PART 1 – GENERAL

1.01 Work Included

1. Pipe and Equipment Hangers, Supports, and Associated Anchors
2. Equipment Bases and Supports
3. Sleeves and Seals
4. Flashing and Sealing Equipment and Pipe Stacks

1.02 Related Work

1. Section 22 05 10 Basic Plumbing Requirements
2. Section 22 00 19 Plumbing Piping Insulation
3. Section 22 10 00 Plumbing Piping
4. Section 23 11 23 Facility Natural-Gas Piping
5. Section 22 30 10 Plumbing Equipment
6. Section 23 21 00 Hydronic Piping
7. Section 23 23 00 Refrigerant Piping and Specialties

1.03 Special Requirements

Contractor shall submit shop drawings on products and methods of pipe supports.

PART 2 – PRODUCTS

2.01 Acceptable Manufacturers

1. B-Line Systems
2. Grinnell
3. F and S Central
4. Other (As approved by Architect/Engineer (A/E))

2.02 Pipe Hangers and Supports

A. Hangers for Pipe Sizes 1/2 to 2 Inch: Carbon steel, adjustable swivel, split ring (copper plated for copper pipe, hot dipped galvanized coating on non-copper pipe).

B. Hangers for Pipe Sizes 2 to 4 Inches and Cold Pipe Sizes 6 Inches and Over: Carbon steel, adjustable, clevis (copper plated for copper pipe, hot dipped galvanized coating on non-copper pipe).

C. Hangers for Hot Pipe Sizes 6 Inches and Over: Adjustable steel yoke, cast iron roll, double hanger (hot dipped galvanized coating.)

D. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods; cast iron roll and stand for hot pipe sizes 6 inches and over.

E. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.

F. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp; adjustable steel yoke and cast iron roll for hot pipe sizes 6 inches and over. Refer to drawings for special support details.

G. Vertical Support: Steel riser clamp (at each floor).

H. Floor Support for Pipe Sizes to 4 Inches and All Cold Pipe Sizes: Cast iron adjustable pipe saddle, locknut nipple, floor flange, and concrete pier or steel support.

I. Floor Support for Hot Pipe Sizes 6 Inches and Over: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.

J. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

K. Shield for Insulated Piping 2 Inches and Smaller: Sch. 40 galvanized steel shield over insulation in 180 degree segments, minimum 12 inches long at pipe support.

L. Shield for Insulated Piping 2-1/2 Inches and Larger (Except Cold Water Piping): Pipe covering protective saddles.

M. Shields for Insulated Cold Water Piping 2-1/2 Inches and Larger: Hard block non-conducting saddles in 90 degree segments, 12 inch minimum length, block thickness same as insulation thickness.

N. Shields for Vertical Copper Pipe Risers: As specified by Manufacturer.

O. Offset Pipe Clamp: Carbon steel, hot dipped galvanized finish (copper plated for copper pipe) for supporting vertical pipe away from wall.

P. Refer to drawings for additional supports.

2.03 Hanger Rods

Hanger Rods: Threaded both ends, threaded one end, or continuous threaded. Hanger rods shall be zinc plated steel.

2.04 Inserts

Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.05 Flashing

A. Metal Flashing: 22 gage galvanized steel

B. Lead Flashing: 5 lb/sq. ft. sheet lead for waterproofing; one lb/sq. ft. sheet lead for soundproofing.

C. Flexible Flashing: 47 mil thick sheet butyl; compatible with roofing.

2.06 Sleeves

The following are the minimum acceptable requirements for this project. Refer to the plans for more stringent methods and requirements.

A. Sleeves for Pipes through Non-fire Rated Floors: Form with Sch. 40 galvanized steel, unless otherwise directed on the drawings with a more stringent requirement.

B. Sleeves for Pipes through Non-fire Walls or Footings. Form with steel pipe or Sch. 40 galvanized steel, unless otherwise directed on the drawings with a more stringent requirement.

C. Sleeves through outside walls shall be made with Sch. 40 galvanized steel and fitted with chrome escutcheon covers at all finished surfaces.

D. Sleeves for Pipes through Fire Rated and Fire Resistive Floors and Walls, and Fireproofing: Prefabricated fire rated sleeves including seals, UL Listed. Contractor shall submit manufacturer’s UL approved methods for firesafing all types required for the project as coordinated with the methods of floor and wall construction. Refer to the plans for further requirements.

E. Sleeves for Round Ductwork: Form with galvanized steel.

F. Sleeves for Rectangular Ductwork: Form with galvanized steel.

G. Caulk: Silicone sealant of top quality.

2.07 Fabrication

A. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping (minimum 2 pipe sizes larger).

B. Design hangers without disengagement of supported pipe.

C. Provide copper plated hangers and supports for copper piping.

2.0 Material/Finish

A. General Locations: Steel pipe hangers, miscellaneous steel supports, hardware, bolts, washers, nuts, screws, etc., not specified to be plated or coated shall be hot dipped galvanized with a minimum of 1.50 oz./ft. on all sides and all field cuts shall be zinc coated.

B. Located In or Around Cooling Tower Yards: Pipe hangers, equipment supports, miscellaneous structure components, hardware, bolts, washers, nuts, screws, etc., shall be non-metallic polyester resin, vinyl ester resin, fiberglass, glass reinforced polyurethane or 316 stainless steel.

PART 3 EXECUTION

3.01 Inserts

A. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

B. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.

C. Where concrete slabs form finished ceiling, provide inserts to be flush with slab surface.

3.02 Pipe Hangers and Supports

A. Support horizontal piping as follows:

|  |  |  |
| --- | --- | --- |
| Pipe Size (Inches) | Maximum Hanger Spacing | Hanger Rod Diameter |
| 1/2 to 1-1/4 | 6'-6" | 3/8" |
| 1-1/2 to 2 | 9'-0" | 3/8" |
| 2-1/2 to 3 | 10'-0" | 1/2" |
| 4 to 6 | 10'-0" | 3/4" |
| 8 to 12 | 14'-0" | 7/8" |
| 14 to 18 | 20'-0" | 1" |
| PVC (All Sizes) | 4'-0" | 3/8" |

B. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.

C. Place a hanger within 12 inches of each horizontal elbow.

D. Use hangers with 1-1/2 inch minimum vertical adjustment.

E. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.

F. Support vertical piping at every floor and support from wall midway between ceiling and floor or at 12 feet maximum spacing, whichever is less. Support vertical cast iron pipe at each floor and at each hub.

G. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

H. Support riser piping independently of connected horizontal piping.

I. All auxiliary steel required for pipe supports shall be furnished and installed by the Contractor. Where building structure is not usable for pipe supports, provide steel members, channels, angles, or "UNISTRUT" components for piping support. All auxiliary steel exposed to weather shall be galvanized.

J. Provide all steel required for support of pipes other than steel shown on structural Engineer's drawings.

K. Interior Pipe Guides, Expansion Loops, and Anchors: Provide pipe guides, expansion loops, and anchors on hot water heating pipes installed above the ceiling. Expansion loops shall be installed every 50 feet and supported from building structure with pipe guides on 10 feet spacing. Piping shall be anchored to the structure as necessary for directional expansion control.

L. Roof Drain Hangers must be within 12” of the elbow at the base of the drain.

M. Copper Stub-Outs on CPVC Water Systems must be rigidly supported.

P. Plastic or Metal rolls “Plumbers Strap” is PROHIBITED.

3.03 Equipment Bases and Supports

A. Provide equipment bases and supports of concrete type under all mechanical equipment and as shown on drawings.

B. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.

C. Construct support of steel members. Brace and fasten with flanges bolted to structure.

D. Provide rigid anchors for pipes after vibration isolation components are installed.

E. Refer to Section 22 05 10 and 23 05 10 Basic Plumbing and HVAC Requirements, Paragraph 1.19, Foundations, Supports, Piers, Attachments, for additional requirements.

3.05 Flashing

A. Provide flexible flashing and metal counterflashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.

B. Flash vent and soil pipes projecting 3 inches minimum above finished roof surface with lead worked one inch minimum into hub, 8 inches minimum clear on sides with 24 x 24 inches sheet size. For pipes through outside walls, turn flanges back into wall and caulk, metal counterflash and seal.

C. Provide acoustical lead flashing around ducts and pipes penetrating equipment rooms, installed in accordance with Manufacturer's instructions for sound control.

3.05 Sleeves

1. Set sleeves in position in formwork. Provide reinforcing around sleeves.
2. Extend sleeves through floors one inch above finished floor level. Caulk sleeves full depth and provide floor plate.
3. Where piping penetrates floor, ceiling, or wall, close off space between pipe or duct and adjacent work with fire stopping insulation and caulk seal. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
4. Install chrome plated steel escutcheons at finished surfaces.
5. Sleeves installed in exterior walls with exposed ends shall be non-corrosive type sleeves (i.e., stainless steel).
6. Sleeves installed in foundations shall extend a minimum of six (6) inches beyond the width of the foundation on each side.

**END OF SECTION**