شركة ميرك العربية السعودية
MEIRC Saudi Arabia

Gas Conditioning & processing Principles

Duration: 5 Days

Course Introduction:

The rapidly increasing worldwide demand for natural gas as an energy source requires expertise in gas engineering technology, which involves several production operations such as dehydration, acid gas removal, recovery of natural gas liquids and the production of liquefied natural gas. In addition, one involved in such industry needs to be familiar with different gas sources, specifications, storage requirements, transportation and distribution.
This course will start by defining what natural gas is, its properties, specifications and end uses. Then, typical gas processing operations will be discussed, including dehydration, acid gas removal, recovery of ethane, propane and NGL (natural gas liquids), and liquefied natural gas (LNG) operations. Sulfur recovery, tail gas conditioning and process control will also be discussed.

Course Objectives:

This short course is designed to give the attendants the fundamentals of natural gas conditioning and processing including some of the details of the process. Specifically, by attending this course you will:

- Gain a deep knowledge of the properties, specifications and end uses of natural gas.
- Gain a deeper understanding of typical natural gas processing operations, including:
- Dehydration
- Acid gas removal
- Recovery of ethane, propane and NGL (natural gas liquids)
- Sulfur recovery
- Gain a deeper understanding of the production of liquefied natural gas (LNG).

Course Outline:

Day 1
-What is natural gas?
-Origins
-Properties
-Specifications
-End uses and markets for natural gas
-Environmental advantages
-Physical behavior of natural gas systems
-Physical and thermal properties
-Phase behavior analysis
-Pure substances
-The phase rule
-Behavior of mixtures
-Vaporization by gas pressure
-Molecular theory of gases and liquids
-Natural gases
-Density of natural gas
-Density of liquids
-Dense phase
-Surface tension
-Viscosity
-Thermal conductivity of gases
-Thermodynamic properties
-Sampling and analysis

Day 2
-Natural gas processing plant
-Flowsheet
-Equipment and components
-Water-hydrocarbon phase behavior
-Water content of gases
-Water content of sour gases
-Water monitors
-Gas hydrates
-Hydrate equilibrium
-Hydrate inhibition

Day 3
-Flow of fluids
-Friction
-Newtonian liquid flow
-Loop systems
-Gas flow
-Unsteady state gas flow
-Temperature changes in piping
-Multiphase flow
-Horizontal two-phase flow
-Vertical two-phase flow
-Multiphase flow splitting
-Pipeline pigging
-Mechanical design of piping

Day 4
-Natural gas liquid recovery and gas treating
-Why gas need to be conditioned?
-Gas absorption versus fractionation
-Cooling in gas processing
-Gas absorption/stripping cycles for liquid recovery
-Adsorption versus absorption
-Separation of ethane from NGL product
-Gas dehydration
-Glycol dehydration unit
-Process design factors
-Glycol regeneration
-Circulation Rate – Absorber contacts
-Absorber design
-Regeneration and heat exchange
-Filters
-Pumps
-Operating problems
-Aromatic absorption
-Adsorption dehydration
-Desiccant properties
-Pressure loss
-The basic system
-The regeneration cycle

-The nature of adsorption
-Process variables
-Adsorber sizing
-Desiccant capacity
-Length
-Water loading
-Breakthrough time
-Allowable gas flow rate
-Hydrocarbon recovery
-Process characteristics

Day 5
-Gas drying problems and troubleshooting
-Glycol pump deficiencies
-Glycol regeneration temperature
-Flooding dehydrator towers
-Fouling vs. flooding
-Plugged trays
-Dehydration capacity
-Amine processes
-Types of amines and amine processes used in gas sweetening
-General operating problems
-Corrosion
-Solution degradation
-Foaming
-Amine reclaiming
-Filtration
-Foam inhibitors
-Corrosion inhibitors
-General considerations
-Inlet scrubbing
-Amine losses
-Amine regeneration
-Carbonate processes
-Physical absorption methods
-Solid bed sweetening
-Sulfur production
-Tail gas conditioning
-NGL transportation