

Position

Fundamental considerations relating to “Euro 7/VII”
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Contacts for this topic

Managing Director
Dr. Joachim Damasky

Dr. Jakob Seiler

Context

Recent results indicate that the Euro 6d-temp and Euro VI_d emission legislation is effective. The air quality is continually improving as the market penetration of clean Euro 6d/VI_d vehicles increases. According to current figures from the German Environment Agency (UBA), the number of measuring stations recording exceedances of the limit values for air quality fell by around 50% in 2019. So the existing emission legislation is already having a beneficial effect. As fleet penetration by the most advanced vehicle technology (that is in line with the latest emission standard and will be mandatory from 2020) progresses, the air quality in Europe continues to improve.

The top priority in drafting Euro 7/VII is therefore no longer to achieve unified across-the-board reductions in emission levels, but to make the legislation clearer and more streamlined and to align it with new technological developments. In this context the VDA is in favor of preparing modern Euro 7/VII exhaust legislation.

Guiding principles

The European Commission has commissioned the CLOVE consortium to draw up a set of guiding principles for future exhaust legislation. The VDA welcomes this approach. However, it nonetheless remains fundamental that any future regulation be derived from the EU's environmental and economic requirements. Principles such as “as clean as possible” and “near zero emissions under almost all driving conditions” run counter to efficient regulation and harbor the risk of regulation-induced overengineering.

Further optimization requirements for vehicles must bring a clear benefit both to human beings and to the environment. Improvements that have only a marginal benefit, but simultaneously make individual mobility disproportionately expensive, must be avoided. This means that the regulation must be a suitable instrument for efficiently attaining the EU's air quality targets.

Against this background, we propose defining a top-down Impact Assessment based on the EU's air quality targets to act as the basis for the guiding principles, and deriving from it cost-effective requirements that can achieve the declared targets for road traffic.

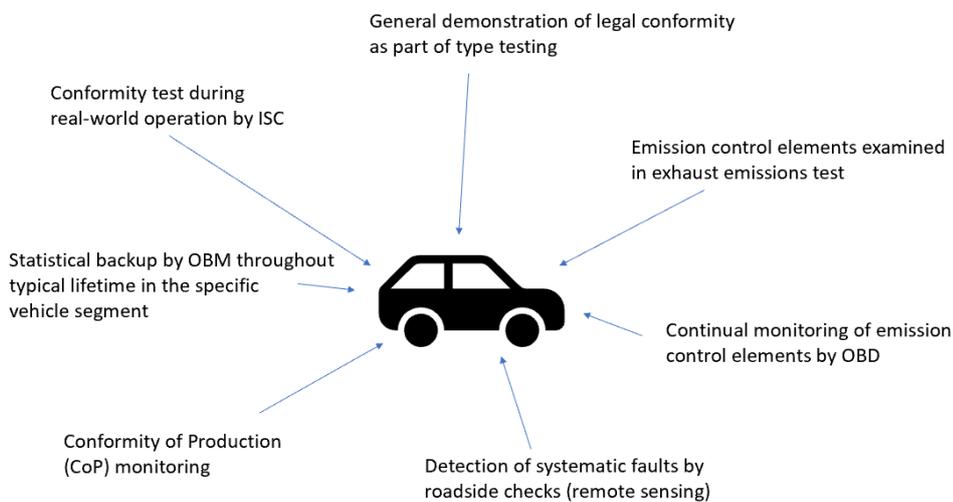
Robustness, durability, tamper protection, and monitoring

In real-world driving, vehicles should deliver what the manufacturer specified during the type-approval process. This applies to passenger cars and trucks alike. Therefore, for some years now

vehicle registration in Europe has stipulated that certification include examination of compliance with the legal requirements on the road (RDE using PEMS). This will ensure that a vehicle in real-world operation will comply with a specified emission level during any chosen journey within legally defined boundary conditions that cover a broad range of real journeys.

The VDA is open to the idea of extending the demonstration of legal conformity to include the typical vehicle-segment-specific service life by using suitable monitoring elements and appropriate statistical evidence.

Existing monitoring elements are Conformity of Production (CoP) testing, On-Board Diagnostics (OBD), In-Service Conformity (ISC) and exhaust emissions testing during vehicles' periodic general inspection (PTI). They can be supplemented with new monitoring elements and integrated into an overall concept for emissions testing. This includes examining the potentials of On-Board Measurement (OBM) and checking the addition of roadside checks, e.g. by remote sensing.



Alongside demonstrating and checking the robustness and durability of the emission control systems, the existing and potential new monitoring elements offer increased protection against unlawful tampering with vehicles on the roads.

OBD and OBM: independent, powerful elements

On-Board Diagnostics (OBD) already monitors the functionality of the emission control equipment. Faults are detected, giving workshops the basic information for necessary repairs. This will remain essential in the future. In the case of major environmentally relevant faults, the driver will be alerted directly by the yellow warning lamp (malfunction indicator light, MIL) to schedule a repair. OBD, by contrast, is largely an instrument for diagnosing defects in components and systems, and should not be confused with direct measurement of emissions using a PEMS, for example. A new approach is to measure emissions in the vehicle (On-Board Measurement, OBM), followed by evaluation and interpretation of the results. Yet this requires suitable on-board sensors to be available for measuring the individual exhaust components. Furthermore, the sensors must be able to measure the pollutants sufficiently accurately, under almost all relevant operating conditions, over the vehicle's lifetime. OBM has the potential to supply information/a picture of the vehicle's emission status. OBM can sometimes directly detect faults or intentional tampering with the exhaust system. Parallel ISC-testing with a PEMS may therefore become less significant. The VDA is ready and willing to enter into an objective discussion of OBM. It is important that suitable sensors should be widely available on the market. The relevant factors include durability, accuracy and tolerance in relation to the emissions level, the range of operating conditions, and the costs of the sensor technologies. The VDA therefore recommends additional studies for the potential use of OBM in the Euro 7/VII legislation. Only after such studies will it be possible to state

definitively whether valid assessments can generally be made of OBM data, in which form, and what tolerance limits would apply.

OBM also requires clear rules governing the use and assessment of data.

Shorter cycles, more transparent, more modern

In the past, each successive exhaust regulation both reduced the limit values for the pollutant components and introduced additional new tests and requirements. However, this resulted in the regulation being not only more comprehensive, but above all less clear. Today the legislation covers over 1,000 pages. For this reason Euro 7/VII cannot be allowed simply to progress “as before”!

Instead, Euro 7/VII legislation should be simplified to make it more transparent and easier to apply and to understand. The testing process should be made less complex. The elements of in-service monitoring and the technical options, e.g. PEMS or OBD and possibly OBM, should be actively deployed to replace testing procedures that are no longer relevant, and to simplify the exhaust tests in the type approval procedures and/or to shift the focus onto measuring procedures that are relevant today. The VDA sees potential for streamlining in the following areas:

- Smoke test for diesels: the smoke test for diesel engines has been rendered superfluous by a mature PM/PN measuring procedure during type approval. The test is therefore not needed in the Euro 7/VII legislation.
- Durability (type 5 test): the exhaust legislation has to handle increasing durability requirements. This reflects the greater mileages traveled by modern vehicles. However, providing evidence of durability before a vehicle’s first registration is becoming ever longer and more elaborate – which runs counter to the ever-shorter development phases. Demonstrating durability in type testing is becoming less important in view of the many and varied monitoring elements that can be used during vehicle operation (see figure); here durability has to be guaranteed to achieve compliance. It may be sufficient to demonstrate durability during the development process.
- Idle CO emissions (type 2 test): this test dates from the time when carburetors were in use. Today it serves at best to demonstrate proper air regulation in a gasoline engine. OBD and the prescribed on-road tests provide sufficient CO-testing for engines without the need for type 2 tests as well.
- Emissions of particulate matter are already effectively controlled under the Euro 6/VI legislation. Modern powertrains have near zero particle emissions, as the effective particle mass today is usually far below the applicable limit value. Measurement of the particle mass is therefore up against its physical limits, and the measurement quality is moderate and very sensitive. In our view it is therefore impossible to reduce the PM limit value without revising the PM measuring technology. Today’s PEMS devices are not technically able to measure PM. The real challenge is to be sure of complying with the permissible particle number.
- With efficient monitoring of vehicles on the roads, it may be possible to simplify or reduce today’s very complex CoP testing.

Standardized laboratory procedures remain indispensable

RDE represents an effective instrument for ensuring low emissions in many driving situations, and should continue to be developed for assessing compliance with emission levels. Given the importance of the discussion on streamlining the testing procedures, we regard the standard laboratory test (WLTP/WHDC) as an indispensable objective measuring procedure. One can discuss whether it remains necessary to check compliance with the emission limit values in the laboratory, but for CO₂-based laws for fleets and taxation in Europe, a standardized and reproducible measuring procedure based on WLTP or WHDC will continue to be necessary in the future.

Limit values

Calculations (such as those from the ifeu research consultancy) show that the Euro 6/VI legislation has resulted in road traffic contributing significantly to certain attainment of the air quality targets in the EU. It therefore appears that a unified reduction of all emission limit values is not justified in terms of air pollution control (immissions). For this reason the VDA is calling for an Impact Assessment taking into consideration European air quality targets and all emitters in Europe – before tightening the limit values. The automotive industry rejects an across-the-board reduction of the limit values and the determination of new limit values without prior discussion of suitable air quality targets.

The tolerances of the measuring technology must still be taken into account either explicitly or implicitly when limit values are defined.

In the past, the new limit values for successive exhaust standards were generally set by the European Council and the European Parliament, and the necessary demonstration procedures were subsequently elaborated by the European Commission in delegated acts. However, the stringency and feasibility of exhaust legislation – and thus also the OEMs' development goal – depend crucially on the measuring method. It is therefore important that when new limit values are discussed, the associated measuring methods and boundary conditions are also defined.

Any new definition of emission limit values should follow the principles of technology neutrality, fuel neutrality and of harmonizing the limit values – even when the legislation is simplified, more transparent, and easier to apply and understand.

Additional pollutants should only be regulated if they can usefully be measured and an Impact Assessment indicates the need to regulate them. Furthermore, newly limited exhaust components must not lead indirectly to stricter fleet CO₂ standards. In the future the CO₂ regulations for light-duty and heavy-duty vehicles must still relate to specifically defined measuring procedures.

Harmonization of LDVs/HDVs

One important aspect of harmonization is the idea of a holistic monitoring concept for vehicles, as described, throughout their typical service life – even if this certainly has to take account of differences specific to applications and vehicle types. This is because the goal that vehicles should function properly throughout their service life applies equally to trucks and passenger cars. In addition, the monitoring elements mentioned (type testing, COP, OBD, OBM, ISC, exhaust emissions testing, roadside checks, etc.) are equally available and relevant for passenger cars and trucks.

Testing of real driving emissions (RDE) using a PEMS was first introduced in Europe in 2013 for trucks to accompany EURO VI, and subsequently developed further for RDE legislation applicable to passenger cars. Although the truck procedure was originally defined purely as a monitoring element (ISC), in a very late phase of EURO VI definition it was decided that this evidence also had to be provided during type testing. This part of the emission directive is therefore already impacting on the development of trucks. The VDA is however willing to discuss how the more “conformity-oriented” procedure can be developed into a more “assessment-oriented” RDE procedure similar to that for passenger cars. For this to happen, the procedure must aim more to produce a more reliable quantitative result, and should not focus on generating a qualitative conformity statement (as is the case today).

In this context, the VDA welcomes greater parallel alignment of the exhaust legislation for passenger cars and trucks. However, the VDA takes a skeptical view of the suggestion of completely merging the exhaust legislation applicable to HD and LD vehicles because the current regulations are very different – and with good reason (e.g. engine test bench/dynamometer, differing areas of operation, range of variants). The principle of work-specific assessment and limit-value setting (= limit in g/kWh) as applied to heavy-duty commercial vehicles remains necessary with regard to the differentiated vehicle segments and the large differences between individual applications.

At the international level (UNECE, US, China, etc.), too, the legislation governing LD and HD is divided into two different blocks with the well-known segment-specific assessment procedures (e.g. R83 and R49), in order to take account of the various vehicles, engines and application scenarios for passenger cars, buses and trucks. Implementing harmonization would be a major

technical challenge, which in our view is contrary to the idea of simplification. In any case a unified testing procedure would have to be developed based on standardized limit values. However, the amount of time and financial input needed for such a project should not be underestimated. Adoption of the new harmonized rules by non-EU countries would also be an important aspect. Until these countries switched over, the manufacturers would have to design their vehicles to comply with both the old and the new legislation.

Lead time and phase-in:

New exhaust standards must already be defined in the specifications for future engine and vehicle development, and influence both components and development. If the Euro 7/VII legislation contains new or stricter elements, the industry will need sufficient lead time.

Both the stringency and efficiency of exhaust legislation depend not solely on the limit values that are set, but primarily on the boundary conditions, the monitoring procedures and the durability requirements. Therefore, when it comes to introducing Euro 7/VII, the industry and the approval authorities will need both a precise schedule for drafting the delegated acts and sufficient lead time before the final legislation becomes binding.

The VDA calls for “one big shot” for passenger cars and trucks. The division of the legislation (used in Euro 6d) into four successive packages with a huge number of approval statuses ultimately increased the amount of work needed for development and homologation, and robbed the industry and also the authorities of the necessary lead time. This must not be repeated in the preparation of Euro 7/VII.

Euro 7/VII should become binding at the earliest three years after the delegated acts have been passed and published in the Official Journal. Moreover, the date of entry into force should be coordinated with other legislation (e.g. a new fleet CO₂ target) so as to minimize the amount of administrative work for all stakeholders.

In the case of heavy-duty vehicles, the much longer product lifecycles have to be taken into consideration. The Euro VI designs developed today need to be produced for at least eight years and this should be remembered when the Euro VII transition periods are defined.

In the past, the introduction of new exhaust standards was paced by distinguishing between “new types” and “all new registrations,” and between passenger cars and trucks. This meant, for instance, that more time was allowed for switching existing production than for a new development. A promising alternative approach to introduction that has been applied many times internationally is a volume-weighted phase-in. This enables the manufacturer to react flexibly to new standards in line with individual product planning, and allows the lawmakers to introduce new exhaust standards rapidly after the appropriate lead time. In this way, the manufacturer could be obligated, for example, to register 25% of the newly registered vehicles pursuant to the latest standards in the first year after introduction, and to increase this proportion gradually to 100% during the following years. It would then no longer be necessary to distinguish between new types and all new registrations. The VDA is open to the idea of discussing such new modes of introduction.