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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2015-0310; Special Conditions No. 25-732-SC]

Special Conditions: Gulfstream Aerospace Corporation Model GVII-G500 Series Airplanes; Flight Envelope Protection—High Incidence Protection System

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Gulfstream Aerospace Corporation (Gulfstream) Model GVII-G500 series airplanes. This airplane will have a novel or unusual design feature when compared to the state of technology and design envisioned in the airworthiness standards for transport category airplanes. This design feature is a high incidence protection system that limits the angle of attack at which the airplane can be flown during normal low speed operation. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: This action is effective on [INSERT DATE PUBLICATION IN THE FEDERAL REGISTER].

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SUPPLEMENTARY INFORMATION:

Background

On June 30, 2013, Gulfstream Aerospace Corporation (Gulfstream) applied for a type certificate for its new Model GVII-G500 series airplane. The Gulfstream Model GVII-G500 series airplane will be a business jet with seating for up to 19 passengers. It will incorporate a low, swept-wing design with a T-tail. The powerplant will consist of two aft-fuselage-mounted turbofan engines. The Gulfstream Model GVII-G500 series airplane's maximum takeoff weight will be approximately 79,600 pounds.

The high incidence protection system prevents the airplane from stalling at low speeds and, therefore, a stall warning system is not needed during normal flight conditions.

Type Certification Basis

Under the provisions of title 14, Code of Federal Regulations (14 CFR) 21.17, Gulfstream must show that the Model GVII-G500 series airplane meets the applicable provisions of 14 CFR part 25, as amended by amendments 25-1 through 25-137.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the Gulfstream Model GVII-G500 series airplane because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model

that incorporates the same novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Gulfstream Model GVII-G500 series airplane must comply with the fuel vent and exhaust emission requirements of 14 CFR part 34, and the noise certification requirements of 14 CFR part 36.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type certification basis under § 21.17(a)(2).

Novel or Unusual Design Features

The Gulfstream Model GVII-G500 series airplane will incorporate the following novel or unusual design feature:

A high incidence protection system, which limits the angle of attack at which the airplane can be flown during normal low speed operation, prohibits the airplane from stalling, and cannot be overridden by the flightcrew. The application of this angle of attack limit influences the stall speed determination, stall characteristics, stall warning demonstration, and longitudinal handling characteristics of the airplane. Existing airworthiness regulations do not contain adequate standards to address this feature.

Discussion

The high incidence protection system prevents the airplane from stalling at low speeds and, therefore, a stall warning system is not needed during normal flight conditions. However, during failures, which are not shown to be extremely improbable, the requirements of §§ 25.203 and 25.207 apply, although slightly modified by these conditions. If there are failures of the high incidence protection system that are not shown

to be extremely improbable, the flight characteristics at the angle of attack for C_{LMAX} must be suitable in the traditional sense, and stall warning must be provided in a conventional manner.

Part I of the special conditions is in lieu of §§ 25.21(b), 25.103, 25.145(a), 25.145(b)(6), 25.175(c) and (d), 25.201, 25.203, 25.207, and 25.1323(d). Part II is in lieu of §§ 25.21(g)(1), 25.105(a)(2)(i), 25.107(c) and (g), 25.121(b)(2)(ii)(A), 25.121(c)(2)(ii)(A), 25.121(d)(2)(ii), 25.123(b)(2)(i), 25.125(b)(2)(ii)(B), and 25.143(j).

These special conditions address this novel or unusual design feature on the Gulfstream Model GVII-G500 series airplane, and contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

These special conditions are different from special conditions previously issued on this topic. In Part I, sections 3.b.iv, 3.b.vi, 3.e.vi, 5.a.i.1, 5.a.i.4, 5.a.i.6, 5.a.i.7, 5.c.i.4, 5.c.i.5, 5.c.i.6, 5.c.ii.4, and 5.c.ii.5, previously used verbiage was updated to reflect language recommended in the Aviation Rulemaking Advisory Committee (ARAC) Flight Test Harmonization Working Group (FTHWG) Phase 2 report. This language more accurately describes the actions required and formulas to be used to obtain the required result. In Part I, sections 3.b.ii and 5.a.ii.4, the ARAC FTHWG language was adapted to reflect specific Gulfstream design features.

In several previous special conditions on this subject, we used the nomenclature V_{CLMAX}. To avoid confusion with previous Gulfstream special conditions, we have changed the nomenclature to $V_{CLMAX\ Demo}$ to highlight a difference. The difference is not

significant, but the change in nomenclature was considered clarifying and therefore was adopted in this instance.

Discussion of Comments

The FAA issued Notice of Proposed Special Conditions No. 25-18-02-SC for the Gulfstream Model GVII-G500 series airplane, which was published in the *Federal Register* on May 14, 2018 (83 FR 22214). The FAA received one comment that was not relevant to the subject of these special conditions. Therefore, the special conditions are adopted as proposed.

Applicability

As discussed above, these special conditions are applicable to the Gulfstream Model GVII-G500 series airplane. Should Gulfstream apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, these special conditions would apply to that model as well.

Under standard practice, the effective date of final special conditions would be 30 days after the date of publication in the *Federal Register*. However, as the certification date for the Gulfstream Model GVII-G500 series airplane is imminent, the FAA finds that good cause exists to make these special conditions effective upon publication.

Conclusion

This action affects only certain novel or unusual design features on Gulfstream Model GVII-G500 series of airplanes. It is not a rule of general applicability.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

Authority Citation

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(f), 106(g), 40113, 44701, 44702, 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for Gulfstream Model GVII-G500 series airplanes.

Part I: Stall Protection and Scheduled Operating Speeds

In the following sections, "in icing conditions," means with ice accretions (relative to the relevant flight phase) as defined in appendix C to part 25, at amendment 25-121.

1. Definitions

These special conditions use terminology that does not appear in 14 CFR part 25. For the purpose of these special conditions, the following terms describe certain aspects of this novel or unusual design feature:

High-incidence protection system

A system that operates directly and automatically on the airplane's flight controls to limit the maximum angle of attack that can be attained to a value below that at which an aerodynamic stall would occur.

Alpha-limit

The maximum angle of attack at which an airplane stabilizes with the high incidence protection system operating and the longitudinal control held on its aft stop.

V_{MIN}

The minimum steady flight speed in the airplane's configuration under consideration with the high incidence protection system operating. See Part I, Section 3, "Minimum Steady Flight Speed and Reference Stall Speed," of these special conditions.

V_{MIN1g}

V_{MIN} corrected to 1g acceleration of gravity conditions. See Part I, Section 3, "Minimum Steady Flight Speed and Reference Stall Speed," of these special conditions. This is the minimum calibrated airspeed at which the airplane can develop a lift force normal to the flight path and equal to its weight when at an angle of attack not greater than that determined for V_{MIN}.

2. Capability and Reliability of the High Incidence Protection System

The applicant must establish the capability and reliability of the high incidence protection system. The applicant may establish this capability and reliability by flight testing, simulation, or analysis as appropriate. The capability and reliability required are:

a. It must not be possible to encounter a stall during the pilot-induced maneuvers required by Part I, section 5(a), "High Incidence Handling Demonstrations," and the handling characteristics must be acceptable as required by Part I, section 5(b), "Characteristics in High Incidence Maneuvers" of these special conditions;

b. The airplane must be protected against stalling due to the effects of wind shears and gusts at low speeds as required by Section 6, "Atmospheric Disturbances" of these special conditions;

c. The ability of the high incidence protection system to accommodate any reduction in stalling incidence must be verified in icing conditions;

d. The high incidence protection system must be provided in each abnormal configuration of the high lift devices that is likely to be used in flight following system failures; and

e. The reliability of the system and the effects of failures must be acceptable in accordance with § 25.1309.

3. Minimum Steady Flight Speed and Reference Stall Speed

In lieu of § 25.103, "Stall speed," the following applies:

a. The minimum steady flight speed, V_{MIN}, is the final, stabilized, calibrated airspeed obtained when an airplane is decelerated until the longitudinal control is on its stop in such a way that the entry rate does not exceed 1 knot per second.

b. The minimum steady flight speed, V_{MIN}, must be determined in icing and non-icing conditions with:

i. The high incidence protection system operating normally;

ii. Idle thrust;

iii. All combinations of flap settings and landing gear positions for which V_{MIN} is required to be determined;

iv. The weight used when the reference stall speed, V_{SR}, is used as a factor to determine compliance with a required performance standard;

v. The most unfavorable center of gravity (CG) allowable; and

vi. The airplane trimmed for straight flight at a speed selected by the applicant, but not less than 1.13 V_{SR} and not greater than 1.3 V_{SR}.

c. The 1g minimum steady flight speed, V_{MIN1g}, is the minimum calibrated airspeed at which an airplane can develop a lift force (normal to the flight path) equal to its weight, while at an angle of attack not greater than that at which the minimum steady flight speed referenced in section 3(a) of this special condition is determined. These minimum calibrated airspeeds must be determined for both icing and non-icing conditions.

d. The reference stall speed, V_{SR}, is a calibrated airspeed defined by the applicant. V_{SR} may not be less than a 1g stall speed. V_{SR} must be determined in non-icing conditions and expressed as:

$$V_{SR} \geq \frac{V_{CLMAX\ Demo}}{\sqrt{n_{ZW}}}$$

Where:

$V_{CLMAX\ Demo}$ = Demonstrated calibrated airspeed obtained when the corrected lift coefficient of the load factor $\left(\frac{n_{ZW}W}{qS}\right)$ is first a maximum

during the maneuver prescribed in section 3(e)(viii) of this special condition.

n_{ZW} = Load factor normal to the flight path at $V_{CLMAX\ Demo}$

W = Airplane gross weight;

S = Aerodynamic reference wing area; and

q = Dynamic pressure.

e. $V_{CLMAX\ Demo}$ is determined in non-icing conditions with:

i. Engines idling, or, if that resultant thrust causes an appreciable decrease in stall speed, not more than zero thrust at the stall speed;

ii. The airplane in other respects (such as flaps and landing gear) in the condition existing in the test or performance standard in which V_{SR} is being used;

iii. The weight used when V_{SR} is being used as a factor to determine compliance with a required performance standard;

iv. The CG position that results in the highest value of the reference stall speed;

v. The airplane trimmed for straight flight at a speed selected by the applicant, but not less than 1.13 V_{SR} and not greater than 1.3 V_{SR};

vi. At the option of the applicant, the high incidence protection system can be disabled or adjusted to allow full development of the maneuver to the angle of attack corresponding to V_{SR}; and

vii. Starting from the stabilized trim condition, with an application of the longitudinal control to decelerate the airplane so that the speed reduction does not exceed 1 knot per second.

4. Stall Warning

In lieu of § 25.207, the following apply:

a. Normal operation

If the design meets all conditions of Part I, section 2 of these special conditions, then the airplane need not provide stall warning during normal operation. The conditions of Part I, section 2 provide a level of safety equal to the intent of § 25.207, "Stall warning," so the provision of an additional, unique warning device for normal operations is not required.

b. High Incidence Protection System Failure

For any failures of the high incidence protection system that the applicant cannot show to be extremely improbable, and that result in the capability of the system no longer satisfying any part of sections 2(a), (b), and (c) of Part I of these special conditions: The design must provide stall warning that protects against encountering unacceptable characteristics and against encountering stall.

i. This stall warning, with the flaps and landing gear in any normal position, must be clear and distinctive to the pilot, and must meet the requirements specified in sections 4(b)(iv) and 4(b)(v) of Part I of these special conditions.

ii. The design must also provide this stall warning in each abnormal configuration of the high lift devices that is likely to be used in flight following system failures.

iii. The design may furnish this stall warning either through the inherent aerodynamic qualities of the airplane or by a device that will provide clearly distinguishable indications to the flightcrew under all expected conditions of flight. However, a visual stall warning device that requires the attention of the flightcrew within the flight deck is not acceptable by itself. If a warning device is used, it must provide a warning in each of the airplane configurations prescribed in section 4(b)(i), above, and for the conditions prescribed in sections 4(b)(iv) and 4(b)(v) of part I of these special conditions.

iv. In non-icing conditions, the stall warning must provide sufficient margin to prevent encountering unacceptable characteristics and encountering stall in the following conditions:

1. In power-off straight deceleration not exceeding 1 knot per second to a speed of 5 knots or 5 percent calibrated airspeed (CAS), whichever is greater, below the warning onset; and
2. In turning flight, stall deceleration at entry rates up to 3 knots per second when recovery is initiated not less than 1 second after the warning onset.

v. In icing conditions, the stall warning must provide sufficient margin to prevent encountering unacceptable characteristics and encountering stall in power-off straight and turning flight decelerations not exceeding 1 knot per second, when the pilot starts a recovery maneuver not less than three seconds after the onset of stall warning.

vi. An airplane is considered stalled when the behavior of the airplane gives the pilot a clear, distinctive, and acceptable indication that the airplane is stalled. Acceptable indications of a stall, occurring either individually or in combination, are:

1. A nose-down pitch that cannot be readily arrested;
2. Buffeting of a magnitude and severity that is strong and thereby an effective deterrent to further speed reduction; or
3. The pitch control reaches the aft stop, and no further increase in pitch attitude occurs when the control is held full aft for a short time before recovery is initiated.

vii. An airplane exhibits unacceptable characteristics during straight or turning flight decelerations if it is not always possible to produce and to correct roll and yaw by unreversed use of aileron and rudder controls, or abnormal nose-up pitching occurs.

5. Handling Characteristics at High Incidence

a. High Incidence Handling Demonstrations

In lieu of § 25.201, "Stall demonstration," the following is required:

i. Maneuvers to the limit of the longitudinal control, in the nose-up sense, must be demonstrated in straight flight and in 30-degree banked turns with:

1. The high incidence protection system operating normally;
2. Initial power conditions of:
    a. Power off; and
    b. Power necessary to maintain level flight at 1.5 V_{SR1}, where V_{SR1} is the reference stall speed with flaps in approach position, landing gear retracted, and maximum landing weight;
3. None;
4. Flaps, landing gear, and deceleration devices in any likely combination of positions not prohibited by the airplane flight manual (AFM);
5. Representative weights within the range for which certification is requested;
6. The most adverse CG for recovery; and
7. The airplane trimmed for straight flight at the speed prescribed in section 3(e)(v) of these special conditions.

ii. The following procedures must be used to show compliance in non-icing and icing conditions:

1. Starting at a speed sufficiently above the minimum steady flight speed to ensure that a steady rate of speed reduction

can be established, apply the longitudinal control so that the speed reduction does not exceed 1 knot per second until the control reaches the stop.

2. The longitudinal control must be maintained at the stop until the airplane has reached a stabilized flight condition, and must then be recovered by normal recovery techniques.
3. Maneuvers with increased deceleration rates:
    a. In non-icing conditions, the requirements must also be met with increased rates of entry to the incidence limit, up to the maximum rate achievable.
    b. In icing conditions, with the anti-ice system working normally, the requirements must also be met with increased rates of entry to the incidence limit, up to three knots per second.
4. Maneuvers with ice accretion prior to normal operation of the ice protection system:

    For flight in icing conditions before the ice protection system has been activated and is performing its intended function, the handling demonstration requirements identified in section 5(a)(i) must be satisfied using the procedures specified in sections 5(a)(ii)(1) and 5(a)(ii)(2) of these special conditions. The airplane configurations required to be tested must be in accordance with the

limitations and procedures for operating the ice protection system provided in the AFM, per § 25.21(g)(1), as modified by and Part II of these special conditions.

b. Characteristics in High Incidence Maneuvers

In lieu of § 25.203, "Stall characteristics," the following apply:

i. Throughout maneuvers with a rate of deceleration of not more than 1 knot per second, both in straight flight and in 30-degree banked turns, the airplane's characteristics must be as follows:

1. There must not be any abnormal nose-up pitching;
2. There must not be any uncommanded nose-down pitching, which would be indicative of stall. However, reasonable attitude changes associated with stabilizing the incidence at Alpha limit, as the longitudinal control reaches the stop would be acceptable;
3. There must not be any uncommanded lateral or directional motion, and the pilot must retain good lateral and directional control by conventional use of the controls throughout the maneuver; and
4. The airplane must not exhibit buffeting of a magnitude and severity that would act as a deterrent from completing the maneuver specified in section 5(a)(i) of these special conditions.

ii. In maneuvers with increased rates of deceleration, some degradation of characteristics is acceptable, associated with a transient excursion beyond the stabilized Alpha limit. However, the airplane must not exhibit dangerous characteristics or characteristics that would deter the pilot from holding the longitudinal control on the stop for a period of time appropriate to the maneuver.

iii. It must always be possible for flightcrew to reduce incidence by conventional use of the controls.

iv. The rate at which the airplane can be maneuvered from trim speeds, associated with scheduled operating speeds such as V_2 and V_{REF} up to Alpha limit, must not be unduly damped or be significantly slower than can be achieved on conventionally controlled transport airplanes.

c. Characteristics up to the Maximum Lift Angle of Attack

In addition to the requirements in section 5(b) of this special condition, the following requirements apply:

i. In non-icing conditions, maneuvers with a rate of deceleration of not more than 1 knot per second, up to the angle of attack corresponding to V_{SR} obtained using sections 3(d) and (e) of this special condition, must be demonstrated in straight flight and in 30-degree banked turns in the following configurations:

1. The high incidence protection system deactivated or adjusted, at the option of the applicant, to allow higher incidence than is possible with the normal production system;
2. Automatic-thrust-increase system inhibited (if applicable);
3. Engines idling;
4. Flaps, landing gear, and deceleration devices in any likely combination of positions not prohibited by the AFM;
5. The most adverse CG for recovery; and
6. The airplane trimmed for straight flight at the speed prescribed in section 3(e)(v) of this special condition.

ii. In icing conditions, maneuvers with a rate of deceleration of not more than 1 knot per second up to the maximum angle of attack reached during maneuvers from section 5(a)(ii)(3)(b) must be demonstrated in straight flight with:

1. The high incidence protection system deactivated or adjusted, at the option of the applicant, to allow higher incidence than is possible with the normal production system;
2. Automatic-thrust-increase system inhibited (if applicable);
3. Engines idling;
4. Flaps, landing gear, and deceleration devices in any likely combination of positions not prohibited by the AFM;

5. The most adverse CG for recovery; and

6. The airplane trimmed for straight flight at the speed prescribed in section 3(e)(v) of this special condition.

iii. During the maneuvers used to show compliance with sections 5(c)(i) and 5(c)(ii) of Part I of these special conditions, the airplane must not exhibit dangerous characteristics and it must always be possible for flightcrew to reduce angle of attack by conventional use of the controls. The pilot must retain good lateral and directional control, by conventional use of the controls, throughout the maneuver.

6. Atmospheric Disturbances

Operation of the high incidence protection system must not adversely affect airplane control during expected levels of atmospheric disturbances, nor impede the application of recovery procedures in case of wind shear. This must be demonstrated in non-icing and icing conditions.

7. None.

8. Proof of Compliance

Add the following requirement to that of § 25.21:

(b) The flying qualities will be evaluated at the most unfavorable CG position.

9. The design must meet the following modified requirements:

14 CFR section	Change
25.145(a)	"V_{MIN}" in lieu of "stall identification"
25.145(b)(6)	"V_{MIN}" in lieu of "V_{SW}"
25.175(c) and (d)	"V_{MIN}" in lieu of "V_{SW}"
25.1323(d)	"From 1.23 V_{SR} to V_{MIN}" in lieu of "From 1.23 V_{SR} to the speed at which stall warning begins;" and "speeds below V_{MIN}" in lieu of "speeds below stall warning speed."

Part II: Credit for Robust Envelope Protection in Icing Conditions

1. In lieu of § 25.21(g)(1), the following applies:

   (g) The requirements of this subpart associated with icing conditions apply only if certification for flight in icing conditions is desired. If certification for flight in icing conditions is desired, the following requirements also apply (see AC 25-25):

   (1) Each requirement of this subpart, except §§ 25.121(a), 25.123(c), 25.143(b)(1) and (b)(2), 25.149, 25.201(c)(2), 25.207(c) and (d), and 25.251(b) through (e), must be met in icing conditions. Compliance must be shown using the ice accretions defined in appendix C to part 25, assuming normal operation of the airplane and its ice protection system in accordance with the operating limitations and operating procedures established by the applicant and provided in the airplane flight manual.

2. In lieu of § 25.103, "Stall speed," define the stall speed as provided in Special Conditions Part I, section 3, "*Minimum Steady Flight Speed and Reference Stall Speed."*

3. In lieu of § 25.105(a)(2)(i) to read as follows:

(2) In icing conditions, if in the configuration of § 25.121(b) with the "Takeoff Ice" accretion defined in appendix C to part 25:

(i) the V2 speed scheduled in non-icing conditions does not provide the maneuvering capability specified in § 25.143(h) for the takeoff configuration, or

4. In lieu of § 25.107(c) and (g), the following apply, with additional sections (c') and (g'):

(c) In non-icing conditions, V_2, in terms of calibrated airspeed, must be selected by the applicant to provide at least the gradient of climb required by § 25.121(b) but may not be less than—

1. V_{2MIN};
2. V_R plus the speed increment attained (in accordance with § 25.111(c)(2)) before reaching a height of 35 feet above the takeoff surface; and
3. A speed that provides the maneuvering capability specified in § 25.143(h).

(c') In icing conditions with the "Takeoff Ice" accretion defined in appendix C to part 25, V_2 may not be less than—

1. The V_2 speed determined in non-icing conditions.
2. A speed that provides the maneuvering capability specified in § 25.143(h).

(g) In non-icing conditions, V_{FTO}, in terms of calibrated airspeed, must be selected by the applicant to provide at least the gradient of climb required by § 25.121(c), but may not be less than—

1. 1.18 V_{SR}; and
2. A speed that provides the maneuvering capability specified in § 25.143(h).

(g') In icing conditions with the "Final Takeoff Ice" accretion defined in appendix C to part 25, V_{FTO} may not be less than—

1. The V_{FTO} speed determined in non-icing conditions.
2. A speed that provides the maneuvering capability specified in § 25.143(h).

5. In lieu of §§ 25.121(b)(2)(ii)(A), 25.121(c)(2)(ii)(A), and 25.121(d)(2)(ii), the following apply:

§ 25.121 Climb: one-engine inoperative:

(b) Takeoff; landing gear retracted. In the takeoff configuration existing at the point of the flight path at which the landing gear is fully retracted, and in the configuration used in § 25.111, but without ground effect,

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2. The requirements of subparagraph (b)(1) of this section must be met:

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(ii) In icing conditions with the "Takeoff Ice" accretion defined in appendix C of part 25, if in the configuration of § 25.121(b) with the "Takeoff Ice" accretion:

(A) The V_2 speed scheduled in non-icing conditions does not provide the maneuvering capability specified in § 25.143(h) for the takeoff configuration; or

(c) Final takeoff. In the en route configuration at the end of the takeoff path determined in accordance with § 25.111:

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2. The requirements of subparagraph (c)(1) of this section must be met:

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(ii) In icing conditions with the "Final Takeoff Ice" accretion defined in appendix C of part 25, if:

(A) The V_{FTO} speed scheduled in non-icing conditions does not provide the maneuvering capability specified in § 25.143(h) for the en route configuration; or

(d) Approach. In a configuration corresponding to the normal all-engines operating procedure in which V_{SR} for this configuration does not exceed 110 percent of the V_{SR} for the related all-engines-operating landing configuration:

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2. The requirements of sub-paragraph (d)(1) of this section must be met:

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(ii) In icing conditions with the "Approach Ice" accretion defined in appendix C to part 25, in a configuration corresponding to the normal all-engines-operating procedure in which V_{MIN1g} for this configuration does not exceed 110% of the V_{MIN1g} for the related all engines-operating landing configuration in icing, with a climb speed established with normal landing procedures, but not more than 1.4 V_{SR} (V_{SR} determined in non-icing conditions).

6. In lieu of § 25.123 (b)(2)(i), the following applies:

§ 25.123 En route flight paths:

(b) The one-engine-inoperative net flight path data must represent the actual climb performance diminished by a gradient of climb of 1.1 percent for two-engine airplanes, 1.4 percent for three-engine airplanes, and 1.6 percent for four-engine airplanes.

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2. In icing conditions with the "En route Ice" accretion defined in appendix C to part 25 if:

(i) The minimum en route speed scheduled in non-icing conditions does not provide the maneuvering capability specified in § 25.143(h) for the en route configuration, or

7. In lieu of § 25.125(b)(2)(ii)(B) and § 25.125(b)(2)(ii)(C), the following applies:

§ 25.125 Landing

(b) In determining the distance in (a):

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2. A stabilized approach, with a calibrated airspeed of not less than V_{REF}, must be maintained down to the 50-foot height.

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(ii) In icing conditions, V_{REF} may not be less than:

(A) The speed determined in sub-paragraph (b)(2)(i) of this section;

(B) A speed that provides the maneuvering capability specified in § 25.143(h) with the "Landing Ice" accretion defined in appendix C to part 25.

8. In lieu of § 25.143(j), the following applies:

§ 25.143 General

(j) For flight in icing conditions—before the ice protection system has been activated and is performing its intended function—the following requirements apply:

(1) If activating the ice protection system depends on the pilot seeing a specified ice accretion on a reference surface (not just the first indication of icing), the requirements of § 25.143 apply with the ice accretion defined in part II(e) of appendix C to part 25.

(2) For other means of activating the ice protection system, it must be demonstrated in flight with the ice accretion defined in part II(e) of appendix C to part 25 that:

(i) The airplane is controllable in a pull-up maneuver up to 1.5 g load factor or lower if limited by AOA protection; and

(ii) There is no reversal of pitch control force during a pushover maneuver down to 0.5 g load factor.

9. In lieu of § 25.207, "Stall warning," to read as the requirements defined in Part I of these special conditions.

Issued in Des Moines, Washington, on July 9, 2018.

/s/

Victor Wicklund
Manager, Transport Standards Branch
Policy and Innovation Division
Aircraft Certification Service
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