



# Mandatory Service Bulletin

## ENGINE COMPONENTS, INC.

S.B. No.: **03-7**

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**Title: CYLINDER REPLACEMENT**

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*Technical Portions are FAA DER Approved.*

- 1.0 SCOPE AND APPLICATION:** This Mandatory Service Bulletin requires the replacement of a block of cylinders Part Number AEC631397 manufactured by ECi and installed at the **Number 6** position on **TSIO-520 CE, NB, VB or WB** engines of **325** horsepower and more.
- 2.0 INTRODUCTION:** This Mandatory Service Bulletin alerts you, an owner or operator of Teledyne Continental TSIO-520 engines rated at 325 horsepower and above and Repair Stations, FBO's and FSDO's to replace certain cylinder assemblies manufactured by Engine Components, Inc. (ECi), under license from the PMA holder Airmotive Engineering Corporation (AEC). This Mandatory Service Bulletin is limited to ECi cylinders with heads that were processed by ECi during the period of September 1, 2002 through April 21, 2003. This Mandatory Service Bulletin is further limited to those cylinders installed at the Number 6 position (Left front as viewed from the back). The Number 6 cylinder in these installations and operations has the highest differential temperatures resulting in the highest residual stresses. The replacement of the cylinders is required to replace the repeated inspection requirements established in the initial release of this service bulletin.
- 3.0 BACKGROUND:** The FAA has received reports of 18 cracked Parts Manufacturing Approval (PMA) ECi cylinder heads installed at the Number 6 position on Teledyne Continental TSIO-520-CE, NB, VB and WB engines rated at 325 through 335 horsepower. The cracks are located on the cylinder head between the ninth and tenth cylinder head fins from the head/barrel junction, with cracks starting on the exhaust side of the head.

Investigation of these cylinders by the ECi metallurgical laboratory has revealed that occasional and sporadic deviations from the approved cylinder head heat treatment procedure before the April 2003 time frame are the cause for these cracks. The heat treatment processing deviation involved a shortening of the time frame for artificial aging (heating) the cylinders after solution heat treatment. This left some of these cylinder heads harder and less ductile than the ECi specifications.

The metallurgy of the cylinder heads manufactured by ECi is such that natural aging can occur during operation if the cylinders are not completely artificially aged during the fabrication process. All of the cylinder cracks occurred relatively early in the operating life of the engines, and testing has shown that they were still above hardness values specified.

Natural aging to the appropriate hardness and ductility will occur during operation. However, the number of operating hours required to optimize the ductility has not been quantified. Additionally, the stress level in the other cylinder positions does not appear to create cylinder cracking.



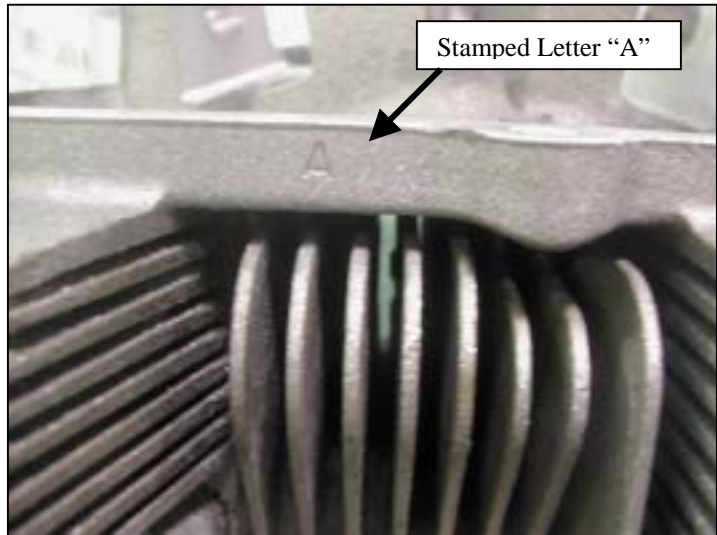
**NOTE: This Mandatory Service Bulletin applies only to cylinders P/N AEC631397 manufactured by ECi between Sept. 1, 2002 and April 21, 2003 and installed on the #6 position on TSIO-520 series engines of 325 HP or higher. These cylinders can be identified by removing the engine cowl and rocker box cover and determining if the logo is as shown in Photograph 1. If the cylinder head has the part number between the logo and rocker box flange and also has the letter “O” below the logo, then inspect the top of the rocker box flange above the logo (view while looking down on the cylinder) and determine if a letter “A” is stamped on the rocker box flange as shown in Photograph 2. If the cylinder head is stamped with the letter “A”, then record this inspection in the engine logs and no further action is required. If there is no letter “A” stamped on the cylinder flange, call ECi Customer Service to Schedule cylinder replacement.**



Photograph 1

**4.0 IMPLEMENTATION:** Engine Components, Inc. requires that at the next maintenance opportunity, but no longer than 25 hours from the date of this bulletin, all owners, operators and repair stations:

- a. Determine that the engine is a TSIO-520 that has been approved for operation at 325 to 335 HP.
- b. Remove the engine upper cowl and release the left side cowl and allow it to hinge down. Remove the rocker box cover from the left front cylinder. Determine if the left front cylinder casting is an ECi Part No. AEC65385 replacement cylinder as shown in Photograph 1. Verify that the cylinder head marking is identical to Photograph 1, with the part number between the ECi logo and the rocker box flange. Also, the letter “O” will be below the logo as shown.



Photograph 2

- c. If the cylinder is identified as an ECi replacement cylinder with the identification shown, then view the rocker box flange from the top of the cylinder. Determine if there is the letter “A” stamped on the rocker box flange as shown in Photograph 2. If the letter “A” is stamped on the rocker box flange, then no further action is required. Record the inspection in the engine logbook and return the airplane to service.



- d. If there is no letter “A” stamped on the cylinder head rocker box flange, then contact ECi Customer Service or your overhaul facility to schedule cylinder replacement at no charge to the owner/operator. ECi will send replacement cylinder assemblies to the owner/operator for change and pay reasonable costs for the cylinder change.
- e. All removed cylinders must be returned to ECi for evaluation. Additionally, please provide details of cracked or broken cylinder heads to the FAA’s Fort Worth Aircraft Certification Office (Mr. Richard Karanian, SW-190, 817-222-5195).
- f. Any alternative method of compliance to this Mandatory Service Bulletin should be evaluated by ECi Engineering before accomplishment. Accordingly, contact ECi Customer Service to schedule consultation with ECi engineers.