



Mandatory Service Bulletin

For Engines On Experimental Aircraft

Title: **Cylinder Assembly Safety Rework Program**

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Technical portions are approved by Airmotive Engineering Corp.



- 1.0 SUBJECT: Cylinder rework to improve fatigue properties: This rework is applicable only to cylinders that are installed on aircraft issued Airworthiness Certificates under 14CFR Part 21.191 (Experimental Certificates).
- 2.0 AFFECTED CYLINDERS: AEL85101, AEL85102, or AEL65102 cylinders that have the Serial Numbers 1138-02 through 42179-30.
- 3.0 BACKGROUND: A randomly occurring cylinder manufacturing and assembly condition has been identified that results in lower fatigue strength of the cylinder head at the junction of the head and barrel. This condition has resulted in the fatigue fracture of a small number of AEL65102, AEL85101, and AEL85102 cylinder assemblies.

Using time tested techniques that are part of the rebarreling process, a sampling of cylinders from the affected group were disassembled and the head-to-barrel interface was inspected. When a less than optimal condition was found, the head-to-barrel interface was reworked to its optimal configuration. The cylinders were reassembled and tested to failure. All cylinders subjected to this safety rework program exceeded the minimum endurance cycles suggested in AC 33.19-1.

- 4.0 REWORK PROGRAM: A cylinder rework program is available for cylinder Serial Numbers identified in § 2.0 above. This rework program is applicable **only** to cylinder assemblies installed on aircraft certified under 14CFR Part 21.191 (Experimental Aircraft). Testing has been accomplished that demonstrates a significant improvement in cylinder head fatigue life. Rework to the optimum configuration is being offered to improve the safety of installed cylinders. Cylinders returned to Engine Components, Inc. under this program should be shipped with valves, pistons, and rings installed. Rocker arms and rocker shafts should not be shipped.

Cylinder assemblies that are returned to ECi and meet the requirements of this program but, upon inspection, can not be reworked to a safe configuration will be replaced with another cylinder assembly that meets the safety requirements.



WARNING

Regardless of cylinder head-to-barrel interface parameters, excessive cylinder head temperature can result in cylinder head fatigue failure at the critical interface area. The enhanced interface parameters significantly improve the structural integrity, but this enhancement can be overcome by excessive temperatures. Another issue is that excessive blow-by past the piston rings does adversely affect cylinder temperatures, which can adversely affect the head-to-barrel interface. This blow-by can be caused by improper break-in or other operating anomaly.

ECi strongly recommends that cylinder removal and, more importantly, reinstallation be accomplished by individuals with skills equivalent to a FAA Licensed Powerplant Mechanic that has been trained in cylinder removal and replacement. Additionally, break-in must be carefully accomplished and verified before releasing the airplane for normal operations. For break-in on the airplane, ECi strongly recommends the use of a cooling shroud (consult break-in instructions available through the ECi web site).

- 5.0 ECi CUSTOMER SERVICE: ECi requests that customers that wish to participate in this safety rework program contact ECi Customer Service at (210) 820-8101. Cylinders returned after rework will be accompanied by a tag that documents that the cylinder assembly has been subjected to the safety inspection and rework process and is eligible for return to service in Experimental Aircraft.
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