

Testing of emissions from cars

Air pollutant emissions are the cause of 400 000 premature deaths in the EU per year, major respiratory diseases and significant healthcare costs.

Urban transport is one of the triggers of excessive air pollution in many urban areas. That is why over the past decades, the Commission has led EU efforts to progressively reduce emissions of air pollutants from road vehicles. The maximum nitrogen oxides (NO_x) emission limits for diesel passenger cars have dropped from 500 mg/km in 2000 to 80mg/km in 2014. And the way in which emissions tests are conducted is becoming increasingly robust.

Until September 2017, only a laboratory test was used to measure air pollution emissions during the type approval process before the car could be placed on the market. However, air pollutants emissions measured on the road substantially exceeded emissions measured on the laboratory test cycle. The Commission has therefore made two major changes to strengthen the emissions testing regime and rebuild consumer confidence: the improvement of lab tests and the introduction of testing in real driving situation.

Improving emissions tests is only part of the Commission's wider work for a clean, sustainable and competitive car sector as laid down in the Commission Communication ['Europe on the Move'](#). Commission initiatives include air quality and CO₂ standards, the overhaul of the type-approval framework or the support for alternative fuels and battery production.

What is the Real Driving Emissions test?

Already before the emissions scandal broke, the Commission had proposed to measure emissions in real driving conditions. This test procedure further tightens the rules since it checks the emissions of NO_x and ultrafine particles (Particle Number – PN) from vehicles on the road and significantly reduces the discrepancy between emissions measured in real driving and those measured in a laboratory. The Real Driving Emissions (RDE) procedure complements the laboratory test.

In the RDE procedure pollutant emissions are measured by portable emission measuring systems (PEMS) that are attached to the car while driving in real conditions on the road. This means that the car is driven outside and on a real road according to random variations of parameters such as acceleration, deceleration, ambient temperature, and payloads.

How was RDE developed?

RDE was developed in four separate regulatory acts:

- **RDE Act 1:** The first step was to define the actual test procedure. This was voted positively by the Member States in the Technical Committee of Motor Vehicles (TCMV) in May 2015 and entered into force in 2016. In the initial phase starting in early 2016, the RDE testing was only done for

monitoring purposes, without an impact on the actual type approval which continued to be delivered on the basis of laboratory measurements.

- **RDE Act 2:** The second step determined the phasing in of RDE testing to have an actual impact on type approvals issued by national authorities. On 28 October 2015, Member States meeting in the Technical Committee of Motor Vehicles (TCMV) agreed that RDE measurements of NO_x would be compulsory for new car models from September 2017, and for all new vehicles from September 2019.
- **RDE Act 3:** As a third step, Member States in the TCMV adopted on 20 December 2016 the Commission proposal to extend RDE testing to cover particle number (PN) emissions for all new vehicle types by September 2017 and for all new vehicles by September 2018. These very small particles exist in diesel cars as well as petrol cars with direct injection technology. Under RDE Act 3, the Commission also fine-tuned the testing methods to take into account that short city trips starting with a cold engine generate most city pollution. To cover a broader range of conditions, hot engine starts will now also be included. In addition, this Act also mandates that the real-world emission performance of a car should be clearly stated by the manufacturer in the certificate of conformity of each vehicle, i.e. that it is transparent and available for all citizens and public authorities.
- **RDE Act 4:** On 3 May 2018, Member States in the TCMV agreed on the Commission proposal to go one step further and strengthen RDE legislation even more. The 4th RDE act ensures transparent and independent control of emissions of vehicles during their lifetime. Type approval authorities will have to check each year the emissions of vehicles already in circulation (“in-service conformity” testing). Type approval authorities, independent parties and the Commission will be able to perform officially recognised tests through accredited laboratories and technical services. Taking account of latest improvements of the measuring technology, the 4th Act introduces a first reduction of the conformity factor, which caters for technical and statistical variations in RDE measurements, from 1.50 to 1.43. The Commission will continue reviewing the conformity factor with the aim of bringing it down to 1 as soon as possible and at the latest by 2023. The next reduction is scheduled for 2019. Finally the act includes a new unique, transparent, robust and simple methodology for evaluating real driving emissions and for making sure that vehicles are driven properly during such tests. After a three-month scrutiny period in the European Parliament and Council, the Commission will adopt the proposal, which would then apply from 1 January 2019.

What about CO₂ emissions testing?

The Commission has also introduced a new, more realistic laboratory test procedure – the World harmonised Light vehicle Test Procedure (WLTP) for measuring CO₂ emissions and fuel consumption from cars and vans. The WLTP is a globally harmonised test procedure developed within the United Nations Economic Commission for Europe (UNECE) with the support of the European Commission. The new WLTP test was adopted by the Commission on 1 June 2017 and became mandatory for all new car models from September 2017 and for all

new cars from September 2018.

The WLTP replaces the New European Drive Cycle (NEDC), which no longer reflected adequately today's driving conditions or vehicle technologies. The WLTP provides fuel consumption and CO₂ emission values that are more representative of real world conditions to the benefit of consumers and regulators both at EU and national levels. It is a stronger incentive for the deployment of fuel efficient and low-carbon technologies.

Member States voted on 3 May in the TCMV on the 2nd WLTP Act, which improves the lab test to provide more representative CO₂ emission and fuel consumption figures. The Commission proposal tightens testing tolerances and introduces a new evaporative emission procedure adapted to the WLTP. The proposal also introduces as of 2021 the obligation for all new cars and vans to have standardised and accessible fuel and energy consumption monitoring on board of the vehicle. Fuel consumption directly relates to the CO₂ emissions. The new feature, so called 'on-board fuel consumption monitoring device' hence allows for the first time to compare laboratory results for CO₂ emissions with the average real driving situation. This will also provide valuable information to consumers. After a three-month scrutiny period in the European Parliament and Council, the Commission will adopt the proposal, which would then apply from 1 January 2019.

What else is the Commission doing? – A snapshot

The new emissions tests will ensure more reliable results and help rebuild confidence in the performance of new cars. The tests represent one of several important steps in the Commission's work for a clean, sustainable and competitive car industry. This includes a full overhaul of the type approval system, strict [air quality standards](#) that Member States have to comply with, and a number of measures to foster low-emission mobility (i.e. [new CO₂ standards for cars and vans](#), [action plan for alternative fuel infrastructure](#), [development of full value chain of battery production](#)).

Under current rules the EU sets the legal framework but national authorities are fully responsible for checking the compliance of a vehicle. From 1 September 2020, the new EU 'type-approval' framework will be in place. It will significantly raise the quality level and independence of vehicle type-approval and testing, increase checks of vehicles that are already on the EU market and strengthen the overall system with European oversight (see [FAQs](#)).

The Commission has opened infringement procedures against eight Member States for breach of EU type approval legislation in [December 2016](#) and [May 2017](#), and continues to monitor whether EU law in the area is being properly enforced. The Commission has called on Member States to take all necessary measures to ensure that non-compliant vehicles are fixed or withdrawn from circulation. To that effect the Commission has been collecting data by Member States on the progress in the recalls of non-compliant vehicles and has [published the different recall rates](#). The Commission has supported Member States' work with [guidance](#) and a common testing methodology on defeat devices to ensure consistency of results of national investigations. The Commission ensures that competition rules are respected and has proposed a [new deal for](#)

[consumers](#).

Further information

- Main features of the reformed type approval framework – [FAQs](#)
- Political agreement on type approval framework (7 December 2017) – [press release](#)
- Agenda for transition towards clean, competitive and connected mobility:
Commission communication (20 July 2016) – [strategy for low emission mobility](#)
Commission communication (31 May 2017) – [Europe on the Move](#)