



Mandatory Service Bulletin

ENGINE COMPONENTS, INC.

M.S.B. No.: **08-1**

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Title: Cylinder Assembly Inspection, Assembly Removal and Replacement (P/N AEL65102) for Lycoming Parallel Valve Engines

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Technical Portions are FAA DER Approved.

1.0 PURPOSE: This Mandatory Service Bulletin is to alert Engine Components, Inc. (ECi®) customers about possible fatigue cracking and head separations on a specified group of replacement cylinders P/N AEL65102 for Lycoming parallel valve engines. ECi has become aware of a number of cylinders that have fractured at the head to barrel interface. The failure history dictates that two manufacturing groups are to be addressed with two different actions. The first and largest group (Group 'A') requires a periodic inspection/pressure test to insure continued airworthiness. Group 'A' cylinders were produced between August, 2002 and December 2005. The second group (Group 'B') requires a one time inspection and then removal from service at the established operating time. Group 'B' cylinders were produced in December 2005 through February 2006, and require a one time inspection/pressure test, and then must be removed from service when meeting the criteria established in paragraph 4.0 below. Cylinders that are removed may be replaced with ECi cylinders Part Number AEL65102 Serial Numbers 37017 and higher.

2.0 MODELS AFFECTED: The cylinders (P/N AEL65102) that require inspection or removal are FAA PMA replacement cylinders installed in the following Textron Lycoming engines:

O-320-A, -B, -C, -D, -E; IO-320-A, -B, -C, -D, -E, -F; AIO-320-A, -B, -C; LIO-320-B, -C; AEIO-320-D, -E; O-340-A, -B; O-360-A, -B, -C, -D, -F, -G, -J; HO-360-A, -B, -C; IO-360-B, -E, -F, -L, -M; LO-360-A; HIO-360-B, -G; AEIO-360-B, -H; TO-360-A, LTO-360-A; O-540-A, -B, -D, -E, -F, -G, -H, -J, -L; IO-540-C, -D, -N, -R, -T, -V, -W; TIO-540-C, -E, -G, -H, -AA, -AB, -AF, -AG, -AK; AEIO-540-D; LTIO-540-K

This bulletin does not apply to Lycoming cylinders repaired or overhauled at Engine Components, Inc. including cylinders fitted with new FAA-PMA Barrels.

3.0 INSPECTION AND PRESSURE TEST:

Table 1 – GROUP 'A' and 'B' CYLINDER INSPECTION

INSPECTION TYPE	INSPECTION PROCEDURES	INSPECTION FINDINGS	EVALUATION OF FINDINGS	RECOMMENDED ACTION
Visual Inspection	Inspection of exhaust side of cylinder (deep fins) using bright light (see Photo 2)	No Evidence of combustion products	Indicates airworthiness	Proceed with compression test (paragraph 3.3)
		Whitish powder observed on cylinder head or adjacent cylinder	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.
		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 2 – GROUP 'A' and 'B' PRESSURE TESTING

INSPECTION TYPE	INSPECTION PROCEDURES	INSPECTION FINDINGS	EVALUATION OF FINDINGS	RECOMMENDED ACTION
Compression Test	Differential pressure test according to AC 43.13-1B paragraph 8-14	Readings are 70/80 or above	Indicates airworthy cylinders	Return aircraft to service
		Readings are between 60/80 and 70/80	Leakage at rings or valves	Determine airworthiness i.a.w. AC 43.13-1B
			No excessive ring or valve leakage	Perform soap bubble test (paragraph 3.4)

		Readings are below 60/80	Marginal airworthiness	Determine cause of low readings
Soap Bubble Test	Rotate Propeller to BDC of cylinder and apply 5 psi. Verify valves closed and raise pressure to 80 psi and apply soapy water.	No Bubbles	Indicates no cracks	Return to service
		Bubbles observed between fins	Indicates a cracked Cylinder head	Remove cylinder for replacement

3.1 Group “A” Time in Service: The Group “A” inspection/compression test described below is required after the cylinders have reached 350 operating hours. The initial visual inspection and compression test for cylinder assemblies with more than 350 operating hours are to be completed within 10 hours of operation after receipt of this MSB. Group “A” cylinder assemblies may be operated to their full 2000 hour TBO for airplanes, and should be replaced within 25 hours of reaching TBO. Group “A” cylinder assemblies installed on helicopters should be replaced within 25 hours after reaching 1500 operating hours. Cylinders that are removed may be replaced with ECi cylinders Part Number AEL65102 Serial Numbers 37017 and higher.

3.2 Visual Inspection: An external inspection of each cylinder assembly will help identify conditions that could develop to adversely affect the airworthiness of the cylinder. With the cowling removed, and with the aid of a flashlight, inspect the deep finned side of the cylinder heads 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 for cracks, exhaust leaks or any signs of oil leaks, fuel or any conditions that may indicate the presence of a crack. During the visual inspection, check the general appearance of the cylinder to determine if the cylinder head is operating normally, or whether there could be some high temperature issues. Tale-tell signs of high temperature operation include the appearance of carbonized oil and dark stains around the exhaust valve spring pocket area, and the loss of paint around the spark plug and exhaust port area as shown in Photo 1. If these conditions are found during inspection even without indications of leakage, contact the ECi Customer Service Department and describe the extent of the evidence of high temperature operation. Digital photographs can be emailed to the Customer Service representative to assist ECi and Airmotive Engineering Corp. evaluate the situation.

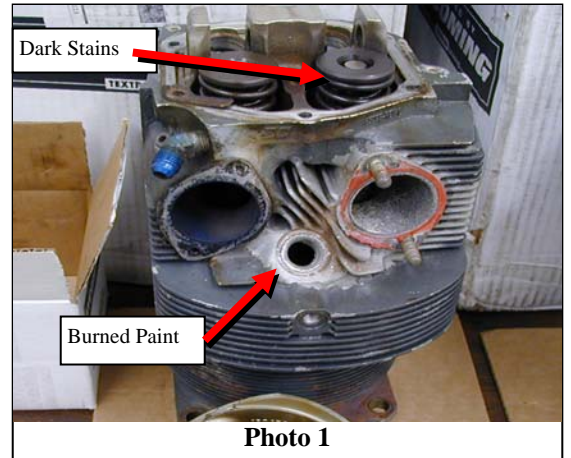


Photo 1

3.3 Compression Test: AEL65102 Cylinder Assemblies produced from August 2002 to December 2005 are identified in accordance with Photo 3 and Photo 4 and as delineated in § 7.0 in this MSB, a periodic (50 hours) compression test must be accomplished in accordance with AC 43.13-1B § 8-14. If the compression reading is 80/70 (80 psi input and 70 psi between .040 orifice and cylinder) or better, then no further inspections are required. If the compression reading is below 80 over 70, and the cause is not obvious leakage past the rings (blow-by heard through oil level gage tube) or valves (blow-by heard in engine air intake or exhaust), then the soap bubble test described in paragraph 3.4 below should be accomplished.

3.4 Soap Bubble Leak Check: The soap bubble leak check should be accomplished if the compression test accomplished in paragraph 3.3 above results in a reading of less than 80/70 and there is no obvious significant leakage past rings or valves. This simple test (Photo 2) 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. This technique reduces the



Photo 2

possibility of a rotating propeller causing a hazard. 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 leakage which is indicated by an accumulation of bubbles. A mixture of 1-5% of regular dish soap in water is appropriate for this inspection. Leakage, if present, usually starts on the exhaust side of the head where the fins are the longest. The presence of white powder around the fin area might also indicate the presence of a crack, and is cause for cylinder removal.

4.0 GROUP 'B' INSPECTION/REPLACEMENT:

Group 'B' cylinder assemblies are identified by reference to Photo 3 and Photo 4, and are listed in § 8.0 in this MSB. Cylinder assemblies in this group must be inspected/compression tested according to §3.2 through 3.4 time within 10 hours operating time from receipt of this MSB, and may continue in service until reaching 350 operating hours. Cylinder assemblies that have reached 350 hours operating time must be removed within 25 operating hours. Cylinders that are removed may be replaced with ECi cylinders Part Number AEL65102 Serial Numbers 37017 and higher.

5.0 CYLINDER IDENTIFICATION:

The identification of the affected cylinders is accomplished as follows:
Verify the engine that the suspect cylinder assemblies are installed on is a parallel valve Lycoming 320, 360 or 540 series engines.

- 5.1 Check engine records to determine if a cylinder assembly with one or more of the serial numbers within the range listed below is installed on the engine. If so, then proceed to paragraph 5.2. If not, no further action is required.
- 5.2 Verify which cylinder(s) have serial number(s) that match any of the serial numbers listed in this Service Bulletin. The cylinder serial number can be found on the flat surface on the outside of the cylinder intake port as shown in Photo 3.
- 5.3 Further identification of the cylinders can be seen in Photo 4 showing the Oberdorfer Logo, the ECi logo and casting number AEL85099.

NOTE: The intake port side of the cylinder is distinguished by shallow fins. The exhaust side has deeper fins for added cooling.

6.0 PROCEDURES TO BE FOLLOWED:

Replacement cylinders will be sent in accordance to ECi's written warranty policy. If you have an affected cylinder(s), go to ECi's website <http://www.eci.aero/pages/services.aspx> and complete the Warranty Application Form (T800.1) ([http://www.eci.aero/pages/WarrantyApplicationT800.1\(03-13-08\).doc](http://www.eci.aero/pages/WarrantyApplicationT800.1(03-13-08).doc)) online. In order to properly complete the form you must have the cylinder part number, serial number and time in service. If you have any questions you may call us at either 1-800-324-2359 or 210-820-8101 or, if you prefer, you may e-mail us at MSB08-1@eci.aero.

7.0 GROUP 'A' AFFECTED SERIAL NUMBERS:

Group 'A' cylinders that require inspection or replacement are included in serial numbers 1138-02 through 35171-22, which are part of Group 'B' (refer to paragraphs 8.0 and 8.1). These cylinders were produced between August 2002 and December 5, 2005. Note that this range of serial numbers includes other products that are not subject to this inspection. Only cylinders identified in accordance with paragraphs above and with serial numbers within this range are affected.

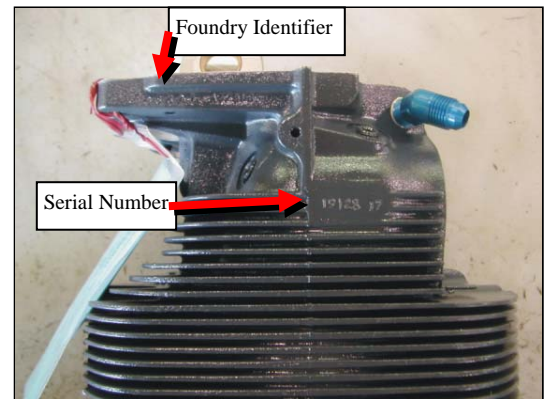


Photo 3

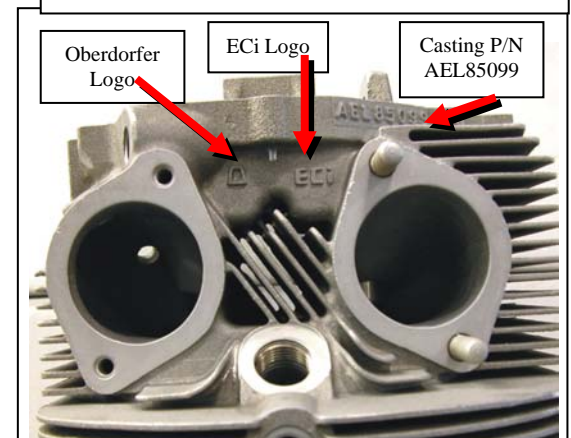


Photo 4

Other identifying features
(in addition to serial number)



8.0 GROUP 'B' AFFECTED SERIAL NUMBERS:

Group "B" cylinders that require a one time inspection and an operating time dictated removal in accordance with stipulations identified in 4.0 above are included in section 8.1 below. These cylinders were produced between Dec. 6, 2005 and Feb. 7, 2006. As detailed in paragraph 4.0, this range of serial numbers includes other products, and only cylinder assemblies meeting the requirements established in Paragraph 4.0 are listed in Section 8.1.

8.1 SERIAL NUMBERS: Refer to Photo 3 for the location of the serial number.

Table with 10 columns of serial numbers ranging from 35239-11 to 35368-02.



Cylinder Assembly Inspection, Assembly Removal and Replacement (P/N AEL65102) for Lycoming Parallel Valve Engines

35824-27	35889-27	35933-28	36188-04	36246-08	36317-07	36407-18	36460-29	36510-28	36602-27
35824-28	35889-28	35933-29	36188-05	36246-09	36317-08	36407-19	36460-30	36510-29	36602-28
35824-29	35889-29	35934-01	36188-06	36246-10	36317-09	36407-21	36508-01	36510-30	36602-29
35824-30	35889-30	35934-02	36188-08	36246-11	36317-11	36407-22	36508-02	36530-01	36602-30
35888-01	35930-01	35934-03	36188-09	36246-12	36317-12	36407-23	36508-03	36530-03	36643-03
35888-02	35930-03	35934-04	36188-11	36246-13	36317-13	36407-25	36508-04	36530-05	36643-04
35888-03	35930-04	35934-06	36188-12	36246-14	36317-14	36407-26	36508-05	36530-06	36643-08
35888-04	35930-05	35934-07	36188-14	36246-15	36317-15	36407-27	36508-06	36530-07	36643-09
35888-05	35930-07	35934-08	36188-15	36246-16	36317-16	36407-29	36508-07	36530-10	36643-10
35888-06	35930-08	35934-09	36188-16	36246-17	36317-17	36455-01	36508-08	36530-12	36643-11
35888-07	35930-09	35934-10	36188-18	36246-18	36317-18	36455-02	36508-09	36530-15	36643-12
35888-08	35930-10	35934-11	36188-19	36246-19	36317-19	36455-03	36508-10	36530-16	36643-13
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35888-17	35930-17	35989-06	36188-27	36246-26	36317-26	36455-10	36508-18	36530-24	36643-30
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**Cylinder Assembly Inspection, Assembly Removal and Replacement
(P/N AEL65102) for Lycoming Parallel Valve Engines**

36758-09	36779-16	36811-06	36811-26	36841-05	36841-27	36882-17	36894-11	36924-19	36993-22
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9.0 ECi CONTACT INFORMATION:

Contact ECi Customer Service at (toll free) 1-800-324-2359, (local) 210-820-8101 or (email) MSB08-1@eci.aero.