



SECTION 23 05 29
NON-PENETRATING ROOFTOP HANGERS AND SUPPORTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Rooftop support products including:
 - 1. Pillow block pipe supports.
 - 2. Dynamic support series.
 - 3. Elevate support series.
 - 4. Custom hanger support series.
 - 5. Custom duct and cable tray support series.
 - 6. Mechanical supports.
 - 7. Surefoot access products.
 - 8. Accessories.

1.2 RELATED SECTIONS

- A. Section 05 50 00 - Metal Fabrications.
- B. Division 07 - Roofing sections as applicable.
- C. Section 07 62 00 - Sheet Metal Flashing and Trim.
- D. Section 07 70 00 - Roof and Wall Specialties and Accessories.
- E. Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.
- F. Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.
- G. Section 23 05 31 - Pipe Enclosures*.
- H. Section 26 05 48 - Vibration and Seismic Controls for Electrical Systems.

1.3 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM A1011 SS GR33 - Standard Specification for hot rolled carbon steel sheet and strip, structural quality. (Hot Rolled Channel - Hot-Dipped Galvanized Finish).
- B. American Iron and Steel Institute (AISI):
 - 1. AISI Specifications for the Design of Cold-Formed Steel Structural Members, 2007 Edition.
- C. American Society of Civil Engineers (ASCE):

1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- D. Occupational Safety and Health Administration (OSHA):
1. Safety and Health Regulations for Construction, Fall Protection.
 2. OSHA 1910, Subpart D, Walking and Working Surfaces.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Installation methods.
- C. Shop Drawings:
1. Provide project specific, engineered stamped shop drawings and calculations including extents of installation, load bearing capacity and structural requirements.
 2. Show installation layout, indicating product type and spacing. Coordinate with manufacturer's take off evaluations, measurements, control dimensions, and rooftop requirements analysis.
 3. Show details of each roofing system including material layers and thicknesses, flashing, terminations, and penetrations with each rooftop support system to be installed.
 4. All supports shall be pre-assembled and shipped for turnkey installation. Indicate all steps and preparation required by others.
- D. Certification:
1. Installer Qualifications: Certified by the manufacturer.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company with minimum 20 years of experience and specializing in the manufacture and distribution of engineered support systems.
1. Manufacturer's custom work process shall include the following steps:
 - a. Project concept development and consulting.
 - b. Design and engineering including quantity and type of supports and accessories.
 - c. Fabrication and delivery.
 - d. On site evaluation that installation meets specifications herein and manufacturer requirements.
 - e. Owner training and maintenance instruction.
- B. Installer Qualifications: Approved by the manufacturer, with minimum 5 years of experience installing similar products.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
1. Finish areas designated by Architect.
 2. Do not proceed with remaining work until workmanship is approved by Architect.
 3. Refinish mock-up area as required to produce acceptable work.

1.6 PRE-INSTALLATION MEETINGS

- A. After approval of submittals but before beginning installation, conduct a meeting at the Project site including:
1. Attendance shall include the Architect, Contractor, roofing installers, mechanical,

- electrical and other trades whose work will be installed in support system.
2. Describe the installation process in detail to establish responsibilities and project specific requirements and site logistics.
 3. Prepare detailed meeting report and distribute to all attendees.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification, product model names and catalog numbers, and related information until ready for installation.
- B. Store materials off the ground under ventilated covers until ready for installation.
- C. Handle materials to avoid damage.

1.8 PROJECT CONDITIONS

- A. Quantity Take Off: A manufacturer certified technician shall perform on-site quantity take-off including the following:
 1. Field measurements.
 - a. Where field measurements are not possible during design or construction, show control dimensions and project specific information on shop drawings.
 2. Design and layout.
 3. Product designation and tagging.
- B. Do not install products under environmental conditions outside manufacturer's recommended limits.
- C. Coordinate with roofing, mechanical, electrical and other related trades as required.

1.9 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.10 WARRANTY

- A. Provide manufacturers standard product warranty against defects in manufacturing, proper operation, and against damaging roofing membrane when products are installed in accordance with engineered shop drawings and manufacturer's instructions. Warranty is not a maintenance agreement, insurance policy or obligation to repair leaks determined to be a result of the building design, installation, construction error, misuse of system, failure to inspect or maintain system or other limitations in manufacturer's standard warranty.
 1. Warranty Period: 20 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: MIRO Industries Inc., which is located at: 844 S. 430 W. Suite 100; Heber City, UT 84032; Toll Free Tel: 800-768-6978; Tel: 801-975-9993; Fax: 800-440-7958; Email: sales@miroind.com; Web: www.miroind.com
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 GENERAL

- A. Unique design absorbs thermal expansion and contraction of pipes to prevent damage to roofing membranes using non-corrosive bases that rest on roofing membranes including:
 - 1. Gently rounded edges to prevent damage to roofing membrane.
 - 2. Drainage ports to prevent ponding.
 - 3. Carbon black additive in polycarbonate for UV stabilization, stainless steel and hot-dipped galvanized bases are available as specified below.
- B. Loading and Design Constraints:
 - 1. Maximum loading from any type of MIRO base to finishes roof surface not to exceed 2.0 psi (0.012 Mpa) unless specifically indicated in project specifications.
 - 2. Horizontal deflection not to exceed the span length divided by 360 or 1/8 inch (3.175 mm).
- C. Include manufacturers pipe guides, spacers, clamps, support pads, 2-sided tape and other recommended accessories.

2.3 Pillow block pipe supports

- A. 1.5 - Pillow Block: Pipe support for roof-mounted gas pipes, electrical conduit, solar and other mechanical piping with the following properties:
 - 1. Base Material: Polycarbonate.
 - 2. Deck Base: 6 inch (152.4 mm) square
 - 3. Pipe Clearance: Fixed height of 2 inch (50.8 mm). Each 1.5 spacer increases the clearance of the pipe by 1-1/2 inches (38.1 mm).
 - 4. Maximum Load Weight: 48 pounds (21.7 kg) per pipestand.
 - 5. Pipe Rests: "U" shaped cradle in a polycarbonate resin seat.
 - 6. Nominal Inside Diameter: 1-1/2 inch (38.1 mm).
 - 7. Maximum Outside Diameter: 1-9/10 inch (48.3 mm).
 - 8. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
- B. 3-R-2 - Pillow Block: Roller bearing pipe support for roof-mounted gas pipes, electrical conduit, solar and other mechanical piping with the following properties:
 - 1. Base Material: Polycarbonate.
 - 2. Deck Base: 7-3/4 inch (196.8 mm) square.
 - 3. Pipe Clearance: Fixed height of 2.15 inch (54.6 mm). Each 3-R spacer increases the clearance of the pipe by 2 inch (50.1 mm).
 - 4. Maximum Load Weight: 79 pounds (35.8 kg) per pipestand.
 - 5. Pipe Rests: Self-lubricating polycarbonate resin roller and axle.
 - 6. Nominal Inside Diameter: 3 inch (76.2 mm).
 - 7. Maximum Outside Diameter: 3-3/4 inch (95.25 mm).
 - 8. Top of the Cradle: 4 inch (101.6 mm).
 - 9. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 7 foot (2.133 meter) centers as loading permits.
- C. 3-R-4 - Pillow Block: Roller bearing pipe support for roof-mounted gas pipes, electrical conduit, solar and other mechanical piping with the following properties:
 - 1. Base Material: Polycarbonate.
 - 2. Deck Base: 7-3/4 inch (196.8 mm) square.
 - 3. Pipe Clearance: Fixed height of 4.175 inch (106 mm). Each 3-R spacer increases the clearance of the pipe by 2 inch (50.1 mm).
 - 4. Maximum Load Weight: 79 pounds (35.8 kg) per pipestand.
 - 5. Pipe Rests: Self-lubricating polycarbonate resin roller and axle.

6. Nominal Inside Diameter: 3 inch (76.2 mm).
7. Maximum Outside Diameter: 4-1/2 inch (114.3 mm).
8. Top of the Cradle: 4 inch (101.6 mm).
9. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 7 foot (2.133 meter) centers as loading permits.

2.4 DYNAMIC SUPPORT SERIES

- A. 3-RAH-7 - Dynamic: Roller bearing pipe support for roof-mounted gas pipes, electrical conduit, solar and other mechanical piping with the following properties:
 1. Base Material: Polycarbonate.
 2. Deck Base: 7-1/2 by 10 inch (190 by 254 mm).
 3. Pipe Clearance: Adjustable from 3-7/8 inch (98.4 mm) to 7 inch (177.8 mm).
 4. Maximum Load Weight, Polycarbonate: 115 pounds (52.16 kg) per pipestand.
 5. Pipe Rests: Self-lubricating polycarbonate resin roller, axle and collar.
 6. Support All-Thread and Metal Parts: Stainless Steel.
 7. Nominal Inside Diameter: 3 inch (76.2 mm).
 8. Maximum Outside Diameter: 4-1/2 inch (114.3 mm).
 9. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 10. If supporting insulated pipe a shield or saddle shall be used.

- B. 3-RAH-12 - Dynamic: Roller bearing pipe support for roof-mounted gas pipes, electrical conduit, solar and other mechanical piping with the following properties:
 1. Base Material: Polycarbonate.
 2. Deck Base: 9 by 15-1/4 inch (228 by 387 mm).
 3. Pipe Clearance: Adjustable from 4-1/2 inch (114.3 mm) to 13 inch (330.2 mm).
 4. Maximum Load Weight: 186 pounds (84.36 kg) per pipestand.
 5. Pipe Rests: Self-lubricating polycarbonate resin roller, axle, and collar.
 6. Support All-Thread and Metal Parts: Stainless Steel.
 7. Nominal Inside Diameter: 3 inch (76.2 mm).
 8. Maximum Outside Diameter: 4-1/2 inch (114.3 mm).
 9. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 10. If supporting insulated pipe a shield or saddle shall be used.

- C. 4-RAH-7 - Dynamic: Roller bearing pipe support for roof-mounted gas pipes, electrical conduit, solar and other mechanical piping with the following properties:
 1. Base Material: Polycarbonate.
 - a. Deck Base: 9 by 15-1/4 inch (228 by 387 mm).
 - b. Pipe Clearance: Adjustable from 4-1/2 inch (114.3 mm) to 7 inch (177.8 mm).
 - c. Maximum Load Weight on Base: 223 pounds (101.15 kg) per pipestand.
 2. Base Material: Type 304 Stainless Steel. (Model 4-RAH-7 SS - Dynamic)
 - a. Deck Base: 12 by 16 inch (304.8 by 406.4 mm).
 - b. Pipe Clearance: Adjustable from 3-3/4 inch (95.25 mm) to 7 inch (177.8 mm).
 - c. Maximum Load Weight on Base: 330 pounds (149.68 kg) per pipestand.
 3. Pipe Rest: Self-lubricating polycarbonate resin roller, axle and collar.
 4. Support All-Thread and Metal Brackets: Stainless Steel or Hot-Dipped Galvanized.
 5. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 6. If supporting insulated pipe a shield or saddle shall be used.

- D. 4-RAH-12 - Dynamic: Roller bearing pipe support for roof-mounted gas pipes, electrical

conduit, solar and other mechanical piping with the following properties:

1. Base Material: Polycarbonate.
 2. Deck Base: 9 by 15-1/4 inch (228 by 387 mm).
 3. Pipe Clearance: Adjustable from 4-1/2 inch (114.3 mm) to 12 inch (304.8 mm).
 4. Maximum Load Weight: 186 pounds (84.36 kg) per pipestand.
 5. Pipe Rest: Self-lubricating polycarbonate resin roller, axle, and collar.
 6. Support All-Thread and Metal Parts: Stainless Steel.
 7. Nominal Inside Diameter: 4 inch (101.6 mm).
 8. Maximum Outside Diameter: 4-1/2 inch (114.3 mm).
 9. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 10. If supporting insulated pipe a shield or saddle shall be used.
- E. 5-RAH-7 - Dynamic: Roller bearing pipe support for roof-mounted gas pipes, electrical conduit, solar and other mechanical piping with the following properties:
1. Base Material: Polycarbonate.
 2. Deck Base: 9 by 15-1/4 inch (228 by 387 mm).
 3. Pipe Clearance: Adjustable from 3-1/2 inch (88.9 mm) to 7 inch (177.8 mm).
 4. Maximum Load Weight: 223 pounds (101.15 kg) per pipestand.
 5. Pipe Rest: Self-lubricating polycarbonate resin roller.
 6. Support All-Thread, Axle, and Metal Parts: Stainless Steel.
 7. Maximum Inside Diameter: 5 inch (127 mm).
 8. Maximum Outside Diameter: 8-1/2" inch (215.9 mm).
 9. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 10. If supporting insulated pipe a shield or saddle shall be used.
- F. 5-RAH-12 - Dynamic: Roller bearing pipe support for roof-mounted gas pipes, electrical conduit, solar and other mechanical piping with the following properties:
1. Base Material: Polycarbonate.
 2. Deck Base: 9 by 15-1/4 inch (228 by 387 mm).
 3. Pipe Clearance: Adjustable from 3-1/2 inch (88.9 mm) to 12 inch (304.8 mm).
 4. Maximum Load Weight: 223 pounds (101.15 kg) per pipestand.
 5. Pipe Rest: Self-lubricating polycarbonate resin roller.
 6. Support All-Thread, Axle, and Metal Parts: Stainless Steel.
 7. Nominal Inside Diameter: 8-1/2 inch (215.9 mm).
 8. Maximum Outside Diameter: 6 inch (152.4 mm).
 9. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 10. If supporting insulated pipe a shield or saddle shall be used.
- G. 6-RAH-7 - Dynamic: Roller bearing pipe support for roof-mounted gas pipes, electrical conduit, solar and other mechanical piping with the following properties:
1. Base Material: Polycarbonate.
 - a. Deck Base: 16 by 18 inch (406 by 457 mm).
 - b. Pipe Clearance: Adjustable from 4-3/8 inch (111.1 mm) to 6-1/2 inch (165.1 mm).
 - c. Maximum Load Weight: 385 pounds (174.63 kg) per pipestand.
 2. Base Material: Type 304 Stainless Steel. (Model 6-RAH-7 SS - Dynamic)
 - a. Deck Base: 12 by 16 inch (304.8 by 406.4 mm).
 - b. Pipe Clearance: Adjustable from 2-7/8 inch (73 mm) to 6-1/2 inch (165.1 mm).
 - c. Maximum Load Weight: 349 pounds (158.3 kg) per pipestand.
 3. Pipe Rest: Self-lubricating polycarbonate resin roller.

4. Support All-Thread, Axle, and Metal Parts: Stainless Steel.
 5. Nominal Inside Diameter: 6 inch (152.4 mm).
 6. Maximum Outside Diameter: 8-1/2 inch (215.9 mm).
 7. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 8. If supporting insulated pipe a shield or saddle shall be used.
- H. 6-RAH-12 - Dynamic: Roller bearing pipe support for roof-mounted gas pipes, electrical conduit, solar and other mechanical piping with the following properties:
1. Base Material: Polycarbonate.
 - a. Deck Base: 16 by 18 inch (406 by 457 mm).
 - b. Pipe Clearance: Adjustable from 4-1/2 (114.3 mm) to 7 Inch (177.8 mm).
 - c. Maximum Load Weight: 385 pounds (174.63 kg) per pipestand.
 2. Pipe Rest: Self-lubricating polycarbonate resin roller.
 3. Support All-Thread, Axle, and Metal Brackets: Stainless Steel.
 4. Nominal Inside Diameter: 6 inch (152.4 mm).
 5. Maximum Outside Diameter: 8-1/2 inch (215.9 mm).
 6. Spacing: Spacing: Horizontal support spacing per pipe specification or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 7. If supporting insulated pipe a shield or saddle shall be used.
- I. 8-RAH-18 - Dynamic: Roller bearing pipe support for roof-mounted gas pipes, electrical conduit, solar and other mechanical piping with the following properties:
1. Base Material: Polycarbonate.
 2. Deck Base: 19 by 23 inch (482 by 584 mm).
 3. Pipe Clearance: Adjustable from 6 inch (152.4 mm) to 18 inch (457.2 mm).
 4. Maximum Load Weight: 640 pounds (290 kg) per pipestand.
 5. Roller Material: Composite rubber.
 6. Support All-Thread, Axle and hardware: Stainless Steel.
 7. Support Axle Yoke: Cast Hot-dipped galvanized.
 8. Nominal Inside Diameter: 8 inch (152.4 mm).
 9. Maximum Outside Diameter: 12 inch (304.8 mm).
 10. Spacing: Spacing: Horizontal support spacing per pipe specification or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 11. If supporting insulated pipe a shield or saddle shall be used.

2.5 elevate support series

- A. 2.5 Conduit Support-2 - Elevate: Pipe support with strut used to support roof-mounted electrical conduit, solar piping, solar racking, gas piping, cable trays and other mechanical equipment with the following properties:
1. Base Material: Polycarbonate.
 2. Deck Base: 7-1/2 by 10 inch (190 by 254 mm).
 3. Pipe Clearance: Fixed 2-1/2 inch (63.5 mm).
 4. Maximum Load Weight: 115 pounds (52 kg) per pipestand.
 5. Pipe Rests: 12 inch (304 mm) hot-dipped galvanized steel struts connected hot-dipped galvanized bolts to the base.
 6. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 7. If supporting insulated pipe a shield or saddle shall be used.
- B. 2.5 Conduit Support-5 - Elevate: Pipe support with strut used to support roof-mounted electrical conduit, solar piping, solar racking, gas piping, cable trays and other mechanical

equipment with the following properties:

1. Base Material: Polycarbonate.
 2. Deck Base: 7-1/2 by 10 inch (190 by 254 mm).
 3. Pipe Clearance: Adjustable height from 3-1/2 inch (88.9 mm) to 5-3/8 inch (136.5 mm).
 4. Maximum Load Weight: 115 pounds (52 kg) per pipestand.
 5. Pipe Rests: 12 inch (304 mm) hot-dipped galvanized steel struts connected with stainless steel all thread to base.
 6. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 7. If supporting insulated pipe a shield or saddle shall be used.
- C. 2.5 Conduit Support-7 - Elevate: Pipe support with strut used to support roof-mounted electrical conduit, solar piping, solar racking, gas piping, cable trays and other mechanical equipment with the following properties:
1. Base Material: Polycarbonate.
 2. Deck Base: 7-1/2 by 10 inch (190 by 254 mm).
 3. Pipe Clearance: Adjustable height from 3-1/2 inch (88.9 mm) to 7-7/8 inch (200 mm).
 4. Maximum Load Weight: 115 pounds (52 kg) per pipestand.
 5. Pipe Rests: 12 inch (304 mm) hot-dipped galvanized steel struts connected with stainless steel all thread to base.
 6. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 7. If supporting insulated pipe a shield or saddle shall be used.
- D. 2.5-Conduit Support-12 - Elevate: Pipe support with strut used to support roof-mounted electrical conduit, solar piping, solar racking, gas piping, cable trays and other mechanical equipment with the following properties:
1. Base Material: Polycarbonate.
 2. Deck Base: 9 by 15-1/4 inch (228 by 387 mm).
 3. Pipe Clearance: Adjustable height from 4-1/4 inch (107.95 mm) to 12-1/4 inch (311.15 mm).
 4. Maximum Load Weight: 223 pounds (101 kg) per pipestand.
 5. Pipe Rests: 12 inch (304 mm) hot-dipped galvanized steel struts connected with stainless steel all thread to base.
 6. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 7. If supporting insulated pipe a shield or saddle shall be used.
- E. 12-Base Strut-7 SS - Elevate: Strut pipe support system for ganging roof-mounted electrical conduit, solar piping solar racking, gas piping, cable trays and other mechanical equipment, mounted to base, fastened with pipe clamps and with the following properties:
1. Base Material: Stainless steel.
 2. Deck Base: 12 by 16 inch (304.8 by 406.4 mm).
 3. Pipe Clearance: Adjustable from 3-1/8 inch (79.4 mm) to 7-7/8 inch (200 mm).
 4. Maximum Load Weight: 349 pounds (158 kg) per pipestand.
 5. Pipe Rests: 12 inch (304 mm) hot-dipped galvanized steel struts connected with stainless steel all thread to base.
 6. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 7. If supporting insulated pipe a shield or saddle shall be used.

- F. 16-Base Strut-7 - Elevate: Strut pipe support system for ganging roof-mounted electrical conduit, solar piping, solar racking, gas piping, cable trays and other mechanical equipment, mounted to base, fastened with pipe clamps and with the following properties:
1. Base Material: Polycarbonate.
 - a. Deck Base: 9 by 15-1/4 inch (228 by 387 mm).
 - b. Pipe Clearance: Adjustable from 4-1/4 inch (107.95 mm) to 7-3/4 inch (196.85 mm).
 - c. Maximum Load Weight on Base: 223 pounds (101 kg) per pipestand.
 2. Base Material: Stainless steel. (Model 16-Base Strut-7 SS - Elevate)
 - a. Deck Base: 12 by 16 inch (304.8 by 406.4 mm).
 - b. Pipe Clearance: Adjustable from 3-1/4 inch (82.55 mm) to 7-3/4 inch (196.85 mm).
 - c. Maximum Load Weight on Base: 349 pounds (158 kg) per pipestand.
 3. Pipe Rests: 16 inch (406.4 mm) Hot-dipped galvanized steel struts connected with stainless steel all thread to base.
 4. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 5. If supporting insulated pipe a shield or saddle shall be used.
- G. 16-Base Strut-12 - Elevate: Strut pipe support system for ganging roof-mounted electrical conduit, solar piping, solar racking, gas piping, cable trays and other mechanical equipment, mounted to base, fastened with pipe clamps and with the following properties:
1. Base Material: Polycarbonate.
 2. Deck Base: 9 by 15-1/4 inch (228 by 387 mm).
 3. Pipe Clearance: Adjustable from 4-1/4 inch (107.95 mm) to 12-1/4 inch (311.15 mm).
 4. Maximum Load Weight: 223 pounds (101 kg) per pipestand.
 5. Pipe Rests: 16 inch (406.4 mm) Hot-dipped galvanized steel struts connected with stainless steel all thread to base.
 6. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 7. If supporting insulated pipe a shield or saddle shall be used.
- H. 20-Base Strut-7 - Elevate: Strut pipe support system for ganging roof-mounted electrical conduit, solar piping, solar racking, gas piping, cable trays and other mechanical equipment, mounted to base, fastened with pipe clamps and with the following properties:
1. Base Material: Polycarbonate.
 2. Deck Base: 16 by 18 inch (406.4 by 457.2 mm).
 3. Pipe Clearance: Adjustable from 4-3/4 inch (114.3 mm) to 7-3/4 inch (196.8 mm).
 4. Maximum Load Weight: 385 pounds (172 kg) per pipestand.
 5. Pipe Rests: 20 inch (508 mm) Hot-dipped galvanized steel struts connected with stainless steel all thread to base.
 6. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 7. If supporting insulated pipe a shield or saddle shall be used.
- I. 20-Base Strut-12 - Elevate: Strut pipe support system for ganging roof-mounted electrical conduit, solar piping, solar racking, gas piping, cable trays and other mechanical equipment, mounted to base, fastened with pipe clamps and with the following properties:
1. Base Material: Polycarbonate.
 2. Deck Base: 16 by 18 inch (406.4 by 457.2 mm).
 3. Pipe Clearance: Adjustable from 4-3/4 inch (120.6 mm) to 12-1/4 inch (311.15 mm).
 4. Maximum Load Weight: 380 pounds (172 kg) per pipestand.
 5. Pipe Rests: 20 inch (508 mm) Hot-dipped galvanized steel struts connected with

- stainless steel all thread to base.
6. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 7. If supporting insulated pipe a shield or saddle shall be used.
- J. 24-Base Strut-4 - Elevate: Strut pipe support system for ganging roof-mounted electrical conduit, solar piping, solar racking, gas piping, cable trays and other mechanical equipment, mounted to base, fastened with pipe clamps and with the following properties:
1. Base Material: Polycarbonate.
 2. Deck Base: 19 by 23 inch (482.6 by 584.2 mm).
 3. Pipe Clearance: Fixed 4-1/8 inch (104.8 mm).
 4. Maximum Load Weight: 640 pounds (290 kg) per pipestand.
 5. Pipe Rests: 24 inch (609.6 mm) Hot-dipped galvanized steel struts connected with stainless steel all thread to base.
 6. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 7. If supporting insulated pipe a shield or saddle shall be used.
- K. 24-Base Strut-18 - Elevate: Strut pipe support system for ganging roof-mounted electrical conduit, solar piping, solar racking, gas piping, cable trays and other mechanical equipment, mounted to base, fastened with pipe clamps and with the following properties:
1. Base Material: Polycarbonate.
 2. Deck Base: 19 by 23 inch (482.6 by 584.2 mm).
 3. Pipe Clearance: Adjustable from 5-1/2 inch (139.7 mm) to 19 inch (482.6 mm).
 4. Maximum Load Weight: 640 pounds (290 kg) per pipestand.
 5. Pipe Rests: 24 inch (609.6 mm) Hot-dipped galvanized steel struts connected with stainless steel all thread to base.
 6. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers.
 7. If supporting insulated pipe a shield or saddle shall be used.
- L. 24-Base Strut-5 - Elevate: Strut pipe support system for ganging roof-mounted electrical conduit, solar piping, solar racking, gas piping, cable trays and other mechanical equipment, mounted to base, fastened with pipe clamps and with the following properties:
1. Base Material: Two polycarbonate base components.
 2. Deck Base: Two 7.5 by 10 inch (190.5 by 254 mm).
 3. Pipe Clearance: Adjustable from 4-1/8 inch (104.8 mm) to 6-1/8 inch (155.6 mm).
 4. Maximum Allowable Uniform Load: 115 lbs/ft (171.139 kg/m).
 5. Pipe Rests: 24 inch (609.6 mm) Hot-dipped galvanized steel struts connected with stainless steel all thread to base.
 6. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
 7. If supporting insulated pipe a shield or saddle shall be used.
- M. 36-Base Strut-5 - Elevate: Strut pipe support system for ganging roof-mounted electrical conduit, solar piping, solar racking, gas piping, cable trays and other mechanical equipment, mounted to base, fastened with pipe clamps and with the following properties:
1. Base Material: Three polycarbonate base components.
 2. Deck Base: Three 7.5 by 10 inch (190.5 by 254 mm).
 3. Pipe Clearance: Adjustable from 4-1/8 inch (104.8 mm) to 6-1/8 inch (155.6 mm).
 4. Maximum Allowable Uniform Load: 115 lbs/ft (171.139 kg/m).
 5. Pipe Rests: 36 inch (914.4 mm) Hot-dipped galvanized steel struts connected with

stainless steel all thread to base.

6. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
7. If supporting insulated pipe a shield or saddle shall be used.

N. 48-Base Strut-5 - Elevate: Strut pipe support system for ganging roof-mounted electrical conduit, solar piping, solar racking, gas piping, cable trays and other mechanical equipment, mounted to base, fastened with pipe clamps and with the following properties:

1. Base Material: Four polycarbonate base components.
2. Deck Base: Four 7.5 by 10 inch (190.5 by 254 mm).
3. Pipe Clearance: Adjustable from 4-1/8 inch (104.8 mm) to 6-1/8 inch (155.6 mm).
4. Maximum Allowable Uniform Load: 115 lbs/ft (171.139 kg/m).
5. Pipe Rests: 48 inch (1219.2 mm) Hot-dipped galvanized steel struts connected with stainless steel all thread to base.
6. Spacing: Horizontal support spacing per pipe specification, or horizontal pipe support intervals per the appropriate ICC Code. Manufacturer's suggested spacing shall not exceed 10 foot (3 meter) centers as loading permits.
7. If supporting insulated pipe a shield or saddle shall be used.

2.6 Custom Hanger Support Series

A. 6H Model Hanger Support: Versatile, custom product able to support a single pipe or multiple pipes at varying heights above the roof for maximum efficiency and cost savings. Pipestand consists of three major components: bases set upon roof membrane, strut assembly of hot-dipped galvanized steel supporting hanger system of stainless steel all-thread to suspend hangers. System is designed for pipes up to 6 inch (152.4 mm) diameter with two bases, vertical and horizontal supports adjustable within required range with cross bracing when required, and hangers as specified below:

1. Deck Bases: Polycarbonate, 9 by 15-1/4 inch (228.6 by 387.3 mm).
2. Deck Bases: Stainless steel, 8 by 14 inch (203.2 by 355.6 mm).
3. Deck Bases: Hot-dipped galvanized steel, 8 by 14 inch (203.2 by 355.6 mm).
4. Type of Pipe Being Supported: _____.
5. Pipe Contents: _____.
6. Centerline Distance between Adjacent Pipes for Multiple Pipe Supports: _____.
7. Minimum / Maximum Clearance Above Roof: _____.
8. Pipe Insulation Thickness: _____.
9. Total Length of Pipe Run: _____.
10. Quantity of Supports Required: _____.
11. Hanger Type: Clevis hanger.
12. Hanger Type: Roller hanger.
13. Hanger Type: Roller chair.
14. Hanger Type: Trapeze hanger.
15. If supporting insulated pipe a shield or saddle shall be used.

B. 8H Model Hanger Support: Versatile, custom product able to support a single pipe or multiple pipes at varying heights above the roof for maximum efficiency and cost savings. Pipestand consists of three major components: bases set upon roof membrane, strut assembly of hot-dipped galvanized steel supporting hanger system of stainless steel all-thread to suspend hangers. System is designed for pipes up to 8 inch (203.2 mm) diameter with two bases, vertical and horizontal supports adjustable within required range with cross bracing when required, and hangers as specified below:

1. Deck Bases: Polycarbonate, 16 by 18 inch (406.04 by 457.2 mm).
2. Deck Bases: Stainless steel, 12 by 16 inch (304.8 by 406.4 mm).
3. Deck Bases: Hot-dipped galvanized steel, 12 by 16 inch (304.8 by 406.4 mm).
4. Type of Pipe Being Supported: _____.

5. Pipe Contents: _____.
 6. Centerline Distance between Adjacent Pipes for Multiple Pipe Supports: _____.
 7. Minimum / Maximum Clearance Above Roof: _____.
 8. Pipe Insulation Thickness: _____.
 9. Total length of Pipe Run: _____.
 10. Quantity of Supports Required: _____.
 11. Hanger Type: Clevis hanger.
 12. Hanger Type: Roller hanger.
 13. Hanger Type: Roller chair.
 14. Hanger Type: Trapeze hanger.
 15. If supporting insulated pipe a shield or saddle shall be used.
- C. 10H Model Hanger Support: Versatile, custom product able to support a single pipe or multiple pipes at varying heights above the roof for maximum efficiency and cost savings. Pipestand consists of three major components: bases set upon roof membrane, strut assembly of hot-dipped galvanized steel supporting hanger system of stainless steel all-thread to suspend hangers. System is designed for pipes up to 10 inch (254 mm) diameter with two bases, vertical and horizontal supports adjustable within required range with cross bracing when required, and hangers as specified below:
1. Deck Bases: Polycarbonate, 19 by 23 inch (482.6 by 584.2 mm).
 2. Type of Pipe Being Supported: _____.
 3. Pipe Contents: _____.
 4. Centerline Distance between Adjacent Pipes for Multiple Pipe Supports: _____.
 5. Minimum / Maximum Clearance Above Roof: _____.
 6. Pipe Insulation Thickness: _____.
 7. Total length of Pipe Run: _____.
 8. Quantity of Supports Required: _____.
 9. Hanger Type: Clevis hanger.
 10. Hanger Type: Roller hanger.
 11. Hanger Type: Roller chair.
 12. Hanger Type: Trapeze hanger.
 13. If supporting insulated pipe a shield or saddle shall be used.
- D. 16-H Model Hanger Support: Versatile, custom product able to support a single pipe or multiple pipes at varying heights above the roof. Pipestand consists of three major components: bases set upon roof membrane, custom fabricated HSS hot-dipped galvanized frame members with supporting hanger system of stainless steel all-thread to suspend hangers. System is designed for large pipes or custom loading conditions with two bases, vertical and horizontal supports adjustable within required range with cross bracing when required, and hangers as specified below:
1. Deck Bases: Polycarbonate, Two 16 by 18 inch (406.04 by 457.2 mm) per leg.
 2. Type of Pipe Being Supported: _____.
 3. Pipe Contents: _____.
 4. Centerline Distance between Adjacent Pipes for Multiple Pipe Supports: _____.
 5. Minimum / Maximum Clearance Above Roof: _____.
 6. Pipe Insulation Thickness: _____.
 7. Total length of Pipe Run: _____.
 8. Quantity of Supports Required: _____.
 9. Hanger Type: Clevis hanger.
 10. Hanger Type: Roller hanger.
 11. Hanger Type: Roller chair.
 12. Hanger Type: Trapeze hanger.
 13. If supporting insulated pipe a shield or saddle shall be used.
- E. Custom Stanchioned Model Supports: For rooftop mounted pipe subject to design requirements for Wind and Seismic forces the supports from the above categories with

Stanchioned Supports placed strategically on the roof will provide a code compliant solution.

1. Type of Pipe Being Supported:_____.
2. Pipe Contents:_____.
3. Centerline Distance between Adjacent Pipes for Multiple Pipe Supports:_____.
4. Minimum/Maximum Clearance Above Roof:_____.
5. Pipe Insulation Thickness:_____.
6. Total Length of Pipe Run:_____.
7. Structural Design Criteria in accordance with Structural Documents.
8. Wind and Seismic Design Criteria:
 - a. Adopted Building Code: _____.
 - b. Building Risk/Occupancy Category:_____.
 - c. Wind Design Criteria:
 - 1) Mean Roof Height:_____
 - 2) Basic Wind Speed:_____ (3 Second Gust).
 - 3) Exposure Category:_____
 - d. Seismic Design Criteria:
 - 1) Seismic Design Category:_____
 - 2) Design Short Period MCE Spectral Response acceleration, SDS:_____
 - 3) Seismic Component Importance Factor, IE:_____
9. Appliances and supports that are exposed to wind shall be designed and installed to resist wind pressures determined in accordance with ASCE 7 chapter 29.
10. When earthquake loads are applicable in accordance with ASCE 7 chapter 13, mechanical systems and supports shall be designed and installed accordingly.
11. The design requirements for mechanical/electrical components, supports and attachments shall be supported by one of the following methods:
 - a. Project-specific design and documentation submitted for approval to the authority having jurisdiction after review and acceptance by a registered design professional.
 - b. Submittal of manufacturer's certification that the component is qualified by an independent third party via either analysis or testing in accordance with industry standards.
 - c. If supporting insulated pipe a shield or saddle shall be used.

2.7 Custom Duct and cable tray support series

- A. 6DS Model Duct and Cable Tray Support: Duct support is a custom product designed for single or multiple duct supports and cable trays. Provide rooftop duct layout drawings for manufacturer's use and the following:
 1. Deck Bases: Polycarbonate, 9 by 15-1/4 inch (228.6 by 387.3 mm).
 2. Deck Bases: Stainless steel, 8 by 14 inch (203.2 by 355.6 mm).
 3. Deck Bases: Hot-dipped galvanized steel, 8 by 14 inch (203.2 by 355.6 mm).
 4. Duct Dimensions: _____ (Width by Height)
 5. Duct Material: _____ gauge thickness.
 6. Minimum / Maximum Clearance Above Roof: _____.
 7. Duct Insulation Thickness: _____ (Exterior Insulation).
 8. Maximum Outside Dimension: _____ (Width by Height).
 9. Total Length of Duct Run:_____.
 10. Quantity of Supports Required:_____.
 11. Weather tight enclosure is required.
 12. Weather tight enclosure is not required.
- B. 8DS Model Duct and Cable Tray Support: Duct support is a custom product designed for single or multiple duct supports and cable trays. Provide rooftop duct layout drawings for manufacturer's use and the following:
 1. Deck Bases: Polycarbonate, 16 by 18 inch (406.4 by 457.2 mm).

2. Deck Bases: Stainless steel, 12 by 16 inch (304.8 by 406.4 mm).
 3. Deck Bases: Hot-dipped galvanized steel, 12 by 16 inch (304.8 by 406.4 mm).
 4. Duct Dimensions: _____. (Width by Height)
 5. Duct Material: ____ gauge thickness.
 6. Minimum/Maximum Clearance Above Roof: _____.
 7. Duct Insulation Thickness: _____ (Exterior Insulation).
 8. Maximum Outside Dimension: _____ (Width by Height).
 9. Total Length of Duct Run: _____.
 10. Quantity of Supports Required: _____.
 11. Weather tight enclosure is required.
 12. Weather tight enclosure is not required.
- C. 10DS Model Duct and Cable Tray Support: Duct support is a custom product designed for single or multiple duct supports and cable trays. Provide rooftop duct layout drawings for manufacturer's use and the following:
1. Deck Bases: Polycarbonate, 19 by 23 inch (482.6 by 584.2 mm).
 2. Duct Dimensions: _____ (Width by Height).
 3. Duct Material: ____ gauge thickness.
 4. Minimum / Maximum Clearance Above Roof: _____.
 5. Duct Insulation Thickness: _____ (External Insulation).
 6. Maximum Outside Dimension: _____ (Width by Height).
 7. Total Length of Duct Run: _____.
 8. Quantity of Supports Required: _____.
 9. Weather tight enclosure is required.
 10. Weather tight enclosure is not required.
- D. Custom Stanchioned Model Supports: For rooftop mounted pipe subject to design requirements for Wind and Seismic forces the supports from the above categories with Stanchioned Supports placed strategically on the roof will provide a code compliant solution.
1. Duct Dimensions: _____ (Width by Height).
 2. Duct Material: ____ gauge thickness.
 3. Minimum / Maximum Clearance Above Roof: _____.
 4. Duct Insulation Thickness: _____ (Exterior Insulation).
 5. Maximum Outside Dimension: _____ (Width by Height).
 6. Total Length of Duct Run: _____.
 7. Structural Design Criteria in accordance with Structural Documents
 8. Wind and Seismic Design Criteria:
 - a. Adopted Building Code: _____.
 - b. Building Risk/Occupancy Category: _____.
 - c. Wind Design Criteria:
 - 1) Mean Roof Height: _____.
 - 2) Basic Wind Speed: _____ (3 Second Gust).
 - 3) Exposure Category: _____.
 - d. Seismic Design Criteria:
 - 1) Seismic Design Category: _____
 - 2) Design Short Period MCE Spectral Response acceleration, SDS: _____
 - 3) Seismic Component Importance Factor, IE: _____
 9. Appliances and supports that are exposed to wind shall be designed and installed to resist wind pressures determined in accordance with ASCE 7 chapter 29.
 10. When earthquake loads are applicable in accordance with ASCE 7 chapter 13, mechanical systems and supports shall be designed and installed accordingly.
 11. The design requirements for mechanical/electrical components, supports and attachments shall be supported by one of the following methods:
 - a. Project-specific design and documentation submitted for approval to the authority having jurisdiction after review and acceptance by a registered design

- professional.
- b. Submittal of manufacturer's certification that the component is qualified by an independent third party via either analysis or testing in accordance with industry standards.

2.8 Mechanical supports

- A. LD Mechanical Supports: Custom product designed to elevate and support mechanical units, cabinets and other devices allowing the roof environment and mechanical pipe network to expand and contract with temperature changes. Support pan is adjustable in height, designed with slots to allow proper ventilation and moisture drainage, and the following:
 - 1. Deck Bases: Polycarbonate.
 - 2. Support Pan: Solid perimeter and upturned edges with large perforations in center.
 - a. 14 ga. Pre-Galvanized Steel (24x24 30x30 & 24x48 Pan)
 - b. 12 ga. Pre-Galvanized Steel (36x36 Pan)
 - 3. Metal Components: Hot-dipped galvanized steel.
 - 4. Support Pan Width: _____.
 - 5. Support Pan Length: _____.
 - 6. Minimum Clearance Above Roof: _____.
 - 7. Mechanical Unit Weight: _____.

- B. HD Mechanical Supports: Custom product designed to elevate and support mechanical units, cabinets and other devices allowing the roof environment and mechanical pipe network to expand and contract with temperature changes. Support is constructed to desired height, width and length, and the following:
 - 1. Deck Bases: Polycarbonate.
 - 2. Deck Bases: Stainless steel.
 - 3. Deck Bases: Hot-dipped galvanized steel.
 - 4. Platforms: Bar grating.
 - 5. Platforms: 12 inch (304.8 mm) Punched Interlock Grating with anti-skid surface.
 - 6. Platforms: Fiberglass Grating (FRP).
 - 7. Platform Width: _____.
 - 8. Platform Length: _____.
 - 9. Minimum Clearance Above Roof: _____.
 - 10. Mechanical Unit Weight: _____.

- C. Stanchioned Mechanical Support: For rooftop mounted mechanical units, cabinets and other devices subject to design requirements for Wind and Seismic forces.
 - 1. Platform Width: _____.
 - 2. Platform Length: _____.
 - 3. Minimum/Maximum Clearance Above Roof: _____.
 - 4. Mechanical Unit Dimensions: _____ long by _____ wide by _____ high.
 - 5. Mechanical Unit Weight: _____.
 - 6. Structural Design Criteria in accordance with Structural Documents
 - 7. Wind and Seismic Design Criteria:
 - a. Adopted Building Code: _____
 - b. Building Risk/Occupancy Category: _____
 - c. Wind Design Criteria:
 - 1) Mean Roof Height: _____
 - 2) Basic Wind Speed: _____ (3 Second Gust).
 - 3) Exposure Category: _____
 - d. Seismic Design Criteria:
 - 1) Seismic Design Category: _____
 - 2) Design Short Period MCE Spectral Response acceleration, SDS: _____
 - 3) Seismic Component Importance Factor, IE: _____

8. Appliances and supports that are exposed to wind shall be designed and installed to resist wind pressures determined in accordance with ASCE 7 chapter 29.
9. When earthquake loads are applicable in accordance with ASCE 7 chapter 13, mechanical systems and supports shall be designed and installed accordingly.
10. The design requirements for mechanical/electrical components, supports and attachments shall be supported by one of the following methods:
 - a. Project-specific design and documentation submitted for approval to the authority having jurisdiction after review and acceptance by a registered design professional.
 - b. Submittal of manufacturer's certification that the component is qualified by an independent third party via either analysis or testing in accordance with industry standards.

2.9 SUREFOOT ACCESS PRODUCTS

- A. Crossover Bridges: Custom designed to meet project specific requirements, OSHA 1910 Subpart D standards including handrails, and the following:
 1. Clearance Height Required: _____.
 2. Clearance Length Required: _____.
 3. Crossover Width Required: _____ (22 inches (558.8 mm) minimum).
 4. Deck Bases: Polycarbonate, with stanchions where required.
 5. Deck Bases: Stainless steel, with stanchions where required.
 6. Deck Bases: Hot-dipped galvanized steel, with stanchions where required.
 7. Metal Components: Hot-dipped galvanized steel.
 8. Metal Components: Stainless steel.
 9. Walking Surfaces: Bar Grating with serrated surface.
 10. Walking Surfaces: 12 inch (304.8 mm) Punched Interlock Grating with anti-skid surface.
 11. Walking Surfaces: Fiberglass Grating.
 12. Railings: Standard railings shall be provided on all stairways having 4 or more risers and platforms 4 feet (1.22 m) or more above adjacent level.
 13. Toeboards: 4 inch (101.6 mm) Toeboards shall be provided whenever, beneath the open side:
 - a. A person can pass;
 - b. There is moving machinery;
 - c. Where falling material could create a hazard.
 14. Structural Design Criteria in accordance with Structural Documents
 15. Wind and Seismic Design Criteria:
 - a. Adopted Building Code: _____.
 - b. Building Risk/Occupancy Category: _____.
 - c. Wind Design Criteria:
 - 1) Mean Roof Height: _____.
 - 2) Basic Wind Speed: _____ (3 Second Gust).
 - 3) Exposure Category: _____.
 - d. Seismic Design Criteria:
 - 1) Seismic Design Category: _____.
 - 2) Design Short Period MCE Spectral Response acceleration, SDS: _____.
 - 3) Seismic Component Importance Factor, IE: _____.
 16. Crossover structures that are exposed to wind shall be designed and installed to resist wind pressures determined in accordance with ASCE 7 chapter 29.
 17. When earthquake loads are applicable in accordance with ASCE 7 chapter 13, crossover structures shall be designed and installed accordingly.
 18. The design requirements for crossover structures, components, supports and attachments shall be supported by one of the following methods:
 - a. Project-specific design and documentation submitted for approval to the

- authority having jurisdiction after review and acceptance by a registered design professional.
- b. Submittal of manufacturer's certification that the component is qualified by an independent third party via either analysis or testing in accordance with industry standards.
- B. Crossover Ramps: Custom designed to meet project specific requirements OSHA 1910 Subpart D standards, and the following:
1. Clearance Height Required: _____.
 2. Clearance Length Required: _____.
 3. Ramp Width Required: _____ (22 inch (558.8 mm) minimum.)
 4. Deck Bases: Polycarbonate.
 5. Deck Bases: Stainless steel.
 6. Deck Bases: Hot-dipped galvanized steel.
 7. Metal Components: Hot-dipped galvanized steel.
 8. Metal Components: Stainless steel.
 9. Walking Surfaces: Bar grating with serrated surface.
 10. Walking Surfaces: 12 inch (304.8 mm) Punched Interlock Grating with anti-skid surface.
 11. Walking Surfaces: Fiberglass Grating
 12. Railings: Standard railings shall be provided on all ramps and platforms 4 feet (1.22 m) or more above adjacent level.
 13. Toeboards: 4 inch (101.6 mm) Toeboards shall be provided whenever, beneath the open side:
 - a. A person can pass;
 - b. There is moving machinery;
 - c. Where falling material could create a hazard.
 14. Structural Design Criteria in accordance with Structural Documents
 15. Wind and Seismic Design Criteria:
 - a. Adopted Building Code: _____.
 - b. Building Risk/Occupancy Category: _____.
 - c. Wind Design Criteria:
 - 1) Mean Roof Height: _____.
 - 2) Basic Wind Speed: _____ (3 Second Gust).
 - 3) Exposure Category: _____.
 - d. Seismic Design Criteria:
 - 1) Seismic Design Category: _____
 - 2) Design Short Period MCE Spectral Response acceleration, SDS: _____
 - 3) Seismic Component Importance Factor, IE: _____
 16. Ramp structures that are exposed to wind shall be designed and installed to resist wind pressures determined in accordance with ASCE 7 chapter 29.
 17. When earthquake loads are applicable in accordance with ASCE 7 chapter 13, ramp structures shall be designed and installed accordingly.
 18. The design requirements for ramp structures, components, supports and attachments shall be supported by one of the following methods:
 - a. Project-specific design and documentation submitted for approval to the authority having jurisdiction after review and acceptance by a registered design professional.
 - b. Submittal of manufacturer's certification that the component is qualified by an independent third party via either analysis or testing in accordance with industry standards.
- C. Service Platforms: Custom designed to meet project specific requirements OSHA 1910 Subpart D standards, and the following:
1. Clearance Height Required: _____.

2. Required Length of Platform: _____.
3. Required Width of Platform: _____.
4. Deck Bases: Polycarbonate.
5. Deck Bases: Stainless steel.
6. Deck Bases: Hot-dipped galvanized steel.
7. Metal Components: Hot-dipped galvanized steel.
8. Metal Components: Stainless steel.
9. Walking Surfaces: Bar grating with serrated surface.
10. Walking Surfaces: 12 inch (304.8 mm) Punched Interlock Grating with anti-skid surface.
11. Walking Surfaces: Fiberglass Grating.
12. Railings: Standard railings shall be provided on all ramps and platforms 4 feet (1.22 m) or more above adjacent level.
13. Toeboards: 4 inch (101.6 mm) Toeboards shall be provided whenever, beneath the open side:
 - a. A person can pass;
 - b. There is moving machinery;
 - c. Where falling material could create a hazard.
14. Structural Design Criteria in accordance with Structural Documents
15. Wind and Seismic Design Criteria:
 - a. Adopted Building Code: _____.
 - b. Building Risk/Occupancy Category: _____.
 - c. Wind Design Criteria:
 - 1) Mean Roof Height: _____.
 - 2) Basic Wind Speed: _____ (3 Second Gust).
 - 3) Exposure Category: _____.
 - d. Seismic Design Criteria:
 - 1) Seismic Design Category: _____.
 - 2) Design Short Period MCE Spectral Response acceleration, SDS: _____.
 - 3) Seismic Component Importance Factor, IE: _____.
16. Service Platform structures that are exposed to wind shall be designed and installed to resist wind pressures determined in accordance with ASCE 7 chapter 29.
17. When earthquake loads are applicable in accordance with ASCE 7 chapter 13, Service Platform structures shall be designed and installed accordingly.
18. The design requirements for Service Platform structures, components, supports and attachments shall be supported by one of the following methods:
 - a. Project-specific design and documentation submitted for approval to the authority having jurisdiction after review and acceptance by a registered design professional.
 - b. Submittal of manufacturer's certification that the component is qualified by an independent third party via either analysis or testing in accordance with industry standards.

2.10 Accessories

- A. Support Pads: Designed specifically to fit non-penetrating rooftop supports while protecting the rooftop envelope. Slip resistant pads are heat molded with a small lip to hold the support pad and reduce movement on the rooftop. Holes in the pad save weight and allow for venting and drainage.
 1. Support Pad Material: 100 percent recycled rubber.
 2. Dimensions: 19 by 23 inch (482.6 by 584.2 mm).
 3. Dimensions: 16 by 18 inch (406.4 by 457.2 mm).
 4. Dimensions: 9 by 15 inch (229.6 by 381 mm).
 5. Dimensions: 10 by 10 inch (254 by 254 mm).
 6. Dimensions: 7 by 10 inch (177.8 by 254 mm).

7. Dimensions: Custom size as recommended by the manufacturer.
- B. Pipe Guides: Designed to attach to pipe supports to allow pipe to be installed or removed from pipe stands. Pipe guides ship separately for site installation, allowing room for expansion and contraction as recommended by the manufacturer.
 1. Size: 1.5.
 2. Size: 3-R-2.
 3. Size: 3-R-4.
 4. Size: 3-RAH.
 5. Size: 4-RAH.
 6. Size: 5-RAH.
 7. Size: 6-RAH.
 8. Size: As recommended by the manufacturer.
 - C. Spacers: Polycarbonate structure with gently rounded base, drainage holes, and cradle attached to other components to increase height.
 1. Size: 1.5.
 2. Size: 3-R.
 - D. 3-R Riser Brackets (Pairs): Designed to be inserted into Model 3-R-2 to raise the roller height clearance by 2 inches (50.8 mm). Sold as a pair to be inserted into 3-R-3 roof supports.
 1. Installation: Field installed.
 2. Installation: Factory installed in the 3-R-4 support.
 - E. Rollers: Heavy duty support roller of polycarbonate resin.
 1. Size: 3 inch (76.2 mm).
 2. Size: 5 inch (127 mm).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Field Measurements and Quantity Take Off: A manufacturer certified technician shall perform on-site field measurements, coordinate design and layout, designate and tag products based on project conditions.

3.2 PREPARATION

- A. Clean roofing surfaces in accordance with the roofing manufacturer's instructions prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for each substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install supports and hangers in accordance with manufacturer's recommendations.
- C. Install supports at maximum spacing of 10 feet (3 m) unless closer spacing is required due to weight of pipe or conduit requirements, or greater spacing is specifically allowed by

support manufacturer.

1. Space and adjust supports to evenly distribute weight.
 2. Do not exceed support manufacturer's recommended load limits or specified mechanical piping limits.
- D. Remove roofing aggregate from area 2 inches (50.8 mm) larger than support base; comply with roofing manufacturer's requirements to maintain roofing warranty.
- E. Install an additional sheet of roofing material, support pad, or deck plate beneath each support base.
- F. Support Pads:
1. Remove rock, aggregate, dirt and excess dust from area to be covered by pad.
 2. Apply support pad on cleaned area.
 3. Center bases on top of support pads.
- G. Deck Plates:
1. Locate centered under bases of pipe supports and hangers.
 2. Remove rock, aggregate, dirt and excess dust from an area 2 inches (50.8 mm) larger than deck plate.
 3. Install with curved edges up.
- H. Pipe Supports:
1. Center pipestands and bases beneath pipes so supports are aligned.
 2. If more than one pipe is being supported, adjust for even weight distribution.
 3. Set pipe in support without dropping or causing undue impact.
- I. Adjustable Supports: Adjust height of each support to achieve proper height and level before installing supported item.
1. Level rollers or struts before installing pipe.
 2. Make final height adjustments to provide even distribution of load on all supports.
- J. Fixed Anchor Stanchion Supports: Prior to installation of roof decking, insulation and roof membrane attach support to roof structure as indicated on drawings.
1. After installation of roof decking, insulation and membrane, install pipe or roof top mechanical supports used in connection with fixed anchor supports.
 2. Install piping or mechanical units on each support.

3.4 FIELD QUALITY CONTROL

- A. When requested by Architect, provide a factory-trained representative of manufacturer to visit site while work is in progress to assure that installation complies with design requirements and manufacturer's installation requirements.
- B. After system startup, correct any deficiencies that arise, including but not limited to, improper location or position, improper seating or level on the roof, lack of roof pads or deck plates, inadequate operation, and as directed by Architect.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION