



SECTION 23 05 29 – HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions) and Division 00 and 01 as appropriate, apply to the Work specified in this Section.
- B. Refer to all Sections, as well as the Specifications for the other various trades and materials and be thoroughly familiar with all provisions regarding all work.

1.2 SCOPE OF WORK

- A. This Section includes hangers and supports for mechanical systems piping and equipment.

1.3 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 01 Specification Sections.
- B. Product data for each type of hanger and support.
- C. Submit pipe hanger and support schedule showing manufacturer's Figure No., size, location, and features for each required pipe hanger and support.
- D. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.
- E. Shop drawings for each type of hanger and support, indicating dimensions, weights, required clearances, and methods of component assembly.

1.4 QUALITY ASSURANCE

- A. Qualify welding processes and welding operators according to AWS D1.1 "Structural Welding Code--Steel."
 - 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
- B. Qualify welding processes and welding operators according to ASME "Boiler and Pressure Vessel Code," Section IX, "Welding and Brazing Qualifications."
- C. Listing and Labeling: Provide hangers and supports that are listed for their intended use.
 - 1. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Hangers, Supports, and Components: Factory-fabricated according to MSS SP-58.
 - 1. Components include galvanized coatings where installed for piping and equipment that will not have a field-applied finish.
 - 2. Pipe attachments include nonmetallic coating for electrolytic protection where attachments are in direct contact with copper tubing.

- B. Thermal-Hanger Shield Inserts: 100-psi average compressive strength, waterproofed calcium silicate, encased with sheet metal shield. Insert and shield cover entire circumference of pipe and are of length indicated by manufacturer for pipe size and thickness of insulation.
- C. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used. Fasteners for fire protection systems include UL listing and FM approval.

2.2 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36, steel plates, shapes, and bars, black and galvanized.
- B. Bolts and Nuts: ASME B18.10 or ASTM A 183, steel, hex-head, track bolts and nuts.
- C. Washers: ASTM F 844, steel, plain, flat washers.
- D. Grout: ASTM C 1107, Grade B, nonshrink, nonmetallic.
 - 1. Characteristics include post-hardening, volume-adjusting, dry, hydraulic-cement-type grout that is nonstaining, noncorrosive, nongaseous and is recommended for both interior and exterior applications.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.
 - 3. Water: Potable.
 - 4. Packaging: Premixed and factory-packaged.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger requirements are specified in the Section specifying the equipment and systems.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping specification Sections.

3.2 HANGER AND SUPPORT INSTALLATION

- A. General: Comply with MSS SP-69 and SP-89. Install hangers, supports, clamps, and attachments to properly support piping from building structure.
- B. Arrange for grouping of parallel runs of horizontal piping supported together on field-fabricated, heavy-duty trapeze hangers where possible.
- C. Install supports with maximum spacings complying with MSS SP-69.
- D. Where pipes of various sizes are supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
- E. Install building attachments within concrete or to structural steel. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert to forms. Install reinforcing bars through openings at top of inserts.
- F. Install concrete inserts in new construction prior to placing concrete.
- G. Install mechanical-anchor fasteners in concrete after concrete is placed and completely cured. Install according to fastener manufacturer's written instructions. Do not use in lightweight concrete slabs or in concrete slabs less than 4 inches thick.
- H. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

- I. Heavy-Duty Steel Trapezes: Field-fabricate from ASTM A 36 steel shapes selected for loads being supported. Weld steel according to AWS D-1.1.
- J. Support fire protection systems piping independent of other piping.
- K. Install hangers and supports to allow controlled movement of piping systems, permit freedom of movement between pipe anchors, and facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- L. Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
- M. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so that maximum pipe deflections allowed by ASME B31.9 "Building Services Piping" is not exceeded.
- N. Insulated Piping: Comply with the following installation requirements.
 - 1. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ASME B31.9.
 - 2. Saddles: Install protection saddles MSS Type 39 where insulation without vapor barrier is indicated. Fill interior voids with segments of insulation that match adjoining pipe insulation.
 - 3. Shields: Install MSS Type 40, protective shields on cold piping with vapor barrier. Shields span an arc of 180 degrees and have dimensions in inches not less than the following:

THICKNESS NPS (Inches)	LENGTH (Inches)	
1/4 to 3-1/2	12	0.048
4	12	0.060
5 and 6	18	0.060
8 to 14	24	0.075
16 to 24	24	0.105

- 4. Pipes 8 Inches and Larger: Include pressure treated wood inserts.
- 5. Insert Material: Length at least as long as the protective shield.
- 6. Thermal-Hanger Shields: Install with insulation of same thickness as piping.

3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural steel stands to suspend equipment from structure above or support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make a smooth bearing surface.
- C. Provide housekeeping pads where indicated on plans.

3.4 METAL FABRICATION

- A. Cut, drill, and fit miscellaneous metal fabrications for pipe and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field-weld connections that cannot be shop-welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for manual shielded metal-arc welding, appearance and quality of welds, methods used in correcting welding work, and the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Finish welds at exposed connections so that no roughness shows after finishing, and so that contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

- A. Hanger Adjustment: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

3.6 ESCUTCHEONS, SLEEVES AND RISER CLAMPS

- A. Contractor shall furnish and install all escutcheons, inserts, thimbles, hangers, etc. required for the proper support and installation of his equipment and piping and he shall cooperate with other trades in locating and placing these items.
- B. Contractor shall furnish and install all piping sleeves required. Sleeves passing through structural members or concrete footings shall be of cast iron or Schedule 40 steel pipe. Sleeves passing through nonstructural walls or floors shall be of 26-gauge galvanized iron. Joints between sleeves and pipes passing through floors shall be made weather tight with plastic materials. Where pipes pass through water proofing membrane, flashing sleeves shall be installed. Sleeves of structural members shall be as detailed on structural plans.
- C. Provide malleable iron split ring hangers with rod supports as specified. Strap hangers or wire will not be accepted. Spacing of hangers shall be as required above by MSS Standards. Maximum spacing shall no case exceed the following: For cast iron pipes 5ft.; for other than soil pipes 10 ft.
- D. Provide galvanized iron shields between hangers and pipe covering.
- E. Provide heavy steel riser clamps on vertical risers at floors to support pipes.
- F. Provide chrome plated brass escutcheons wherever pipes pass through floors, walls or ceilings in exposed or finished areas.
- G. All piping projecting from chases shall be rigidly supported in the wall or chase. Loosely supported piping, fixtures or accessories will not be accepted.

3.7 PAINTING

- A. Touching Up: Clean field welds and abraded areas of shop paint and paint exposed areas immediately after erection of hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Touching Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal is specified in Division 09 Section "Paints and Coatings."
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 23 05 29