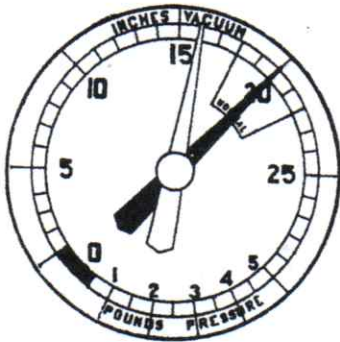


SAVVA Technical Tip 177 – Vacuum gauges

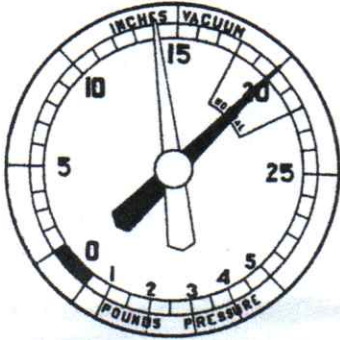
Years ago, a test instrument found in most tool boxes was a vacuum gauge. In recent years these have been replaced by more modern electronic devices, however, if we have problems with an older car perhaps using a vacuum gauge could be preferential to using modern electronic gadgetry to find out where the offending fault lies. Attached are two pages on how to use them - taken from an earlier edition of the Automobilst.

This is typical of an early gauge:

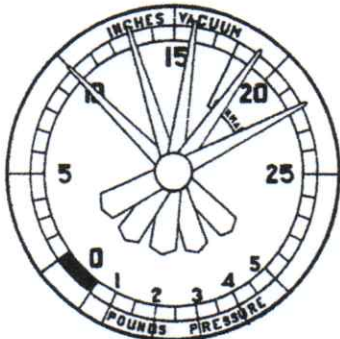




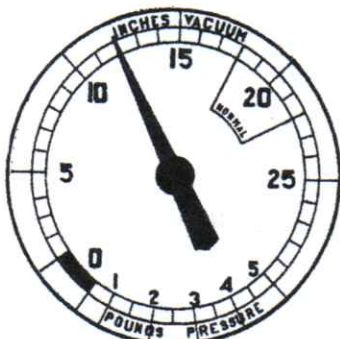
STICKY VALVES



BURNT OR LEAKY VALVES



WEAK VALVE SPRINGS



LATE VALVE TIMING

Manifold Vacuum test

Connect vacuum gauge hose to vacuum line leading directly to intake manifold. Make connection as close as possible to intake manifold and be sure that this connection is right, that hose is not kinked and that suction exists at points where connection is made. (On V type engines having two intake manifolds, make separate test on each manifold.)

Start engine and run at lowest idling speed. Adjust throttle butterfly valve and set idling adjustment on carburettor so that car will "idle" smoothly. On cars with manual spark advance, be sure that the spark is fully advanced. Now, if engine is in good operating condition, the vacuum gauge pointer will remain in the normal zone (between 18 and 22), with a possible slight fluctuation back and forth of one-half point on the dial.

NOTE:

Vacuum readings vary with altitude and, therefore, before making vacuum test, determine the altitude in your locality. For each one thousand feet above sea level, vacuum gauge readings will be lowered by one inch of vacuum or one division on the dial. Example - a vacuum reading of 20 inches at sea level would read 19 inches at 1000 feet above sea level, 18 inches at 2000 feet above sea level, etc.

Sticky Valves

If gauge pointer drops back intermittently about four points on the dial, this indicates sticky valves. To check this condition, disconnect vacuum hose and inject penetrating oil into manifold for temporary relief. If this occasional back drop of the pointer ceases you can be sure that the valves are sticking.

Burnt Valve

When this condition prevails, the gauge pointer has a constant drop whenever

burnt valve or valves which are holding open come into operation. This action can also be caused by insufficient valve tappet clearance.

Weak Valve Springs

With engine at idling speed, valves will seat properly and vacuum gauge pointer remains steady between 18 and 22. When engine is speeded up, vacuum pointer vibrates excessively, indicating a weak valve spring. If a fast vibration of vacuum gauge pointer is noted at idling speed and this fast vibration disappears with the increasing speed of the engine, valve stem guides are worn.

Valve Timing

First of all, normal compression in the cylinder is necessary for making a good vacuum test. If valve timing is late any appreciable amount, the vacuum gauge pointer remains steady at approximately 12 and a higher reading cannot be obtained.

Choke Test

With ignition switch in "off" position and THROTTLE CLOSED, turn engine over with starting motor. Pointer should rise quickly and steadily to 18 or 21. If the pointer stays around 3 to 6, this indicates a burned riser tube, air leaks in the manifold system, or failure of throttle valve to close.

Choked Silencer

Speed up engine several times in rapid succession, and if vacuum gauge pointer drops back to "0" quickly, this indicates a good silencer. A choked silencer is indicated by a slow drop of gauge pointer.

Vacuum Pump Test

If windshield wiper is connected to vacuum pump, connect vacuum gauge hose to wiper line. At idling speed, vacuum indication should not be less than manifold vacuum. With sudden opening of the throttle, vacuum in wiper line should NOT drop to zero, as a low

reading indicates broken diaphragm in pump and usually high oil consumption.

Vacuum Tank Test

To make this test, vacuum tank should be drained by disconnecting gasoline line leading to gasoline tank at inlet. Connect vacuum gauge hose to inlet of vacuum tank where gasoline line was connected; then run engine at idling speed and if the tank is in good condition, the pointer should show a reading of between 18 and 22. If lower readings are obtained, this indicates that the valve in the vacuum tank is not closing properly and should be repaired.

Carburation Test

A carburettor cannot be adjusted properly if other units in the engine are functioning poorly. Before making this test, check the engine for gasoline leaks at connections and under carburettor bowl. Have good compression, good ignition, good spark plugs, and proper valve action; also, if internal parts of carburettor are worn, or jets are stopped up or if improper size, satisfactory results will not be obtained.

After checking the above carefully, warm up engine to normal operating temperature and connect vacuum hose as close as possible to intake manifold. At idling speed, vacuum gauge pointer should remain steady between 18 and 22, having a properly adjusted carburettor. If pointer shows a slow floating motion between 14 and 22, turn idling adjustment screw, either to the rich or lean side, until the vacuum gauge pointer reaches the highest point without any appreciable vibration. For high-speed adjustment, adjust to highest reading obtainable on vacuum gauge without causing vibration of the pointer. (Some engines are equipped with carburettors with both high and low speed adjustments. In this case, make the high speed adjustment first.) For low speed adjustment, retard the spark, with engine at idling speed, and set idling adjustment at highest point obtainable without vibration of gauge pointer.

FUEL PUMP TEST

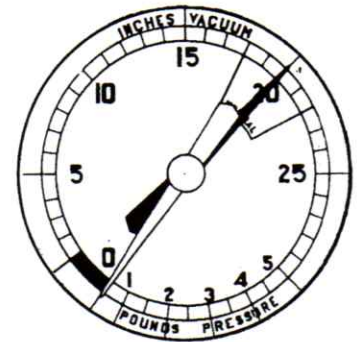
Fuel Pump Vacuum Test

Disconnect the gasoline feed line from gasoline tank to fuel pump; attach vacuum gauge hose to fuel pump inlet where gasoline line was disconnected. Start the engine and if fuel pump is in good condition, the vacuum gauge will build up to 10 before carburettor is empty and engine stops.

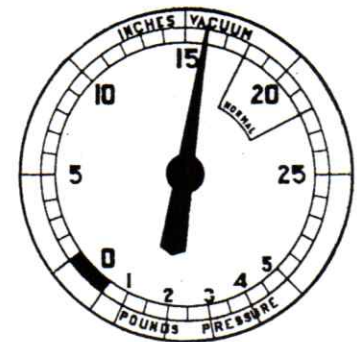
To test gasoline line for help, connect gasoline line to fuel pump or gasoline tank and allow carburettor to fill up with gasoline again. Disconnect gasoline line at gasoline tank and attach vacuum gauge hose to end of gasoline line. Start engine, and if there are no leaks in gasoline line, the gauge reading obtained will be the same as when testing the vacuum pump or the vacuum tank. A lower reading indicates a leak in the gasoline line.

FUEL PUMP PRESSURE TEST

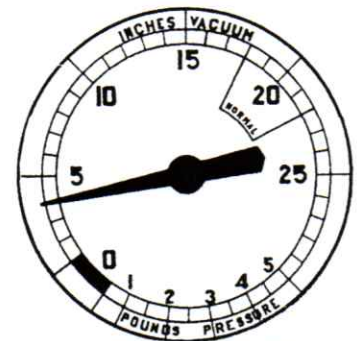
Disconnect the fuel line outlet from carburettor, which is the output side of the fuel pump and is the connection between the pump and the carburettor. Then connect vacuum gauge hose to output side of fuel pump. Run the engine at idling speed. (The gasoline in the carburettor bowl is generally sufficient to operate the engine for approximately two minutes). The vacuum pump reading should be a minimum of 1 1/2 pounds to a maximum of 4 pounds. A higher reading than four pounds will generally cause a rich fuel mixture with possible poor economy and in extreme cases may cause carburettor flooding. The vacuum pump should hold its pressure for several minutes after the engine has stopped before the gauge pointer gradually returns to zero. If this pressure does not hold, look for a worn pump valve, punctured diaphragm, or leaks around diaphragm. □



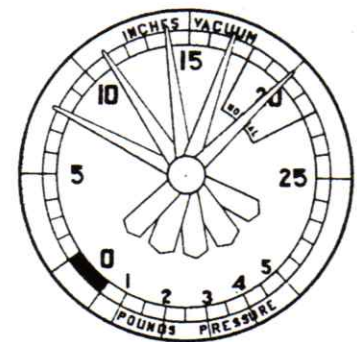
CHOKED SILENCER



LATE IGNITION TIMING



LEAKY INTAKE OR CARBURETTOR GASKETS



LEAKY HEAD GASKETS