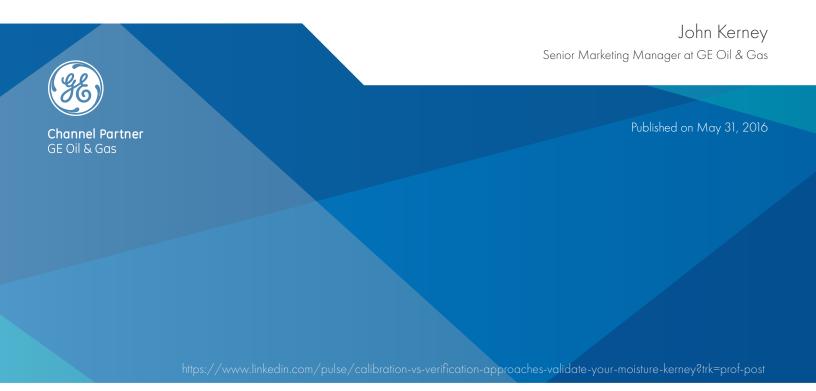
# Calibration vs. Verification: Approaches to validate your moisture analyzer in the field



# "HOW DO I KNOW IF THE READING FROM THE MOISTURE ANALYZER IS CORRECT?"

This question vexes many instrument technicians, process engineers, and facilities managers, especially when the moisture reading is higher than expected, causing an alarm situation in the control room or an out of compliance situation affecting product quality or the production process. Most would love the ability to calibrate their moisture analyzer in the field to immediately "prove" that the reading is correct and the process is operating abnormally. However, each moisture sensor technology presents a variety of challenges to generate a repeatable, accurate, and traceable field calibration. Another option is a field verification or validation can provide a reasonable assessment as to the operation of the moisture analyzer. Let's consider an aluminum oxide moisture analyzer and review several options that a user can employ to check its operation.



### VERIFICATION: PORTABLE ANALYZER

One the guickest means to verify the installed moisture analyzer is to compare readings with a portable analyzer. While quick and simple to perform, a user should consider the following to ensure a valid comparison:

Confirm recent factory calibration for the portable's moisture probe has been conducted within six months by providing the probe serial number to manufacturer



Panametrics Hygrometer Calibration System: Portable field calibration system for verifying moisture and humidity sensors

or checking the calibration data sheet for your particular probe.

- Connect the portable analyzer's sample system in series with permanently mounted sample system. This ensures both moisture probes are exposed to the same fluid and operating at the same pressure, to properly compare dew point temperature readings.
- Review the accuracy specifications for each probe to understand how close the readings need to be to confirm accuracy. (Most aluminum oxide moisture probes have an accuracy of 2°C or 3°C, depending on the expected dew point temperature.) One of the drawbacks of this method is contamination, as it may negatively impact the readings on both analyzers.

# VERIFICATION: CERTIFIED GAS CYLINDER BOTTLE

Gas manufacturers offer gas cylinder bottles at different moisture content levels from low, single digit parts per million by volume (PPM) to several hundred PPMV. Gas cylinders usually use nitrogen or helium as the carrier gas, but are also available with methane, carbon dioxide or other gases. When using a cylinder bottle to verify an aluminum oxide moisture probe, users should consider the following:

- The bottle is full. Moisture can desorb from the walls of the cylinder over time, possibly affecting the moisture content of the bottle.
- The bottle is connected to the inlet to the sample system with a short, continuous, stainless steel tube.
- The bottle is not be exposed to harsh ambient conditions to avoid heating the bottle significantly, which can impact the moisture content.

When performed properly and using a traceable bottle, this technique is effective for a field validation.



## VERIFICATION: CHILLED MIRROR HYGROMETER

A system using a portable moisture generator and a chilled mirror hygrometer provides the most accurate validation. Generally used as laboratory standards to measure dew point temperature, a chilled mirror provides a primary standard, highly accurate measurement comparison. Additionally, the moisture generator offers the ability to generate several moisture levels, providing a versatile and accurate validation. However, to achieve the best results, this validation should be performed in a laboratory type setting, office or shelter. A video example of this technique in action is available <u>HERE</u>.

### CALIBRATION

While field validation offers a mechanism to check an aluminum oxide moisture sensor, it cannot replace a fully traceable factory calibration. Factory calibration of the aluminum oxide sensor provides other benefits, such as cleaning and inspection of the sensor surface, evaluation and quantification of any change in calibration, and accredited calibration. Factory calibration should be performed as part of a robust preventative maintenance plan while field validation can supplement when questions arise between calibrations.

For more information on the Panametrics and General Eastern moisture product families and services offered by GE, visit https://www.gemeasurement.com/moisture-and-humidity-measurement.

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