SECTION 400507 - HANGERS AND SUPPORTS FOR PROCESS PIPING

Note that this section has only been edited for NYSOGS standardization and has not been technically edited. The designer shall make all technical edits specific to the project for this section.

This Section specifies supports, hangers, anchors, and guides applicable to plant process piping systems, and equipment bases and supports.

This Section is intended to be used as a standalone Section to specify hangers and supports for entire Division. If this Section is used, consider deleting requirements in individual piping system specification Sections and instead reference this Section.

1. GENERAL
   * + 1. SUMMARY
          1. Section Includes:

Pipe hangers and supports.

Hanger rods.

Structural attachments.

Pipe guides.

Formed-steel channel.

<**\_\_\_\_\_\_\_\_**>.

* + - * 1. Related Requirements:

List other Sections directly related to or affecting Work of this Section. Include Sections specifying information expected to be found in this Section, as well as Sections required to describe complete system or assembly requirements.

Section 031000 - Concrete Forming and Accessories: Execution requirements for placement of [**inserts**] [**sleeves**] in concrete forms specified by this Section.

Section 033000 - Cast-in-Place Concrete: Execution requirements for placement of concrete housekeeping pads specified by this Section.

Section 400512 - Brass Process Pipe: Execution requirements for placement of hangers and supports as specified by this Section.

Section 400517 - Copper Process Pipe and Tubing: Execution requirements for placement of hangers and supports as specified by this Section.

Section 400519 - Ductile Iron Process Pipe: Execution requirements for placement of hangers and supports as specified by this Section.

Section 400523 - Stainless Steel Process Pipe and Tubing: Execution requirements for placement of hangers and supports as specified by this Section.

Section 400524 - Steel Process Pipe: Execution requirements for placement of hangers and supports as specified by this Section.

Section 400531 - Thermoplastic Process Pipe: Execution requirements for placement of hangers and supports as specified by this Section.

Section 400536 - Fiberglass-Reinforced Plastic Process Pipe: Execution requirements for placement of hangers and supports as specified by this Section.

Section 400551 - Common Requirements for Process Valves: Common product requirements for valves for placement by this Section.

Section 404213 - Process Piping Insulation: Insulation requirements for pipe, fittings, and appurtenances.

* + - 1. REFERENCE STANDARDS

List reference standards included within text of this Section, with designations, numbers, and complete document titles.

LEED requires compliance with specific editions of referenced standards. Consider including publication dates for referenced standards in this Section to ensure the correct standard is used for LEED compliance.

* + - * 1. American Welding Society:

AWS D1.1 - Structural Welding Code - Steel.

* + - * 1. ASME International:

ASME B31.1 - Power Piping.

ASME B31.9 - Building Services Piping.

* + - * 1. ASTM International:

ASTM A36 - Standard Specification for Carbon Structural Steel.

ASTM A47 - Standard Specification for Ferritic Malleable Iron Castings.

ASTM A181 - Standard Specification for Carbon Steel Forgings, for General-Purpose Piping.

ASTM A576 - Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality.

* + - * 1. Manufacturers Standardization Society of the Valve and Fittings Industry:

MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacturer, Selection, Application, and Installation.

* + - 1. COORDINATION
         1. Coordinate Work of this Section with piping and equipment connections specified in other Sections [**and as indicated on Drawings**].
      2. PREINSTALLATION MEETINGS
         1. Convene minimum [**one week**] <**\_\_\_\_\_\_\_\_**> [**weeks**] prior to commencing Work of this Section.
      3. SUBMITTALS

Only request submittals needed to verify compliance with Project requirements.

* + - * 1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
        2. Manufacturer’s installation instructions shall be provided along with product data.
        3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
        4. Product Data: Submit manufacturer information, including load capacity.
        5. Shop Drawings: Indicate system layout with location, including critical dimensions, sizes, hanger and support locations, and details of trapeze hangers, anchors, and guides.
        6. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
        7. Welder Certificates: Certify welders and welding procedures employed on Work, verifying AWS qualification within previous 12 months.

Include separate Paragraphs for additional certifications.

Include following Paragraph when Contractor is responsible for designing products or assemblies. List affected products when Section specifies more than one product.

* + - * 1. Delegated Design Submittals:

Submit signed and sealed Shop Drawings with design calculations and assumptions for load carrying capacity of trapeze, multiple pipe, and riser support hangers.

Indicate [**sizing methods**] [**calculations**] used to determine load carrying capacity of trapeze, multiple pipe, and riser support hangers.

* + - * 1. Manufacturer Instructions: Submit special procedures and assembly of components.
        2. Qualifications Statements:

Coordinate following Subparagraphs with requirements specified in QUALIFICATIONS Article.

Submit qualifications for manufacturer, fabricator, installer, and licensed professional.

Submit manufacturer's approval of installer.

* + - 1. QUALITY ASSURANCE

Include this Article to specify compliance with overall reference standards affecting products and installation included in this Section.

Some codes permit compliance with more than one reference standard. Coordinate references with applicable codes.

* + - * 1. Perform Work according to [**applicable authority**] [**AWS D1.1**] for welding hanger and support attachments to building structure.

In following Paragraph insert "State of New York Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

* + - * 1. Perform Work according to <**\_\_\_\_\_\_\_\_**> standards.

Include following Paragraph only when cost of acquiring specified standards is justified.

* + - * 1. Maintain <**\_\_\_\_\_\_\_\_**> [**copy**] [**copies**] of each standard affecting Work of this Section on Site.
      1. QUALIFICATIONS

Coordinate following Paragraphs with requirements specified in SUBMITTALS Article.

* + - * 1. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum [**three**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience.
        2. Fabricator: Company specializing in fabricating products specified in this Section with minimum [**three**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience.
        3. Installer: Company specializing in performing Work of this Section with minimum [**three**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience [**and approved by manufacturer**].
        4. Licensed Professional: [**Professional engineer**] <**\_\_\_\_\_\_\_\_**> experienced in design of specified Work and licensed [**at Project location**] [**in State of**] <**\_\_\_\_\_\_\_\_**>.
      1. DELIVERY, STORAGE, AND HANDLING
         1. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
         2. Store materials according to manufacturer instructions.
         3. Protection:

Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

Provide additional protection according to manufacturer instructions.

* + - 1. EXISTING CONDITIONS
         1. Field Measurements:

Verify field measurements prior to fabrication.

Indicate field measurements on Shop Drawings.

* + - 1. WARRANTY

This Article extends warranty period beyond one year. Extended warranties may increase construction costs and State enforcement responsibilities. Specify warranties with caution.

* + - * 1. Furnish [**five**] <**\_\_\_\_\_\_\_\_**>-year manufacturer's warranty for pipe hangers and supports.

1. PRODUCTS
   * + 1. PIPE HANGERS AND SUPPORTS
          1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=7949&mf=04&src=wd):

designer to provide two manufacturers and approved equivalent for all listed products.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

In following Subparagraph insert "State of New York Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

* + - * 1. Description:

ASME B31.9 concerns piping in industrial, institutional, commercial, and public buildings, and multiunit residences, which do not require the range of sizes, pressures, and temperatures as covered in ASME B31.1.

MSS SP-58 combines the content of other MSS pipe hanger and support standards into a single document.

Comply with [**ASME B31.1**] [**ASME B31.9**] [**MSS SP-58**].

Provide means of vertical adjustment after erection.

Pipe Sizes 1/2 to 1-1/2 Inches:

Material: [**Malleable iron; ASTM A47**] [**Steel; ASTM A36**] <**\_\_\_\_\_\_\_\_**>.

Configuration: Split ring.

Swivel: Adjustable.

Pipe Sizes 2 Inches and Larger:

Material: [**Steel; ASTM A36**] <**\_\_\_\_\_\_\_\_**>.

Configuration: Clevis.

Swivel: Adjustable.

Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

Wall Support for Pipe Sizes 3 Inches and Smaller: Cast-iron J-hook.

Wall Support for Pipe Sizes 4 Inches and Larger: [**Welded steel bracket**] <**\_\_\_\_\_\_\_\_**>.

Vertical Support: Riser clamp.

Floor Supports: Cast-iron adjustable pipe saddle, lock nut, nipple, floor flange, and [**concrete pier**] [**steel support**].

* + - * 1. Performance and Design Criteria:

Insert performance requirements and criteria below when design is assigned to Contractor.

Pipe Hangers:

Design for pipe movement without disengagement of supported pipe.

Allow for expansion and contraction of piping while eliminating undue stress on piping appurtenances and equipment.

Provide linkage to permit lateral or axial movement where anticipated.

If horizontal pipe movement is greater than 1/2 inch , or if hanger rod deflection from the vertical is greater than 4 degrees from cold to hot position of pipe, offset hanger rod and structural attachment to maintain rod vertical in hot position.

Heat Transmission: Design supports, hangers, anchors, and guides to prevent excessive heat from being transmitted to building structure, equipment, or piping appurtenances.

Riser Supports: Support risers on each floor with riser clamps and lugs, independent of connected horizontal piping.

Point Loads:

Support plastic piping containing meters, valves, appurtenances, and other point loads on both sides.

Avoid point loads on plastic piping by providing extra-wide pipe saddles or galvanized-steel shields.

Noise Reduction: Wrap copper tubes located within buildings in a 2-inch- wide strip of [**rubber**] <**\_\_\_\_\_\_\_\_**> at each pipe support, bracket, clip, and hanger.

* + - 1. HANGER RODS
         1. Material: [**Steel; ASTM A576**] <**\_\_\_\_\_\_\_\_**>.
         2. End Connections: [**Threaded both ends**] [**Threaded one end**] [**All thread**].
         3. Size: [**Comply with ASME B31.1**] [**and**] [**as indicated on Drawings**].
      2. STRUCTURAL ATTACHMENTS
         1. Concrete Inserts:

[Manufacturers](http://www.specagent.com/LookUp/?ulid=7950&mf=04&src=wd):

designer to provide two manufacturers and approved equivalent for all listed products.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

In following Subparagraph insert "State of New York Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

Case: Malleable iron with [**galvanized-**]steel shell and expander plug.

Connection: Threaded, with lateral adjustment.

Size: To suit threaded hanger rods.

* + - * 1. Mounting Brackets: Welded steel; ASTM A36.
        2. Beam Clamps:

[Manufacturers](http://www.specagent.com/LookUp/?ulid=9287&mf=04&src=wd):

designer to provide two manufacturers and approved equivalent for all listed products.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

In following Subparagraph insert "State of New York Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

Comply with MSS SP-58.

Material: [**Steel; ASTM A36**] [**Forged steel; ASTM A181**] <**\_\_\_\_\_\_\_\_**>.

Size: Suitable for load to be supported.

Anchoring: Locknuts and [**cup-point**] set screws.

Furnish reversible [**top**] [**or**] [**bottom**] flange.

* + - * 1. Riser Clamps:

[Manufacturers](http://www.specagent.com/LookUp/?ulid=9288&mf=04&src=wd):

designer to provide two manufacturers and approved equivalent for all listed products.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

In following Subparagraph insert "State of New York Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

Material: [**Steel; ASTM A36**] <**\_\_\_\_\_\_\_\_**>.

Consider including following Subparagraph if copper tubing is to be supported.

Support of Copper Tubing: Furnish copper-plated clamp.

* + - * 1. Offset Clamps:

[Manufacturers](http://www.specagent.com/LookUp/?ulid=9289&mf=04&src=wd):

designer to provide two manufacturers and approved equivalent for all listed products.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

In following Subparagraph insert "State of New York Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

Configuration: Double leg, two pieces.

* + - 1. PIPE GUIDES
         1. Intermediate Guides:

Pipes 6 Inches and Smaller: Pipe clamp with oversize pipe sleeve.

Pipes 8 Inches and Larger: U-bolts with double nuts.

* + - * 1. Alignment Guides:

Pipes 8 Inches and Smaller:

Material: [**Galvanized steel**] <**\_\_\_\_\_\_\_\_**>.

Type: [**Spider**] [**Sleeve**] <**\_\_\_\_\_\_\_\_**>.

Pipes 10 Inches and Larger:

Material: [**Galvanized steel**] <**\_\_\_\_\_\_\_\_**>.

Type: [**Roller**] <**\_\_\_\_\_\_\_\_**>.

* + - 1. FORMED-STEEL CHANNEL
         1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=7952&mf=04&src=wd):

designer to provide two manufacturers and approved equivalent for all listed products.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

In following Subparagraph insert "State of New York Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

* + - * 1. Description:

Material: [**Galvanized steel**] <**\_\_\_\_\_\_\_\_**>.

Thickness: 12 gage.

Mounting Holes: 1-1/2 inches o.c.

1. EXECUTION
   * + 1. EXAMINATION
          1. Verify that field dimensions as indicated on [**Shop**] Drawings.
       2. INSTALLATION
          1. Obtain permission from [**Director’s Representative**] <**\_\_\_\_\_\_\_\_**> before using powder-actuated anchors.
          2. Obtain permission from [**Director’s Representative**] <**\_\_\_\_\_\_\_\_**> before drilling or cutting structural members.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

* + - * 1. Do not drill or cut structural members.
        2. Inserts:

Placement:

Concrete forms.

Reinforced concrete slabs and sides of reinforced concrete beams.

Piping 4 Inches and Larger: Provide hooked rod to concrete reinforcement section.

Concrete Slabs Forming Finished Ceiling: Locate inserts flush with slab surface.

* + - * 1. Pipe Hangers and Supports:

Comply with [**ASME B31.1**] [**ASME 31.9**] [**MSS SP-58**].

Support horizontal piping as indicated [**in schedule following END OF SECTION**] [**on Drawings**] [**on Shop Drawings**].

Install hangers with minimum 1/2-inch space between finished covering and adjacent Work.

Place hangers within 12 inches of each horizontal elbow.

Minimum Vertical Adjustment: 1-1/2 inches.

Supports:

Independently of equipment.

Horizontal Cast-Iron Piping: Adjacent to each hub, with maximum 5-foot spacing between hangers.

Vertical Piping:

Cast-Iron Piping: At each floor at hub.

Other Piping: At every [**other**] floor.

Riser Piping: Independent of connected horizontal piping.

Piping in Parallel at Same Elevation: Provide multiple pipe or trapeze hangers.

[**Provide sheet-lead packing between hanger or support and piping**].

Clamps and Brackets:

Provide welded steel brackets if piping is to be run adjacent to building walls or columns.

Use beam clamps if piping is to be suspended from building steel.

Insulated Piping: Provide two bolted clamps designed to accommodate insulated piping.

Use offset clamps if pipes are indicated as offset from wall surfaces.

* + - * 1. Insulation:

Provide clearance in hangers and from structure and other equipment for installation of insulation.

As specified in Section [**404213 - Process Piping Insulation**] <**\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_**>.

Manufactured hangers are typically supplied in black steel.

* + - * 1. Equipment Bases and Supports:

Housekeeping Pads:

Material: Concrete, as specified in Section 033300 - Cast-in-Place Concrete.

Minimum Thickness: [**3-1/2 inches**] [**As indicated on Drawings**] [**As indicated on Shop Drawings**].

Plan Area: Extend 6 inches beyond supported [**equipment**] <**\_\_\_\_\_\_\_\_**>.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

Housekeeping Pads: As indicated on [**Drawings**] [**Shop Drawings**].

Supports:

Material: [**Steel members**] [**Formed-steel channel**] [**Steel pipe and fittings**] <**\_\_\_\_\_\_\_\_**>.

Brace and fasten with flanges bolted to structure.

Anchor Bolts and Accessories: Use templates furnished with equipment.

* + - * 1. Finishes:

Hangers and supports located in crawlspaces, pipe shafts, and suspended ceiling spaces are not considered as exposed.

* + - 1. ATTACHMENTS

When relying on separate schedules, tables, illustrations, or forms to specify product requirements, include list of each attachment. Include identical list of attachments in Project Manual table of contents.

Consider including schedule if pipe hanger spacing and size is not defined by code.

Insert attachments following END OF SECTION. Consider following examples when developing Project schedule.

* + - * 1. Pipe Hanger Spacing:

Pipe Material: ABS.

Maximum Hanger Spacing: 4 feet

Hanger Rod Diameter:3/8 inch.

Pipe Material: Aluminum.

Maximum Hanger Spacing: 10 feet.

Hanger Rod Diameter:1/2 inch.

Pipe Material: Cast iron.

Maximum Hanger Spacing: 5 feet.

Hanger Rod Diameter:5/8 inch.

Pipe Material: Cast iron, with 10-foot length of pipe.

Maximum Hanger Spacing: 10 feet.

Hanger Rod Diameter:5/8 inch.

Pipe Material: CPVC.

Size: 1 inch and smaller.

Maximum Hanger Spacing: 3 feet.

Hanger Rod Diameter:1/2 inch.

Pipe Material: CPVC.

Size: 1-1/4 inches and larger.

Maximum Hanger Spacing: 4 feet.

Hanger Rod Diameter:1/2 inch.

Pipe Material: Copper tube.

Size: 1-1/4 inches and smaller.

Maximum Hanger Spacing: 6 feet.

Hanger Rod Diameter:1/2 inch.

Pipe Material: Copper tube.

Size: 1-1/2 inches and larger.

Maximum Hanger Spacing: 10 feet.

Hanger Rod Diameter:1/2 inch.

Pipe Material: Fiberglass:

Maximum Hanger Spacing: 4 feet.

Hanger Rod Diameter:1/2 inch.

Pipe Material: Glass.

Maximum Hanger Spacing: 8 feet.

Hanger Rod Diameter:1/2 inch.

Pipe Material: Polybutylene.

Maximum Hanger Spacing: 2.7 feet.

Hanger Rod Diameter:3/8 inch.

Pipe Material: Polypropylene.

Maximum Hanger Spacing: 4 feet.

Hanger Rod Diameter:3/8 inch.

Pipe Material: PVC.

Maximum Hanger Spacing: 4 feet.

Hanger Rod Diameter:3/8 inch.

Pipe Material: Steel.

Size: 3 inches and smaller.

Maximum Hanger Spacing: 12 feet.

Hanger Rod Diameter:1/2 inch.

Pipe Material: Steel.

Size: 4 inches and larger.

Maximum Hanger Spacing: 12 feet.

Hanger Rod Diameter:5/8 inch.

END OF SECTION 400507