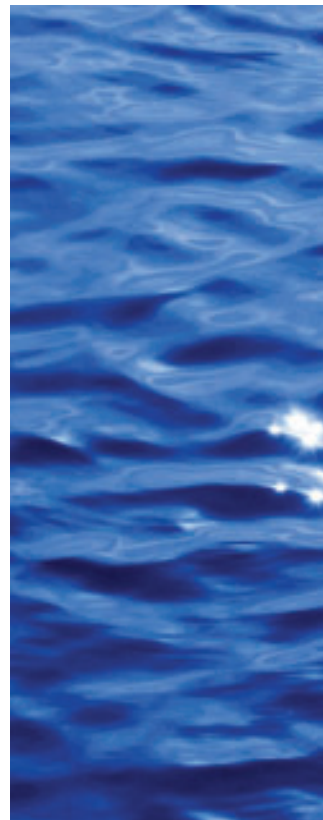


# AOD<sup>®</sup> Ammonia On Demand

## Urea Hydrolysis System



## Safest Process for DeNO<sub>x</sub>

## Ammonia - The Hazards

Ammonia is typically used as a chemical agent for the reduction of nitrous oxide emissions (NOx).

Anhydrous ammonia is a highly toxic chemical (subject to EPA, DOT, OSHA, and Dept. of Homeland Security regulations), which is typically stored in pressure vessels (rated to 300 psig) as a liquified-gas. There are significant risks and liability associated with its transport, unloading, and bulk storage.

For example, several trucks or railcars must be unloaded each day, so the potential risk is on-going. The resulting bulk storage requirement presents a significant hazard. In the event of a major storage tank failure, an ammonia aerosol cloud will form and travel several miles - with the potential to be immediately lethal.

It should be noted - aqueous ammonia, although less concentrated than anhydrous ammonia, poses similar risks and is increasingly subject to stricter regulations by local authorities.

### Ammonia Exposure Effects

Readily detectable odor	20 - 50 ppm
Severe irritation of eyes, ears, nose, and throat; No lasting effect with short-term exposure	400 - 700 ppm
Dangerous, less than 1/2 hour exposure may be fatal	2,000 - 3,000 ppm
Serious edema, strangulation, asphyxia, rapidly fatal	5,000 - 10,000 ppm
Immediately fatal	> 10,000 ppm

## New Regulations

New regulations require many industrial boilers and commercial combustion processes to be equipped with Selective Catalytic Reduction (SCR) of Nitrous Oxide Emissions. The SCR process typically utilizes injection of ammonia upstream of a catalyst to reduce the emissions to elemental nitrogen. However, anhydrous ammonia, and to a lesser extent, aqueous ammonia, are highly toxic. To avoid the hazards of storage and handling of ammonia, many SCR systems utilize technology to convert non-toxic urea to ammonia on demand.

## A Safe Alternative: AOD®



**AOD® Skid Mounted System**

For small applications up to approximately 40 pounds/hr of ammonia, Wahlco has developed a more cost effective urea to ammonia system under the trademark: AOD® (Ammonia on Demand). This patented technology offers a small packaged unit complete with urea feed pump, controls, ammonia production, and heated dilution air. All of the components are installed on a small skid base to enable quick and easy installation. Wahlco can also supply truck unloading, storage tanks, forwarding pumps and blow back tanks to complete your installation.

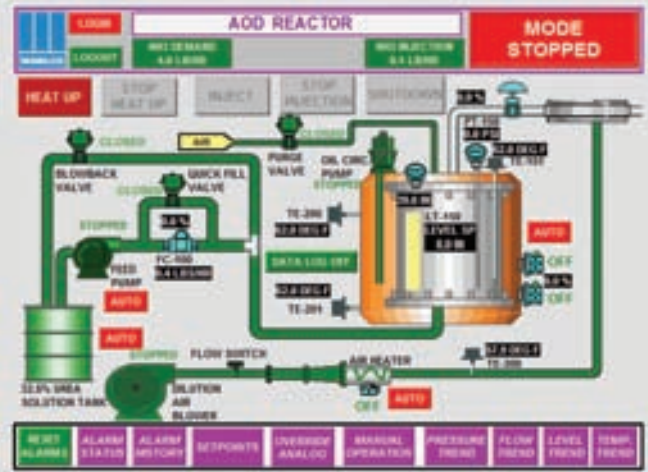


**AOD® System (US Patent No. 9,586,831 B2 2017)**

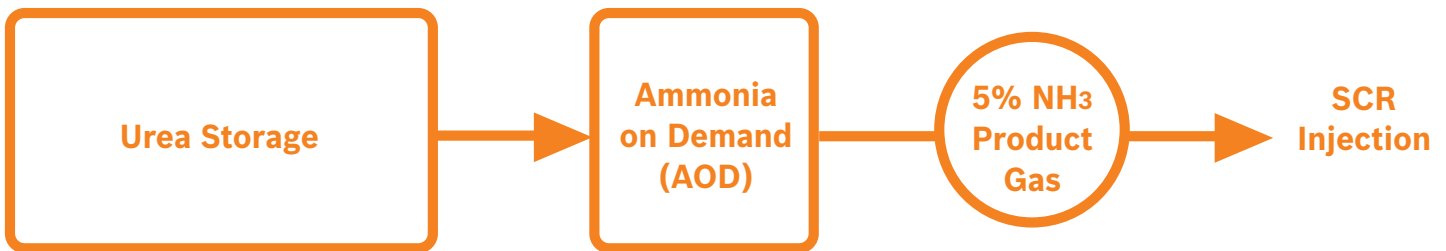
## AOD® Process Description

In the AOD® process, urea solution of 32.5% to 40% Diesel Exhaust Fluid (DEF) is supplied from a small feed tank to a reactor and heated under pressure to produce a product gas stream of ammonia, carbon dioxide, and water vapor. The product gas is then mixed with heated air supplied from an electric heater on the unit and routed to the injection grid upstream of the SCR unit.

Fully Automated Control by PLC or Plant DCS



## AOD® is the Safest and Most Cost Effective Process for DeNOx



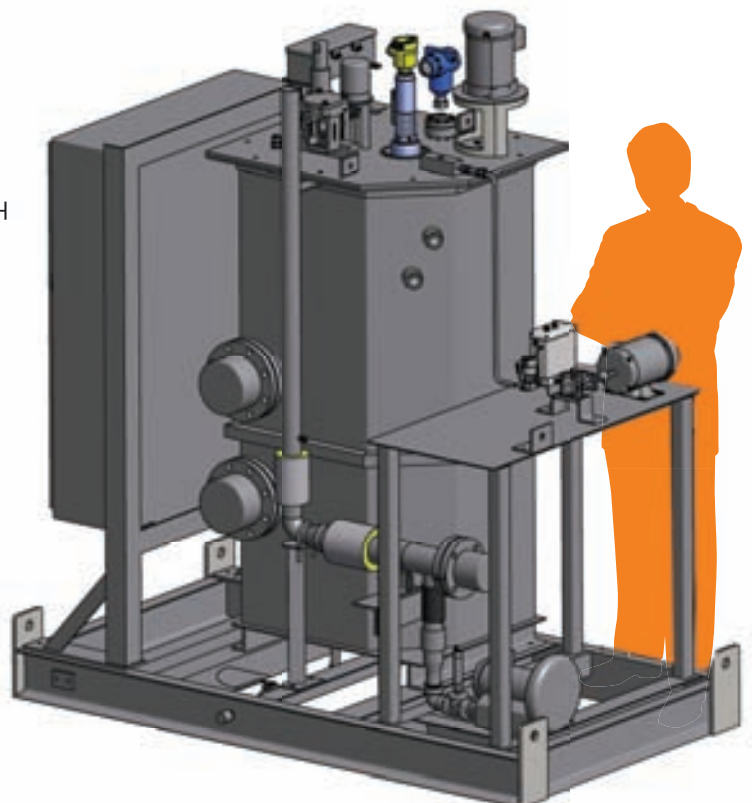
### Product Description

The skid mounted AOD® System has the following specifications:

- Skid dimensions: from 8' to 9' L x 4.5' to 5.5' W x 7' to 8' H (depending upon capacity)
- Dry weight: 4,000 to 6,000 lb  
Operating weight: 5,200 to 7,500 lb
- Heat transfer oil shipped separately in drums (approximately 130 gal)

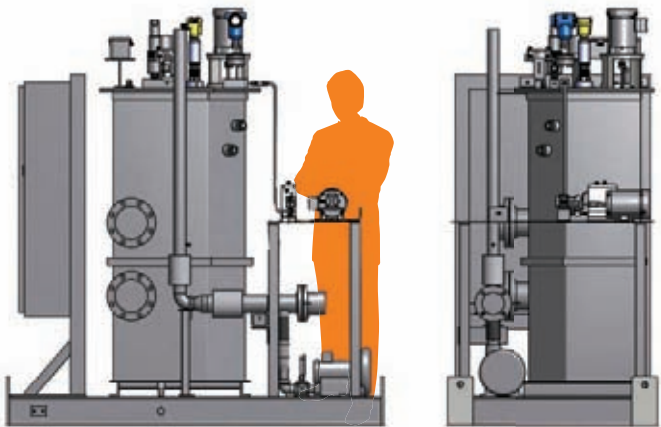
### Product Performance

- Sized for up to 40 lb/hr of ammonia
- Product gas is 5% ammonia maximum by volume
- Ammonia delivery/discharge time from hot stand-by: 3 minutes
- Utilities:
  - Electric power: 480VAC, 3-phase, 60 Hz, 25 to 90 KW
  - Instrument air: 3 cfm at 85 psig
- Noise level: less than 85 dBA





# Ammonia On Demand The Safest Process for DeNOx



AOD® System (US Patent No. 9,586,831 B2 2017)

## Markets

### Small Industrial Boilers & Gas Turbines



- Airports
- Cogen facilities
- Correctional facilities
- Food processing
- Hospitals
- Hotels / resorts
- Laundry / dry cleaning facilities
- Oil and gas
- Power producers
- Pulp and paper
- Universities



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## Leader in Ammonia Technology

Wahlco has served the power, refinery and chemical industries for over 40 years through the manufacture and supply of air pollution control equipment world-wide. As the SCR market has evolved, Wahlco has become a premier supplier of ammonia handling and storage systems for these applications.

Wahlco's experience with urea to ammonia technology is unsurpassed in the industry, with many units installed in the US, Asia, and Europe.

### Wahlco Products:

- Anhydrous & Aqueous Ammonia Systems
- Patented On-site Urea to Ammonia Conversion (U2A®)
- AOD® Urea Hydrolysis Systems
- Flue Gas Conditioning (FGC)
- Fuel Control Valve Trains
- Custom Industrial Equipment
- Thermocouple Arrays
- Tubular & Duct Immersion Electric Heaters
- Rental Units / Aftermarket
- Formaldehyde-free Urea



### WAHLCO Headquarters in Santa Ana, California

Corporate offices, engineering, fabrication, testing and field service



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