European Aviation Safety Agency

EASA

TYPE-CERTIFICATE DATA SHEET

Number: IM.E.013
Issue: 02
Date: 16 February 2009
Type: Pratt and Whitney Canada PW545 series engines

Variants
PW545A
PW545B
PW545C

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I. General

1. Type/Variants: PW545A, PW545B, PW545C

2. Type Certificate Holder:

Pratt and Whitney Canada Corp.
1000 Marie-Victorin
Longueuil, Quebec
Canada J4G 1A1

3. Manufacturer: Pratt and Whitney Canada Corp.

4. EASA Certification/JAA Validation Application Date:

PW545A	PW545B	PW545C
11 August 1995	10 February 2003	22 January 2007

5. Validation Reference Date:

PW545A	PW 545B	PW545C
7 September 1994	20 December 2002	17 April 2006

6. EASA Certification Date:

PW545A	PW545B	PW545C
13 October 1998	18 October 2004	16 February 2009

EASA Type Certification for the PW545A engine model is granted, in accordance with article 2 paragraph 3 (a) of EU Commission Regulation EC 1702/2003, based on a CAA United Kingdom validation letter issued following the JAA Validation Recommendation.

II. Certification Basis

1. Transport Canada Certification Basis: See Transport Canada TCDS E-28

2. EASA Certification Basis:

2.1 Airworthiness Standards and Environmental Protection Requirements:

2.1.1 PW545A

- JAR-E change 8 dated 4 May 1990 plus Orange Paper E/91/1 dated 27 May 1991 and Orange Paper E/93/1 dated 17 May 1993.
- Emissions and Fuel Venting : ICAO Annex 16, Volume II, 2nd Edition, 1993.

2.1.2 PW545B

- JAR-E amendment 11 dated 1 November 2001.
- E 570(b)(1) of JAR-E at amendment 12
- Emissions and Fuel Venting : ICAO Annex 16, Volume II, 2nd Edition, 1993.

2.1.3 PW545C

- CS-E, Initial issue dated 24 October 2003
- Emissions and Fuel Venting: ICAO Annex 16, Volume II (2nd Edition July 1993)

2.2 Special Conditions:

2.2.1 PW545A

- NPA-E-27 16 September 1997 - Ingestion of Rain and Hail

2.2.2 PW545B / PW545C

None

2.3 Deviations:

2.3.1 PW545A

- JAR-E 570(a)(3) Oil System -oil pump inlet strainers
- JAR-E 800 Bird Strike/Ingestion - medium birds

2.3.2 PW545B / PW545C

None

2.4 Equivalent Safety Findings:

2.4.1 PW545A

- JAR-E 840(a)(2) Rotor Integrity tests
- JAR-E 890 Thrust Reverser Tests

2.4.2 PW545B

- JAR-E 890 Thrust Reverser Tests

2.4.3 PW545C

None

III.Technical Characteristics

1. Type Design Definition:

PW545A: Parts list EAPL A31J1900-01
PW545B: Engine Assembly Drawing No. 30J2622 Revision B and subsequent revisions
PW545C: Parts List for Engine Definition A30J2934

2. Description:

Dual Spool, axial flow, medium bypass turbofan. The 2-stage axial and single stage centrifugal high pressure compressor is driven by a single stage high pressure turbine. The integrally bladed fan and single boost stage low pressure compressor is driven by a 3-stage low pressure turbine. Reverse flow annular combustion chamber.

3. Equipment:

Approved Equipment is included in the type design definition.

4. Dimensions:

Overall Length	1.914m
Overall Width	1.047m

5. Dry Weight:

376.5 kg, excluding all fluids and buyer furnished equipment .

6. Ratings:

Rating		PW545A	PW545B	PW545C
Thrust, daN (lbf)	Take-off (5 minutes)	1758 (3592)	1832 (4119)	1832 (4119)
	Maximum Continuous	1500 (3372)	1500 (3372)	1500 (3372)

Take off ratings quoted valid up to 25ºC, maximum continuous ratings to 35ºC

7. Control System:

Engine control system comprises an Electronic engine control with full back-up by a hydromechanical Fuel Control Unit (PW545A and PW545B).
The PW545C engine model is equipped with a Full Authority Digital Engine Control System (FADEC).

8. Fluids

8.1 Fuel:

For approved fuel types and additives refer to relevant Maintenace Manual Chapter 72.

8.2 Oil:

For approved oil types and additives refer to relevant Maintenance Manual Chapter 72.

9. Aircraft Accessory Drives:

Drive Pad	Rotation Facing Gearbox Pad	Gear Ratio to Core Speed	Maximum Torque (Nm) Continuous	Static	Maximum Overhung Moment (Nm)
Starter Generator	CW	0.3633	27.120	180.8	23.73
Hydraulic Pump	CW	0.1280	25.4	180.8	4.52

CW = Clockwise facing accessory pad

10. Maximum Permissible Air Bleed Extraction:

The maximum permissable bypass air bleed is 2% of the bypass mass flow throughout the flight envelope, 3% for PW545C. For high pressure compressor air bleed information refer to the relevant Installation Manual Figure 2-9.

IV.Operational Limits:

1. Temperature Limits:

1.1 Interturbine Temperature (ITT), ^{o}C

	PW545A	PW545B	PW545C
Take-off (5 Minutes)	720	740	740
Maximum Continuous	720	720	720
Starting (5 seconds)	720	740	740
Transient (20 seconds maximum)	760	780	780

1.2 Oil Temperature

Refer to relevant Installation Manual Section 8.

1.3 Fuel Temperature

Refer to relevant Installation Manual Section 6.

2. Maximum Permissible rotor Speeds:

2.1 PW545A

	Take Off / Maximum Continuous	Transient (20s)	Minimum Flight Idle
Low Pressure Rotor N1 rpm (%)	13034 (100)	13295 (102)	--
High Pressure Rotor N2 rpm (%)	33289 (101.8)	33681 (103)	16841 (51.5)

2.2 PW545B / PW545C

	Take Off / Maximum Continuous	Transient (20s)	Minimum Flight Idle	Transient (5s)
Low Pressure Rotor N1 rpm (%)	13034 (100)	13295 (102)	--	--
High Pressure Rotor N2 rpm (%)	33622(102.8)	34008 (104)	17396(53.2)	34727(106.2)

3. Pressure limits:

3.1 Oil Pressure

Refer to relevant Installation Manual Section 8.

3.2 Fuel Pressure

Refer to relevant Installation Manual Section 6.

4. Installation Assumptions:

The installation assumptions are quoted in the relevant Engine Installation manual.

V. Operating and Service Instructions

	PW545A	PW545B	PW545C
Engine Installation Manual	PW545A	PW545B	PW545C
Engine Maintenance Manual	30J1272	30J2242	30J2302
Engine Manual (Overhaul)	30J1273	30J2243	See note 6
Service Bulletins	As required	As required	As required

VI. Notes

Note 1: The engine ratings are based on dry sea-level static ICAO Standard Atmospheric Conditions, no airbleed and no external accessory loads. The engine ratings specified are obtainable on a test stand with the specified fuel and oil, without intake ducting and using exhaust duct and intake specified in the Installation and Operating Instructions Manual.

Note 2: Life limited parts are listed in the relevant Maintenance Manual, Airworthiness Limitations Section

Note 3: The software for the Electronic Engine Control has been developed and tested in accordance with provisions of level A as defined in RTCA DO 178B.

Note 4: The take off rating may be used for up to 10 minutes during One Engine Inoperative operations.

Note 5: The engine definition does not include a thrust reverser. Considerations for the installation of a thrust reverser are contained in the relevant Installation manual.

Note 6: Prior to the issue of the Overhaul Manual, overhauls are not permitted.

Note 7: Model PW545C HIRF and Lightning conformance and installation requirements are provided in the Installation Manual.

Note 8: Model PW545C The software contained in the Electronic Engine Control has been designed, developed, tested and documented in accordance with the provisions of the Critical Category, Level A of RTCA/DO178B.

Note 9: Model PW545C The engine is equipped with a FADEC which is approved for Time Limited Dispatch (TLD). The dispatch criteria are defined in the Airworthiness Limitation Section of the Maintenance Manual. The TLD dispatchable fault configuration is defined in ER6612-01 Part A Interface Control Document.

Note 10: Model PW545C Flight Idle is a function of Ambient Pressure.
