



The Introduction of Euro 5 and Euro 6 Emissions Regulations for Light Passenger and Commercial Vehicles

Introduction

As a member of the European Union, Ireland is obliged to introduce Regulation (EC) No. 715/2007 and its implementing Regulation (EC) No. 692/2008. This Regulation will set tighter emission limits, known as Euro 5 and Euro 6, of atmospheric pollutants such as particulates and nitrogen oxide for vehicles sold in the EU market. Euro 5 will apply to passenger cars and light duty vehicles of categories M1, M2, N1 and N2 (all with a reference mass not exceeding 2,610kg) and will be mandatory for vehicles registered from the 1st January 2011 or from 1st January 2012 for some vehicles, see later for details. Euro 6 will apply to new vehicle registrations from 2015, and in particular will set tougher emission limits for nitrogen oxides. Implementation dates for each vehicle category are summarised further in this document. This Regulation controls the emissions of vehicles with a reference mass up to 2,610kg and removes them from the scope of directive 2005/55/EC. Reference mass means the mass of the vehicle in running order less the uniform mass of the driver of 75kg and increased by a uniform mass of 100kg (refer to Certificate of Conformity point 12.1).

Objectives of the Regulation

Reducing emissions from road transport is seen as an important factor in the improvement of air quality, particularly because the share of diesel vehicles in the overall sales of light duty vehicles is increasing. The Euro 5 and 6 Regulation revises the current emission limits for motor vehicles (the Euro 4 standards, which have applied since 1st January 2005), as technology has improved. The specific objectives cover:

- Setting harmonised rules on the construction of motor vehicles, and

- Improving air quality by reducing pollutants emitted from the road transport sector by setting the next stage of emission limit values for passenger cars and light-duty vehicles in a cost-effective way.

Background

Although air quality has improved over the past decade, there are still significant problems throughout the European Union, especially in urban areas and in densely populated regions. Member States and their citizens are concerned about the risks to human health and the environment that results from such air pollution. In that context, Euro 5 and Euro 6 standards lay down common EU rules on the construction of motor vehicles with regard to the emission of atmospheric pollutants (both particulates and nitrogen oxides) from light duty vehicles.

The technical requirements take effect in two stages, Euro 5 emission limits will come into effect for new type approvals from 1st September 2009 (and new registrations from 1st January 2011) and Euro 6 emission limits will apply for new type approvals from 1st September 2014 (and new registrations from 1st September 2015). The main effect of Euro 5 is to reduce the emission of particulate matter from diesel cars from 25mg/km to 5mg/km. This will make the introduction of particle filters for diesel cars obligatory. Euro 6 limits will mainly reduce the emissions of nitrogen oxide from diesel cars further, from 180mg/km to 80mg/km.

This Regulation also sets out requirements for unrestricted access to vehicle repair information, and in particular to that information relating to on-board diagnostic (OBD) systems and their interaction with other vehicle systems. OBD systems play an important role in the control of vehicle emissions.

Implications for Irish Stakeholders

Although there is no indigenous engine manufacturing industry in Ireland, the introduction of the Euro 5 and Euro 6 Regulation will have type approval implications for a number of sectors such as importers, distributors and converters of light passenger and commercial vehicles, as well as the Irish consumer. It is essential that vehicle importers, distributors and converters are aware of the effective dates of implementation for Euro 5 and Euro 6 and their applicability.

The improvements to air quality that will result from the introduction of the Regulation will likely lead to improved public health and thus enable the Irish Government to generate savings. It will also guarantee a common level of emissions amongst all vehicles in the EU.

Whilst the introduction of new technologies will likely bring additional costs to consumers, the new emission limit values of Euro 5 and Euro 6 have been calculated to ensure a balance is achieved between higher environmental standards and continued affordability of cars and light duty vehicles both in the diesel and the petrol markets.

Requirements of the Regulation

Given the need for uniform standards, the Commission has devised procedures, tests and specific requirements for the following:

- Tailpipe emissions, including test cycles, low ambient temperature emissions, emissions at idling speed, exhaust gas opacity, and the proper functioning and regeneration of after-treatment systems;
- Evaporative emissions and crankcase emissions;
- On-board diagnostic systems and the performance of anti-pollution devices while the vehicle is running;
- Durability of anti-pollution devices, replacement parts for emissions control systems, in-service conformity, conformity of production and technical control;
- Carbon dioxide emissions and fuel consumption;
- Hybrid vehicles;
- Extension of approvals and requirements for small manufacturers;
- Requirements for testing equipment, and
- Reference fuels, such as petrol, diesel fuel, gas and biofuels.

Easy and clear access to information on vehicle repair and maintenance is essential in guaranteeing free competition on the internal market for information and repair services. To this end, manufacturers must ensure that independent operators have easy, restriction-free and standardised access via the internet to information on the repair and upkeep of vehicles, without discrimination in favour of dealerships and official repair workshops. This obligation covers on-board diagnostic systems and their components, diagnostic tools and testing equipment. Charges for accessing such information are permitted if they are reasonable and proportionate.

Under Regulation (EC) 715/2007, the sale or installation on a vehicle of replacement pollution control devices that are not type approved is prohibited.

Type Approval and Registration Dates

The implementation dates of Euro 5/6 for new type approvals and new registrations for various vehicle types (with a reference mass not exceeding 2,610kg) are summarised in the table below. Reference to the Regulation should be made for more details and definitions of vehicle types. Examining the table, new vehicles of categories M1 and N1 Class 1 will be required to be manufactured to Euro 5 standards from 1st September 2009 onwards and vehicles of these categories will be required to have Euro 5 certification in order to be registered from 1st January 2011 onwards. Therefore Euro 4: M category vehicles cannot be registered from 1st January 2011; category N1 class II and III and category N2 vehicles and vehicles designed to fulfill specific social needs cannot be registered from 1st January 2012. In certain conditions, an end of series exemption can be applied for, which if granted, will allow vehicles an extended period

of time for registration. Details of the end of series exemption procedure and an application can be found at www.rsa.ie.

		New Approvals	Type	New Registrations
Euro 5	M1, M2, N1 Class I	1/09/2009		01/01/2011
	M1 designed to fulfil specific social needs	01/09/2009		01/01/2012
	N1 Classes II and III, N2	01/09/2010		01/01/2012
Euro 6	M1, M2 and N1 Class I	01/09/2014		01/09/2015
	N1 Classes II and III, N2	01/09/2015		01/09/2016

A further reduction of the Euro 5 emissions limit for mass of particulate matter will be effective from 1st September 2011 for type-approval on new types of vehicles and from 1st January 2013 for registration of vehicles. The table in Appendix 1 is extracted from Regulation 692/2008 which amends Regulation 715/2007 and details the type approval dates, registration dates (implementation date: new vehicles) and the gives details of the certification numbering system. The move from starting to require Euro 5 to completion of the move to full Euro 6 will be undertaken in 25 steps with limits to the dates when vehicles can be registered during this process. The final column gives the dates when registration is no longer permitted for each stage.

Appendix 2 of this document details the limit values for emissions for Euro 5 and Euro 6.

Penalties for breach of these regulations

Under SI 157 of 2009 European communities (Road Vehicles: Entry Into Service) Regulations 2009 and SI 158 of 2009 European Communities (Road Vehicles: Type-Approval) Regulations 2009 a person guilty of an offence under these Regulations is liable:-

- a. on summary conviction to a fine not exceeding €5,000 or imprisonment for a term not exceeding 6 months or both and or €100,000 and or imprisonment for a term of 12 months and
- b. on conviction on indictment, to a fine not exceeding €100,000 or imprisonment for a term not exceeding 12 months or both.

Appendix 1

Specific Euro 5/ 6 Type Approval and Registration Dates

1. Section 3 of the EC type-approval number issued according to Article 6(1) shall be composed by the number of the implementing regulatory act or the latest amending regulatory act applicable to the EC type-approval. This number shall be followed by an alphabetical character reflecting the different vehicle categories in accordance with Table 1 below. These alphabetical characters shall also distinguish the Euro 5 and 6 emission limit values to which the approval was granted.

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
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	M, N ₁ Class I	Pi, Ci	1-9-2014	1-9-2015	
X	Euro 6b	Euro 6	N ₁ Class II	Pi, Ci	1-9-2015	1-9-2016	
Y	Euro 6b	Euro 6	N ₁ Class III, N ₂	Pi, Ci	1-9-2015	1-9-2016	

Key:

'Euro 5a' emissions standard = excludes revised measurement procedure for particulates, particle number standard and flex fuel vehicle low temperature emission testing with biofuel.

'Euro 6a' emissions standard = excludes revised measurement procedure for particulates, particle number standard and flex fuel vehicle low temperature emission testing with biofuel.

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

'Euro 6-' OBD standards = relaxed diesel OBD threshold limits, no in use performance ratio (IUPR).

'Euro 6-plus IUPR' OBD = includes relaxed diesel OBD threshold limits and relaxed in use performance ratio (IUPR)

Note: Article 4(7) only permits type-approvals according to characters W, X and Y to be performed once Euro 6 OBD threshold have been introduced.

Appendix 2

Specific Euro 5/6 Emission Limit Values

The following tables are extracted from Annex I of Regulation 715/2207 and give details the limit values for emissions for Euro 5 and Euro 6.

EMISSION LIMITS

Table 1: Euro 5 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 ⁽¹⁾ (PM)		Number of particles ⁽²⁾ (P)	
			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 ⁽³⁾	CI	PI	CI
M	-	All	1 000	500	100	-	68	-	60	180	-	230	5.0/4.5	5.0/4.5	-	6.0 × 10 ¹¹
N ₁	I	RM ≤ 1 305	1 000	500	100	-	68	-	60	180	-	230	5.0/4.5	5.0/4.5	-	6.0 × 10 ¹¹
	II	1 305 < RM ≤ 1 760	1 610	630	130	-	90	-	75	235	-	295	5.0/4.5	5.0/4.5	-	6.0 × 10 ¹¹
	III	1 760 < RM	2 270	740	160	-	108	-	82	280	-	360	5.0/4.5	5.0/4.5	-	6.0 × 10 ¹¹
N ₂	-	All	2 270	740	160	-	108	-	82	280	-	360	5.0/4.5	5.0/4.5	-	6.0 × 10 ¹¹

Key: PI = Positive Ignition, CI = Compression Ignition

⁽¹⁾ A revised measurement procedure shall be introduced before the application of the 4.5 mg/km limit value.

⁽²⁾ A new measurement procedure shall be introduced before the application of the limit value.

⁽³⁾ Positive ignition particulate mass standards shall apply only to vehicles with direct injection engines.

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 ⁽¹⁾ (PM)		Number of particles ⁽²⁾ (P)	
			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 ⁽³⁾	CI	PI ⁽⁴⁾	CI ⁽⁴⁾
M	-	All	1 000	500	100	-	68	-	60	80	-	170	5.0/4.5	5.0/4.5		6.0 × 10 ¹¹
N ₁	I	RM ≤ 1 305	1 000	500	100	-	68	-	60	80	-	170	5.0/4.5	5.0/4.5		6.0 × 10 ¹¹
	II	1 305 < RM ≤ 1 760	1 610	630	130	-	90	-	75	105	-	195	5.0/4.5	5.0/4.5		6.0 × 10 ¹¹
	III	1 760 < RM	2 270	740	160	-	108	-	82	125	-	215	5.0/4.5	5.0/4.5		6.0 × 10 ¹¹
N ₂	-	All	2 270	740	160	-	108	-	82	125	-	215	5.0/4.5	5.0/4.5		6.0 × 10 ¹¹

Key: PI = Positive Ignition, CI = Compression Ignition

⁽¹⁾ A revised measurement procedure shall be introduced before the application of the 4.5 mg/km limit value.

⁽²⁾ A number standard is to be defined for this stage for positive ignition vehicles.

⁽³⁾ Positive ignition particulate mass standards shall apply only to vehicles with direct injection engines.

⁽⁴⁾ A number standard shall be defined before September 1, 2014.

⁽⁵⁾ A new measurement procedure shall be introduced before the application of the limit value.