U.S. Department of Transportation
Federal Aviation Administration

Policy Statement

Subject: Type Certification Policy for Approval of Use of Type II, III, and IV Deicing/Anti-Icing Fluids on Airplanes Certificated Under 14 CFR Parts 23 and 25

Date: 03/05/2015

Initiated By:
ACE-100
ANM-100

Policy No:
PS-ACE-23-05
PS-ANM-25-10

Summary

This policy statement establishes Federal Aviation Administration (FAA) certification policy for approving the use of Type II, III, and IV deicing/anti-icing fluids on airplanes certificated under Title 14, Code of Federal Regulations (14 CFR) parts 23 and 25. These fluids can be characterized as non-Newtonian, pseudoplastic fluids, also known as "thickened" fluids. Deicing fluids are used before takeoff to remove frost or ice contamination, while anti-icing fluids are used before takeoff to prevent frost or ice contamination from occurring for a period of time (commonly referred to as "holdover time") after application. Thickened deicing/anti-icing fluids can affect airplane performance and handling characteristics, and their residue may cause stiff or frozen flight controls. This policy statement describes an approval process that may be used by type certificate holders and applicants for a type certificate under parts 23 and 25 to support operational use of these fluids on their airplanes.

Definition of Key Terms

In the policy statement below, the terms "must," "should," or "recommend" have a specific meaning that is explained in Attachment 1.

The definitions for various airspeeds (e.g., V_1 and V_R) provided in 14 CFR parts 1, 23, and 25 apply to this document.

Current Regulatory and Advisory Material

The applicable regulations in 14 CFR parts 23 and 25 are:

- **§ 23.143(c) and § 25.143(d), Controllability and Maneuverability – General.**
  These sections specify maximum forces that a pilot would need to apply to the controls during maneuvering flight.

- **§ 23.251(b) and § 25.251(d), Vibration and Buffeting.**

  There must be no perceptible buffeting condition in the cruise configuration in straight flight at any speed up to V_{MO}/M_{MO}, except that stall warning buffeting is allowable.

- **§ 23.1529 and § 25.1529, Instructions for Continued Airworthiness.**

  The applicant must prepare Instructions for Continued Airworthiness in accordance with appendix G of part 23 or appendix H of part 25 that are acceptable to the Administrator. The instructions may be incomplete at type certification if a program exists to ensure their completion prior to delivery of the first airplane or issuance of a standard certificate of airworthiness, whichever occurs later.

- **§ 23.1581, Airplane Flight Manual and Approved Manual Material — General and § 25.1581, Airplane Flight Manual — General.**

  (a) *Furnishing information.* An Airplane Flight Manual must be furnished with each airplane, and it must contain the following:

  …

  (2) Other information that is necessary for safe operation because of design, operating, or handling characteristics.

  …

- **§ 23.1585, Operating procedures.**

  (a) For all airplanes, information concerning normal, abnormal (if applicable), and emergency procedures and other pertinent information necessary for safe operation and the achievement of the scheduled performance must be furnished, including—

  (1) An explanation of significant or unusual flight or ground handling characteristics;

  …

- **§ 25.1587, Performance information.**

  …

  (b) Each Airplane Flight Manual must contain the performance information computed under the applicable provisions of this part (including §§ 25.115, 25.123, and 25.125 for the weights, altitudes, temperatures, wind components, and runway gradients, as applicable) within the operational limits of the airplane, and must contain the following:

  …

  (5) An explanation of significant or unusual flight or ground handling characteristics of the airplane.

  …

- **Appendix G to part 23 and appendix H to part 25, Instructions for Continued Airworthiness.**

  …

  G23.3 and H25.3 *Content*.

  …

  The Instructions for Continued Airworthiness must contain the following manuals or sections, as appropriate, and information:

  …

  (b) *Maintenance instructions.*

  (1) Scheduling information for each part of the airplane and its engines, auxiliary power units, propellers, accessories, instruments, and equipment that provides the recommended periods at which they should be cleaned, inspected, adjusted, tested, and lubricated, and the degree of inspection, the applicable wear tolerances, and work recommended at these periods. However, the applicant may refer to an accessory, instrument, or equipment manufacturer as the source of this information if the applicant shows that the item has an exceptionally high degree of complexity requiring specialized maintenance techniques, test equipment, or expertise. The recommended overhaul periods and necessary cross references to the Airworthiness Limitations section of the manual must also be included. In addition, the applicant must include an inspection program that includes the frequency and extent of the inspections necessary to provide for the continued airworthiness of the airplane.

- **Advisory Circular (AC) 23.1419-2D, *Certification of Part 23 Airplanes for Flight in Icing Conditions,*** dated April 19, 2007, discusses issues associated with ground deicing/anti-icing fluids and methods to evaluate their effect on airplane performance and handling characteristics for part 23 airplanes. We intend to revise this AC to reflect the guidance in this policy statement.

Relevant Past Practice

The aviation industry and regulatory authorities, working through the Society of Automotive Engineers (SAE) International, established standards for minimizing the aerodynamic effect of deicing and anti-icing fluids. SAE Aerospace Standard (AS) 5900[1] and SAE Aerospace Material Specification (AMS) 1428[2] each contain a standard for acceptable aerodynamic characteristics of deicing/anti-icing fluids as they flow off airplane lifting and control surfaces during takeoff

[1] SAE AS 5900, *Standard Test Method for Aerodynamic Acceptance of SAE AMS 1424 and SAE AMS 1428 Aircraft Deicing/Anti-icing Fluids.*
[2] SAE AMS 1428, *Fluid, Aircraft Deicing/Anti-icing, Non-Newtonian (Pseudoplastic), SAE Types II, III, and IV.*

ground acceleration and initial climb. Ground deicing/anti-icing fluid specifications are in SAE AMS 1424[3] and SAE AMS 1428.

The SAE AS 5900 standard uses a measurement of the fluid's boundary layer thickness on a flat plate during a simulated takeoff in a wind tunnel. Whether or not a fluid is acceptable depends on the fluid's boundary layer thickness after 30 seconds of acceleration, the boundary layer thickness of a reference fluid, and temperature. However, Type II and IV fluids are not tested below speeds used in the "high-speed ramp test" specified in SAE AS 5900, so the aerodynamic effects on airplanes using a takeoff rotation speed of less than 110 knots are not evaluated under the AS 5900 standard. Since the boundary layer displacement thickness is measured after 30 seconds of acceleration, if the time from brake release to rotation is less than 30 seconds, the aerodynamic affects may also not be adequately evaluated under the AS 5900 standard. Type III fluids are tested on a "low-speed ramp test," which is used for airplanes with a takeoff rotation speed as low as 60 knots. It should also be noted that the SAE standards do not address any potential effects on either airplane control surface effectiveness or control forces.

Some type certificate holders have evaluated the effect of fluids on airplane takeoff performance and handling characteristics. Usually this evaluation was done at the request of an operator seeking operational approval of a ground deicing and anti-icing program that incorporated deicing and anti-icing fluids. Historically, these tests were not accomplished as part of type certification. However, such tests sometimes resulted in operating limitations and procedures considered necessary by the type certificate holder for safe airplane operation when thickened fluids are applied. Examples of such operating limitations include increased takeoff rotation speeds and limitations on the use of certain takeoff flap settings. Examples of operating procedures include procedures the flightcrew may need to use to rotate the airplane for takeoff if use of the fluids results in requiring the pilot to exert more force on the controls to initiate airplane rotation.

The FAA received reports of safety concerns regarding certain airplanes with unpowered longitudinal flight controls when treated with thickened anti-icing fluids. Those reports came from flightcrews that conducted rejected takeoffs after their airplanes were treated with thickened anti-icing fluids. The flightcrews reported that the airplanes did not respond to normal, and in some cases, higher-than-normal control column back pressure for rotation to the takeoff attitude. The flightcrews assessed the need for unusually high back pressure forces to be a flight control malfunction. They elected to reject the takeoff at speeds in excess of V_1. Fortunately, these rejected takeoffs did not occur during takeoffs that were limited by runway length. If they had, these rejected takeoffs could have resulted in runway overruns with potentially catastrophic outcomes.

Common factors in these incidents are low rotation speeds (below 110 knots) and unpowered longitudinal flight controls. In most of the reported cases, thickened anti-icing fluids had been approved for use on the airplane. Also, the flightcrews had followed the airplane flight manual (AFM) procedures for takeoff for an airplane treated with thickened anti-icing fluids. It appeared the flightcrews were not aware of the added force they needed to apply to the control column to

---

[3] SAE AMS 1424, *Deicing/Anti-Icing Fluid, Aircraft SAE Type I.*

rotate the treated airplane to the takeoff attitude. The use of thickened fluids has also resulted in delayed response from the airplane to the pilot's pitch control input to rotate the airplane. The lack of expected airplane response to normal control forces to rotate the airplane could lead a pilot to reject a takeoff from speeds above takeoff rotation speed (V_R) and exceed the available runway length during the rejected takeoff.

For at least two airplane model/series, we issued associated airworthiness directives to require changes in takeoff procedures or to apply takeoff performance penalties to address an unsafe condition resulting from use of Type II or IV fluids.

In addition to the effect of thickened fluids on takeoff performance and handling characteristics, European operators reported a large number of stiff or frozen flight control system events. These events occurred with both powered and unpowered flight control systems. The events were attributed to re-hydration and subsequent freezing of residue from thickened deicing/anti-icing fluids. Thickened fluid may collect and evaporate in aerodynamically quiet cove areas, like those along control surface hinge lines.

When the residue of the evaporated thickened fluid is re-hydrated by humidity, rain, or washing the airplane, it may freeze and restrict movement of the control surface when the airplane climbs to altitudes where temperatures are below freezing. Re-hydrated fluid has been found in and around gaps between stabilizers, elevators, tabs, and hinge areas. Residues have also been found on flight control actuators, cables, and pulleys, and in control surface balance bays. This issue has been prevalent in Europe, where operators often repeatedly deice and anti-ice with thickened fluids in a one-stop application process. It has not often been reported by North American operators because those operators deice with heated mixtures of Type I fluid and water that remove residues, thereby preventing accumulation of the re-hydrated gel residue.

Thickened fluid may also collect in the balance bays of aerodynamically or weight-balanced control surfaces due to inadequate drainage. This may result in unbalanced control surfaces, unexpected changes in control forces, and control surface vibrations or buffeting. Additionally, one turbojet airplane had an elevator tab that was aerodynamically sensitive to accumulated ground anti-icing fluid on its surface, causing severe vibration and limit cycle oscillations.

Applicability

This policy statement applies to the AFM and maintenance manuals for all airplanes certificated under 14 CFR parts 23 or 25 for which approval to use Type II, III, or IV fluids is desired; for changes to information regarding Type II, III, or IV fluids provided in the AFM or maintenance manual; and for airplane modifications that may affect previous approvals for the use of those fluids.

Although this policy statement applies to all airplanes certificated under parts 23 and 25, the specific flight test evaluations outlined below apply only to airplanes with the specific attributes noted. The takeoff performance evaluations described in paragraph 1, "Takeoff Performance,"

apply only to airplanes with V_R below 110 knots calibrated airspeed (KCAS)[4], or a time from brake release to V_R of less than 30 seconds. The controllability evaluations of paragraph 2, "Controllability," apply only to airplanes with reversible longitudinal flight controls. All other paragraphs are applicable to all airplanes seeking approval for use of Type II, III, or IV deicing/anti-icing fluids.

Policy

The impact of using Type II, III, or IV deicing/anti-icing fluids on the type design should be addressed before operational use of such fluids is authorized. The approval process described in this policy statement should therefore be addressed during an airplane's type certification process. If using thickened fluids results in significant or unusual flight or ground handling characteristics, this information must be provided in the AFM in accordance with §§ 23.1581 and 23.1585, or §§ 25.1581 and 25.1587, as applicable. In addition, applicants should provide the information identified later in this policy statement in the Instructions for Continued Airworthiness (ICA)[5] to maintain the designed capabilities. The AFM should identify the specific fluid types (i.e., Type II, III, or IV) that have been approved and that use of other fluid types is prohibited.

To determine if using thickened fluids results in significant or unusual flight or ground handling characteristics, applicants should conduct flight tests or show similarity to a previously tested model. Because the purpose of these tests is to show compliance with part 23 or part 25 regulatory requirements, the procedures in FAA Order 8110.4C, *Type Certification*, are applicable for these tests. As a result, the tests should be conducted in accordance with a Type Inspection Authorization, with an FAA-approved test plan, and an FAA-approved test report. The FAA certifying office should review the test data and proposed AFM in coordination with the aircraft evaluation group and determine if any unique procedures or handling characteristics resulting from the use of thickened fluids should be emphasized in flightcrew training. An example of a unique handling characteristic is the need for higher control forces to rotate the airplane for takeoff.

Approval for use of Type II, III, or IV fluids on a specific airplane model should address the following items, as applicable:

1. **Takeoff Performance**. For airplanes with takeoff rotations speeds less than 110 KCAS, or with a time from brake release to rotation of less than 30 seconds, the effect of Type II and Type IV fluids on takeoff speeds and distance should be determined.

Typically, the lowest takeoff gross weight and maximum flap position approved for takeoff is normally considered critical for this evaluation because of the lower scheduled takeoff rotation speed and the shorter time it takes to reach that speed. A mid-to-forward

---

[4] The AS 5900 standard uses the generic term "knots" in specifying the airspeeds associated with the low and high speed ramp tests. To be more precise in identifying the applicable airspeed, this policy statement uses "knots calibrated airspeed."

[5] Appendix G to part 23 for part 23 airplanes, and appendix H to part 25 for part 25 airplanes.

center-of-gravity position should be used. However, heavy weight takeoff tests should also be conducted to evaluate the angle-of-attack (AOA) margin (paragraph 1b), the pitch authority at takeoff rotation, and any effects on takeoff performance.

a. Lift Loss Determination. Perform normal takeoffs with and without thickened fluid applied to determine the percentage of lift loss due to the presence of the thickened fluid. Tests at maximum pitch attitude are not needed. A 6% decrement in lift coefficient at liftoff ($C_{L_{LOF}}$) measured at an airplane attitude typical for a one-engine-inoperative climb should be considered significant. For decrements greater than 6%, takeoff speeds should be increased by at least one-half of the percentage decrement in $C_{L_{LOF}}$. (For example, for an 8% decrement in $C_{L_{LOF}}$ takeoff speeds V_R and V_2 should be increased by at least 4%.) Takeoff distances specified in the AFM should be increased accordingly.

The 6% allowable decrement in $C_{L_{LOF}}$ before adjusting takeoff speeds has been employed by some airplane manufacturers and accepted by a number of aviation regulatory authorities. This decrement has been accepted on the basis that with the airplane at the same rotation pitch attitude and AOA, it will take a speed about 3% higher to generate the same lifting force. The part 25 standards for icing certification allow up to a 3% increase in takeoff speeds before the effects of icing must be taken into account. This level of lift loss also corresponds to some of the results of fluid testing on a Boeing Model 737-200ADV that was part of the research effort to develop the aerodynamic acceptance test for fluids.[6]

b. Takeoff Angle-of-Attack (AOA) Margin Tests. The aerodynamic acceptance test for the fluid is based on a loss of $C_{L_{MAX}}$ (or increase in stall speed) due to the presence of the thickened fluid. Since the minimum values of V_2 and V_{FTO} are factors of stall speed, an increase in stall speed without a corresponding increase in takeoff speeds would result in a lower AOA margin to stall during takeoff. In addition, the effect of the thickened fluid may also decrease the stall AOA, leading to a further reduction in the AOA margin during takeoff.

It would be impractical to conduct airplane stall tests with a representative takeoff thickened fluid configuration since most of the thickened fluid would be expected to have sheared off prior to reaching a safe altitude for performance stall testing. However, representative takeoffs should be conducted to show that there are no noticeable adverse effects on AOA margin due to the thickened fluid.

Conduct all-engines-operating takeoffs with rotation at: (1) V_R and (2) at a speed equal to the scheduled V_R minus 7% or the scheduled V_R minus 10 knots, whichever results in the higher rotation speed. (Conduct this testing after the fixed pitch angle takeoff testing in paragraph 1a, "Lift Loss Determination," of this policy. If V_R was increased as a result of those tests, use the increased V_R speed

---

[6] Hill, E.G., and Ziertan, T.A., "*Aerodynamic Effects of Aircraft Ground Deicing/Anti-Icing Fluids*," *Journal of Aircraft*, Vol. 30, No. 1, Jan.-Feb., 1993.

minus 7% or the increased V_R speed minus 10 knots, whichever results in the higher rotation speed, for these tests.) Consider the minimum and maximum takeoff flap positions at low takeoff weight and mid-to-forward center-of-gravity position. If limited by the minimum control speed in the air (V_{MCA}), use a higher weight resulting in the lowest V_R value.

Also conduct simulated one-engine-inoperative takeoffs, with the maximum takeoff flap setting for which approval of takeoff with a thickened fluid is sought, and rotation at V_R according to procedures for takeoff with a thickened fluid applied. (Note: The one-engine-inoperative condition can be simulated by conducting the test with all engines operating, but with the engines at reduced power or thrust.)

There should not be any adverse handling characteristics experienced during these tests. In particular, there should be no evidence of excessive reduction in AOA margin, such as buffet or instability in either pitch or roll.

c. **Takeoff Performance.** The takeoff AOA margin tests may also be used to verify takeoff performance. Review the time from rotation to liftoff, from liftoff to V_2 or V_{50} (whichever is applicable), and the rotation/liftoff airspeeds. Use engineering judgment to determine if there are any significant differences from the clean airplane that would warrant changing the AFM performance data for use after a thickened fluid has been applied.

2. **Controllability.** For airplanes with reversible longitudinal controls, the control forces during takeoff and climb should be shown to comply with § 23.143 or § 25.143, as applicable. For airplanes with reversible control surfaces, thickened fluids may require the pilot to apply additional longitudinal control forces during takeoff rotation and climb, regardless of takeoff rotation speed. Even if compliance with § 23.143 or § 25.143 is shown, if rotation control forces are increased over the non-treated airplane, the Flight Standardization Board should determine if the increased force is a training emphasis item. There should be no “snatching” or discontinuities in control force in any axis. This evaluation should also include whether the use of thickened fluids may affect the airplane’s responsiveness to the pitch control input for rotation.

a. For airplanes with reversible longitudinal controls, the following evaluations should be conducted with all engines operating at the minimum practical gross weight and the maximum takeoff gross weight, using the minimum approved and maximum approved takeoff flap positions:

(1) Control power and control force during rotation at the scheduled V_R.

(2) Controllability during takeoff with rotation at a speed equal to the scheduled V_R minus 7% or the scheduled V_R minus 10 knots, whichever results in the higher rotation speed.

(3) Controllability evaluations after takeoff (± 40º bank angle changes, ± 0.5g, or stall warning) with takeoff flaps, as soon as practical after liftoff, either

at V_2 +10 knots or the speed at 50 feet height + 10 knots, depending on airplane category and certification basis.

b. The following evaluations should be conducted for multi-engine airplanes at the minimum practical gross weight, with the maximum approved takeoff flap position and simulated one engine inoperative:

(1) Control power and control force during rotation at V_R.

(2) Controllability evaluations after takeoff (± 30º bank angle changes, +1.3/+0.8g, or stall warning) with takeoff flaps, as soon as practical after liftoff, either at V_2 or the speed at 50 feet height, depending on airplane category.

(3) Controllability evaluations immediately after flap retraction at V_{FTO} for part 25 airplanes and en route climb speed for part 23 airplanes.

3. **Vibration and Buffeting.** To evaluate potential effects of thickened fluids on vibration and buffet, the evaluation tests should include flights to V_{MO} as soon as practicable after takeoff. The evaluation must meet the vibration and buffeting requirements of § 23.251(b) or § 25.251(d), as applicable for the category of airplane.

4. **Post-Flight Inspections.** Conduct post-flight inspections to determine if thickened fluid residue is present in aerodynamically quiet areas of the airplane or on internal control system components. Include photo documentation in the post-test report showing where fluid does and does not collect inside the airplane. Access panels may need to be removed for thorough documentation. Use the results of this inspection to guide the development of the maintenance instructions specified in paragraph 9, "Instructions for Continued Airworthiness," of this policy statement. Any fluid accumulation in a flight critical area or component could be cause for special periodic inspections.

5. **Fluids.**

a. **Fluids to be Tested.** Type II and IV fluids are considered to have a similar effect on airplane aerodynamics and controllability, and both have a greater effect than Type III fluids. Testing a Type II or IV fluid allows approval of Type II, Type III, and Type IV fluids as long as any mitigation needed is applied to use of any of these fluid types. Alternatively, if the mitigations resulting from testing one fluid type are considered too penalizing for use of other fluid types, separate testing can be performed for each of the fluid types.

b. **Fluid Application.**

(1) Apply the fluid undiluted.

(2) Follow the fluid application procedures that will be recommended in the airplane maintenance manual. Treat all applicable surfaces (including the

horizontal stabilizer). Slats/flaps should be in the recommended position for fluid application.

(3) Conduct takeoff tests as soon as possible following fluid application.

(4) Conduct tests in non-precipitation conditions so the applied fluid is not diluted by precipitation.

c. **Test Day Temperature.** To ensure the testing is accomplished close to the fluid's critical temperature, the test day temperature should result in a fluid boundary layer displacement thickness (BLDT) within 1 mm of the maximum allowable BLDT per the results of SAE AS 5900 testing for that fluid.

d. Conduct a viscosity check of an on-wing fluid sample to confirm it is at least the minimum viscosity published in the official FAA holdover time tables. The time tables are published annually and posted on the FAA's Aircraft Ground Deicing website.

6. **Airplane Systems.**

a. Any adverse effect on airplane systems should be noted (for example, environmental control system, auxiliary power unit inlet, and vent blocking).

b. Takeoff procedures should include normal system operation (including ice protection system) for takeoff in icing conditions. This permits determination of any adverse interaction between heated surfaces and the fluid. An example of adverse interaction is the fluid "baking" and hardening on critical surfaces and air data probes.

7. **Airplane Configuration.**

a. Equip the test airplane with suitable instrumentation for handling qualities and performance evaluations, if these tests are applicable.

b. The elevator/horizontal stabilizer gap should be measured and recorded. This data may be needed for future reference.

8. **Airplane Flight Manual**.

a. **Fluids.** In the AFM Limitations section identify the type(s) of fluid approved as an operating limitation. The AFM Limitations section should also state, "Use of the approved fluid types is prohibited at ambient temperatures below the Lowest Operational Use Temperature specified for the fluid." For any of the fluid types (II, III, or IV) that have not been approved in accordance with this policy, the AFM Limitations section should state the use of that fluid type(s) is prohibited.

b. **Limitations.** Any airplane-specific restrictive information considered necessary for safe airplane operations with deicing or anti-icing fluids applied should be

furnished in the AFM Limitations section. An example is restrictions in the use of flaps.

c. **Performance.** Any increases in takeoff speeds above the threshold discussed in paragraph 1a, "Lift Loss Determination," above and the corresponding takeoff distances should be specified in the AFM Performance section.

9. **Instructions for Continued Airworthiness.** Address the following items in the maintenance instructions, if applicable:

a. **Inspection.**

(1) Drain holes.

(2) Control balance bays.

(3) Identified aerodynamically quiet areas.

(4) Internal control system components.

b. **Cleaning and Lubrication.** Establish deicing procedures to ensure residue from thickened fluids is removed from the airplane. Lubricating required surfaces may be necessary.

c. **Guidance and procedures.** Provide guidance and procedures for the following items:

(1) What to look for, for example, re-hydrated gel and/or dried fluid residues and what these look like.

(2) Where to look for such gel/residues on the airplane structure and control systems.

(3) How to effectively remove these gel/residues.

(4) Guidelines on how to determine the frequency of such checks and corrective actions. (It is not intended that type certificate holders define the frequency of tasks, as this is not practicable given the large variation in the operational use of airplanes. Type certificate holders should provide best practice information on the methods, techniques, and tools that may be employed by operators to monitor the use of such fluids and adjust their maintenance programs accordingly.)

Effect of Policy

The general policy stated in this document does not constitute a new regulation. The FAA personnel who implement this policy should follow it when it is applicable to a specific project. If an applicant's proposed method of compliance is outside this policy, the FAA certifying office

must coordinate it with the policy-issuing office using an issue paper. Similarly, if the FAA certifying office becomes aware of reasons that an applicant's proposal that meets this policy should not be approved, the office must coordinate its response with the policy-issuing office.

Evaluating these fluids and their application may be new to many offices. Before delegating any project or associated data submittals, it is suggested that FAA certifying offices gain familiarity with this policy statement by applying it to a specific project and working closely with the policy-issuing office for any required clarifications. Due to weather and time constraints, if testing is not delegated, it is acceptable for testing to be accomplished concurrently in accordance with FAA Order 8110.4.

Applicants should expect that the certificating officials will consider this information when making findings of compliance relevant to new approvals for the use of Type II, III, or IV deicing and anti-icing fluids. In addition, as with all guidance material, this policy statement identifies one means, but not the only means, of compliance.

This policy will affect the AFM and maintenance manuals for all airplanes for which approval to use Type II, III, or IV de-icing/anti-icing fluids is desired, changes to the information provided in the AFM or maintenance manual regarding those fluid types, or for airplane modifications that may affect previous approvals for the use of those fluids. It will affect type certificate holders' flight testing of the following airplanes for approval of the use of Type II, III, or IV fluids:

- Airplanes with a V_R below 110 KCAS;
- Airplanes with a time from brake release to V_R of less than 30 seconds; and
- Airplanes with reversible longitudinal flight controls.

Implementation

This policy statement discusses compliance methods that should be applied to type certification approval for use of Type II, III, or IV deicing/anti-icing fluids on a part 23 or part 25 airplane. Type certification approval will be needed to facilitate authorization for operational use of such fluids on the airplane. The compliance methods identified in this policy statement apply to those programs for which application for type certification approval is sought on or after the effective date of the final policy.

Conclusion

To provide for safe airplane operations when thickened deicing/anti-icing fluids are applied, information and data may need to be included in the AFM and ICA. Training emphasis items may also need to be addressed. Flight tests should be conducted to evaluate the effect of thickened fluids on airworthiness to show compliance with §§ 23.143(c), 23.1529, 23.1581, 23.1583, 23.1585, and appendix G to part 23; or §§ 25.143(d), 25.1529, 25.1581, 25.1583, 25.1587, and appendix H to part 25, as applicable.

Original signed by Steven W. Thompson

Steven W. Thompson
Acting Manager, Small Airplane Directorate
Aircraft Certification Service

Original signed by Jeffrey E. Duven

Jeffrey E. Duven
Manager, Transport Airplane Directorate
Aircraft Certification Service

Attachment

Terms

Table A-1 defines the use of key terms in this policy statement. The table describes the intended functional impact.

Table A-1 Definition of Key Terms

	Regulatory Requirements	**Acceptable Methods of Compliance (MOC)**	**Recommendations**
Language	Must	Should	Recommend
Meaning	Refers to a regulatory requirement that is mandatory for design approval	Refers to instructions for a particular MOC	Refers to a recommended practice that is optional
Functional Impact	No Design Approval if not met	Alternative MOC has to be approved by issue paper.	None, because it is optional