

# 1 General

## .1 System Requirements

- .a Where future expansion is planned in the initial design of a facility the Engineer shall provide adequate additional capacity and connection points in the plumbing design. The additional capacity shall be clearly noted in the equipment schedules.
- .b All points for future connections shall be clearly shown and labeled on the drawings with the capacity (GPM, etc.) that is available at each connection point.
- .c Design domestic water circulation systems to address prevention of stagnate water areas.
- .d Provide hot water recirculating systems as required for efficient distribution of hot water to remote locations. If furthest fixture is over 50 ft. provide circulation.
- .e Explore condensate reclaim when viable.
- .f Install metal valve tags on all valves and provide schedule. (Refer to Division 23 labeling convention – Exhibit B)
- .g Toilet seats shall be easy clean plastic.
- .h Isolation shut off valves on piping serving a floor or zone at or near the main risers of multiple story buildings shall be located at 60" AFF in a valve closet or in non-locking solid front stainless cabinet as approved by owner. Cabinet to be labeled "Plumbing Building System Floor Shut Off Valves". Building shut off valves shall be located in main mechanical rooms.
- .i Provide floor drains in all mechanical rooms. Floors shall be sloped toward drains.
- .j Provide floor drains in all restrooms.
- .k Ice machines shall have a filter rack and floor sink.
- .l Labels shall be placed on the ceiling grid for shut off valves showing Valve Number, System, and Area Served. **Refer to Exhibit A in Division 23 – Exhibit A.**
- .m All concealed equipment located above ceilings shall have a label placed on the ceiling grid showing the equipment tag from the design drawings.
- .n Consider above ceiling shut off valves near entry (clearly assessable) for every restroom.
- .o Secondary water meter shall be installed at main riser into the building capable of reporting water consumption (in gallons) to the Building Automation System. Coordinate output with onsite DDC controls. Provide conduit from meter to nearest mechanical room.
- .p Provide mechanical water meter for all make-up water systems.
- .q Provide dual back flow prevention assemblies for domestic water supply.
- .r Reclaim water may be used where available and as permitted by the owner.
- .s Designer shall evaluate condensing water recovery systems where practical and approved by the owner.
- .t Sub-meter condensate recovery and reclaim systems where installed.
- .u All water piping shall be located a minimum of 10 ft. from electrical switchboards and panel boards.
- .v Provide icemaker connection for kitchen equipment as directed by the owner.
- .w Janitor's closet must have floor sink, cast terrazzo.
- .x Concrete floors shall be sloped to floor drains.
- .y Do not locate pumps, motors, water heaters, or other equipment requiring routine maintenance overhead.
- .z Where local shut off valves are located above hard ceilings, provide appropriately sized lockable metal access doors large enough for a maintenance person standing on a ladder to be able to reach and service. Local valves vales must be accessible.
- .aa Heat trace shall be provided on **all piping** installed at a location where freezing may occur.
- .bb Provide quarter turn supply stops for plumbing fixtures.

## **.2 Codes & Standards**

- .a Comply with applicable provisions of the most recent “North Carolina Building Code: Plumbing Code”.
- .b Comply with ASME Codes and Standards.
- .c Comply with all applicable ANSI standards.
- .d Comply with ADA Standards for Accessible Design.
- .e Comply with Wake County Energy Design Guidelines.
- .f Comply with USGBC LEED requirements where applicable.
- .g All products specified and installed shall bear the label of UL or other North Carolina recognized third party testing agency.
- .h Design and installation shall be compliant with the requirements of the “local authority having jurisdiction.”

# **2 Products**

## **.1 Equipment And Fixture Selection**

- .a The selection of all plumbing systems shall be approved by Wake County at the schematic design phase.
- .b **Plumbing Pipe and Fittings**
  1. All piping to be run parallel and at right angles to walls, ceilings, floors and building structure.
  2. Domestic hot water and cold-water piping shall be type “L” copper. Type “M” is not permitted.
  3. All sanitary waste and vent piping inside the building shall be cast iron except for sanitary waste serving condensing boilers and water heaters. CPVC shall be used for condensing boilers and water heaters from the floor drain to the building sanitary sewer main.
  4. All isolation or shut off valve shall be full port ball valves, bronze. Gate valves are not acceptable.
  5. **Dielectric unions are not permitted.** Use copper only or where black steel is stubbed out, use a brass flange or brass union.
  6. Extruded fittings, quick connect, push to connect, or other o-ring dependent connections are not permitted.
  7. Trap primers are not permitted. Use hose bibbs with security valve key lock.
  8. Wall clean-outs are preferred. Floor clean-outs are not to be located in carpeted and public areas.
  9. Wall cleanouts shall be accessible and flush with finished wall.
  10. Schedule 80 PVC piping may be used below grade under concrete slabs of the building. Where utilized cast iron elbows supporting vertical piping are to be used with transition to PVC occurring on a horizontal plane. Designer to provide details of cast iron to PVC transitions in the construction documents.
  11. Groove and cut joint piping shall not be installed.
  12. Pressurized piping shall not be installed underground.
  13. **All piping shall be identified by color and labeling as indicated on the Wake County Pipe Label & Identification Chart. Refer to Division 23 – Exhibit B.**
  14. No double wyes underground or above ceiling.
- .c **Plumbing Insulation**
  1. All concealed domestic hot and cold-water piping is to be insulated with fiberglass insulation with all service jacket.

2. All exposed domestic hot and cold-water piping 8'-0" AFF and lower is to be insulated with cellular glass insulation with all service jacket. All other exposed water piping to be insulated with fiberglass insulation with PVC jacket.
3. The bodies of roof drains and any horizontal section of roof leaders shall be insulated with fiberglass insulation with all service jacket.

**.d Plumbing Fixtures**

1. All lavatories and sinks shall be piped with domestic cold and domestic hot water.
2. Domestic hot water shall be supplied by electrical, or gas fired water heaters.
3. Re-circulating pumps are to be installed to maintain temperatures at the extremities of the domestic water system.
4. Automatic operating, infrared, **hardwired** powered faucet are preferred at all lavatories. Transformers to be accessible. Battery powered may be considered as approved by Wake County. In EMS or Fire Stations where overnight accommodations are provided, faucets should be manual.
5. Water closets shall be floor mounted elongated vitreous-china floor mounted type, unless otherwise approved by the owner, and urinals shall be wall mounted vitreous-china type and mounted as required by ADA.
6. Hardwired powered automatic flush valves and water control devices shall be provided at water closets. Battery powered may be considered as approved by Wake County.
7. Kitchen sinks shall be stainless steel.
8. Water coolers shall be bi-level, wall mounted, and stainless steel or vinyl covered steel with stainless steel top with filtered bottle filler.
9. Janitor Closet Floor Sinks shall be cast terrazzo. Provide backflow protection on both hot and cold-water supplies.
10. Floor drains shall be round and utilize cast iron body and brass or stainless cover only.
11. Waterless Urinals are not to be permitted. Any exception required by owner.
12. Provide eyewash stations where the critical need exists. Provide floor drain and piping as required by NCSBC.
13. All appliances requiring in wall connections shall be commercial metal type supply boxes. PVC boxes are not acceptable
14. Ice Makers:
  - a. Ice makers shall be air cooled type.
  - b. External wall mounted water filters shall be provided.
15. Antifreeze Hydrants shall be self-draining, loose key, concealed with integral vacuum breaker, flush mounting cover. Box and cover finish to be polished nickel bronze or chrome plated and wall-plated finish to be polished nickel bronze.
16. Hydrants inside building shall be flush, self-draining, loose key with integral vacuum breaker.

**.e Drains**

1. Floor drains shall be round and utilize cast iron body and brass or stainless cover only.
2. Roof drains shall be cast iron with cast iron basket and cap.

**.f Water Heaters**

1. Provide gas water heaters where natural gas is available.
2. Commercial gas storage water heaters shall be steel with enameled finish, glass lined, self-cleaning with built-in draft blower, intermittent electronic ignition.
3. Commercial storage type electric water heaters shall be steel with enameled finish, glass lined, have two screw-in immersion type heating elements, adjustable thermostat for each element and comply with UL 174.

4. Where water heating requirements are more than 199 MBH the owner prefers multiple 199 MBH (100 gallon) water heaters. Maximum water heaters shall be limited to 4. Where water heating requirements are more than 1,000 MBH, a domestic boiler and storage tank is preferred.
5. Electric tankless water heaters shall have copper piping or tubing complying with NSF 61 barrier materials for potable water, without storage capacity and provided with brackets for wall mounting.
6. Local under counter water heaters may be used as recommended and approved by the owner. **Heaters shall be concealed in all applications.**

**.g Sub Metering**

1. Provide sub meters on all make up water systems for mechanical equipment.

## 3 Execution

### **.1 Design Requirements**

- .a** The electrical contractor shall provide all power wiring to each piece of plumbing equipment. The plumbing contractor shall furnish all starters and disconnects to turn over to the electrical contractor. Plumbing contractor is to make final connection to each piece of mechanical equipment.
- .b** Install valve tags on all valves and provide schedule.
- .c** Pipe Labels and Identification shall be provided as noted in the Pipe Label & Identification Chart in Division 23 – Exhibit B.
- .d** All exposed piping shall be painted in accordance with the Pipe Label & Identification Chart in Division 23 – Exhibit B.
- .e** Engraved laminated labels shall be provided on **all** equipment.
- .f** Equipment name plates (metal preferred) for permanent attachment shall list the following:
  1. Manufacturer, product name, model number, and serial number.
  2. Capacity, operating and power characteristics, and essential data
  3. Labels of tested compliances.
- .g** Install ceiling labels on ceiling grid or access doors where valves or concealed equipment is in accordance with the Grid/Access Panel Labeling Convention in Division 23 – Exhibit A.

### **.2 Testing**

- .a** A copy of the domestic water testing and a water test sample shall be submitted to the designer and Wake County
- .b** Submit backflow testing report.
- .c Provide video recording of underground domestic waste system at substantial completion.**
- .d** All test results shall be included in O&M manual.