



Big Foot Systems

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This Manu-Spec® utilizes the Construction Specifications Institute (CSI) *Project Resource Manual* (PRM), including *MasterFormat™*, *SectionFormat™* and *PageFormat™*. A Manu-Spec is a manufacturer specification using the proprietary method of specifying applicable to project specifications and master guide specifications. Optional text is indicated by brackets []; delete optional text in final copy of specification. Specifier notes precede specification text; delete notes in final copy of specification. Trade/brand names with appropriate product model numbers, styles and types are used in specifier notes and in the specification text article titled "Acceptable Material." Metric conversion, where used, is soft metric conversion.

This MANU-SPEC is intended to specify non-penetrating frames as support for HVAC equipment. Products specified can also be used as support of such things as plumbing, communication and electrical equipment.

**SECTION 23 05 29
HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT**

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: This Section specifies non-penetrating recycled rubber and metal support system for HVAC equipment.

Specifier Note: Revise paragraph below to suit project requirements. Add section numbers and titles per CSI MasterFormat and specifier's practice.

- B. Related Requirements:

Specifier Note: Include in this paragraph only those sections and documents that directly affect the work of this section. If a reader of this section could reasonably expect to find a product or component specified in this section, but it is actually specified elsewhere, then the related section number(s) should be listed in the subparagraph below. Do not include Division 00 documents or Division 01 sections, as it is assumed all technical sections are related to all project Division 00 documents and Division 01 sections to some degree. Refer to other documents with caution, as referencing them may cause them to be considered part of the contract.

1. Section [].

1.2 REFERENCES

Specifier Note: List retained standard(s) referenced in this section alphabetically. Indicate issuing authority name, acronym, standard designation and title. Establish policy for indicating edition date of standard referenced and update as applicable. Contract Conditions Section 01 42 00 - References may be used to establish the edition date of standards. This paragraph does not require compliance with standard(s). It is a listing of all references used in this section. Only include here standards referenced in the body of the specification in PARTS 1, 2 or 3. Do not include references to building codes at any level.

- A. Reference Standards:

1. ASTM International (ASTM).

- a. ASTM A36 Standard Specification for Carbon Structural Steel.
- b. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- c. ASTM D575 Standard Test Methods for Rubber Properties in Compression.
2. Australian Standard (AS).
 - a. AS 1683.12 Methods of Test for Elastomers - Rubber, Vulcanized or Thermoplastic - Determination of Tear Strength (Trouser, Angle and Crescent Test Pieces).
 - b. AS 1683.15 Methods of Test for Elastomers - International Rubber Hardness.
 - c. AS 2498.6 Methods of Testing Rigid Cellular Plastics - Determination of Dimensional Stability.
3. British Standards Institute (BS).
 - a. BS 7188 Methods of Test for Impact Absorbing Playground Surfaces.
4. International Organization for Standardization (ISO).
 - a. ISO 845 Cellular Plastics and Rubbers - Determination of Apparent Density.
 - b. ISO 1461 Hot dip galvanized coatings on fabricated iron and steel articles.
 - c. ISO 1827 Rubber, Vulcanized or Thermoplastic - Determination of Shear Modulus and Adhesion to Rigid Plates - Quadruple-Shear Methods.
5. US Green Building Council (USGBC).
 - a. LEED V4 LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide for Building Design and Construction.

Specifier Note: Article below includes submittal of relevant data to be furnished by Contractor before, during or after construction. Coordinate this article with Architect's and Contractor's duties and responsibilities in Contract Conditions and Section 01 33 00 - Submittal Procedures.

1.3 SUBMITTALS

- A. Make submittals in accordance with [Section 01 33 00 - Submittal Procedures].
- B. Product Data: Indicate sizes, profiles, surface finishes, configuration and include:
 1. Performance criteria.
 2. Manufacturer's Spec-Data product sheets.
 3. Material Safety Data Sheets (MSDS).
- C. Shop Drawings: Include dimensions, configurations and recommended spacing for loads.
- D. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
- E. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- F. Manufacturer's Field Reports: Submit manufacturer's field reports within 3 days of each manufacturer representative's site visit and inspection.

Specifier Note: Coordinate Article below with Contract Conditions and with Section 01 78 36 - Warranties.

- G. Installer's Experience: Submit verification of evidence of work similar to the work of this section.
- H. Warranty: Fully executed, issued in [Owner's] name and registered with manufacturer, including:
 1. Manufacturer's [1-year] warranty covering defects in materials from date of substantial completion.

Specifier Note: Retain the following only if specifying for a LEED project. Specify only the technical submittal requirements necessary to achieve the credits desired for this project.

- I. Sustainable Design (LEED) Submittals:
 1. LEED Submittals: In accordance with Section [01 35 21 – LEED Requirements].

2. Submit verification for items when appropriate as follows:
 - a. MR4.1 for recycled content of 10% minimum.
 - b. MR4.2 for recycled content of 20% minimum.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Manufacturer's instructions on care and cleaning of resilient athletic flooring.

1.5 QUALITY ASSURANCE

- A. Installer: Experienced in performing work similar to work of this section.

1.6 DELIVERY, STORAGE & HANDLING

- A. Deliver store and handle materials in accordance with manufacturer's written instructions.
 1. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact and product name and manufacturer clearly visible, and in sizes to suit project.
- B. Store materials protected from exposure to harmful environmental conditions, clean, dry, frost-free and at recommended temperature and humidity levels.

1.7 FIELD CONDITIONS

- A. Do not install in locations where temperature may be less than minus 40 degrees F.

1.8 WARRANTY

- A. Project Warranty: Refer to Contract Conditions for project warranty provisions.
- B. Manufacturer's warranty: Submit, for owner's acceptance, manufacturer's standard warranty document executed by authorized company official.
 1. Manufacturer's warranty is in addition to and not intended to limit other rights owner may have under Contract Conditions.

PART 2 PRODUCTS

Specifier Note: Add product attributes performance characteristics, material standards and descriptions in other articles as applicable. Use of such phrases as "or equal," "approved equal" or similar phrases may cause ambiguity in specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining "or equal" products.

2.1 MANUFACTURER

- A. Big Foot Systems; Apex Way, Hailsham, East Sussex, BN27 3WA, United Kingdom; Phone: 44+ 1323 844355; Fax: 44+ 1323 848846; Email: sales@bigfootsupport.com; Email for Technical Assistance: technical@bigfootsupport.com; Website: www.bigfootsupport.com.

2.2 PERFORMANCE REQUIREMENTS

- A. General:
 1. Tear strength: To AS 1683.12.
 2. Impact Absorption: To BS 7188.
- B. Metal frame:
 1. Galvanized steel to ASTM A36, ISO 1461.
 2. Density 487 lbs/ft3.
- C. Foot.
 1. Reinforced nylon, 30% glass fiber.
- D. Recycled Rubber Crumb:
 1. Density: 950-1020 kg/m3 to ISO 845.

2. Compressive strength: 1.2 MPa to ASTM D575.
3. Compression Young's modulus: 0.26 MPa to D575.
4. Dimensional stability: < 1 mm to AS2498.6.
5. Heat conductivity: 0.1906 W/mk to ASTM C518.
6. Heat resistance: 0.1283 m²K/W to ASTM C518.
7. Shear strength: 2.56 MPa to ISO 1827.
8. Shore Hardness: 60 - 70 to AS 1683.15.

2.3 DESCRIPTION

- A. Non-penetrating recycled rubber, glass filled nylon and metal support system for rooftop HVAC, piping and equipment.

Specifier Note: Use the following article when a non-penetrating support with a recessed channel is required for low level services such as pipes, cable trays, ladders and paired mini splits. This system is also suited for equipment on roof tops and inside plant rooms where low level services require support. Delete the article if a low level service support system is not being used.

2.4 ROOFTOP AIR CONDITIONING SUPPORTS

- A. Unfinished recycled rubber crumb, UV stabilized, pressed foot and galvanized support struts members.

Specifier Note: Edit the following paragraph to meet project requirements. Specify maximum loading for each Big Foot Systems, Standard Frame support type as follows: For Model B6075, maximum loading is 1102 lbs; for Model B6077, maximum loading is 2205 lbs; for Model B6078, maximum loading is 3307 lbs; for Model B9442, maximum loading is 882 lbs; for Model B9443, maximum loading is 1764 lbs; for Model B9444, maximum loading is 2646 lbs. Contact Big Foot Systems directly for dimensions of custom frames.

1. Design Load: [882] [1102] [1764] [2205] [2646] [3307] lbs maximum.
2. Color:
 - a. Black feet.
 - b. Black mat.
 - c. Natural galvanized steel.
3. Number of feet: [4] [6] [8].

Specifier Note: Edit the following paragraph to meet project requirements. Specify size dimensions to match required Big Foot Systems, Standard Frame models as follows: For Model B6075, size is 39 3/8 × 47 1/4 inches; for Model B6077, size is 78 3/4 × 47 1/4 inches; for Model B6078, size is 118 1/8 × 47 1/4 inches; for Model B9442, size is 39 3/8 × 59 1/16 inches; for Model B9443, size is 78 3/4 × 59 1/16 inches; for Model B9444, size is 118 1/8 × 59 1/16 inches. Contact Big Foot Systems directly for dimensions of custom frames.

4. Size: [39 3/8 × 47 1/4] [78 3/4 × 47 1/4] [118 1/8 × 47 1/4] [39 3/8 × 59 1/16] [78 3/4 × 59 1/16] [118 1/8 × 59 1/16] [] × [] inches.

Specifier Note: Edit the following paragraph to meet project requirements. Specify weights to match required Big Foot Systems, Standard Frame models as follows: For Model B6075, weight is 86 lbs; for Model B6077, weight is 148 lbs; for Model B6078, weight is 214 lbs; for Model B9442, weight is 93 lbs; for Model B9443, weight is 159 lbs; for Model B9444, weight is 227 lbs. Contact Big Foot Systems directly for weights of custom frames.

5. Weight: [86] [93] [148] [159] [214] [227] lbs.
- B. Acceptable Material: Big Foot Systems, Standard Frame, Model [B6075] [B6077] [B6078] [B9442] [B9443] [B9444] [insert custom reference].

2.5 CONFIGURABLE AIR CONDITIONING SUPPORT SYSTEM

- A. Unfinished recycled rubber crumb, UV stabilized, pressed foot, configurable crossbar and galvanized support struts members.

Specifier Note: Edit the following particle to meet project requirements.

1. Design Load: 1102 lbs maximum.
2. Color:
 - a. Black feet.
 - b. Natural galvanized steel.

Specifier Note: Edit the following paragraph to meet project requirements. Specify size dimensions to match required Big Foot Systems, Multi Frame models as follows: For Model B9720, specify 4 feet; for Model B9721, specify 2 feet.

3. Number of feet: [4] [2].

Specifier Note: Edit the following paragraph to meet project requirements. Specify size dimensions to match required Big Foot Systems, Multi Frame models as follows: For Model B9720, size is 49 13/16 × 61 1/2 inches; for Model B9721, size is 39 6/16 × 61 1/2 inches.

4. Size: [49 13/16 × 61 1/2] [39 6/16 × 61 1/2] inches.

Specifier Note: Edit the following paragraph to meet project requirements. Specify weights to match required Big Foot Systems, Multi Frame models as follows: For Model B9720, weight is 79 lbs; for Model B9721, weight is 57 lbs.

5. Weight: [57] [79] lbs.
- B. Acceptable Material: Big Foot Systems, Multi Frame, Model [B9720] [B0721].

2.6 MINI SPLIT SUPPORT SYSTEM

Specifier Note: Edit the following Article to meet project requirements. Specify maximum loading for each Big Foot Systems, Mini Split support type as follows: For Model B5550, Model 5551, Model 5553 and Model 5554, maximum loading is 385 lbs; for Model B5552, maximum loading is 661 lbs.

- A. Mini Split Support comprised of glass filled nylon foot, extendable crossbar and galvanized support struts members.
 1. Design Load: [385] [661] lbs maximum.
 2. Color:
 - a. Black feet.
 - b. Natural galvanized steel.
 3. Number of feet: [4] [2].

Specifier Note: Edit the following paragraph to meet project requirements. Specify size dimensions to match required Big Foot Systems, Mini Split models as follows: For Model B5550, Model B5551 and Model B5553, size is 27 9/16 × 44 1/4 inches; for Model 5553 and Model B5554 size is 41 3/4 × 44 1/4 inches.

4. Size: [27 9/16 × 44 1/4] [41 3/4 × 44 1/4] inches.

Specifier Note: Edit the following paragraph to meet project requirements. Specify weights to match required Big Foot Systems, Mini Split support type as follows: For Model B5550, Model B5551, Model B5553 and Model B5554, weight is 385 lbs; for Model B5552, weight is 661 lbs.

5. Weight: [385] [661] lbs.
- B. Acceptable Material: Big Foot Systems, Mini Split [Low] [High] [Tower][Extension] Stand Range Frame, Model [B5550] [B5551] [B5552] [B5553] [B5554] [insert custom reference].

2.7 VRF/VRV STAND RANGE

- A. VRF/VRV support comprised of glass filled nylon foot and galvanized support struts members.

Specifier Note: Edit the following paragraph to meet project requirements. Specify maximum loading for each Big Foot Systems, VRF/VRV support type as follows: For Model B5556 and Model B5559, maximum loading is 1323 lbs; for Model B5557 and Model B5560, maximum loading is 1102 lbs; for Model B5558 and Model B5561, maximum loading is 882 lbs.

1. Design Load: [882] [1102] [1323] lbs maximum.
2. Color:
 - a. Black feet.
 - b. Natural galvanized steel.
3. Number of feet: [2] [4].

Specifier Note: Edit the following paragraph to meet project requirements. Specify size dimensions to match required Big Foot VRF/VRV as follows: For Model B5556, size is 48 1/2 × 53 1/2 inches; for Model B5557, size is 60 1/4 × 53 1/2 inches; for Model B5558, size is 66 1/2 × 53 1/2 inches; for Model B5559, size is 40 1/2 × 53 1/2 inches; for Model 5560, size is 52 3/8 × 53 1/2 inches; for Model B5561, size is 58 5/8 × 53 1/2 inches. Contact Big Foot Systems directly for dimensions of custom frames.

4. Size: [39 3/8 × 47 1/4] [78 3/4 × 47 1/4] [118 1/8 × 47 1/4] [39 3/8 × 59 1/16] [78 3/4 × 59 1/16] [118 1/8 × 59 1/16] [×] inches.

Specifier Note: Edit the following paragraph to meet project requirements. Specify weights to match required Big Foot Systems, VRF/VRV as follows: For Model B5556, weight is 77 lbs; for Model B5557, weight is 84 lbs; for Model B5558, weight 90 lbs; for Model B5559, weight is 55 lbs; for Model 5560, weight is 62 lbs; for Model B5561, weight is 68 lbs. Contact Big Foot Systems directly for weights of custom frames.

5. Weight: [77] [84] [90] [55] [62] [68] lbs.
- B. Acceptable Material: Big Foot Systems, Stand Range [Mini Split] [VRF/VRV] Support, Model [B5550] [B5551] [B5552] [B5553] [B5554] [B5555] [B5562] [B5556] [5557] [B5558] [B5559] [B5560] [B5561][insert custom reference].

2.8 ACCESSORIES

- A. Foot Fleece: in accordance with manufacturer's written recommendations.
- B. Vibration Isolation:
 1. Acceptable material: Big Foot Systems, [Fix-it-Foot Mini Split Kit] [AV Pads] [Vibromats].

PART 3 EXECUTION

3.1 INSTALLER

- A. Use installers who have experience of work similar to the work of this Section.

3.2 EXAMINATION

- A. Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for HVAC equipment support frames installation in accordance with manufacturer's written recommendations.
 1. Visually inspect substrate in presence of Consultant.
 2. Inform Consultant of unacceptable conditions immediately upon discovery.

Specifier Note: Retain and edit the following Article to meet project requirements. Retain only those Paragraphs that are appropriate to the project.

3.1 INSTALLATION

- A. Assemble and install equipment support frames in accordance with manufacturer's written recommendations.
 1. Assemble and install equipment support frames on centers as indicated and in accordance with manufacturer's written instructions.

Specifier Note: Edit or delete the following three paragraphs to meet project requirements.

- B. Install roofing fleece under each equipment support frame foot where frame is installed over PVC roofing.

- C. Use vibration isolation type to meet project requirements in accordance with manufacturer's written recommendations under frame foot and as indicated.
- D. Use mounting platforms as indicated and in accordance with manufacturer's written instructions.

3.2 FIELD QUALITY CONTROL

- A. Field Inspection: Coordinate field inspection in accordance with Section [01 45 00 Quality Control].

Specifier Note: Specify requirements if manufacturers are to provide field quality control with onsite personnel for instruction or supervision of product installation, application, erection, or construction. Manufacturer field reports are included under PART 1, Submittals.

- B. Manufacturer's Services:

Specifier Note: Use the following Paragraphs only when manufacturer's field services are provided and are required to verify the quality of the installed components. Establish the number and duration of periodic site visits required by manufacturer and specify below. Contact Big Foot Systems to determine any costs associated with Technical Representatives providing manufacturer's field services. Delete if field services are not required.

- 1. Coordinate manufacturer's services with Section [01 45 00 - Quality Control].

Specifier Note: Delete the following paragraph if no costs are associated with manufacturer's services.

- 2. Arrange for payment for manufacturer's services.
 - 3. Have manufacturer review work involved in handling and installation of equipment support frames and submit written reports in acceptable format to verify compliance of Work with Contract conditions.
 - 4. Manufacturer's Field Services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for product installation review in accordance with manufacturer's instructions.
 - a. Report any inconsistencies from manufacturer's recommendations immediately to Consultant.

Specifier Note: Edit the following Paragraph to meet project requirements. Coordinate site visits with manufacturer or delete the Paragraph and all of its subparagraphs if site visits are not required.

- 5. Schedule site visits to review work at stages listed:
 - a. After delivery and storage of equipment support frames and when preparatory work on which Work of this Section depends is complete, but before application begins.
 - b. Twice during progress of work at 25% and 60% complete.
 - c. Upon completion of Work, after cleaning is carried out.
 - d. Obtain reports within three days of review and submit immediately to Consultant.

3.3 CLEANING

- A. Perform daily progress cleaning.
 - 1. Leave work area clean at end of each day.
- B. Upon completion, remove surplus materials, rubbish, tools and equipment.
- C. Collect recyclable waste and dispose of at appropriate recycling facilities.

3.4 PROTECTION

- A. Protect piping and equipment support system from damage during construction.
- B. Repair or replace adjacent materials damaged by installation of piping and equipment support system.

END OF SECTION