

## SECTION 15050 - BASIC MECHANICAL MATERIALS AND METHODS

## PART 1 - GENERAL

## 1.1 SUMMARY

## A. Section Includes:

1. Hangers and Supports: Pipe supports.
2. Mechanical equipment labels

## B. Related Requirements:

1. Section 13900 - Fire Suppression: Fire Protection Sprinkler system piping.
2. Section 15100 - Building Services Piping
3. Section 15600 – Refrigeration Systems.

## 1.2 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.
- B. American Society of Mechanical Engineers (ASME):
  1. ASME B31.9 – Building Services Piping.
- C. Cast Iron Soil Pipe Institute (CISPI):
  1. Cast Iron Soil Pipe and Fittings Handbook.
- D. Manufacturers Standardization Society of The Valve and Fittings Industry Inc. (MSS):
  1. MSS SP – 69 – Pipe Hangers and Supports – Selection and Application.
  2. MSS SP – 89 – Pipe Hangers and Supports – Fabrication and Installation Practices.

## 1.3 QUALITY ASSURANCE

- A. Comply with rules and regulations of public utilities and municipal department affected by connection of services.
- B. Laws, codes, and ordinances shall take precedence except where work called for by Drawings and Specifications exceeds code requirements in quality or quantity.

## 1.4 CONSTRUCTION DOCUMENTS

- A. Drawings and Specifications show pipe and duct sizes, general routing and location, and describe various systems. These documents describe equipment, including size, general location, usage, support, and auxiliary requirements. Contract Documents do not, however, detail certain job requirements. Drawings are intended to cover layout and design of the Work and are not to be scaled for exact measurements. Where specific detail and dimension for mechanical Work are not shown on Drawings, take measurements and make layouts as required for proper installation of mechanical Work in coordination with other Work on project.

## 1.5 DELIVERY, STORAGE AND HANDLING

- A. Follow manufacturer's published directions in the delivery, storage, protection, installation, piping, and wiring, and start-up of equipment and materials.

## PART 2 - PRODUCTS

### 2.1 HANGERS AND SUPPORTS

- A. Pipe Hanger Schedule: Pipe hangers, except for fire suppression piping, shall be as specified in Schedule I at the end of this Section. Trapeze hangers for multiple parallel pipes shall be installed as shown on the drawings.
- B. Hangers and supports for fire suppression piping shall be as shown on the drawings.
- C. Wall Support for Pipe Sizes to 3 Inches: Steel riser clamp.
- D. 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.
- E. Vertical Support: Steel riser clamp.
- F. Provide copper plated hangers and supports for uninsulated copper piping. Provide plastic inserts for uninsulated copper piping penetrating metals studs.

### 2.2 WIRE ROPE HANGER SYSTEMS (CONTRACTOR OPTION)

- A. General: At the option of the Contractor, wire rope hanger system for piping support may be used in lieu of conventional hangers specified above. Wire rope hangers shall not be used for condenser water system or gas pipe system supports.
- B. Manufacturer: One of the following:
  - 1. Ductmate Industries, Charleroi, PA (800) 245-3188.
  - 2. Erico, Inc., Solon, OH (800) 462-4797.
  - 3. Gripple, Inc., Batavia, IL. (630) 208- 0111
- C. Wire Rope Hanger System: One of the following.
  - 1. Clutcher Mechanical Hanger System by Ductmate.
  - 2. Hang Fast Wire Rope Hanging System by Gripple.
  - 3. Caddy Speed Link Universal Support System by Erico
- D. Wire Rope:
  - 1. Gripple: Zinc galvanized steel wire rope. Standard lengths of 5, 10, 15, and 30 feet with a preformed loop at one end.
  - 2. Ductmate: Zinc coated steel aircraft quality rope, field cut to length.
  - 3. Erico: Galvanized steel aircraft quality wire rope. Available in 3.3, 6.6, 9.9, 16.4, and 32.8 feet lengths with factory hook at one end.
- E. Locking Device:
  - 1. Gripple Fastener: Zinc housing with stainless steel springs.
  - 2. Ductmate: Clutcher cast zinc housing with stainless steel springs.
  - 3. Erico: Stainless steel housing with all steel locking device.

### 2.3 EQUIPMENT LABELS

- A. Provide label for each type of mechanical equipment installed on the project.
- B. Provide equipment labels as specified below unless otherwise required in the individual sections for the specific piece of equipment specified.
- C. Labels:
  - 1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving 1/16 thick, and having predrilled holes for attachment hardware.

2. Letter Color: White.
3. Background Color: Black.
4. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
5. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
6. Attachment: Either of the following
  - a. Fasteners: Stainless-steel self-tapping screws.
  - b. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

## PART 3 - EXECUTION

### 3.1 HANGERS AND SUPPORTS

- A. Support pipes throughout building, both horizontally and vertically in accordance with requirements herein and as shown on the drawings. Attach to structure overhead as shown on drawings. Do not use fasteners which penetrate the roof deck.
  1. Provide sway bracing if required to comply with code seismic requirements.
- B. In areas without ceilings, secure insulation shields to insulation with pressure sensitive tape at each end of shield.
- C. Hangers for PEX or polypropylene (PP) pipe shall be suitable for the type of pipe used and designed to prevent gouging of the pipe. Verify with manufacturer of the hangers and/or clamps that hanger or clamp products are compatible with PEX or PP piping. Fasteners shall be approved by the pipe manufacturer
- D. Piping Support Spacing: Support horizontal piping above slab, except fire suppression piping, as shown in Schedules I-III at the end of this Section.
  1. Support fire suppression piping at spacing as shown on the Fire Protection (FP) drawings.
- E. Install hangers to provide minimum 1/2 inch clear space between finished covering and adjacent work.
- F. Place a hanger within one foot of each horizontal elbow.
- G. Support vertical pipe runs at roof, at floor, and at maximum 10-foot intervals.
- H. Space supports not more than five feet apart at valves, strainers or piping accessories larger than 2 inches.
- I. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units. Provide expansion devices as required for the specific piping material used.
- J. Comply with the requirements of Section 09900 for field painting and touch-up.
- K. Wire Rope Hanger Systems (Contractor Option).
  1. Comply with manufacturer's load ratings and recommended installation procedures.
  2. For insulated pipe, provide pipe saddles to protect the entire circumference of the pipe insulation.
  3. Support piping in accordance with Schedule IV at the end of this Section.

### 3.2 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Load Distribution: Adjust hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- C. Pipe Slopes: Adjust hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflec-

tions allowed by ASME B31.9 for building services piping.

- D. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inch.

3.3 OPERATION PRIOR TO ACCEPTANCE

- A. Contractor may operate any equipment provided that the operation is supervised and the Contractor retains full responsibility for properly maintaining equipment and the full manufacturers warranty remains unaffected from the time of Owner's possession.

3.4 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.
- C. Where equipment, such as VAV boxes, is concealed by accessible drop or lay-in ceilings or other accessible barrier, attach label to ceiling grid or a visible location to identify location of hidden equipment.

3.5 SCHEDULES: Schedules below apply to all piping, except fire suppression piping, hung inside the building.

SCHEDULE I - PIPE HANGER SCHEDULE						
Pipe Service	Pipe Size	Hanger Type	B-Line No.	Globe No.	Grinnell No.	PHD
Uninsulated Steel or PVC or CPVC	2" & smaller	Split Ring	B-3173 with B-3224	721	108 with 114	500 with 114
	2-1/2" & larger	Clevis	B-3100	404/407	260	450
Uninsulated Copper	2" & smaller	Ring	B-3170-CT	301	CT 99	152
	2-1/2" & larger	Clevis	B-3104-CT	407	CT 65	442
Cast Iron Soil Pipe	All	Clevis	B-3102	404	260	420
Insulated Steel, PVC, PEX, or PP	2" & smaller, 2 1/2" & larger	Clevis	B-3100 with shield	404 with shield	260 with shield	450 with shield
Insulated ABS (Glycol Refrigeration Piping Only)	2" & smaller, 2 1/2" & larger	Clevis	B-3100 with shield	404 with shield	260 with shield	450 with shield
Insulated Copper	2" & smaller	Clevis	B-3104 with shield	411 with shield	CT 65 with shield	442 with shield
	2 1/2" & larger	Clevis	B-3100 with shield	408 with shield	260 with shield	442 with shield

SCHEDULE II - PIPING SUPPORT SCHEDULE							
Maximum Spacing In Feet							
Copper	Steel	Cast Iron	PVC	PEX	Polypropylene (PP)	ABS (Glycol Refrigeration Piping Only)	CPVC
6' max up to 1-1/4" I.D.	12' max	5' max, except may be 10' max where 10' lengths are installed.	4' max	32" max	32" max up to 1"	3' max up to 1-1/2" I.D.	3' max up to 1" I.D.
10' max all other		Min one hanger at each joint.			4' max all other	4' max all other	4' max all other

SCHEDULE III - PIPING SUPPORT SCHEDULE	
(GAS PIPE)	
Maximum Spacing In Feet	
Pipe I.D.	Steel
1/2"	6'
3/4" or larger	8'

**SCHEDULE IV – WIRE ROPE HANGER SYSTEM SCHEDULE**

Pipe I.D.	Wt (lbs/ft)	Single Hanger at 10 ft Spacing			Single Hanger at 6 ft Spacing			Single Hanger at 4 ft Spacing		
		Gripple	Duct-mate	Erico	Gripple	Duct-mate	Erico	Gripple	Duct-mate	Erico
UP TO 3/4"	1.36	No. 1	No. 10	SLD2L	No. 1	No. 10	SLD2L	No. 1	No. 10	SLD2L
UP TO 2"	5.10	No. 2	No. 10	SLD2L	No. 2	No. 10	SLD2L	No. 1	No. 10	SLD2L
UP TO 4"	16.30	No. 3	No. 20	SLD3L	No. 2	No. 10	SLD2L	No. 2	No. 10	SLD2L
UP TO 8"	47.15	No. 4	No. 30	-	No. 4	No. 30	-	No. 3	No. 20	SLD3L
UP TO 12"	102.10	-	No. 40	-	No. 5	No. 30	-	No. 4	No. 30	-

**NOTES:**

- Schedule is based on schedule 40 steel pipes filled with water.
- Hanger sizes are based on vertical hanging only. Refer to manufacturer's data for load limits of hangers at angles other than vertical.
- Wire diameters are based on the following sizes:

Gripple	Ductmate	Erico
Size No. 1 = 3/64"	No. 10 = 5/64"	SLD2L = 0.079" = 5/64"
Size No. 2 = 5/64"	No. 20 = 1/8"	SLD3L = 0.118" ~ 1/8"
Size No. 3 = 1/8"	No. 30 = 3/16"	
Size No. 4 = 3/16"	No. 40 = 1/4"	
Size No. 5 = 1/4"		

- The locking device numbers corresponds to the wire numbers for all three manufacturers.

END OF SECTION