VENDOR SERVICE PUBLICATION

TO: All Piper International Distributors, Domestic Sales Dealers, Factory Direct Dealers, Parts Distributors, and Piper Field Service Facilities

SUBJECT: Fuel Nozzle Adaptor and Sheath Distortion

PURPOSE: To distribute the attached United Technologies Pratt & Whitney Canada Alert Service Information Letter 1043, 3033, 4023, 5034, 9002, 10002, 11020, 12027, 13028, and 14011 to all Piper International Distributors, Domestic Sales Dealers, Factory Direct Dealers, Parts Distributors, and Piper Field Service Facilities.

The attached Service Information Letter may affect the engines used on Piper Aircraft models listed below. Refer to the publication for specific details.

Aircraft Models:

PA-31T Cheyenne/Cheyenne II
PA-31T Cheyenne I/Cheyenne IA
PA-31T2 Cheyenne IIXL
PA-31T3 T-1040
PA-42 Cheyenne III
PA-42-720 Cheyenne IIIA
PA-42-720R Cheyenne

UNITED TECHNOLOGIES PRATT & WHITNEY CANADA

S.I.L. NO. 1043
3033
4023
5034
9002
10002
11020
12027
13028
14011

-ALERT-

SERVICE INFORMATION LETTER

Subject: Fuel Nozzle Adapter and Sheath Distortion

Applicability: All PT6 Engines

During an in-house investigation of a PT6A-65B engine for an unrelated defect it was noted that the hot section of this engine was in a deteriorated condition and heavily carbonized. In several fuel nozzle sheaths, the nozzle tips were offset to one side and some were actually interfering with the side of the holes in the sheaths. In addition, this set of nozzles was difficult to remove from the engine. There was also evidence of serious air leakage at the nozzle locations.

Due to the seriousness of the discrepancy inadvertently found, an investigation was made to evaluate the effect of such distortions. The assembly of the nozzle and components were tested in our experimental burner rig. The results showed that the engine combustion radial temperature distribution was disrupted and gas temperatures near the compressor turbine blade tip and shroud segments were much hotter than normal. The effect of combustion temperature distribution circumferentially was to adversely raise peak temperatures by up to 200°F. As expected the distorted fuel nozzle/sheath showed excessive streaking, drooling and spitting. The obvious conclusion was that the advanced hot section distress on this engine was caused by the use of these distorted nozzle/sheaths.

The mislocation of the nozzle tip to one side of the hole in the sheath, caused the cooling airflow around the spray tips to be disrupted. This disruption of cooling airflow apparently also affected the fuel spray and flame patterns.

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This Service Information Letter is valid for one year from date of issue.

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All of these effects culminated in a poor combustion profile with adverse temperature distribution which subsequently resulted in advanced hot section deterioration.

The inspected nozzle adapter/sheaths exhibited bowed flanges and locating pins that were skewed. From the aforementioned appearances, these nozzle adapter/sheaths had, during their previous service lives been serviced without due respect for their close tolerance fit and flatness requirements.

This Alert S.I.L. is issued to request operators to perform simple mechanical checks at their next fuel nozzle installation and cultivate a habit of performing the following checks in all nozzle installations.

A. Refer to Figure 1. With the nozzle adapter and sheath pressed together by hand and the pin engaged, check the clearance between the adapter and sheath all around with a feeler gage. Maximum gap is 0.003". A larger gap suggests that one or the other part is distorted and should be replaced.

B. With the nozzle adapter and sheath assembled together, carefully check the clearance around the fuel nozzle tip with the side of the hole in the sheath, this clearance must not be less than 0.020". Refer to Figure 1. The shank of a No.76 drill (0.020" dia) may be used for this purpose. If the clearance is less than this value at any point or if the drill could not be passed completely around the nozzle tip, determine by substitution which is the distorted part and discard.

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C. When adapter and sheath are bolted to the gas generator case, it should not be possible to insert a 0.001" feeler gage between the two flanges.

Service Centers performing PT6 fuel nozzle servicing for operators should devise tooling and processes to comply with these checks so that distorted nozzle/adapter/sheaths are not released to operators.

The above procedures will be incorporated into relevant Maintenance Manuals at the next revision.

Yours truly,

PRATT & WHITNEY CANADA INC.

K. Soo
Manager, Technical Support
Large PT6 Engines

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Attch. Figure 1