PRATT & WHITNEY CANADA

SERVICE BULLETIN

P&WC S.B. No. 13002R20

BULLETIN INDEX LOCATOR

TURBOPROP ENGINE
ROTOR COMPONENTS - SERVICE LIFE

MODEL APPLICATION

PT6A-52, PT6A-60A, PT6A-61, PT6A-62, PT6A-65AR, PT6A-65B, PT6A-65R

Compliance: Refer to Para. 1.E. in the Service Bulletin

Summary:

1. This service bulletin (SB) provides the service life limits for the rotor component parts which are authorized for use in the above Pratt & Whitney Canada (P&WC) Inc. engine models, as required by the Canadian Department of Transport regulations.
2. Compliance with the Accomplishment Instructions in step 3 is necessary to maintain conformity with the approval type design and the validity of the airworthiness certification.
3. The Low Cycle Fatigue (LCF) counting process is described in detail, including the formula to use, refer to the “Remaining Life” section, to calculate the total accumulated cycles for the various rotor components.

Oct 02/1982
Revision No. 20: Nov 07/2023

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A United Technologies Company

07 November 2023

P&WC S.B. No. 13002R20

REVISION TRANSMITTAL SHEET
TURBOPROP ENGINE MODEL PT6A

SUBJECT: Pratt & Whitney Canada Service Bulletin No. PT6A-72-13002, Rev. No. 20, dated Nov 07/2023 (P&WC S.B. No. 13002R20) ROTOR COMPONENTS - SERVICE LIFE

Replace your existing copy of this service bulletin with the attached revised bulletin. Destroy the superseded copy.

Please retain this Revision Transmittal Sheet with the revised bulletin.

SUMMARY: This service bulletin is revised to:

- add PT6A-62 BS1320.

EFFECT OF REVISION ON PRIOR ACCOMPLISHMENT:

None.

NOTE: A black bar in the left margin indicates a change in that line of text or figure.

REVISION HISTORY:

Original Issue: Oct 02/1982
Revision No. 1: Mar 24/1983
Revision No. 2: Dec 23/1983
Revision No. 3: Oct 25/1984
Revision No. 4: Feb 28/1985
Revision No. 5: Oct 02/1985
Revision No. 6: Oct 14/1986
Revision No. 7: Oct 26/1988
Revision No. 8: Nov 15/1989
Revision No. 9: Apr 16/1991
Revision No. 10: TBA
Revision No. 11: Sep 22/1993
Revision No. 12: May 11/1999
Revision No. 13: Dec 23/1999
Revision No. 14: Aug 02/2007
Revision No. 15: Jan 03/2008
Revision No. 16: Mar 04/2010
Revision No. 17: Dec 08/2019
Revision No. 18: Jun 24/2020
Revision No. 19: Aug 02/2021
Revision No. 20: Nov 07/2023

PRATT & WHITNEY CANADA

SERVICE BULLETIN

P&WC S.B. No. 13002R20

TURBOPROP ENGINE
ROTOR COMPONENTS - SERVICE LIFE

1. Planning Information

A. Effectivity

PT6A-52, PT6A-60A, PT6A-61, PT6A-62, PT6A-65AR, PT6A-65B and PT6A-65R Engines

B. Concurrent Requirements

None.

C. Reason

(1) To provide initial rotor components service life in accordance with D.O.T. regulation.

(2) To provide information covering method of marking.

D. Description

(1) Engine rotating parts listed under Paragraph 3.D. and 3.E. are subject to LCF due to cyclic operation of the engine. As a result, these parts must be replaced when the cycle limit is reached.

(2) Operators must record all flights, starts and accumulated total cycles (which must be calculated using the formula Ref. 3.H) in the applicable document for each component (i.e. logbook, LCF component card, etc.).

(3) The following is additional information for the Accumulated Total Cycle calculation:

- A start is defined as an engine start followed by one or more flights.
- Aircraft operation often includes abbreviated engine cycles. The definition of an abbreviated cycle is: idle - takeoff - flight - landing - idle. A normal or full cycle includes the foregoing plus an engine start and shutdown (i.e. abbreviated cycles are equivalent to the number of flights minus the number of starts). The limits specified in Paragraph 3. are in terms of full cycles. Accumulated abbreviated cycles are summated in terms of full cycles by means of a formula and tabulated factors.
- A full cycle is defined as an engine start followed by one flight then shutdown.
- An abbreviated cycle is less severe than a full cycle. To benefit from this, an Abbreviated Cycle Factor (ACF) is listed in the le below, and used in the formula which determines accumulated total cycles;
- A Flight Count Factor (FCF) is a multiplying factor that can be used to credit or debit life to the components listed in the Life Service to reflect the aircraft application of the engine. This factor can also be specific to an operator that diverges from the standards as missions.

P&WC No. 27832, 27906, 28910, 31338, 31368, 33304, 70070B, 80245, 80305, 81921A, 83278, 85794, 96298A, 96181A, D8527C, D8527D, D2736A, D5439D, EC-0008320, CO-0006793, CO-0012219

1. Planning Information (Cont'd)

- When abbreviated cycles are not recorded, each flight is considered to have been preceded by one start, i.e., each flight is equivalent to a full cycle.

(4) The LCF life limits listed in the below are incorporated in the Type Approval as issued by Transport Canada. Transport Canada must approve changes to rotor component cyclic lives.

(5) The specified cyclic lives apply to engines, modules and components that contain parts listed in the approved parts list, as shown in the applicable Illustrated Parts Catalog (IPC) and SB. Operators requesting approval to incorporate parts not listed in the applicable IPC and SBs will be required to substantiate the cyclic lives of these parts to their local Airworthiness Authority.

(6) Operators having missions which include many touch-and-go flights, or a frequency of scheduled in-flight shutdowns (such as used within training missions) or which include more than 10 flights per hour, must submit their mission profiles to P&WC Inc. for life cycle analysis.

(7) Operators making scheduled or frequent use of the engine's highest allowable rated power must submit their mission profile(s) to P&WC for analysis.

(8) The same component (e.g. disk, Hub, Impeller, etc.) may be installed in different models, providing the part number is authorized to be installed in the specific engine models (Ref. applicable SB). Operators transferring rotating components between engine models governed by different SBs must adhere to the lower of the LCF life limits published in the applicable SBs.

NOTE: 1. This applies to all PT6A engines and exclude all ST6 (industrial and marine) engines.

NOTE: 2. It is not permitted to use parts which were installed on ST6 engines for PT6 engines.

E. Compliance

The service lives quoted in the Accomplishment Instructions are incorporated by reference in the type approval as issued by the Canadian Department of Transport. Compliance with these instructions is therefore necessary to maintain conformity with the approval type design and the validity of the airworthiness certification.

1. Planning Information (Cont'd)

F. Approval

Transport Canada has reviewed and approved the technical contents of this Service Bulletin.

NOTE: This SB is incorporated by reference in one or more Transport Canada, Aircraft Engine Type Approvals and the service lives thereby constitute limits applicable to the corresponding engines, modules and components which embody only parts listed in the Transport Canada approved parts list, as promulgated in the applicable IPC and SBs. Operators requiring approval for incorporation of parts not listed will be required to substantiate to their local Airworthiness Authority the applicability of the lives of the substitute parts and associated parts and assemblies.

G. Manpower

Not applicable.

H. Weight and Balance

None.

I. Electrical Load Data

Not changed.

J. Software Accomplishment Summary

Not applicable.

K. References

Applicable PT6A Technical Manuals
P&WC S.B. No. 13188, 13229, 13240, 13257, 13269, 13434, 13441 and 13508

L. Publications Affected

Applicable PT6A Technical Manuals

M. Interchangeability and Intermixability of Parts

Not applicable.

2. Material Information

A. Industry Support Information

Not applicable.

2. Material Information (Cont'd)

B. Material - Cost and Availability

Not applicable.

C. Material Necessary for Each Engine

Not applicable.

D. Reidentified Parts

None.

E. Tooling - Price and Availability

Not applicable.

3. Accomplishment Instructions

A. Accumulated total cycles and all flights and starts must be recorded in the appropriate engine log book.

B. Turbine disk assemblies removed for repair must be tagged, stating the total number of flights, engine starts and/or the calculated total cycles, per Paragraph 3.D.

C. Components with accumulated total cycles or hours, as applicable, greater than the limits shown in Tables 1, 2 or 3 or components not supported with proper documentation, are to be removed from service.

NOTE: The practice of marking life limited parts with the accumulated cycle count is no longer required. The accumulated cycle count previously marked on parts alone is not considered sufficient supporting documentation.

D. The following limits shown in Table 1 in terms of number of cycles apply to, PT6A-60A, PT6A-61 and PT6A-62 engines only.

TABLE 1, Rotor Components - Service Life Limits

Description	Detail Part No.	Engine Model	Abbr'd Cycle Factor	Flight Count Factor	Life Limits No. Of Cycles
Hub, Compressor (1st Stage)	3036211	PT6A-60A, -61	3	1	7,500
	3036011	PT6A-60A, -61	3	1	10,000
	3037311	PT6A-60A, -61	3	1	8,000

3. Accomplishment Instructions (Cont'd)

TABLE 1, Rotor Components - Service Life Limits (Cont'd)

Description	Detail Part No.	Engine Model	Abbr'd Cycle Factor	Flight Count Factor	Life Limits No. Of Cycles
Rotor, Compressor (1st Stage)	3033801	PT6A-60A, -61, -62	3	1	15,000
	3035701	PT6A-60A, -61, -62	3	1	15,000
	3037701	PT6A-60A, -61	3	1	15,000
	3036001	PT6A-60A, -61	3	1	15,000
	3038401	PT6A-60A, -61	3	1	15,000
	3038801	PT6A-60A, -61, -62	3	1	15,000
	3041401	PT6A-60A, -61, -62	3	1	15,000
	3041301	PT6A-60A, -61, -62	3	1	15,000
	3040781	PT6A-60A, -61	3	1	15,000
	3041271	PT6A-60A, -61, -62	3	1	15,000
Disk, Compressor (2nd Stage)	3034312	PT6A-60A, -61, -62	3	1	20,000
	3134865	PT6A-60A, -61, -62	3	1	20,000
Disk, Compressor (3rd Stage)	3034313	PT6A-60A, -61, -62	3	1	20,000
	3134866	PT6A-60A, -61, -62	3	1	20,000
Impeller, Centrifugal	3017463	PT6A-60A, -61, -62	3	1	20,000
	3035635	PT6A-60A, -61, -62	3	1	20,000
	3036098	PT6A-60A, -61, -62	3	1	20,000
	3036793	PT6A-60A, -61, -62	3	1	24,000

3. Accomplishment Instructions (Cont'd)

TABLE 1, Rotor Components - Service Life Limits (Cont'd)

Description	Detail Part No.	Engine Model	Abbr'd Cycle Factor	Flight Count Factor	Life Limits No. Of Cycles
Disk, Compressor Turbine	3031811	PT6A-60A, -61	10	1	15,000
	3036711	PT6A-60A, -61	10	1	15,000
	3040311	PT6A-60A, -61	10	1	15,000
	3031811	PT6A-62	10	2	15,000
	3036711	PT6A-62	10	2	15,000
	3040311	PT6A-62	10	2	15,000
	3040311	PT6A-62 BS1320	1	15	15,000
Disk, Power Turbine (1st Stage)	3029312	PT6A-60A	10	1.5	30,000
	3029312	PT6A-61	10	1.5	30,000
	3029312	PT6A-62	10	2.5	30,000
	3029312	PT6A-62 BS1320	1	30	30,000
Disk, Power Turbine (2nd Stage)	3029313	PT6A-60A	10	1.5	30,000
	3029313	PT6A-61	10	1.5	30,000
	3029313	PT6A-62	10	2.5	30,000
	3029313	PT6A-62 BS1320	1	30	30,000

E. The following limits shown in Table 2 in terms of number of cycles apply to PT6A-65AR, -65B and -65R engines only.

TABLE 2, Rotor Components - Service Life Limits

Description	Detail Part No.	Engine Model	Abbr'd Cycle Factor	Flight Count Factor	Life Limits No. Of Cycles
Hub, Compressor (1st Stage)	*3033511	PT6A-65B, -65R	3	1	2,500
	3036111	PT6A-65B, -65R	3	1	5,000

3. Accomplishment Instructions (Cont'd)

TABLE 2, Rotor Components - Service Life Limits (Cont'd)

Description	Detail Part No.	Engine Model	Abbr'd Cycle Factor	Flight Count Factor	Life Limits No. Of Cycles
Rotor, Compressor (1st Stage)	3033601	PT6A-65AR, -65B, -65R	3	1	24,000
	3035901	PT6A-65AR, -65B, -65R	3	1	24,000
	3037101	PT6A-65AR, -65B, -65R	3	1	24,000
	3038901	PT6A-65AR, -65B, -65R	3	1	24,000
	3040791	PT6A-65AR, -65B, -65R	3	1	24,000
	3073211-01	PT6A-65AR, -65B, -65R	3	1	24,000
Shaft, Compressor Rotor	3037277	PT6A-65AR, -65B, -65R	3	1	15,000
	3111903-01	PT6A-65AR, -65B, -65R	3	1	15,000
	3039799	PT6A-65AR, -65B, -65R	3	1	24,000
	3040925	PT6A-65AR, -65B, -65R	3	1	24,000
	3043092	PT6A-65AR, -65B, -65R	3	1	24,000
Disk, Compressor (2nd Stage)	3033512	PT6A-65AR, -65B, -65R	3	1	24,000
	3036802	PT6A-65AR, -65B, -65R	3	1	24,000
Disk, Compressor (3rd Stage)	3033513	PT6A-65AR, -65B, -65R	3	1	24,000
	3036803	PT6A-65AR, -65B, -65R	3	1	24,000

3. Accomplishment Instructions (Cont'd)

TABLE 2, Rotor Components - Service Life Limits (Cont'd)

Description	Detail Part No.	Engine Model	Abbr'd Cycle Factor	Flight Count Factor	Life Limits No. Of Cycles
Disk, Compressor (4th Stage)	3033514	PT6A-65AR, -65B, -65R	3	1	24,000
	3036804	PT6A-65AR, -65B, -65R	3	1	24,000
Spacer, Compressor (4th Stage)	3102018-01	PT6A-65AR, -65B, -65R	3	1	24,000
	3105389-01	PT6A-65AR, -65B, -65R	3	1	24,000
	3107098-01	PT6A-65AR, -65B, -65R	3	1	24,000
	3114590-01	PT6A-65AR, -65B, -65R	3	1	24,000
	3075012-01	PT6A-65AR, -65B, -65R	3	1	24,000
Impeller, Centrifugal	3032973	PT6A-65AR, -65B, -65R	3	1	24,000
	3036794	PT6A-65AR, -65B, -65R	3	1	24,000
	3035876	PT6A-65AR, -65B, -65R	3	1	24,000
	3036039	PT6A-65AR, -65B, -65R	3	1	24,000
	3036891	PT6A-65AR, -65B, -65R	3	1	24,000
	3036897	PT6A-65AR, -65B, -65R	3	1	24,000
	3037204	PT6A-65AR, -65B, -65R	3	1	24,000

3. Accomplishment Instructions (Cont'd)

TABLE 2, Rotor Components - Service Life Limits (Cont'd)

Description	Detail Part No.	Engine Model	Abbr'd Cycle Factor	Flight Count Factor	Life Limits No. Of Cycles
Disk, Compressor Turbine	3031811	PT6A-65AR, -65B, -65R	10	1	15,000
	3036711	PT6A-65AR, -65B, -65R	10	1	15,000
	3040311	PT6A-65AR, -65B, -65R	10	1	15,000
Disk, Power Turbine (1st Stage)	3029312	PT6A-65AR, -65B, -65R	10	1	30,000
Disk, Power Turbine (2nd Stage)	3029313	PT6A-65AR, -65B, -65R	10	1	30,000

* Ref. Para. G. (Tables 4 and 5)

F. The following limits shown in Table 3 in terms of number of cycles apply to PT6A-52 engines only.

TABLE 3, Rotor Components - Service Life Limits

Description	Detail Part No.	Engine Model	Abbr'd Cycle Factor	Flight Count Factor	Life Limits No. Of Cycles
Rotor, Compressor (1st Stage)	3041271	PT6A-52	3	1	15,000
Disk, Compressor (2nd Stage)	3034312	PT6A-52	3	1	20,000
	3134865	PT6A-52	3	1	20,000
Disk, Compressor (3rd Stage)	3034313	PT6A-52	3	1	20,000
	3134866	PT6A-52	3	1	20,000
Impeller, Centrifugal	3036793	PT6A-52	3	1	24,000
Disk, Compressor Turbine	3040311	PT6A-52	10	1	15,000

3. Accomplishment Instructions (Cont'd)

TABLE 3, Rotor Components - Service Life Limits (Cont'd)

Description	Detail Part No.	Engine Model	Abbr'd Cycle Factor	Flight Count Factor	Life Limits No. Of Cycles
Disk, Power Turbine (1st Stage)	3029312	PT6A-52	10	1.5	30,000
Disk, Power Turbine (2nd Stage)	3029313	PT6A-52	10	1.5	30,000

G. First stage compressor hub P/N 3033511 was installed on engines with the following serial numbers and must be removed after accumulating 2500 total cycles.

TABLE 4, Compressor hub installed on PT6A-65B engines

Engine Serial No.	Hub Serial No.
32001	5M123
32002	4M462
32003	5M128
32004	4M466
32005	7M858
32006	7M831

TABLE 5, Compressor hub installed on PT6A-65R engines

Engine Serial No.	Hub Serial No.
97008	5M124
97009	4M464
97010	4M460
97011	5M127
97012	4M468
97013	5M119
97014	5M131
97016	5M125
97018	5M134

3. Accomplishment Instructions (Cont'd)

TABLE 5, Compressor hub installed on PT6A-65R engines (Cont'd)

Engine Serial No.	Hub Serial No.
97019	5M122
97020	7M856
97023	9M312
97024	7M837
97026	7M830

H. At repair and overhaul, component life is calculated in accordance with the following formula:

$$\text{Accumulated Total Cycles} = \left[\text{No. of Starts} + \left(\frac{\text{No. of Flights - No. of Starts}}{\text{Abbreviated Cycle Factor}} \right) \right] \text{X Flight Count Factor}$$

EXAMPLE:

Part No.	3031811 (Disk)
Abbreviated Cycle Factor	10
No. of Starts	3000
No. of Flights	9000
Flight Count Factor	1

$$\text{Accumulated Total Cycles} = \left[3000 + \left(\frac{9000 - 3000}{10} \right) \right] \text{X } 1$$

$$= [3000 + 600] \text{ X } 1$$

$$= 3600$$

4. Appendix

Not applicable.