European Aviation Safety Agency

EASA

TYPE-CERTIFICATE DATA SHEET

Number : IM.E.020
Issue : 1
Date : 08 June 2005
Type : Pratt and Whitney PW6000 series engines

Variants
PW6122A
PW6124A

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I. General

1. Type/Variants:

PW6122A and PW6124A. These variants are approved for use on multi-engined civil aircraft classified in the Transport Category (Passenger) at the ratings and within the operating limitations specified below, subject to compliance with the powerplant installation requirements appropriate to approved installations.

2. Type Certificate Holder:

Pratt & Whitney Division
United Technologies Corporation
East Hartford, CT 06108
USA

3. Manufacturer: Pratt & Whitney

4. EASA Certification/JAA Validation Application Date: 23 April 2004

5. Validation Reference Date: 30 June 2003

6. EASA Certification Date: 08 June 2005

II. Certification Basis

1. FAA Certification basis: See FAA TCDS E00064EN

2. EASA Certification Basis:

Airworthiness Standards:-

- JAR-E, amendment 12, dated 01 May 2003
- Plus the following paragraphs of CS-E, issue 1 dated 24 October 2003: CS-E 15(e), 20(d), 30(b), 40(g), 50, 60, 110(e), 130(e), 170, 560(f), 570(a)(4), 740(f), 850, 860(b) .
- Fuel Venting & Emissions: ICAO Annex 16, Volume II, Part II, Chapter 2 and Volume II, Part III, Chapter 2 in combination with CS-34 dated 17 October 2003

III. Technical Characteristics

1. Type Design Definition:

PW6122A: P/N 5400000-04
PW6124A: P/N 5400000-03

2. Description:

The P&W 6000 Series engines have an axial-airflow, dual-spool, turbofan engine, single stage fan, four-stage low-pressure compressor, six-stage high-pressure compressor, annular combustor, single-stage high-pressure turbine, three-stage low-pressure turbine.

3. Equipment:

For details of equipment included in the type design definition: refer to Installation and Operating Manual

The following customer supplied equipment are not part of the basic engine weight: integrated drive generator (IDG); hydraulic pump, filter and pressure switch; one high pressure valve; pressure regulating valve; intermediate pressure check valve; nacelle inlet cowl /P2T2 probe mount; fan cowls and associated hardware; thrust reverser assembly including activation system, attachment hardware and associated electrical harnesses; common nozzle assembly including aft pylon fairing and attachment hardware; forward engine mount, rear engine mount, and attachment hardware. The engine build-up (EBU) includes: IDG cooling system components; inlet anti-icing valve and ducts; environmental control system bleed air ducts; electrical harnesses; starter, starter air valve, and ducting; mass fuel flow meter; fire detection system.

4. Dimensions:

Overall Length (mm)	2749,4
Nominal diameter (mm)	1584,9

Length, flange to flange, maximum.
Nominal diameter, fan case.

5. Dry Weight:

Dry engine weight (kg)	2449,4

Weight of basic engine includes P&W supplied engine build-up (EBU) components.

6. Ratings:

The ISA sea-level static thrust ratings are:

Ratings (daN)	PW6122A	PW6124A
Maximum Continuous	9030	9297
Takeoff, 5 minutes	9830	10587

Refer to Note 4 & 1.

7. Control System:

The engine is equipped with dual channel Full Authority Digital Engine Control (FADEC) system with autostart.
Refer to the Installation Manual and Operating Instructions for further information.

8. Fluids

8.1 Fuel
Fuels and fuel additives conforming to the latest approved applicable issue of Pratt & Whitney Turbojet Engine Service Bulletin No. 2016 may be used separately or mixed in any proportions without adversely affecting the engine operation or power output.

8.2 Oil
Oils conforming to Pratt & Whitney Engine Service Bulletin No. 238 (latest revision) are approved for use in the PW6000 Series Engine.

9. Aircraft Accessory Drives:

Drive Pad	Rotation	Speed Ratio to N2	Torque (Nm)			Overhung Moment (Nm)
			Continuous	Overload	Static	
Starter	CCW	.545 : 1	*	*	*	62.1
IDGS	CCW	.453 : 1	**	**	1.243	90.3
Hydraulic Fluid Power Pump	CCW	.210 : 1	0.147	0.219***	0.734	45.1

The following overload conditions can be accommodated:

kW	Duration Time	Recurring Time
167	5 minutes	1/1000 hours
167	5 seconds	1/hour
335	5 seconds	1/1000 hours

CCW = Counter clockwise (facing the drive pad)
IDGS = Integrated Drive Generator
* Strength of starter drive shall be adequate for starter delivering maximum torque of 664 Nm at zero rpm and 782 Nm at 4800 rpm maximum impact torque. The engine starter drive shear section is designed to shear at a static torque value of 1274- 1465 Nm.
** Maximum allowable continuous torque values are equivalent to 130,5 kW at any engine speed at or above sea level ground idle.
*** Maximum allowable to 5 minutes duration recurring at 4 hour intervals minimum

10. Maximum Permissible Air Bleed Extraction:

PW6122A and PW6124A 2.26 kg/second

Note: Switching from High Pressure Compressor 8th and 11th stage bleed is controlled automatically based upon flight condition (see Installation and Operating Manual PWA-7707).

IV. Operating Limitations:

1. Temperature Limits

1.1 Maximum permissible Turbine Exhaust Gas Temperatures
Measured by four thermocouple probes located at the low pressure turbine exhaust case are as follows:

- Take-off (5 minutes): 760 C See note 1
- Maximum Continuous: 727 C
- Transient: See note 6

1.2 Turbine Gas Temperature (°C)

at start-up:
Ground: 760
Flight: 760

1.3 Fuel temperature

See “Installation and Operating Manual“, PWA 7707

1.4 Oil outlet temperature: (°C)

- Continuous operation: 163
- Transient operation (limited to 20 minutes): 177

2. Pressure Limits

2.1 Fuel pressure limit kPa

Fuel pressure at the engine fuel pump inlet during operation shall be maintained at not less than 34,5 kPa above the true vapour pressure of the fuel but not greater than 482 kPa above absolute ambient pressure, with a vapour/liquid ratio of zero. The maximum allowable pressure at the fuel pump inlet after shutdown is 1551 kPa.

2.2 Oil pressure kPa

Maximum Oil Pressure: No limit
Minimum Oil Pressure (kPa): 172

There are no oil pressure limits below ground idle.
Temporary interruption associated with negative “g” operation is limited to 30 seconds maximum. Normal oil pressure will be restored rapidly once the negative "g" effect has been eliminated.

3. Maximum / Minimum Permissible Rotor Speeds

	N1(rpm) Low pressure rotor	N2 (rpm) High Pressure rotor
Maximum permissible	6350	18850
Maximum Continuous *	6125	18150
Minimum • Ground Idle • Flight Idle	 1325 1700	 11000 11000

* Controlling the engine to the Maximum Continuous Exhaust Gas Temperature will ensure that Maximum Continuous max permissible rotor speed will not be exceeded

4. Installation Assumptions:

Refer to Installation and Operating Manual for details.

5. Dispatch Limitations:

This engine is certified with no Time Limited Dispatch criteria. Any FADEC faults are cause for no dispatch. Lightning protection requirements and electromagnetic interference emitted by the electronic engine control system, including cables, are specified in the Installation and Operating Manual, Section 5.12

V. Operating and Service Instructions

The following Manuals are approved for PW6000 series engines:
- Installation and Operating Manual, PWA 7707
- Engine Manual (EM), P/N 5407764
- Clean, Inspect, Manual (CI), P/N 5407765
- Engine Maintenance Manual (MM), P/N 5407763

Engine Instruction for Continued Airworthiness (ICA’s) are not complete. An aircraft with PW6122A or PW6124A installed is not eligible for airworthiness certificate until ICA’s are complete and accepted by EASA.

VI. Notes

1. The 5 minute takeoff time limit may be extended to 10 minutes for one engine(s) inoperative or shutdown of a multiengine aircraft.

2. The minimum N1 certified for operation in icing conditions is 1700 rpm.

3. The maximum permissible engine inlet distortion is specified in the Installation and Operating Manual:
Report PWA-7707, Section 5.4 PW6122A and PW6124A

4. For the PW6122A: Installed values for Take-off and Maximum Continuous thrust are 9488 daN and 8705 daN, respectively at Sea Level Static, ICAO Standard Atmospheric Conditions.

For the PW6124A: Installed values for Take-off and Maximum Continuous thrust are 10222 daN and 9012 daN, respectively at Sea Level Static, ICAO Standard Atmospheric Conditions.

5. Certain engine parts are life limited. Limits are listed in the Pratt & Whitney PW6000 series engine Turbofan Engine Manual: Part Number 5407764, time limit section for models PW6122A and PW6124A

6. Limits regarding transient rotor shaft overspeed, transient turbine exhaust gas over temperature and the number of overtemperature occurrences are specified in the Engine Maintenance Manual (Part Number 5407763).

7. Overhaul of the PW6122A and PW6124A engine and its components is only authorized via approved Manuals or Type Certificate holder approved procedures.

8. The use of the Hurel-Hispano Thrust Reverser Unit , part number D78BR13010000 for the left hand position and part number D78BR23010000 right hand installation , which is not part of the engine type design, is not yet approved until verified and accepted as part of the aircraft certification.