

SECTION 15140

HANGERS AND SUPPORTS

PART 1 – DESIGN DIRECTIVES

1.1 DESIGN CRITERIA

- A. The designer shall incorporate expansion loops or expansion devices, see DC Standards, “BASIC PIPING MATERIAL AND METHODS” for design directive.
- B. Expansion loops shall be used wherever possible. Where space is limited, expansion joints may be used. Ball joints may be used if it is the only apparent option and only when specifically approved by DC-FO&M.

PART 2 – PRODUCTS

2.1 MANUFACTURED HANGER UNITS

- A. Hangers and support components shall be factory fabricated of materials, design, and manufacturer complying with MSS SP-58, current edition.
- B. Components shall have galvanized coatings where installed for exterior piping and equipment that will not have field applied finish.
- C. Pipe alignment guides shall be factory fabricated, of steel, consisting of bolted two-section outer cylinder and base with two-section guiding spider that bolts tightly to pipe. Length of guides shall be as recommended by manufacturer to allow indicated travel.
- D. Slide plates and guides shall be constructed of pre-finished carbon steel with Teflon rub surfaces

2.2 EXPANSION JOINTS

- A. Externally pressurized bellows type expansion joints. Bellows shall be made of a minimum 3 ply multi-layer 304 stainless steel. Bellows shall be welded to the internal guide ring and housing. Expansion joint shall be preset for ambient conditions on the construction site and shall have a minimum 3/4” compensation for contraction.
- B. Expansion joints shall be flanged whenever possible and shall be equipped with a drain port. Housing shall be made of carbon steel piping matching the installation.
- C. Approved manufacturers are HySpan series 3500 and Pathway X-Press.

2.3 BALL JOINTS

- A. Ball joints shall be made of carbon steel body with stainless steel ball. Ball housing shall be sealed with Teflon seat and shall be equipped with packing injectors to allow refilling of graphite.
- B. Approved manufacturers is HySpan or approved equal.

2.4 MISCELLANEOUS MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions under which supports and anchors are to be installed. Do not proceed with installing until unsatisfactory conditions have been corrected.
- B. Review with the Architect/Engineer/FO&M substrates of questionable integrity prior to installation.

3.2 INSTALLATION OF HANGERS AND SUPPORTS

- A. Install hangers, supports, clamps and attachments to support piping properly from building structure; comply with MSS SP-69 and SP-89. Arrange for grouping of parallel runs of horizontal piping supported together on field fabricated, heavy duty trapeze hangers where possible. Install supports with maximum spacing complying with the most stringent of:
 1. MSS SP 69, latest edition.
 2. Applicable Building Code.
 3. The following schedule:

	Pipe Size	Steel Pipe	Copper Pipe	Cast Iron Pipe	PVC Pipe See note a	PVC Pipe See note b
Horizontal	≤3/4"	7'	5'	10'	4'	3'
	1" – 1-1/4"	7'	6'	10'	4'	3.5'
	1-1/2"	9'	8'	10'	4'	3.5'
	2"	10'	8'	10'	4'	4'
	2-1/2"	11'	9'	10'	4'	4.5'
	3"	12'	10'	10'	4'	4.5'
	4"	12'	10'	10'	4'	5'
	6"	12'	10'	10'	4'	6'
	8"	12'	10'	10'	4'	6.5'
10"	12'	10'	10'	4'	7'	
Vertical	All sizes: at every floor or as scheduled	12'	12'	10'	4'	

- a. Schedule 40 PVC pipe spacing with 100°F fluid temperature, such as DWV pipe. Higher temperatures may require closer spacing, refer to manufacturer's printed recommended spacing.
- b. Schedule 80 PVC pipe spacing with 120°F fluid temperature, such as condenser water systems.

- B. Hanger rods shall be carbon steel, sizes per the following schedule:

Pipe size	Rod size
≤2"	3/8"
2½" → 3"	1/2"
4" → 5"	5/8"
6" → 8"	3/4"
10" → 12"	7/8"
≥14"	1"

1. Bending of hanger rods is not allowed.
- C. Install building attachments within concrete or to structural steel. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping.
- D. Steel 'C' clamps (MSS type 23) are permitted for use with hangers supporting single pipes ≤2", use malleable iron beam clamps (MSS type 19) or center beam hangers (MSS types 21, 22, 27, 28, 29, or 30) for single pipe hangers >2" and multiple pipe hangers
- E. Fabricate heavy duty steel trapezes from steel shapes selected for loads required. Weld steel in accordance with AWS D-1.1. Trapeze hangers shall be sized for all loads imposed on the trapeze and in accordance with all applicable codes, including NFPA 13.
- F. Install hangers and supports to allow controlled movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints and loops.
- G. Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
- H. Provide adjustable steel clevis hangers in steel piping systems, copper clevis hangers for copper piping systems, MSS Type-1 for uninsulated piping.
- I. Comply with the following installation requirements for insulated piping:
1. For the purpose of this section, pipes subject to movement include steam and condensate return piping ≥2", heating hot water and chilled water piping ≥3". Pipes not subject to movement include steam and condensate return piping <2", heating hot water, chilled water, domestic water piping <3", storm and drain pipe (all sizes), condensate (from air conditioning systems), and chilled water.
 2. Supports for larger pipe lines subject to movement:
 - a. Provide Teflon slide type supports MSS Type 35 or provide protection saddles MSS Type 39 with either adjustable roller hangers MSS Type 43 or single pipe rolls MSS type 41. Fill interior voids of saddles with segments of insulation that match adjoining pipe insulation.
 3. Supports for smaller pipe lines subject and not subject to movement:
 - a. Provide adjustable steel clevis hangers MSS Type 1 or Type 7 for insulated piping, sized for insulation outside diameter.
 - b. Install protective insulation shields MSS type 40.

Pipe Size	Length	Thickness
1/4" → 3-1/2"	12"	18 ga
4"	12"	16 ga
5" → 6"	18"	16 ga
8" → 14"	24"	14 ga

3.3 INSTALLATION OF ANCHORS

- A. Fabricate and install anchors by welding steel shapes, plates, and bars to piping and to structure. Comply with ASME B31.9 and with AWS Standards D1.1.
- B. Where expansion compensators are indicated, install anchors in accordance with expansion unit manufacturer's written instructions to control movement to compensators.

3.4 INSTALLATION OF PIPE ALIGNMENT GUIDES

- A. Anchor to building substrate.
- B. Cold set in accordance with manufacturer recommendations.

3.5 EQUIPMENT SUPPORTS

- A. Fabricate structural steel stands to suspend equipment from structure above or support equipment above floor.

3.6 METAL FABRICATION

- A. Cut, drill, and fit miscellaneous metal fabrications for pipe anchors and equipment supports.
 - 1. Comply with AWS D1.1 for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work. Grind smooth welds at exposed connections so that no roughness shows after finishing, and so that contours of welded surfaces match adjacent contours.

3.7 COMPLETION

- A. Immediately after erection of anchors and supports, clean welds and paint exposed areas with a rust inhibitive paint.
- B. Apply paint by brush to provide a minimum dry film thickness of 2.0 mils.
- C. For galvanized surfaces clean welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION 15140