

Boost the confidence of your CAT diagnosis

Replacing cats can be an awkward and time-consuming job so when a post-cat lambda sensor flags a potential cat failure, you need to be sure you've got things right. Here, we find out how to avoid costly mis-diagnosis

CATALYTIC converters use a combination of heat and precious metals to chemically reduce the harmful emissions of an engine. They normally run at 350 to 400°C, with the 'light off' temperature being around 300°C (depending upon the type of unit fitted).

This temperature is a result of a reaction to the exhaust gas concentration. In other words, the temperature the cat reaches depends on how rich the engine is running. Catalytic converters only work within a certain band of exhaust gas strength. If the mixture is too rich or too lean, they suffer. The pre-cat lambda is central in maintaining this air-fuel ratio. For that reason, most cat failures can be associated with lambda failures.

Theory in practice

Customers, especially in today's market, will always seek a cheaper fix for their cars. The dilemma that hits us, the repairer, is whether the cheaper cat will work as well as the dearer (generally dealership) part.

There are lots of factors in the equation; how big is the price difference; what would be your customer's preference; how awkward is the part to fit; what is the likelihood of the aftermarket part working?

You also have to throw some other factors into the repair decision; cats can be very difficult and time consuming to fit; they are difficult to diagnose accurately; the price premium between genuine and aftermarket products is usually huge and it's very hard to tell if a new part has cured the fault. Because of this, most garages have had a bad experience fitting an aftermarket cat.

The EOBD dilemma

The issue of EOBD cars, with post-cat lambda sensors highlighting potential cat failures is becoming more of a mainstream problem for the aftermarket garage. EOBD was introduced to the UK in 2001. The cars the aftermarket services are generally between 5 and 8 years old – slap bang in the middle of the EOBD issue.

Post-cat lambda sensors look for high emissions at the back of the cat but this does not always relate to cat failure. The quick fix scenario with a car that has a post-cat lambda-related fault is to blame or renew the cat. However, when the light comes back after the quick fix, you're faced with the problem of not knowing if the cat is faulty or whether it's a misdiagnose error?

The solution

The UK aftermarket cat business is a very price driven and competitive one. This has resulted in many dubious quality units being on the market. So how can we, as an aftermarket repairer, have any confidence the cat is going to work when it's fitted?

The answer lies in a piece of European legislation that's been out there since 2001. It's known as R103 and although it's a legal requirement in most of Europe, the UK government have largely ignored it (see the side-panel).

The regulation controls the manufacturing specifications for converters. For a cat to be R103 compliant it has to be tested by an independent European government-approved test centre, such as MIRA or Millbrook in the UK.

The test encompasses emissions, noise construction, back pressure and ultimately fitment. All of these are compared against an OE converter and if they are within a set limit of the same performance, the cat will be certified as R103 compliant.

See the signs

So how do you know if the cat you're fitting meets the R103 standards? The cat will be identified by a permanent marking showing the R103 number, incorporating the country the cat was certified in and also a number which identifies the specific vehicle for which the cat has been approved.

This allows a high degree of confidence the converter has been independently tested to work on the vehicle to which it is being fitted.

Know the fault

If the vehicle is noisy, the emissions are too high or the post-cat lambda sensor light comes on, you can now discount a cat fault with a high degree of certainty.



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QUALITY MARK: R103 legislation controls the manufacturing specifications for catalytic converters. Seeing this stamp on a cat shows it has been tested by an independent government-approved test centre such as Millbrook.

SYMBOL STATUS: The R103 number includes details of the country the cat is certified in and a code which identifies the specific vehicle for which the cat has been approved. Fuel Parts 'JK says the symbol offers a high degree of confidence in the cat's quality.



REPAIR TIME: The temperature a cat reaches depends to a large extent on how rich an engine is running. If the mixture is too weak or lean, the cats suffer. Pre-cat lambda sensors play a central role in maintaining this air-fuel ratio.

R103 – The UK's position

The UK government has skirted around the issue of implementing R103. It's been on the cards since 2001 but as with most government issues, it's been left open and undecided. When implemented, it will be illegal to fit a non-approved CAT to a vehicle, approved to EU emission standards, first used on or after the 1st of January 2001.

The date the European government stipulated as the date by which the UK must conform to the directive was the 1st of January this year. Obviously that date has come and gone. The consultation papers have been signed off so UK wheels are turning. Watch this space...