

SECTION 21 05 05 HANGERS, SUPPORTS AND ANCHORS FOR FIRE SUPPRESSION SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Hangers, supports, anchors and guides for fire protection piping and equipment.

B. Related Sections:

1. Division 08 - Access Doors and Frames: Product requirements for access doors for placement by this section.
2. Division 09 - Painting and Coating: Product and execution requirements for painting specified by this section.
3. Section 21 05 04 - Valves for Fire Suppression: Product requirements for valves for placement by this section.
4. Section 21 05 16 - Expansion Fittings and Loops for Fire-Suppression Piping: Product requirements for piping expansion compensation devices for placement by this section.
5. Section 21 05 48 - Noise and Vibration Controls for Fire Suppression Piping and Equipment.
6. Section 21 12 00 - Fire Suppression Standpipes: Product requirements for fire standpipe piping for placement by this section.
7. Section 21 13 13 - Wet-Pipe Sprinkler Systems: Product requirements for wet sprinkler piping for placement by this section.

1.02 SUBMITTALS

A. Division 01 - Submittal Procedures: Submittal procedures.

B. Manufacturer's literature, catalog data and illustrations.

C. Shop Drawings indicating:

1. Dimensions.
2. Construction details of hangers, inserts, anchors and guides.
3. Materials.
4. Maximum Load.
5. Locations.

6. Recommended installation procedures.
7. Isolator loading and deflection.
8. Spring diameters, compressed spring heights at rated load; solid spring heights.
9. Equipment operating speeds.

1.03 QUALITY ASSURANCE

- A. Codes and Authorities:
 1. Federal Specification WW-H171b.
 2. ASA Code for Pressure Piping.
 3. ASTM A-575-73.
 4. MSS SP-58-67.
 5. MSS SP-69-66.
 6. Underwriters Laboratories.
 7. Factory Mutual.
 8. National Fire Protection Association
- B. Perform Work in accordance with IBC-NJ.

1.04 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum five (5) years documented experience approved by manufacturer.
- C. Design pipe hangers and supports under direct supervision of Professional Engineer experienced in design of this Work and licensed in the State of New Jersey.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Division 01 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Furnish temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. Protect piping from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Division 01 - Product Requirements: Environmental conditions affecting products on site.

1.07 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.08 COORDINATION

- A. Division 01 - Administrative Requirements: Requirements for coordination.

PART 2 - PRODUCTS

2.01 HANGERS

- A. All bracket, clamp and rod sizes indicated in this specification are minimum sizes only. All structural hanging materials shall have a built-in safety factor of 5.
- B. Provide rolled-steel auxiliary pipe supports as required.
- C. Anchor points shall be located and constructed to permit the piping system to take up its expansion and contraction freely in opposite directions from the anchored points.
- D. Guide points shall be located and constructed wherever required or shown on drawings and at each side of an expansion joint or loop, to permit free axial movement only in a piping system.
- E. All hangers shall be U.L. listed and FM approved.
- F. C-clamps with locknut and retaining clip will be permitted.
- G. Pipe Hanger Schedule:

	Carpenter & Paterson 'Witch'	Grinnell	I.R. Rauch's & Sons
C-Clamp with Retaining Clip and locknut	47	86	47
(pipe sizes 2" & smaller)	with 22	with 89	with 22
Beam Clamp	293	228	82
Multi-J Hook	---	---	228
J Hook	---	---	221
Clevis Hanger	100	260	100

	Carpenter & Paterson 'Witch'	Grinnell	I.R. Rauch's & Sons
Clevis hanger w/Saddle	100SH	---	100SH
180° Shield	265P	168	265P
Single Rod Roll Hanger	140	181	140
Double Rod Roll Hanger	142	171	142
Trapeze	---	46	1600-1700
U-bolt Adjustable Pipe	283	137C	283
Stanchion Saddle	247	259	247
Welded Steel Bracket	84 or 139	199 or 195	84 or 139
Riser clamp	126	261	126
Welded Beam Attachment	113A	66	---
Welded Beam Attachment w/bolt & nut	113B	66	113A
Concrete Insert	108	282	180 or 181
Phillips Inserts	513	Phillips Insert	1000

H. Hanger Rod Schedule:

Pipe Size	Rod Diameter
2" and smaller	3/8"
2-1/2" - 3-1/2"	1/2"
4" - 5"	5/8"
6"	3/4"
8" - 12"	7/8"

I. Acceptable Manufacturers:

1. I.R. Rauch's & Sons
2. Grinnell Company, Inc.
3. Carpenter & Paterson

2.02 FOUNDATIONS

- A. All equipment, piping, etc., shall be mounted on approved foundations, all as specified herein, or as shown on the drawings.
- B. All floor-mounted equipment shall be erected on 12" high concrete pads, over the complete floor area of the equipment, unless specified to the contrary herein. Hereinafter, wherever vibration eliminating devices and/or concrete inertia blocks are specified, these items shall in turn be mounted upon aforementioned pads unless specified to the contrary herein.

- C. All concrete foundations and supports (and required reinforcing thereof) will be furnished and installed under this Section of the Specification. Furnish templates for all concrete foundations and supports, and all required hanger bolts and other appurtenances necessary for the proper installation of equipment. Submit shop drawings showing the complete details of all foundation bases including necessary concrete and steel work, vibration isolation devices, etc.

2.03 FLASHING

- A. Metal Flashing: 26 gage thick galvanized steel.
- B. Metal Counterflashing: 22 gage thick galvanized steel.
- C. Lead Flashing:
 - 1. Waterproofing: 5 lb./sq. ft sheet lead.
 - 2. Soundproofing: 1 lb./sq. ft sheet lead.
- D. Flexible Flashing: 47 mil thick sheet butyl; compatible with roofing.
- E. Caps: Steel, 22 gage minimum; 16 gage at fire resistant elements.

2.04 SLEEVES

- A. Sleeves for Pipes through Non-fire Rated Floors: 18 gage thick galvanized steel.
- B. Sleeves for Pipes through Non-fire Rated Beams, Walls, Footings and Potentially Wet Floors: Schedule 40 galvanized steel pipe.
- C. Sleeves for pipes through Rated Construction: Galvanized steel, thickness as required to meet UL1479 requirements.
- D. Sealant: Acrylic; refer to Division 07.

2.05 MECHANICAL SLEEVE SEALS

- A. Manufacturers: Subject to requirements of the specification, provide the following manufacturer's products by one of the following or approved equal:
 - 1. Thunderline Link-Seal, Inc.
 - 2. NMP Corporation
 - 3. Substitutions: Division 01 - Product Requirements.
- B. Product Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve,

connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.06 FORMED STEEL CHANNEL

- A. Manufacturers: Subject to requirements of the specification, provide the following manufacturer's products by one of the following or approved equal:
 - 1. Allied Tube & Conduit Corp.
 - 2. B-Line Systems
 - 3. Unistrut Corp.
 - 4. Substitutions: Division 01 - Product Requirements.
- B. Product Description: Galvanized 12 gage thick steel. With holes 1-1/2 inches on center.

2.07 FIRESTOPPING

- A. Manufacturers: Subject to requirements of the specification, provide the following manufacturer's products by one of the following or approved equal:
 - 1. Dow Corning Corp.
 - 2. Fire Trak Corp.
 - 3. Hilti Corp.
 - 4. 3M fire Protection Products
 - 5. Specified Technology, Inc.
 - 6. Substitutions: Division 01 - Product Requirements.
- B. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
 - 1. Silicone Firestopping Elastomeric Firestopping: Multiple component silicone elastomeric compound and compatible silicone sealant.
 - 2. Foam Firestopping Compounds: Multiple component foam compound.
 - 3. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
 - 4. Fiber Stuffing and Sealant Firestopping: Composite of ceramic fiber stuffing insulation with silicone elastomer for smoke stopping.
 - 5. Mechanical Firestopping Device with Fillers: Mechanical device with incombustible fillers and silicone elastomer, covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.

- 6. Intumescent Firestopping: Intumescent putty compound which expands on exposure to surface heat gain.
- 7. Firestop Pillows: Formed mineral fiber pillows.
- C. Firestopping system shall meet UL1479 requirements.
- D. Color: As selected from manufacturer's full range of colors.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Division 01 - Administrative Requirements: Verification of existing conditions before starting work.

3.02 INSTALLATION

- A. All piping shall be supported only from building structural steel or galvanized steel inserts imbedded in poured concrete. Where piping revisions are required after slabs are poured, pipes 3" and smaller may be supported at intermediate points by "Phillips" or other 3/4" expansion bolts and shields, provided main supports are not less than 20' on centers. All inserts, expansion bolts and shields in post-tensioned concrete slabs shall be submitted to Structural Engineer for approval prior to commencement of work. Intermediate supports for piping 4" and larger shall be attached to concrete beams or columns by means of 4" x 4" x 3/8" (horizontal) and supporting rod at 90° from anchor bolt. It is the intent that inserts are only permitted in poured concrete construction.
- B. Hanger Locations for Horizontal Piping:
 - 1. Steel Piping 1-1/4" and Smaller: Every 6'.
 - 2. Steel Piping 1-1/2" and Larger: Every 10'.
- C. Support Locations for Vertical Piping:
 - 1. Threaded & Mechanical Joint Piping: At every floor, but in no case greater than 20-foot intervals.
- D. Hangers shall be installed outside of piping insulation with a semi-cylindrical galvanized shield set between the hanger and insulation.
- E. All beam attachments shall be installed on clean, smooth, and non-fireproofed sections of the beam.
- F. All fire protection piping shall be hung individually from the structure.

- G. All hangers, anchors, rods and supports shall be painted. Refer to Section 15308-2.13.
- H. Supporting piping from other piping, conduit or ductwork is prohibited.

3.03 INSTALLATION - INSERTS

- A. Install inserts for placement in concrete forms.
- B. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe 4 inches and larger.
- D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
- E. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

3.04 INSTALLATION - PIPE HANGERS AND SUPPORTS

- A. Install in accordance with ASME B31.1, ASTM F708, MSS SP58, MSS SP69 and MSS SP89.
- B. Support horizontal piping as scheduled.
- C. Install hangers with minimum 1/2 inch space between finished covering and adjacent work.
- D. Place hangers within 12 inches of each horizontal elbow.
- E. Use hangers with 1-1/2 inch minimum vertical adjustment.
- F. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.
- G. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.
- H. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.
- I. Support riser piping independently of connected horizontal piping.
- J. Provide copper plated hangers and supports for copper piping.
- K. Design hangers for pipe movement without disengagement of supported pipe.

- L. Prime coat exposed steel hangers and supports. Refer to Division 09. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- M. Provide clearance in hangers and from structure and other equipment for installation of insulation. Refer to Section 22 07 00.
- N. All rooftop piping supports shall be anchored to the structure and shall be able to withstand 120 MPH wind loading.

3.05 INSTALLATION - EQUIPMENT BASES AND SUPPORTS

- A. Provide housekeeping pads of concrete, minimum 4 inches thick and extending a minimum of 6 inches beyond supported equipment. Refer to Division 03.
- B. Using templates furnished with equipment, install anchor bolts, and accessories for mounting and anchoring equipment.
- C. Construct supports of formed steel channel. Brace and fasten with flanges bolted to structure.
- D. Provide rigid anchors for pipes after vibration isolation components are installed. Refer to Section 21 05 48.

3.06 INSTALLATION - FLASHING

- A. Provide flexible flashing and metal counterflashing where piping penetrates weather or waterproofed walls, floors, and roofs.
- B. Flash vent and water pipes projecting 12 inches minimum above finished roof surface with lead worked 1 inch minimum into hub, 8 inches minimum clear on sides with 24 x 24 inches sheet size. For pipes through outside walls, turn flanges back into wall and caulk, metal counter-flash, and seal.
- C. Flash floor drains in floors with topping over finished areas with lead, 10 inches clear on sides with minimum 36 x 36 inch sheet size. Fasten flashing to drain clamp device.
- D. Adjust storm collars tight to pipe with bolts; caulk around top edge. Use storm collars above roof jacks. Screw vertical flange section to face of curb.

3.07 INSTALLATION - SLEEVES

- A. Exterior watertight entries: Seal with mechanical sleeve seals.
- B. Set sleeves in position in forms. Provide reinforcing around sleeves.
- C. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

- D. Extend sleeves through floors 1 inch above finished floor level. Caulk sleeves.
- E. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent work with firestopping insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
- F. Install chrome plated steel escutcheons at finished surfaces.

3.08 INSTALLATION - FIRESTOPPING

- A. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping and other items, requiring firestopping to meet UL1479 requirements.
- B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.
- C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating, to uniform density and texture.
- D. Place intumescent coating in sufficient coats to achieve rating required.
- E. Remove dam material after firestopping material has cured.
- F. Fire Rated Surface:
 - 1. Seal opening at floor, wall, partition, ceiling, and roof as follows:
 - a. Install sleeve through opening and extending beyond minimum of 1 inch on both sides of building element.
 - b. Size sleeve allowing minimum of 1 inch void between sleeve and building element.
 - c. Pack void with backing material.
 - d. Seal ends of sleeve with UL listed fire resistive silicone compound to meet fire rating of structure penetrated.
- G. Non-Rated Surfaces:
 - 1. Seal opening through non-fire rated wall, partition floor, ceiling, and roof opening as follows:
 - a. Install sleeve through opening and extending beyond minimum of 1 inch on both sides of building element.
 - b. Size sleeve allowing minimum of 1 inch void between sleeve and building element.
 - c. Install type of firestopping material recommended by manufacturer.

2. Install escutcheons, floor plates or ceiling plates where piping, penetrates non-fire rated surfaces in occupied spaces. Occupied spaces include rooms with finished ceilings and where penetration occurs below finished ceiling.
3. Exterior wall openings below grade: Assemble rubber links of mechanical sealing device to size of piping and tighten in place, in accordance with manufacturer's instructions.
4. Interior partitions: Seal pipe penetrations at computer rooms, telecommunication rooms and data rooms. Apply sealant to both sides of penetration to completely fill annular space between sleeve and conduit

3.09 FIELD QUALITY CONTROL

- A. Division 01 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

3.10 CLEANING

- A. Division 01 - Execution and Closeout Requirements: Requirements for cleaning.

END OF SECTION