



# N640: P&ID (*Piping and Instrumentation Diagram*) and *Engineering Drawings Interpretation*

Tutor(s): Marcel Leal-Valias / Richard Carter / Jamie Merriam

2 Days

Competence Level:  
Awareness



Classroom Course

## Summary

This two-day course focuses on engineering drawings typically used in the chemical and process industries by engineers and technologists in the design phase, and by operations and maintenance staff once facilities are up and running. It is suitable for anyone interested in how drawings should be interpreted, created, maintained, and used in assessing emergency situations and regulatory compliance issues. The combination of classroom instruction and workshop exercises focuses on critical documentation essential to the safe day-to-day operation of facilities (e.g., P&ID, PFD, Plot Plan, Electrical Area Classification, Piping Drawing, Isometric Drawing, Line List, Tie-In List and Shutdown Keys).

## Learning Outcomes

Participants will learn to:

1. Explain the relationship of P&ID drawings to facilities and appraise the potential for safety improvements.
2. Understand and evaluate the purpose, content, and importance of process/electrical and engineering drawings from company plants.
3. Interpret P&ID drawings, including valves, equipment, and control/safety systems.
4. Develop and implement strategies to maintain current and accurate drawings throughout the lifecycle of the facility.
5. Provide engineers with the skills to communicate in the same “language” as facility operators during Management of Change scenarios.
6. Recognize emergency situations and assess safety, environmental and regulatory compliance issues such as Process Hazards Analysis (PHA)/HAZOP studies.
7. Construct a foundation for base-level learning and support consistent improvement in quality, staff and leadership communications, and other processes which rely on P&ID drawings.

## Duration and Training Method

Two classroom days providing 1.6 CEU (Continuing Education Credits) or 16 PDH (Professional Development Hours)

## Who Should Attend

This course focuses on engineering drawings typically used in the chemical and process industries by engineers and technologists in the design phase and by operations and maintenance staff once facilities are up and running. It is suitable for employees, managers, officers of corporations and anyone else with an interest in how these drawings should be created, maintained and used in assessing emergency situations and regulatory compliance issues.



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## Course Content

### Day One

1. Introduction
2. Preliminary engineering drawings
  - a. Block flow diagram (BFD)
  - b. Process flow diagram (PFD)
  - c. Material balance
  - d. PFD symbols
3. Piping and instrumentation diagrams
  - a. Piping and instrumentation diagram (P&ID)
  - b. P&ID symbols
  - c. Line numbering
  - d. Valve numbering
  - e. Equipment identification
  - f. Abbreviations
4. Interpreting P&IDs - valves
  - a. Valve types
  - b. Valve identification
  - c. Valve fittings
5. Interpreting P&IDs - equipment
  - a. Vessels
  - b. Pumps
  - c. Heat exchangers
  - d. Compressors
  - e. Equipment identification
6. Drawing interpretation workshop #1

### Day Two

7. Interpreting P&IDs – control & safety systems
  - a. Distributed control systems (DCS)
  - b. Safety instrument system (sis)
  - c. Instrument symbols
  - d. Instrument signal lines
  - e. Pressure instruments
  - f. Temperature instruments
  - g. Flow instruments
8. Detailed engineering drawings
  - a. Plot plan
  - b. Electrical area classification
  - c. Piping drawing
  - d. Isometric
  - e. Material take off



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- f. Line list
  - g. Tie-in list
  - h. Shutdown key
9. Drawing interpretation workshop #2
10. Engineering drawings for construction and operation
- a. Developing as-builds
  - b. Preparing for a PHA (HAZOP, what-if, etc)
  - c. Management of change (MOC)
11. Capstone exercise
12. Course wrap-up