

SECTION 23 05 29

HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

Throughout this document you will find these 'specifier notes' or links to specific electronic resources to better serve your needs. If you have any questions or comments, please contact your local Eaton B-Line Division sales representative, email blineus@eaton.com or call (618) 654-2184.

PART 1 GENERAL

1.1 SUMMARY

- A. The work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, and services to completely execute the pipe hanger and supports as described in this specification.

1.2 REFERENCES

- A. American Society of Mechanical Engineers:
 - 1. ASME B31.1 - Power Piping.
 - 2. ASME B31.5 - Refrigeration Piping.
 - 3. ASME B31.9 - Building Services Piping.
- B. ASTM International:
 - 1. ASTM B633 - Specification for Electrodeposited Coatings of Zinc on Iron and Steel
 - 2. ASTM A123 - Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip
 - 3. ASTM A653 - Specification for Steel Sheet, Zinc-Coated by the Hot-Dip Process
 - 4. ASTM A1011 - Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability (*Formerly ASTM A570*)
- C. Manufacturers Standardization Society of the Valve and Fittings Industry:
 - 1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
 - 2. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
 - 3. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.
- D. NFPA
 - 1. NFPA 13 - Standard for the Installation of Sprinkler Systems

1.3 DEFINITIONS

- A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.4 SUBMITTALS

- A. Submit product data on all hanger and support devices, including shields and attachment methods. Product data to include, but not limited to materials, finishes, approvals, load ratings, and dimensional information.

1.5 QUALITY ASSURANCE

- A. Hangers and supports used in fire protection piping systems shall be listed and labeled by Underwriters Laboratories.
- B. Steel pipe hangers and supports shall have the manufacturer's name, part number, and applicable size stamped in the part itself for identification.
- C. Hangers and supports shall be designed and manufactured in conformance with MSS SP 58.
- D. Supports for sprinkler piping shall be in conformance with NFPA 13.

1.6 QUALIFICATIONS

Include the following paragraph if a list of manufacturers is not included or when substitutions are allowed to define applicable requirements. [] denotes a variable or choice

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum [] years of documented experience, and with service facilities within [] miles of Project.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene a minimum of [] week(s) prior to commencing work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.
- C. Protect from weather and construction traffic, dirt, water, chemical, and damage, by storing in original packaging.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with these specifications, wire basket cable tray systems to be installed shall be as manufactured by the following:
1. Eaton's B-Line Division. 509 West Monroe Street, Highland, IL, 62249, USA. Phone:(618) 654-2184 or email blineus@eaton.com
 2. Engineer approved equivalent

2.2 PIPE HANGERS AND SUPPORTS

A. Hangers

1. Uninsulated pipes 2 inch and smaller:
 - a. Adjustable steel swivel ring (band type) hanger, B-Line series B3170.
 - b. Adjustable steel swivel J-hanger, B-Line series B3690.
 - c. Malleable iron ring hanger, B-Line series B3198R or hinged ring hanger, B3198H.
 - d. Malleable iron split-ring hanger with eye socket, B-Line series B3173 with B3222.
 - e. Adjustable steel clevis hanger, B-Line series B3104 or B3100.
2. Uninsulated pipes 2-1/2 inch and larger:
 - a. Adjustable steel clevis hanger, B-Line series B3100.
 - b. Pipe roll with sockets, B-Line series B3114.
 - c. Adjustable steel yoke pipe roll, B-Line series B3110.
3. Insulated pipe- Hot or steam piping:
 - a. 2 inch and smaller pipes: use adjustable steel clevis with galvanized sheet metal shield. B-Line series B3100 with B3151 series.
 - b. 2-1/2 inch and larger pipes:
 - 1) Adjustable steel yoke pipe roll with pipe covering protection saddle. B-Line series B3110 with B3160-B3165 series.
 - 2) Pipe roll with sockets with pipe covering protection saddle, B-Line series B3114 with B3160-B3165 series.
4. Insulated pipe – Cold or chilled water piping:
 - a. 5 inch and smaller pipes: use adjustable steel clevis with galvanized sheet metal shield. B-Line series B3100 with B3151 solutions.
 - b. 6 inch and larger pipes:
 - 1) Pipe roll with sockets with pipe covering protection saddle, B-Line series B3114 with B3160-B3165 series.
 - 2) Steel yoke pipe roll with pipe covering protection saddle. B-Line series B3110 with B3160-B3165 solutions.

B. Pipe Clamps

1. When flexibility in the hanger assembly is required due to horizontal movement, use pipe clamps with weldless eye nuts, B-Line series B3140 or B3142 with B3200. For insulated lines use double bolted pipe clamps, B-Line series B3144 or B3146 with B3200.

C. Multiple or Trapeze Hanger

1. Trapeze hangers shall be constructed from 12-gauge roll formed ASTM A1011 SS Grade 33 structural steel channel, 1-5/8 inch by 1-5/8 inch minimum, B-Line series B22 strut or stronger as required.
2. Mount pipes to trapeze with 2-piece pipe straps sized for outside diameter of pipe, B-Line series B2000 solutions.
3. For pipes subjected to axial movement:
 - a. Strut mounted roller support, B-Line series B3126. Use pipe protection shield or saddles on insulated lines.
 - b. Strut mounted pipe guide, B-Line series B2417.

D. Wall Supports

1. Pipes 4 inch and smaller:
 - a. Carbon steel hook, B-Line series B3191.
 - b. Carbon steel J-hanger, B-Line series B3690.
2. Pipes larger than 4 inches:
 - a. Welded strut bracket and pipe straps, B-Line series B3064 and B2000 solutions.
 - b. Welded steel brackets, B-Line series B3066 or B3067, with roller chair or adjustable steel yoke pipe roll. B-Line series B3120 or B3110. Use pipe protection shield or saddles on insulated lines.

E. Floor Supports

1. Hot piping under 6 inches and all cold piping:
 - a. Carbon steel adjustable pipe saddle and nipple attached to steel base stand sized for pipe elevation. B-Line series B3093 and B3088T or B3090 and B3088. Pipe saddle shall be screwed or welded to appropriate base stand.
2. Hot piping 6 inch and larger:
 - a. [Adjustable] Roller stand with base plate, B-Line series B3117SL [or B3118SL]
 - b. Adjustable roller support and steel support sized for elevation, B-Line series B3124

F. Vertical Supports

1. Steel riser clamp sized to fit outside diameter of pipe, B-Line series B3373.

G. Copper Tubing Supports

1. Hangers shall be sized to fit copper tubing outside diameters.
 - a. Adjustable steel swivel ring (band type) hanger, B-Line series B3170CT.
 - b. Malleable iron ring hanger, B-Line series B3198RCT or hinged ring hanger B3198HCT.
 - c. Malleable iron split-ring hanger with eye socket, B-Line series B3173CT with B3222.
 - d. Adjustable steel clevis hanger, B-Line series B3104CT.
2. For supporting vertical runs use epoxy painted or plastic-coated riser clamps, B-Line series B3373CT or B3373CTC.
3. For supporting copper tube to strut use epoxy painted pipe straps sized for copper tubing, B-Line series B2000 solutions, or plastic inserted vibration isolation clamps, B-Line series BVT products.

H. Plastic Pipe Supports

1. V-Bottom clevis hanger with galvanized 18-gauge continuous support channel, B-Line series B3106 and B3106V, to form a continuous support system for plastic pipe or flexible tubing.

I. Supplementary Structural Supports

1. Design and fabricate supports using structural quality steel bolted framing materials as manufactured by Cooper B-Line, Inc. (DBA Eaton). Channels shall be roll formed, 12-gauge ASTM A1011 SS Grade 33 steel, 1-5/8 inch by 1-5/8 inch or greater as required by loading conditions. Submit designs for pipe tunnels, pipe galleries, etc., to engineer for approval. Use clamps and fittings designed for use with the

2.3 UPPER ATTACHMENTS

A. Beam Clamps

1. Beam clamps shall be used where piping is to be suspended from building steel. Clamp type shall be selected on the basis of load to be supported, and load configuration.
2. C-Clamps shall have locknuts and cup point set screws, B-Line series B351L, or B3036L. Top flange c-clamps shall be used when attaching a hanger rod to the top flange of structural shapes, B-Line series B3034 or B3033. Refer to manufacturer's recommendation for setscrew torque. Retaining straps shall be used to maintain the clamps position on the beam where required.
3. Center loaded beam clamps shall be used where specified. Steel clamps shall be B-Line series B3050, or B3055. Malleable iron or forged steel beam clamps with cross bolt shall be B-Line series B3054 or B3291-B3297 solutions as required to fit beams.

B. Concrete Inserts

1. Cast in place spot concrete inserts shall be used where applicable; either steel or malleable iron body, B-Line series B2500 or B3014. Spot inserts shall allow for lateral adjustment and have means for attachment to forms. Select inserts to suit threaded hanger rod sizes, B-Line series N2500 or B3014N solutions.
2. Continuous concrete inserts shall be used where applicable. Channels shall be 12 gauge, ASTM A1011 SS Grade 33 structural quality carbon steel, complete with styrofoam inserts and end caps with nail holes for attachment to forms. The continuous concrete insert shall have a load rating of 2,000 lbs/ft. in concrete, B-Line series B22I, 32I, or 52I. Select channel nuts suitable for strut and rod sizes.

2.4 VIBRATION ISOLATION AND SUPPORTS

- A. For refrigeration, air conditioning, hydraulic, pneumatic, and other vibrating system applications, use a clamp that has a vibration dampening insert and a nylon inserted locknut. For copper and steel tubing use B-Line series BVT series Vibra-Clamp™, for pipe sizes use BVP series.
- B. For larger tubing or piping subjected to vibration, use neoprene or spring hangers as required.
- C. For base mounted equipment use vibration pads, molded neoprene mounts, or spring mounts as required.

- D. Vibration isolation products as manufactured by Cooper B-Line, Inc. (DBA Eaton) Vibratrol systems.

2.5 ACCESSORIES

- A. Hanger Rods shall be threaded both ends, or continuous threaded rods of circular cross section. Use adjusting locknuts at upper attachments and hangers. No wire, chain, or perforated straps are allowed.
- B. Shields shall be 180-degree galvanized sheet metal, 12 inch minimum length, 18-gauge minimum thickness, designed to match outside diameter of the insulated pipe, B-Line series B3151.
- C. Pipe protection saddles shall be formed from carbon steel, 1/8-inch minimum thickness, sized for insulation thickness. Saddles for pipe sizes greater than 12 inches shall have a center support rib.

2.6 FINISHES

- A. Indoor Finishes
 - 1. Hangers and clamps for support of bare copper piping shall be coated with copper colored epoxy paint, B-Line series Dura-Copper™. Additional PVC coating of the epoxy painted hanger shall be used where necessary.
 - 2. Hangers for other than bare copper pipe shall be zinc plated in accordance with ASTM B633 OR shall have an electro-deposited green epoxy finish, B-Line series Dura Green™.
 - 3. Strut channels shall be pre-galvanized in accordance with ASTM A653 SS Grade 33 G90 OR have an electro-deposited green epoxy finish, B-Line series Dura Green.
- B. Outdoor and Corrosive Area Finishes
 - 1. Hangers and strut located outdoors shall be hot dip galvanized after fabrication in accordance with ASTM A123. All hanger hardware shall be hot dip galvanized or stainless steel. Zinc plated hardware is not acceptable for outdoor or corrosive use.
 - 2. Hangers and strut located in corrosive areas shall be type 304 [316] stainless steel with stainless steel hardware.

PART 3 EXECUTION

3.1 PIPE HANGERS AND SUPPORTS

- A. Pipe shall be adequately supported by pipe hanger and supports specified in PART 2 PRODUCTS. Hangers for insulated pipes shall be sized to accommodate insulation thickness.
- B. Horizontal steel piping shall be supported in accordance with MSS SP-69 Tables 3 and 4, excerpts of which follow below:

NOMINAL PIPE SIZE

ROD DIAMETER

MAXIMUM SPACING

(INCHES)	(INCHES)	(FEET)
1/2 to 1-1/4	3/8	7
1-1/2	3/8	9
2	3/8	10
2-1/2	1/2	11
3	1/2	12
3-1/2	1/2	13
4	5/8	14
5	5/8	16
6	3/4	17
8	3/4	19
10	7/8	22
12	7/8	23
14	1	25
16	1	27

- C. Horizontal copper tubing shall be supported in accordance with MSS SP-69 Tables 3 and 4, excerpts of which follow below:

NOMINAL PIPE SIZE (INCHES)	ROD DIAMETER (INCHES)	MAXIMUM SPACING (FEET)
1/2 to 3/4	3/8	5
1	3/8	6
1-1/4	3/8	7
1-1/2	3/8	8
2	3/8	8
2-1/2	1/2	9
3	1/2	10
3-1/2	1/2	11
4	1/2	12
5	1/2	13
6	5/8	14
8	3/4	16

- D. Provide means of preventing dissimilar metal contact such as plastic-coated hangers, copper colored epoxy paint, or non-adhesive isolation tape- B-Line series Iso-pipe. Galvanized felt isolators sized for copper tubing may also be used, B-Line series B3195CT.
- E. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.
- F. Install hangers to provide a minimum of 1/2 inch space between finished covering and adjacent work.

- G. Place a hanger within 12 inches of each horizontal elbow.
- H. Support vertical piping independently of connected horizontal piping. Support vertical pipes at every [other] floor. Wherever possible, locate riser clamps directly below pipe couplings or shear lugs.
- I. Where several pipes can be installed in parallel and at the same elevation, provide trapeze hangers as specified in section 2.02 C. Trapeze hangers shall be spaced according to the smallest pipe size or install intermediate supports according to schedule in section 3.01B.
- J. Do not support piping from other pipes, ductwork or other equipment that is not building structure.

3.2 CONCRETE INSERTS

- A. Provide inserts for placement in formwork before concrete is poured.
- B. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- C. Where concrete slabs form finished ceilings, provide inserts to be flush with slab surface.
- D. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.

END OF SECTION