



CUSTOMIZED TEACHER ASSESSMENT BLUEPRINT

PLUMBING

Test Code: 5924

Version: 01

Specific competencies and skills tested in this assessment:

Safety

- Follow rules for fire safety
- Follow rules for housekeeping safety
- Follow shop rules
- Follow rules for material handling safety
- Follow rules for eye protection
- Follow rules for hearing protection
- Follow rules for respiratory protection
- Follow rules for hand tool safety
- Follow rules for power equipment safety
- Follow rules for portable electric hand tool safety
- Follow rules for MSDS safety
- Follow safety rules as they relate to ECP (Exposure to Control Procedures: bloodborne pathogens, etc.)
- Follow OSHA (Occupational Safety and Health Act) regulations
- Discuss provisions, inspections, and citations of OSHA
- Identify the different types of ladders and scaffolds used on a worksite
- Describe how to use ladders and scaffolding safely
- Properly set up, inspect, and use stepladders, extension ladders, and scaffolding
- Identify basic hand tools, state their uses, and use them in the trade
- Identify power tools, safety, and use and maintenance

Valves and Devices

- Identify usage and installation of backflow prevention devices
- Identify types of valves that start and stop flow
- Identify types of valves that regulate flow
- Identify valves that relieve pressure
- Identify valves that regulate the direction of flow
- Explain the factors that influence valve selection
- Disassemble and assemble various types of valves (such as gate valve, globe valve, and flush valve)

Plumbing (continued)

Identifying and Joining Non-Ferrous Piping and Tubing

Demonstrate skills in joining, cutting, and bending various types of copper tubing: solder, compression, flare, swage, and press fit

Prepare and braze a joint

Perform tests on all soldered and brazed joints

Measure, cut, and assemble PVC, CPVC, and ABS

Measure, cut, and assemble PEX and PE

Measure, cut, and assemble HDPE

Fabricate a crimp joint connection

Fabricate a tubing type joint

Identifying and Joining Ferrous Piping

Thread steel pipe with an adjustable die, power threading machine, non-adjustable die

Measure, cut, ream, thread, assemble, and test various types of steel piping

Identify and use cast iron tools

Measure and cut cast iron soil pipe with a chain cutter

Assemble cast iron to various pipe types with no hub, Fernco, rubber gasket joints

Construct various types and sizes of steel pipe projects using end to end, end to center, center to throat, and overall improvements

Advanced Off-Set Piping Fabrication

Calculate simple pipe offsets

Blueprint Reading and Transit Operations

Identify types of drawings

Identify the various lines used on drawings

Interpret specifications and dimensions

Identify the three basic views of a drawing

Create isometric drawings

Identify piping systems according to color-coding

Identify and set up a level and/or transit

Set up the level and/or transit; shoot elevations and grade pipe

Pipe Specifications and Supporting Systems

Identify pipe and components according to specifications

Demonstrate knowledge of pipefitting standards, codes, and specifications

Read and interpret pipefitting specifications

Identify and explain the types of piping systems

Identify piping systems according to color-coding

Explain the effects and corrective measures for thermal expansion in piping systems

Explain types and applications of pipe insulation

Identify various metals and specification process used in the plumbing and heating industry

Use hangers to secure horizontal and vertical pipe lines to masonry, metal, and wood

Plumbing (continued)

Water Distribution Lines

Perform water pressure tests on water supply systems

Rough-in water supply lines for bathtubs, wall mounted urinals, water closets, clothes washer, kitchen sink, lavatories

Demonstrate knowledge of whirlpool tub installation

Demonstrate knowledge of bidet installation

Sanitary and Storm Drainage Systems

Layout and establish grade/slope for drain lines

Install backflow prevention valves

Water or air test a drain

Install air admittance valves

Rough-in water lines and vents for bathtubs, lavatories, dishwashers, water closets, showers, bidets and urinals

Install a grease interception trap in waste lines

Install garbage disposal units

Install sump pumps

Install a sewage pump

Venting Systems

Install soil or waste back vents

Install soil or waste loop vents

Install vent terminals (roof-flashing)

Testing Piping Systems

Perform head pressure tests

Perform hydrostatic tests

Perform leak tests on gas supply lines

Plumbing Fixtures

Install tank-type water closets

Install bathtubs

Install wall mounted lavatories

Install wall mounted urinals

Install kitchen sink

Install prefabricated shower base drains

Install built-in lavatories

Install flush valve-type water closets

Install traps and cleanouts

Plumbing (continued)

Plumbing Appliances

- Install dishwashers
- Install electric water heaters
- Install gas water heaters
- Install clothes washing machines
- Install oil-fired water heater
- Install water re-circulating pumps
- Install garbage disposal units
- Install sump pumps
- Install a sewage pump

Maintain Plumbing Systems

- Clear obstructions from lavatory drains
- Remove obstructions from main drain lines
- Remove obstructions from water closets
- Repair/replace lavatory trap drains and leaking water faucets or valves
- Repair leaking shower valves
- Repair water flush valves on water closets
- Replace a section of galvanized water supply line
- Explain how to thaw frozen pipes
- Disassemble "P" traps to clear lavatory drains
- Repair/replace any type of water closets

Hydronic Heating Systems and Boilers

- Identify and explain various boiler fittings and accessories, including thermo expansion devices
- Discuss the various types of boilers
- Identify and explain various boiler, steam, and hot water fittings, and piping
- Identify and explain feed water accessories
- Identify and explain steam and hot water accessories
- Explain the operation of a boiler and its various controls
- Explain the operation of the draft controls
- Identify and explain boiler safety
- Describe and design a hydronic heating system
- Describe and design a primary and secondary loop
- Explain operation of 3-way or 4-way mixing valve, injection pump, tempering valve accessories/controls of system

Plumbing (continued)

Written Assessment:

Administration Time: 3 hours

Number of Questions: 196

Areas covered:

16%	Safety
6%	Valves and Devices
8%	Identifying and Joining Non-Ferrous Piping and Tubing
6%	Identifying and Joining Ferrous Piping
2%	Advanced Off-Set Piping Fabrication
6%	Blueprint Reading and Transit Operations
7%	Pipe Specifications and Supporting Systems
3%	Water Distribution Lines
7%	Sanitary and Storm Drainage Systems
5%	Venting Systems
3%	Testing Piping Systems
10%	Plumbing Fixtures
7%	Plumbing Appliances
8%	Maintain Plumbing Systems
6%	Hydronic Heating Systems and Boilers

Sample Questions:

What is the correct practice before using a chisel with a mushroom head?

- A. peen with a hammer
- B. grind off and trim
- C. use as is
- D. pry off with a wrench

When joining CPVC tubing, the plumber should use

- A. both primer and cement
- B. Teflon[®] and pipe dope
- C. CPVC adaptor
- D. CPVC cement

When setting up to survey using a tripod and builder's level, the plumber should first

- A. take a reading on the rod
- B. establish a benchmark by using the transit
- C. select the right target
- D. level the instrument

Plumbing (continued)

The plumber should place the branch vent

- A. at an equal height as the trap
- B. 2 inches below the flood level rim
- C. 6 inches above the flood rim level
- D. at the same height as the crown weir

The minimum size trap for an automatic washing machine box is

- A. 1-1/2 inches
- B. 2 inches
- C. 2-1/2 inches
- D. 3 inches

Performance Assessment:

Administration Time: 3 hours

Number of Jobs: 2

Areas Covered:

50%

Install and Prepare to Leak Test a DWV System

Selection of tools/materials, safe handling of tools and equipment, rough-in Lavatory #1, rough-in Lavatory #2, techniques for joining pipe and fittings, installation techniques, accuracy of fittings chosen, workstation left in good condition, adhere to local plumbing code, and leak test.

50%

Install and Prepare to Leak Test a Water Supply System

Selection of tools/materials, safe handling of tools and equipment, rough-in Lavatory #1, rough-in Lavatory #2, techniques for joining pipe and fittings, installation techniques, accuracy of fittings chosen, workstation left in good condition, adhere to local plumbing code, and leak test.

Sample Job: Install and Pressure Test a DWV System

Maximum Job Time: 1 hour and 30 minutes

Participant Activity: Study the rough-in sketch and drawings provided for two lavatories; measure and cut the pipe to the correct size, selecting appropriate tools; assembly all connections per rough-in dimensions, install appropriate nail plates, and prepare DWV system for leak testing.