

Albonair's new urea dosing system for diesel NOx reduction

To many engineers in the powertrain industry, death and taxes may be preferable to another unavoidable certainty: more and more stringent emissions regulations. To others, it is a challenge and obstacle to be conquered.

One NOx-reduction technology for diesel engines that is becoming more ubiquitous is selective catalytic reduction (SCR). First used in industrial applications, SCR entered heavy-duty vehicle use in Europe about 2005. It is increasingly seen by some as a global solution for meeting emissions legislation for on- and off-highway vehicles.

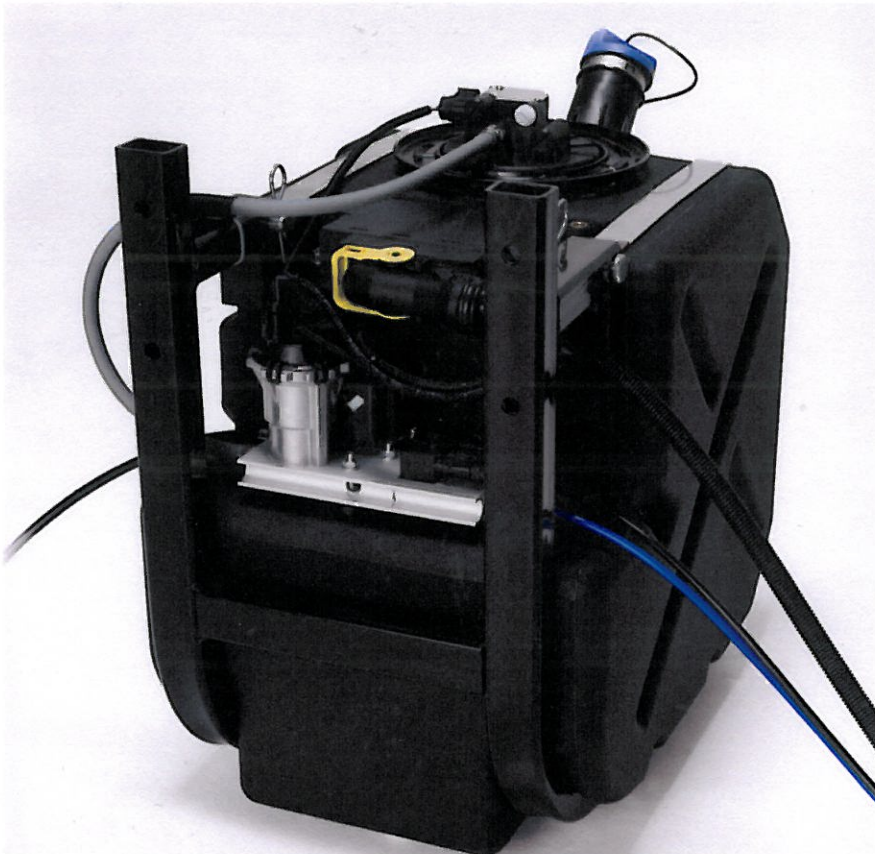
SCR essentially involves a chemical reaction during which a diesel exhaust fluid (DEF), typically urea, is injected into the exhaust stream where it converts to ammonia and then interacts with a catalyst to convert NOx into innocuous components such as N₂, CO₂, and water.

According to **Albonair**, which is showing its urea-based SCR solution at the **SAE 2010 World Congress**, the key to optimizing SCR system effectiveness is ensuring the optimal droplet size of the DEF reducing agent when it is fed into the exhaust tract. This is ultimately a function of the even distribution of DEF onto the catalyst.

Researchers from Albonair made extensive use of CFD to determine the evaporation rates for different droplet sizes. In essence, smaller droplets evaporate quickly and evenly while larger droplets evaporate slower with an uneven distribution. The company's new urea dosing system is able to adjust the droplet size depending on the exhaust conditions, creating droplets with a Sauter mean diameter of less than 10 μm . This enables the DEF to vaporize within a few centimeters in the exhaust pipe.

Albonair's system consists of two parts: the housing with SCR catalysts, injection nozzle, and temperature and NOx sensors; and the urea tank with level and temperature sensors, dosing unit, and aftertreatment control unit. The benefit of this integrated design is the reduced number of variants for different vehicle types and OEMs, according to company engineers.

One of the Albonair SCR system's biggest claimed advantages for the customer, however, is its compactness and design flexibility, allowing integra-



The system consists of a dosing unit and an electronic control unit, both of which are fixed to a urea tank.

tion into existing vehicle space. The urea dosing system itself has a mass of just 1.6 kg (3.5 lb).

Because there are no moving components or sensors at the injection point, the nozzle can be positioned in high-temperature areas of the exhaust system without being damaged. Depending on customer design needs, the nozzle can be fixed to the exhaust pipe at a variety of positions.

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Event theme: **Ecollaboration**

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