

**MINISTÉRIO DA AERONÁUTICA
DEPARTAMENTO DE PESQUISAS E DESENVOLVIMENTO
CENTRO TÉCNICO AEROESPACIAL**

TYPE CERTIFICATE DATA SHEET Nº EM-8604-01

Type Certificate Holder:

PRATT & WHITNEY - UNITED TECHNOLOGIES CORPORATION
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USA

EM-8604-01
Sheet 01

PRATT & WHITNEY

JT9D-7R4D
JT9D-7R4D1
JT9D-7R4E1

March 1999

Engines of models described herein conforming with this data sheet, which is part of Type Certificate No. 8604, 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.

MODEL	JT9D-7R4D, JT9D-7R4D1, JT9D-7R4E1			
TYPE	Turbofan, dual axial 16 stage compressor, annular combustion chamber, and 6 stage turbine.			
RATINGS	(See Note 5)	JT9D-7R4D	JT9D-7R4D1	JT9D-7R4E1
	Maximum continuous at sea level, static thrust, lb	45 800	45 800	47 500
	Takeoff static thrust at sea level, lb dry (5 min.) (See Note 13)	48 000	48 000	50 000

	JT9D-7R4D	JT9D-7R4D1	JT9D-7R4E1
COMPONENTS			
Fuel Control	Ham. Std. JFC68-7	Ham. Std. JFC58-10	--
Fuel Pump	TRW 706800	--	--
High Compressor Stator Vane Control/3.0 Bleed Control	Ham. Std./ EVC 3-5/ 674977	--	--
or	or	--	--
Engine Vane and Modulating Bleed Control	GTA9-3	--	--
Start Bleed Control (3.5 bleed control)	793396	--	--
Electronic Engine Control (See Note 17)	Ham. Std. 780170-6 780170-5 780170-2 780170-8	Ham. Std. 769370-3	See Note 17
EEC PROGRAMMING PLUG (PWA P/N)	795034	795354	795035
FUEL TYPE	See Note 10	--	--
OIL, LUBRICATION	See Note 11	--	--
TEMPERATURE LIMITS	See Note 2	--	--
PRESSURE LIMITS	See Note 3	--	--

		JT9D-7R4D	JT9D-7R4D1	JT9D-7R4E1
PRINCIPAL DIMENSIONS	Maximum length in (including Spinner)	154.256	--	154.295
	Width, in	96.00	--	--
	Weight (dry), lb. (includes basic engine with all essential accessories; with fuel heater, oil tank, fuel oil cooler, and CSD fuel oil cooler; but excluding starter, exhaust nozzle and power source for the ignition systems)	8 935	8 915	8 935
	Center of gravity, in			
	Forward of engine reference plane	3.3±1.0	--	--
Below engine center line	1.4±0.5	--	--	
IGNITION	Exciters	Simmonds Precision RH P/N 43925 LH P/N 44933	--	--
	Igniters (two each)	Champion AA134S-1 or AC S611809	--	--
IMPORT REQUIREMENTS	Each engine imported separately and/or spare parts must be accompanied by an export airworthiness approval 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 CTA approved type design. The CTA type design corresponds to the FAA approved type design, as stated in CTA Report V33-0300-0 dated October, 1998 or further revisions			
CERTIFICATION BASIS	RBHA 33 (Brazilian Requirements for Aeronautical Certification), which endorses the FAR 33 effective February 1, 1965, as amended by 33-1, 33-2, 33-3, and 33-4, and Special Condition No. 33-8-EA-3.		Application	Issued TC
		JT9-7R4D	13 June 1986	25 Aug. 1986
		JT9-7R4D1	16 Oct. 1997	12 Oct. 1998
		JT9-7R4E1	16 Oct. 1997	12 Oct. 1998

PRODUCTION BASIS Production Certificate Number 2

NOTES

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

	JT9-7R4D*	JT9-7R4D1	JT9-7R4E1
Low pressure rotor (N1), rpm	3770	3810	3810
High pressure rotor (N2), rpm	8000	8000	8000

For inadvertent exceedances of certified overspeed limits, see Chapter 72-00-00 of the appropriate maintenance manual.

* Engines converted from JT9D-7R4E4 per Service Bulletin JT9D-7R4-72-331 (EC86EA123) and operated to either JT9D-7R4D or JT9D-7R4E ratings will have maximum permissible rotor speeds as follows:

Low Pressure Rotor (N1), rpm 3810
High Pressure Rotor (N2), rpm 8080

NOTE 2 Maximum permissible temperatures are as follows:

Turbine gas temperature (Tt7) total temperature immediately downstream from the low pressure turbine discharge.

	JT9-7R4D*	JT9-7R4D1	JT9-7R4E1
Takeoff (5 minutes)	625°C (1157°F)	625°C (1157°F)	635°C (1175°F)
Maximum continuous	600°C (1112°F)	600°C (1112°F)	610°C (1130°F)
Maximum acceleration	625°C (1157°F)	625°C (1157°F)	635°C (1175°F)
Ground Starting	535°C (995°F)	535°C (995°F)	535°C (995°F)
Inflight Starting+ +	625°C (1157°F)	625°C (1157°F)	635°C (1175°F)

Oil Inlet: Maximum oil inlet temperature is not to exceed 135°C (275°F).
 During idle descent, a 163°C (325°F) limit is permissible for up to 20 minutes.

NOTE 2 * Engines converted from -7R4E4 per Service Bulletin JT9D-7R4-72-331 (EC86EA123) and operated to either -7R4D or -7R4E ratings
Cont. will have an EGT limit as follows:

- Takeoff 680°C (1256°F)
- Max Cont. 635°C (1175°F)
- Max Accel 675°C (1247°F)

** If during an inflight start, the normal ground starting EGT is exceeded, maximum EGT and duration must be recorded for maintenance action.

For inadvertent exceedances to certified temperature limits see Chapter 72-00-00 of the appropriate maintenance manual. External engine limiting temperatures for specific components are specified in the engine installation and operation manual.

NOTE 3 Fuel and oil pressure are as follows:

Fuel pressure: At inlet to engine system pump, not less than 5 psi above the true vapor pressure of the fuel and not greater than 70 psig with a vapor/liquid ratio of zero.

Oil pressure: Minimum 35 psig (normal range 40-60 psig)

Note: During cold weather starting, oil pressure in excess of 60 psig may be evidenced until oil viscosities are reduced by increasing oil temperature. Engine operation is limited to idle power when oil pressure is in excess of 60 psig during cold weather starts.

NOTE 4 Maximum permissible air bleed extraction is as follows (all models):

	Percent of Primary Engine Airflow	
	Normal Bleed	Maximum Bleed
High compressor bleed		
a. Idle to 40% max cont.	9%	9%
b. 40% max cont. to takeoff	5%	5%

* 5% is the maximum allowable from the 8th stage in this thrust range. The 6.5% listed is allowable from the 15th stage alone or from a

combination of 8th and 15th stage bleeds

NOTE 5 Ratings, with the exception of the -7R4 models, are based on static test stand operation under the following conditions:

Compressor inlet air at 59°F and 29.92 in Hg

Engine air inlet, jet nozzle exhaust pipe, and fan exit nozzle per P&W Drawing P/N 758201(-59A); 760701 (-70A); 808801 (70 and 7Q3).

No aircraft accessory loads or air extraction.

No anti-icing airflow.

Turbine gas temperature limits and engine rotor speed limits not exceeded.

Rating for -7R4 models are based on ideal nozzles.

NOTE 6 The following accessory drive provisions are incorporated:

Drive	Rotation (facing pad)	Speed Ratio to Turbine Shatf	Torque (lb.in)		Overhang (in.lb)
			Continuous	Static	
Starter	CC	1.0910:1	(a)	(a)	500
Generator	#	#	#	#	1 575
Constant Speed Drive	CC	1.0910:1	(b)	15 960	1 575
Tachometer	C	0.5380:1	7	50	#
Fluid Power	CC	0.5000:1	1 890	9 450	400
Pumps (2)	CC	0.4990:1	1 300	6 500	400
IDGS	CC	1.1210:1		12 620	2 000

(a) 910 lb. ft. engine starter drive shear section is designed to fail at a static torque of 1 400 – 1 610 lb. ft.

(b) Maximum allowable continuous torque values are equivalent to 210 horsepower at any engine speed at or above sea level ground idle.

(c) "#" indicates "does not apply"

(d) "C" Clockwise

(e) "CC" Counter Clockwise

NOTE 7 Power setting, power checks, and control of engine output in all operations is to be used based upon P&W engine charts referring to turbine discharge section gas pressure. Pressure probes are included in the engine assembly for this purpose.

NOTE 8 For inflight operation during icing conditions, the minimum N1 rpm is 20% for JT9D-7R4 series engines.

NOTE 9 This model engine meets Item 1 in Special Conditions No. 33-8EA-3 in the uncowed configuration.

NOTE 10 Fuels meeting the requirements of the latest applicable issue of FAA approved P&W Turbojet Engine Service Bulletin No. 2016, which includes with other fuel information requirements of P&W Specification No. 522, are acceptable for these engines. Approved fuel additives and allowable concentrations for each are also included in Service Bulletin No. 2016.

NOTE 11 The following oils are eligible for these engines:

Synthetic type conforming to P&W Specification No. 521C, or later revision. P&W Turbojet Engine Service Bulletin No. 238 lists approved brand oils.

NOTE 12 Certain engine parts are life limited. These limits are listed in the time limits section of the FAA approved P&W Engine Manuals P/N 785058 for the -7R4D1, -7R4E1; P/N 785059 for the -7R4D

NOTE 13 JT9D Model Characteristics

-7R4D Basically same as JT9D-7 (see TCDS E20EA) except incorporates an improved fan, higher efficiency 4 stage LPC, single crystal first stage turbine blades, improved use of turbine cooling air and a supervisory Electronic Engine Control. Takeoff rating of 48 000 lbs. at and below 92°F ambient temperature, sea level static.

-7R4D1 Same as -7R4D except for external arrangement required for installation.

-7R4E1 Same as -7R4D1 except takeoff rating of 50 000 lb. at and below 92°F ambient temperature, sea level static.

NOTE 14 All JT9D-7R4 series engines meet the Smoke and Gaseous Emission requirements of 40 CFR Part 87 dated December 30, 1982.

NOTE 15 All JT9D-7R4 series engines meet the January 1, 1975 fuel venting emission requirements of SFAR-27.

NOTE 16 For JT9D-7R4D engines, EEC software versions -007 or -010, there exists within the EEC, logic which will result in the Maximum Continuous thrust rating being limited during enroute climb. This condition will occur only when setting Maximum Continuous thrust directly from takeoff thrust with the EEC on, the thrust level positioned full forward, and following a climb of more than 3 000 feet above the runway. The difference between the limit and the Maximum Continuous thrust when taking off from a sea level airport is as follows:

For engines incorporating the 154CF3 P2T2 probe (P/N 786464) and resistor harness (P/N 795644) the difference varies from 0 at 3 000 feet to a maximum of 0.15 EPR at 14 000 feet.

For engine incorporating the 154CF7 P2T2 (P/N 798133) the difference varies from 0 at 3 000 feet to a maximum of 0.06 EPR at 14 000 feet.

Thrust will not be limited if taking off from an airport of 4 300 feet or higher.

For either engine configuration, Maximum Continuous thrust will not be limited when either an altitude of 14 000 feet or a Mn of .47 has been attained or if maximum climb thrust has been set. Maximum Continuous thrust is not limited with the EEC turned off.

NOTE 17	Electronic Engine Control	JT9D-7R4E1 (AI500) Ham. Std. 769370-3	JT9D-7R4E1(AI600) Ham. Std. 787240-1
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