This test allows the mechanical condition of the cylinder and valves to be accurately determined and is used when other less accurate tests indicate a possible fault condition. This test can also detect a gas pressure leak from a cylinder into a liquid cooling system.

Each cylinder is pressurised with air via the spark plug hole and an adaptor. The pressure is fixed and the amount of air, which can flow, is also fixed. When all the air is leaking away a gauge attached to the equipment reads 100% Leakage. When no air leaks away the same gauge reads 0% leakage. Note, there is always a small amount of leakage via the piston ring gaps, especially if the engine is 'cold', this is the only leakage acceptable. Leakage from any other source indicates a fault condition.

The table below shows cylinder condition in relation to typical average percentage of leakage past a piston.

Typical % leakage	**Typical condition of cylinder**
0 to 10	Good condition
11 to 20	Fair – typical of medium mileage
21 to 30	Poor – typical of high mileage
Over 30	Unacceptable -problem condition

The leakage past each of the pistons for a multi-cylinder engine should be similar in each cylinder. Large variations over 10% between cylinders would indicate a problem.

Procedure:

1. Note the firing order of the engine. Identify mark to each spark plug lead for future identification.
2. Run the engine up to its normal operating temperature. With liquid cooled engines it is common to run the engine at a fast idle until the cooling fan has operated twice completely through its cycle.
3. Clean any debris from the area adjacent to the spark plugs. Remove the spark plug and fit an adaptor to No.1 cylinder. On some engines it is essential to earth the spark plug lead and/or disconnect the C.D.I. control unit before starting this part of the test sequence.
4. Rotate the engine until No. l cylinder is at t.d.c. There are various ways of doing this, a common one is to use a whistle which is attached to a spark plug adaptor to determine the compression stroke. Then use engine timing marks to set t.d.c. more accurately.

5. Lock the engine to prevent it from turning. Lock slide type throttle open or lift CV damper and needle assembly.
6. Zero the test equipment. Take care you will be using high pressure compressed air.
7. Connect the test equipment to the cylinder, ensuring that the engine does not turn. Record the percentage leakage reading indicated on the pressure gauge.
8. Trace the leakage by listening at the exhaust pipes, carburettors, crankcase breather and adjacent cylinders. Observe the cooling system water level and note if it rises or has bubbles.
9. Repeat the procedure with each of the other cylinders.

Result;	**Typical fault;**
Air leakage heard at exhaust	'tight' valve clearance or exhaust valve / seat fault
Air leakage heard at carburettor / air box	inlet valve / seat fault or 'tight' valve clearance.
Air leakage heard at crankcase breather or oil filler	worn or damaged; piston rings; piston; bore
Air leakage heard at adjacent cylinder	failed head gasket or crack in casting of cylinder bore or head
Air bubbles or rise in coolant level	failed head gasket or base gasket seal, or crack in casting of cylinder bore or head