

COMMISSION REGULATION (EU) No 459/2012**of 29 May 2012****amending Regulation (EC) No 715/2007 of the European Parliament and of the Council and Commission Regulation (EC) No 692/2008 as regards emissions from light passenger and commercial vehicles (Euro 6)****(Text with EEA relevance)**

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EC) No 715/2007 of the European Parliament and of the Council of 20 June 2007 on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information ⁽¹⁾, and in particular Article 5(3),Having regard to Directive 2007/46/EC of the European Parliament and of the Council of 5 September 2007 establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles (Framework Directive) ⁽²⁾, in particular Article 39(2) thereof,

Whereas:

- (1) Regulation (EC) No 715/2007 and Commission Regulation (EC) No 692/2008 of 18 July 2008 implementing and amending Regulation (EC) No 715/2007 of the European Parliament and of the Council on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information ⁽³⁾ establish common technical requirements for the type approval of motor vehicles and replacement parts with regard to their emissions and lay down rules for in-service conformity, durability of pollution control devices, on-board diagnostic (OBD) systems, measurement of fuel consumption and accessibility of vehicle repair and maintenance information.
- (2) Pursuant to Regulation (EC) No 715/2007, a particle number (PN) standard is to be defined for vehicles equipped with a positive ignition engine to be approved according to Euro 6 standards.
- (3) Particles emitted by vehicles may be deposited in the alveoli of human lungs, potentially leading to respiratory

and cardiovascular illness and increased mortality. Therefore it is in the public interest to have a high level of protection from those particles.

- (4) For measuring the particle emissions of positive ignition vehicles, the Particulate Measurement Programme (PMP) measurement protocol developed for diesel vehicles is currently used. However, evidence exists that the size spectra and chemical compositions of particle emissions of positive ignition can differ from those of diesel vehicles. Particle size spectra and chemical composition, and the effectiveness of the current measurement technique in controlling harmful particle emissions, should be kept under review. A revision of that measurement protocol for positive ignition vehicles may be required in the future.
- (5) Based on today's knowledge, the level of particle emissions from conventional, port fuel injection (PFI) engines that inject the fuel into the intake manifolds or inlet ports rather than directly into the combustion chamber is low. Therefore, it appears to be justified to limit regulatory action for the moment to vehicles equipped with direct injection engines, without excluding further research and monitoring of the particle emission performance of all positive ignition engines, in particular with respect to the size spectrum and chemical composition of emitted particles as well as to the real driving emissions, and the Commission should propose further regulatory measures if necessary, also taking into account the future market share of PFI engines.
- (6) Regulation (EC) No 692/2008 has set a particle number emission limit of 6×10^{11} #/km for Euro 6 diesel vehicles. In accordance with the principle of technology neutral legislation, a respective emission limit for Euro 6 positive ignition vehicles should be the same since there is no evidence suggesting that particles emitted by PI engines have a lower specific toxicity than particles emitted by diesel engines.
- (7) Gasoline particle filters (GPF), an effective after-treatment technology for abating particles emitted by positive ignition vehicles, are expected to become available for integration into some Euro 6 vehicles at a reasonable cost. In addition, it appears likely that within a time frame of three years after the mandatory Euro 6 dates set out in Article 10 of Regulation (EC) No 715/2007, a similar reduction of PN emissions can be achieved with internal engine measures at substantially lower costs for many applications. Any engine measure must be

⁽¹⁾ OJ L 171, 29.6.2007, p. 1.⁽²⁾ OJ L 263, 9.10.2007, p. 1.⁽³⁾ OJ L 199, 28.7.2008, p. 1.

applicable to all engine working conditions to ensure that, in the absence of aftertreatment devices, emission levels in real life driving conditions are not worsened.

- (8) In order to allow for all necessary technologies to be developed and to allow adequate lead time, a two step approach should be adopted, which would apply the Euro 6 diesel particle number limits also to direct injection positive ignition vehicles in its second phase.
- (9) Attention shall be given to the particle emissions of positive ignition vehicles under real driving conditions and the development of respective test procedures. The Commission should develop and introduce corresponding measurement procedures at the latest three years after the entry into force of Euro 6.
- (10) The Commission should keep under review the impact of PN abatement measures on CO₂ emissions of positive ignition vehicles.
- (11) Pursuant to Article 4(7) of Regulation (EC) No 692/2008, vehicles falling under the scope of that Regulation may only be type-approved to Euro 6 emission standards once on-board-diagnostic (OBD) thresholds limits have been introduced. OBD is an important tool for identifying malfunctions of pollution control devices.
- (12) In its Communication 2008/C 182/08 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) ⁽¹⁾ the Commission has suggested a series of OBD threshold limits, which broadly reflect the thresholds applied to most light duty vehicles in the United States and Canada from the year 2013 onwards, where the majority of vehicles' OBD systems are compliant with the legislation set by the Californian Air Resources Board (CARB). An alignment of the Union's requirements with those of the United States would be in accordance with the objectives of international harmonisation and would provide a high level of environmental protection.
- (13) However, the OBD requirements in the United States are technologically challenging for vehicle manufacturers not exporting into the United States. Therefore, an initial period of three years of more lenient OBD requirements should be adopted, providing more lead time to the industry.
- (14) The final Euro 6 OBD threshold limits for CO, NMHC and PM provided by Regulation (EC) No 692/2008

should be more lenient than the values suggested in Communication 2008/C 182/08, reflecting particular technical difficulties in those areas. In addition, no Euro 6 OBD threshold limit for particle numbers should be adopted by this Regulation.

- (15) The environmental need, technical feasibility and cost/benefit ratios of more stringent Euro 6 OBD threshold limits applicable to CO and NMHC and of setting a particle number Euro 6 OBD threshold limit should be evaluated at a later stage. Any resulting amendment of the regulatory requirements in that respect should only be introduced with appropriate lead time for industry. Given the complexity of OBD systems, such lead time is typically three to four years.
- (16) Regulations (EC) No 715/2007 and (EC) No 692/2008 should therefore be amended accordingly.
- (17) The measures provided for in this Regulation are in accordance with the opinion of the Technical Committee — Motor Vehicles,

HAS ADOPTED THIS REGULATION:

Article 1

Regulation (EC) No 715/2007 is amended as follows:

- (1) in Article 3, at the end of point 17, the full stop should be changed into a semicolon;
- (2) in Article 3, the following point 18 is added:
- ‘18. “direct injection engine” means an engine which can operate in a mode where the fuel is injected into the intake air after the air has been drawn through the inlet valves.’;
- (3) in Article 10, the following paragraph 7 is added:
- ‘7. Until three years after the applicable dates set out in paragraphs 4 and 5 for new type approvals and the registration, sale or entry into service of new vehicles and upon the choice of the manufacturer, a particle number emission limit of 6×10^{12} #/km shall apply to vehicles with a direct injection positive ignition engine.’;
- (4) Annex I is amended in accordance with Annex I to this Regulation.

⁽¹⁾ OJ C 182, 19.7.2008, p. 17.

Article 2

Regulation (EC) No 692/2008 is amended as follows:

- (1) in Article 4, paragraph 7 is deleted;
- (2) Annexes I, XI and XVI are amended in accordance with Annex II to this Regulation.

Article 3

This Regulation shall enter into force on the third day following that of its publication in the *Official Journal of the European Union*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 29 May 2012.

For the Commission
The President
José Manuel BARROSO

Amendments to Regulation (EC) No 715/2007

Annex I to Regulation (EC) No 715/2007 is amended as follows:

(1) the text in the second row of the last column of Table 1 (Euro 5 emission limits) is replaced by the following:

'Number of particles (PN)';

(2) Table 2 is replaced by the following table:

Table 2
Euro 6 Emission Limits

Category		Class	Reference mass (RM) (kg)	Limit values													
				Mass of carbon monoxide (CO)		Mass of total hydrocarbons (THC)		Mass of non-methane hydrocarbons (NMHC)		Mass of oxides of nitrogen (NO _x)		Combined mass of hydrocarbons and oxides of nitrogen (THC + NO _x)		Mass of particulate matter (PM) ⁽¹⁾		Number of particles (PN)	
				L ₁ (mg/km)		L ₂ (mg/km)		L ₃ (mg/km)		L ₄ (mg/km)		L ₂ + L ₄ (mg/km)		L ₅ (mg/km)		L ₆ (#/km)	
			PI	CI	PI	CI	PI	CI	PI	CI	PI	CI	PI ⁽²⁾	CI	PI ⁽²⁾ ⁽³⁾	CI	
M	—	All	1 000	500	100	—	68	—	60	80	—	170	4,5	4,5	6,0 × 10 ¹¹	6,0 × 10 ¹¹	
N ₁	I	RM ≤ 1 305	1 000	500	100	—	68	—	60	80	—	170	4,5	4,5	6,0 × 10 ¹¹	6,0 × 10 ¹¹	
	II	1 305 < RM ≤ 1 760	1 810	630	130	—	90	—	75	105	—	195	4,5	4,5	6,0 × 10 ¹¹	6,0 × 10 ¹¹	
	III	1 760 < RM	2 270	740	160	—	108	—	82	125	—	215	4,5	4,5	6,0 × 10 ¹¹	6,0 × 10 ¹¹	
N ₂	—	All	2 270	740	160	—	108	—	82	125	—	215	4,5	4,5	6,0 × 10 ¹¹	6,0 × 10 ¹¹	

Key: PI = Positive Ignition, CI = Compression Ignition

⁽¹⁾ A limit of 5,0 mg/km for the mass of particulate emissions applies to vehicles type approved to the emission limits of this table with the previous particulate mass measurement protocol, before 1.9.2011.

⁽²⁾ Positive ignition particulate mass and number limits shall apply only to vehicles with direct injection engines.

⁽³⁾ Until three years after the dates specified in Article 10(4) and (5) for new type approvals and new vehicles respectively, a particle number emission limit of 6,0 × 10¹² #/km shall apply to Euro 6 PI direct injection vehicles upon the choice of the manufacturer. Until those dates at the latest a type approval test method ensuring the effective limitation of the number of particles emitted by vehicles under real driving conditions shall be implemented.'

ANNEX II

Amendments to Regulation (EC) No 692/2008

Regulation (EC) No 692/2008 is amended as follows:

(1) Appendix 6 to Annex I is amended as follows:

(a) in point 1, the second sentence is replaced by the following:

'This number shall be followed by one or more characters reflecting the different categories in accordance with Table 1.:'

(b) Table 1 is replaced by the following table:

Table 1

Character	Emissions standard	OBD standard	Vehicle category and class	Engine	Implementation date: new types	Implementation date: new vehicles	Last date of registration
A	Euro 5a	Euro 5	M, N ₁ class I	PI, CI	1.9.2009	1.1.2011	31.12.2012
B	Euro 5a	Euro 5	M ₁ to fulfil specific social needs (excluding M ₁ G)	CI	1.9.2009	1.1.2012	31.12.2012
C	Euro 5a	Euro 5	M ₁ G to fulfil specific social needs	CI	1.9.2009	1.1.2012	31.8.2012
D	Euro 5a	Euro 5	N ₁ class II	PI, CI	1.9.2010	1.1.2012	31.12.2012
E	Euro 5a	Euro 5	N ₁ class III, N ₂	PI, CI	1.9.2010	1.1.2012	31.12.2012
F	Euro 5b	Euro 5	M, N ₁ class I	PI, CI	1.9.2011	1.1.2013	31.12.2013
G	Euro 5b	Euro 5	M ₁ to fulfil specific social needs (excluding M ₁ G)	CI	1.9.2011	1.1.2013	31.12.2013
H	Euro 5b	Euro 5	N ₁ class II	PI, CI	1.9.2011	1.1.2013	31.12.2013
I	Euro 5b	Euro 5	N ₁ class III, N ₂	PI, CI	1.9.2011	1.1.2013	31.12.2013
J	Euro 5b	Euro 5+	M, N ₁ class I	PI, CI	1.9.2011	1.1.2014	31.8.2015
K	Euro 5b	Euro 5+	M ₁ to fulfil specific social needs (excluding M ₁ G)	CI	1.9.2011	1.1.2014	31.8.2015
L	Euro 5b	Euro 5+	N ₁ class II	PI, CI	1.9.2011	1.1.2014	31.8.2016

Character	Emissions standard	OBD standard	Vehicle category and class	Engine	Implementation date: new types	Implementation date: new vehicles	Last date of registration
M	Euro 5b	Euro 5+	N ₁ class III, N ₂	PI, CI	1.9.2011	1.1.2014	31.8.2016
N	Euro 6a	Euro 6-	M, N ₁ class I	CI			31.12.2012
O	Euro 6a	Euro 6-	N ₁ class II	CI			31.12.2012
P	Euro 6a	Euro 6-	N ₁ class III, N ₂	CI			31.12.2012
Q	Euro 6b	Euro 6-	M, N ₁ class I	CI			31.12.2013
R	Euro 6b	Euro 6-	N ₁ class II	CI			31.12.2013
S	Euro 6b	Euro 6-	N ₁ class III, N ₂	CI			31.12.2013
T	Euro 6b	Euro 6-plus IUPR	M, N ₁ class I	CI			31.8.2015
U	Euro 6b	Euro 6-plus IUPR	N ₁ class II	CI			31.8.2016
V	Euro 6b	Euro 6-plus IUPR	N ₁ class III, N ₂	CI			31.8.2016
W	Euro 6b	Euro 6-1	M, N ₁ class I	PI, CI	1.9.2014	1.9.2015	31.8.2018
X	Euro 6b	Euro 6-1	N ₁ class II	PI, CI	1.9.2015	1.9.2016	31.8.2019
Y	Euro 6b	Euro 6-1	N ₁ class III, N ₂	PI, CI	1.9.2015	1.9.2016	31.8.2019
ZA	Euro 6c	Euro 6-2	M, N ₁ class I	PI, CI	1.9.2017	1.9.2018	
ZB	Euro 6c	Euro 6-2	N ₁ class II	PI, CI	1.9.2018	1.9.2019	
ZC	Euro 6c	Euro 6-2	N ₁ class III, N ₂	PI, CI	1.9.2018	1.9.2019	

Character	Emissions standard	OBD standard	Vehicle category and class	Engine	Implementation date: new types	Implementation date: new vehicles	Last date of registration
ZX	n.a.	n.a.	All vehicles	Battery full electric	1.9.2009	1.1.2011	
ZY	n.a.	n.a.	All vehicles	Fuel cell full electric	1.9.2009	1.1.2011	
ZZ	n.a.	n.a.	All vehicles using certificates according to point 2.1.1 of Annex I	PI, CI	1.9.2009	1.1.2011	

Key:

"Euro 5a" emissions standard = excludes revised measurement procedure for particulate matter, particle number standard and flex fuel vehicle low temperature emission testing with biofuel;

"Euro 5b" emissions standard = Full Euro 5 emission requirements including revised measurement procedure for particulate matter, particle number standard for CI vehicles and flex fuel vehicle low temperature emission testing with biofuel;

"Euro 6a" emissions standard = excludes revised measurement procedure for particulate matter, particle number standard and flex fuel vehicle low temperature emission testing with biofuel;

"Euro 6b" emissions standard = Euro 6 emission requirements including revised measurement procedure for particulate matter, particle number standards (preliminary values for PI vehicles) and flex fuel vehicle low temperature emission testing with biofuel;

"Euro 6c" emissions standard = Full Euro 6 emission requirements, i.e. Euro 6b emission standard and final particle number standards for PI vehicles;

"Euro 5" OBD standard = Base Euro 5 OBD requirements excluding in use performance ratio (IUPR), NO_x monitoring for petrol vehicles and tightened PM threshold limits for diesel;

"Euro 5+" OBD standard = includes relaxed in use performance ratio (IUPR), NO_x monitoring for petrol vehicles and tightened PM threshold limits for diesel;

"Euro 6-" OBD standard = relaxed OBD threshold limits;

"Euro 6- plus IUPR" OBD standard = includes relaxed OBD threshold limits and relaxed in use performance ratio (IUPR);

"Euro 6-1" OBD standard = Full Euro 6 OBD requirements but with preliminary OBD threshold limits as defined in point 2.3.4 of Annex XI and partially relaxed IUPR;

"Euro 6-2" OBD standard = Full Euro 6 OBD requirements but with final OBD threshold limits as defined in point 2.3.3 of Annex XI.

(2) Annex XI is amended as follows:

(a) the following points 2.3.3 and 2.3.4 are inserted:

'2.3.3. The OBD thresholds limits for vehicles that are type approved according to the Euro 6 emission limits set out in Table 2 of Annex I to Regulation (EC) No 715/2007 from three years after the dates given in Article 10(4) and 10(5) of that Regulation are given in the following table:

Final Euro 6 OBD threshold limits

Category	Class	Reference mass (RM) (kg)	Mass of carbon monoxide		Mass of non-methane hydrocarbons		Mass of oxides of nitrogen		Mass of particulate matter		Number of particles	
			(CO) (mg/km)	(CI) (mg/km)	(NMHC) (mg/km)	(CI) (mg/km)	(NO _x) (mg/km)	(PI) (mg/km)	(CI) (mg/km)	(PI) (mg/km)	(PN) (#/km)	(CI) (PI)
M	—	All	1 900	1 750	170	290	90	140	12	12		
N ₁ ⁽³⁾	I	RM ≤ 1 305	1 900	1 750	170	290	90	140	12	12		

Category	Class	Reference mass (RM) (kg)	Mass of carbon monoxide		Mass of non-methane hydrocarbons		Mass of oxides of nitrogen		Mass of particulate matter		Number of particles	
			(CO) (mg/km)	(CI) (mg/km)	(NMHC) (mg/km)	(CI) (mg/km)	(NO _x) (mg/km)	(CI) (mg/km)	(PI) (mg/km)	(CI) (#/km)	(PI) (#/km)	
	II	1 305 < RM ≤ 1 760	3 400	2 200	225	320	110	180	12	12		
	III	1 760 < RM	4 300	2 500	270	350	120	220	12	12		
N ₂	—	All	4 300	2 500	270	350	120	220	12	12		

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

Explanatory note:

The OBD thresholds set out in the table are subject to a review to be conducted by the Commission by 1 September 2014. Where the thresholds appear to be not technically feasible, their values or the mandatory date of application are to be amended accordingly, considering the effects of other new requirements and tests that will be introduced for Euro 6 vehicles. Where the review shows an environmental need as well as technical feasibility and a net monetised benefit, more stringent values need to be adopted and OBD threshold limits for particle numbers or, where applicable, other regulated pollutants introduced. In doing so, appropriate lead time for introducing the technical developments has to be given to the industry.

2.3.4. Until three years after the dates specified in Article 10(4) and (5) of Regulation (EC) No 715/2007 for new type approvals and new vehicles respectively, the following OBD threshold limits shall be applied to vehicles that are type approved according to the Euro 6 emission limits set out in Table 2 of Annex I to Regulation (EC) No 715/2007, upon the choice of the manufacturer:

Preliminary Euro 6 OBD threshold limits

Category	Class	Reference mass (RM) (kg)	Mass of carbon monoxide		Mass of non-methane hydrocarbons		Mass of oxides of nitrogen		Mass of particulate matter	
			(CO) (mg/km)	(CI) (mg/km)	(NMHC) (mg/km)	(CI) ⁽²⁾ (mg/km)	(NO _x) (mg/km)	(CI) (mg/km)	(PI) (mg/km)	(PI) (mg/km)
M	—	All	1 900	1 750	170	290	150	180	25	25
N ₁ ⁽³⁾	I	RM ≤ 1 305	1 900	1 750	170	290	150	180	25	25
	II	1 305 < RM ≤ 1 760	3 400	2 200	225	320	190	220	25	25
	III	1 760 < RM	4 300	2 500	270	350	210	280	30	30
N ₂	—	All	4 300	2 500	270	350	210	280	30	30

Key: PI = Positive Ignition, CI = Compression Ignition.¹

(b) point 2.14 is replaced by the following:

2.14. Contrary to point 3.3.5 of Annex 11 to UN/ECE Regulation No 83, the following devices shall be monitored for total failure or removal if the latter resulted in exceeding the applicable emission limits:

— as from 1 September 2011, a particulate trap fitted to compression ignition engines as a separate unit or integrated into a combined emission control device,

- for vehicles certified against either the OBD threshold limits shown in the tables set out in point 2.3.3 or 2.3.4, a NO_x aftertreatment system fitted to compression ignition engines as a separate unit or integrated into a combined emission control device,
- for vehicles certified against either the OBD threshold limits shown in the tables set out in point 2.3.3 or 2.3.4, a diesel oxidation catalyst (DOC) fitted to compression ignition engines as a separate unit or integrated into a combined emission control device.

The devices referred to in the first paragraph shall also be monitored for any failure that would result in exceeding the applicable OBD threshold limits.;

(c) in point 3.1.5 of Appendix 1, the following sentence is added:

‘For new type approvals and new vehicles the monitor required by point 2.9 of this Annex shall have an IUPR greater or equal to 0,1 until three years after the dates specified in Article 10(4) and (5) of Regulation (EC) No 715/2007 respectively.;

(3) in Annex XVI, point 6.2 is replaced by the following:

‘6.2. The manufacturer shall demonstrate that use of the sensors referred to in point 6.1 and any other sensors on the vehicle, results in the activation of the driver warning system as referred to in point 3, the display of a message indicating an appropriate warning (e.g. “emissions too high — check urea”, “emissions too high — check AdBlue”, “emissions too high — check reagent”), and the driver inducement system as referred to in point 8.3, when the situations referred to in points 4.2, 5.4 or 5.5 occur.

For the purposes of this point these situations are presumed to occur:

- in the case of vehicles approved to the Euro 5 emission limits of Table 1 of Annex I to Regulation (EC) No 715/2007, if the applicable NO_x emission limit of that table multiplied by a factor of 1,5, is exceeded,
- in the case of vehicles approved to the Euro 6 emission limits of Table 2 of Annex I to Regulation (EC) No 715/2007, if the applicable NO_x OBD threshold limit of the tables set out in points 2.3.2, 2.3.3 or 2.3.4 of Annex XI is exceeded.

NO_x emissions during the test to demonstrate compliance with these requirements shall be no more than 20 % higher than the values referred to in the second paragraph.’
