

SERVICE INSTRUCTION

DATE: September 28, 1998

Service Instruction No. 1191A
(Supersedes Service Instruction No. 1191)
Engineering Aspects are
FAA Approved

SUBJECT: Cylinder Compression

MODELS AFFECTED: All Textron Lycoming aircraft engines.

TIME OF COMPLIANCE: As required to determine cylinder compression.

The condition of the working parts in the combustion chamber of a cylinder can be determined by measuring the static leak rate of the cylinder as compared to the leak rate through an orifice of specified size. This is accomplished by attaching a differential compression measuring device, which incorporates the orifice, to one spark plug hole of the cylinder while the piston is at top center of the compression stroke.

CAUTION

TAKE ALL NECESSARY PRECAUTIONS AGAINST ACCIDENTAL FIRING OR ROTATION OF THE ENGINE.

The piston is held at top dead center by firmly holding the propeller to prevent the engine from turning when air pressure is applied through the differential compression device to the combustion chamber.

CAUTION

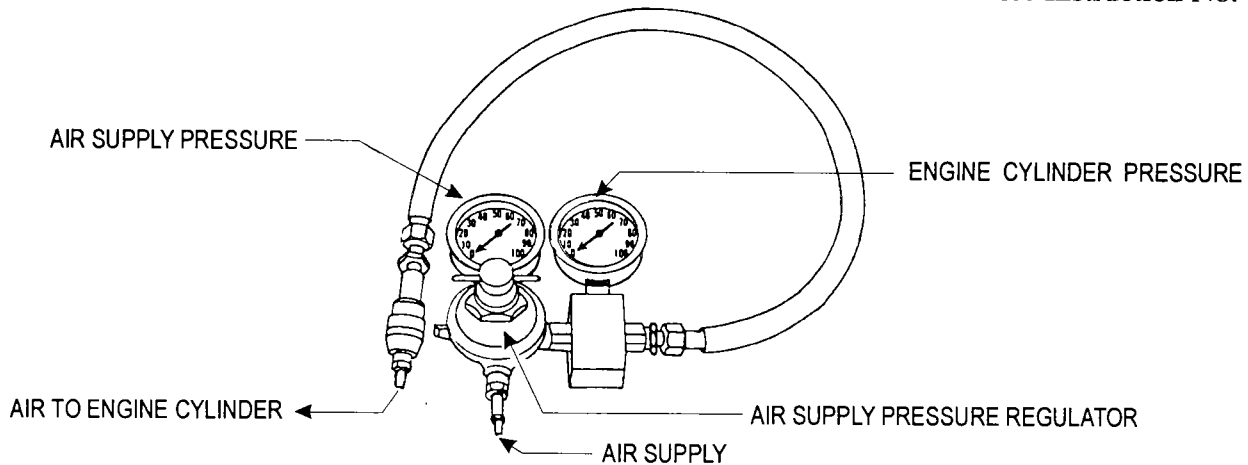
USE GLOVES OR RAGS TO PROTECT THE HANDS WHILE HOLDING THE PROPELLER BLADE. ALSO, BEFORE ATTACHING THE COMPRESSION TESTER, CHECK THE AIR SUPPLY REGULATOR TO MAKE SURE THE AIR PRESSURE TO THE CYLINDER IS NOT EXCESSIVE. AIR PRESSURE IN THE CYLINDER CAN CAUSE THE PROPELLER TO TURN; KEEP CLEAR OF THE PATH OF THE BLADES.

To assure that the piston rings are seated, the propeller is moved slightly back and forth with a rocking motion while air pressure is applied; thus providing a more accurate reading. Meanwhile, a second person adjusts the air supply pressure to 80 psi, indicated on the supply pressure gage of the differential compression device. Then, observation of the engine cylinder pressure gage will give an indication of the condition of the parts in the combustion chamber of the cylinder.

NOTE

The orifice size of the differential compression measuring device is critical if consistent and meaningful cylinder analysis are to be obtained; the larger the orifice the less chance of detecting potential problems. Therefore, a specific orifice size that provides an acceptable leak rate has been selected for all Textron Lycoming engines; the instructions described herein are based on this orifice which is .040 in. dia. (No. 60 drill) x .250 in long, with entrance angle of 59°/60°.

At any time loss of power, increasing oil consumption, hard starting or other evidence of unexplained abnormal operation is encountered, a compression check of the cylinders is recommended with equipment and in the manner described above by personnel experienced with the equipment and with the type of engine to be checked. In practice the procedure is as follows:



Typical Differential Compression Measuring Device

1. Operate the engine until normal cylinder head and oil temperatures are attained; then shut down the engine making sure that magneto switches and fuel supply valves are shut off. Proceed with the test as soon as possible after shut down.
2. Conduct the test in accordance with the test equipment manufacturer's recommendations.
3. Interpretation of the results of the test is highly dependent on the skill and judicious opinion of the tester; however, the following observations cover the principle factors to be noted:
 - a. Pressure readings for all cylinders should be nearly equal; a difference of 5 psi is satisfactory; a difference of 10 to 15 psi indicates an investigation should be made.

NOTE

Unless the pressure difference exceeds 15 psi the investigation should not necessarily mean removal of the cylinder; often a valve will reseat itself and result in acceptable compression during a later check which should be made within the next 10 hours of operation.

- b. If the pressure reading for all cylinders is equal and above 70 psi; the engine is satisfactory; less than 65 psi indicates wear has occurred and subsequent compression checks should be made at 100 hour intervals to determine rate and amount of wear. If the pressure reading is below 60 psi or if the wear rate increases rapidly, as indicated by appreciable decrease in cylinder pressure, removal and overhaul of the cylinders should be considered.
- c. Low pressure in a single cylinder is indicative of air passing by the piston or by the valve.
- d. Air discharged from the breather or oil filler tube indicates leakage in the area of the piston and rings.
- e. Air discharged through the intake system indicates leakage at the intake valve.
- f. Air discharged from the exhaust system indicates leakage at the exhaust valve.