



**AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL - BRASIL**

**TYPE CERTIFICATE DATA SHEET Nº EM-2017T08**

Type Certificate Holder:

**Pratt & Whitney**  
400 Main Street  
East Hartford, CT 06118  
**USA**

EM-2017T08-00

Sheet 01

**PRATT & WHITNEY**  
PW1519G, PW1521G,  
PW1524G, PW1525G,  
PW1521G-3, PW1524G-  
3, PW1525G-3,  
PW1919G, PW1921G,  
PW1922G, PW1923G

22 December 2017

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Engines of models described herein conforming with this data sheet, which is part of Type Certificate No. 2017T08, 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** PW1519G, PW1521G, PW1524G, PW1525G, PW1521G-3, PW1524G-3, PW1525G-3, PW1919G, PW1921G, PW1922G, PW1923G

**TYPE** High bypass ratio, axial-airflow, dual-spool, turbofan engine controlled by a Full Authority Digital Electronic Control (FADEC). The low pressure spool consists of a three-stage low pressure turbine that directly drives a three-stage low pressure compressor, and a single stage high bypass ratio fan through a fan drive gear speed reduction system. The high pressure compressor has eight axial stages driven by a two-stage cooled high pressure turbine.

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**RATINGS (SEE NOTE 1)**

	PW1519G	PW1521G, PW1521G-3	PW1524G, PW1524G-3, PW1525G, PW1525G-3
<b>Sea Level Static Thrust daN (lb)</b>			
Takeoff (5 min) (see note 2)	8 796 (19 775)	9 773 (21 970)	10 854 (24 400)
Maximum Continuous	8 312 (18 685)	9 235 (20 760)	10 253 (23 050)
<b>Flat Rating Ambient Temperature</b>			
Takeoff °C (°F)	30 (86)	30 (86)	30 (86)
Maximum Continuous °C (°F)	25 (77)	25 (77)	25 (77)
Data Storage Unit PN (Rating Plug)	5323246	5323244 (PW1521G) 5325207 (PW1521G-3)	5323242 (PW1524G) 5325205 (PW1524G-3) 5323240 (PW1525G) 5325212 (PW1525G-3)

**RATINGS (SEE NOTE 1)**

	PW1919G	PW1922G	PW1921G, PW1923G
<b>Sea Level Static Thrust daN (lb)</b>			
Normal Takeoff (5 min) (see note 2)	9 279 (20 860)	10 593 (23 815)	10 031 (22 550) (PW1921G) 10 593 (23 815) (PW1923G)
Maximum Takeoff (5 minutes) (see note 2)	10 031 (22 550)	10 593 (23 815)	10 725 (24 110)
Maximum Continuous	9 032 (20 305)	9 032 (20 305)	9 699 (21 805)
<b>Flat Rating Ambient Temperature</b>			
Normal Takeoff °C (°F)	30 (86)	35 (95)	30 (86) (PW1921G) 35 (95) (PW1923G)
Maximum Takeoff °C (°F)	30 (86)	35 (95)	33 (92) (PW1921G) 34 (93) (PW1923G)
Maximum Continuous °C (°F)	25 (77)	25 (77)	25 (77)

	Data Storage Unit PN (Rating Plug)	5322351	5322352	5322353 (PW1921G) 5322354 (PW1921G)
<b>COMPONENTS / CONFIGURATION</b>	For PW1500G information regarding components and engine configuration, refer to: Installation Drawing 5310001 For PW1900G information regarding components and engine configuration, refer to: Installation Drawing 5350001			
<b>MODELS</b>	PW1519G	PW1521G, PW1521G-3, PW1524G, PW1524G-3, PW1525G, PW1525G-3		PW1919G, PW1921G, PW1922G, PW1923G
<b>PRINCIPAL DIMENSIONS (Room Temperature)</b>				
<b>Leght (Flange To Flange , cm (in)</b>	304.6 (119.9)	--	--	--
<b>Leght (fan spinner face to aft flange, cm (in)</b>	318.5 (125.4)	--	--	--
<b>Nominal diameter (fan case, cm (in)</b>	200.7 (79.0)	--	--	--
<b>Maximum radial projection, cm (in) (at drain mast)</b>	116.1 (45.7)	--	--	--
<b>CENTER OF GRAVITY cm (in)</b>				
<b>Axial Engine Station, Relative To A-Flange</b>	148.6 (58.5)	--	--	--
<b>Vertical, relative to engine centerline:</b>	-1.27 (-0.5)	--	--	--
<b>Lateral, relative to centerline:</b>	-2.54 (-1.0)	--	--	--
<b>OIL, LUBRICATION</b>	Service Bulletin PW1000G-A-79-00-0010-00A-930A-D provides a listing of approved turbine oils for use in PW1500G series turbofan engine. Service Bulletin PW1000G-A-79-00-0010-00B-930A-D provides a listing of approved turbine oils for use in PW1900G series turbofan engine.			

**WEIGHT\* DRY**  
**basic engine kg (lb) (see note**  
**6)**

2 177 (4 800)

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**FUEL TYPE**

Service Bulletin PW1000G-A-73-00-0010-00A-930A-D provides the fuels requirements and provides a listing of approved fuels and fuels additives for use in PW1500G series turbofan engine.

Service Bulletin PW1000G-A-73-00-0010-00B-930A-D provides the fuels requirements and provides a listing of approved fuels and fuels additives for use in PW1900G series turbofan engine.

**IMPORT REQUIREMENTS**

Each engine imported separately and/or spare parts must be accompanied by a FAA Export Airworthiness Approval through the FAA Form 8130-3, Authorized Release Certificate, certifying that the engine is in compliance with the ANAC approved Type Design, defined by the Brazilian Type Certificate No. 2017T08, is in condition for safe operation and has undergone a final operational check. The original Authorized Released Certificate should be sent with the engine and a copy remains with the issuing organization.

For each engine it is required a list of exceptions (if any) in respect to the ANAC approved Type Design, listed in the FAA Authorized Release Certificate above mentioned.

**CERTIFICATION BASIS**

Brazilian Type Certificate No.2017T08 is based on the RBAC 21.29 and RBAC 33, which correspond 14 CFR Part 33, Amendments 33-1 through 33-28, effective December 23, 2008. Additionally, based on RBAC 21.29(1)(a)(ii) the following requirements are applicable: 14 CFR Part 33, as amended by amendment 33-34.

With the following Equivalent level of safety findings:

33.78(a)(1), Rain and hail Ingestion – ELOS No. TC3047EN-E-P-5-R1.

Emission requirements: RBAC 34 amendment 4 which endorses the 14 CFR Part 34 effective 10 September 1990, as amended by 34-1 through 34-4. Additionally, based on RBAC 21.29(1)(a)(ii) the following requirements are applicable: 14 CFR Part 34, as amended by amendment 34-5A

See note 14 for detailed summary of the certification basis for fuel venting and exhaust emissions.

<u>Model</u>	<u>Application</u>	<u>Issued TC</u>
PW1519G	01/06/2017	15/12/2017
PW1521G	01/06/2017	15/12/2017
PW1524G	01/06/2017	15/12/2017
PW1525G	01/06/2017	15/12/2017
PW1521G-3	01/06/2017	15/12/2017
PW1524G-3	01/06/2017	15/12/2017
PW1525G-3	01/06/2017	15/12/2017
PW1919G	01/06/2017	15/12/2017
PW1921G	01/06/2017	15/12/2017
PW1922G	01/06/2017	15/12/2017
PW1923G	01/06/2017	15/12/2017

**NOTES:****NOTE 1****Engine Ratings (all models)**

Engine ratings are based on calibrated test stand performance under the following conditions:

1. Sea level static, standard pressure (14 696 psia), up to the flat rating ambient temperature °F
  2. No customer bleed or customer horsepower extraction
  3. Ideal inlet, 100% ram recovery
  4. Production aircraft flight cowling
  5. Production instruments
  6. Fuel lower heating value of 18 400 BTU/lb.
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**NOTE 2**Temperatures (all models)

Maximum permissible Indicated Turbine Temperatures (ITT) are as follows:

Takeoff (5 minutes)*	1 054 °C / 1 929 °F
Maximum Continuous	1 006 °C / 1 843 °F

\*The normal and maximum 5 minutes takeoff rating may be extended to 10 minutes for engine out contingency.

Indicated Turbine Temperatures (ITT) at start-up	1 054 °C / 1 929 °F
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Oil outlet temperature (all models):

Continuous operation: 163 °C / 325 °F. Maximum oil temperature 174 °C / 345 °F for up to 20 minutes. Total operation between 163 °C / 325 °F and 174 °C / 345 °F cannot exceed 20 minutes. See PW1500G Installation and Operating Manual, PWA-8828 and PW1900G Installation and Operating Manual, PWA-10649 for details.

PW1500G:

Minimum oil temperature at idle, before takeoff power operation: 48 °C / 118 °F

Minimum oil temperature for ground operation: 21 °C / 70 °F.

PW1900G:

Minimum oil temperature at idle, before takeoff power operation: 49 °C / 120 °F

Minimum oil temperature for ground operation: 21 °C / 70 °F.

PW1500G:

Fuel Temperatures:

See Installation and Operating Manual, PWA-8828

Component Temperatures:

See Installation and Operating Manual, PWA-8828

PW1900G:

Fuel Temperatures:

See Installation and Operating Manual, PWA-10649

Component Temperatures:

See Installation and Operating Manual, PWA-10649

**NOTE 3**

Pressure (all models)

**PRESSURES (all models)**

Fuel pressure limits: Fuel pressure at the engine fuel pump inlet during operation shall be maintained at not less than 5.0 psi above the true vapor pressure of the fuel but not greater than 100 psi above the absolute ambient pressure with a vapor/liquid ratio of zero. The maximum allowable pressure at the fuel pump inlet after shutdown is 120 psig.

Oil pressure limits:

Minimum: 50 psig at idle. Variable by N2 Speed off idle. See PW1500G Installation and Operating Manual, PWA-8828 and PW1900G Installation and Operating Manual, PWA-10649.

Maximum: 235 psig cold high MOP limit for MOT < 49 °C / 120 °F  
 Otherwise, 175 psig.

Oil supply pressure is measured relative to main lube pressure.

Temporary interruption associated with negative “g” operation is limited to 7 seconds maximum. Normal oil pressure will be restored rapidly once the negative “g” effect has been eliminated.

**NOTE 4**

Accessory Drive Provisions

PW1500G Accessory Drives						
Drive Pad	Rotation	Speed Ratio to N2	Torque kg*cm (lb*in)			Overhung moment kg*cm (lb*in)
			Continuous	Overload	static	
Hydraulic pump	CW	0.1835:1	953 (810)	1 901 (1 650)	4 148 (3 600)	202 (175)
Variable Frequency Generator (VFG)	CW	0.8595:1	645 (560) <sup>+</sup>	1 866 (1 620) <sup>+</sup>	6 337 (5 500)	1 066 (925)

CW = Clockwise (facing the drive pad)  
 + Maximum allowable continuous torque values are at any speed unless otherwise specified provided no destructive forces resulting from accessory torsional vibration are present.  
 Maximum Allowable continuous overhung bending moments of accessories about drive face are as shown provided no destructive forces resulting from vibration are present.

PW1900G Accessory Drives						
Drive Pad	Rotation	Speed Ratio to N2	Torque kg*cm (lb*in)			Overhung moment kg*cm (lb*in)
			Continuous	Overload	static	
Hydraulic pump	CW	0.1835:1	484 (420)	1 613 (1 400)	4 148 (3 600)	213.7 (185.5)
Integrated Drive Generator (IDG)	CW	0.8595:1	323 (280)	1 290 (1 120)	6 337 (5 500)	1 066 (925)
CW = Clockwise (facing the drive pad) Maximum Allowable continuous overhung bending moments of accessories about drive face are as shown provided no destructive forces resulting from vibration are present.						

**NOTE 5****MODEL DESCRIPTION:**

The PW1500G engine series consist of the following engine models:

PW1519G	Bombardier CS100 reduced thrust model
PW1521G	Bombardier CS100 reduced thrust model
PW1524G	Bombardier CS100 basic model
PW1525G	Bombardier CS100 alternate climb thrust model
PW1521G-3	Bombardier CS-300 reduced thrust model
PW1524G-3	Bombardier CS-300 basic model
PW1525G-3	Bombardier CS-300 alternate climb thrust model

The PW1900G engine series consist of the following engine models:

PW1919G	Embraer E190-E2 model
PW1921G	Embraer E195-E2 model
PW1922G	Embraer E190-E2 model
PW1923G	Embraer E195-E2 model

**NOTE 6**

The engine weight is defined as the dry weight of the basic engine with P&W supplied Standard Equipment.

**NOTE 7**

PW1500G Engine mount system provisions are specified in Installation Drawing 5310001 and Mount and Maneuver Load Drawing, 5310003.

PW1900G Engine mount system provisions are specified in Installation Drawing 5350001 and Mount and Maneuver Load Drawing, 5350003.



**NOTE 8****PW1500G SPECIAL INSTALLATION REQUIREMENTS:**

- 1) Engine design and operating limitations are defined in the Installation and Operating Manual, PWA-8828.
  - 2) The PW1500G Engine Series is not eligible for Extended Twin Engine Operations, (ETOPS) Operation.
  - 3) The minimum N1 certified for in-flight operation in icing conditions is 1,991 rpm. The Electronic Engine Control will prevent rotor speeds below this value while in flight.
  - 4) There are no approved criteria pertaining to the engine control systems' time limited dispatch and maintenance requirements.
  - 5) Lightning protection requirements and electromagnetic interference emitted by the electronic engine control system, including cables, are specified in the Installation and Operating Manual, PWA-8828.
- The thrust reverser is not part of the engine type design and is certified as part of the aircraft. Information for installation of a thrust reverser is contained in the Installation and Operating Manual, PWA-8828.

**PW1900G SPECIAL INSTALLATION REQUIREMENTS:**

- 1) Engine design and operating limitations are defined in the Installation and Operating Manual, PWA-10649.
  - 2) The PW1900G Engine Series is not eligible for Extended Twin Engine Operations, (ETOPS) Operation.
  - 3) The minimum N1 certified for in-flight operation in icing conditions is 1,991 rpm. The Electronic Engine Control will prevent rotor speeds below this value while in flight.
  - 4) There are no approved criteria pertaining to the engine control systems' time limited dispatch and maintenance requirements.
  - 5) Lightning protection requirements and electromagnetic interference emitted by the electronic engine control system, including cables, are specified in the Installation and Operating Manual, PWA-10649.
- The thrust reverser is not part of the engine type design and is certified as part of the aircraft. Information for installation of a thrust reverser is contained in the Installation and Operating Manual, PWA-10649.

**NOTE 9****SPECIAL OPERATING PROCEDURES:**

PW1500G Requirements and limitations for ground operation in icing conditions are specified in the Installation and Operating Manual, PWA-8828.

PW1900G Requirements and limitations for ground operation in icing conditions are specified in the Installation and Operating Manual, PWA-10649.

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**NOTE 10** APPLICABLE INSTALLATION, MAINTENANCE & OVERHAUL MANUALS

PW1500G:

1) Installation and Operating Manual, PWA-8828

2) Instructions for Continued Airworthiness are incomplete. The aircraft will be eligible for return to service when the ICA is complete and accepted.

PW1900G:

1) Installation and Operating Manual, PWA-10649

2) Instructions for Continued Airworthiness are incomplete. The aircraft will be eligible for return to service when the ICA is complete and accepted.

**NOTE 11** LIFE LIMITED PART INFORMATION

PW1500G life limits for critical components and mandatory inspection requirements are specified in the PW1500G Airworthiness Limitation Manual PN 5305816.

PW1900G life limits for critical components and mandatory inspection requirements are specified in the PW1900G Airworthiness Limitation Manual PN 5321709.

Intermixing of life-limited parts between the PW1500G and PW1900G engines is not allowed.

**NOTE 12** ROTOR SPEEDS

Maximum permissible Low Pressure Rotor (N1): 10 600 rpm

Minimum Low Pressure Rotor (N1),

Flight Idle: 1 991 rpm

Ground Idle: 1 574 rpm

(See Note 8)

Maximum permissible High Pressure Rotor (N2): 24 470 rpm

Minimum High Pressure Rotor (N2),

Ground Idle: 13 264 rpm

Flight Idle: 13 264 rpm

Power setting, power checks, and control of engine thrust output in all operations are based on Low Rotor Speed (N1). Fan Speed, (NFAN) is directly proportional to Low Rotor Speed (N1) by a gear ratio of 1: 3.0625.

**NOTE 13** Maximum Permissible Bleed Air Extraction limits are specified in the PW1500G Installation and Operating Manual, PWA-8828, and PW1900G Installation and Operating Manual, PWA-10649.

**NOTE 14** EXHAUST EMISSIONS AND FUEL VENTING

In addition to the FAA's finding of compliance based on the certification requirements defined in this TCDS, the engine manufacturer has declared that the ICAO emissions standards identified in Annex 16, Volume II, Third Edition, Part III, Chapter 2, Section 2.2.2 for SN, Section 2.3.2 for CO and HC, Section 2.3.2.e. for NOx (also known as CAEP/8), and Part II Chapter 2 for fuel venting have also been demonstrated.



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