



AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL - BRASIL

TYPE CERTIFICATE DATA SHEET Nº EM-8303

Type Certificate Holder:

GENERAL ELECTRIC AVIATION
One Neumann Way
Cincinnati, Ohio - OH 45215-6301
USA

EM-8303-04

Sheet 01

GENERAL ELECTRIC
CF6-80A, -80A2,
-80C2B1, -80C2B2,
-80C2B6F, -80C2D1F,
-80C2B1F, -80C2B4
-80A3, -80C2A2,
-80C2A8, -80C2B7F,
-80C2B2F, -80C2B4F,
-80C2B5F

September 2007

Engines of models described herein conforming with this data sheet, which is part of Type Certificate No. 8303, 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

CF6-80A, -80A2, -80A3

TYPE

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.

RATINGS

See Note 5	CF6-80A	CF6-80A2	CF6-80A3
Maximum continuous at sea level, static thrust, lb	43 660	45 720	45 800
Takeoff (5 min. See Note 22) at sea level, static thrust, lb	46 930	48 670	48 970

RATINGS (Cont.)		CF6-80A	CF6-80A2	CF6-80A3
	Flat rating ambient temperature - Takeoff °F (°C)	92.0 (33.3)	92.0 (33.3)	92.0 (33.3)
	- Max. continuous °F (°C)	77.0 (25.0)	92.0 (33.3)	92.0 (33.3)
MAIN ENGINE CONTROL	WOODWARD / GE P/N	9238M79	--	9363M11
POWER MANAGEMENT CONTROL	GE P/N	7076M98G15 7076M98G16 1305M68P02 1305M68P03	7076M98G17 1305M69P04 1305M69P05 #	7084M12G09 7084M12G10 1305M70P02 1305M70P03
EGT SHUNT JUNCTION BOX (See Note 15)	GE P/N	9230M48P02	--	--
FUEL TYPE	See Note 7			
OIL, LUBRICATION	See Note 14			
FUEL PUMP	GE P/N	9304M23	--	9304M45
IGNITION SYSTEM	Two ignition units GE P/N or GE P/N	9101M52 9238M66	-- --	-- --
	Two ignitor plugs GE P/N or GE P/N	9101M37 1305M52	-- --	-- --
TEMPERATURE LIMITS	Maximun Permissible Temperatures, See Note 2			
PRESSURE LIMITS	Fuel and Oil Pressure Limits, See Note 3			
PRINCIPAL DIMENSIONS	Length (in) (fan spinner to LPT aft flange face)	166.9	--	235.6
	Width (in) (maximum envelope)	97.9	--	94.5
	Height (in) (maximum envelope)	95.1	--	105.6

Legend: "--" Same as preceding

"#" Does not apply

		CF6-80A	CF6-80A2	CF6-80A3
WEIGHT	Dry (lb) ⁽¹⁾ ⁽¹⁾ Weight includes basic engine accessories & optional equipment as listed in the manufacturer's engine specifications, including condition monitoring instrumentation sensors.	8 776	--	8 760
CENTER OF GRAVITY LOCATIONS	Station (in) (engine only)	222.8 ± 2.0	--	219.4 ± 4.0
	Waterline (in) (engine only)	98.2 ± 1.0	--	95.8 ± 1.0
	Buttline (in) (engine only)	99.8 ± 0.5	--	98.7 ± 0.5
II - MODEL	CF6-80-C2A2, -80C2B1, -80C2B4			
TYPE	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.			
RATINGS	See Note 5	CF6-80-C2A2	CF6-80-C2B1	CF6-80C2B4
	Maximum continuous at sea level, static thrust, lb	48 080	49 550	52 370
	Takeoff (5 min. See Note 22) at sea level, static thrust, lb	52 460	55 980	57 180
	Flat rating ambient temperature - Takeoff °F (°C)	111.0 (44.0)	86.0 (30.0)	90.0 (32.2)
	- Max. continuous °F (°C)	77.0 (25.0)	--	--
MAIN ENGINE CONTROL	WOODWARD / GE P/N	1332M18	1332M19	--
POWER MANAGEMENT CONTROL	GE P/N	1339M19	1339M21	1339M20
EGT SHUNT JUNCTION BOX (See Note 15)	GE P/N	1325M15P05	--	#
		1325M15P07	--	--
		1383M97P03	--	--
		1383M97P07	--	--

		CF6-80-C2A2	CF6-80-C2B1	CF6-80C2B4
FUEL TYPE	See Note 7			
OIL, LUBRICATION	See Note 14			
FUEL PUMP	GE P/N	9355M33	--	--
IGNITION SYSTEM	Two ignition units GE P/N	9238M66	--	--
	Two ignitor plugs GE P/N	9387M23	--	--
	or GE P/N	9392M95	#	#
TEMPERATURE LIMITS	Maximun Permissible Temperatures	See Note 2	--	--
PRESSURE LIMITS	Fuel and Oil Pressure Limits	See Note 3	--	--
PRINCIPAL DIMENSIONS	Length (in) (fan spinner to LPT aft flange face)	168.26	--	--
	Width (in) (maximum envelope)	105.10	--	--
	Height (in) (maximum envelope)	105.97	--	--
WEIGHT	Dry (lb) ⁽¹⁾ ⁽¹⁾ Weight includes basic engine accessories & optional equipment as listed in the manufacturer's engine specifications, including condition monitoring instrumentation sensors.	9 480	9 670	--
CENTER OF GRAVITY LOCATIONS	Station (in) (engine only)	223.93 ± 2.0	--	223.86 ± 2.0
	Waterline (in) (engine only)	98.90 ± 0.5	--	98.86 ± 0.5
	Buttline (in) (engine only)	100.00 ± 0.5	--	99.97 ± 0.5

III - MODEL	CF6-80C2B2, 80C2A8		
TYPE	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.		
RATINGS	See Note 5	CF6-80C2B2	CF6-80C2A8
	Maximum continuous at sea level, static thrust, lb	49 020	48 080
	Takeoff (5 min. See Note 22) at sea level, static thrust, lb	51 950	57 860
	Flat rating ambient temperature - Takeoff °F (°C)	90.0 (32.2)	95.0 (35.0)
	- Max. continuous °F (°C)	86.0 (30.0)	86.0 (30.0)
MAIN ENGINE CONTROL	WOODWARD / GE P/N	1453M12	1459M60
POWER MANAGEMENT CONTROL	GE P/N	1374M94P03 1374M94P04	1672M13P01 #
EGT SHUNT JUNCTION BOX (See Note 1 & 19)	GE P/N	1325M15P07 1383M97P03 1383M97P07	1383M97P03 1383M97P07 #
FUEL TYPE	See Note 7		
OIL, LUBRICATION	See Note 14		
FUEL PUMP	GE P/N	9355M33	--
IGNITION SYSTEM	Two ignition units / GE P/N	9238M66	--
	Two ignitor plugs / GE P/N	9387M23	--
TEMPERATURE LIMITS	Maximum Permissible Temperatures, See Note 2		
PRESSURE LIMITS	Fuel and Oil Pressure Limits, See Note 3		

		CF6-80C2B2	CF6-80C2A8		
PRINCIPAL DIMENSIONS	Length (in) (fan spinner to LPT aft flange face)	168.26	--		
	Width (in) (maximum envelope)	105.10	--		
	Height (in) (maximum envelope)	105.97	--		
WEIGHT	Dry (lb) ⁽¹⁾	9 570	9 480		
	⁽¹⁾ Weight includes basic engine accessories & optional equipment as listed in the manufacturer's engine specifications, including condition monitoring instrumentation sensors.				
CENTER OF GRAVITY LOCATIONS	Station (in) (engine only)	223.86 ± 2.0	--		
	Waterline (in) (engine only)	98.86 ± 0.5	--		
	Buttline (in) (engine only)	99.97 ± 0.5	--		
IV - MODEL	CF6-80C2B1F, -80C2B6F, -80C2D1F, -80C2B7F				
TYPE	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.				
RATINGS	See Note 5	CF6-80C2B1F	CF6-80C2B6F	CF6-80C2D1F	CF6-80C2B7F*
	Maximum continuous at sea level, static thrust, lb	49 810	56 170	56 730	56 170
	Takeoff (5 min. See Note 22) at sea level, static thrust, lb	57 160	60 030	60 690	60 030
	Flat rating ambient temperature - Takeoff °F (°C)	90.0 (32.2)	86.0 (30.0)	--	--
	- Max. continuous °F (°C)	77.0 (25.0)	77.0 (25.0)	--	--
HYDROMECHANICAL UNIT	GE P/N	1383M68	--	1471M24	1383M68
	ELECTRONIC CONTROL UNIT	GE P/N	1471M63	--	--
		1519M89	--	--	--
		1820M33	--	--	--

		CF6-80C2B1F	CF6-80C2B6F	CF6-80C2D1F	CF6-80C2B7F*
ELECTRONIC CONTROL UNIT, GE P/N (CONT.)		2121M25	--	--	--
		2121M26	--	--	--
		2121M29	--	--	--
		2121M37	--	--	--
		2121M38	--	--	--
		2121M41	--	--	--
IDENTIFICATION PLUG (See Note 21) GE P/N		1851M56	--	--	--
		7161M98	--	--	--
		7157M87	--	--	--
EGT SHUNT JUNCTION BOX (See Notes 15, 19 & 21) GE P/N		1325M15P07	--	1519M97P01	1383M97P03
		1383M97P03	--		1383M97P07
		1383M97P07	1519M97P01		1519M97P01
		1519M97P01			
FUEL TYPE		See Note 7	--	--	--
OIL, LUBRICATION		See Note 14	--	--	--
FUEL PUMP GE P/N		9355M33	--	--	--
IGNITION SYSTEM	Two ignition units GE P/N	9238M66	--	--	--
	Two ignitor plugs GE P/N	9387M23	--	--	--
RATING PLUG	GE P/N	7156M94G01	7156M94G04	7156M94G01	7156M94G07
TEMPERATURE LIMITS	Maximun Permissible Temperatures	See Note 2	--	--	--
PRESSURE LIMITS	Fuel and Oil Pressure Limits	See Note 3	--	--	--

		CF6-80C2B1F	CF6-80C2B6F	CF6-80C2D1F	CF6-80C2B7F*
PRINCIPAL DIMENSIONS	Length (in) (fan spinner to LPT aft flange face)	168.26	--	--	--
	Width (in) (maximum envelope)	111.42	--	--	--
	Height (in) (maximum envelope) see	105.97	--	--	--
WEIGHT	Dry (lb) ⁽¹⁾	9 790	--	9 850	9 790
	⁽¹⁾ Weight includes basic engine accessories & optional equipment as listed in the manufacturer's engine specifications, including condition monitoring instrumentation sensors.				
CENTER OF GRAVITY LOCATIONS	Station (in) (engine only)	223.86 ± 2.0	--	--	--
	Waterline (in) (engine only)	98.86 ± 0.5	--	--	--
	Buttline (in) (engine only)	99.97 ± 0.5	--	--	--
V - MODEL	CF6-80C2B2F, -80C2B4F, -80C2B5F				
TYPE	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.				
RATINGS	See Note 5	CF6-80C2B2F	CF6-80C2B4F	CF6-80C2B5F	
	Maximum continuous at sea level, static thrust, lb	49 140	52 470	49 810	
	Takeoff (5 min. See Note 22) at sea level, static thrust, lb	52 010	57 280	60 030	
	Flat rating ambient temperature - Takeoff °F (°C)	90.0 (32.2)	--	86.0 (30.0)	
	- Max. continuous °F (°C)	86.0 (30.0)	77.0 (25.0)	--	
HYDROMECHANICAL UNIT	GE P/N	1383M68	--	--	
ELECTRONIC CONTROL UNIT	GE P/N	1471M63	--	--	
		1519M89	--	--	
		1820M33	--	--	

		CF6-80C2B2F	CF6-80C2B4F	CF6-80C2B5F
ELECTRONIC CONTROL UNIT, (CONT.)	GE P/N	2121M25	--	--
		2121M26	--	--
		2121M29	--	--
		2121M37	--	--
		2121M38	--	--
		2121M41	--	--
IDENTIFICATION PLUG (See Note 21)	GE P/N	1851M56	--	--
		7161M98	--	--
		7157M87	--	#
EGT SHUNT JUNCTION BOX (See Notes 15, 19 & 21)	GE P/N	1325M15P07	--	1519M97P01
		1383M97P03	--	#
		1383M97P07	--	#
		1519M97P01	--	#
FUEL TYPE	See Note 7			
OIL, LUBRICATION	See Note 14			
FUEL PUMP	GE P/N	9355M33	--	--
IGNITION SYSTEM	Two ignition units GE P/N	9238M66	--	--
	Two ignitor plugs GE P/N	9387M23	--	--
RATING PLUG	GE P/N	7156M94G02	7156M94G03	7156M94G09
TEMPERATURE LIMITS	Maximum Permissible Temperatures, See Note 2			
PRESSURE LIMITS	Fuel and Oil Pressure Limits, See Note 3			

		CF6-80C2B2F	CF6-80C2B4F	CF6-80C2B5F
PRINCIPAL DIMENSIONS	Length (in) (fan spinner to LPT aft flange face)	168.26	--	--
	Width (in) (maximum envelope)	111.42	--	--
	Height (in) (maximum envelope)	105.97	--	--
WEIGHT	Dry (lb) ⁽¹⁾	9 790	--	--
	⁽¹⁾ Weight includes basic engine accessories & optional equipment as listed in the manufacturer's engine specifications, including condition monitoring instrumentation sensors.			
CENTER OF GRAVITY LOCATIONS	Station (in) (engine only)	223.86 ± 2.0	--	--
	Waterline (in) (engine only)	98.86 ± 0.5	--	--
	Buttline (in) (engine only)	99.97 ± 0.5	--	--
IMPORT REQUIREMENTS	Each engine imported separately and/or spare parts must be accompanied by an export airworthiness approvals issued by FAA (or a third country authority, in case of used engine imported from such country) 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 Report V33-0120-0 dated 09 October 1998 or further revisions			
CERTIFICATION BASIS	<u>CF6-80A Series</u> RBHA 33 which endorses the FAR 33 effective 01 February 1965, including Amendments 33-1, 33-2, 33-3, 33-4, 33-5, 33-6, 33-7, and 33-8 as revised by Grant of Exemption No. 3372 from Paragraphs 33.7, 33.14, 22.23, 33.27, and 33.88 of Amendment 8.	<u>Model</u>	<u>Application</u>	<u>Issued TC</u>
	<u>CF6-80C2 Series</u> RBHA 33 which endorses the FAR 33 effective 01 February 1965, including Amendments 33-1, 33-2, 33-3, 33-4, 33-5, 33-6, 33-7, and 33-8 except for the approved substitute compliance procedures, which are in accordance with Amendment 10.	-80A -80A2 -80C2B2 -80C2B1 -80C2B6F -80C2B7F -80C2D1F -80C2B1F -80C2B4 -80A3 -80C2A2 -80C2A8	10 Nov. 1981 10 Nov. 1981 08 Dec. 1986 29 Mar. 1988 15 Jan. 1990 15 Jan 1990 04 Jan. 1991 22 Aug. 1991 18 Feb. 1995 15 May 1997 15 May 1997 15 May 1997	23 June 1983 23 June 1983 18 Jan. 1987 20 Oct. 1988 17 Oct. 1991 17 Oct. 1991 17 Oct. 1991 29 Apr. 1992 03 Aug. 1995 10 Oct. 1998 10 Oct. 1998 10 Oct. 1998

**CERTIFICATION BASIS
(Cont.)**

<u>Model</u>	<u>Application</u>	<u>Issued TC</u>
-80C2B2F	27 July 2007	21 Sep. 2007
-80C2B4F	27 July 2007	21 Sep. 2007
-80C2B5F	27 July 2007	21 Sep. 2007

PRODUCTION BASIS Production Certificate No. 108 for engines produced by General Electric in the United States.

NOTES:**NOTE 1** Maximum Permissible Engine Rotor Speeds:

	CF6-80A (all models)	CF6-80C2 (all models)
Low pressure rotor (N1)	4 016 rpm (117.0%)	3 854 rpm (117.5%)
High pressure rotor (N2)	1 0859 rpm (110.5%)	1 1055 rpm (112.5%)

NOTE 2 Maximum Permissible Temperatures:

<u>Turbine exhaust gas temperature (T49):</u>	CF6-80A (all models)	CF6-80C2 (all models)
Takeoff (5 min.)	1 724 °F (940 °C)	1 760 °F (960 °C) (See Note15)
Maximum continuous	1 643 °F (895 °C)	1 697 °F (925 °C)
120 second maximum transient		1 769 °F (965 °C)
Starting (max. transient 40 secs)	1 598 °F (870 °C)	--
Starting (max. no time limit)	1 382 °F (750 °C)	--

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

Fuel Pump Inlet:

CF6-80A / A2	Refer to CF6-80A Installation Manual GEK 50460
CF6-80A3	Refer to CF6-80A Installation Manual GEK 50490
CF6-80C2A2 / A8 / B1 / B2 / B4	Refer to CF6-80C2 Installation Manual GEK 50492
CF6-80C2B1F / B2F // B4F / B5F / B6F / B7F / D1F	Refer to CF6-80C2 FADEC Installation Manual GEK 97284

Oil Outlet (All Models):

Continuous operation	320°F (160°C)
Transient operation (15 mins limit)	347°F (175°C)

NOTE 3Fuel and Oil Pressure Limits:Fuel Pressure Limits at Engine Pump InletCF6-80A / A2

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

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

CF6-80A3

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

Operating 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 5.0 psi (34.5 kPa) to a maximum of 50 psig (344.8 kPa gage) supplied with vapor-free fuel for all normal operating conditions except idle power at altitudes greater than 10 000 feet (3.0480 km). for altitudes greater than 10 000 feet (3.0480 km) at least 15 psig (103.4 kPa gage) pressure is required at the main fuel pump inlet at metered fuel flow levels of 2500 pph (1 134 kg/hr) or less.

CF6-80C2 (all models)

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

Oil Pressure Limits at Idle

CF6-80A / A2 / A3 The pressure limit at idle is 10 psid (69.0 kPa diff) minimum; varying from 26 to 120 psid (179.4 to 827.6 kPa diff) in the normal operating range.

CF6-80C2 (all models) The pressure limit at idle is 9.5 psid (65.5 kPa diff) minimum; varying from 26 to 120 psid (179.4 to 827.6 kPa diff) in the normal operating range. See Note 16.

NOTE 4 Accessory Drive Provisions:

<u>CF6-80A / A2</u>	Rotation Facing Gearbox Pad	Gear Ratio To Core Speed	Horsepower Continuous	Shear Torque (lb . in)	Static Overhung Moment (lb . in)
Drive Pad					
Starter	CC W*	0.956	8 400 (torque lb.in)	16 800	400
IDG	CCW	0.832	175 hp	9 492	2 000
Hydraulic Pump (1)	CCW	0.344	85 hp	4 260	500
IDG Overload Limits	225 hp "kw" equivalent for 5 minutes per 1 000 hours of operation 225 hp "kw" equivalent for 5 seconds per hour of operation 450 hp "kw" equivalent for 5 seconds per 1 000 hours of operation				
	(*) CCW = Counterclockwise				

<u>CF6-80A3</u>	Rotation Facing Gearbox Pad	Gear Ratio To Core Speed	Horsepower Continuous	Shear Torque (lb . in)	Static Overhung Moment (lb . in)
Drive Pad					
Starter	CCW *	0.956	10 800 (torque lb.in)	19 200	400
IDG	CCW	0.832	175 hp	9 492	2 000
Hydraulic Pump (2)	CCW	0.350	85 hp	7 400	400
	(*) CCW = Counterclockwise				

**NOTE 4
(Cont.)**

<u>CF6-80C2A2 / A8 / D1F</u>	Rotation Facing Gearbox Pad	Gear Ratio To Core Speed	Horsepower Continuous	Shear Torque (lb . in)	Static Overhung Moment (lb . in)
Drive Pad					
Starter	CCW *	0.956	8 400 (torque lb.in) (949.07 N.m)	16 800 (1898.1 N.m)	400 (45.2 N.m)
IDG	CCW	0.832	215 hp (160.3 kw)	9 492 (1072.5 N.m)	2 000 (226.0 N.m)
Hydraulic Pump (1)	CCW	0.344	42 hp (31.3 kw) each	4 260 (481.1 N.m)	400 (45.2 N.m)
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				
	(*) CCW = Counterclockwise				

<u>CF6-80C2B1 / B2 / B4 / B1F / B2F / B4F / B5F / B6F / B7F</u>	Rotation Facing Gearbox Pad	Gear Ratio To Core Speed	Horsepower Continuous	Shear Torque (lb . in)	Static Overhung Moment (lb . in)
Drive Pad					
Starter	CCW *	0.956	8 400 (torque lb.in) (949.07 N.m)	16 800 (1898.1 N.m)	400 (45.2 N.m)
IDG	CCW	0.832	215 hp (160.3 kw)	9 492 (1072.5 N.m)	2 000 (226.0 N.m)
Hydraulic Pump (1)	CCW	0.344	85 hp (63.4 kw)	4 260 (481.1 N.m)	400 (45.2 N.m)
IDG Overload Limits	270 hp (201.3 kw) for 5 minutes per 1 000 hours of operation 360 hp (268.5 kw) for 5 seconds per hour of operation 450 hp (335.6 kw) for 5 seconds per 1 000 hours of operation				
	(*) CCW = Counterclockwise				

NOTE 5 Engine Ratings are Defined Under the Following Conditions:CF6-80 (all models):

Fan inlet air at 59°F (15°C) and 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 (ES) and Fan Reverser System (TR) definition:

<u>CF6-80A/A2/A3</u>	<u>CF6-80C2A2 / A8</u>	<u>CF6-80C2B1</u>	<u>CF6-80C2B2 / B4</u>
NS-CF6-1	ES-CF6-1G01	TR-CF6-F23G03	TR-CF6-F23G01
	ES-CF6-1G02	TR-CF6-F23G04	TR-CF6-F23G02
	ES-CF6-1G03	TR-CF6-F23G07	TR-CF6-F23G05
	ES-CF6-1G04	TR-CF6-F23G08	TR-CF6-F23G06
		TR-CF6-F23G11	TR-CF6-F23G09
		TR-CF6-F23G12	TR-CF6-F23G10
		TR-CF6-F23G13	
		TR-CF6-F23G14	
<u>CF6-80C2B1F / B5F</u>	<u>CF6-80C2B2F / B4F / B6F</u>	<u>CF6-80C2DF1</u>	
	<u>/ B7F</u>		
TR-CF6-F23FG03	TR-CF6-F23FG01	ES-CF6-2G01	
TR-CF6-F23FG04	TR-CF6-F23FG02	ES-CF6-2G02	
TR-CF6-F23FG07	TR-CF6-F23FG05	ES-CF6-2G03	
TR-CF6-F23FG08	TR-CF6-F23FG06	ES-CF6-2G04	
TR-CF6-F23FG11	TR-CF6-F23FG09	ES-CF6-2G05	
TR-CF6-F23FG12	TR-CF6-F23FG10	ES-CF6-2G06	
TR-CF6-F23FG13		ES-CF6-2G07	
TR-CF6-F23FG14		ES-CF6-2G08	
		ES-CF6-2G09	
		ES-CF6-2G10	
		ES-CF6-2G11	
		ES-CF6-2G12	

NOTE 6 Maximum Permissible Air Bleed Extraction:

<u>Bleed Location:</u>	<u>CF6-80A / A2</u>	<u>CF6-80A3</u>
Stage 8, compressor airflow, normal	5.00%	5.00%
Stage 8, compressor airflow, intermittent*	5.75%	5.75%
N2 rpm 8009-8600	6.25%**	#
N2 rpm 8600-8850	5.75%	#
N2 rpm 8850-9680		
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 8 009 (81.5%) to 9 680 (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 2×10^{-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.

NOTE 6 (Cont.)	Bleed Location:	CF6-80C2	CF6-80C2
		FADEC (Percent)	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

NOTE 7 Fuel

Approved fuels must conform to GE Specification D50TF2. The latest revision of specification will apply.

NOTE 8 Life limits established for critical rotating components are published in the CF6-80A Engine Manual, GEK 72501, and CF6-80C2 Engine Manual, GEK 92451.

NOTE 9 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.

NOTE 10 Reserved

NOTE 11 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) = 6 050 rpm, which is a preset limit within the Main Engine Control, (PMC engines) or Electronic Control Unit (FADEC engines) and is not field adjustable.

NOTE 12 CF6-80A3 Model - 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 CF6-80A3 engines in accordance with RBHA/FAR 33.

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 Number 1	681L292
Position Number 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 CF6-80C2A2 / A8; CF6-80C2B1 / B2 / B4; CF6-80C2B1F / B2F / B4F / B5F / B6F / B7F and CF6-80C2D1F engines. The components, which had been approved for installation on CF6-80C2 engines in accordance with RBHA/FAR 33, are defined in the model lists CF6-80C2A2 / A8; CF6-80C2B1 / B2 / B4; CF6-80C2B1F / B2F / B4F / B5F / B6F / B7F; CF6-80C2D1F.

The engine manufacturer also supplies total exhaust system and engine attach fittings for the CF6-80C2A2 / A8; the CF6-80C2D1F (except D1F upper aft mount beam), but supplies only the Fan Reverser System for the CF6-80C2B1 / B2 / B4 and CF6-80C2B1F / B2F / B4F / B5F / B6F / B7F engines.

The exhaust system (ES) and Fan Reverser (TR) Kit numbers approved for installation under RBHA/FAR33 are listed in Note 5 of this TCDS.

NOTE 13 Overhaul of CF6-80C2 engine components is not authorized until component manuals become available. In the interim, components utilizing new part tolerance may be provided by the manufacturer.

NOTE 14 Oil Synthetic type conforming to GE Specification D50TF1. GE Service Bulletin 79-0001 lists approved oils and applicable restrictions.

NOTE 15 The indicated 960°C EGT redline for the CF6-80C2 engines using EGT Junction Box P/N 1325M15P05 or 1325M15P07 corresponds to an actual 1005°C EGT. The indicated 960°C EGT Redline for the CF6-80C2 engines using EGT Shunt Junction Box P/N 1383M97P03 or 1383M97P07 corresponds to an actual 1020°C EGT. CF6-80C2A2/B1/B2/B4 and CF6-80C2B1F 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. Refer to previous pages for EGT Shunt Junction Box applications to the various engine models.

NOTE 16 CF6-80C2 models only: During negative-g operation only, it is permissible to operate below minimum oil pressure (10 psid indicated) for a maximum of 30 seconds. See CF6-80C2 Specific Operating Instructions, GEK 92462, Section 6.

NOTE 17 These models incorporate the following general characteristics:

CF6-80A	Basic model.
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.
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.
CF6-80C2B1	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.
CF6-80C2A8	Same as 80C2A1, except takeoff thrust is flat rated to 95 °F. 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 Electronic 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 Electronic 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.

- NOTE 17 (Cont.)** CF6-80C2D1F Same as CF6-80C2A1, except higher takeoff rating (61 960 ideal). Minor HPT and LPT hardware changes. Incorporates Full Authority Digital Electronic 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.
- CF6-80C2B7F Same as 80C2A1, except higher takeoff thrust rating (60 800 ideal). Minor HPT and LPT hardware changes. Incorporates Full Authority Digital Electronic 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.
- CF6-80C2B2F Same as 80C2A1, except higher takeoff thrust rating (52 700 ideal). Incorporates Full Authority Digital Electronic 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.
- CF6-80C2B4F Same as 80C2A1, except higher takeoff thrust rating (58 100 ideal). Incorporates Full Authority Digital Electronic 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.
- CF6-80C2B5F Same as 80C2A1, except higher takeoff thrust rating (60 800 ideal). Minor HPT and LPT hardware changes. Incorporates Full Authority Digital Electronic Control (FADEC), modulated active clearance control for the HPT, and a constant level of 11th stage cooling to the HPT. Minor airframe related hardware changes, and added servo fuel heater.
- NOTE 18** The CF6-80C2 FADEC engines criteria pertaining to the dispatch and maintenance requirements for engine control systems are specified in General Electric Documents No. GEK 98408 (Boeing models), No. GEK 98497 (Douglas models) and GEK 103028 (Airbus models), which define the various configurations and maximum operating intervals.
- A control system reliability monitoring program is in place at General Electric, to verify that overall engine control system and specific component failure rates do not exceed the maximum engine values permitted as given in GEK 98408, GEK 98497, GEK 103028.
- NOTE 19** The CF6-80C2A8 / B5F / B6F / B7F / D1F 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.
- NOTE 20** 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 / B4F / B5F / B6F / B7F engine models as listed on the data sheet.
- NOTE 21** The incorporation of the Engine Identification Plug is applicable to the CF6-80C2 FADEC engine models only. The applicable part numbers are as follows:

- NOTE 21 (Cont.)** CF6-80C2BF Engine Models:
Engine Identification Plug P/N 7157M87G01 must be used with ECU P/N's 1471M63P07/P08/P11/P12 and with 1519M89P05/P06. Engine Identification Plug P/N 7161M98Gxx must be used with ECU P/N's 1471M63P16 (or later) or 1519M89P08 (or later) or 1820M33P01 (or later). Engine Identification Plug P/N 7161M98xx or 1851M56xx must be used with ECU P/N's 1471M63P31 (or later) or 1519M89P21 (or later) or 1820M33P04 (or later). The exact Engine Identification Plug P/N is determined by engine hardware options and engine test results.
- CF6-80C2DF Models Engine:
Engine Identification Plug P/N's 7161M98Gxx must be used with ECU P/N 1519M91P04 (or later) or 1820M34P01 (or later). Engine Identification Plug P/N 7161M98xx or 1851M56Gxx must be used with ECU P/N's 1519M91P07 or 1820M34P02 or 1851M51P01 or 1851M52P01 or 1851M53P01. The exact Engine Identification Plug P/N is determined by engine hardware options and engine test results.
- NOTE 22** The normal 5 minute takeoff time limit may be extended to 10 minutes for engine out contingency.
- NOTE 23** 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.
1. 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.
- NOTE 24** The Fan Reverser **Systems** identified in Note 5 **are** certified for “Ground Use Only”.

p. o. Hélio Tarquinio Júnior
CLÁUDIO PASSOS SIMÃO

**Gerente Geral de Certificação de Produtos Aeronáuticos
(Manager, Aeronautical Products Certification Branch)**

Hélio Tarquinio Júnior
Gerente de Programas
Certificação de Produtos Aeronáuticos