

DIVISION 15 - MECHANICAL

Section 15050 - Basic Mechanical Materials and Methods

Introduction

Mechanical systems materials and methods of installation common to some or all of mechanical systems sections in Division 15.

Part 1 - General

- All electrical work associated with Division 15 shall comply with requirements of Division 16.
- Refer to section 15990 For testing requirements

Part 2 - Products

Valves

- Sizes 6" and above shall have gear operator ball chain if located more than 7 ft. above floor.
- Provide isolation Ball valves - 100% full-port, full-line size, bronze-body, threaded connections at all equipment and on all main branch take-offs.
- Provide brass valve tags marked for the service. See pertinent service specification for valve type.
- Butterfly valves shall be 100% bubble-tight shut-off. Lug type only. Iron body with bronze disk. Valves to have two year warranty. Use for throttling/balancing. Preferred manufacturers are Bray, Centerline or UA approved equal.

Piping Labels

- Provide at directional changes and/or each 20 ft. Labels to be pre-manufactured snap-on plastic wrap-around type (where not exposed to UV) sized to cover entire circumference of piping and insulation.
- Where labeling exposed to UV, provide labels and fasteners that are metal or other material not susceptible to UV damage. Proposed product shall be approved by the University.
- Labels to have integral color identification as established by ANSI Standard A13.1 - 1981.
- Lettering shall be sized to be easily legible. Directional arrows shall indicate direction of flow and shall be located to point away from lettering.

Escutcheons

- Install in exposed locations, except in mechanical rooms.
- Escutcheons to be hinged, chrome-plated type.

Pipe Sleeves / Concrete Walls & Floors Above Grade

- Shall be schedule 40 steel.
- Sized for full dimensions of insulation and fire caulked where required.
- Install in all exterior walls, fire walls and floors.
- Sleeves are not required in cored concrete except wet area floors
- Floor sleeves to extend 1" above floor surface in wet areas.

Pipe sleeves in non-rated, non-masonry walls or partitions. Provide 24 gage galvanized steel.

Pipe sleeves in rated non-masonry wall or partitions – provide listed approved fire-rated assemblies.

Pipe sleeves installed below ground through exterior walls shall have mechanical type neoprene seals.

Pipe Hangers

- Use Vibra-Zorb cushioned supports on 1 1/4" pipe and smaller which is connected to vibrating equipment.
- Provide piping support hangers to ensure that no sags occur. Minimum hanger rod sizing and maximum hanger spacing shall conform to following table:

<u>Material</u>	<u>Pipe Size</u>	<u>Spacing</u>	<u>Hanger Rod</u>
Steel Pipe	1/2"	6'-0"	3/8"
	3/4" through 1-1/4"	8'-0"	3/8"
	1-1/2, 2"	10'-0"	3/8"
	2-1/2"	10'-0"	3/8"
	3"	12'-0"	3/8"
	4"	12'-0"	3/8"
	5"	12'-0"	1/2"
	6"	12'-0"	1/2"
	8-12"	12'-0"	5/8"
Copper Pipe	1/2"	6'-0"	3/8"
	3/4", 1"	8'-0"	3/8"
	1-1/4 through 4"	10'-0"	3/8"
	5"- 6"	12'-0"	1/2"
	8" and above	12'-0"	5/8"
Cast Iron	1 1/2" - 2"	1 ea. Joint	3/8"
	3"	1 ea. Joint	1/2"
	4" through 6"	1 ea. Joint	1/2"
	8" and above	1 ea. Joint	5/8"
Vertical risers shall be supported at each floor line with steel riser clamps			

Equipment Nameplates.

- Provide nameplates for all pieces of equipment.
- Nameplate shall be minimum of 3/32" thick laminated phenolic plastic.

Access Doors

- Minimum size 16"x16" for wall access - provide 24" x 24" for ceiling access.

Motors

- Motors shall have premium efficiency EPAC rating in accordance with IEEE Standard 112 test method B.
- Motors shall have a minimum service factor of 1.15 and the design load shall not exceed 1.0.
- Motors located in conditioned space shall have an ambient rating of 104° F (40°C). Motors in unconditioned space shall have an ambient rating of 122°F (50°C).

Part 3 - Execution

Workmanship

- Piping to run parallel to building lines.
- Locate groups of pipes parallel to each other, spaced to permit valve servicing.
- Particular attention must be paid to the proximity of mechanical piping and equipment to electrical conduit and cable.

- All underground utility pipe shall have a tracing wire that is electrically continuous. The wire shall be 14TW AWG stranded (green) wrapped around or buried alongside the pipe. The wire shall be terminated at either end in a box flush with the ground with 3 feet of coiled wire in the box.
- Pitch piping in direction of flow 1" per 40 ft.
- Piping to be inspected and pressure tested prior to insulation.
- Piping to be routed to allow access to equipment.
- Welding to be done by welders certified locally in the State of Arizona. Welders must have proof of certification in their possession.
- Weld inspection
 - Visual inspection on low pressure piping (CHW, Condensate, LPS, HW, etc.).
 - Visual inspection and optional radiography on medium and high pressure steam piping (MPS, HPS).
- Do not support pipe with sleeve.
- Pipes on trapeze type hangers shall be firmly secured.

Installation

- Install strainers with full port ball valve on blowdown. Provide hose threaded connection on valves 3/4" and below.
- All gauges to be installed with a single gauge manifolded with ball valves on both sides of pumps, heat exchangers, tunnel supply and return, etc.
- Install valves with stems in vertical position except ball valves. Do not go below horizontal with ball valve stems.
- Use 10 mil plastic wrap around copper pipe on ferrous hangers or supports.
- Use dielectric fittings whenever joining dissimilar metals.

Equipment Installation/Removal

- Provide access to all equipment in accordance with the Mechanical code and Manufacturer's recommendations, for maintenance, servicing. And removal.
- Provide a means of removing any valve that is larger than 2" and is mounted six feet or more above floor level.
- Domestic Water Piping Arrangement
 - Provide recirculating loops for all domestic hot water piping systems with pipe runs longer than 50 feet.
 - Arrange piping in such a manner that there are no "transitory dead legs", i.e., piping branch lines that contain stagnant water. All abandoned branches or futures to be as close to main as possible, but in no case longer than 6" pipe diameters or 18" for pipe over 3".
 - Refer to "Provisions for Future Expansion and/or Installations" Section 15000 - General Discussion for the installation requirements of future connections.
- Electrical conduits shall not touch or be supported via pipes or ducts.
- Ensure fire and smoke separation rating of walls and floors is maintained via appropriate protection of openings and penetrations.

End of Section 15050