



Mandatory Service Bulletin

ENGINE COMPONENTS, INC.

M.S.B. No.: 06-2

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Title: INSPECTION OF 520/550 CYLINDERS

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Revision: 3 (07/22/08)

Technical Portions are FAA DER Approved.

1.0 PURPOSE: To inspect cylinders for cracks which may lead to leaks or loss of compression.

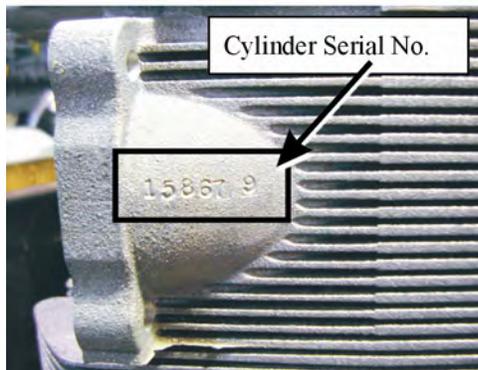
2.0 COMPLIANCE: Initial inspection, as described in section 5.0 below, is required upon reaching 500 operating hours since new. Recurring inspections are required every 50 hours until the cylinders reach TBO. For cylinder assemblies with 500 or more hours-in-service (HIS), the initial inspection is required within the next 10 operating hours.

3.0 MODELS AFFECTED: All new AEC631397 cylinders manufactured with revision D castings produced between September 2002 and November 2005 for installation in IO-520 series, TSIO-520 series (except TSIO/LTSIO-520-AE and TSIO-520-BE), IO-550-A, B, C, D, E, F & L and IOF-550-B, C, D, E, F & L.

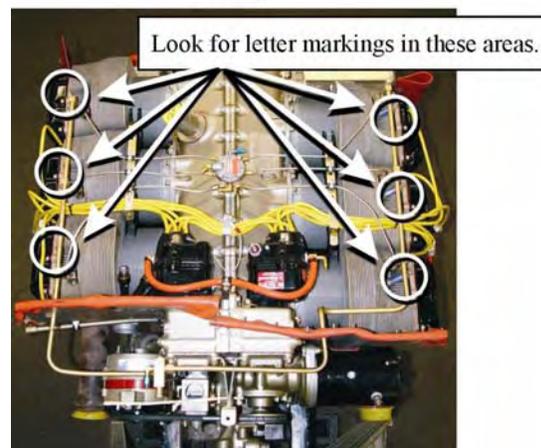
4.0 CYLINDER IDENTIFICATION: To identify the affected cylinders proceed as follows:

- a. Determine if the engine is an IO/TSIO-520 or IO/IOF-550 as described in section 3.0 of this service bulletin.
- b. Inspect the cylinder's serial number. This number is stamped on the outside of the intake port boss (Photograph 1). This serial number will either be a four digit or five digit number followed by a dash and then either a one-digit or two-digit number. If the serial number is below 7709, the cylinders should have been removed from service in accordance with Engine Components, Inc. (ECi®) Mandatory S.B. 04-1 (AD 2004-08-10). If the serial number is between 7709 and 33696, proceed to view the rocker box flange from the top of the cylinder. The general area for the letter markings below the rocker cover flange is shown in photograph 2. **NOTE:** If the serial number cannot be read because of limited visibility, proceed with steps "c", "d" and "e" below to identify cylinder. **DO NOT** remove cylinder for identification purposes.
- c. If there is no letter stamp, or if the letter "E" or **LATER** is stamped, or if the letters "E" **and** "A" are stamped, this S.B. does **not** apply. See photograph 3 titled "Markings for Cylinders NOT Affected".
- d. If the letters "A", "X" or "B" are stamped, this bulletin applies and you should proceed for full identification by removing the rocker covers as detailed in paragraph "e" below. See photograph 4 titled "Markings for Affected Cylinders".
- e. Remove the rocker box covers from the cylinders and determine if the cylinders are made from ECi casting Part Number AEC65385 as shown in Photograph 5. Verify that the cylinder head marking is as shown in either photograph 5 or 6. Note that if the casting part number is followed by the letter "E" or **LATER** inside the rocker cover as shown in photograph 7, this bulletin does **NOT** apply.

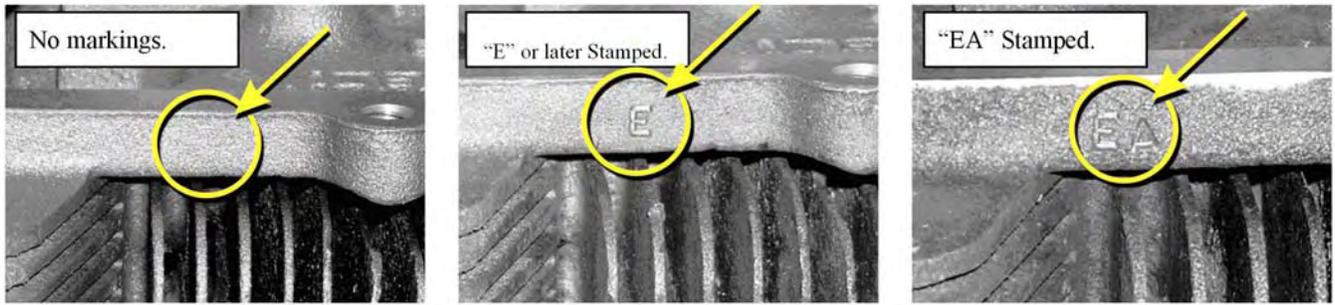
Photograph 1



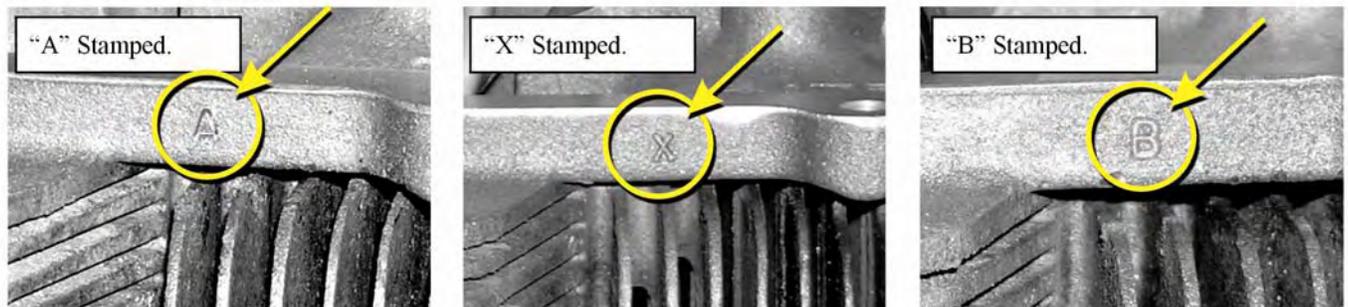
Photograph 2



Photograph 3: Markings for Cylinder NOT Affected



Photograph 4: Markings for Affected Cylinders



Photograph 5
No raised cast letter after casting part number, SB applies.



Photograph 6
Hexagonal inspection stamp (typical), SB applies.



Photograph 7
Casting part number followed by "E", this SB does NOT apply.



5.0 INSPECTION: Each inspection must include the following procedures which will help identify either internal or external structural discrepancies that are either present or in the process of developing in the cylinder. These inspection procedures include a visual inspection, a compression check and a leak check.

- A. Visual Inspection.** An external inspection of each cylinder assembly will help identify conditions that could develop to the point of adversely affecting the airworthiness of the cylinder. Remove the cowling and with the aid of a flashlight, inspect the deep finned side of the cylinder head and between adjacent cylinders to ensure that there is no powder residue that may be deposited by combustion gases leaking through from the combustion chamber. Inspect intake and exhaust ports, top and bottom spark plug bosses and the fuel injector boss. Inspect for cracks, exhaust leaks or any signs of oil leaks, fuel or any conditions that may indicate the presence of a crack. The primary focus of this inspection should be around the 17th fin from the bottom of the head on the exhaust side of the cylinder as shown in Photograph 8. If any of the conditions described above are present, refer to Table 1 in Section 6.0 for repair or replacement instructions.
- B. Compression Check.** Cylinder assemblies should undergo a differential pressure test in accordance with the procedures outlined in the latest revision of TCM Service Bulletin 03-3. Following this procedure will be of assistance in making an early identification of internal conditions which may affect the airworthiness of each cylinder.
- C. Soap Bubble Leak Check.** This simple test serves as a reliable verification method to the visual test described in part A above. The procedure involves pressurizing the cylinder to 5 PSI and positioning the piston as close to BDC on the compression stroke as possible while ensuring that the intake valve remains closed to maintain compression. The pressure is gradually raised to 80 PSI and then the cylinder head and barrel areas are saturated with mixed soap and water. The complete cylinder is then inspected for leaks which are indicated by an accumulation of bubbles. A mixture of 1-5% of regular dish soap in water is appropriate for this inspection. Reference TCM SB 96-12.

WARNING

**The propeller must be held stationary while pressurizing the cylinder.
Use extreme caution to prevent injury to personnel or damage to equipment. Leak check
must be performed at BDC to ensure propeller rotation does not result in injury**

6.0 COMPRESSION AND LEAK CHECK TEST RESULTS

Table 1

INSPECTION TYPE	INSPECTION PROCEDURES	INSPECTION FINDINGS	EVALUATION OF FINDINGS	RECOMMENDED ACTION
Visual Inspection	Inspection on exhaust side of cylinder (deep fins) using bright light (see Photograph 8)	No evidence of blow-by or combustion powder	Indicates airworthiness.	Proceed with compression and leak test.
		Whitish powder observed on cylinder head or adjacent cylinder head or evidence of excessive oil seepage at head to barrel juncture	Indicates a combustion leak. Verify not an exhaust gasket leak.	Fix exhaust leak if found. Further testing suggested or remove cylinder for repair if combustion residue found. If only a small amount of oil residue is found at head to barrel juncture, suggest cleaning and inspection after 25 hours of operation.
		Evidence of crack visible between fins	Verify not a casting indication. Otherwise indicates a head crack.	If casting indication, continue inspection. If cracked, remove cylinder for replacement.

Table 1 (continued)

INSPECTION TYPE	INSPECTION PROCEDURES	INSPECTION FINDINGS	EVALUATION OF FINDINGS	RECOMMENDED ACTION
Compression Test	Reference TCM SB03-3 or AC43.13-1B §8-14(b). Insure piston is at top dead center (TDC) position. Use differential pressure tester with .060 inch restrictor orifice. Apply 80 psi input pressure to differential pressure compression tester. As pressure is being applied, rock propeller to seat piston rings at bottom of ring grooves (finish movement to top center with propeller rotating in normal power direction). Warning, if piston is slightly off center or propeller is moved while pressure is applied the propeller can rotate fast enough to cause injury.	Reading is below 60 psi (75% of input pressure) or below the value established using master orifice as depicted in TCM SB03-3.	A compression leak is indicated. High oil consumption or high operating temperatures would indicate further solution required. If the reading is below 60 psi and the air discharge is between the cylinder fins or at the interface of the cylinder head and barrel, remove the cylinder for replacement.	Identify leak source by listening at intake for leaking intake valve, at exhaust for leaking exhaust valve or oil filler opening for worn or broken piston rings. Air leaks may also be found at the spark plug bosses or from a crack in the cylinder head. High oil or cylinder head temperature may indicate excessive blow-by. Continue inspection or remove cylinder for repair.
		Reading is above 60 psi or above the value established using master orifice	The cylinder has acceptable compression. Airworthiness indicated unless experiencing high oil consumption or high operating temperatures.	Airworthiness is indicated. Visual and low pressure testing to verify absence of cracking recommended
Soap Bubble Leak Test	Reference TCM SB 96-12. Position piston at bottom dead center (BDC) of the power stroke. Pressurize cylinder head to 80 psi using the differential compression tester or similar system. Apply 1-5% soapy water to exterior of cylinder head. SAFETY ISSUE: Review procedure on page 3 to prevent possible injury from propeller!	Observe formation of any bubbles on exterior of cylinder head or at head to barrel juncture	Look for bubbles between fins, especially on exhaust side around 17 th fin from bottom (Ref. Photograph 8). Also look for bubbles at spark plug bosses, between fins on top of cylinder head, etc.	Tighten any loose spark plugs or other component if bubbles so indicate. If bubbles are identified coming from any structural area, then remove cylinder for replacement (see photograph 8 below).

7.0 REPAIR OR REPLACEMENT INSTRUCTIONS: If it is determined that cylinders need to be removed for repair or replacement, please contact ECi customer service at 800-324-2359 or 210-820-8101 for a Return Material Authorization (RMA) number. Warranty coverage for replacement cylinders will be provided in accordance with ECi’s published Warranty Policy. All product should be returned to ECi, 9503 Middlex, San Antonio, Texas 78217 on a freight prepaid basis. These inspections will continue until a different FAA approved cylinder assembly is installed.

