



AL148: Maintenance and Troubleshooting of Laser Moisture Analyzer Model 5100 HD

Training Description:

The measurement of moisture in natural gas is an important parameter for the processing, storage and transportation of natural gas globally. Natural gas is dehydrated prior to introduction into the pipeline and distribution network. However, attempts to reduce dehydration result in a reduction in "gas quality" and an increase in maintenance costs and transportation as well as potential safety issues. Consequently, to strike the right balance, it is important that the water component of natural gas is measured precisely and reliably.

Moreover, in custody transfer of natural gas between existing and future owners' maximum allowable levels are set by tariff, normally expressed in terms of absolute humidity (mg/m³ or lbs/mmscfh) or dew point temperature. Several technologies exist for the online measurement and for spot sampling of moisture content. This course will discuss the most commonly used moisture measuring instruments and provides a comparison of those technologies.

Various viable technologies exist for measuring the amount of water vapor in natural gas. These tend to rely on sample conditioning systems, where a gas sample is extracted, filtered, the pressures regulated and the flow controlled. It is not advisable to install a sensor directly in a natural gas pipeline as it can contain both physical contaminants (rust, scale, etc.), additives (such as odorizers, antifreeze agents such as methanol) and liquid hydrocarbons. Another benefit of a sampling system is that it can be isolated from the main pipeline. However, the sample system must not alter the moisture concentration of the sample via leaks or desorption/adsorption from the wetted components.

Currently, the most widely used measurement technologies are chilled mirror, impedance sensors, quartz microbalance, Fabry-Perot interferometer and tunable diode lasers. Each technology has its advantages and disadvantages.

Training Objectives:

By the end of the training, participants will be able to:

- ✓ Apply and gain an in-depth knowledge on laser moisture analyzers operation and maintenance
- ✓ Explain spectroscopic principles used in the online instrumentation
- ✓ Identify the effect and significance of measuring moisture in hydrocarbon gases
- ✓ Describe the physicochemical principles of the moisture content in gases
- ✓ Recognize laser base moisture measurement technology known as TDLAS (Tunable Diode Laser Spectrometer)
- ✓ Carryout TDLAS moisture analyzer calibration
- ✓ Employ basic troubleshooting on TDLAS moisture analyzer
- ✓ Discuss physical environment relating to specialist rescue and the limitations this may represent

Training Designed for:

This course is designed for those professionals who are involved in operation and maintenance of laser moisture analyzer such as Operation Managers, Supervisors, Operators and other technical staff. Further, the course is a must for instrumentation and production operational personnel who are dealing with analytical instruments and online process instruments and analyzers.

Training Requirement:

"Hand's on practical sessions, equipment and software will be applied during the course if required and as per the client's request."

Contents can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Program:

FIVE DAYS:

- ❖ **Basic Principles of Spectroscopy**
 - Introduction, Molecular Vibration
 - Lambert/Beer Law, Laser Spectroscopy
- ❖ **Process Analyzer's Parameters**
 - Sensitivity, Detection Limits
 - Signal to Noise Ratio, Dynamic Range
 - Linearity, Hysteresis
- ❖ **Instrument Technologies for Measuring Water Vapor in Natural Gas**
- ❖ **Understand Basic of Laser Technology called TDLAS**
 - Principle of Operation of Laser Moisture Analyzer
 - Main Components of Laser Moisture Analyzer (e.g. Measuring Cell, Optical Assembly, Detector, Electronics)
- ❖ **Practical Sessions/Site Visit**
- ❖ **Calibration**
 - Standardization & Blank Correction
 - Standardization Methods, Linear Regression, Calibration Curves
- ❖ **Case Study**
 - Step by Step Operating & Maintenance Manual
 - Analyzer Sample Flow Scheme, Calibration Procedure
 - Basic Troubleshooting, Software Operation & Analyzer
 - Laptop Connection with Analyzer, Physical Tests through Software
 - Analyzer Sampling System
- ❖ **Course Conclusion**
- ❖ **POST-ASSESSMENT and EVALUATION**

Training Certificate(s):

CMCT Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

TBA as per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Gamification, Software & General Discussions
- Pre and Post Test

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:00	Recess (Prayer Break & Lunch)
13:00 - 14:00	Last Session

For training registrations or in-house enquiries, please contact:

Aisha Relativo - Training & Career Development Manager

aisha@cmc-me.com / training@cmc-me.com

Tel.: +971 2 665 3945 or +971 2 643 6653 | Mob.: +971 52 2954615