EUROPEAN COMMISSION
DIRECTORATE-GENERAL JOINT RESEARCH CENTRE

JRC 2011 and 2013 studies on methodologies to measure light-duty vehicle emissions – brands disclosure

The JRC carried out studies on the Commission's initiative comparing different methodologies to measure car emissions (laboratory vs on the road testing). The first report was published in 2011 (Analyzing on-road emissions of light-duty vehicles with Portable Emission Measurement Systems (PEMS) and the second one in 2013 (A complementary emissions test for light-duty vehicles: Assessing the technical feasibility of candidate procedures). The Commission was interested in the technical feasibility of on-road emissions tests for more precise and realistic information on car air pollution emissions in real traffic conditions. The research showed that the on the road option using PEMS could be considered viable for light-duty vehicles once the technological and methodological challenges were solved. Results also confirmed the existence of discrepancies between lab results and on-road results, something which was already common knowledge at the time and was one of the drivers for examining the potential of on-road emissions tests. The research provided vital support in the Commission's efforts to develop and introduce Real Driving Emissions testing for passenger cars.

The aim of this research was mainly to assess the technical feasibility of on-road emissions testing with cars. Indeed, real driving testing methodology using Portable Emission Measurement Systems was already in use for heavy-duty vehicles (trucks, buses) but it was bulky and heavy. Test equipment had to be adapted for use on the lighter and smaller passenger cars, and the test procedure with its boundary conditions as well as the data processing methodology had to be developed.

The initial research was of a qualitative nature, designed to compare methodologies for measuring emissions in laboratories against those measured on the road. As the scope was focused on the methodologies and not the emissions of individual cars, a limited number of 15 vehicles (selected at random mainly on the basis of car rental availability, size and type of fuel used) was tested and analysed.

This document provides information on the brands and models of the vehicles used for this research. It must be noted that the vehicles used for the research cannot be considered representative of the general level of emissions by the models in question as the vehicles used span a large range of model years (2004-2012, including a Euro6 lab-vehicle derived from a 2009 model), different engine volumes (1242-2461 ccm) and power (44-130 kW), different Euro standards (Euro3-6), different after treatment technologies and different numbers of kilometres driven at test start (800-100.000 km). For these tests, most of the cars were rented and the choice of the brands was done on the basis of the availability for hire of small, medium and large vehicles with diesel and petrol engines, according to the needs of the study.

The purpose of the studies was neither to test specific brands, models or cars nor to control compliance with emission levels. These were scientific studies in view of future policies, not technical controls.

The research team measured exhaust emissions. The existence of discrepancies between lab results and on-road results was already common knowledge at the time, but from a technical perspective these discrepancies could be explained by a less solid calibration of an engine outside the test cycle parameters. Furthermore no checks of the rental cars could be made to see if proper maintenance schemes were applied, and if after treatment systems were functioning. In addition, even if all cars were tested on the same four routes, traffic conditions and atmospheric conditions varied as the tests were conducted at different times of the year, therefore inevitably impacting on the emissions levels. Both studies, based on a limited number of cars, found that real driving pollutant emissions of petrol engines were in general well controlled, whilst NOx emissions from diesel engines were not.

The 2011 study was based on 12 vehicles (6 diesel, 5 petrol and 1 hybrid) and for the 2013 publications, data were complemented with results from 3 additional Euro 5 diesel vehicles. In total, 15 vehicles were tested, referred to with letters A to L (2011) and A to O (2013). It should be noted that in both studies letters A to I refer to the same vehicle, whilst vehicles labelled J, K and L in the 2011 study correspond to vehicles labelled L, M and N respectively in the 2013 study.

List of brands:

2011 & 2013 reports - same letters for same cars				
A	Fiat	Scudo	diesel	
B	Ford	C-Max	petrol	
C	VW	Multivan	diesel	
D	Renault	Clio	diesel	
E	VW	Golf	diesel	
F	Renault	Clio	petrol	
G	Toyota	Prius	hybrid (petrol)	
H	Fiat	Bravo	diesel	
I	BMW	120d	diesel	
2011 report				
J	VW	Golf	petrol	
K	Fiat	500	petrol	
L	Ford	Fiesta 1.2	petrol	
2013 report				
J	Fiat	Punto	diesel	
K	Renault	Clio	diesel	
L	VW	Golf	petrol	(same car and results as J in 2011 report)
M	Fiat	500	petrol	(same car and results as K in 2011 report)
N	Ford	Fiesta 1.2	petrol	(same car and results as L in 2011 report)
O	VW	Passat 2.0	diesel	

PDF ISBN 978-92-79-54050-9 ISSN 1831-9424 doi:10.2788/654727

Print ISBN 978-92-79-54051-6 ISSN 1018-5593 doi:10.2788/756824