Light-duty vehicles exceed EU emissions limits during on-road driving

The nitrogen dioxides (NO\textsubscript{X}) and carbon dioxide (CO\textsubscript{2}) emissions of some light-duty petrol and diesel vehicles are higher during on-road driving than during standard laboratory tests, according to a new study. This means that in normal on-road driving, light-duty vehicles, which include passenger cars and light commercial vehicles, may exceed European emissions limits and could be having a greater impact on urban air quality than previously thought.

Light-duty vehicles are a major source of air pollution in urban areas: in 2008, they contributed 8% to the NO\textsubscript{X} emissions and 27% to the carbon monoxide emissions of the EU. The compliance of light-duty vehicles with applicable emissions limits is currently verified by emissions tests in the laboratory under standardised conditions.

To establish whether light-duty vehicles produce more air pollution during on-road driving than in the laboratory, the researchers used portable emissions measurement systems (PEMS) to monitor 12 vehicles driven over a variety of urban and rural roads, including uphill and downhill sections and motorways. The vehicles included petrol and diesel vehicles and one vehicle with a petrol-hybrid engine. The researchers recorded carbon monoxide, NO\textsubscript{X}, total hydrocarbons and CO\textsubscript{2} emissions for each vehicle.

They found that the total hydrocarbon and carbon monoxide emissions of the tested vehicles generally stayed below the European emissions limits if vehicles are driven on the road.

NO\textsubscript{X} emissions were within EU limits for petrol vehicles, but not for diesel vehicles. In fact, the on-road NO\textsubscript{X} emissions from diesel vehicle have not declined significantly over the past ten years and currently exceed the respective emissions limit by several factors. Looking more closely at the data, the researchers found that NO\textsubscript{X} emissions were highest when the engine was working hardest, such as on uphill sections and motorways. The researchers also found that CO\textsubscript{2} emissions on the road are around 20% higher than during standard laboratory emissions testing.

However, the researchers note that their study has limitations, particularly that the number of vehicles tested was relatively small. Also, although test routes covered a variety of road types, they may not necessarily be representative of the average driving patterns in Europe.

The results of this study indicate that the current emissions testing in the laboratory may be insufficient to effectively limit the emissions of light-duty vehicles under ‘real world’ driving conditions. The study confirms the need to complement existing emissions tests in the laboratory by on-road emissions tests of light-duty vehicles. The research suggests that the portable emissions measurement systems (PEMS) used for this study could be a suitable and reliable tool for this purpose.


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