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SERVICE INSTRUCTION

DATE: December 15, 2009

Service Instruction No. 1246B
(Supersedes Service Instruction No. 1246A)
Engineering Aspects are
FAA (DER) Approved

SUBJECT: Engine Conversion For Use of 100/130 or 100LL Grade Fuel

MODELS AFFECTED: O-235, O-290 series engines.

TIME OF COMPLIANCE: During engine overhaul or earlier at owner's discretion.

Although solid stem valves and bronze valve guides have been an ideal combination in smaller, low compression engines, operators of aircraft powered by these engines have encountered difficulties when forced to use highly leaded fuels instead of the grades 80 and 80/87 fuels originally specified for them. The lead deposits that are associated with the use of high lead content fuels cause valve erosion and accelerated valve guide wear. These conditions can be alleviated by replacement of the solid stem valves and bronze guides with sodium cooled valves and guides made of ni-resist alloy. At the time of new exhaust valve replacement, also install improved intake valves P/N 17A23939.

The procedure and parts required to accomplish this replacement are described in the following paragraphs. Owners and operators who convert their engines in this manner are not restricted to grades 80 and 80/87 fuel. High lead content 100/130 or 100LL fuels may be used continuously without the 150 hour valve guide inspection requirement described in the latest revision of Service Instruction No. 1070.

NOTE

100/130, dyed green, contains a maximum amount of tetra-ethyl lead (TEL) of 4 ml/U.S. gallon while 100LL, dyed blue, contains a maximum amount of TEL of 2 ml/U.S. gallon. Also note that in some overseas countries, 100LL is designated as "100L" and is dyed green.

1. Remove the valve guide from the cylinder; this is accomplished with the Puller P/N ST-49. See the appropriate overhaul or maintenance and overhaul manual for specific instructions.
2. Carefully clean the area of the cylinder head to remove oil and loose dirt and measure the hole in the cylinder head with P/N ST-429 standard plug gage. If the no-go end of the gage enters the hole more than 1/8 inch, it will be necessary to ream the hole and install an oversize guide. If the gage enters the hole easily or seems loose in the hole, it is evident that an oversize guide has already been installed and the next larger guide must be used.
3. Mount P/N 64501 valve guide replacement fixture on a drill press table. Fasten cylinder securely in place on fixture.



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4. Having determined the proper size reamer, mount the reamer in the drill press spindle and ream the valve guide hole in the head. Check the reamed hole with the corresponding gage. See Special Service Tools.
5. Heat the cylinder to 400°F. - 425°F. for at least 2 hours. Place the new guide on P/N 64796 valve guide installation drift and insert the guide in the hole in the cylinder head. Drive the guide to a firm seat with sharp hammer blows on the end of the drift. After the cylinder has cooled, ream the valve guide with P/N ST-27 valve guide ID reamer for the exhaust and P/N 64684 valve guide ID reamer for the intake, at a speed of approximately 500 RPM. Note that this is an end cutting reamer and is to be fed slowly into the guide. Use cutting oil liberally; finish is to be no more than 30 micro inches maximum. Check the finished ID of the guide with P/N ST-26 valve guide ID plug gage for the exhaust and P/N 64514 valve guide ID plug gage for the intake.

NOTE

FOR ADDITIONAL INFORMATION ON HONING THE EXHAUST GUIDES, USE LATEST REVISION OF SERVICE INSTRUCTION NO. 1200.

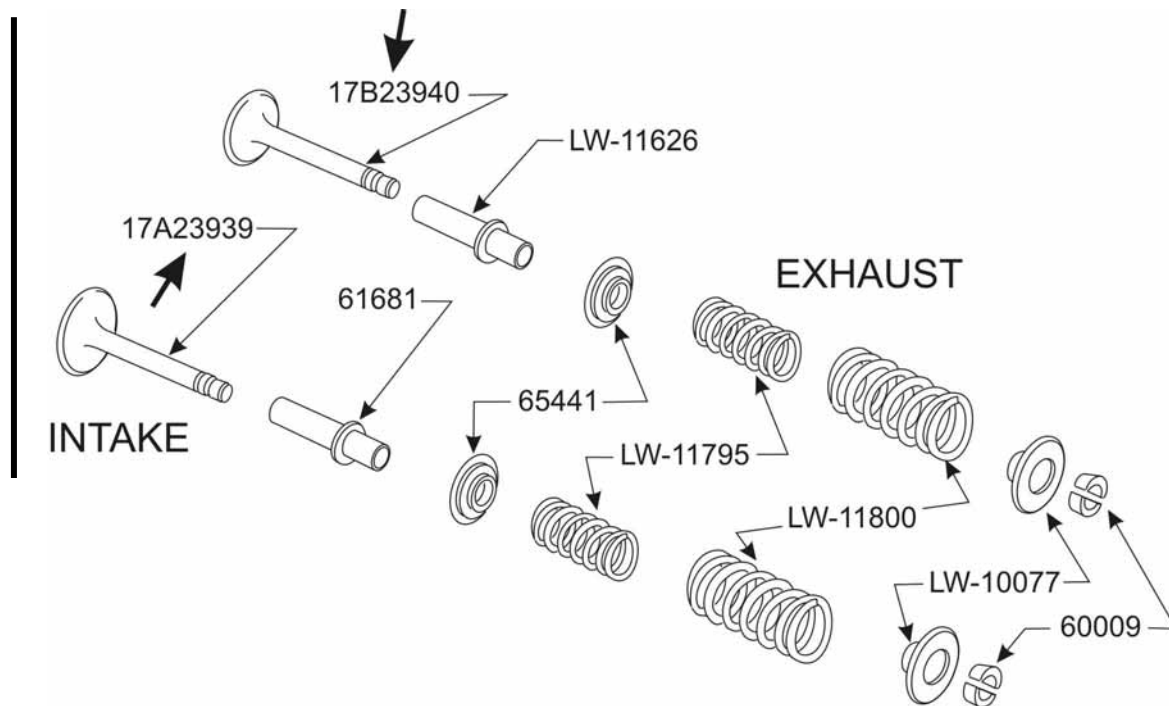


Figure 1. Intake and Exhaust Valve Components Showing Order of Assembly

6. Face the valve seat, locating from the hole in the valve guide. Clean cylinder to remove all traces of metal shavings.
7. Reassemble the cylinder using the new parts shown in the chart. See Figure 1 for proper sequence of components showing order of assembly.

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PARTS REQUIRED:

<u>Part No.</u>	<u>Description</u>	<u>Qty.</u>
LW-12040	Top Overhaul Gasket Kit	1
77611	Exhaust Flange Gaskets	4
LW-11626**	Ni-Resist Exhaust Valve Guide	4
61681**	Intake Valve Guide	4
17B23940	Exhaust Valve	4
17A23939	Intake Valve	4
60009	Key Valve	16

** - These part numbers are only available at P05, 10, 20, 30 and 40 oversize.

SPECIAL SERVICE TOOLS:

64501	Fixture - Valve Guide Replacement
ST-429	Plug Gage (Std.) valve guide hole in cylinder head
ST-429-5	Plug Gage .005 in. o/s valve guide hole in cylinder head
ST-429-1	Plug Gage .010 in. o/s valve guide hole in cylinder head
ST-429-2	Plug Gage .020 in. o/s valve guide hole in cylinder head
ST-429-3	Plug Gage .030 in. o/s valve guide hole in cylinder head
ST-429-4	Plug Gage .040 in. o/s valve guide hole in cylinder head
ST-430-5	Reamer .005 in. o/s valve guide hole in cylinder head
ST-430-1	Reamer .010 in. o/s valve guide hole in cylinder head
ST-430-2	Reamer .020 in. o/s valve guide hole in cylinder head
ST-430-3	Reamer .030 in. o/s valve guide hole in cylinder head
ST-430-4	Reamer .040 in. o/s valve guide hole in cylinder head
64796	Drift - Valve Guide Installation
ST-26	Plug Gage - Valve Guide ID - Exhaust
ST-27	Reamer, Valve Guide ID - Exhaust
ST-49	Puller - Valve Guide
64514	Plug Gage, Valve Guide ID - Intake
64684	Reamer, Valve Guide ID - Intake

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