

Ultra-Low PN₁₀ Emissions of a Close-Coupled Emission Control System on a Heavy-duty Truck Application

P. Mendoza Villafuerte¹, J. Demuynck¹, D. Bosteels¹

¹AECC - Association for Emissions Control by Catalysts

Heavy-duty vehicles represent a significant portion of road transport and they need to operate in a clean and efficient manner. Their exhaust emission control systems need to be enhanced to sustain the high conversion efficiencies seen during motorway conditions to other operating conditions.

The European Commission is developing legislative proposals for Euro 7 and Euro VII emissions regulations for light- and heavy-duty vehicles. The new Euro VII regulation will likely focus on ensuring the emissions from heavy-duty vehicles are minimized over extensive on-road operating conditions and in particular on operating conditions such as urban driving and cold start. These challenges are increased by the need to ensure low secondary emissions like PN₁₀, NH₃ and N₂O as well as low impact on CO₂ emissions.

The low pollutant emissions achieved by an AECC heavy-duty Diesel demonstrator vehicle will be presented. The vehicle is equipped with an innovative layout of state-of-the-art emission control technologies, combined with an advanced engine strategy implemented to an existing Euro VI-C long-haul truck. The new emissions control system integrates a close-coupled Diesel Oxidation Catalyst (DOC), a first Selective Catalytic system Reduction (SCR) in close-coupled position, a 2nd DOC followed by a catalyzed Diesel Particulate Filter (DPF), and the 2nd SCR from the dual-SCR system with twin AdBlue® dosing controlled by FEV developed software. Both SCR systems contain an Ammonia Slip Catalyst (ASC).

The presentation will focus on the sub-23 particles emissions PN₁₀ measured over a broad range of operating conditions, including cold start and urban driving as well as for different payloads and ambient temperatures.

To show the potential CO₂ reduction on life cycle assessment basis, the vehicle has also been tested with a 100% renewable fuel. This, in combination with engine efficiency improvements, should enable the next generation heavy-duty vehicles to operate with ultra-low pollutant emissions, whilst maintaining their path towards the required CO₂ targets.