March 21, 2022

Jim Grigg
Manager, Fort Worth ACO Branch
Compliance & Airworthiness Division
Aircraft Certification Service
Federal Aviation Administration
10101 Hillwood Pkwy
Fort Worth, TX 76177

RE: Request for Global AMOC to Airworthiness Directive (AD) 2014-05-29: Continental Motors, Inc. Reciprocating Engines with Superior Air Parts, Inc. (SAP) Cylinder Assemblies Installed

Dear Mr. Grigg,

The Aircraft Owners and Pilots Association (AOPA) and Superior Air Parts, Inc. (SAP) jointly and respectively request the following Global Alternative Method of Compliance (AMOC) to Airworthiness Directive (AD) 2014-05-29.

REQUEST

AOPA and SAP hereby request approval of a Global AMOC that replaces paragraph (i)(2) of the AD with the following alternative paragraph:

(2) When the cylinder reaches 24 calendar years-since-installation.

SAFETY

The requested global AMOC does not change any of the previous compliance actions, required by both the AD and initial AMOC, but extends the calendar limit to 24 years time-in-service (TIS).

AOPA and SAP strongly contend that the mitigations of visual inspections, compression checks, leak checks, and borescope inspections have, and will continue to, adequately address and mitigate the airworthiness concern in which the AD was issued to correct.

Concerns of corrosion will continue to be mitigated through both a compression check and borescope inspection of each cylinder, performed per Continental Motors Service Bulletins, at 50-hour intervals or annually, whichever comes first. Cylinder corrosion is typically first identified by low compression – tested by the compression check. That test, coupled with a borescope inspection, visual inspection, leak check, and required replacement if any abnormality, damage or corrosion is observed should, in our opinion, verify the condition of the cylinder and ensure corrosion is not a concern.

We are unaware of a single incident or accident, resulting from cylinder head separation which has occurred since the AD was issued and/or AMOC granted. Yet we have members/customers with aircraft, that have complied with and passed all checks and inspections, resulting in a safe, healthy, and airworthy engine. But, the very next day, initially due to the 12-year, 17-year, 19-year, and current 21 calendar year limit, are deemed unairworthy and would be forced to pull and replace all cylinders at significant cost.

BACKGROUND

The FAA originally proposed the AD in April 2008, calling for initial and repetitive inspections and compression tests to detect cracks in cylinders with more than 750 flight hours (TIS). The terminating action for the proposed AD was to replace the cylinders that have accumulated or exceeded their respective time-before-overhaul (TBO) TIS flight hours. There was no mention of a calendar year terminating action in the NPRM.

Subsequently, in September 2013, the FAA proposed to supersede the previous AD, since the agency "became aware of additional engines that need to be added to the applicability." The new proposed AD listed four "actions since existing AD was issued" and provided rationale for each of the proposed changes. However, under paragraph (i), the NPRM added, with no comment or justification, a second terminating action of replacing SAP cylinder assemblies "when the cylinder reaches 12 calendar years-since-installation" to the original action of when they reach TBO.

The FAA's own AD manual instructs the agency to use calendar times when the agency "can establish a direct relationship between calendar time and airworthiness" and is most often used in cases of corrosion. The NPRM received two comments, requesting removal of the 12-year limitation but were subsequently rejected in the Final Rule which noted that the "12-year calendar requirement is due to the increased risk of environmental corrosion, a corresponding increase in potential for metal fatigue cracks, and the subsequent separation of the cylinder assemblies. The type certificate holder [Continental Motors, Inc.] recommends removal and replacement of the cylinders no later than 12 years from date placed in service." No data and no direct relationship between the new calendar terminating action and airworthiness was provided.

INITIAL AMOC REQUEST AND SUBSEQUANT APPROVALS

In early 2014, AOPA began to hear from members who had aircraft with affected cylinders. They had relatively low hours accumulated but were effectively grounded due to the new 12-year terminating action. Working with SAP, an AMOC was submitted and subsequently granted with the following compliance requirements –

> **Compliance:** Upon reaching 12 calendar years TIS, but less than the published engine model hourly Time in Service, perform the following tests and inspections at 50 hour intervals or annually, whichever comes first. Upon reaching 17 years TIS, the remaining affected cylinders must be replaced.
>
> 1. Visually inspect each affected cylinder assembly per CMI Service Bulletin No. SB96-12, dated September 10, 1996, Part I, Section A, Paragraph (a) cylinder barrel and (b) cylinder head.
>   a. Comply with CMI Service Bulletin No. SM96-12, Table 1.
>   b. Any abnormality or damage Identified in Table I requires cylinder removed from service.
> 2. Compression Check each cylinder per CMI Service Bulletin No. SB96-12, dated September 10, 1996, Part I, Section B.
>   a. Refer to CMI Service Bulletin SB03-3, dated March 28, 2003, Section B for detailed instruction for the Cylinder Differential Pressure Test.
>   b. Warning: It will be necessary to hold the propeller stationary while pressure is applied to the cylinder. Use extreme caution to prevent injury to personnel or damage to equipment.
> 3. Leak check each affected cylinder assembly per CMI Service Bulletin No. SB96-12, dated September 10, 1996, Part I, Section C.

a. Note It is recommended that the aircraft is operated on the ground rather than flying for purposes of this Service Bulletin. After the engine has been brought to operating temperature via ground run and shut down, allow 30 minutes, but less than 90 minutes to elapse before proceeding (this step is necessary to ensure that the cylinders are not so hot that the soap/water solution used is not evaporated away before bubbling can occur).
b. Warning: It will be necessary to hold the propeller stationary while pressure is applied to the cylinder. Use extreme caution to prevent injury to personnel or damage to equipment.

4. Perform a borescope inspection per CMI Service Bulletin No. SB03-3, dated March 28, 2003, Section C. Comply with all replacement instructions. Any abnormality noted identified in Table 2 requires cylinder removed from service. Any observation of heavy corrosion on a cylinder wall will also require that the cylinder be replaced.

In late 2018, AOPA and SAP made a request to approve a Global AMOC that would extend the calendar limit by an additional five years, from 17 years to 22 years TIS. This request was partially approved to 19 years TIS due to a lack of substantiating data.

In early 2020, AOPA and SAP made another request to approve a Global AMOC that would extend the calendar limit by an additional two years, from 19 to 21 years TIS. This extension was approved on April 7, 2020.

CONCLUSION

This requested global AMOC does not change any of the above compliance actions, it only changes the calendar limit by extending it an additional three years, requiring replacement of the affected cylinders upon reaching 24 years TIS. The data and safety rationale to extend the calendar limit remains the same.

This request, if granted, would avoid the unnecessary risk, introduced by prematurely replacing those cylinders, save over $10,000 per engine, and, most importantly, maintain an equivalent level of safety through continuation of the required inspections and checks.

Thank you, in advance, for your timely consideration of this request.

Sincerely,

Christopher Cooper
Senior Director, Regulatory Affairs
Aircraft Owners & Pilots Association

Keith Chatten
Chief Executive Officer
Superior Air Parts, Inc.

cc: Justin Carter, FAA
Jonas Perez, FAA
Keith Chatten, Superior Air Parts
Bill Ross, Superior Air Parts
Murray Huling, AOPA