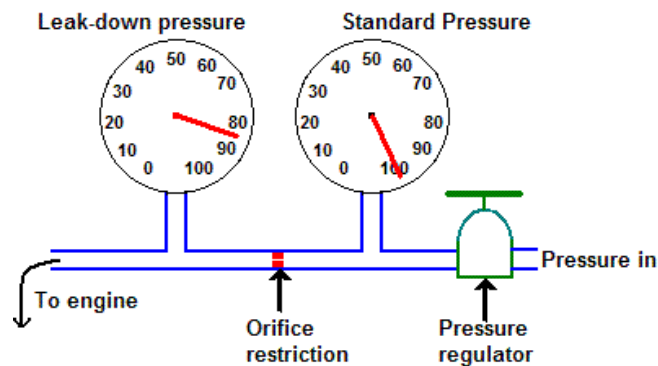


ENGINE CYLINDER LEAK – DOWN TESTING

A leak-down tester is a measuring instrument used to determine the condition of internal combustion engine. This is done by introducing compressed air into the cylinder and measuring the rate at which it leaks out. Compression testing is a crude form of leak-down testing which also includes effects due to various compression ratios, starter/battery condition, recoil starting systems, automatic decompression devices and other factors. Technicians performing leak-down tests can confine the results to cylinder leakage alone.

Testing is done on an engine which is not running and with the tested cylinder at top dead center of the compression stroke. Air pressure is fed into the top of the cylinder e.g. the spark plug hole (gasoline engine) or a fuel injector hole (diesel engine). The flow which represents any leakage from the cylinder is measured.

Leakage is given in wholly arbitrary percentages but these “percentages” do not relate to any actual quantity or real dimension. The meaning of the readings is only relative to other tests done with the same design of tester. Leak-down readings of up to 20% are usually acceptable while greater than that requires a repair.



HOW IT WORKS

A leak-down tester is essentially a miniature flow meter. The measuring element is the restriction orifice and the leakage in the engine is compared to the flow of this orifice. There will be a pressure drop across the orifice and another across whatever leaks in the engine. Since the meter and engine are connected in series, the flow is the same across both; the pressure drops will also be equal if, for example, the size of the unknown leak would be the same as the known orifice. This would give a reading of 50 which gives the same pressure drop across each element (both the leak and the orifice). Conversely, if there is no leakage there will be no pressure drop across either the orifice or the leak, giving a reading of 100 or 0% leakage.



- Before adding pressure to a cylinder always ensure the crankshaft is locked into position at TDC. Air pressure in the cylinder can cause the piston to drive downward turning the crankshaft and flywheel.
- Use a shop air source pressure of 110 ~ 125 PSI and using the regulator on the gauge set it to 100PSI during the test.
- Prior to testing, allow the engine to run for approximately 5 min
- Even a new engine will have some leakage; frequent testing of an engine will provide you with a known “satisfactory” range and a “poor” leakage amount.
- Always read the manufacturer’s operation and safety instructions provided with your leak down tester.
- Always consult the engine shop manual or engine manufacturers for recommendations on specific models.

The leak down tester can also be used to help identify the source or component causing the cylinder pressure leak.

- Bad rings/broken piston/cylinder damage - results in the air pressure leaking past the piston and can be detected by listen for the air leakage at the breather and oil filler cap.
- Bad exhaust valve - results in the air pressure leaking past the exhaust valve and can be detected by listening for air leakage at the exhaust pipe.
- Bad intake valve - results in the air pressure leaking past the intake valve and can be detected by listening for air leakage at the intake manifold and thru the carburetor.
- Bad head gasket - results in the air pressure leaking past the head gasket (cylinder to water jacket) and can be detected by looking to leakage or pressure in the radiator coolant.

Leak down testers can be sourced from many different manufactures.

- Snap-On tools
- Mac Tools
- Matco Tools
- Briggs & Stratton - Part # 19545 (comes with safety crankshaft holder)

NOTE: *Reference engine manufacturers repair manuals to consider any differences.*