



AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL - BRASIL

**TYPE CERTIFICATE DATA SHEET Nº EM-2005T12**

Type Certificate Holder:

**GENERAL ELECTRIC COMPANY**

1 Neumann Way  
Cincinnati, OH 45215-6310

**USA**

EM-2005T12-02

Sheet 01  
GENERAL ELECTRIC  
COMPANY

CF34-10E5, CF34-10E5A1,  
CF34-10E6, CF34-10E6A1,  
CF34-10E7, CF34-10E2A1,  
**CF34-10E7-B**

**September 2008**

Engines of models described herein conforming with this data sheet, which is part of Type Certificate No. 2005T12, 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.

**I - MODEL**

CF34-10E5, CF34-10E5A1, CF34-10E6, CF34-10E6A1.

**TYPE**

Dual rotor, axial flow, high bypass ratio turbofan with single stage fan, 3-stage low pressure compressor, 9-stage high pressure compressor, annular combustion chamber, single stage high pressure turbine, 4-stage low pressure turbine, a thrust reverser, aft core cowl, exhaust nozzle, starter, and a Full Authority Digital Engine Control (FADEC).

**RATINGS (See Note 5)**

Sea Level static thrust, kN (lbf)

	CF34-10E5	CF34-10E5A1	CF34-10E6	CF34-10E6A1
Maximum takeoff (5 min., See Notes 15 and 16)	83.7 (18 820)	83.7 (18 820)	83.7 (18 820)	83.7 (18 820)
Normal takeoff (5 min., See Notes 15 and 16)	77.4 (17 390)	83.7 (18 820)	77.4 (17 390)	83.7 (18 820)
Maximum continuous	75.8 (17 040)	75.8 (17 040)	75.8 (17 040)	75.8 (17 040)

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		CF34-10E5	CF34-10E5A1	CF34-10E6	CF34-10E6A1
<b>FLAT RATE AMBIENT TEMPERATURE</b>	Takeoff, °F(°C)	86 (30)	--	95(35)	--
	Maximum Continuous, °F (°C)	77 (25)	--	--	--
<b>CONTROL SYSTEM COMPONENT</b>	Fuel Metering Unit	2043M10	--	--	--
	Full Authority Digital Engine Control (FADEC)				
	Hardware	2043M11	--	--	--
	Software	2043M65	--	--	--
	Configuration Plug				
	Hardware	2162M48	--	--	--
	Engine Rating	2041M41	--	--	--
	Engine Configuration	2041M42	--	--	--
	N1 Trim Setting	2041M43			
	Ignition System				
2 Ignition Exciters	9238M66	--	--	--	
2 Ignition Plug	1374M12	--	--	--	
Fuel Pump	2043M12	--	--	--	

**II - MODEL**

CF34-10E7, CF34-10E2A1, CF34-10E7-B

**TYPE**

Dual rotor, axial flow, high bypass ratio turbofan with single stage fan, 3-stage low pressure compressor, 9-stage high pressure compressor, annular combustion chamber, single stage high pressure turbine, 4-stage low pressure turbine, a thrust reverser, aft core cowl , exhaust nozzle, starter, and a Full Authority Digital Engine Control (FADEC).

<b>RATINGS (See Note 5)</b>		CF34-10E7	CF34-10E2A1	CF34-10E7-B
Sea Level static thrust, kN (lbf)				
	Maximum takeoff (5 min., See Notes 15 and 16)	90.6 (20 360)	75.4 (16 960)	90.6 (20 360)
	Normal takeoff (5 min., See Notes 15 and 16)	83.7 (18 820)	75.4 (16 960)	83.7 (18 820)
	Maximum continuous	75.8 (17 040)	67.2 (15 110)	75.8 (17 040)
<b>FLAT RATE AMBIENT TEMPERATURE</b>				
	Takeoff, °F(°C)	86 (30)	--	--
	Maximum Continuous, °F (°C)	77 (25)	--	--
<b>CONTROL SYSTEM COMPONENT</b>		CF34-10E7	CF34-10E2A1	CF34-10E7-B
	Fuel Metering Unit	2043M10	--	--
	Full Authority Digital Engine Control (FADEC)			
	Hardware	2043M11	--	--
	Software	2043M65	--	--
	Configuration Plug			
	Hardware	2162M48	--	--
	Engine Rating	2041M41	--	--
	Engine Configuration	2041M42	--	--
	N1 Trim Setting	2041M43		--
	Ignition System			
	2 Ignition Exciters	9238M66	--	--
	2 Ignition Plug	1374M12	--	--
	Fuel Pump	2043M12	--	--
<b>FUEL TYPE</b>	Fuel conforming to GE Jet Fuel Specification No. D50TF2 is applicable for all models. See GEK 112084, Operating Instructions, for specific fuels approved per the subject specifications.			
<b>OIL</b>	Oil conforming to GE Specification No.D50TF1 is applicable for all models. See GEK 112084, Operating Instructions, for specific oils approved per the subject specifications.			

		CF34-10E5	CF34-10E5A1	CF34-10E6	CF34-10E6A1	
<b>PRINCIPAL DIMENSIONS AND MEASUREMENTS</b>	Length - cm (in)	451.9 (177.93)	--	--	--	
	Maximum diameter - cm (in)	187.7 x 219.9 (73.89 x 86.59)	--	--	--	
	Weight, kN (lbf) (includes residual fuel and oil)	22.7 (5100)	--	--	--	
	Center of Gravity Location – cm (in)					
	Engine Station	518.7 (204.2)	--	--	--	
	Butt Line	250.4 (98.6)	--	--	--	
	Water Line	265.2 (104.4)	--	--	--	
			CF34-10E7	CF34-10E2A1	CF34-10E7-B	
	Length - cm (in)	451.9 (177.93)	--	--	--	
Maximum diameter - cm (in)	187.7 x 219,9 (73.89 x 86.59)	--	--	--		
Weight, kN (lbf) (includes residual fuel and oil)	22.7 (5 100)	--	--	--		
Center of Gravity Location – cm (in)						
Engine Station	518.7 (204.2)	--	--	--		
Butt Line	250.4 (98.6)	--	--	--		
Water Line	265.2 (104.4)	--	--	--		

**IMPORT REQUIREMENTS**

Each engine imported separately and/or spare parts must be accompanied by an export airworthiness approval issued by FAA, attesting that the particular engine and/or parts were submitted to the governmental quality control before delivery and are in conformity with the ANAC approved type design. The ANAC type design corresponds to the FAA approved type design, as stated in ANAC Reports V.33-0930-00, original issuance dated 18 August 2005, or further revisions.

**CERTIFICATION BASIS**

RBHA 33 corresponding 14 CFR Part 33, effective 01 February 1965, as amended by amendments 33-1 through 33-20 (13 December 2000).

RBHA 34 corresponding to 14 CFR Part 34, effective 10 September 1990, as amended by amendment 3 (03 February 1999).

Equivalent level of safety 8040-ELOS-04-NE-01 RBHA/14 CFR Part 33.83 (c) (1) Vibration Test

<u>Model</u>	<u>Date of Application</u>	<u>TC Issued / Amended</u>
CF34-10E5	15 February 2001	18 August 2005
CF34-10E5A1	15 February 2001	18 August 2005
CF34-10E6	15 February 2001	18 August 2005
CF34-10E6A1	15 February 2001	18 August 2005
CF34-10E7	13 January 2006	22 August 2006
CF34-10E2A1	13 January 2006	22 August 2006
CF34-10E7-B	17 July 2007	08 September 2008

**NOTES:**

Notes 1 through 22 applicable to models as specified.

**NOTE 1**

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

CF34-10E (all models)

Low pressure rotor (N1), rpm

Maximum takeoff

6325

Normal takeoff

6325

Maximum continuous

6325

High pressure rotor (N2), rpm

Maximum takeoff

18018

Normal takeoff

18018

Maximum continuous

18018

Refer to GE Engine Manual GEK 112081 and other manual or inspection requirements when limits are exceeded, 100 percent N1 rotor speed is 5954.4 rpm, 100 percent N2 rotor speed is 17 160 rpm.

**NOTE 2**

(1) Indicated maximum permissible temperature are listed below. In addition, the CF34-10E2A1 model incorporates an EGT shunt of 30°C at fan speeds above idle. Thus, for an indicated EGT of 983°C (1801°F), the measured EGT is 953°C (1747°F). All CF34-10E series engines are certified with takeoff EGT transient allowance. This allowance applies to normal and maximum takeoff EGT, up to 5.5°C for 2 seconds, 4.4°C for 5 seconds, 3.6°C for 15 seconds and 2.4°C for 30 seconds.

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<b>NOTE 2 (Cont.)</b> Indicated Exhaust Gas Temperature (EGT*), F (C)	CF34-10E5	CF34-10E5A1	CF34-10E6	CF34-10E6A1
Maximum takeoff (5 min)	1801 (983)	--	--	--
Normal takeoff (5 min)	1733 (945)	1801 (983)	1737 (947)	1801 (983)
Maximum continuous	1760 (960)	--	--	--
At start-up, ground	1364 (740)	--	--	--
At start-up, inflight	1607 (875)	--	--	--
	CF34-10E7	CF34-10E2A1	CF34-10E7-B	
Maximum takeoff (5 min)	1801 (983)	--	--	
Normal takeoff (5 min)	1729 (943)	1801 (983)	1729 (943)	
Maximum continuous	1760 (960)	--	--	
At start-up, ground	1364 (740)	--	--	
At start-up, inflight	1607 (875)	--	--	

\* The exhaust gas temperature is measured by 9 probes, which are equally spaced and mounted in the second-stage low pressure turbine vanes.

(2) Refer to GE Engine Manual GEK 112081 (CF34-10E all models for inspection requirements when limits are exceeded.

(3) Oil temperature limit (oil supply temperature measured in the oil tank), F (°C)

All Models

Continuous Operation 311 (155)

(4) Fuel Inlet temperature (at pylon interface), F (°C)

All Models

Continuous Operation 155 (68.3)

**NOTE 3**Fuel and Oil Pressure Limits

- (1) 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 1209 PSIG. See GE Installation Manual GEK 112083 for additional limits.
- (2) Oil: Minimum oil pressure limit is 25 PSID. For oil temperature less than -20°C, the minimum oil pressure is PSID for the first two minutes following an engine start. After two minutes at idle or if the engine power is increased above idle, the minimum oil pressure is 25 PSID. See GE Installation Manual GEK 112083 for additional limits.

**NOTE 4**Accessory Drive Provisions (All Models):

Accessory	Location on AGB axis	Speed (rpm)	HP (rated)	Direction of Rotation facing AGB	Torque (lb-in) Static / Continuous / Overload	Max. Acc. Wt. (lb)	Overhung Moment (lb-in)	Shear Torque (lb/in)
Lumbe & Scavenge Oil Pump	Axis – J Aft	8 575	7	CCW	300 (1) / 48 / NA	10.3	33	750 - 850
IDG	Axis – G Fwd	7 928	74.8 (2)	CW	675 (1) / 595 / 1 129 (5 min)(4) / 1 605 (5 sec) (4)	81.2 (6)	720 Maximum	3 144 – 3648
Air Turbine Starter	Axis – D Fwd	12 281	NA	CW	2 112, 4 200 (3) / NA / NA	27.7	113	6 300 – 7500
Hydraulic Pump	Axis – F Fwd	5 567	35	CW	573 (1) (5) / 392 / 670	13.9 dry	38.4	2 004 Maximum
Alternator	Axis – J Fwd	8 575	4	CW	NA / NA / NA	3.0	2.6	NA
Fuel Pump	Axis – E Aft	7 928	55	CW	150 / 240 / NA	28.6	142	1 400 – 1 540

CW – Clockwise

CCW- Counter Clockwise

**NOTE 4  
(Cont.)**

Accessory Speeds are based on Core Speed: 17160 rpm

- (1) -40°F SLS
- (2) HP is constant over the operating range with slight variations due to changes in efficiency. HP extraction is 74.8 at 7898 rpm (pad speed) and 73.5 HP at 4618 rpm (pad speed). The 5 minute overload rating is 82.7 HP and the 5 second overload rating is 137.37
- (3) 2112 in-lbs at 59°F SLS, 4200 in-lbs at -40°F SLS.
- (4) Overload at 4618 rpm (pad speed)
- (5) 573 in-lbs at 626 rpm (pad speed)
- (6) Includes oil and V band coupling

**NOTE 5**

Engine ratings are based on calibrated test stand performance, and performance calculations are based on accepted parameter correction methods documents in the production data folder. These calculations assume the following conditions:

1. Static sea level standard conditions of 59°F and 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. Production engine inlet and production flight exhaust.

**NOTE 6**

Air Bleed Extraction – maximum customer air bleed extraction is as follows: Customer bleed air is available from either stages 5 or 9 (compressor discharge) of the compressor at all operating conditions at or above idle. (No compressor bleed is permitted below idle). Customer bleed is scheduled to switch from stage 9 bleed at low power operation as described in GE Installation Manual GEK (CF34-10E all models).

<u>Location</u>	<u>Maximum Demonstrated Bleed Air (% of Total Compressor Airflow)</u>
	CF34-10E (all models)
Compressor Stage 5	8.0
Compressor Stage 9 (Compressor Discharge)	12.0
Maximum allowable Bleed	12.0

**NOTE 7**

Reserved

**NOTE 8**

The maximum permissible inlet distortion for these engines is specified in GE Installation Manual GEK 112083. Ground operational limits and procedures for operation in crosswind are specified in GE Specific Operating Instructions GEK 112084.

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**NOTE 9** For the CF34-10E model series, the 14CFR Part 33 engine type design definition includes thrust reverser system, which is part of the nacelle system, and is identified as follows:

<u>Engine Parts List</u>	<u>Thrust Reverser Parts List</u>
CF34-10E5GXX	601E0001-5XX
CF34-10E5A1GXX	601E0001-5XX
CF34-10E6GXX	601E0001-5XX
CF34-10E6A1GXX	601E0001-5XX
CF34-10E2A1GXX	601E0001-5XX
CF34-10E7GXX	601E0001-5XX
CF34-10E7BGXX	601E0001-5XX

The Engine Manual, GEK 1122081, defines the installation requirements for the engine and thrust reverser, GXX or -5XX indicates all parts lists designations, for example G01, G02, -501, -502, etc.

**NOTE 10** Life limits established for critical components and mandatory inspection requirements are specified in the Airworthiness Limitation Section of GE Engine Manual GEK 112081. Recommended maintenance inspection intervals are published in GE Engine Manual GEK 112081.

**NOTE 11** Reserved.

**NOTE 12** The operating temperature limit for specific components and accessories specified in GE Installation Manual GEK 112083 must be observed when installing the engine.

**NOTE 13** Reserved.

**NOTE 14** The follow manuals are approved on accepted for the CF34-10 model series:

	CF34-10E (all models)
Operating Instructions	GEK 112084
Installation Manual	GEK 112083
Engine Manual	GEK 112081

*qf*

**NOTE 15** This engine is equipped with an automatic power reserve function for takeoff operation with one engine inoperative. During takeoff, when the automatic power reserve function is activated, the engine control of the inoperative engine sends an input signal to the engine control of the operating engine. Upon receiving this signal, the engine thrust of the operating engine automatically increases from normal takeoff (NTO) or lower thrust to the corresponding, pre-determined maximum takeoff (MTO) thrust. Full MTO thrust is available to the pilot at any time by throttle selection. The engine control system also incorporates schedules that assure a fully degraded engine, during operation at the NTO of lower thrust, will achieve the specified MTO thrust without exceeding the engine operating limits when the automatic power reserve function is activated.

**NOTE 16** The time limit at the normal takeoff rating is five minutes and shall include any time accumulated above the normal takeoff rating for that takeoff. The **5-minute** takeoff time limit may be extended to 10 minutes for one engine inoperative operation in multi-engine aircraft.

**NOTE 17** Time Limited Dispatch Criteria  
Criteria pertaining to the dispatch and maintenance requirements for the engine control systems are specified in the airworthiness section of the Engine Manual, GEK 112081, which defines the various configurations and maximum operating intervals

**NOTE 18** Overhaul of components is only authorized via approved component manuals. Engine components for which no approved or accepted Manual is available must be replaced with new ones or serviceable parts.

**NOTE 19** Refer to Operating Instructions GEK 112084 for engine warm-up procedure

**NOTE 20** Refer to Operating Instructions GEK 112084 for thrust reverser operation

**NOTE 21** The above models incorporate the following characteristics:

Model	Characteristics	Model	Characteristics	Model	Characteristics
CF34-10E2A1	Basic Model	CF34-10E6	Basic Model	<b>CF34-10E7-B</b>	<b>Basic Model</b>
CF34-10E5	Basic Model	CF34-10E6A1	Basic Model		
CF34-10E5A1	Basic Model	CF34-10E7	Basic Model		

  
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