

# Overview of Vehicle Standards and Vehicle Testing

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## 1. Introduction

The purpose of this Paper is to provide a summary for the Urban Transport Related Air Pollution Group (UTRAP) of the vehicle standards and vehicle testing regimes currently in operation within the European Union.

The different systems described below have been established in order to apply and enforce a range of technical, safety and environmental standards as determined by the Member States. The evolution and availability of innovative technologies, the improving accuracy of equipment and the on-going creation of new policy in this area have created a complex (and somewhat fragmented) legislative landscape.

## 2. Type Approval

### 2.1 Background

'Type approval' was first introduced in February 1970 in order to create harmonised standards for motorised vehicles which up to that point differed from one Member State to another. As inconsistent standards inhibited the proper functioning of the common market, an EU-wide standard accepted by all Member States allowed for the free movement of new vehicles amongst the Member States.

Over the last number of decades, the type approval system has extended in scope so that motorised vehicles must be manufactured to strict safety and quality standards before they are allowed to be placed on the market and registered by a Member State.

### 2.2 Current Regime

Directive 2007/46/EC<sup>1</sup> is the Union legal framework for the type-approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles. Although there are variants of type approval, the general process is as follows:

- A manufacturer applies to a Type Approval Authority for a vehicle to be approved. There is one Type Approval Authority per Member State and manufacturers are free to choose from any Authority;
- The manufacturer must show that the vehicle meets the standards required by the legislation and they must also prove conformity of production, i.e. that all other vehicles of the same type are manufactured identically;

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<sup>1</sup> 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)

- Once the Type Approval Authority approves the vehicle in question, the manufacturer can issue a Certificate of Conformity (CoC) for all other vehicles of the same type in order to show they comply with the standards required (i.e. the vehicles are now considered to be 'type approved').
- A vehicle approved in one Member State can be placed on the market, registered and entered into service in any other Member State on the basis of their CoC.

## 2.3 Future System

The current EU type-approval framework which is based on an EU Directive is to become an EU Regulation with direct effect, from 1 September 2020. One of the main reasons for this change arises from the Dieselgate scandal that saw a vehicle manufacturer incorporate a system into a vehicle to alter its performance during the type approval testing process (this system is known as a 'defeat device').

The new regulation (Regulation (EU) 2018/858<sup>2</sup>) will continue to set out the EU-wide rules on the technical requirements and procedures required for new types of motor vehicles. The new Regulation aims to:

- Raise the quality level and independence of vehicle type approval and testing;
- Introduce market surveillance and require EU countries to carry out regular spot-checks on vehicles already entered into service;
- In addition to the existing ban on 'defeat devices' which alter the performance exhibited during test procedures, manufacturers must provide access to the car's software protocols to allow for external checks.

## 3. 'Euro' Vehicle Emissions

### 3.1 Background

Although emissions regulations date back to 1970, the first EU-wide standard for vehicles sold in the single market (known as Euro 1) wasn't introduced until 1992. Since then, the EU has continued to impose and strengthen emissions standards for new vehicles with the aim of improving air quality. The testing of emissions standards is part of the type approval system and is governed by Regulation (EC) No 715/2007<sup>3</sup> and its implementing Regulations, which set lower emission limits (now known as Euro 5 and Euro 6) of atmospheric pollutants such as particulates and nitrogen oxide. Although air

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<sup>2</sup> Regulation (EU) 2018/858 of the European Parliament and of the Council of 30 May 2018 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, amending Regulations (EC) No 715/2007 and (EC) No 595/2009 and repealing Directive 2007/46/EC

<sup>3</sup> 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

quality has improved over the past decade, there are still significant problems throughout the EU, especially in urban areas and in densely populated regions. The equivalent system for large commercial vehicles is known as Euro I – VI.

### 3.2 Current and Future System

The technical requirements have taken effect in two stages: Euro 5 emission limits came into effect for new vehicle types from 1 September 2009 (and new vehicles from 1 January 2011); and Euro 6 emission limits have applied to new vehicle types from 1 September 2014 (and new vehicles from 1 September 2015).

The main effect of Euro 5 was to reduce the emission of particulate matter from diesel cars from 25mg/km to 5mg/km and accordingly the introduction of particle filters for diesel cars became largely obligatory. Euro 6 limits mainly reduce the emissions of nitrogen oxide from diesel cars further, from 180mg/km to 80mg/kg. Regulation (EC) No 715/2007 also sets the requirements for unrestricted access to vehicle repair information and in particular to 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.

The Commission has recently formed an Advisory Group on Vehicle Emission Standards (AGVES) by joining all the relevant expert groups working on emission legislation, in order to provide technical advice to the Commission for the development of the post-Euro 6 emission standards for motor vehicles. The Commission has also launched a scientific study on this issue, the first part of which will examine the effectiveness of what's in place with regard to emissions testing and an emphasis will be given to a review of international regulations. The second part of the study will consist of an impact assessment. The Commission intends to look at possible technical solutions during 2020 and plans to produce a proposal for new a Regulation in 2021.

## 4. Roadworthiness Testing

### 4.1 Background

The main objective of roadworthiness testing is to enhance road safety. The governing legislation provides a single European system for roadworthiness testing based on harmonised standards, equipment, inspector qualifications and the assessment of defects. Periodic roadworthiness testing is based on the age and the type of a vehicle while randomised roadside inspections also take place for buses, vans and trucks.

Periodic roadworthiness testing for passenger cars is known as the National Car Test (NCT) and periodic roadworthiness testing for commercial vehicles is called the Commercial Vehicle Roadworthiness Test (CVRT). The Road Safety Authority (RSA) has responsibility for the operation and administration of roadworthiness testing in the State.

As a harmonised EU-wide system has been achieved, Member States must mutually recognise certificates of roadworthiness issued by other Member States.

## 4.2 Emissions Testing

The specific tests and methods of testing for periodic roadworthiness inspections are given in Annex I of Directive 2014/45/EU<sup>4</sup> and the assessment of defects are categorised as Minor, Major or Dangerous.

As regards the testing of vehicle exhaust emissions, this information is given by item 8.2 of Annex I of the Directive. For positive ignition (petrol) engines, a visual check of any exhaust emissions control equipment is carried out to determine if the equipment has been removed or modified. A check is also carried out on gaseous emissions using an exhaust gas analyser or reading an on-board diagnostic device.

For combustion ignition (diesel) engines a visual inspection of any exhaust emission control equipment takes place followed by an opacity test for vehicles registered after 1 January 1980. The opacity is not to exceed the level recorded on the manufacturer's plate on the vehicle.

If any of the above tests are unsuccessful the vehicle is determined to have a major deficiency and the roadworthiness inspection is deemed to have been failed. Until the vehicle has been repaired and successfully undergoes an additional test, that vehicle will not receive a certificate of roadworthiness (i.e. an NCT or a CVRT Cert.).

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<sup>4</sup> Directive 2014/45/EU of the European Parliament and of the Council of 3 April 2014 on periodic roadworthiness tests for motor vehicles and their trailers and repealing Directive 2009/40/EC.