PART 1: GENERAL

1.01 Codes and Standards:

A. Plumbing Code Compliance: Comply with applicable portions of National Standard Plumbing Code pertaining to selection and installation of Plumbing materials and products. Laboratory water is that which is downstream of a backflow preventer.

B. The design guidelines contained herein include the requirements for systems, materials, fittings and valves utilized for piping systems at The University of Texas at Austin. It is the intention of this document to provide a standard for piping systems at The University in order to provide the highest level of quality and standardization possible; it is not intended to be a guide specification.

C. The UT-Austin campus has a central system for distribution of deionized water (DW). (For historical reasons, we often still call it distilled water.) The DW is carried in pressurized PVC Schedule 80 lines in the utility tunnels.

D. For buildings that need DW, we take a small (1”) PVC 80 line from the tunnel DW main up to a non-pressurized DW tank in the attic. There is a stainless-steel orifice in the line (1/4” for buildings with large DW demand, 1/8” for buildings with small demand) to limit the amount of makeup to the tank. A stainless-steel solenoid valve maintains the level in the DW tank. A larger PVC line (often 2 inch) lets DW flow by gravity from the tank to the building uses. There is a detail of a typical DW tank and controls.

E. Avoid 2-1/2, 3-1/2 and 5-inch pipe in deionized-water systems.

F. An ultraviolet sterilizer shall be installed in the piping downstream of the DW storage tank.

G. Storage tank shall be provided with tank level sight glass. Sight glass shall be piped external to tank and be provided with isolation service valves at top and bottom of glass. Sight glass shall be equipped with high and low level switches. Switches shall be located within the section of sightglass isolated by service valves. Switches shall provide dry contacts for reporting conditions to BAS/FCMS system.

PART 2: PRODUCTS

2.01 Materials and Products:

A. General: The following are materials and product standards to be followed in the design of domestic water systems.
2.02 Standards for Basic Identification:

A. General: Piping identification Standard at the University is ANSI A13.1 "Scheme for Identification of Piping Systems. All piping shall have flow arrows indicating direction of flow.

2.03 Basic Pipes and Pipe Fittings:

A. General: The following listing is to be used as the standard for domestic and laboratory water pipes and fittings:

B. Interior Laboratory Water Piping:

1. Tube Size 3” and Smaller: Copper tube; Type L, hard-drawn temper; wrought-copper fittings, lead free jointing (Silvabrite) for cold water. For hot water above 160 degrees, use Type K copper tubing with lead free jointing (Silvabrite).

2. Pipe Sizes 4”and Larger: Steel pipe with mechanical joints.

C. Exterior or Below Grade Laboratory Water Piping:

1. Tube Size 3/4” and Smaller: Copper tube; Type K, soft-annealed temper; cast-copper flared tube fittings.

2. Tube Size 1” and larger: Copper tube; Type K, soft-annealed temper; wrought-copper fittings, lead free jointing (Silvabrite).

2.04 De-Ionized Water Piping:

A. PVC, Type DWV Pipe and Fittings: ASTM D2665 pipe and fittings, with solvent cemented joints; DWV plastic fitting patterns shall conform to ASTM D3311.

B. Solvent: ASTM D2564.

1. When designing De-ionized water delivery systems for low meg-ohm water (laboratory grade 1-2 meg-ohm) a recirculating system is not required. Point of use polishing utilizing de-mineralized water from the central system is the standard design for production of lab-grade de-ionized water.

2.05 Basic Piping Specialties Standard:

A. General: Provide piping specialties in accordance with the following standard listing:

B. Basket Strainers: Provide basket strainers with cast-iron body, 125-psi flanges,
bolted type or yoke type cover. Furnish with removable, non-corrosive perforated strainer basket, with 1/8" perforations and lift-out handle.

C. **Available Manufacturers:** Subject to compliance with requirements, manufacturers offering basket strainers which may be incorporated in the work include, but are not limited to, the following:

2. Metraflex Co.
3. Spirax Sarco

**2.06 Basic Supports and Anchors:**

A. **General:** Provide supports and anchors in accordance with the following listing:

1. Adjustable steel clevises and adjustable pipe saddle supports are Standard for horizontal piping hangers and supports.
2. Two-bolt riser clamps are Standard for vertical piping supports.
3. Concrete inserts, C-clasps, and steel brackets are Standard for building attachments.
4. Protection shields are Standard for insulated piping support in hangers.

**2.07 Basic Valves:**

A. **General:** The following valves are Standard in application at the University of Texas:

B. **Section Valves:**

1. 2" and Smaller: Gate valves or ball valves
2. 2 1/2" and Larger: Gate valves or butterfly valves

C. **Shutoff Valves:**

1. 2" and Smaller: Gate valves or ball valves.
2. 2 1/2 or Larger: Gate valves or butterfly valves

D. **Drain Valves:**

1. 2" and Smaller: Gate valves or ball valves.
2. 2 1/2 and Larger: Gate valves.

E. **Check Valves:**
1. **All Sizes**: Swing check valves.
2. **See Section 15100**

**F. Plug Valves:**

1. For use on natural gas, use valves approved by University of Texas Utilities Department and AGA approved.

### 2.08 Bibbs and Faucets:

**A. Hose Bibbs:**

1. **Threaded End**: Bronze body, renewable composition disc, tee handle, 3/4" NPT inlet, 3/4" hose outlet.

**B. Sill Faucets**: Bronze body, renewable composition disc, wheel handle, 3/4" solder inlet, 3/4" hose outlet.

**C. Available Manufacturers**: Subject to compliance with requirements, manufacturers offering bibbs and faucets, which may be incorporated in the work, include, but are not limited to, the following:

1. Hammond Valve Corp.
2. Lee Brothers; Div. Phelps Dodge Brass Co.
4. Nibco Inc.
7. Watts Regulator Co.

### 2.09 Hydrants:

**A. Recessed Non-Freeze Wall Hydrants**: Case-bronze casing, length to suit wall thickness, vacuum breaker, hinged locking cover, 3/4" inlet, hose outlet.

**B. Project Non-Freeze Wall Hydrants**: Cast-bronze hydrant, chrome plate face, tee handle key, bronze casing, length to suit wall thickness, vacuum breaker, 3/4" inlet hose outlet.

**C. Projected Non-Freeze Wall Hydrants**: Cast-bronze hydrant, chrome plated face, tee handle key, bronze casing, length to suit wall thickness, vacuum breaker, 3/4" inlet hose outlet.

**D. Floor Level Non-Freeze Hydrants**: Bronze hydrant, rough bronze box, tee handle key, bronze casing, length to suit depth of bury, drain hole, vacuum breaker, hinged locking cover, 3/4" inlet, hose outlet.
E. Non-Freeze Post Hydrants: Bronze hydrant, tee handle key, bronze casing with cast-iron casing guard, length to suit depth of bury, drain hole, vacuum breaker, 3/4" inlet, hose outlet.

F. Available Manufacturers:
   3. Tyler Pipe; Sub. of Tyler Corp.

2.10 Backflow Preventers:

A. General: The standard back flow preventer is of the reduced pressure zone (RPZ) type, the assembly including shutoff valves on inlet and outlet, and strainer on inlet. Backflow preventers shall include test cocks, and pressure-differential relief valve located between 2 positive seating check valves. Construct in accordance with ASSE Standard 1013. The exact model of the backflow preventor shall be coordinated with the Owner prior to incorporation into the design.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering backflow preventers which may be incorporated in the work include, but are not limited to, the following:
   1. Febco Sales, Inc.; Subs. of Charles M. Bailey Co., Inc.
   2. Hersey Products, Inc.
   3. ITT Lawler; Fluid Handling Div.
   4. Watts Regulator Co.

2.11 Pressure Regulating Valves:

A. General: The standard pressure regulating valve is single seated, direct operated type, bronze body, integral strainer, complying with requirements of ASSE Standard 1003.

B. Available Manufacturers:
   2. Cla-Val Co.
   3. Spencer Engineering Co., Inc.
   4. Watts Regulator Co.

2.12 Relief Valves:

A. General: The standard relief valves are to be manufactured in accordance with
ASME Boiler and Pressure Vessel Code and are of the following configurations:

1. **Combined Pressure-Temperature Relief Valves**: Bronze body, test lever, thermostat, complying with ANSI 221.22 listing requirements for temperature discharge capacity. Provide temperature relief at 210°F (99°C), and pressure relief at 150 psi.

B. **Available Manufacturers**:

2. Conbraco Industries, Inc.
3. Watts Regulator Co.

**PART 3: EXECUTION**

3.01 **General**:

A. **Locate groups of pipes** parallel to each other, spaced to permit applying full insulation and servicing of valves.

1. **Provide clean-out capability** for domestic hot water return piping in recirculating loops. There may be a capped “tee” at each ninety-degree turn in the piped return system.

3.02 **Installation of Valves**:

A. **Sectional Valves**: Install on each branch and riser, close to main, where branch or riser serves 2 or more plumbing fixtures or equipment connections.

B. **Shutoff Valves**: Install on inlet of each plumbing equipment item, and on inlet of each plumbing fixture.

C. **Drain Valves**: Install on each plumbing equipment item located to completely drain equipment for service or repair. Install at base of each riser, at base of each rise or drop in piping system, and elsewhere where indicated or required to completely drain potable water system.

D. **Check Valves**: Install on discharge side of each pump.

E. **Balance Cocks**: Install in each hot water recirculating loop.

F. **Hose Bibbs**: Install on exposed piping where indicated, with vacuum breaker.

G. **Sill Faucets**: Install on concealed piping where indicated with vacuum breaker.
3.03 Installation of Backflow Preventers:

A. Install backflow preventers where required by National Standard Plumbing Code. Locate in same room as equipment being protected. Pipe relief outlet to nearest floor drain.

B. Backflow preventers shall be installed at any connection between potable and non-potable water systems.

3.04 Installation of Pressure Regulating Valves:

A. Provide inlet and outlet shutoff valves, and throttling valve bypass. Provide pressure gage on valve outlet.

3.05 Equipment Connections:

A. Piping Runouts to Fixtures: Provide hot and cold water piping runouts to fixtures of sizes indicated, but in no case smaller than required by National Standard Plumbing Code.

B. Mechanical Equipment Connections: Connect hot and cold water piping system to mechanical equipment as indicated, and comply with equipment manufacturer's installation instructions. Provide shutoff valve and union for each connection, provide drain valve on drain connection.

END OF STANDARD 15160