ASSOCIATION FOR EMISSIONS CONTROL BY CATALYST

AECC POSITION ON THIRD REAL-DRIVING EMISSIONS (RDE) REGULATORY PACKAGE

Updated Position Paper – December 2016

After the publication in the EU Official Journal of the first two regulatory packages on Real-Driving Emissions (RDE), namely Commission Regulations (EU) 2016/427 and (EU) 2016/646, the European Commission published on 10 November 2016 a new proposal for a third RDE regulatory package which addresses in particular **the procedure for measuring and assessing Particle Number (PN) on-road emissions and provisions on real-driving emissions after engine start ("cold-start RDE").**

In early July 2016 AECC had already published a position paper[1] on the main elements expected to be covered in that third RDE regulatory package. Since then, further emissions test data have been gathered by AECC.

AECC now welcomes the opportunity to submit additional input as part of the stakeholders' consultation on the third regulatory RDE package launched by the European Commission ahead of the vote in the Technical Committee – Motor Vehicle (TCMV). AECC therefore wants to provide **an update of the position of the European catalyst and filter industry**.

AECC demonstrated that on the vehicles tested, which were equipped with either Diesel Particulate Filters (DPF) or Gasoline Particulate Filters (GPF), the Euro 6c PN limit (6x10^{11}/km) was met in real-world, even under severe driving conditions and low ambient temperatures.

In 2015 AECC evaluated the performance of the first commercially-available passenger car equipped with a GPF[2] and confirmed that GPF technology offers the most effective route for controlling Particle Number (PN) emissions from Gasoline Direct Injection (GDI) cars under a wide range of driving conditions.

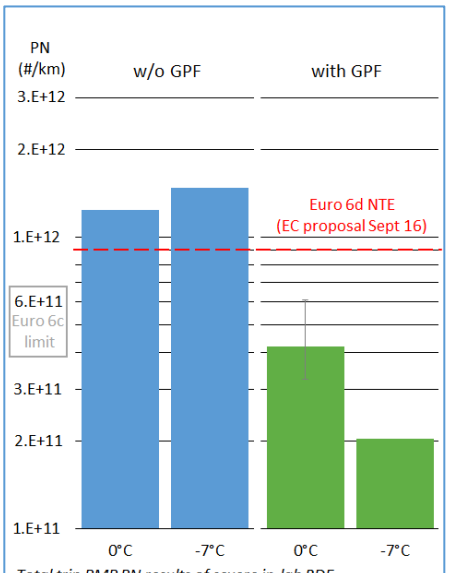
In 2016 AECC conducted a further test programme to evaluate the performance of a GDI vehicle with and without a GPF, under a variety of driving conditions[3].

Emissions measurements were recently conducted towards the boundaries of RDE test conditions, both in terms of driving severity and low ambient temperatures. These tests were performed on a chassis dyno, tailpipe emissions being measured in parallel with lab analysers and PEMS instruments. However, at 0° and -7°C, the prototype PEMS-PN instrument used did not meet the required specifications. As a consequence only PMP lab measurement at these low temperatures can be referred to.

Total RDE trip PN emissions measured on the vehicle fitted with a GPF were below the Euro 6c limit, even under those conditions close to the RDE boundaries (*see picture*). PN emissions were of the same level for the urban part only of the RDE trip.

The RDE PN results shown here do not account for the on-board measurement uncertainty of the PEMS-PN instrument.

DPF technology was also confirmed to be effective for reducing particulate emissions under real-world driving conditions in a diesel Euro 6 RDE test programme[4] conducted by AECC in 2015.



Total trip PMP PN results of severe in-lab RDE, no exclusion/normalisation, emissions divided by a value of 1.6 to account for the extended ambient temperature

bd. Auguste Reyers, 80 | B-1030 Brussels | Belgium | Tel: +32 2 7068160 | info@aecc.eu | www.aecc.eu

AECC supports the European Commission's proposal to include cold-start real driving emissions directly in the assessment of RDE emissions in the urban phase without weighing factors.

It is essential that all real driving emissions are controlled by the RDE procedure, including those from the first few minutes from engine start, as the European Commission has established[5] that more than 30% of trips made in cars in Europe cover distances of less than 3 km and 50% of trips are less than 5 km long. Warm-up and thermal management strategies are in place to bring the emission control system components up to operating temperature under urban driving conditions and their effectiveness in controlling emissions should be included in the requirements of RDE legislation.

AECC believes that the Commission's proposal for soaking the vehicle prior to the RDE test is an appropriate preconditioning for the cold-start RDE assessment.

Adding the emissions from the currently excluded first five minutes of the RDE test to the urban result shows a significant contribution to urban raw emissions, up to 38% diesel NOx[6] and up to 86% PN for a GDI car not fitted with a GPF[3].

Just adding the cold-start data to the urban RDE is the preferred option in view of the limited data available to construct a robust new procedure within the timeframe of the third RDE regulatory package.

The industry that AECC represents believes that in general the RDE procedure should be realistic and as simple as possible to ensure it is robust, transparent and delivers the air quality benefit needed by EU Member States, local authorities and citizens.

After the monitoring phase, when more RDE data becomes available, the RDE procedure should be simplified to ensure the credibility of EU emissions legislation. RDE data collected could then be used to reconsider and enhance the assessment of real-world urban emissions and the RDE testing of hybrid vehicles. In addition the original RDE data post-processing tools EMROAD and CLEAR must be re-assessed to ensure they are transparent and necessary following the inclusion of complementary dynamic driving boundary conditions (Appendices 7a-b to Annex IIIA of Regulation (EC) 692/2008).

01.12.2016

Should you need more information, you can contact AECC at info@aecc.eu.

References:

[1] AECC position paper on Real-Driving Emissions (RDE) package 3 (June 2016), www.aecc.eu/wp-content/uploads/2016/08/160630-AECC-position-on-RDE-package-3.pdf

[2] 'Real Driving Emissions of a GPF-equipped production car', Bosteels et al., IQPC 3rd International Conference Real Driving Emissions, Berlin, October 2015, www.aecc.eu/wp-content/uploads/2016/08/151027-IQPC-RDE-AECC-RDE-of-a-GPF-equipped-production-car_final.pdf.

[3] 'Real-driving emission results from GDI vehicles with and without a GPF', Demuynck, IQPC 4th International Conference Advanced Emission Control Concepts for Gasoline Engines, Bonn, May 2016, www.aecc.eu/wp-content/uploads/2016/08/160511-IQPC-conference-RDE-GDI-with-and-without-a-GPF.pdf and 'Particles Emissions from a Euro 6 Gasoline Direct Injection (GDI) Passenger Car', Favre et al., 12th Integer Emissions Summit, Brussels, June 2016, www.aecc.eu/wp-content/uploads/2016/08/160621-AECC-Integer-Emissions-Summit-Europe.pdf.

[4] 'New results from a 2015 PEMS testing campaign on a Diesel Euro 6b vehicle', Favre et al., 11th Integer Emissions Summit & AdBlue® Forum Europe 2015, Brussels, June 2015, www.aecc.eu/wp-content/uploads/2016/08/150618-Integer-conf-AECC-RDE-Program-presentation-final.pdf.

[5] 'Cycling: the way ahead for towns and cities', European Commission, 1999, http://ec.europa.eu/environment/archives/cycling/cycling_en.pdf.

[6] 'Euro 6 Vehicles' RDE-PEMS Data Analysis with EMROAD and CLEAR', Demuynck et al., 6th International MinNOx Conference, Berlin, June 2016, www.aecc.eu/wp-content/uploads/2016/08/160622-AECC-MinNOx-PEMS-analysis.pdf.

[7] 'Analysis of High Mileage Gasoline Exhaust Particle Filters', Lambert et al., SAE 2016-01-0941.

[8] Daimler press release, 27 May 2016, http://media.daimler.com/marsMediaSite/en/instance/ko/Innovative-solution-for-diesel-and-gasoline-engines-Mercedes.xhtml?oid=10932250.

[9] Volkswagen press release, 22 June 2016, www.volkswagen-media-services.com/en/detailpage/-/detail/Matthias-Mller-We-have-launched-the-biggest-change-process-in-Volkswagens-history/view/3710903/7a5bbec13158edd433c6630f5ac445da?p_p_auth=XlaMC9Fw.

AECC is an international non-profit scientific association of European companies operating worldwide in the research, development, testing and manufacture of key technologies for emissions control. Their products are the ceramic substrates for catalysts and filters; catalysts (substrates with catalytic materials incorporated or coated); adsorbers; filter-based technologies to control engine particulate emissions; and speciality materials incorporated into the catalyst or filter. Members' technology is integrated in the exhaust emissions control systems of cars, commercial vehicles, buses, non-road mobile machinery and motorcycles in Europe. More information on AECC can be found at www.aecc.eu.

ASSOCIATION FOR EMISSIONS CONTROL BY CATALYST

AECC's members are: BASF Catalysts Germany GmbH, Germany; Ibiden Europe B.V. Stuttgart Branch, Germany; Johnson Matthey PLC, United Kingdom; NGK Europe GmbH, Germany; Solvay, France; and Umicore AG & Co. KG, Germany.

AECC is registered in the EU Transparency Register under n° 78711786419-61.