PRATT & WHITNEY CANADA

SERVICE BULLETIN

P&WC S.B. No. 41057R6

BULLETIN INDEX LOCATOR
72-50-01 / 72-50-03

TURBOSHAFT ENGINE
SHROUD HOUSING, COMPRESSOR TURBINE - REPLACEMENT/MODIFICATION OF

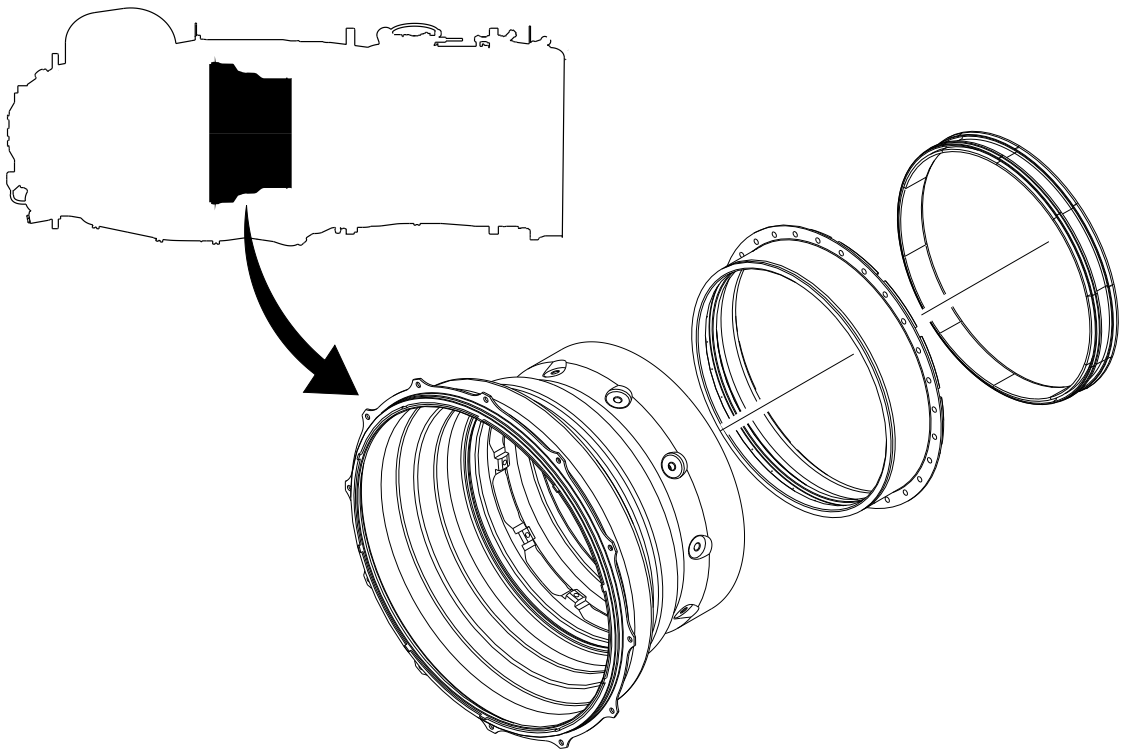
MODEL APPLICATION

PT6C-67C

Commercial Support Program No: 1006342

Compliance: CATEGORY 4

Summary: There is an opportunity to simplify procurement by introducing a new Compressor Turbine (CT) shroud segment and housing configuration for the PT6C-67C that is similar to the other PT6C engine models. The new CT shroud housing features a different material and can further improve hot section durability. A new Power Turbine (PT) housing is also required to accommodate the new position of the sealing ring.



Sep 21/2011
Revision No. 6: Feb 24/2021

PT6C-72-41057
Cover Sheet

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Pratt & Whitney Canada
A United Technologies Company

24 February 2021

P&WC S.B. No. 41057R6

REVISION TRANSMITTAL SHEET
TURBOSHAFT ENGINE MODEL PT6C

SUBJECT: Pratt & Whitney Canada Service Bulletin No. PT6C-72-41057, Rev. No. 6, dated Feb 24/2021 (P&WC S.B. No. 41057R6) SHROUD HOUSING, COMPRESSOR TURBINE - REPLACEMENT/MODIFICATION OF

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 Destroy the superseded copy.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

- change the compliance code from CC5 to CC4 in Para. 1.E., Planning Information.
- modify Fig. 1 to read Dia B in lieu of Face B.
- update the pricing to the current year.

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: Sep 21/2011
Revision No. 1: Apr 11/2012
Revision No. 2: Sep 27/2013
Revision No. 3: Jun 23/2014
Revision No. 4: Apr 25/2016
Revision No. 5: Nov 07/2019
Revision No. 6: Feb 24/2021

PRATT & WHITNEY CANADA

SERVICE BULLETIN

P&WC S.B. No. 41057R6

TURBOSHAFT ENGINE

SHROUD HOUSING, COMPRESSOR TURBINE - REPLACEMENT/MODIFICATION OF

1. Planning Information

A. Effectivity

PT6C-67C Engines which are before and include Serial No. PCE-KB0917.

NOTE: The above effectivity list does not identify engines that have been converted from one engine model to another via an engine conversion service bulletin. To clarify the effectivity of converted engines, refer to the original engine effectivity above. For the parts embodied during the engine conversion, refer to conversion service bulletin.

B. Concurrent Requirements

To obtain full benefit P&WC recommends to incorporate P&WC S.B. 41050 (FUEL NOZZLE CONFIGURATION AND ECOLOGY SYSTEM ACCUMULATOR - REPLACEMENT OF) prior to, or in conjunction with this service bulletin.

C. Reason

(1) Problem

The Compressor Turbine (CT) shroud housing is not common with other PT6C models.

(2) Cause

A compressor turbine shroud housing was developed for other variants of PT6C. In order to simplify procurement, it is desirable to commonize this new CT shroud housing with the PT6C-67C.

(3) Solution

Introduce a new CT shroud housing with new CT shroud segments. This new CT shroud housing features a different material and can further improve hot section durability. A new Power Turbine (PT) housing is also required to accommodate the new position of the sealing ring.

D. Description

Remove and replace existing compressor turbine shroud housing and segments with new ones and remove and replace power turbine housing with a new or modified one.

E. Compliance

CATEGORY 4 - P&WC recommends to do this service bulletin the first time the engine or module is at a maintenance base that can do the procedures, regardless of the scheduled maintenance action or reason for engine removal.

P&WC No. D8680A, D8680T, E5517A, DCR27522, DCR35389, EC-0016033

1. Planning Information (Cont'd)

F. Approval

D.O.T./D.A.A. approved.

G. Manpower

No more man-hours are necessary to include this service bulletin at overhaul.

Once you have access to the part, an estimate of 3.0 man-hours is required to include this service bulletin at maintenance.

H. Weight and Balance

For PT6C-67C BS963 and BS1019:

The engine weight will decrease by 0.19 pounds (0.071 kgs).

The effect of weight change on the center of gravity is negligible.

I. Electrical Load Data

Not changed.

J. Software Accomplishment Summary

Not applicable.

K. References

Illustrated Parts Catalog P/N 3045334 (PT6C-67C)
Maintenance Manual P/N 3045332 (PT6C-67C)
Overhaul Manual P/N 3045333 (PT6C-67C)
P&WC S.B. No. 41050
P&WC Consumable Materials List P/N 3043340
PWA Overhaul Standard Practices Manual P/N 585005
Cleaning Inspection Repair Manual 3075447 (PT6C)

L. Publications Affected

Illustrated Parts Catalog P/N 3045334 (PT6C-67C)
Maintenance Manual P/N 3045332 (PT6C-67C)
Overhaul Manual P/N 3045333 (PT6C-67C)

M. Interchangeability and Intermixability of Parts

Interchangeability - Refer to Para. 2.C.

1. Planning Information (Cont'd)

Intermixability - Not changed.

2. Material Information

A. Industry Support Information

Please refer to Commercial Support Program Notification (CSPN) 1006342.

B. Material - Cost and Availability

You can get the procurable parts listed in Para. 2.C. from any Pratt & Whitney Canada Parts Distribution Center.

The estimated total cost of new parts needed to replace old parts is $Quote (US, 2021).

The new parts are available.

C. Material Necessary for Each Engine

The quantity of materials listed in this section is on a per Engine basis.

New P/N	Keyword	Old P/N	Qty	Est. Unit List Price ($US, 2021)	Instructions Disposition
3072900-01	Housing Assembly, Power Turbine Stator	3059005-01	1	92483.00	(A)(B)(C)
3072897-01	. Housing, Power Turbine Stator	3059004-01	1	NP	
3072898-01	Housing, Compressor Turbine Shroud	3118089-01	1	49854.00	(A)(B)
	Shroud Segment, Compressor Turbine	3039465	10		(A)(B)
3072899CL	Shroud Segment, Compressor Turbine		14	Quote	(A)
	. Shroud Segment 0.185 - 0.189 in.	3039465CL08	AR		
	. Shroud Segment, 0.189 - 0.193 in.	3039465CL09	AR		
3072899CL10	. Shroud Segment, 0.193 - 0.197 in.	3039465CL10	AR		

TURBOSHAFT ENGINE
SHROUD HOUSING, COMPRESSOR TURBINE - REPLACEMENT/MODIFICATION OF

New P/N	Keyword	Old P/N	Qty	Est. Unit List Price ($US, 2021)	Instructions Disposition
3072899CL11	. Shroud Segment, 0.197 - 0.201 in.	3039465CL11	AR		
3072899CL12	. Shroud Segment, 0.201 - 0.205 in.	3039465CL12	AR		
3072899CL13	. Shroud Segment, 0.205 - 0.209 in.	3039465CL13	AR		
3072899CL14	. Shroud Segment, 0.209 - 0.213 in.	3039465CL14	AR		
3072899CL15	. Shroud Segment 0.213 - 0.217 in.	3039465CL15	AR		
3072899CL16	. Shroud Segment, 0.217 - 0.221 in.	3039465CL16	AR		
3072899CL17	. Shroud Segment, 0.221 - 0.225 in.	3039465CL17	AR		
3072899CL18	. Shroud Segment, 0.225 - 0.229 in.	3039465CL18	AR		
3072899CL19	. Shroud Segment, 0.229 - 0.233 in.	3039465CL19	AR		
3072899CL20	. Shroud Segment, 0.233 - 0.237 in.	3039465CL20	AR		
3072899CL21	. Shroud Segment 0.237 - 0.241 in.	3039465CL21	AR		
3072899CL22	. Shroud Segment, 0.241- 0.245 in.	3039465CL22	AR		
3072899CL23	. Shroud Segment, 0.245 - 0.249 in.	3039465CL23	AR		
	. Shroud Segment, 0.249 - 0.253 in.	3039465CL24	AR		

Consumable Materials and Parts Required:

PWC09-002	. Compound Locking and Retaining

(A) RESTRICTED INTERCHANGEABILITY - (ATA 200 Explanation Code 07):
All parts are interchangeable as a complete set.

New P/N	Keyword	Old P/N	Qty	Est. Unit List Price ($US, 2021)	Instructions Disposition

(B) Discard the part if it is unserviceable. Return a serviceable part to stock.

(C) To get the new part it is possible to make a modification to the old part, or you can get the new part from any Pratt & Whitney Canada Distribution Center.

D. Reidentified Parts

The following list of parts can be reworked:

OLD P/N	NEW P/N
3059005-01	3072900-01

E. Tooling - Price and Availability

Tool No.	Nomenclature	Est. Price ($US,)	Delivery
PWC71508	Base, Housing	847.00	

3. Accomplishment Instructions

A. Remove the parts in the Old P/N list in Para. 2.C., Material Information, in accordance with the maintenance or overhaul manual instructions as follows:

- Ref. MM 72-50-01 COMPRESSOR TURBINE STATOR - MAINTENANCE PRACTICES.
- Ref. OHM 72-50-01 CT STATOR, SHROUD AND DUCT - DISASSEMBLY.
- Ref. OHM 72-50-03 POWER TURBINE HOUSING AND STATORS- DISASSEMBLY.

B. Verify if Dim at location H of power turbine housing assembly P/N 3059005-01 allows for rework of the part:

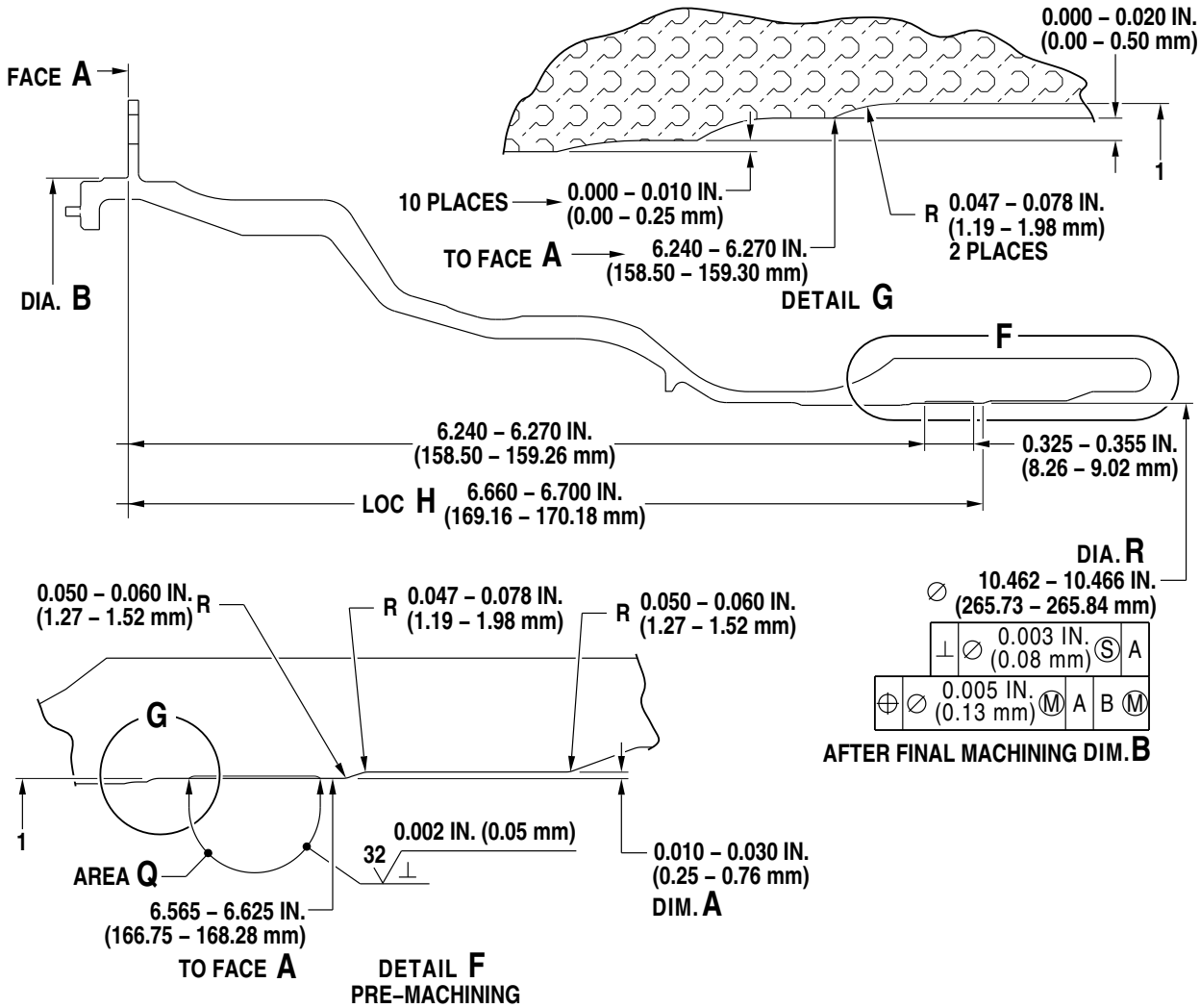
(1) If dimension at location H is greater or equal to 6.660 in. (169.164 mm) - proceed with rework of the part, otherwise replace the existing power turbine housing assembly with a new power turbine housing assembly

C. The serviceable power turbine stator housing P/N 3059005-01 may be reworked and re-identified as follows (Ref. Fig. 1 and CIR 72-53-50):

(1) Machine 0.010 to 0.030 in. (0.25 - 0.76 mm) Dia. to remove existing plasma coating on the old sealing diameter location (Ref. Detail F, Dim. A).

(2) Machine Area Q and adjacent surface (Ref. Detail F and G).

TURBOSHAFT ENGINE
SHROUD HOUSING, COMPRESSOR TURBINE - REPLACEMENT/MODIFICATION OF



NOTE:

1 PRE–MACHINING DIMENSION: 10.482 IN. (266.24 mm) MAX. DIAMETER
MAKE SURE THERE IS A 0.005 IN. (0.13 mm) TO 0.008 IN. (0.20 mm) UNDERCOAT THICKNESS

ICN-00198-G000043295-001-01

Power Turbine Housing Modification
Figure 1

3. Accomplishment Instructions (Cont'd)

(3) Fluorescent penetrant inspect reworked area per SPOP 62.

(4) Prepare surface of Area Q for plasma coating and mask surrounding area.

(5) Thermal spray enclosed Area Q, (0.005 to 0.008 in. (0.13-0.20 mm) thick.

(a) Coat Area Q, with powder (PWC05-012), (Ref. P&WC Overhaul Standard Practices Manual, Chapter 70-46).

(6) Final machine to dimension shown (Ref. Dim. B).

NOTE: Final plasma thickness after machining must be 0.005 to 0.008 in. (0.13-0.20 mm).

WARNING: USE EYE PROTECTION WHEN YOU WRITE WITH THE VIBRATION PEENING PROCEDURE.

(7) Put a line across the old part number. Use the vibration peening procedure, 0.003 to 0.006 in. (0.08-0.15 mm) deep, and write the new part number in the same area.

D. Assemble new compressor turbine shroud housing P/N 3072898-01 and shroud segments P/N 3072899 in accordance with the maintenance or overhaul manual instructions (Ref. Fig. 2 and 3 and Ref. Table 1 and 2) as follows:

- Ref. MM 72-50-01 COMPRESSOR TURBINE STATOR - MAINTENANCE PRACTICES.
- Ref. OHM 72-50-01 CT STATOR, SHROUD AND DUCT - SUB-ASSEMBLY.
- Ref. OHM 72-50-01 CT STATOR, SHROUD AND DUCT - FITS AND CLEARANCES.

(1) Apply a small amount of adhesive/sealant (PWC09-002) in the bottom of both housing grooves as shown (Ref. Fig. 2, Sheet 1, Detail F-F).

(2) Install the shroud housing P/N 3072898-01 in the base (PWC71508).

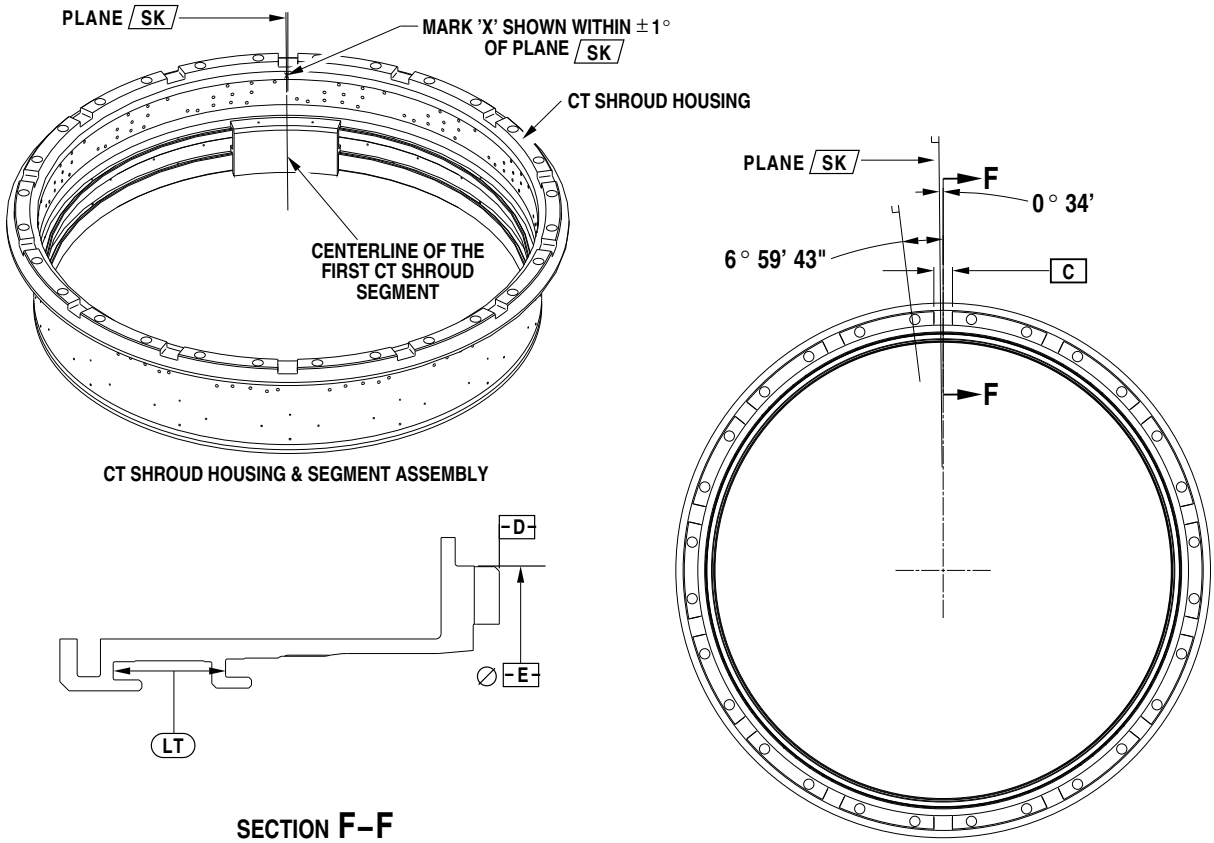
(3) Install one shroud segment P/N 3072899 in the locating grooves of the shroud housing (Ref. Fig. 1, Sheet 1 and Ref. Table 3, Fit No. 917).

NOTE: Select class 12 or higher shroud segments.

(4) Check clearance (Ref. Table 3, Fit No. 907 and Ref. Fig. 2) is maintained between shroud housing and shroud segments.

(5) Install remaining 13 segments one at the time. Maintain required gap between segments (Ref. Table 3, Fit No. 910 and Ref. Fig.2, Sheet 2, View P). Use shim stock to facilitate gap equalization between segments.

TURBOSHAFT ENGINE
SHROUD HOUSING, COMPRESSOR TURBINE - REPLACEMENT/MODIFICATION OF



LT APPLY A VERY SMALL AMOUNT OF LOCKTITE ALL AROUND IN THE BOTTOM OF HOUSING GROOVES PRIOR TO ASSEMBLY OF SHROUD SEGMENTS (ITEM 2).

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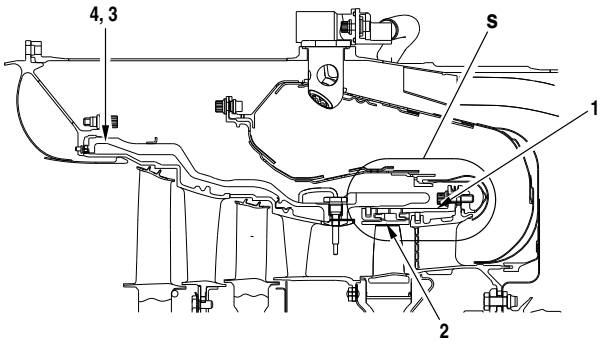
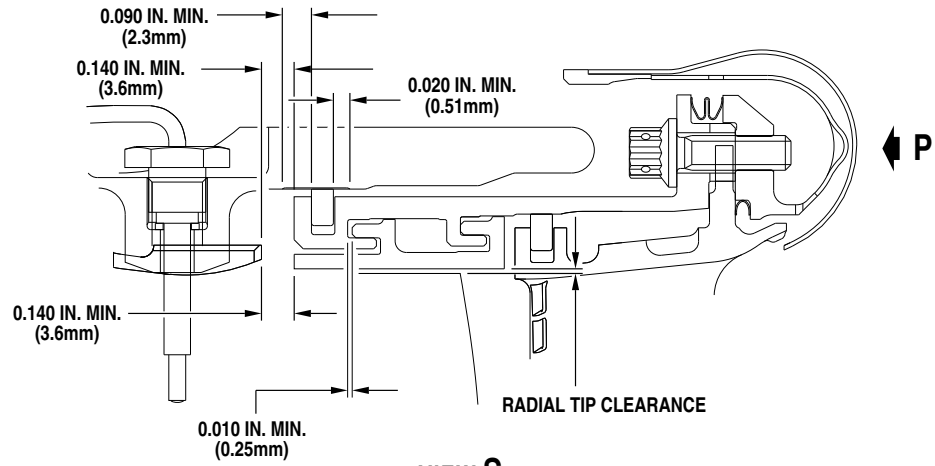
Compressor Turbine Shroud Housing Assembly
Figure 2 (Sheet 1 of 3)



CROSS–SECTION THROUGH CT AREA

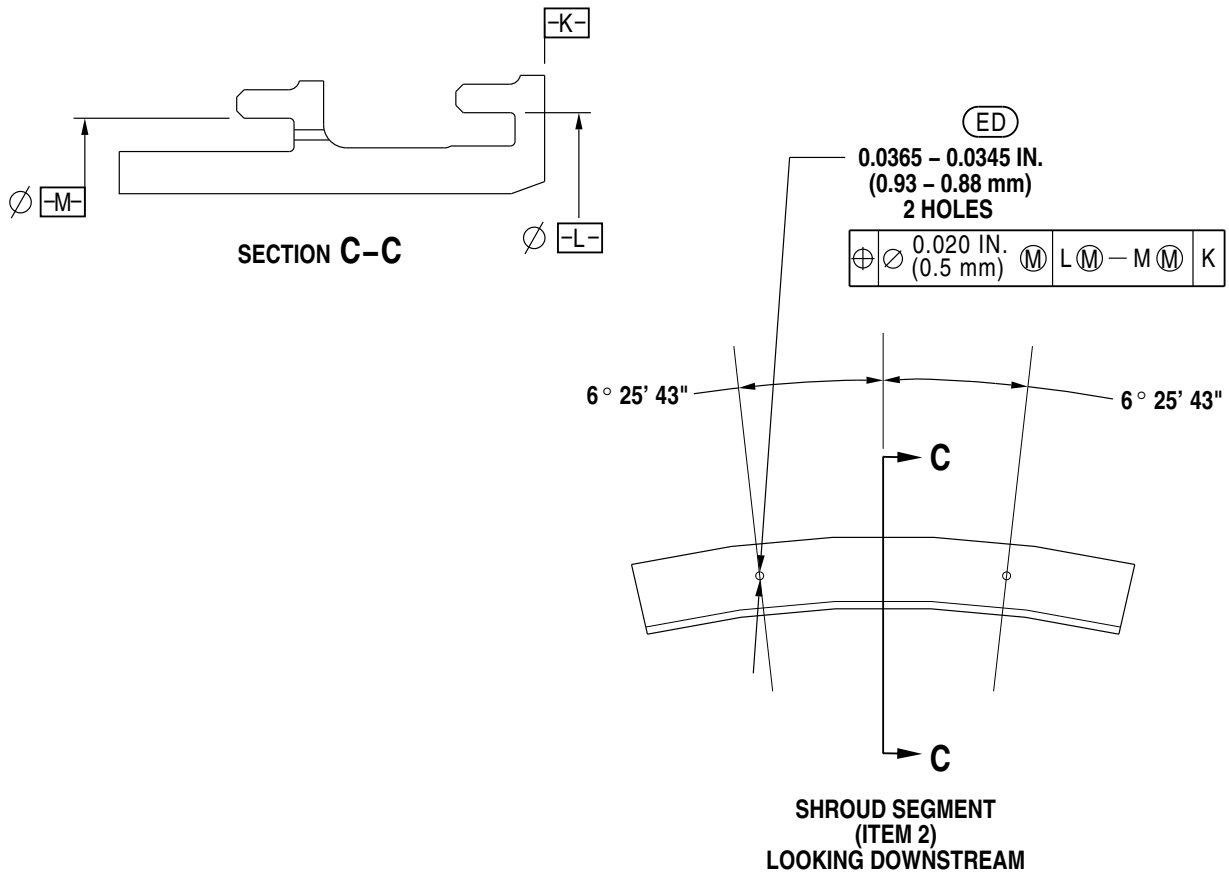
VIEW P
SHOWING ONLY SHROUD HOUSING
AND SHROUD SEGMENT
LOOKING DOWNSTREAM



VIEW S

C183829

Compressor Turbine Shroud Housing Assembly
Figure 2 (Sheet 2)



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Compressor Turbine Shroud Housing Assembly
Figure 2 (Sheet 3)

Key to Figure 2

1 CT Shroud Housing
2 Shroud Segment
3 PT Stator Housing Assy
4 PT Stator Housing

3. Accomplishment Instructions (Cont'd)

(6) With shim stock in position, cure adhesive/sealant 15 minutes at 275°F ± 25°F.

(7) Remove the assembly from the oven and allow to reach room temperature.

(8) Remove shim stock.

E. Install new or modified power turbine stator housing in accordance with the maintenance or overhaul manual instructions as follows:

- Ref. MM 72-50-03 POWER TURBINE INTERSTAGE - MAINTENANCE PRACTICES.
- Ref. OHM 72-50-03 POWER TURBINE HOUSING AND STATORS - SUB-ASSEMBLY.

F. Vane matching:

NOTE: The engine normally requires vanes re-matching following incorporation of this SB. Proper vane matching is to be established such that the engine meet all the test performance and handling criteria as defined in the PT6C-67C Overhaul Manual.

G. Write the accomplishment of P&WC S.B. No. 41057 in the engine module log book.

4. Appendix

A. Refer to Table 1 and Table 2 for Fits and Clearances and Ref. Fig. 3.

4. Appendix (Cont'd)

TABLE 1, Fits and Clearances

REF. NO.	IFR	Name	Dim. for Ref. inches (mm) Min.	Dim. for Ref. inches (mm) Max.	Limits inches (mm) Min.	Limits inches (mm) Max.	Limits inches (mm) Replace
Post-SB41057							
546		Blade Turbine (Fit To) (Measured At Blade Leading Edge) Radial Tip Clearance New Prod., (See Note)	0.0295 (0.749) RadialTipClearance	0.0315 (0.800)			
		New Prod Final Build And Service (See Note)	0.0275 (0.699) RadialTipClearance	0.0335 (0.851)			

NOTE: Calculated radial tip clearance is obtained by the following formula: (actual machined shroud diameter - compressor turbine diameter at longest blade) / 2 - 0.0015, where 0.0015 is the average bearing radial play.

B. Fit 546 Cont'd
Green Build

(1) The shroud concentricity relative to engine centerline is to be determined (after shroud machining if necessary) the maximum permissible deviation is 0.003 (0.076) fir.

(2) From the shroud measurements and fixed rotor diameter the average clearance is to be within the limits specified, the shroud segments diameter to be machined if necessary using formula: compressor turbine diameter at longest blade + 0.0640 ± 0.0015.

(3) Radial tip clearance applies with vane ring / shroud assembly mounted in gas generator, rotor installed and loaded radially to remove bearing play and produce smallest gap. Maximum bearing play not to exceed internal radial clearance of bearing. Over max conditions up to 0.001 in. (0.0254 mm) beyond the limits specified are acceptable over an arc of 30 degrees or accumulative equivalent.

C. Fit 546 Cont'd
FINAL BUILD AND SERVICE

4. Appendix (Cont'd)

(1) The shroud concentricity relative to engine center line is to be determined with C/T Vane Ring & Shroud Assy mounted in gas generator. The maximum permissible deviation is 0.005 fir, machine if necessary.

(2) Measure radial tip clearances over each blade with feeler gages. Clearance to be within final build and service limits. If not shroud segments are to be replaced or ground per (Step 4).

(3) Radial tip clearance applies with vane ring / shroud assembly mounted in gas generator, rotor installed and loaded radially to remove bearing play and produce smallest gap. Maximum bearing play not to exceed internal radial clearance of bearing. Over max conditions up to 0.001 in. (0.0254 mm) beyond the limits specified are acceptable over an arc of 30 degrees or accumulative equivalent.

(4) Machine shrouds if necessary to produce clearances within final build limits using formula: compressor turbine diameter at longest blade + 0.0640 ± 0.0015.

TABLE 2, Fits and Clearances

REF. NO.	IFR	Name	Dim. for Ref. inches (mm) Min.	Dim. for Ref. inches (mm) Max.	Limits inches (mm) Min.	Limits inches (mm) Max.	Limits inches (mm) Replace
Post-SB41057							
590		Shroud Segment, Compressor Compressor Turbine Stator step gap has to be included between 0.0305 in.(0.775 mm) (positive step) & 0.0875 in. (2.223 mm) (positive step)					

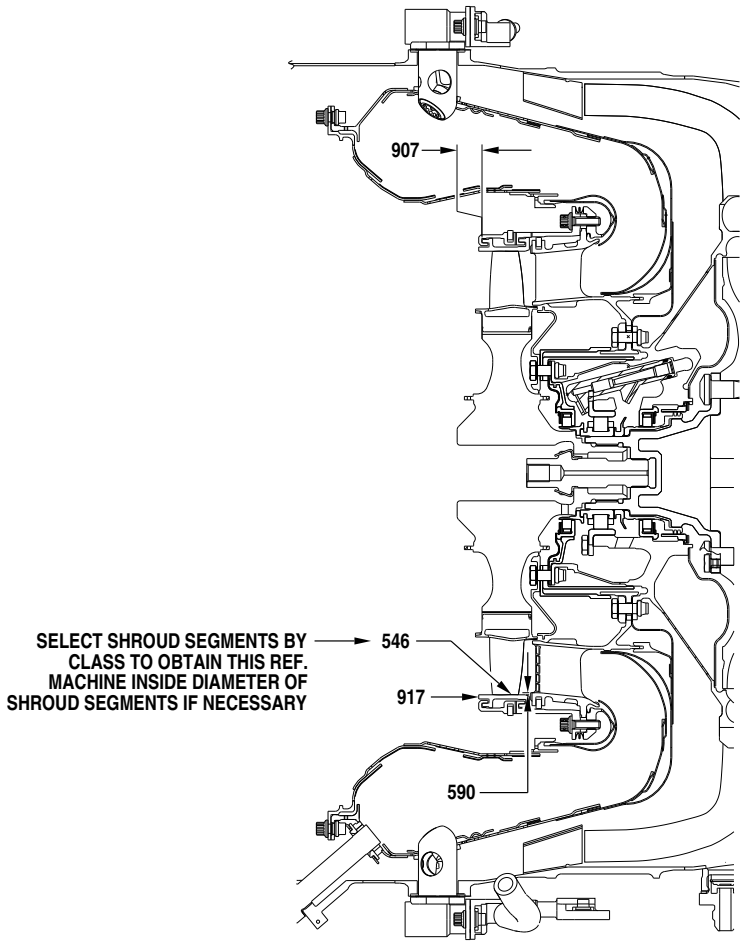
4. Appendix (Cont'd)

D. Refer to Table 3 for Special Assembly Requirements and Ref. Fig. 3.

TABLE 3, Special Assembly Requirements

REF. NO.	IFR	Nomenclature	Limits Min.	Limits Max.	Replace
Post-SB41057					
907		Axial gap between housing, Compressor Turbine Shroud and Shroud Segment.	0.0200 L (0.508)L	0.0300 L (0.762)L	
Post-SB41057					
910		Gap between each shroud segment, applicable when the shroud segments are loaded inward	0.0105 (0.267)	0.0145 (0.368)	
Post-SB41057					
917		Center line of one shroud-segment must be lined up with "x" mark on Housing, Compressor Turbine Shroud within ± 0.100.			

TURBOSHAFT ENGINE
SHROUD HOUSING, COMPRESSOR TURBINE - REPLACEMENT/MODIFICATION OF



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Special Assembly Requirements
Figure 3