

Course 107: Hand Tools

Begins with measuring tools, including a discussion of units of measurement. Examines the various kinds of wrenches and screwdrivers, their uses and handling techniques. Explains other hand tools by specialty: pipefitting tools, plumbing tools, electrician's tools, sheet metalworking tools, machinists' metal-working tools. Ends with hoisting and pulling tools.

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



Lesson 1: Measuring Tools

Topics

Linear and Angular Measurement; Units of Linear Measurement; Rules and Measuring Tapes; Using Rules and Tapes; Calipers; Slide Calipers; Vernier Calipers; Micrometer Caliper; Using the Micrometer; Squares

Objectives

- Explain how to hold a rigid rule correctly when measuring an object and show from which point the measurement begins.
- Describe how to set lock joint transfer-type calipers.
- Identify vernier calipers.
- Explain how to take a measurement with a micrometer caliper.
- Name the parts of a combination square.

Lesson 2: Wrenches and Screwdrivers

Topics

Using Wrenches; Open-End Wrenches; Box-End Wrenches; Combination Wrenches; Socket Wrenches; Socket Handles; Socket-Screw Wrenches; Adjustable Wrenches; Torque Wrenches; Using Wrenches Safely; Using Screwdrivers; Standard Screwdrivers; Cross-Slot Screwdrivers; Spiral Ratchet Screwdrivers; Offset Screwdrivers; Driving a Screw; Removing a Screw; Restoring a Screwdriver Blade; Using Screwdrivers Safely

Objectives

- Identify types of materials used for making wrenches.
- Identify open-end, box-end, socket, socket-head, adjustable, torque, and striking-face wrenches.
- Describe two sizes that are important in identifying a socket wrench.
- Identify standard, Phillips, offset, and spiral-ratchet screwdrivers.
- List the steps to follow when driving a screw.

Lesson 3: Pipefitting Tools

Topics

Pipe Wrenches; Using a Pipe Wrench; Pipe Vises; Cutting Pipe; Reaming Pipe; Threading Pipe; Tapping Pipe; Cutting Tubing and Plastic Pipe; Flaring Metal Tubing; Caring for Pipe Tools

Objectives

- Identify a straight pipe wrench, a Stillson wrench, a chain pipe wrench, a strap wrench, and a compound-leverage wrench.
- Explain how to use a pipe wrench.
- Explain why a machinists' vise should not be used for holding pipe.
- Explain how to thread pipe.
- Explain how to clean a pipe tool.
- Explain how to cut and flare tubing.

Lesson 4: Plumbing Tools

Topics

Plumbing Codes; Plumbing System; Joining Copper Pipe; Tube Bending; Cutting Cast-Iron Pipe; Joining Cast-Iron Pipe; Assembling Plastic Pipe; Force-Cup Plungers; Augers; Line-Clearing Tools; Sewer Tapes; Special Wrenches; Measuring Pipe

Objectives

- Explain how to use a mechanical tube bender.
- List the steps in joining hubless pipe.
- Explain why the drain pipe should be completely covered by the force cup.
- Name the criteria used in selecting line clearing tools.
- List the steps in measuring pipe when using the center-to-center measuring systems.

Lesson 5: Electrician's Tools

Topics

The Electrician; EMT Bender; Correcting Knocked Over Stubs; Bending Rigid Conduit; Assembling Rigid Conduit; Knockout Punches; Fish Tapes; Pliers; Wire and Cable Strippers; Electrician's Screwdrivers; Test and Safety Equipment

Objectives

- Explain how to use an EMT bender and a neon circuit tester.
- List the parts of a knockout punch.
- Name the uses of the all-purpose tool.

Lesson 6: Woodworking Tools

Topics

Handsaws; Crosscut Saws; Ripsaws; Special-Purpose Saws; Planes; Scrapers; Drills and Bits; Chisels; Levels; Plumb Bobs; Hammers and Nail Sets

Objectives

- Describe the difference between a rip saw and a crosscut saw.
- Explain the difference between a compass saw and a keyhole saw.
- Describe the different types of planes.
- Identify a Forstner bit.
- Explain the working of a plumb line.

Hand Tools

Lesson 7: Masonry, Plastering, and Glazing Tools

Topics

Concrete and Mortar; Preparing Mortar; Working with Bricks and Mortar; Tuckpointing; Working with Concrete; Edging, Jointing, and Finishing; Repairing Plaster; Repairing Wallboard; Cutting Glass; Installing Glass; Safety on the Job

Objectives

- Explain how to mix a small batch of mortar.
- List the uses of a trowel.
- Define tuckpointing.
- Explain why flat concrete surfaces must be screeded.
- Explain how to repair one of the following problems: (a) small plaster cracks, (b) shrinkage cracks, or (c) loose or bulging plaster.
- Explain how to replace a broken pane of glass in a window.

Lesson 8: Sheet Metalworking Tools

Topics

Sheet Metal; Sheet Metal Gauges; Layout Tools; Dividers; Punches; Rivets and Riveting Tools; Metal-Cutting Chisels; Using a Chisel; Hammers; Metal-Cutting Snips; Dressing; Notchers; Bench Stakes; Forming Tools; Hand Seamer; Soldering; Sheet Metal Safety

Objectives

- Identify different types of snips and punches.
- Identify the bench stakes discussed in this Lesson.
- List six safety practices to follow when working with sheet metal.
- Describe different types of sheet metal.

Lesson 9: Metalworking Tools

Topics

Vises; Hacksaws; Using Hacksaws; Files; File Cuts; File Specifications; Selecting a File; Using Files; Taps; Tap Sizes; Using Taps; Dies; Thread Classes; Using Dies; Reamers; Using Reamers

Objectives

- Select the proper hacksaw blades for cutting various materials.
- Explain the difference between single-cut and double-cut files.
- List the types of taps usually found in a tap set.
- Explain how to cut an external thread on a bolt, screw, or stud.
- Explain how to remove a reamer from a hole.

Lesson 10: Hoisting and Pulling Tools

Topics

Hoisting with Rope; Knots; Wire Rope; Slings; Sling Angles; Sling Hitches; Center of Gravity; Sling Spreader Beams; Block and Tackle; Chain Fall; Chain Load Pullers; Machine Part Pullers; Jaw Pullers; Slide-Hammer Pullers; Choosing the Proper Puller

Objectives

- Explain how to prevent synthetic and fiber rope from unraveling.
- Explain how individual wires and strands of wire are formed into wire rope.
- Identify the most appropriate sling for use near corrosive chemicals.
- Identify a slide-hammer puller.
- Describe different kinds of slings and loads.