

Traffic lights on green for commercial vehicles thanks to lowest emissions

Products and engineered solutions for cost-effective and environmentally friendly operation

Continuously tightened emissions standards in the EU, the US, Japan and South Korea as well as ambient air quality standards and low emission zones require continuous development of innovative products and systems for exhaust emission control. Combined with modern engine technology these systems ensure the basis of environmentally most friendly, yet economic commercial vehicles. Engine power, pay-load, loading capacity and endurance maintain as good as today, the high efficiency of the diesel engine tuned for optimum combustion assures low fuel consumption. No investment in a new costly infrastructure, that would be necessary for electrical vehicles, is required. At IAA Commercial Vehicles 2010 Emitec shows examples of trucks, vans and engines with lowest emissions, together with optimized exhaust emission control components and innovative system solutions for the commercial vehicles of today and tomorrow.

Engineered solutions – case studies and new serial production products

Ambient air quality problems in urban and densely populated areas caused by nitrogen oxide emissions are related to a quite significant extent to vehicle traffic. SCR (Selective Catalytic Reduction) technology is now becoming widely applied in trucks to decrease the nitrogen emissions. Turbulence-inducing metal catalyst substrates of Emitec feature increased efficiency and allow reducing catalyst volume and space requirements. This solution is equally applicable for smaller and larger engines. An example is an airfield fire truck with 700 HP engine power: Emitec developed the SCR-system to meet the EU V emission standard (**fig. 1a,b**).

Commuter buses and distribution vans demonstrate how NO_x-reduction by SCR is enabled to work in urban traffic even under load operating conditions. The electrically heated catalyst integrated in the SCR system upgrades SCR to E-SCR (**fig. 2**). Visitors can see this in action on a minibus driving around the exhibition grounds.

For current and up-coming future emission limits EMITEC's engineers have developed the modular SCRi system. A continuously operating, maintenance-free PM-METALIT particulate filter is integrated in the SCRi[®] system. The filter not only reduces

Press inquiries to:

Emitec Gesellschaft für Emissionstechnologie mbH
Hauptstraße 128
53797 Lohmar
Deutschland
www.emitec.com
presse@emitec.com

Press Office:

Rainer Schäferdiek
Telephone +49 22 46 109 - 311
Facsimile +49 22 46 109 - 109
email: rainer.schaeferdiek@emitec.com

particulates but also uniformly blends the exhaust gas with the AdBlue and generates ammonia by completely evaporating the injected solution. The prepared exhaust gas ensures the optimum operation of the SCR catalyst. The use of highly efficient, structured Emitec metal catalysts result in a compact design, allowing the system to be installed close to the engine of trucks and machines. The SCRi[®] system is eminently suitable for future serial applications in new trucks and machinery as well as for retrofit applications (**fig. 3**).

For SCR-systems Emitec is offering the latest generation of AdBlue[®]-Dosing systems, as components or as system solutions for OEM first fit and for retrofit. The acquisition of Grundfos NoNO_x a few days ago complements Emitec's product portfolio of exhaust emission control technologies (**fig. 4 a,b,c**).

Metal substrate-high performance catalyst feature low backpressure, enabling full engine power and low fuel consumption. Flexibility in geometry and turbulence-inducing structures ensure highest efficiency with smaller volume requirement. Of special advantage is the application as Diesel Oxidation Catalyst (DOC) for emission control systems with Diesel Particle Filters (DPF) that require active regeneration by injection of fuel. Metal substrates ensure fast heat-up and light-off of the catalytic activity. Internal flow homogenization by structured foils (LS, LS/PE) improve the efficiency, hence the catalyst can be sized smaller and therefore more cost-effective, and as a benefit to the truck operator the fuel consumption for active filter regeneration will be lower (**fig. 5**).

Engines with state-of-the-art fuel injection technology can meet the nitrogen oxide limit safely through engine-based measures. The particulate emissions from these engines typically have to be reduced by approx. 40 – 60%. Emitec has developed the PM-METALIT, a continuously regenerating particulate filter, which has proven itself in serial production of cars and trucks over many years. Thanks to its compact size it can be integrated in the standard silencer space of a truck. The filter has been designed to be maintenance-free for the service life of the machine. Emitec shows as a world premiere the system solution for the EU V emission standard by PM-METALIT filter, that will be introduced for serial production by a South Korean truck and engine manufacturer for MY 2011.

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Press Office:

Rainer Schäferdiek
Telephone +49 22 46 109 - 311
Facsimile +49 22 46 109 - 109
email: rainer.schaeferdiek@emitec.com



Fig. 1a,b: 700 HP engine with emission control system for EU V



Fig. 2: MB Sprinter with E-SCR in city traffic



Fig. 3: NRMM-engine with closed-coupled SCRi-emission control system

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Fig. 4 a, b, c:
AdBlue dosing systems:
right hand side air-assisted, left hand side „liquid-only“, bottom: „liquid-only“, tank-integrated solution



Fig. 5: Optimized oxidation catalyst for trucks, serial production, US application, 2010

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