Introduction to Gas Conditioning and Processing

Course general description:

This intensive training program provides a thorough understanding of natural gas conditioning and processing operations. The course covers fundamental principles, equipment design, operational considerations, and optimization techniques used in gas processing facilities. Participants will learn about gas characteristics, separation processes, dehydration, sweetening, and NGL recovery, along with practical aspects of plant operations and troubleshooting.

Audience:

This course is designed for:

1. Process Engineers
2. Operations Engineers
3. Plant Operators
4. Technical Services Personnel
5. Design Engineers
6. Maintenance Engineers
7. Production Engineers

Course objectives:

By end of the course participants will gain:

1. Understand natural gas composition and properties
2. Apply gas processing fundamentals and calculations
3. Evaluate gas conditioning requirements
4. Design and optimize separation processes
5. Analyze dehydration and sweetening operations
6. Understand NGL recovery processes
7. Implement process safety considerations
8. Troubleshoot operational issues
9. Optimize plant performance
10. Apply industry standards and specifications.

Course duration:

5 days

Course location:

Cairo-Dubai-Istanbul

Course contents:

Day 1: Natural Gas Fundamentals and Basic Processing

- Natural Gas Properties – Composition, phase behavior, physical and chemical properties, and gas laws.
- Separation Principles – Two-phase and three-phase separation, separator design, and selection.
- Processing Steps – Field processing systems, process flow diagrams, and key processing steps.
- Practical Applications – Case study on gas properties calculations and a group exercise on separator sizing.
- Assessment – Daily quiz to reinforce learning.

Day 2: Gas Dehydration

- Moisture in Gas – Water content, hydrate formation, and prevention methods.
- Dehydration Processes – Glycol dehydration (TEG system) and solid desiccant (molecular sieve) systems.

- System Design & Optimization – Equilibrium principles, regeneration systems, and troubleshooting techniques.
- Practical Applications – Case study on dehydration unit analysis and problem-solving on glycol calculations.
- Assessment – Daily quiz to test key concepts.

Day 3: Gas Sweetening and Sulfur Recovery

- Acid Gas Removal – Amine sweetening systems, selection criteria, and process design.
- Sulfur Recovery – Claus process fundamentals, tail gas treatment, and material selection.
- Environmental Considerations – Emission control and compliance with regulations.
- Practical Applications – Case study on sweetening unit operations and group process optimization exercise.
- Assessment – Daily quiz for knowledge reinforcement.

Day 4: NGL Recovery and Fractionation

- NGL Recovery Technologies – Refrigeration systems, turboexpander, and cryogenic processing.
- Fractionation Principles – Deethanizer, depropanizer, and debutanizer systems.
- Equipment & Design – Heat exchangers, product specifications, and system efficiency.
- Practical Applications – Case study on NGL recovery and simulation exercise on fractionation.
- Assessment – Daily quiz to consolidate understanding.

Day 5: Process Control and Safety

- Process Control Systems – Fundamentals, instrumentation, and automation.
- Safety & Shutdown Systems – Emergency shutdown procedures and safety compliance.
- Plant Optimization – Efficiency improvements and troubleshooting.
- Final Review – Course summary, Q&A session, and exam preparation.
- Final Evaluation – Comprehensive exam and certificate distribution.

Methodology:

- 50% lectures & concepts
- 10% Videos
- 15% Case studies
- 15% Exercises
- 10% Discussions

Course code: (TPRS008)