

PART 1 - GENERAL

- 1.1 REFERENCES
- .1 American Society of Mechanical Engineers (ASME)
 - .1 ASME B31.1-16, Power Piping.
 - .2 ASTM International
 - .1 ASTM A 125, Standard Specification for Steel Springs, Helical, Heat-Treated.
 - .2 ASTM A 307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .3 ASTM A 563, Standard Specification for Carbon and Alloy Steel Nuts.
 - .3 Factory Mutual (FM)
 - .4 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)
 - .1 MSS SP 58, Pipe Hangers and Supports - Materials, Design and Manufacture.
 - .2 MSS SP 69, Pipe Hangers and Supports - Selection and Application.
 - .3 MSS SP 89, Pipe Hangers and Supports - Fabrication and Installation Practices.
 - .5 Underwriter's Laboratories of Canada (ULC)
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS
- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .1 Provide manufacturer's printed product literature and data sheets for hangers and supports and include product characteristics, performance criteria, physical size, finish and limitations.
 - .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.
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1.2 ACTION AND
INFORMATIONAL
SUBMITTALS
(Cont'd)

- .3 Shop Drawings: (Cont'd)
 - .2 Submit shop drawings for:
 - .1 Bases, hangers and supports.
 - .2 Connections to equipment and structure.
 - .3 Structural assemblies.
 - .4 Certificates:
 - .1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .5 Manufacturers' Instructions:
 - .1 Provide manufacturer's installation instructions.

1.3 CLOSEOUT
SUBMITTALS

- .1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 DELIVERY,
STORAGE AND
HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
 - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Packaging Waste Management: remove for reuse or recycling.

PART 2 - PRODUCTS

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| <u>2.1 SYSTEM
DESCRIPTION</u> | .1 | Design Requirements:
.1 Construct pipe hanger and support to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.
.2 Design hangers and supports to support systems under conditions of operation, allow free expansion and contraction, prevent excessive stresses from being introduced into pipework or connected equipment.
.3 Provide for vertical adjustments after erection and during commissioning. Amount of adjustment in accordance with MSS SP 58. |
| <u>2.2 GENERAL</u> | .1 | Fabricate hangers, supports and sway braces in accordance with MSS SP 58. ANSI B31.1 and |
| | .2 | Use components for intended design purpose only. Do not use for rigging or erection purposes. |
| <u>2.3 PIPE HANGERS</u> | .1 | Finishes:
.1 Pipe hangers and supports: galvanized or painted with zinc-rich paint after manufacture.
.2 Ensure steel hangers in contact with copper piping are copper plated or epoxy coated. |
| | .2 | Upper attachment structural: suspension from lower flange of I-Beam:
.1 Cold piping NPS 2 maximum: malleable iron C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip.
.1 Rod: 9 mm UL listed. |
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- 2.3 PIPE HANGERS
(Cont'd)
- .3 Upper attachment structural: suspension from upper flange of I-Beam:
 - .1 Cold piping NPS 2 maximum: ductile iron top-of-beam C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip, UL listed.
 - .4 Upper attachment to concrete:
 - .1 Ceiling: carbon steel welded eye rod, clevis plate, clevis pin and cotters with weldless forged steel eye nut. Ensure eye 6 mm minimum greater than rod diameter.
 - .2 Concrete inserts: wedge shaped body with knockout protector plate UL listed to MSS SP 69.
- 2.4 RISER CLAMPS
- .1 Steel or cast iron pipe: galvanized carbon steel to MSS SP 58, type 42, UL listed.
 - .2 Copper pipe: carbon steel copper plated to MSS SP 58, type 42.
 - .3 Bolts: to ASTM A 307.
 - .4 Nuts: to ASTM A 563.
- 2.5 INSULATION
PROTECTION SHIELDS
- .1 Insulated cold piping:
 - .1 64 kg/m³ density insulation plus insulation protection shield to: MSS SP 69, galvanized sheet carbon steel. Length designed for maximum 3 m span.
 - .2 Insulated hot piping:
 - .1 Curved plate 300 mm long, with edges turned up, welded-in centre plate for pipe sizes NPS 12 and over, carbon steel to comply with MSS SP 69.
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| <u>2.6 EQUIPMENT
SUPPORTS</u> | .1 | Fabricate equipment supports not provided by equipment manufacturer from structural grade steel |
| <u>2.7 EQUIPMENT
ANCHOR BOLTS AND
TEMPLATES</u> | .1 | Provide templates to ensure accurate location of anchor bolts. |
| <u>2.8 HOUSE-KEEPING
PADS</u> | .1 | Provide 100 mm high concrete housekeeping pads for base-mounted equipment; size pads 50 mm larger than equipment; chamfer pad edges. |
| <u>2.9 OTHER
EQUIPMENT SUPPORTS</u> | .1 | Fabricate equipment supports from structural grade steel. |
| | .2 | Submit structural calculations with shop drawings. |

PART 3 - EXECUTION

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| <u>3.1 MANUFACTURER'S
INSTRUCTIONS</u> | .1 | Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet. |
| <u>3.2 INSTALLATION</u> | .1 | Install in accordance with:
.1 Manufacturer's instructions and recommendations. |
| | .2 | Vibration Control Devices:
.1 Install on piping systems at pumps, boilers, chillers, cooling towers, refrigeration lines, and as indicated. |
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- 3.2 INSTALLATION (Cont'd) .3 Clamps on riser piping:
- .1 Support independent of connected horizontal pipework using riser clamps and riser clamp lugs welded to riser.
 - .2 Bolt-tightening torques to industry standards.
 - .3 Steel pipes: install below coupling or shear lugs welded to pipe.
 - .4 Cast iron pipes: install below joint.
- .4 Provide supplementary structural steelwork where structural bearings do not exist or where concrete inserts are not in correct locations.

- 3.3 HANGER SPACING .1 Plumbing piping: to Canadian Plumbing Code, 0. Provincial Code authority having jurisdiction.
- .2 Copper piping: up to NPS 1/2: every 1.5 m.
- .3 Flexible joint roll groove pipe: in accordance with table below for steel, but not less than one hanger at joints. Table listings for straight runs without concentrated loads and where full linear movement is not required.
- .4 Within 300 mm of each elbow.

Maximum Pipe Size : NPS	Maximum Spacing Steel	Maximum Spacing Copper
up to 1-1/4	2.4 m	1.8 m
1-1/2	3.0 m	2.4 m
2	3.0 m	2.4 m

- .5 Pipework greater than NPS 12: to MSS SP 69.

- 3.4 HANGER INSTALLATION .1 Install hanger so that rod is vertical under operating conditions.
- .2 Adjust hangers to equalize load.
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- 3.4 HANGER
INSTALLATION
(Cont'd)
- .3 Support from structural members. Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members.
- 3.5 HORIZONTAL
MOVEMENT
- .1 Angularity of rod hanger resulting from horizontal movement of pipework from cold to hot position not to exceed 4 degrees from vertical.
- .2 Where horizontal pipe movement is less than 13 mm, offset pipe hanger and support so that rod hanger is vertical in the hot position.
- 3.6 FINAL
ADJUSTMENT
- .1 Adjust hangers and supports:
- .1 Ensure that rod is vertical under operating conditions.
- .2 Equalize loads.
- .2 Adjustable clevis:
- .1 Tighten hanger load nut securely to ensure proper hanger performance.
- .2 Tighten upper nut after adjustment.
- .3 C-clamps:
- .1 Follow manufacturer's recommended written instructions and torque values when tightening C-clamps to bottom flange of beam.
- .4 Beam clamps:
- .1 Hammer jaw firmly against underside of beam.
- 3.7 CLEANING
- .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and recycling.