

Technical Airworthiness Authority Advisory (TAA Advisory)	
Title	Ground De/Anti-ice Operations
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Reference	TAM Part 1, Chapter 4, Annex C
RDIMS File	2182-1027-812-6 VOL 1, AEPM 987535 (English) AEPM 1042026 (French)

1. Purpose

- 1.1 This Technical Airworthiness Authority (TAA) Advisory provides clarification and guidance pertaining to the standards governing the Department of National Defence (DND) requirements for performance of ground de/anti-ice operations.
- 1.2 This TAA advisory is not mandatory nor does it constitute a regulation. It describes a means acceptable to the TAA, but is not the only means to demonstrate compliance with the regulation(s). If you choose to use this TAA Advisory, then all of its aspects must be followed.

2. Applicability

- 2.1 The TAA advisory is applicable to organizations involved with de-/anti-icing RCAF-registered aircraft.

3. Related Material

3.1 Acronyms:

- a. CARs: Canadian Aviation Regulations
- b. CDF: Central De-icing Facility
- c. CFTO: Canadian Forces Technical Order
- d. FOD: Foreign Object Damage
- e. SIAGDP: Standardized International Aircraft Ground De-icing Program
- f. SAE: Society of Automotive Engineers
- g. TC: Transport Canada
- h. TCCA: Transport Canada Civil Aviation
- i. WHMIS: Workplace Hazardous Materials Information System

3.2 Definitions:

- a. **Anti-icing.** A precautionary procedure that provides protection against the formation of frost and/or ice and the accumulation of slush and/or snow on treated surfaces of an aircraft for a period of time during active frost, frozen precipitation, and freezing precipitation.
- b. **De-icing.** A procedure by which frost, ice, slush or snow is removed from an aircraft to render it free of contamination.

NOTE

See Transport Canada Civil Aviation (TCCA) publication TP14052E for a complete list of applicable definitions.

3.3 Regulatory References

- 3.3.1 B-GA-100-001/AA-00 *National Defence Flying Orders* – Flight Rules, Chapter 9, page 7, paragraph 44;
- 3.3.2 C-05-005-001/AG-001 – *Technical Airworthiness Manual (TAM)*;
 - a. Part 1, Chapter 4, Section 2, Standard 1, paragraph 2;
 - b. Part 1, Chapter 4, Section 2, Annex C, paragraphs 2, 4 and 5; and
 - c. Part 3, Chapter 1, Section 2, Standards S1 and S2.
- 3.3.3 Civilian and/or other military airworthiness regulations/advisories
 - a. B-GA-106-000/FP-000 RCAF Operational (Air) Manual: *Ground De-/Anti-Icing Program – Aircraft De-Icing and Anti-Icing*;
 - b. TCCA, CAR 602.11;
 - c. TCCA, Standard 622.11;
 - d. TCCA TP14052E – *Guidelines for Aircraft Ground Icing Operations*; and
 - e. TCCA *Holdover Time (HOT) Guidelines*.
- 3.3.4 Additional civilian standards
 - a. Standardized International Aircraft Ground De-Icing Program (SIAGDP)

4. Discussion

- 4.1 National Defence Flying Orders state that “Unless otherwise addressed in CFTOs specific to aircraft type, take-off will not be attempted when any frost, snow, ice or other surface contaminant is adhering to the critical surfaces of an aircraft. Critical surfaces include but are not limited to wings, control surfaces, rotors, propellers, horizontal and vertical stabilizers, any other stabilizing surface, and the upper fuselage on aircraft having rear-mounted engines. Take off will not be attempted when flight-critical pitot or static pressure orifices are covered or blocked. Approved de-icing techniques and fluids shall be used as appropriate to remove contamination and blockage prior to flight. If available, holdover time tables may be used as applicable, for guidance in determining the approximate protection time provided by certain de-icing/anti-icing fluids.” The complete RCAF ground icing program can be found at regulatory reference 3.3.3.a.
 - 4.1.1 The TAA considers performance of ground de-/anti-icing of aircraft to be an aircraft servicing task, since it is the removal/protection against formation or accumulation of contaminants from critical surfaces of an aircraft. All the requirements of the TAM in regards to an authorized individual performing this servicing function must be met.
 - 4.1.2 This TAA advisory details the requirements of an organization performing ground de/anti-icing of aircraft. Organizations that are currently TAA Accredited or Recognized Acceptable Maintenance Organizations (AMOs) can expand their TAA-approved scope and depth of authority to include de/anti-icing service. Organizations that only provide de-/anti-icing services will be accredited by the TAA as an Accredited Ground De-/Anti-icing Service Provider for the RCAF, using the technical requirements in this TAA advisory.

- 4.1.3 The following organizations are acceptable to the TAA for performing aircraft de-/anti-icing on DND-registered aircraft while in transit, providing that the Aircraft Commander has provided the facility operator or service provider the needed aircraft specific technical data required to support the application of de-/anti-icing fluid:

NOTE

Aircraft specific technical data covers the technical instructions necessary to support the application of de-icing and/or anti-icing fluids. These instructions will be aircraft type specific and approved by the fleet Senior Design Engineer (SDE). Aircraft specific instructions can be found within the annex A of the RCAF Ground De-/Anti-Icing Program (GIP) at regulatory reference 3.3.3.a., or internally, within DND, at:

http://winnipeg.mil.ca/cms/en/DComd-FG/A4-Maint/A4_Maint_AMSET/A4MaintAMEval/RCAF_GIP.aspx

- a. an organization whose de-/anti-icing program meets the Standardized International Aircraft Ground De-icing Program (SIAGDP) as determined by a third party, such as IATA;
- b. a Transport Canada approved Central De-icing Facility (CDF);
- c. a de-/anti-icing facility and/or service provider at a civilian airport that provides de-/anti-icing services to civilian CAR 704 and 705 air operators; or
- d. an organization that has been accredited by the TAA where the scope and depth of this accreditation includes de-/anti-icing.

4.2 Acceptable Means of Compliance

- 4.2.1 TCCA has established guidelines and requirements for Canadian air operators to enable aircraft ground icing operations. It is not the intent of the TAA to establish unique military requirements to cover ground icing operations. To harmonize military requirements with those of civil aviation, this TAA Advisory adopts TP14052E – *Guidelines for Aircraft Ground Icing Operations* as the standard that the TAA will use to evaluate (accredit) organizations that perform de-/anti-icing on RCAF-registered aircraft. The TAA will only evaluate the requirements of TP14052E that fall under the TAA authority. The operational aspects of TP14052E that relate to aircrew actions such as: use of a de-/anti-icing facility, establishing holdover times, or checking condition of critical surfaces prior to take-off, belong to OAA and are defined within the appropriate operational directives.

NOTE

Many of the listed requirements extracted from TP14052E are not within the scope of responsibility of the TAA to approve. Full evaluation of an organization against these requirements will involve the TAA, OAA and other responsible RCAF organizations. No attempt has been made to distinguish between TAA and OAA approval within this list. This has been done intentionally to ensure that the policy, procedures and instructions proposed for a de-/anti-icing organization are cohesive and not fragmented.

- 4.2.2 An organization seeking TAA accreditation to perform servicing work that includes de-/anti-icing is required to address the technical requirements of TP14052E that cover:
- a. Layout of De-icing Facilities;
 - b. Description of aircraft that can be accommodated;
 - c. Procedure dealing with non RCAF aircraft (if applicable);
 - d. De-Icing Procedures;
 - e. Specialized procedures if applicable (forced air, infra-red, broom, etc.);

- f. Training and authorizing individuals;
- g. De-/anti-icing Vehicle Operation;
- h. De-/anti-icing Vehicle Maintenance;
- i. Communications;
- j. Control Center;
- k. Glycol Management;
- l. Environment;
- m. Snow Removal Plan;
- n. Emergency Procedures;
- o. Contingency Plans;
- p. Training Plan;
- q. Health and Safety; and
- r. Quality Assurance and Control Program.

4.3 Training and authorizing individuals

4.3.1 Initial Ground Icing and Maintenance Personnel Training will, as a minimum, include:

- a. Company Policy;
- b. Effects of Contamination;
- c. Weather Conditions Requiring De-/Anti-Icing;
- d. De-/Anti-Icing Vehicle and Equipment;
- e. Fluids and Fluid Application Methods and Techniques;
- f. Holdover Time Considerations;
- g. Inspection Procedures; and
- h. Safety.

4.3.2 Recurrent ground icing and maintenance personnel training will, as a minimum, be conducted yearly, prior to the beginning of each de-ice season, and cover the following:

- a. Current de-/anti-icing operations and inspection procedures;
- b. Any changes to the program;
- c. Latest available research and development on ground de-icing; and
- d. Information circulars that review procedures and contain any new information.

4.4 Facilities and Equipment

4.4.1 Facilities and equipment are required to meet the following:

- a. Be capable of operation such that personnel safety is not compromised;
- b. Be operated safely and efficiently under all foreseen operating conditions;
- c. Have equipment fluid dispensing systems designed and operated in accordance with the requirements of the appropriate fluid and equipment manufacturer;

NOTES

1. *Types II and IV fluids require specialized equipment.*
2. *Equipment intended to be used with engine operating may require to be operated at a greater distance.*

- d. Vehicle design in accordance with SAE ARP 1971 and ARP 4806;
- e. Self-propelled vehicles manufactured in accordance with SAE 4047 and ARP 4806;
- f. Require sufficient lights to ensure surfaces being de-/anti-iced can be properly checked during low visibility conditions;
- g. Preventive maintenance program recognized by equipment manufacture;
- h. Provision of personal protective equipment for facility/equipment operators; and
- i. Communication equipment shall be available and utilized as per approved procedures.

4.5 Glycol Management

4.5.1 The glycol management plan needs to address the following:

- a. General Information on the organizations and aircraft that will be operating and using the de-icing facility;
- b. Details of the area where the de-icing operation will take place;
- c. Details on the storage and handling of de-icing fluids;
- d. Application details including operator training;
- e. How the effluent will be contained;
- f. How the effluent will be disposed;
- g. Contingency plans for spills and accidents; and
- h. Reporting plan – for reporting types and quantity of glycol used.

4.6 Environment

4.6.1 Fluids will be stored, handled and managed in accordance with applicable federal, provincial, and municipal requirements. Items to consider are:

- a. *Canadian Environmental Protection Act;*
- b. Canadian Council of Ministers of the Environment (CCME) – For above ground and underground storage tank systems containing petroleum and allied petroleum products;
- c. Guidelines for effluent from federal establishments;
- d. *The Fisheries Act;*
- e. Storm water discharge;
- f. Program for sampling and analysing storm water; and
- g. Containing, collecting, and disposing runoff from de-icing operations.

4.7 Health and Safety

4.7.1 The program will need to consider federal, provincial and municipal health and safety requirements. Items to consider are:

- a. WHMIS requirements; and

- b. Fall protection.

4.8 Quality Program

4.8.1 The quality system requirements are:

- a. Maintain a TAA-approved Ground De-/Anti-icing Manual (or equivalent) that captures the requirements of paragraph 4.2.2;
- b. A quality system that meets the requirements of TAM Part 1, Chapter 6 (or equivalent), or the requirements of the TP14052E Chapter 4, for Service Providers;
- c. Safety procedures to meet the RCAF Flight Safety program and FOD control program; and
- d. Tailored de-/anti-icing quality audit checklists.

4.8.1.1 The Quality System documents maintained for de-/anti-icing will, as a minimum, include:

- a. Training records;
- b. Glycol delivery acceptance;
- c. Fluid tests;
- d. Test frequencies;
- e. Equipment log sheets;
- f. Refractometer calibration, when applicable;
- g. Application Report, which as a minimum must record:
 - (1) Operation record number,
 - (2) Organization Identification,
 - (3) Date/Time of Operation,
 - (4) Type of Aircraft,
 - (5) Aircraft Tail Number,
 - (6) Weather Conditions,
 - (7) Aircraft condition on arrival,
 - (8) Outside air temp,
 - (9) Name and quantity of glycol type I used,
 - (10) Name and quantity of glycol type IV used,
 - (11) Start and finish time for type I application,
 - (12) Start and finish time for type IV application,
 - (13) Refractometer reading for fluid used,
 - (14) Glycol type 1 Mixture ratio,
 - (15) De-icing trucks involved,
 - (16) Truck driver and operator identification,
 - (17) Type of de/anti-icing requested by the pilot, and
 - (18) Identification and signature of the individual responsible for de/anti-icing application.

- h. **Critical Surface Inspection.** The Critical Surface Inspection is a mandatory post de-/anti-icing inspection to assure preservation of the “clean aircraft” concept during ground icing conditions. It consists of an external inspection of critical surfaces conducted by a qualified person, to determine if the surfaces are contaminated by frost, ice, slush or snow. Upon completion, it must include a documented declaration that all of the critical surfaces for the aircraft type are free of contaminants.

NOTE

The “clean aircraft” declaration may be documented on the Application Report, or through a single declaration that the aircraft has been de-/anti-iced and is clean of any contamination in accordance with the approved aircraft specific de-/anti-icing procedures. Refer to regulatory references under paragraph 3.3.3 for more details.