Carbon build-up on 1995-1998 BMW V-8 Converter head pipes

Recently, we've noticed a recurring problem with BMW V-8 converters being returned for warranty due to an illuminated check engine lamp and catalyst inefficiency codes stored. Often, the problem is not the converter, but rather the presence of carbon on the head pipes.

We conducted an independent laboratory test on random samples of returned goods affected by this problem.

We first tested the converter assemblies with all the pipes attached, getting an efficiency average of 30%.

We then cut the converters out of the assemblies to test them without the carbon coated head pipes. The results were impressive. With the head pipes removed, the average converter efficiency was 85%!

From the information gathered from these tests, we now know that carbon build-up inside the head pipes can adversely affect emission reduction. The reason is, carbon stores oxygen, and proper oxygen levels are crucial for emission reduction. If there is too much oxygen present before the upstream O2 sensor, the sensor will believe the vehicle to be running lean and command the computer to add fuel, richening the air/fuel ratio. This will drive all cylinders rich and even more carbon will be produced. Furthermore, the excess oxygen will pass through the converter to the downstream O2 sensor, which will report the high oxygen content, and cause the computer to set a DTC P0420/P0430. Generally, the car will not exhibit any drivability issues whatsoever, in fact, it may seem to be running better than ever! Meanwhile, this rich air/fuel mixture will damage a catalytic converter very quickly, sometimes in just a few short weeks.

Some of the major causes of carbon build-up are:

- ✓ Breather valve malfunction allowing unmetered air entry (BMW part 11 61 7 501 563). The small leak is not noticeable to the driver, but it allows extra oxygen into the combustion chamber causing a lean condition. Just as above, the O2 sensor will report this, and the computer will richen all cylinders to compensate.
- ✓ Intake manifold O-ring deteriorated or not properly seated. Same result as above.
- ✓ Unequal fuel distribution. One or two cylinders running lean due to a small restriction in fuel delivery. Same result as above, an overall rich air/fuel ratio.

We've found that a fuel injection cleaning service can also prove beneficial, cleaning carbon deposits from the combustion chambers, exhaust manifolds and head pipes. The one we used was made by BG products, but other systems like Motor-Vac or products such as Bilstein Engine Flush can be equally effective. After our trials, we saw a major increase in overall efficiency of the catalyst as well as a substantial drop in the exhaust oxygen content.

If excessive carbon is the problem,
replacing the catalytic converter will cure the symptom, not the cause.

If the problem isn't solved, carbon will build up again and cause the new catalytic converter to "fail" again. In other words, "Back to Square One".

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