

# *European Aviation Safety Agency*

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## **EASA TYPE-CERTIFICATE DATA SHEET**

Number : IM.E.010  
Issue : 01  
Date : 08 November 2004  
Type : General Electric Aircraft Engines  
CT7-8 series engines

### Variants

CT7-8  
CT7-8A  
CT7-8B  
CT7-8E  
CT7-8F  
CT7-8A5  
CT7-8B5  
CT7-8E5  
CT7-8F5

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## **I. General**

**1. Type/Variants:** GE CT7-8, -8A, -8B, -8E, -8F, -8A5, -8B5, -8E5, -8F5

**2. Type Certificate Holder:**

General Electric Aircraft Engines  
1000 Western Ave.  
Lynn  
Massachusetts 01910, USA

**3. Manufacturer:** General Electric Aircraft Engines

**4. EASA Certification / JAA Validation Application Date:**

GE CT7-8	GE CT7-8A	GE CT7-8B	GE CT7-8E	GE CT7-8F
12 Nov 1996	10 Oct 2003	10 Oct 2003	10 Oct 2003	10 Oct 2003

GE CT7-8A5	GE CT7-8B5	GE CT7-8E5	GE CT7-8F5
10 Oct 2003	10 Oct 2003	10 Oct 2003	10 Oct 2003

**5. Validation Reference Date:** 30 September 1997

**6. EASA Certification Date:**

GE CT7-8	GE CT7-8A	GE CT7-8B	GE CT7-8E	GE CT7-8F
20 Jan 2003	08 Nov 2004	08 Nov 2004	08 Nov 2004	08 Nov 2004

GE CT7-8A5	GE CT7-8B5	GE CT7-8E5	GE CT7-8F5
08 Nov 2004	08 Nov 2004	08 Nov 2004	08 Nov 2004

EASA Type Certification for the CT7-8 model is granted, in accordance with article 2 paragraph 3 (a)(i) of EU Commission Regulation EC 1702/2003, based on the CAA United Kingdom validation letter issued following the JAA Validation Recommendation.

## **II. Certification Basis**

**1. FAA Certification Basis details:** see FAA TCDS E8NE

**2. EASA Certification Basis:**

**2.1 Airworthiness Standards:**

For CT7-8:

- JAR-E Change 9 plus Orange Papers E/96/1 & E/97/1 (21 October 1996 and 30 December 1997)
- JAR-E790 at Change 10
- ICAO annex 16, Volume II, second edition, effective 11 November 1993

For CT7-8A, -8B, -8E, -8F, -8A5, -8B5, -8E5, -8F5 in addition to above:

- JAR E20(f) and E25 at Change 12
- Emissions and Fuel Venting : EC 1702/2003 Annex Part 21A.18(b), 27 September, 2003

**2.2 Special Conditions :**

- SC1 : Ratings
- SC2 : Controls
- SC3 : Provisions for Instruments
- SC4 : Conditions applicable to Endurance tests
- SC5 : Endurance tests – Inspection checks and calibration tests
- SC6 : Functioning
- SC8 : Endurance tests
- SC10: Safe Life Determination
- SC11: Overtemperature test
- SC12: Overtorque and Overspeed
- SC13: 30 Minute AEO Rating Definition
- SC14: Endurance Test (30 Minute AEO Rating)
- SC15 : Instructions for Continued Airworthiness (Resulting from use of 30 Minute AEO Rating)
  
- SC9 (for CT7-8 only): Use of Instructions for Continued Airworthiness following use of 30-Sec/2-Min OEI ratings

**2.3 Equivalent Safety Findings :**

JAR E840 – Rotor Integrity ( CT7-8 only )

**2.4 Exemptions :**

None

**III. Technical Characteristics**

**1. Type Design Definition:**

As defined by the applicable GE CT7-8/-8A/-8A5/-8B/-8B5/-8E/-8E5/-8F/-8F5 Model Lists.

**2. Description:**

The CT7-8/-8A/-8A5/-8B/-8B5/-8E/-8E5/-8F/-8F5 family of engines are front drive, turboshaft engines featuring a single-spool gas generator section consisting of a five-stage axial, single-stage centrifugal flow compressor, a through flow annular combustion chamber, a two-stage axial flow gas generator turbine, and a free or independent two-stage axial flow power turbine. The power turbine shaft is co-axial and extends to the front end of the engine. The engines also incorporate modular construction throughout, a top-mounted accessory package, an engine-driven fuel boost pump, a self-contained lubrication system, condition monitoring-diagnostics provisions, a dual channel full authority digital electronic control (FADEC) system providing gas generator and power turbine speed control, engine load sharing, and redundant gas generator and power turbine overspeed protection. The engine type definition does not include the starter or the mounts.

**3. Equipment:**

Approved Equipment are included in Item III. 1.

**4. Dimensions:** See Note 1.

Overall Length	123,9 cm	(48,8 inches)
Overall Diameter	66,0 cm	(26,0 inches)
Overall Width	66,0 cm	(26,0 inches)
Overall Height	63,5 cm	(25,0 inches)

- 5. Dry Weight:** CT7-8 243,6 kg (537,0 lbs.) See note 2  
 CT7-8A/-8A5/-8B/-8B5/-8E/-8E5/-8F/-8F5 245,9 kg (542,0 lbs.) See note 2

**6. Ratings:** See Notes 3 and 4

Ratings	CT7-8	CT7-8A	CT7-8A5	CT7-8B	CT7-8B5	CT7-8E	CT7-8E5	CT7-8F	CT7-8F5
Maximum Continuous (Sea Level – (SL)) Power, kW (Shaft hp) Output, rpm	1523 (2043) 21945	1523 (2043) 21945	1608 (2157) 21945	1522 (2041) 20900	1606 (2154) 20900	1522 (2041) 20872	1606 (2154) 20872	1462 (1960) 20841	1604 (2151) 20841
Takeoff (5 min (SL)) Power, kW (Shaft hp) Output, rpm	1879 (2520) 21945	1879 (2520) 21945	1964 (2634) 21945	1886 (2529) 20900	1946 (2609) 20900	1884 (2527) 20872	1945 (2608) 20872	1845 (2474) 20841	1941 (2603) 20841
30 Minute AEO (SL) Power, kW (Shaft hp) Output, rpm	1742 (2336) 21945	1742 (2336) 21945	1897 (2544) 21945	1856 (2489) 20900	1886 (2529) 20900	1855 (2488) 20872	1885 (2528) 20872	1777 (2383) 20841	1882 (2524) 20841
Continuous OEI (SL) Power, kW (Shaft hp) Output, rpm		1863 (2498) 21945	1897 (2544) 21945	1856 (2489) 20900	1886 (2529) 20900	1855 (2488) 20872	1885 (2528) 20872	1777 (2383) 20841	1882 (2524) 20841
30-Minute OEI (SL) Power, kW (Shaft hp) Output, rpm	1863 (2498) 21945								
2-Minute OEI (SL) Power, kW (Shaft hp) Output, rpm	1879 (2520) 20848	1879 (2520) 20900	1943 (2606) 20900	1881 (2523) 20900	1943 (2606) 20900	1881 (2522) 20872	1942 (2604) 20872	1812 (2430) 19800	1841 (2469) 19800
30-Second OEI (SL) Power, kW (Shaft hp) Output, rpm	1939 (2600) 20848	2043 (2740) 20900	2065 (2769) 20900	2043 (2740) 20900	2065 (2769) 20900	2042 (2739) 20872	1989 (2767) 20872	1957 (2624) 19800	1957 (2624) 19800

**7. Control System:**

The engine is equipped with a Full Authority Digital Engine Control (FADEC) system.

Fuel Control – Hamilton Sunstrand Fuel Metering Unit (FMU)  
EECU – Hamilton Sunstrand Electronic Engine Control Unit (EECU)

Note: EECU software is verified to level A according to RTCA Document DO-178B.

**8. Fluids**

8.1 Fuel:

The approved fuels and additives must conform to current revision of GE Specification D50TF2. For specific approved fuels, see Operating Instructions GEK 105157. See Note 5.

8.2 Oil:

The engine oil must be of a type conforming to current revision of GE Specification D50TF1. For specific approved brand of oil, see Operating Instructions GEK 105157.

**9. Accessory Drive Provisions:**

DRIVE PAD	Type	Rotation Speed (*)	Speed	Maximum Torque Nm (in-lb) Continuous	Maximum Torque Nm (in-lb) Static
Starter	MS3326-2 (1)	CW	0,64979 (2)	38,0 (336)	101,7 (900) (3), (4), (5)

(\*) Facing engine gearbox pad (CW = clockwise)

(1) Modified for speed and strength requirements

(2) Ratio to gas generator speed (Rotation speed is divided by gas generator (GG) speed)

(3) The starter and/or start sequence must be controlled to avoid exceeding specified impact torque.

(4) 3 second maximum duration per start

(5) Maximum axial impact force shall not exceed 1000 pounds

**10. Maximum Permissible Air Bleed Extraction:**

	Allowable Bleed Limit (Percent) from Stage 5
From Idle to Max Ng	6,5% of Core airflow (W <sub>2</sub> )

Ng - Gas Generator/ Compressor rotor speed

**IV. Operational Limits:**

**1. Temperature Limits:**

1.1 Maximum Gas Generator Exhaust Gas Temperature (T4.5 / ITT), °C (°F):

Rating	GE CT7-8	GE CT7-8A, -8B	GE CT7-8A5/-8B5/-8E/-8E5/-8F/-8F5
30-Second OEI	1010 (1851)	1049 (1921)	1049 (1921)
2-Minute OEI	990 (1814)	1006 (1843)	1006 (1843)
Continuous OEI	---	988 (1811)	988 (1811)
30-Minute OEI	979 (1794)	---	---
12 second Transient	987 (1809)	1003 (1838)	1003 (1838)
Takeoff (5 min)	986 (1807)	995 (1823)	1002 (1835)
30-Min AEO	957 (1755)	988 (1811)	988 (1811)
Maximum Continuous	920 (1688)	935 (1715)	935 (1715)
Starting	1000 (1832)	1000 (1832)	1000 (1832)

T4.5 is measured at the inlet of the LP Turbine

1.2 Oil Temperature: °C (°F)

Oil Type	Condition	Min	Max
Type I (MIL-L-7808)	Cold Start-up	-54 (-65)	
Type II (MIL-L-23699)	Cold Start-up	-40 (-40)	
Type I or II	Normal Operation		132 (270)
Type I or II	Transient (15 minutes Maximum)		149 (300)

1.3 Fuel temperature limits (at boost pump inlet): ° C (°F)

ASTM D 1655 Fuels	Min	Max
JET A (JP-5)	-40 (-40)	57 (135)
JET B (JP-4)	-54 (-65)	16 (60)

Note: The maximum allowed fuel viscosity is 12 centistokes. Fuel heating and anti icing additive is not required at fuel temperatures above -26°C.

**2. Maximum Permissible rotor Speeds**

2.1 Gas Generator speed (Ng) \*

Rating	GE CT7-8 Ng - rpm	GE CT7-8A/-8A5/-8B/-8B5/-8E/- 8E5/-8F/-8F5 Ng - rpm
30-Sec OEI	46340	46340
2-Min OEI	46010	46010
Continuous OEI	- - -	45760
30-Min OEI	45760	- - -
12 Second Transient	46120	46340
Takeoff (5 min)	46010	46010
30-Min AEO	45350	45760
Max Continuous	44660	44660

\* : 100 percent Ng is 44,700 RPM

2.2 Power Turbine speed (Np) \*

Np -Operating Speed	GE CT7-8 /-8A/-8A5	GE CT7-8B/-8B5	GE CT7-8E/-8E5	GE CT7-8F/-8F5
Nominal Rating	21945	20900	20872	20841
Minimum Governing	19855	19855	19855	19800
Maximum Governing	21945	21945	21945	21945
Maximum Continuous	22200	22200	22200	22200
Maximum Transient (12 seconds)	24350	24350	24350	24350

\*: 100% Np is 20,900 rpm

**3. Torque Limits:** Maximum Torque on the power turbine shaft during operation.

Rating	CT7-8 Torque in Nm (ft-lb)	CT7-8A/-8A5/-8B/-8B5/-8E/-8E5/- 8F/-8F5 Torque in Nm (ft-lb)
30-Sec OEI	916 (676)	952 (702)
2-Min OEI	862 (636)	895 (660)
Continuous OEI	---	868 (640)
30-Min OEI	819 (604)	---
Takeoff (5 min)	818 (603)	895 (660)
30-Min (AEO)	778 (574)	868 (640)
Maximum Continuous	712 (525)	827 (610)
Maximum Transient (12 second)	865 (638)	1053 (777)

#### 4. Pressure Limits:

##### 4.1 Fuel Pressure Limits at Engine Boost Pump Inlet:

For all CT7 models: At engine boost pump inlet: For all operation, including starts, the minimum pressure shall be 6,9 kPa (1,0 psi) above true vapor pressure of the fuel, with a vapor/liquid ratio less than or equal to 1.0. Maximum fuel pressure shall be 344,7 kPa (50 psi) above absolute ambient atmospheric pressure. In addition, minimum fuel pressure during starting shall be no lower than atmospheric pressure (or tank pressure, whichever is higher) minus 19,3kPa (2.8 psi).

See Section A-3, Paragraph 5 of Engine Installation Manual SEI-866.

##### 4.2 Oil Pressure Limits:

For all CT7 models: Maximum for continuous operation: 689,5 kPa (100 psid)  
See Section A-3, Paragraph 6 of Engine Installation Manual SEI-866.

#### 5. Installation Assumptions:

The installation assumptions are quoted in the Engine Installation Manual SEI-866.

#### 6. Dispatch Limitations:

Time Limited Dispatch Criteria : Criteria pertaining to the dispatch and maintenance requirements for engine control systems are specified in the airworthiness limitation section of the CT7-8/-8A/-8A5/-8B/-8B5/-8E/-8E5/-8F/-8F5 Engine Maintenance Manual GEK 105159, which define the various configurations and maximum operating intervals.

## V. Operating and Service Instructions

– See Notes 15 and 16

Engine Installation Manual	SEI-866
Engine Operating Instructions	GEK 105157
Engine Maintenance Manual	GEK 105159
Engine Overhaul Manual	GEK 105175
Service Bulletins	Issued as appropriate

## VI. Notes

**Note 1:** The Principle Dimensions are nominal values for reference only. More exact dimensions are defined in the Installation Manual Drawing found in SEI-866, Installation Manual for CT7-8/-8A/-8A5/-8B/-8B5/-8E/-8E5/-8F/-8F5.

**Note 2:** Dry weight includes basic engine accessories and optional equipment as listed in the manufacturer's engine specification. Weight does not include FADEC cable from engine harness connectors to engine FADEC unit (aircraft mounted).

**Note 3:** The engine ratings are based on dry sea-level static ICAO standard condition of 59°F and 29.92 inches Hg. The engine ratings specified are the minimum guaranteed and are based on calibrated test stand performance with no external air bleed for aircraft accessories, no anti-icing airflow, with GE aircraft Engines air inlet (P/N 1076662-542) and shaft shield (P/N 1076662-592) and with exhaust configuration as defined by GE aircraft Engines P/N 1076662-524 or P/N 1076662-554.

**Note 4:** Sea Level Static Power Limits below 15°C (59°F).

Ratings	CT7-8	CT7-8A	CT7-8A5	CT7-8B	CT7-8B5/8E5	CT7-8E	CT7-8F/8F5
30-Sec OEI	Increase linearly to 1995 kW (2675 shp) at 8°C (47°F), then flat to -49°C (-57°F), decreasing linearly to 1972 kW (2644 shp) at -54°C (-65°F)	Increase linearly to 2051 kW (2750 shp) at 11°C (51°F), then flat to -38°C (-36°F), decreasing linearly to 1972 kW (2645 shp) at -54°C (-65°F)	Flat to -49°C (-56°F), then decreasing to 1985 kW (2662 shp) at -54°C (-65°F)	Flat to -39°C (-39°F), then decreasing to 1972 kW (2645 shp) at -54°C (-65°F)	Flat to -38°C (-36°F), then decreasing to 1985 kW (2662 shp) at -54°C (-65°F)	Flat to -42°C (-44°F), then decreasing to 1981 kW (2656 shp) at -54°C (-65°F)	Flat rated to -54°C (-65°F)
2-Min OEI	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)
Continuous OEI	---	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)
30-Min OEI	Flat rated to -54°C (-65°F)						
Normal Takeoff	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)
30-Min AEO	Flat rated to -54°C (65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)
Maximum Continuous	Increase linearly to 1573 kW (2110 shp) at 12°C (53°F), then flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)	Flat rated to -54°C (-65°F)

**Note 5:** The following optional additive may be used in approved fuels (all models):

- (1) Phillips PFA-55-MB or anti-icing additives to specification MIL-1-27696 at a concentration not in excess of 0,15% by volume.

**Note 6:** Life limits established for critical rotating components are published in Chapter 5 of the CT7-8/-8A/-8A5/-8B/-8B5/-8E/-8E5/-8F/-8F5 GEAE Engine Maintenance Manual, GEK 105159.

**Note 7:** Recommended maintenance inspection intervals are published in the GEAE Engine Maintenance Manual, GEK 105159.

**Note 8:** The engine casing and component temperature values and/or nacelle airflow requirements specified in Paragraphs A-8 and A-9 of the Installation Manual, SEI-866, must be observed when installing the engine.

**Note 9:** Limits have been established for the CT7-8/-8A/-8A5/-8B/-8B5/-8E/-8E5/-8F/-8F5 models with regard to electromagnetic interference (EMI) and lightning. Refer to section A-16 of the Installation Manual, SEI-866, for a more detailed description of EMI and lightning capabilities and limits.

**Note 10:** The FADEC system synchronously governs Np/Nr and incorporates torque matching between engines. Automatic operational limiters are provided for torque, speed and gas generator exhaust gas temperature (T4.5 / ITT).

**Note 11:** The gas generator exhaust gas temperature (T4.5 / ITT) and torque data are required for the aircraft system to alert the pilot and track the time when the engine is at the 30-second and 2-minute OEI ratings; see Installation Manual, SEI-866. The FADEC system provides only the T4.5 / ITT signal to the aircraft system to track the time at these ratings.

**Note 12:** The operating / starting envelope is provided in Section A-13 of the Installation Manual, SEI-866.

**Note 13:** Repair / overhaul of the CT7-8/-8A/-8A5/-8B/-8B5/-8E/-8E5/-8F/-8F5 engines or components is not authorized until engine and component overhaul manuals become available.

**Note 14:** For the CT7-8/-8A/-8A5/-8B/-8B5/-8E/-8E5/-8F/-8F5 models, in dual engine operating condition, the EECU (Engine Electronic Control Unit) provides T4.5 limiting at Takeoff power, which will be automatically reset to 30-second OEI limits based on the engine Np signal sensing more than 5% aircraft main rotor droop. The limiter setting will be automatically lowered back to the normal dual engine Takeoff setting when droop is less than 3%.

**Note 15:** Engine maintenance logic is provided by the FADEC system, which transmits maintenance information over an ARINC data bus. This information includes system fault event indications and power assurance calculation results. Refer to Maintenance Manual, GEK 105159 and Installation Manual, SEI-866.

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