DEPARTMENT OF TRANSPORATION
FEDERAL AVIATION ADMINISTRATION

A59CE
Revision 11
Embraer S.A.
EMB-500
March 9, 2022

TYPE CERTIFICATE DATA SHEET NO. A59CE

This data sheet which is part of Type Certificate No. A59CE prescribes conditions and limitations under which the product for which the type certificate was issued meets the airworthiness requirements of Title 14 of the Code of Federal Regulations.

Type Certificate Holder	Embraer S.A. Rodovia Presidente Dutra KM 134 Distrito De Eugenio De Melo 12247-004 -- São José dos Campos -- SP Brazil
Type Certificate Holder Record	Empresa Brasileira de Aeronáutica S.A. (EMBRAER) changed company name to Embraer S.A. effective November 19, 2010.

I. Model EMB-500, (Normal Category), Approved December 12, 2008

Engines:

Two Pratt & Whitney Canada PW617F-E turbofans for PHENOM 100 and PHENOM 100E (see NOTE 6), or
Two Pratt & Whitney Canada PW617F1-E turbofans for PHENOM 100EV (see NOTE 6)
Engine TC #E00080EN — PW617F-E Issued July 15, 2009
PW617F1-E Issued October 31, 2016

Fuel:

ASTM Specification D1655-JET A and JET A-1,
Military Specification MIL-DTL-83133-JP8,
Brazilian Specification CNP08-QAV-1
Russian Specification GOST 10227-86 TS-1
(Use the latest version of the Standard Specifications)

Engine Limits:

Static thrust limits, standard day, sea level:

For the PW617F-E turbofan engine:

	Standard Version (See NOTE 7)	Enhanced Version (See NOTE 7)
Takeoff (5 min.)	1,695 lb.	1,695 lb.
ATR (10 min.)	1,720 lb.	1,820 lb.

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

N_1 (Fan)	100% (100% = 19,845 rpm)
N_2 (Gas Gen.)	100.4% (100.4% = 40,200 rpm)
N_1 Transient (operation 20 sec.)	101% (101% = 20,043 rpm)

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Engine Limits, Continued:

N_2 Transient (operation 20 sec.)	102% (102% = 40,840 rpm)

Maximum permissible interturbine gas temperatures

Takeoff	830 Degrees C
ATR	845 Degrees C
Max. Continuous	830 Degrees C
Transient (starting 5 sec.)	892 Degrees C
	950 Degrees C (see NOTE 8)
Transient (operation 20 sec.)	862 Degrees C

For the PW617F1-E turbofan engine:

Takeoff (5 min.)	1,728 lb.
ATR (10 min.)	1,891 lb.

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

N_1 (Fan)	100% (100% = 19,845 rpm)
N_2 (Gas Gen.)	101.6% (101.6% = 40,676 rpm)
N_1 Transient (operation 20 sec.)	101% (101% = 20,043 rpm)
N_2 Transient (operation 20 sec.)	103.2% (103.2% = 41,316 rpm)

Maximum permissible interturbine gas temperatures

Takeoff	830 Degrees C
ATR	845 Degrees C
Max. Continuous	830 Degrees C
Transient (starting 5 sec.)	950 Degrees C
Transient (operation 20 sec.)	862 Degrees C

Airspeed Limitations:

V_{MO} (maximum operating)

Sea level to 28,000 ft.	275 KIAS

M_{MO} above 28,000 ft.	0.7 Mach
V_A (maneuvering) – sea level	186 KIAS

V_{FE} (maximum flap extended)

10 degrees (takeoff)	200 KIAS
26 degrees (takeoff/landing)	160 KIAS
36 degrees (landing)	145 KIAS

V_{MC} (minimum control speed)

For takeoff	97 KIAS

Note – The value presented above refers to the maximum V_{MC} for the aircraft envelope (the values can change according to the temperature, altitude, weight, and takeoff flaps)

V_{LO} (landing gear operating)

Gear Retract and Extend	180 KIAS

V_{LE} (landing gear extended)	275 KIAS
Maximum tire ground speed	139 Knots

Center of Gravity Limits:

For the PHENOM 100 and PHENOM 100E (see NOTE 6):

Forward Limits:

Takeoff and Landing (landing gear extended)

Linear variation from 232.24 in. aft of datum (35% MAC) at 6614 lb. to 223.53 in. aft of datum (21.5% MAC) at 7099 lb.; constant value of 223.53 in. aft of datum (21.5% MAC) at 7099 to 8885 lb.; linear variation from 223.53 in. aft of datum (21.5% MAC) at 8885 lb. to 224.88 in. aft of datum (23.6 % MAC) at 10582 lb.; constant value from 224.88 in. aft of datum (23.6 % MAC) at 10582 to 10626 lb.

In-Flight extension

From 223.53 in. aft of datum (21.5% MAC) at 7099 lb to 222.24 in. aft of datum (19.5% MAC) at 7099 lb.; constant value from 222.24 in. aft of datum (19.5% MAC) at 7099 to 8885 lb.; linear variation from 222.24 in. aft of datum (19.5% MAC) at 8885 lb. to 223.59 in. aft of datum (21.6% MAC) at 10582 lb; linear variation from 223.59 in. aft of datum (21.6% MAC) at 10582 lb. to 224.88 in. aft of datum (23.6% MAC) at 10582 lb.

Aft Limits:

Takeoff and Landing (landing gear extended)

Linear variation from 232.24 in. aft of datum (35.0% MAC) at 6614 lb. to 234.50 in. aft of datum (38.5% MAC) at 7540 lb.; constant value from 234.50 in. aft of datum (38.5% MAC) at 7540 to 8885 lb.; linear variation from 234.50 in. aft of datum (38.5% MAC) at 8885 lb. to 233.41 in. aft of datum (36.8% MAC) at 10582 lb.; constant value from 233.41 in. aft of datum (36.8%MAC) at 10582 to 10626 lb.

For the PHENOM 100EV (see NOTE 6):

Forward Limits:

Takeoff and Landing (landing gear extended)

Linear variation from 232.24 in. aft of datum (35% MAC) at 6658 lb. to 223.53 in. aft of datum (21.5% MAC) at 7099 lb.; constant value from 223.53 in. aft of datum (21.5% MAC) at 7099 to 8885 lb.; linear variation from 223.53 in. aft of datum (21.5% MAC) at 8885 lb. to 224.82 in. aft of datum (23.5 % MAC) at 10703 lb.; constant value from 224.82 in. aft of datum (23.5 % MAC) at 10703 to 10747 lb.

In-Flight extension

From 223.53 in. aft of datum (21.5% MAC) at 7099 lb to 222.24 in. aft of datum (19.5% MAC) at 7099 lb.; constant value from 222.24 in. aft of datum (19.5% MAC) at 7099 to 8885 lb.; linear variation from 222.24 in. aft of datum (19.5% MAC) at 8885 lb. to 223.59 in. aft of datum (21.5% MAC) at 10703 lb; linear variation from 223.53 in. aft of datum (21.5% MAC) at 10703 lb. to 224.82 in. aft of datum (23.5% MAC) at 10703 lb.

Aft Limits:

Takeoff and Landing (landing gear extended)

Linear variation from 232.24 in. aft of datum (35.0% MAC) at 6658 lb. to 234.50 in. aft of datum (38.5% MAC) at 7540 lb.; constant value from 234.50 in. aft of datum (38.5% MAC) at 7540 to 8885 lb.; linear variation from 234.50 in. aft of datum (38.5% MAC) at 8885 lb. to 233.54 in. aft of datum (37% MAC) at 10703 lb.; constant value from 233.54 in. aft of datum (37%MAC) at 10703 to 10747 lb.

Landing Gear retracting moment: (-1530.22 in.-lb.)

Datum:

98.82 in. forward of the jig point (nose jack pad location)

Leveling Means:

Located in the main door between frames 9 and 10 (see AMM for further information)

Maximum Weight:

Takeoff	10,472 lb.
	10,582 lb. (see NOTE 11)
	10,703 lb. (for PHENOM 100EV - see NOTE 6)
Landing	9,766 lb.
	9,877 lb. (see NOTE 11)
	9,998 lb. (for PHENOM 100EV - see NOTE 6)
Zero Fuel	8,444 lb.
	8,775 lb. (see NOTE 9)
	8,554 lb. (see NOTE 11)
	8,885 lb. (see NOTE 9 and NOTE 11)
	9,072 lb. (for PHENOM 100EV - see NOTE 6)
Ramp	10,516 lb.
	10,626 lb. (see NOTE 11)
	10,747 lb. (for PHENOM 100EV - see NOTE 6)

Minimum Crew for all Flights (See NOTE 5 for cockpit equipment/arrangement restrictions):

One pilot (in the left pilot seat) plus additional equipment as specified in the Limitations Section of the FAA Approved Airplane Flight Manual

OR

One pilot and one copilot

No. of Seats:

Maximum of eight occupants. Refer to the Airplane Flight Manual (AFM-2656) section 6 "Weight & Balance" for seat configurations and moment arms.

Maximum Baggage:

Forward baggage compartment	66 lb. (+45.47 in. aft of datum)
Aft baggage compartment	353 lb. (+314.29 in. aft of datum)
RH forward cabinet	66 lb. (+143.46 in. aft of datum)
LH aft cabinet	33 lb. (+249.76 in. aft of datum)

Some airplanes have stowage compartments in the RH forward cabinet and LH aft cabinet with higher load capacities. Refer to their respective placards to find this information.

Fuel Capacity (usable):

Total usable fuel 2,806 lb.
Two wing tanks with 1,403 lb. usable each; +230.91 in. aft of datum;
(see NOTE 1 for unusable fuel)

Oil Capacity (total):

Tank mounted on each engine: 4.23 U.S. quarts (4.00 liters) total each engine; +302.52 in. aft of datum; (see NOTE 1)

Maximum Operating Altitude:

41,000 ft.

Control Surface Movements:

Elevator	Up	27 +1/-1 degrees
	Down	19 +1/-1 degrees

Control Surface Movements, Continued:

Elevator Trim Tab	Up	6 +1/-1 degrees
	Down	13 +1/-1 degrees
Rudder	Right	27 +1/-1 degrees
	Left	27 +1/-1 degrees
Rudder Trim Tab	Right	16.5 +1/-1 degrees
	Left	16.5 +1/-1 degrees
Aileron	Up	25 +1/-1 degrees
	Down	15 +1/-1 degrees
Aileron Trim Tab	Up	20 +1/-1 degrees
	Down	20 +1/-1 degrees
Wing Flap	TO	10 +1/-1 degrees
	TO/Land	26 +1/-1 degrees
	Land	36 +1.5/-1.5 degrees
Ground Spoilers/	Up	31.5 +1/-1 degrees (see NOTE 10)
Speed Brake		31.5 +1/-1 degrees (see NOTE 11)

See Airplane Maintenance Manual (AMM) for rigging instructions.

Manufacturer's Serial Numbers:

50000005 and up

Import Requirements:

A U.S. airworthiness certificate may be issued on the basis of a Brazilian Certificate of Airworthiness for Export signed by a representative of the Agência Nacional De Aviação Civil (ANAC) containing the following statement: "The aircraft covered by this certificate has been examined and found to comply with U.S. Type Certificate No. A59CE and to be in a condition for safe operation."

Refer to the applicable bilateral agreement to verify eligibility for import into the United States of both new and used aircraft based on the scope of the agreement, to identify any required statements by the exporting authority on the export certificate of airworthiness (or equivalent document), and for procedures for coordinating exceptions to conformity statements on these documents. Refer to FAA Order 8130.2J, *Airworthiness Certification of Aircraft*, for requirements for issuance of an *airworthiness certificate* for imported aircraft.

Certification Basis:

(1) Part 23 of Title 14 of the Code of Federal Regulations effective February 1, 1965, as amended by Amendments 23-1 through 23-55

(2) Part 36 of Title 14 of the Code of Federal Regulations effective December 1, 1969, as amended by Amendments 36-1 through 36-28

(3) Part 34 of Title 14 of the Code of Federal Regulations effective September 10, 1990, as amended by Amendments 34-1 through 34-3

Certification Basis, Continued:

(4) Special Conditions as follows:

(a) 23-220-SC, High Fuel Temperature
(b) 23-221-SC, Fire Extinguishing for Aft Mounted Engines
(c) 23-228-SC, Full Authority Digital Engine Control (FADEC) System
(d) 23-282-SC, Protection of Systems for High Intensity Radiated Fields, (HIRF)
(e) 23-232-SC, Flight Performance, Flight Characteristics, and Operating Limitations
(f) 23-251-SC, Single-Place Side-Facing Seat Dynamic Test Requirements, issued March 22, 2011
(g) 23-255-SC, Single-Place Side Facing Seat Dynamic Test Requirements, issued October 12, 2011

(5) Equivalent levels of safety as follows:

(a) ACE-08-09: 14 CFR § 23.1555(d)(1), Control Markings - Usable Fuel Capacity
(b) ACE-08-10: 14 CFR §§ 23.1305, 23.1309, 23.1321 and 23.1549; Digital Only Display of N2, Oil Temperature, Oil Pressure, and Fuel Flow
(c) ACE-08-14: 14 CFR § 23.807(e)(2): Emergency Egress Provision During Ditching
(d) ACE-08-21: 14 CFR § 23.1553: Digital Fuel Quantity Indication

(6) Exemption as follows:

(a) No. 9549 (amended) granted to use a relaxed "Dutch Roll" damping criteria above 18,000 ft. in lieu of damping criteria of 14 CFR § 23.181(b), issued June 12, 2008, Regulatory Docket No. FAA-2007-28646, ACE-00-388-E

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

(8) Compliance with the provisions for ditching equipment has been demonstrated in accordance with 14 CFR § 23.1415(a)(b).

Type Certificate A59CE issued December 12, 2008.

Application for type certificate dated October 5, 2005.

RVSM Approval: S/N 50000005 and on: All airplanes are equipped with Garmin avionics systems with RVSM capable Air Data Computers and pilot's and copilot's Primary Flight Displays as standard equipment. Each operator must obtain RVSM operating approval directly from the FAA.

Production Basis:

Production Certificate No. 346CE

The manufacturer Embraer Executive Aircraft Inc. located in Melbourne, Florida, is licensed by Embraer S.A. to manufacture the Model Aircraft listed in this Type Certificate Data Sheet. S/N 50000255 and subsequent may be produced either by Embraer Executive Aircraft Inc. in Melbourne, Florida or Embraer S.A. in Brazil. The manufacturer can be confirmed by the aircraft data plate. Aircraft produced by Embraer Executive Aircraft Inc. in Melbourne, Florida with a S/N 50000246, 50000255, 50000265, and 50000267 were produced under the Type Certificate**.**

Equipment:

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

Service Information:

Service bulletins, structural repair manuals, vendor manuals, AFMs, and overhaul and maintenance manuals, which contain a statement that the document is approved by ANAC are accepted by the FAA and are considered FAA approved. (These approvals pertain to the design data only).

NOTES:

NOTE 1. A current weight and balance report, including a list of equipment included in the certificated empty weight, and loading instructions when necessary 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	44 lb.	at	+228.90 in. aft of datum
Full oil	17.64 lb.	at	+302.52 in. aft of datum; includes the oil from the engine installation (filters and lines)
Hydraulic Fluid	3.09 lb.	at	+34.17 in. aft of datum
	13.86 lb.	at	+51.18 in. aft of datum (See NOTE 11)

NOTE 2. Airplanes must be operated according to the FAA Approved Airplane Flight Manual (AFM), part number AFM-2656 dated December 12, 2008 or later approved revision. Required placards and markings are listed in Chapter Eleven (11) of the Aircraft Illustrated Parts Catalog (AIPC) and in the Airplane Maintenance Manual (AMM).

NOTE 3. See Maintenance Manual, Chapter Four (4), "Airworthiness Limitations" for Systems Airworthiness Limitations, Structure Airworthiness Limitations (ALI) and Life-Limited Items (LLI). The life limits for rotating parts on the PW617F-E and the PW617F1-E engines are in the Airworthiness Limitations Manual, Pratt & Whitney Canada P/N 3072699, latest revision.

NOTE 4. 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 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 5. Approval for operation with a minimum crew of one pilot is based upon the cockpit equipment installation and arrangement evaluated during FAA 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 responsible Aircraft Certification Office.

NOTE 6. The EMB-500 is often referred to in Embraer marketing literature as the “PHENOM 100”, “PHENOM 100E”, or “PHENOM 100EV”. These names are strictly marketing designations and are not part of the official model designation.

- PHENOM 100: aircraft equipped with PW617F-E engines and G1000 avionics system;
- PHENOM 100E: aircraft equipped with PW617F-E engines, G1000 avionics system, and spoiler panels; and
- PHENOM 100EV: aircraft equipped with PW617F1-E engines, G3000 avionics system, and spoiler panels.

NOTE 7. Aircraft serial numbers 50000005 thru 50000217 are considered to have “ENHANCED TAKE-OFF THRUST”. For aircraft serial numbers 50000218 and up, the placard in the cockpit must be checked to determine the correct version (i.e. “STANDARD TAKE-OFF THRUST” or “ENHANCED TAKE-OFF THRUST”).

NOTE 8. Post SB 500-73-0001 incorporation or with an equivalent factory –incorporated mod.

NOTE 9. Post SB 500-00-0005 incorporation or with an equivalent factory-incorporated mod.

NOTE 10. Post SB 500-27-0008 incorporation.

NOTE 11. Post SB 500-00-0009 incorporation or Post SB 500-00-0018 incorporation or with an equivalent factory-incorporated mod.

END