

Gasmeter™ FTIR application note

Ammonia (NH₃) based DeNO_x - systems

KEY WORDS

- Continuous emissions monitoring (CEM)
- DeNO_x - systems
- Fourier Transform Infrared (FTIR)

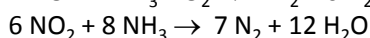
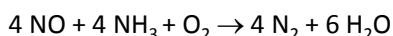
PRODUCTS

- [CX4000](#) For continuous emissions monitoring
- [GASMET CEM II](#) FTIR Continuous Emissions Monitoring system

OVERVIEW OF DeNO_x SCRUBBERS

Process:

NO and NO₂ can be effectively reduced from stack gases by reacting them with ammonia:



Measurement need

- Emissions: *Ammonia is a criteria pollutant*
- Process control: *Ammonia is expensive*
- Process control: *Excessive ammonia use increases salt formation → Blocked heat exchangers → Increased down time*

TYPICAL APPLICATION

Compound name	Range	Unit
Water	0 – 25	vol-%
Carbon Dioxide	0 – 20	vol-%
Carbon Monoxide	0 – 500	mg/Nm ³
Nitrogen Monoxide	0 – 200	mg/Nm ³
Nitrogen Dioxide	0 – 200	mg/Nm ³
Nitrous Oxide	0 – 100	mg/Nm ³
Sulfur Dioxide	0 – 20	mg/Nm ³
Ammonia	0 – 100	mg/Nm ³
Methane	0 – 100	mg/Nm ³
Hydrogen Chloride	0 – 20	mg/Nm ³
Hydrogen Fluoride	0 – 120	mg/Nm ³



Gasmeter™ CEMS –system:

CX4000 FTIR gas analyzer; Gasmeter sampling unit; Gasmeter Industrial Computer; Analog outputs or ModBus;

Heated sample probe; Heated sample lines; Optional oxygen analyzer

CASE STUDY: Monitoring Selective Catalytic Reduction (SCR) NO_x Control Systems

Measurements at: *Austin Energy, Sand Hill Energy Center*

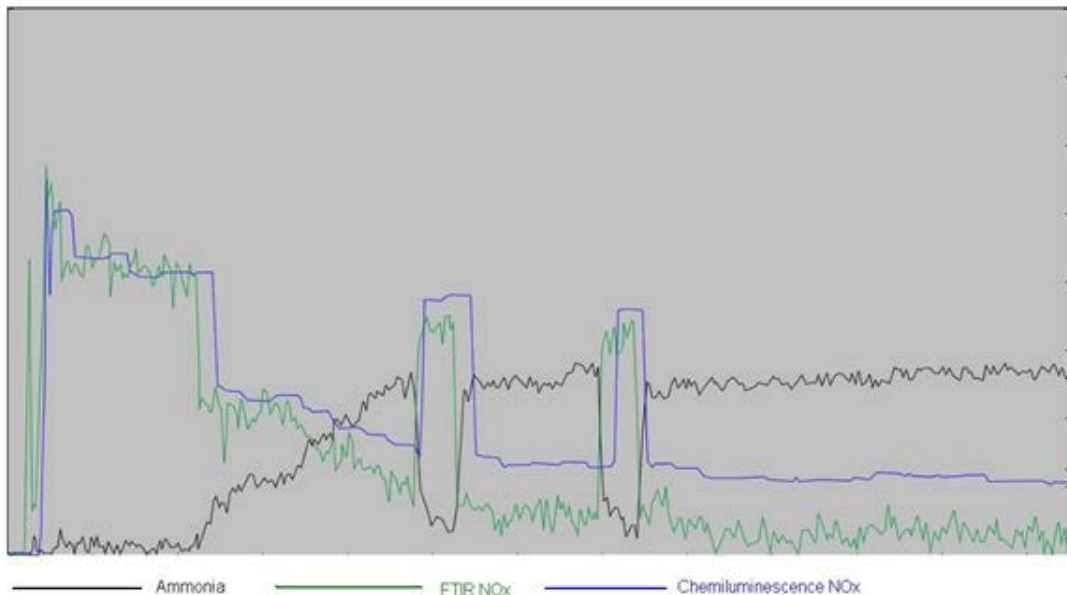
Combustor: *Simple cycle gas turbines*

Data published at AWMA 2003 Annual Conference, San Diego, CA USA:

GT-SCR PERFORMANCE MONITORING SYSTEM DEMONSTRATION PROJECT

by Bob Breeze, Markham R. Nelson and Aron D. Gaus

NO_x measured with FTIR and Chemiluminescences vs. Ammonia



The above figure presents NO_x measured with FTIR and Chemiluminescence analysers and ammonia measured with **Gasmeter**TM FTIR – gas analyzer. NO_x levels decrease when ammonia is introduced to the scrubber. Chemiluminescence analysers typically have some positive ammonia bias, and an increase in the input of ammonia can cause too high readings of NO_x in the chemiluminescence analyser. This may lead the operator to increase the ammonia input even further to reduce the NO_x reading. On the other hand, **Gasmeter**TM gives simultaneous and separate readings for both NO_x and ammonia, which gives an accurate picture of the process. This helps the operator to optimize the amount of ammonia used so that NO_x scrubbing is effective but ammonia is not used in excess amounts.

This application note is meant to be an informative example of typical application where Gasmeter analysers could be used. This is not a technical specification sheet. Information in this document is subject to change without prior notice. Optimal product configuration is application dependent, and exact application details such as detection limits, components included in the application, etc depend on process and/or measurement site details and may vary. Please, contact your local Gasmeter sales representative to get information specific to your needs.

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