

NITROGEN BEARING WASTE

Thermal Oxidizer



BURNERS | FLARES | THERMAL OXIDIZERS
VAPOR CONTROL | RENTALS | AFTERMARKET



NITROGEN BEARING WASTE

Thermal Oxidizer

Opportunity NOx.

Zeeco is the world leader in ultra low-NOx combustion solutions. For decades, our engineers have custom-designed Nitrogen Bearing Waste Thermal Oxidizers for petrochemical plants, petroleum refineries, carbon fiber manufacturers, and electronics companies. At this very moment, our combustion systems are eliminating hazardous waste and minimizing environmental emissions in all corners of the globe.

Nitrogen Bound Waste Thermal Oxidizers are incineration systems that treat gaseous and liquid wastes comprised of nitrogen bound compounds such as ammonia and cyanide. High-temperature incineration of nitrogen-bound wastes in an oxidizing (excess-air) environment produces unacceptable levels of nitrogen oxides (NOx).

To limit the formation of NOx, Zeeco employs a multi-stage low-NOx incineration process. Our propriety design sets the standard for low-NOx thermal oxidation systems.

Tougher requirements, lasting solutions.

Our Combustion Research and Test Facility is considered one of the best on the planet and was the first in the world to become ISO 9001-2000 certified. Our staff stays ahead of rapidly changing environmental emission requirements while exceeding our customers' expectations for quality and long-lasting performance.

With 15 full-scale combustion test furnaces, Zeeco is capable of testing a wide variety of combustion systems under simulated field conditions. We have multiple liquid and gaseous fuels available to enable us to simulate virtually any specified fuel under specific process conditions. A multi-stream incineration system allows us to test the most complex situations in a controlled environment. Zeeco is also equipped to demonstrate a full range of burner and flare equipment, including process burners, boiler burners, and all manner of flaring equipment, including a wide variety of smokeless technologies.

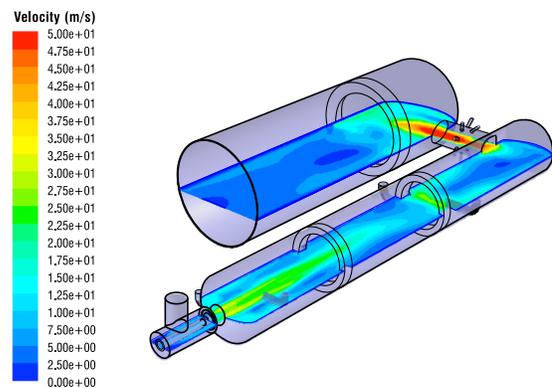
Computational Modeling

Zeeco combines advanced Computational Fluid Dynamics (CFD) capabilities with our extensive experience in the design, fabrication, and operation of combustion equipment to ensure optimal performance. By modeling our client's specific process conditions against actual equipment design, CFD allows us to predict what we cannot otherwise see or anticipate, rather than relying only on past experience and traditional design rules.



Zeeco's automatic control and instrumentation systems assure equipment operations are conducted in a safe and controlled manner.

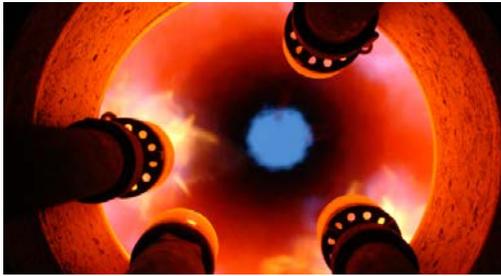
Case 1 normal - Velocity Profile (m/s)
(horizontal cut through incinerator center)



ZEECO CFD Model



ZEECO Combustion Research and Test Facility



ZEECO GLSF Ultra-Low NOx Free-Jet Burner



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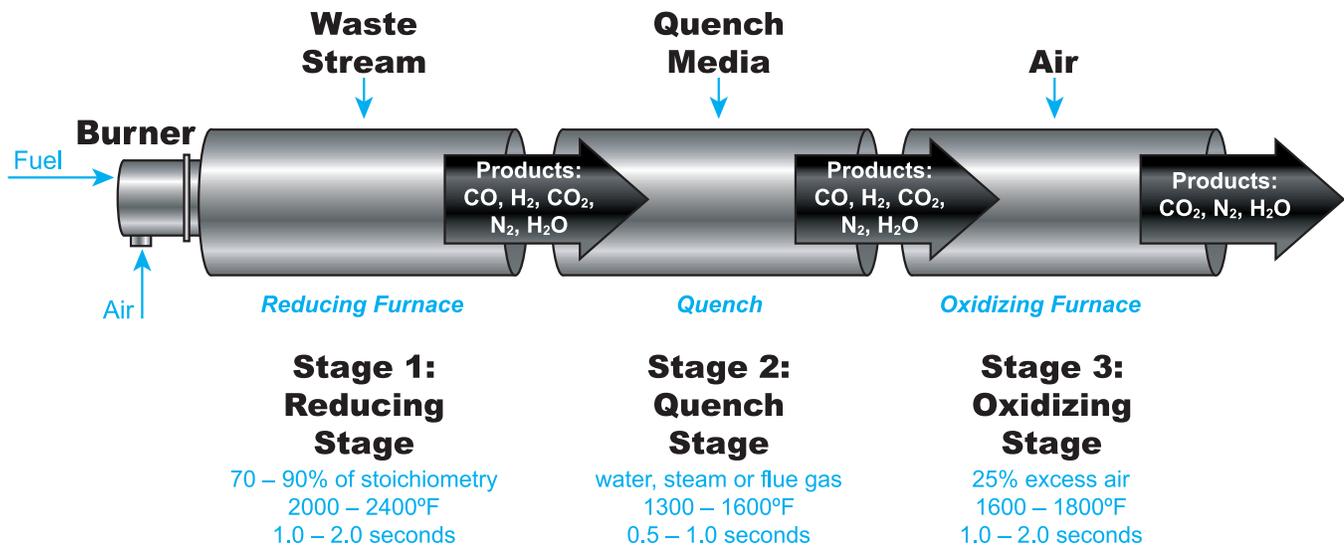
ZEECO® high-energy pilot burners are fully tested to ensure reliable long-term operation in severe service, and can even be ignited and fired while completely submerged underwater.



ZEECO facility on 250 acres (1 km²)



ZEECO Nitrogen Bearing Waste Thermal Oxidizer



ZEECO's three-stage thermal oxidation process for Nitrogen Bound Waste

Stage One: Reduction Furnace

The first stage typically involves burning waste and fuel together in a reducing environment (e.g. with less than the stoichiometric requirement of oxygen) at a controlled temperature at or above 2000-2400°F (~1100-1300°C) and a residence time up to 2.0 seconds. This high temperature environment and sub-stoichiometric oxygen levels cause the compounds containing bound nitrogen to dissociate, eventually producing free nitrogen. Due to the supply of sub-stoichiometric oxygen, combustibles including carbon monoxide (CO) and hydrogen (H₂) exist in the Stage One effluent.

Stage Two: Quench

The second stage cools the Stage One effluent to a lower temperature that ranges between the NO_x formation threshold temperature and the auto-ignition temperature of the flue gas. The residence time in the second stage typically ranges from 0.5-1.0 seconds. An inert cooling medium, such as water, steam, or recycled flue gas, is introduced in this zone to achieve these temperatures, which typically range from 1300-1600°F (~700-870°C).

Stage Three: Oxidation Furnace

The third stage oxidizes the combustibles in the now-quenched Stage Two effluent. The combustibles that are oxidized in stage three include CO, H₂, and any remaining hydrocarbons that cannot be released untreated into the atmosphere. In order to complete the combustion process, supplementary air is introduced to the cooled flue gas so that the remaining combustibles oxidize prior to atmospheric discharge. The operating temperature at this final stage is typically limited to 1800°F (~980°C) and residence time in this final stage is usually 1.0-2.0 seconds.

Typical Performance

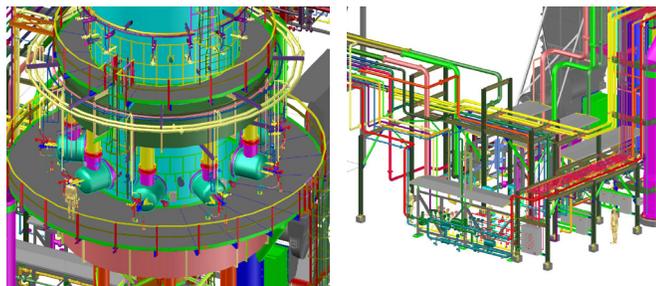
- NO_x emissions for Nitrogen Bound Waste Streams <100 ppm (vd)
- Waste Destruction Efficiency (DRE) > 99.99% (available up to 99.9999%)



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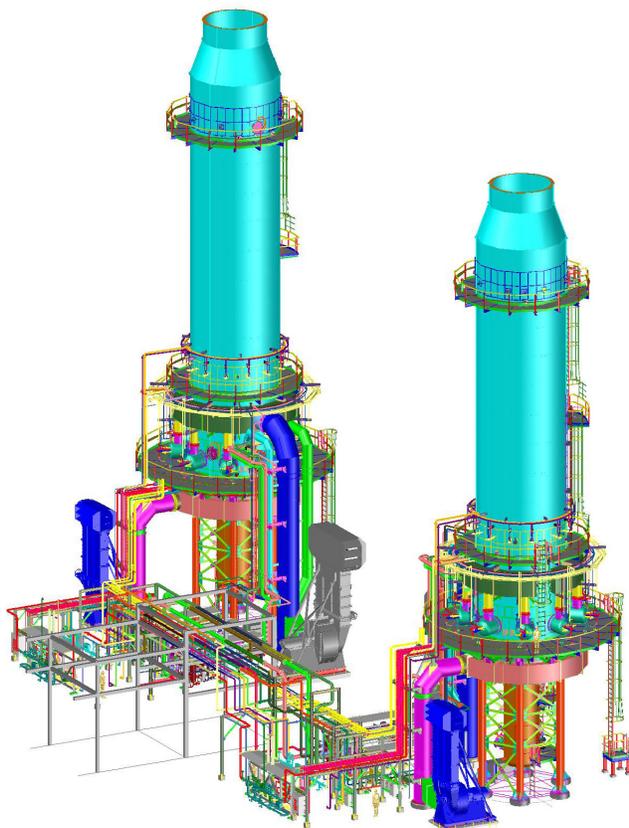
Typical Applications

- Petrochemical applications involving Amines, Nitriles, etc.
- Ammonia and/or Cyanide Vapors
- Sulfur Recovery Units: Sour Water Stripper (SWS) Gas Overhead Streams
- Carbon fiber manufacturing LT/HT Off-Gas streams
- Electronics manufacturing vent streams



Proprietary Design Features

- Guaranteed predictable emissions performance
- Proper re-ignition in oxidizing stage
- Burner combustion air is efficiently separated from waste combustion air for optimal control
- Dependable process control and long-term reliability





The Zeeco Difference

By concentrating on what we do best, Zeeco has grown into a worldwide leader in combustion and environmental solutions. We are a privately held company whose ownership stays highly involved in daily operations, with upper management comprised of the world's leading combustion experts.

When you call Zeeco, we answer. When you make a request, you get a quick, efficient response. We are lean and efficient, able to make decisions quickly, without bureaucracy and red tape. Our sales, engineering, and purchasing groups work hand-in-hand to deliver highly competitive quotes and heroic turnaround times. We stand ready and willing to travel anywhere in the world to discuss upcoming projects firsthand, and to ensure that every existing project runs seamlessly.



Visit zeeco.com/contact for additional Global Location contact information



Choose to work with our dedicated, flexible, and innovative team, and you won't be disappointed. Call or email us today to request a quote or to learn more about our proprietary combustion systems.

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REGISTERED
ISO 9001:2015

Certification applies to
Zeeco Headquarters.