Gas Sampling
(Instructor-Led Training)

Course Description

This course covers the purpose, design and standards associated with gas sampling. Various sampling methods, mechanisms of sample distortion, and routine sample system maintenance are discussed. This course prepares the student to correctly sample gas in the field.

Course Prerequisites

- GTA Web-Based Training
  - None
- GTA Instructor-Led Training
  - Introduction to Gas Chromatography

Course Objectives

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

- State the purpose of gas sampling systems.
- Explain the key considerations for designing a gas sampling system.
- State the standards that govern gas sample system design.
- Discuss mechanisms of gas sampling distortion.
- Describe the various methods of gas sampling.
- State the different composite gas sampling systems.
- List routine maintenance performed on gas sampling systems.

Course Outline

1. Gas Sampling Systems
    a. Gas Sampling
    b. Mechanisms of Sample Distortion
        i. Thermal Distortion
        ii. Dynamic Distortion
        iii. Contamination
        iv. Flow Distortion
    c. Gas Sampling System Design
        i. Thermal Considerations
        ii. Dynamic Considerations
        iii. Cleaning Considerations
    d. Sample Probe Location
    e. Flow Characteristics
    f. Sample Containers
    g. Typical Gas Sampling System Layout
    h. BTU/Dekatherm Conversion
    i. Energy Content Calculation
2. Gas Sampling Methods
    a. Spot Sampling
    b. GPA Fill and Empty Method
    c. Floating Piston Method
    d. Composite Sampling
    e. Other Sampling Methods
    f. Length of Stain Sampling
3. Composite Sampling Systems
    a. Constant Pressure Cylinder Method
    b. Constant Volume Cylinder Method
    c. Composite Samplings System Examples
    d. YZ Systems

e. PGI International
f. Welker Engineering
g. GSS-4SPMC
h. MSP-2C
i. Heated Sampling Enclosures
j. Composite Sampler Calculations
k. Proportional to Volume Based Sampling Controlled by Flow Computer
l. Proportional to Time Based Sampling Controlled by a Clock/Timer
m. Overfilled/Underfilled Composite Samples

4. Gas Sampling System Maintenance
    a. Gas Sampling Systems
    b. YZ Systems
    c. PGI International
    d. Inspection Procedure
    e. Welker Engineering
    f. Gas Sample Heated Enclosure Maintenance
    g. Filter Operation
    h. Sample Line Purge
    i. Filter Cartridge Replacement
    j. Returning the Heater Enclosure to Service
    k. Daniel Danalyzer Chromatograph Routine Maintenance
    l. Helium Carrier Gas Change-Out (with manifold for multiple gas cylinders)
    m. Alternate Method for Single Cylinder Carrier Gas Manifolds Only
    n. Primary Reference Standard Change-Out
    o. Filter Maintenance

Recommended Resources

- GTA Gas Sampling Participant Guide
- GTA Gas Sampling Instructor Presentation.
- AGA Report 8, GPA Standards 2145 and 2166, and API MPMS Chapter 14.1
- Internet sites and textbooks related to gas sampling.