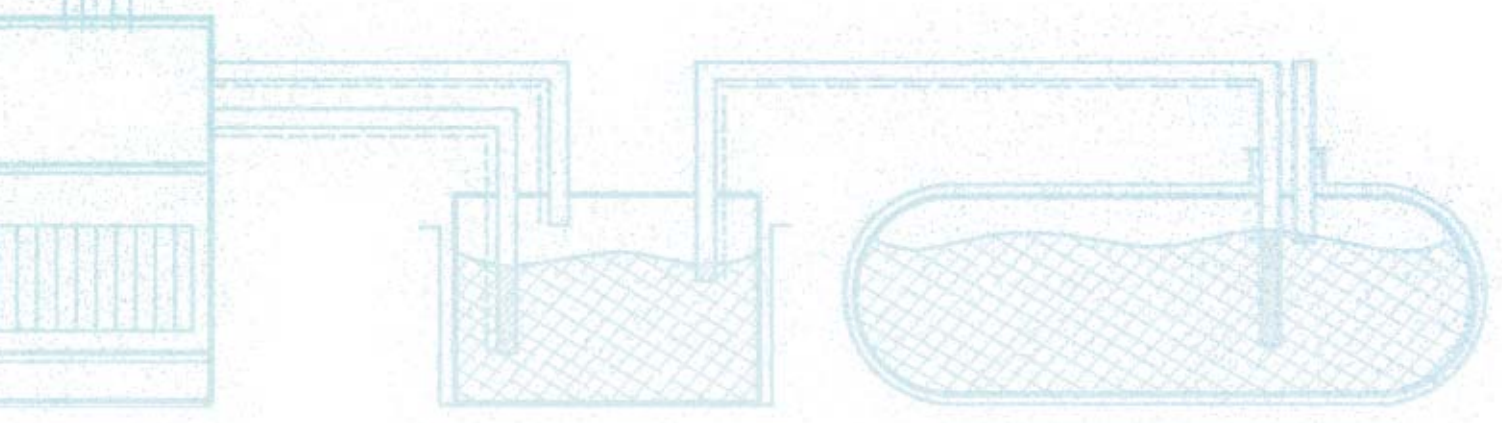
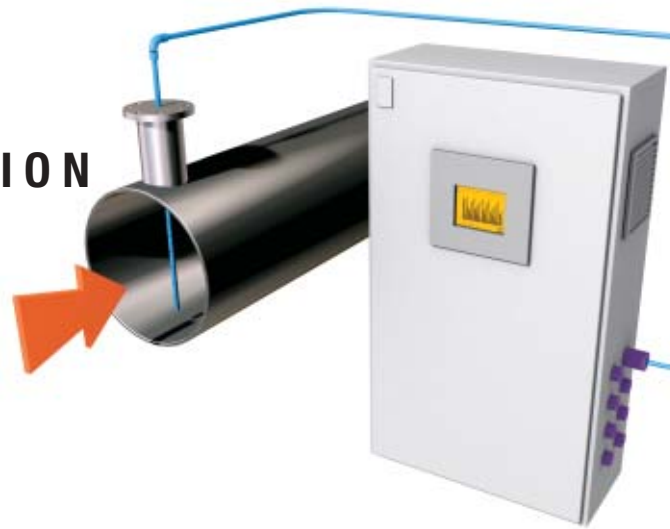


# MIRATECH SCR

» SELECTIVE CATALYTIC REDUCTION SYSTEMS



# SCR: Selective CATALYTIC REDUCTION



Gas Compression | Air Compression | Liquid Pumping | Power Generation:

Distributed Generation, Cogeneration, Peak Shaving, Emergency Standby | Chillers & More

## MIRATECH SCR: SELECTIVE CATALYTIC REDUCTION.

For lean-burning natural gas and diesel engines where NO<sub>x</sub> control is a challenge, MIRATECH SCR delivers the best Selective Catalytic Reduction systems, service and product support in North America – bar none.

**World-Class Technology. Headquarters: USA.** It starts with the world's best SCR technology. MIRATECH is the sole North American partner of HUG Engineering, an acknowledged world leader in the field. Our partnership with HUG gives our customers all the benefits of Best Available Control Technology – backed by full-service engineering, technical and product support based in the central U.S., within easy reach for fast response.

**Experience You Can Bank On.** Along with unsurpassed technical expertise, vast real-world experience goes into every MIRATECH SCR project – experience gained in nearly three decades of cumulative SCR experience, with more than 1,200 units installed worldwide in applications of all shapes and sizes. If there's a problem – or a potential problem – we've probably already solved it. If a new issue arises, no one will get to the bottom of it faster.

**Bottom-Line Value.** When you install a MIRATECH SCR system equipped with advanced reactant injection control, your engine will run more efficiently, with less fuel cost, and with Ongoing Compliance™ assured every step of the way – working harder, longer, with greater flexibility to handle varying loads, and with less risk of non-compliance fines or operational shutdowns.



» MIRATECH SCR

### » ON-SITE SERVICE



» MIRATECH SCR

For Lean-Burning Natural Gas & Diesel Engines

- » Standard-Setting Technology
- » Cost-Effective, High-Performance, High-Value Systems
- » Full-Time U.S.-Based Service & Support
  - Fast-Response Field Service & Technical Support
  - Replacement Components Stocked In Tulsa, OK
  - U.S.-Based Engineering Support



4224 SOUTH 76<sup>TH</sup> EAST AVENUE • TULSA, OKLAHOMA 74145-4712  
800.640.3141 • [www.miratechcorp.com](http://www.miratechcorp.com)

## WHY MIRATECH?

- » Advanced Technology
- » Cost-Effective, Comprehensive Solutions
- » Unsurpassed Experience & Expertise
- » Fast, Responsive, Customer-Focused Service & Support
  - Prevent Non-Compliance Fines
  - Improve Engine & Catalyst Performance
  - Cut Maintenance Costs
  - Maximize Catalyst Life

## EMISSIONS SOLUTIONS

- » Non-Selective Catalytic Reduction
  - 3-Way Catalyst Systems
  - Oxidation Catalysts
  - HAPs Catalysts
  - Diesel Oxidation Catalysts
- » Catalyst Housings
  - MN/MBA
  - IQ
- » Catalyst-Silencer Combos
  - QCC/QCH
  - RCS/RHS
- » Active Regeneration Soot Traps
- » SCR Catalyst Systems
- » NX Analyzers
- » Analysis-Controlled Injection Systems
- » Air-Fuel Ratio Control Systems
- » Service Contracts
- » Technical Support & Training
- » MIRATECH Catalyst Services
- » Replacement Parts

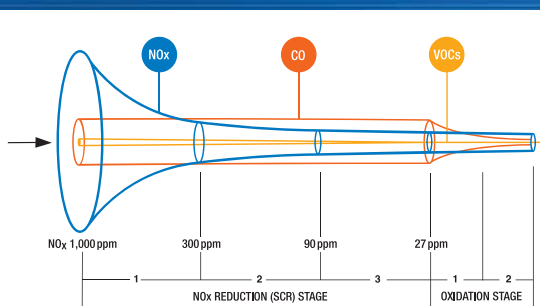
# The MIRATECH SCR PROCESS



## EMISSIONS: CONTROLLED.

MIRATECH SCR catalytic converters reduce regulated exhaust-stream pollutants for any stationary reciprocating diesel, dual-fuel or lean-burn natural gas engines. These pollutants include oxides of nitrogen, (NO<sub>x</sub>), carbon monoxide (CO), and unburned hydrocarbons (HC) comprising Hazardous Air Pollutants (HAPs) and Volatile Organic Compounds (VOCs).

### » THE SCR PROCESS



#### » Emissions Reduction Profile

When pollutants pass through the MIRATECH SCR system, their concentrations fall as a natural, logarithmic function.

Applications vary widely, from power generation and gas compression to liquids pumping and greenhouse CO<sub>2</sub> augmentation.

Our SCR systems work in two efficient stages: the NO<sub>x</sub> Reduction Stage and the Oxidation Stage for CO and HC reduction. Both stages work together, drastically reducing harmful emissions to satisfy the strictest regulatory requirements.

**NO<sub>x</sub> Reduction.** Oxides of nitrogen are chemical precursors to acid rain and particulates, and are one of the main ingredients of "smog." Reducing NO<sub>x</sub> emissions has been a regulatory goal in many nations for decades.

With rich-burn gas-fueled engines, precious-metal oxidation catalysts can do the job. But when you run an engine lean, the exhaust stream contains too much air for 3-way NSCR catalysts to reduce NO<sub>x</sub> effectively. That's why Selective Catalytic Reduction is needed: to reduce lean-burn engine NO<sub>x</sub> emissions to compliance-levels.

In the mixing section, either ammonia or aqueous urea is injected into the exhaust stream.

Urea is often used instead of ammonia; since it's much less toxic than ammonia, it's generally easier to transport and store, and allows easier permitting. This urea is hydrolyzed and breaks down in the exhaust stream to form ammonia.

Ammonia, whether injected directly or formed from urea, reacts with NO<sub>x</sub> at the SCR catalyst to form harmless water and nitrogen.

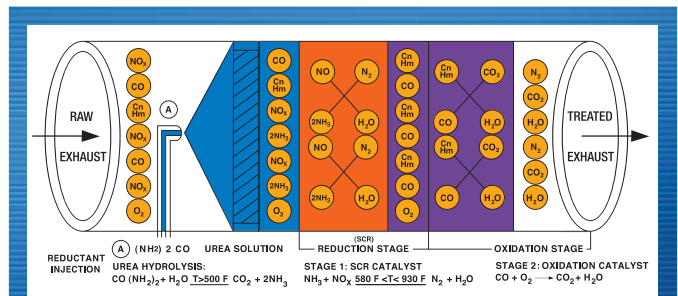
The Oxidation Stage uses ceramic honeycomb oxidation catalyst elements, with surface coatings impregnated with precious metals, to reduce CO, HAPs, and VOCs – oxidizing these pollutants to form water and carbon dioxide.

## COMPLIANCE & MORE.

MIRATECH SCR catalytic converters do more than just help you meet emissions requirements. They can also help decrease fouling rates, boosting the efficiency and reliability of heat recovery. MIRATECH SCR systems even cut noise, too. In fact, they can reduce engine exhaust noise by up to 35 DBA.

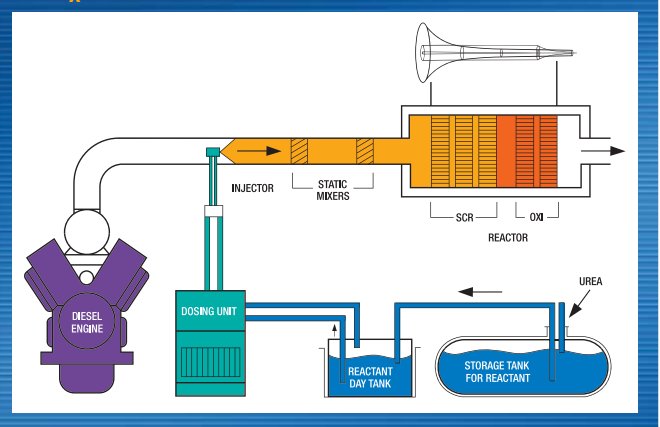
Most important of all, MIRATECH SCR solutions give you assured compliance with less cost, less disruption of your operation – and full support you can count on over the long haul.

With the MIRATECH SCR system, you don't have to deal with complex controls assembly. Our panels come pre-assembled and include Programmable Logic Controller (PLC) hardware. MIRATECH SCR systems give you your choice of reactant – ammonia or urea – and come with purge lines and an air-assisted injection nozzle for efficient atomization. And MIRATECH SCR gives you a level of operations control that's simply unique to the industry.



### » SCR EXHAUST REACTION

#### » NO<sub>x</sub> REDUCTION



# Total Emissions Control



## SCR INJECTION CONTROL SYSTEMS.



**ACIS: Analysis Controlled Injection System.** To handle tight requirements in load-variant applications, MIRATECH recommends ACIS – a superior urea/ammonia injection control technology, combining reactant injection control and exhaust gas analysis into one package. With ACIS, injection rates are automatically adjusted to actual operating conditions, rather than relying on fixed, preset values.

- ▶▶ No Load-Curve Generation Required
- ▶▶ Easy Installation & Setup
- ▶▶ Remote, Online Monitoring Capability
- ▶▶ Operation Based On Engine Load



**NX Analyzer.** This high-precision, wall-mount, multi-engine emissions monitoring system is a convenient, cost-effective alternative to traditional CEM rack-frame systems – with easier installation and less need for tech support.

- ▶▶ Base-Load Applications
- ▶▶ Easy Installation & Maintenance
- ▶▶ Natural Gas, LPG or Diesel Engines
- ▶▶ Single- or Dual-Point Nitric Oxide Measurement
- ▶▶ Carbon Monoxide (CO) Monitoring
- ▶▶ Multiple Engine Monitoring

## MIRATECH SERVICES.

One of the big problems with industrial emissions control: *You have an operation to run.* Every minute you and your people spend on your emissions control system is time and attention taken away from Job One.

For many customers, an important part of the MIRATECH advantage comes in on-going, single-source service contracts, as well as on-site training and technical support services, tailored to their specific needs and budgets.

These programs and services let you concentrate on

your core business while we take care of emissions control – with unsurpassed experience and expertise behind every task we take off your busy agenda.

**MIRATECH Service Contracts.** Let our seasoned professionals handle emissions control system maintenance chores for you, at fixed service-hour intervals. That way, you'll get the most out of your MIRATECH Emissions Solutions, with more manageable, predictable costs, and with minimum distraction, headache and hassle for you and your employees.

- ▶▶ Inspection & Testing
- ▶▶ System Adjustments
- ▶▶ Cleaning
- ▶▶ Component Replacement
  - Gaskets
  - Filters
  - O-Rings
  - Valves & More

## MIRATECH Technical Support Services.

Emissions regulations are complex and constantly changing. Emissions control *solutions* can be complex, too, involving technologies that may be unfamiliar to your personnel. Count on MIRATECH Technical Support Services for answers – expert, detailed knowledge of current, applicable regulations, upfront review of permitting, technical drawings, training for your staff, troubleshooting, and more. We'll help you unravel the regulations, maximize cost-efficiency, and make *Ongoing Compliance™* easier for you and your organization.

- ▶▶ Consultation & Technical Support
  - Product Drawings & Specifications – Preliminary & Project-Specific
  - Construction & Operating Permit Review
  - Design & Installation Review
  - Regulatory Review
- ▶▶ On-Site Assessment
- ▶▶ Commissioning
- ▶▶ Total Emissions Control
  - Turnkey planning, implementation & maintenance
- ▶▶ Troubleshooting
- ▶▶ Training
  - On-Site & Off-Site



## BREATHE EASIER: CONTACT MIRATECH.

For the best in Selective Catalytic Reduction technology, service and support, bar none, simply give us a call. Better yet, visit our website: [www.miratechcorp.com](http://www.miratechcorp.com). Ask for your free subscription to our fact-filled electronic newsletter, *THE EMISSIONS MONITOR*.

## WHY MIRATECH SCR?

- ▶▶ Standard-Setting Technology
- ▶▶ Cost-Effective, High-Performance, High-Value Systems
- ▶▶ Vast Experience
  - Over 1,200 Systems Installed, Worldwide
- ▶▶ Full-Time U.S.-Based Service & Support
  - Fast-Response Field Service & Technical Support
  - Replacement Components Stocked In Tulsa, OK
  - U.S.-Based Engineering & Product Support

## APPLICATIONS

- ▶▶ Stationary Reciprocating Engines:
  - Lean-Burn Natural Gas
  - Propane/LPG
  - Diesel, Dual-Fuel
- ▶▶ Power Generation
  - Distributed Generation/Cogeneration, Peak Shaving, Emergency Standby
- ▶▶ Gas Compression
- ▶▶ Air Compression
- ▶▶ Liquids Pumping
- ▶▶ Chillers
- ▶▶ Greenhouse CO<sub>2</sub> Augmentation

## FEATURES & BENEFITS

- ▶▶ Two-Stage System: SCR & Oxidation
  - Compliance-Levels For All Emissions: NO<sub>x</sub>, Co, HAPs, VOCs
- ▶▶ Your Choice Of SCR Reactant: Urea Or Ammonia
- ▶▶ Efficient Reactant Atomization
  - Purge Lines & Air-Assisted Injection Nozzle
- ▶▶ Easy Access To Injector For Cleaning & Maintenance
- ▶▶ Tough, Durable Carbon Or Stainless Steel Catalyst Housing
- ▶▶ Insulation Package With Aluminum Or Galvanized Steel Sheathing
- ▶▶ Catalyst Access Door: Easy Maintenance
- ▶▶ Fiberglass Socks Gasket & Protect Unitized Catalyst Modules
- ▶▶ High-Activity Tungsten-Vanadia Catalyst
- ▶▶ Advanced, User-Friendly Control Technology
- ▶▶ Pre-Assembled Panels
  - Packaged Controls Include Pumps For Reactant & Air
- ▶▶ Simple, Quick Bulkhead Connections For Wiring & Plumbing
- ▶▶ Safety Shutdown & Alarm Controls

