2 Compression test - description and interpretation

1 When engine performance is down, or if misfiring occurs which cannot be attributed to the ignition or fuel systems, a compression test can provide diagnostic clues as to the engine's condition. If the test is performed regularly, it can give warning of trouble before any other symptoms become apparent.

2 The engine must be fully warmed-up to normal operating temperature and the battery must be fully charged.

3 Remove the fuel pump fuse (located in the passenger compartment fuse box), and if possible, start the engine and allow it to run until the residual fuel in the system is exhausted. Failure to do so could result in damage to the catalytic converter.

4 Remove the spark plugs (see Chapter 1). Install a compression tester in the No 1 cylinder spark plug hole - the type of tester which screws into the plug hole is preferred. **Warning:** *Make sure all of the electrical connectors are disconnected from the ignition coils.*

5 Block the throttle wide open, then crank the engine with the starter motor for at least six compression strokes. The compression pressure should build-up to a maximum figure, and then stabilize. Record the highest reading obtained.

6 Repeat the test on the remaining cylinders, recording the pressure in each.

7 All cylinders should produce very similar pressures; a difference of more than approximately 29 psi (2 bar) between any two cylinders indicates a fault. Note that the compression should build-up quickly in a healthy engine; low compression on the first stroke, followed by gradually increasing pressure on successive strokes, indicates worn piston rings. A low compression reading on the first stroke, which does not build-up during successive strokes, indicates leaking valves or a blown head gasket (a cracked head could also be the cause). Deposits on the undersides of the valve heads can also cause low compression.

8 BMW minimum values for compression pressures are given in the Specifications.

9 If the pressure in any cylinder is low, carry out the following test to isolate the cause. Introduce a teaspoonful of clean oil into that cylinder through its spark plug hole, and repeat the test.

10 If the addition of oil temporarily improves the compression pressure, this indicates that bore or piston wear is responsible for the pressure loss. No improvement suggests that leaking or burnt valves, or a blown head

gasket, may be to blame.

11 A low reading from two adjacent cylinders is almost certainly due to the head gasket having blown between them. The presence of coolant in the engine oil will confirm this.

12 If one cylinder is about 20 percent lower than the others and the engine has a slightly rough idle, a worn camshaft lobe could be the cause.

13 If the compression reading is unusually high, the combustion chambers are probably coated with carbon deposits. If this is the case, the cylinder head should be removed and decarbonized.

14 On completion of the test, reinstall the spark plugs (see Chapter 1) and reinstall the fuel pump fuse.