

Drawing Sets and Print Reading (Instructor-Led Training)

Course Description

This course provides the basic information needed to properly use drawings and diagrams for the purpose of communicating simple to complex mechanisms, systems, and processes.

Course Prerequisites

- GTA Web-Based Training
 - Core WBT
 - Drawing Sets and Print Reading

Course Objectives

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

- Describe the different types of drawings and their specific use.
- Interpret the various symbols commonly used on drawings and schematics.
- Read and interpret a plot plan.
- Name the proper drawing type to trace piping flows.
- Read and understand a "Piping and Instrumentation Diagram" in the performance of work.
- Trace instrument loops from input device to output device.
- Describe how schematics are used to find electrical connections.
- Read and understand alignment sheets.
- Download and navigate through alignment sheets.
- Describe proofing of drawings comparing "construction drawings" to "as built drawings" and verify bill of materials.
- Describe the proper procedures for redlining drawings and submitting drawing changes.

Course Outline

1. Types of Prints and Diagrams
 - a. L-Plat Drawings
 - b. Civil Drawings
 - c. Mechanical Drawings
 - d. Principles of Mechanical Drawings
 - e. Graphic Styles
 - f. Piping and Instrumentation Diagrams
 - g. Electrical Drawings
 - h. Block Diagrams
 - i. Single (One-Line) Diagram
 - j. Wiring and Physical Diagrams
 - k. Schematic Diagrams
 - l. Vendor Supplied Schematic and Wiring Diagram
 - m. Alignment Sheets
 - n. Drawing Identification
2. Symbols
 - a. Electrical Diagram Symbology
 - b. Standard Device Numbers
 - c. Special Notes and Legends
 - d. Title Block
 - e. Revision Block
 - f. Special Notes
 - g. Legends
 - h. Instrument Symbols
3. Plot Plans
 - a. Flow Directions
 - b. Equipment and Building Locations
 - c. Orientations
4. Piping Flows

- a. Valve Identification
- b. Dimensions
- c. Elevations
- 5. Bills of Materials
 - a. Piping and Instrumentation Diagrams
 - b. Learning Objectives
 - c. Control Loops
- 6. Electrical Diagrams
 - a. Single-Line Diagrams
 - b. Interconnection Diagrams
 - c. Connection Diagrams
 - d. Westinghouse Type Connection Diagrams
 - e. GE Type Connection Diagrams
 - f. Raceway Drawings
 - g. Grounding Grid
- 7. Alignment Sheets
 - a. Interpretation of Drawings
 - b. Title Block
 - c. Engineering Records, Reference Drawings, and Legend
 - d. Map Bands
 - e. Pipeline Stationing Band
 - f. Pipe Detail Band and Detail Band
 - g. Project ID and Material Band
 - h. Coating Band
 - i. Class Location Band
 - j. MAOP Band
 - k. Alignment Plan View Horizontal Depiction
- 8. Drawing “Redlining” Procedures
 - a. Instructional Pages
 - b. Procedures and Guidelines for Redlining (making revisions) to Drawing Records

- c. Purpose, Definitions, and Principles
 - d. General Redlining Rules
 - e. Tie-in Information
 - f. Minimum Information Requirements
 - g. Equipment/Material
 - h. Dimensioning
 - i. Valves
 - j. Buildings
 - k. Sketches
 - l. Electrical
 - m. Photographs
 - n. Material Lists
 - o. Contact Information, Processes, and Responsibilities
 - p. Engineering Drafting
9. Five Action Steps for Systematic Troubleshooting
- a. Five-Step Troubleshooting Method
 - b. Step 1: Verify That a Problem Actually Exists
 - i. Panel Graphic
 - ii. Loop Diagram
 - iii. Piping and Instrumentation Diagram
 - iv. Block Diagram
 - v. Schematic Diagrams
 - vi. Wiring Diagram
 - c. Step 2: Isolate the Cause of the Problem
 - d. Step 3: Correct the Cause of the Problem
 - e. Step 4: Verify That the Problem Has Been Corrected
 - f. Step 5: Follow Up to Prevent Future Problems
 - g. Deriving Logical Troubleshooting Strategies
 - h. Deriving Your Own Troubleshooting Strategy
 - i. Steps for Troubleshooting Intermittent Failures

- j. Attempt to Re-create the Problem
- k. Thermally Induced Failure
- l. Mechanically Induced Failure
- m. Erratic Failure
- n. Identifying All Possible Causes of Trouble

Recommended Resources

- GTA Drawing Sets and Print Reading Participant Guide
- GTA Drawing Sets and Print Reading Presentation.
- GTA Drawings to Accompany “Drawing Sets and Print Reading”
- Internet sites related to interpreting drawings and prints.
- Textbooks or other publications related to interpreting drawings and prints.
- Additional drawings and prints to illustrate the various types.