

SCRs and Removable Insulation Blankets – Working Together

With RICE NESHAP regulations just around the corner, SCR (Selective Catalytic Reduction) systems are often the technology of choice for reducing noxious emissions resulting from diesel and gas engines. SCRs provide a reliable and cost effective means of reducing harmful emissions, in particular Nitrogen Oxides (NOx) , and bringing them to within acceptable regulatory levels.

How They Work:

Selective catalytic reduction works by converting nitrogen oxides into diatomic nitrogen (N₂) and water (H₂O). Both of these are harmless when released and are safe for the environment. The process for making this conversion is to combine the NO_x with a 'reducing agent', typically ammonia (NH₃), which then comes in contact with the catalyst to produce the reaction that separates the NO_x into the N₂ and H₂O. SCR systems can reduce the amount of NO_x released by 70% to 95%, depending on the particular application.¹

SCRs and Insulation Blankets:

In order for SCRs to function properly, the catalyst block inside the housing needs to reach an optimal operating temperature, typically between 674°F and 836°F². Various factors may reduce the exhaust temperature to below this optimal range, for example, the location of the SCR system (indoors vs. outdoors), length of exhaust piping, ambient temperature, etc. Even outside this



SCR System, without Insulation Blankets

¹ <http://www.cormetech.com/selective-catalytic-reduction.htm>

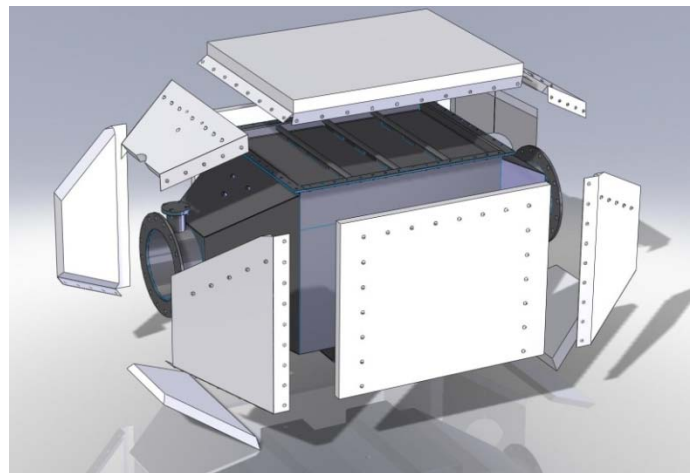
² http://en.wikipedia.org/wiki/Selective_catalytic_reduction

optimal range, these high operating temperatures can also give rise to safety concerns for workers operating in proximity to these systems.

For these reasons, removable insulation blankets often go hand in hand with SCR systems. Insulating the SCR housing and adjacent piping helps to maintain exhaust temperatures and allows the catalyst to function optimally. Ambient heat, which can be an issue in enclosed spaces such as an engine room, is also lowered, making for a safer environment. Finally, the fact that the insulation is removable allows for easy access to components for maintenance and repair.

Challenges:

The shape and geometry of SCR systems can be somewhat complex. Rather than being 1 continuous surface, SCR systems tend to be constructed from panels connected at different levels and / or various angles.



Structural bracing and an abundance of protrusions, test ports, access points, etc. add to the complexity. This poses a challenge when designing removable



blankets that will both fit properly and be easy to install.

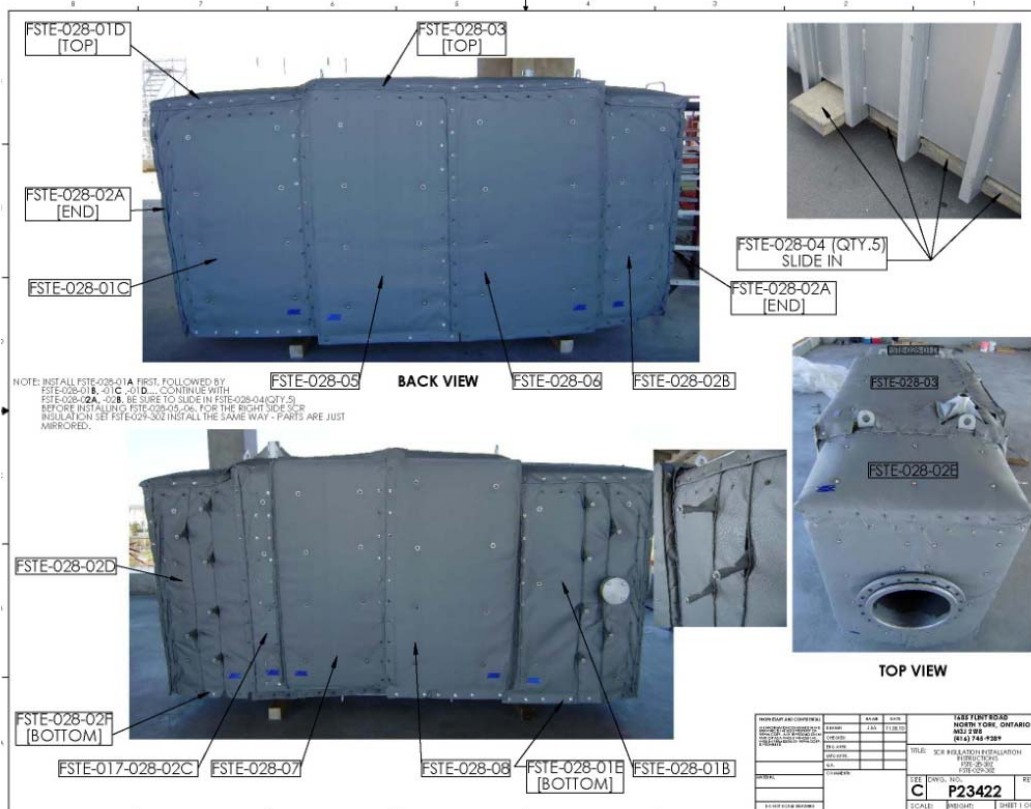
Firwin's senior designer, Jon Miles:

"Ensuring a proper fit is essential when designing removable insulation blankets for SCR systems, both from an aesthetic and functional point of view. You certainly don't want any gaps between blanket panels for heat to escape, and you want the final product to look good and not like a bunch of



SCR System, Removable Insulation Blankets Installed

blankets thrown together”, said Jon. “You also want to make sure that the final product is simple to install. This means that the size of the individual blanket panels should not be too large, and that it should be intuitive, even to a novice, which blanket is intended for which location”, added Jon. “We try to design the insulation blankets so that they can be installed by 1 or 2 people in 1 shift. And we typically will provide an installation diagram to guide the customer as to which parts go where.”



SCR Installation Diagram

Putting It All Together

Removable Insulation Blankets are often an important component of an SCR system. SCRs and their adjacent exhasut piping often run quite hot. Properly designed and installed insulation blankets can help to lower the ambient heat to an acceptable level, protect personnel, and ensure the internal exhaust temperature remains high enough to allow for optimal catalyst performance and that regulatory targets are met.

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