

## 23 20 00 HVAC Piping and Pumps

Revision 01/04/2019

### Purpose:

The Architect and/or Engineer shall incorporate the Rice specific requirements indicated in this standard's section into their design. The Architect and/or Engineer shall further produce project specifications in line with industry standards that are updated to reflect these Rice specific requirements.

### 1. Chilled Water Pumps

- a. Pump Quantities: N+1 redundancy required
  - i. Two 100% pumps, or
  - ii. Three 50% pumps.
- b. Pumps shall use variable frequency drives (refer to Rice Standards 26 29 23)
- c. Horizontal, pad-mounted pumps are preferred where space permits. Vertical in-line pumps may be used upon Rice Project Manager approval.

### 2. Heating Water Pumps

- a. Pump Quantities: N+1 redundancy required
  - i. Two 100% pumps or
  - ii. Three 50% pumps.
- b. Pumps shall use variable frequency drives (refer to Rice Standards 26 29 23)
- c. Horizontal pad-mounted pumps are preferred where space permits. Vertical in-line pumps may be used upon Rice Project Manager approval.

### 3. Piping

- a. Size piping for maximum pressure loss per 100 feet of 3-5 feet based on 30 year old pipe using Cameron or equivalent sizing charts. Maximum velocity in pipe mains should be 8 feet per second.
- b. Piping 1½" and below shall be threaded.
- c. Piping 2" and larger shall be butt-welded or flanged joints.
- d. Groove lock pipe fittings (Victaulic or similar) are **NOT** permitted.
- e. Black steel piping should be covered with insulated pipe covering or should be painted where insulation is not required or exposed to exterior.
- f. Expansion compensation that depends on manufactured devices and requires periodic maintenance should be avoided (especially in main pipe runs). Pipe loops and anchors are preferred for expansion compensation.
- g. Risers through floors should be curbed or sleeved to a minimum height of 2" in mechanical rooms to prevent water migration. 2" welded steel angle grouted to floor is preferred.

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- h. Piping or valves supported from the floor shall be supported with either unistrut, steel pipe or steel angle mounted to a baseplate of the same material.
- i. Piping supported from above shall be secured to structural elements only. No supports hung from other piping.
- j. Balancing at pumps and at each coil should be considered. Design should use balancing valves with memory stops and employ pressure/temperature test plugs at each coil and in major zone branches.
- k. Install pipe markers on each system. Include arrows showing normal direction of flow.
  - i. Pipe labels and arrows are to be installed by plumbers, **not** insulators.
- l. Refrigerant piping must be Type "K" copper ACR tubing.
- m. Refrigerant pipe fittings must be wrought copper streamlined sweat fitting. Solder must be Sil-Fos 15%, except on valves use solder recommended by valve manufacturer.
- n. Piping to/from building pumps shall have flexible stainless steel hose for vibration isolation
- o. Piping to/from air handling coils in sound sensitive areas shall have flexible stainless steel hose for vibration isolation.
  - i. Sound sensitive areas shall include:
    1. classrooms,
    2. Sound sensitive laboratories.
    3. Other University designated spaces.
    4. Architect to request list of sound sensitive areas during schematic design.