Introduction to Gas Chromatography (Instructor-Led Training)

Course Description

This course introduces the basics of gas chromatography to technicians new to the natural gas industry. It covers basic operating theory, providing background necessary for installation and operation of industrial field gas chromatographs.

Course Prerequisites

- GTA Web-Based Training
  - Core WBT
  - Statistics and Uncertainty
  - Gas Properties I
  - Gas Properties II
  - Basics of Gas Chromatography I
  - Basics of Gas Chromatography II
- GTA Instructor-Led Training
  - Measurement Systems
  - Instrumentation Systems

Course Objectives

Upon completion of this course, the student will have received instruction designed to assist him/her in the following:

- Describe the background and theory of gas chromatography
- Explain gas chromatography sampling principles.
- Describe the different types of columns and detectors used for gas chromatography.
- Explain industry standards that apply to gas chromatography.
- Describe a control loop and its use in process control.

Course Outline

1. Gas Chromatography Overview
    a. Types of Gas Chromatographs
        i. Laboratory Chromatographs
        ii. Portable Chromatographs
        iii. Online Chromatographs
    b. Theory of Operation
    c. Chromatograph Output
        i. Carrier Gas
        ii. Calibration Gas
    d. BTU Calculation
2. Sampling Systems
    a. Sampling Principles
    b. Sample Point
    c. Sample Probe System
    d. Sample Lines
    e. Sample Introduction
    f. Sample Contamination
    g. Safety
3. Columns and Detectors
    a. Packed Columns
    b. Capillary Columns
    c. Thermal Conductivity Detector
    d. Wheatstone Bridge
    e. Derivation of Principle
    f. TCD Application
    g. Flame Ionization Detector
    h. FID Principles of Operation
4. Standards
    a. Relevant Standards

b. Standards Application Example

Recommended Resources

- GTA Introduction to Gas Chromatography Participant Guide
- GTA Introduction to Gas Chromatography Instructor Presentation.
- AGA Report 8, GPA Standards 2145, 2166, 2172, 2261, and API MPMS Chapter 14.1.
- Internet sites and textbooks related to industrial gas chromatography systems.