SECTION 230529

SUPPORTS AND ANCHORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pipe and equipment hangers and supports.

B. Equipment bases and supports.

C. Sleeves and seals.

D. Flashing and sealing equipment and pipe stacks.

1.2 RELATED SECTIONS

A. Division 03 - Cast-In-Place Concrete: Equipment bases.

B. Division 07 - Firestopping: Joint seals for piping and duct penetration of fire rated assemblies.

C. Division 07 - Prefabricated Roof Curbs.

D. Division 07 - Caulking and Sealants.

E. Division 09 - Painting.

F. Section 22 11 16 - Plumbing Piping.

G. Section 23 05 48 - Vibration Isolation.

H. Section 23 07 00 - Piping Insulation.

I. Section 23 07 16 - Equipment Insulation.

J. Section 23 21 13 - Hydronic Piping.

K. Section 23 23 00 - Refrigerant Piping and Specialties.

1.3 REFERENCES

A. ASME B31.1 - Power Piping.

B. ASME B31.2 - Fuel Gas Piping.

C. ASME B31.5 - Refrigeration Piping.

D. ASME B31.9 - Building Services Piping.

E. ASTM F708 - Design and Installation of Rigid Pipe Hangers.

F. MSS SP58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.

G. MSS SP69 - Pipe Hangers and Supports - Selection and Application.

H. MSS SP89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

I. ASCE Standard 7, current edition – Minimum Design Loads for Buildings and Other Structures.

1.4 SUBMITTALS

A. Submit under the provisions of Division 01.

B. Shop Drawings: Indicate system layout with location and detail of trapeze hangers.

C. Product Data: Provide the manufacturer's catalog data including load capacity.

D. Design Data: Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.

E. Manufacturer's Installation Instructions: Indicate special procedures and assembly of components.

1.5 REGULATORY REQUIREMENTS

A. Conform to International Plumbing and Mechanical codes for support of plumbing hydronic piping.

B. Conform to the International Building Code for Support and Bracing of Mechanical and Plumbing Equipment, Piping and Ductwork. Provide engineering calculations as required to confirm compliance.

PART 2 PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. Manufacturers:
1. I.T.T. Grinnel.
2. Other acceptable manufacturers offering equivalent products.
   a) Fee and Mason.
   b) PHD.
   c) Elcen.

B. Hydronic Piping:
1. Conform to ASME B31.9, ASTM F708, MSS SP58, MSS SP69 and MSS SP89.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Carbon steel, adjustable swivel, split ring, copper plated or plastic coated.
3. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
4. Hangers for Hot Pipe Sizes 2 to 4 Inches: Carbon steel, adjustable, clevis.
5. Hangers for Hot Pipe Sizes 6 Inches and Over: Adjustable steel yoke, cast iron roll, double hanger.
6. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
7. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 Inches and Over: Steel channels with welded spacers and hanger rods, cast iron roll.
8. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
9. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
10. Wall Support for Hot Pipe Sizes 6 Inches and Over: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast-iron roll.
11. Vertical Support: Steel riser clamp.

12. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
13. Floor Support for Hot Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
14. Floor Support for Hot Pipe Sizes 6 Inches and Over: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.
15. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

C. Refrigerant Piping:
1. Conform to ASME B31.5, ASTM F708, MSS SP58, MSS SP69 and MSS SP89.
2. Hangers for Pipe Sizes up to 1-1/2 Inch: Carbon steel, adjustable swivel, split ring, copper plated or plastic coated.
3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
5. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
6. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
7. Vertical Support: Steel riser clamp.
8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
9. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

2.2 ACCESSORIES

A. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.

2.3 INSERTS

A. Manufacturers:
1. I.T.T. Grinnel
2. Other acceptable manufacturers offering equivalent products.
a) Fee and Mason.
b) PHD.
c) Elcen.

B. 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.

2.4 FLASHING

A. Metal Flashing: 26-gage galvanized steel.

B. Metal Counterflashing: 22-gage galvanized steel.

C. Lead Flashing:
1. Waterproofing: 5 lb./sq. ft. sheet lead.
2. Soundproofing: 1 lb./sq. ft. sheet lead.

D. Flexible Flashing: 45-mil-thick sheet compatible with roofing.

E. Caps: Steel, 22-gage minimum; 16-gage at fire resistant elements.

2.5 EQUIPMENT CURBS

A. Manufacturers:
   1. Custom Curbs Model CRC-3 and CES-3.
   2. Other acceptable manufacturers offering equivalent products.
      a) Thy Curb Model TC-3 and EMS-3.
      b) Creative Metals Model CSS and ESSF.
      c) Curbs Plus Model CPES-1.

B. Fabrication: Welded 18-gage galvanized steel shell and base, 1-1/2-inch-thick insulation, factory installed wood nailer.

C. Vibration Isolation: Pad equal to Kinetics Model KIP-RT.

D. Wind Restraint Brackets: Designed for equipment in geographic location in accordance with adopted building codes.

2.6 SLEEVES

A. Sleeves for Pipes Through Non-Fire Rated Floors: 18 gage galvanized steel.

B. Sleeves for Pipes Through Non-Fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18-gage galvanized steel.

C. Sleeves for Pipes Through Fire Rated and Fire Resistive Floors and Walls, and Fireproofing: Prefabricated fire rated sleeves including seals, UL listed. Refer to Division 07.

D. Sleeves for Round Ductwork: Galvanized steel.

E. Sleeves for Rectangular Ductwork: Galvanized steel or wood.

F. Stuffing or Firestopping Insulation: Glass fiber type, non-combustible; refer to Division 07.

G. Sealant: Refer to Division 07.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with the manufacturer's instructions.

3.2 INSERTS

A. Provide inserts for placement in concrete formwork.

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

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

D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

E. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

3.3 PIPE HANGERS AND SUPPORTS

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

B. Place hangers within 12 inches of each horizontal elbow.

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

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

E. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.

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

G. Support riser piping independently of connected horizontal piping.

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

I. Design hangers for pipe movement without disengagement of supported pipe.

J. Prime coat exposed steel hangers and supports. Refer to Division 09. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

3.4 EQUIPMENT BASES AND SUPPORTS

A. Provide housekeeping pads of concrete, a minimum of 4-inches-thick and extending 6 inches beyond supported equipment.

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

C. Construct supports of steel members and Steel pipe and fittings. Brace and fasten with flanges bolted to structure.

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

E. All machines and devices shall be level, except where pitch or slope is specified or shown, and shall be securely fastened to the structure unless shown otherwise. Provide vibration mounts where shown and/or specified. Where machines are vibration isolated, provide flexible connections at control connections and at minor piping connections so that vibration is not transmitted to the structure. Provide steel bracing as required to resist earthquake and wind loads.

3.5 FLASHING

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

B. Provide curbs for mechanical roof installations 12 inches minimum high above roofing surface. Flash and counterflash with sheet metal; seal watertight. Attach counterflashing mechanical equipment and lap base flashing on roof curbs. Flatten and solder joints.

C. Adjust storm collars tight to pipe with bolts, caulk around top edge. Use storm collars above roof jacks. Screw vertical flange section to face of curb.

3.6 SLEEVES

A. Set sleeves in position in formwork. Provide reinforcing around sleeves.

B. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

C. Extend sleeves through floors one inch above finished floor level. Caulk sleeves.

D. Where piping or ductwork penetrates the floor, ceiling, or wall, close off space between pipe or duct and adjacent work with fire stopping insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

E. Install chrome plated steel escutcheons at finished surfaces.

END OF SECTION