

# Review of diesel NO<sub>x</sub> limits: tackle pollution, don't tinker with the limits (again)

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## Summary

The ongoing revision of the rules for Real Driving Emissions (RDE) tests, triggered by a landmark ruling of the EU General Court, is a unique opportunity to rectify the scandalous behind-the-door relaxing of nitrogen oxide (NO<sub>x</sub>) limits decided in the middle of the Dieselgate scandal. Making sure that all new Euro 6d diesel cars strictly respect legal limits when driven under all possible conditions that they have been designed for is essential to tackle Europe's looming air quality crisis. The 80 mg per km limit for NO<sub>x</sub> was adopted 12 years ago and the carmakers' own data shows it is already being met by the vast majority of cars entering the market without the need for flexibilities. T&E therefore demands that the **'conformity factor' be removed** in the current review and that the modalities of the **test procedure be improved** to better reflect actual emissions.

## 1. Background: In reaction to Dieselgate, pollution limits were relaxed – not tightened

Even before systematic cheating in the car industry ('Dieselgate') was revealed in late 2015, the EU had already started to introduce on-road tests for cars into its regulations. Although the Euro 5 and 6 regulation required emissions limits to be met "under normal conditions of use"<sup>1</sup>, there was evidence showing that laboratory tests did not properly reflect on-road emissions. First evidence of carmakers optimising their vehicles for laboratory tests was made public by T&E as early as 1998<sup>2</sup> but only the development of Portable Emissions Measurement Systems (PEMS) in the mid-2000's allowed researchers to determine the real extent of the gap between official and actual pollutant emissions<sup>3</sup>, eventually uncovering the systematic manipulation of emission control systems by certain carmakers.

A logical reaction to Dieselgate would have been to step up enforcement. Shockingly, the opposite happened in the EU; carmakers successfully lobbied primarily national but also EU institutions to relax the NO<sub>x</sub> limits for on-road tests. Secondary laws originally intended to define test details were used to introduce so-called 'conformity factors' through the backdoor, allowing cars to emit 2.1 times the Euro 6 diesel limit of 80 mg NO<sub>x</sub> per km (hence up to 168 mg/km) until 2019/20; and 50% more (or up to 120mg/km) subject to annual reviews.<sup>4</sup> Three EU capitals challenged this decision and the General Court of the EU ruled in December 2018 that the relaxing of limits was illegal. The European Commission has appealed this ruling but in parallel also re-submitted, under an ordinary legislative procedure, the same relaxing of limits to be approved as primary law by both Parliament and member states, and therefore to legitimise it.

<sup>1</sup> Article 4.2 of [Regulation 715/2007](#) 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

<sup>2</sup> Transport & Environment: [Cycle Beating and the EU Test Cycle for Cars](#), 1998

<sup>3</sup> Joint Research Centre: [The introduction of the Real-Driving Emissions procedure in the European type-approval process and the EMROAD tool](#), 2017

<sup>4</sup> This conformity factor was later slightly revised downwards. As of January 2020, a conformity factor of 1.43 will apply to all new types and as of January 2021 to all new cars according to current legislation.

## 2. Years pass by but dirty diesels stay

The EU legislators now have a second chance to make better use of RDE tests and thereby tackle Europe's looming air quality crisis. Since Dieselgate broke out, the air quality in cities has improved only slowly. Air pollution is estimated to decrease the life expectancy of every person in Europe by an average of almost 1 year<sup>5</sup> and the European Environment Agency estimates that every year 79,000 premature deaths in the EU are due to NO<sub>2</sub> pollution.<sup>6</sup> 15 Member States have been taken to court for failing to respect NO<sub>2</sub> limits and diesel cars are responsible for 75% of the health costs of road air pollution in the EU.<sup>7</sup>

At the same time, the technology to get diesel cars to emit significantly less NO<sub>x</sub> and meet the emission limits in real world have become cheaper and widely available. However, carmakers still fail to recall and retrofit the vast majority of polluting diesel cars currently on the road - despite advertising Euro 6 diesels as 'clean' for several years now. Many of the cars approved as Euro 6b were found to emit up to 13 times the current NO<sub>x</sub> legal limit when driven on the road<sup>8</sup>, additionally T&E's recent analysis has shown that the numbers of dirty diesels on Europe's roads has further increased to a total of 51 million vehicles.<sup>9</sup> Real-Driving Emissions tests are essential to force the newest Euro 6d cars to be cleaner and actually respect the legal emission limits on the road even if these tests only cover a few pollutants and are still not representative of all real-world driving conditions.<sup>10</sup> The strict enforcement of NO<sub>x</sub> limits for the millions of Euro 6d cars that will be sold in the years to come is an absolute minimum to reduce emissions of new cars and help cities make the air better for the health of their citizens.

## 3. Old arguments, new evidence: there are no reasons to reinstate 'conformity factors'

Many car industry representatives are now using the same arguments as in 2015/16 to call for the use of 'conformity factors'. There are however strong arguments and new evidence that show why the mistakes made back then should not be repeated:

- **Dangerous precedent:** Beyond the RDE particulars, allowing scientifically and democratically set environmental norms to be watered down via discussions on technical equipment sets a dangerous precedent for decision-making and enforcement. Limits should be met in the real world, not on paper. Legislators should not allow technicalities to stand in the way of the bigger goals and public interest. Allowing the conformity factors to rewrite the original NO<sub>x</sub> limits will open the door to dangerous legal precedents in the future and should therefore be rejected.
- **Diesel already has a laxer limit than petrol:** NO<sub>x</sub> limits for diesel cars (80 mg/km) are still higher than for petrol cars (60 mg/km) and from the perspective of public health, technology and a level playing field there is no reason why one should be allowed to pollute more - let alone why diesel limits should be further relaxed. Regulations in China are already set to reduce the NO<sub>x</sub> limit for diesels to 60 mg/km from July 2020, in line with the limits that apply to petrol vehicles. As of 2023 a limit of 35 mg/km will apply to both diesel and petrol.<sup>11</sup> The new post-Euro 6 standard is an

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<sup>5</sup> World Health Organisation: [Data and statistics](#), consulted in September 2019

<sup>6</sup> European Environment Agency: [Air quality in Europe – 2018 report](#), 2018

<sup>7</sup> CE Delft: [Health impacts and costs of diesel emissions in the EU](#), 2018

<sup>8</sup> Transport & Environment: [Diesel: the true \(dirty\) story](#), 2017

<sup>9</sup> Transport & Environment: [There are now 51 million dirty diesel cars on EU's roads](#), 2019

<sup>10</sup> Transport & Environment: [Dieselgate, three years on: 43 million dirty diesels on our roads – and still growing](#), 2018

<sup>11</sup> In China, RDE tests will only be used as of 2023 to enforce the NO<sub>x</sub> limit of 35 mg/km. A conformity factor of 2.1 will apply but even with this conformity factor the limit in China will be lower than the one in the EU.

opportunity to revise downwards the EU's pollutant limits, too, and the current RDE review should prepare the ground for this work to achieve the 'zero-pollution ambition' set by the new European Commission President.<sup>12</sup>

- **Carmaker data shows the limit can now be met:** T&E's analysis of data published by the manufacturers themselves (March 2019) shows that 87% of Euro 6d-temp and Euro 6d diesel cars approved by then already emit below the limit of 80 mg NO<sub>x</sub> per km during real world RDE testing. The law should reward those that use best available technology, not be changed to accommodate the laggards in the car sector that put profits before public health.<sup>13</sup> Cars must be made cleaner and not the law weaker. A demo car presented by the European association of catalyst producers shows that emissions can be lowered further if available emissions technology is fitted in vehicles.<sup>14</sup>
- **Measurement uncertainties are no excuse:** Some carmakers argue they only need the 'conformity factor' because of measurement uncertainties of PEMS equipment. But any measurement equipment has a margin of error, even under laboratory conditions, and manufacturers already take this into account when designing vehicles to meet regulatory limits. PEMS equipment has been found to have a somewhat larger margin of error compared to non-mobile lab equipment, but this can mean it both over- and under-estimates emissions. It is unacceptable that these uncertainties are used one-sidedly at the expense of public health. If exceedances in tests occur, the burden of proof should be on the carmaker to demonstrate that this is exclusively due to measurement uncertainties and not due to high emissions.

#### 4. 12 years after their adoption it's time to enforce Euro 6 limits

T&E therefore recommends that the EU legislators take the following decisions:

- 1) **Remove the conformity factor from RDE legislation:** 80mg should mean 80mg. The conformity factor is neither justified nor needed. Limits were always designed to be met on the road, not to clean up laboratory air, and possible measurement uncertainties can be minimised by using the best available PEMS equipment. Stringent design and good calibration of the engine and emission after-treatment systems already allows most cars to meet the legal limit on the road without a CF factor.
- 2) **Improvements to RDE testing to ensure on-road compliance:** Current RDE tests are still not representative of real-world driving. Solutions already exist to ensure that vehicles meet the emission standards under all possible driving conditions however, in the absence of stricter RDE tests, manufacturers do not feel obliged to ensure standards are met outside of RDE boundary conditions. The ongoing work on the post-Euro 6 emission standards offers the opportunity for a fundamental review, however the current RDE revision should be seized to fix certain crucial loopholes, namely
  - a) **The current limits on maximum driving dynamics during an RDE test need to be abolished.** The current so-called "V\*apost limits" mean that vehicles don't have to meet emission standards if they are driven in a more dynamic manner. If a vehicle is capable of being driven under high acceleration conditions it needs to meet the emission standards.
  - b) **Temperature and altitude boundary conditions need to be extended to the maximum capability of the PEMS equipment** used for on road emissions monitoring to ensure that

<sup>12</sup> European Commission: [Mission Letter to the Commissioner-designate for Transport](#), 2019

<sup>13</sup> Transport & Environment: [EU must withdraw carmakers' 'license to pollute' as data shows new cars meet limits](#), 2019

<sup>14</sup> AECC: [Diesel Vehicle with Ultra-low NOx Emissions on the Road](#), 2019

emission standards are met under all possible driving conditions. This includes an increase in the temperature boundaries from the current range of -7 to 35 °C to -10 to 45 °C and the maximum altitude from 1300m to 3000m. There should be no limit either on the maximum altitude gain during an RDE test. The current limit of 1100 m / 100 km means that emission limits effectively do not have to be respected in hilly or mountainous regions.

- c) **The additional conformity factor of 1.6 applied to RDE extended boundary conditions needs to be abolished** as the emission limits need to be respected under all possible driving conditions.
- d) **The regeneration of diesel particulate filters, during which soot stored on the filter is burnt off, can lead to a large increase in emissions.**<sup>15</sup> However, the current RDE tests do not measure or include the emissions during regeneration if it occurs in on road tests, applying theoretical emission (Ki) factors instead. This allows vehicles to emit an unlimited amount of pollution during these tests without this being accounted for. This is unacceptable, emission limits must apply under all driving conditions including during regeneration.
- e) To date only particles and NOx emissions have been regulated in RDE tests. Most notably, there is a lack of an on-road carbon monoxide limit, despite the toxic gas already being measured during RDE testing. **RDE tests should without delay be extended to all regulated pollutants, and consider adding CO2.**

Ultimately, years after the Dieselgate scandal broke out and the first set of RDE tests were agreed, the world has changed: emissions abatement technology has become cheaper and more accessible, and the real-world measurement equipment has improved. It is time for the regulations to be future-proof and require the diesel industry to install the latest technology and not cling to the old diesel past in an attempt to maximise profits. This is also about the EU's credibility since much of its ability to enforce emissions rules was put into question following Dieselgate.

### Further information

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<sup>15</sup> M. Leblanc, L. Noël, B. R'Mili, A. Boréave, B. D'Anna, S. Raux, Journal of Earth Sciences and Geotechnical Engineering, vol.6, no. 4, 2016, 29-50