TYPE-CERTIFICATE DATA SHEET

EASA.IM.E.240

for
CF6-80A / CF6-80C Series

Type Certificate Holder
GENERAL ELECTRIC COMPANY
GE AVIATION
1 Neumann Way
Cincinnati, OH 45215-6301
United States of America

For Models:

CF6-80A	CF6-80C2B1	CF6-80C2B1F1
CF6-80A1	CF6-80C2B2	CF6-80C2D1F
CF6-80A2	CF6-80C2B4	CF6-80C2A5F
CF6-80A3	CF6-80C2B6	CF6-80C2B7F
CF6-80C2A1	CF6-80C2B1F	CF6-80C2B5F
CF6-80C2A2	CF6-80C2B2F	CF6-80C2B8F
CF6-80C2A3	CF6-80C2B3F	
CF6-80C2A5	CF6-80C2B4F	
CF6-80C2A8	CF6-80C2B6F	

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I. General

1. Type/ Model

CF6-80, -80A, -80A1, -80A2, -80A3, -80C2A1, -80C2A2, -80C2A3, -80C2A5, -80C2A5F, -80C2A8, -80C2B1, -80C2B1F, -80C2B1F1, -80C2B2, -80C2B2F, -80C2B3F, -80C2B4, -80C2B4F, -80C2B5F, -80C2B6, -80C2B6F, -80C2B7F, -80C2B8F, -80C2D1F.

2. Type Certificate Holder

GENERAL ELECTRIC COMPANY
GE AVIATION
1 Neumann Way
Cincinnati, OH 45215-6301
United States of America

3. Manufacturer

GE Aviation Production Certification No. 108 One Neumann Way Cincinnati - Ohio 45215 United States of America	Safran Aircraft Engines (formerly SNECMA)* 1, Rond point René Ravaud 77550 Moissy-Cramayel, France EASA Production Certificate N° FR.21G.0007

* See Note 12

4. Date of Application

CF6-80A	01 December 1978	**CF6-80A1**	29 July 1980
CF6-80A2	16 June 1981	**CF6-80A3**	16 June 1981
CF6-80C2A1	11 September 1984	**CF6-80C2A2**	11 September 1984
CF6-80C2A3	05 March 1986	**CF6-80C2A5**	12 May 1987
CF6-80C2A5F	02 April 1993	**CF6-80C2A8**	22 June 1990
CF6-80C2B1	11 September 1984	**CF6-80C2B1F**	26 March 1987
CF6-80C2B1F1	23 October 1989	**CF6-80C2B2**	20 November 1986
CF6-80C2B2F	18 May 1988	**CF6-80C2B3F**	11 April 1990
CF6-80C2B4	05 March 1986	**CF6-80C2B4F**	18 May 1988
CF6-80C2B5F	22 May 1997	**CF6-80C2B6**	20 February 1987
CF6-80C2B6F	18 May 1988	**CF6-80C2B7F**	27 January 1993
CF6-80C2B8F	02 September 1997	**CF6-80C2D1F**	18 May 1988

Application for some of the engine models had been made to individual EU member states prior to EASA existence. The date of application to the FAA is taken as reference date.

5. EASA Type Certification Date

CF6-80A	9 February 1993	**CF6-80A1**	14 June 1982
CF6-80A2	9 February 1993	**CF6-80A3**	14 June 1982
CF6-80C2A1	05 September 1985	**CF6-80C2A2**	04 February 1986
CF6-80C2A3	22 January 1987	**CF6-80C2A5**	14 January 1988
CF6-80C2A5F	22 December 1993	**CF6-80C2A8**	23 May 1991
CF6-80C2B1	23 February 1987	**CF6-80C2B1F**	23 August 1989
CF6-80C2B1F1	23 May 1991	**CF6-80C2B2**	27 April 1987
CF6-80C2B2F	23 August 1989	**CF6-80C2B3F**	22 December 1993
CF6-80C2B4	23 February 1987	**CF6-80C2B4F**	23 August 1989
CF6-80C2B5F	09 October 2002	**CF6-80C2B6**	25 November 1987
CF6-80C2B6F	23 August 1989	**CF6-80C2B7F**	18 February 2000
CF6-80C2B8F	18 February 2000	**CF6-80C2D1F**	23 May 1991

The EASA Type Certificate for these engines is granted in accordance with article 2 paragraph 3 (a) of EU Commission Regulation (EU) No 748/2012 of 3 August 2012. These dates have been taken over from individual EU member states approval dates.

II. Certification Basis

1. State of Design Authority Certification Basis

See FAA TCDS E13NE.

2. EASA Certification Basis

These engine models had been certified in several EU member states before 28 September 2003. According to Article 3 Paragraph 1 (a)(i) of Commission Regulation (EU) 748/2012 for these engines the European TC and associated TCDS have been issued based on the Certification Basis as established by the State of Design.

The basis for the Airworthiness Standards () and the Special Conditions have been the former TCDS nr. M-IM 13 issued by DGAC France, German LBA TCDS nr. 6318 and UK-CAA Airworthiness Approval Notes (AAN) 22462, 22463, 22464, 23916, 25053, including Addendums and Up-issues.

2.1. Airworthiness Standards

Models	EASA Airworthiness Standards
CF6-80A, -80A1, -80A2, -80A3	JAR-E Change 4 of 26 septembre 1978
CF6-80C2A1, -80C2A2, -80C2A3, -80C2A5, -80C2A8, -80C2B1, -80C2B2, -80C2B4, -80C2B6	JAR-E Change 4 of 26 septembre 1978
CF6-80C2B1F, -80C2B1F1, -80C2B2F, -80C2B3F, -80C2B4F, -80C2B6F, -80C2D1F	JAR-E Change 4 of 26 septembre 1978
CF6-80C2A5F	JAR-E Change 4 of 26 septembre 1978
CF6-80C2B5F, -80C2B7F, -80C2B8F	JAR-E Change 4 of 26 septembre 1978

2.2. Special Conditions (SC)

Models	EASA Airworthiness Standards
CF6-80A, -80A1, -80A2, -80A3	None
CF6-80C2A1, -80C2A2, -80C2A3, -80C2A5, -80C2A8, -80C2B1, -80C2B2, -80C2B4, -80C2B6	None
CF6-80C2B1F, -80C2B1F1, -80C2B2F, -80C2B3F, -80C2B4F, -80C2B6F, -80C2D1F	• NPA-E10 As indicated in DGAC France letter 53052 SFACT/TC du 18 January 1989,
CF6-80C2A5F	• NPA-E10 • SC n° 1, Birds ingestion: Medium bird 1,134 kg (2,5 Lbs)

	• SC n° 2, Water and hail ingestion: AIA "Advisory proposal" PC 338-1 As indicated in DGAC France letter 54154/SFACT/N du 29 October 1993.
CF6-80C2B5F, -80C2B7F, -80C2B8F	• Electronic Engine Control: compliance with JAR-E50(b), E150(c) and E530(f) as interpreted in AMJ 20X1 (as in JAR-E change 10). • Compliance with NPA-E-20: Birds (dated 8 January 1999) - Definition of a new threat. • Compliance with JAR-E -790 as in JAR-E change 10 - Ingestion of rain and hail. As indicated in DGAC France letter 990771 - SFACT/NME du 02 February 1999, and letter SFACT 2002-3623- du 23 September 2002.

2.3. Equivalent Safety Findings

None.

2.4. Deviations

None.

2.5. Environmental Protection

Models	Environmental Protection Requirements
All models	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.
CF6-80C2B1F, CF6-80C2BSF CF6-80C2B6F, CF6-80C2B7F	CS-34 Amendment 3 as implemented by ED Decision 2019/014/R (29 July 2019); ICAO Annex 16 Volume II, Fourth Edition, Amendment 9 applicable 01 January 2018 as implemented into EU legislation 11 September 2018. • NOx levels in compliance with Part III, Chapter 2, paragraph 2.3.2 d) (CAEP/6), • Maximum nvPM mass concentration levels in compliance with Part III, Chapter 4, paragraph 4.2.2 (CAEP/10)

III. Technical Characteristics

1. Type Design Definition

As defined by the applicable GE Model List and approved design changes.

CF6-80A	CF6-80A1	CF6-80A2	CF6-80A3	CF6-80C2A1	CF6-80C2A2	CF6-80C2A3
CF6-80C2A5	CF6-80C2A5F	CF6-80C2A8	CF6-80C2B1	CF6-80C2B1F	CF6-80C2B1F1	CF6-80C2B2
CF6-80C2B2F	CF6-80C2B3F	CF6-80C2B4	CF6-80C2B4F	CF6-80C2B5F	CF6-80C2B6	CF6-80C2B6F
CF6-80C2B7F	CF6-80C2B8F	CF6-80C2D1F				

2. Description

The series CF6-80A (CF6-80A, -80A1, -80A2, -80A3) Dual rotor, axial flow, high bypass turbofan. The 14-stage high pressure compressor is driven by a 2-stage high pressure turbine and the integrated front fan and low-pressure compressor are driven by a 4-stage low pressure turbine.

The series CF6-80C2 (CF6-80C2A1, -80C2A2, -80C2B1, -80C2B4, -80C2A3, -80C2B2, -80C2B6, -80C2A5, -80C2A8, -80C2B1F, -80C2B2F, -80C2B4F, -80C2B6F, -80C2D1F, -80C2B1F1, -80C2B3F, -80C2A5F, -80C2B7F, -80C2B5F, -80C2B8F) Dual rotor, axial flow high bypass turbofan. The 14-stage compressor is driven by a 2-stage high pressure turbine and the integrated front fan and low-pressure compressor are driven by a 5-stage low pressure turbine.

See notes 13 and 18.

3. Equipment

As defined by the applicable GE Model Lists.

4. Dimensions

Models	**Dimensions** mm (in.)		
	Overall Length	**Overall Width**	**Overall Height**
CF6-80A, CF6-80A2	4239.3 (166.9)	2486.6 (97.9)	2415.5 (95.1)
CF6-80A1, CF6-80A3		2400 (94.5)	2682.2 (105.6)

Models	**Dimensions** mm (in.)		
	Overall Length	**Overall Width**	**Overall Height**
Series CF6-80C2 (CF6-80C2A1, -80C2A2, -80C2B1, -80C2B4, -80C2A3, -80C2B2, -80C2B6, -80C2A5, -80C2A8)	4273.8 (168.26)	2669.5 (105.10)	2691.6 (105.97)
Series CF6-80C2 (CF6-80C2B1F, -80C2B2F, -80C2B4F, -80C2B6F, -80C2D1F, -80C2B1F1, -80C2B3F, -80C2A5F, -80C2B7F, -80C2B5F, -80C2B8F)		2830.1 (111.42)	

5. Dry Weight

Models	**Dry Weight** kg (lbs)
CF6-80A, CF6-80A2	3980.7 kg (8776 lbs)
CF6-80A1, CF6-80A3	3973.5 kg (8760 lbs)

Models	**Dry Weight** kg (lbs)
Series CF6-80C2 (CF6-80C2A1, -80C2A2, -80C2A3, -80C2A5, -80C2A8)	4300.1 kg (9480 lbs)
Series CF6-80C2 (CF6-80C2B1, -80C2B4, -80C2B2, -80C2B6)	4386.2 kg (9670 lbs)
Series CF6-80C2 (CF6-80C2B1F, -80C2B2F, -80C2B4F, -80C2B6F, -80C2D1F, -80C2B1F1, -80C2B3F, -80C2A5F, -80C2B7F, -80C2B5F, -80C2B8F)	4440.7 kg (9790 lbs)
CF6-80C2D1F	4467.9 kg (9850 lbs)
CF6-80C2B3F	4308.7 kg (9499 lbs)
CF6-80C2A5F	4472.4 kg (9860 lbs)

See Note 1.

6. Ratings

Models	**Thrust** kN (lbf)	
	Take-off (5 minutes)	**Maximum Continuous**
A	208.755 (46930)	194.209 (43660)
A1	209.022 (46990)	193.987 (43610)
A2	216.494 (48670)	203.373 (45720)
A3	217.829 (48970)	203.728 (45800)
C2A1	257.374 (57860)	237.490 (53390)

C2A2	233.354 (52460)	213.870 (48080)
C2A3	262.223 (58950)	243.718 (54790)
C2A5	267.338 (60100)	250.034 (56210)
C2A8	257.374 (57860)	213.870 (48080)
C2B1	249.011 (55980)	220.409 (49550)
C2B1F1	267.027 (60030)	221.566 (49810)
C2B2	231.085 (51950)	218.052 (49020)
C2B4	254.349 (57180)	232.953 (52370)
C2B6	267.205 (60070)	249.545 (56100)
C2B1F	254.260 (57160)	221.566 (49810)
C2B2F	231.352 (52010)	218.586 (49140)
C2B4F	254.794 (57280)	233.398 (52470)
C2B5F	267.027 (60030)	221.566 (49810)
C2B6F	267.027 (60030)	249.857 (56170)
C2D1F	269.962 (60690)	252.348 (56730)
C2A5F	267.338 (60100)	250.034 (56210)
C2B3F	231.352 (52010)	177.262 (39850)
C2B7F	267.027 (60030)	249.857 (56170)
C2B8F	267.027 (60030)	249.857 (56170)

See Notes 2, 3, and 4.

7. Control System

i. The following engines are equipped with a Full Authority Digital Engine Control (FADEC) consisting primarily of a dual channel Electronic Control Unit (ECU), a Hydro Mechanical Unit (HMU), an ECU Rating Plug and a Main Fuel Pump. Refer to the Installation Manuals (§ V.) for unit part numbers.

- CF6-80C2B1F, CF6-80C2B2F, CF6-80C2B4F, CF6-80C2B6F, CF6-80C2D1F, CF6-80C2B1F1, CF6-80C2B3F, CF6-80C2A5F, CF6-80C2B7F, CF6-80C2B5F, CF6-80C2B8F.

ii. The following engines are not equipped with a Full Authority Digital Engine Control (FADEC). The engines are controlled by a Woodward Main Engine Control (MEC), supervised by Power Management Control (PMC), and a Main Fuel Pump. Refer to the Installation Manuals (§ V.) for unit part numbers.

- CF6-80A, CF6-80A1, CF6-80A2, CF6-80A3, CF6-80C2A1, CF6-80C2A2, CF6-80C2B1, CF6-80C2B4, CF6-80C2A3, CF6-80C2B2, CF6-80C2B6, CF6-80C2A5, CF6-80C2A8.

iii. See Note 13

iv. The incorporation of the Engine Identification Plug is applicable to the CF6-80C2 FADEC engine models only. See Note 16.

8. Fluids (Fuel, Oil, Coolant, Additives)

8.1. Fuel and Additives

The approved fuels and additives must conform to GE Specification D50TF2. The latest revision of the specification will apply.

8.2. Oil

The engine oil must be a synthetic type conforming to GE Specification D50TF1, Class B. For approved brands of oil refer to Service Bulletin 79-001.

9. Aircraft Accessory Drives

For CF6-80A / A2:

Drive Pad	Rotation Facing Gearbox Pad	Gear Ratio to Core Speed	Horsepower Continuous Pad Rating	Shear Torque**	Maximum Overhung Moment**
Starter	CCW	0.956	949.07 (8400)**	1898.1 (16800)	45.2 (400)
IDG	CCW	0.832	130.5 (175)*	1072.45 (9492)	226.0 (2000)
Hydraulic Pump	CCW	0.344	63.4 (85)*	481.1 (4260)	45.2 (400)
IDG Overload Limits	225 hp (167.8 kw) for 5 minutes per 1,000 hours of operation 225 hp (167.8 kw) for 5 seconds per hour of operation 450 hp (335.6 kw) for 5 seconds per 1,000 hours of operation				

For CF6-80A1 / A3:

Drive Pad	Rotation Facing Gearbox Pad	Gear Ratio to Core Speed	Horsepower Continuous Pad Rating	Shear Torque**	Maximum Overhung Moment**
Starter	CCW	0.956	1220.24 (10800)**	2169.31 (19200)	45.2 (400)
IDG	CCW	0.832	130.5 (175)*	1072.45 (9492)	226.0 (2000)
Hydraulic Pump	CCW	0.350	63.4 (85)*	836.1 (7400)	45.2 (400)
IDG Overload Limits	225 hp (167.8 kw) for 5 minutes per 1,000 hours of operation 225 hp (167.8 kw) for 5 seconds per hour of operation 450 hp (335.6 kw) for 5 seconds per 1,000 hours of operation				

For CF6-80C2A1 / A2/ A3 / A5 / A8 / D1F / A5F:

Drive Pad	Rotation Facing Gearbox Pad	Gear Ratio to Core Speed	Horsepower Continuous Pad Rating	Shear Torque**	Maximum Overhung Moment**
Starter	CCW	0.956	949.07 (8400)**	1898.1 (16800)	45.2 (400)
IDG	CCW	0.832	160.3 (215)*	1186.4 (10500)	226.0 (2000)
Hydraulic Pump	CCW	0.344	31.3 (42)*	481.1 (4260)	45.2 (400)

IDG Overload Limits	225 hp (167.8 kw) for 5 minutes per 1,000 hours of operation 225 hp (167.8 kw) for 5 seconds per hour of operation 450 hp (335.6 kw) for 5 seconds per 1,000 hours of operation

For CF6-80C2B1 / B2 / B4 / B6 / B1F/ B2F / B3F / B4F / B6F / B1F1 / B7F / B5F / B8F:

Drive Pad	**Rotation Facing Gearbox Pad**	**Gear Ratio to Core Speed**	**Horsepower Continuous Pad Rating**	**Shear Torque****	**Maximum Overhung Moment****
Starter	CCW	0.956	949.07 (8400)**	1898.1 (16800)	45.2 (400)
IDG	CCW	0.832	164.1 (220)*	1186.4 (10500)	226.0 (2000)
Hydraulic Pump	CCW	0.344	63.4 (85)*	481.1 (4260)	45.2 (400)
IDG Overload Limits	270 hp (201.3 kw) for 5 minutes per 1,000 hours of operation 360 hp (268.5 kw) for 10 seconds per hour of operation 450 hp (335.6 kw) for 5 seconds per 1,000 hours of operation				

CCW = Counter Clockwise
* Units: kW (hp)
** Units: Torque Nm (lb-in)

10. Maximum Permissible Air Bleed Extraction

Bleed location	**CF6-80A/A2**	**CF6-80A1/A3**
Stage 8, compressor airflow, normal	5.00%	5.00%
Stage 8, compressor airflow, intermittent (*)		
N2 RPM 8009-8600	5.75%	5.75%
N2 RPM 8600-8850	6.25% (**)	---
N2 RPM 8850-9680	5.75%	---
Compressor discharge		
Steady state at takeoff rating	5.00%	5.00%
Steady state between 80% N2 and maximum continuous	10.00%	10.00%
During acceleration above 80% N2	7.00%	7.00%
Operating at 80% N2 or below	12.50%	12.50%
Stage 10	2.00%	2.00%
Stage 11	---	---

(*) Intermittent operation is defined as "dispatch with a system inoperative, or bleed system, or engine failure inflight" and should be confined to the physical core speed (N2) range of 8009 (81.5%) to 9680 (98.5%) rpm as shown in the above tabulation. At all normal flight conditions, maximum bleed will remain 5% of core engine physical airflow. The manufacturer is to be consulted regarding conditions, number of occurrences, and duration of each occurrence within the limitations of:

The average of 2 x 10-3 occurrences per engine operating hour; and a maximum of 0.5 hour duration per occurrence (cumulative total of 50 hours).

(**) 5.75 maximum allowable stage 8 bleed when 10th stage customer bleed is also used.

Bleed location	**CF6-80C2 FADEC (percent)**	**CF6-80C2 PMC (percent)**
Stage 8, compressor airflow, normal	8.8	8.8
Stage 11	1.5	1.5
Compressor discharge		
Steady state at takeoff rating	5.0	5.0
Steady state at maximum continuous or below	10.0	---
Transient operation above maximum continuous rating	7.0	---
Steady state between 80% N2 and maximum continuous	---	10.0
During acceleration above 80% N2	---	7.0
Operating at 80% N2 or below	---	12.0

IV. Operating Limitations

1. Temperature Limits

1.1. Climatic Operating Envelope

The engine may be used in:

- Altitude: from 0 to 13 700 m
- Temperature: - 55 ° to + 55 °C ground temperature
- Mach nr: 0 to 0,94

Refer to the Installation Manual for details of the Operating Envelope, including the air inlet distortion at the engine inlet.

1.2. Turbine Exhaust Gas Temperature (EGT), °C (°F)

	Exhaust Gas Temperature °C (°F)				
Models	**Take-off (5 minutes)**	**Maximum Continuous**	**Starting Maximum Transient (40 sec)**	**Starting (Ground) Max (no time limit)**	**120 second maximum transient**
CF6-80A (ALL MODELS)	940 (1724)*	895 (1643)*	870 (1598)	750 (1382)	---
CF6-80C2 (ALL MODELS)	960 (1760)**	925 (1697)			965 (1769) ***

See Note 5 for time temperature envelope.

(*) See Note 20 for further information regarding maximum permissible parameters on CF6-80A engines.

(**) See Notes 11 and 15 for further information regarding EGT Redline and EGT Junction Box.

(***) 120 second maximum transient is only for CF6-80C2B8F

1.3. Fuel temperature

For the fuel temperature at the Fuel Pump Inlet, refer to the Installation Manual for additional information:

Models	**Installation manual**
CF6-80A / CF6-80A2	CF6-80A Installation Manual GEK 50460
CF6-80A1 / CF6-80A3	CF6-80A Installation Manual GEK 50490
CF6-80C2A1 / A2 / A3 / A5 / A8 / B1 / B2 / B4 / B6	CF6-80C2 Installation Manual GEK 50492
CF6-80C2B1F / B2F / B3F / B4F / B6F / D1F / B1F1 / A5F / B7F / B5F / B8F	CF6-80C2 FADEC Installation Manual GEK 97284

1.4. Oil temperature

	Maximum Oil Temperature °C (°F)	
Models	**Continuous Operation**	**Transient (15 minutes maximum)**
Oil Outlet	160 (320)	175 (347)

2. Pressure Limits

2.1. Fuel pressure limits at engine pump inlet

i. CF6-80A / A2

a. GROUND STARTING

This limit is from minimum fuel pressure of not less than 82.7 kPa, absolute (12 psia) to a maximum of 441.3 kPa gage (64 psig) (relative to atmosphere) with vapor/liquid ratio of zero at all conditions.

b. OPERATION AND AIR STARTING

Operation and air starting pressure limit extends from a minimum fuel pressure of more than 34.5 kPa (5.0 psi) above the true vapor fuel pressure to a normal maximum fuel pressure of 441.3 kPa gage (64 psig) with transient pressure (2 minute maximum) up to 489.5 kPa gage (71 psig) permitted (relative to the atmosphere) at all conditions.

ii. CF6-80A1 / A3

a. GROUND STARTING

This limit is from a minimum fuel pressure of not less than 82.7 kPa, absolute (12 psia) to a maximum of 344.8 kPa gage (50 psig) (relative to atmosphere) with vapor/liquid ratio of zero at all conditions.

b. OPERATION AND AIR STARTING

The engine fuel system will provide fuel flow and pressure required for starting and operating the engine throughout the defined operational envelope when the fuel pressure at the fuel pump inlet connections to the engine ranges from a minimum of true vapor pressure of the fuel plus 34.5 kPa (5.0 psi) to a maximum of 344.8 kPa gage (50 psig) supplied with vapor-free fuel for all normal operating conditions except idle power at altitudes greater than 3.048 km (10,000 feet). For altitudes greater than 3.048 km (10,000 feet) at least 103.4 kPa gage pressure (15 psig) is required at the main fuel pump inlet at metered fuel flow levels of 1134 kg/hr (2500 pph) or less.

iii. CF6-80C2 (ALL MODELS)

a. GROUND STARTING, AIR STARTING, AND OPERATION

This limit is from a minimum fuel pressure of not less than 34.34 kPa, absolute (5.0 psia) above the true vapor pressure to a maximum of 482.6 kPa gage (70 psig) (relative to atmosphere) with vapor/liquid ratio of zero at all conditions.

2.2. Oil pressure at idle

i. CF6-80A / A1 / A2 / A3

The pressure limit at idle is 69.0 kPa differential minimum (10 psid); varying from 179.4 to 827.6 kPa diff. (26 to 120 psid) in the normal operating range.

ii. CF6-80C2 (ALL MODELS)
The pressure limit at idle is 65.5 kPa differential minimum (9.5 psid); varying from 179.4 to 827.6 kPa diff (26 to 120 psid) in the normal operating range. See Note 10.

3. Speed limits

	Maximum Permissible Rotor Speeds rpm (%)	
Models	**Low Pressure Rotor (N1)**	**High Pressure Rotor (N2)**
CF6-80A (ALL MODELS)	4016 rpm (117.0%)	10859 rpm (110.5%) (*)
CF6-80C2 (ALL MODELS)	3854 rpm (117.5%)	11055 rpm (112.5%)

(*) See Note 20 for further information regarding maximum permissible parameters on CF6-80A engines.

4. Installation Assumptions:

The installation assumptions are stated in the appropriate engine Installation Manual.
See Note 14 and 17.

5. Time Limited Dispatch:

Criteria pertaining to the dispatch and maintenance requirements for CF6-80C2 FADEC engines are specified in the Airworthiness Limitations Section of CF6-80C2 Engine Manual GEK 92451, which define the various configurations and maximum operating intervals.

V. Operating and Service Instructions

	Document Reference			
Document	**CF6-80A / CF6-80A2**	**CF6-80A1 / CF6-80A3**	**CF6-80C2 (ALL MODELS)**	**CF6-80C2B1F / B2F / B3F / B4F / B6F / D1F / B1F1 / A5F / B7F / B5F / B8F**
Installation Manual	GEK 50460	GEK 50490	GEK 50492	---
Specific Operating Instructions	GEK 72506		GEK 92462	---
Engine Manual	GEK 72501		GEK 92451	---
Maintenance Manual	GEK 72500		GEK 92450	---
FADEC Installation Manual	---		---	GEK 97284
Service Bulletins	As issued for each engine model			

See Notes 6, 7, 8 and 9.

VI. Notes

1. Dry weight includes basic engine accessories & optional equipment as listed in the manufacturer's engine specifications, including condition monitoring instrumentation sensors.

2. The engine ratings are based on the following conditions:

   - Fan inlet air at 15°C (59°F) and 14.69 psia (29.92 in. hg.) abs. zero humidity.
   - Ideal engine inlet (100% bellmouth recovery).
   - No external air bleed or accessory drive power for aircraft accessories.
   - Turbine temperature and engine rotor speed limits not exceeded.

   Also, with the following flight exhaust system definition:

Models	**Exhaust systems defintion**
CF6-80A, -80A1, -80A2, -80A3	NS-CF6-1 NS-CF6-1G01 NS-CF6-1G02 NS-CF6-1G03 NS-CF6-1G04
CF6-80C2A1, -80C2A2, -80C2A3, -80C2A5, -80C2A8	ES-CF6-1G01 ES-CF6-1G02 ES-CF6-1G03 ES-CF6-1G04
CF6-80C2B1	TR-CF6-F23G03 TR-CF6-F23G04 TR-CF6-F23G07 TR-CF6-F23G08 TR-CF6-F23G11 TR-CF6-F23G12 TR-CF6-F23G13 TR-CF6-F23G14
CF6-80C2B2, -80C2B4, -80C2B6	TR-CF6-F23G01 TR-CF6-F23G02 TR-CF6-F23G05 TR-CF6-F23G06 TR-CF6-F23G09 TR-CF6-F23G10
CF6-80C2B1F/ B1F1/B3F/B5F	TR-CF6-F23FG03 TR-CF6-F23FG04 TR-CF6-F23FG07 TR-CF6-F23FG08 TR-CF6-F23FG11 TR-CF6-F23FG12 TR-CF6-F23FG13 TR-CF6-F23FG14
CF6-80C2 B2F/B4F/B6F/B7F/B8F	TR-CF6-F23FG01 TR-CF6-F23FG02

	TR-CF6-F23FG05 TR-CF6-F23FG06 TR-CF6-F23FG09 TR-CF6-F23FG10
CF6-80C2D1F	ES-CF6-2G01 ES-CF6-2G02 ES-CF6-2G03 ES-CF6-2G04 ES-CF6-2G05 ES-CF6-2G06 ES-CF6-2G07 ES-CF6-2G08 ES-CF6-2G09 ES-CF6-2G10 ES-CF6-2G11 ES-CF6-2G12
CF6-80C2A5F	ES-CF6-5G01 ES-CF6-5G02 ES-CF6-5G03 ES-CF6-5G04

3. Take off rating is limited to a continuous period of not more than 5 minutes except in the event of a power unit having failed or been shut down when a continuous period of not more than 10 minutes is allowed.

4. Take-off thrust and Maximum Continuous thrust is flat rated up to ambient temperature of:

	Flat rating ambient temperature °C (°F)	
Models	**Take-off**	**Maximum Continuous**
A, A1, A2, A3	33.3°C (92°F)	25°C (77°F)
C2A1	30°C (86°F)	25°C (77°F)
C2A2	44°C (111°F)	25°C (77°F)
C2A3	30°C (86°F)	25°C (77°F)
C2A5	30°C (86°F)	25°C (77°F)
C2A8	35°C (95°F)	25°C (77°F)
C2B1	30°C (86°F)	25°C (77°F)
C2B1F1	30°C (86°F)	25°C (77°F)
C2B2	32.2°C (90°F)	30°C (86°F)
C2B4	32.2°C (90°F)	25°C (77°F)
C2B6	30°C (86°F)	25°C (77°F)
C2B1F	32.2°C (90°F)	25°C (77°F)
C2B2F	32.2°C (90°F)	30°C (86°F)
C2B4F	32.2°C (90°F)	25°C (77°F)
C2B5F	30°C (86°F)	25°C (77°F)
C2B6F	30°C (86°F)	25°C (77°F)
C2D1F	30°C (86°F)	25°C (77°F)
C2A5F	30°C (86°F)	25°C (77°F)

C2B3F	32.2°C (90°F)	25°C (77°F)
C2B7F	30°C (86°F)	25°C (77°F)
C2B8F	30°C (86°F)	25°C (77°F)

5. Refer to CF6-80A Operating Instruction GEK 72506, or CF6-80C2 Operating Instruction GEK 92462 for time temperature envelope.

6. Cyclic life limits for critical rotating and static components are published in the Airworthiness Limitations Sections of CF6-80A Engine Manual GEK 72501, CF6-80C2 Engine Manual GEK 92451.

7. Power setting, power checks and control of engine thrust output in all operations is to be based on GE engine charts referring to Fan Speed (N1). Speed sensors are included in the engine assembly for this purpose

8. For CF6-80A inflight operation during icing conditions, the minimum permissible N1 rpm is 40% for CF6-80 series engines. However, momentary N1 excursions below 40%, not to exceed 60 seconds duration, are permissible for approach and landing operation below 10,000 feet pressure altitude. For CF6-80C2 operation, the minimum idle permissible inflight corresponds to N2 (core) = 6050 rpm, which is a preset limit within the Main Engine Control, (PMC engines) or Electronic Control Unit (FADEC engines) and is not field adjustable.

9. CF6-80A1/A3 Models

   The engine manufacturer supplies Nacelle System NS-CF6-1. The following kits listed, which are part of this Nacelle system, have been approved for installation on CF6-80A1/A3 engines.

System	**Kit Number**
Nozzle & Centerbody	681L287
Engine Attach Fittings	
Lower Aft Mount	681L288
Upper Aft Mount	681L294
Engine Assembled EBU	681L185
Fan Reverser TR-CF6-F23G02	
Position #1	681L292
Position #2	681L293
Fan Reverser Actuation System	
Supply Air - Pylon Mounted	681L188
Supply Air - Engine Mounted	681L189
Compartment Cooling Air System	681L244
Fuel Flowmeter	681L250

CF6-80C2 Models

The engine manufacturer supplies the engine assembled EBU for CF6-80C2A1 / A2 / A3 / A5 / A8 / A5F; CF6-80C2B1 / B2 / B4 / B6; CF6-80C2B1F / B2F / B3F / B4F / B5F / B6F / B7F / B1F1; and

CF6-80C2D1F engines. The components, which had been approved for installation on CF6-80C2 engines, are defined in the model lists CF6-80C2A1 / A2 / A3 / A5/ A8; CF6-80C2B1 / B2 /B4 / B6; CF6-80C2B1F / B2F / B3F / B4F / B5F / B6F / B7F / B1F1 / B8F; CF6-80C2D1F; CF6-80C2A5F.

The engine manufacturer also supplies total exhaust system and engine attach fittings for the CF6-80C2A1 / A2 / A3 / A5 / A8; the CF6-80C2A5F, and CF6-80C2D1F (except D1F upper aft mount beam), but supplies only the Fan Reverser System for the CF6-80C2B1 / B2 / B4 / B6 and CF6-80C2B1F / B2F / B3F / B4F / B5F / B6F / B7F / B1F1 / B8F engines.

The exhaust system (ES) and Fan Reverser (TR) Kit numbers approved for installation are listed in Note 2 of this TCDS.

10. CF6-80C2 models only: During negative-g operation only, it is permissible to operate below minimum oil pressure 69 kPa differential (10 psi differential) for a maximum of 30 seconds. See Sections 6 of CF6-80C2 Specific Operating Instructions, GEK 92462.

11. The indicated 960°C EGT Redline for the CF6-80C2 engines using EGT Shunt Junction Box P/N 1325M15P05 or 1325M15P07 corresponds to an actual 1005°C EGT. The indicated 960°C EGT Redline for CF6-80C2 engines using EGT Shunt Junction Box P/N 1383M97P03 or 1383M97P07 corresponds to an actual 1020°C EGT. CF6-80C2A1/A2/A3/B1/B2/B4 and CF6-80C2B1F/B2F/B3F/B4F models equipped with EGT Shunt Junction Box P/N 1383M97P03/P07 must also incorporate the HP/LP turbine hardware and associated changes per General Electric CF6-80C2 Service Bulletins 72-201, 72-222, 72-240, 72-241, 72-248, 72-255, 72-268, 77-005, and 77-006.

12. CF6-80A1/A3 engines and parts thereof manufactured by Safran Aircraft Engines (formerly SNECMA), 1, Rond point René Ravaud 77550 Moissy-Cramayel, France under Production agreement No. 6-3032 with the General Electric Company, are identified by engine Serial Numbers 585-.

    CF6-80C2 engines and parts thereof manufactured by Safran Aircraft Engines (formerly SNECMA), 1, Rond point René Ravaud 77550 Moissy-Cramayel, France under Production agreement No. 6.3592 with the General Electric Company, are identified by engine Serial Numbers 695- assigned to CF6-80C2 PMC engines manufactured by Safran Aircraft Engines, and Numbers 703- and 705-204 and up are assigned to CF6-80C2 FADEC engines manufactured by Safran Aircraft Engines.

13. These models incorporate the following general characteristics:

SERIES CF6-80A

CF6-80A	Basic model.
CF6-80A1	Same as CF6-80A, except the engine incorporates a fan case mounted gearbox.
CF6-80A2	Same as CF6-80A, except increased takeoff thrust rating. Corresponding PMC and MEC changes.
CF6-80A3	Same as CF6-80A1, except increased takeoff thrust rating. Corresponding PMC and MEC changes.

SERIES CF6-80C2

CF6-80C2A1	Basic model (takeoff ideal thrust rating: 59,000 pounds).
CF6-80C2A2	Same as 80C2A1, except lower takeoff thrust rating (53,500 ideal). Corresponding PMC and MEC changes.
CF6-80C2A3	Same as 80C2A1, except higher takeoff thrust rating (60,200 ideal). Corresponding PMC and MEC changes.
CF6-80C2B1	Same as 80C2A1, except lower takeoff thrust rating (56,700 ideal). Corresponding PMC and MEC changes. Minor airframe related hardware changes and added servo fuel heater.
CF6-80C2B2	Same as 80C2A1, except lower takeoff thrust rating (52,500 ideal). Corresponding PMC and MEC changes. Minor airframe related hardware changes and added servo fuel heater.
CF6-80C2B4	Same as 80C2A1, except lower takeoff thrust rating (57,900 ideal). Corresponding PMC and MEC changes. Minor airframe related hardware changes and added servo fuel heater.
CF6-80C2B6	Same as 80C2A1, except higher takeoff thrust rating (60,800 ideal). Corresponding PMC and MEC changes. Minor HPT and LPT hardware changes, minor airframe related hardware changes, and added servo fuel heater.
CF6-80C2A5	Same as 80C2A1, except higher takeoff thrust rating (61,300 ideal). Corresponding PMC and MEC changes. Minor HPT and LPT hardware changes
CF6-80C2A8	Same as 80C2A1, except takeoff thrust is flat rated to 95ºF. Corresponding PMC and MEC changes. Minor HPT and LPT hardware changes.
CF6-80C2B1F	Same as 80C2A1, except lower takeoff thrust rating (58,000 ideal). Incorporates Full Authority Digital Engine Control (FADEC), modulated active clearance control for the HPT and LPT, modulated bore cooling, two levels of 11th stage cooling to the HPT and redesigned accessory gearbox. Minor airframe related hardware changes, and added servo fuel heater.
CF6-80C2B1F1	Same as 80C2A1, except higher takeoff thrust rating (60,800 ideal) and maximum continuous rating same as 80C2B1F. Minor HPT and LPT hardware changes. Incorporates Full Authority Digital Engine Control (FADEC), modulated active clearance control for the HPT and LPT, modulated bore cooling, two levels of the 11th stage cooling to the HPT and redesigned accessory gearbox. Minor airframe related hardware changes, and added servo fuel heater. Only ECU P/N 1820M33P04

incorporating 8.2.N software can be used on the CF6-80C2B1F1. See Note 19.

CF6-80C2B2F — Same as 80C2A1, except lower takeoff thrust rating (52,700 ideal). Incorporates Full Authority Digital Engine Control (FADEC), modulated active clearance control for the HPT and LPT, modulated bore cooling, two levels of 11th stage cooling to the HPT and redesigned accessory gearbox. Minor airframe related hardware changes, and added servo fuel heater.

CF6-80C2B3F — Same as 80C2A1, except lower takeoff thrust rating (52,700 ideal). Incorporates Full Authority Digital Engine Control (FADEC), modulated active clearance control for the HPT and LPT, modulated bore cooling, two levels of 11th stage cooling to the HPT and redesigned accessory gearbox. Minor airframe related hardware changes, and added servo fuel heater. Only ECU P/Ns 1471M63P31, 1519M89P21, or 1820M33P04 incorporating 8.2.N software can be used on the CF6-80C2B3F. See Note 19.

CF6-80C2B4F — Same as 80C2A1, except lower takeoff thrust rating (58,100 ideal). Incorporates Full Authority Digital Engine Control (FADEC), modulated active clearance control for the HPT and LPT, modulated bore cooling, two levels of 11th stage cooling to the HPT and redesigned accessory gearbox. Minor airframe related hardware changes, and added servo fuel heater.

CF6-80C2B6F — Same as 80C2A1, except higher takeoff thrust rating (60,800 ideal). Minor HPT and LPT hardware changes. Incorporates Full Authority Digital Engine Control (FADEC), modulated active clearance control for the HPT and LPT, modulated bore cooling, two levels of 11th stage cooling to the HPT and redesigned accessory gearbox. Minor airframe related hardware changes, and added servo fuel heater.

CF6-80C2D1F — Same as CF6-80C2A1, except higher takeoff rating (61,960 ideal). Minor HPT and LPT hardware changes. Incorporates Full Authority Digital Engine Control (FADEC), modulated active clearance control for the HPT and LPT, modulated bore cooling, and two levels of 11th stage cooling to the HPT. Minor airframe related changes.

CF6-80C2A5F — Same as 80C2A1, except higher takeoff thrust rating (61,300 ideal). Minor HPT and LPT hardware changes. Incorporates Full Authority Digital Engine Control (FADEC), modulated active clearance control for the HPT and LPT, modulated bore cooling. Minor airframe related hardware changes, and added servo fuel heating system.

CF6-80C2B7F — Same as 80C2A1, except higher takeoff thrust rating (60,800 ideal). Minor HPT and LPT hardware changes. Incorporates Full Authority Digital Engine Control (FADEC), modulating active clearance control for the HPT and LPT, modulated bore cooling, two levels of 11th stage cooling to the

HPT and redesigned accessory gearbox. Minor airframe related hardware changes, and added servo fuel heater.

CF6-80C2B5F — Same as 80C2A1 except higher takeoff thrust rating (60,800 ideal). Minor HPT and LPT hardware changes. Incorporates Full Authority Digital Engine Control (FADEC), modulated active clearance control for the HPT, and a constant level of 11th stage cooling to HPT. Minor airframe related changes, and added servo fuel heater.

CF6-80C2B8F — Same as CF6-80C2B7F except for increased thrust during takeoff. In addition, the CF6-80C2B8F incorporates a 965°C transient EGT redline for a maximum of two minutes. Incorporates improved HPT and LPT rotors.

14. The CF6-80C2A5/A8/B5F/B6/B6F/B7F/B1F1/D1F/A5F engine models require the incorporation of General Electric CF6-80C2 Service Bulletins 72-201, 72-222, 72-240, 72-241, 72-248, 72-255, 72-268, 77-005 and 77-006.

15. Incorporation of EGT Junction Box P/N 1519M97P01 (direct readout) in lieu of EGT Shunt Junction box P/N 1325M15P07 or 1383M97P03/P07 is applicable to CF6-80C2 FADEC engine models only and requires the simultaneous introduction of ECU P/N's 1471M63P16 (or later) or 1519M89P08 (or later) or 1820M33P01 (or later) for CF6-80C2B1F/B2F/B3F/B4F/ B5F/ B6F/ B1F1/ B7F/ B8F engine models as listed on the data sheet. EGT Junction Box P/N 1519M97P01 is used on all CF6-80C2DF and CF6-80C2AF models.

16. The incorporation of the Engine Identification Plug is applicable to the CF6-80C2 FADEC engine models only. The applicable part numbers are as follows:

    <u>CF6-80C2BF Engine Models</u>

    Engine Identification Plug P/N 7157M87 must be used with ECU P/N's 1471M63P07/P08/P11/ P12 and with 1519M89P05/P06.

    Engine Identification Plug P/N 7161M98 must be used with ECU P/N's 1471M63P16 (or later) or 1519M89P08 (or later) or 1820M33P01 (or later). Engine Identification Plug P/N 7161M98 or 1851M56 must be used with ECU P/N's 1471M63P31 (or later) or 1519M89P21 (or later) or 1820M33P04 (or later) or 2121M25P01 (or later), or 2121M26P01 (or later), or 2121M29P01 (or later), or 2121M37P01 (or later), or 2121M38P01 (or later), or 2121M41P01 (or later). The exact Engine Identification Plug P/N is determined by engine hardware options and engine test results.

    <u>CF6-80C2DF Models</u>

    Engine Identification Plug P/N's 7161M98 must be used with ECU P/N 1519M91P04 (or later) or 1820M34P01 (or later). Engine Identification Plug P/N 7161M98 or 1851M56 must be used with ECU P/N's 1519M91P07 (or later) or 1820M34P02(or later) or 1851M51P01(or later) or 1851M52P01(or later) or 1851M53P01(or later). The exact Engine Identification Plug P/N is determined by engine hardware options and engine test results.

    <u>CF6-80C2AF Models</u>

Engine Identification Plug P/N 7161M98 or 1851M56 must be used for all ECU P/N's. The exact Identification Plug P/N is determined by engine hardware options and engine test results.

17. The CF6-80C2B3F does not require the incorporation of General Electric CF6-80C2 Service Bulletins 72-201, 72-222, 72-240, 72-241, 72-248, 72-255, 72-268, 77-005 and 77-006. If these bulletins are not incorporated, the engine must use one of the Identification Plug P/N's 7161M98G26 through G49 or P/N's 7161M98G74 through G97. See Note 16.

18. A suffix may be added to the CF6-80C2B7F basic engine model number on the engine nameplate to identify minor variations in the engine configuration, installation components, or differences peculiar to aircraft requirements. For example: CF6-80C2B7FX.

    CF6-80C2B7F1 – Same as CF6-80C2B7F except for a minor variation in the installation components and engine control software to interface with aircraft requirements for higher bleed demand. All hardware, limitations, and other ratings are identical. Only ECU P/N 1820M33P04 incorporating 8.2.N software can be used on the CF6-80C2B7F1. See note 19.

19. The engine Instructions for Continued Airworthiness (ICA's) are incomplete and do not include the CF6-80C2B1F1 / B3F / B7F1 engine models. Aircraft with CF6-80C2B1F1 / B3F / B7F1 engine models installed are not eligible for an airworthiness certificate until the ICA's are revised and accepted by the FAA Engine Certification Office.

20. The maximum high pressure rotor speed and maximum turbine exhaust gas temperatures permissible for all CF6-80A models, determined in (§. IV), have been increased from originally certified operating limits. This limit increase was approved by the FAA in Service Bulletin No. CF6-80 S/B 72-260, Revision 2, dated January 31, 1984. The life limits, dependent on the operating limits, applicable to certain rotating components are listed in Chapter 5 of the Engine Manual GEK 72501.

SECTION: ADMINISTRATIVE

I. Acronyms and Abbreviations

EASA	European Union Aviation Safety Agency
EGT	Exhaust Gas Temperature
FAA	Federal Aviation Administration
FADEC	Full Authority Digital Engine Control
GE	General Electric
HPC/HPT	High Pressure Compressor/Turbine
ICAO	International Civil Aviation Organisation
IDG	Integrated Drive Generator
JAA	Joint Aviation Authorities
JAR	Joint Aviation Requirements
LPC/LPT	Low Pressure Compressor/Turbine
SC	Special Condition
TC	Type Certificate
TCDS	Type Certificate Data Sheet

II. Type Certificate Holder Record

n/a

III. Change Record

Issue	Date	Changes	TC issue
Issue 01	11 April 2022	Initial Issue. Transferring from former EU NAA TCDSs into EASA TCDS format	Initial Issue, 11 April 2022

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