviation Regulations
GC	Gas Chromatograph
GRV	Glycol Recovery Vehicles
ICP	Inbound Control Point
LOUT	Lowest Operational Use Temperature
METAR	Meteorological Weather Observation.
MSDS	(Manufacturer's) Material Safety Data Sheet
NOTAM	Notice to Airmen
OCP	Outbound Control Point
PIC	Pilot in Command
PPE	Personal Protective Equipment
SCADA	Supervisory Control and Data Acquisition
SOP	Standard Operating Procedures
TAF	Terminal Area Forecast
VN	Voice Notice (Notice to Airmen)

2.3 Recommended DDF Terminology

Except where specifically stated in this document, the use of the term “deicing” shall also include “anti-icing”

Aircraft Communication Addressing and Reporting System (ACARS):is a digital data link system transmitted via VHF radio that allows airline flight operations departments to communicate with the aircraft in their fleet.

Aircraft Deicing Facility: is a designated airport facility designed to conduct aircraft deicing/anti-icing operations while fulfilling all operational, safety and environmental requirements.

Central Deicing Facility: is a designated airport facility consisting of multiple adjacent located Remote Deicing Facilities designed to conduct deicing/anti-icing of aircraft while fulfilling all operational, safety and environmental requirements, and controlled by a centralized facility control center (Ice House).

Designated Deicing Facility: is the accumulation of multiple designated airport infrastructure facilities designed to conduct deicing/anti-icing of aircraft (Central Deicing Facilities and/or Remote Deicing Facilities, or a combination thereof) while fulfilling all operational, safety and environmental requirements. The operation is controlled by a centralized control center for the Central Deicing Facility and/or individual pad control facilities for the remote deicing facility, or a combination thereof.

Remote Deicing Facility: is a designated airport infrastructure facility designed to conduct deicing/anti-icing of aircraft preferably close to the take-off runway threshold. The operation is controlled by an individual pad control facility and is designed to permit aircraft engines-on operation while fulfilling all operational, safety and environmental requirements.

Deicing Operator: is a qualified person (as per ARP 5149) performing deicing/anti-icing operations on the ground and associated checks at a DDF.

Deicing Crew: are all personnel assigned duties for an individual piece of deicing equipment. Deicing Team:are all personnel assigned to the deicing operation on an individual aircraft. Icehouse:is a Control Center or Deicing Pad Tower that controls the assigned deicing facility.

Iceman: is the controller of specific deicing/anti-icing ground positions. The Iceman is located in the Ice House, and is a person who communicates with the Pilot in Command (PIC) via VHF radio .The Iceman provides general deicing/anti-icing information and provides directions to the PIC before making contact with the Ground Coordinator and/or with the Deicing Coordinator.

Deicing Coordinator: is the person who controls the movement of the aircraft and co-ordinates the deicing/anti-icing activities of the deicing vehicle(s) on a deicing pad or, if appropriate procedures and/or appropriate technology for safe separation of deicing/anti-icing operation and communication is established, on multiple deicing bays. This person communicates with the PIC through the interphone or via VHF radio for the purpose of communicating associated check (inspection) information. A deicing coordinator may perform these duties at locations that do not utilize a ground coordinator.

Deicing Lead or Primary Deicing Vehicle Operator(located at any deicing location): is responsible for co-coordinating deicing/anti-icing operation of an aircraft and for communicating with the PIC at locations where deicing vehicles are used and a Ground Coordinator is not used for this purpose. Depending on the location’s set-up, this coordination may be accomplished by an individual (not assigned to a vehicle) or it may be a vehicle assigned to de-ice/anti-ice a specific portion of the aircraft. The external interphone system or VHF radio is used to communicate deicing/anti-icing and associated check (inspection) information to the PIC.

Deicing Bays: The specific area where the deicing and/or anti-icing of aircraft is performed.

Deicing Pads: The operational areas within a DDF, including taxiways, taxi lanes, staging bays and deicing bays, controlled by the Icehouse.

Ground Coordinator: is responsible for coordination of ground deicing operations within a DDF

Pad Control: This is the radio call sign of the operating position in the Icehouse that controls aircraft entering the DDF and exiting the deicing bays.

Pad Leadership: can be - bay lead, lead truck, crew chief, deicing pad team leader, etc.

Control Point: where transfer of control of an aircraft occurs between controlling agencies.

Pink Snow: Contaminated snow removed from the deicing area that is contained in a specific location for later melting or disposal.

Slot Management: Departure allocation program intended to meter departing air traffic.

Snow Desk: Operational position within an airport authority operations control centre where all snow removal operations are coordinated and equipment, logistics and removal methods are dispatched.

Staging Area: A dedicated area behind and adjacent to each deicing bay, where aircraft await approval to enter the deicing bay.

Transfer Points: The location on the taxiway where responsibility for the aircraft is transferred between controlling agencies

Windrows: A row of snow created by snow removal equipment during snow removal operations

3. DDF OPERATING PROCEDURES

Operating a DDF is in most cases the joint effort of several parties, including facility operators, airport authorities, air traffic control, apron control, etc. To help ensure the safe operation of a DDF it is recommended that parties manage this joint effort in such a way that possible conflicts or misunderstandings that may hamper a safe and efficient operation are reduced. This can be achieved by organizing regular and ad-hoc meetings to harmonize the operational and managerial policy and for information exchange.

Deicing Procedures should follow the recommended practice of ARP4737 ‘Aircraft Deicing/Anti-icing Methods’.

3.1 Management Plan

The management plan should address and define the responsibilities associated with the following:

a. Deicing personnel

b. Pilots and air operators for operation of the aircraft while at the DDF, including basic aircraft operation and complying with the procedures at the location. The PIC will always have final responsibility for the safety of the flight

c. Facility operators and/or deicers for handling of the aircraft at the location, maintenance of the deicing equipment and facilities

d. Airport authorities for constructing and maintaining the deicing locations including infrastructure for the vehicles;

e. Air Traffic Control for guidance of aircraft to and from the DDF;

f. Airport deicing management organization; and

g. Pre-authorization for deicing services between carriers and service provider and airport authority.

The responsibilities of all parties can be documented into a memorandum of understanding (MOU) containing an overview of the total operation. This should include items such as a description of the infrastructure, a process model, communication structure, publication strategy, dissemination of information, and logistic support.

3.2 DDF Operations

The following should be addressed and defined in a DDF Operations Plan

a. General;

b. Equipment;

c. Approved aircraft types;

d. Apron management coordination;

e. Movement of aircraft to the pad;

f. Aircraft movement;

g. Vehicle movement;

h. Pad configuration;

i. Engines-On deicing operations;

j. Procedures – jet powered aircraft;

k. Procedures – propeller driven aircraft.

3.3 Alternative Contamination Removal

Alternative methods of contamination removal from aircraft critical surfaces include infrared deicing, forced air removal or steam deicing. These alternative methods can be used where local environmental requirements and weather conditions support the use of alternative deicing. Standard Operating Procedures for these alternatives should be developed if used at DDF's.

3.4 Specific Aircraft Procedures and Precautions

Given the large number of aircraft configurations, their unique characteristics and regulatory requirements, aircraft manufacturers and operators should be consulted with regards to specific deicing/anti-icing procedures.

3.5 Checks and Responsibilities

The plan should include the definitions of and responsibilities for insuring that the following have been checked

a. Wings, Tail and Control Surfaces;

b. Pitot Heads, Static Ports and Angle of Attack Sensors;

c. Engine Inlets;

d. Air Conditioning Inlets/Exits;

e. Landing Gear and Landing Gear Doors;

f. Fuel Tank Vents; and

g. Fuselage

3.6 Anti-icing Fluid Condition

To avoid deicing operator, and flight crew confusion, with regards to type of fluids to be applied to an aircraft, a standard agreed to by all DDF stakeholders should outline the decision factors for fluid “mode” (1 step or 2 step) process.

3.7 Aircraft and Vehicle Movement Procedures

Movement patterns for both aircraft and vehicles will be determined by facility layout, aircraft code classification, and weather condition.

3.8 Fluid Application

Refer to guidelines established in ARP4737.

3.9 Fluid Blending

Depending on operational requirements, and equipment available on-site, fluid blends tailored to specific weather conditions may be made available. This blended fluid is considered a certified deicing fluid provided the water used meets the published quality standards of the fluid manufacturer. Aircraft Deicing Fluid (ADF) will be blended to meet the requirements of the Lowest Operational Use Temperature (LOUT). The freeze point of Type I fluid shall be at least 10°C below the ambient temperature.

3.10 Pre- Dispatch Procedures

Inspection and contamination removal from areas such as engine inlets and flap/slat tracks should remain the responsibility of the individual air carriers. If the aircraft will taxi to the DDF on its own power, these areas should be checked and contamination removed prior to departure from gate and subsequent arrival at DDF

3.11 Preventive Anti-icing

An allowance should be made within the DDF operator's program for air carriers requesting pre-treatment of aircraft prior to inclement weather events. All procedures should take into account impact on the environment.

3.12 Contingency Plans

Airport stakeholders should jointly develop procedures to be implemented in times of irregular operations (IRROPS). Certain winter weather conditions can create long deicing wait times and a pre-storm departure allocation program can help avoid aircraft congestion and long lineups waiting for deicing.

3.13 Weather Monitoring and Reporting Sources

a. TAF/ METAR Retrieval Procedures

b. METAR Codes

c. TAF Codes

d. Radar Weather Retrieval Procedures

e. Real time weather (Now casting)

f. Liquid Water Equivalent Reporting System

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).

4.2.1 Direct Communication Policy

The deicing crew must ensure that all information is understood and that there are no questions from the PIC before communication is terminated.

The aircraft call sign shall precede all VHF radio communications between the PIC and the deicing crew.

Third party communication of any information pertaining to the associated checks (inspection) or deicing/anti-icing operation of an aircraft for the Deicing Operator/Crew/Team is not acceptable, except at airports where VHF or pad displays are the standard method for communication of this type of information and/or appropriate procedures and transfer of information to/from qualified third party personnel (according to ARP5149) is established.

Visual hand signals shall NOT be used to relay deicing information to the PIC.

4.2.2 Inspection Communication

When aircraft contamination inspections occur, the pilot in command shall be notified of the inspection results by inter phone, VHF or person to person.

4.2.3 Request for Deicing Communication

Requests for deicing/anti-icing shall only be made through the published communication channels using the text given in Appendix A, Table A2 without variance

4.2.4 Deicing Communication

Before the deicing/anti-icing process begins the Pad Controller, Iceman, Deicing Coordinator, Lead Deicing Vehicle Operator or the Deicing Operator/Crew as appropriate shall verbally communicate with the PIC.

a. Using the text given in Appendix A, Table A2 without variance.

b. Some time will be required to configure the aircraft for deicing/anti-icing, so there may be some time between the “Stand-by “and the “Aircraft configured for deicing” statements by the PIC.

4.2.5 Post Deicing/anti-icing Communication

4.2.5.1 Deicing/anti-icing Information

After the deicing/anti-icing process is completed, and it has been verified that all deicing equipment are clear of the aircraft the Deicing Coordinator or the Primary Deicing Vehicle or the Deicing Operator/Crew shall verbally communicate with the PIC.

a. Using the text given in Appendix A, Table A1 without variance.

b. Communicating the tactile check (if applicable).

c. Communicating the post treatment check.

d. Transmission of the anti-icing code.

e. Communicating that the equipment is clear.

f. During Engines on deicing/anti-icing operations both verbal and visual communication are required to hold aircraft until all equipment is clear.

WARNING: “Deicing equipment shall not be in motion while the aircraft is in motion”.

When the Deicing Coordinator or the Primary Deicing Vehicle or the Deicing Operator/Crew states “Post deicing/anti-icing check is complete”, this indicates that the deicing/anti-icing process has been completed, that all required inspections have been completed and the aircraft is free of frozen contamination and that all deicing equipment is clear of the aircraft.

When the PIC states “Roger” it means that the pilot understands the information that has just been given. If the pilot does not understand clarification will be requested.

4.2.5.1 All Clear Signal to Flight Crew During “Engines On” Deicing Operations

The operational plan shall include a process for the communication of an “all clear” signal to the flight crew. This signal shall be both verbal and visual and is performed after the following has been accomplished:

a. De/anti-icing information has been provided to the flight crew

b. It has been verified that deicing vehicles, equipment, and personnel are clear of the aircraft and in safety zones

c. Ground crew has ensured safe taxi clearances

4.2.6 Hand Signals

Deicing facilities with a functional self-park system in conjunction with VHF radio communication with the PIC are not required to use hand signals for aircraft and deicing vehicle guidance. Hand signals shall be used in absence of the self-park system and VHF radio communication methodology. It is recommended that all personnel involved in deicing operations should be trained on ICAO hand signals for aircraft and deicing vehicle guidance in the event that hand signal communication is required.

4.2.7 Deicing Equipment Communication

The Deicing Operator/Crew/Team shall be in communication at all times either through the use of an intercom or two-way radios. All deicing personnel working on the same aircraft should use a common frequency.

The pertinent Protocol is given in Appendix A, Table A2.

All communication between the Deicing Crew/Team shall be clear and concise.

WARNING: Misunderstood communication can lead to personnel injury, equipment and/or aircraft damage.

All communication equipment shall be tested before the deicing vehicle initiates operation. If the communication system fails or becomes inoperative during the deicing/anti-icing process, use the “Loss of communication procedures”.

NOTE: The flight crew will refer to the airport specific section of the airport charts for the release or clear-to-taxi communication methods.

4.3 Communications: DDF Essential Information

4.3.1 Single Deicing Service Provider

Single Deicing Service Providers shall provide information to potential users of the DDF as follows:

a. Site Location with reference to airport chart/associated aprons, taxiways & runways;

b. Facility Layout indicating associated buildings, facilities, taxiways, taxi-lanes, deicing facilities, staging bays, safe zones, vehicle corridors, entry and exit points etc;

c. Explanation of associated in-ground lighting and illuminated signage if available;

d. Description of the deicing facilities, if segregated, for deicing/anti-icing and/or staging and the capability for reversing locations if possible;

e. Pilot/Crew Brief Sheet: This information must be laid out similar to TC/FAA/ICAO and airport charts including a descriptive (narrative/explanation) of an aircraft's transition through the deicing facility. This will provide valuable assistance to both flight operations personnel and flight crews regarding the DDF;

f. A sample pilot brief sheet is given in Appendix B;

g. Description of traffic flow and coordination through the DDF with regard to aircraft and vehicles;

h. Communications protocol for aircraft, vehicles and associated agencies (ATC/APRON/RAMP/Airport authorities/Airlines) involved in the movement of aircraft to and from the DDF.

i. Personnel Responsibilities (Ice House/Pad Control/Deicing Coordinator / Deicing Equipment Operators/GRV operators / Snow Removal Personnel);

j. Sample phraseology for flight crews and deicing vehicle;

k. Emergency procedures;

4.3.2 Multi Deicing Service Providers using one pad shall:

a. Obtain orientation package from the Facility Manager;

b. Undergo orientation briefing;

c. Ensure that all deicing personnel and equipment meet DDF requirements;

d. Perform on-site orientation and practical simulation with Facility Manager;

e. Advise the authorities/facility manager date of commencement of operations;

f. Appropriate program elements of information available from section 4.3.1

g. Use standardized communication procedures

4.3.3 Information for Pilots

Information for the PIC will be found in the AIP (Aeronautical Information Publication), issued by local Air Traffic Control (ATC) or related agencies.

Information to pilots may include the lay-out of the DDF, the use of surrounding taxiway systems, aeronautical installations that are available at the DDF, lighting and markings at the DDF, low-visibility procedures, specific taxiing procedures and communication aspects such as frequencies to be used. Special attention is necessary for those cases where the DDF is also used as a holding area or a taxiway.

The information may originate from airport authorities, facility operators or handling agencies and may be divided into:

a. AIP and AIRAC publications: standardized information with permanent value which includes drawings of ground movement charts, detailed lay-outs of the DDF, listing of radio frequencies to be used, etc. Information about DDF's to be included in airport or facility directories; and

b. NOTAM: information with temporary value, which include procedures and/or instructions for a limited period. NOTAM information is not expected to remain current for an extended period and is carried until expiration or cancellation. NOTAMs of a permanent nature are carried until published on the proper charts or in Airport/Facility Directories and/or AIPs.

4.3.4 Information Coordination for Parties Managing Traffic Flow

Coordinated information to parties managing traffic flow to and from the DDF is mandatory. It is recommended that all parties involved (Airport Authorities, ATC, DDF Operators) issue permanent and detailed documents that can be used in conjunction with AIPs. These documents can be condensed into Standard Operating Procedures (SOPs).

Individual airports may require their own communication procedures and/or requirements. Various airport systems therefore need to be addressed such as phone calls, flight strips, and/or electronic communications.

A DDF Aircraft Deicing Plan should be developed, revised and published yearly. The plan should be a coordinated effort on behalf of all parties at the airport using the DDF.

ATC/DDF site agreements – runway selection and flow requirements should be addressed in advance of seasonal operations. Irregular flow operations should also be addressed. This information should be made available to DDF users.

4.3.5 Information for Other Concerned Parties

All pertinent DDF information should be made available to agencies such as airport authority staff, contractors, airport emergency services etc.

It is recommended that Airport Authorities, ground handling agencies and other parties involved should integrate the deicing/anti-icing operation into their respective Quality and Safety Management Systems.

5. DEICING/ANTI-ICING FLUIDS – ENVIRONMENTAL CONSIDERATIONS

Reference should be made to Environmental Matrix: AIR5636 – 'Guidance for Handling Aircraft Deicing Fluids at North American Airports' as a guide for handling spent fluids at any location, worldwide. Other reference material includes ARP4902 'Design and Operation of Aircraft Deicing Facilities', ARP4737 ‘Aircraft Deicing/Anti-icing Methods’, and to ARP5149 'Training Program Guidelines for Deicing/Anti-icing of Aircraft on Ground’.

5.1 Environmental Impact

If not properly managed, spent Aircraft Deicing Fluid (ADF) can be potentially hazardous to the environment.

In high concentrations, deicing fluid runoff can have an adverse affect on both mammalian and aquatic life. Glycol, the primary ingredient in most types of de/anti-icing fluid, is biologically oxygen demanding and can deplete oxygen supplies in freshwater.

The need to effectively manage spent fluid has provided the impetus for an increase in the number of DDF’s. Properly designed and managed DDF’s have proven to be an effective means of controlling the escape of harmful concentrations of effluent from deicing operations into surrounding natural waterways.

5.2 Environmental Standards and Guidelines

Water quality standards or guidelines will often vary from one country to another. The responsibility for water quality can fall under the jurisdiction of various levels of government within each country (e.g. federal, state, provincial, regional or municipal).

The purpose of these standards or guidelines is to protect human health and the environment by providing a guide for containment and treatment of storm water runoff before it enters the ecosystems.

The standards or guidelines create an environmental performance criterion, which will assist in the design and implementation of appropriate infrastructure and operational procedures. Local and National legislation or guidelines regarding water quality should always be consulted and followed.

5.3 Collection and Disposal of Effluent from Deicing Operations

All runoff from deicing operations should be contained, collected and disposed of in accordance with the requirements of the authority having jurisdiction. It should be noted that laws and regulations can change and it is the responsibility of the users or facility operator to keep up to date on environmental regulations and guidelines and adjust operating plans as required.

A protocol for tracking recovered glycol should be implemented to ensure that all spent deicing fluids collected, recycled, and all by-products transferred from the DDF are properly accounted for.

The receiving tanks should be kept at the minimum depth at all times in order to be able to accept spent fluid from the next deicing event.

5.4 Drain Valves

5.4.1 Storm Drain Settings

At the commencement of the winter season, in readiness for the deicing/anti-icing of aircraft, all valves that discharge to the storm water system should be set in a position to prevent escape of effluent into the storm water system. During rain events, when the fluid collected at the facility meets compliance guidelines, the control valves may be reopened to allow discharge to the storm water system. The valves should be reset again as soon as the rain event is over or when the fluid exceeds guidelines for discharge.

5.4.2 Valve Operation

The DDF operator should monitor and operate, as necessary, all associated valves and pumping equipment that are used for the collecting and managing of spent deicing fluid.Through the effective and efficient collection of spent deicing/anti-icing fluid, the risk of environmental damage and unnecessary costs can be reduced. The fluid collection system is to be operated in a constant state of readiness for a de/anti-icing event.

5.4.3 Drain Management

Upon commencement of the winter season, all storm valves should be in the closed-to-environment position in readiness for the deicing/anti-icing of aircraft. During rain events, once the fluid collected at the facility meets compliance guidelines, the environmental fluid control valves may be adjusted to storm setting allowing discharge to the storm water system. The valves should be reset again as soon as the rain event is over or when the fluid exceeds guidelines. Exception may be applied for summer months when there is no deicing/anti-icing event and fluid collected meets compliance guidelines.

5.4.4 Valve Control Log

A daily record of the position of each fluid control valve should be kept. Once per shift a record of the date, time and valve positions should be noted. Should a precipitation event warrant a change in the valve positions it should be reflected on the log sheet and signed by the responsible operator. Anytime that a valve has been repositioned it should be recorded and initialed. A valve check to maintain a control function over valve positioning should be conducted each shift.

Some DDF's operate with an electronic or Supervisory Control and Data Acquisition (SCADA) system to accomplish the valve operations at the DDF. Any failure of the valve system to operate must be immediately reported and rectified as soon as possible.

Access to the electronic or SCADA system should be limited to trained staff.

5.5 Fluid Run-Off Testing and Reporting

5.5.1 Water Quality Program

To ensure that airport effluent does not negatively impact the environment, a program of sampling and analyzing storm water should be implemented. Water quality programs should be established at airports to ensure maximum protection of the environment.

In the absence of other requirements from the Authority Having Jurisdiction the service provider should produce yearly reports after each winter season. As a minimum these Reports should contain details of the fluids used and the test results taken from selected outfalls detailing the detected levels of glycol.

Facilities designed to contain and divert fluid run off into on-site collection areas/vessels should establish a program to test DDF surfaces for compliance following a deicing/anti-icing event and clean up. Once the fluid is compliant it can then be redirected to sanitary or storm lines as dictated by permits that are in place. These test results should also be recorded for reference.

5.5.2 Fluid Testing

Fluid testing should determine if the fluid collected from the apron exceeds the environmental release limit (ERL) for glycol. When this effluent is above the ERL the fluid should be collected and stored for later disposal (in this case the pad diversion valves should be positioned to “collection mode”). When the effluent is below the ERL the fluid may be disposed through the storm water system (valves should be positioned to “storm water mode”).

Field-testing for glycol can be accomplished using Chemical Oxygen Demand (COD) or Gas Chromatograph (GC). All employees responsible for glycol management should be trained in the use of gas chromatography and/or COD test.

Each month split samples taken from various discharges should be taken to an external accredited laboratory for independent laboratory analysis to ensure accurate results.

5.6 Environmental Operations

5.6.1 Hours of Daily Operation

During hours of operation dedicated personnel should be available for the monitoring and operation of the environmental systems.

5.6.2 Visual Reconnaissance

A continuous daily visual reconnaissance procedure of the operational area should be created and carried out. This procedure ensures that variables such as valve settings and general conditions of the facilities are in order and to ensure spillage of glycol is handled in an appropriate and timely manner. A daily log sheet should be used to record the general conditions of the deicing operational areas.

Daily checks of equipment should be carried out to ensure that equipment maintenance occurs as required and there are no fluid leaks. Ensure that all storage units associated with the fluid management facilities are continuously monitored and inspected and any leaks or problems rectified as soon as possible.

5.6.3 Pre-Season

A Pre-Season Technical Inspection of the fluid storage facilities should be completed and documented. During the winter season storage tanks and piping should be inspected regularly for leaks and correct operation. Facility inspections should be recorded.

5.6.4 Plan of Operation

A successful Plan of Operation should attempt to harmonize the safe and efficient movement of aircraft through the facility with effective glycol recovery and disposal. The following points highlight general considerations for inclusion in a DDF operating plan:

a. Clearly define responsibility for environmental management of the facility;

b. Define criteria/authority for determining temporary suspension or closure of facility;

c. Develop contingency plan to handle excess fluid volumes and/or possible loss of containment;

d. Define procedures for co-ordination of manual or mechanical recovery operations with deicing/anti-icing to ensure sustained compliance;

e. Establish procedures and responsibility for valve management;

f. Determine responsibility and procedure for control and monitoring of passive fluid collection systems; and

g. Define criteria for high and low concentrate and how the product will be handled.

5.6.5 Reporting and Communication

Weekly summary report should be prepared, detailing the previous week's operational activities, and equipment deficiencies. This report should be available to the Service Provider and the Airport Operator for review and comment.

A report should be produced at the end of each winter season summarizing fluid management operations, deficiencies and any problems with the operation. The report should recommend any changes required to operations prior to the start of the next season's deicing/anti-icing operation.

5.7 Glycol Management/Mitigation Plan

To ensure responsible environmental management of glycol based chemicals (or other SAE approved fluids used in deicing operations) the Air Operator, Service Provider and Airport Operator should prepare detailed Glycol Management or Mitigation Plans. These plans should be updated annually and submitted to regulatory authorities as required.

5.7.1 Plan Development

The Glycol Management/Mitigation Plan should detail the deicing/anti-icing operation and the methods used to prevent environmental damage from the deicing/anti-icing operation. The Management Plan should be developed with input from the Airport Operator, the Deicing Service Provider, and the Air Carriers using the airport, and the companies or individuals responsible for collection, disposal and recycling of the used fluid. All parties involved in the preparation of the Glycol Management Plan should be signatory to the plan or have access to the plan.

5.7.2 Typical Plan

A typical plan should, as a minimum, address the following issues:

a. General Information on the companies that will be operating and using the DDF;

b. Name, phone numbers, and other contact information for the primary contact persons operating, or responsible for, the DDF;

c. Details of the area where the deicing/anti-icing operation will take place;

d. Details on the storage and handling of deicing/anti-icing fluids;

e. Type and product name of fluid(s) used;

f. How the effluent will be contained and collected;

g. How the effluent will be disposed or recycled;

h. Contingency plans for spills and accidents;

i. Details of the deicing/anti-icing fluid inventory control;

j. Reporting plan - for reporting Glycol use and collection;

k. Environmental Monitoring Program;

l. Reporting plan for environmental issues (such as uncontained spills); and

m. Detailed plans of DDF areas showing drainage patterns, storm drains, valves, etc

5.8 Environmental Emergency/Spill Response Plan

An Emergency Response Plan should be developed and can be a stand-alone plan or included as part of the Glycol Management/Mitigation Plan. The Emergency Response Plan should include 1st response procedures, detailed plans for containing large and small spills, contact information and reporting protocols, and other items as required.

5.9 Handling Spent Fluid

5.9.1 Spills

During fluid handling avoid any spillage and comply with local environmental and health laws. All spills must be reported to the appropriate supervisor for further action.

In the event of a de/anti-icing fluid spill or if fluid leaks from a deicing vehicle the DDF will immediately attempt to recover spilled fluid through the use of a Glycol Recovery Vehicle (GRV) or other appropriate equipment. Other spilled fluids (i.e. Diesel fuel or engine oil) should be contained and cleaned using hydrocarbon-absorbing materials and not mixed with spent ADF.

NOTE: Refer to the manufacturers Material Safety Data Sheet (MSDS) for information on handling, protective equipment, etc.

5.9.2 Disposal Program

A spent deicing/anti-icing fluid recovery and disposal program should be created and customized for each DDF. The program should cover all relevant operations including valve management, fluid transfer, fluid storage, fluid disposal, and treatment

5.9.3 Disposal Options

Spent de/anti-icing fluid can be handled in three ways:

a. Recycling - when and where it is economically feasible or mandated;

b. Disposal to the municipal sanitary sewer system (Waste Water Treatment Plant) or into the storm water system depending on the concentration of Glycol and agreements with the municipality; and

c. Transportation to offsite biological treatment/destruction.

5.9.4 Disposal Streams

If segregation is required, fluids can be collected in different concentrations such as:

Low concentration fluids: (snow melting, subsurface retention and rain events) may be sent to municipal sanitary sewers (with appropriate agreement between DDF operator and water treatment plant), or to a waste provider for destruction.

Fluids with glycol concentrations less than published guidelines can be pumped to the storm water system.

High concentration fluids: (from active deicing/anti-icing and collected after a deicing/anti-icing event) may be suitable for recycling or anaerobic digestion. A high concentrate fluid stream may include deicing/anti-icing fluids captured by a Glycol Recovery Vehicle (GRV) from the Deicing Facility.

5.9.5 Discharge to the Storm Water System

Before the release of fluids to the storm water system, the fluids should be tested to ensure that the concentrations do not exceed the criteria established by the authority having jurisdiction.

5.9.6 Discharge to the Sanitary Sewer System

Prior to the discharging of fluids to the sanitary system the concentration of glycol should be tested to ensure that the concentrations are acceptable for discharge. Samples should be taken every time there is a discharge to the sanitary sewer system. To verify results, a composite sample of each discharge may be collected and sent to an independent accredited laboratory for testing.

Tanks actively collecting fluids should not to be discharged directly to the sanitary system until the fluid has settled and a test to determine concentration has been performed. Testing should first be performed to determine the concentration of glycol in the tank, and then an estimate of the volume of fluid that can be pumped to the sanitary system should be calculated. The maximum allowable discharge is set in the discharge agreements with the waste receiver. This volume of fluid can only be exceeded with written permission from the waste receiver. If it is necessary to share discharge agreements with others, limits for each user should be established to ensure total limit is not exceeded.

5.10 Design Considerations for Management of Spent Fluid

There are a variety of systems, designs and methods available to effectively manage spent fluid. The following items highlight some of the key considerations to consider when designing or modifying a DDF.

a. The chosen system should be capable of handling projected volumes;

b. (Note: the design should account for significant volumes of collected effluent due to typically larger containment and collection areas at a DDF);

c. Surface/storm drains should be equipped to allow the operator to open and close valves and direct fluid as required;

d. A method for fluid streaming should be incorporated in order to enable to operator to separate high and low concentrates;

e. Adequate water supply to the DDF to facilitate on-site or on-truck fluid blending and provide crew amenities;

f. Adequate electrical supply to operate fill stations and support equipment;

g. Slope and contour of pad should be designed to ensure maximum collection of spent fluid.

h. Slope and contour surfaces to allow collection of high concentrate at source;

i. Ensure the connection to local sanitary system for controlled release of collected fluid can effectively handle large volumes;

j. Storage/collection areas need to be sized to projected volumes. Examples of storage may include aboveground or underground tanks, retention ponds or lagoons;

k. Research the standards for acquiring local permits for sanitary disposal or controlled release to ensure the facility design can meet the criteria;

l. A DDF design should be capable of handling all the effluent collected during a sustained deicing/anti-icing operation; and

m. The DDF should be large enough to facilitate a reasonable amount of aircraft movement.

5.11 Glycol Mitigation Methods

A properly designed DDF can greatly improve the management of spent fluid. In addition efforts to reduce the total amount of fluid used can increase the success of glycol management plans, help maintain available storage capacity and mitigate the potential for exceeding established guidelines and environmental damage. The following items are recommended methods and procedures for reducing the overall use of de/anti-icing fluid.

a. At DDFs designed with a passive collection system it is important to continue to mechanically clean and scrub designated areas following an event in order to bring surfaces back to compliance. This will reduce the amount of rain and melted snow that becomes contaminated thus reducing the total amount of fluid collected;

b. Deicing systems that use infrared energy can significantly reduce the use of deicing fluids;

c. The use of Forced Air can remove accumulations of snow on aircraft surfaces thus reducing the amount of fluid required to clear contamination;

d. Where practical, mechanical methods such a squeegees or soft brooms can be used to remove accumulations of snow on aircraft surfaces and subsequently reduce the amount of deicing fluid required to remove contamination;

e. Blending fluid to temperature is very effective in reducing the total amount of fluid concentrate used for deicing. Deicing fluid can be blended efficiently with deicing vehicles equipped with on board blending systems or with on-site blending equipment. Fluid can also be manually blended by mixing appropriate quantities of water and ADF concentrate (note: caution must be used with this method to ensure proper and complete mixing of the fluid);

f. Reduced flow rate nozzles can be used for lighter deicing operations (such as frost deicing) to limit the amount of fluid used; and

g. Proper training of employees on effective application methods and techniques.

5.12 New Deicing Fluid

5.12.1 General

Storage, handling and management of deicing/anti-icing fluids should comply with all applicable national and local codes.

All areas where deicing/anti-icing fluid is stored, transferred or used should be equipped with appropriate secondary containment. If there are drains that connect to outside drainage systems they should be managed to prevent the escape of fluid.

MSDS should be available for employees handling fluids and accessible for emergency response personnel. ADF storage tanks should have labeling identifying the contents affixed and visible on the exterior of the tank(s).

5.12.2 Transportation and Transferring of fluids

Deicing fluid and anti-icing fluids are transported to the airport for on-site storage until operationally required. All phases of the fluid transfer operation should be monitored by personnel trained in spill response. Transfer of fluid from bulk storage to the deicing vehicles should take place at a spills protected, designated fill site. Spill kits should be available at all locations where transfer of fluid occurs, and where fluid is stored.

Areas designated for bulk transfer of deicing/anti-icing fluid should have appropriate containment. Ideally, surfaces should be constructed using impermeable materials.

5.12.3 Storage

Type I, II, III and IV fluids should be stored in single or double wall storage tanks. Underground tanks should be double wall construction. Aboveground tanks may be single or double wall construction. If single wall design, the tanks should be sited in a containment system typically capable of holding 110% of the volume of the largest individual tank. This will allow containment of a leak or spill and will facilitate fluid recovery.

Storage tanks should be made from GRP (fiberglass), stainless steel or other materials as specified/approved by the fluid manufacturer.

For enhanced protection storage tanks should be fitted with high level alarms and auto shut offs to prevent overfilling. All transfer piping should preferably be fitted with dry break couplings, or as a minimum a means to collect spilled fluids.

All storage tanks, permanent piping, and transport containers must be labeled in accordance with regulations in order to avoid contamination and mishandling.

The DDF operator is responsible for the proper handling and storage of these fluids.

NOTE: Check with the fluid manufacturer for information on mandatory testing of the fluids, to ensure fluid meets specifications.

6. TRAINING

Reference should be made to ARP5149.

This section addresses site-specific training requirements – i.e. specific DDF communication equipment, facility equipment, environmental equipment or systems pertinent to DDFs but not mentioned in ARP5149 and ARP4737.

6.1 Training Course Content and Training Frequency

Personnel who have responsibilities within the operator's Ground Icing Program should receive training in the following subjects:

a. The effects of contamination on critical surfaces;

b. Aircraft deicing/anti-icing procedures;

c. Aircraft inspection and reporting procedures; and

d. The use of holdover timetables.

Recurrent training should be given on an annual basis and should include a review of current deicing/anti-icing operations and inspection procedures. Training should highlight changes in procedures and cover the latest available research and development information on aircraft ground deicing operations. Prior to the commencement of winter operations, the operator should distribute a ground deicing/anti-icing operations information circular to all affected personnel. The information circular should review procedures and present any new information not covered in the annual recurrent training.

Deicing training instructors should be re-qualified each year.

6.2 Regulatory Compliance Requirements

The course content should be in compliance with US Code of Federal Regulations, 14 CFR 121 .629 and approved by the FAA Certificate Management Office; Canadian Aviation Regulations, 602.11 Canadian Aviation Standard, 622.11 Part VI - General Operating and Flight Rules, Subpart 2 - Operating and Flight Rules, Division III – Training; JAR ….; or other regulatory requirement, as applicable.

6.3 Training Program

The training program for Ground Personnel involved in the ground deicing/anti-Icing of aircraft should include the following:

a. Introduction to Winter Operations;

b. Winter Operations Planning and Responsibilities;

c. Types of Contamination;

d. Effects of Ice and Snow on Aircraft;

e. De/Anti-Icing Fluids;

f. Deicing Policies;

g. Personnel Safety Precautions;

h. Aircraft Specific Precautions and Procedures;

i. De/Anti-Icing Procedures;

j. Standard Communications;

k. Emergency Procedures;

l. Deicing Equipment Inspection/Walk around;

m. HoldOver Times;

n. Deicing/Anti-Icing Inspection;

o. Deicing/Anti-Icing Records;

p. Flight Crew Reporting Requirements;

q. Overnight Aircraft Handling;

r. Type I, II, III, IV Fluids;

s. Testing Fluids; and

t. Final Examination.

6.4 Examinations

A written examination shall be part of the training program. A minimum passing grade of 75% is recommended. Any incorrect answers shall be reviewed to ensure the student knows and understands the correct answer. Any individual who does not achieve a minimum score of 75% should be required to repeat the course and retake the exam.

Records documenting the initial and annual recurrent training of each person shall be maintained.

6.5 Ground/Maintenance Personnel Training

Ground/maintenance personnel who have responsibilities within the operator's Ground Icing Operations Program should, at a minimum, receive:

a. Training on the effects of surface contamination;

b. Training in aircraft deicing/anti-icing procedures; and

c. Training in aircraft inspection procedures, which, if necessary, shall be aircraft specific

6.6 Training for Deicing Aircraft of Another Operator

Ground personnel trained and qualified to apply deicing and anti-icing fluid, in accordance with a certificate holder's approved program, do not require additional training and qualification to deice and anti-ice similar aircraft operated by another certificate holder with a deicing and anti-icing program also approved in accordance with the current regulations. However, specific training is needed for an operator's deicing personnel to de/anti-ice aircraft with different configurations.

Practical hands-on training is required following classroom training. Specifically when deicing in an engine on operation.

7. DDF EMERGENCY ACTION PLANS

DDF's are situated in the maneuvering area of the airport. Safety and security operations in these areas are strictly regulated by local authorities and other "on airport" stakeholders, as part of standard operation plans and/or emergency plans.

Examples of emergencies and abnormal situations may be fire (or fire related calamities) and adverse weather (snow, storm, thunderstorms etc). Each situation may require a different approach and organization.

7.1 Fire

The local procedures for alerting and activating fire and rescue services must be operationally tested to ensure that the emergency services respond in a timely manner. This may require specific awareness and/or communication tools for the staff working at the DDF, that are in addition to alarm methods used by pilots and ATC. Procedures to ensure adequate emergency response to the aircraft in case of an emergency must be part of the operating instructions of the DDF. In all cases, enough space for emergency vehicles to approach the aircraft being de-iced must be maintained.

7.2 Adverse Weather Conditions

Special local procedures must be developed to cope with adverse weather conditions. These procedures may include detailed snow removal plans for the DDF, taking into account the higher risk of ground collisions between aircraft and deicing vehicles in the confined space at the DDF .

In case of storms or thunderstorms, both the airport and the facility operator may develop procedures that stop or limit the use of the DDF.

7.3 Communications - Emergencies

7.3.1 Loss of Communication Emergency Procedures – Vehicle Operators

In the event of a communication system failure, the driver will bring the vehicle back behind the red clearance line (or into the safety zone) to clear the aircraft area.

7.3.2 Aircraft Emergency Communications

In the event of an aircraft emergency a flight deck crew member will contact the Deicing Coordinator or the Primary Deicing Vehicle or the Deicing Operator/Crew by VHF radio, the pilot/co-pilot will also flash the nose wheel lights and/or any other exterior lights on and off to immediately alert ground personnel. All ground personnel will pull away from the aircraft to the safety zone to allow emergency vehicles to approach and they will also standby ready to assist with passenger evacuation if required.

During an aircraft or ground emergency standard terminology should be used to communicate specific commands. During emergencies, The Iceman, Ground Coordinators, Deicing Coordinator and Deicing Operator/Crew should use terms that are identified in the following sections to avoid confusion.

a. The PIC will determine when a problem with the aircraft (when identified by any flight crew member) is deemed an "Aircraft Emergency";

b. When a Ground Coordinator and/or Deicing Coordinator verbally advise the PIC of an 'Aircraft Fire' (or other emergency) the PIC will determine the appropriate action to safeguard the passengers and crew. During ERD, all engines will be shut down (For three-engine aircraft, the ground/deicer coordinator will need to specify the number 2 engine shutdown on the aircraft, if required); and

c. The Deicing Operator/Crew will be notified by ground radio. Upon notification they will pull away from the aircraft and standby ready to assist with passenger evacuation, if required.

The following identifies the responsibilities of each position:

7.3.2.1 Pilot in Command (PIC)

a. The PIC is responsible for notification to the Iceman of an “Aircraft Emergency” via VHF radio on the appropriate published frequency.

b. The PIC will then:

1. Flash the nose wheel lights and/or other exterior lights on and off to alert the Deicing Team; and

2. Update the Iceman with his requirements/needs.

7.3.2.2 Iceman: Upon notification by the PIC via VHF radio of an “Aircraft Emergency”, the Iceman will:

a. Notify all Ground Coordinators/Deicing Coordinators of the “Aircraft Emergency” in accordance with the Communication Protocol given in Appendix A, Table A3(a);

b. Contact the appropriate emergency personnel;

NOTE: Emergency contacts (fire, rescue, paramedic, etc.) are station specific and governed by the local emergency plan.

c. Keep in contact with the PIC for further needs or information; and

d. Contact local station management and update.

7.3.2.3 Ground Coordinator/Deicing Coordinator: The following procedures are to be followed upon notification of an “Aircraft Emergency”.

a. Upon verbal notification, or by the PIC flashing the nose wheel lights and/or other exterior lights on and off to indicate an “Aircraft Emergency”, the Ground Coordinator/Deicing Coordinator will notify the Iceman and the Deicing Operator/Crew in accordance with the Communication Protocol given in Appendix A, Table A3(b);

b. When an aircraft emergency is declared during the ERD process, all aircraft on the same remote location will shut off engines (For three-engine aircraft the ground/deicer coordinator will need to specify the number 2 engine shutdown on this aircraft). The Deicing Operator/Crew will pull their deicing vehicle away from the aircraft into the safety zone. Additionally, the Ground Coordinator will stand-by for instructions from the Iceman.

c. Co-ordinate the movement of passengers to a designated area;

d. If an aircraft fire is identified by ground personnel, the Ground Coordinator/Deicing Coordinator will notify the PIC in accordance with the Communication Protocol given in Appendix A, Table A3(c); and

e. When an “Aircraft Emergency” is declared, the Ground Coordinator/Deicing Coordinator shall notify all aircraft on the same Deicing Facility via VHF radio to shut down engines (for three-engine aircraft, the Ground/Deicer Coordinator will need to specify the number 2 engine shutdown on this aircraft, if required), and inform all deicing vehicles to clear the aircraft so that emergency vehicles may approach. The deicing vehicle operators will standby, and if necessary be ready to assist with passenger evacuation.

7.3.2.4 Deicing Operator/Crew:

The Deicing Operator/Crew once informed of an “Aircraft Emergency” will move the deicing vehicle to the safety zone and then be prepared to assist, if necessary, with passenger evacuation.

7.3.3 Ground Emergency Communications

In the event of a ground emergency, the Ground Coordinator/Deicing Coordinator will contact the flight deck crew by interphone or by VHF radio (this may be relayed through the Iceman) and advise the PIC of the nature of the ground emergency. All ground personnel will be notified by VHF radio. Upon notification they will pull away from the aircraft and standby in the safety zone ready to assist with passenger evacuation if required.

a. A ground emergency is defined as any problem with a deicing vehicle that affects the safety of ground crews, deicing operators/crews/teams, flight crews or passengers, or the aircraft; and

b. Equipment failure that affects the ground crews ability to deice/anti-ice the aircraft but poses no threat to ground employees, flight-crew members, or passengers is not considered a ground emergency.

THE FOLLOWING IDENTIFIES THE REQUIREMENT OF EACH POSITION

PIC: The PIC is responsible for evaluating if the declared “Ground Emergency” requires the declaration of an “Aircraft Emergency”. The pilot will also determine if the situation requires evacuation of the aircraft.

Iceman: Upon notification by the ground/deicer via VHF radio of a “Ground Emergency”, the Iceman will contact the appropriate emergency personnel.

Emergency contact arrangements (with fire, rescue, paramedic, etc.) are station specific and governed by the local station emergency plan.

a. Keep in contact with the Ground Coordinator/Deicing Coordinator for further needs for information; and

b. Contact local station management and update.

Ground/Deicing Coordinator

Upon visual or verbal notification of a “Ground Emergency”, the Ground Coordinator/Deicing Coordinator will:

a. Notify the PIC in accordance with the Communication Protocol given in Appendix A, Table A3(d);

b. The declaration of a “Ground Emergency” for a specific aircraft number requires that all deicing vehicles assigned to the specific aircraft number stop de/anti-icing. Additionally, the Ground Coordinator / Deicing Coordinator will inform the Iceman of the stated emergency;

c. During ERD on three-engine aircraft, the Ground Coordinator will need to specify number 2 engine shutdown on the aircraft, if required;

d. Notify the Iceman and Deicing Operator/Crew/Team in accordance with the Communication Protocol given in Appendix A, Table A3(e); and

e. Additionally; if the PIC deems a passenger evacuation is required the Ground Coordinator/Deicing Coordinator will co-ordinate the movement of passengers to a designated area.

Deicing Operator/Crew/Team

The Deicing Operator/Crew/Team once informed of a “Ground Emergency” will move the deicing vehicle(s) away from the aircraft to allow emergency vehicles to approach and then, if required, provide assistance to:

a. Ground Personnel needing assistance

b. Passengers, if passenger evacuation occurs

The Ground Coordinator/Deicing Coordinator will co-ordinate the assistance provided by the Deicing Operator/Crew if a passenger evacuation occurs.

8. SNOW REMOVAL

8.1 Overview

This section outlines how the facility is operated, who is responsible for the development, implementation and oversight of the snow removal plan including who, what and how the plan is communicated.

Operation of the DDF requires a development of a plan for snow removal to ensure continued operation of the facility during winter precipitation conditions.

Specific plans should be established prior to each deicing season for each area of operation.

8.2 Surface Areas to be considered

8.2.1 DDF Surfaces

The surfaces for which the DDF is responsible need to be defined in terms of snow clearance, snow removal, and ice control operations, Including but not limited to the DDF taxiway system, deicing facilities, the pink snow area, and DDF parking areas.

8.2.2 DDF Taxiway System

Define and describe all taxiways that the responsibility of the DDF.

8.2.3 Deicing Pads

Description of Deicing Pads, Deicing Bays and Staging Bays.

8.2.4 Pink Snow Area

A description and location of the contaminated snow area should be given, including how it is utilized. This should include areas from which contaminated snow is to be collected.

8.2.5 Vehicle Parking Areas

Parking areas include both groundside and airside parking lots and include entrances and sidewalks to ensure barrier free access.

8.3 Snow Removal Responsibilities and Operations

The plan should include a detailed description of areas of responsibility, (DDF Operator, Airport Authority, contractors); the equipment to be utilized, the method of plan implementation, and include a co-ordination and communications plan.

8.3.1 Apron Storm Grading

Categories of snow events, or storm grading, specific to apron surfaces should be established. These storm event classifications determine what equipment types are required and in what quantities.

8.3.2 Deicing Facilities and Taxi-lane Inspections and Monitoring

The DDF General Manager, or his designee, should conduct inspections of all DDF surfaces prior to any winter weather activity and should conduct inspections of deicing facilities and taxi-lane surface conditions once snow begins to accumulate, during snowfall, and after the snow has finished. Areas that pose an immediate operational impact should be reported and given the highest priority for snow clearing. All other conditions which require action, but that are not necessarily of an urgent nature should be reported to the appropriate parties for later action.

During rapidly changing winter conditions, the DDF General Manager should provide ongoing verbal reports to airport operations. Otherwise, a DDF report completed by the DDF General Manager should note all inspections and winter event operational activities and should be kept on file for availability to the Airfield Technical Inspectors upon request.

8.3.3 Examples of Accumulation Classification

Class One Trace to five centimeters (5 cm) of frozen precipitation

Class Two Five centimeters (5 cm) to ten centimeters (10 cm) of frozen precipitation

Class Three Ten centimeters (10 cm) or more of frozen precipitation

NOTE: When freezing rain is forecast, ice control operations should begin on all apron surfaces in advance of, during, and after an event. Ground surface accumulation of freezing rain is normally minimal, or at least less than two millimeters (2 mm), as prompt application of chemical deicing material melts the freezing rain upon impact with the treated surface.

8.3.4 Priority Levels

Priorities, in terms of areas where snow removal operations should be focused, are assessed according to which areas are being, or will be, utilized for deicing.

The Airfield Maintenance Technical Inspector and the DDF General Manager, or designee, should meet in advance of a storm to discuss and determine the snow removal priorities and winter event operation for the impending event. After priorities are determined and a specific plan devised, the plan shall be forwarded by the Airfield Maintenance Technical Inspector to the Airfield Maintenance Crew Forman. The DDF General Manager, or designee, shall forward the plan to the snow removal Contractor if applicable.

Although winter event operations will typically be carried out on multiple surfaces concurrently, priority should be given to the following areas if and when necessary, in order of importance:

1. DDF Taxiways;
2. DDF Entry/Exit Points;
3. Deicing Pad Entry/Exit Points;
4. Deicing Facilities including lead in lines in specific order;
5. Groundside parking area;
6. Airside parking area;
7. Pink snow area; and
8. Deicing vehicle safety zones.

Other areas, that are considered priorities but which are not easily accessible and which should be cleared manually during all snow activity include but are not limited to:

a. Pad filling stations;
b. Fresh glycol tank farm area;
c. Diversion vaults and hatchways;
d. Sidewalks at entrances;
e. Signs and light standards; and
f. Garage and warehouse doors.

Every attempt should be made to clear all areas simultaneously. However, maintaining surface safe conditions in all areas is dependent on the severity of the precipitation. During heavier than normal periods of precipitation, fixed resources, in terms of equipment and personnel may not be sufficient or capable of covering all areas concurrently. Whenever priorities shift as a result of weather conditions, the DDF General Manager, or designee, should implement the priority levels for snow clearance, snow removal, and ice control operations, in the agreed upon order, as indicated.

8.4 Snow Removal Methods

8.4.1 High-Speed Method

Snow removal utilizing high-speed snow removal equipment is the preferred and most efficient method of snow removal. Depending on the layout of the facility, this method can be used regardless of whether the entire facility is closed or a portion of the facility is closed,. It usually includes equipment with a plow and sweeper combination and a snow blower. The plows push the snow towards the centre of the facility creating 'windrows', some of which are immediately removed into waiting dump trucks or removed by a 'load-and-go' operation.

Expediting the removal of windrows in this manner is essential in making certain the facility is not closed any longer than necessary. Other benefits in using this method are that there is no residual cleanup required and all safe zones remain clear and clean in the event of a reverse flow operation. The same is not true of the 'push-and-pile' method.

8.4.2 Push and Pile Method

This method on DDF surfaces requires snow to be pushed into piles and into areas that are not utilized by aircraft or vehicular traffic, where it is later removed.

8.4.3 Load and Go Method

This method of snow removal is principally for picking up windrows left behind by snow removal plows. Any windrows left behind by the plows are picked up by a blower, which blows the snow accumulation directly into an accompanying dump truck for immediate transport to the pink snow area.

8.4.4 Half-Pad Method

This method is employed when there is heavy aircraft traffic. Half the pad is closed for snow clearance while the other remains in operation. This method is dependant on facility layout.

8.5 Communication Protocols

Communication protocols are essential to ensure all parties are aware of areas where operations are occurring due to the potential of multiple snow removal teams performing operations in nearby areas. All operations should be coordinated through one area of Command and Control (Command Center or Snow Desk).

8.6 Closing Deicing Facilities

When closing Deicing Facilities, either partially or entirely, to carry out snow removal operations, the DDF General Manager, or designee, should notify the Command Center or Snow Desk as to which areas are closed and the areas that remain operational. As the Command Center/Snow Desk is in constant communication with multiple offices, agencies, and teams, throughout a storm event, they are able to advise any parties affected by these closures and/or issue a Voice Notice to Airmen (VN). Upon completion of snow removal operations and once the facilities are re-opened, the DDF General Manager, or designee, should again contact the Command Center/Snow Desk to advise that the Deicing Facilities are open for operation.

8.7 Cleanup

At the conclusion of every storm event, a thorough cleanup is required. Depending on the time of day the precipitation activity occurred and the duration of the winter storm, a final cleanup should be initiated by the DDF General Manager, or designee, or the Airfield Maintenance Technical Inspector. Included in the cleanup process is the removal of all residual ice and compacted snow on the aprons.

Snow accumulations such as any windrows and/or snow piles left behind from earlier snow removal operations should be removed immediately after each event as necessary. Cleanup should be arranged between the DDF General Manager, or designee, the Airfield Maintenance Technical Inspector, and the on-duty site Supervisor of the snow removal contractor.

9. SAFETY

9.1 General

Safety of personnel, aircraft and equipment is the primary priority while operating on the DDF.

Pertinent National and local Codes and Standards should be respected.

Reference should be made to ARP4737 Aircraft Deicing/Anti-icing Methods

9.2 Deicing Vehicles

All deicing vehicles, and any other vehicle or equipment that operates on the DDF should meet an agreed upon standard for mechanical fitness and should be inspected on a regular schedule to ensure compliance (preventative maintenance program).

The following safety equipment, in working order, is mandatory.

a. Open Bucket - four point body harness & lanyard. Deicing Team members working in an open basket MUST wear a full body harness. The harness MUST be connected, by a lanyard, to the proper connection point on the deicing vehicle;

b. Closed Bucket - Seat Belt. Deicing Team members working in an enclosed cab MUST wear the seat belt; and

c. Open Bucket - eye and face protection - Deicing Team members MUST wear a face shield or goggles when spraying de/anti-icing fluid.

Recommended equipment includes:

a. Respiratory Protection - Respirators should be available, and are recommended for use when spraying deicing fluid; and

b. Protective Clothing - Deicing Team members should wear protective gloves and clothing when spraying heated de/anti-icing fluids.

All vehicles shall be inspected on a daily basis when equipment is in use, to ensure the safety equipment is in place and operable.

Confirmation should be made that hand-held and base station/truck cab radios are in working order on a daily basis

Prior to each season an inspection of each deicing vehicle/deicing equipment should be conducted, including an appropriate follow-up to ensure rectification of any deficiencies found during the inspection.

An annual check should be scheduled for each deicing vehicle and each piece of deicing equipment with the local Ground Support Equipment Control Station. This check should be performed before each vehicle or piece of deicing deicing equipment is placed in operation.

The Deicing Operator, prior to starting or moving a deicing vehicle, should perform a “walk around” check.

Availability of glycol tester(s) should be verified and each tester should be checked to ensure working order. Each tester should be checked monthly between October 1st and April 30th. An appropriate supply of distilled water should be made available in order for the operator to perform the required monthly glycol tester check.

A weekly deicing vehicle/deicing equipment check should be performed and records retained for at least 6 months. An adequate and current supply of Aircraft Weekly Deicing Vehicle / Deicing Equipment Check Forms should be on hand.

Confirm that a sufficient supply of deicing/anti-icing fluid is available and procedures in place to re-order as required

9.3 Aircraft Operators

All aircraft operators should ensure that the PIC is aware of all procedures and communication required for the operation of the DDF. A Pilot Briefing Document should be produced to facilitate this, with a method to distribute and communicate the document.

9.4 Personnel

Personal Protective Equipment (PPE) including safety materials, equipment, devices, and clothing and safety restraining devices are required to operate on the facility.

Personal Duty Times will meet the requirement of the local Occupational Health & Safety Regulations and the Collective Agreements of the Service Providers.

9.5 DDF Operators

A Management System & Procedures for Accident Prevention should be in place.

A process to investigate and put in place corrective action in the event of an accident, incident or discrepancy from the SOP is required.

Internal and external safety audits should be performed to ensure compliance and understanding of all SOP's and training requirements. The audits should also include facility maintenance, and roles and responsibility of the facility management.

10. EQUIPMENT

10.1 General Deicing Equipment:

Ice, slush, snow, or frost may be removed from aircraft surfaces using fluids, mechanical methods, alternative technologies or combinations thereof.

NOTE: Equipment utilizing alternative technologies may be used to accomplish the deicing/anti-icing process, provided that the requirements in ARP4737 Aircraft Deicing/Anti-icing Methods are followed.

NOTE: Pre-step process may be carried out prior to deicing/anti-icing with ADF.

To reduce the quantity of glycol-based deicing fluid that is needed, a pre-step process using mechanical application equipment, but no ADF may be considered

This pre-step process may be performed with various means (e.g., soft brooms, forced air, heat, heated water, and heated fluids with negative buffer freezing point). If the pre-step procedure is used, it is imperative that the subsequent deicing process removes all frozen contamination including the contamination that may have formed on surfaces and or in cavities due to the pre-step process.

10.2 Equipment Maintenance

A preventive maintenance program should be established to ensure that equipment consistently operates to its design specification.

10.2.1 Equipment Cleaning

To prevent fluid contamination, application equipment shall be clean before being initially filled with deicing/anti-icing fluid. Recommendations concerning fluid handling and storage equipment are given in ARP4737 Aircraft Deicing/Anti-icing Methods.

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.

DDF's should provide safe, clean and sanitary storage for personal protective equipment, and personnel should be instructed in proper and safe use of the equipment.

11. DOCUMENTATION

11.1 Record Keeping

11.1.1 Policy

An accurate, detailed record keeping system must be in place to allow secure storage and easy access to all information pertaining to the deicing/anti-icing operation and fluids management. Care must be taken to ensure that not only is the information accurate but also that it is recorded in a timely fashion and kept at the DDF for the prescribed period of time.

11.1.2 Standard De/Anti-icing Report Form

This form records each deicing/anti-icing operation and contains the information listed hereunder. It must be kept on file at the DDF for a period of time in accordance with regulatory requirements.

a. Confirmation Slip number

b. Station identification

c. Date of operation

d. Air Carrier

e. Aircraft registration

f. Type of aircraft

g. Flight Number

h. Weather

i. Aircraft condition

j. Outside air temperature

k. Deicing location

l. Type of deicing/anti-icing required by pilot

m. Quantity deicing fluid

n. Quantity anti-icing fluid

o. Start/Finish time deicing

p. Start/Finish time anti-icing

q. Refractometer R/I

r. Deicing fluid mixture rate

s. Deicing Coordinator

t. Deicing vehicle(s) involved

u. Deicing vehicle driver(s) and operator(s)

v. Remarks

11.1.3 Deicing Vehicle Refills

Each time a deicing vehicle is being refilled either at the start of operation or the beginning of a work shift, a R/I refractometer reading must be carried out by the operator and recorded on a Form to indicate the glycol content of his deicing vehicle. This information must be kept on file at the DDF for a minimum duration of two (2) years.

11.2 DDF Operator

11.2.1 Fluid Test Log

Each delivery of Type 1 deicing fluid and Type II, III, and IV anti-icing fluid is to be recorded on separate forms. Records should be kept on file at the station for a minimum duration of two (2) years.

12. FLUIDS MANAGEMENT

Deicing/anti-icing fluids used at any DDF must be approved and must meet the SAE standard AMS1424 for Type I fluids and AMS1428 for Type II, III, and IV thickened fluids. Operators will provide written notification to the airlines that the fluid(s) used at the facility meets the SAE specifications. Operators should also advise the airlines which fluid types will be available at the DDF.

Airlines should be requested to provide written notification to the operator that the fluid(s) used at the facility are approved for use on their aircraft.

12.1 Fluid Management

Storage, handling and management of the de/anti-icing fluids should comply with all applicable national and local codes and comply with Section 5 of this ARP.

Material Safety Data Sheets (MSDS) should be available for employees handling de/anti-icing fluids and accessible for emergency response personnel. ADF Storage tanks should have labeling affixed and visible on the exterior of the tank indicating the contents of the tank.

12.1.1 Plan of Operation

A successful Plan of Operation should attempt to harmonize the safe and efficient movement of aircraft through the facility with effective glycol recovery and disposal. The following bullet points highlight general considerations for inclusion in a DDF operating plan:

a. Clearly define responsibility for environmental management of the facility;

b. Define criteria/authority for determining temporary suspension or closure of facility;

c. Develop contingency plan to handle excess fluid volumes and/or possible loss of containment;

d. Define procedures for coordination of manual or mechanical recovery operations of ADF to ensure sustained compliance of the facility with environmental regulations;

e. Establish procedures and responsibility for valve management;

f. Determine responsibility and procedure for control and monitoring of passive fluid collection systems; and

g. Define criteria for high and low concentrate and how the product will be handled.

12.1.2 Reporting Procedures – Chain of Custody – Inventory Control

A protocol for tracking recovered glycol should be implemented to ensure that all spent deicing/anti-icing fluid is collected and if appropriate, recycled, and all by-products transferred from the DDF are properly accounted for.

12.1.3 Transportation and Transferring of Fluids

Deicing fluids and anti-icing fluids are transported to the airport for onsite storage until operationally required. All phases of each transfer operation should be monitored by personnel trained in spill response.

12.1.4 Hours of Daily Operation

Dedicated personnel should be available for the monitoring and operation of the environmental system of the DDF as required.

12.1.5 Reporting and Communication

Weekly summary report should be prepared, detailing the previous week's operational activities, and equipment deficiencies. This Report should be available to the Service Provider and the Airport Operator for review and comment.

A report should be produced at the end of each deicing season summarizing fluid management operations, amount of ADF used, deficiencies, and any problems with the operation. The report should recommend any changes required to operations prior to the start of the next season's winter operation.

12.2 Fresh Fluids

12.2.1 Approved Fluids

Always use approved SAE fluids with appropriate holdover times in accordance with your DDF location and anticipated weather conditions. Obtain written approval from aircraft operators for the type of de/anti-icing fluids in use.

12.2.2 Pumping

As thickened fluids (AMS1428, Type II, III, and IV fluids) can show degradation after excessive mechanical shearing only compatible pumps and spray nozzles are to be used. The design of the pumping system should be in accordance with the fluid manufacturer recommendations. Pumps should be clearly labeled as to fluid suitability.

12.2.3 Acceptance

Deicing and anti-icing fluids are available in drums, tote tanks, or bulk. Ensure proper manifesting including complete forms and always check the tanker contents and ensure that it is pumped into the correct storage tank. Keep a record of all manifest forms. An inventory record system should be established to monitor all fluid storage, transfer and use at the DDF. Use dedicated storage and handling facilities and do not mix the deicing/anti-icing fluid with any other material. Do not transfer fluid from a deicing vehicle to a storage tank containing virgin fluid. If there were contamination in the deicing vehicle, contamination would propagate to the entire tank.

12.2.4 Deicing/Anti-icing Fluid

a. Confirm the correct fluid has been delivered before it is unloaded into storage tanks. This must be done by:

    1. Visual inspection;

    2. Read product labels and shipping papers; and

    3. Check fluid with a refractometer.

b. Send samples to the fluid manufacturer for a full analysis if:

1. Product samples tested fail to meet all requirements;

2. Contamination with any other material is suspected; and

3. For any reason confirmation is necessary (e.g. storage for length of time that exceeds manufacturers specifications)

12.2.5 Fluid Testing

Test the fluid Freeze Point with a Refractometer fluid tester:

a. Ensure refractometer is in good working order

b. Upon receipt of the fluid from the manufacturer, before being added to existing stock;

c. On a daily basis from each deicing vehicle and storage tank or fill point (from underground piping) before the de/anti-icing operation; and

d. In the event of a fluid sample failing a test, fluids from the same source as the sample must not be used on aircraft until fluid viability can be confirmed.

12.2.6 Annual Testing

All deicing and anti-icing fluids including blended fluid contained in vessels and storage tanks should be sampled and sent to the fluid manufacturer for analysis prior to the commencement of the deicing season.

NOTE: Follow manufacturer's sampling guidelines when obtaining the samples. In addition, a viscosity test should be completed on all Type II, III, and IV fluids contained in vessels and storage tanks prior to the commencement of the deicing season. This test should also be completed if the fluid has been subjected to adverse conditions or contamination is suspected. This test can be completed using the falling ball viscosity test. If the viscosity falls outside of the acceptable range a second test should occur. Should the viscosity test still fail a sample should be sent to the manufacturer. The fluid should not be used on aircraft until its viability is confirmed.

NOTE: Check with the fluid manufacturer for information on testing of the fluids, to ensure fluid meets specifications.

12.2.7 Fluid Blending

ADF will be blended to meet the requirements of the Lowest Operational Use Temperature (LOUT). The freeze point of Type I fluid should be at least 10 degrees Celsius below the ambient temperature.

ADF may be diluted and used to deice aircraft in accordance with the fluid concentration and temperature charts provided by the fluid manufacturer.

NOTE: Blended Fluid is considered a certified deicing fluid provided the water quality used in the blending process meets the published standards of the fluid manufacturer.

13. QUALITY CONTROL

13.1 Objectives

The objective of a Quality Control Program is to ensure compliance to the service provider's methods and procedure in carrying out the deicing/anti-icing operations and to implement a process through which ongoing feedback from/to employees will result in overall performance enhancement.