The Zeeco difference.

Our only business is the combustion business. By concentrating on what we do best, Zeeco has grown into a worldwide leader in combustion 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.

Choose Zeeco.

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.
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 Bearing Waste Thermal Oxidizer**

Zeeco is equipped to demonstrate to us to test the most complex situations in a controlled environment. A multi-stream incineration system allows and gaseous fuels available to enable us to simulate under simulated field conditions. You can test a wide variety of combustion systems capable of testing a wide variety of combustion systems and exceed our client’s specific process conditions against the actual equipment design. Our engineers continually strive to stay ahead of rapidly changing conditions and provide the best on the planet, and was the first to become ISO 9001-2000 certified. Our engineers are considered one of the best in the world to become ISO 9001-2000 certified. Our engineers continually strive to stay ahead of rapidly changing conditions.

**Thermal Oxidizer**

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**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 the actual equipment design, CFD lets us predict what we cannot otherwise see or anticipate, rather than relying only on past experience and traditional design rules.

**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 continually strives to stay ahead of rapidly changing environmental emissions 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 simulate various fuel types under any 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.

**Proprietary Design Features:**

- Dependable process control and long-term reliability
- Burner combustion air is efficiently separated from waste combustion air for optimal control
- Proper re-ignition in oxidizing stage
- Guaranteed predictable emissions performance
- Electronics manufacturing vent streams
- Carbon fiber manufacturing LT/HT Off-Gas streams
- Petrochemical applications involving Amines, Nitriles, etc.
- Ammonia and/or Cyanate Vapors
- Safary Recovery Units
- SAU (Steam-Air-Feedwater) Gas Overhead Streams
- Carbon fiber grafting LT/HT Off-Gas streams
- Electronics manufacturing vent streams

**Typical Applications:**

- Petrochemical applications involving Amines, Nitriles, etc.
- Ammonia and/or Cyanate Vapors
- Safary Recovery Units
- SAU (Steam-Air-Feedwater) Gas Overhead Streams
- Carbon fiber manufacturing LT/HT Off-Gas streams
- Electronics manufacturing vent streams

**Typical Performance:**

- NO\textsubscript{x} emissions for Nitrogen Bound Waste Streams < 100 ppm (vd)
- Wast Disposal Efficiency (WDE) > 99.99% (available up to 99.9999%)

**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 2.5 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\textsubscript{2}), hydrogen (H\textsubscript{2}) exist in the Stage Two effluent.

**Stage Two: Quench**

The second stage cools the Stage One effluent to a lower temperature that ranges between the NO\textsubscript{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 control these temperatures, which typically range from 1200-1600°F (~650-870°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\textsubscript{2}, H\textsubscript{2}, and any remaining hydrocarbons which 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 within this final stage is typically 1800-2200°F (~980-1200°C) and residence time is typically 2 seconds.
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zeeco.com
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 Bearing Waste Thermal Oxidizers are simultaneously fueled with nitrogen bearing waste and a secondary fuel, such as gas or diesel. This secondary fuel adds oxygen to the waste stream and reduces the concentration of nitrogen oxides in the exhaust.

Zeeco’s 3-stage thermal oxidation process for Nitrogen Bound Waste Streams includes a Reduction Furnace, a Quenching Zone, and an Oxidizing Stage.

Stage One: Reducing 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 an oxygen levels (1300-1600°F (~700-870°C)). The residence time in this final stage is usually 1.0-2.0 seconds.

Stage Two: Quench
The second stage cools the Stage One effluent to a lower temperature that ranges between the NOx formation threshold temperature and the auto-ignition temperature of the fuel gas. The residence time in this stage typically ranges from 0.5-1.0 seconds. An inert cooling medium, such as water, steam, or recycled fuel gas, is introduced in this zone to control the residence temperatures, which typically range from 1200-1600°F (~650-870°C).

Stage Three: Oxidizing Stage
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 which cannot be released uncombusted into the atmosphere. In order to complete the combustion process, supplementary air is introduced to the cooled fuel gas so that the remaining combustibles exist prior to atmospheric discharge. The operating temperature within the final stage is typically 1800°F (~980°C) and residence time in this final stage is usually 1.0-2.0 seconds.

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

Typical Applications
- Petrochemical applications involving Ammonia, Nitric, 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
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 over 100 countries around 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 existing (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 proprietary design sets the standard for low-NOx thermal oxidation systems.

Computational Modeling

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Tougher requirements, lasting solutions.

Our Combustion Research and Test Facility is considered one of the best in the world to become ISO 9001-2000 certified. Our staff continually strives to stay ahead of rapidly changing needs and expectations for quality and long-lasting performance.

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 1900-2400°F (~1050-1300°C) and a residence time up to 2.5 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 (CO2) 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 NOx 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 control the residence time in the second stage.

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 CO2, H2O, and any remaining hydrocarbons which cannot be released untreated into the atmosphere. The remaining combustibles oxidize to produce CO2, H2O, and any remaining hydrocarbons.

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

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.

Typical Performance

• NOx emissions for Nitrogen Bound Waste Streams <100 ppm (v/v)
• Waste Destruction Efficiency (WDE) > 99.99% (available up to 99.9999%)

Typical Applications

• Petrochemical applications involving Amine, Nitric, etc.
• Ammonia and/or Cyanide Vapors
• Safar Recovery Units: Sour Water Stripper (SWS) Gas Overhead Streams
• Carbon fiber manufacturing Off-Gas Streams
• Electronics manufacturing waste 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

Zeeco’s automatic control and instrumentation systems are engineered not only to function properly under adverse conditions, but can also be started and operated with no outside assistance.
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