

SECTION 15410 - PLUMBING SYSTEMS PIPING SPECIFICATIONS

- General
- Principal items of work included
 - Coil piping
 - Drain, waste, and vent piping (DWV)
 - Indirect waste piping
 - Hot and cold domestic water system
 - Roof and overflow drains, roof leaders, and rain water drainage piping
 - Valves and accessories
 - Utility connection requirements
 - Potable water system disinfection
 - Plumbing fixtures and water heater per drawings
 - Back-flow preventer
 - Related work specified elsewhere
 - Trenching and backfill: see earthwork
 - Fixtures and equipment: see plumbing fixture schedule on drawings
 - Painting: see painting
 - Requirements
 - Codes
 - International mechanical code
 - Uniform Plumbing Code
 - 2018 South Carolina Building Code, Energy Conservation
 - National electrical code (NEC)
 - Applicable local codes
 - Applicable safety codes
 - Americans with disabilities act (ADA)
- Standards:
- American national standards institute (ANSI):
 - A-53 Steel, black and hot dipped, zinc coated, welded and seamless pipe, cost bronze solder-joint pressure fittings
 - B16.18 wrought copper and bronze solder-joint pressure fittings, cost copper alloy solder-joint drainage fittings-DWV
 - B16.22 wrought copper and bronze solder-joint pressure fittings, cost copper alloy solder-joint drainage fittings-DWV
 - B16.23 wrought copper and bronze solder-joint pressure fittings, cost copper alloy solder-joint drainage fittings-DWV
 - B16.25 wrought copper and bronze solder-joint pressure fittings, cost copper alloy solder-joint drainage fittings-DWV
 - B16.29 wrought copper and bronze solder-joint pressure fittings, cost copper alloy solder-joint drainage fittings-DWV
 - B30e-86 copper drainage tube (DWV)
 - American Society for Testing and Materials (ASTM):
 - A-53 steel, black and hot dipped, zinc coated, welded, and seamless pipe, cost iron soil pipe and fittings
 - A-74 cast iron soil pipe and fittings
 - E-32 solder metal
 - E-33 seamless copper water tube
 - E-306 copper drainage tube (DWV)
 - D-1785 polyvinyl chloride (pvc) plastic pipe, schedule 40 and 80, propylene plastic molding and extruding materials
 - D-2446 socket-type PVC plastic pipe fittings
 - D-2564 solvent cements for PVC plastic pipe and fittings
 - D-2661 ABS schedule 40 plastic drain, waste and vent pipe
 - D-2665 PVC plastic drain, waste and vent pipe and fittings
 - D-2751 ABS sewer pipe and fittings
 - Submittals:
 - Three (3) copies of catalog sheets shall be submitted to owner's construction manager for review. Submittals shall be made and favorable review secured before materials and equipment are installed. Submit catalog data sheets for:
 - Valves and accessories
 - Hangers and supports
 - Clean outs
 - Electric connections
 - Water hammer arrestors
 - Floor sinks and floor drains
 - Water heater and accessories
 - Plumbing fixtures
 - Back-flow preventer
- Products
- Materials:
 - For material applications see "material specifications" later in these notes
 - Cast iron DWV piping systems: ASTM A74
 - Copper DWV piping systems: type DWV copper per ASTM B306
 - Copper pressure piping systems:
 - Piping type "L" copper per ASTM B88
 - Fittings: solder-joint cost bronze per ANSI B16.18 or wrought copper per ANSI B16.22
 - Flanges: class 150 pound bronze: NIBCO, CHACE, or approved alternative
 - Unions: solder-weld bronze: NIBCO, CHACE, or approved alternative
 - Water valves:
 - Ball, 2-inch and smaller: 125 psi WSP brass; sweat joints: WATTS #WBVS or approved alternative
 - Check valves: 150 psi WSP, bronze body, sweat or threaded joints: WATTS #CV or CVS or approved alternative
 - Air valves: bronze, screwed end, 150 WSP, CPANE #431-UB, stockham #120, or approved alternative
 - Quick connect couplings: 1/2-inch size brass construction, parker hannifin, onflo, or approved alternative
 - PVC piping systems:
 - Pipe: schedule 40 PVC per ASTM D1785 or schedule 80 pvc per astm 1785
 - Fittings and flanges: pvc schedule 80 socket weld per astm D2467
 - Water valves: same as for copper piping
 - Joints in piping:
 - Copper: solder-joint
 - Plastic: socket weld and fusion weld
 - Cast iron: compression, or no-hub joint

- Equipment:
 - Hangers and supports:
 - Split-ring type, galvanized Grinnell, superstrut, or approved alternative
 - Trapeze type, galvanized unistrut, knifor F, or approved alternative
 - Bolts: steel, galvanized, superstrut, or approved alternative
 - Vertical strut type: unistrut, knifor F, or approved alternative
 - Piping isolators: metal-clad felt type specifically note for isolating pipe from hanger; senco trisolators; superstrut type C715 isolator, or approved alternative
 - Water hammer arrestors: JP Smith Hydrostat, zurn shocktrol, or approved alternative
 - Back-flow preventer: reduced pressure type, bronze construction, three-year approval by the foundation for cross-connection control research, university of southern California: FEBCO Model 835, BECCO, or approved alternative
 - Dielectric connections, insulating unions: capitol, clayton-mark (patron), or approved alternative. For cold water only, schedule 80 penton, or cpvc nipples, 4-inch long, may be used
 - Miscellaneous materials:
 - Flashing for piping protruding through exterior walls or roof: 16-ounce per square foot copper, or 4-pound per square foot lead
 - Solder: 95/5 (tin/antimony) per ASTM B32
 - Coupling lead: 99.7 percent pure lead
 - Pipe sleeves: steel, cast iron or plastic
 - Escutcheons: cast iron, malleable iron, painted or chrome plated
 - Insulation: Manville Aerotube or approved alternative
 - Substitutions:
 - Substitutions may be considered in lieu of specified fixtures as follows:
 - Floor installed fixtures and clean outs - J.R. Smith, Joson
 - Water closets, lavatories, urinals - Kohler, American standard, crane
 - Roof drains: tech specialties
 - Water heater - state, a.o. smith
- These and other equivalent alternatives shall be presented to the owner's construction manager for consideration per the "submittals" section.
- Execution:
- Installation - General:
 - Piping shall include all piping, fittings and valves connect to existing piping utilities as indicated on drawings
 - Conceal all interior piping in walls or above ceilings, except where shown to be exposed
 - Provide for expansion and contraction of all pipes
 - Provide reducing fittings for all changes in pipe size - do not use bushings
 - Provide dielectric isolation between dissimilar metals and where required at equipment connections
 - Provide fittings for all changes in pipe direction
 - Continuation pipe: do not disconnect or interconnect between potable water piping and drain, soil, or waste piping
 - Installation - Systems:
 - Water piping:
 - Copper type "L"
 - Provide shut-off valves as indicated or required
 - Provide drain valves where indicated for complete system drainage
 - Provide water hammer arrestors sized and located per table V, WH-201 or as shown
 - Provide back-flow preventer where shown
 - Sanitary Piping:
 - Grading: slope horizontal soil and waste piping 1/4-inch per foot where possible, but in no case less than 1/8-inch per foot
 - Installation - Testing:
 - All hot and cold water supply, drainage, and vent piping shall be tested as indicated below or as required by the local jurisdiction, whichever is more stringent. No piping system shall be covered up or buried until successfully tested and approved by the owner and the local plumbing inspector
 - Water piping upon completion of a section, or of the entire hot and cold water supply system, it shall be tested and proved watertight under a water pressure not less than the working pressure under which it is to be used, or eighty (80) psig, whichever is higher (verify with the local water company). The water used for testing shall be obtained from a potable source of supply. The piping under test shall withstand the test without leaking and not less than fifteen (15) minutes. Any section of piping failing the test shall be repaired and retested, as indicated above until successful, holding the applied pressure for at least the specified time period
 - Drainage piping upon completion of a section, or of the entire drainage and venting systems, they shall be tested and proved watertight under a water pressure not less than a ten (10) foot head. If the system is tested in sections, each opening shall be tightly plugged except at the highest opening of the section to be tested, and each section shall be filled with water to a ten (10) foot head. Testing of massive sections at least the upper ten (10) feet of the next proceeding section shall be tested, so that no joint or pipe in the building shall have been tested at less than ten (10) foot head of water. The water shall be kept in the system, the section under test, for at least thirty (30) minutes and maintain the applied pressure without leaking. Any section of the drainage or vent piping failing the test shall be repaired and retested as indicated above until successfully tested at the applied pressure for at least the specified time period
 - Guarantee:
 - All work shall be guaranteed for a minimum of one year from the date of acceptance by the Owner. The guarantee period for certain items shall be longer, as indicated in the specifications
 - Should any malfunction occur during the guarantee time period due to defective material, faulty workmanship, or non-compliance with specifications, codes, or directions of the Designer and/or Engineer, or Inspector, the contractor shall furnish all necessary labor and materials to correct the malfunction without additional charges
 - Clean-up:
 - The contractor shall remove all waste generated by the plumbing works and do not leave any debris on the job site clear and safe from any debris and/or items that fall under the responsibility of the project, the plumbing works shall be cleaned including plumbing fixtures, waste lines, water heaters, and any other plumbing devices shall be performed to the satisfaction of the owner or the owner's representative and shall occur before final acceptance of the project. All debris and waste shall be removed from the site and disposed of in a safe manner as required by local and state authorities
 - Materials Specification:
 - Sanitary Soil, Waste, and Vent Systems: soil, waste, and vent piping shall be schedule 40 pvc or cast iron. Before commencement of work, contractor shall verify that pipe to be installed complies with local codes and will be acceptable to local building inspectors. Contractor shall bear all costs for removal and replacement of any unacceptable pipe. Where pvc is unacceptable, soil and waste piping below slab and including yard piping shall be standard weight cast iron soil pipe and fittings (no hub). The couplings shall be stainless steel shields and clamp with neoprene gaskets. Vent piping above floor shall be schedule 40 galvanized steel with cast iron drainage pattern screw fittings
 - Water piping above and below slab: type "L" hard drawn copper tubing with 95-5 tin/antimony solder or approved lead-less joint fittings
 - Water piping below grade outside building: schedule 40 pvc, if pvc is unacceptable to local authorities or if soil is contaminated use type "L" hard drawn copper tubing with 95-5 tin/antimony solder or approved lead-less joint fittings. Where street pressure exceeds 80 psi provide pressure reducing valve assembly complete with relief valve. No joints will be allowed under building slab
 - Indirect & condensate drains: copper, type "M" with 95-5 tin/antimony solder joint fittings. No joints will be allowed under building slab
 - Insulate all cold water lines within the building (in areas with high outdoor humidity and/or temperature or low outdoor temperature only) shall be insulated with "ppg" industries, certain feed joint gobain snap-on or john mansulation. All hot water lines within the building shall be insulated with "ppg" industries, certain feed joint gobain snap-on or john mansville micro-loc, except in the ceiling space which shall be john mansville aerotube from plastic pipe insulation. Hot and cold water insulation shall be 1" thick or per local codes. Exposed hot and cold water pipes and traps below restroom lavatories shall be insulated with "fruebi" or insulation kit, see plumbing schedule. All hvac condensate drains including waste lines from evaporative coolers shall be insulated with 1/2" thick john mansville aerotube foam plastic pipe insulation
 - Water hammer arrestors: all stainless steel construction bellows-type, psi approved and certified sizing and placement conforming to plumbing and drainage institute standard psi-wh 201 latest edition and as manufactured by J.R. Smith, zurn, or pff, inc

GENERAL PLUMBING NOTES:

- ALL WORK SHALL BE ARRANGED IN A NEAT, WELL ORGANIZED MANNER. ALL WORK SHALL BE PARALLEL AND PERPENDICULAR TO THE PRIMARY LINE OF THE BUILDING. LOCATE ALL OPERATING AND CONTROL EQUIPMENT PROPERLY TO PROVIDE CODE AND/OR MANUFACTURER'S CLEARANCE.
- ALL BELOW SLAB WASTE PIPING TO BE SLOPED AT 1/4" PEP FOOT.
- ALL WORK SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE PORTIONS OF ALL NATIONAL, STATE, AND LOCAL CODES AND STANDARDS WHERE THE CONTRACT DOCUMENTS ARE IN EXCESS OF CODE REQUIREMENTS. THE CONTRACT DOCUMENTS SHALL GOVERN IN THE EVENT OF A CONFLICT BETWEEN THE CONTRACT DOCUMENTS AND APPLICABLE CODE. THE LATTER SHALL GOVERN.
- GC SHALL ENSURE THAT ALL LIGHTS, SPRINKLER HEADS, DIFFUSERS AND OTHER CEILING DEVICES ARE CENTERED IN CEILING TILES AND IN BETWEEN LIGHT FIXTURES.
- ALL PIPING TO BE INSULATED PER SPECIFICATIONS UNLESS NOTED OTHERWISE ON THE PLANS.
- FURNISH AND INSTALL ALL ITEMS, INCLUDING EVERY ARTICLE, DEVICE OR ACCESSORY REASONABLY NECESSARY TO FACILITATE EACH SYSTEM'S FUNCTIONING AS INDICATED BY THE DESIGN AND THE EQUIPMENT SPECIFIED. ELEMENTS OF THE WORK SHALL INCLUDE, BUT ARE NOT LIMITED TO MATERIALS, LABOR, SUPERVISION, SUPPLIES, EQUIPMENT, TRANSPORTATION, HOISTING/RIGGING, STORAGE, UTILITIES AND ALL REQUIRED PERMITS AND LICENSES.
- EQUIPMENT LOCATION SHOWN ON PLAN ARE APPROXIMATE. COORDINATE EXACT LOCATION WITH STRUCTURE AND OTHER EQUIPMENT PRIOR TO POUR-IN.
- CONTRACTOR SHALL COORDINATE ALL PIPE ROUTING WITH STRUCTURE AND OTHER DISCIPLINES PRIOR TO PURCHASING, CONSTRUCTING, OR INSTALLING ANY PIPING.
- MAINTAIN ALL OUTSIDE AIR INTAKE OPENINGS MINIMUM 30" FROM ALL MECHANICAL VENTS, PLUMBING VENTS, AND EXHAUST FANS.
- PROVIDE SHUT OFF VALVES AT EACH FUTURE BRANCH IN ADDITION TO SHUT OFF VALVES AT FIXTURES FOR MAINTENANCE OR REPLACEMENT OF EACH FIXTURE.
- ALL PIPING SHALL BE CONSTRUCTED, SEALED AND SUPPORTED PER SPECIFICATIONS.
- PROVIDE ALL PLUMBING EQUIPMENT WITH NEW LAMINATED IDENTIFICATION TAGS, LABEL TAGS AS SHOWN ON PLAN.
- ALL GAS PIPED EQUIPMENT TO BE UL LISTED AND ASIA APPROVED.
- ALL EQUIPMENT SHALL BE ANCHORED TO THE BUILDING STRUCTURE EXCEPT AS REQUIRED BY INC SECTIONS 602.2.1 THROUGH 602.2.5. MATERIALS WITHIN PLENUMS SHALL BE NONCOMBUSTIBLE OR SHALL HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25 WITH A SMOKE DEVELOPED INDEX OF NOT MORE THAN 50 WHEN TESTED IN ACCORDANCE WITH ASTM-E-84 OR UL-723.
- PROVIDE SLEEVES AND FLASHINGS REQUIRED FOR PIPING AND DUCTWORK PENETRATIONS. PROVIDE ESCUTCHEONS AT ALL PIPING PENETRATING FINISHED WALLS. ALL ESCUTCHEONS, INTERIOR AND EXTERIOR WALL PENETRATIONS SHALL BE TESTED AND SEALED TO MINIMIZE ENTRY OF PESTS AND MOISTURE.
- FIELD VERIFICATION OF EXISTING CONDITIONS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR SHALL NOTIFY THE ARCHITECT/OWNER OF ANY DISCREPANCIES FOUND PRIOR TO SUBMISSION OF BID. THE CONTRACTOR SHALL TAKE NOTE THAT THE DRAWING IS A SCHEMATIC IN NATURE AND INDICATE THE APPROXIMATE LOCATION OF THE MECHANICAL PLUMBING SYSTEMS. LOCATE ALL NEW WORK BY ON-THE-JOB SURVEYMENTS. COOPERATE WITH OTHER TRADES TO ENSURE PROPER FIT AND ACCESS TO ALL ITEMS.
- COORDINATE WITH ELECTRICAL TO PROVIDE POWER FOR ALL INSULATION OR CONDENSATION TRAPS, THE CLOCK AND HEAT TRAP WORK, WHETHER OR NOT SHOWN ON PLANS.
- CONTRACTOR SHALL BE GRANTED FOR UNDERSTANDING OF THE PROJECT AND AMOUNT OF WORK TO BE PERFORMED. TENDER OF A PROPOSURE SHALL BE CONTRACTOR AGREEMENT OF THE ITEMS SPECIFIED AND/OR INDICATED, SCHEDULED OR REQUIRED BY THE CONTRACT DOCUMENTS, AND/OR REQUIRED BY THE NATURE OF THIS WORK.
- THE GENERAL CONTRACTOR AND ALL SUBCONTRACTORS SHALL COORDINATE THE INSTALLATION OF DUCTWORK, PIPING, CONDUIT, CABLE, ETC., INSTALLATION WITH LIGHTING FIXTURES, SPECIAL CEILING CONSTRUCTION, AIR DISTRIBUTION EQUIPMENT AND THE STRUCTURE. PROVIDE ADDITIONAL PIPES AND OFFSETS AS REQUIRED IF, AFTER INSTALLED, NEW DUCTWORK, PIPING, CONDUIT, OR CABLE IS FOUND TO BE IN CONFLICT WITH THE ARCHITECTURE, STRUCTURE, OR OTHER TRADE WORK, OR WHICH IS EITHER EXISTING OR SHOWN ON THE CONTRACT DOCUMENT, THE DUCTWORK, CONDUIT, OR CABLE SHALL BE RELOCATED WITHOUT ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL PROTECT THE WORK, EQUIPMENT, AND MATERIALS FROM DAMAGE BY HIS WORK OR HIS PERSONNEL, AND SHALL CORRECT ALL DAMAGE THUS CAUSED WITHOUT ADDITIONAL COST TO THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK, MATERIALS, AND EQUIPMENT UNTIL FINAL ACCEPTANCE BY THE OWNER. PROTECT ALL WORK AGAINST THEFT, INJURY, OR DAMAGE AND CAREFULLY STORE MATERIAL AND EQUIPMENT RECEIVED ON SITE WHICH IS NOT IMMEDIATELY INSTALLED. THE CONTRACTOR SHALL CLOSE OPEN ENDS OF WORK WITH TEMPORARY COVERS OR PLUGS DURING CONSTRUCTION TO PREVENT THE ENTRY OF DUST, DIPT, AND OBSTRUCTING MATERIAL. THE CONTRACTOR SHALL PROTECT ALL EQUIPMENT AND MATERIALS FROM DAMAGE DUE TO WATER, SPRAY-ON FIREPROOFING, CONSTRUCTION DEBRIS, ETC. IN A MANNER ACCEPTABLE TO THE ENGINEER AND/OR OWNER.

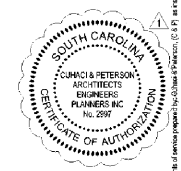
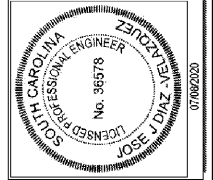
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