

NOTICE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

N 8000.308

10/5/05

Cancellation
Date: 10/5/06

SUBJ: REEVALUATION OF DEICING/ANTI-ICING PROGRAMS

1. PURPOSE. This notice provides guidance and information for inspectors, pilots, and operators regarding the evaluation of deicing/anti-icing programs. This notice is for principal inspectors (PI) of certificate holders that are required under Title 14 of the Code of Federal Regulations (14 CFR) part 121, § 121.629, and other certificate holders operating under 14 CFR parts 125 and 135 that have elected to operate with a program approved under § 121.629(c). This notice also advises those inspectors and applicable certificate holders of the importance and need for proper compliance with § 121.629 and the applicable guidance under which the program was approved. This notice stresses the need for reevaluation by each certificate-holding district office (CHDO) and certificate holder of that certificate holder's deicing/anti-icing program with emphasis on the areas of concern listed and discussed in this notice.

2. DISTRIBUTION. This notice is distributed to the division level in the Flight Standards Service in Washington headquarters; to the branch level in the regional Flight Standards divisions; to the Flight Standards District Offices; and to the Regulatory Standards Division at the Mike Monroney Aeronautical Center. This notice is also distributed electronically to the division level in the Flight Standards Service in Washington headquarters and to all regional Flight Standards divisions and district offices. This information is also available on the Federal Aviation Administration's (FAA) Web site at:

http://www.faa.gov/library/manuals/examiners_inspectors/8000/N8000-308.doc.

3. APPLICABILITY. This notice contains information for PIs who have responsibility for 14 CFR parts 121, 125, and 135 operators.

4. BACKGROUND. Since ground deicing/anti-icing programs are critical to aviation safety and the consequences of a program failure can be catastrophic, the FAA undertook an extensive evaluation of deicing/anti-icing programs of 10 certificate holders operating under part 121 and one part 135 certificate holder that was transitioning to a part 121 program under § 121.629(c). Using the system safety principles and risk assessment process, the FAA determined that programs requiring FAA approval such as ground deicing/anti-icing programs, would have the highest degree of inherent risk and, as such, were determined to be the most critical due to the approaching 2005-2006 winter season.

a. Once accomplished, the evaluations revealed that deficiencies and noncompliance with the regulatory requirements existed in the system design and procedures of each program evaluated.

b. Given this information and data, the Flight Standards Service (AFS) has concluded that these discrepancies are likely to exist in other operators' ground deicing/anti-icing programs that have been approved by the FAA.

5. DISCUSSION. AFS revised AC 120-60, Ground Deicing and Anti-Icing Program, (the current edition is AC 120-60B), at the request of major operators. The intent was to have a guidance document that could be used as an industrywide standard on which all of the major operators could establish their deicing/anti-icing programs. The longer-term objective was to make it possible for an operator or service provider whose deicing/anti-icing program (or training program in the case of a service provider) was approved in accordance with AC 120-60, current edition, to provide deicing and anti-icing services to another operator with a similar program. This long-term objective would reduce operating costs for participating operators and service providers, which benefits the public and increases the level of safety by reducing the number of programs on which an operator or service provider must be trained and qualified.

a. The results of the FAA's review of deicing/anti-icing programs for operators clearly show that the long-term objective mentioned in the preceding paragraph has not been reached. The review also shows that some operators and a number of FAA inspectors do not have a clear or accurate understanding of the guidance material or icing regulations.

b. Based on the FAA's findings and the reports of various aviation safety inspectors (ASI), AFS agrees with the FAA's conclusion that their findings are probably indicative of the state of other operators' deicing/anti-icing programs in other regions. In order to reach the highest level of safety in cold weather operations, AFS plans to organize and conduct a national, yearly review of new and amended deicing/anti-icing programs, at the regional level.

c. The FAA's evaluation found the following discrepancies:

(1) Program Management and Responsibility. The majority of the programs reviewed lacked a management plan that would ensure effective implementation of the ground deicing/anti-icing program. Only a few programs identified the ambient conditions under which the program would be activated and most programs did not identify the person (or occupational title) responsible for determining when ground-deicing procedures must be put into effect. Even when responsibility was established, the procedures of implementation were not clearly defined or were absent. Most programs omitted the assignment of specific high-level responsibility and authority in the company's management structure. In one instance, the program responsibility was assigned to a person at the lowest possible organizational level.

(a) Only one program addressed the transition from the deice/anti-ice flight deck checklist to the accomplishment of normal before starting engines or before taxi checklists. This is critical in scenarios where aircraft are configured for deicing/anti-icing after normal checklist items have been completed. Failure to reaccomplish normal checklist items has led to aborted takeoffs due to incorrect stabilizer trim settings in several instances.

(b) AC 120-60, current edition, provides for a cross utilization of operator deicing/anti-icing programs or associated training when the programs conform to AC 120-60. None of the programs reviewed included procedures for confirming that contract operator programs conformed to the AC or § 121.629.

(c) Manuals identified on operations specification (OpSpec) paragraph A023 did not always reflect all documents that comprised the entire ground deicing/anti-icing program.

(2) **Definitions.** Many programs did not provide definitions of terms associated with processes, procedures, and training within the program. These omissions set the stage for inconsistent performance or misunderstanding of requirements.

(3) **Critical Surfaces.** In the majority of programs, critical surfaces are sometimes not defined or identified, or the definitions are generic rather than aircraft type specific. One operator defined most critical surfaces as “other surfaces” (i.e., noncritical surfaces), which omitted them from the requirement to be verified free of ice prior to takeoff.

(4) **Representative Surfaces.** These surfaces were also misidentified or improperly defined. In many programs, representative surfaces were confused with critical surfaces. In some cases, these surfaces are the focus of the pretakeoff contamination check instead of the pretakeoff check.

(5) **Cold Weather Preflight Inspections.** These inspections were found to be either insufficiently defined or only briefly mentioned. None of the programs reviewed included well-defined procedures for cold weather preflight inspection with a focus on critical areas.

(6) **Training Curricula.** The required training curricula often omitted training on cold weather preflight inspections and contamination recognition techniques. Few training curricula conformed to the criteria in AC 120-60B, current edition. Most training curricula omitted at least one of the seven items specifically required by § 121.629 and none of the programs reviewed included the tracking system suggested by AC 120-60B. The FAA’s review found that ground deice training curricula are often contained in documents outside of the approved deice/anti-ice program. In many instances testing and/or qualification requirements are not specified.

(7) Pretakeoff Contamination Checks.

(a) The majority of programs reviewed allowed this check to be accomplished from inside the aircraft. In accordance with the guidance in Order 8400.10, Air Transportation Operations Inspector’s Handbook, the air carrier must show that their procedure to perform a pretakeoff contamination check from inside the aircraft, provides an equivalent level of safety, when compared to a check performed from outside the aircraft. However, no records were found that attested to an actual demonstration of the effectiveness of inside the aircraft pretakeoff contamination checks. In all programs reviewed, vertical and horizontal stabilizers and rudder and elevator surfaces are assumed to be free of contamination when those surfaces visible from the cockpit or cabin are clean. None of the pretakeoff contamination checks incorporated fluid failure and contamination recognition techniques, even when included in training.

(b) Procedures for the use of holdover timetables were ambiguous in some cases and omitted in others. Informal discussions with flight crewmembers suggest that these checks are not conclusive.

6. ACTION. PIs should review the content and requirements of this notice with air carrier management personnel charged with the responsibility for the quality and oversight of this program and overall safety of flight operations. A copy of this notice should be given to the director of safety (part 121 operators) and the director of operations (all operators) with a request that all flight operations and ground personnel involved with the ground deice/anti-ice program become familiar with its contents. Principal operations inspectors (POI) assigned to part 121 certificated operators and to parts 125 and 135 certificate holders that have deicing/anti-icing programs that comply with § 121.629(c), shall complete a comprehensive program assessment using the criteria in subparagraphs a through d below no later than November 4, 2005.

a. Management Plan. As an overall condition of approval by the FAA, the deicing program management plan must contain, or address, the following:

(1) All documents containing information describing compliance with § 121.629 must be identified in OpSpec paragraph A023. Recommend that the entire program be contained in a single document and excerpts from that single source distributed as needed to various occupational groups, i.e., flight crewmembers, ground personnel, dispatchers, etc.

(2) Ensure that the responsibility for overall program implementation and administration is assigned to a high-level management position, preferably at a level equivalent to the “Director of Operations.”

(3) Ensure that the authority to approve changes to the program is assigned to a high-level management position, preferably a level equivalent to the “Director of Operations.”

(4) Establish the authority to determine (approve) the use of another operator’s procedures or training based on conformity to AC 120-60, current edition. This authority must be commensurate with the persons’ or organizations’ technical ability.

(5) Specify actual or forecast ambient conditions (conducive to ground icing) under which the program would be implemented.

(6) Specify the occupational title of the person responsible for monitoring conditions at each airport and for deciding/declaring that the program is in effect. This must be based on established ambient conditions.

(7) Ensure that the operator has specific procedures, including duties and responsibilities for each operational group, for getting the aircraft safely airborne while the program is in effect.

(8) Acknowledge training requirements by occupational title and specify how training will be administered.

NOTE 1: All personnel involved in the program must receive training on the subjects listed in § 121.629(c)(2)(i) through (vii).

NOTE 2: Training curricula that conform to AC 120-60, current edition, provide an industrywide standard means for obtaining approval of a ground

deicing/anti-icing program in accordance with 14 CFR part 121, § 121.629. In addition, it provides a means acceptable to the Administrator for a certificate holder to deice/anti-ice aircraft using another certificate holder's personnel and procedures or contract personnel who have been trained by the other certificate holder.

(9) The management plan must incorporate procedures to evaluate and incorporate airport specific plans and Air Traffic Control procedures.

b. Definitions.

NOTE: Definitions must conform to terminology used in § 121.629 and ACs 20-117, Hazards Following Ground Deicing and Ground Operations in Conditions Conducive to Aircraft Icing, 120-58, Pilot Guide Large Aircraft Ground Deicing, and 120-60, current edition, to ensure common understanding in procedures and training, and promote industry standardization.

(1) **Critical Surface.** Verify that the definition of "critical surface" coincides with the aircraft manufacturer's definition or AC 120-60, current edition, and is consistently incorporated "as defined" in procedures and training. Verify that the definition identifies the required checks associated with "critical surfaces," i.e., cold weather preflight, postdeice, postanti-ice, and pretakeoff contamination checks. "Critical surfaces" must be defined for each aircraft type.

(2) **Representative Surface.** Verify that this check is included in the definitions and that it is clearly associated with the pretakeoff check.

(3) **Sensitive Areas.** Sensitive areas are those areas where direct, high-pressure application should be avoided during application of deice/anti-ice fluids. Verify that sensitive areas are defined for each aircraft type and that they are not confused with critical or representative surfaces. The aircraft manufacturer may identify these in the Airplane Flight Manual (AFM) or other documents. If not, the following should be considered typical:

- (a) Instrument sensors.
- (b) Brakes.
- (c) Nosewheel steering actuators.
- (d) Engine and APU inlets.
- (e) Areas where accumulation of fluid may occur.
- (f) Certain composite panels and surfaces.
- (g) Outflow valve.

(4) **Cold Weather Preflight Inspection.** Verify that the inspection is defined and that the focus of the inspection is "critical surfaces" as defined above.

(5) **Postdeice Check.** Verify that this check is defined and that the purpose of this check is stated, i.e., to ensure that all “critical surfaces” are free of frozen contaminants and/or residual anti-ice fluids. It should be emphasized that this check is separate and distinct from the “post anti-ice check.”

(6) **Postanti-ice Check.** Verify that this check is defined and that the purpose of this check is stated, i.e., to ensure uniform application of anti-ice fluid.

(7) **Pretakeoff Check.** Verify that this check is included in the definitions and that it is clearly associated with “representative surfaces.” The definition should specify that this check must be completed just prior to takeoff and within the holdover time.

(8) **Pretakeoff Contamination Check.** Verify that this check is included in the definitions and that it is clearly associated with “critical surfaces” only. The definition should specify that this check is to be completed when the holdover time has been exceeded and that the takeoff must occur within 5 minutes of accomplishing the check.

(9) **Tactile Check.** Verify that this check is included in the definitions for those aircraft in which a tactile check is mandated by Airworthiness Directives or otherwise required by the AFM, limitations section.

c. **Procedures.** Verify that procedures are provided for the following:

(1) Monitoring of conditions at all airports and initiating/implementing the program.

(2) Performing cold weather preflight inspections focusing on “critical surfaces.” These procedures shall include contamination recognition techniques and specify vantage points from which the inspections must be accomplished. This check must include methods for detecting clear ice.

NOTE: The AFM or other documents provided by the manufacturer may contain useful information.

(3) Aircraft taxi, positioning, and ground coordination, including radio frequencies.

(4) Aircraft configuration by type.

(5) Deicing, focusing on “critical surfaces.”

(6) Postdeice checks focusing on “critical surfaces.” This check should include methods for detecting clear ice.

(7) Anti-icing, focusing on “critical surfaces.”

(8) Postanti-ice checks focusing on “critical surfaces,” and the uniform and symmetrical application of fluid.

(9) Transition to normal checklist after deicing/anti-icing.

(10) Use of holdover timetables including the requirement to continually monitor ambient conditions and make adjustments to holdover times.

(11) Pretakeoff checks, focusing on representative surfaces. This check must incorporate the following:

(a) Fluid failure recognition techniques.

NOTE: Anti-ice fluids are considered to have “failed” and to have lost their effectiveness when they become diluted with falling precipitation to the point where ice becomes visible in the fluid. When this occurs, the fluid begins to appear “opaque” rather than transparent and glossy and/or the inability to discern structural details (rivets, screws, seams) through the fluid becomes apparent.

(b) Contamination recognition techniques.

(c) Taxi back if fluid failure is detected and for complete deicing and anti-icing retreatment.

(12) Pretakeoff contamination checks must focus on the wings, control surfaces, and the other “critical surfaces” identified in the carrier’s program. To determine what surfaces constitute “critical surfaces,” the carrier should at least include those identified by the manufacturer, or as specified in AC 120-60, current edition, and incorporate:

(a) Fluid failure recognition techniques.

NOTE: Anti-ice fluids are considered to have “failed” and to have lost their effectiveness when they become diluted with falling precipitation to the point where ice becomes visible in the fluid. When this occurs, the fluid begins to appear “opaque” rather than transparent and glossy and/or the inability to discern structural details (rivets, screws, seams) through the fluid becomes apparent.

(b) Contamination recognition techniques.

(c) Taxi back if fluid failure is detected and for complete deicing and anti-icing retreatment.

NOTE: The pretakeoff contamination check must be performed from outside the aircraft, unless the operator shows that the check can be adequately accomplished from inside the airplane.

(13) Procedures for performing a pretakeoff contamination check must address all conditions that may exist when such a check is performed. Conditions that may affect the effectiveness of a pretakeoff contamination check include variations in ambient lighting that the flightcrew may encounter. The absence of adequate lighting when performing this check may limit the capability of the flightcrew to safely perform this check, and may require the flightcrew

to return the aircraft for reapplication of deicing fluid. The air carrier's program should address this aspect and the potential limitations of the pretakeoff contamination check.

NOTE: Procedures for accomplishing the pretakeoff contamination check from inside the aircraft on high-wing or hard-wing aircraft with aft-mounted turbine engines must be approved by the Air Transportation Division, AFS-200, through the respective regional offices.

d. Training Requirements.

(1) Verify that each of the following training subjects is included in the curriculum for all personnel directly involved in the program. This training must be tailored to specific aircraft types.

(a) The use of holdover times.

(b) Aircraft deicing/anti-icing procedures, including inspection, and check procedures and responsibilities.

(c) Communications procedures.

(d) Aircraft surface contamination (i.e., adherence of frost, ice, or snow) and critical area identification, and how contamination adversely affects aircraft performance and flight characteristics.

(e) Types and characteristics of deicing/anti-icing fluids.

(f) Cold weather preflight inspection procedures.

(g) Techniques for recognizing contamination on the aircraft.

NOTE 1: All personnel must receive training in all subjects listed. The details of that training must be tailored to their respective job functions.

NOTE 2: If the duties of pilots include supervising offline deice/anti-ice operations, detailed training must be provided to address these job functions.

(2) Encourage the operator to enhance the training by ensuring that it conforms to AC 120-60, current edition. Industrywide conformance to the standards set by AC 120-60 makes it possible for operators to use (give credit for) the training provided by other operators, in effect making the training "interchangeable" for similar type aircraft.

e. Verification. If an operator proposes to accomplish the pretakeoff contamination check from inside the aircraft, they must show that the associated procedures are adequate. Programs that currently provide an existing authorization to perform this check from inside the aircraft require a reassessment of the procedures and processes before allowing that authorization to remain in the program. The procedures must address variations in ambient conditions including lighting, both external and internal.

(1) Ongoing research, conducted by the FAA William J. Hughes Technical Center, into the limits of human ability to visually and tactilely detect ice indicates that the human ability to visually detect ice, in controlled, postdeicing conditions, may be considerably less reliable than previously believed. Given the known difficulties of determining, from inside the aircraft, whether the anti-ice fluid has failed, the POI must ensure, at the earliest opportunity, that the pretakeoff contamination check from inside the aircraft does account for the wings, control surfaces, and all other “critical surfaces” as defined in the certificate holder’s program.

(2) It is recommended that the results of this determination/verification be incorporated into the program or kept on file at the certificate-managing office until the operator no longer uses that type of aircraft. Verification must be accomplished and recorded for each aircraft type. The POI should not grant this authority in the operator’s deicing/anti-icing program unless the operator successfully demonstrates to the FAA that a pretakeoff contamination check can be performed from inside the aircraft. If an operator already has that authority at the time of this reevaluation and cannot meet the criteria in this notice, then that operator’s authority for performing pretakeoff contamination check from inside the aircraft must be withdrawn from the operator’s approved deicing/anti-icing program until such time as the operator can meet the verification criteria. The verification must meet the following performance criteria:

(a) Account for each “critical surface” defined by the manufacturer or as outlined in AC 120-60, current edition.

(b) Apply fluid failure recognition techniques for all treated surfaces.

(c) Apply contamination recognition techniques for all critical surfaces.

(d) Be viable under worse case operational environments.

EXAMPLE: Appendix 1 contains an example of the validation document or program that should list and account for each “critical surface”/component.

f. Validation. During the upcoming winter season, certificate managers should:

(1) Validate that the management plan is fully implemented as specified in the program document(s). Direct observation and interviews with key personnel responsible for the implementation and administration of the program is required.

(2) Validate the effectiveness of initial and recurrent training by direct classroom observation.

(3) Validate the effectiveness of the program/procedures by direct observation of deice/anti-ice activities under actual conditions. Surveillance must focus on the operator’s consistent adherence to approved procedures. Emphasis must be placed on the pretakeoff contamination check, especially when this check is done from inside the aircraft. The most effective method will be to position one or more inspectors outside the aircraft to observe deice/anti-ice procedures and one inspector inside the aircraft to observe flight operations procedures relative to this program. En route inspections will be required to effectively evaluate

the performance of this program. Observations must be made at a number of stations and must include stations where deicing/anti-icing is provided under contract.

(4) Verify that contract ground personnel given credit for training under another part 121 operator's program received training on aircraft of the same or similar type.

(5) Confirm that the internal evaluation program (IEP), for participating carriers, incorporates specific process measurement techniques for the continuous evaluation of the ground deice/anti-ice program.

7. PROGRAM TRACKING AND REPORTING SUBSYSTEM (PTRS).

a. PIs should document that they have read and conveyed this notice to their operators' appropriate representatives as directed in paragraph 6. These PTRS entry requirements apply to Air Transportation Oversight System (ATOS) and non-ATOS CHDOs.

(1) The POI should use PTRS activity code "1381" and the principal maintenance inspector (PMI) should use PTRS activity code "3381" (without quotes) (Directed Action).

(2) The POI and PMI should enter "N8000308" (without quotes) into the "National Use" field.

b. By November 4, 2005, POIs should document that the reevaluation of certificate holders' ground deicing/anti-icing program has been completed as specified in paragraph 6a through e.

(1) The POI should use PTRS activity code "1380" and the PMI should use PTRS activity code "3390" (without quotes) (Special Emphasis).

(2) The POI should enter "N8000308" (without quotes) into the "National Use" field.

(3) The POI should place in the comments section of PTRS that the reevaluation of the certificate holders' ground deicing/anti-icing program is complete and any discrepancies have been corrected.

8. DISPOSITION. This notice will not be incorporated into Order 8400.10, Air Transportation Operations Inspector's Handbook. Questions concerning passenger deicing/anti-icing programs should be directed to the Air Transportation Division, AFS-200, at (202) 267-3749.

/s/ Carol E. Giles (for)
James J. Ballough
Director, Flight Standards Service

**APPENDIX 1. EXAMPLE: THE VALIDATION DOCUMENT OR
PROGRAM SHOULD LIST AND ACCOUNT FOR EACH CRITICAL
SURFACE/COMPONENT**

Upper Wing Surface: Visible from cabin with exterior lights on and interior lights off. (Supplemental lighting may be required.)

Ailerons: Visible from cabin with exterior lights on and interior lights off. (Supplemental lighting may be required.)

Spoilers: Visible from cabin with exterior lights on and interior lights off. (Supplemental lighting may be required.)

Flaps: Visible from cabin with exterior lights on and interior lights off. (Supplemental lighting may be required.)

Winglets: Visible from cabin with exterior lights on and interior lights off. (Supplemental lighting may be required.)

Horizontal Stabilizer, Elevators, and Tabs: Not visible. Comparative analysis may be used to validate the condition of nonvisible surfaces predicated on the condition of those surfaces that are visible. Factors such as the similarity of the dihedral and type of materials used in construction and exposure to environmental conditions, time of exposure, etc., may be considered.

Vertical Stabilizer, Rudder, and Tabs: Not visible. Comparative analysis may be used as in the example above, possibly comparing the vertical stabilizer to winglets, if installed.

Propellers: Not visible. Heated. Heater failure indication in cockpit.

Engine Inlet: Not visible (on some aircraft). Heated. Heater failure indication in cockpit.

Pitot Probes: Not visible. Heated. Heater failure indication in cockpit.

Static Ports: Not visible. Heated. Heater failure indication in cockpit.

Angle of Attack: Not visible. Heated. Heater failure indication in cockpit.

Total Air Temperature Sensor: Not visible. Heated. Heater failure indication in cockpit.

Fuel Tank Vents: Special emphasis during the cold weather preflight and postdeice check and not susceptible to ground icing due to location.