AECC input to the post-Euro 6 consideration

AGVES meeting • Brussels • 18 October 2019
Agenda

- RDE legislation has significantly improved real-world emissions
  - Gasoline cars
  - Diesel cars
- General legislative principles to enhance real-world compliance
- Results of AECC diesel demonstrator car
Light-duty gasoline emissions control technology evolution

Single Three-Way Catalyst for Euro 6a/b

Introduction of Gasoline Particulate Filter on cars with direct injection and integration with Three-Way Catalyst for Euro 6d(-TEMP)

Three-Way Catalyst (TWC)

Source: Volvo

Source: PSA

Source: Audi

Source: Opel

Source: VW

Source: PSA

Source: Audi

Source: Opel
RDE has significantly improved GDI PN emissions

-On-road emissions of Euro 6d(-TEMP) cars are well within standards

-Trend is confirmed by 3rd party testing

Source: Emissions Analytics

Source:
- ACEA/JAMA Euro 6d(-TEMP) PEMS data consulted 9 September 2019
- pre-RDE emissions factors from B. Giechaskiel, Int. J. Environ. Res. Public Health, 2018

AGVES meeting – 18 October 2019
Light-duty diesel emissions control technology evolution

- **Introduction of individual deNOx technologies for Euro 6a/b**
  - Diesel Oxidation Catalyst (DOC)
  - Lean NOx Trap (LNT)
  - Diesel Particulate Filter (DPF)

- **Combination of deNOx technologies for Euro 6d-TEMP**
  - Selective Catalytic Reduction (SCR)
  - SCR

- **Further integration for Euro 6d**
  - Components in the underbody
  - SCR catalytic converter with ammonia slip catalyst zone
  - 1. SCR-Eindosierung
  - 2. SCR-Eindosierung

*Sources: BMW, VW, Hyundai, Daimler*
RDE has significantly improved diesel NOx emissions

On-road emissions of Euro 6d(-TEMP) cars are well within standards
RDE has significantly improved diesel NOx emissions

Trend is confirmed by 3rd party testing

Source: ADAC Ecotest

Source: Green NCAP

Source: Auto Motor und Sport

Source: Emissions Analytics
General legislative principles to enhance real-world compliance

To build further on success of RDE in Euro 6d for the next step in emission legislation

Effective

- Ensure exposure of individual citizens to vehicle pollution is within safe limits
- Towards zero-impact on air quality with specific attention to urban environment

Real-world

- Legislate actual tailpipe emissions
- No more data exclusion and normalisation

Neutral

- Fuel- & technology-neutral procedures and limits
- Application-neutral with similar stringency for every type of vehicle and machine
AECC ultra-low NOx emissions diesel demonstrator

Robust NOx control over wide range of driving conditions

- Low speed/load
  e.g. city driving

- High speed/load
  e.g. motorway driving

- Transients
  e.g. overtaking


Emissions controls to cover wide range of driving conditions

- LNT + dual-SCR system
- Supported by 48V mild-hybrid

EGR: Exhaust Gas Recirculation
HP/LP: High/Low pressure
cc: close-coupled
LNT: Lean NOx trap
SCR: Selective Catalytic Reduction
DPF: Diesel Particulate Filter
SDPF: SCR on DPF
uf: underfloor
ASC: Ammonia Slip Catalyst

AGVES meeting – 18 October 2019
Robust NOx control achieved

AGVES meeting – 18 October 2019
All aftertreatment components contribute to NOx control

- City driving: LNT and close coupled SCR+SDPF
- Motorway driving: underfloor SCR required to secure robust emissions control
More videos available on YouTube (AECC eu):
https://www.youtube.com/channel/UCbPS9op5ztLqrv6zlMH_IcQ
THANK YOU!

www.aecc.eu
dieselinformation.aecc.eu