

**DEPARTMENT OF
TRANSPORTATION**

Federal Aviation Administration

14 CFR Part 39 [63 FR 44545 No. 161; 08/20/98][SN]

**Textron Lycoming /
Teledyne
Continental Motors
AD 98-17-11
Amendment 39-10713
Effective Oct. 19, 1998
ATA Code: 80
Recurring: No**

{See Correction

below.}

[Docket No. 98-ANE-27-AD; Amendment 39-10713; AD 98-17-11] RIN 2120-AA64

**Airworthiness Directives; Textron Lycoming and Teledyne Continental Motors
Reciprocating Engines**

AGENCY: Federal Aviation Administration, DOT.

ACTION: Final rule.

SUMMARY: This amendment adopts a new airworthiness directive (AD), applicable to certain Textron Lycoming and Teledyne Continental Motors reciprocating engines that had crankshafts repaired by Nelson Balancing Service, Repair Station Certificate No. NB7R820J, Bedford, Massachusetts, that requires removal from service of affected crankshafts, or a visual inspection, magnetic particle inspection, and dimensional check of the crankshaft journals, and, if necessary, rework or removal from service of affected crankshafts and replacement with serviceable parts. This amendment is prompted by reports of crankshafts exhibiting heat check cracking of the nitrided bearing surfaces which led to crankshaft cracking and subsequent failure. The actions specified by this AD are intended to prevent crankshaft failure due to cracking, which could result in an inflight engine failure and possible forced landing.

DATES: Effective October 19, 1998.

FOR FURTHER INFORMATION CONTACT:

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

SUPPLEMENTARY INFORMATION: A proposal to amend part 39 of the Federal Aviation Regulations (14 CFR part 39) to include an airworthiness directive (AD) that is

applicable to certain Textron Lycoming and Teledyne Continental Motors (TCM) reciprocating engines that had crankshafts repaired by Nelson Balancing Service, Repair Station Certificate No. NB7R820J, Bedford, Massachusetts, was published in the Federal Register on May 11, 1998 (63 FR 25781). That action proposed to require removal from service of affected crankshafts, or a visual inspection, magnetic particle inspection, and dimensional check of the crankshaft journals, and, if necessary, rework or removal from service of affected crankshafts and replacement with serviceable parts.

Interested persons have been afforded an opportunity to participate in the making of this amendment. Due consideration has been given to the comments received.

One commenter states that the proposed AD is insufficiently researched; specific dates and serial numbers are needed for affected crankshafts. The commenter suggests that there were periods during the time frame of interest when the grinding was acceptable. The FAA does not concur. The FAA believes that this AD has been thoroughly researched. The failures/known cases of crankshaft nitride cracking occur throughout the time period. There is no way to isolate one specific time and determine that crankshafts during that time were satisfactorily repaired. Those crankshafts that are identified in the company's records are presented in the AD, but the FAA has determined that these records are incomplete. Therefore, the applicability of the AD must include all crankshafts identified in aircraft owners' and other repair station records as being repaired at Nelson during the suspect time period.

The same commenter questions how many TCM O-470 crankshafts have been determined to be bad and if there is a sufficient percentage to warrant tearing down all O-470 engines that Nelson repaired during this time period. The FAA does not concur. The available data indicates that crankshafts from O-470 engines were subject to the same improper repair procedures as crankshafts from other engines. Of the three related failure events, one occurred on an O-470-R engine. Therefore, the FAA has determined that all crankshafts repaired by Nelson Air Services during the suspect time period have the potential of causing an unsafe condition.

The same commenter believes that the proposed AD is based on failures of aerobatic engines. The commenter suggests that the AD is an overly reactive extrapolation from highly stressed aerobatic crankshafts to comparatively mildly stressed non-aerobatic engines. The FAA does not concur. The FAA is unaware of any information that indicates that the safety analysis presented in the NPRM is biased by aerobatic engine data. There is only one aerobatic engine listed. The other engines are used in normal or utility category applications. The data indicates that nitride cracking of the crankshafts is not limited to specific flight operations but rather a matter of an improper grinding procedure that can result in heat check cracking of the nitride surface.

The same commenter states that the AD should not be issued as written, but only imposed on those who have a reasonable likelihood of having a bad crankshaft, due to expense required to tear down an engine. The FAA does not concur. The expense of the AD was certainly considered as evidenced by the NPRM economic impact statement. However, it must be emphasized that the FAA has made a determination that an unsafe condition is likely to exist on crankshafts repaired by Nelson during the suspect time period. The FAA determined that an AD was necessary after consideration of both the severity of the potential unsafe condition and the economic impact of the action.

One commenter states that the AD should not apply to crankshafts which were in the Nelson shop for balancing, it should only apply to those which had the journals ground. The FAA does not concur. The data indicates that deficient process controls existed at Nelson Balancing Service during the suspect time period and therefore all crankshafts which were repaired in the Nelson shop during that time are suspect.

However, if an individual can substantiate that any given crankshaft should be exempt from the requirements of the AD based on the extent of repairs performed by Nelson, then this data can be presented through an FAA Airworthiness Inspector as an Alternative Method of Compliance with the AD.

This commenter further states that the AD should reaffirm that only those work order numbers noted in the AD are affected. The FAA does not agree. The work orders listed in the AD are intended as guidance only as the FAA can not be absolutely sure that all crankshafts are accounted for in the listing.

One commenter states that the AD should apply only to those crankshafts repaired after September 1995, arguing that date represented the earliest repair date for the crankshaft that demonstrated a problem in service after being serviced by Nelson. The FAA does not concur. The crankshaft with the earliest repair date to have exhibited a problem in service was repaired in February 1995 and failed after only 30 hours in service. The repair station was certificated in September 1994. Thus, the FAA has limited this AD to only those engines with crankshafts on which this unsafe condition either exists or is likely to develop.

After careful review of the available data, including the comments noted above, the FAA has determined that air safety and the public interest require the adoption of the rule as proposed.

There are approximately 250,000 engines of the designs listed in the applicability section of this AD in the worldwide fleet. The FAA estimates that 200,000 of those engines are installed on aircraft of U.S. registry. Of these it is estimated that 30% or 60,000 engines will have had an overhaul in the time frame of interest; however, only 291 would be required to take compliance action. Of this 60,000 it is estimated that 10,000 will require removal of the propeller spinner to determine applicability of the AD. The cost associated with the spinner removal/replacement is estimated to be \$60 per work hour average labor rate times one hour. It will take approximately 90 work hours per engine to accomplish the proposed action and the average labor rate is \$60 per work hour. Required parts would cost \$115 per engine for gaskets, seals, etc. In addition, it is estimated that half of the 291 affected engines can be reworked at a cost of \$1,800 per engine and that the other half of the 291 affected engines will be rejected, plus purchasing another crankshaft which will cost \$4,000 per engine. Based on these figures, the total cost impact of the AD on U.S. operators is estimated to be \$3,048,765.

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.

For the reasons discussed above, I certify that this action

- (1) is not a “significant regulatory action” under Executive Order 12866;
- (2) is not a “significant rule” under DOT Regulatory Policies and Procedures (44 FR

11034,

February 26, 1979); and

(3) will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

A final evaluation has been prepared for this action and it is contained in the Rules Docket.

A copy of it 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, 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.

Sec. 39.13 [Amended]

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

98-17-11 TEXTRON LYCOMING AND TELEDYNE CONTINENTAL MOTORS:

Amendment 39-10713. Docket 98-ANE-27-AD.

Textron Lycoming (LYC) O-235, O-235-C1, O-235-C2C, O-235-L2C, O-235-N2C, O-290, O-290-D2, O-320, O-320-A, O-320-A1A, O-320-A2B, O-320-B2B, O-320-B2C, O-320-D2J, O-320-D3G, O-320-E2A, O-320-E2D, O-320-E2G, O-320-E3D, O-320-H2AD, O-360, O-360A1A, O-360-A1D, O-360-A3A, O-360-A4A, O-360-A4K, O-360-B1B, IO-360-F1A6, AEIO-320-E1B, HIO-360-C1A, IO-320, IO-320-B1A, IO-360, IO-360-A1A, IO-360-A1B6, IO-360-B1E, IO-360-C, IO-360-C1C, IO-360-C1C6, IO-360-C1D6, IO-360-D, O-540-A1B5, O-540-A1D5, O-540-R2AD, IO-540, IO-540-C4B5, IO-540-S1A5, TIO-540-A2, LIO-320-C1A, LIO-360-C1E6, and IO-720 reciprocating engines; and **{See Correction below.}**

Teledyne Continental Motors (TCM) A-65, A65-3, A65-8, A75, A75-8, C75-12, C85, C85-8, C85-12, C90-8FJ, C90-12, O-200, O-200-A, O-300, O-300-D, IO-360-C, E-185-4, E-225-8, O-470, O-470-K, O-470-L, O-470-R, O-470-11, IO-470, IO-470-N, IO-470-S, IO-520, IO-520-D, GTSIO-520, and TSIO-520-VB reciprocating engines, with installed crankshafts repaired by Nelson Balancing Service, Bedford, Massachusetts, Repair Station Certificate No. NB7R820J, between February 1, 1995, and December 31, 1997, inclusive, as listed (by work order (W/O)) in **Table 1** of this AD.

Table 1

Engine and Model	W/O	Date	Engine Ser. No.
LYC:			
AEIO-320-E1B.....	1134	2/17/96	L-5653-55A
HIO-360-C1A.....	1155	2/7/96	L-12126-51A
IO-320.....	1141	1/17/96	
.....			
IO-320-B1A.....	1525	11/14/97	
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IO-360.....	1314	12/17/96	
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IO-360.....	IN6137	8/7/97	
.....			
IO-360-A1A.....	1230	6/10/96	L-474-51
IO-360- A1A.....	1289	10/23/96	L-4085-5174
IO-360-A1A.....	1415b	5/23/97	RL-3920-51A
IO-360-A1B6.....	1463	7/31/97	
.....			
IO-360-B1E.....	1312	12/12/96	L-4453-51A
IO-360-C.....	1146	1/23/96	R-51448-9-C
IO-360-C1C.....	1336	2/10/97	
.....			
IO-360-C1C.....	1518	12/9/97	
.....			
IO-360-C1C6.....	1530	11/25/97	
.....			
IO-360-C1C6.....	1537	12/9/97	L-19294-51A
IO-360-C1D6.....	1286	4/28/97	
.....			
IO-360-D.....	1540	12/2/97	

IO-360-F1A6.....	1176	3/7/96	L-27423-36A
IO-540.....	1014	2/8/95	
IO-540.....	1056	6/13/95	
IO-540.....	1302	12/5/96	
IO-540-C4B5.....	1313	12/17/96	L-19547-48
IO-540-S1A5.....	1513	10/27/97	L-19597-48A
IVO-435-G1A.....	1271	10/1/96	
LIO-320-C1A.....	1158	2/8/96	
LIO-360-C1E6.....	1280	10/7/96	
LIO-360-C1E6.....	1281	10/9/96	
O-235.....	1013	2/21/95	
O-235.....	1051	6/2/95	
O-235.....	1054	6/9/95	
O-235.....	1057	6/14/95	L-9041-15
O-235.....	1058	6/29/95	
O-235.....	1060	6/30/95	
O-235.....	1069	8/10/95	
O-235.....	1110	2/20/96	
O-235.....	1145	1/23/96	
O-235.....	1151	1/25/96	
O-235.....	1160	2/9/96	RL-24636-15
O-235.....	1305	12/5/96	L-22542-15
O-235.....	1329	2/11/97	
O-235.....	1332	2/11/97	
O-235.....	1481	9/2/97	

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O-235-C1.....	1089	10/8/95	L-6475-15
O-235-C1.....	1188	4/2/96	L-7143-15
O-235-C1.....	1335	3/12/97	L-5569-15
O-235-C1.....	1367	3/24/97	
.....			
O-235-C2C.....	1019	2/24/95	L-12284-15
O-235-C2C.....	1040	5/8/95	
.....			
O-235-C2C.....	1105	12/1/95	L-12273-15
O-235-L2C.....	1030	4/6/95	L-14545-15
O-235-L2C.....	1036	4/24/95	
.....			
O-235-L2C.....	1037	4/24/95	L-23012-15
O-235-L2C.....	1050	6/2/95	L-15542-15
O-235-L2C.....	1062	7/5/95	L-18306-15
O-235-L2C.....	1067	8/8/95	
.....			
O-235-L2C.....	1070	8/10/95	L-160015-15 {See
Correction			below.}
.....			
O-235-L2C.....	1095	11/14/95	RL-023227-15
O-235-L2C.....	1101	11/4/95	L-15300-15
O-235-L2C.....	1102	11/15/95	L-20183-15
O-235-L2C.....	1162	2/14/96	L-16114-15
O-235-L2C.....	1179	3/11/96	L-21215-15
O-235-L2C.....	1219	5/16/96	L-21215-15
O-235-L2C.....	1251	8/22/96	
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O-235-L2C.....	1285	10/19/96	
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O-235-L2C.....	1365	3/24/97	
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O-235-L2C.....	1400	4/28/97	
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O-235-L2C.....	1414	8/5/97	
.....			
O-235-L2C.....	1417	12/5/97	
.....			
O-235-L2C.....	1433	6/26/97	L-17074-15
O-235-L2C.....	1435	6/9/97	
.....			
O-235-L2C.....	1504	10/31/97	
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O-235-L2C.....	1508	11/18/97	
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O-235-L2C.....	1524	11/12/97	
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O-235-L2C.....	1536		
11/24/97			
O-235-L2C.....	2010	11/19/97	
.....			
O-235-N2C.....	1511	10/29/97	L-23857-15
O-290.....	1257	9/4/96	
.....			
O-290.....	1326	3/26/97	
.....			
O-290-D2.....	1082	9/26/95	L-6019-21
O-320.....	1018	2/22/95	
.....			
O-320.....	1024	3/17/95	
.....			
O-320.....	1038	5/13/95	{See L-39272-27A
			Correction below.}
O-320.....	1045	5/24/95	
.....			
O-320.....	1084	9/28/95	
.....			
O-320.....	1116	1/8/95	{See
.....			
			Correction below.}
O-320.....	1125	1/8/96	
.....			
O-320.....	1169	2/28/96	
.....			
O-320.....	1175	3/7/96	
.....			
O-320.....	1184	3/28/96	
.....			
O-320.....	1189	8/27/96	
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O-320.....	1202	4/30/96	
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O-320.....	1212	5/10/96	
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O-320.....	1283	10/17/96	
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O-320.....	1316	12/21/96	

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O-320.....	1340	2/25/97	L-24367
O-320.....	1347	2/18/97	
.....			
O-320.....	1360	3/10/97	
.....			
O-320.....	1361	3/10/97	
.....			
O-320.....	1436	5/29/97	
.....			
O-320.....	1468	8/14/97	
.....			
O-320.....	1474	8/22/97	L-13130-39A
O-320.....	1477	9/13/97	
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O-320.....	1477	9/13/97	
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O-320.....	1507	11/18/97	
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O-320.....	1519	11/21/97	
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O-320.....	1546	12/7/97	
.....			
O-320.....	1171	3/1/06	
.....			
{See		Correction below.}	
O-320-A.....	1192	4/13/96	
.....			
O-320-A.....	1194	4/13/96	
.....			
O-320-A.....	1196	4/13/96	
.....			
O-320-A1A.....	1244	8/13/96	L-5270-27
O-320-A2B.....	1081	9/22/95	
.....			
O-320-A2B.....	1461	9/9/97	L-12626-27
O-320-B2B.....	1452	7/10/97	L-2977-39
O-320-B2C.....	1315	12/17/96	
.....			
O-320-D2J.....	1172	3/4/96	L-13039-39A
O-320-D2J.....	1173	3/7/96	L-123412-39A
O-320-D2J.....	1253	9/4/96	
.....			
O-320-D2J.....	1534	11/25/97	

.....			
O-320-D2J.....	1539	12/3/97	
.....			
O-320-D3G.....	1077	9/17/95	
.....			
O-320-D3G.....	1114	1/8/96	L-10983-39A
O-320-D3G.....	1354	2/25/97	
.....			
O-320-D3G.....	1370	3/26/97	H45247
O-320-D3G.....	1544	12/3/97	
.....			
O-320-E2A.....	1103	11/10/95	L-26363-27A
O-320-E2A.....	1191	4/13/96	L-19377-27A
O-320-E2A.....	1317	12/21/96	L-15219-27A
O-320-E2A.....	1439	6/9/97	L-38003-55A
O-320-E2D.....	1068	8/10/95	L-35528-27A
O-320-E2D.....	1078	9/17/95	
.....			
O-320-E2D.....	1177	3/9/96	L-44732-27A
O-320-E2D.....	1181	3/14/96	
.....			
O-320-E2D.....	1241	8/9/96	L-42691-27A
O-320-E2D.....	1245	8/13/96	L-40483-27A
O-320-E2D.....	1260	9/9/96	L-15300-15
O-320-E2D.....	1343	2/17/97	
.....			
O-320-E2D.....	1346	3/2/97	L-44320-27A
O-320-E2D.....	1385	4/16/97	
.....			
O-320-E2D.....	1458	7/18/97	
.....			
O-320-E2D.....	1533	11/25/97	
.....			
O-320-E2D.....	1549	12/12/97	
.....			
O-320-E2G.....	1338	3/10/97	L-38264-27A
O-320-E3D.....	1034	4/18/95	L-29668-27A
O-320-E3D.....	1074	8/24/95	L-29495-27A
O-320-E3D.....	1431	6/9/97	L-33770-27A
O-320-E3D.....	1444	6/13/97	
.....			
O-320-E3D.....	1500	10/7/97	L-33841-27A
O-320-H2AD.....	1322	1/22/97	L-1530-78T
O-360.....	1025	3/17/95	

.....			
O-360.....	1157	2/7/96	
.....			
O-360.....	1199	4/18/96	
.....			
O-360.....	1362	3/10/97	
.....			
O-360.....	1386	4/17/97	
.....			
O-360.....	1394	5/6/97	
.....			
O-360.....	1528	11/19/97	
.....			
O-360-A1A.....	1170	2/28/96	L-20677-36A
O-360-A1A.....	1214	5/14/96	L-20190-36A
O-360-A1A.....	1239	8/5/96	
.....			
O-360-A1D.....	1411	5/5/97	
.....			
O-360-A3A.....	1531	11/25/97	
.....			
O-360-A4A.....	1270	9/27/96	L-14008-36A
O-360-A4A.....	1464	7/30/97	L-24796-36A
O-360-A4A.....	1486	9/6/97	
.....			
O-360-A4A.....	1529	11/25/97	
.....			
O-360-A4K.....	1166	2/22/96	L-26455-36A
O-360-B1B.....	1262	9/9/96	L-5261-51A
O-540-A1B5.....	1129	12/29/95	
.....			
O-540-A1B5.....	1132	1/9/96	L-1165-40
O-540-A1D5.....	1462	7/28/97	L-5661-40
IO-720.....	1510	10/26/97	
.....			
TIO-540-A2.....	1064	7/13/95	
.....			
TIO-540-A2.....	1111	1/10/96	
.....			
TIO-540-R2AD.....	1106	11/27/95	L-5949-61A

TCM:

A-65.....	1152	1/25/96	
.....			

A-65.....	1154	2/27/96	{See 7187 Correction below.}
A-65.....	1183	2/22/96	
A-65.....	1185	3/28/96	
A-65.....	1233	6/23/96	
A-65.....	1290	10/29/96	
A-65.....	1296	11/14/96	4933868
A-65.....	1299	11/19/96	
A-65.....	1325	3/26/97	
A-65.....	1326	3/26/97	
A-65.....	1376	4/29/97	
A-65.....	1438	6/17/97	5890178
A-65-3.....	1243	8/13/96	324993
A-65-8.....	1541	12/2/97	
A-65-8.....	1276	10/5/96	5762568
A75.....	1156	2/7/96	5321868
A75.....	1255	9/3/96	
A75.....	1256	9/4/96	
A75-8.....	1275	10/5/96	5162868
C75-12F.....	1293	11/4/96	3316-6-12
C85.....	1088	10/4/95	
C85.....	1092	10/18/95	
C-85.....	1198	4/17/96	29652-7-8
C-85.....	1297	11/14/96	
C-85.....	1352	3/10/97	
C-85.....	1381	4/28/97	
C-85.....	1391	4/19/97	

C-85.....	1392	4/19/97	
.....			
C-85.....	1484	9/4/97	28487-6-12
C-85-8FJ.....	1139	1/17/96	29845-7-8
C-85-8FJ.....	1420	5/12/97	29465-7-8
C-85-12.....	1031	4/6/95	
.....			
C85-12.....	1182	3/18/96	21596-6-12
C-85-12.....	1217	5/15/96	
.....			
C85-12.....	1265	9/12/96	14657
C-85-12.....	1298	11/14/96	23610-6-12
C-90-8F.....	1471	9/6/97	42838-1-8
C-90-12.....	1279	10/7/96	44747-6-12
E-185-4.....	1124	1/16/96	25700D-1-9
E-225-8.....	1505	10/28/97	35477-D-9-8-P
GTSIO-520.....	1208	5/7/96	210114-70H
IO-360-C.....	1126	12/28/95	F-51439-9-C
IO-470.....	1028	3/23/95	87329-R
IO-470-N.....	1421	5/13/97	95271-1-N
IO-470-S.....	1331	3/11/97	102412-2-S-I
IO-520.....	1174	3/4/96	
.....			
IO-520-D.....	1167	2/22/96	
.....			
O-200.....	1033	4/18/95	
.....			
O-200.....	1043	5/12/95	
.....			
O-200.....	1049	6/2/95	
.....			
O-200.....	1076	9/11/95	214668-27A
O-200.....	1104	11/21/95	213830-71A
O-200.....	1131	1/5/96	
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O-200.....	1142	1/18/96	265349-R
O-200.....	1147	1/23/96	
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O-200.....	1190	4/13/96	
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O-200.....	1193	4/13/96	
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O-200.....	1195	4/13/96	
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O-200.....	1197	4/17/96	
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O-200.....	1213	5/13/96	
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O-200.....	1261	9/9/96	
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O-200.....	1303	12/5/96	
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O-200.....	1321	2/7/97	28115
O-200.....	1324	2/6/97	
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O-200.....	1344	3/2/97	
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O-200.....	1393	5/5/97	
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O-200.....	1413	5/7/97	61001-5-4
O-200.....	1430	5/23/97	
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O-200.....	1437	6/17/97	255759A-48
O-200.....	1488	9/7/97	
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O-200.....	1506	11/18/97	
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O-200.....	1522	11/11/97	
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O-200-A.....	1052	6/21/95	254150-A-48
O-200-A.....	1085	9/29/95	
.....			
O-200-A.....	1120	12/29/95	253971
O-200-A.....	1161	2/9/96	24R-469
O-200-A.....	1215	5/15/96	
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O-200-A.....	1240	8/5/96	69589-8-A
O-200-A.....	1254	9/3/96	6105-71-A-R
O-200-A.....	1264	9/12/96	
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O-200-A.....	1356	3/10/97	
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O-300.....	1027	3/20/95	
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O-300.....	1042	5/12/95	34012-D-6-D
O-300.....	1083	9/26/95	
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O-300.....	1096	10/23/95	464481

O-300.....	1137	1/17/96	
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O-300.....	1259	9/4/96	
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O-300.....	1387	4/22/97	
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O-300.....	1397	4/26/97	5928-9A
O-300.....	1403	4/28/97	
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O-300.....	1423	6/9/97	3834D8Z
O-300.....	1555	1/13/98	
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O-300-A.....	1446	6/27/97	
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O-300-D.....	1022	3/17/95	35110-D-6-D
O-300-D.....	1079	9/17/95	24276-D-0-D
O-300-D.....	1487	9/6/97	
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O-300-D.....	1543	12/3/97	
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O-470.....	1046	6/1/95	
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O-470.....	1383	4/4/97	
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O-470-11.....	1017	2/22/95	
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O-470-11.....	1491	10/19/97	
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O-470-11.....	1492	10/19/97	
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O-470-11.....	1493	10/19/97	
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O-470-11.....	1494	10/19/97	
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O-470-F.....	1236	7/25/96	76956-4-F
O-470-K.....	1087	10/3/95	47172-6-K
O-470-L.....	1128	1/10/96	68681-8-L
O-470-L.....	1359	5/19/97	68245-8-L
O-470-L.....	1399	4/28/97	
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O-470-R.....	1016	2/10/95	133087-6-R
O-470-R.....	1086	10/3/95	
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O-470-R.....	1165	2/22/96	

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O-470-R.....	1178	3/10/96	
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O-470-R.....	1201	6/2/96	83164-1-R
O-470-R.....	1319	1/6/97	459408
TSIO-520-VB.....	1055	6/9/95	
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Note 1: Blank spaces indicate unknown data. Where the engine serial number is blank in this table, it is either unknown or the crankshaft may not be installed in an engine.

Note 2: This airworthiness directive (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 (c) 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 cracking, which could result in an inflight engine failure and possible forced landing, accomplish the following:

- (a) Within 10 hours time in service after the effective date of this AD, determine if this AD applies, as follows:
 - (1) Determine if any repair was conducted on the engine that required crankshaft removal during the February 1, 1995, to December 31, 1997, time frame; if the engine was not disassembled for crankshaft removal and repair in this time frame, no further action is required.
 - (2) If the engine and crankshaft was repaired during this time frame, determine from the maintenance records (engine log book), and **Table 1** of this AD if the crankshaft was repaired by Nelson Balancing Service, Repair Station Certificate No. NB7R820J, Bedford, Massachusetts. The maintenance records should contain the Return to Service (Yellow) tag for the crankshaft that will identify the company performing the repair. Also the work order number contained in **Table 1** of this AD was etched on the crankshaft propeller flange, adjacent to the closest connecting rod journal. Because some etched numbers will be difficult to see, if necessary, use a 10X magnifying glass with an appropriate light source to view the work order number. In addition, the propeller spinner, if installed, will have to be removed in order to see this number.

- (3) A person with a private pilot or higher rated certificate may make the determination of applicability of this AD provided the propeller spinner does not have to be removed.
 - (4) If it cannot be determined who repaired the crankshaft, compliance with this AD is required.
 - (5) If the engine and crankshaft were not repaired during the time frame specified in (a)(1), or if it is determined that the crankshaft was not repaired by Nelson Balancing Service, no further action is required.
- (b) Within 10 hours time in service after the effective date of this AD, accomplish the following:
- (1) Perform a visual inspection as defined in paragraph (b)(2) of this AD, magnetic particle inspection, and a dimensional check of the crankshaft journals, or remove from service affected crankshafts and replace with serviceable parts.
 - (2) For the purpose of this AD, a visual inspection of the crankshaft is defined as the inspection of all surfaces of the crankshaft for cracks which include heat check cracking of the nitrided bearing surfaces, cracking in the main or aft fillet of the main bearing journal and crankpin journal, including checking the bearing surfaces for scoring, galling, corrosion, or pitting.

Note 3: Further guidance on all inspection and acceptance criteria is contained in applicable TCM or LYC Overhaul or Maintenance Manuals, or other FAA-approved data.

- (3) Replace any crankshaft that fails the visual inspection, magnetic particle inspection, or the dimensional check with a serviceable crankshaft, unless the crankshaft can be reworked to bring it in compliance with:
 - (i) All the overhaul requirements of the appropriate TCM or LYC Overhaul/Maintenance Manuals; or
 - (ii) All of the FAA-approved requirements for any repair station which currently has approval for limits other than those in the appropriate TCM or LYC Overhaul/Maintenance Manuals.
- (4) For the purpose of this AD, a serviceable crankshaft is one which meets the requirements of paragraph (b)(3)(i) or (b)(3)(ii) of this AD.

Note 4: Crankshafts removed from TCM engine models IO-360, IO-520, and TSIO-520 series engines are also subject to compliance with AD 97-26-17.

- (c) 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, New York (LYC) or Atlanta (TCM) Aircraft Certification Offices. Operators shall submit their requests through an appropriate FAA Airworthiness Inspector, who may add comments and then send it to the Manager, New York or Atlanta Aircraft Certification Offices.

Note 5: Information concerning the existence of approved alternative methods of

compliance with this airworthiness directive, if any, may be obtained from the Atlanta Aircraft Certification or New York Aircraft Certification Office, as applicable.

- (d) 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 aircraft to a location where the requirements of this AD can be accomplished.
- (e) This amendment becomes effective on October 19, 1998.

Issued in Burlington, Massachusetts, on August 11, 1998.

Jay J. Pardee, Manager, Engine and Propeller Directorate, Aircraft Certification Service.

FOR FURTHER INFORMATION CONTACT:

- Rocco Viselli, Aerospace Engineer (assigned to *Textron Lycoming*), New York Aircraft Certification Office, FAA, Engine and Propeller Directorate, 10 Fifth St., 3rd Floor, Valley Stream, NY 11581-1200; telephone (516) 256-7531, fax (516) 568-2716; or
- Jerry Robinette, Aerospace Engineer (assigned to *Teledyne Continental Motors*), Atlanta Aircraft Certification Office, FAA, Small Airplane Directorate, 1895 Phoenix Boulevard, One Crown Center, Suite 450, Atlanta, GA 30349; telephone (770) 703-6096, fax (770) 703-6097.

Manufacturer's Service Information:

None

DEPARTMENT OF TRANSPORTATION Federal Aviation Administration 14 CFR Part 39 [63 FR 55918 No. 201; 10/19/98]	Textron Lycoming / Teledyne Continental Motors <u>AD 98-17-11</u> Correction Amendment 39-10713 Effective: Oct. 19, 1998 <u>Corrects AD 98-17-11</u> ATA Code: 80 Recurring: No
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[Docket No. 98-ANE-27-AD; Amendment 39-10713; AD 98-17-11] RIN 2120-AA64

**Airworthiness Directives; Textron Lycoming and Teledyne Continental Motors
Reciprocating Engines**

Correction

In rule document 98-22240 beginning on page 44545 in the issue of Thursday, August 20, 1998, make the following corrections:

Sec. 39.19 [Corrected]

1. On page 44547, in the second column, in Sec. 39.13, in the airworthiness directive, in the 7th line, “O-360A1A” should read “O-360-A1A”.
2. On page 44548, in the fourth column of **Table 1**, in the same section, in the 6th entry, “L-160015-15” should read “L-16005-15”.
3. On the same page, in the third column of **Table 1**, in the same section, in the 35th entry, “5/13/95” should read “5/3/95”.
4. On the same page, in the same column, in the same section, in the 38th entry, “1/8/95” should read “1/8/96”.
5. On the same page, in the same column, in the same section, in the 13th entry from the bottom, “3/1/06” should read “3/1/96”.
6. On page 44549, in the third column, in the same section, in the 15th entry from the bottom, “2/27/96” should read “2/7/96”.