The Euro 6 Exhaust Standard and the Impact on the Retail Forecourt Industry

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The Euro 6 exhaust standard has been in place since September 2014 whereby emissions of NOx (nitrogen oxides) during normal operation must now be 80 % below those of diesel vehicles without NOx after-treatment. This represents the biggest challenge diesel vehicles have been faced with since the introduction of the EU's first exhaust standards! The automotive industry has already come up with solutions for meeting the exhaust standard of tomorrow: optimized engines, NOx Storage Catalysts (NSC) and Selective Catalytic Reduction (SCR). The latter substantially reduces exhaust emissions by using a new aqueous solution. Its name: AdBlue.

Against this background, the automotive industry is being challenged by even stricter legal requirements for further emission reductions. A very ambitious proposal from the European Commission envisages regulating the CO2 output from passenger cars at 95 g/km CO2 by the year 2020. This corresponds to a fuel consumption of less than four litres for every 100 kilometers travelled. The current CO2 regulation sets a limit of 130 grams for the European passenger car fleet by the year 2015. In other words, to achieve the 95 g/km target, the European car manufacturers must save an average of 35 g/km of CO2 within just five years – from 2015 to 2020. If adopted, the EU limits would turn out to be the strictest applicable standards anywhere in the world.

As a part of the road map that has been established for the Euro 6 Exhaust Standard, the standard has been binding on all new passenger car type approvals since September 2014. By September 2015, it will apply to all newly registered passenger cars. In September 2017, the Euro 6 exhaust standard is to be tightened even further. Not only will car producers then have to prove that the engines of all new vehicle models comply with the exhaust limits based on the dynamometer specified in the New European Driving Cycle (NEDC), but that this will also work in normal, everyday operation. The introduction of Euro 6 therefore means that effective systems for the after-treatment of nitrogen oxides are of paramount significance.

SCR technology with AdBlue has laid the technological foundations for bringing down pollutant emissions – especially when it comes to nitrogen oxides – from diesel-powered commercial vehicles. In the case of heavy commercial vehicles, AdBlue which is in common use, has already proven its worth and therefore not surprisingly established itself as an effective solution for exhaust after-treatment. Modern commercial vehicles using it now run almost free of emissions.

According to the forecast of the German Automotive Industry Association (VDA) and the European Automobile Manufacturers' Association (ACEA), nearly 40 million passenger cars and

Typical filler neck

Filler neck with nozzle

light commercial vehicles will be driving on European roads by the year 2020. There is no doubt that the combination of SCR and AdBlue is developing into a major technology component for diesel vehicles and it is very likely that these vehicles need to be refilled with AdBlue on a regular basis.

The Open Issue

The Refilling Method: It is already clear that the separate AdBlue tank will have a volume between 8 to 30 litres and an interface (filler inlet) defined by ISO 22241-5. So far the industry has not made final decisions about the method of refilling. It was previously assumed that AdBlue would be topped up at the garage workshop as part of the standard inspection cycle, but recent tests show that prescribed maintenance intervals are way too long for the majority of the vehicles. Hence there will definitely not be any other option than a self-service solution for the motorist. Special bottles and containers are already available as an interim solution at many petrol stations. However these bottles turn out not to be motorist friendly as they are awkward to handle. The industry is now looking for a more acceptable motorist-friendly and simple refilling method by using a forecourt type nozzle integrated onto a Multi-Product Dispenser.

Refilling by Nozzle

Since mid-2013, vehicle manufacturers and the oil industry have had a joint systematic long-term testing program which is being implemented at selected public filling stations. The aim is to gain more insight into technical knowledge – with a special focus on feasibility – and evaluating practical motorist experiences. Based on the requirements of the vehicle manufacturers and oil companies, ELAFLEX have constructed the new ZVA AdBlue LV nozzle. It incorporates a misfilling-proof interface in accordance with ISO 22241-5 and has a flow rate of not more than 10 l/min. Lightweight and a slim design - such as diesel and petrol nozzles – will give motorists the same operating feeling and handling that they are used to.

ZVA AdBlue LV Nozzle

Logistic Hose with Dry Disconnect Couplings

Dispensing Hoses and Break Away couplings

Dispensing hoses shall meet all requirements in accordance with ISO 22241. In 2005, ELAFLEX developed a highly flexible hose together with a 1" female BSP stainless steel end fitting; these hose assemblies will also ensure purity of the medium and hassle-free refilling of vehicles.

In some countries, a break-away coupling is mandatory whilst in others it is optional. The ZVA AdBlue LV nozzle is available with an optional SSB 16 SS Safety Swivel Break. In case of a drive-off incident it will separate to avoid spill and equipment damage. Break-Away's have to fulfill all the requirements in EN 13617-2.

Logistics

The bulk refilling of AdBlue has been well known since 2005 and the refilling equipment market has matured too. Certified tanker hoses and stainless steel Dry Disconnect Couplings have proven their value and their usage have for this reason become standard practice today. They are operating in a wet hose system on tank trucks for the fast filling of underground storage tanks (UST), above ground storage tanks (AST) or Intermediate bulk container (IBC). In a wet hose system it is important for the lining of the hose to guarantee a high media purity. The use of Dry Disconnect Couplings, with EPDM seals, make for a quick and clean connection without spill – either under pressure or with gravity flow from the tank truck.

References:

- ISO 22241-5 "refilling interface for passenger cars"
- AdBlue is a registered trademark of the German Automotive Industry Association (VDA)
- Info Leaflet of the German Automotive Industry Association (VDA) 2013.