

# Moisture measurement in natural gas

This article focuses on the basics of natural gas, why moisture measurement in natural gas is important and the various types of moisture measurement instruments

Priya Rajesh

**M**oisture measurement in natural gas is very much essential. Natural gas is a gaseous fossil fuel found in oil fields underneath the earth. It mainly consists of methane along with Helium, some heavier gaseous hydrocarbons such as ethane, propane and butane, as well as other sulphur containing gases, in varying amounts. Natural gas is refined and processed to remove impurities like sand, hydrogen sulphide, water, heavier hydrocarbons and other gases before it is being transmitted via network pipelines.

Moisture in natural gas causes the following problems:

- Freezing of control valves, regulators etc.
- Accelerated pipeline corrosion
- High moisture content also leads to formation of hydrates of liquid hydrocarbons present which will reduce the flow through the pipeline
- Moisture reduces the BTU value of the gas
- Specified moisture content for custody transfer (7lbs/MMSCF i.e. -38 Deg. Td at 1 atmosphere)
- Condensation at compressor stations

**The key applications of moisture measurement are at:**

- TEG Dehydration stations (Triethylene glycol is used to remove water from natural gas)
- Transmission pipelines
- Cryogenic gas plants

**Advantages of having moisture**

**monitoring for natural gas:**

- Less material & maintenance/labour cost for replacement of corroded pipe line, frozen valves, pressure regulators, compressor stations etc.
- Hydrate formation is prevented and ensures a good flow
- BTU content is maintained
- Avoid penalties for failure to meet the custody transfer requirements

**Moisture analyzer system considerations**

There are various moisture measurement instruments for natural gas applications such as transmitters, portables and online analyzers with multi-point NIST traceable factory calibration. In transmission pipeline, measurements are generally done in terms of lbs/MMSCF and in cryogenic gas plants measurements will be in terms of dew point. If there is methanol in the sample, it should be ensured that methanol-ageing factor is added to the sensor to have an accurate measurement. The main challenge during the measurement is the contaminants like H<sub>2</sub>S, Mercury, glycol carry over etc. In most cases, a properly designed sample system is a requirement. Sample conditioning is the most important factor in accurate moisture analysis, and usually the most neglected. The design and operation of any sample system should include the following:

- The removal of components from the sample stream, which may harm the



sensor or influence its reading without affecting the moisture content.

- The ability to adjust the environment of the sample stream, with respect to temperature, pressure, and flow rate, in order to meet the sensor's specifications.
- Deliver a representative sample of the actual moisture content in the process stream.

If a moisture analyzer system is designed taking into consideration of all the above points, then we can ensure that the system performs up to the expectation. Along with superior technology, it is the application expertise and experience of the solution provider, which matters most for a good result. ■

The author is Gas & Moisture Application Specialist at GE India Industrial Pvt. Ltd, Bangalore, E-mail: priya.rajesh@ge.com