



Plumbing Technology

Program / Hours: CIP 46.0503–2 Year Half Day Program

Course Description: Plumbing prepares individuals to practice as licensed plumbers by applying technical knowledge and skills to lay out, assemble, install and maintain piping fixtures and systems for steam, natural gas, oil, hot water, heating, cooling, drainage, lubricating, sprinkling and industrial processing systems in home and business environments. The program includes instruction in source determination, water distribution, waste removal, pressure adjustment, basic physics, technical mathematics, blueprint reading, pipe installation, pumps, welding and soldering, plumbing inspection and applicable codes and standards.

Learning Activities / Modes of Assessment:

- Small Group
- Large Group
- Independent Work
- One-on-One
- Classwork Activities
- Presentations
- Research Projects
- Research Papers
- Technology Use
- Tests and Quizzes

Individual Resources:

- Textbooks
- Workbooks
- Online Resources
- PowerPoint Presentations
- Computer Applications
- Plumbing Equipment and Tools
- Plumbing HVAC Lab Simulations

Year / MP	Task #	K - Know	U - Understand	D - Do
Yr 1 MP 1	113	Practice OSHA safety Standards.	OSHA ensures worker safety on plumbing job Sites.	Identify hazards & demonstrate OSHA compliance
Yr 1 MP 1	114	Demonstrate donning, usage, and care of PPE.	PPE protects against injury when used properly.	Correctly wear, remove, and maintain PPE.
Yr 1 MP 1	115	Demonstrate safety procedures for hand & power tools.	Tools must be used safely to prevent accidents.	Operate tools under supervision with safety steps.
Yr 1 MP 1	116	Follow shop safety rules and procedures.	Shop rules keep everyone safe and productive.	Consistently apply safety protocols.
Yr 1 MP 1	501	Use and maintain hand tools.	Proper tool use and care extend tool life.	Safely cut, bend, tighten, and assemble pipe.
Yr 1 MP 1	502	Use and maintain power tools & equipment.	Power tools save time but require caution.	Correctly operate threading machines, drills, saws.
Yr 1 MP 1	2301	Demonstrate the use of different ladders.	Ladders must match the job type and height.	Select and safely climb/descend ladders.
MP2 – Codes, Standards, Measurement				
Yr1 MP2	2302	Set up and inspect stepladders, extension ladders, scaffolding.	Proper setup prevents falls.	Correctly set up & inspect ladders/scaffolds.
Yr1 MP2	402	Follow plumbing standards, codes, specifications.	Codes ensure safe & legal Installations.	Reference code book when planning tasks.
Yr1 MP2	1904	Perform tests per plumbing/mechanical codes.	Testing ensures safe & leak-free systems.	Perform air, hydrostatic, or pressure tests.
Yr1 MP2	2004	Convert center/back throat/face measurement to end measurement	Conversions allow accurate fitting placement.	Solve conversion problems on pipe layouts.
MP3 – Blueprints & Layout				
Yr1 MP3	301	Interpret types of drawings.	Blueprints are communication tools	Identify types of drawings (plans, isometrics).
Year / MP	Task #	K - Know	U - Understand	D - Do

Yr1 MP3	302	Interpret lines on drawings.	Each line type has a meaning.	Match lines with correct symbol/function
Yr1 MP3	303	Interpret specifications & dimensions.	Specs control accuracy and quality.	Read and explain blueprint dimensions.
Yr1 MP3	305	Identify piping symbols on blueprints.	Symbols represent pipe, valves, and fittings.	Identify/label blueprint symbols.
Yr1 MP3	1401	Lay out and establish grade/slope for drain lines.	Drain slope ensures proper flow.	Use level to set grade/slope.
Yr1 MP3	1701	Apply principles/purposes of venting.	Vents protect trap seals and prevent siphonage.	Explain venting options on diagrams.
Yr1 MP3	1703	Explain vent termination.	Terminations must be code compliant.	Identify correct vent termination methods.
Yr1 MP3	1704	Identify correct vent termination methods.	AAVs provide alternative venting.	Describe function and location of AAVs.
MP4 – Basic Piping & Joining				
Yr1 MP4	401	Install pipe & connections per manufacturer specs.	Manufacturer specs ensure warranty and safety.	Install pipe/fittings as directed.
Yr1 MP4	701	Join, cut, bend copper pipe.	Copper piping requires accurate cuts/bends.	Cut, ream, bend, join copper.
Yr1 MP4	705	Prepare & join copper with brazing	Brazing makes strong joints for high pressure	Brazing makes strong joints for high pressure
Yr1 MP4	706	Prepare & join copper with soldering	Solder seals copper joints for water-tightness.	Solder seals copper joints for water-tightness.
Yr1 MP4	801	Measure, cut, assemble PVC/CPVC.	Plastics require correct solvent welding.	Cut, prime, cement plastic joints.
Yr1 MP4	802	Measure, cut, assemble PEX/PE tubing.	PEX/PE use crimp/expansion fittings.	Assemble PEX with crimp tools.
Yr1 MP4	1101	Thread steel pipe with die/threader.	Steel requires threading for connections.	Thread pipe with machine & hand tools.
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Yr1 MP4	1102	Measure, cut, ream, assemble steel piping.	Steel piping demands accurate fitting.	Assemble steel sections correctly.
Yr1 MP4	405	Research thermal expansion in piping.	Expansion damages piping if uncontrolled.	Report on expansion methods.
Yr1 MP4	406	Install pipe insulation	Insulation prevents heat loss & condensation.	Install insulation correctly.
Yr1 MP4	2001	Calculate simple offsets.	Offsets allow alignment around obstacles.	Offsets allow alignment around obstacles.
Yr1 MP4	2002	Calculate 45° equal spread offsets.	Equal-spread offsets allow symmetry.	Equal-spread offsets allow symmetry.
Yr1 MP4	2003	Calculate 45° unequal spread offsets.	Unequal offsets solve layout challenges.	Lay out & cut unequal offsets.
Year 2 MP1 – Fixtures & Steel Pipe				
Yr2 MP1	1501	Install water closets.	Toilets must be installed watertight & level.	Install gravity/flush valve closets.
Yr2 MP1	1502	Install bathtubs.	Bathtubs require level support & drainage.	Install tub to spec.
Yr2 MP1	1503	Install tub to spec.	Wall fixtures require carriers & bracing.	Install wall-hung sink or urinal
Yr2 MP1	1604	Install washing machine box.	Laundry needs water, drain, and vent.	Install washer outlet Box.
Yr2 MP1	1811	Replace toilet tank components.	Tank parts wear out & must be replaced.	Rebuild toilet tank.
MP2 – Advanced Fixtures, Supports, Steel				
Yr2 MP2	901	Use hangers to secure piping.	Supports prevent sagging/leaks.	Install hangers in wood/metal/masonry.
Yr2 MP2	902	Layout fixture carriers.	Carriers support heavy fixtures.	Layout carriers per blueprint.
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Yr2 MP2	1002	Rough-in water supply lines.	Rough-in sets fixture connections.	Rough-in supply for sink/toilet.
Yr2 MP2	1103	Adapt steel pipe to other piping	Adapters transition between materials.	Use unions/adapters for mixed piping
Yr2 MP2	1104	Join black steel with mega press.	Mega press is modern Jointing.	Install mega press fitting.
Yr2 MP2	1105	Assemble CSST pipe & fittings.	CSST is flexible gas piping.	Assemble CSST system.
Yr2 MP2	1505	Install kitchen sinks.	Kitchens need water, drain, vent.	Install kitchen sink.
Yr2 MP2	1506	Install shower base drains	Bases must be sealed watertight	Install shower base & drain.
Yr2 MP2	1507	Install lavatories.	Lavatories require level & vented install.	Install lavatory & trap.
Yr2 MP2	1509	Install fixture traps.	Traps prevent sewer gas.	Install P-trap/S-trap correctly.
MP3 – Valves, Cast Iron, Drainage				
Yr2 MP3	601	Use backflow prevention devices.	Backflow prevention protects potable water.	Test/install backflow devices.
Yr2 MP3	602	Use start/stop valves.	Valves control flow.	Install ball/gate valves.
Yr2 MP3	603	Use regulating valves.	Regulating valves balance systems.	Install globe/balance valve.
Yr2 MP3	604	Use pressure relief valves	Relief valves protect from overpressure.	Install & test relief valve.
Yr2 MP3	1201	Use tools for cast iron pipe.	Cast iron requires specialty tools.	Use snap cutters & saws
Yr2 MP3	1202	Measure & cut cast iron soil pipe.	Proper cutting ensures fit.	Cut cast iron pipe.
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Yr2 MP3	1203	Assemble cast iron joints.	Gaskets & bands seal cast iron.	Assemble no hub/Fernco joints.
Yr2 MP3	1204	Research lead joints.	Lead joints are historical methods.	Research & present lead joint process.
Yr2 MP3	1402	Explain backwater prevention.	Backwater valves stop sewer backup.	Identify backwater valve applications.
Yr2 MP3	1405	Rough-in drain lines.	Drains must meet slope & code.	Rough-in drains to spec.
Yr2 MP3	1812	Research sewer camera inspection.	Cameras diagnose drain issues.	Report on inspection tools.
Yr2 MP3	2101	Research boiler fittings, controls.	Boilers need controls for safety.	Present on boiler accessories.
Yr2 MP3	2102	Research boiler types & fuels.	Boilers use multiple energy sources.	Compare boiler fuel types.
Yr2 MP3	2201	Research hydronic heating piping.	Hydronics distribute heated water.	Present hydronic piping methods.
Yr2 MP3	2202	Research primary/secondary piping.	Primary/secondary increases efficiency.	Diagram primary/secondary system.
Yr2 MP3	2203	Research radiant systems.	Radiant heating uses embedded piping.	Present radiant floor heating design.
MP4 – Appliances, Maintenance, Advanced Systems				
Yr2 MP4	606	Disassemble & assemble valves.	Disassemble & assemble valves.	Rebuild gate/globe valve.
Yr2 MP4	1601	Install dishwasher.	Dishwashers require water, drain, power.	Install residential dishwasher.
Yr2 MP4	1602	Install water heater (gas/electric).	Water heaters require vent, supply, safety valves.	Install water heater.
Yr2 MP4	1605	Install specialty water Heaters.	Tankless & indirect units save space/energy.	Install tankless or indirect WH.
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Yr2 MP4	1606	Describe operation of recirculating pump.	Recirculation provides instant hot water.	Diagram pump operation.
Yr2 MP4	1607	Install garbage disposal.	Disposals grind food waste	Install disposal to sink.
Yr2 MP4	1608	Install sump pump.	Sumps remove groundwater.	Install sump pump system.
Yr2 MP4	1609	Research sewage ejector pump.	Ejectors move sewage against gravity.	Research & present system.
Yr2 MP4	1801	Clear obstructions from lavatory drains.	Small drains clog easily.	Use auger to clear lavatory drain.
Yr2 MP4	1802	Clear obstructions from main drains.	Main line blockages affect whole system.	Use sewer snake/jetter.
Yr2 MP4	1803	Clear obstructions from toilets.	Toilets require plunging or auger.	Clear WC obstruction.
Yr2 MP4	1804	Repair/replace leaking faucets/valves.	Leaks waste water & cause damage.	Replace washers, cartridges, seals.
Yr2 MP4	1808	Research thawing frozen pipes.	Frozen pipes burst without prevention.	Present thawing methods.