

**PART 1: GENERAL**

1.01 Purpose:

- A. This standard is intended to provide useful information to the Professional Service Provider (PSP) to establish a basis of design. The responsibility of the engineer is to apply the principles of this section so that the University may achieve a level of quality and consistency in the design and construction of their facilities. Deviations from these guidelines must be justified through LCC analysis and submitted to the University for approval.

1.02 Requirements:

- A. All Chilled Water Underground Piping shall be HDPE – 24” header/ 8” reduced. 3½” and 5” pipe in chilled-water systems IS NOT ACCEPTABLE.

1. All piping & Fittings to be DOMESTIC MANUFACTURED

- B. Drains and vents on chilled-water distribution piping shall consist of Schedule 80 thread-o-lets with bronze ball valves. Drain valves and air vents must be located such that any isolated section of the system can be properly drained and vented.
- C. All taps shall be constructed of appropriately sized Thread-o-Let or Weld-o-Let. Taps or branch connections SHALL NOT BE LESS THAN ¾”
- D. Provide means for access where valves and fittings are not exposed.
- E. Chilled water systems serving secondary loads shall be independently circuited from the primary chilled water system within the building and serve mechanical systems such as standalone computer HVAC, refrigeration equipment, etc. Each loop shall be provided with independent circulating pump. Pump shall be located in easily accessible areas for service and not above ceiling. Secondary loads shall be consolidated into a minimum number of separate chilled water circulating loops. Aggregation of equipment on such loops shall be approved in advance by the University.
- F. Chilled water design supply water temperature shall be 42 °F, with a minimum return water temperature of 58 °F to maximize the usable lifetime (optimize pipe size of existing piping) of water systems. This shall be accomplished without the use of blending stations.
- G. Provide sectional valves on each branch and riser, close to main, where branch or riser serves 2 or more hydronic terminals or equipment connections. For Loop-Header systems isolation valves shall be located on either side of any lateral connection.
- H. Provide drain valves on each mechanical 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 at any low point required to completely drain hydronic-piping system.
- I. Provide high point vents/valves, and air pots at high points on lines.
- J. All pumps shall be floor mounted, with strainers installed and shall have isolation valves

## **PART 2: PRODUCTS**

### 2.01 Piping:

- A. Pipe Size ½" (connections to fan coil units): Type "L" copper w/ wrought copper fittings.
- B. Pipe Size 2" and Smaller: Black steel pipe; Schedule 40; Class 150 malleable iron fittings with threaded joints.
- C. Pipe Size 2½" and Larger: Black steel pipe, Schedule 40, wrought-steel butt-welded fittings with welded joints. Mechanical/grooved fittings and couplings may be specified by the PSP.
- D. For main loop chilled water distribution piping (definition above), utilize the Utilities Department specifications for piping, valves, and fittings.
- F. All direct bury hydronic piping shall be HDPE NO EXCEPTIONS.

### 2.02 Pumps:

- 1. Aurora, Armstrong, Goulds, Peerless, Taco, Bell & Gossett & Paco Chill water pumps preferred.

## **PART 3: EXECUTION**

### 3.01 Installation

- A. Piping shall be installed plumb and square with the structure and walls in a good workmanship manner.
- B. SHSU reserves the right to inspect the welds (at owner's expense) by any means normally accepted in the industry including but not limited to; visual, dye-penetrant, mag-particle and radiograph. All weld inspections will use the procedures as outlined by the American Society for Non-Destructive Testing (ASNT).

### 3.02 Adjusting and Cleaning

- A. CLEAN AND FLUSH ALL NEW PIPING SYSTEMS IN ACCORDANCE WITH FOLLOWING REQUIREMENTS:
  - 1. PIPES STORED AT CONSTRUCTION SITE SHALL HAVE ENDS COVERED.
  - 2. DO NOT CONNECT NEW PIPE TO EXISTING UNTIL THE FLUSHING AND CLEANING HAS BEEN COMPLETE.
  - 3. DURING THE FUSION PROCESS AND AFTER FACING OF PIPE JOINT, PIPES SHALL BE SEPARATED TO HAVE ALL "SHAVING RIBBONS" REMOVED.
  - 4. AFTER INSTALLATION PIPES SHALL BE FILLED WITH WATER AND FLUSHED.
  - 5. ENDS OF SUPPLY AND RETURN PIPES SHALL BE CONNECTED AFTER TESTING AND FLASHING HAS BEEN COMPLETED.
  - 6. CIRCULATE WATER AT 5 TO 8 FPS UNTIL NO DEBRIS IS CAUGHT AT 5 MICRON STRAINER FOR 24 HOURS.

7. PROVIDE FLUSHING MACHINE WITH ADEQUATELY SIZED PUMP TO PROVIDE THE FLOW REQUIRED TO REACH STATED VELOCITIES.
  8. RECORD TEST.
- B. CHEMICAL TREATMENT: REFILL PIPING SYSTEMS, ADDING CAUSTIC SODA TO MAINTAIN PH OF 8.0 TO 8.5 AND SODIUM SULFATE IN AMOUNT OF 1/3 CAUSTIC SODA OR TO MAINTAIN RESIDUAL OF 30- TO 4- PPM IN SYSTEM. ADD TRISODIUM PHOSPHATE TO MAKE HARDNESS OF 0-PPM AND RESIDUAL OF APPROXIMATELY 30-PPM IN SYSTEM. REPEAT MEASUREMENTS DAILY WITH SYSTEM UNDER FULL CIRCULATION AND APPLY CHEMICALS TO ADJUST LEVELS UNTIL NO CHANGE IS APPARENT.

END OF STANDARD