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Sustainable mobility, Air pollution

1. http://europa.eu/legislation_summaries/environment/air_pollution/l28186_en.htm

2. www.gov.uk/government/uploads/system/uploads/attachment_data/file/4247/ppr-354.pdf

European Commission

Science for Environment Policy

New emissions certification test for cars could be improved, study concludes

A test currently under development for certifying levels of vehicle emissions may not adequately represent real world driving conditions, a new study suggests. The authors measured emissions during the new Worldwide Light-Duty Test Cycle (WLTC) compared with those in existing driving cycles and highlighted areas where the test could be potentially improved.

In the EU, tailpipe emissions from new vehicles are certified to Euro emissions standards[1] based on tests that take place in a laboratory on a roller. These tests use standard driving cycles[2] consisting of several 'trips', which cover a range of driving speeds, accelerations and gear changes to simulate different driving conditions. The new WLTC has been designed to match real world driving conditions and emissions more closely compared with the existing New European Driving Cycle (NEDC).

In their study, the researchers compared these two cycles as well as a third called the Common Artemis Driving Cycle (CADC), which is used in emissions modelling. They measured emissions of nitrogen oxides, carbon monoxide, methane, CO_2 and hydrocarbons from six vehicles certified to Euro 5 or 6 emissions standards. The Euro 6 standard introduced in 2014 is currently the most stringent, while Euro 5 is the next most stringent.

By comparing visual representations of emissions between the three test cycles, the researchers were able to highlight important differences. First, using longer test cycles masked the emissions impacts of cold starts. For example, for a petrol vehicle certified to Euro 5 standard, the carbon monoxide emissions in the first 30 seconds of the NEDC test cycle made up 79% of the total carbon monoxide. However, they only made up 19% of the total carbon monoxide in the longer WLTC cycle.

Therefore, while the WLTC test provided more time to demonstrate the ability of after-treatment systems to reduce emissions in a warm engine, the researchers say that the longer test cycle masks the impact of a cold start on overall emissions.

In addition, for some vehicles, such as the Euro 5-certified petrol car, the first 'trip' contributed a large proportion of the total emissions for every test cycle. Therefore if the emissions for this trip are not simulated accurately, it could lead to a misrepresentation of real world driving emissions, according to the researchers.

In the NEDC, the average speed of the first trip is low compared to the other two cycles. This might simulate driving in traffic jams, but if the speed is too low then it could lead to emissions being significantly overestimated. If the speed is too high then emissions could be significantly underestimated.

Finally, the contour maps revealed that the WLTC fails to test some combinations of speed and acceleration, particularly accelerations in the range of 70-110 km per hour. Results from the CADC cycle showed that emissions in this speed range are very high for some lower horsepower petrol cars, and the WLTC could therefore fail to account for some driving conditions that produce high-level emissions. The researchers say that the new cycle should cover as wide a range of speed and acceleration combinations as possible.