

TEXTRON Lycoming

Reciprocating Engine Division/
Subsidiary of Textron Inc.
652 Oliver Street
Williamsport, PA 17701 U.S.A.

MANDATORY SERVICE BULLETIN

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SUBJECT: Maintenance Procedures and Service Limitations for Valves

MODELS AFFECTED: All Avco Lycoming opposed series aircraft engines.

TIME OF COMPLIANCE: During periodic maintenance and when intake and exhaust valves are removed from cylinders.

Valves used in Avco Lycoming aircraft engines are made from various steel alloys and in a variety of designs, each dependent on the requirements for the particular engine model in which it is employed. Regardless of varieties, all of these valves have identical functions, serve the same purposes and are subject to the same service maintenance.

Of all of the forces that act on the valves to create maintenance problems, perhaps heat is the most destructive. Heat, generated in the cylinder, is conducted to the heads of the valves, and in addition, hot gas flowing at high velocity across them combine to make valve corrosion and distortion an ever-present likelihood. For these reasons, it is necessary that all maintenance involving the valves, valve seats, and valve guides, be carried out with the utmost care.

The following outline is provided to serve as a standard for all valve maintenance procedures on Avco Lycoming engines.

1. VALVE INSPECTION (400 Hour Maintenance Inspection). During each 400 hour engine maintenance check, the following procedure shall be conducted:

a. Remove rocker box covers and inspect inside of covers for evidence of wear; then make a visual inspection inside the rocker box area for possible damage, paying particular attention to the valve springs, valve keys and rockers, valves and guides.

b. Rotate the engine by hand and check to determine that all cylinders have normal valve lift and that rocker arms operate freely.

NOTE

O-235-C and O-290-D models have mechanical tappets, and it is necessary

to check clearance between valve tip and rocker every 100 hours. However, all other models have hydraulic valve lifters and consequently, periodic clearance check is not necessary.

c. If any parts in the rocker box area (including the cover) are broken, cracked or show any signs of unusual wear, the cylinder and related parts should be disassembled and inspected.

2. VALVE INSPECTION (Cylinder Removed from Engine). If cylinder has been removed from engine, or if engine has been disassembled for overhaul, valves should be inspected in the following manner.

a. Remove valves from cylinder and clean to remove carbon and examine visually for physical damage, damage due to face burning or excessive corrosion in stem to head fillet area. Valves that indicate damage of this nature must not be reused. Do not reuse valves in which stem diameters midway of valve measure less than that measured at key end; excepting inconel valves which may be .002 undersize on stem diameter as shown in figure 1.

NOTE

Exhaust valve should not be reused unless they had been recently installed and are satisfactory in respect to these inspection requirements, 2 a. thru f.

b. If valves require refacing, remove only enough metal to provide a smooth surface.

c. After refacing, check runout of valve face. See figure 2. Total runout must not exceed .0015 inch. Do not reuse any valves that exceed this limit.

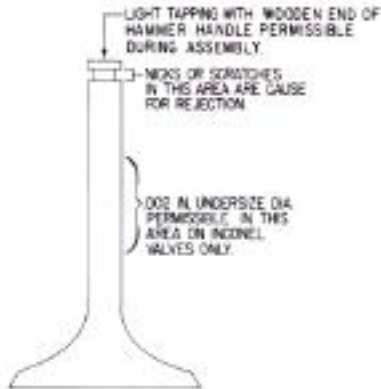


Figure 1. Diagram of Valve Showing Area for Inspection

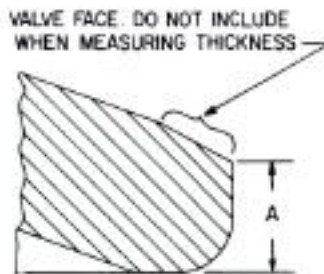


Figure 2. Valve Showing Locations for Checking Runout and Section for Measuring Edge Thickness

d. Measure edge thickness of intake valve heads. See figure 2. If, after refacing, "A" is less than the limit shown in the following chart, the valve must not be reused.

NOTE

The edge of intake valve heads are generally formed as shown in figure 3. The thickness "A" can best be measured with an optical comparator; however, it can be measured with sufficient accuracy by means of a dial indicator and a surface plate, as shown in figure 4.

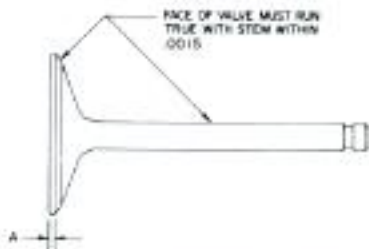


Figure 3. Section Thru Edge of Valve

e. Using an optical magnifier, examine exhaust valves in the stem area and the tip for evidence of cracks, nicks, tool marks, or other indications of damage. Damage of this nature seriously weakens the valve, making it liable to failure. Any exhaust valve having a nick, with ragged edges and more than 1/16 inch in length should not be reused. A nick or tool mark of any sort in the keeper groove of an exhaust valve is sufficient reason for not reusing the valve.

f. If superficial nicks and scratches on the valve indicate that the valve might be cracked, it should be inspected by the magnetic or dye penetrant method. Dye penetrant procedures should be carried out strictly within the recommendations of the manufacturer of the penetrant.

3. VALVE REPAIR. Repairs to valves are limited to removal of carbon, regrinding the face, and polishing superficial scratches. Bending processes, to straighten and puddling to restore the face must not be attempted.



Figure 4. Method of Checking Valve Edge Thickness with Dial Indicator

4. VALVE INSTALLATION. Prior to valve installation, inspection of the valve guides and seats should be made in accordance with instructions in the applicable overhaul manual. Do not install either new or used valves in cylinders with excessively worn or damaged valve guides or valve seats. Be sure to pre-lubricate valves before assembly; see Service Instruction No. 1059. Also, replace valve keys when installing new exhaust valves.

a. Valve keys tend to wear in uniform, distinctive patterns and therefore if they are to be reinstalled in the cylinder, they should be returned to the same position as they were before removal; that is, they must not be installed up-side-down at a different valve location.

b. If valve seats have been properly ground, the valve should seat without lapping. However, if lapping is used, care must be exercised to keep lapping compound away from the valve stem and guide. Be sure all traces of lapping compound are removed from the cylinder parts before they are assembled.

CAUTION

Do not directly tap end of valve with any object; the tip of the valve could be damaged. Instead, place the wooden end of a hammer against the end of the valve and strike the head of the hammer with the palm of the hand.

Intake Valve Part No.	Minimum Permissible Edge Thickness "A"
60037	.040 inch
66429	
LW-11901	
67905	.050 inch
72625	.060 inch
73938	
LW-15314	
73129	.075 inch
LW-13622	
67518	.085 inch
72612	
73117	
73876	
78671	
LW-12949	
LW-13087	
LW-13262	

NOTE: Revision "B" changes paragraph 1, a, c; Caution note on page 3; table on page 3. Paragraph 4 revised to add step a.