AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL - BRASIL

TYPE CERTIFICATE DATA SHEET Nº EM-2009T11

Type Certificate Holder:

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EM-2009T11-00

Sheet 01

PRATT&WHITNEY CANADA

PW535E

24 November 2009

Engines of models described herein conforming with this data sheet, which is part of Type Certificate No. 2009T11, 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 PW535E

TYPE Twin spool turbofan engine with an integrally bladed LP compressor fan and boost stage driven by a two-stage LP turbine and the two axial stages and one centrifugal stage of the HP compressor driven by a single stage HP turbine. The engine also incorporates an annular reverse flow combustor and a full length annular by-pass duct.

RATINGS

	PW535E
Max. continuous, daN (lb):	1 494.6 (3 360)
Max. takeoff (10 min), daN (lb):	1 494.6 (3 360)

	Normal takeoff, daN (lb):	1 494.6 (3 360)
RATINGS (CONT.)		PW535E
	Engine Speed Limits (rpm)	
	Max. continuous N1	15 850 (100%)
	Max. takeoff (10 min) N1	15 850 (100%)
	Normal takeoff N1	15 850 (100%)
	Transient (20 seconds) N1	16 167 (102%)
	Max. continuous N2	33 970 (100%)
	Max. takeoff (10 min) N2	34 310 (101%)
	Normal takeoff N2	34 310 (101%)
	Transient (20 seconds) N2	34 989 (103%)
	Flight Idle Minimum N2	18 717 (55.1%)
	Air Inlet Temperature Limits °C (°F)	
	Max. continuous	24 (75.2)
	Max. takeoff (10 min)	33 (91.4)
	Normal takeoff	33 (91.4)
	Interturbine Temperature (ITT) °C (°F)	
	Maximum continuous	680 (1 256)
	Maximum takeoff (10 min)	725 (1 337)
	Normal takeoff	700 (1 292)
	Transient (20 seconds)	765 (1 409)
	Starting (5 seconds)	740 (1 364)
	(Refer to Installation Manual)	
OIL TEMPERATURE °C (°F)	Maximum	132.2 (270)
	Minimum (for starting and ground idle)	-40 (-40)
	Transient maximum (200 sec)	140.5 (285)
	(Refer to Installation Manual)	

MAXIMUM ACCESSORY TEMPERATURE

The engine compartment shall be ventilated as necessary to keep the air temperature surrounding accessory components from exceeding the limits defined in the Installation Manual.

ELECTRICAL SYSTEM

Refer to Section 7 of the Installation Manual for HIRF and Lightning qualification and conformance.

MAXIMUM WEIGHT

317 kg (699 lb) - (Dry, including basic components and sensors required for engine operation and monitoring.)

PRINCIPAL DIMENSIONS

Refer to Installation Drawing in approved Installation Manual.

C.G. LOCATION

Refer to Installation Drawing in approved Installation Manual.

FUEL

Fuel Bleed

A motive flow fuel from pump output is provided from the Fuel Metering Unit (FMU) motive flow port. Refer to Installation Manual ER6639.

Fuel Pressure

Refer to Installation Manual.

Fuel temperature

Maximum fuel temperature allowed at the inlet of the FCU is equal to for starting and operating is 99°C (210°F). The minimum inlet temperature is -41°C (-43°F) for typical kerosene type fuels and -52°C (-60°F) for typical wide-cut fuels. Refer to Installation Manual for additional information.

Fuel type

Fuels and additives conforming to the specification CPW-204 listed in the PW535E Maintenance Manual P/N 3072702 are approved for use.

LUBRICATION

Oil Pressure (psid)	PW535E
Minimum at ground idle & above	25
Maximum, Steady State	160
Maximum,Transient (400 seconds) (Refer to Installation Manual)	270

Oil Tank Capacity	
Total capacity (liters)	10.03
Imperial gallons	2.21
U.S. gallons	2.65
Usable capacity (liters)	0.83
Imperial gallons	0.18
U.S. gallons	0.22

LUBRICATION (CONT.)

Oil Type:
Oils conforming to the specification CPW-202 listed in the PW535E Maintenance Manual are approved for use.

BLEED AIR

A. The engine is equipped with two high pressure compressor delivery air bleed ports, each incorporating flow limiting features that restrict flow to a maximum of 6.5% of core flow at all altitudes.
B. During starting: bleed air not permitted
C. Bleed air contamination meets Para. 3.1.2.11.3 of MIL-E-5007E and ARP 4918.

EQUIPMENT

Equipment such as the Engine Electronic Control (EEC), Fuel Control Unit (FCU), fuel pump, bleed valve controller, flow divider, ignition exciter, ignition plug, fuel and oil filters, provision for fuel flowmeter, and fire shield for rear engine mount, are standard equipments as shown in the Approved Parts List. For output drive specification, accessory drives, principal dimensions, weights, inertias and C.G. locations, refer to Installations Manual.

IMPORT REQUIREMENTS

Each engine imported separately and/or spare parts must be accompanied by an export airworthiness approvals issued by TCCA (or a third country authority, in case of used engine imported from such country) attesting that the particular engine and/or parts were submitted for airworthiness authority inspection before delivery and are in conformity with the ANAC approved type design. The ANAC type design corresponds to the TCCA approved type design, as stated in ANAC Validation Report V33-0833-0.

CERTIFICATION BASIS

For Model PW535E	Application	Issued TC
RBAC 33 (Brazilian Requirements for Aeronautical Certification), which endorses the 14 CFR Part 33, Amendments 1 through 24 inclusive, effective 05 November 2007 (except Amendment 21) and RBAC 34, which endorses the 14 CFR Part 34, Amendment 3, effective 03 February 1999 (compliance with ICAO Annex 16 Volume II).	09 March 2007	24 November 2009

NOTES:

NOTE 1

The engine ratings for PW535E engine model are based on dry sea level static ICAO standard atmospheric conditions. No external accessory loads or air bleed. Engine intake and exhaust as described in the approved Installation Manual.

NOTE 2

The power extraction from the start generator pad under continuous operation is limited to a maximum of 25.7 kW (34.5 hp). The power extraction from the starter generator pad under overload conditions occurring for periods up to 2 minutes, is limited to 33.55 kW (45 hp) and for periods of 5 seconds, is limited to 38.77 kW (52 hp).

Accessory Drives

The following apply to the accessory drives, which are provided by the engine and included in the basic engine weight::

Drive		Speed Ratio to N2	Maximum Torque (in.lb)	Maximum Torque (in.lb)	Maximum Overhang (in.lb)
Drive Driven by High Rotor	Rotation	Shaft	Continuous	Static	
Starter generator	CW	0.3634:1	195	1 600	241.5

CW - Clockwise facing accessory pad.

NOTE 3

Certain engine parts are life limited. Life limits are listed in Airworthiness Limitation Section of the PW535E Maintenance Manual P/N 3072702.

NOTE 4

Recommended overhaul and inspection intervals are listed in PW535E Maintenance Manual P/N 3072702.

NOTE 5

The software contained in the Electronic Engine Control Unit (EEC) has being designed, developed tested and documented in accordance with the provision of the Critical Category, Level A of RTCA/DO178B.

NOTE 6

Approved Publications for PW535E engine model:

- Installation Manual ER6639
- Engine Control System Interface Control Document ER6677
- Part List A3072913-01 for production engine configuration.

Instructions for Continued Airworthiness

- PW535E Maintenance Manual P/N 3072702
- PW535E Overhaul Manual P/N 3072703 (See Note 13)

NOTE 7 Normal takeoff is equal to Maximum takeoff in conditions where wing anti-ice bleed is OFF and may be used for up to 10 minutes in emergency or OEI conditions. Maximum takeoff exists for wing anti-ice bleed ON conditions and is for use in emergency, OEI or mono bleed situations.

NOTE 8 The engine is approved for multiple engine installation only.

NOTE 9 The engine is not approved for use with a thrust reverser.

NOTE 10 Flight idle is a function of ambient pressure.

NOTE 11 The PW535E Electronic Engine Control Unit is approved with Time Limited Dispatch (TLD) limitations. The dispatch criteria and time limits are contained in the Airworthiness Limitations Section of the Maintenance Manual P/N 3072702. The TLD dispatchable fault configuration is defined in ER6677-01 Part A Interface Control Document.

NOTE 12 Service Bulletins, Overhaul and Maintenance Manuals, which are Transport Canada-approved, are accepted by the ANAC and are considered ANAC-approved unless otherwise noted. These approvals pertain to the type design only.

NOTE 13 Prior to issue of Transport Canada accepted Overhaul Manual, overhauls are not permitted.

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