European Aviation Safety Agency

EASA

TYPE-CERTIFICATE DATA SHEET

Number : IM.E.078
Issue : 01
Date : 31 August 2007
Type : Pratt & Whitney Canada
PT6A-41 series engines

Variants
PT6A-41
PT6A-42
PT6A-42A
PT6A-45A
PT6A-45B
PT6A-45R
PT6A-52
PT6A-60A
PT6A-61
PT6A-62
PT6A-65AR
PT6A-65B
PT6A-65AG

List of effective Pages:

Page	1	2	3	4	5	6	7	8										
Issue	1	1	1	1	1	1	1	1										

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I. General

1. Type/Variants: PT6A-41, PT6A-42, PT6A-42A, PT6A-45A, PT6A-45B, PT6A-45R, PT6A-52, PT6A-60A, PT6A-61, PT6A-62, PT6A-65AG, PT6A-65AR, PT6A-65B

2. Type Certificate Holder: Pratt and Whitney Canada Corp.
1000 Marie Victorin
Longueuil, Québec, J4G 1A1
Canada

3. Manufacturer: Pratt and Whitney Canada

4. EASA Certification/JAA Validation Application Date: 01 May 2006 for PT6A-52

5. Validation Reference Date: 24 October 1974

6. EASA Certification Date:

PT6A-41	PT6A-42	PT6A-42A	PT6A-45A	PT6A-45B
27 June 1977	19 April 1983	02 Oct. 2000	27 June 1977	19 April 1983

PT6A-45R	PT6A-52	PT6A-60A	PT6A-61	PT6A-62
19 April 1983	31 August 2007	06 Sept. 1984	08 May 1985	03 July 1990

PT6A-65AG	PT6A-65AR	PT6A-65B		
14 Nov. 1988	04 Dec. 1987	06 Sept. 1984		

EASA Type-Certification for the above mentioned engine models, except PT6A-52, is granted, in accordance with Article 2 paragraph 3(a)(i) of EU Commission Regulation EC 1702/2003, based on the respective CAA United Kingdom, DGAC France, LBA Germany and AustroControl validation letters issued following NAA approvals prior to 28 September 2003.

II. Certification Basis

1. Transport Canada Certification Basis details: see Transport Canada TCDS E-12.

2. EASA Certification Basis:

2.1 Airworthiness Standards:

- FAR Part 33 effective 1 February 1965, and amendments 33-1 to 33-5

In addition for PT6A-52: Ingestion of rain and hail (CS-E 790 effective 24 October 2003)

2.2 Special Conditions:

none

2.3 Equivalent Safety Findings:

none

2.4 Deviations:

None

2.5 Environmental Protection Requirements:

Fuel Venting : EC 1702/2003 Annex Part 21A.18(b), 27 September 2003

III.Technical Characteristics

1. Type Design Definition:

As defined by the applicable PT6A-41, PT6A-42, PT6A-42A, PT6A-45A, PT6A-45B, PT6A-45R, PT6A-60A, PT6A-61, PT6A-62, PT6A-65AG, PT6A-65AR and PT6A-65B Engine Parts Lists.
For PT6A-52: Engine Assembly Drawing No. 3072554 Change A and subsequent revisions.

2. Description:

The PT6A-41 and PT6A-60 series turboprop engines are comprised of a 2 stage reduction gearbox, 2 stage power turbine, single stage gas generator turbine and 4 stage gas generator compressor (3 axial, 1 centrifugal) for the PT6A-41, PT6A-42, PT6A-42A, PT6A-45A, PT6A-45B, PT6A-45R, PT6A-60A, PT6A-61, PT6A-62 and 5 stage gas generator compressor (4 axial , 1 centrifugal) for the PT6A-65AG, PT6A-65AR and PT6A-65B. The fuel control is purely hydro-mechanical. The accessory gearbox design is common for all PT6A-41 and PT6A-60 series engines.

3. Equipment:

Approved equipment is defined in the applicable PT6A-41, PT6A-42, PT6A-42A, PT6A-45A, PT6A-45B, PT6A-45R, PT6A-60A, PT6A-61, PT6A-62, PT6A-65AG, PT6A-65AR and PT6A-65B Engine Parts Lists and in Engine Assembly Drawing No. 3072554 Change A and subsequent revisions for the PT6A-52..

4. Dimensions and Weight:

Rating	Overall Length (mm)	Overall Diameter (mm)	Dry Spec. Weight (kg)
PT6A-41	1688	464	190
PT6A-42	1688	464	190
PT6A-42A	1688	464	190
PT6A-45A	1845	464	202
PT6A-45B	1845	464	202
PT6A-45R	1845	464	208
PT6A-52	1696	464	204
PT6A-60A	1831	464	221
PT6A-61	1696	464	201
PT6A-62	1770	464	206
PT6A-65AG	1490	464	227
PT6A-65AR	1490	464	227
PT6A-65B	1490	464	225

5. Ratings:

Engine Model	Maximum Continuous Power (kW)	Take-off Power (5 minutes)
PT6A-41	634	634
PT6A-42	634	634
PT6A-42A	634	634
PT6A-45A	760	875
PT6A-45B	761	875
PT6A-45R	760	893 (875 Alternative*)
PT6A-52	634	634
PT6A-60A	783	783
PT6A-61	634	634
PT6A-62	708	708
PT6A-65AG	910	969
PT6A-65AR	910	1062 (918 Alternative)
PT6A-65B	875	875

* Available to 11 °C

6. Control System:

The PT6A-41 and PT6A-60 series engines are controlled by purely hydromechanical fuel control system. Refer to model specific Installation Manuals for unit part numbers.

7. Fluids

7.1 Fuel:

The approved fuels and additives must conform to the latest revision of the following PWC Service Bulletins:
SB 3044 (PT6A-41, PT6A-42, PT6A-42A, PT6A-45A, PT6A-45B, PT6A-45R)
SB 13044 (PT6A-52, PT6A-60A, PT6A-61, PT6A-62, PT6A-65AR, PT6A-65B)
SB 13244 (PT6A-65AG)

7.2 Augmentation Fluid:

The augmentation fluid must conform to the latest revision of the PWC Specificaion CPW No. 328.

7.2 Oil:

The approved oils must conform to the latest revision of the following PWC Service Bulletins:
SB 3001 (PT6A-41, PT6A-42, PT6A-42A, PT6A-45A, PT6A-45B, PT6A-45R)
SB 13001 (PT6A-52, PT6A-60A, PT6A-61, PT6A-62, PT6A-65AG, PT6A-65AR, PT6A-65B)

8. Aircraft Accessory Drives:

For accessory drives specifications, including direction of rotation, drive speed ratio to engine speed, torque continuous pad rating and maximum overhung moment, refer to model specific Installation Manual.

9. Maximum Permissible Air Bleed Extraction: For all engine models, the bleed extraction is as follows:

Maximum External (%): 5.25
Maximum during Start (kg/min): 0.68

IV.Operational Limits:

1. Temperature Limits:

1.1 Maximum Interstage Turbine Temperature (ITT), ^{o}C :

Rating	Maximum Continuous (^{o}C)	Take-off (5 minutes) (^{o}C)	Starting (Ground and Air) (^{o}C)
PT6A-41	750	750	1000
PT6A-42	800	800	1000
PT6A-42A	800	800	1000
PT6A-45A	800	800	1000
PT6A-45B	800	800	1000
PT6A-45R	812	845 (800 Alternative)	1000
PT6A-52	820	820	1000
PT6A-60A	820	820	1000
PT6A-61	800	800	1000
PT6A-62	800	800	1000
PT6A-65AG	820	820	1000
PT6A-65AR	840	855 (820 Alternative)	1000
PT6A-65B	810	820	1000

1.2 Oil Temperature, ^{o}C :	PT6A-41, PT6A-42, PT6A-42A, PT6A-62	PT6A-45A, PT6A-45B, PT6A-45R, PT6A-52, PT6A-65AG, PT6A-65AR, PT6A-65B , PT6A-60A, PT6A-61
Minimum:	-40	-40
Maximum Continuous Operation:	104	110
Minimum Ground Operation:	110	110
Maximum (10 minutes):	104	-----

1.3 Fuel Temperature

Refer to Installation Manual.

2. Maximum Permissible Rotor Speeds:

Engine Model	Gas Generator (N1) (rpm)	Power Turbine Module Output (N2) (rpm)	Power Turbine Module Output (N2) Transient (rpm)
PT6A-41	38,100	2000 (90.7%)	2205 (100%)
PT6A-42	38100	2000(90.7)	2205 (100%)
PT6A-42A	38100	2000 (90.7)	2205 (100%)
PT6A-45A	39,000	1700 (100%)	1870 (110%)
PT6A-45B	39,000	1700 (100%)	1870 (110%)
PT6A-45R	39,000	1700 (100%)	1870 (110%)
PT6A-52	39,000	2000 (90.7%)	2205 (100%)
PT6A-60A	39,000	1700 (100%)	1870 (110%)
PT6A-61	39,000	2000 (90.7%)	2205 (100%)
PT6A-62	39,000	2000 (90.7%)	2205 (100%)
PT6A-65AG	39,000	1700 (100%)	1870 (110%)
PT6A-65AR	39,000	1700 (100%)	1870 (110%)
PT6A-65B	39,000	1700 (100%)	1870 (110%)

Propeller speed of 100% of 1700 rpm corresponds to power turbine speed of 29,894 rpm. The 100% propeller speed of 2000 rpm corresponds to power turbine speed of 30,145 rpm.

3. Pressure Limits:

3.1 Fuel Pressure Limit at Engine Pump Inlet:

Refer to Installation Manual.

3.2 Oil Pressure Limits:

Pressure range (gauge): 620.4-930.7 kPa (90-135 psi)
Gas Generator speed 27000 rpm or above and oil temperature 60-71 ^{o}C

Minimum Pressure (gauge) : 262 kPa (60 psi)
Gas Generator speed below 27000 rpm

4. Installation Assumptions:

The installation assumptions are quoted in the respective model engine Installation Manuals.

5. Dispatch Limitations:

Not applicable to PT6A-41 series engines as all models have hydro-mechanical fuel control.

V. Operating and Service Instructions

Engine Model	Engine Operating Instructions	Engine Maintenance Manual	Engine Overhaul Manual	Service Bulletins *
PT6A-41	3021441	3021442	3021443	3000 Series
PT6A-42	3031941	3021442	3021443	3000 Series
PT6A-42A	3040599	3021442	3021443	3000 Series
PT6A-45A	3029001	3027042	3027043	3000 Series
PT6A-45B	3031814	3027042	3027043	3000Series
PT6A-45R	3033041	3027042	3027043	3000 Series
PT6A-52	3072151	3072862	3072863	13000 Series
PT6A-60A	3033341	3034342	3034343	13000 Series
PT6A-61	3033741	3034342	3034343	13000 Series
PT6A-62	3034559	3034542	3034543	13000 Series
PT6A-65AG	3034629	3032842	3032843	13000 Series
PT6A-65AR	3037027	3032842	3032843	13000 Series
PT6A-65B	3033241	3032842	3032843	13000 Series

* Service Bulletins as issued for each engine model.

VI. Notes

Note 1: Dry weight includes basic engine accessories and optional equipment as listed in the manufacturer's engine specification.

Note 2: The engine ratings are based on dry sea level static ICAO Standard Atmospheric conditions. Compressor intake screen installed. No external accessory loads and no airbleed. The quoted ratings are obtainable on a test stand with the specified fuel and oil without intake ducting and using exhaust stubs P/N ESK7630. With fluid augmentation, the take-off rating is available to 21°C (69°F) for the PT6A-45A, and to 29°C (84°C) for the PT6A-45B. Use of fluid augmentation limited as follows:

PT6A-45A, PT6A-45B	PT6A-45B
10,000 ft altitude	5,000 ft. altitude
176.9 kg/h (390 lb/hr) flow	267.6 kg/h (590 lb/hr) flow

At temperatures between 5°C (41°F) and 57.3°C (135°F), minimum required flow 390 lb/hour provided by minimum pressure of 186 kPa (27 psig).

Note 3:

Engine Model	Take off power is flat rated up to an ambient temperature ^{O}C (^{O}F).	Maximum Continuous power is flat rated up to an ambient temperature ^{O}C (^{O}F)
PT6A-41	41 (106)	41 (106)
PT6A-42	41 (106)	41 (106)
PT6A-42A	41 (106)	41 (106)
PT6A-45A	8 (46)	26 (79)
PT6A-45B	11 (52)	29 (84)
PT6A-45R	23 (73) (11 (52) Alternate)	33 (92)
PT6A-52	61 (142)	61 (142)
PT6A-60A	25 (77)	25 (77)
PT6A-61	46 (115)	46 (115)
PT6A-62	37 (99)	37 (99)
PT6A-65AG	22 (71)	38 (101)
PT6A-65AR	28 (82) (29 (84) Alternate)	38 (101)
PT6A-65B	43 (110)	38 (101)

Note 4: The time temperature limits are specified in the Specific Operating Instructions.

Note 5: These engines meet the requirements of FAR 33.68 for operation in icing conditions as defined in FAR 25 Appendix C when the intake system conforms with the P&WC Installation Manual Instructions for inertial separation of snow and icing particles. The engines also meet the requirements of FAR 33.27 and do not require external armouring.

Note 6: Certain engines when separated at "C" flange, may be overhauled or maintained as two modules; the Gas Generator Module and the Power Section Module as follows:

Engine Model	G.G. Module Part Number	P.S. Module Part Number
PT6A-45A	A 3030300	A 3030200
PT6A-45B	2A 3030300	A 3030200
PT6A-45R	3A 3030300	A 3030200
PT6A-65B	3100800	3100900
PT6A-65AR, -65AG	3100800	3100900
PT6A-60A, -60AG	3102600	3102000
PT6A-61	3102600	3103300
PT6A-62	3035000	3035200
PT6A-52	3072558	3072555

Note 7: The PT6A-45R, and -65AR models include provision for automatic power increase from Alternative Take-off Power to Take-off Power.

Note 8: The PT6A-65AG is a special purpose version of the PT6A-60 Series of engines intended for use in agricultural aviation. This model may not be re-designated for other than agricultural operations.
