

Snap-on®

**Cylinder Leakage Tester
User Manual**

US TOOL MART INC.



Before Testing

The engine must be at operating temperature. A cold engine does not insure proper tolerances, lubrication at the rings, or proper ring seating.

IMPORTANT

Engines with aluminum heads require special care to prevent stripping the spark plug threads. Since aluminum cylinder threads are less likely to strip when the engine is cold, it is good procedure to prepare for a cylinder leakage test by loosening and retightening the spark plugs when the engine is cold.

- Before removing spark plugs, always clean dirt from around the plugs by directing an air nozzle at the base of the plug. This insures proper seating of the adaptor and the new spark plugs. Apply a drop of oil to the threads of the adaptor and hand tighten into the cylinder head.
- A compressed air supply is required for making leakage tests. The air supply should be moisture free and capable of supplying a minimum of 120 psi (maximum pressure should not exceed 200 psi).
- A way of locating top dead center during the compression stroke of each cylinder is also required. When locating top dead center, always rotate the engine in the same direction as when engine is running.

Disabling the Ignition System

- Remote Coil
 - > Disconnect the coil wire from the distributor cap. Ground the coil wire.
- Integral Coil Distributor
 - > Disconnect the primary and trigger wire harness from the distributor.
- Distributorless Ignition
 - > Disconnect the power supply/trigger wire harness from the ignition control module. If none of these methods can be used to disable the ignition system, ground each spark plug wire to the engine with a short jumper wire.
- Coil On Plug Ignition
 - > Remove the ignition system fuse or relay.

Test Procedure

WARNING

- Set the gear selector in neutral for a standard transmission, or park for an automatic. Set the parking brake and block the drive wheels.
- Disable the Ignition system while testing by disconnecting the battery power from the coil, or grounding the coil secondary wire.
- Read, understand and follow the Safety Information in the front of this manual.

A moving vehicle can cause injury.

Two different test procedures are described in this manual.

- General Cylinder Problem Identification:
 - This procedure is recommended when simply attempting to determine the cause of a high cylinder leakage rate for a suspected cylinder.
- Cylinder Comparison Test:
 - This procedure is recommended for performing cylinder-to-cylinder comparison tests or when a more accurate cylinder leakage rate is desired.

General Setup

Steps 1–10 of the following instructions apply to both the General Cylinder Problem Identification and the Cylinder Comparison Test test procedures.

1. Run the engine until it reaches normal operating temperature.
2. Remove all spark plugs.
3. Remove the air cleaner, oil filler cap, engine oil dipstick and radiator cap. Open the throttle all the way.
4. Position the piston in the cylinder to be tested at Top Dead Center of the compression stroke. Always rotate the engine in the same direction as when engine is running.

WARNING: If the cylinder is not properly positioned, the engine may rotate when air is applied to the cylinder. If this should occur, immediately reduce the air pressure and return to step 4.

5. Compare the thread length of the adaptor to be used to the thread length of the spark plug. Make sure that the threads of the adaptor do not protrude into the cylinder any farther than the spark plug. This could cause damage to the piston or valves.
6. Thread the adaptor into the spark plug hole. Tighten hand tight only.

IMPORTANT: Remove all wrenches and other tools that were used to rotate the crankshaft to position the piston at Top Dead Center, be sure to remove the tool from the crankshaft before coupling the Cylinder Leakage Tester to the adaptor. Applying air pressure into cylinder may cause the engine to rotate. If a tool is attached to the crankshaft, it could cause injury or damage to the vehicle.

7. Be sure the regulator knob is turned all the way counterclockwise before connecting the tester to air pressure.
8. Connect the tester to the air supply (120 – 200 psi).
9. Turn the regulator knob clockwise to adjust air pressure to 100 psi on the tester pressure gauge.
10. Connect the tester to the adaptor.

General Cylinder Problem Identification

1. Read and record the percentage of cylinder leakage shown on the percentage gauge. Listen and note any air escaping from the intake, exhaust, crankcase or adjacent cylinders. Also look in the radiator for air bubbles. This information will be used for diagnosis.
2. Reduce the regulator pressure to 70 psi before disconnecting the adaptor. The cylinder comparison is found after diagnostic information.

Gauge Readings

The cylinder leakage test is a useful diagnostic test, however, it is a test for which vehicle manufacturers do not provide specifications. Due to standard engine tolerances and normal wear, no cylinder will maintain 0% leakage. Engines with larger cylinder diameters will tend to show a larger percentage of leakage than engines with smaller cylinder diameters, given that both engines are in the same condition. Because of these factors, this tool is best used to compare a suspect cylinder to a known good cylinder on the same engine.

Diagnosis

Test results can be interpreted to find a cylinder or cylinders with excess leakage as well as helping to determine the cause of the leakage (valves, piston rings, etc.). Cylinders with more leakage than the others will have a problem.

The larger the leakage percent, the more severe the problem. The cause of the leakage can be found by listening for air escaping from the intake, exhaust, crankcase or radiator.

- Air escaping from the intake indicates that the intake valve in that cylinder is not sealing pressure in the cylinder.
- Air escaping from the exhaust indicates that the exhaust valve in that cylinder is not sealing pressure in the cylinder.
- Air escaping from the crankcase indicates that cylinder pressure is leaking past the piston rings.
- Air escaping from the radiator indicates that cylinder pressure is leaking into the cooling system. It may be leaking into the cooling system from either a bad head gasket or a crack in the cylinder head or block. The engine will probably require disassembly to determine the exact cause.
- Air escaping from an adjacent spark plug hole indicates that pressure is probably leaking from the cylinder being tested into the adjacent cylinder through a leaking head gasket.

A stethoscope or other listening aid may be helpful in detecting small amounts of leaking air as well as minimizing the distraction of normal shop noise.

Example 1

Cyl #	% Leakage	Notes
1	10	No air heard
2	12	No air heard
3	15	No air heard
4	50	Air leaking from exhaust pipe
5	09	No air heard
6	11	No air heard

This engine has a leaking exhaust valve in the number 4 cylinder.

Example 2

Cyl #	% Leakage	Notes
1	10	No air heard
2	30	Air leaking from #3 spark plug
3	40	Air leaking from #2 spark plug
4	12	No air heard

This engine has a bad head gasket between cylinder 2 and 3.

Example 3

Cyl #	% Leakage	Notes
1	35	Air leaking from crankcase
2	42	Air leaking from crankcase
3	40	Air leaking from crankcase
4	38	Air leaking from crankcase

This engine has worn piston rings. It may start and run, but it will lack power.

Cylinder Comparison Test

1. After completing General Setup steps 1–8, turn the regulator counter-clockwise (CCW) to relieve pressure.
2. With the tester hose disconnected from the cylinder adaptor hose, turn the pressure regulator clockwise (CW) until the leakage gauge pointer is set to zero (0).
4. Connect the tester hose to the cylinder adaptor hose.
5. Read and record the percentage of cylinder leakage shown on the leakage gauge.
6. After measurements are recorded, turn the regulator CCW to reduce the pressure.
7. Repeat General Setup steps 1–8 and Cylinder Comparison Test steps 1–5 for each cylinder.

Maintenance

Wipe off excess oil, grease, and dirt from the Cylinder Leakage Tester after every use. Keep adaptor threads clean to prevent damage to threads on engine.

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**Snap-on Tools Company
Kenosha, WI 53141-1410 U.S.A.**

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