AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL - BRASIL

TYPE CERTIFICATE DATA SHEET Nº EA-2009T12

Type Certificate Holder:

Embraer Empresa Brasileira de Aeronáutica S.A
Av. Brigadeiro Faria Lima, 2.170
12227-901 – S.J dos Campos –SP
Brazil

EA-2009T12
Sheet 01

EMBRAER

EMB-505

03 December 2009

This data sheet, which is part of Type Certificate No. 2009T12, prescribes conditions and limitations under which the product, for which the Type Certificate was issued, meets the airworthiness requirements of the Brazilian Aeronautical Regulations.

I – Model EMB-505 (Commuter Category), approved 03 December 2009.

ENGINE

Two Pratt & Whitney Canada PW535E turbofans
(ANAC TCDS EM-2009T11)

FUEL

Brazilian Specification CNP08-QAV-1
Specification ASTM-D1655, type Jet A, Jet A-1
Specification MIL-T-83133, type JP-8

ENGINE LIMITS

Limits Static thrust standard day, sea level:

Takeoff	1 524 kg (3 360 lb)
ATR	1 524 kg (3 360 lb)

Maximum permissible engine rotor operating speeds
(Takeoff and Maximum Continuous):

N1(fan)	100% (100% = 15 850 rpm)
N1 Transient (operation 20 s)	102% (102% = 16 167 rpm)
N2 (Gas Generator)	101% (101% = 34 310 rpm)
N2 Transient (operation 20 s)	102% (102% = 34 649 rpm)

Maximum permissible interturbine gas temperatures:

Takeoff (5 min.)	700 ^{o}C
ATR (5 min.)	725 ^{o}C
Max. continuous	680 ^{o}C
Starting (transient 5 s)	740 ^{o}C
Transient (operation 20 s)	765 ^{o}C

AIRSPEED LIMITS (IAS)

	km/h (knots)	Mach
Maximum operating (V_{MO}): Sea level to 26000 ft.	592.6 (320)	
Maximum operating (M_{mo}) above 26000 ft.	-	0.78
Maneuvering (V_A) - sea level:	379.8 (205)	-
Flaps extended (V_{FE}) 8° (takeoff): 26° (takeoff and landing):	333.4 (180) 314.8 (170)	- -
Minimum control speed - Air (V_{MC}): 8° (takeoff): 26° (takeoff): 26° (landing):	 174 (94) 180 (95) 160 (86)	 -

Note: The values presented above refer to the maximum V_{MC} for the aircraft envelope (the values can change according to the temperature and altitude)

Maximum tire ground speed:	334 (182.5)	
L. G. operation - extend (V_{LO}):	463 (250)	-
L. G. operation - retract (V_{LO}):	463 (250)	-
L. G. extended (V_{LE}):	463 (250)	-

CG RANGE

Forward Limits:

Takeoff and Landing Conditions: Linear variation from 7.46 m (293.70 in) aft of datum (36% MAC) at 5150 kg (11,353.79 lb) to 7.23 m (284.68 in) aft of datum (25 % MAC) at 5600 kg (12,345.87 lb); Linear variation from 7.23 m (284.68 in) aft of datum (25% MAC) at 5600 kg (12,345.87 lb) to 7.11 m (279.92 in) aft of datum (19 % MAC) at 6850 kg (15,101.65 lb); Constant value of 7.11 m (279.92 in) aft of datum (19 % MAC) at 6850 kg (15,101.65 lb) to 8200 kg (18,077.88 lb).

Flight extension: Linear variation from 7.23 m (284.68 in) aft of datum (25% MAC) at 5600 kg (12,345.87 lb) to 7.07 m (278.35 in) aft of datum (17 % MAC) at 6850 kg (15,101.65 lb); Constant value of 7.07 m (278.35 in) aft of datum (17 % MAC) at 6850 kg (15,101.65 lb) to 8150 kg (17,967.65 lb).

Aft Limits:

Takeoff and Landing Conditions: Linear variation from 7.58 m (298.42 in) aft of datum (42 % MAC) at 5150 kg (11,353,79 lb) to 7.518 m (295.98 in) aft of datum (39 % MAC) at 6350 kg (13,999.34 lb); Linear variation from 7.518 m (295.98 in) aft of datum (39 % MAC) at 6350 kg (13,999.34 lb) to 7.37 m (290.16 in) aft of datum (32 % MAC) at 8200 kg (18,077.88 lb).

Flight extension: Linear variation from 7.518 m (295.98 in) aft of datum (39 % MAC) at 6350 kg (13,999.34 lb) to 7.436 m (292.75 in) aft of datum (35 % MAC) at 8150 kg (17,967.65 lb).

Landing Gear retracting moment: -52.29 m-kg (-4,531.67) in-lb.

DATUM	2.286 m (90 in) forward and 0.154 m (6.06 in) leftward of the jig point (nose jack pad location).
LEVELING MEANS	Located in the main door region on the omega beam between frames 11 and 12 (see AMM for further information)
MEAN AERODYNAMIC CHORD	2.05 m (80.71 in.) (L.E. of MAC at + 6.72 m (264.51 in.) aft of datum)
MAXIMUM WEIGHT	Takeoff: 8,150.0 kg (17,968 lb) Landing: 7,650.0 kg (16,865 lb) Zero Fuel: 6,350.0 kg (13,999 lb) Ramp: 8,200.0 kg (18,078 lb)
MINIMUM CREW	Crew for all Flights (See note 5 for cockpit equipment/arrangement restrictions): One pilot (in the left pilot seat) plus additional procedure as specified in the Limitations Section of the ANAC Approved Airplane Manual or one pilot and one copilot
MAXIMUM OCCUPANTS	Maximum nine (two crew plus seven passenger seats) Refer to the Airplane Flight Manual (AFM-2655) section 6 “Weight & Balance” for seat configurations and moment arms.
MAXIMUM BAGGAGE	Forward baggage compartment: 50 kg (110 lb) (+1.00 m (39.29 in) aft of datum) AFT baggage compartment: 210 kg (463 lb) (+9.95 m (391.73 in) aft of datum) Wardrobe: 40 kg (88 lb) (+3.785 m (149.02 in) aft of datum) Lavatory Cabinet: 15 kg (33 lb) (+7.95 m (312.99 in) aft of datum
FUEL CAPACITY	Total usable fuel 2428.2 kg (5353.2 lb.)Two wing tanks with 1214 kg (2676.6 lb) usable each; (see NOTE 1 for unusable) + 7.00 m (275.59 in) aft of datum, considering density of 0.803 kg/l (6.70 lb/US gal)
OIL CAPACITY	Tank mounted on each engine: 8.6 US quarts (8.14 liters) total each engine; + 9.826 m (386.85 in.) aft of datum; (see NOTE 1)
HYDRAULIC FLUID CAPACITY	12.0 kg (26.455 lb.) at + 7.96 m (313.42 in.) aft of datum, considering density of 0.846 kg/l (7.06 lb/gal or 7.06 lb/gal at 16°).
MAXIMUM OPERATING ALTITUDE	13.715 m (45.000 ft)
TEMPERATURE OPERATING LIMITS	Maximum: 52 °C Minimum: - 54 °C

CONTROL SURFACE MOVEMENTS

Elevator:	Up 25° +1°, -1°
	Down 15° +1°, -1°
Elevator trim tab*:	Up 2.7° +1°, -1°
	Down 9.3° +1°, -1°
Rudder:	Right 34° +1°, -1°
	Left 34° +1°, -1°
Rudder trim tab*:	Right 17° +1°, -2°
	Left 17° +2°, -1°
Aileron:	Up 25° +0,5°, -0,5°
	Down 15° +0,5°, -0,5°
Aileron trim tab*:	Up 18° +2°, -1°
	Down 18° -2°, +1°
Wing flaps:	TO 8° +1°, -1°
	TO /Land 26° +1°, -1°
Horizontal Stablilizer	Up 2° +0.5°, -0.5°
	Down 13° +0.5°, -0.5°
Ventral Rudder	Right 30° +1°, -1°
	Left 30° +1°, -1°

*Note: valid only for neutral position See Airplane Maintenance Manual (AMM) for rigging instructions

SERIAL NUMBER

50500005 and up

CERTIFICATION BASIS

1) Brazilian Type Certificate No. 2009T12 issued on 03 December 2009, based on the RBHA 23, which endorses the 14 CFR Part 23, effective 1 February 1965, as amended by 23-1 through 23-57 effective on 01 March 2002, and additional requirements:

2) Noise requirements:

   RBHA 36, corresponding to ICAO Annex 16 Volume I, Chapter 4 (Fourth Edition) effective July 2005, as amended on the application date.

3) Emission requirements:

   RBHA 34, corresponding to US 14 CFR Part 34 effective 10 September 1990, as amended on the application date

4) Special Conditions as follows:

   (a) “Resolução N° 124”, 01 Dec. 2009 Pressure Vessel Integrity for High Altitude Operations– EMB-505 FCAR ES-21.

   (b) “Resolução N° 125”, 01 Dec. 2009 Oxygen equipment and supply – EMB-505 FCAR SM-01.”

   (c) “Resolução N° 121”, 25 Nov. 2009 Ventilation System – EMB-505 FCAR SM-05.

CERTIFICATION BASIS

(d) “Resolução N° 124”, 01 Dec. 2009 Pressurization System – EMB-505 FCAR SM-06.

(e) “Resolução N° 123”, 01 Dec. 2009 Ice Protection, Special Condition for Auto-Inhibited Anti-ice Systems – EMB-505 FCAR SM-07.

(f) “Resolução N° 126”, 01 Dec. 2009 Special Condition for Subpart B (Flight) – EMB-505 FCAR EV-01.

(g) “Resolução N° 126”, 01 Dec. 2009 Special Condition for Subpart G (Operating Limitations and Information) – EMB-505 FCAR EV-04.

(h) “Resolução N° 127”, 01 Dec. 2009 Performance Credit for ATR during Go-Around – EMB-505 FCAR EV-11.

(i) “Resolução N° 108”, 4 Aug. 2009 Special Condition for FADEC – EMB-505 FCAR PR-07.

(j) “Resolução N° 120”, 17 Nov. 2009 Hot Weather Operation– EMB-505 FCAR PR-09.

5) Equivalent levels of safety as follows:

(a) “Decisão N° 368”, 23 Oct. 2009 RBHA/14 CFR 21.21 (b)(1); RBHA/14 CFR Part 23.807(e) , Ditching Emergency Exit for Passengers – EMB-505 FCAR EI-03.

(b) “Decisão N° 334”, 15 Sep. 2009 RBHA/14 CFR 23.815 (b) Width of Aisle – EMB-505 FCAR EI-08.

(c) “Decisão N° 395”, 01 Dec. 2009 RBHA 21.21(b)(1); RBHA/14 CFR 23.853(d)(2), "No Smoking" placard dimensions – EMB-505 FCAR EI-09.

(d) “Decisão N° 394”, 01 Dec. 2009 RBHA/14 CFR Part 23.855, Forward baggage compartment fire protection – EMB-505 FCAR EI-10.

(e) “Decisão N° 397”, 01 Dec. 2009 RBHA/14 CFR 23.1389, 23.1391 23.1393, and 23.1395, Position Lights – EMB-505 FCAR SE-05.

(f) “Decisão N° 398”, 01 Dec. 2009 RBHA/14 CFR Part 23.841(b)(6), High Elevation Airfield Operation – EMB-505 FCAR SM-08.

(g) “Decisão N° 396”, 01 Dec. 2009 RBHA 21.21; RBHA/14 CFR Part 23.1323, System error during the accelerate-takeoff ground run – EMB-505 FCAR EV-02.

(h) “Decisão N° 183”, 23 Apr. 2009 RBHA/14 CFR Part 23.1305, 23.1309, 23.1321 & 25.1549, Digital Only Display of Turbine Engine High/Intermediate Pressure Rotor Speed (N2) – EMB-505 FCAR PR-02.

(i) “Decisão N° 237”, 09 Jun. 2009 RBHA/14 CFR Part 23.1555(d)(1) & 23.1337(b)(1), Control Markings - Usable Fuel Capacity – EMB-505 FCAR PR-05.

(j) “Decisão N° 184”, 23 Apr. 2009 RBHA/14 CFR Part 23.1553, 23.1337(b)(1), 23.959, Digital Fuel Quantity

Indication – EMB-505 FCAR PR-11.

(k) "Decisão N° 393", 01 Dec. 2009 RBHA/14 CFR Part Appendix H 23.5 (b) (4), 23.904, 23.1301, 23.1309, ATR - Automatic Thrust Reserve Function Deactivation – EMB-505 FCAR PR-13.

6) Exemption as follows:

(a) "Decisão N° 391", 01 Dec. 2009 RBHA/14 CFR Part 23.181(b), Exemption for Dynamic Stability – EMB-505 FCAR EV-05

(b) "Decisão N° 392", 01 Dec. 2009 RBHA/14 CFR Part 23.3 (d) - Airplane categories: Commuter category – EMB-505 FCAR HT-04.

7) Compliance with ice protection has been demonstrated in accordance with RBHA/14 CFR 23.1416 and 23.1419.

8) Not approved for ditching; Compliance with the provisions for ditching equipment has not been demonstrated in accordance with RBHA/14 CFR 23.1415 (a) (b).

9) RVSM Approval: S/N 50500005 and on: All airplanes are equipped with dual Goodrich Integrated Air Data and Stall Protection Probes (IASP) and Garmin G1000 pilot's and copilot's Primary Flight Displays as standard equipment. Therefore the crew must be training for RVSM operation. Each operator must obtain RVSM operating approval directly from the ANAC.

REQUIRED EQUIPMENT

The basic required equipment, as prescribed in the applicable airworthiness regulations (see Certification Basis) must be installed in the airplane for certification.

NOTES:

NOTE 1 Weight and balance.

Current weight and balance report, including the list of equipment that are part of the certificated basic empty weight and loading instructions, must be provided for each aircraft at the time of original certification

The certificated empty weight and corresponding center of gravity location must include:

Unusable fuel	22.8 kg (50.26 lb) at + 6.51 m (256.30 in.) aft of datum
Full engine oil	16 kg (35.27 lb) at + 9.83 m (387.01 in) aft of datum*
Hydraulic Fluid	12 kg (26.46 lb) at + 7.96 m (313.38 in) aft of datum

*Note - Including the oil from the engine installation (filters and lines)

NOTE 2 Markings and placards.

All marking and placards required by the applicable certification requirements (see certification basics) and by the operational requirements must be installed in the appropriated locations. Required placards and marking are listed in chapter Eleven (11) of the Aircraft Illustrated Parts Catalog (AIPC) and Airplane Maintenance Manual (AMM).

NOTE 3 Continuing Airworthiness.

See Maintenance Manual, Chapter Four (4), "Airworthiness Limitations" for Systems Airworthiness Limitations, Structure Airworthiness Limitations (ALI) and Life-Limited Items (LLI). The life limit for rotating parts on the PW535E engine is in the Airworthiness Limitations Section of the Pratt & Whitney Canada Engine Maintenance Manual P/N 3072702, latest revision.

NOTE 4 Airplanes must be operated according to the ANAC Approved Airplane Flight Manual (AFM), part number AFM-2664 dated 03 December 2009 or later approved revisions.

NOTE 5 All replacement seats (crew and passenger), although they may comply with TSO C127, must also be demonstrated to comply with installation requirements into the aircraft listed in RBHA/14 CFR 23.2, 23.561, 23.562, and 23.785.

The foam cushion buildup of all seats (crew and passenger) may not be altered. Any deviations in the foam construction or stiffness must be demonstrated by test or analysis to comply with the 14 CFR 23.562 paragraph.

NOTE 6 Approval for operation with a minimum crew of one pilot (in the left pilot seat) is based upon the cockpit equipment installation and arrangement evaluated during ANAC certification testing. No significant changes may be made to the installed cockpit equipment or arrangement (EFIS, autopilot, avionics, etc.), except as permitted by the approved MMEL, without prior approval from the Aeronautical Products Certification Branch.

NOTE 7 The EMB-505 is often referred to in Embraer marketing literature as the “PHENOM 300”. This name is strictly marketing designation and is not part of the official model designation.

Original in the Portuguese language signed by:

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