Panametrics
a Baker Hughes business

Moisture can’t escape our innovation

Aurora Series

High precision TDLAS moisture measurement

Moisture can be costly even in small quantities. Aurora Series laser moisture analyzers deliver sharp signals and specific detail with the fastest response of any moisture measurement technology. When the smallest amount of moisture can stop your large facility, shut you out of a pipeline, or damage your valuable assets, **you need Aurora.**

Using tunable diode laser absorption spectroscopy (TDLAS), Aurora analyzers have the technology to rapidly and accurately measure moisture in your process gas. With Aurora, you'll get continuous, fast responding and reliable readings with precise measurements.

Baker Hughes has a heritage of moisture measurement and laser development. For more than 50 years, Panametrics legacy technology has been at the forefront of moisture measurement. Baker Hughes Dr. Robert Hall, from Schenectady, New York, also made the first injection diode laser in 1962. Today, diode lasers are compact, inexpensive and widely used in a number of industries. Aurora Series analyzers combine expertise with cutting-edge technology for moisture measurement you can trust.

A sharper signal.

Because you need to know.

When profits rely on detecting moisture, you want the system that provides the clearest signal. Aurora Series laser absorption spectroscopy technology is the key. It solves the problem of background gas interference, pressure/temperature variation and requirement for zero reference, providing you with a reliable, continuous moisture measurement.

Aurora TDLAS analyzers provide:

- Speed-of-light measurement
  - Instant alert to compliance or process issues
  - Fastest confirmation of process upset recovery
- Problem-free performance
  - Non-contact measurement, no sensor drift
  - Rugged for all environments and any weather
  - Flexible installation—fixed, rack or portable
  - No field calibration needed
  - No zero reference or baseline requiredSafety right out of the box
  - Hazardous area certification available
  - Through-the-glass programing
  - No hot permit required
- Measurement integrity
  - State-of-the-art moisture calibration
  - NIST-traceable standards
  - Automated for repeatability
  - Data archived

Aurora measurement fundamentals

The measurement principle used by Aurora analyzers is based on the Beer-Lambert Law.

$$A = In\left(\frac{Io}{I}\right) = SLN$$

A = Absorbance

I = Light intensity transmitted through a sample gas

Io = Incident light intensity

S = Absorption coefficient*

L = Absorption path length (a constant)

N = Concentration of the water vapor in the absorption cell

* The absorption coefficient is a constant at a specific temperature, pressure and background gas composition.

The concentration of water is directly related to the partial pressure. At certain specific frequencies, light energy will be absorbed by water molecules. As the concentration of water increases, the absorption also increases. Aurora analyzers sweep the diode laser output through a narrow spectrum of light frequencies. By measuring the return light intensity with a photo detector as compared to the incident light intensity, the analyzer provides a direct indication of the partial pressure of water. The partial pressure divided by the total pressure yields the mole ratio, which may be expressed as parts per million by volume (ppmv) or parts per billion by volume (ppbv).

The test of time and reliability.

As with all Panametrics products, Aurora TDLAS analyzers are built for reliability. This reliability is proven through a rigorous testing process. For a simulated five-year period, the devices are exposed to the harshest of elements: extreme heat, frigid cold and high humidity.

Because they have endured all these severe testing methods, you can be assured that they will run continuously and fearlessly—no matter where on earth you place them.

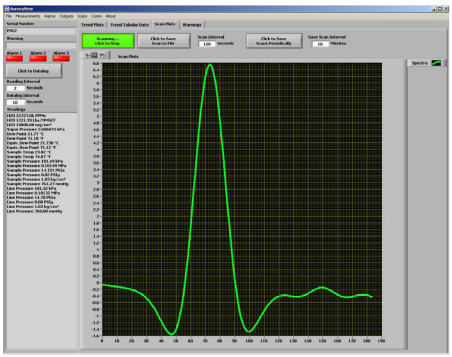
Accuracy that's always on.

You can sleep because you know that Aurora analyzers won't. There is no need for baseline measurement data and there are no blind moments. They are always monitoring, with accurate process information that's available faster than any other technology.

Just connect and go.

With power and gas lines that easily connect, Aurora TDLAS analyzers are ready for immediate moisture measurement. We understand not only how valuable seconds can be when analyzing moisture, but also how valuable your time is. So we've developed these analyzers with many time-saving features:

- Easy to learn, configure and operate
- Turnkey sample system: just connect power and gas lines
- Field programmable with magnetic wand—no need to open unit or to obtain a hot permit
- AuroraView intuitive interface
- Minimal maintenance and supervision required



The location of the peak on the X-axis confirms the identity of water. The y-axis is related to the partial pressure of water and therefore the concentration. The system is equipped with AuroraView software, which enables users to capture the absorption spectrum and export it to other application programs such as Excel™.

Backed by a half century of Panametrics experience.

Aurora's cutting-edge technology is just one example of our commitment to continuing a long, successful history in moisture measurement. You now have a choice in moisture analyzers—brought to you by an industry leader.

Our expertise includes:

- Aluminum oxide moisture analyzers
- TDLAS moisture analyzers
- Automated manufacturing and calibration
- Six Sigma testing methodology
- Global field testing
- Traceable standards from NIST and national metrology institutions

Aurora Series TDLAS technology provides the **right analyzer** for the most comprehensive view of the moisture content in your process gas.

Aurora Moisture Analyzer

The Aurora moisture analyzer provides a wide range of measurement with accuracy and fast response you need for immediate alert of process upset or out-of-compliance moisture concentrations. Once corrected, gas can be quickly cleared for re-entry to pipeline or process. The Aurora features patented pressure and temperature compensated calibration to minimize variations in background gas compositions.

Applications include moisture in:

- Natural gas dehydration processing
- Natural gas storage, transmission and custody transfer
- Carbon dioxide for enhanced oil recovery
- Carbon dioxide in carbon sequestration
- Metal heat treating furnace gases
- H2 recycle gas in reforming

Aurora TransPort Portable Moisture Analyzer

The Aurora TransPort, the latest addition to the Aurora Series, is a battery operated, moveable analyzer that can be taken into the field to directly measure moisture content of natural gas and other process gases.

The unit is assembled into a rugged and transportable case with a telescoping handle and wheels. It features a rechargeable battery providing 8 to 10 hours of operation and an integrated sample conditioning system.

Aurora TransPort is ideally suited for spot checking processes or for field verification of permanently installed moisture analyzers and transmitters.

Applications include:

- Natural gas processing and drying systems
- Gas storage facilities
- Compression stations
- Refinery processes
- Heat treating furnaces
- Instrument air

Aurora 19
Rack Mounted
Moisture Analyzer

The Aurora 19 provides all of the benefits of the standard Aurora moisture analyzer conveniently packaged into a 19-inch rack mount configuration for safe area installation.

Applications include:

- Moisture in glove boxes
- Moisture in desiccant and membrane dryer testing and monitoring
- Moisture in metal heat treating
- Moisture in testing and calibration

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