

# Vacuum Testing an Engine

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Before the days of computer engine diagnosis, savvy mechanics used this simple instrument to pin down all kinds of engine problems quicker than some modern equipment can be hooked up. Vacuum gauge testers are still readily available from automotive stores at a nominal cost. Two of the main marketers of them are KD Tool Company and Lisle Tool company, and both are quite likely to have the same instrument in their package. Most parts stores will have one of these two companies in their product line.

If you want to know what's going on inside your engine without taking it apart, looking, and perhaps missing the real problem anyway, get yourself a vacuum gauge like this one. It will tell you everything you want to know and in some cases, things you don't want to see.

When using any vacuum gauge keep in mind that they are all calibrated at sea level and read-outs in the instructions are in reference to that level. When above sea level all readings will drop one division per each 1,000 feet of altitude above sea level. Thus a reading of 20 inches of vacuum at sea level would drop to 19 inches at 1,000 feet, 18 inches at 2,000 feet, etc. All readings are taken at idle except as noted. The gauge kit will have an adapter or two and complete detailed instructions in the package.

The initial hook-up is made anywhere on the intake manifold except where the distributor vacuum advance connects. You can T into that line, but the vacuum advance must be connected to get the proper readings.

**TESTING MANIFOLD VACUUM:** Warm up the engine and if necessary set the idle mixture and speed to optimum smooth idle. If the needle holds steady with more than 1/2 a gauge graduation of fluctuation you're good to go, everything is normal.

**CARBURETOR ADJUSTMENT:** This should be part of the first test in that you adjust the idle mixture and speed to the optimum vacuum reading while maintaining smooth idle. Remember to rev the engine to clear the spark plugs before taking your final reading and readjust if necessary. When you blip the throttle the needle should drop to as low as 2, pop back up to as high as 26, and quickly level off in the normal zone.

**STICKY VALVES:** A 3 or 4 point intermittent drop of the needle indicates a sticking valve(s). A quick double check of this condition is to shoot some penetrating oil through the carburetor while the engine is running. If the needle steadies up in the normal zone a while and goes back into the intermittent drop you have a/some valve sticking problem(s). This isn't a big deal and you can cure it quite easily. Just start adding some Marvel Mystery oil or Sea Foam to the gas as directed on the and the situation will be remedied in short order.

**IGNITION AND VALVE TIMING:** A low, 10 to 14 inch, but steady reading indicates faulty ignition or valve timing. Set the ignition timing to the correct recommended spec and everything will probably be OK. You can even set the timing very close to specifications with the vacuum gauge. Adjust the distributor to the highest steady vacuum reading at idle and you'll be close enough to know if that or valve timing is the problem. If you can't get the reading into the "normal" zone by adjusting the distributor then valve timing is the problem. Check and set the ignition timing with a timing light before driving the car, or at least back the timing off a hair and be on the alert for any pre-ignition pinging in the engine. Timing with a vacuum gauge will normally result in timing that is more advanced than what specifications call for. Faulty valve timing is pretty rare in a properly assembled engine, it doesn't change on it's own.

**TIGHT TAPPETS OR BURNED VALVES:** These conditions are indicated by an intermittent quick dropping of the needle into, as low as, the 14 inch zone. The drop and rise will be quick and consistent at idle. If you see this set

the tappets and run the test again. If you get the same, or nearly so, readings again you have a burnt valve.

***IMPORTANT SUPPLEMENT: Something I just thought of:*** You could get the same above readings caused by carbon build-up on the valves. Try running a can of Sea Foam through the intake, as instructed on the can, before committing to pulling the head for no good reason

**WEAK VALVE SPRINGS:** Weak springs will show as a normal vacuum reading at idle but a wildly jerking and fluctuating needle when the engine is revved up and running steady. The range of fluctuation can be as much as from 10 inches to 22 inches.

**WORN VALVE GUIDES:** If the needle fluctuates with jerky motions somewhere in the 14 to 21 inch range at idle but steadies as speed is increased the valve guides are worn.

**LEAKY HEAD GASKET:** A jerky fluctuating needle in the 8 to 20 inch range is a good indicator of a leaky head gasket, but could be a combination of the above listed valve problems ganging up on you. In any case you'll end up pulling the head and pinning it down before long.

**CHOKED MUFFLER:** A normal reading at idle with a gradual drop to 0 or very near it as the engine is speeded up is caused by a choked muffler, clogged cat converter, or any stoppage of exhaust flow.

**FUEL PUMP PRESSURE:** This one is pretty simple. Get a connection to the fuel line, run the pump and read the scale under the fat end of the needle.

There are a couple more tests that can be done with a vacuum gauge but are not applicable to cars as simple as our LBC's.

## John Dandy

(**theAutoist** NOTE: John Weimer's new "nom de plume")

**WEIMEROLOGY CHAPTER 3**