

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION TYPE CERTIFICATE DATA SHEET E15NE	TCDS NUMBER E15NE REVISION: 13 DATE: June 18, 2014 GENERAL ELECTRIC COMPANY MODELS: CF34-1A CF34-3A2 CF34-3A CF34-3B CF34-3A1 CF34-3B1
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Engines of models described herein conforming with this data sheet (which is part of Type Certificate Number E15NE) and other approved data on file with the Federal Aviation Administration, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Federal Aviation Regulations, provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

TYPE CERTIFICATE (TC) HOLDER: General Electric Company
 GE Aviation
 1000 Western Ave
 Lynn, Massachusetts 01910

1. MODELS	CF34-1A	CF34-3A	CF34-3A2	CF34-3A1	CF34-3B/-3B1
TYPE	Turbofan, 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, lb					
Maximum takeoff (5 min.) (See NOTES 14 and 16)	9140	9220	--	--	--
Normal takeoff (5 min.) (See NOTES 14 and 16)	8650	8729	--	--	--
Maximum continuous (See NOTE 14)	8920	9140	--	--	--
FUEL Control, Woodward Governor	GE P/N 6047T74	--	GE P/N 6091T07	GE P/N 6078T55 4147T69	GE P/N 6078T55 4147T70
FUEL (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	Oil conforming to GE Specification No. D50TF1, current revision. See SEI-579 (CF34), Operating Instructions for specific oils approved per the subject specifications.				
PRINCIPAL DIMENSIONS					
Length, inches	103.19	--	--	--	--
Maximum diameter, inches	49.6	--	--	--	--
WEIGHT (dry maximum), pounds	1625	--	--	1655	1670

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LEGEND: "-" INDICATES "SAME AS PRECEDING MODEL"
 "—" NOT APPLICABLE
 NOTE: SIGNIFICANT CHANGES ARE BLACK-LINED IN THE
 LEFT MARGIN.

1. MODELS	CF34-1A	CF34-3A	CF34-3A2	CF34-3A1	CF34-3B/-3B1																										
CENTER OF GRAVITY LOCATION, inches Forward of combustion chamber forward flange Below horizontal centerline Relative to vertical centerline	6.83 1.00 0.00	-- -- --	-- -- --	7.9 0.7 -1.0	-- -- --																										
IGNITION SYSTEM	CF34-1A Simmonds type 83311 or Bendix type 10-397550-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.																														
CERTIFICATION BASIS:	14 CFR Part 33, effective February 1, 1965, as amended by amendments 33-1 through 33-9; amendment 33-10 for 14 CFR Section 33.14; and FAA Grant of Exemption 3473. <table border="0" style="width: 100%;"> <tr> <td style="width: 33%;"></td> <td style="text-align: center;"><u>Type Certificate</u></td> </tr> <tr> <td style="text-align: center;"><u>Model</u></td> <td style="text-align: center;"><u>Date of Application</u></td> </tr> <tr> <td style="text-align: center;"><u>Model</u></td> <td style="text-align: center;"><u>No. E15NE Issued</u></td> </tr> <tr> <td>CF34-1A</td> <td style="text-align: center;">October 24, 1980</td> </tr> <tr> <td>CF34-3A</td> <td style="text-align: center;">November 26, 1985</td> </tr> <tr> <td>CF34-3A1</td> <td style="text-align: center;">August 16, 1989</td> </tr> <tr> <td>CF34-3A2</td> <td style="text-align: center;">September 3, 1992</td> </tr> <tr> <td>CF34-3B/-3B1</td> <td style="text-align: center;">July 26, 1993</td> </tr> <tr> <td></td> <td style="text-align: center;">August 18, 1982</td> </tr> <tr> <td></td> <td style="text-align: center;">September 26, 1986</td> </tr> <tr> <td></td> <td style="text-align: center;">July 24, 1991</td> </tr> <tr> <td></td> <td style="text-align: center;">October 9, 1992</td> </tr> <tr> <td></td> <td style="text-align: center;">May 31, 1995</td> </tr> </table> <p>The following models comply with 14 CFR part 34, amendment 5, effective December 31, 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.</p>						<u>Type Certificate</u>	<u>Model</u>	<u>Date of Application</u>	<u>Model</u>	<u>No. E15NE Issued</u>	CF34-1A	October 24, 1980	CF34-3A	November 26, 1985	CF34-3A1	August 16, 1989	CF34-3A2	September 3, 1992	CF34-3B/-3B1	July 26, 1993		August 18, 1982		September 26, 1986		July 24, 1991		October 9, 1992		May 31, 1995
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PRODUCTION BASIS:	Production Certificate No. 107																														

NOTES

Notes 1 through 18 applicable to CF34-1A/-3A/-3A2. Notes 1 through 8, and 11 through 18 applicable to CF34-3A1/-3B/-3B1.

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

	<u>CF34-1A</u>	<u>CF34-3A/-3A2</u>	<u>CF34-3A1</u>	<u>CF34-3B/-3B1</u>
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)*, °F(°C)

	<u>CF34-1A</u>	<u>CF34-3A/-3A2</u>	<u>CF34-3A1</u>	<u>CF34-3B/-3B1</u>
Maximum takeoff (5 min.)	1,575(857)	1,600(871)	1,650(899)	--
Maximum takeoff (2 min. transient out of a total of 5 minutes)	1,627(886)	1,652(900)	1,702(928)	--
Normal takeoff (5 min.)	1,548(842)	1,573(856)	1,623(884)	--
Normal takeoff (2 min. transient out of a total of 5 minutes)	1,587(864)	1,613(878)	1,663(906)	--
Maximum continuous	1,540(838)	1,580(860)	1,630(888)	1650(899)

*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 inlet temperature**, °F (°C)

Continuous operation	311(155)	--	--	--
Transient operation	358(163)	--	--	--

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

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

Continuous operation				
JP5	158(70)	--	250(121)	--
JP4, JP4/JP5 mixture	158(70)	--	250(121)	--
Ground operation	158(70)	--	250(121)	--

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 PSIG 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 Drive	Pad Type	Speed Ratio to Core Rotor	Rotation Facing Pad	Maximum Torque (in-lb)		Max. Cont. Power (HP)	Max. Acc. Wt. (lbs.)	O'hung Moment (in-lb)	Gasket
				Cont.	Static				
Starter (4)	AS969A-2S(1)	.3987	C	6,000	13,000	--	80	625	None
Hydraulic Pump	AS969A-3CT(2)	.3288	C	750 (6)	3,750	71	50	350	None
Electric Generator	AS971A-8CS(3)	.9815	C	1,050	5,250	165(5)	150	2,500	None

C - clockwise; CC - counterclockwise

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:

Static sea level standard conditions of 59°F and 29.92 inches Hg.

No aircraft accessory loads or air extraction.

No anti-icing; no inlet distortion; no inlet screen losses; and 100% ram recovery.

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.

Specified fuel having an average lower heating value of 18,400 BTU/lb; specified lube oil.

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

<u>Location</u>	<u>Maximum Bleed Air (% of Total Compressor Airflow)</u>
Compressor Stage 10, (for cabin condition use) 800°F max.	4
Compressor Stage 14, 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 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:

<u>Engine Model</u>	<u>Computer Deck No.</u>
CF34-1A	82070
CF34-3A/-3A1/-3A2	85168A
CF34-3B/-3B1	94111D

NOTE 15. CF34 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:

<u>Model</u>	<u>Characteristics</u>
CF34-1A	Basic Model
CF34-3A	Same as -1A except for increased interturbine temperature and rating. The thrust is flat rated to 70°F 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 14 CFR Part 34, Amendment 5, effective December 31, 2012, and 40 CFR Part 87, effective July 18, 2012, have been complied with for: CF34-3A, CF34-3A1, CF34-3A2, CF34-3B, CF34-3B1.

Fuel Venting Emission Standards: 14 CFR §§ 34.10(a) and 34.11; in addition, 40 CFR §§ 87.10(a) and 87.11.

Smoke Number (SN) Emission Standards: 14 CFR §34.21(e)(2); in addition, 40 CFR § 87.23(c)(1).

Carbon Monoxide (CO) Emission Standards: 14 CFR § 34.21(d)(1)(ii); in addition, 40 CFR § 87.23(c)(1).

Hydrocarbons (HC) Emission Standards: 14 CFR § 34.21(d)(1)(i); in addition, 40 CFR § 87.23(c)(1).

Oxides of Nitrogen (NOx) Emission Standards: 14 CFR § 34.23(b)(1); in addition, 40 CFR § 87.23(c)(3).

In addition to the FAA's finding of compliance based on the certification requirements defined in this TCDS, the engine manufacturer has declared that the ICAO emissions standards identified in Annex 16, Volume II, Third Edition, Part III, Chapter 2, Section 2.2.2 for SN, Section 2.3.2 for CO and HC, Section 2.3.2.e.3 for NOx (also known as CAEP/8), and Part II Chapter 2 for fuel venting have also been demonstrated.

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