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DOE FUNDAMENTALS

**ENGINEERING SYMBOLOGY,
PRINTS, AND DRAWINGS**



**U.S. Department of Energy
Washington, D.C. 20585**

ABSTRACT

Engineering Symbology, Prints, and Drawings was developed to assist nuclear facility operating contractors in providing operators, maintenance personnel, and technical staff with the necessary fundamentals training to ensure a basic understanding of engineering prints, their use, and their function. The text includes information on engineering fluid drawings and prints; piping and instrument drawings; major symbols and conventions; electronic diagrams and schematics; logic circuits and diagrams; and fabrication, construction, and architectural drawings. This information will provide personnel with a foundation for reading, interpreting, and using the engineering prints and drawings that are associated with various DOE nuclear facility operations and maintenance.

Key Words: Training Material, Print Reading, Piping and Instrument Drawings, Schematics, Electrical Diagrams, Block Diagrams, Logic Diagrams, Fabrication Drawings, Construction Drawings, Architectural Drawings

OVERVIEW

A basic understanding of engineering prints and drawings is necessary for DOE nuclear facility operators, maintenance personnel, and the technical staff to safely operate and maintain the facility and facility support systems. The information in the document is presented to provide a foundation for applying engineering concepts to the job. This knowledge will improve personnel understanding of the impact that their actions may have on the safe and reliable operation of facility components and systems.

Engineering Symbology, Prints, and Drawings consists of six modules. The following is a brief description of the information presented in each module of the handbook.

Module 1 - Introduction to Print Reading

This module introduces each type of drawing and its various formats. It also reviews the information contained in the non-drawing areas of a drawing.

Module 2 - Engineering Fluid Diagrams and Prints

This module introduces engineering fluid diagrams and prints (P&IDs); reviews the common symbols and conventions used on P&IDs; and provides several examples of how to read a P&ID.

Module 3 - Electrical Diagrams and Schematics

This module reviews the major symbols and conventions used on electrical schematics and single line drawings and provides several examples of reading electrical prints.

Module 4 - Electronic Diagrams and Schematics

This module reviews electronic schematics and block diagrams. It covers the major symbols used and provides several examples of reading these types of diagrams.

Module 5 - Logic Diagrams

This module introduces the basic symbols and common conventions used on logic diagrams. It explains how logic prints are used to represent a component's control circuits. Truth tables are also briefly discussed and several examples of reading logic diagrams are provided.

Module 6 - Engineering Fabrication, Construction, and Architectural Drawings

This module reviews fabrication, construction, and architectural drawings and introduces the symbols and conventions used to dimension and tolerance these types of drawings.

The information contained in this text is by no means all encompassing. An attempt to present the entire subject of engineering drawings would be impractical. However, *Engineering Symbology, Prints, and Drawings* does present enough information to provide the reader with a fundamental knowledge level sufficient to understand the advanced theoretical concepts presented in other subject areas, and to improve understanding of basic system operation and equipment operations.