See UM Consultant Procedures and Design Guidelines. All design guidelines posted are applicable. Information below supplements and supersedes information provided in Division 22 of those documents.

22 0100 Plumbing System Design

1. All valves shall be tagged, a valve schedule shall be provided, and valve number indicated at the correct location in the record drawings. Valve tag numbering shall follow MUHC standard and start with the next number in the valve tag list. Consultant shall coordinate numbering with the MUHC Plumbing Trades Supervisor.

2. No plumbing piping shall be exposed overhead where dust accumulation could occur that could create food contamination or patient exposure.

3. Trap primers are not used at MUHC hospitals. Approval for use on off-site facilities is through MUHC Health Facility Managing Engineer.

4. All new construction shall provide hose bibs at accessible points on the exterior of the building and shall be able to produce a minimum of 80 psi. If this pressure isn't achievable, Consultant shall advise of options/recommendations.

5. Provide hose bibs for all roof mounted equipment that requires water for cleaning and/or general maintenance.

6. Per MUHC water management plan: On backup feeds, crossover lines, bypasses, and other lines normally closed to water flow-through, install a valve and a drain line just upstream of that valve on both ends of the line (or only at the downstream end if the upstream end is the public/campus water main) to allow it to be thoroughly flushed to a drain prior to opening a valve that releases water from the line to points of use within the building. This condition must be reviewed and approved by the UM AHJ.

7. Backflow devices shall be installed for the following equipment at a minimum:
   - Cooling Towers
   - Heating water systems
   - Lawn irrigation systems
   - Hose bibs
   - Pools/spas
   - Hydrotherapy tanks
   - Fire sprinkler systems
   - X-ray film processors
   - Morgue tables
   - Dialysis machines and central systems
   - Sterilizers/autoclaves
   - Endoscope washers
   - Washing machines
   - Carbonated beverage dispensers
   - Food waste grinders
   - Potato peelers
   - Ice machines

8. RO/DI systems: to avoid unnecessary shutdowns, coordinate startup to prevent down time due to requirement for sanitization of system.

9. For applications that require pure water services and will not utilize point-of-service canisters, polypro piping must be used unless otherwise stated by MUHC Managing Engineer.

10. Ice machines are Owner Furnished, contractor installed (OFCI). Installation shall meet manufacturer's required clearances for air-cooled units. Minimum clearances shall be 6" on each side and 12" on the top.
    - Confirm storage capacity with MUHC.
    - Follett is preferred manufacturer.
    - Confirm features (touchless switches, ice and water, ice only, ice shape, etc.).
    - Water filtration unit and cup sink for drainage shall be included.
    - Water filters to be installed under the cabinet.
    - Water filters shall be 0.2 micron.
    - No top drawer in base cabinet under the ice machine.

- Do not use washer boxes in the wall.
- Tap on cold water supply to sink.
- Tap on drains from sink.

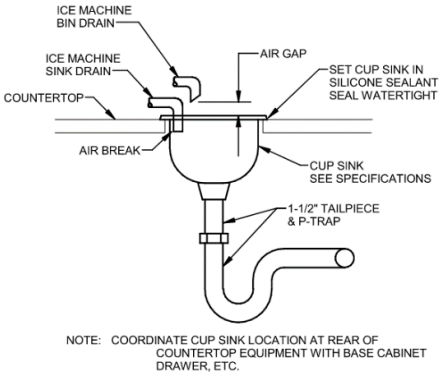

Figure 2 Ice Machine Below Counter Detail

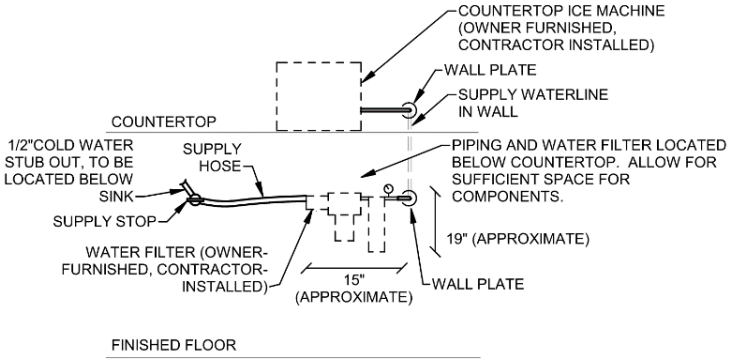

Figure 1 Countertop Ice Machine Drain Detail

11. Drinking water fountains must meet ADA requirements and are to be integrated units – no separate condensing units.

    - Use independent filtering if entire building is not filtered.
    - Use Water filters shall be 0.2 micron.

12. Piping insulation for renovation:

    - For projects that modify small sections of piping, match existing insulation installation if insulation is in good condition.
    - If project modifies most of the piping an area, new insulation shall match current insulation guidelines in UM Consultant Procedures and Design Guidelines, Division 22 Plumbing.
    - If insulation in a project area is generally in poor condition, confirm scope of demolition and new insulation with MUHC PDC.

13. Piping and fittings storage: all pipe and fittings used on MUHC projects shall be stored in a clean manner to prevent any contamination (including but not limited to sand, dirt, rock, cans, pests, etc.) of pipe prior to installation. Owner reserves the right to reject any materials not conforming to this practice.

14. Victaulic Piping: Confirm with MUHC early in design whether Victaulic Piping is allowed.

15. Press fittings only allowed with approval of MUHC PDC.

22 0553 Identification for PlumbingPiping and Equipment

1. All piping except control line tubing shall be labeled.

2. ASME A13.1- 2007 (R2013) references the technical definitions, color standards and color tolerances set forth in the American National Standards Institute (ANSI)/National Electrical Manufacturers Association (NEMA) Z535.1- 2006 (R2011) Safety Colors. The color shades suggested are intended to give the highest level of recognition to employees with both normal and color-deficient vision.

    - Matrix:

        - Domestic Water Piping: Blue (Background) – White (Letters)
        - Sanitary Waste, Vent and Storm Drainage Piping: Black (Background) – White (Lettering)
        - Medical Air Systems: Yellow (Background) – Black (Letters)
        - Oxygen: Green (Background) – White (Letters)
        - Medical Vacuum: White (Background) – Black (Letters)
        - WAGD: Purple (Background) – White (Letters)

22 1316 Sanitary Waste and Vent Piping

1. Includes Pipe and Fittings.

    - Waste piping material to be cast iron.
    - Waste laterals should be coated.
    - PVC not allowed for hospitals since they are defend-in-place. PVC construction/barrier penetrations create higher potential for toxic smoke throughout a smoke zone.

2. Where low flow or water conservation type fixtures are used, the engineering design shall match the reduced water flow with drainpipe installation to produce proper drainage and slope.

3. No double combinations are to be installed opposite one another to prevent formation of blockages (sanitary wipes, cloths, etc.).

4. Sanitary drain double Y connections shall be offset where two drains come together.

23 3000 Plumbing Equipment

1. Cleanouts

    - Acceptable manufacturers:
        - Mifab
        - Jay R. Smith
        - Watts

2. Cleanouts above floor grade are to have easy access.

3. None located in the ceiling servicing, minimum of 1 foot above finished floor.

4. Building Hot Water Mixing Valve

   - MUHC facilities utilizing steam for heating utilize a main mixing valve after the water heater.
   - Major clinics will also utilize a building mixing valve.
   - Confirm basis of design with MUHC ES Managing Engineer.
   - Mixing valve temperature shall be 120 deg F.

5. Hot Water Recirculating Pump

   - Preferred Vendors:
     - Bell & Gossett
     - Armstrong
     - Aurora

6. Redundant Pumps

   - Should be used every day to prevent stagnant water in idle pumps and associated isolated piping.
   - If switching idle pumps is a manually process, it is acceptable to alternate weekly.
   - Preference is to include control of domestic pumps via the BAS system.
   - Discuss with MUHC Health Facilities Managing Engineer during design.

7. Water Heater – Electric or Gas:
   - Standard water heaters are steam fired at MUHC Main Campus buildings. Use of electric or gas fired water heaters in design requires approval of Owner's Representative.

- Acceptable manufacturers:
  - A. O Smith
  - Hesco, Inc.
  - State Industries
  - Rheem/Rudd

22 4000 Plumbing Fixtures

1. Faucets

   - Preferred Vendors:
     - Chicago Faucets
     - Zurn

   - Faucets intended for staff and patient use shall contain antimicrobial laminar flow aerators.

   - Per MUHC water management plan: Faucets for handwash sinks must be offset from the drain to minimize chance that biofilm in the drain will be loosened and transmitted. CDC recommends splash guards on sinks within 3 feet of areas for med prep or patient/clean supplies.

   - In public restrooms of off-site buildings (facilities with no generators), automated faucets shall be hard wired.

   - Battery operated inside the hospitals (facilities with generators)

   - Faucet stems shall have ceramic seats. Chicago Faucets preferred manufacturer.

   - Low flow faucets shall not have a flow less than 1.0 gpm and shall include an anti-microbial laminar flow aerator when installed at sinks.

2. Lavatories – in countertops

   - 19” x 19” x 10” deep stainless-steel bowl for Procedure, Soiled/Clean Utility, Med Room, Exam Rooms and Patient Rooms.

- Basis of Design:
    - Elkay Lustertone Classic Stainless Steel 19 ½ "x 19" x 10 1/8

3. Lavatories – Wall hung.

    - Appropriate blocking required to support weight.

4. Shower valves (thermostatic and/or pressure balancing type)

    - Hoses shall be short enough that the wand is at least 3" above the floor when hanging to prevent Legionella growth.

    - Preferred manufacturers
        - Leonard
        - Simmons
        - Lawler

5. Water Closets

    - Preferred manufacturers (standard)
        - American Standard
        - Kohler
        - Crane

    - Preferred manufacturers (bariatric)
        - Discuss with MUHC HF Managing Engineer

    - Floor Mount only.

    - Bottom discharge preferred. Floor-mount rear-discharge may be considered for specific applications.

    - Auto Flush Valves (Public and Staff only):
        - Hard wired
        - Patient rooms: include hose type bedpan sprayer assembly.
        - Basis of Design: Sloan Royal 186-1

- Manual Flush Valves (Patient and On-call)
    - Basis of Design:
        i. Toilet valves: Sloan 110, chrome exposed manual flushometer.
        ii. Urinal valves: Sloan 186, chrome exposed manual flushometer.

- Public restrooms shall utilize ADA accessible, flip-down grab/support bar on the off-wall side of the toilet.

- Ensure that all water closets are rated to accommodate patient weight requirements for patients of size and that the supports/ blocking behind the wall or in the floor will support/exceed that rating.

- MUHC prefers the top of the water closet seat to be at maximum ADA height AFF.

- Low-flow water closets shall not have a flow less than 1.6 gpm.

6. Eye Wash and Emergency Showers

- Eye Wash and emergency showers shall comply with ANSI-Z358.1.

- Validate if a unit is required through MUHC Safety. For eyewash units, Basis of Design would be a Guardian G5022 or equivalent.

- Per DNV, eyewash installation must meet requirements from the most current version of ANSI-Z358-1

22 6000 Medical Air, Gas and Cacuum

1. Medical Piping and Pipeline Components (No Substitutions)
    - Medical Gas Outlets
        - KSMC– Beacon Medaes Gemini III
        - UH Campus:
            i. Medstar/Oxiequip outlet.
            ii. Suggested vendor: Amico.

- System inspections

    - Shall be performed prior to concealing piping distribution systems in walls, ceilings, chases, trenches, underground, or otherwise hidden from view. (NFPA 99 –2012 5.1.12.3.1.1)

    - Inspections shall be conducted by a party technically competent and experienced in the field of medical gas and vacuum pipeline inspections and testing and meeting the requirements of an ASSE 6020, or ASSE 6030. (NFPA 99-2018 5.1.12.3.1.3)

    - Inspections shall be performed by a party other than the installing contractor. (NFPA 99 –2012 5.1.12.3.1.4)

    - The presence and correctness of labeling and valve tagging required by this code for all concealed components and piping distribution systems shall be inspected. (NFPA 99 – 2012 5.1.12.3.2.2)

2. Design requirements

- Medical Gas rooms containing cryogenic containers or positive pressure gases other than oxygen or medical air shall have an O2 sensor installed. It will alarm outside the room and will be tied into the BAS where feasible.

- Zone Valve Box Label Placement

    - Labels shall be placed inside AND near the zone valve box.

    - Placing label on the cover of the valve box is prohibited by NFPA 101.

    - Label inside the valve box must be visible with the cover in place.

END OF SECTION