

Communication on the application and future development of Community legislation concerning vehicle emissions from light-duty vehicles and access to repair and maintenance information (Euro 5 and 6)

(2008/C 182/08)

1. This Communication provides background information to Regulation (EC) No 715/2007 (Euro 5 and 6) and its implementing legislation. This Regulation sets out requirements for the type-approval of light duty vehicles with regard to emissions and on access to vehicle repair and maintenance information. The technical requirements take effect in two stages, with Euro 5 emission limits coming into force from 1 September 2009 and Euro 6 emission limits from 1 September 2014.
2. The purpose of this Communication is to set out the intentions of the Commission with regard to this legislation. The Regulation and its implementing measures contain detailed technical provisions necessary to implement the main requirements. However, there are a number of areas where the Commission considers that further revision of legislation will be necessary in the future.
3. This current Regulation contains a full set of requirements necessary for the type-approval of the initial Euro 5 specification vehicles. In the future, the Commission intends to further refine the relevant requirements to be applicable either at mid-way through Euro 5 or at the full Euro 6 stage. The areas that should be subject to further review are discussed in this Communication.

Particulate mass and particle number test procedures

4. Revised test procedures for measuring particulate mass and particle number are currently being finalised for incorporation into UNECE Regulation No 83. When these test procedures are finalised it will be necessary to update the Euro 5 and 6 implementing legislation as soon as possible afterwards.

Particle number emission limits for spark ignition vehicles

5. Regulation (EC) No 715/2007 authorises the Commission to introduce particle number emission limits for petrol cars. At the time of development of the implementing legislation it was decided that additional information was desirable on the emissions of these vehicles prior to a standard being set. Hence, no limit value was set for Euro 5 vehicles. Regulation (EC) No 715/2007 requires that a limit value is set at the latest by the Euro 6 stage. Therefore, the Commission intends to review the particle emissions of spark ignition vehicles and propose a particle number limit for Euro 6 specification vehicles before the entry into force of the Euro 6 requirements.

Reference fuels

6. The initial version of the implementing legislation does not contain a reference fuel specification for ethanol (E75) to be used by flex fuel vehicles for the low temperature emissions test (type 6 test). The Commission intends to finalise the specification of the ethanol (E75) reference fuel for the low temperature emissions test soon. This process should be completed before the dates set out in Article 10(6) of Regulation (EC) No 715/2007, as Euro 5 flex fuel vehicles approved after these dates are subject to the low temperature test for type approval.

Low temperature emissions test

7. Regulation (EC) No 715/2007 contains a requirement for the Commission to review the emission limits set for petrol cars under the low temperature test at -7°C . The concern being that the current emission limits, carried over from Euro 3 and 4, are no longer appropriate for vehicles meeting the Euro 5 and 6 emissions standard.
8. In addition, it is intended to review the requirements for manufacturers to provide information to type approval authorities on the performance of diesel vehicles at low temperatures. This is due to the risk of elevated NO_x emissions at cold temperatures from diesel vehicles with EGR systems and NO_x after-treatment. This review should consider whether to extend the low temperature emissions test to Euro 6 diesel vehicles and whether a limit value should be introduced in the future.

Evaporative emissions

9. Due to the wider introduction of biofuels, the Commission intends to review test procedures for evaporative emissions. This review should consider whether greater global harmonisation is desirable through alignment of the European test procedure with that used in the United States. In doing so, consideration may be given to introducing in-service conformity or durability requirements to control the effects of long term use of fuels containing ethanol on evaporative emissions.

Emissions test procedure

10. The emissions and fuel consumption of light duty vehicles are measured using a standardised test procedure, based on the so-called New European Driving Cycle (NEDC). Regulation (EC) No 715/2007 requires that the Commission keep this under review, and propose changes if the procedures are no longer adequate or reflect real world emissions. The Commission considers that the procedure requires updating, and therefore intends to review the test cycle so that it adequately reflects the emissions generated by real driving on the road. This review may contribute to the discussions at the UNECE of developing a globally harmonised test cycle for light duty vehicles; however, it is not conditional on the progress made at UNECE level. Consideration may also be given to the introduction of an off-cycle emissions requirement to supplement the standardised test procedure.

Reference mass limits for light duty vehicles

11. The Euro 5 and 6 legislation introduced a significantly clearer and simpler scope between the emissions legislation applicable to light duty vehicles and heavy duty vehicles. The legislation is now based on reference mass, where all vehicles below 2 610 kg are considered as light duty vehicles. This reference mass is based on the current limits to the laboratory based emissions test. The Commission considers that this mass limit may be too low and should be reviewed. Given the current masses of vehicles, a higher reference mass limit may be necessary for future legislation.

Mass neutral emissions standards

12. Regulation (EC) No 715/2007 foresees that with future emission limits, consideration should be given to introducing mass neutral emissions standards. This is the approach currently adopted by US legislation and would result in the deletion of the current vehicle category N₁, Class I, II and III distinction that developed purely for the purposes of emissions legislation and has been recently adopted for mobile air conditioning legislation. At this stage, such a mass neutral approach seems highly feasible for petrol vehicles, given the nature of the emissions control system. For diesel vehicles, the introduction of aftertreatment for NO_x will provide greater control of tailpipe emissions and removes the original rationale for heavier vehicles to have higher regulated emissions. Before introducing any such proposal, the Commission would need to review the feasibility and cost-effectiveness of such an approach.

CO₂ emissions calculation covering all greenhouse gases

13. Regulation (EC) No 715/2007 foresees that the Commission considers reviewing the approach to calculating CO₂ emissions from vehicles to include other greenhouse gases such as methane emissions. Such a change is likely to have a very small impact on the emissions figures for most petrol and diesel vehicles, though could be a little more significant for gas vehicles. Due to the small number of vehicles covered, such a change may not be of the highest priority at this stage. The Commission may therefore review whether an approach based on a wider range of greenhouse gases is desirable.

Durability requirements — Deterioration factors for Euro 6 diesel cars

14. The implementing legislation only provides assigned deterioration factors for Euro 5 diesel cars. No factors were set for Euro 6 diesel cars due to uncertainty as to the durability characteristics of future diesel engines and exhaust aftertreatment systems. In order to introduce assigned deterioration factors for Euro 6 diesel cars, the Commission will need to review the durability of diesel cars that meet the Euro 6 emission limits.

Type approval of replacement pollution control devices

15. The Commission intends to review requirements for the type approval of replacement pollution control devices to take account of the revised OBD requirements and also the introduction of new pollution control device technologies. In addition, the durability requirements for the replacement of periodically regenerating devices may need to be reviewed.

On Board Diagnostics (OBD)

16. The implementing legislation does not contain any OBD thresholds for Euro 6 vehicles, apart from interim thresholds designed for the early introduction of Euro 6 diesel vehicles. The full Euro 6 thresholds will need to be confirmed by the Commission before such vehicles are able to be type approved.
17. An initial proposal by the Commission for Euro 6 OBD thresholds is contained in Table 1. This table shows the thresholds that the Commission considers should be introduced for Euro 6 vehicles.
18. These OBD thresholds broadly reflect the thresholds applied to most light duty vehicles in the United States and Canada, where the majority of vehicle's OBD systems are compliant with the legislation set by the Californian Air Resources Board (CARB). CARB set thresholds as a multiplication factor of the emission limit value, applying factors of either 1,5 or 1,75. The figures in Table 1 have been derived on this basis, however a higher factor 2 has been applied to particulate limits, reflecting the low concentrations in the exhaust emissions. CARB is currently allowing relaxed OBD thresholds for diesel cars up until the end of 2012. The Euro 6 thresholds would come into effect about 2 years later than this.
19. Industry has submitted proposals for OBD thresholds at the Euro 6 stage that exceed the limit values by factors ranging from 1,9 to 5,5 for petrol vehicles and from 2,6 to 5,5 for diesel vehicles.
20. The Commission considers that by the Euro 6 stage of emission limits, there is little reason for European OBD requirements to be significantly different from the requirements in North America. In particular, the diagnostic principles for petrol cars are well understood, having been developed in the US, so could be easily introduced in the EU. Moreover, the work by a consultant reviewing OBD thresholds suggested that the environmental benefits and cost effectiveness of lower petrol OBD thresholds were good.
21. The Commission is aware that the thresholds for diesel vehicles are technology forcing, particularly with regard to particulates. Such thresholds are considered necessary due to the desirability of detecting partial failures of aftertreatment devices such as particulate filters, which could be subject to tampering if blocked. Moreover, good diesel diagnostics are essential for the long term competitiveness of the diesel technology in other parts of the world. Adoption of the proposed Euro 6 OBD thresholds should therefore support the future competitiveness of diesel technology.
22. The Commission review of the feasibility of the Euro 6 OBD thresholds should focus on the technical feasibility of the proposed thresholds for compression ignition vehicles and the particulate OBD thresholds for positive ignition vehicles. This review should consider the state of development of new exhaust sensor technology, such sensors for particulate matter and particles and also the development of pressure sensing and modelling techniques for predicting the soot loading levels of particle filters.
23. In addition, the Commission intends to review whether it is necessary for OBD thresholds for both particulate mass and particle number to apply at the Euro 6 stage. At this stage it is difficult to envisage whether particle number thresholds will be technically feasible.
24. The Commission intends that the review of OBD thresholds should take place before 1 September 2010.
25. In addition to the OBD thresholds, the Commission intends to keep under consideration the functioning of the OBD in-use performance ratio requirements. This includes the publication of guidance, where it appears to be necessary, and in particular for:
 - incrementing and disabling the general denominator as well as numerators and denominators of individual monitors, and

— the statistical tests to be used by manufacturers for demonstrating compliance with the in-use performance requirements.

26. The Commission will also consider introducing the World Harmonised OBD malfunction classification requirements from the mandatory application of Euro 6 limit values.

Table

Proposed Euro 6 OBD threshold limits

Category	Class	Reference mass (RW) (kg)	Mass of carbon monoxide		Mass of non-methane hydrocarbons		Mass of oxides of nitrogen		Mass of particulates		Number of particles	
			(CO) (mg/km)		(NMHC) (mg/km)		(NO _x) (mg/km)		(PM) (mg/km)		(P) (#/km)	
			PI	CI	PI	CI	PI	CI	PI ⁽¹⁾	CI	PI ⁽²⁾	CI
M	—	All	1 500	750	100	140	90	140	9	9		1,2 × 10 ¹²
N ₁	I	RW ≤ 1 305	1 500	750	100	140	90	140	9	9		1,2 × 10 ¹²
	II	1 305 < RW ≤ 1 760	2 700	940	130	140	110	180	9	9		1,2 × 10 ¹²
	III	1 760 < RW	3 400	1100	160	140	120	220	9	9		1,2 × 10 ¹²
N ₂	—	All	3 400	1100	160	140	120	220	9	9		1,2 × 10 ¹²

Key: PI = Positive Ignition, CI = Compression Ignition.

⁽¹⁾ Positive ignition particulate mass standards apply only to vehicles with direct injection engines.

⁽²⁾ × 2 threshold to be considered once emission limit is set.