PLUMBING DIVISION 22 00 00

The UVU Standards are provided in CSI format for ease of locating requirements from UVU. These requirements are in addition to the State of Utah Division of Facilities and Construction Management (DFCM) Design Requirements. In the event of any discrepancy between the DFCM Design and UVU Standards requirements, the Architectural/Engineering Team shall use the UVU Standards over the DFCM Design Requirements.

Items below are not intended to specify all the requirements needed for the completion of a project. The Engineer of Record shall provide their expertise for full completion. Items below that UVU does currently give direction on, are left to the discretion of the Engineer of Record.

SECTIONS

Section 22 00 00 Plumbing

1. GENERAL

1.1. Plumbing System Description

1.1.1 Plumbing systems on campus are tied to a central loop for domestic hot water systems.
1.1.2 Individual Buildings are supplied from the city water lines that are throughout the campus.
1.1.3 There is a separate irrigation line throughout the campus that feeds the landscape areas. The use of potable water for irrigation should be avoided.
1.1.4 Drain, Waste, Vent, and Facility Storm Drainage are separate systems and should not be combined.

1.2. Workmanship

1.2.1 Plumbing work performed for Utah Valley University must be executed in a professional manner. Careful consideration should be taken to minimize the disruption of campus operations while performing work during normal operating hours.
1.2.2 Plumbing Contractors hired to perform work for Utah Valley University are required to have at least one Journeyman Plumber, currently licensed by the state of Utah, on-site at ALL times while work is being performed

1.3. Deviations of Standards Approval Team

1.3.1 Any deviation from these standards can be allowed if written permission is obtained from ALL of the following individuals:
(A) UVU Construction Project Manager – Changes per Project
(B) UVU Director of Campus Facilities
(i) 801-863-8131
(ii) campusservices@uvu.edu

1.4. Materials and Equipment

1.4.1 All Plumbing materials and equipment (piping, water heaters, pumps, plumbing fixtures) must be NEW. Re-furbished or re-purposed materials and equipment of any kind is not acceptable. Utilization of existing, unused materials and equipment (piping, fixtures, etc) must be approved by the Deviations of Standards Approval Team.

1.5. Applicable Codes and Standards

1.5.1 The most recent of any code adopted by the state of Utah shall be followed. The most recent handbook of the standards referenced here-in shall be followed.
(A) IBC – International Building Code
(B) IPC - International Plumbing Code
(C) IECC - Internal Energy Conservation Code OR ASHRAE 90.1

(D) State of Utah High Performance Building Standard

1.6. Temporary Water

1.6.1 The campus will allow for contractors to connect to existing non potable water systems without back billing. Contractor will supply all necessary parts and labor to connect to a temporary source.

1.7. Interruption of Existing Plumbing Service

1.7.1 Do not interrupt plumbing service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary plumbing service according to requirements indicated:

1.7.2 Notify the owner no fewer than 40 working days' in advance for outages involving two or more buildings, 20 working days' in advance for outages involving one building, and 10 days' in advance for outages involving a portion of one building in advance of proposed interruption of plumbing service.

1.7.3 Do not proceed with interruption of plumbing service without Owner's written permission.

1.7.4 To gain permission please provide the following to the UVU Construction Project Manager, UVU Director of Campus Facilities, and UVU Lead Plumber (contact information is outlined under Deviation of Standards):

(A) Date and Time of interruption
(B) Duration of Interruption
(C) Equipment associated with the interruption

1.7.5 Interruptions shall only be approved for Sundays and during the week between 10:00 PM and 6:00 AM. Monday through Friday during normal hours is allowed if the interruption only affects small areas and with approval.

2. PRODUCTS

2.1. None

3. EXECUTION

3.1. Install all free-standing equipment on a 4 inch thick concrete housekeeping pad. This shall include water heaters, base mounted expansion tanks, etc. Construct concrete bases of the dimensions indicated by the manufacturer but not less than 4 inches larger in both directions than supported unit.

Section 22 01 00 Operations and Maintenance

1. GENERAL

1.1. None

2. PRODUCTS

2.1. Hard Copy O&M Manual Binder

2.1.1 2-1/2" D Ring, Buckram Type Binder, Color Green.
2.1.2 The cover of the binder shall include a custom-printed embossed label indicating
(A) Project Name
(B) "Plumbing O&M Manual"
(C) Date of Substantial Completion

3. EXECUTION

3.1. In the room containing the main service domestic water PRV station, provide a 11 x 17 laminated drawing showing clear locations where each valve for the plumbing system is located, include a red label on the drawings indicating the valve number.

3.1.1 In addition, a list of all valves shall be located 8x11 laminated in the same room as identified above.

3.2. Operations and Maintenance Manuals will include final shut-off valve locations shown on 11x17 PDF drawings.

3.3. Plumbing chases will be a minimum of 36" in width. When walls are insulated use an aluminum back insulation to allow maintenance staff to not brush up against the insulation.

3.4. Identification on ceiling grid on valve locations. "Domestic Water Valve – Valve No."

3.5. O&M Manuals and Relines shall be provided to the Director of Campus Services before Final Retention shall be released. The Director of Campus Services shall sign for these O&M.

Section 22 05 19 Meters and Gauges for Plumbing

1. GENERAL

   1.1. None

2. PRODUCTS

   2.1. Pressure Gauges

      2.1.1 All plumbing pressure gauges will be liquid filled, 4” diameter, bourdon type gauges. .
      2.1.2 Pressure range for the gauges will be the following:
         (A) 0-100 psi for gauges located after the Reduce Pressure
         (B) 0-160 psi for gauges located before the buildings main Reduce Pressure Backflow Preventer

   2.2. Thermometers

      2.2.1 All domestic water thermometers shall be 5” round, bi-metal, with an adjustable angle OR a 9” thermometer mercury-free liquid in glass with an adjustable angle
      2.2.2 Provide 2” extension where piping is insulated.
      2.2.3 Thermometers shall have a range of the following:
         (A) Domestic Hot Water: Range 0-150F
         (B) Domestic Hot Water Return Recirculation Line: Range 0-150F
         (C) Domestic Hot Water Serving Kitchens (140F+ Loop) or before a mixing valve where the water is expected to be 140F+: Range 30-240F
         (D) Domestic Cold Water: Range 0-150

   2.3. Water Meters

      2.3.1 Manufacturer: Onicon or owner approved equal.
      2.3.2 BACnet capable.
      2.3.3 Turbine and Electromagnetic are allowed.

3. EXECUTION

   3.1. Pressure Gauges

      3.1.1 Pressure Gauges shall be located as follows:
         (A) Before Pressure Reducing Valves
         (B) After Pressure Reducing Valves
         (C) After Water Heaters
         (D) Before Mixing Valves (both hot and cold water side)
         (E) After Mixing Valves
      3.1.2 Pressure gauges shall include isolation of the pressure gauge with a general duty valve, ball valve type.

3.2. Thermometers

3.2.1 Thermometers shall be located as follows:

(A) Domestic Hot Water Supply after Building Mixing Station when a Building Master Mixing Valve is installed

(B) Domestic Hot Water Supply feed directly from plant and as the DHW pipe enters into the main plumbing/mechanical room.

(C) Domestic Hot Water Supply after a Water Heater.

(D) Domestic Hot Water Return Recirculation Line.

(E) Domestic Cold Water before the cold waters enter a water heater or thermostatic mixing valve.

3.3. Water Meters

3.3.1 Provide a digital water meter for the main building water supply

3.3.2 Provide a digital water meter for the mechanical system (the mechanical system is grouped together on one meter; mechanical system includes cooling towers and evaporative media).

3.3.3 Provide a Water Meter for the domestic hot water system when the system is tied to the central plant.

3.4. BMS System Thermometer

3.4.1 For systems connected to the domestic hot water central plant system provide a supply and recirculation BMS thermometer.

Section 22 05 23 General-Duty Valves for Plumbing Piping

1. GENERAL

1.1. None

2. PRODUCTS

2.1. Domestic Water Valves:

2.1.1 2” and Smaller: Use a Ball valves with stainless steel balls.
2.1.2 2 -1/2” and larger Butterfly/Ball Valves: All butterfly valves shall have EPDM seat, stainless steel disc, lug body, and appropriate operator. This applies especially to seat and seal materials.
2.1.3 Valves located in insulation will have extension stems appropriate for the thickness of the insulation.

2.2. Gas Valves

2.2.1 Defer to Engineer of Record

2.3. RO/DI Valves

2.3.1 Defer to Engineer

3. EXECUTION

3.1. Plumbing Isolation shall be provided at various levels of isolation:

3.1.1 Building Isolation
(A) Where Domestic Cold or Hot Water enters the building an isolation valve shall be provided to isolate the building while allowing water to flow to buildings attached further down the domestic feed
3.1.2 Floor Isolation
(A) Where Domestic Cold or Hot Water comes from a chase to feed a floor an isolation valve shall be provided to isolate the floor while allowing water to flow to other floors attached further down the domestic water system.
3.1.3 Branch Isolation
(A) Each branch line greater than 2” in size shall have an isolation valve. Any remodel done on campus where the project connects to the domestic system shall also include an isolation valve.
3.1.4 Plumbing Group Isolation
(A) Where one or more plumbing fixtures is in a single room the room shall have an isolation, valve located outside of the room, as near to the room as possible.
3.1.5 Plumbing Fixture Isolation
(A) Hose bibs, sill cocks and water coolers (water fountains) shall have isolation valves located in the ceiling next to the fixture. Hose bibs located in plumbing groups do not have to be individually isolated.

3.1.6 Plumbing Equipment Isolation

(A) All plumbing equipment including, pumps, storage tanks, expansion tanks, water heaters, heat exchangers and thermostatic mixing valves shall be provided with isolation valves for the individual piece of equipment.

(B) Equipment shall not be grouped together for isolation but must be individually isolated.

3.2. Angle stops must be provided on lavatories but do not count as an isolating valve.

3.3. All valves shall be located no further than 3’ vertically from ceiling grid or hard lid ceiling.

Section 22 05 53 Identification for Plumbing Piping and Equipment

1. GENERAL

   1.1. None

2. PRODUCTS

   2.1. Engraved Laminated: Acrylic or Melamine Label: Adhesive-backed with white lettering 3/8" high. Background shall be black for normal power and red for emergency power. Labels shall be punched or drilled and mounted with screws.

   2.2. Piping Label: Use Outdoor Grade 3.2 mil thick high-gloss adhesive-backed vinyl film.

      2.2.1 Tape shall be applied on both ends with the same color as the marker with 1" of cover over the label and 1" cover of the pipe or insulation.
      2.2.2 Minimum letter height shall be 1"

   2.3. Valve Tagging: Use 2" round brass 20 gauge type tags with #6 brass beaded chain.

3. EXECUTION

   3.1. Domestic water piping shall be labeled per piping label per color and naming scheme below:

      3.1.1 Domestic Cold Water: Label shall read DCW or Domestic Cold Water and labeled yellow.
      3.1.2 Domestic Hot Water: Label shall read DHW or Domestic Hot Water and labeled green.
      3.1.3 Domestic Hot Water Re-Circulation: Label shall read DHWR or Domestic Hot Water Return and labeled green.
      3.1.4 Gas Line Labeled: Label shall read Gas Line Pressure XX (whatever the pressure should be) and labeled black.
      3.1.5 Natural Gas Line: Label shall read Natural Gas Pressure XX and labeled green

   3.2. Industrial water piping shall be labeled per piping label per color and naming scheme below:

      3.2.1 Industrial Cold Water: Label shall read ICW or Industrial Cold Water and labeled yellow.
      3.2.2 Industrial Hot Water: Label shall read IHW or Industrial Hot Water and labeled green.
      3.2.3 Industrial Hot Water Re-Circulation: Label shall read IHWR or Industrial Hot Water Return and labeled green.

   3.3. All domestic water piping shall be labeled at the following locations:

      3.3.1 Entering and Exiting a wall, whether the wall is sheet rock to the deck or not.

3.3.2 Label next to each isolation valve.
3.3.3 Label next to each piece of plumbing equipment.
3.3.4 Where more than four hydronic or domestic pipes are in an area label every 25 feet.
3.3.5 Where four or less pipes are in an area label every 50 feet.

3.4. All valves shall be labeled with a stamp metal tag indicating the following

3.4.1 Type of service - Abbreviation
(A) Domestic Hot Water – DHW
(B) Domestic Hot Water Recirculation – DHWR
(C) Domestic Cold Water – DCW
(D) Industrial Hot Water – IHW
(E) Industrial Hot Water Recirculation – IHWR
(F) Industrial Cold Water – ICW

3.4.2 Valve Normal Position - Abbreviation
(A) Normally Open – NO
(B) Normally Closed – NC

3.4.3 Unique Identifying Number
(A) This is simply a number (such as 01 or 02) but each valve including the HVAC or Hydronic System valves must contain a unique number. There should not be two valves with the same number.

Section 22 05 29 Hangers and Supports for Plumbing Piping

1. GENERAL

   1.1. None

2. PRODUCTS

   2.1. None

3. EXECUTION

   3.1. Hangers shall be oversized to accommodate - insulation of the piping. No hanger, clamp or support shall penetrate the insulation.

Section 22 07 00 Plumbing Insulation

1. GENERAL

   1.1. All new plumbing piping systems shall be insulated following applicable codes and this standard.

2. PRODUCTS

   2.1. Fiberglass Pipe Insulation: All Service Jacket; Johns Manville Micro-Lok or approved equivalent with similar thermal resistance properties.

   2.2. PVC Jacketing: 20 mil, colors to match selection. Johns Manville Zeston PVC Jacketing or equivalent.

3. EXECUTION

   3.1. Insulation shall follow procedures outlined in the most recent MICA National Commercial and Industrial Insulation Standards.

   3.2. All plumbing insulation shall be continuous through all walls.

   3.3. Calcium Silicate shall be used where insulation is supported by hangers, clamps or supports on pipe 1-1/4” and larger. A 4” shield shall also be used in addition to the calcium silicate.

   3.4. Shields shall be used at 12” in length for piping less than 1-1/4”.

   3.5. Plumbing insulation should follow applicable current codes adopted by the State of Utah. In no case shall piping insulation be less than the following per system (based off of .28 BTU-in/(hr-ft2-F) at a mean temperature of 200 F):

      3.5.1 Domestic/Industrial Cold Water – ½”
      3.5.2 Domestic/Industrial Hot Water – 1”
      3.5.3 Domestic/Industrial Hot Water Recirculation – 1”
      3.5.4 Tempered Water (use in eye wash and emergency shower stations) – Not insulated
      3.5.5 Facility Drainage Systems (Roof Drains) – ½”

3.6. Primary Facility Storm Drains shall be fully insulated.

3.7. Secondary Facility Storm Drains shall be insulated on horizontal piping including the ninety or forty-five fitting preceding the horizontal piping. Vertical piping for the secondary drain is not intended to be insulated.

3.8. Roof drain bowls shall be insulated for the primary and secondary system.

3.9. Exposed Plumbing piping insulation located in mechanical rooms, custodial closets, and corridors (where Plumbing piping is exposed) shall be PVC Jacketed. PVC jacketing will follow the following color scheme:

3.9.1 Domestic Hot Water – Green
3.9.2 Domestic Hot Water Recirculation – Green
3.9.3 Domestic Cold Water – Yellow
3.9.4 Industrial Hot Water – Green
3.9.5 Industrial Hot Water Recirculation – Green
3.9.6 Industrial Cold Water – Yellow
3.9.7 Natural Gas – Painted Green Pipe; insulation not needed.

3.10. All storage tanks shall be insulated including domestic hot water and cold water. Thickness shall be to applicable codes but in no case less than one inch for domestic hot water and ½ inch for domestic cold water.

Section 22 08 00 Commissioning of Plumbing

1. GENERAL

    1.1. Commissioning shall be performed for HVAC systems. A third-party commissioning firm shall be hired on all projects that exceed 5,000 sqft or where code dictates.

2. PRODUCTS

    2.1. None

3. EXECUTION

    3.1. None

Section 22 11 16 Domestic Water Piping

1. GENERAL

   1.1. None

2. PRODUCTS

   2.1. All piping and fittings shall be made in the USA.

   2.2. Domestic water piping shall be installed as follows:

      2.2.1 4” and smaller: Type L copper soldered or Viega ProPress, Apollo, Hammond or approved equivalent.
      2.2.2 Larger than 4”: Type L copper soldered.

3. EXECUTION

   3.1. The entire domestic water system including the water main shall be sterilized in accordance with the Engineer of Record’s recommendations.

      3.1.1 All piping shall be thoroughly cleaned before sterilization.
      3.1.2 The chlorinating materials shall be introduced into the system in a manner approved by the owner's representative.
      3.1.3 Water systems will not be accepted until a negative bacteriological test is made on water taken from the systems by an independent laboratory.
      3.1.4 Repeat dosing as necessary until such negative test is accomplished.
      3.1.5 Follow AWWA guidelines.
      3.1.6 Bypass the water softeners and reverse osmosis unit and lines during sterilization (Ref. AWWAC601-54 Standard of Disinfecting Water Mains).

   3.2. Domestic Water Piping shall be arranged so that hot water shall be provided at the discharge of the fixture within 15 seconds or in accordance with IECC whichever is more stringent.

Section 22 11 19 Domestic Water Piping Specialties

1. GENERAL

   1.1. None

2. PRODUCTS

   2.1. Water Hammer Arrestors

      2.1.1 Nesting bellows type, stainless steel casing and bellows, pressure rated for 250 psi static and 125 psi residual, tested and certified in accordance with PDI Standard WH-201.
      2.1.2 Approved Manufactures: Zurn “Shocktrol”, Smith, Josam, Wade, Watts, Amtrol

   2.2. Hose-bib

      2.2.1 Manufacturer: Zurn, Watts

   2.3. Silcocks

      2.3.1 Silcocks shall be JR Smith, Josam, Zurn or Watts.
      2.3.2 Wall box with key

   2.4. Master Mixing Valves

      2.4.1 Manufacturer: Powers, Symmons, Watts

3. EXECUTION

   3.1. Reduce Pressure Backflow Prevention (RPBP)

      3.1.1 Domestic cold water service to each building shall incorporate a reduced pressure backflow preventer to protect the water supply from backflow. The reduced pressure backflow preventer shall be located as directed by Facilities Services Department.
      3.1.2 Backflow preventers shall be mounted above ground in a weather sheltered area with at least three feet of clear space on either side of the preventer. The backflow preventer shall be located so no part of the building needs to be dismantled to replace the preventer.
      3.1.3 All bypass water lines shall have the same type of backflow prevention as the backflow prevention on the main water service.
      3.1.4 A drain system shall be required for all Reduced Pressure RP assemblies.
      3.1.5 All boiler, cooling tower, and direct evaporative feeds must be equipped with approved back flow preventer and full-sized by-pass.
      3.1.6 Install pressure regulating valves with inlet and outlet shutoff valves, and ball valve bypass. Install a pressure gauge on valve outlet and inlet in accordance with Section 22 05 19.
      3.1.7 A union shall be provided on each side of any RPBP or PRV

3.2. Fire Protection Backflow Prevention

3.2.1 The fire sprinkler water service to each building shall incorporate a double check detector assembly or a reduced pressure backflow preventer to protect the water supply from backflow.

3.3. Water Hammer Arrestors

3.3.1 Water Hammer Arrestors will be installed in accordance with applicable codes and standards including PDI-WH 201.

3.4. Hose-bibs

3.4.1 Hose-bibs shall be provided in all restrooms and mechanical rooms.
(A) Hose-bibs shall be connected to the domestic hot water system in restrooms and mechanical rooms.

3.5. Silcocks

3.5.1 Color to be chosen by architect.
3.5.2 Located every 100’ around perimeter of building.
3.5.3 A silcock shall be provided within 50’ to Cooling Towers, AHU, RTU, and Grease Fans.

3.6. Roof Hydrants

3.6.1 Roof hydrants shall be provided on roofs if a silcock cannot be located near mechanical equipment on the roof.

3.7. Thermostatic Mixing Valve

3.7.1 When a building is connected to the central domestic hot water system a master mixing valve shall not be used.
3.7.2 Where Domestic Water Heaters are used a master mixing valve is required.

Section 22 11 23 Domestic Water Pumps

1. GENERAL

   1.1. None

2. PRODUCTS

   2.1. Manufacturer: B&G, Patterson, Armstrong, Grundfoss

3. EXECUTION

   3.1. Domestic Water Pumps shall be controlled via the Building Management System, including a start/stop and status.

   3.2. Pressure gauges will be installed before and after the pump in accordance with Section 22 05 19 of this standard and a circuit setter will be installed to test the water flow.

   3.3. For building recirculation pumps an additional pump is not necessary for redundancy.

   3.4. Isolation valves shall be installed before and after the pump (per Section 22 05 23) and after the circuit setter.

Section 22 13 16 Sanitary Waste and Vent

1. GENERAL

   1.1. None

2. PRODUCTS

   2.1. Below Grade Sanitary Waste and Vent

      2.1.1 Below grade Sanitary Waste and Vent (DWV) shall be
         (A) Cast Iron Schedule 40.
         (B) Copper Type K.
         (C) PVC Schedule 40, solid core only.

   2.2. Above Grade Sanitary Waste and Vent

      2.2.1 Above grade Sanitary Waste and Vent (DWV) shall be
         (A) Cast Iron Schedule 40, No-Hub or Hub and Spigot
         (B) Copper Type K or L, soldered joints.

3. EXECUTION

   3.1. Below Grade PVC Installation

      3.1.1 PVC for Drain Waste and Vent is only allowed below grade unless written permission is given, and reasoning is explained to UVU.
      3.1.2 When installing PVC Schedule 40 installation methods must follow ASTM D 2321 installation methods and must be observed by an owner's representative. Compaction testing of soils must be provided to the owner for the following:
         (A) Below trench compaction, unless the soil is undisturbed.
         (B) Every lift above the piping in lift heights in accordance with ASTM D 2321 which is dependent on the coil classification.
         (C) Hand tampered haunches must be observed by the owner's representative.
      3.1.3 PVC is not allowed in areas that could receive water temperatures exceeding 140 F. These areas may include:
         (A) Boiler Rooms
         (B) Kitchens
         (C) Serving Areas
         (D) Custodial Closets
         (E) PVC may be used after 30 feet of horizontal separation between the source drain of any of the areas identified above.

   3.2. Above Grade Sanitary Waste and Vent

      3.2.1 PVC is not allowed when installed in areas considered to be plenums.
      3.2.2 PVC is not allowed for:
         (A) Soil Stacks.

(B) Wet Vents.
(C) Sound sensitive areas that require a NC of less than 30.

3.2.3 PVC is allowed for the following if not located in plenums:
(A) Vent Stacks.
(B) Stack Vents.
(C) Branch Vents .

Section 22 13 19.13 Sanitary Drains

1. GENERAL

    1.1. None

2. PRODUCTS

    2.1. Deep seal traps shall be used in lieu of a trap primer.

3. EXECUTION

    3.1. A floor drain shall be provided in all bathrooms and mechanical rooms.

    3.2. Floor sinks shall be provided next to all hydronic and domestic equipment.

Section 22 14 00 Facility Storm Drainage

1. GENERAL

1.1. All rainwater should be wasted to storm sewers and not sanitary sewers.

2. PRODUCTS

2.1. Downspout Nozzle

2.1.1 Manufacturer: JR Smith 1770

2.2. Roof Drain

2.2.1 Cast iron, undermount with Cast iron dome.
2.2.2 A 2” ring shall be provided on the secondary roof drain.

2.3. Below Grade Facility Drain Piping

2.3.1 Below grade Facility Storm Drainage shall be:
(A) Cast Iron Schedule 40.
(B) PVC Schedule 40, solid core.

2.4. Above Grade Facility Storm Drainage

2.4.1 Cast Iron Schedule 40.
2.4.2 PVC Schedule 40, solid core.
(A) Only allowed in non-plenum areas and non-sound sensitive areas.

3. EXECUTION

3.1. Primary Drain

3.1.1 Shall be connected to the storm wastewater system.
3.1.2 Scuppers, external gutters or external downspout systems (including using chains as a downspout) shall not be allowed.

3.2. Secondary Drain

3.2.1 A secondary drain shall be routed from the interior of the building to the exterior of the building terminating to a downspout nozzle.
3.2.2 Do not pipe secondary roof drains to any pedestrian path.
3.2.3 Scuppers, external gutters or external downspout systems (including using chains as a downspout) shall not be allowed.

3.3. Both primary and secondary roof drains shall be placed at the same elevation.

3.4. Construction Protection

3.4.1 During construction of roof systems, a plug shall be placed in every roof drain until all roofing is completed.

3.4.2 The final plug shall be added in presence of the owner or representative and removed in presence of the owner or representative.

3.5. Below Grade Facility Storm Drainage

3.5.1 When installing PVC Schedule 40 installation methods must follow ASTM D 2321 installation methods and must be observed by an owner's representative.

3.5.2 Compaction testing of soils must be provided to the owner for the following:

(A) Below trench compaction, unless the soil is undisturbed.

(B) Every lift above the piping in lift heights in accordance with ASTM D 2321 which is dependent on the coil classification.

(C) Hand tampered haunches must be observed by the owner's representative.

3.6. Above Grade Facility Storm Drainage

3.6.1 PVC is not allowed when installed in areas considered to be plenums.

3.6.2 PVC is not allowed in sound sensitive areas that require a NC of less than 30.

Section 22 31 00 Domestic Water Softeners

1. GENERAL

    1.1. The design team will determine water softener requirements for each project.

2. PRODUCTS

    2.1. Manufacturer for Salt Insertion System: Step Saver

3. EXECUTION

    3.1. A pipe shall be routed to a truck accessible area, exterior of the building, for filling salt remotely.

    3.2. Consult with the approved manufacturer for design requirements. (888) 478-6697

Section 22 34 00 Fuel Fire Domestic Water Heaters

1. GENERAL

   1.1. None

2. PRODUCTS

   2.1. Manufacturer: AO Smith, Bradford White or Rheem

3. EXECUTION

   3.1. Booster hot water heaters shall be provided for all Kitchens to allow for temperatures of 180 F.

   3.2. A temperature sensor shall be located after the water heaters on each water heater and connected to the BMS system 230900.

Section 22 42 00 Commercial Plumbing Fixtures

1. GENERAL

1.1. None

2. PRODUCTS

2.1. Water Closets

2.1.1 Manual flush valves shall be used for water closets.
2.1.2 Dual flush valves are desired over a single low flush valve.
2.1.3 Water closets shall be wall hung.
2.1.4 Manufacturer: Zurn AquaVantage AV Z6000 or Sloan Wes-111
2.1.5 Bowl Manufacturer: Kohler, American Standard, Sloan
2.1.6 Flush Valve: Zurn, American Standard, Sloan

2.2. Urinals

2.2.1 Automatic Flush valves shall be used for urinals.
2.2.2 Pint flush can be used when necessary.
2.2.3 Manufacturer: Zurn EZ Flush OSP-81109-001 or Sloan EBV-500-A
2.2.4 Waterless urinals are not allowed.
2.2.5 Bowl Manufacturer: Kohler, American Standard, Sloan
2.2.6 Flush Valve: Zurn, American Standard, Sloan

2.3. Lavatories

2.3.1 Moen 8413 shall be the basis of design for all lavatories.
2.3.2 Lavatories shall be manual only.
(A) Exception: Sloan EBF-650 can be used as an automatic option.
2.3.3 Bowl shall be per Engineer of Record and Architect.

2.4. Janitorial Faucets

2.4.1 Manufacturer: Chicago Faucets
2.4.2 Pail Lip
2.4.3 Reinforced arm.
2.4.4 Corner Service Sink: Kohler, American Standard
2.4.5 Rim Guard provided
2.4.6 Hose Holder and Hose Provided

3. EXECUTION

3.1. Water Closets

3.1.1 All water closets shall have a MaP rating of 1000 as tested per Maximum Performance Testing Toilet Fixture Performance Testing Protocol.

3.2. Janitorial Sinks and Faucets

3.2.1 A check valve shall be provided on the hot and cold domestic hot water side where faucets will be used for cleaning (such as Janitorial Sinks, or spray hoses).

Section 22 47 00 Drinking Fountains and Water Coolers

1. GENERAL

    1.1. None

2. PRODUCTS

    2.1. Manufacturer: Murdoch or Elkay

3. EXECUTION

    3.1. Dual level drinking fountains shall be used at each location.

    3.2. A bottle fill station shall be located at each drinking fountain without a filter.

        3.2.1 Bottle fill stations shall not contain a filter.