

[4910-13-U]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39 [64 FR 49961 No. 178 09/15/99]

[Docket No. 99-NE-28-AD; Amendment 39-11290, AD 99-19-01]

RIN 2120-AA64

Airworthiness Directives; Teledyne Continental Motors O-470, IO-470, TSIO-470, IO-520, TSIO-520, LTSIO-520, GTSIO-520, IO-550, TSIO-550, and TSIOL-550 Series Reciprocating Engines

AGENCY: Federal Aviation Administration, DOT.

ACTION: Final rule; request for comments.

SUMMARY: This amendment adopts a new airworthiness directive (AD) that is applicable to Teledyne Continental Motors (TCM) O-470, IO-470, TSIO-470, IO-520, TSIO-520, LTSIO-520, GTSIO-520, IO-550, TSIO-550, and TSIOL-550 series reciprocating engines. This action supersedes priority letter AD 99-09-17 that currently requires a one-time visual and ultrasonic (UT) inspection of the No. 2 and No. 5 crankshaft cheeks for cracks. All crankshafts found with a cracked cheek must be replaced with a serviceable crankshaft prior to further flight. This action adds to the applicability TCM GTSIO-520 series engines and additional engines, identified by serial numbers (S/Ns), of currently affected engine series; references a revised service bulletin that clarifies snap ring installation; increases to 500 hours time-in-service (TIS) the cutoff for engines that require a more immediate inspection; and corrects the contact telephone number for TCM. This amendment is prompted by inspection results from the current priority letter AD. The actions specified by this AD are intended to prevent crankshaft failure due to crankshaft cheek cracks, which could result in total engine power loss, in-flight engine failure, and possible forced landing.

DATES: Effective September 30, 1999.

The incorporation by reference of certain publications listed in the regulations is approved by the Director of the Federal Register as of September 30, 1999.

Comments for inclusion in the Rules Docket must be received on or before November 15, 1999.

ADDRESSES: Submit comments in triplicate to the Federal Aviation Administration (FAA), New England Region, Office of the Regional Counsel, Attention: Rules Docket No. 99-NE-28-AD, 12 New England Executive Park, Burlington, MA 01803-5299. Comments may also be sent via the Internet using the following address: "9-ane-adcomment@faa.gov". Comments sent via the Internet must contain the docket number in the subject line.

The service information referenced in this AD may be obtained from Teledyne Continental Motors, PO Box 90, Mobile, AL 36601; telephone toll free (888) 200-7565. This information may be examined at the FAA, New England Region, Office of the Regional Counsel, 12 New England Executive Park, Burlington, MA; or at the Office of the Federal Register, 800 North Capitol Street, NW, suite 700, Washington, DC.

FOR FURTHER INFORMATION CONTACT: Jerry Robinette, Aerospace Engineer, Atlanta Aircraft Certification Office, FAA, Small Airplane Directorate, One Crown Center, 1895 Phoenix Blvd., Suite 450, Atlanta, GA 30349; telephone (770) 703-6096, fax (770) 703-6097.

SUPPLEMENTARY INFORMATION: On April 22, 1999, the Federal Aviation Administration (FAA) issued priority letter airworthiness directive (AD) 99-09-17, applicable to Teledyne Continental Motors (TCM) O-470, IO-470, TSIO-470, IO-520, TSIO-520, LTSIO-520, IO-550, TSIO-550 and TSIOL-550 series new and rebuilt reciprocating engines, manufactured between January 1, 1998, and December 31, 1998, inclusive, listed by serial number (S/N) in TCM Critical Service Bulletin (CSB) 99-3, dated April 19, 1999, and any other engine from the above series that has had a crankshaft installed that was newly manufactured or rebuilt between January 1, 1998, and December 31, 1998, inclusive. That priority letter AD requires a one-time visual and ultrasonic (UT) inspection of the No. 2 and No. 5 crankshaft cheeks for cracks. All crankshafts found with a cracked cheek must be replaced with a serviceable crankshaft prior to further flight. All inspections must be performed by TCM representatives, since it is a new procedure that only TCM-trained personnel are currently authorized to perform.

## **Background**

Priority letter AD 99-09-17 was prompted by reports of crankshaft failures. Since December 1998, the FAA obtained information regarding seven crankshaft failures. The investigation revealed that the crankshafts failed due to cracks through the No. 2 or No. 5 cheeks. Analysis indicated that the crankshaft failures occurred early in the life of a new or rebuilt crankshaft, from 80 to 175 hours time-in-service (TIS). In addition, one crankshaft was found which had not failed but which had a crack initiation. TCM advised the FAA that all of the fractures were due to a discrepancy in the counterweight bushing installation process, involving a tool that can damage the nitride surface of the cheek sufficient to create a crack which will propagate through the nitride layer. The tool has been repaired. Such a crack will always result in failure of the crankshaft. All of the fractures were grouped around certain crankshaft manufacturing dates between January 1998 and December 1998, inclusive. Review of the manufacturing processes, basic metallurgy, nitride characteristics, dimensional characteristics, and supplier practices did not identify any other contributing causes. That condition, if not corrected, could result in crankshaft failure due to crankshaft cheek cracks, which could result in total engine power loss, in-flight engine failure, and possible forced landing.

## **Events Since the Priority Letter AD**

Since the issuance of that priority letter AD, the FAA received results from the inspections mandated by priority letter AD 99-09-17. One crankshaft was found with a significant crack. This crankshaft had 340 hours TIS, which is outside the range of the previous known cracks. Since this crack was found outside the hours TIS range of the previous known cracks, the cutoff for engines that require a more immediate inspection has been raised to 500 hours TIS. This additional TIS range should not introduce a significant hardship as approximately 3,000 of the original 3,200 crankshafts have already been inspected.

In addition, the FAA received a report of a TCM GTSIO-520 crankshaft failure. The crack initiated on cheek No. 2, occurring within 45 hours TIS since the crankshaft was rebuilt. Based upon this report, the FAA determined the need to add the TCM GTSIO-520 series engines to the AD's applicability. The GTSIO-520 crankshaft is of a different design, with three cheeks that have counterweights; therefore, three cylinders, three connecting rods, and six counterweights must be removed versus two cylinders, two connecting rods, and four counterweights for the other engines affected. This AD requires inspecting crankshaft cheeks No. 2, 5, and 8 on the geared engines in accordance with TCM CSB 99-6A, dated July 21, 1999.

Also, TCM has published Mandatory Service Bulletin (MSB) 99-3C dated July 27, 1999, that adds additional engines, identified by serial numbers (S/Ns), of currently affected engine series and clarifies snap ring installation.

Finally, this AD corrects the contact telephone number for TCM.

Since a situation exists that requires the immediate adoption of this regulation, it is found that notice and opportunity for prior public comment hereon are impracticable, and that good cause exists for making this amendment effective in less than 30 days.

### **Comments Invited**

Although this action is in the form of a final rule that involves requirements affecting flight safety and, thus, was not preceded by notice and an opportunity for public comment, comments are invited on this rule. Interested persons are invited to comment on this rule by submitting such written data, views, or arguments as they may desire. Communications should identify the Rules Docket number and be submitted in triplicate to the address specified under the caption "**ADDRESSES**." All communications received on or before the closing date for comments will be considered, and this rule may be amended in light of the comments received. Factual information that supports the commenter's ideas and suggestions is extremely helpful in evaluating the effectiveness of the AD action and determining whether additional rulemaking action would be needed.

Comments are specifically invited on the overall regulatory, economic, environmental, and energy aspects of the rule that might suggest a need to modify the rule. All comments submitted will be available, both before and after the closing date for comments, in the Rules Docket for examination by interested persons. A report that summarizes each FAA-public contact concerned with the substance of this AD will be filed in the Rules Docket.

Commenters wishing the FAA to acknowledge receipt of their comments submitted in response to this notice must submit a self-addressed, stamped postcard on which the following statement is made: "Comments to Docket Number 99-NE-28-AD." The postcard will be date stamped and returned to the commenter.

The regulations adopted herein will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this final rule does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

The FAA has determined that this regulation is an emergency regulation that must be issued immediately to correct an unsafe condition in aircraft, and is not a "significant regulatory action" under Executive Order 12866. It has been determined further that this action involves an emergency regulation under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979). If it is determined that this emergency regulation otherwise would be significant under DOT Regulatory Policies and Procedures, a final regulatory evaluation will be prepared and placed in the Rules Docket. A copy of it, if filed, may be obtained from the Rules Docket at the location provided under the caption "**ADDRESSES**."

### **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

### **Adoption of the Amendment**

Accordingly, pursuant to the authority delegated to me by the Administrator, the Federal Aviation Administration amends part 39 of the Federal Aviation Regulations (14 CFR part 39) as follows:

PART 39 - AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§39.13 [Amended]

2. Section 39.13 is amended by adding the following new airworthiness directive:

# AIRWORTHINESS DIRECTIVE



REGULATORY SUPPORT DIVISION  
P.O. BOX 26460  
OKLAHOMA CITY, OKLAHOMA 73125-0460

U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

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The following Airworthiness Directive issued by the Federal Aviation Administration in accordance with the provisions of Federal Aviation Regulations, Part 39, applies to an aircraft model of which our records indicate you may be the registered owner. Airworthiness Directives affect aviation safety and are regulations which require immediate attention. You are cautioned that no person may operate an aircraft to which an Airworthiness Directive applies, except in accordance with the requirements of the Airworthiness Directive (reference 14 CFR part 39, subpart 39.3).

**99-19-01 TELEDYNE CONTINENTAL MOTORS:** Amendment 39-11290. Docket No. 99-NE-28-AD. Supersedes AD 99-09-17. Issued August 30, 1999.

Applicability: Teledyne Continental Motors (TCM) O-470, IO-470, TSIO-470, IO-520, TSIO-520, LTSIO-520, IO-550, TSIO-550, TSIOL-550, series new and rebuilt engines manufactured between January 1, 1998, and December 31, 1998, listed by serial number (S/N) in TCM Mandatory Service Bulletin (MSB) 99-3C, dated July 27, 1999. Also, GTSIO-520 series engines, listed by S/N in TCM Critical Service Bulletin (CSB) 99-6A dated July 21, 1999. This airworthiness directive (AD) is also applicable to any other TCM O-470, IO-470, TSIO-470, IO-520, TSIO-520, LTSIO-520, IO-550, TSIO-550, TSIOL-550, and GTSIO-520 series engines that were overhauled by facilities other than TCM, and that have had replacement crankshafts installed that were sold individually by TCM and were manufactured or rebuilt between January 1, 1998, and December 31, 1998.

**Note 1:** Engine S/Ns can be found in logbooks or other maintenance records. For those engines that were overhauled in the field with factory new crankshafts, crankshaft S/Ns should be shown in work orders, log books or other maintenance records.

**Note 2:** This AD applies to each engine identified in the preceding applicability provision, regardless of whether it has been modified, altered, or repaired in the area subject to the requirements of this AD. For engines that have been modified, altered, or repaired so that the performance of the requirements of this AD is affected, the owner/operator must request approval for an alternative method of compliance in accordance with paragraph (f) of this AD. The request should include an assessment of the effect of the modification, alteration, or repair on the unsafe condition addressed by this AD; and, if the unsafe condition has not been eliminated, the request should include specific proposed actions to address it.

Compliance: Required as indicated, unless accomplished previously.

To prevent crankshaft failure due to crankshaft cheek cracks, which could result in total engine power loss, in-flight engine failure, and possible forced landing, accomplish the following:

(a) For those engines listed by S/N on pages 3 through 12 of TCM MSB 99-3C, dated July 27, 1999, or on pages 2 and 3 of TCM CSB 99-6A, dated July 21, 1999, with 500 hours or less time-in-service (TIS) on the effective date of this AD, perform visual and ultrasonic (UT) inspections of the crankshaft for cracks within 10 hours TIS after the effective date of this AD, in accordance with sections A and B of TCM 99-3C, dated July 27, 1999, or for the GTSIO-520 series engines, in accordance with

sections A and B of TCM CSB 99-6A dated July 21, 1999. These inspections must be performed by TCM representatives. Disposition the crankshaft as follows:

**Note 3:** The engines and crankshafts that are the subject of this AD were manufactured or rebuilt by TCM during 1998. The dates that engines and crankshafts were delivered, however, may not coincide with their dates of manufacture. For the engines identified in paragraphs (a) and (b) of this AD, TCM has already determined which engines have either a new or rebuilt suspect crankshaft installed, and identified those engines by engine S/N. Only for those engines identified in paragraphs (c) and (d) of this AD does crankshaft serial number play a role in determining the need for visual and UT inspections.

**Note 4:** The engine S/Ns listed in TCM MSB 99-3C and TCM CSB 99-6A contain only the numerical portion of the S/N. Rebuilt engines will have the letter "R" at the end of the six digit numerical portion. This letter "R" should be disregarded and only the six digit numerical sequence should be used for determination of applicability. Only TCM is authorized to rebuild TCM engines and they have not approved any other agency to perform that function.

(1) If a crack is found, replace the crankshaft with a serviceable crankshaft of the same part number (P/N) prior to further flight.

(2) If no crack is found, reassemble the engine and return it to service.

(3) If inspections have been previously accomplished in accordance with earlier revision levels of TCM MSB 99-3 (previously CSB 99-3) or CSB 99-6, no further action is required.

(b) For those engines listed by S/N on pages 3 through 12 of MSB 99-3C, dated July 27, 1999, or on pages 2 and 3 of TCM CSB 99-6A dated July 21, 1999, with more than 500 hours TIS on the effective date of this AD, perform visual and UT inspections of the crankshaft for cracks at the next maintenance event, or within 50 hours TIS after the effective date of this AD, whichever comes first, in accordance with sections A and B of TCM MSB 99-3C, dated July 27, 1999, or for the GTSIO-520 series engines, in accordance with sections A and B of TCM CSB 99-6A, dated July 21, 1999. These inspections must be performed by TCM representatives. Disposition the crankshaft as follows:

(1) If a crack is found, replace the crankshaft with a serviceable crankshaft of the same P/N prior to further flight.

(2) If no crack is found, reassemble the engine and return it to service.

(3) If inspections have been previously accomplished in accordance with earlier revision levels of TCM MSB 99-3 (previously CSB 99-3) or CSB 99-6, no further action is required.

(c) For any other engine that was overhauled at a facility other than TCM, and that has a crankshaft installed that was manufactured or rebuilt between January 1, 1998, and December 31, 1998, with 500 hours or less TIS on the effective date of this AD, perform visual and UT inspections of the crankshaft for cracks within 10 hours TIS after the effective date of this AD, in accordance with sections A and B of TCM MSB 99-3C, dated July 27, 1999, or for the GTSIO-520 series engines, in accordance with sections A and B of TCM CSB 99-6A, dated July 21, 1999. These inspections must be performed by TCM representatives. Disposition the crankshaft as follows:

(1) If a crack is found, replace the crankshaft with a serviceable crankshaft of the same P/N prior to further flight.

(2) If no crack is found, reassemble the engine and return it to service.

(3) If inspections have been previously accomplished in accordance with earlier revision levels of TCM MSB 99-3 (previously CSB 99-3) or CSB 99-6, no further action is required.

**Note 5:** The crankshaft manufacture date may be determined from the crankshaft serial number, which consists of eight characters, arranged as follows:

<b>Position:</b>	1	2,3	4,5	6,7	8
<b>Content:</b>	Letter A - L, representing month of manufacture	Day of month manufactured	Year of manufacture	Sequence number of crankshaft manufactured on that day	Always "N"
<b>Example:</b>	C	22	98	05	N

The example crankshaft, with a serial number of "C229805N", indicates a date of manufacture of March 22, 1998.

(d) For any other engine that was overhauled at a facility other than TCM, and that has a crankshaft installed that was manufactured or rebuilt between January 1, 1998, and December 31, 1998, with more than 500 hours TIS on the effective date of this AD, perform visual and UT inspections of the crankshaft for cracks at the next maintenance event, or within 50 hours TIS after the effective date of this AD, whichever comes first, in accordance with sections A and B of TCM MSB 99-3C, dated July 27, 1999, or for the GTSIO-520 series engines, in accordance with sections A and B of TCM CSB 99-6A dated July 21, 1999. These inspections must be performed by TCM representatives. Disposition the crankshaft as follows:

(1) If a crack is found, replace the crankshaft with a serviceable crankshaft of the same P/N prior to further flight.

(2) If no crack is found, reassemble the engine and return it to service.

(3) If inspections have been previously accomplished in accordance with earlier revision levels of TCM MSB 99-3 (previously CSB 99-3) or CSB 99-6, no further action is required.

(e) After the effective date of this AD, installation of a crankshaft that was manufactured or rebuilt between January 1, 1998, and December 31, 1998, is prohibited, unless it has been inspected and reidentified in accordance with section C of TCM MSB 99-3C, dated July 27, 1999, or, for the GTSIO-520 series engines, in accordance with section C of TCM CSB 99-6A, dated July 21, 1999. These inspections must be performed by TCM.

(f) An alternative method of compliance or adjustment of the compliance time that provides an acceptable level of safety may be used if approved by the Manager, Atlanta Aircraft Certification Office (ACO). Operators shall submit their requests through an appropriate FAA Principal Maintenance Inspector, who may add comments and then send it to the Manager, Atlanta ACO.

**Note 6:** Information concerning the existence of approved alternative methods of compliance with this airworthiness directive, if any, may be obtained from the Atlanta ACO.

(g) Special flight permits may be issued in accordance with sections 21.197 and 21.199 of the Federal Aviation Regulations (14 CFR 21.197 and 21.199) to operate the airplane to a location where the inspection requirements of this AD can be accomplished.

(h) The actions required by this AD shall be accomplished in accordance with the following TCM SB's:

<b>Document No.</b>	<b>Page</b>	<b>Date</b>
MSB 99-3C	1-26	July 27, 1999
Total pages: 26.		
CSB 99-6A	1-13	July 21, 1999
Total pages: 13.		

This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from Teledyne Continental Motors, PO Box 90, Mobile, AL 36601; telephone toll free (888) 200-7565. Copies may be inspected at the FAA, New England Region, Office of the Regional Counsel, 12 New England Executive Park, Burlington, MA; or at the Office of the Federal Register, 800 North Capitol Street, NW, suite 700, Washington, DC.

- (i) This amendment supersedes priority letter AD 99-09-17, issued April 22, 1999.
- (j) This amendment becomes effective on September 30, 1999.

**FOR FURTHER INFORMATION CONTACT:**

Jerry Robinette, Aerospace Engineer, Atlanta Aircraft Certification Office, FAA, Small Airplane Directorate, One Crown Center, 1895 Phoenix Blvd., Suite 450, Atlanta, GA 30349; telephone (770) 703-6096, fax (770) 703-6097.