Our Gas Measurement Solutions for

Alternative Fuel Combustion

(Mono-fuel combustion, mixed combustion / H_2, NH_3, etc.)

Hydrogen and ammonia are essential energy sources for decarbonization in various fields such as transportation, power generation, and various indusries.
Therefore, the implementation of alternative energies is accelerating to achieve carbon neutrality toward 2050.
HORIBA is contributing to the "Carbon Neutrality" effort through our leading-edge measurement solutions.

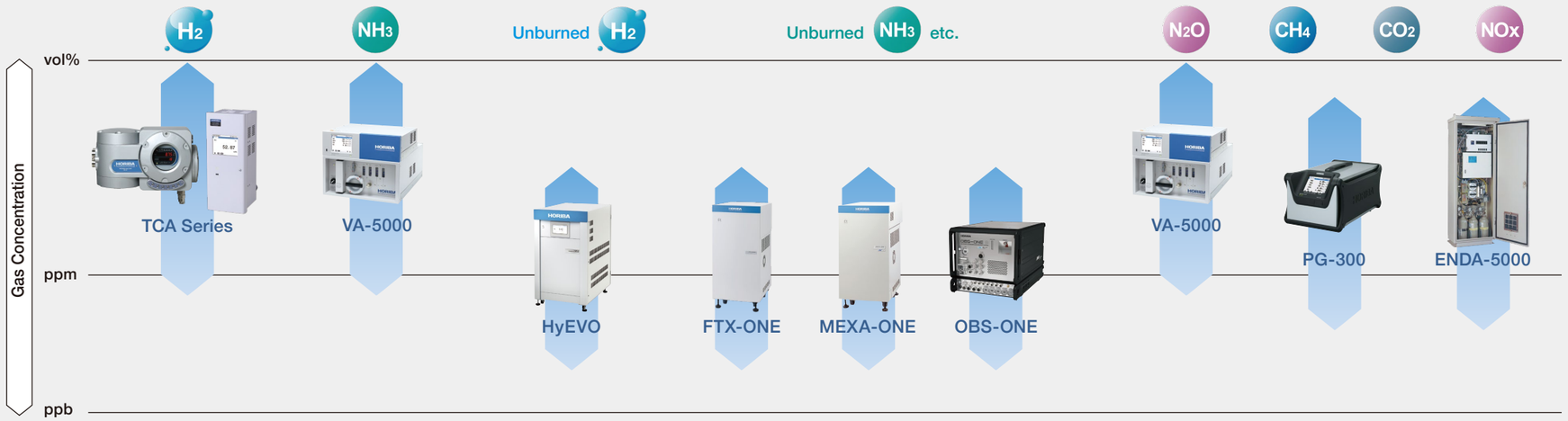
HORIBA

Electrolysis and Synthesis / Biofuels / Alternative Fuel Engines

Engines / Turbines / Industrial Furnaces / Boiler

Catalysts / Detoxification Equipment / Environmental Conservation

Fuel Refining & Supply | Combustion / Exhaust Gas Treatment Process | Compliance with Environmental Regulations



Highly-sensitive Measurement of Nitrogen Compound Gases

MEXA-ONE IRLAM*

Absorption Method Exhaust Gas Measurement System

[WET] [High-Speed Response]

New "IRLAM" technology developed by HORIBA improves robustness, fast response (on the order of msec), and high sensitivity measurement (minimum range: 10 to 20 ppm) for understanding the combustion process.

*IRLAM is the measurement principle of NH_3 and N_2O.

NH_3 NO NO_2 N_2O etc.

IRLAM by HORIBA

Continuous Measurement up to 28 Gases

FTX-ONE-CS/RS

FTIR Exhaust Gas Analyzer

[WET] [High-Speed Response]

Continuous and high-speed measurement of concentrations of up to 28 components such as NO, NO_2, N_2O and other nitrogen oxides, NH_3, and H_2O contained in exhaust gas.

NH_3 NO NO_2 N_2O CH_4 CO_2 etc.

FTIR

High-precision, High-resolution Hydrogen Gas Analysis

HyEVO

Hydrogen Gas Analyzer

[WET] [Fast Response]

Hydrogen gas analyzer capable of measuring gases containing high humidity with high accuracy and resolution without moisture removal. Response time of less than 1 second is realized, enabling measurement of even transient concentration changes.

H_2

Mass spectrometry

Various Gas Components

VA-5000 Series

Multi-component Gas Analyzer

[DRY] [General Purpose]

This gas analyzer meets diverse needs from various types of combustion exhaust gas analysis to support new energy development, and is applicable to various gas component measurement such as NH_3, N_2O, etc.

NH_3 NOx N_2O CH_4 CO_2 etc.

NDIR

Continuous Measurement

ENDA-5000 Series

Stack Gas Analysis System

[DRY] [Continuous Measurement]

Ideal for monitoring of stationary installations for stable measurement of gases after separation and treatment. We also offer the ENDA-C9000 series for power plants which supports continuous monitoring of NH_3.

NOx N_2O CH_4 CO_2 etc.

NDIR

For Gas Flow Measurement

EXFM-ONE

Ultrasonic Exhaust Flow Meter

Directly measures exhaust gas flow from vehicles and engines using an ultrasonic method. Combined with exhaust gas concentration measurement, the weight of each gas component in the exhaust gas can be calculated in real time.

Hydrogen Gas Measurement in the 100% Range

TCA Series

Explosion-proof Gas Analyzer

[Explosion-proof] [DRY]

Continuous measurement of hydrogen gas in various plants with a measurement range up to 100%.

H_2

Explosion-proof type

Various R&D purposes

Thermal conduction method

Lightweight, Portable and Compact

PG-300 Series

Portable Gas Analyzer

[DRY] [Continuous Measurement]

Portable gas analyzer capable of measuring each component in combustion exhaust gas with high accuracy, also applicable to N_2O and CH_4 measurement.

NOx N_2O CH_4 CO_2 etc.

NDIR

Measuring Exhaust Gas during Real Road Driving

OBS-ONE GS/IRLAM

Portable Emission Measurement System (PEMS)

[WET] [High-speed Response]

Portable Emission Measurement System (PEMS) for real-driving emissions which measures the gases such as NH_3 and N_2O in the exhaust gas.

NH_3 NO NO_2 N_2O CH_4 CO_2 etc.

IRLAM by HORIBA

IRLAM™ (Infrared Laser Absorption Modulation) is a next-generation infrared gasanalysis technology originally developed by HORIBA.

https://www.horiba.com/int/irlam/

Bulletin: HRE-3783C

NH_3

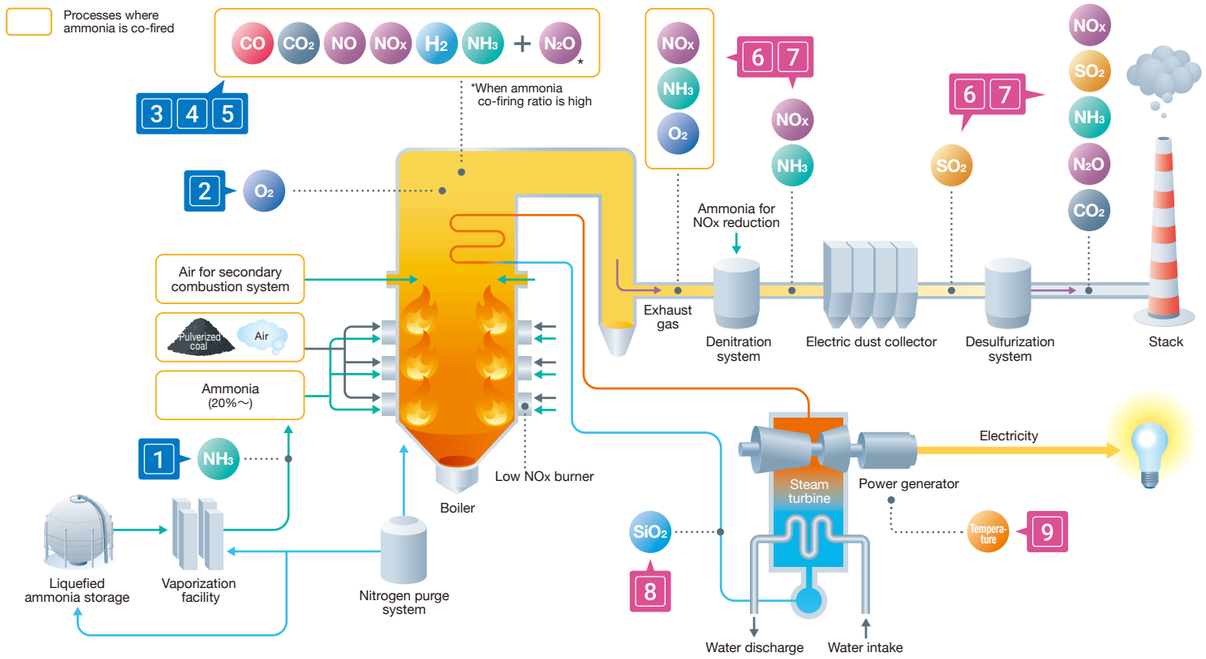
Carbon-free ammonia has 1.7 times greater energy density than that of liquid hydrogen.
Due to its excellent storage, transportation efficiency and its ability to be burned directly, demonstration tests are currently underway to evaluate its use as a fuel.
Compared to the combustion of conventional fuels, ammonia combustion must be improved to enhance combustion efficiency and address issues such as slow combustion speed, low calorific value, unstable combustion, and emission of NOx and N_2O (the latter having a global warming potential approx. 298 times greater than that of CO_2).
HORIBA offers analysis and measurement solutions to support the research and development of ammonia co-firing and 100% firing based on our accumulated measurement expertize.

HORIBA

For R&D / demonstration system

Power generation by ammonia co-firing / 100% firing

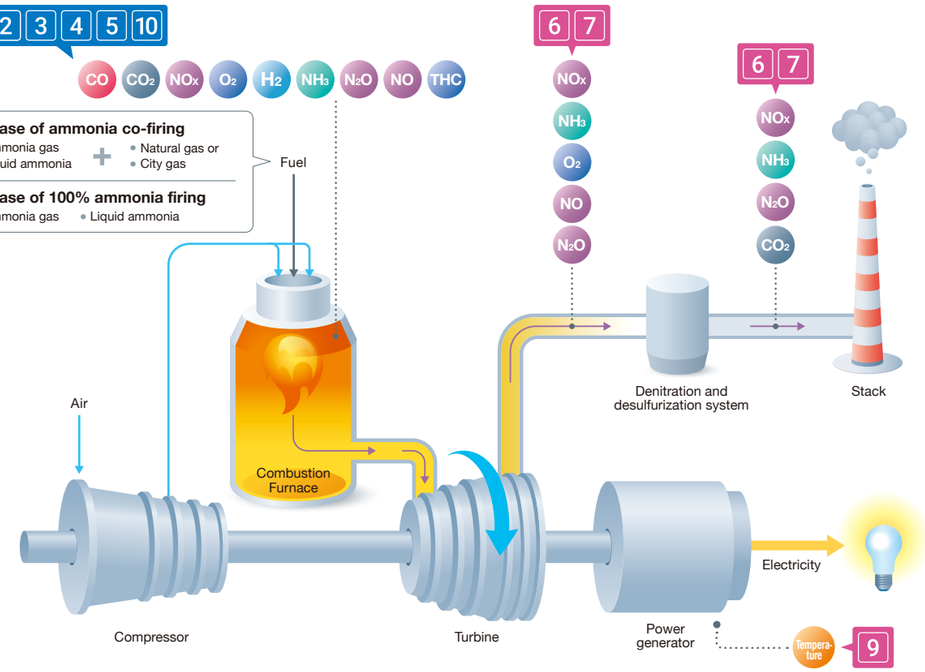
R&D of burners for higher rate of ammonia co-firing / 100% ammonia firing in coal-fired power generation facilities is underway, aiming to improve combustion methods and gas treatment facilities' operation methods in order to realize the social implementation of ammonia co-firing/ full-firing systems. Currently, practical tests are ongoing with a 20% ammonia co-firing pulverized coal boiler. Furthermore, endeavors are in progress to elevate the co-firing rate, with the aim of achieving 100% ammonia firing by the 2030s.



For R&D / demonstration system

Gas-turbine power generation by liquid ammonia with direct spray method

100% liquid ammonia firing technology to reduce greenhouse gas (GHG) emissions from conventional gas turbine power generation systems is under development. Given that liquid ammonia has lower flammability than gases, it is necessary to stabilize the flame and reduce harmful substances in the exhaust gas. In addition to conventional air pollutants such as NOx, there is a particular need to measure unburned NH_3 and N_2O.



Performance Evaluation of Burner / Boiler / Combustion Furnace

1 Monitoring the concentration of fuel NH_3 for enhancing combustion efficiency NH3

Multi-Component Gas Analyzer
VA-5000

2 Monitoring of O_2 concentration for prevention incomplete combustion O2

Multi-Component Gas Analyzer
VA-5000

Stack Gas Analysis System
ENDA-5000

3 Monitoring of NH_3 concentration for detection unburned NH_3 and misfires in NH_3 co-firing burners
4 Nitrogen oxide emissions and unburned NH_3 monitoring in combustion exhaust gas, when NH_3 co-firing ratio is high NH3 NO NOx N2O

Laser Spectroscopic Exhaust Gas Analyzer
MEXA-ONE-IRLAM

Multi-Component Gas Analyzer
VA-5000

Stack Gas Analysis System
ENDA-5000

▸ For low concentration

Nitrogen Oxides Monitor
APNA-380

Optimized internal structure enables rapid switching between NOx and NO lines, allowing real-time continuous measurement

5 Monitoring the concentration of CO / H_2 for grasping combustion conditions

Hydrogen Gas Analyzer
HyEVO H2

Multi-Component Gas Analyzer
VA-5000 CO

Stack Gas Analysis System
ENDA-5000 CO

10 Monitoring the concentration of THC for fuel combustion efficiency control THC

Hydrocarbon Monitor
APHA-380

Flame ionization detector with selective combustion provides simultaneous measurement of THC, CH_4 and NMHC

Environmental Assessment Evaluation / Efficient Facility Management

6 Monitoring of NOx and SO_2 concentrations before and after denitration and desulfurization systems NO NOx N2O NH3 SO2 CO2 O2

7 Monitoring whether GHG emissions from the stack comply with environmental regulation thresholds

Stack Gas Analysis System
ENDA-5000

Multi-Component Gas Analyzer
VA-5000

Stack Gas Analysis System
ENDA-9000 series

▸ For low concentration

Sulfur Dioxide Monitor
APSA-380

Long-term stable continuous measurement with eliminating interference from moisture and coexisting components

8 Silica measurement for sludge control SiO2

Silica analyzer
SLIA-5000

Obtain highly repeatable measurement results in 5 minutes
Sensitivity range: 0 to 10 µg/L
Concentration range: 0 to 5.0 mg/L

9 Temperature measurement for condition monitoring of turbines, bearings, etc. Tempera-ture

Infrared Thermometers
IT-480 series

A built-in/installable infrared thermometer with industry's highest level of accuracy*
For temperature control of various systems and plants.
*According to our investigation, as of 2023.