DIVISION 15 - MECHANICAL

Section 15510 - Hydronic Piping and Specialties

Introduction

Piping and specialties associated with heat transfer equipment including:

CHILLED WATER, PROCESS COOLING WATER, CONDENSER WATER, HEATING WATER

Part 1 - General

- Install a strainer with differential pressure transmitter to EMCS on building side of isolation valve for chilled water supply from tunnel system. Install a single pressure gauge across strainer (see Section 15050 requirements).
- For projects installing HVAC control infrastructure within the same room as the chilled water tunnel entrance, provide independent chilled water supply and return pressure sensors immediately downstream of the building shutoff valves and before any branch lines or end use devices; verify functionality with UFS Building Automation Services at project completion. Where such devices already exist, verify functionality of existing sensors with the UFS Building Automation Services.
- Piping appurtenances (e.g. valves, strainers, circuit setters) shall be individual entities. Combination devices that place piping appurtenances into a single body/assembly are not allowed.
- Use reverse return piping concept for all banked coil applications.
- The University prefers the use of PICV with integral flow measurement for modulating applications. Where specified, include communication point on the control diagrams for integration of flow and other data into the network.
- The use of circuit setters shall be at the design engineer’s discretion. Circuit setters shall not be used in conjunction with pressure independent control valves (PICVs).
- Preferred design is a variable flow pumping system controlling system differential pressure and using externally adjustable pressure dependent circuit setters at each point of use.
- Provide 3-way control valves in heating water piping at end of branch line units only, unless otherwise approved in writing by UFS Mechanical Engineer.
- Where 3-way control valves are utilized, provide with circuit setter in the bypass line.
- Refer to Section 15540 for cooling and heating fluid temperature requirements.
- Refer to meter requirements (attachment to Section 15970).
- Refer to section 15990 for testing requirements.

Part 2 - Products

- Pipe Schedule

Size	Pipe	Fittings	Joints
Above ground			
Up to 2”	Copper Type "L" seamless hard drawn	Wrought copper	Less Than 0.2% Lead Alloy Solder

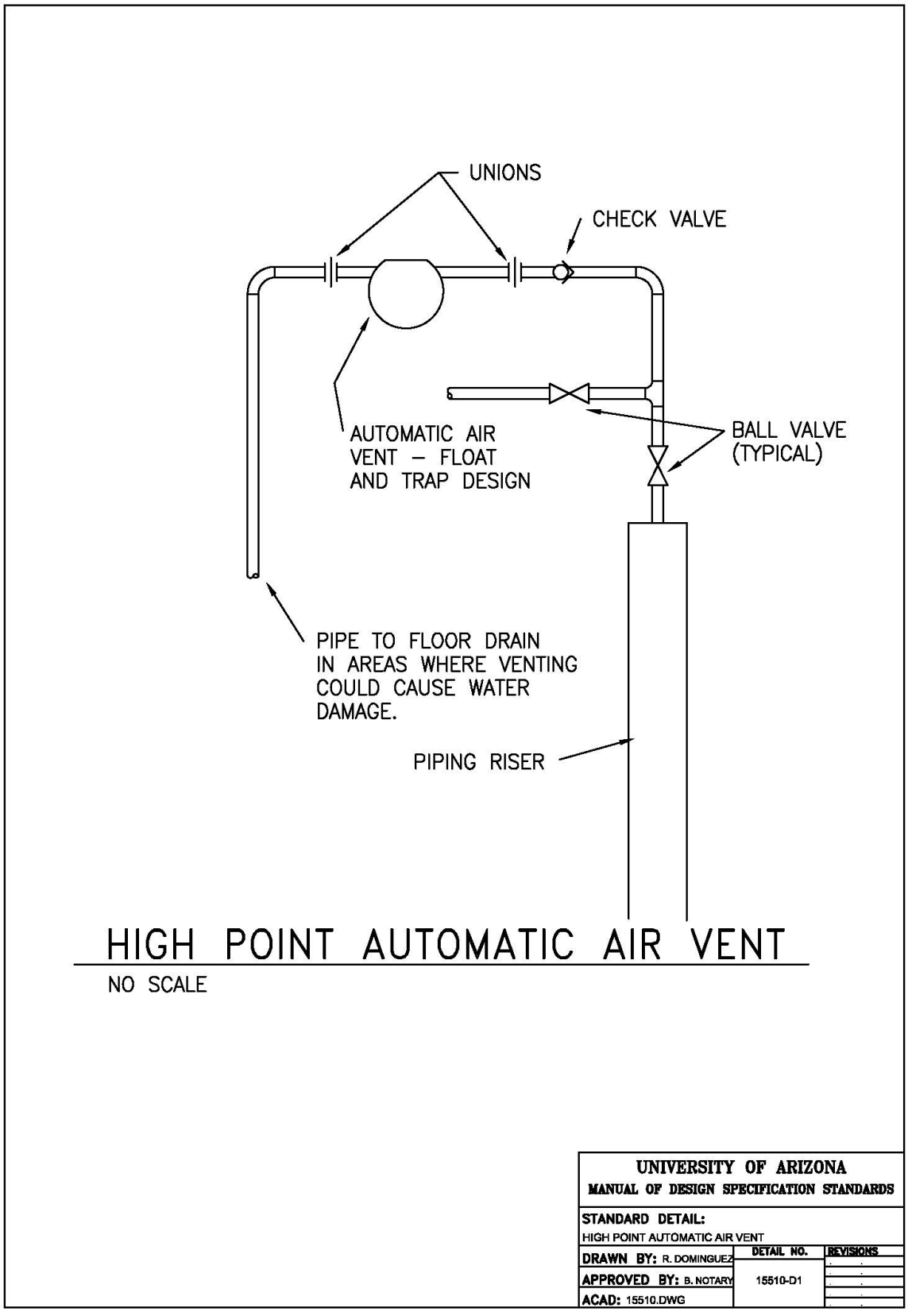
2 ½:" and larger	Copper Type "L" seamless hard drawn	Wrought copper	15% silver brazed
	OR		
	Schedule 40 Black steel	Forged Carbon Steel	Bevel Welded
Below ground			
Up to 2"	Copper Type "K" seamless hard drawn	Wrought copper	6% silver solder
2 ½:" and larger	Copper Type "K" seamless hard drawn	Wrought copper	15% silver brazed
	OR		
	Ductile iron	Ductile iron	Push-on or Mechanical

- Pipe Gasketing - Water Services - Garlock or UA approved equal.
- Valve Types: See Section 15050
- Thermometers
  - Adjustable angle type 9" die cast aluminum thermometer with separable well. Select with normal operating range at the midpoint of the scale. Install thermometer on both sides of each flow stream across coils, heat exchangers, etc.
- Pressure Gauges
  - Cast aluminum with 4 ½" dial. Select with normal operating range at the midpoint of the scale. Provide with pressure snubber and shutoff valve.
  - Provide gauges at each pump, Heat Exchanger (e.g. coils, plate-&-frame, shell-&_tube), and pressure station.
  - Use a single gauge manifold with valving on each side of equipment.
- Expansion Tanks
  - Provide diaphragm-type compression tank with replaceable diaphragm.
- Air Vents
  - Provide automatic float and trap air vents in mechanical rooms only. Other locations to use manual air vents.
- Expansion Joints
  - Provide bellows type. Type 316 stainless steel.
- Pressure Regulators
  - Brass body, threaded connections.
- Flow Regulating Devices
  - Circuit setter with external adjustment and indicator with threaded connections only. Circuit setters shall be adjustable, dial types; autoflows shall not be used. See Part 1 for additional discussions.

- Hoses
    - High pressure braided stainless steel and rated for temp and pressure requirements. Bends shall be in a single plane and not exceed a total of 90 degrees.

Part 3 - Execution

- Weld inspection: see Specification 15050 Part 3 Execution.
- Perform a minimum of three passes on weld joints (root, filler, cap).
- Route piping to allow sufficient access to all equipment, valves, controls, etc., for maintenance.
- In general, piping shall be installed below electrical conduits not requiring maintenance access.
- Piping shall be secured at each trapeze hanger or support.
- Install piping sufficiently below structure to allow top air vents.
- Provide isolation valves on each side of strainers and full part ball valve on blow down. Provide hose thread connection on blow down port ¾" and below.
- Provide air vent with isolation valve at all system high points. Install automatic air vents in equipment rooms and manual air vents elsewhere. Automatic air vents are to be piped to drain. Minimum vent piping size is ½ ".
- Provide ball valves with hose end threads for system drains.
- When an existing system “hot tap” is necessary, provide a full port ball valve to isolate the new branch line.
- Do not use circuit setter as isolation valve.
- Prior to startup and operation, clean, flush, and chemically treat all new piping. Coordinate requirements with FM.
    - Pre-clean new equipment and piping with an alkaline phosphate cleaner to remove oils of manufacture.
    - Coordinate with Facilities Management for current appropriate cleaner.
    - Upon completion of cleaning, flush the system until the ortho phosphate level is within 1 PPM of the city water. If the flushing occurs over an extended period (more than 24 hours), the flush water should be treated water.
    - The system should then be immediately disinfected with 120 PPM of 45% glutaraldehyde (or an alternate approved form of disinfection for larger systems) and then be treated. Systems containing copper should increase the azole level to 20 PPM.
    - Systems that are adding piping that cannot be isolated for alkaline phosphate cleaning must be cleaned by adding a surfactant (normally 50 PPM) for 48 hours to help remove oils of manufacture.
    - All test results should be reported through project management to Facilities Management for approval prior to opening connections to campus utility distribution loops.
    - Provide all new piping systems to include pot feeders with integral 50-micron bag filters.



End of Section 15510