

Diesel Emission Standards - The Role of Insulation

As emission standards for both off-highway and stationary diesel engines become increasingly stringent, emission control technologies are becoming increasingly sophisticated. New engines being introduced by the major diesel engine manufacturers are designed to minimize emissions, and a variety of catalytic filters are available to treat harmful exhausts. A perhaps lesser-known but nonetheless important aspect of effective emissions reduction is the maintenance of **high exhaust temperatures**. Properly insulated exhaust and emissions reduction equipment is crucial in order to ensure that emission reduction targets are met.

Background: Off-Highway and Stationary Engine Emission Standards

Although Diesel Emission Standards for off-highway engines have been around since the early 1990's, it wasn't until relatively recently that **stationary** diesel engines became subject to similar controls. In the U.S., beginning in January 2007, all new diesel engines, whether off-highway or stationary, will be required to conform to the Environmental Protection Agency's off-highway emission regulations. These regulation levels, also known as Tier levels, depend on the kW rating of the engines.

The regulations are to become increasingly stringent over the next number of years. By 2015, all off-highway and stationary diesel engines will be subject to the EPA's highest Tier 4 level of emissions control. Other jurisdictions, including Canada and the European Union, have standards that closely match those of the EPA. (For more information on diesel emission standards, please visit www.dieselnet.com/standards).

Response of Industry to Emission Standards

Be it off-highway or stationary, emission control standards for diesel engines are intended to reduce the emission of NO_x (Nitrogen Oxides), DPM (Diesel Particulate Matter), HC (Hydro Carbons), and CO (Carbon Monoxide). Engine and catalyst manufacturers have responded to the challenge of these new regulations with various strategies aimed at ensuring compliance.

In general, the approach of industry can be divided into two categories:

- Engine Modification: In engine modification, the aim is to reduce harmful emissions at the engine level via a combination of improved electronic engine control, better engine design, and turbo-charging systems.

- After-Treatment: This approach treats the exhaust after it has left the engine. Different types of after-treatment strategies include the use of a variety of catalytic filters, fuel modifications (e.g. biodiesel or ultra low sulfur diesel), secondary fuel injection, and Selective Catalytic Reduction (SCR) systems.

These approaches are by no means mutually exclusive. Indeed, especially for larger stationary engines, engine modifications alone are not always sufficient, and must be complemented with one or more after-treatment strategies in order to meet the mandated emissions target.