



TYPE CERTIFICATE DATA SHEET Nº EM-9108

Type Certificate Holder:

General Electric Company
GE AVIATION
1000 Western Avenue
Lynn, Massachusetts - 01910
USA

EM-9108-00

Sheet 01
GENERAL ELECTRIC
COMPANY

CF34-1A, CF34-3A,
CF34-3A1, CF34-3A2,
CF34-3B, CF34-3B1

28 AUGUST 2019

Engines of models described herein conforming to this data sheet, which is part of Type Certificate No. 9108, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Brazilian Aeronautical Regulations provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other instructions.

MODEL CF34-1A; CF34-3A; CF34-3A1; CF34-3A2; CF34-3B; CF34-3B1

| | | | | | | |
|--|--|-----------------|-----------------|----------|--------------------|--------------------|
| TYPE | Dual rotor, axial flow; single stage fan, fourteen stage axial compressor, annular combustion chamber, two stage high pressure turbine, four stage low pressure turbine. | | | | | |
| RATINGS See Note 5 | Sea level static thrust, kN (lbf) | CF34-1A | CF34-3A | CF34-3A2 | CF34-3A1 | CF34-3B/-3B1 |
| | Maximum takeoff (5 min.) (See Notes 14, 15 and 18) | 40.66 (9140) | 41.01 (9220) | -- | -- | -- |
| | Normal takeoff (5 min.) (See Notes 14 and 15) | 38.48 (8650) | 38.83 (8729) | -- | -- | -- |
| | Maximum continuous (See Note 14) | 39.68 (8920) | 40.66 (9140) | -- | -- | -- |
| | Fuel Control, Woodward Governor, GE P/N | 6047T74 | - - | 6091T07 | 6078T55 4147T69 | 6078T55 4147T70 |
| FUEL TYPE (SEE NOTE 9) | Fuel conforming to GE Jet Fuel Specification No. D50TF2, current revision. See SEI-579 (CF34) Operating Instructions for specific fuels approved per the subject specifications. | | | | | |
| OIL LUBRICATION | Oil conforming to GE Specification No. D50TF1, current revision. See SEI-579 (CF34), Operating Instructions for specific oils approved per the subject specifications. | | | | | |
| | Models | CF34-1A | CF34-3A | CF34-3A2 | CF34-3A1 | CF34-3B/-3B1 |
| | Length mm (inches) | 2621 (103.19) | -- | -- | -- | -- |
| PRINCIPLE | Maximum diameter mm (inches) | 1260 (49.6) | -- | -- | -- | -- |
| DIMENSIONS | WEIGHT (dry maximum), kg (pounds) | 737 (1625) | -- | -- | 751 (1655) | 757 (1670) |
| CENTER OF GRAVITY LOCATION, mm (inches) | Forward of combustion chamber forward flange | 173.5 (6.83) | -- | -- | 200.6 (7.9) | -- |
| | Below horizontal centerline | 25.4 (1.00) | -- | -- | 17.8 (0.7) | -- |
| | Relative to vertical centerline | 0.00 | -- | -- | -25.4 (-1.0) | -- |

"- -" Same as previous model; "#" Not applicable

**IGNITION
SYSTEM**

| | |
|-------------------|--|
| CF34-1A | Simmonds type 83311 or Bendix type 10-397550-1 ignition exciter with two igniters, Champion type FHE256-10. |
| CF34-3A | Same as CF34-1A through engine 350335; from engine 350336, two igniters Champion type GE P/N 4048T30P10. |
| CF34-3A2 | Simmonds type GE P/N 1538M69, or Unison type GE P/N 9238M66 ignition exciters, with two igniters, Unison type GE P/N 4096T38P04. |
| CF34-3A1/-3B/-3B1 | Same as CF34-3A2, except may use alternate igniters, Unison type GE P/N 4096T38P01. |

**IMPORT
REQUIREMENTS**

Each engine imported separately and/or spare parts must be accompanied by a FAA Export Airworthiness Approval through the FAA Form 8130-3, Authorized Release Certificate, certifying that the engine is in compliance with the ANAC approved Type Design, defined by the Brazilian Type Certificate Data Sheet No. EM-9108, last revision, is in condition for safe operation and has undergone a final operational check. The original Authorized Release Certificate should be sent with the engine and a copy remains with the issuing organization.

For each engine it is required a list of exceptions (if any) in respect to the ANAC approved Type Design, listed in the FAA Authorized Release Certificate above mentioned. The ANAC type design corresponds to the FAA approved type design.

**CERTIFICATION
BASIS**

1. RBAC 33 corresponding to Code of Federal Regulations (CFR) Part 33, including Amendments 33-1 through 33-9, amendment 33-10 for section 33.14; and FAA Grant of Exemption 3473.
2. RBHA 34 corresponding to Code of Federal Regulations (CFR) Part 34, Amendment 5, effective 31 December 2012. See note 18, for detailed summary of the certification basis for fuel venting and exhaust emissions: CF34-3A, CF34-3A1, CF34-3A2, CF34-3B, CF34-3B1.

| <u>Model</u> | <u>Date of Application</u> | <u>Issued/Amended</u> | <u>Model</u> | <u>Date of Application</u> | <u>Issued/Amended</u> |
|--------------|----------------------------|-----------------------|--------------|----------------------------|-----------------------|
| CF34-1A | 11 January 1991 | 01 August 1991 | CF34-3A1 | 13 March 1996 | 15 May 1996 |
| CF34-3A | 11 January 1991 | 01 August 1991 | CF34-3B | 13 March 1996 | 15 May 1996 |
| CF34-3A2 | 92 July 1993 | 15 May 1996 | CF34-3B1 | 13 March 1996 | 15 May 1996 |

**PRODUCTION
BASIS**

FAA Production Certificate No. 107

NOTES:

NOTE 1 Maximum permissible engine operating speeds for the engine rotors are as follows:

Applicable to all models

Low pressure rotor (N1), rpm

Maximum takeoff 7,300

Normal takeoff 7,120

Maximum continuous 7,300

High pressure rotor (N2), rpm

Maximum takeoff 17,710

Normal takeoff 17,510

Maximum continuous 17,674

Refer to GE Maintenance Manual SEI-580 and Overhaul Manual SEI-582 for CF34-1A/-3A/-3A2, and GE Engine Manual SEI-756 for CF34-3A1/-3B/-3B1 for inspection requirements when limits are exceeded. 100 percent N1 rotor speed is 7,400 rpm. 100 percent N2 rotor speed is 17,820 rpm.

NOTE 2 Maximum permissible temperatures are as follows:

Interturbine temperature (T5)*, °C (°F):

| | CF34-1A | CF34-3A/-3A2 | CF34-3A1 | CF34-3B/-3B1 |
|--|-------------|--------------|-------------|--------------|
| Maximum takeoff (5 min.) | 857 (1,575) | 871 (1,600) | 899 (1,650) | -- |
| Maximum takeoff (2 min. out of a total of 5 minutes)** | 886 (1,627) | 900 (1,652) | 928 (1,702) | -- |
| Normal takeoff (5 min.) | 842 (1,548) | 856 (1,573) | 884 (1,623) | -- |
| Normal takeoff (2 min. out of a total of 5 minutes) | 864 (1,587) | 878 (1,613) | 906 (1,663) | -- |
| Maximum continuous | 838 (1,540) | 860 (1,580) | 888 (1,630) | 899 (1,650) |

"--" Same as previous model; "#" Not applicable

NOTE 2 (Cont.) *The interturbine temperature is measured by 10 thermocouples mounted in the low pressure turbine transition casing. Additional transient temperature and time limits of less than 1 minute are defined in GE Operating Instructions SEI-579. Refer to GE Maintenance Manual SEI-580 and Overhaul Manual SEI-582 for CF34-1A/-3A/-3A2, and GE Engine Manual SEI-756 for CF34-3A1/-3B/-3B1, for inspection requirements when limits are exceeded.

Oil tank temperatures**, °C (°F): Applicable to all models

| | |
|----------------------|-----------|
| Continuous operation | 155 (311) |
| Transient operation | 163 (325) |

**Transient operation above 155°C (311°F) is limited to 15 minutes.

Fuel inlet temperature (at engine fuel filter inlet), °C (°F):

| | | |
|----------------------|-----------------|-------------------|
| Continuous operation | CF34-1A/-3A/3A2 | CF34-3A1/-3B/-3B1 |
| JP5 | 70 (158) | 121 (250) |
| JP4, JP4/JP5 mixture | 70 (158) | 121 (250) |
| Ground operation | 70 (158) | 121 (250) |

NOTE 3 Fuel and Oil Pressure Limits

Fuel: At engine pump inlet: minimum pressure of 5 PSID above the true vapor pressure of the fuel with a vapor/liquid ratio of zero with aircraft boost operative. Operating range 5 PISG to 50 PSIG. At engine motive flow discharge: minimum pressure of 150 PSIG at idle or above. Operating range is 150 PSIG to 700 PSIG.

Oil: CF34-1A/-3A/-3A2: at idle on the ground, 25 PSID minimum to 50 PSID maximum. At takeoff, 40 PSID minimum to 80 PSID maximum. Operating range, 25 PSID to 80 PSID, allowable to 95 PSID above 16,000 feet.
CF34-3A1/-3B/-3B1: At idle on the ground, 25 PSID minimum to 75 PSID maximum. At takeoff 45 PSID minimum to 95 PSID maximum. Operating range, 25 PSID to 95 PSID, allowable to 110 PSID above 16,000 feet.

NOTE 4: Accessory Drive Provisions

| Accessory | Location on AGB Axis | Speed (rpm) | Power Rating kW (hp) | Direction of Rotation facing AGB | Torque Nm (lbf-in) Static / Cont / Overload | Max. Acc. Wt. Kg (lb) | Overhung Moment N.m (lbf-in) | Pad Type |
|-------------------------|----------------------|-------------|----------------------|----------------------------------|---|-----------------------|------------------------------|----------------|
| Electrical Generator | Axis-BB Aft | 16686 | 165 (123.1) [5] | CW | 593.2 (5250) / 118.6 (1050) / NA | 68.04 (150) | 282.5 (2500) | AS969A-2S [1] |
| Air Turbine Starter [4] | Axis-D Aft | 6778 | N/A | CW | 1468.8 (13000) / 677.9 (6000) / NA | 36.29 (80) | 70.6 (625) | AS969A-3CT [2] |
| Hydraulic Pump | Axis-F Aft | 5590 | 52.94 (71) | CW | 423.7 (3750) / 84.7 (750) [6] / NA | 22.68 (50) | 39.5 (350) | AS971A-8CS [3] |

CW – Clockwise CCW – Counter Clockwise

[1] Pad modified for torque, speed and stud location.

[2] Pad modified for torque.

[3] Pad modified for speed, power, overhung moment, and stud length and elimination of V-band clamp flange.

[4] Pneumatic starter must be fitted with a deflector to prevent impingement of starter discharge air on engine casing.

[5] Pad rated at constant horsepower from 9,900 to 17,815 pad RPM with a 5 minute overload rating of 180 horsepower and a 5 second overload rating of 240 horsepower.

[6] A short-time overload rating of 1300 in-lb can be applied for six (6) seconds at a time.

NOTE 5 Engine ratings are based on calibrated test stand performance under the following conditions:

1. Static sea level standard conditions of 15°C (59° F) and 39.89 mbar (29.92 inches Hg).
2. No aircraft accessory loads or air extraction.
3. No anti-icing; no inlet distortion; no inlet screen losses; and 100% ram recovery.
4. Inlet bellmouth per Table in Zone D-8 of Installation Drawing 6036T80, Sheet 6, for CF34-1A/-3A/-3A2; Installation Drawing 6078T61, Sheet 6, for CF34-3A1/-3B/-3B1; contained in GE Installation Manual SEI-567. Referee short cowl system as described in Part A, Appendix I contained in GE Installation Manual SEI-567.
5. Specified fuel having an average lower heating value of 42,798 Kj/Kg 18 550 BTU/lb; specified lube oil.

NOTE 6 Air Bleed Extraction - maximum customer air bleed extraction is as follows: Customer bleed air is available from either stages 10 or 14 (compressor discharge) of the compressor at all operating conditions at or above idle. (No compressor bleed is permitted below idle).

| <u>Location</u> | <u>Maximum Demonstrated Bleed Air (% of Total Compressor Airflow)</u> |
|--|---|
| Compressor Stage 10, (for cabin condition use) 426.7 °C (800 °F) max. | 4 |
| Compressor Stage 14 (Compressor Discharge) 537.8°C (1000°F) max. | 6 |

Minimum required bleed above 40,000 feet is 2 percent; maximum power extraction above 40,000 feet is 32 HP

NOTE 7 These engines meet FAA requirements for operation in icing provided a minimum core speed (N2) of 11,400 rpm, corrected to 15°C (59° F), is maintained.

NOTE 8 The maximum permissible inlet distortion for these engines is specified in GE Installation Manual SEI-567.

NOTE 9 On CF34-1A/-3A/-3A2, unless the engine is equipped with an optional fuel heater, the following approved fuel additives must be used individually or in combination: Phillips PFA-55MB or anti-icing additives to specification MIL-I-27686E at a concentration of 0.10 to 0.15% by volume.

NOTE 10 Reserved

NOTE 11 Life limits, established for critical rotating components, are published in FAA approved GE Maintenance Manual SEI-580 for CF34-1A/-3A/-3A2, GE Engine Manual SEI-756 for CF34-3A1/-3B1 and GE Service Manual SEI-780 for CF34-3A1/-3B.

NOTE 12 Recommend maintenance inspection intervals are published in GE Maintenance Manual SEI-580 for CF34-1A/-3A/-3A2, GE Engine Manual SEI-756 for CF34-3A1/-3B1 and GE Service Manual SEI-780 for CF34-3A1/-3B.

NOTE 13 The operating temperature limit for specific components and accessories specified in Table A-4 of GE Installation Manual SEI-567 must be observed when installing the engine.

NOTE 14 The static thrust at sea level are rated at 59°F ambient temperature and below for CF34-1A model and at 70°F ambient temperature and below for CF34-3A/-3A1/-3A2 models. For the CF34-3B, static thrusts at sea level are rated at 86°F ambient temperature and below. For CF34-3B1, static thrusts at sea level is rated at 86°F ambient temperature and below for maximum takeoff and at 73°F and below for normal takeoff and maximum continuous. The computer performance decks for calculating engine performance are as follows:

| Engine Models | Computer Deck No. |
|-------------------|-------------------|
| CF34-1A | 82070 |
| CF34-3A/-3A1/-3A2 | 85168A |
| CF34-3B/-3B | 94111D |

NOTE 15 CF34-1/-3 engines comply with the applicable fuel venting and exhaust emission requirements of SFAR 27-5 and 40 CFR 87.21; except those engines exempted by Grant of Exemption Nos. 4049 and 4049A under provisions of 40 CFR 87.7(b) and Grant of Exemption Nos. 4594 and 4594A under provisions of 40 CFR 87.7(c). The following engine models manufactured after December 31, 1999 comply with 14 CFR Part 34, effective September 10, 1990, including Amendments 34-1 through 34-3: CF34-3A1, CF34-3B, CF34-3B1.

NOTE 16 When the automatic reset mechanism in the fuel control is utilized, operation to the normal takeoff rating operating limits will insure the maximum takeoff rating operating limits are not exceeded when the reset mechanism is actuated. The time limit at the normal takeoff rating is five minutes and shall include any time accumulated above the normal takeoff rating.

NOTE 17 The above models incorporate the following general characteristics:

| Model | Characteristics |
|--------------|--|
| CF34-1A | Basic model |
| CF34-3A | Same as -1A except for increased interturbine temperature and rating. The thrust is flat rated to 70oF ambient temperature sea level static. |
| CF34-3A1 | Same as -3A except for increased interturbine temperature and improved maintainability and durability features, compatible with airline service requirements. |
| CF34-3A2 | Same as -3A except for improved combustor, ignition system, and fuel control 3-D cam, same as -3A1, modified fuel distribution system, and revised starting procedures/ |
| CF34-3B/-3B1 | Same as -3A1 except for improved stage 1 compressor and HPT and LPT stator cooling and clearance control modifications. CF34-3B and -3B1 configurations are identical except for flat rating points (see NOTE 14). |

NOTE 18 The following emissions standards promulgated in RBAC 34, Amendment 05, which corresponds to 14 CFR Part 34, Amendment 5, effective December 31, 2012, have been complied with for: CF34-3A, CF34-3A1, CF34-3A2, CF34-3B, CF34-3B1.

- Fuel Venting Emission Standards: § 34.10(a) and § 34.11;
- Smoke Number (SN) Emission Standards: § 34.21(e)(2);
- Carbon Monoxide (CO) Emission Standards: § 34.21(d)(1)(ii);
- Hydrocarbons (HC) Emission Standards: § 34.21(d)(1)(i) and
- Oxides of Nitrogen (NOx) Emission Standards: § 34.23(b)(1).

In addition, the engine manufacturer has declared that have been demonstrated the ICAO emissions standards identified in Annex 16, Volume II, 3rd Edition, Part III, Chapter 2, Section 2.2.2 for SN, Section 2.3.2 for CO and HC; Section 2.3.2.e for NOx (also known as CAEP/8), as well as the Part II Chapter 2 for fuel venting.



MÁRIO IGAWA

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