

SECTION 15220 - MECHANICAL SUPPORTING SYSTEMS

PART 1 – GENERAL

1.01 SUMMARY

- A. Provide adequate pipe, equipment foundation and suspension systems in accordance with recognized engineering practices, using, where possible, standard, commercially accepted hangers and accessories. See Seismic Protection, Section 15225, and Vibration Isolation Section 15210 which takes precedence over this section.

1.02 CODES

- A. All pipe hangers and supports shall conform to the latest requirements of the Code for Pressure Piping, Refrigeration Piping ANSI/ASME B31.5-74 and Manufacturers' Standardization Society of Valve & Fittings Industry Documents MSS-SP-58-75 and MSS-SP-69-76.
- B. All auxiliary steel necessary for the installation of the pipe hangers and supports shall be designed in accordance with the AISC 2005 Specification and Requirements of Section 05500 MISCELLANEOUS METALS, and as indicated on the Drawings.
- C. Supporting systems shall comply with local mechanical and plumbing codes.

1.03 DESIGN

- A. Supporting Steel not shown for the equipment will be designed, supplied and erected by the Contractor. (The supporting steel is that steel which is connected to the structure shown on the Drawings and carries the weight of the mechanical items.) This supporting steel design must carry the dead weight and dynamic load imposed by the equipment.
- B. The supporting steel shall be connected to the structure in such a manner as not to overload the structure. It is the responsibility of the general contractor, mechanical contractor and the steel fabricator to verify that this purpose is accomplished. It is the responsibility of the general contractor to call to the attention of the Architect-Engineer any deficiency prior to bidding.
- C. Where thermal movement in the pipe line will occur, the pipe hanger assembly must be capable of supporting the line in all operating conditions. Accurate weight balance, calculations shall be made to determine the supporting force at each hanger in order to prevent excessive stress in either pipe or connected equipment.

PART 2 – PRODUCTS

2.01 MANUFACTURER

- A. Numbers refer to GRINNELL; equal devices by B-Line will be acceptable.

2.02 CONCRETE INSERTS

- A. Inserts shall be Figures 281, 282 or Powerstrut 359 stanchion where a continuous insert is required.

2.03 BEAM & STEEL JOIST CLAMPS

A. Clamps shall be Figures 133, 134, 218, 225, 226, 228, or 292. Clamps are not approved except where seismic bracing is not required by local code.

2.04 RISER CLAMPS

A. Riser clamps shall be Figure 261, for steel pipe or Figure CT121 for copper tubing.

2.05 HANGER RODS

A. Hanger rods shall be Figures 140 and 146. Eye rods shall be Figures 248 and 248L.

2.06 PIPE HANGERS

A. All hangers for piping 2" or larger shall be provided with means of vertical adjustment.

B. On uninsulated steel pipe, hangers shall be Figures 104, 108, 212, or 260. On piping 2" and smaller, Figures 70, 97, or 138R will be permitted.

C. On uninsulated copper tubing, hangers shall be Figures CT-65, CT-69, CT-99, CT-109, OR CT-122R.

D. On hot insulated steel pipe, hangers shall be Figure 295 or welded attachments, Figure 60. Where thermal movement causes the hanger rod to deviate more than 5° from the vertical, or where longitudinal expansion causes a movement of more than 1/2" in the piping supported from below, roller hangers Figures 171, 181, 271, or 274 shall be used in conjunction with a protection saddle. Figures 160 thru 165 to suit the insulation thickness. On insulated steel pipe for chilled or hot water or similar service, the hanger must be placed on the outside of the insulation with a Figure 167 Shield.

E. On insulated copper tubing, hangers shall be Figures 70, 97, 104, or 108 and shall be placed on the outside of the insulation with a Figure 167 Shield. The Figure 167 Shield shall be applied to distribute the hanger load over the insulation and to eliminate damage to the vapor barrier on the covering.

F. Base supports shall be Figures 259 or 264.

2.07 BRACKETS AND RACKS

A. Welded steel brackets shall be Figures 194, 195 and 199. Multiple pipe racks or trapeze hangers shall be fabricated from Powerstrut channel and accessories.

2.08 GUIDES AND SLIDING SUPPORTS

A. Guides shall be Figures 171, 175, 177, or 256. Sliding supports shall be Figures 280, 432, 435, 436, 437, or 438.

2.09 ROOF PIPE SUPPORTS

A. Piping installed above roof and/or where indicated shall be supported by PATE or RPS Pipe Mounting Pedestals anchored on RPS Equipment Rails of the size suitable for the pipe in full compliance of the manufacturer's recommendations.

PART 3 – EXECUTION

3.01 ATTACHING TO STRUCTURE

- A. Where equipment or piping is supported off a concrete structure, inserts shall be used. Where support rod sizes exceed 7/8" diameter or where the pipe load exceeds the recommended load for the insert, use 2 inserts with a trapeze type connecting member below the concrete. In cases where pipes are supported from existing slab, use Phillips; "RED HEAD" or equal, sized for Safety Factor 4.
- B. Where equipment or piping is supported from building steel beam, welded beam attachments shall be used. Holes drilled in building steel for hanger support rods will not be permitted. Clamps may be used where seismic bracing is not required by local code.
- C. All vertical runs of piping shall be supported at each floor.

3.02 HANGER RODS AND SPACING

- A. Where hanger rod sizes are catalog-listed for a specified hanger, this size shall govern. Where hanger rod sizes are not catalog-listed, the load on the hanger shall be the determining factor and the maximum recommended hanger rod load as catalog-listed, shall govern.
- B. Pipe hangers shall be at each change in direction, not more than 2'-0" from end of run and on straight runs at each joint or the spacing shall not exceed which ever is closer:

<u>PIPE SIZE</u>	<u>STEEL PIPE</u>	<u>COPPER</u>	<u>PVC, DWV PVC, CPVC</u>	<u>POLYPROPYLENE/A CID WASTE</u>
To 3/4"	7'-0"	5'-0"	3'-0"	1'-6"
1" To 2"	10'-0"	8'-0"	4'-0"	2'-0"
2-1/2" To 4"	12'-0"	10'-0"	5'-0"	2'-6"
5" To 8"	16'-0"	10'-0"	6'-0"	3'-0"
10" and Larger	20'-0"	10'-0"	8'-0"	4'-0"

Pipe hangers for PVC piping shall be as recommended by the manufacturer for the service temperature, but not more than listed above unless information is submitted with the shop drawings showing manufacturer recommended spacing.

- C. Provide supports at concentrated loads such as equipment, in-line pumps, valves and other piping specialties, to prevent line sag and/or excess stress in the piping systems.
- D. For cast iron pipe provide hanger at each joint or fitting with a maximum spacing of 5'-0" on center.
- E. Where distance between riser clamp and hanger exceed 10'-0" in height, intermediate clamps shall be installed to provide support or alignment as a maximum of every 10'-0".

3.03 AUXILIARY STEEL

- A. Furnish all miscellaneous structural members necessary to hang or support pipe or mechanical equipment. Material of members shall be consistent with that of the main structural system.
- B. All auxiliary steel shall receive one shop coat of primer paint prior to installation.
- C. Notify Architect-Engineer of any adjustment necessary in main structural system for proper support of major equipment.

3.04 CONCRETE PADS

- A. Provide concrete pads under all floor-mounted equipment and apparatus. Dowel into structural floor slab.
- B. All pads shall be a nominal 4" thick except 12" for pumps. Make pads thicker than 4" if necessary to obtain required condensate drainage.
- C. Unless otherwise detailed, slabs for chillers shall be 6" thick and isolated from main floor slab with a bituminous strip.
- D. See Vibration Isolation and Seismic requirements for additional work.

END OF SECTION 15220