

TECH TIPS

How to Tame Those Pesky P0420 Codes

By Charles Pantano, Eastern Catalytic

When it comes to service issues on today's vehicles, the difficulty in correctly diagnosing and evaluating catalytic converter problems has to be at top of the list. One of the most annoying is the persistent P0420 diagnostic code (Catalyst System Efficiency Below Threshold Bank 1), which not only shows its teeth when the catalytic converter is on the blink, but can also be generated by a variety of engine problems not directly related to the converter.

Possible P0420 Code Causes

The following engine related problems can generate the P0420:

- Intake manifold air leaks
- Fuel injector problems (leaks)
- Incorrect spark plugs
- Ignition timing
- EGR problem
- Defective catalytic converter
- Oil or antifreeze entering exhaust
- O₂ sensor not operating correctly
- Road damage to converter
- Silicone contamination

Most, if not all, converter failures are caused by a problem somewhere in the emission system ahead of the converter. So, it's important to determine the actual cause in order to prevent a recurrence. Here are some troubleshooting suggestions.

Testing the Converter

Method 1: Vacuum test — Check vacuum on the intake manifold, carburetor or throttle body. Note gauge reading at idle. Raise and hold engine speed at 3,000 RPM. The needle will drop when the throttle is first opened, but should then rise and level off. If the vacuum starts to drop, pressure may be backing up in the exhaust system indicating a blockage.

Method 2: Backpressure test — Measure backpressure directly. If the engine has air injection, disconnect the check valve from the distribution manifold and connect a low pressure gauge. Or, remove the oxygen sensor and take your reading at its port in the manifold or head pipe. A reading of more than 1.25 PSI at idle or more than 3 PSI at 2,000 RPM indicates an exhaust restriction.

Method 3: Temperature test — In late model engines with fuel injection, the combustion is so efficient that the converter has little to process and the difference between the inlet and outlet temperatures may only be 50 °F at 2,500 RPM. This is a

lot less than the 100 °F old rule of thumb for a good converter. At idle, the converter in many late-model vehicles may cool down so much that there's almost no measurable difference between the front and back. So, checking exhaust temperatures at idle and 2,500 RPM may not be an accurate way to determine if the converter is working right.

Watch out for Silicone Contamination

Silicone-based products or Teflon sealants should not be used on any part of the exhaust system. They are not designed to operate at high exhaust temperatures and will out gas, causing damage to O₂ sensors. Below are some examples of O₂ sensors contamination caused by the use of RTV silicone on exhaust manifold flanges and other components as well as Teflon-type sealants used on O₂ sensors.



Typical contamination problems (left to right) silicone used on exhaust manifold, O₂ sensor contamination from Teflon Tape, and silicone contaminated O₂ sensor.

Charles Pantano is the Certification Program Manager at Eastern Catalytic, a leading innovator and world-class manufacturer of catalytic converters. Eastern offers a full range of catalytic converters for universal, direct-fit, manifold, diesel, and heavy-duty applications.

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