



CONDIÇÃO ESPECIAL

CE/SC nº 23 – 002

Título: **Condição Especial Aplicável às Características de Voo e Limitações Operacionais**

Title: **Special Condition for Flight Characteristics and Operating Limitations**

Aprovação: Resolução nº 126, de 1º de dezembro de 2009, publicada no Diário Oficial da União, Nº 230, S/1, p. 35, de 2/12/2009

Origem: SAR

APLICABILIDADE

Esta condição especial se aplica às características de voo e limitações operacionais do avião Embraer EMB-505.

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Esta condição especial altera as seções 23.177, 23.181, 23.201, 23.203, 23.251, 23.253, 23.1505, e 23.1583, do RBHA 23, emenda 23-55, e introduz a seção SC RBHA 23.255

“§ SC 23-002 Special Condition for Flight Characteristics and Operating Limitations.

SC RBHA 23.177 - Static directional and lateral stability.

RBHA 23.177(a) - Replace “up to the maximum allowable speed for the condition being investigated” with “up to VFE, VLE, or VFC/MFC, whichever is appropriate.”

RBHA 23.177(b) - Replace “up to the maximum allowable speed for the condition being investigated” with “up to VFE, VLE, or VFC/MFC, whichever is appropriate.”

SC RBHA 23.181(d) – Dynamic Stability.

Instead of compliance with RBHA Part 23.181 (d), the following apply:

“(d) During the conditions as specified in RBHA Part 23.175, when the longitudinal control force required to maintain speeds differing from the trim speed by at least plus and minus 15 percent or 15 kts, whichever is less, is released, the response of the airplane must not exhibit any dangerous characteristics nor be excessive in relation to the magnitude of the control force released. Any long-period oscillation of flight path, phugoid oscillation, that results must not be so unstable as to increase the pilot's workload or otherwise endanger the airplane.”

SC RBHA 23.201(e) - Wings level stall.

Instead of compliance with RBHA 23.201(e), the following apply:

“(e) Compliance with the requirements of this section must be shown under the following conditions:

(1) The flaps, landing gear, and speed brakes in any likely combination of positions and altitudes appropriate for the various positions.

(2) Thrust-

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- (i) Idle; and
 - (ii) The thrust necessary to maintain level flight at 1.6 VS1, (where VS1, corresponds to the stalling speed with flaps in the approach position, the landing gear retracted, and maximum landing weight).
 - (3) Trim at 1.4 VS1 or the minimum trim speed, whichever is higher.”

SC RBHA 23.203 - Turning flight and accelerated turning stalls.

Instead of compliance with RBHA 23.203(c), the following apply:

“(c) Compliance with the requirements of this section must be shown under the following conditions:

- (1) The flaps, landing gear, and speed brakes in any likely combination of positions and altitudes appropriate for the various positions.
- (2) Thrust-
 - (i) Idle; and
 - (ii) The thrust necessary to maintain level flight at 1.6 VS1, (where VS1, corresponds to the stalling speed with flaps in the approach position, the landing gear retracted, and maximum landing weight).
- (3) Trim at 1.4 VS1 or the minimum trim speed, whichever is higher.”

SC RBHA 23.251 - Vibration and buffeting.

Instead of compliance with RBHA 23.251, the following apply:

- “(a) The airplane must be demonstrated in flight to be free from any vibration and buffeting that would prevent continued safe flight in any likely operating condition.
- (b) Each part of the airplane must be shown in flight to be free from excessive vibration under any appropriate speed and thrust conditions up to VDF/MDF. The maximum speeds shown must be used in establishing the operating limitations of the airplane in accordance with special condition SC 23.1505.
- (c) Except as provided in paragraph (d) of this special condition, there may be no buffeting condition, in normal flight, including configuration changes during cruise, severe enough to interfere with the control of the airplane, to cause excessive fatigue to the crew, or to cause structural damage. Stall warning buffeting within these limits is allowable.
- (d) There may be no perceptible buffeting condition in the cruise configuration in straight flight at any speed up to VMO/MMO, except that stall-warning buffeting is allowable.
- (e) With the airplane in the cruise configuration, the positive maneuvering load factors at which the onset of perceptible buffeting occurs must be determined for the ranges of airspeed or Mach number, weight, and altitude for which the airplane is to be certified. The envelopes of load factor, speed, altitude, and weight must provide a sufficient range of speeds and load factors for normal operations. Probable inadvertent excursions beyond the boundaries of the buffet onset envelopes may not result in unsafe conditions.”

SC RBHA 23.253 - High speed characteristics.

Instead of compliance with RBHA 23.253, the following apply:

- “(a) Speed increase and recovery characteristics. The following speed increase and recovery characteristics must be met:
 - (1) Operating conditions and characteristics likely to cause inadvertent speed increases (including upsets in pitch and roll) must be simulated with the airplane trimmed at any likely cruise speed up to VMO/MMO. These conditions and characteristics include gust upsets, inadvertent control movements, low stick force gradient in relation to control friction, passenger movement, leveling off from climb, and descent from Mach to airspeed limit altitudes.
 - (2) Allowing for pilot reaction time after effective inherent or artificial speed warning occurs, it must be shown that the airplane can be recovered to a normal attitude and its speed reduced to VMO/MMO, without:
 - (i) Exceptional piloting strength or skill;

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- (ii) Exceeding VD/MD, VDF/MDF, or the structural limitations; and
 - (iii) Buffeting that would impair the pilot's ability to read the instruments or control the airplane for recovery.
 - (3) There may be no control reversal about any axis at any speed up to VDF/MDF. Any reversal of elevator control force or tendency of the airplane to pitch, roll, or yaw must be mild and readily controllable, using normal piloting techniques.
 - (b) Maximum speed for stability characteristics, VFC/MFC. VFC/MFC is the maximum speed at which the requirements of RBHA 23.175(b)(1), SC RBHA 23.177 and SC RBHA 23.181 must be met with flaps and landing gear retracted. It may not be less than a speed midway between VMO/MMO and VDF/MDF except that, for altitudes where Mach number is the limiting factor, MFC need not exceed the Mach number at which effective speed warning occurs.”

SC RBHA 23.255 - Out of trim characteristics.

Add a new section:

- “(a) From an initial condition with the airplane trimmed at cruise speeds up to VMO/MMO, the airplane must have satisfactory maneuvering stability and controllability with the degree of out-of-trim in both the airplane nose-up and nose-down directions, which results from the greater of:
 - (1) A three-second movement of the longitudinal trim system at its normal rate for the particular flight condition with no aerodynamic load, except as limited by stops in the trim system, including those required by RBHA 23.655(b); or
 - (2) The maximum mistrim that can be sustained by the autopilot while maintaining level flight in the high-speed cruising condition.
- (b) In the out-of-trim condition specified in paragraph (a) of this section, when the normal acceleration is varied from +1g to the positive and negative values specified in paragraph (c) of this section:
 - (1) The stick force vs. g curve must have a positive slope at any speed up to and including VFC/MFC; and
 - (2) At speeds between VFC/MFC and VDF/MDF the direction of the primary longitudinal control force may not reverse.
- (c) Except as provided in paragraphs (d) and (e) of this section, compliance with the provisions of paragraph (a) of this section must be demonstrated in flight over the acceleration range:
 - (1) -1g to +2.5g; or
 - (2) 0 g to 2.0 g, and extrapolating by an acceptable method to -1g and +2.5g.
- (d) If the procedure set forth in paragraph (c)(2) of this section is used to demonstrate compliance and marginal conditions exist during flight test with regard to reversal of primary longitudinal control force, flight tests must be accomplished from the normal acceleration at which a marginal condition is found to exist to the applicable limit specified in paragraph (b)(1) of this section.
- (e) During flight tests required by paragraph (a) of this section, the limit maneuvering load factors prescribed in RBHA 23.333(b) and 23.337, and the maneuvering load factors associated with probable inadvertent excursions beyond the boundaries of the buffet onset envelopes determined under SC RBHA 25.251(e), need not be exceeded. In addition, the entry speeds for flight test demonstrations at normal acceleration values less than 1 g must be limited to the extent necessary to accomplish a recovery, without exceeding VDF/MDF.
- (f) In the out-of-trim condition specified in paragraph (a) of this section, it must be possible from an overspeed condition at VDF/MDF to produce at least 1.5 g for recovery by applying not more than 125 pounds of longitudinal control force using either the primary longitudinal control alone or the primary longitudinal control and the longitudinal trim system. If the longitudinal trim is used to assist in producing the required load factor, it must be shown at VDF/MDF that the longitudinal trim can be actuated in the airplane nose-up direction with primary surface loaded to correspond to the least of the following airplane nose-up control forces:
 - (1) The maximum control forces expected in service as specified in RBHA 23.301 and 23.397.
 - (2) The control force required to produce 1.5 g.

(3) The control force corresponding to buffeting or other phenomena of such intensity that it is a strong deterrent to further application of primary longitudinal control force.”

SC RBHA 23.1505 - Airspeed Limitations.

Instead of compliance with RBHA 23.1505(a), (b) and (c), the following apply:

“The maximum operating limit speed (Vmo/Mmo airspeed or Mach number, whichever is critical at a particular altitude) must be established as a speed that may not be deliberately exceeded in any regime of flight (climb, cruise, or descent) unless a higher speed is authorized for flight test or pilot training operations. Vmo/Mmo must be established so that it is not greater than the design cruising speed Vc/Mc and so that it is sufficiently below Vd/Md or Vdf/Mdf and the maximum speed shown under SC RBHA 23.251 to make it highly improbable that the latter speeds will be inadvertently exceeded in operations. The speed margin between Vmo/Mmo and Vd/Md or Vdf/Mdf may not be less than that determined under sec. 23.335(b), or found necessary in the flight tests conducted under SC RBHA 23.253.”

SC RBHA 23.1583(a) - Operating Limitations.

Instead of compliance with RBHA 23.1583(a)(2), the following apply:

(2) The speeds Vmc, Vo, Vle, Vfe and Vlo, if established, and their significance. ”