

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 References:

1.03 Requirements:

A. Metering:

1. Building utilities are required to be metered including but not limited to: chilled water, hot water, domestic water and electricity. Building BTU metering shall also be provided in accordance with SHSU Standards and construction details. Locate hydronic metering equipment inside a machine room. Provide isolation valves and/or bypasses to accommodate meter service.
2. For buildings with mixed occupancy (E&G and non-E&G), provide sub- metering to properly allocate utility costs between organizations. Coordinate sub-metering requirements with the University.
3. Refer to standard **5.23.09 Instrumentation and Controls for HVAC** for further utility metering requirements.

B. Valves:

1. Provide valves with extended stems to be accessible on outside of insulation. Valve body and stem shall be insulated.
2. Provide means of access where valves are not exposed.
3. Provide valve vaults or boxes, as conditions demand, to provide access to valves installed below grade.
4. Hydronic equipment connections shall be provided with shutoff valves and pressure relief valves on supply and return piping.
5. Shut off valves shall be provided at each floor, AHU, and FCU
6. All hydronic isolation valves shall be integral gasketed butterfly valves.
7. Flow control valves for ATU & AHU 1-1/4" or smaller shall be ball valves, greater than 1-1/4 shall be globe valves.
8. Actuators shall be electric motor driven with override positive indication, with positive stops.

C. Hangers and Supports:

1. Design piping systems to utilize pipe hangers, inserts, and supports in conformance with International Mechanical Code, MSS SP-58 and MSS SP-69.
2. Provide hangers fabricated to allow adequate vertical adjustment of 1.5 inches minimum after installation while still supporting the load. The use of pipe hooks, chains, or perforated iron piping for support is prohibited.
3. Provide pipe hangers within 12 inches of each change in direction and provide hangers on both sides of line valves.
4. Provide vertical piping support at each floor. For pipe risers exceeding three floors, evaluate pipe supports for longitudinal expansion and support requirements. Support riser piping independently of connected horizontal piping.
5. Provide supports for ductwork and accessories in accordance with SMACNA requirements.
6. Provide four inch high concrete housekeeping pads and equipment bases for the following: outdoor equipment on grade, indoor floor mounted equipment in mechanical rooms and penthouse equipment rooms. Housekeeping pads shall extend a minimum 6 inches beyond the equipment or supported member in all directions. Provide pads with half-inch chamfer on all exposed edges, placed and finished smooth and level to ensure proper and continuous support for the bearing surfaces of equipment.
7. Provide prefabricated, factory insulated curbs for roof-mounted equipment, a minimum of 12 inches in height above finished roof surface. Provide curb pitches to match roof slope where required. NO ROOF TOP UNITS for Residence Life Maintenance Building without prior approval
8. Provide sleeves for all ductwork and pipe penetrations through walls, roofs, or floors. Provide sleeves larger than pipe or ductwork to accommodate insulation thickness. Provide sleeves in non-load bearing surfaces fabricated of galvanized sheet metal and sleeves in load bearing surfaces constructed of uncoated carbon steel pipe. Sleeves shall not be installed in structural members unless specifically approved by the University. Caulk all sleeves water and airtight. Provide UL listed sealant between pipe and sleeve as required by code. Provide escutcheons around penetrations in finished areas.
9. Provide Linkseal as per SHSU Construction details for all underground wall penetrations.
10. Where piping or ductwork penetrates a floor, ceiling or wall, provide fire stopping insulation, sealed airtight, to close off penetration space between pipe, ductwork, and adjacent work. Provide escutcheon covers at both sides of penetration.
11. Where piping or ductwork penetrates a fire rated floor, wall, or ceiling, provide fire-safe insulation so that the assembly, when complete, is UL listed and equals the fire rating of constructed penetrated.

D. Vibration and Sound Control:

1. Design mechanical equipment, piping, and ductwork to be installed with vibration isolation devices, as required, to minimize transmission of noise and vibration transmitted to the building structure or adjacent spaces in accordance with the latest version of ASHRAE Handbook – HVAC Applications.

2. Provide flexible connectors between ductwork and connections to air handling equipment. External isolation supports not required for fan-coil units with internally isolated fans.
3. Provide flexible connectors for piping connections to rotating equipment. For pipe systems 2 inches and smaller, provide braided stainless steel flexible connectors. For pipe systems larger than 2 inches, provide Kevlar reinforced rubber, double-sphere flanged flexible connectors. Flexible connectors shall be rated at 150% of the working pressure minimum. Flanged Flexible connectors shall be fitted with a minimum class 150# flange and be rated at 150% of the working pressure minimum.
4. Design equipment, supports, and connections such that maximum interior room background sound levels to not exceed the levels set forth in ASHRAE Handbook – HVAC Applications. Coordinate wall and slab construction requirements with Design Professionals to ensure conformance.
5. Pump bases shall include support for suction and/or discharge piping elbows.
6. All pumps shall be floor mounted

E. Mechanical Identification:

1. Hydronic Piping: Mark all piping with plastic pipe markers. Color and letter coding Standard is ANSI A13.1, "Scheme for Identification of Piping Systems."
2. All equipment, valves and instrumentation shall be labeled in accordance with SHSU nomenclature and shall match labels and tags on approved construction documents.

F. Testing, Adjusting, and Balancing:

1. Testing, adjusting, and balancing (TAB) services for HVAC, piping, ductwork, and plumbing systems shall be provided in accordance with Associated Air Balance Council (AABC) Standards. TAB work shall be done by a University approved, independent contractor.

PART 2: PRODUCTS

2.01 Motors:

- A. Motors shall be high efficiency - speed drive: ABB Speed Drives Only. Baldor Motors are not acceptable

2.02 Valves:

- A. Section Valves 2" and smaller shall be full port ball type, 2½" and larger shall be butterfly type.
 - i. GATE valves are not allowed.
- B. Shutoff Valves 2" and smaller shall be full port ball type, 2½" and larger shall be butterfly type.
 - i. GATE valves are not allowed.
- C. Drain Valves 2" and smaller shall be full port ball type, 2½" and larger shall be butterfly type.
 - i. GATE valves are not allowed.

D. Check Valves shall be spring-loaded silent type.

E. Ball valves shall be full-port, bronze valve, with Teflon seat. Watts or Nibco valves preferred.

F. Pratt or Keystone butterfly valves preferred.

2.03 Piping:

A. All piping and fittings shall be seamless pipe

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PART 3: EXECUTION
END OF STANDARD