



# Compression TESTING

WHY AND HOW TO TEST

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A compression test on the Model A will help to check the internal condition of the engine. The compression pressure is taken on each of the four cylinders, then recorded and compared. Most compression loss in a Model A engine is due to defective valves. This could include not properly adjusted valves, worn springs or guides, bent valve, or valves not seating properly due to a carbon build up. If the valves are known to be in good condition it may be worn piston rings or a leaking head gasket.

Compression pressure can be changed by the following: decking the block, shaving the cylinder head, increasing the bore, or installing a high compression head. Why do people want higher compression? Higher compression will give the Model A more power and in theory better fuel mileage. The stock Model A cylinder head had a compression ratio of 4.2 to 1. Later in production the "Police Head" was developed and produced a compression ratio of 5.2 to 1. Again, note that the engine bore effects the compression ratio. A large engine bore diameter will create more compression pressure, thus creating higher compression.

Also compression reading is a factor of barometric pressure. Knowing that, the same engine will read different at sea level than it will at 2,000 feet above sea level. The stock head (on a fresh rebuilt, sleeved engine that is broke in) will produce about 60 psi per cylinder at sea level, and will read higher as the barometric pressure rises. This could be due to higher altitudes or weather conditions. The important factor is that each cylinder should read within 5 to 6 pounds of pressure to each other.

Any time the compression ratio is changed one must know the condition of the babbitted bearings. The experts who pour babbitt bearings will tell you to stay at 6.3 to 1 or less, so as not to place excessive force on the babbitt. For example if you have a touring engine with inserted bearings then it is recommended that 7.1 to 1 be the highest compression ratio to use to prevent damage to the engine.



A compression gauge (Fig.1) will measure the pressure developed in each of the four cylinders. To check the compression of the Model A the gauge is threaded into an adaptor (Fig.2) and that adaptor will thread into the spark plug holes in the cylinder head. (Fig.3).

Most mechanics will suggest that the compression reading of the lowest cylinder be within 5 to 6 psi of the highest cylinder. For example if the highest cylinder pressure was 65 psi, then the lowest acceptable reading would be 59 psi. This difference is an indication of a good for strong running Model A engine. Please note that the compression values are not as important as is the difference in readings between the four cylinders.



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### How to perform a compression test

1. Engine should be at operating temperature. (Metal parts inside the cylinder expand and seal better).
2. Ignition key in the off position.
3. Coil wire disconnected from coil. (I use a safety cap made from an old distributor

body) Fig. 3.

4. Throttle lever on steering column all the way down.
5. Remove all four spark plugs and connectors. (This allows the starter to turn the engine easier).
6. Insert the compression gauge into cylinder #1 (front of engine).
7. Crank the engine four revolutions and record the pressure.
8. Take compression readings on the other three cylinders and record.
9. Compare the recorded values for all four cylinders. They should not vary by more than 5 or 6 psi. per cylinder.
10. Install the spark plugs and connectors along with the coil wire.
11. Return the throttle lever to the top of the steering column.

Note: This test is best performed using two workers. One should be inside the car controlling the throttle and starter. The other worker is on the outside by the passenger side of the engine connecting the compression gauge and recording the readings.

Fig 3 and Fig 4 show testing of various heads.



The Average Compression Pressure values shown were derived from testing local Model A's. Our test group did not have any Lion, Thomas or Winfield heads.

The values are an average and will change according to the barometric pressure at the time the compression test was taken. Also, compression gauges can vary slightly in readings.

Below is a sample of the "Compression Test Recording Form." This form can be used to record the compression test information.

### Average Compression Pressure

Stock head	4.22 to 1	50 to 64 pounds
Police head	5.20 to 1	65 to 72 pounds
Brumfield standard	5.20 to 1	65 to 70 pounds
Snyder's head	5.50 to 1	65 to 75 pounds
Snyder's #2 head	6.10 to 1	75 to 85 pounds
Lion head	6.50 to 1	
Thomas head	6.70 to 1	
Winfield head	6.80 to 1	
Brumfield head	7.00 to 1	85 to 105 pounds

Compression Test Recording Form

Name or Model A: \_\_\_\_\_ Year of A 28 29 30 31

Engine type: A or B Bore size: \_\_\_\_\_

Type of head: Stock Stock-shaved Snyder's 5.5 to 1  
 Snyder's 6.1 to 1 Lion Thomas Brumfield Winfield Other: \_\_\_\_\_

Cylinder readings are taken from the front to the rear of the engine.

Front

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Is the lowest reading within 5 to 6 psi of the highest reading? Yes No If yes, the engine is good. If no, more trouble shooting should be done on this engine.

Date the test was taken: \_\_\_\_\_

