

TELEDYNE CONTINENTAL® AIRCRAFT ENGINE
CRITICAL SERVICE BULLETIN

Compliance Necessary to Maintain Safety

CATEGORY 2

CSB97-10A

FAA APPROVED

SUBJECT: PISTON PIN PLUG WEAR.

PURPOSE: To notify owners, operators and maintenance facilities of the possibility of abnormal wear to the aluminum piston pin plug when installed in certain manganese phosphated cylinders.

COMPLIANCE: Within the next ten (10) hours of operation from the date of issuance of this bulletin, inspect each affected IO-240, IO-360, TSIO-360, LTSIO-360, IO-520, TSIO-520, LTSIO-520, GTSIO-520, IO-550, TSIO-550 and TSIOL-550 series engine and cylinder in accordance with PART 1 of this bulletin. If elected, an optional method of compliance may be performed in accordance with PART 2 of this bulletin.

ALL AFFECTED E-SERIES, O-470 AND IO-470 ENGINES AND CYLINDERS MUST BE INSPECTED AS SOON AS POSSIBLE (BUT NO LATER THAN THE NEXT 10 HOURS OF OPERATION) IN ACCORDANCE WITH PART 2 OF THIS BULLETIN.

MODELS

AFFECTED: Refer to Table 1 and Table 2 of this bulletin.

GENERAL INFORMATION

In August, 1996 Teledyne Continental Motors (TCM) began using a manganese phosphate coating on the cylinder bore of certain cylinders to provide resistance to corrosion during the first hours of operation.

TCM has identified accelerated wear in a small number of aluminum piston pin plugs removed from these cylinders. This wear has been attributed to a bore surface that was rougher than that specified for the cylinder bore believed to be due to extended exposure to the manganese phosphate treatment. TCM believes only a small number of manganese phosphate coated cylinders would cause accelerated piston pin plug wear. Cylinders that are affected by this bulletin are listed by part number in Table 2.

To insure that piston pin plugs utilized in coated cylinders are not experiencing accelerated wear, perform the inspection detailed in PART 1 or PART 2.

WARNING

FAILURE TO IDENTIFY ABNORMAL PISTON PIN PLUG WEAR MAY LEAD TO SUBSEQUENT PISTON DAMAGE AND RESULTING CATASTROPHIC ENGINE FAILURE.

ISSUED			REVISED			 TELEDYNE CONTINENTAL MOTORS An Allegheny Teledyne Company P.O. Box 90 Mobile Alabama 36601 Ph. 334-438-3411	PAGE NO	REVISION
MO	DAY	YEAR	MO	DAY	YEAR		1 of 11 CSB97-10	A
06	19	97	07	15	97			

INSPECTION INSTRUCTIONS

PART 1 - PROGRESSIVE INSPECTION

1. Inspect the part number on the side of the cylinder base flange to determine if cylinder inspection is required. Only those cylinders that are identified with the part numbers listed in Table 2 are affected by this bulletin.

NOTE: All factory new IO-550-B, IO-550-C and TSIO-520-UB engines provided in the new serial number listing of Table 1 must be inspected in accordance with Part 1 or Part 2 of this bulletin, regardless of cylinder part number.

2. If oil analysis has been performed prior to the date of this service bulletin, review the analysis report(s) for findings of high or abnormal amounts of aluminum.
3. If possible, review inspection results of previous oil filter element or screen examinations for content of fine aluminum material.
4. If high or abnormal amounts of aluminum were noted in the oil analysis or fine aluminum material was present in the oil filter element or screen, comply with PART 2 of this bulletin.
5. For all affected engines or cylinders listed in Table 1 or Table 2 regardless of previous history, the progressive inspection sequence below must be conducted. This includes a special oil analysis program. TCM will provide three (3) oil analysis kits and analyses at no charge. Contact TCM at 1-334-438-3411 ext. 81 to arrange immediate shipment of these kits. Please be prepared to provide the following information:

- ENGINE MODEL AND SERIAL NUMBER.
- TOTAL CYLINDER HOURS.
- OWNER'S NAME, ADDRESS, PHONE NUMBER.
- "SHIP TO" ADDRESS FOR OIL ANALYSIS KITS.

- a. After operation of the engine and while the engine oil is hot, drain oil and take an oil sample in accordance with the instructions contained in the oil analysis kit. Mail sample for analysis.
 - b. Remove oil filter or screen. For oil filters, cut open the filter canister and remove the filter element. Allow the excess oil to drain from the filter element or screen and examine it for debris. Unless the amount of debris contained in the filter element or screen is more than typical for the total hours, reinstall and tighten the screen or new oil filter to the specified torque value and service the engine with the approved type, grade and quantity of oil. Record the findings of filter or screen inspection.
 - c. Perform a borescope inspection of each affected cylinder paying particular attention to the 3 o'clock and 9 o'clock positions in the bore for signs of excessive piston pin plug contact. Reference Figures 1, 2, 3 and 4. Record inspection results for each cylinder.
6. Two additional oil analysis samples, oil filter examinations and borescope inspections must be performed at intervals of 25 and 50 hours after the initial inspection if results reveal no abnormalities.
 7. Record results of each oil analysis, filter/screen examination and borescope inspection in the engine log book.
 8. If any abnormal oil analysis trends, borescope inspections or oil filter/screen examinations are discovered, inspection in accordance with PART 2 will be required.
 9. If upon completion of the three (3) inspections no abnormalities have been noted, compliance with the requirements of this bulletin is satisfied. Make a log book entry as to compliance with service bulletin CSB97-10.

ISSUED			REVISED			 TELEDYNE CONTINENTAL MOTORS An Allegheny Teledyne Company P.O. Box 90 Mobile Alabama 36601 Ph. 334-438-3411	PAGE NO	REVISION
MO	DAY	YEAR	MO	DAY	YEAR		2 of 11 CSB97-10	A
06	19	97	07	15	97			

PART 2 - CYLINDER REMOVAL, INSPECTION AND REASSEMBLY.

This inspection method will require the removal of each affected cylinder for inspection of the cylinder bore surface finish and piston pin length by TCM.

NOTE: This is the required inspection method for affected 470 series engines listed in Table 1 that have affected part number cylinders installed as listed in Table 2. All E-Series and 470 series engines that have had replacement cylinders installed as listed in Table 2 must also be removed and returned to TCM for inspection.

1. Cylinder Removal and Shipping Instructions.
 - a. Remove the cylinder in accordance with the applicable TCM Overhaul Manual.
 - b. Record and tag each cylinder and piston pin with the following information:
 - Aircraft Registration Number.
 - Engine Model.
 - Engine Serial Number.
 - Total Cylinder Hours.

- Cylinder Part Number.
- Cylinder Position, (#1, #2, etc.).
- c. Carefully preserve and package each cylinder and piston pin separately in a manner that will avoid shipping damage. Ship to TCM in accordance with Appendix A for inspection.

NOTE: International customers must contact TCM at 1-334-438-3411 for special instructions.

2. Reassembly Instructions.
 - a. Reassemble all parts in accordance with the applicable TCM Overhaul Manual. Torque all hardware in accordance with the latest revision of TCM Service Bulletin SB96-7.

WARRANTY

The action required to comply with this bulletin is covered by the Gold Medallion Warranty or Service Parts Warranty, subject to its terms and conditions.

TABLE 1 - AFFECTED NEW AND REBUILT ENGINES

ENGINE MODEL	NEW ENGINE - SERIAL NUMBER
IO-240-B	806823, 806828 thru 806832, 806929, 806930.
TSIO-360-JB	313036, 313037.
TSIO-360-MB	317269 thru 317275.
TSIO-360-RB	321359, 321360
TSIO-360-SB	321611, 321612
O-470-R	466727.
IO-470-N	458162 thru 458171.
IO-520-BB	580053 thru 580055, 580057, 580058.
IO-520-CB	576319, 576320.
IO-520-D	575926 thru 575928.

ISSUED			REVISED			 TELEDYNE CONTINENTAL MOTORS An Allegheny Teledyne Company P.O. Box 90 Mobile Alabama 36601 Ph. 334-438-3411	PAGE NO	REVISION
MO	DAY	YEAR	MO	DAY	YEAR		3 of 11 CSB97-10	A
06	19	97	07	15	97			

ENGINE MODEL	NEW ENGINE - SERIAL NUMBER
IO-520-F	579240.
IO-550-B See Note 1.	682287 thru 682304, 682361 thru 682364, 682537, 682608 thru 682634, 682769, 682770, 682787 thru 682797, 682952, 682953, 913001, 913008.
IO-550-C See Note 1.	676987, 676989 thru 676998, 683102 thru 683107, 683171, 683172, 683263, 683272, 683346 thru 683350, 683401 thru 683419, 683532 thru 683535, 683545, 683550 thru 683557, 683696, 683697.
IO-550-F	679516, 679517.
IO-550-G	679271 thru 679278, 679281, 679283, 679293.
TSIO-520-CE	530166.
TSIO-520-M	532068 thru 532073.
TSIO-520-R	522690 thru 522693.
TSIO-520-UB See Note 1.	527249 thru 527252, 527297, 527299 thru 527303, 527329, 527330.
TSIO-520-VB	529108, 529109.
GTSIO-520-M	613077 thru 613079.
TSIO-550-C	802557 thru 802560, 802562 thru 802564.
TSIO-550-E	803037.
TSIOL-550-A	800637.
Note 1 – New IO-550-c, IO-550-B and TSIO-520-UB engines must comply with this service bulletin regardless of cylinder part number.	

ENGINE MODEL	REBUILT ENGINE - SERIAL NUMBER
IO-360-A	020138-R.
IO-360-C	060664-R.
IO-360-D	063013-R, 063014-R.
IO-360-DB	808773-R thru 808778-R.
IO-360-G	244595-R, 244597-R.
IO-360-JB	292505-R.
IO-360-K	240138-R.
IO-360-KB	288686-R thru 288688-R, 288690-R thru 288693-R.
TSIO-360-A	197116-R.
TSIO-360-C	283553-R, 283554-R.
TSIO-360-CB	236238-R, 236239-R.
TSIO-360-E	225150-R.

ISSUED			REVISED			 TELEDYNE CONTINENTAL MOTORS An Allegheny Teledyne Company P.O. Box 90 Mobile Alabama 36601 Ph. 334-438-3411	PAGE NO	REVISION
MO	DAY	YEAR	MO	DAY	YEAR		4 of 11 CSB97-10	A
06	19	97	07	15	97			

ENGINE MODEL	REBUILT ENGINE - SERIAL NUMBER
TSIO-360-EB	809123-R, thru 809126-R, 809128-R thru 809132-R.
TSIO-360-FB	299628-R thru 299638-R.
TSIO-360-KB	811279-R, thru 811282-R.
TSIO-360-LB	247326-R, 247327-R.
TSIO-360-MB	279280-R, 279281-R.
LTSIO-360-E	225660-R.
LTSIO-360-EB	807408-R, 807410-R thru 807418-R, 807422-R.
LTSIO-360-KB	812012-R, 812013-R.
O-470-G	070702-R.
O-470-J	202205-R, 202206-R.
O-470-K	049485-R, 049487-R thru 049490-R.
O-470-L	069866-R thru 069872-R.
O-470-R	811818-R thru 811857-R, 811859-R, 811861-R, 811862-R.
O-470-S	269420-R, 269422-R thru 269428-R
O-470-U	809972-R, 809974-R thru 809983-R, 809985-R thru 809990-R, 809992-R, 809993-R, 809995-R thru 810000-R, 813254-R, 813255-R, 813257-R, 813259-R, 813262-R, 813264-R.
IO-470-C	295543-R.
IO-470-D	105635-R.
IO-470-E	088761-R.
IO-470-F	089905-R, 089906-R.
IO-470-K	092982-R, 092984-R.
IO-470-L	297703-R thru 297717-R, 297720-R thru 297723-R, 297728-R thru 297730-R, 297732-R, 297733-R.
IO-470-N	096683-R, 096685-R thru 096689-R.
IO-470-S	109376-R.
IO-470-V	171171-R thru 171178-R.
IO-520-A	112795-R thru 112801-R.
IO-520-B	234778-R thru 234781-R.
IO-520-BA	807193-R, 807194-R, 807196-R thru 807199-R, 807201-R thru 807207-R, 807209-R thru 807234-R, 807236-R.
IO-520-BB	809694-R, 809695-R, 809701-R, 809703-R, 809704-R, 809706-R, 809707-R, 809709-R, 809710-R, 809713-R thru 809727-R, 809729-R thru 809738-R

ISSUED			REVISED			 TELEDYNE CONTINENTAL MOTORS An Allegheny Teledyne Company P.O. Box 90 Mobile Alabama 36601 Ph. 334-438-3411	PAGE NO	REVISION
MO	DAY	YEAR	MO	DAY	YEAR		5 of 11 CSB97-10	A
06	19	97	07	15	97			

ENGINE MODEL	REBUILT ENGINE - SERIAL NUMBER
	809741-R, 809742-R, 809744-R thru 809746-R, 809748-R thru 809750-R.
IO-520-C	810845-R thru 810851-R, 810853-R thru 810878-R, 810881-R thru 810885-R, 810888-R thru 810895-R, 810897-R thru 810900-R.
IO-520-CB	298839-R thru 298854-R, 298856-R thru 298867-R, 298869-R thru 298885-R, 298888-R, 298889-R.
IO-520-D	293491-R thru 293500-R, 812751-R thru 812763-R, 812765-R thru 812771-R, 812773-R thru 812780-R, 812782-R, 812783-R, 812785-R thru 812788-R, 812791-R thru 812795-R, 812797-R thru 812811-R.
IO-520-E	215870-R thru 215888-R.
IO-520-F	812255-R, 812278-R, 812279-R, 812293-R, 812295-R, thru 812297-R, 812299-R thru 812311-R, 812313-R thru 812327-R, 812329-R thru 812332-R, 812334-R thru 812337-R, 812339-R, 812340-R, 812342-R thru 812345-R, 812347-R thru 812354-R, 812356-R thru 812371-R, 812373-R, 812376-R, 812377-R, 812379-R thru 812385-R, 812388-R thru 812391-R.
IO-520-J	216529-R.
IO-520-K	224118-R thru 224122-R.
IO-520-L	294769-R, 294770-R, 294772-R thru 294777-R, 294779-R thru 294799-R, 294801-R, 294802-R, 294804-R, 294805-R, 294809-R.
IO-520-M	811535-R thru 811540-R, 811544-R thru 811554-R, 811556-R thru 811558-R, 811560-R thru 811562-R, 811565-R thru 811567-R.
IO-520-MB	277607-R, 277612-R, 277614-R, 277615-R, 277618-R thru 277620-R, 277623-R thru 277640-R, 277643-R, 277644-R.
IO-550-A	280446-R thru 280453-R, 280455-R, 280458-R thru 280461-R.
IO-550-B	296928-R, 296939-R thru 296967-R, 296969-R thru 296971-R, 296975-R.
IO-550-C	810363-R thru 810404-R, 810406-R, 810408-R.
IO-550-D	284242-R thru 284244-R, 284246-R thru 284256-R.
IO-550-E	283360-R, 283364-R thru 283373-R.
IO-550-F	284787-R, 284790-R thru 284804-R.
IO-550-L	289113-R thru 289121-R.
TSIO-520-AE	246153-R thru 246155-R.
TSIO-520-AF	245240-R.
TSIO-520-B	176711-R, 176714-R thru 176726-R, 176730-R.
TSIO-520-C	178506-R thru 178510-R.
TSIO-520-CE	268568-R, 268569-R, 268570-R.
TSIO-520-E	812506-R thru 812513-R, 812515-R thru 812521-R, 812524-R, 812525-R, 812528-R, 812529-R.

ISSUED			REVISED			 TELEDYNE CONTINENTAL MOTORS An Allegheny Teledyne Company P.O. Box 90 Mobile Alabama 36601 Ph. 334-438-3411	PAGE NO	REVISION
MO	DAY	YEAR	MO	DAY	YEAR		6 of 11 CSB97-10	A
06	19	97	07	15	97			

ENGINE MODEL	REBUILT ENGINE - SERIAL NUMBER
TSIO-520-EB	271449-R thru 271452-R, 271455-R thru 271469-R, 271472-R thru 271474-R.
TSIO-520-G	216050-R.
TSIO-520-H	217380-R thru 217382-R, 217384-R thru 217387-R.
TSIO-520-J	218983-R, 218984-R.
TSIO-520-JB	237183-R, 237184-R.
TSIO-520-LB	237295-R, 237296-R.
TSIO-520-M	291823-R thru 291850-R, 291852-R thru 291857-R, 291861-R thru 291863-R, 291865-R, 291868-R, 291869-R.
TSIO-520-NB	290966-R, 290967-R, 290969-R thru 290974-R, 290978-R, 290979-R, 290981-R thru 290989-R, 290992-R, 290993-R, 290995-R, 290996-R, 290998-R, 290999-R, 813501-R.
TSIO-520-P	278774-R, 278776-R thru 278781-R, 278785-R thru 278790-R.
TSIO-520-R	293845-R thru 293847-R, 293849-R thru 293861-R, 293863-R thru 293869-R, 293872-R thru 293875-R, 293877-R.
TSIO-520-T	239436-R thru 239445-R.
TSIO-520-UB	809316-R, 809317-R.
TSIO-520-VB	811061-R, 811065-R, 811067-R thru 811073-R, 811075-R, 811076-R, 811079-R thru 811083-R, 811085-R, 811087-R thru 811095-R, 811097-R thru 811104-R, 811107-R thru 811111-R, 811114-R, 811116-R.
TSIO-520-WB	274376-R, 274379-R thru 274393-R, 274395-R, 274396-R, 274398-R.
LTSIO-520-AE	246654-R.
GTSIO-520-H	267443-R thru 267449-R, 267451-R, 267454-R.
GTSIO-520-L	292234-R thru 292239-R, 292241-R, 292243-R thru 292246-R, 292248-R thru 292257-R, 292259-R, 292260-R, 292262-R, 292264-R thru 292270-R.
GTSIO-520-M	810560-R thru 810562-R, 810564-R thru 810570-R, 810573-R thru 810576-R, 810579-R, 810580-R, 810582-R thru 810587-R.
GTSIO-520-N	808289-R, 808292-R, 808293-R, 808295-R, 808296-R.
TSIO-550-C	802557-R thru 802560-R, 802562-R thru 802564-R.
TSIOL-550-A	800636-R thru 800638-R, 800642-R.


ISSUED			REVISED			 TELEDYNE CONTINENTAL MOTORS An Allegheny Teledyne Company P.O. Box 90 Mobile Alabama 36601 Ph. 334-438-3411	PAGE NO	REVISION
MO	DAY	YEAR	MO	DAY	YEAR		7 of 11 CSB97-10	A
06	19	97	07	15	97			

TABLE 2 - AFFECTED CYLINDERS

The following table contains cylinder part numbers affected by this bulletin and the engine models on which they are utilized. Any 240, 360, 520 or 550 cylinder identified with the affected part number that was shipped from TCM within the dates listed must be inspected in accordance with the instructions set forth in PART 1 or PART 2 of this bulletin. All E-Series and 470 series cylinders identified below must be inspected in accordance with PART 2 of this bulletin

NOTE: Cylinders that are identified with the letter "M" or "P" steel stamped after the cylinder position number are not affected by this bulletin. The cylinder position number is located at the 12 o'clock position on the cylinder mounting flange.

TABLE 2 - AFFECTED CYLINDERS

ENGINE MODEL	AFFECTED DATES	(1) Affected Cylinder P/N
All IO-240, IO-360-ES, TSIO-360-MB	3-11-97 to 6-9-97	654702
All IO-360, TSIO-360 & LTSIO-360	3-11-97 to 6-9-97	654701
All E-Series	3-13-97 to 6-9-97	654761
O-470-A, E & J, IO-470-J & K	2-20-97 to 6-9-97	654657
O-470-G, GCI, K, L, M, R & S, IO-470-C	3-7-97 to 6-9-97	654649
O-470-U, IO-470-D, E, F, H, L, M, N, S, U, V & VO	3-7-97 to 6-9-97	654650
All IO-520, TSIO-520-AF, CE & UB, IO-550-A, B & C	1-7-97 to 6-9-97	654651
IO-550-D, E, F & L	2-18-97 to 6-9-97	654653
TSIO-520-B, BB, C, D, DB, E, EB, G, H, J, JB, K, KB, L, LB, M, N, NB, P, R, T, VB, WB	1-15-97 to 6-9-97	654652
IO-550-G, TSIO-520-BE, GTSIO-520-F & K	2-12-97 to 6-9-97	654656
TSIO-520-AE, LTSIO-520-AE	3-6-97 to 6-9-97	654658
TSIO-550-A, B, C, E	3-13-97 to 6-9-97	654659
TSIOL-550-A, B	3-13-97 to 6-9-97	654648
GTSIO-520-C, D, H	2-12-97 to 6-9-97	654655
GTSIO-520-L, M, N	1-21-97 to 6-9-97	654654
(1) This will include all suffixes of these numbers; i.e. 654651A5.		

ISSUED			REVISED			 TELEDYNE CONTINENTAL MOTORS An Allegheny Teledyne Company P.O. Box 90 Mobile Alabama 36601 Ph. 334-438-3411	PAGE NO	REVISION
MO	DAY	YEAR	MO	DAY	YEAR		8 of 11	A
06	19	97	07	15	97		CSB97-10	

Appendix A - Instructions For Returning Removed Cylinders For Inspection.

Contact the TCM Customer Service Desk at (334) 438-3411, Ext. 81, for packing material and shipping labels. Please be prepared to provide the following information.

Engine Model and Serial Number
Shipping Address

1. Using the shipping labels provided;
 - a. Complete a Return Tag for each cylinder and attach to the cylinder.
 - b. Complete a Return Tag for each piston pin and attach to the piston pin.
 - c. Complete a shipping label for each cylinder and attach to the outside of the box.
 - d. Complete a return shipping label for each cylinder and place inside the box. (This label will be used for returning the cylinder to you.)

2. Ship all packages to TCM as follows.
 - a. Ship via Emery 2nd Day Air, Inbound Collect.
On the Airbill, reference:

Account #545519019
Consignee Reference #75970400

Ship To: Teledyne Continental Motors
2000 Ninth Street
Mobile, AL 36615
Attn. Cylinder Inspection Program

ISSUED			REVISED			 TELEDYNE CONTINENTAL MOTORS <small>An Allegheny Teledyne Company P.O. Box 90 Mobile Alabama 36601 Ph. 334-438-3411</small>	PAGE NO	REVISION
MO	DAY	YEAR	MO	DAY	YEAR		9 of 11 CSB97-10	A
06	19	97	07	15	97			

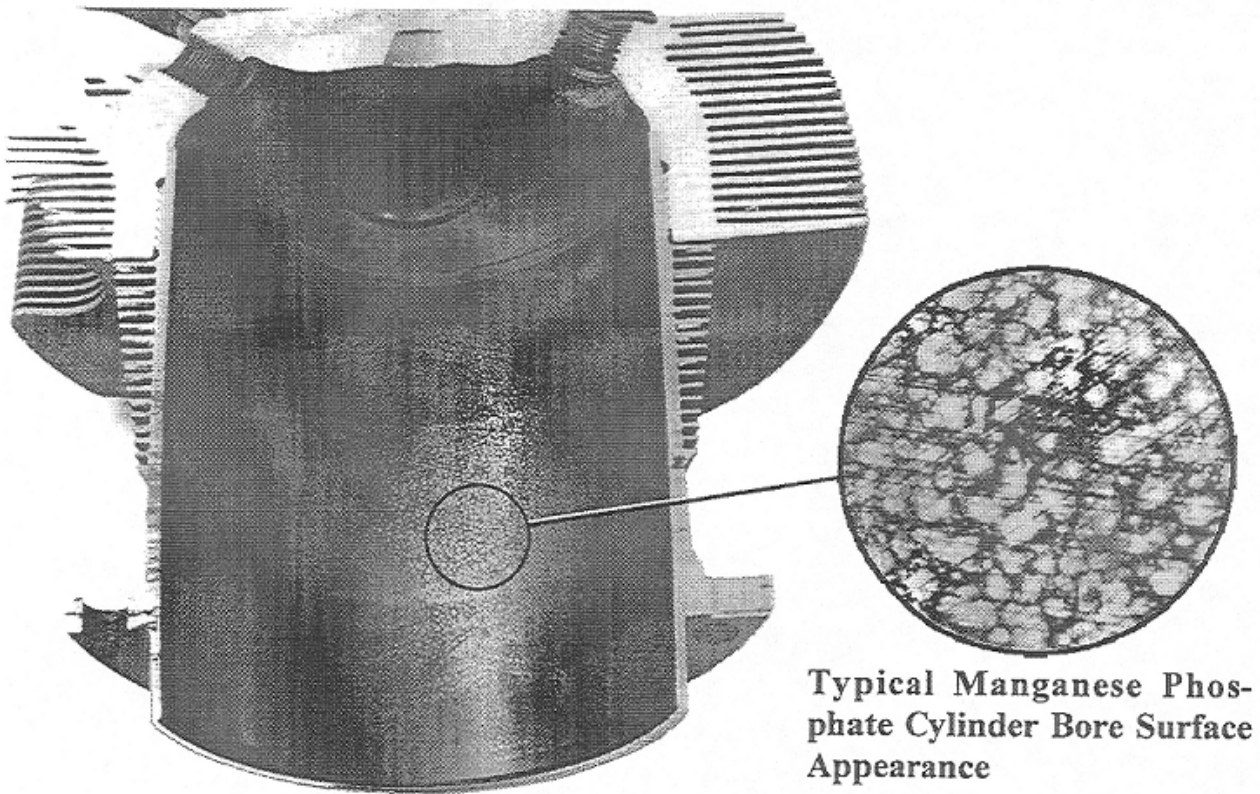


Figure 1.

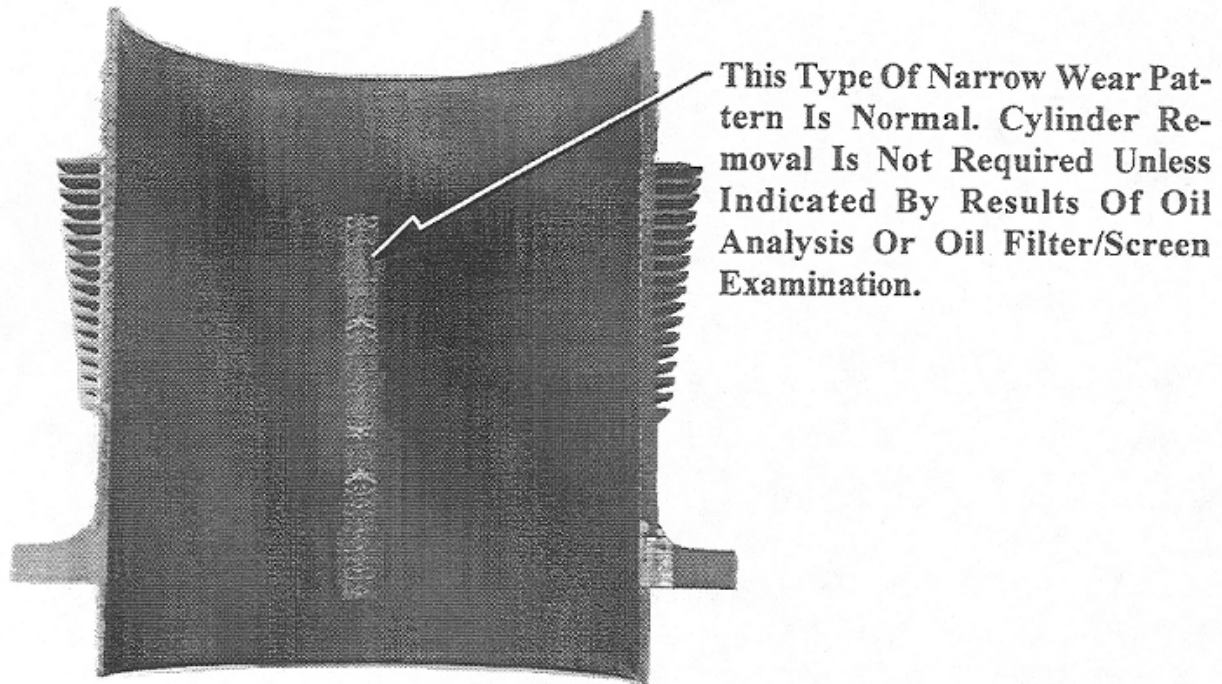
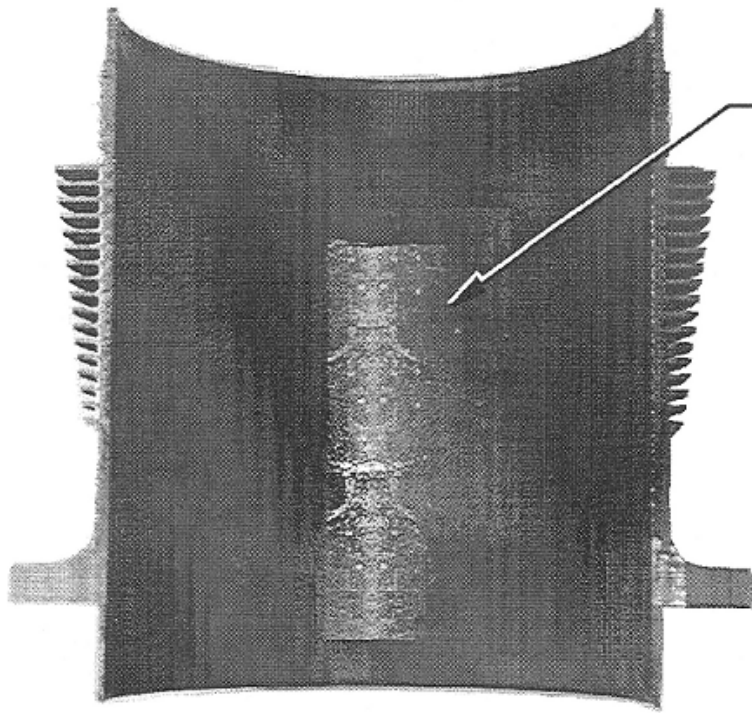


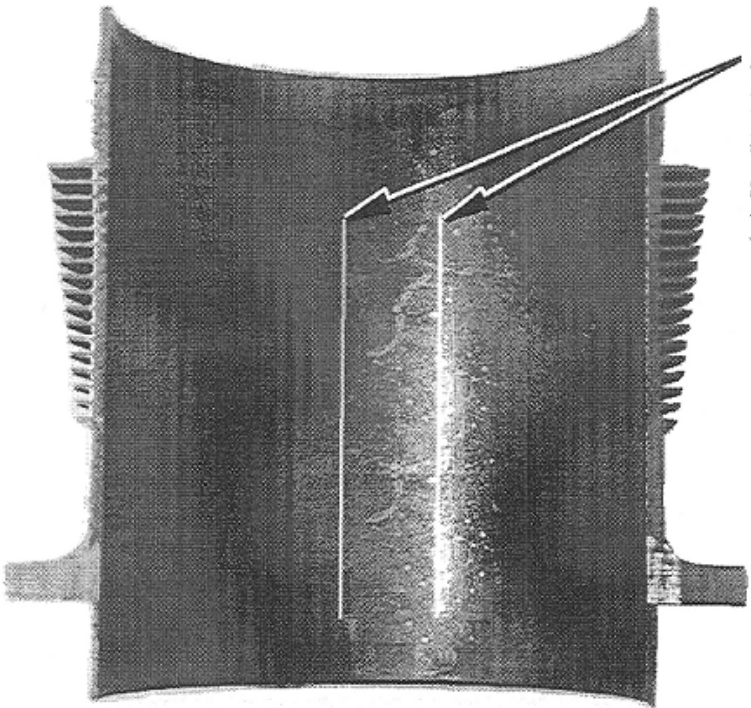
Figure 2.

ISSUED			REVISED			TELEDYNE CONTINENTAL MOTORS An Allegheny Teledyne Company P.O. Box 90 Mobile Alabama 36601 Ph. 334-438-3411	PAGE NO	REVISION
MO	DAY	YEAR	MO	DAY	YEAR		10 of 11 CSB97-10	A
06	19	97	07	15	97			



Any Cylinder Bore That Exhibits This Type Of Wide Wear Pattern Must Be Removed For Inspection.

Figure 3.



Any Cylinder Bore That Exhibits These Distinct Vertical Wear Signatures At The 3 O'clock Position Or 9 O'clock Position Must Be Replaced.

Figure 4.

ISSUED			REVISED			 TELEDYNE CONTINENTAL MOTORS An Allegheny Teledyne Company P.O. Box 90 Mobile Alabama 36601 Ph. 334-438-3411	PAGE NO	REVISION
MO	DAY	YEAR	MO	DAY	YEAR		11 of 11	A
06	19	97	07	15	97		CSB97-10	