Gas Chromatography and Problem

Solving for the Petroleum and Gas Sector - Essential Concepts of a Contemporary Analytical Chemistry Instrument

Introduction

Over the last half-century, gas chromatography has emerged as a crucial analytical instrument in nearly all stages of the petroleum industry, ranging from the extraction of crude oil and the refinement of refined products to the development of novel petrochemicals. In its most basic form, gas chromatography (GC), one of the most used methods in contemporary analytical chemistry, is used to separate complicated mixtures of various molecules according to their physical characteristics, such as polarity and boiling point. When analysing gas and liquid samples that include hundreds or even thousands of distinct compounds, like crude oil or its byproducts, this instrument is perfect. The method enables the analyst to determine the kinds and concentrations of molecular species that are present.

This extensive Course N Carry Oil & Gas Technology training programme covers sample introduction, data analysis, operation, maintenance, and troubleshooting in addition to the basic theory of gas chromatography. In order to guide best practices and effectively optimise and troubleshoot methods, instrument components are provided and described along with their underlying ideas.

Petroleum chemists employ a wide range of gas chromatographic techniques due to the diversity and complexity of sample types. You'll discover what the most recent industry standards are for system setup options and starting procedure conditions.

After providing an overview of gas chromatography, this Course N Carry training programme will address the following topics:

- Sample Set-Up
- An Example of an Introduction
- Supply and Handling of Sample Separation Gas
- PTV inlets and split/less split
- Capillary Volumetric Measurements
- The Automatic Sampling PC & Data System Generation Techniques
- Quantification and Calibration of Integration and Reporting

Furthermore, the following GC equipment troubleshooting and maintenance are covered in this Course N Carry training seminar:

- Data analysis systems, columns, detectors, sample inlet and auto samplers, and detectors

Objectives

The goal of this Course N Carry training session is to equip attendees with the knowledge and skills needed:

- Recognise the Fundamental Theoretical Elements of Gas Chromatography
- Share with others the useful knowledge, capabilities, and constraints of gas chromatography.
- Develop trust in the GC Analysis Method
- GC Troubleshooting: Analytical Findings Assessment

Training Methodology

This training session on Course N Carry Gas Chromatography and Problem-Solving for the Petroleum and Gas Sector combines numerous videos on GC hardware and software with classroom-based presentations to clearly illustrate the concepts. Through the use of workshops, group discussions, PowerPoint presentations, and numerous brief troubleshooting videos covering the daily subjects, delegates will be encouraged to engage in this seminar.

Organizational impacts

The following will be advantageous to the delegates:

- An introduction to sample handling techniques and quality assessment methods for gas chromatography
- An extensive synopsis of the Gas Chromatography measurement principles and application needs
- Overview of the Gas Chromatography system's operation and troubleshooting requirements

Personal Imapct

When delegates got back to work, they would have gained the following:

- The ability to manage Gas Chromatography samples for quality and quantity measurements will have greatly increased for the participants, as well as their understanding of the process.
- Participants are introduced to the Gas Chromatography's functioning and troubleshooting requirements.
- Assurance in sample preparation, introduction, analysis, and quantification

- Participants were given an introduction to the principles of measurement and the requirements for using gas chromatography.
- Overview of the fundamentals of ISO17025 Accreditation requirements

Who should attend?

For lab and quality professionals who lack formal training or experience in gas chromatography, or who wish to brush up on their existing expertise, this Course N Carry Gas Chromatography and Problem-Solving for the Petroleum and Gas Sector training course is perfect. Inspectors of fiscal quality and environmental quality personnel can also use it.

Course Outline

Day 1

Overview of Chromatography

Theory of Gas Chromatography

The Elements of the Development Process Managing Molecular Forces of Retention and Chromatographic Selectivity

Nomenclature for Stationary Phase Loading and GC Performance Chromatography

Day 2

Selection Variation for Injection Ports Gas Supply and Handling GC Inlets

- Packed Column vs. Capillary
- Cooling on Column: Direct Capillary Split/Split Less Programmed Temperature Vaporizer (PTV) Inlets
- The Function of Sample Injection and Introduction GC Operations' Ports
- An Example of an Auto Sampler

Day 3

Columns for Gas Chromatography (GC): Selection and Packaging

- Impact of a Capillary GC Column on Chromatographic Column Performance Peak
- Dispersion, Column Maintenance, and Troubleshooting
- Programming GC Oven: Isothermal vs. Temperature

Day 4

The Selection of Gas Chromatography (GC) Detectors

- Function of Detectors in GC Processes
- What effect do detectors have on GC performance?
- Upkeep and Troubleshooting of Detectors for Chromatographic Applications
- Method Development Configuration and GC Operation Ready for Action

Day 5

Data Acquisition and Processing Methods for Gas Chromatography (GC) Sampling Techniques

- Systems for Gathering and Processing Data
- Troubleshooting Gas Chromatography Calibration and Performance
- Basics of ISO17025 Accreditation for Laboratory Information Management Systems (LIMS)
- Management and Troubleshooting of Labs