



Pembroke Hopkins Park Construction Outreach Program

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Competencies / Objectives

Level One

MODULE 08101-06 - ORIENTATION TO THE TRADE (5 Hours)

1. Describe the types of work performed by pipefitters.
2. Identify career opportunities available to pipefitters.
3. Explain the purpose and objectives of an apprentice training program.
4. Explain the responsibilities and characteristics of a good pipefitter.
5. Explain the importance of safety in relation to pipefitting.

MODULE 08102-06 - PIPEFITTING HAND TOOLS (20 Hours)

1. Describe the safety requirements that apply to the use of pipefitter hand tools.
2. Explain how to properly care for selected pipefitter hand tools.
3. Demonstrate how to safely and properly use selected pipefitter hand tools.
4. Identify tools and state their uses.
5. Use selected hand tools.

MODULE 08103-06 - PIPEFITTING POWER TOOLS (15 Hours)

1. State the safety procedures that must be followed when working with power tools.
2. Cut pipe using a portable band saw.
3. Identify and explain the uses of portable grinders.
4. Explain the proper and safe operation of machines used in pipe joint preparation:
 - Pipe threaders
 - Portable power drives
 - Pipe bevelers
5. Perform selected pipe joint preparation operations using power tools.

MODULE 08104-06 - OXYFUEL CUTTING (17.5 Hours)

1. Identify and explain the use of oxyfuel cutting equipment.
2. Set up oxyfuel equipment.
3. Light and adjust an oxyfuel torch.
4. Shut down oxyfuel cutting equipment.
5. Disassemble oxyfuel equipment.
6. Change empty cylinders.



7. Perform oxyfuel cutting:
 - Straight line and square shapes
 - Piercing and slot cutting
 - Bevels
 - Washing
8. Operate a motorized, portable oxyfuel gas cutting machine.

MODULE 08105-06 - LADDERS AND SCAFFOLDS (10 Hours)

1. Identify the different types of ladders and scaffolds used on a work site.
2. Describe how to safely use ladders and scaffolding.
3. Properly set up, inspect, and use stepladders, extension ladders, and scaffolding.

MODULE 08106-06 - MOTORIZED EQUIPMENT (10 Hours)

1. State the safety precautions associated with the use of motor-driven equipment on job sites.
2. Identify and explain the operation and use of the following motor-driven equipment.
 - Welding machines
 - Portable generators
 - Air compressors
 - Portable pumps
 - Aerial lifts
 - Forklifts
 - Compaction equipment
 - Trenching equipment
 - Backhoe loaders
 - Mobile cranes
3. Perform prestart checks and operate the following equipment:
 - Portable generators
 - Welding machines
 - Portable pumps
 - Air compressors

Level Two

MODULE 08201-06 - PIPING SYSTEMS (5 Hours)

1. Identify and explain the types of piping systems.
2. Identify piping systems according to color-coding.
3. Explain the effects and corrective measures for thermal expansion in piping systems.
4. Explain types and applications of pipe insulation.



MODULE 08202-06 - DRAWINGS AND DETAIL SHEETS (15 Hours)

1. Identify parts of drawings.
2. Identify types of drawings.
3. Make field sketches.
4. Interpret drawing indexes and line lists.

MODULE 08203-06 - IDENTIFYING AND INSTALLING VALVES (20 Hours)

1. Identify types of valves that start and stop flow.
2. Identify types of valves that regulate flow.
3. Identify valves that relieve pressure.
4. Identify valves that regulate the direction of flow.
5. Identify types of valve actuators.
6. Explain how to properly store and handle valves.
7. Explain valve locations and positions.
8. Explain the factors that influence valve selection.
9. Interpret valve markings and nameplate information.

MODULE 08204-06 - PIPEFITTING TRADE MATH (15 Hours)

1. Identify and explain the use of special measuring devices.
2. Use tables of weights and measurements.
3. Use formulas to solve basic problems.
4. Solve area problems.
5. Solve volume problems
6. Solve circumference problems.
7. Solve right triangle problems using the Pythagorean theorem.

MODULE 08205-06 - THREADED PIPE FABRICATION (15 Hours)

1. Identify and explain the materials used in threaded piping systems.
2. Identify and explain pipe fittings.
3. Read and interpret screwed fitting joint drawings.
4. Identify and explain types of threads.
5. Determine pipe lengths between joints.
6. Thread and assemble piping and valves.
7. Calculate offsets.

MODULE 08206-06 - SOCKET WELD PIPE FABRICATION (25 Hours)

1. Identify and explain types of socket weld piping materials.
2. Identify and explain socket weld fittings.



3. Read and interpret socket weld piping drawings.
4. Determine pipe lengths between socket weld fittings.
5. Fabricate socket weld fitting to pipe.

MODULE 08207-06 - BUTT WELD PIPE FABRICATION (37.5 Hours)

1. Identify butt weld piping materials and fittings.
2. Read and interpret butt weld piping drawings.
3. Prepare pipe ends for fit-up.
4. Determine pipe lengths between fittings.
5. Select and install backing rings.
6. Perform alignment procedures for various types of fittings.

MODULE 08208-06 – EXCAVATIONS (10 Hours)

1. Identify and explain the use of shoring materials.
2. Identify and explain the use of premanufactured support systems.
3. Install a vertical shore to be used for shoring.
4. Determine the overall fall of a sewer line.
5. Determine and set the grade and elevation of a trench.
6. Explain backfilling procedures.

MODULE 08209-06 - UNDERGROUND PIPE INSTALLATION (20 Hours)

1. Identify and explain the types of underground piping materials.
2. Identify the size classifications of underground pipe.
3. Identify and explain the use of underground pipe fittings.
4. Explain the joining methods for underground pipe.
5. Explain the storage and handling methods of underground pipe.
6. Identify and explain underground pipe installation guidelines.
7. Join CPVC and PVC.
8. Join ductile iron.

Level Three

MODULE 08301-07 - RIGGING EQUIPMENT (10 Hours)

1. Identify and describe the uses of common rigging hardware and equipment.
2. Perform a safety inspection on hooks, slings, and other rigging equipment.
3. Describe common slings and determine sling capacities and angles.
4. Select, inspect, use, and maintain special rigging equipment, including:
 - Simple block and tackle
 - Chain hoists



- Come-alongs
 - Jacks
 - Tuggers
5. Inspect heavy rigging hardware.
 6. Tie knots used in rigging.

MODULE 08302-07 - RIGGING PRACTICES (10 Hours)

1. Identify and use the correct hand signals to guide a crane operator.
2. Identify basic rigging and crane safety procedures and determine the center of gravity of a load.
3. Identify the pinch points of a crane and explain how to avoid them.
4. Identify site and environmental hazards associated with rigging.
5. Properly attach rigging hardware for routine lifts and pipe lifts.
6. Identify the components of a lift plan.

MODULE 08303-07 - STANDARDS AND SPECIFICATIONS (7.5 Hours)

1. Understand and interpret pipefitting standards and codes.
2. Read and interpret pipefitting specifications.
3. Identify pipe and components according to specifications.

MODULE 08304-07 - ADVANCED TRADE MATH (20 Hours)

1. Use tables of equivalents.
2. Perform right angle trigonometry.
3. Calculate takeouts using trigonometry.

MODULE 08305-07 - MOTORIZED EQUIPMENT II (10 Hours)

1. Identify and explain types of manlifts.
2. Explain manlift safety rules and hazards.
3. Inspect scissors-type and telescoping boom manlifts.
4. Explain the use of cable lifts.
5. Identify and explain the use of drain cleaners.

MODULE 08306-07 - INTRODUCTION TO ABOVEGROUND PIPE INSTALLATION (20 Hours)

1. Store pipe and materials.
2. Identify types of flanges.
3. Identify types of gaskets used with flanges.
4. Lay out and cut gaskets.



5. Explain the location of flange bolt holes.
6. Install pipe with flanged connections.
7. Lay out and install pipe sleeves and floor penetrations.
8. Read and interpret spool sheets.
9. Explain how to erect spools in a piping system.

MODULE 08307-07 - FIELD ROUTING AND VESSEL TRIM (10 Hours)

1. Secure the work area.
2. Determine field run specifications.
3. Determine the required rigging equipment based on weight, location, and configuration.
4. Determine the load weight for erection equipment.
5. Determine the support needs.
6. Select and install erection materials.
7. Fabricate the field run of piping.
8. Erect vessel trim.

MODULE 08308-07 - PIPE HANGERS AND SUPPORTS (25 Hours)

1. Identify types of pipe hangers and supports.
2. Identify and interpret pipe support drawings and symbols.
3. Determine field placement of hangers.
4. Identify and install concrete fasteners.
5. Fabricate angle iron brackets to support pipe.
6. Identify and explain the types of spring can supports.
7. Identify and explain the types of variable spring can supports.
8. Identify and explain the types of constant spring can supports.
9. Explain the storing and handling procedures for spring can supports.
10. Explain how to install spring can supports.
11. Maintain spring can supports.

MODULE 08309-07 - TESTING PIPING SYSTEMS AND EQUIPMENT (20 Hours)

1. Perform pretest requirements.
2. Perform service and flow tests.
3. Perform head pressure tests.
4. Perform hydrostatic tests.
5. Explain how to perform steam blow tests.
6. Explain nondestructive examinations (NDE).

Level Four



MODULE 08401-07 - ADVANCED BLUEPRINT READING (50 Hours)

1. Identify symbols and abbreviations on P&IDs.
2. Identify piping arrangement drawings.
3. Read and interpret GPS coordinates, control points, and elevation.
4. Read and interpret P&IDs, plan views, and section views.
5. Identify isometric drawings.
6. Read isometric drawings taken from plan views.
7. Draw isometric drawings.
8. Read and interpret spool drawings taken from isometric drawings.

MODULE 08402-07 - ADVANCED PIPE FABRICATION (50 Hours)

1. Calculate simple piping offsets.
2. Calculate three-line, 45-degree, equal-spread offsets around a vessel.
3. Calculate three-line, 45-degree, unequal-spread offsets.
4. Fabricate tank heating coils.
5. Perform mitering procedures.
6. Lay out three- and four-piece mitered turns.
7. Lay out 45-degree laterals, using references or a calculator.
8. Fabricate dummy legs and trunions out of pipe, using references.
9. Perform geometric layout of pipe laterals and supports.
10. Lay out and fabricate a fishmouth.
11. Lay out and fabricate a wye.

MODULE 08403-07 - STRESS RELIEVING AND ALIGNING (15 Hours)

1. Explain thermal expansion, anchors, and cold springing.
2. Explain stress-relief procedures.
3. Explain grouting.
4. Explain four types of misalignment.
5. Align pipe flanges to rotating equipment nozzles.

MODULE 08404-07 - STEAM TRAPS (15 Hours)

1. Identify types of steam traps.
2. Install steam traps.
3. Troubleshoot steam trap systems.

MODULE 08405-07 - IN-LINE SPECIALITIES (10 Hours)

1. Identify the potential hazards associated with in-line specialties.
2. Identify in-line specialties.



3. Explain how to store and handle in-line specialties.

MODULE 08406-07 - SPECIAL PIPING (25 Hours)

1. Install flared and compression joints, using copper tubing.
2. Solder and braze joints, using copper tubing.
3. Bend pipe to a specified radius.
4. Install glass-lined pipe.
5. Explain how to install hydraulic fitted compression joints.
6. Install grooved pipe couplings.

MODULE 08407-07 - HOT TAPS (10 Hours)

1. Explain hot tap safety and potential hazards.
2. Identify fittings used with hot taps.
3. Explain the use of hot tap machines.
4. Identify and explain the use of stopples.

MODULE 08408-07 - MAINTAINING VALVES (10 Hours)

1. Remove and install threaded valves.
2. Remove and install flanged valves.
3. Replace valve stem O-rings.
4. Replace bonnet gaskets.
5. Explain the purpose of valve packing.
6. Explain or demonstrate how to repack a valve.

MODULE 08409-07 - INTRODUCTION TO SUPERVISORY ROLES (7.5 Hours)

1. Explain the importance of training for construction industry personnel.
2. Identify the gender and minority issues associated with a changing workforce.
3. Describe what employers can do to prevent workplace discrimination.
4. Describe the four major categories of construction projects.
5. Describe the difference between formal and informal organizations, as well as the difference between authority and responsibility.
6. Explain the purpose and content of a job description and a policy/procedure document.
7. List the characteristics and behavior of effective leaders, as well as the different leadership styles.
8. Explain the difference between problem solving and decision making.
9. Describe strategies for reducing absenteeism and turnover.
10. Explain the duties of a crew leader in enforcing safety on the job.