DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Parts 125 and 135

[Docket No. 27459; Amendment No. 125–18, 135–46]

RIN 2120–AF09

Training and Checking in Ground Icing Conditions

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Interim final rule; request for comments.

SUMMARY: This interim final rule requires part 125 certificate holders to provide pilot testing on conducting operations in ground icing conditions, part 135 certificate holders to provide pilot training on conducting operations in ground icing conditions, and part 125 and 135 certificate holders to check airplanes for contamination (i.e., frost, ice, or snow) prior to takeoff when ground icing conditions exist. This rule is necessary because accident statistics and experience indicate the importance of effectively determining whether the airplane's wings and control surfaces are free of all frost, ice, or snow prior to beginning a takeoff. The rule is intended to provide an added level of safety to flight operations in ground icing conditions under parts 125 and 135.

DATES: This interim final rule is effective January 31, 1994. Additional comments must be received not later than April 15, 1994.

ADDRESSES: Comments on this interim final rule should be mailed, in triplicate, to: Federal Aviation Administration, Office of the Chief Counsel, Attention: Rules Docket (AGC–200), Docket No. 27459, 800 Independence Ave., SW., Washington, DC 20591. Comments delivered must be marked Docket No. 27459. Comments may be examined in room 915G weekdays between 8:30 a.m. and 5 p.m., except on Federal holidays.

FOR FURTHER INFORMATION CONTACT: Larry Youngblut, Flight Standards Service, Regulations Branch, AFS–240, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591, telephone (202) 267–8096.

SUPPLEMENTARY INFORMATION:

Background

On September 21, 1993, the FAA published proposed requirements for ground deicing procedures for parts 125 and 135 certificate holders (58 FR 49164). Under the proposal and this interim final rule, when ground icing conditions exist, parts 125 and 135 certificate holders are required to check their airplanes for contamination prior to beginning takeoff. In addition, under the proposed and final revisions to part 125, certificate holders are required to provide pilot testing on ground deicing/anti-icing procedures, and under proposed and final revisions to part 135, certificate holders are required to provide pilot training on ground deicing/anti-icing procedures.

The FAA proposed the requirements in response to part 135 accidents that have been caused by pilots beginning takeoff with contamination adhering to critical airplane surfaces. Regulations covering procedures for ground icing conditions under parts 121, 125, and 135 have for many years relied on the basic "clean aircraft" concept, i.e., that no person may take off an airplane when frost, ice, or snow is adhering to the wings, control surfaces, or propellers of the airplane (§§ 121.629, 125.221, 135.227). Under these regulations, ultimate responsibility for determining that the airplane is free of contamination in icing conditions and thus complies with the "clean aircraft" concept rests with the pilot-in-command (PIC). Both the FAA and industry have developed guidance and recommended procedures to assist the PIC in making that determination.

In 1992, due to a number of ground icing related accidents that had occurred in part 121 operations and in response to industry-wide recommendations to improve the safety of operations during ground icing conditions, the FAA amended the part 121 regulations (57 FR 44924, September 29, 1992). The amended regulations retain the "clean aircraft" concept and in addition, require part 121 certificate holders to establish and comply with an FAA-approved ground deicing/anti-icing program.

At the time of the part 121 rulemaking, the FAA did not include parts 125 and 135 because of time constraints associated with that rulemaking and the need for further FAA review to determine the appropriateness of applying a similar rule to other types of operations.

Since that time, the FAA has reviewed the accident history for part 125 and 135 operations, conferred with industry representatives, and studied the recommendations from the National Transportation Safety Board (NTSB) and the General Accounting Office (GAO). Based on this review, the FAA today adopts interim final rules for part 125 and 135 certificate holders that are designed to achieve the same results as the recent part 121 regulations on ground deicing/anti-icing procedures.

This rule is based partly on the different types of aircraft operated under part 135 and the differences between how part 135 certificate holders operate as compared to part 121 certificate holders. It also reflects part 135 accident data which indicates pilots may lack full awareness of the dangers associated with takeoff with contamination adhering to the airplane's critical surfaces. In this rule the FAA is revising part 135 pilot training requirements to include training on the hazards associated with operating in ground icing conditions.

A part 135 operator that does not expect to authorize takeoffs in ground icing conditions is not required to incur the cost of training its pilots on operating aircraft in ground icing conditions. However, no certificate holder may authorize a takeoff and no pilot may take off unless the pilot has completed the training required in § 135.341 and described in § 135.345 for operating in ground icing conditions.

In addition to revised training, the rule also requires that whenever frost, ice, or snow may reasonably be expected to adhere to the airplane, the certificate holder must complete an approved pretakeoff contamination check within 5 minutes of beginning takeoff, comply with an approved alternative procedure (e.g., when technology permits, having approved ice detectors or sensors installed on the airplane's wings and control surfaces), or comply with the part 121 deicing/anti-icing rule.

Operations conducted under part 125 are also included in this rule. Part 125 covers passenger carrying and cargo carrying operations involving airplanes with a seating configuration of 20 or more passengers or a maximum payload capacity of 6,000 pounds or more, when common carriage is not involved. Although the FAA's review of accident history does not reveal any ground icing accidents or incidents during part 125 operations, the types of airplanes flown are similar to those used in parts 121 and 135, the same airports are used and the same weather conditions are encountered. Thus, operations conducted under part 125 are equally susceptible to the hazards associated with operating during ground icing conditions.

While most part 125 operators use the same type airplanes as those used in part 121 operations, the size and scope of part 125 operations are more similar to the size and scope of most part 135 operations. For example, the number of aircraft used, the number of employees,

and the extent of direct crew involvement for part 125 operations are more similar to part 135 operations than to part 121 operations. For this reason, the FAA is issuing rules for part 125 certificate holders that are comparable to those being required for part 135 certificate holders.

Unlike part 135, which contains pilot training requirements, part 125 contains pilot testing requirements. Therefore, under the rule, pilots operating under part 125 are required to be tested on the subject areas relating to ground icing conditions and procedures similar to those contained in the part 135 training requirements. Like their part 135 counterparts, part 125 certificate holders are also required to complete a pretakeoff contamination check within 5 minutes prior to beginning takeoff anytime conditions are such that frost, ice, or snow may reasonably be expected to adhere to the airplane. Alternatively, the certificate holder may comply with the part 121 deicing/anti-icing rule or with an approved alternative procedure, such as, when technology permits, having approved ice detectors or sensors installed on the airplane's wings and control surfaces.

This rule does not require part 125 and 135 certificate holders that do not anticipate operating during ground icing conditions to train or test their pilots or develop pretakeoff contamination check procedures. However, if pilots of a certificate holder that chooses not to train or develop deicing procedures encounter ground icing conditions, they will not be able to take off until such conditions no longer exist. Thus, the FAA is providing flexibility for certificate holders so they may determine to what extent this amended rule affects their operations.

The present provisions in parts 125 and 135 allowing takeoff with polished frost on the aircraft are retained. In addition, the amendments to parts 125 and 135 do not change the FAA's policy of permitting takeoff with small amounts of frost on the underwings in the area of fuel tanks of certain airplanes when authorized by the Administrator. The FAA has authorized takeoffs with small amounts of frost near the fuel tanks when this frost is caused by cold soaked fuel and when this frost is within aircraft manufacturer established limits that have been approved by FAA aircraft certification offices and these limits are stated in aircraft maintenance or aircraft flight manuals.

Helicopter operations conducted under part 135 have not been included in this rule because helicopter design characteristics and operations differ in many ways from airplane operations under part 135. However, the "clean aircraft" concept in § 135.227(a) continues to apply to helicopters. The FAA will continue to review whether additional deicing rulemaking is required for helicopters.

Discussion of Comments

General

More than 70 comments were received. Eighty percent of these were from part 135 certificate holders and most of these commenters objected to all or parts of the proposed rule. Comments were also received from associations representing part 135 air carriers, pilots, as well as other organizations dedicated to aviation safety. These associations and organizations, although generally supporting the intent of this rulemaking, also objected to various parts of the proposed rule. The FAA has carefully considered all of the comments received. A full discussion of comments and FAA responses follows.

Additional Comment Period

Several commenters object to the 15-day comment period and many more object to the rush to place this rule in effect for the 1993–1994 winter season. Several suggest that the FAA issue this rule as an interim final rule with time for additional comment as was done for the part 121 rule last year.

FAA Response

While the comment period was shorter than normally provided, the interest of aviation safety requires accelerated rulemaking to assure adequate ground deicing/anti-icing rules for this winter. In response to the comments received, the FAA agrees that it is in the public interest to make this an interim final rule, as proposed, and to provide an additional comment period to obtain further comments on the rule this winter. All comments received before April 15, 1994, will be carefully considered. If warranted, the FAA will make changes to the rule.

Applicability

The proposed and interim final rule apply to certificate holders operating airplanes under parts 125 and 135 in ground icing conditions.

One helicopter operator states that there is no justification for training its personnel on operations in ground icing conditions since helicopters are prohibited from operating in falling or blowing snow or in icing conditions. One commenter states that part 125 operators should be grouped with part 121 operators rather than with part 135 operators. Two persons operating single-engine airplanes, VFR only, questioned the applicability of the proposed rule to their operations. One stated his understanding that the rule would not apply to his business since he does not fly in icing conditions.

The Air Line Pilots Association (ALPA), while generally supporting the proposed rule, states that the proposal fosters "perpetuation of two levels of safety for scheduled air carrier operations." ALPA states that it has a policy goal of one level of safety for the traveling public and that this goal means "that aircraft having 10 seats or more being operated as a scheduled commuter air carrier should be held to the same safety standards required of scheduled part 121 air carriers." ALPA addresses and to some extent disputes each of the factors cited by the FAA (airplane size and design, pilots more personally involved in flight details, faster turn around time, shorter delays) for differentiating between part 135 and part 121 operations. ALPA concludes that "the option to choose § 121.629 requirements for part 135 scheduled commuter air carriers should be changed to a requirement."

The Aviation Consumer Action Project (ACAP) states that it "joins the NTSB, the GAO, the Dryden Commission and the Flight Safety Foundation in advocating one standard of safety for all scheduled air carriers."

FAA Response

The proposed and interim final rule language of §§ 135.227(b) and 135.345(b)(6)(iv) applies to airplane operations. Thus, no new requirements apply to helicopters. Persons who do not operate airplanes in potential ground icing conditions are not affected by this rule. This rule does not address inflight icing conditions.

In regard to ALPA's and ACAP's comments, the FAA believes that this rule provides an equivalent level of safety to the traveling public. Sections 121.629, 125.221, and 135.227 all embody the clean aircraft concept. The differences within these rules are the methods involved in assuring compliance. The FAA's goal in this rulemaking is twofold. First, as in part 121, pilots will be made fully aware, through training, of the dangers involved in beginning takeoff with contamination adhering to the airplane. Second, as in the amended § 121.629, pilots will be required to accomplish one or more checks (pretakeoff and/or pretakeoff contamination) prior to beginning takeoff. Requiring that a pretakeoff contamination check be completed within 5 minutes prior to beginning a takeoff is intended to provide an equivalent level of safety to

§ 121.629. The FAA has fully considered ALPA's comments on the FAA's rationale for differentiating between part 135 and part 121 operations and for proposing different rules for the different types of certificate holders. The FAA believes, for the reasons stated in the preamble to the NPRM and in this rulemaking that significant differences exist, and these differences justify a different means of achieving the same clean aircraft concept that has been required under both parts for many years.

As explained above, part 125 certificate holders have been grouped with part 135 operators in this rulemaking because their operations are more similar to part 135 operations in size and scope than to part 121 operations.

Justification

Virtually all of the adverse comments received question the FAA's justification for the rule. One commenter states that, since there have been no accidents attributed to ground icing by part 125 certificate holders, "that rate will be difficult to reduce."

Most commenters state that the 14 ground-icing related accidents involving airplanes operating under part 135 during the period 1984–1992 do not justify the rule. These commenters point out that in almost all of these accidents it is likely that the operator was in violation of the present requirements. These commenters state that what is needed is compliance with existing rules, not new rules. Also, a large number of commenters state that in most of the cited accidents poor judgment was involved and as one commenter states, "no amount of rule-making or training will improve the judgment or common sense qualities of these types of individuals."

FAA Response

The FAA recognizes that no amount of rulemaking will ensure 100% compliance with the clean aircraft concept; however, the FAA believes that the training and testing required under this rule will create an increased awareness among part 125 and part 135 pilots that will assist and improve pilots' judgment and decision-making skills.

As is stated in the proposed rule preamble, a common thread throughout the accidents and incidents cited was the pilots' apparent lack of awareness of the potential hazard from even small amounts of frost, ice, or snow on an airplane's wings and control surfaces. Thus, the FAA has determined there is sufficient evidence to justify additional training or testing and pretakeoff checking procedures to ensure that the clean aircraft concept is met prior to a pilot beginning takeoff during ground icing conditions. Specifically part 125 pilot testing and part 135 pilot training must address the elements set forth in §§ 125.287(a)(9) and 135.345(b)(6)(iv). Pretakeoff checking procedures are set forth in §§ 125.221(b) and 135.227(b).

Operating Limitations—General

Proposed and final §§ 125.221(a) and 135.227(a), which require a "clean aircraft" in order to take off, contain the same requirements and exception as contained in current §§ 125.221(a) and 135.227(a).

One commenter states that a light coating of frost adhering to a helicopter rotor blade should not pose a threat to the safe operation of the aircraft. The commenter believes that it should be up to the pilot to determine when an accumulation of frost should be removed. The commenter states that no person should attempt to operate a helicopter if ice or snow is adhering to the blades.

Proposed and final §§ 125.221(b) and 135.227(b) are new and require that during ground icing conditions an aircraft may not take off unless the pilot has completed all applicable training as required by §§ 125.287(a)(9) or 135.341 (described in § 135.345) and unless other specified requirements are met. One commenter states that the reference in part 135 should be to § 135.345 (which specifies the required training for operating airplanes during ground icing conditions in paragraph (b)(6)(iv)) rather than to § 135.341.

FAA Response

Prohibiting a pilot from taking off if frost is adhering to a rotor blade has been the rule in part 135 for many years. No change was proposed to this requirement and hence the requirement is not subject to change in the interim final rule.

Proposed § 135.227(b) references § 135.341 because that section specifically requires part 135 certificate holders, other than those that use only one pilot in their operations, to establish and maintain an approved pilot training program. This training is described further in § 135.345.

Underwing Frost

Proposed §§ 125.221(a)(2) and 135.227(a)(2) would allow takeoffs to be made with frost under the wing in the area of the fuel tanks if authorized by the Administrator.

One commenter states that since "no hazard exists from underwing frost in the area of fuel tanks, the requirement for FAA approval should be deleted."

FAA Response

The proposed language in §§ 125.221(a)(2) and 135.227(a)(2) provides a regulatory mechanism for allowing takeoffs with small amounts of unpolished frost in the area of the fuel tanks. Technically, under the existing FAR takeoffs with any amount of unpolished frost are prohibited. Therefore, the reference in the rule to "FAA approval" is retained.

Pretakeoff Contamination Check

Proposed §§ 125.221(b)(1) and 135.227(b)(1) would require a pretakeoff contamination check to ensure that the wings and control surfaces are free of frost, ice, or snow. This check would have to be completed within 5 minutes prior to takeoff.

A number of commenters object to the pretakeoff contamination check contained in new § 135.227(b)(1). The most serious concern of these commenters is the requirement that the check must be completed within 5 minutes prior to takeoff. Commenters state that the 5-minute limitation is unrealistically short and that it would disrupt most operations. The Regional Airline Association (RAA) states that the proposed rule would require this check within 5 minutes of takeoff *"regardless of the elapsed time since being deiced, the type of fluid used, or holdover time* unless the operator complies with the entire part 121 rule or is able to install and use approved ice detectors or sensors." (emphasis in original). RAA states that this proposed rule "is more restrictive than the part 121 rule and is inconsistent with the proposed requirement that pilots must be trained in the use of holdover times for fluids being used." RAA recommends that the FAA in the final rule recognize that takeoff within recognized holdover times would be an acceptable alternative to the pretakeoff contamination check.

The National Air Transportation Association (NATA) states that the 5 minute limit for a contamination check is unnecessary and, perhaps, dangerous. NATA suggests that pilots, "in an effort to get their 'wheels in the well' in less than 5 minutes, may be tempted or even feel compelled to cut corners, to hasten through or abbreviate check lists, etc."

Several commenters point out that the description of the pretakeoff contamination check should read "within 5 minutes prior to beginning takeoff" as it does in part 121 rather than "within 5 minutes prior to takeoff as proposed. The Aviation Consumer

Action Project (ACAP) expresses concern over whether the pretakeoff contamination check can be adequately conducted from inside the airplane. ACAP states that *"it is impossible for pilots to confidently identify the presence or absence of contamination due to ground icing without leaving the cockpit."* (emphasis in original). ACAP cites the November 1992 GAO recommendations in support of its position and urges the FAA to require tactile examination of critical surfaces as part of the approved pretakeoff contamination check for parts 125 and 135.

FAA Response

The FAA agrees with the commenter and to be consistent with the language used in § 121.629(c)(4), the word "beginning" has been inserted into the pretakeoff contamination check definition and the rule language has been changed accordingly. The requirement for a pretakeoff contamination check to be completed within 5 minutes prior to beginning takeoff should not be a burden for most part 125 and 135 certificate holders since, as a practical matter, some type of check must be made to ensure compliance with the clean aircraft concept requirements of the present rules. An approved pretakeoff contamination check is a check to make sure that the wings and control surfaces are free of frost, ice, or snow. The proposed and interim final rule language does not specify the details of this check or how many or what surfaces are to be checked, but leaves the airplane type specific details to be developed by the certificate holder to be submitted to the FAA for approval. This approval is the responsibility of the certificate holder's principal operations inspector (POI). Thus, this check could be the same procedure as presently conducted to assure compliance with the existing rules. Depending on the aircraft design, particularly for aircraft involved in part 135 operations, this check can often be made from inside the airplane.

The FAA believes that the proposed and adopted § 135.227(b)(1) is not more restrictive than the part 121 rule even though this new rule always requires a pretakeoff contamination check be completed within 5 minutes prior to beginning takeoff. A part 135 certificate holder that operates pursuant to § 135.227(b)(1) does not have to comply with several requirements applicable to part 121 certificate holders. Part 121 certificate holders, as part of their approved program, must: (1) Develop a management plan defining personnel responsibilities; (2) train all personnel associated with the ground deicing/anti-icing process; (3) use holdover timetables; and (4) complete pretakeoff check procedures. Despite not applying these requirements to part 135 certificate holders, the FAA believes that an equivalent level of safety is maintained by requiring part 135 certificate holders to always complete a pretakeoff contamination check within 5 minutes prior to beginning takeoff. In any event, § 135.227(b)(3) allows part 135 certificate holders, that find it more advantageous to their operations, to comply with § 121.629(c) in lieu of always accomplishing a pretakeoff contamination check.

The FAA does not believe completing a pretakeoff contamination check 5 minutes prior to beginning takeoff would encourage pilots to "cut corners or hasten through or abbreviate check lists" because the pretakeoff contamination check would be one of the last checks initiated prior to takeoff.

The FAA does not agree with the ACAP assertion that it is impossible for a pilot to complete the required pretakeoff contamination check without leaving the cockpit. The rule, as proposed and as issued, requires this check to be "established by the certificate holder and approved by the Administrator for the specific airplane type * * *" In approving pretakeoff contamination check procedures for different airplane types, the FAA will consider the effects of each airplane's design on the crew's ability to ensure that the clean aircraft concept is met.

Approved Alternative Procedures

Sections 125.221(b)(2) and 135.227(b)(2) allow certificate holders to use an approved alternative procedure (to the pretakeoff contamination check) to ensure that their airplanes are free of frost, ice, or snow.

One commenter questions the availability of guidelines for use by inspectors in the field in implementing such alternative procedures. This commenter says that the only existing guidelines are in § 121.629 and asks if the FAA would accept an alternative procedure that does not meet part 121 requirements. Finally, this commenter says that the technology to detect surface frost, ice, or snow on an aircraft on the ground does not exist. The use of such equipment as part of an alternative procedure, as suggested by the FAA, would therefore not be a viable alternative.

FAA Response

The option to use an approved alternative procedure was included to permit certificate holders to develop alternative check procedures, such as industry development of new technologies. The FAA believes that certificate holders should take the initiative to develop such alternative procedures and submit them to the FAA for approval. Any such alternative procedures must be specifically designed for the type of aircraft and the type of operations in which they would be used. Contrary to the commenter's assertion, § 121.629 does not contain guidance for approval of an alternative procedure. Advisory Circular (AC) 135–XX, which appears in today's issue of the **Federal Register**, provides both guidance and coordination procedures to POI's for evaluating alternative procedures.

Compliance with Part 121 Deicing/Anti-icing Program

Sections 125.221(b)(3) and 135.227(b)(3) allow certificate holders to use an approved deicing/anti-icing program that complies with § 121.629(c) as an alternative means to comply with this rule.

Two commenters point out that there is a difference between part 135 scheduled air carriers and part 135 on-demand air carriers and that the proposed rule can only apply to the former. One of these commenters says that on-demand carriers could not implement this type of program because of the vast number of airports served and the lack of company trained personnel other than pilots.

One of the above commenters also says that training and testing previously completed in voluntary compliance with the part 121 rule and the proposed advisory circular on ground deicing and anti-icing should be accepted as evidence of compliance with § 135.227(b)(3). This commenter says that the final rule or supporting advisory circular should contain language to ensure that field inspectors are aware that they do not have to retrain and retest to comply with the new rule.

One commenter says that the proposed rule's cross reference to § 121.629(c) does not take into account that part 135 operators do not maintain part 121 documents. This commenter says that this part 121 material should be contained in the part 135 proposed rule.

FAA Response

The FAA agrees that a deicing/anti-icing program that complies with § 121.629(c) would not be selected by most part 135 on-demand air carriers. It would probably be more efficient for

most of these carriers to comply with the training and pretakeoff contamination check requirements of new § 135.227(b)(1).

Any training voluntarily completed and documented under the part 121 rule would be viewed as satisfying the part 135 deicing/anti-icing pilot training requirements provided the training covered the elements included in this rule and if the training was specific to the aircraft and operations being conducted under part 135. Part 135 certificate holders can obtain the part 121 rule and associated advisory circular by contacting the person identified under **FOR FURTHER INFORMATION CONTACT.**

Initial, Transition, and Upgrade Ground Training

Proposed § 135.345 would require initial, transition, and upgrade ground training for pilots in the knowledge and procedures necessary for operating airplanes during ground icing conditions. (Similarly § 125.287 would require initial and recurrent testing for pilots on such knowledge and procedures.)

Many part 135 certificate holders commented on the proposed training requirements. Most of these commenters say that the proposed training is unnecessary because their training programs already cover frost, ice, and snow removal in accordance with existing part 135 requirements (§ 135.227). Several commenters say that such training is included in their curricula for cold weather operations. One commenter addresses deicing in the "preflight check" portion of its training manual. This commenter also points out that deicing is addressed in FAA Advisory Circular 91–13C, "Removal of Frost, Ice & Snow", as well as in pilot training for a private pilot's license and the private pilot and commercial pilot written tests.

A number of commenters say that it would be cumbersome, time consuming, and costly to create a separate training section on ground deicing. Other commenters say that the proposed rule is not justified considering the low accident rate involving part 135 airplanes where ground icing was the probable cause.

One commenter says that most part 135 operators fly into different type air fields, each with its own deicing procedures, and that it would be impractical to create a training manual to cover all the possible deicing situations.

One commenter says that if "hands on" training with glycol/water solutions becomes required, the result will be a significant environmental impact and much higher costs to the operator.

A number of commenters provide suggestions or alternative ways in which they argue the FAA should require training in ground icing conditions. One commenter says that training for pilots to recognize snow or ice, or its effects, should be covered under pilot certification rules in part 61. Another commenter says that training must be comprehensive to ensure improved pilot technique in icing conditions. A third commenter points out the need for additional training and testing covering the effect of contamination on airfoils and its relationship to aircraft performance for those seeking commercial pilot certification (parts 61 and 91).

Another commenter requests that the FAA develop and publish an Advisory Circular to provide suggested methods to comply with proposed § 135.345, particularly in terms of the 1 hour initial training requirement (during the first year after the effective date of the rule).

FAA Response

The FAA recognizes that most training programs under part 135 already address operations in ground icing conditions. The intent of this rule is to ensure that all pilots being trained under part 135 acquire knowledge and skills in all of the specific topics listed in § 135.345(b)(6)(iv). Certificate holders who already cover all of these topics can obtain approval by showing those parts of their training program to their POI's. Certificate holders who do not currently cover all of these topics will need to add whatever material is missing to their training programs. A separate training section on deicing is not necessary.

The FAA disagrees with commenters who suggest that training on ground icing characteristics should be exclusively covered under part 61 pilot certification rules or part 91 general operating rules. It is only under the part 135 training programs or part 125 testing programs that pilots can learn not only the characteristics of airplane surface contamination, but also the procedures for dealing with such contamination in their particular work environment. Much of the information learned under §§ 125.287(a)(9) and 135.345(b)(6)(iv) will be tailored to the operations of each certificate holder.

FAA developed advisory material is discussed under the implementation section of this preamble.

Recurrent Training

Section 135.351 requires recurrent training for pilots on the subjects required for initial ground training on icing conditions, as appropriate, as well as emergency training.

One commenter says that the changes proposed for § 135.227 and § 135.345 are proposed for airplanes, yet the change proposed for § 135.351 applies to all aircraft.

FAA Response

The language added to § 135.351(b)(2) in both the proposed and interim final rule references §§ 135.341 and 135.345 so that the limitation to airplanes in these sections applies.

Implementation

The NPRM, published on September 21, 1993, allowed a 15-day comment period and proposed an effective date for all part 125 and 135 certificate holders of November 1, 1993. The preamble states that a certificate holder who intends to operate in ground icing conditions on or after that date would have to amend its approved training or testing program, initially train or test its pilots, develop procedures for accomplishing pretakeoff contamination checks for each type airplane, and have the FAA approve these procedures.

The preamble also states that the FAA is aware that requiring all pilots to be fully trained or tested by the effective date could be financially and logistically impractical for some certificate holders. Therefore, if training or testing cannot be completed as part of a certificate holder's established initial training or testing program by the effective date, the FAA announced that it would allow certificate holders to submit training or testing materials for approval by the certificate holder's POI. For this first year, the FAA has determined that approved pilot bulletins or other written take-home training materials (e.g., self-graded quizzes or video tapes) will be sufficient for initial pilot training or testing. If pilots complete these approved materials, the FAA would consider initial training/testing provisions of this rule satisfied. The certificate holder could then integrate these materials into its established training or testing program.

A number of comments were received on implementation. All comments state that the implementation date is unrealistic. One commenter states that the implementation time should be at least as long as that allowed for part 121 and another that the date for completion of pilot training programs should not be sooner than 90 days after issuance of FAA guidance material. Another commenter requests there be a phase-in allowed, beginning with those operations most likely to encounter

ground icing conditions. Several commenters need clarification on what must be accomplished by the implementation date.

Some commenters believe that the FAA cannot approve the programs in such a short time. In connection with FAA approval, one commenter asks what the consequences will be for certificate holders who after complying with the provisions of the new rule do not receive the required Operations Specifications and training program approval from the FAA by the deadline. This commenter would like an FAA policy statement specifying the options available to air charter operators who find themselves not in compliance through no fault of their own. The same commenter asks if an FAA approved annotation in a certificate holder's Operations Specifications to not attempt a takeoff when ground icing or falling snow conditions exist would meet the provisions of the proposed rule. One commenter says that, in its opinion, an amendment to the Aircraft Flight Log, and a new form would have to be developed, approved, and reproduced to show compliance with the pretakeoff contamination check. The time frame for such approval is approximately 90 days.

One commenter points out that FSDO offices are not fully staffed and that it would be difficult for POIs to review and approve these training programs in the time frame outlined in the notice (especially considering the proposed requirement that POIs review and approve pretakeoff contamination check procedures under proposed § 135.227(b)(1)).

One commenter recommends that the final preamble specifically allow for the use of take-home brochures, video tapes, self-grading quizzes or other types of review material as the part 121 interim final rule preamble allowed. Another commenter says that, because of the FAA imposed time line, the FAA should allow initial training and testing material to be distributed to flight crewmembers concurrent with the FAA approval process.

Two commenters mention that the guidance material promised by the FAA has not been issued and that complying with the rule will be difficult without FAA guidance.

FAA Response

The FAA's intent in this action was to have the rule implemented by the winter of this year. The FAA recognized that this would be a short implementation period, but believed that most part 125 and 135 certificate holders operating in ground icing conditions already have some type of procedures for ensuring compliance with the clean aircraft concept while operating during ground icing conditions (in compliance with §§ 125.221 and 135.227) and provide pilot training on these procedures. Therefore, to comply with this interim final rule, a certificate holder must have the training or testing program approved by the FAA, initially train or test its pilots, develop procedures for accomplishing pretakeoff contamination checks for each type airplane, and have these procedures approved by the FAA. If a certificate holder only provides minimal training on procedures for ground icing conditions now, the time frame does impose a greater burden. The FAA has developed a draft advisory circular, AC 135–XX, which when final will provide an outline of the material that the FAA would find acceptable to be included within a certificate holder's training program or testing procedure. The draft AC is published in this issue of the **Federal Register**.

After POI approval and completion of the approved materials by the certificate holder's pilots, the certificate holder will have satisfied the initial training/testing provisions of this rule. As mentioned previously, these materials may be take-home materials, video tapes, self-grading quizzes, or other materials. In effect, this allows a certificate holder to quickly provide initial training to its pilots and provides additional time for the certificate holder to amend its established training program.

The FAA does not believe that a phase-in of ground operating deicing procedures would accomplish the intent of the rule; however, if a certificate holder does not conduct operations with certain airplanes in ground icing conditions, procedures and training for these airplanes are not required by this rule.

The FAA has decided to make the rule effective on January 31, 1994. This will provide approximately the same time allowed after publication of the part 121 rule.

The FAA intends to move quickly to review and approve or deny the pretakeoff contamination check procedures and training or testing materials. The FAA has conducted training sessions for POIs and has provided POIs with guidance materials to facilitate their review.

Discussion of Cost Comments

Actual Operational Costs

One commenter states that the cost figures contained in the NPRM Regulatory Evaluation includes only training costs. Moreover, the commenter states that the actual operational costs need to be analyzed as well, prior to a fair benefit-cost determination. Another commenter states that the most important cost element has been ignored—the cost of purchasing, maintaining, and operating the deicing equipment.

FAA Response

Part 135 operators are not expected to incur significant operational costs. Of the three types of potential operational cost components (training and related functions, deicing fluids, and deicing equipment), only training is expected to impose significant incremental costs. Since deicing equipment is already in place at all major and medium size hub airports, it is unlikely that additional deicing equipment will be required by part 135 operators at these airports. Even though the deicing rule for part 121 had little, if any, impact on small airports, deicing equipment is already being used at these airports. During icing conditions, parts 125 and 135 aircraft operators at all airports (regardless of size) in the U.S. are required by §§ 125.221(b) and 135.227(b) of the FAR to utilize the FAA's "Clean Aircraft Concept," i.e., no aircraft is permitted to take off unless it is free of contamination (i.e., ice, snow, frost, etc.). Because of enhanced safety awareness as a result of the additional testing and training required by this rule, the FAA expects some increase in the use of deicing equipment. However, the need for additional deicing equipment is expected to be insignificant.

The FAA has not included any delay costs in this regulatory evaluation that might be incurred as a result of increased deicing. The FAA believes that delays for part 135 aircraft operations would not be significant for several reasons. First, part 135 operations, because of their flexible runway requirements and quick turnaround times, often do not experience the same delays associated with larger part 121 operations. Also, many part 135 and part 125 operations take place at small airports that do not experience large numbers of simultaneous arrivals and departures associated with the larger air carrier's hub and spoke operations.

The FAA invited comments associated with delay costs for the interim part 121 rule and none were received. However, the FAA invites part 135 and part 125 certificate holders to comment on any delay costs associated with this interim final rule.

Reduction in Services

One commenter states that the unnecessary requirements of this proposed rule and similar types of programs drive up costs for operators in an already floundering industry. In addition, this commenter contends that higher costs will ultimately reduce the services his company can offer to the flying public.

This commenter also asserts that station and vender auditing will increase dramatically for certain operators. Furthermore, the commenter notes that many of the industry's single-engine 135 operators will require deicing equipment at stations where they previously needed none, or at least require regular auditing of vendors. Currently, these vendors are seldom used, if ever. Additional deicing equipment purchase expenses for these operations will mount astronomically, according to this commenter.

FAA Response

A review of the accident history, as discussed in the background section of the NPRM, indicates this rule is necessary. While the commenter believes that station and vendor auditing will increase, the commenter failed to provide any data for the agency to evaluate nor has the commenter disproved the FAA's original assessment of costs and benefits associated with this rule. The comment regarding the need for additional deicing equipment has been discussed previously.

Loss of Revenue Days

One commenter notes that besides the added cost of the additional training, there will be a loss of revenue on days they are unable to fly due to this rule being implemented too close to the winter season.

FAA Response

The FAA disagrees with this commenter. The loss in revenues on days an air carrier is unable to fly during icing conditions would not be attributed to this rule. Currently, no air carrier can take off from a U.S. airport (regardless of size) unless it is free of contamination, as required by §§ 125.221(b) and 135.227(b) of the FAR. More on this issue and related matters is discussed in detail under "The Implementation" section of this document.

Number of Operators Impacted

This commenter states that the FAA's estimate that 70 percent of the part 135 unscheduled operators are potentially impacted by the proposed rule is not realistic, i.e., this 70 percent estimate should be higher. This commenter also mentions that Docket No. 27459 is unjustified based on potential costs and benefits.

FAA Response

The FAA disagrees with this commenter. As explained in the full regulatory evaluation, an estimated 70 percent of part 135 unscheduled aircraft operators are expected to be impacted by the rule. This assessment is stated as an assumption based on data received from the FAA's Office of Flight Standards, Management Information Section, in Oklahoma City, Oklahoma. The data represent the total number of active parts 125 and 135 certificate holders by city, state, name of operator, number of employees, type of aircraft, and number of seats. Based on this information, the FAA was able to estimate the number of air taxi certificate holders in warm climates who would not be impacted by this proposed rule, since such certificate holders would rarely encounter ground icing conditions. More descriptive information on the derivation of the 70 percent estimate is contained in the full evaluation of this rule.

Lost Revenue and Reduced Aircraft Operations

Several commenters contend that as the result of the proposed rule, additional research will have to be conducted for operations in and out of airports that are not certified for part 121 operations. Furthermore, these commenters state that, in most instances, they have found that smaller airports servicing part 135 on-demand operators do not have deicing equipment readily available that will be required to comply with the proposed rule. Without such equipment at small airports, on-demand operator services could be reduced according to these commenters. In conclusion, these commenters point out that the proposed rule could result in considerable loss in revenue and discontinued operations by some operators.

FAA Response

As stated in the NPRM, the FAA intends to issue an interim final rule. Therefore, the FAA would continue to accept comments from all impacted parties on costs that are not adequately reflected in its regulatory evaluation, especially with regard to the purchase of additional deicing equipment and deicing fluid by operators for use at small airports. As the result of the FAA's current "Clean Aircraft Concept", the FAA believes the demand for additional deicing equipment at small airports will be insignificant, and little if any reduction in on-demand service will occur.

Accurate Cost Estimation

According to several commenters, the cost estimates of the proposed rule cannot be calculated accurately. They contend that additional information is required to make this determination. Such information should contain answers to these questions: what is the availability of deicing equipment at smaller, non-hub airports complying with the NPRM?, how much deicing equipment is available at each destination/departure airport?, will additional equipment be required to complete the pre-takeoff contamination checks?, etc.

FAA Response

The FAA has estimated costs of this rule based on the best available data. These commenters, while disagreeing with the FAA cost estimates, did not provide any additional data. Therefore, the FAA retains its original cost estimates. However, as stated in the NPRM, the FAA is issuing an interim final rule. Therefore, the FAA will continue to accept comments from all impacted parties on costs that are not adequately reflected in its regulatory evaluation, especially with regard to the purchase of additional deicing equipment and deicing fluid by operators.

Modification of Training/Testing Program Costs

One operator asserts that the FAA economic impact of the proposed rule is misstated. According to this commenter, modification of the manuals will take 8 hours for each operator plus at least 8 hours of FAA review time. Coupled with the revision of all manuals for the industry's pilots and training, this commenter estimates the cost burden to his company to be $3,000 rather than $1,350 as estimated by the FAA.

FAA Response

The FAA disagrees with this commenter. Using 8 hours, the FAA was unable to derive the commenter's cost estimate of $3,000 for the modification of its manuals. This problem is due to the fact that the commenter fails to provide specific details of how the cost estimate was derived. In the full regulatory evaluation, the FAA provides detailed means on how it derived its cost estimates of $1,350 to $2,700 for the modification of manuals (and other materials) by operators. Without a similar illustration or explanation, the

FAA is unable to evaluate the merits of this commenter's remarks. Therefore, the FAA retains its original cost estimates.

Environmental Analysis

This rule is a federal action that is subject to the National Environmental Policy Act (NEPA). Under applicable guidelines of the President's Council on Environmental Quality and agency procedures implementing NEPA, the FAA normally prepares an environmental assessment (EA) to determine the need for an environmental impact statement (EIS) or whether a finding of no significant impact (FONSI) would be appropriate. (40 CFR 1501.3; FAA Order 1050.1D appendix 7. par 4 (a)). In the NPRM the FAA requested comments on the following:

(1) Whether the proposed rule will increase the use of deicing fluid,

(2) The impact, if any, of using these deicing fluids on taxiways "just prior to takeoff," and

(3) Containment methods currently used that can be adapted to other locations on an airport.

Two commenters state that the proposed rule will lead to increased use of deicing fluids. One commenter believes that the rule will cause excessive and unnecessary use of deicing fluids that will result in disposal problems and increased expense. Another commenter questions FAA's belief that "the rule will not promote significant additional use of deicing fluids" when the use of these fluids is the only method discussed in planned training and testing operations.

FAA Response

An EA that supports a FONSI is included in the docket for this rulemaking. The EA discusses in detail the potential effect of this rule and addresses in general terms the issues raised by the comments summarized above. The following discussion addresses these issues.

With respect to the potential for significantly increased use of deicing fluids, this is unlikely because no changes in deicing/anti-icing operations are required under the proposed rule, and therefore little, if any incremental increase in impact is anticipated due to implementation of the proposed rule. Training on fluids is only required for part 125 and part 135 certificate holders that presently use or plan to use deicing fluids. Training focuses on increased training and awareness for the use of these fluids that will result in more effective use and application of the deicing fluids currently being used.

With respect to increased disposal problems, the characteristics of glycols which are the active component of deicing/anti-icing fluids (e.g., low toxicity, low ecotoxicology, low volatility, high biodegradability) lead to minor environmental and public health impacts. Mitigation measures for air (release reporting under CERCLA) and water quality (storm water discharge NPDES permits) will reduce the possible minor impacts even further, producing no significant impacts overall. And finally, the baseline environment of airports are already affected by ongoing airport operations, including current deicing/anti-icing programs.

Paperwork Reduction Act

Information collection requirements in these amendments to parts 125 and 135 have been approved by the Office of Management and Budget (OMB) under the provisions of the Paperwork Reduction Act of 1980 (Pub. L. 96–511). The OMB control number is 2120–0578.

Regulatory Evaluation Summary

The FAA has determined that this final rule is not a "significant rulemaking action", as defined by Executive Order 12866 (Regulatory Planning and Review). The anticipated costs and benefits associated with this final rule are summarized below. (A detailed discussion of costs and benefits is contained in the full evaluation in the docket for this final rule).

Costs

The FAA estimates that the total compliance cost of this final rule will be $8.1 million over the next 10 years, in 1992 dollars. On a discounted basis (using a 7 percent rate of interest), the total potential cost is $6.7 million. This estimate is based on costs to comply with three requirements: (1) Initial Training/Testing of Pilots, (2) Recurrent Training/Testing of Pilots, and (3) Modification of the Training/Testing Program. The cost of each of these components is discussed below.

Initial Training/Testing of Pilots

The FAA assumes that all pilots under part 125 will receive initial testing and pilots under part 135 will receive initial training of 1 hour during the first year after this rule becomes effective. Training and testing will be for pilots-in-command (PICs) and pilots second-in-command (SICs). Costs for these pilots are based on their hourly wage rates of $62 and $33, respectively. The cost of initial training and testing was derived based on the total number of PICs and SICs that are expected to be trained multiplied by their respective hourly wages.

Based on aircraft data obtained from the FAA Flight Standards Service Office, Information Management Section, there are an estimated 7,950 active fixed-wing aircraft operating under parts 125 and 135 that will be affected by the rule. However, many of these aircraft operate in climates that do not experience icing conditions; therefore, FAA estimates that about 7,950 (approximately 70 percent) will be affected by this rule. In order to estimate the total number of pilots that will be trained, the number of affected airplanes was multiplied by four pilots (two active and two reserve); this is approximately 29,300 pilots. Multiplying the number of pilots trained by their average hourly wage rate of $48 results in initial training/testing costs of $1.4 million (or $1.3 million, discounted).

Recurrent Training/Testing of Pilots

The recurrent training/testing required annually for each pilot will start in the second year of the 10-year time frame of the rule. The FAA estimates that the training will take approximately 15 minutes and cost $12 ($48 per hour x .25) per pilot. This cost estimate multiplied by the total number of pilots (29,300) results in estimated annual recurrent training costs of $350,000. Over the next 10 years, this cost will be $3.2 million (or $2.2 million, discounted).

Modification of Training/Testing Program

While the FAA cannot precisely estimate to what extent operators will incur costs as the result of modifying their respective training/testing programs, this evaluation assumes that some additional costs will be incurred. To calculate these costs, the FAA estimated that this rule will affect 97 scheduled part 135 operators, 2,043 unscheduled part 135 operators, and 26 part 125 operators. The one-time cost estimate of $2,700 (scheduled part 135 operators) and $1,350 (part 125 and unscheduled part 135 operators) for training/testing program modifications multiplied by the total number of operators amounts to $3.1 million (or $2.9 million, discounted). The FAA solicits comments prior to April 15, 1994 from the aviation community, particularly operators under parts 125 and 135, regarding the actual training costs and total compliance costs that are incurred.

Benefits

This final rule will generate potential safety benefits of $14.2 million (or $10.0 million, discounted) over the next 10 years, in 1992 dollars. These benefits will be the reduction in fatalities, serious injuries, and property loss from accidents involving ice contamination for airplane operations under parts 125 and 135.

To estimate the potential benefits associated with this rule, the FAA examined all of the part 135 icing accidents that have occurred from 1984 to 1992. A similar effort was employed for part 125 operations; however, there were no icing accidents or incidents involving part 125 operators. Even though there were no relevant part 125 ground icing accidents during the period examined, the FAA believes that there will be some part 125 future benefits from accidents avoided. Between 1984 and 1992, there were 14 accidents with 7 fatalities, 2 serious injuries, and 8 minor injuries. These accidents were examined closely to answer the following questions:

- To what extent will this rule have prevented the accident from occurring?
- What other factors (other than ice on the airframe) contributed to the accident?
- If there were other factors, how much did these factors contribute to the accident?

The analytical approach employed to quantify the potential safety benefits focuses on the increased safety awareness resulting from this additional training and testing and the improved checking procedures. Under this rule, a pilot will most likely perform a visual pretakeoff contamination check prior to departure. Alternatively, certificate holder's may have FAA approved ice detectors or sensors installed on the airplane's critical surfaces, or may comply with the part 121 deicing/anti-icing interim rule.

The FAA recognizes that there are many uncertainties when dealing with winter storms, human error, etc, and that even under this rule, it is possible that an accident may occur. Some of the 14 known accidents identified in this evaluation may have occurred even in the absence of icing conditions. Consequently, for purposes of this evaluation, the FAA is claiming as benefits generated by this rule, only 60 percent of the casualty losses from those 14 accidents. This estimate is based on the FAA's knowledge of ice contamination, similar issues related to part 121 operations, and review of those part 135 accidents involving icing conditions. The FAA realizes that there is still some uncertainty in the 60 percent effectiveness rate. Therefore, the FAA continues to solicit comments from the aviation community on the likelihood of this rule preventing these types of accidents.

To estimate the potential benefits of this rule, the FAA calculated the average annual number of accidents/incidents over the 9-year period. There were 14 accidents/incidents over the 9-year period averaging 1.6 (14/9) per year. Similarly, the average annual number of fatalities and serious injuries were .8 (7/9) and .2 (2/9), respectively. In order to provide the public and government officials with a benchmark comparison of the expected safety benefits of rulemaking actions with estimated costs in dollars, the FAA currently uses a minimum value of $2.5 million to statistically represent a human fatality avoided and $640,000 for each serious injury. These values are applied to the .8 annual fatalities and .2 annual serious injuries over the next 10 years. After including the average annual replacement value of the airplanes involved in these accidents/incidents, which is estimated to be approximately $280,000, the total benefits will be $23.7 million. Assuming that this rule is approximately 60 percent effective, the potential benefits will be $14.2 million, or $10.0 million discounted.

Conclusion to Cost/Benefit Analysis

This rule is expected to impose total costs estimated at $6.7 million (discounted) compared to total potential safety benefits estimated at $10.0 million (discounted). Therefore, the FAA has determined that this rule is cost-beneficial.

Final Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure that small entities are not unnecessarily and disproportionately burdened by government regulations. The RFA requires government agencies to determine whether rules that would have "a significant economic impact on a substantial number of small entities" and, in cases where they would, to conduct a Regulatory Flexibility Analysis.

According to FAA Order 2100.14A: Regulatory Flexibility and Guidance, a substantial number of small entities is defined as a number which is not less than eleven and which is more than one-third of the small entities subject to a proposed or existing rule. A significant economic impact on a small entity is an annualized net compliance cost which, when adjusted for inflation, equals or exceeds the significant cost threshold for the entity type under review.

The entities that will be affected by this rule are small operators that own, but not necessarily operate, nine or fewer aircraft. The FAA estimates that there are 26 operators under part 125, with an average of about two aircraft owned per operator. The FAA also estimates that there are 2,140 part 135 operators (97 scheduled and 2,043 unscheduled). On average, the unscheduled operators own fewer than four aircraft each. The scheduled operators own, on average, slightly more than 14 aircraft. Multiplying the $7.7 million cost of this rule by a capital recovery factor of .14278 (10 years, 7%), results in an annualized cost estimate of $1.1 million. This estimate of $1.1 million was subsequently divided by the total number of operators (2,166) and resulted in an estimated annual cost impact of about $500 per operator. This annualized cost estimate is less than the annualized threshold cost of $4,600 (1992 dollars). Therefore, this rule will not impose a significant economic impact on a substantial number of small aircraft operators.

International Trade Impact Statement

This rule will have no impact on the competitive posture of either U.S. carriers doing business in foreign countries or foreign carriers doing business in the United States. This assessment is based on the fact that this rule will impact operators engaged in U.S. domestic operations. These operators do not compete with operators engaged in similar activities in the United States.

Federalism Implications

The regulations herein will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this regulation will not have federalism implications to warrant the preparation of a Federalism Assessment.

Conclusion

The rule has been reviewed by the Office of Management and Budget under Executive Order 12866. This regulation is considered significant under DOT Regulatory Policies and Procedures for Simplification, Analysis, and Review of Regulations. In addition, the FAA certifies that this regulation will not

have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

A final regulatory evaluation of the regulation, including a Final Regulatory Flexibility Determination and International Trade Impact Analysis, has been placed in the docket. A copy may be obtained by contacting the person identified under **FOR FURTHER INFORMATION CONTACT.**

List of Subjects

14 CFR Part 125

Air carriers, Air transportation, Aviation safety, Safety.

14 CFR Part 135

Air carriers, Air taxi, Air transportation, Aviation safety, Safety.

The Amendment

In consideration of the foregoing, the Federal Aviation Administration amends parts 125 and 135 of the Federal Aviation Regulations (14 CFR parts 125 and 135) as follows:

PART 125—CERTIFICATION AND OPERATIONS: AIRPLANES HAVING A SEATING CAPACITY OF 20 OR MORE PASSENGERS OR A MAXIMUM PAYLOAD CAPACITY OF 6,000 POUNDS OR MORE

1. The authority citation for part 125 continues to read as follows:

Authority: 49 U.S.C. 1354, 1421 through 1430 and 1502; 49 U.S.C. 106(g) (revised, Pub. L. 97–449, January 12, 1983).

2. Section 125.221 is amended by revising paragraph (a), by redesignating paragraphs (b) through (d) as paragraphs (c) through (e), respectively, and by adding a new paragraph (b) to read as follows:

§ 125.221 Icing conditions: Operating limitations.

(a) No pilot may take off an airplane that has frost, ice, or snow adhering to any propeller, windshield, wing, stabilizing or control surface, to a powerplant installation, or to an airspeed, altimeter, rate of climb, or flight attitude instrument system, except under the follow conditions:

(1) Takeoffs may be made with frost adhering to the wings, or stabilizing or control surfaces, if the frost has been polished to make it smooth.

(2) Takeoffs may be made with frost under the wing in the area of the fuel tanks if authorized by the Administrator.

(b) No certificate holder may authorize an airplane to take off and no pilot may take off an airplane any time conditions are such that frost, ice, or snow may reasonably be expected to adhere to the airplane unless the pilot has completed the testing required under § 125.287(a)(9) and unless one of the following requirements is met:

(1) A pretakeoff contamination check, that has been established by the certificate holder and approved by the Administrator for the specific airplane type, has been completed within 5 minutes prior to beginning takeoff. A pretakeoff contamination check is a check to make sure the wings and control surfaces are free of frost, ice, or snow.

(2) The certificate holder has an approved alternative procedure and under that procedure the airplane is determined to be free of frost, ice, or snow.

(3) The certificate holder has an approved deicing/anti-icing program that complies with § 121.629(c) of this chapter and the takeoff complies with that program.

* * * * *

3. Section 125.287 is amended by removing "and" at the end of paragraph (a)(7), removing the period at the end of paragraph (a)(8) and adding a semicolon in its place, and adding a new paragraph (a)(9) to read as follows:

§ 125.287 Initial and recurrent pilot testing requirements.

(a) * * *

(9) Knowledge and procedures for operating during ground icing conditions, (i.e., any time conditions are such that frost, ice, or snow may reasonably be expected to adhere to the airplane), if the certificate holder expects to authorize takeoffs in ground icing conditions, including:

(i) The use of holdover times when using deicing/anti-icing fluids.

(ii) Airplane deicing/anti-icing procedures, including inspection and check procedures and responsibilities.

(iii) Communications.

(iv) Airplane surface contamination (i.e., adherence of frost, ice, or snow) and critical area identification, and knowledge of how contamination adversely affects airplane performance and flight characteristics.

(v) Types and characteristics of deicing/anti-icing fluids, if used by the certificate holder.

(vi) Cold weather preflight inspection procedures.

(vii) Techniques for recognizing contamination on the airplane.

* * * * *

PART 135—AIR TAXI OPERATORS AND COMMERCIAL OPERATORS

4. The authority citation for part 135 continues to read as follows:

Authority: 49 U.S.C. 1354(a), 1355(a), 1421 through 1431, and 1502; 49 U.S.C. 106(g) (Revised Pub. L. 97–449, January 12, 1983).

5. Section 135.227 is amended by revising paragraph (a), by redesignating paragraphs (b) through (e) as paragraphs (c) through (f), respectively, and by adding a new paragraph (b) to read as follows:

§ 135.227 Icing conditions: Operating limitations.

(a) No pilot may take off an aircraft that has frost, ice, or snow adhering to any rotor blade, propeller, windshield, wing, stabilizing or control surface, to a powerplant installation, or to an airspeed, altimeter, rate of climb, or flight attitude instrument system, except under the following conditions:

(1) Takeoffs may be made with frost adhering to the wings, or stabilizing or control surfaces, if the frost has been polished to make it smooth.

(2) Takeoffs may be made with frost under the wing in the area of the fuel tanks if authorized by the Administrator.

(b) No certificate holder may authorize an airplane to take off and no pilot may take off an airplane any time conditions are such that frost, ice, or snow may reasonably be expected to adhere to the airplane unless the pilot has completed all applicable training as required by § 135.341 and unless one of the following requirements is met:

(1) A pretakeoff contamination check, that has been established by the certificate holder and approved by the Administrator for the specific airplane type, has been completed within 5 minutes prior to beginning takeoff. A pretakeoff contamination check is a check to make sure the wings and control surfaces are free of frost, ice, or snow.

(2) The certificate holder has an approved alternative procedure and under that procedure the airplane is determined to be free of frost, ice, or snow.

(3) The certificate holder has an approved deicing/anti-icing program that complies with § 121.629(c) of this chapter and the takeoff complies with that program.

* * * * *

6. Section 135.345 is amended by republishing the introductory text of paragraph (b), revising the introductory text of paragraph (b)(6), removing "and" at the end of paragraph (b)(6)(ii), adding "and" at the end of paragraph (b)(6)(iii),

and adding a new paragraph (b)(6)(iv) to read as follows:

§ 135.345 Pilots: Initial, transition, and upgrade ground training.

* * * * *

(b) For each aircraft type—

* * * * *

(6) Knowledge and procedures for—

* * * * *

(iv) Operating airplanes during ground icing conditions, (i.e., any time conditions are such that frost, ice, or snow may reasonably be expected to adhere to the airplane), if the certificate holder expects to authorize takeoffs in ground icing conditions, including:

(A) The use of holdover times when using deicing/anti-icing fluids;

(B) Airplane deicing/anti-icing procedures, including inspection and check procedures and responsibilities;

(C) Communications;

(D) Airplane surface contamination (i.e., adherence of frost, ice, or snow) and critical area identification, and knowledge of how contamination adversely affects airplane performance and flight characteristics;

(E) Types and characteristics of deicing/anti-icing fluids, if used by the certificate holder;

(F) Cold weather preflight inspection procedures;

(G) Techniques for recognizing contamination on the airplane;

* * * * *

7. Section 135.351(b)(2) is revised to read as follows:

§ 135.351 Recurrent training.

* * * * *

(b) * * *

(2) Instruction as necessary in the subjects required for initial ground training by this subpart, as appropriate, including low-altitude windshear training and training on operating during ground icing conditions, as prescribed in § 135.341 and described in § 135.345, and emergency training.

* * * * *

Issued in Washington, DC, on December 27, 1993.

David R. Hinson,

Administrator.

[FR Doc. 93–31945 Filed 12–27–93 3:51 pm]

BILLING CODE 4910–13–P

Notices

Federal Register
Vol. 58, No. 249
Thursday, December 30, 1993

This section of the FEDERAL REGISTER contains documents other than rules or proposed rules that are applicable to the public. Notices of hearings and investigations, committee meetings, agency decisions and rulings, delegations of authority, filing of petitions and applications and agency statements of organization and functions are examples of documents appearing in this section.

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

[AC No. 135–XX]

Proposed Advisory Circular on Ground Deicing and Anti-Icing Training, Testing, and Checking

AGENCY: Federal Aviation Administration, DOT.

ACTION: Request for comments on proposed advisory circular.

SUMMARY: Proposed advisory circular (AC) 135–xx, Ground Deicing and Anti-Icing Training, Testing, and Checking, provides guidance about ground deicing and anti-icing that should be incorporated in an air carrier's approved training program. This AC provides guidance about one method of complying with the requirements of revised Federal Aviation Regulation (FAR) § 135.227.

DATES: Comments must be received on or before February 28, 1999.

ADDRESSES: Written comments are invited on all aspects of the proposed AC. Commenters must identify file number AC 135–xx, Ground Deicing and Anti-Icing Training and Checking. Send all comments on the proposed AC to the following location: Federal Aviation Administration, Flight Standards Service, Commuter/Air Taxi Branch (Attention: AFS250), 800 Independence Avenue, SW., Washington, DC 20591.

FOR FURTHER INFORMATION CONTACT:

David Metzbower, Flight Standards Service, Commuter/Air Taxi Branch, AFS250, 800 Independence Avenue, SW., Washington, DC 20591; telephone: (202) 267–3762 (8 a.m. to 4:30 p.m. EST).

SUPPLEMENTARY INFORMATION: The guidance in this AC provides one method, but not the only method, of complying with the requirements of revised FAR § 135.227. This guidance material supplements the interim final rule, FAR § 135.227, which is being published in this issue. Due to the critical safety nature of this proposed AC, it is published in its entirety in order to allow commenters expedient access to the document.

Issued in Washington, DC on December 23, 1993.

Thomas C. Accardi,

Director, Flight Standards Service.

[FR Doc. 93–31946 Filed 12–29–93; 8:45 am]
BILLING CODE 4910–13–P

Ground Deicing and Anti-icing Training and Checking (AFS–250; 135–XX)

1. *Purpose.* This advisory circular (AC) provides one means, but not the only means, of complying with Federal Aviation Regulations (FAR) §§ 135.227, 135.345, and 135.351 (referred to as the FAR part 135 ground deicing rule). This AC provides guidance about FAR §§ 135.227, 135.345, and 135.351. Specifically, the guidance in this AC concerns:

a. Ground deicing and anti-icing training requirements that must be incorporated into an approved training program for certain air carriers;

b. Ground deicing and anti-icing guidance for those air carriers that are not required to have an approved training program; and

c. The pretakeoff contamination aircraft check required of all FAR part 135 air carriers except those that develop an approved alternative procedure or comply with the FAR part 121 ground deicing rule contained in FAR § 121.629(c).

2. *Related FAR sections. a. Part 135, Subpart A—general.* Sections 135.23 and 135.25.

b. Part 135, Subpart B—flight operations. Sections 135.77, 135.79 and 135.81.

c. Part 135, Subpart D—VFR/IFR operating limitations and weather requirements. Section 135.227.

d. Part 135, Subpart E—flight crewmember requirements. Section 135.244.

e. Part 135, Subpart H—training. Sections 135.323, 135.325, 135.327, 135.329, 135.339, 135.341, 135.343, 135.345, 135.347, and 135.351.

f. Special Federal Aviation Regulation (SFAR) no. 58. Advanced Qualification Program.

3. *Related reading material.* The following material should be useful in developing material, instructions, and procedures for incorporation in the certificate holder's training programs and operations manual:

a. AC 20–117, Hazards Following Ground Deicing and Ground Operations in Conditions Conducive to Aircraft Icing.

b. Federal Aviation Administration (FAA) publication, Winter Operations Guidance for Air Carriers and Other Adverse Weather Topics.

c. AC 120–58, Pilot Guide for Large Aircraft Ground Deicing.

d. AC 120–XX Pilot Guide for Ground Deicing of Air Taxi and Commercial Aircraft.

e. AC 135–XX, Ground Deicing and Anti-Icing Training and Checking.

f. Society of Automotive Engineers (SAE):

(1) AMS 1424, Deicing/Anti-Icing Fluid, Aircraft, Newtonian—SAE Type I.

(2) AMS 1428, Fluid, Aircraft Deicing/Anti-Icing, Non-Newtonian, Pseudo-Plastic, SAE Type II.

(3) ARP 4737, Aircraft Deicing/Anti-Icing Methods with Fluids, for Large Transport Aircraft.

g. International Standards Organization (ISO) publications:

(1) ISO 11075, Aerospace—Aircraft de-icing/anti-icing newtonian fluids ISO type I.

(2) ISO 11076, Aerospace—Aircraft de-icing/anti-icing methods with fluids.

(3) ISO 11077, Aerospace—De-icing/anti-icing self propelled vehicles—Functional requirements.

(4) ISO 11078, Aerospace—Aircraft de-icing/anti-icing non-newtonian fluids ISO type II.

4. *Background.* a. The "clean aircraft" concept. The current regulations in FAR parts 121 and 135 rely on the "clean aircraft" concept; i.e., that no person may takeoff an airplane when frost, ice, or snow is adhering to the wings, control surfaces, or propellers of the airplane (FAR §§ 121.629 and 135.227) The rationale behind this concept is that the presence of even minute amounts of frost, ice, or snow (referred to as "contamination") on particular airplane surfaces can cause a potentially dangerous degradation of airplane performance and unexpected changes in

airplane flight characteristics. Under current regulations, ultimate responsibility for determining whether the airplane is free of contamination and complies with the "clean aircraft" concept rests with the pilot-in-command (PIC). Both the FAA and industry have developed guidance and recommended procedures that are designed to help the PIC in making that determination. These procedures include monitoring weather conditions and temperature changes, visual checks, and using deicing/anti-icing fluids. When conditions conducive to the formation of frost, ice, or snow on airplane surfaces exist at the time of takeoff, those surfaces must be checked for contamination in accordance with FAR § 135.227. When contaminants are adhering to airplane surfaces, those contaminants, except as specifically provided, must be removed before takeoff. Because of the wide variations in airplane design and performance characteristics, methods for removing contamination for airplanes operated under FAR parts 121 and 135 vary greatly. Deicing of airplanes may be accomplished:

(1) By applying heated water followed by undiluted glycol-based fluid;

(2) By applying a heated water/glycol solution;

(3) By mechanically brushing the snow or ice off; or

(4) By placing the airplane in a hangar until the frost, ice, or snow melts.

Note: Currently, anti-icing (the treatment of the airplane with undiluted glycol-based fluid to prevent frost, ice, or snow from adhering to aircraft surfaces) is not commonly used in FAR part 135 operations.

b. Accidents related to icing. National Transportation Safety Board (NTSB) records reveal that 14 ground icing-related accidents and incidents involving airplanes operating under FAR part 135 occurred during the period of 1984–1992. While most of these accidents/incidents involved FAR part 135 non-scheduled cargo operations, three involved either non-scheduled or scheduled passenger carrying operations. Four of the accidents resulted in a total of seven fatalities. The NTSB identified other probable causes in some of these accidents/incidents, but in all 14 cases the NTSB identified the existence of frost, ice, or snow on the wings or other critical surfaces of the airplane as a probable cause. A common thread throughout these accidents/incidents was the pilots' apparent lack of awareness of the potential hazard from even small amounts of frost, ice, or snow on an airplane's wings and control surfaces. For instance, one pilot lost his life in an accident involving a non-scheduled cargo operation in Morrisonville, New York, on March 19, 1984. Prior to the accident, after identifying the presence of ice accumulation on the leading edges and upper wing surfaces, the pilot declined the use of a hangar to warm the airplane and instead attempted to remove the ice from the leading edges by hand. In another accident in Vienna, Missouri, on March 3, 1988, a pilot of a night cargo operation and another person lost their lives after taking off in known icing conditions. Before the flight, a line serviceman noticed ice on the aircraft's wings and suggested its removal, but the pilot declined.

5. *Definitions.* The terms used in this AC are not defined in FAR part 1, but are defined herein for better understanding of this material as follows:

a. Deicing. A procedure by which frost, ice, or snow is removed from the aircraft in order to provide clean surfaces.

b. Anti-icing. A precautionary procedure that provides protection against the formation of frost or ice and accumulation of snow on treated surfaces of the aircraft for a limited period of time.

c. Deicing/anti-icing. A combination of the two procedures above. It can be performed in one or two steps.

(1) One-step deicing/anti-icing is carried out with an anti-icing fluid. The fluid used to deice the aircraft remains on aircraft surfaces to provide limited anti-ice capability.

(2) Two-step deicing/anti-icing consists of two distinct steps. The first step (deicing) is followed by the second step (anti-icing) as a separate fluid application. Anti-icing fluid is applied to protect the relevant surfaces, thus providing maximum possible anti-ice capability (holdover time).

d. Holdover time. The estimated time the application of deicing or anti-icing fluid will prevent the formation of frost or ice and the accumulation of snow on the treated surfaces of an aircraft. Holdover time begins when the final application of deicing/anti-icing fluid commences, and it expires when the deicing/anti-icing fluid applied to the aircraft loses its effectiveness as described in the appropriate holdover timetable.

e. Pretakeoff contamination check. A pretakeoff contamination check is a check to make sure the wings and control surfaces are free of frost, ice, or snow. Section 135.227 of the FAR requires that a pretakeoff contamination check be completed within 5 minutes prior to beginning takeoff. Under FAR part 135, depending upon the type of aircraft, it may be accomplished from within or outside the aircraft and may be visual or tactile or a combination, as long as the check is adequate to ensure the absence of contamination. The certificate holder's FAA principal operations inspector (POI) must approve the pretakeoff contamination check procedures for each specific type of aircraft operated by the certificate holder. Also, the pretakeoff contamination check is referenced or described within the certificate holder's operations specifications.

6. *Overview of the FAR part 135 ground deicing rule.* The FAA and the aviation community rely almost exclusively on the PIC's judgment for ensuring the clean aircraft concept. The FAA believes that pilot education is the paramount element to combating the threat of icing. After reassessing its policy and reviewing accident statistics, the FAA still believes that pilot education is a major element in combating these types of accidents, but it must be supplemented by aircraft checks for contamination. To ensure the implementation of the clean aircraft concept, the FAR part 135 ground deicing rule requires education through additional training, and an aircraft check for contamination of the wings and control surfaces prior to beginning takeoff. All part 135 certificate holders whose aircraft expect to takeoff in ground icing conditions must complete a pretakeoff contamination check. The part 135 ground deicing rule allows an operator to develop an approved alternative method of checking the aircraft for contamination such as deice sensors. Additionally, part 135 certificate holders may choose to check the aircraft for contamination by complying with the FAR part 121 deicing rule.

7. *Applicability of the part 135 ground deicing rule. a. General.* The FAR part 135 ground deicing rule requires that a certificate holder who has a required, approved training program to incorporate deicing/anti-icing pilot training and pretakeoff contamination check procedures or an approved alternative to the pretakeoff contamination check (alternative aircraft check) into that approved training program. The procedures for a pretakeoff contamination check or the alternative aircraft check should also be in the certificate holder's operations manual and referenced in its operations specifications. The part 135 ground deicing rule does not apply to part 91 operations conducted by a part 135 operator.

b. Certificate holder who does not operate in ground icing conditions. The FAR part 135 ground deicing rule does not apply to a certificate holder who does not operate during ground icing conditions. That certificate holder is not required to train its pilots or develop pretakeoff contamination check procedures. However, that operator's aircraft cannot takeoff under a part 135 operation until ground icing conditions cannot reasonably be expected to exist.

c. FAR part 135 certificate holder who complies with the FAR part 121 ground deicing rule. If approved, a part 135 operator can comply with the FAR part 121 ground deicing rule. However, the operator must comply with the entire FAR part 121 ground deicing rule and not just with selected provisions.

d. Certificate holders who use only one pilot in their operations. Certificate holders who use only one pilot in their operations (single pilot operations) are not required to comply with the manual and approved training program requirements in FAR § 135.21, Manual requirements, and 135.341, Pilot and flight attendant crewmember training programs. Therefore, single pilot operations are not required to have an approved pilot training program nor the additional training required by the FAR part 135 ground deicing rule. However, single pilot operations must comply with all the operational requirements (i.e., pretakeoff contamination check or an approved alternative to the pretakeoff contamination check described in its operations specifications) of the FAR part 135 ground deicing rule. The pilots of these types of operators will need to demonstrate the knowledge required to operate in ground icing conditions during initial and recurrent flight checks. Thus, the information contained in this AC is also applicable to certificate holders who use only one pilot in their operations.

e. Helicopter operations. Helicopters generally do not operate in icing conditions. The FAA's review of icing-related accidents and incidents did not reveal any accident history for helicopter operations that suggest additional training or a special inspection requirement would be necessary. Therefore, helicopter operations conducted under FAR part 135 are excluded from the additional training and aircraft checking requirements of the FAR part 135 ground deicing rule. However, the "clean aircraft" concept still applies to helicopters.

8. *Miscellaneous.* a. *1993 winter season.* Because of the short lead time for implementing the FAR part 135 ground deicing rule, the FAA will allow maximum flexibility in providing the required training for the 1993 winter season. Initial training can be accomplished through the issuance of bulletins, manual revisions, self-grading quizzes, or other review materials. Receipt of training documents by the operator's pilots will satisfy the training requirement for the 1993 winter season. Formal training will be accomplished in the next recurrent training cycle.

b. Associated deicing/anti-icing personnel. The ground deicing rule in FAR part 135 requires additional training for pilots only. If the certificate holder uses additional employees to accomplish deice procedures the FAA anticipate approving such procedures in circumstances in which those additional employees are also be trained in accordance with the certificate holder's training program and manual procedures.

c. Credit for previous training. (1) Part 135. The FAA recognizes that many part 135 training programs contain training on operations in ground icing conditions. A separate training section on deicing in the operator's approved training program is not necessary. Under the part 135 ground deice rule, credit for previous appropriate training given by the operator to its pilots will be granted. Certificate holders can obtain approval by showing those appropriate parts of their current part 135 training program to their POI's along with any appropriate documentation. Certificate holders who do not cover all of the topics required by the part 135 ground deice rule will need to add those topics to their approved training program.

(2) Part 121. Training completed and documented under the part 121 ground deice rule will be accepted and credited, as appropriate, toward training required under the part 135 ground deice rule. To obtain credit for training completed under the part 121 ground deice rule, the training must be appropriate including specific aircraft type and cover the elements required by the Part 135 ground deice rule.

9. *Operational requirement of the FAR part 135 ground deicing rule.* a. *Pretakeoff contamination check.* Except for those FAR part 135 certificate holders who voluntarily choose to comply with the FAR part 121 ground deicing rule or those that develop an approved alternative procedure, each applicable air carrier who operates under FAR part 135 must develop approved procedures for a pretakeoff contamination check of the aircraft. As previously stated, the part 135 ground deice rule does not apply to a certificate holder who does not operate in ground icing conditions. In accordance with FAR § 135.227, the certificate holder's POI must approve the pretakeoff contamination check procedures for each specific type of aircraft operated by the certificate holder. Except for single pilot operations, the procedures for a pretakeoff contamination check should be contained in the certificate holder's approved training program, operations manual, and referenced within the certificate holder's operations specifications. FAR Part 135 single pilot operations will have the pretakeoff contamination procedures described in its operations specifications.

b. Alternative procedure to the pretakeoff contamination check. The Administrator may approve a certificate holder's alternative procedure which ensures that wings and control surfaces are free of frost, ice, or snow, instead of a pretakeoff contamination check. An alternative procedure may include procedures, techniques, or equipment (such as wing icing sensors) to establish that wings and control surfaces are not contaminated. These procedures, techniques, or equipment must be approved by the Administrator and detailed in the operator's training program (if applicable), operations manual (if applicable), and referenced in its operations specifications.

c. Part 135 certificate holder who complies with the FAR part 121 ground deicing rule. The FAR part 135 ground deicing rule allows a certificate holder to comply with FAR § 121.629(c) program requirements. Guidance for development of a FAR part 121 program is contained in AC 121–XX.

10. Training requirements in certificate holder's approved training program. For certificate holders who are required to have an approved training program and who anticipates takeoffs in ground icing conditions, that training program must include pilot ground training in those subjects relating to deicing and anti-icing operations as required by FAR § 135.345 for initial, transition, and upgrade training and FAR § 135.351 for recurrent training. These training requirements must include procedures for operating airplanes during ground icing conditions. That training must include at least the following elements (a more detailed discussion of each of these elements follows):

a. Procedures for the use of holdover timetables when using deicing/anti-icing fluids.

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

c. Communications procedures.

d. Airplane surface contamination

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

e. Types and characteristics of deicing/anti-icing fluids, if used by the certificate holder.

f. Cold weather preflight inspection procedures.

g. Techniques for recognizing contamination on the airplane.

11. *Procedures for the use of holdover timetables when using deicing/anti-icing fluids.* a. *Use of holdover timetables.* Holdover times are only an estimate of the time deicing/anti-icing fluid prevents the formation of frost or ice and the accumulation of snow on the treated surfaces of an aircraft. A holdover time begins when the final application of deicing/anti-icing fluid commences and expires when the deicing/anti-icing fluid applied to the aircraft loses its effectiveness as described in the appropriate holdover timetable. The effectiveness of deicing/anti-icing fluids are based on a number of variables; e.g., temperature, moisture content of the precipitation, wind or aircraft skin temperature. The operational use of holdover timetables is not mandatory for FAR part 135 operations unless the operator elects to comply and the FAA approves its compliance with the FAR part 121 ground deicing rule requirements. Holdover timetables provide information on the effectiveness of deicing/anti-icing fluids and should be used for departure planning and coordination purposes in conjunction with pretakeoff contamination check procedures. Operations manuals should contain detailed procedures for conducting the pretakeoff contamination check. Procedures for using holdover timetables in the operator's manual are required for those operators who are authorized to comply with the part 121 ground deice rule and are recommended for other part 135 operators who conduct takeoff operations in ground icing conditions.

b. Development of holdover timetables. Holdover timetables have been developed by the SAE and the ISO. Each certificate holder may develop their own holdover timetables for use by its personnel, but the timetables must be supported by data acceptable to the Administrator; currently, the SAE/ISO holdover timetables are considered by the FAA to be the only acceptable data for use by FAR part 121 certificate holders. This policy will also apply to FAR part 135 certificate holders. (See Appendix A, Tables 1 and 2). Further guidance regarding holdover timetables is contained in AC 20–117, Hazards Following Ground Deicing and Ground Operations in Conditions Conducive to Aircraft Icing; AC 120–58, Pilot Guide for Large Aircraft Ground Deicing; SAE ARP 4737, Aircraft Deicing/Anti-Icing Methods for Large Transport Aircraft; AC 120–XX, Pilot Guide for Small Aircraft Ground Deicing; and ISO 11076, Aerospace—Aircraft Deicing/Anti-Icing Methods with Fluids.

12. *Aircraft deicing/anti-icing procedures, including inspection and check procedures and responsibilities.* Deicing and anti-icing procedures must be specific to each aircraft type in accordance with FAR § 135.345. Those aircraft-specific procedures should include instructions and checking guidelines for use by their pilots, and if appropriate and authorized, other personnel to determine whether or not aircraft surfaces are free of contaminants. Those aircraft-specific instructions and guidelines should also be in the certificate holder's operations manual, and described their operations specifications.

a. Deicing/anti-icing procedures. Deicing/anti-icing procedures should include, as applicable to each certificate holder:

(1) Methods of deicing (e.g., warm hangar, deicing fluid).

(2) Safety requirements during fluid application.

(3) Aircraft-specific considerations.

(4) Location-specific procedures.

(5) Post deicing/anti-icing checks.

(6) Contractor Deicing. Many certificate holders will utilize contract services, such as aircraft servicing vendors, fixed base operators, or other air carriers to perform deicing/anti-icing. The certificate holder's training program should include the PIC's responsibilities for supervising a contractor who provides deicing/anti-icing services.

b. Deicing/anti-icing checking procedures and responsibilities. The certificate holder's training program must have pilot training on aircraft-specific surface contamination checking to include the following:

(1) Pilot preflight inspection/cold weather preflight inspection procedures. This is the normal walk-around preflight inspection conducted by a pilot. This inspection should be used to note any aircraft surface contamination and direct any required deicing/anti-icing operation.

(2) Pretakeoff contamination check. An aircraft check completed within 5 minutes prior to beginning takeoff to make sure the wings and control surfaces are free of contamination. Each carrier must define the content of the pretakeoff contamination check. The check may be conducted from inside or outside the aircraft, depending upon such factors as atmospheric conditions lighting conditions, aircraft type and ability of the crew to see the relevant aircraft surfaces.

(3) Certificate holders should consider the following guidelines for obtaining approval to conduct the pretakeoff contamination checks from inside the aircraft.

(i) Can some of the surfaces be seen to adequately determine whether or not the wings and control surfaces are free of contaminants? This determination should consider the aircraft type, the method of conducting the check—that is, from the cockpit or cabin; lighting; and atmospheric conditions.

(ii) Does the certificate holder have procedures to recognize, and has the pilot been properly trained to recognize changes in weather conditions to allow the PIC to ascertain whether or not the wings and control surfaces could reasonably be expected to remain free of contaminates?

c. Alternative procedure. The Administrator may approve a certificate holder's alternative procedure, which ensures that wings and control surfaces are free of frost, ice, or snow, instead of a pretakeoff contamination check. An alternative procedure may include procedures, techniques, or equipment (such as wing icing sensors) to establish that wings and control surfaces are not contaminated. Any alternative procedure must be approved by the certificate holder's POI through the manager of the Air Transportation Division and after approval, detailed in the operator's training program (if applicable), operations manual (if applicable), and referenced in its operations specifications.

d. PIC responsibility. Operator developed guidance and procedures should contain a discussion regarding the PIC's responsibility to make the decision on whether or not to takeoff.

e. Aircraft surfaces. The aircraft surfaces, which should be clear of contaminants before takeoff, should be described in the aircraft manufacturers' maintenance manual or other manufacturer-developed documents, such as service or operations bulletins.

(1) Certificate holders should list in their approved training programs and operations manual (which are referenced in the operations specifications) for each type of aircraft used in their operations, the surfaces which should be checked on pilot-conducted preflight inspections and pretakeoff contamination checks.

(2) Generally, the following aircraft surfaces should be clear of contaminants, if the aircraft manufacturer's information is not available:

(i) Propeller, windshield, wing, empennage, stabilizing, and control surfaces.

(ii) Powerplant installation(s) including associated surfaces and systems such as engine inlets and fuel vents.

(iii) Airspeed, altimeter, rate of climb, and flight attitude instrument including associated surfaces or systems such as pitot heads, static ports, and instrument sensor pickup points.

13. *Communications.* a. The PIC should have the following information when deicing/anti-icing with fluids is accomplished:

(1) Fluid type (for example, Type I or Type II).

(2) Fluid/water mix ratio.

(3) Start time of final fluid application/beginning of holdover time.

(4) Verification that the aircraft is free of contamination.

b. ATC coordination.

c. Means for obtaining most current weather information.

14. *Airplane surface contamination.* a. Certificate holders should include training which ensures that the pilots understand the following:

(1) Freezing Precipitation. Snow, sleet, freezing rain, drizzle, or hail which adheres to aircraft surfaces.

(2) Frost, including hoarfrost, is a crystallized deposit, formed from water vapor on surfaces which are at or below 0°C (32°F).

(3) Freezing Fog. Clouds of supercooled water droplets that form a deposit of ice on objects in cold weather conditions.

(4) Snow. Precipitation in the form of small ice crystals or flakes which may accumulate on or adhere to aircraft surfaces.

(5) Freezing Rain. Water condensed from atmospheric vapor falling to earth in supercooled drops, forming ice on objects.

(6) Rain or High Humiditv (on Cold-Soaked Wing). Water forming ice or frost on the wing surface when the temperature of the aircraft wing surface is at or below 0°C (32°F). Some aircraft may be susceptible to the formation of frost or ice on wing surfaces when the wing surfaces are cold-soaked and the aircraft is exposed to conditions of high humidity, rain, drizzle, or fog at ambient temperatures above freezing.

(7) Underwing Frost. Takeoff with frost under the wing in the area of the fuel tanks (caused by cold-soaked fuel) within limits established by the aircraft manufacturer, authorized by FAA aircraft certification offices, and stated in aircraft maintenance and flight manuals may be permitted.

b. Effects of frost, ice, snow, and slush on aircraft performance, stability, and control. The certificate holder should obtain this information from the manufacturer of each type of aircraft it uses in its operations and should ensure that its pilots are trained in the following effects of contamination on aircraft performance.

(1) Increased drag/weight.

(2) Tendency for rapid pitch-up during rotation or wing roll off.

(3) Loss of lift.

(4) Stall occurs at lower-than-normal angle of attack.

(5) Buffet or stall occurs before activation of stall warning.

(6) Decreased effectiveness of flight controls.

15. *Types and characteristics of deicing/anti-icing fluids.* (a) Certificate holders should refer to the following SAE publications for additional information on specific deicing and anti-icing methods and procedures and on fluid characteristics and capabilities: AMS 1424, Deicing/Anti-Icing Fluid, Aircraft, Newtonian—SAE Type I; AMS 1428, Fluid, Aircraft Deicing/Anti-Icing, Non-Newtonian, Pseudo-Plastic, SAE Type II; and ARP 4737, Aircraft Deicing/Anti-Icing Methods with Fluids, for Large Transport Aircraft; and the following ISO documents: ISO 11075, Aerospace—Aircraft de-icing/anti-icing newtonian fluids ISO type I; ISO 11076, Aerospace—Aircraft de-icing/anti-icing methods with fluids; ISO 11077, Aerospace—de-icing/anti-icing self propelled vehicles—Functional requirements; ISO 11078, Aerospace—Aircraft de-icing/anti-icing non-newtonian fluids ISO type II.

(b) If the certificate holder intends to use deicing/anti-icing fluids for ground deicing, the types and characteristics of deicing/anti-icing fluids should be included in the certificate holder's training program and operations manual. Deicing and anti-icing fluids with differing characteristics and capabilities exist; they may undergo improvements, and new types of fluids may be developed. Certificate holders should ensure that their pilots are knowledgeable about the characteristics of each type of fluid used.

Certificate holders should ensure that the following subjects are discussed, as applicable:

(1) Deicing fluids.

(i) Heated water.

(ii) Newtonian fluid (SAE/ISO Type I) (see Caution).

(iii) Mixtures of water and SAE/ISO Type I fluid.

(iv) Mixtures of water and SAE/ISO Type II fluid.

Note: Deicing fluid should be applied heated to assure maximum efficiency.

b. Anti-icing fluids:

(i) Newtonian fluid (SAE/ISO Type I) (see CAUTION).

(ii) Mixtures of water and SAE/ISO Type I fluid.

(iii) Non-Newtonian fluid (SAE/ISO Type II).

(iv) Mixtures of water and SAE/ISO Type II fluid.

Note: SAE/ISO Type II anti-icing fluid is normally applied cold on clean aircraft surfaces, but may be applied heated. Cold SAE/ISO Type II fluid normally provides longer anti-icing protection. SAE/ISO Type I anti-icing fluid should be applied heated.

c. Fluid Characteristics.

(1) Type I Fluids.

(i) Unthickened.

(ii) Limited holdover time.

(iii) Applied to form thin liquid film on wing.

(2) Type II Fluids.

(i) Thickened.

(ii) Longer holdover times in comparison to those of Type I fluids.

(iii) Application results in a thick liquid film (a gel-like consistency) on wing.

(iv) Wind flow over the wing (shear) causes the fluid to progressively flow off the wing during takeoff.

(3) Deicing/Anti-Icing Fluids Handling/Performance Implications. The type fluid used and how completely the fluid flows off the wing during takeoff determines the effects of the following handling/performance factors. The aircraft manufacturer may also provide performance information regarding the use of the different deicing/anti-icing fluids.

(i) Increased rotation speeds/ increased field length.

(ii) Increased control (elevator) pressures on takeoff.

(iii) Increased stall speeds/reduced stall margins.

(iv) Lift loss at climbout/increased pitch attitude.

(v) Increased drag during acceleration/increased field length.

(vi) Increased drag during climb.

16. *Cold weather preflight inspection procedures.* a. Pilot preflight inspection/ cold weather preflight inspection procedures. This is the normal walk-around preflight inspection conducted by a pilot. This inspection should be used to note any aircraft surface contamination and initiate any required deicing/anti-icing operations.

b. A thorough preflight inspection is

more important in temperature extremes because those temperature extremes may affect the aircraft or its performance. At extremely low temperatures, the urge to hurry the preflight of the aircraft is natural, particularly when the aircraft is outside and adverse weather conditions exists, which make the preflight physically uncomfortable for the pilots. This is the very time to perform the most thorough preflight inspection.

c. Aircraft areas that require special attention during a preflight during cold weather operations depend on the aircraft design and should be identified in the certificate holder's training program. The preflight should include all items recommended by the aircraft manufacturer. A preflight should include items appropriate to the specific aircraft type. Generally, those items may include:

(1) Wing leading edges, upper and lower surfaces.

(2) Vertical and horizontal stabilizing devices, leading edges, upper surfaces, lower surfaces, and side panels.

(3) Lift/drag devices such as trailing edge flaps.

(4) Spoilers and speed brakes.

(5) All control surfaces and control balance bays.

(6) Propellers.

(7) Engine inlets, particle separators, and screens.

(8) Windshields and other windows necessary for visibility.

(9) Antennas.

(10) Fuselage.

(11) Exposed instrumentation devices such as angle-of-attack vanes, pitot-static pressure probes, and static ports.

(12) Fuel tank and fuel cap vents.

(13) Cooling and auxiliary power unit (APU) air intakes, and exhausts.

(14) Landing gear.

d. Blowing Snow: If an aircraft is exposed to blowing snow, special attention should be given to openings in the aircraft where snow can enter, freeze, and obstruct normal operations. The following openings should be free of snow and ice before flight:

(1) Pitot tubes and static system sensing ports.

(2) Wheel wells.

(3) Heater intakes.

(4) Engine air intakes and carburetor intakes.

(5) Elevator and rudder controls.

(6) Fuel vents.

17. *Techniques for recognizing contamination on the airplane.* a. Certificate holders should have aircraft-specific techniques for the use of their pilots (and other personnel, if applicable) to recognize contamination on aircraft surfaces and indications of loss of effectiveness of fluids.

b. Some indications for loss of effectiveness of deicing/anti-icing fluid or contamination on aircraft surfaces include:

(1) Progressive surface freezing or snow accumulation.

(2) Random snow accumulation.

(3) Dulling of surface reflectivity (loss of gloss) caused by the gradual deterioration of the fluid to slush.

(4) Fluid characteristics and indications that the fluid is losing its effectiveness obtained from the deicing/anti-icing fluid manufacturers.

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