

CleanAIR PERMIT/ENDURE™ Hybrid

For Stationary Engines

The PERMIT/ENDURE™ Advantage:

- Reduces NOx Up to 95%
- Reduces Diesel Particulate Matter by Greater than 85%
- Reduces Carbon Monoxide (CO) and Hydrocarbons (HC) by up to 99%
- Works with All Stationary Diesel Engines
- State-of-the Art, Closed-Loop NOx Monitoring and Reductant Injection System
- Catalyst Formulation Tailored to Application
- Passive Regeneration of Filters
- No Clean-Up Slip Catalyst Required
- Sound Attenuation
- All Stainless Steel Construction

Applications:

- Diesel Generator Sets
- Diesel Pumps

The CleanAIR™ Difference:

- CARB Verified PERMIT Filter
- Adjustable NOx Reduction
- Custom Engineering, Flow Modeling and Design
- Integrated Manufacturing
- Product Optimization for Space Availability
- Rust-resistant, All Stainless Steel Construction
- Fully Insulated
- Durable Product Manufacturing for Operation Under Extreme Conditions
- Available for All Engine Sizes

For a price quote call

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The CleanAIR PERMIT/ENDURE™ Hybrid SCR – Filter – Silencer: All in One Product.

The PERMIT/ENDURE™ Hybrid for diesel engines combines selective catalytic reduction (SCR) technology and CARB verified PERMIT diesel particulate filters for dramatic reduction of four toxic pollutants. An industry first, the Hybrid is the only silencer product on the market offering substantial reduction in NOx, diesel particulate matter (PM), carbon monoxide (CO) and hydrocarbons (HC), while also offering critical sound attenuation – all in one compact unit.



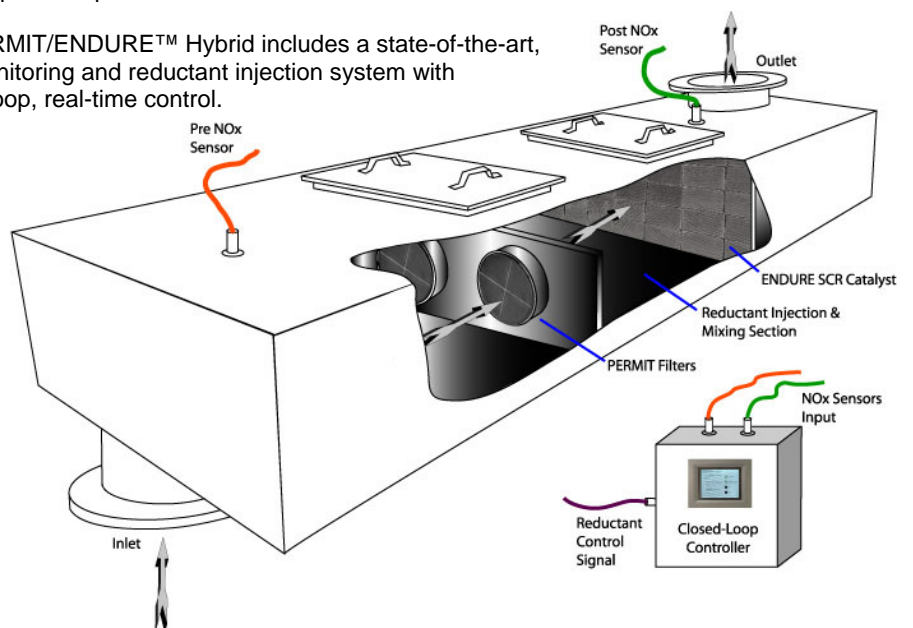
Combining CleanAIR's unique non-vanadium, flow-through ENDURE™ SCR catalyst with the CleanAIR wall-flow PERMIT™ Filter, the Hybrid is housed within an all stainless steel, fully-insulated shell. The corrosion-resistant shell has two removable panels allowing for full access to SCR catalysts and diesel particulate filters mounted inside. Custom-designed for space optimization, the Hybrid can take the place of a standard exhaust silencer.

How the PERMIT/ENDURE™ Hybrid Works

For optimal performance on most large diesel engine applications, multiple PERMIT™ Filters are integrated into the silencer design and are located at the beginning of the exhaust stream. Due to the PERMIT™ Filter's unique catalyst incorporated within the wall-flow filters, the captured PM is oxidized while the engine is operating. This results in a passive, self-cleaning (or regenerating) filter without the need for manual intervention. Regeneration is dependent upon exhaust temperature and fuel sulfur level.

NOx emissions continue through a central mixing chamber where an ammonia-based reductant is then mixed into the exhaust. The ammonia-NOx mixture is converted into nitrogen and water after passing through the SCR catalyst. To fit individual emissions needs, the ENDURE™ SCR catalyst is tailored to on-site factors using custom formulation to obtain the best possible performance.

The PERMIT/ENDURE™ Hybrid includes a state-of-the-art, NOx monitoring and reductant injection system with closed-loop, real-time control.



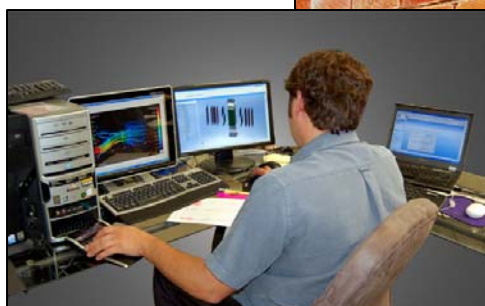
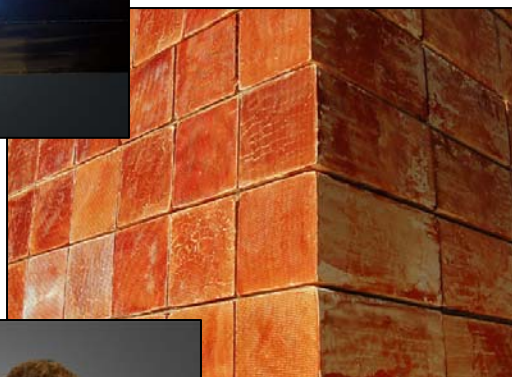
CleanAIR Systems: Committed to a Cleaner Environment

Emissions Reduction Summary for the PERMIT/ENDURE™ Hybrid

Fuel	NOx	CO	HC	PM
ULSD (< 15 ppm S)	95%	99%	99%	Over 85%
LSD (< 500 ppm S)	95%	99%	99%	Varies with fuel and engine
HSD (> 500 ppm S)	95%	99%	99%	Varies with fuel and engine
Biodiesel (<15 ppm S)	95%	99%	99%	Over 85%

Results may vary with application.

Utilizing state-of-the-art design and flow modeling along with custom engineering, CleanAIR's in-house engineers work one-on-one with application personnel to produce a fully integrated system, specific to each site's emissions' requirements.

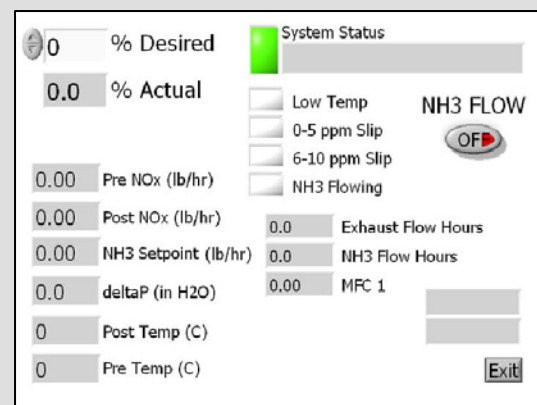


The CleanAIR ENDURE™ Reductant Injection System

A CleanAIR innovation, the state-of-the-art ENDURE™ Reductant Injection System for Real-time NOx monitoring and reductant injection.

Features:

- Closed-loop, real-time NOx control and monitoring
- Works with anhydrous ammonia, aqueous ammonia, or urea reductant
- Touch screen controlled
- Adjustable NOx reduction
- Downloadable data
- Ammonia slip controlled to less than 10 ppm
- No clean-up slip catalyst required



How Sulfur in Fuel

Affects The PERMIT/ENDURE™ Hybrid Performance
The PERMIT™ Filter is designed to operate on fuel sulfur content as high as 8000 ppm. However, maximum performance is achieved when low sulfur fuels are used.

Sulfur Content by Weight	Regeneration Temp.	% Run Time Required
< 15 ppm	280° C (536° F)	>30%
< 500 ppm	360° C (680° F)	>30%
> 500 ppm	390° C (734° F)	>30%

Silencer Type	Typical Attenuation
Industrial Grade	22 – 29 dBA
Critical Grade	27 – 35 dBA
Super Critical Grade	30 – 38 dBA