

# Five Things to Know When Measuring Contaminants in Natural Gas & Biogas Processes



In the ever-evolving world of natural gas, one thing stays constant: the presence of contaminants and their need for removal. Contaminants such as  $\text{H}_2\text{S}$ ,  $\text{H}_2\text{O}$ ,  $\text{CO}_2$  and  $\text{O}_2$  are regularly measured in different points in the natural gas pipeline and ideally removed prior to reaching residential homes, businesses, and the overall distribution to local and national natural gas pipeline network. Biogas is part of a US and worldwide green initiative that yields biomethane. Often, biomethane is mixed into a natural gas pipeline and distributed for use.

In this Q&A, Alan Garza, Endress+Hauser product marketing manager of advanced analysis, and Sam Miller, Optical Analysis head of technical marketing, answer five common questions about measuring contaminants in natural gas and biogas processes.

## **If stream composition changes in the field, does it impact the analyzer reading?**

Endress+Hauser analyzers are designed for the least impact on the readings that stream composition change might have. This is achieved with technologies such as differential TDLAS and with spectroscopic schemes that are less sensitive to stream changes in a particular application. Additionally, for instances where Endress+Hauser analyzers may be used at gathering sites or with streams that vary more than normal, we offer multiple calibrations and in some cases stream-change-compensation.

## **Can you use TDLAS to measure moisture and $\text{H}_2\text{S}$ in pure hydrogen?**

Yes you can. Endress+Hauser has been delivering hydrogen purity measurements since the 2000s. We have a significant

installed base of H<sub>2</sub>O, H<sub>2</sub>S and O<sub>2</sub> in pure hydrogen and an established calibration infrastructure at our factory in Southern California.

### Can you measure H<sub>2</sub>S, O<sub>2</sub> and H<sub>2</sub>O all in one box?

Yes, Endress+Hauser offers an analyzer called a 2-Pack and 3-Pack and we can also add an oxygen measurement. The 2-Pack and 3-Pack are prepackaged systems that can measure H<sub>2</sub>S, moisture and CO<sub>2</sub> and O<sub>2</sub> as an add-on. Natural gas operators often measure CO<sub>2</sub> using GC's (gas chromatography). However, we also get requests to measure CO<sub>2</sub> and oxygen. Ultimately we can measure all four components and we make those systems very often. This is actually more common than single analyte measurement systems.

### Is the J22 TDLAS gas analyzer unique in that it can be used in blended hydrogen/natural gas pipelines? Or are all TDLAS analyzers able to do this?

The J22 (Figure 1) is not unique in that it can be used in blended pipelines; other analyzers can be used in hydrogen and natural gas blended process as well. The difference is that other analyzers won't have the stream change compensation that the J22 has where users can change the factor of hydrogen.

### What is the maximum pressure of the cell for moisture analysis? Most require pressure reduction which can cause dropout.

When you drop pressure from a pipeline – which could be 1000 psi or more – down to the level of the analyzer cell, which operates close to atmospheric pressure, physically you must drop the pressure for TDLAS measurements. We offer or recommend the proper gear to prevent a liquid dropout (or condensation) for sample extraction. This requires heating the sample probe and the sample transport lines in some cases. Evaluating the stream composition allows us to determine whether to heat the probe and transport lines. With the stream composition, we can create a specific phase diagram and develop the correct extraction system for that stream.



**Figure 1** Endress+Hauser J22 TDLAS gas analyzer for superior gas measurement performance

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