

CECO Peerless

JUST SAY  
**NO<sub>x</sub>**

NEXT GENERATION  
DeNO<sub>x</sub> TECHNOLOGY  
SOLUTIONS

**CECO**  
ENVIRONMENTAL

CECO Environmental is your partner for equipment and environmental protection. Our team eliminates nitrogen oxide (NOx), carbon monoxide (CO) and volatile organic compounds (VOCs) 24 hours a day, 7 days a week, 365 days a year. We work with industry leaders in power generation, oil and gas and industrial manufacturing to reduce and eliminate air pollutants. We take pride in helping our customers solve complex challenges, providing a more efficient process that protects our shared environment.

OVER  
**150**  
YEAR  
LEGACY

**19**  
HERITAGE  
BRANDS

**30+**  
INDUSTRIES  
SERVED

**28 CORE**  
TECHNOLOGIES

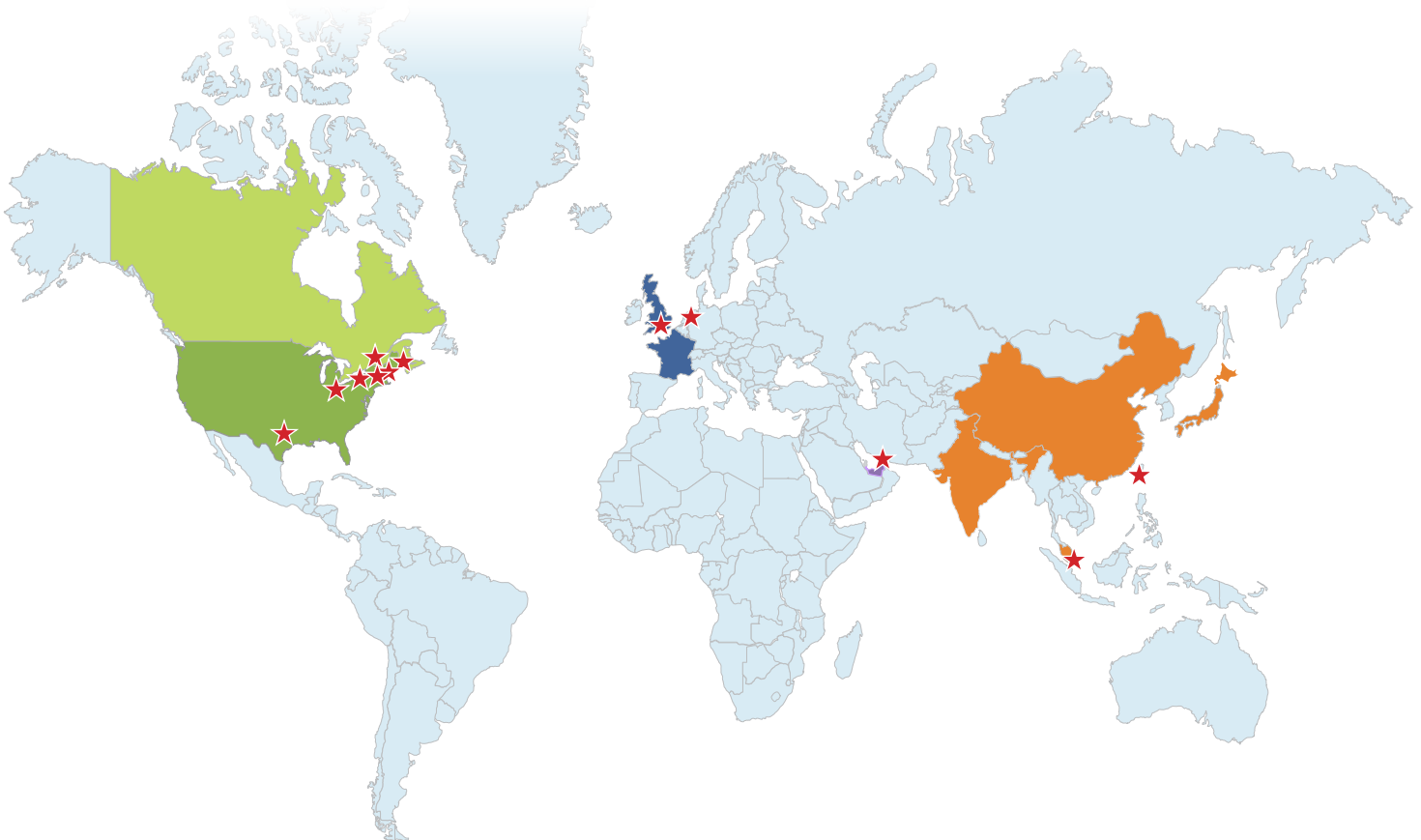
**221**  
PRODUCTS  
WORKING TO  
IMPROVE THE WORLD

# CECO Peerless has been protecting our shared environment and solving the most complex emissions issues for over 85 years.

A global leader in compact, engineered, high-efficiency, processing, separation, and filtration equipment, CECO Peerless primarily serves the oil and gas production, gas pipeline transportation and power generating industries around the world. Over the past 15 years alone, we've served the energy market through system installations for thousands of customers globally, resulting in the reduction of more than 6 billion pounds of NOx. **That's the equivalent of removing nearly 2 million cars and their emissions from the road.**

CECO Environmental leads a global suite of energy brands that increase plant efficiency. We manufacture an arsenal of technologies to enable equipment and environmental protection.

**CECO Aarding    CECO Burgess-Aarding    CECO CCA    CECO Effox-Flextor    CECO Peerless**



## CECO Peerless designs turnkey solutions for power generating industries around the world.

- Over 85 years of experience
- Thousands of successful installations and millions of hours of engineering excellence
- Expertise from concept through commissioning stages
- Experienced in technology, process engineering and turnkey solutions
- Worldwide delivery capability and vast network of local/regional/global partners
- Global presence, multi-cultural teams with localized approach to attain clean, safe, efficient and sustainable solutions within budget and schedule

# RAPID ADVANTAGE SELECTIVE CATALYTIC REDUCTION

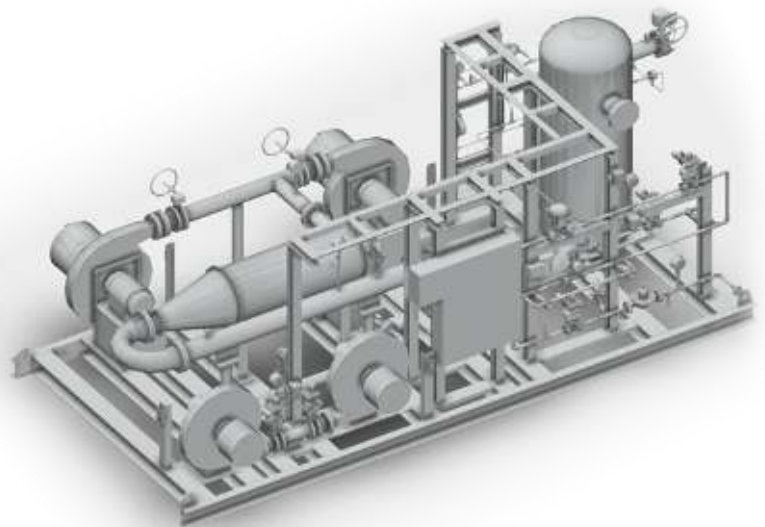
## RAPID ADVANTAGE SELECTIVE CATALYTIC REDUCTION (RASCR™) IS YOUR ELITE SOLUTION FOR FAST START CONTROLS AND CYCLING OPERATIONS.

With our next generation technology, RASCR™, CECO Peerless enables gas turbine operators and end users with fast-starting and load following DeNOx capabilities. RASCR™ allows you to rapidly vaporize ammonia, while controlling NOx and slip during shifts in load and startup.

In addition to the startup and transient operational benefits, a significant advantage to this technology is its operational efficiency. When compared to the large parasitic load of electric vaporization or the higher maintenance costs of a hot gas recirculation system, RASCR™ technology offers a substantial OPEX savings, in many cases yielding an ROI in as little as 12-18 months.

### Overall benefits of RASCR:

LOW AUXILIARY LOAD (80% LOWER THAN ELECTRIC)
START-UP NO <sub>x</sub> REDUCTIONS
TRANSIENT EMISSIONS CONTROL
ENHANCED NO <sub>x</sub> DESTRUCTION LEVELS
QUICKER AMMONIA INJECTION RATES
TIGHTER NH <sub>3</sub> SLIP CONTROL
FASTER STARTUP TIMES



## RASCR™ (RAPID ADVANTAGE SCR)

Many gas turbine plants today are operating to augment renewable power sources such as wind or solar. This addition requires these plants to start-up quickly, achieve a peak power demand rate, and vary the gas turbine load frequently to combat the variable nature of renewable resources.

As we are reliant on the meteorological aspects of the wind blowing, and the sun rising and setting with variability throughout the day, gas turbine flexibility and fast responsiveness to the changing demands is required. This process can take a toll on the exhaust system emissions controls and may require changes to the system to achieve compliance during these operating conditions. Many regulators are beginning to restrict the ability to operate outside of an emissions threshold during maintenance, startup, and shutdown ("MSS") events. RASCR™ equipment is designed to achieve emissions compliance during these startup and transient conditions.

### Features:

- Uses small horsepower ambient air fans
- CECO Peerless combustion chamber design
- Available with or without CECO Peerless high-efficiency packed tower vaporizer
- Hazardous area classified
- Redundancy options available
- Dual fuel capacity

### Benefits:

- Ammonia vaporization in less than 5 minutes from gas turbine start
- Much lower parasitic loss as compared to electric vaporization
- Alleviates potential failures associated with hot gas recirc fans
- Low O&M costs
- Low gas consumption
- Low cost of natural gas offers short-term ROI



## EDGE™ AIG

When your pollution control system underperforms, your plant suffers unnecessary maintenance costs and downtime. Often while one component of the system may appear to be the issue, the root causes may lie in inefficiencies throughout the system.

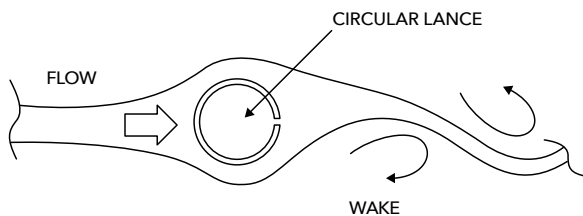
With expertise in total SCR system design and optimization, CECO Peerless offers total solutions to meet NOx emissions regulations while working within your existing plant infrastructure. Our extensive experience with complicated SCR retrofit projects helps you get more out of your plant while avoiding unnecessary maintenance costs and outages.

Our patented Peerless EDGE™ AIG lance design improves ammonia distribution and is inherently less susceptible to plugging, enabling you to:

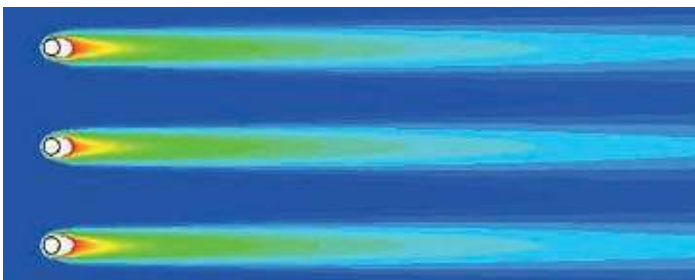
- Maximize NOx reduction
- Minimize NH3 slip
- Reduce ammonia consumption by 20%-40%
- Extend catalyst life by 1-2 years
- Reduce time spent cleaning plugged AIG holes
- Reduce overall system footprint—better performance in half the distance
- Operate for a longer period of time on your current regulatory permit



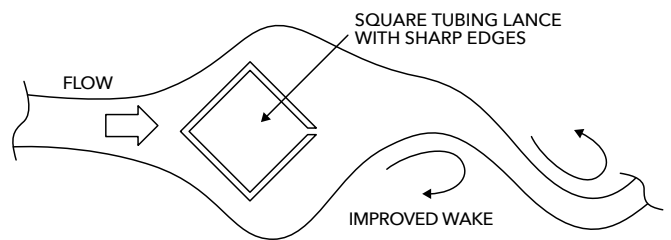
### INCOMPLETE NH3 DISTRIBUTION WITH CIRCULAR LANCE



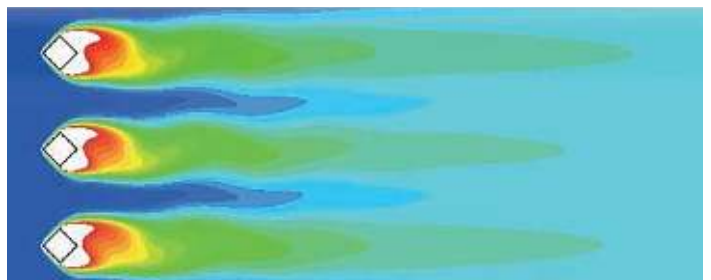
INCOMPLETE MIXING



### COMPLETE AMMONIA DISTRIBUTION WITH EDGE™ AIG



COMPLETE MIXING



## SCR SERVICES

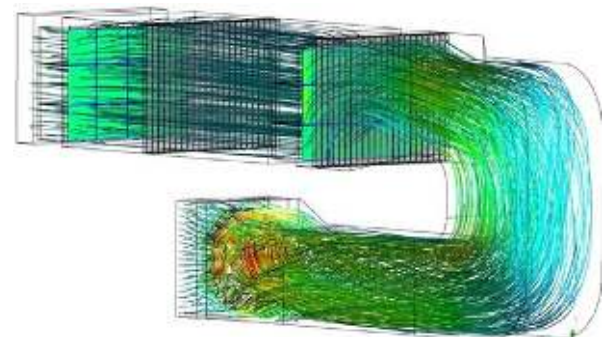
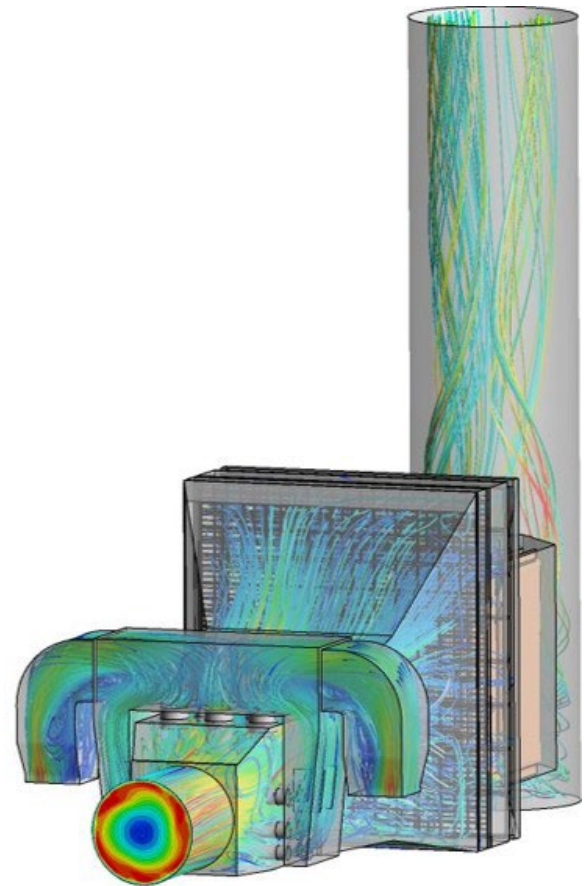
CECO Peerless is your total solution expert in SCR system design and optimization. Our experienced team of SCR engineers and technical support professionals can help you maintain your system and improve your plant's performance.

### Services:

- CFD modeling and flow analysis
- Combustion optimization services
- Emission engineering and consulting
- Engineering assessments
- Equipment upgrade ROI analysis
- Long-term service agreements
- On-site technical advisory engineers/technicians
- Operator training
- Parts
- PLC programming and support
- Systems support

### TURNKEY ENGINEERING AND INSTALLATION

CECO Peerless delivers comprehensive DeNOx system solutions, including design, supply, installation supervision, and start-up services for SCR systems. Our dedicated in-house computational fluid dynamics (CFD) department draws upon 30 years of experience to engineer the best solution for your plant. Through complete integration of AFCU, catalyst, and system processes, CECO Peerless provides a single-source performance warranty that's unrivaled in the industry.



# CECO IS YOUR PARTNER FOR EQUIPMENT AND ENVIRONMENTAL PROTECTION.

CECO Environmental's suite of energy solutions, including our patented EDGE® Ammonia Injection Grid (AIG) and RASCR™ Vaporizer Skid, in conjunction with our dampers, silencing and combustion technology, will help you optimize your facility and avoid unnecessary maintenance costs and downtime.



## CECO Aarding and CECO Burgess-Aarding

CECO Aarding and CECO Burgess-Aarding provide customized solutions based on a proven track record in design, engineering and manufacturing of gas turbine exhaust systems and acoustical systems. Both new systems are provided as well as upgrades and retrofits.



## CECO CCA

CECO CCA takes pride in providing premium, high-efficiency combustion and emissions control systems. CECO CCA's exclusive technologies reduce nitrogen oxides (NOx), unburned carbon and carbon monoxide emissions. Customized SCR systems including direct injection, urea-based and reverse flow style systems.



## CECO Effox-Flextor

With over 5,000 installations globally, CECO Effox-Flextor is the global leader in the design and manufacture of dampers and expansion joints for use in flue gas and process air handling systems. Our team includes a highly skilled staff of engineers, designers, fabricators and field service personnel to ensure the performance of your product solution.

### Products and solutions:

- Dampers
- De-NOx solutions
- Expansion joints
- Gas turbine exhaust systems
- Low-NOx burners (LNB)
- Selective catalytic reduction (SCR systems)
- Selective non-catalytic reduction (SNCR)
- Separation-filtration technologies