1 General

1.1 REFERENCES

.1 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)
  .1 ANSI/ASME B31.1, Power Piping.

.2 American Society for Testing and Materials International (ASTM)
  .1 ASTM A125, Specification for Steel Springs, Helical, Heat-Treated.
  .2 ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  .3 ASTM A563, Specification for Carbon and Alloy Steel Nuts.

.3 Factory Mutual (FM)

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  .1 Material Safety Data Sheets (MSDS).

.5 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)
  .1 MSS SP58, Pipe Hangers and Supports - Materials, Design and Manufacture.
  .2 ANSI/MSS SP69, Pipe Hangers and Supports - Selection and Application.
  .3 MSS SP89, Pipe Hangers and Supports - Fabrication and Installation Practices.

.6 Underwriter's Laboratories of Canada (ULC)

1.2 SYSTEM DESCRIPTION

.1 Design Requirements:
  .1 Construct pipe hanger and support to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.
  .2 Base maximum load ratings on allowable stresses prescribed by ASME B31.1 or MSS SP58.
  .3 Ensure that supports, guides, anchors do not transmit excessive quantities of heat to building structure.
  .4 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.
  .5 Provide for vertical adjustments after erection and during commissioning. Amount of adjustment in accordance with MSS SP58.

.2 Performance Requirements:
  .1 Design supports, platforms, cat walks, hangers, to withstand seismic events for locations as per the national building code.

1.3 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop drawings: submit drawings stamped and signed for approval by Departmental Representative.

.3 Submit shop drawings and product data for following items:
  .1 Bases, hangers and supports.
  .2 Connections to equipment and structure.
  .3 Structural assemblies.
  .4 Quality Assurance Submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
    .1 Certification by manufacturer: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
    .2 Instructions: submit manufacturers installation instruction.

.1 Contractor will make available one (1) copy of systems suppliers installation instructions.

.4 Closeout Submittals:

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

1.4 QUALITY ASSURANCE

.1 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

2 Products

2.1 GENERAL

.1 Fabricate hangers, supports and sway braces in accordance with ANSI B31.1 and MSS SP58 and MSS SP59.

.2 Use components for intended design purpose only. Do not use for rigging or erection purposes.

2.2 PIPE HANGERS

.1 Finishes:

.1 Pipe hangers and supports: galvanized, painted with zinc-rich paint after manufacture.

.2 Use electro-plating galvanizing process or hot dipped galvanized process.

.3 Ensure steel hangers in contact with copper piping are copper plated or epoxy coated.

.2 Shop and field-fabricated assemblies:

.1 Trapeze hanger assemblies: MSS SP89.

.2 Steel brackets: MSS SP89.

.3 Sway braces for seismic restraint system: to MSS SP89.0

.3 Hanger rods: threaded rod material to MSS SP58:

.1 Ensure that hanger rods are subject to tensile loading only.

.2 Provide linkages where lateral or axial movement of pipework is anticipated.

.3 Do not use 22 mm or 28 mm rod.

.4 Pipe attachments: material to MSS SP58:

.1 Attachments for steel piping: carbon steel galvanized.

.2 Attachments for copper piping: copper plated black steel.

.3 Use insulation shields for hot pipework.

.4 Oversize pipe hangers and supports for insulated pipes.

.5 Adjustable clevis: material to MSS SP69 UL listed, (FM approved where required) clevis bolt with nipple spacer and vertical adjustment nuts above and below clevis.

.1 Ensure "U" has hole in bottom for riveting to insulation shields.

2.3 INSULATION PROTECTION SHIELDS

.1 Insulated hot piping:

.1 Curved plate 300 mm long, with edges turned up, carbon steel to comply with MSS SP69.

2.4 CONSTANT SUPPORT SPRING HANGERS

.1 Springs: alloy steel to ASTM A125, shot peened, magnetic particle inspected, with +/-5% spring rate tolerance, tested for free height, spring rate, loaded height and provided with Certified Mill Test Report (CMTR).

.2 Load adjustability: 10% minimum adjustability each side of calibrated load. Adjustment without special tools. Adjustments not to affect travel capabilities.

.3 Provide upper and lower factory set travel stops.

.4 Provide load adjustment scale for field adjustments.

.5 Total travel to be actual travel + 20% . Difference between total travel and actual travel 25 mm minimum.

.6 Individually calibrated scales on each side of support calibrated prior to shipment, complete with calibration record.

2.5 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

.1 Provide templates to ensure accurate location of anchor bolts.

3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

.1 Install in accordance with:

.1 manufacturer's instructions and recommendations.

.2 Vibration Control Devices:

.1 Install on piping systems at pumps, boilers and as indicated.

.3 Clevis plates:

.1 Attach to concrete with four (4) minimum concrete inserts, one (1) at each corner.

.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 most stringent requirements of Canadian Plumbing Code.

.2 Copper piping: up to NPS 1/2: every 1.5 m.

.3 Within 300 mm of each elbow.

.4

Max Pipe Size: NPS	Max Spacing Steel	Max Spacing Copper
up to 1-1/4	2.1m	1.8m
1-1/2	2.7m	2.4m
2	3.0m	2.7m

3.4 HANGER INSTALLATION

.1 Install hanger so that rod is vertical under operating conditions.

.2 Adjust hangers to equalize load.

.3 Support from structural members. Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members. Comprised of angle Iron or c-channel.

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.

END OF SECTION