

Science for Environment Policy

New generation diesel cars are likely to exceed emissions standards on the road

More Europeans are driving diesel cars, with important implications for vehicle emissions. A new study suggests that diesel cars may emit nitrogen oxides (NO_x) at levels far higher than emissions standards, even when considering the newest generation of diesel cars. Part of the problem is that tests of vehicle emissions in the laboratory do not accurately reflect on-road emissions.

Owing to the greater technological challenges of removing NO_x from diesel engines compared to petrol engines, emissions standards in Europe allow for higher NO_x emissions from diesel cars. The most recent Euro 5 standard, adopted in 2009, reduced the NO_x emissions limit for diesel cars, but did not produce the desired reduction in on-road emissions. One reason for this is that diesel cars emit higher levels of NO_x than is predicted by laboratory tests. Laboratory tests are usually carried out on 'rolling roads', referred to in the trade as chassis dynamometers, driving a route known as the 'drive cycle'. The New European Drive Cycle (NEDC) is the drive cycle currently used to test and provide Type Approval for cars in Europe.

A new Euro 6 standard, due to be introduced in 2014, will lower the NO_x emissions limit for diesel cars by roughly 50%. Manufacturers may then be required to adopt new after-treatment technologies such as selective catalytic reduction (SCR). However, the on-road NO_x emissions of new generation Euro 6 cars have not been substantially tested.

This study measured emissions from a SCR-fitted, Euro 6 diesel car in both laboratory and on-road tests and compared it to six Euro 4-5 diesel cars. On-road tests were carried out on different routes intended to represent a range of European driving conditions, while laboratory tests used the NEDC.

All cars complied with their respective emissions standard when tested in the laboratory. On the road, the Euro 4 and 5 cars exceeded their emissions standards by more than two and three times respectively. Although the Euro 6 car performed better, its emissions still exceeded the emissions standard.

In addition, the researchers measured on-road carbon dioxide emissions of the seven cars and found that they exceeded their certified levels by around a quarter. As in the NO_x on-road tests, emissions were highest on the route that involved large amounts of uphill driving.

The results suggest that SCR systems are capable of reducing NO_x emissions, but not to below the Euro 6 standard when driving under real-world conditions. The researchers regard their study only as an indication of the emissions performance of new generation diesel cars and warn against drawing far-reaching conclusions based on tests of a single Euro 6 vehicle. In addition to calling for further tests on Euro 6 cars with SCR technology, they recommend that Euro 6 vehicles equipped with alternative after-treatment technologies such as NO_x storage catalysts should be tested.

However, the study does confirm that standard laboratory tests of vehicle emissions using the NEDC do not provide an accurate picture of on-road emissions. A new complementary test procedure which reflects real-world emissions is currently being developed with the help of European experts and is expected to be used for type approval of cars from 1 September 2017 onwards.



10 January 2013
Issue 312

Subscribe to free
weekly News Alert

Source: Weiss, M., Bonnel, P. Kühlwein, J., et al. 2012. Will Euro 6 reduce the NO_x emissions of new diesel cars? – Insights from on-road tests with Portable Emissions Measurement Systems (PEMS). *Atmospheric Environment*. 62(2): 657–665. DOI: 1352,2310,10.1016/j.atmosenv.2012.08.056

Contact:
martin.weiss@jrc.ec.europa.eu

Theme(s): Air pollution, Sustainable mobility

The contents and views included in Science for Environment Policy are based on independent, peer-reviewed research and do not necessarily reflect the position of the European Commission.

To cite this article/service: "Science for Environment Policy": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.