

NESHAP Compliance
Drilling, Gathering, Transmission, Storage, Refining, Local Distribution
Any Environment Anywhere



Your Best Choice in Emissions Control

Welcome to today's competitive natural gas arena. It's an environment of world-wide concern over the impact of industry operations on the planet – focusing on air quality and noise, in particular. An environment in which government at all levels is more willing to take regulatory action.

On the other side: the endlessly growing demand for affordable, sustainable energy supplies. And in the middle: operators who have to find cost-effective compliance solutions that will let them concentrate on their core mission – supplying the clean-burning natural gas the world needs.

Welcome to MIRATECH – your best partner in meeting the challenges of emissions compliance in today's operating environment.



WHY MIRATECH?

Unsurpassed Experience. Vast real-world experience goes into every MIRATECH project. Over the past two decades, we've installed more than 7,000 units world-wide, in applications covering the field, in all kinds of environments – from gas gathering to transmission, refining, storage and local distribution – with engines from 2 cycle to 4 cycle, rich burn and lean burn, requiring emissions solutions of all shapes and sizes.

No one in the emissions control business knows the natural gas industry better. If there's a problem – or a potential problem – we've probably already solved it. When new challenges arise, no one delivers reliable cost-effective solutions faster.

RICE/NESHAP COMPLIANCE

NEW EPA RICE/NESHAP RULES FOR CI AND SI ENGINES

The U.S. Environmental Protection Agency (EPA) has issued new compliance rules for National Emissions Standards for Hazardous Air Pollutants (NESHAP or HAPS) for Compression Ignition (CI) and Spark Ignition (SI) Reciprocating Internal Combustion Engines (RICE).

WORLD-CLASS TECHNOLOGY: BETTER PERFORMANCE BY DESIGN

MIRATECH is an acknowledged world leader in the field – and we've earned our reputation as a trailblazer in innovative, standard-setting technology tailored to customer needs. MIRATECH solutions consistently meet or exceed the toughest emissions and sound requirements on the planet.



- MIRATECH is your best assurance of first-time compliance verification – saving you time, operational obstacles and cost.
- MIRATECH designs solutions for optimum engine performance – with low pressure-drop and no backpressure worries in any operating environment, sea-level to mountaintops.
- MIRATECH designs and builds products that make emissions control easy, safe for your people, and hassle-free – with minimum impact on your core operations.
- MIRATECH backs all its products with fast-response, U.S.-based field service and technical support.
- MIRATECH stocks ready-to-ship replacement parts in the central U.S. for quick delivery.
- MIRATECH delivers reliable expertise that helps operators get the most out of emissions control investments - with full, in house engineering, direct sales and product support every step of the way.

For Spark Ignition Engines EPA's rulemaking became effective August 20, 2010 with a full compliance deadline of October 19, 2013.

For Compression Ignition Engines EPA's rulemaking became effective May 3, 2010 with a full compliance deadline of May 3, 2013.

Visit the RICE/NESHAP section of MIRATECHCORP.COM to learn more or to access and download MIRATECH's CI and SI RICE NESHAP Compliance Flyers.

COST-EFFECTIVE, COMPREHENSIVE SOLUTIONS – TAILORED TO YOUR NEEDS

MIRATECH solutions are custom-tailored to each operator's specific needs. We'll work with you to make sure our solutions meet all ongoing emissions control needs, in fully integrated systems with full scalability to handle future requirements.



Health & Safety – Built In.



SCR - SELECTIVE CATALYTIC REDUCTION - NO_x REDUCTION FOR LEAN-BURN NATURAL GAS ENGINES

- Catalyst Housings
- Catalyst Elements
- Silencers
- Noise reduction fully integrated into your emissions control solution with dB(A) and dB(C) weighted options
- Air-Fuel Ratio Control
- A full range of maintenance, training and technical support services

NEXT & VORTEX: BETTER PERFORMING, LONGER LASTING CATALYST ELEMENTS

From the start, MIRATECH has constantly worked to improve not only the performance and durability of our products – but also their user friendliness. The result: A long list of unique MIRATECH “firsts” that cut costs, reduce maintenance labor and enhance the safety of your employees. A few examples:



- Built-in “Easy-Grab™” handles make catalyst element handling, removal and insertion easier, faster and safer.
- Slide-in tracks in our VX series and Z Series Catalyst-Silencer combo units for faster, safer element installation and removal.
- Totally self-supporting, custom-designed Ground Access catalyst-silencer housings for larger hp

applications allow maintenance from ground level – no more risky, labor-intensive lifting on ladders or scaffolds! Plus a variety of insulation options to protect operators while retaining catalyst heat.

3-WAY NSCR – NON SELECTIVE CATALYTIC REDUCTION

NO_x – oxides of nitrogen
 CO – carbon monoxide
 HC – unburned hydrocarbons, including Hazardous Air Pollutants (HAPs) and Volatile Organic Compounds (VOCs) like formaldehyde (CH₂O)

OXIDATION CATALYSTS

CO – carbon monoxide
 HC – unburned hydrocarbons, including Hazardous Air Pollutants (HAPs) and Volatile Organic Compounds (VOCs) like formaldehyde (CH₂O)

For any catalyst element to do its job – breaking down regulated pollutants into harmless gases and water – engine exhaust has to come into contact with the catalyst material. In traditional “open foil” catalyst elements, most exhaust gasses pass through the element in a straight line “laminar” flow and only contact the catalyst in the first inch of the element. In MIRATECH’s revolutionary NEXT and VORTEX element substrates, you’ll find better ideas for better performance and durability.

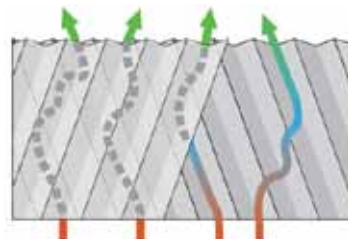
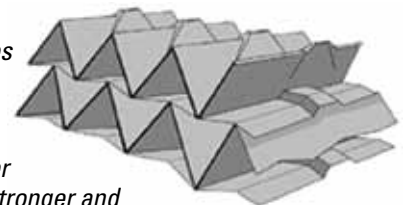


Traditional catalyst element – straight-line laminar flow: Most exhaust gas never contacts the catalyst.



NEXT channel grooves create exhaust gas turbulence for more pollution breakdown – and greater catalyst element strength.

NEXT increases strength and durability because the grooves in NEXT interlock every layer of the substrate. This self-locking system joins the flat and corrugated strips together and makes the entire matrix stronger and more stable to reduce telescoping.



VORTEX uses offset corrugations to create turbulent gas flow for better pollutant breakdown. Contact points are resistance-welded for greater catalyst element strength.

Emissions Solutions for the Natural Gas Compression Industry

- IQ Catalytic Converter – HP Range: 200 to 8,000
 - Lean-burn or rich-burn natural gas, diesel or dual-fuel engines
 - Your choice: A-36 Carbon or 304 stainless steel
 - Faster, easier, safer maintenance: Easy-Grab™ catalyst element design
- RCS/RHS Catalyst-Silencer Combo – HP Range 200 to 8,000
 - Lean-burn or rich burn natural gas, propane and diesel stationary engines
 - Your choice: A-36 Carbon or 304 stainless steel
- NEXT 3-Way NSCR or Oxidation catalysts – Two-year warranty
 - Noise reduction: 25-52 dB(A)
 - Easy-Grab™ catalyst element design
- ZCS/ZHS Catalyst-Silencer Combo – HP Range: 1,200 to 2,500
 - Lean-burn natural gas engines including Caterpillar, Waukesha, Cummins, Superior and Jenbacher
- VORTEX catalyst – Two-year warranty
 - Tracks for multiple catalyst element configurations
 - Unique Slide-in catalyst slot for quick, easy vertical or horizontal insertion
 - Noise reduction: 25-52 dB(A)
- VXC/VXH Catalyst-Silencer Combo – HP Range: 30 to 250
 - Rich-burn natural gas engines including Caterpillar, Waukesha and Cummins

- Ground Access Catalyst-Silencer Housings – HP Range: 2,500-8,000
 - Application 3612, 3616, CM Series
 - Custom engineered to your specifications
 - Emissions reduction
 - Sound
 - Wind load
 - Seismic rating
 - Free standing, base-mounted, totally self-supporting, smaller footprint, lower installation cost, ground-level catalyst maintenance with Slide-In tracks. Increased personnel safety, less labor)
- Selective Catalytic Reduction (SCR)
 - Any stationary reciprocating diesel, dual-fuel or lean-burn natural gas engine
 - Staged catalyst layers: SCR, Oxidation, Ammonia Control
 - Federal and California compliance levels for all emissions: NOx, CO, HC, HAPs, VOCs, PM
 - Your choice of SCR reactant: Urea or Ammonia
 - Noise Reduction up to 50 dB(A)
 - Advanced, user-friendly control and communications. Predictive or Closed Loop control



IQ Catalytic Converter



RCS/RHS Catalyst-Silencer

ZCS/ZHS Catalyst-Silencer Combo



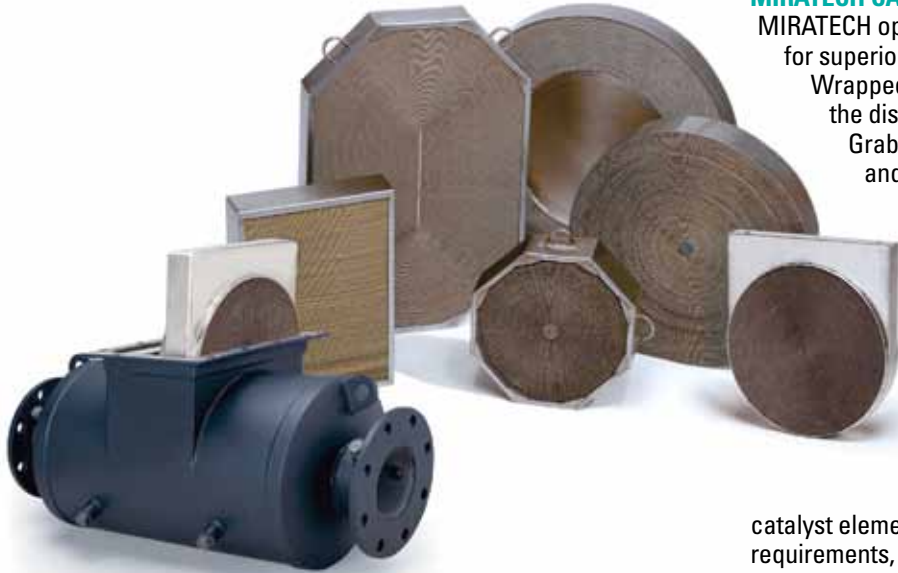
VXC/VXH Catalyst-Silencer Combo



Ground Access Catalyst-Silencer Housings



Ongoing Total Compliance



MIRATECH CATALYSTS FOR ANY CONVERTER

MIRATECH open-foil catalysts are known throughout the industry for superior performance, durability and easy maintenance. Wrapped in tough, 304 stainless for virtual indestructibility, the distinctive MIRATECH design features our built-in Easy-Grab™ handle for insertion and removal that's quick, easy and safe.

Chemisorption catalyst impregnation produces a cost-effective, long-lasting element that resists masking and catalyst "poisoning."

And the patented MIRATECH banding and pinning process is your assurance of superior mechanical strength and high-temperature tolerance that resists nesting, sagging and telescoping. Available in a wide range of sizes and shapes, MIRATECH

catalyst elements can be custom-tailored to fit virtually any space requirements, any brand of catalytic converter, and any budget

- 3-Way Rich Burn Catalysts – NO_x, CO and HC – including HAPs and VOCs
- Oxidation Catalysts – Lean-burn or dual-fuel engines CO and HC including Haps and VOCs
- Replacement Catalysts for most non-MIRATECH brands of catalytic converter in stock and ready to ship

STANDARD SETTING SCR

In Selective Catalytic Reduction (SCR), MIRATECH systems have consistently been the benchmark for Best Available Control Technology (BACT). Count on us to deliver cost-effective, comprehensive solutions tailored to your needs and backed by expert consultation, full engineering support and customer-focused product support.

Fully integrated MIRATECH SCR systems reduce regulated exhaust stream pollutants to failsafe, "first-time" compliance levels in any stationary reciprocating diesel, dual-fuel or lean-burn natural gas engine.

- NO_x, CO, HC – even Particulate Matter (PM) and noise
- Staged catalyst layers: SCR, Oxidation, Ammonia Control
- Federal and California compliance levels for all emissions: NO_x, CO, HC – HAPs and VOCs
- Your choice of SCR reactant: urea or ammonia
- Noise reduction: Up to 50 dB(A) or dB(C)
- Advanced, user-friendly control and communications technology:
- Predictive or closed loop control

BOTTOM-LINE VALUE

When you install a MIRATECH system, your engine will run more efficiently and with less fuel cost- working harder, longer, with greater flexibility to handle varying loads.

Emissions control will create less distraction from your core operations with less hassle, labor and risk for your people. And you'll have your best assurance of ongoing, total compliance with less risk of non-compliance fines or operational shutdowns.



In Gas Compression Selective Catalytic Reduction (SCR) installations, MIRATECH systems have consistently been the benchmark for Best Available Control Technology.

Your Best First Step In NESHAP Compliance: Call Us.

Count on MIRATECH for comprehensive, fully integrated, single-source solutions that give you *assured, ongoing compliance* with less cost and less disruption of your operation – tailored to your specific needs and backed by responsive, U.S.-based support.

WHY MIRATECH?

- Unsurpassed Experience and Track Record, Standard-Setting Technology
- Cost-Effective, High-Performance, High-Value Systems
- Vast Experience
 - *Over 12,000 Systems Installed, Worldwide*
- Direct Field Sales
- U.S.-Based Service & Support
 - *Fast-Response Field Service & Technical Support – Ready-To-Ship Replacement Parts Stocked In Tulsa, OK – U.S.-Based Engineering & Product Support*

ENGINES

- Stationary Reciprocating Engines:
 - *Natural Gas – Rich and Lean Burn*
 - *Propane/LPG*
 - *Diesel, Dual-Fuel*



MARKETS

- Power Generation
 - *Distributed Generation / Cogeneration, Prime Power, Peak Shaving, Emergency Standby, Air Compression, Chillers, Liquids Pumping, Greenhouse CO₂ Augmentation*
- Gas Compression
- Marine Tow, Tug, Ferries, Dredges, Harbor Craft, Workboats
- Railway Passenger & Freight

BENEFITS

NSCR

- Carbon or stainless steel construction
- Insulation
- High activity catalyst
- Restore performance with washing
- Fool proof gasket seal
- Multi-layer catalyst
- High turbulence, steel foil substrate
- Easy-Grab™ handles - reliable service
- Air/Fuel Ratio Control
- Training

SCR

- Multi-Stage System: SCR, Oxidation, DPF, Ammonia Control
- Compliance levels for all emissions: NOx, CO, HAPs, VOCs, DPM

To learn more, please visit miratechcorp.com and send us an e-mail at info@miratechcorp.com, or give us a call: 800-640-3141 ext. 131.



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