Cranking Compression Test

The Tech-Assist Team

When confronted with a misfire condition, what do you check first? Some techs go for ignition system issues while others start by checking fuel system components. When those tests don't reveal the problem, it's time to test the engine's ability to support the combustion process.

Remember, just because you're working on a late model direct-injected, 32-valve, double overhead cam engine with variable valve timing, it still can fall victim to problems such as a burned valve, damaged piston, or worn rings.

There are many ways to test cylinder sealing or compression, but in this article, we'll talk about one of the oldest but still effective tests – the Cranking Compression Test.

Performing the Test

NOTE: Before you start the test, you should connect a battery charger. You want the cranking RPM to remain the same throughout the test.

1. Remove the fuel pump and/or fuel-injection fuses or relay (no fuel entering the cylinders during the test).
2. Disable the ignition system (no spark source - fuel vapors will be blowing out of the cylinders).
3. Remove ALL spark plugs.
4. Thread one end of the compression gauge adapter hose in a spark plug hole by hand.
5. If the throttle is cable or linkage-controlled, block the throttle wide open to get as much air in the engine as possible (OEM specs are usually determined with the throttle wide open). You can use a remote start button or the key to crank the engine over.

   If it's electronically controlled, DO NOT block the throttle open. Use a scan tool with bi-directional control to open the throttle. If you cannot do that, crank the engine over with the ignition key. The results may be a bit low, but they will at least get the same amount of air.

   Important Note: To yield consistent readings, always crank the engine over the same amount of times for all cylinders. On the first cylinder you test, count the number of compression strokes it takes for the needle to reach its peak pressure, then crank the same number of strokes on each cylinder. For example, if the needle stops on the 4th compression stroke and does not move on the 5th, crank the engine over four times for the remaining cylinders.

6. Write down the compression readings for each cylinder on a piece of paper.

Reading the Results

Low Compression:

1. In one cylinder usually indicates a bad intake or exhaust valve
2. In two adjacent cylinders typically means you have a bad head gasket
3. In all cylinders would mean the rings and cylinders are worn and the engine needs to be overhauled

   Note: If you have a cylinder that is below 90 psi, pour 1 teaspoon of engine oil into the plug hole, turn the engine over 3 or 4 times, and retest. If the reading jumps way up, the piston rings are worn. If not, it's probably valve issues or piston damage. To better identify the exact problem, perform a Cylinder Leak-down Test.

Higher Compression than Factory Specifications:

1. In one cylinder could mean excessive carbon build up in that cylinder
2. In all cylinders could mean excessive carbon build up on all cylinders

Keep in mind, you're testing cylinder sealing properties and not it's capacity for to flow air. For that you will need to perform a Running Compression Test.