

# Reading Blueprints

## Course 101: Reading Blueprints

Covers all types of blueprints used in industrial plants. Discusses machine parts and machine drawings. Features drawings of a compound rest and a clutch-brake control. Examines hydraulic, pneumatic, piping, plumbing, electrical, air-conditioning, and refrigeration drawings. Introduces sketching used in industrial plants.

TPC Training is accredited by IACET to offer **1.0 CEU** for this program.



### Lesson 1: Introduction to Blueprints

#### Topics

Importance of Blueprints; Purpose of Blueprints; Types of Information on Blueprints; Supplementary Spaces; Detail Drawings; Interpreting a Detail Drawing; Assembly Drawings; Orthographic Projections; Auxiliary Views; Sections; Pictorial Drawings

#### Objectives

- Identify details, markings, and machine parts from an assembly drawing.
- Identify an object from an orthographic drawing.
- Identify elements located within the title block of a detail drawing.
- Explain why more than one orthographic projection is needed to show an object on a blueprint.

### Lesson 2: Machine Parts

#### Topics

Six Simple Machines; Screw Threads; Drawings of Screw Threads; Screw Thread Specifications; Heads; Rivets; Welds; Pins; Keys; Springs; Gears; Bearings; Belts and Pulleys

#### Objectives

- Describe what a machine is, and explain what it does.
- Name the two basic methods of joining machine parts.
- Name and identify from an exhibit several types of threaded fasteners.
- Name the two basic methods of permanent joining.
- Identify gears, bearings, and belt drives on drawings.
- Identify types of screw threads from a specification.

### Lesson 3: Machine Drawings

#### Topics

Understanding Machine Tools; Purpose of the Compound Rest; Exploded View; Assembly Drawing; Detail Drawing; Comparison with Photograph; Clutch-Brake Control Mechanism; Exploded View; Assembly Drawing; Headstock Linkage; Clutch-Operating System; Assembly Drawing; Drafting Techniques for Gear Trains; Reading the Assembly Drawing

#### Objectives

- Name the main parts of a lathe.
- State the definition of an exploded view.
- Identify an assembly drawing.
- Identify a compound rest swivel on an assembly drawing.
- Identify a specific part on an assembly drawing.

### Lesson 4: Sheet Metal Drawings

#### Topics

Sheet Metal; Ventilation Systems; Ductwork; Sheet Metal Drawings; Parallel Development; Miter Development; Radial Development; Extra Metal for Assembly

#### Objectives

- Describe the difference among coils, strips, and sheet metal.
- Describe how a ventilation system works.
- State the purpose of an arrow on a duct symbol.
- Demonstrate how to lay out a development.
- Define a radial development of a truncated pyramid.

### Lesson 5: Building Drawings

#### Topics

Using Building Drawings; Buildings and Building Sites; Symbols and Conventions; Plat, Site Floor Plans; Working Drawings

#### Objectives

- Name building materials, given their standard symbols.
- Explain how to find useful information on a flow diagram.
- Explain how to find useful information on an industrial plat.
- List the contents of a set of building drawings.
- Describe the purpose of a structural drawing.

### Lesson 6: Hydraulic and Pneumatic Drawings

#### Topics

Fluid Systems; Pascal's Law; Multiplying Forces; Pistons and Cylinders; Fluid System Components; Hydraulic and Pneumatic Symbol

#### Objectives

- Name the components represented by common symbols on hydraulic and pneumatic drawings.
- Name the components in a simple hydraulic power system.
- Name the components in a simple pneumatic power system.
- State Pascal's Law.
- Discuss the purposes of the components of hydraulic systems.

### Lesson 7: Piping and Plumbing Drawings

#### Topics

Importance of Piping Systems; Piping and Plumbing Materials; Kinds of Joints; Fittings; Drawings; Joining Metal Pipes

#### Objectives

- State the definition of piping.
- Explain why joints are sometimes brazed instead of soldered.
- Explain how to assemble a screwed joint.
- Identify different types of pipe joints.
- Identify piping-system components shown in a single-line drawing.
- Define electrochemical corrosion.

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## Lesson 8: Electrical Drawings

### Topics

Importance of Electrical Drawings; Electric Power; Controlling Electricity; Electrical Drawings; Electrical Wiring; Using Electrical Drawings

### Objectives

- Identify different electrical symbols on a drawing.
- Identify the power distribution panels in your plant.
- Identify different types of conduit and cable.
- Select the best electrical drawing to use when looking for a faulty circuit between the basement and the first floor.
- Explain how electricity at 480 volts is reduced by a transformer to 120/240 volts.
- Define the terms voltage, current, and power

## Lesson 9: Air Conditioning and Refrigeration Drawings

### Topics

Principles of Refrigeration; Component Drawings; Principles of Air Conditioning; Air-Conditioning Systems; A/C and R Operating Controls; A/C and R Drawings

### Objectives

- Explain how a refrigeration system works.
- Describe the types of ac controls.
- Name three kinds of condensers used in air conditioning systems.
- Explain the difference between unitary and central air-conditioning equipment.
- Explain how to find useful information on a duct drawing.

## Lesson 10: Sketching

### Topics

Using Sketches; Making Sketches; Kinds of Sketches; Orthographic Sketches; Isometric Sketches; Perspective Sketches

### Objectives

- Name the four kinds of sketches.
- Identify an isometric sketch.
- Describe the appearance of a perspective drawing.
- Discuss how to sketch straight lines and curved lines.
- State the definition of a vanishing point.