

# Modular Aftertreatment System

A proven, flexible exhaust system designed to meet some of the world's most stringent emissions regulations while optimizing efficiency and reliability.



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Our Modular Aftertreatment System satisfies the requirements of European Union (EU) Stage VI and Environmental Protection Agency (EPA) 2013 on-highway standards as well as Stage IIIB and Tier 4 Final off-highway regulations. The flexible, modular design combines diesel particulate filter (DPF) and selective catalytic reduction (SCR) systems, providing our customers with a proven solution.

## ACHIEVES PASSIVE OPERATION AND HIGH NO<sub>x</sub> CONVERSION

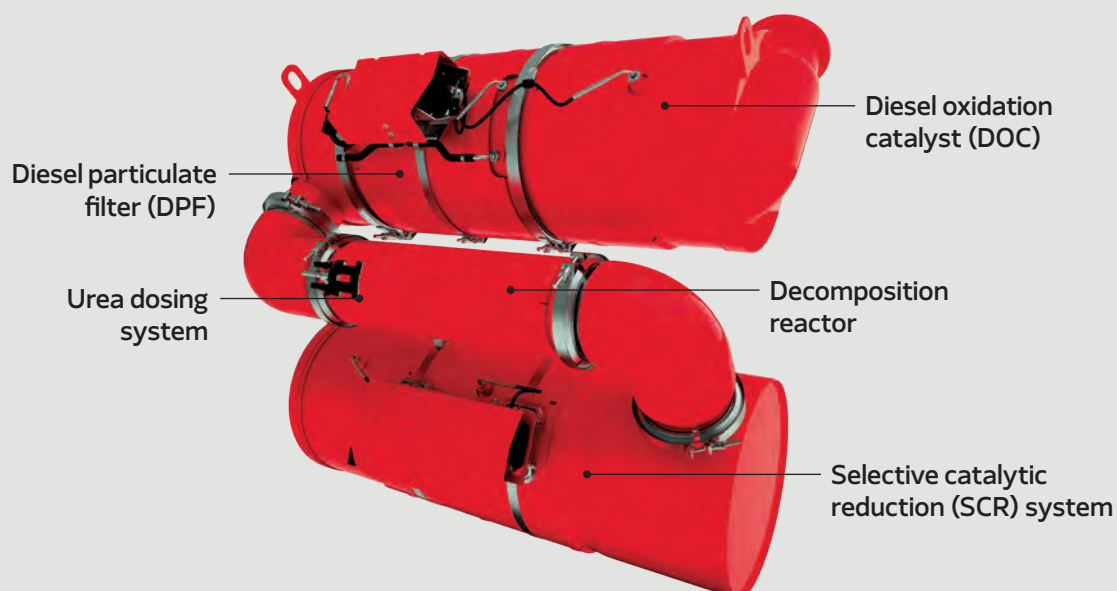
We understand how to balance engine and aftertreatment to deliver optimal system performance while meeting the regulatory levels of system-out nitrogen oxides (NO<sub>x</sub>) and particulate matter (PM). Managing regeneration in the DPF is an example of system optimization. Passive regeneration of the DPF can take place during normal engine operation if the system temperature is managed correctly and takes place without interruption to vehicle operation. Optimum reduction in NO<sub>x</sub> levels is achieved by optimizing SCR performance. Not only is the SCR catalyst designed to store excess ammonia to reduce NO<sub>x</sub> in the case of low temperatures, but also, the urea decomposition chamber has been designed to maximize urea flow distribution and uniformity at the face of the SCR catalyst.

## DIESEL PARTICULATE FILTER

Our DPF is coupled with a diesel oxidation catalyst (DOC). Together, these products are effective at removing 99% of PM soot from the exhaust system using wall-flow substrates. As soot accumulates in the filter, a regeneration event will provide sufficient heat to oxidize the captured soot. The remaining ash is removed during regularly scheduled cleaning events based on the recommendations from the engine manufacturer.

## SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM

SCR technology is an effective, reliable solution that reduces NO<sub>x</sub> emissions and enables enhanced fuel economy. SCR systems are virtually maintenance-free, with occasional dosing system filter upkeep, depending on the application. An SCR system is typically composed of three main elements: an SCR catalyst, a urea dosing system and an ammonia slip catalyst. Our systems use a chemical reductant – urea – which is called diesel exhaust fluid (DEF) in North America and AdBlue® in Europe. DEF converts to ammonia in the exhaust stream and reacts with NO<sub>x</sub> over a catalyst to form harmless nitrogen gas and water.



## UREA DOSING SYSTEM AND DECOMPOSITION REACTOR

The urea dosing system injects atomized urea into the exhaust system. It uses proprietary electronic control technology to measure pre-aftertreatment NOx levels. Based on the NOx level reading, the controls system commands the urea doser to inject reductant into the exhaust stream, reducing NOx emissions.

The decomposition reactor is a mixing chamber designed to hydrolize the DEF, releasing ammonia gas, and then mix the ammonia with exhaust gas.

The spray characteristics of the urea doser, along with the innovative mixing design, ensure uniform ammonia distribution across the face of the SCR catalyst and overall system efficiency to deliver better fuel economy and reliability.

## FLEXIBLE SOLUTIONS DESIGNED FOR YOU

The Modular Aftertreatment System was designed to be integrated into numerous vehicle and machine types. Customers can select from a number of attributes, including:

- Orientation
- Inlet and outlet configuration
- Inlet and outlet type
- Inlet and outlet diameter
- Operating voltage
- Inlet clocking

Some of the available Modular Aftertreatment System configurations are shown on the right.

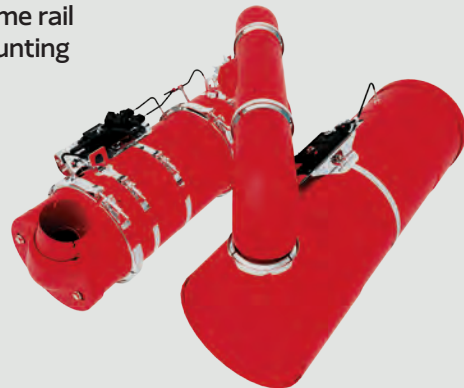
## LEARN MORE

To learn more about the Modular Aftertreatment System or any of our other innovative products, visit [cummins.com](http://cummins.com).

Switchback



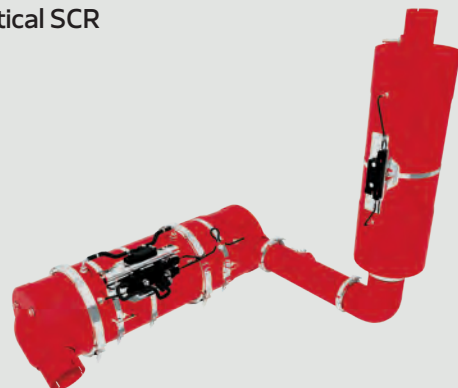
Frame rail mounting



In-Line



Vertical SCR







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