CleanCoat™ – new coating technology for the catalytic oxidation of diesel soot.
A trailblazer for the environment.
Catalytic soot oxidation in diesel particulate filters with new CleanCoat™ coating.

In conjunction with its partner NANO-X, ElringKlinger has developed a special high-performance coating for ceramic diesel particulate filters (DPF). This nano-based coating for catalytic soot burn-off offers significant technological and cost benefits.

THE CLEANCOAT™ COATING

- Based on an environmentally compatible silicate technology without heavy metals or precious metals.
- Consists of a thin reactive layer just a few atomic layers thick.
- Suitable for ceramic substrates such as silicon carbide, aluminum titanate, cordierite and mullite.

STRUCTURE OF CLEANCOAT™ COATING

Preliminary tests on the effect of the CleanCoat™ coating have demonstrated complete soot oxidation. Temperature: 320°C.
Comparison of balance point curves.

Comparison of coating functionalities: balance point investigations of various exhaust aftertreatment systems.

Euro VI filter with precious metal coating versus CleanCoat™ and uncoated DPF, each with identical diesel oxidation catalyst (DOC) upstream.

Tests conducted on an engine test rig show that the CleanCoat™ coating has a balance point that is 35°C lower than a Euro VI precious metal coating – a significant functional advantage.

In January 2012 the Hug mobiclean R™ filter system, comprising oxidation catalyst and diesel particulate filter with CleanCoat™ coating, obtained the sought-after approval of the California Air Resources Board (CARB) for on-road diesel vehicles. CARB approval opens up a major part of the US retrofitting market for Hug technology, as Californian emission regulations stipulate that buses and trucks with a gross vehicle weight rating of more than 6.34 t have to be retrofitted with diesel particulate filters.

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A comparison of systems indicated the lowest regeneration temperatures by far for the Hug CleanCoat™ system. The CleanCoat™ coating significantly enhances the continuous soot burn-off by NOx and proves to be far superior to conventional systems.
CleanCoat™ field test.

FIELD TEST
Example: Refuse truck
Euro class prior to retrofit: Euro III
Engine power: 265 kW

READOUT VALUES
Testing
DOC + DPF with CleanCoat™

Long-term trials such as field tests also provided convincing results.
Example: Refuse truck in field test since February 2010

- Unlike the standard coated DPF, the mean exhaust back pressure of the CleanCoat™ DPF was always within the admissible tolerance – without any active regeneration unit.
- The mean value of the temperature was 165°C.
- The exhaust gas temperature was above 250°C only 3.2 percent of the running time.
- Maximum temperature: 430°C
- Under these “cold” conditions the CleanCoat™ coating in conjunction with the NOx from the DOC ensured continuous soot burn-off.

In 2012 the first OEM application for an international construction machinery manufacturer was readied for serial production.

FIELD TEST
Example: Bus
Euro class prior to retrofit: Euro III
Engine power: 265 kW

READOUT VALUES
Testing DOC + DPF with CleanCoat™

SUMMARY
- In the laboratory and in practice the CleanCoat™ coating demonstrated the catalytic capability to burn-off soot at low temperatures.
- Combined with an upstream oxidation catalyst, it offers significantly lower balance point temperatures compared with current state-of-the-art solutions.
- A lower exhaust back pressure and the reduction and shortening of active regeneration cycles can make a measurable contribution to reducing fuel consumption and CO2 emissions.
- Exhaust aftertreatment systems with DPF and CleanCoat™ coating offer cost benefits over conventional systems.