SECTION 07720

ROOF ACCESSORIES

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Adjustable height molded fiberglass-reinforced nylon supports for pipes, struts and frames intended for exterior rooftop applications.

1.2 RELATED SECTIONS

A. Section 07510 - Built-up Bituminous Roofing.

B. Section 07520 - Cold-Applied Bituminous Roofing.

C. Section 07530 - Elastomeric Membrane Rooofing.

D. Section 07540 - Thermoplastic Membrane Roofing

E. Section 07550 - Modified Bituminous Roofing.

F. Section 07560 - Fluid-Applied Roofing.

G. Section 07570 - Coated Foamed Roofing.

1.3 REFERENCES

A. ASTM International (ASTM):
1. ASTM C1289, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
2. ASTM D2863, Standard Test Methods for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index).
3. ASTM D4066, Standard Classification System for Nylon Injection and Extrusion Materials (PA).

B. International Electrotechnical Commission (IEC).
1. IEC 60243, Electric Strength of Insulating Materials - Test Methods - Part 1: Tests at Power Frequencies.
2. IEC 60695-2-12, Fire Hazard Testing - Part 2-12: Glowing/Hot-Wire Based Test Methods - Glow-Wire flammability Index (GWFI) Test Method for Materials.

C. International Standards Organization (ISO).
1. ISO 62, Plastics - Determination of Water Absorption
2. ISO 75-1, Plastics - Determination of Temperature of Deflection Under Load - Part 1: General Test Method.
3. ISO 180, Plastics - Determination of Izod Impact Strength.
4. ISO 294-4, Plastics - Injection Molding of Test Specimens of Thermoplastic Materials - Part 4: Determination of Molding Shrinkage.
5. ISO 306, Plastics - Thermoplastic Materials - Determination of Vicat Softening Temperature (VST).
6. ISO 527, Plastics - Determination of Tensile Properties - Part 1: General Principles.
7. ISO 1183, Plastics - Methods for Determining the Density of Non-Cellular Plastics - Part 1: Immersion Method, Liquid Pyknometer Method and Titration Method.
8. ISO 3146, Plastics - Determination of Melting Behavior (Melting Temperature or Melting Range) of Semi-Crystalline Polymers by Capillary Tube and Polarizing-Microscope Methods.
9. ISO 11359], Plastics - Thermomechanical Analysis (TMA) - Part 2: Determination of Coefficient of Linear Thermal Expansion and Glass Transition Temperature.

D. Underwriter's Laboratories (UL).
1. UL 746A, Standard for Polymeric Materials - Short Term Property Evaluations.
2. UL 746B, Standard for Polymeric Materials - Long Term Property Evaluations.

E. US Green Building Council (USGBC).
1. LEED NC Version 2.2, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

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: Submit dimensioned drawings showing:
1. Material thicknesses, location and size of adhesive vent perforations;
2. Location and size of holes for mechanical fasteners;
3. Physical properties of each unit specified including minimum and maximum height adjustments;
4. Layout information showing span between units for maximum loading.

D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.

E. Manufacturer's written Instructions, including:
1. Delivery, storage and handling recommendations.
2. Preparation and installation recommendations.

F. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

G. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria, and physical requirements.

H. Manufacturer's Field Reports: Submit manufacturer's field reports within 3 days of each

manufacturer representative's site visit and inspection.

I. Installer's Experience: Submit verification of evidence of work similar to the work of this Section.

J. Warranty: Fully executed, issued in Owner's name, and registered with manufacturer, including:
   1. Manufacturer's 10-year warranty, from date of substantial completion, covering defects in materials.

K. Sustainable Design (LEED) Submittals:
   1. LEED Submittals: In accordance with Division 1.
   2. Submit verification for items when appropriate as follows:
      a. MR 4.4 for Low-Emitting Materials.
      b. MR 5.1 and MR 5.2 for Regional Materials;

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Supply maintenance data for rooftop support system for incorporation into manual specified in Division 01.

B. Record Documentation: In accordance with Division 01.
   1. Materials: List materials used in rooftop support system work.
   2. Warranty: Submit warranty documents specified.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.

B. Installer Qualifications: Minimum 2 year 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. Rebuild mock-up area as required to produce acceptable work.

1.7 PRE-INSTALLATION MEETINGS

A. Convene a pre-installation meeting a minimum two weeks prior to starting work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in accordance with manufacturer's written instructions.
   1. Deliver materials with identification labels intact and product name and manufacturer clearly visible, and in sizes to suit project.
   2. Inspect each unit for damage and promptly contact Green Link, Inc. directly to report damaged units.
   3. Ensure damaged units are replaced with new before beginning installation.

B. Store materials in manufacturer's unopened packaging until ready for installation.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.10 SEQUENCING

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

1.11 WARRANTY

A. Manufacturer's Warranty: Submit manufacturer's standard limited 10-year warranty document.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Green Link, Inc., 5519 E Cork St, Kalamazoo, MI 49048. ASD. Toll Free Tel: (888) 672-9897. Tel: (269) 216-9229. Email: sales@greenlinkengineering.com Web: http://www.greenlinkengineering.com.

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 DESCRIPTION

A. Adjustable height molded fiberglass-reinforced nylon support system for pipes, struts and frames intended for exterior rooftop applications.
   1. Materials: High tensile strength fiberglass-reinforced injection-molded nylon resin to ASTM D4066.
   2. Base: 7 inches (178 mm) diameter with adhesive vent perforations.
   3. Head: To suit configuration of supported materials.
   4. Finish: Grey matte finish.
   5. Maximum Loading: 600 pounds per support.
   6. Comply with UL 746A and UL 746B.

2.3 PERFORMANCE REQUIREMENTS

A. Products shall comply with the following:
   1. Comply with ASTM C1289 and ASTM D2863.
   2. Fire Hazard Testing: To IEC 60695-2-12.
   3. Electrical Strength of Insulating Materials: To IEC 60243.
   4. Water Absorption: To ISO 62.
   5. Deflection Under Load: To ISO 75-1.
   6. Impact Strength: To ISO 180.
   7. Shrinkage: To ISO 294-4.
   8. Softening Temperature: To ISO 306.
   9. Tensile Strength: To ISO 527.
   10. Density: To ISO 1183.
   11. Melting Temperature: To ISO 3146.
   12. Linear Thermal Expansion: To ISO 11359.

2.4 MODELS

A. Light Piping Support:
   1. Acceptable Material: Green Link, Inc., KnuckleHead Lite Pipe Support System.

B. Heavy Piping Support:
   1. Acceptable Material: Green Link, Inc., KnuckleHead Heavy Pipe Support System.

C. Strut Support:
   1. Acceptable Material: Green Link, Inc., KnuckleHead Strut Support System.

D. Solar Panel Framing Support:
   1. Acceptable Material: Green Link, Inc., KnuckleHead Solar Support System.

E. Paver Support:
   1. Acceptable Material: Green Link, Inc., KnuckleHead Paver Support System.

2.5 ACCESSORIES

A. Adhesive: Contact manufacturer for recommended adhesive to maintain warranty.
   1. Acceptable Materials: Green Link Adhesive/Sealant.

B. Mechanical Fasteners:
   1. To suit roof deck and in accordance with support manufacturer's written recommendations.

C. Support Extension Kit: Consisting of extension cylinder, threaded rod and threaded coupling.
   1. Number of 8 inches (203 mm) extension kits required: _____.
   2. Number of 12 inches (305 mm) extension kits required: _____.
   3. Number of 18 inches (457 mm) extension kits required: _____.
   4. Acceptable Material: Green Link, Inc., KnuckleHead Support Extension Kit.

D. Cleaning Solvent: Denatured alcohol solvent or other cleaning agent acceptable to both support manufacturer and roofing manufacturer.

E. Flashing: As recommended by roofing manufacturer.

F. TPO Primer: To be used according to used when adhesive and/or mechanical attachment and TPO membrane is present. Contact manufacturer for specific instructions.

G. Mechanical Retainers: to retain plumbing inside the support and prevent dislodgment.
   1. Caps: use with Light Piping Support (2.4-A).
   2. Straps: use with Heavy Piping Support (2.4-B).
   3. Clips: use with Strut Channel Framing and Strut Support (2.4-C).
   4. Acceptable Material: Green Link, Inc., KnuckleHead Retainer System.

H. Protective Pad: Plasticizer Free pad is used as a slip sheet under the KnuckleHead system to isolate it from the single ply membrane systems, to dampen vibration and to mitigate slippage.

I. Solar Wedge: 5-degree wedge is used to increase or decrease angle to provide 10 or 20 degree angle of attack. Use with Par. 2.4D Solar KnuckleHead.
   1. Acceptable Material: Green Link, Inc., KnuckleHead Solar Support System.

J. Paver Pad: Use with Paver Support (2.4 E).
   1. Acceptable Material: Green Link, Inc., KnuckleHead vibration dampening elastomer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify that conditions of roofing surface substrate previously installed under other Sections or Contracts are acceptable for rooftop support system installation in accordance with manufacturer's written recommendations.
   1. Visually inspect roofing surface substrate in presence of Architect.

2. Ensure roofing surface substrate is sound, clean, dry and free of contaminants and other deleterious materials.
3. Inform Architect of unacceptable conditions immediately upon discovery.
4. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Architect.
5. Starting installation of rooftop support system implies roofing surface substrate conditions are acceptable for Work of this Section.

3.2 INSTALLATION

A. Install support system in accordance with manufacturer's written recommendations.

B. Loose-Laid Support System:
1. Lay support bases in required pattern and spaced to ensure that no single support will be exposed to loads greater than 600 pounds.
   a. Support spacing: As indicated.
   b. Support spacing: 6 feet (1829 mm) maximum.
   c. Support spacing: 9 feet (2743 mm) maximum.
   d. Support spacing: 10 feet (3048 mm) maximum.
   e. Support spacing: 11 feet (3353 mm) maximum.
   f. Support spacing: 12 feet (3658 mm) maximum.
   g. Support spacing: 13 feet (3962 mm) maximum.
   h. Support spacing: 14 feet (4267 mm) maximum.
   i. Support spacing: 15 feet (4572 mm) maximum.
   j. Support spacing: 16 feet (4877 mm) maximum.
   k. Support spacing: 17 feet (5182 mm) maximum.
   l. Support spacing: ____ feet maximum.
2. Screw support head to suit support system on to base and level as required for support system indicated.
   a. Rotate support head to desired height.
   b. Ensure support head is not elevated above "STOP" mark to maintain minimal required thread engagement.
3. Install supporting work in accordance with manufacturer's written recommendations.

C. Adhered Support System:
1. Loose lay complete assembly to establish layout of supports ensuring that no single support will be exposed to loads greater than 600 pounds.
   a. Support spacing: As indicated.
   b. Support spacing: 6 feet (1829 mm) maximum.
   c. Support spacing: 9 feet (2743 mm) maximum.
   d. Support spacing: 10 feet (3048 mm) maximum.
   e. Support spacing: 11 feet (3353 mm) maximum.
   f. Support spacing: 12 feet (3658 mm) maximum.
   g. Support spacing: 13 feet (3962 mm) maximum.
   h. Support spacing: 14 feet (4267 mm) maximum.
   i. Support spacing: 15 feet (4572 mm) maximum.
   j. Support spacing: 16 feet (4877 mm) maximum.
   k. Support spacing: 17 feet (5182 mm) maximum.
   l. Support spacing: ____ feet maximum.
2. Mark location of each support.
3. Clean area of roof where support will be placed in accordance with manufacturer's written recommendations.
4. Apply adhesive to bottom of support based using notched trowel.
5. Cover entire surface of base with adhesive 60 mil thick.
6. Position base in marked area and press gently ensuring adhesive oozes from vent holes.

a. Ensure base is in final position within 20 minutes of applying adhesive.

7. Screw support head to suit support system on to base and level as required for support system indicated.
   a. Rotate support head to desired height.
   b. Ensure support head is not elevated above “STOP” mark to maintain minimal required thread engagement.
8. Place supported work into support head using light steady pressure.
9. Completely cover support at area of contact between support head and supported work with adhesive before setting in place.
   a. Remove excess adhesive immediately after supported work has been put into final position.
   b. Secure framing to support head using all-purpose mechanical fasteners in accordance with manufacturer’s written recommendations.

D. For Mechanically Fastened Support System:

1. Loose lay complete assembly to establish layout of supports ensuring that no single support will be exposed to loads greater than 600 pounds.
   a. Support spacing: As indicated.
   b. Support spacing: 6 feet (1829 mm) maximum.
   c. Support spacing: 9 feet (2743 mm) maximum.
   d. Support spacing: 10 feet (3048 mm) maximum.
   e. Support spacing: 11 feet (3353 mm) maximum.
   f. Support spacing: 12 feet (3658 mm) maximum.
   g. Support spacing: 13 feet (3962 mm) maximum.
   h. Support spacing: 14 feet (4267 mm) maximum.
   i. Support spacing: 15 feet (4572 mm) maximum.
   j. Support spacing: 16 feet (4877 mm) maximum.
   k. Support spacing: 17 feet (5182 mm) maximum.
   l. Support spacing: ____ feet maximum.
2. Clean area of roof where support will be placed in accordance with manufacturer’s written recommendations.
3. Position base in marked area and mechanically fasten base to roof using appropriate fasteners in accordance with manufacturer’s written recommendations.
4. Screw support head to suit support system on to base and level as required for support system indicated.
   a. Rotate support head to desired height.
   b. Ensure support head is not elevated above “STOP” mark to maintain minimal required thread engagement.
5. Place supported work into support head using light steady pressure.
6. Completely cover support at area of contact between support head and supported work with adhesive before setting in place.
   a. Remove excess adhesive immediately after supported work has been put into final position.
   b. Secure supported work to support head using all-purpose mechanical fasteners in accordance with manufacturer’s written recommendations.

3.3 FIELD QUALITY CONTROL

A. Manufacturer’s Services:

1. Coordinate manufacturer’s services with Division 01.
2. Arrange for payment for manufacturer’s services.
3. Have manufacturer review work involved in handling, storage and installation of rooftop support system, 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 Architect.

5. Schedule site visits to review work at stages listed:
   a. After delivery and storage of rooftop support system components, and when preparatory work on which Work of this Section depends is complete, but before application begins.
   b. During progress of work.
   c. Upon completion of Work, after cleaning is carried out.
   d. Obtain reports within three days of review and submit immediately to Architect.

3.4 CLEANING

A. Perform daily progress cleaning. Remove all dirt, oil, loose paint, frost and other contamination from all working surfaces with alcohol. Do not use petroleum solvents such as mineral spirits or xylene.
   1. Leave work area clean at end of each day.
   2. Immediately clean spilled adhesive.

B. Upon completion, remove surplus materials, rubbish, tools and equipment.

C. Collect recyclable waste and dispose of in accordance with manufacturer's written recommendations and at appropriate recycling facilities.

3.5 PROTECTION

A. Protect installed rooftop support system from damage during construction.

B. Repair or replace adjacent materials damaged by installation of rooftop support system.

END OF SECTION