



## 1. Product Name

- KnuckleHead Support and Attachment Systems
  - Lite Pipe Supports
  - Heavy Pipe Supports
  - Strut Supports
- Solar Supports
- Paver Supports

## 2. Manufacturer

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## 3. Product Description

### Basic Use

KnuckleHeads are tough, molded fiberglass-reinforced nylon supports designed to keep equipment elevated to extend a roof's life. KnuckleHeads are intended to be used on low-slope rooftops.

KnuckleHeads are height-adjustable and are designed to support up to 600 pounds of weight each. Units can be spaced in such a way as to evenly distribute the load of the heaviest equipment. Consult Green Link, Inc. technical resource guide [here](#) for optimal spacing per each application. Unlike heavy ballast stones, KnuckleHeads are lightweight, adding little to the total roof load, and preventing low points or depressions that invite ponding water and ice build-up.

KnuckleHead installations have been performing in the field for more than 10 years. After constant exposure to high temperatures, freeze-thaw cycles, UV exposure and mechanical stress they show no signs of deterioration.

KnuckleHeads will prevent damage caused by ponding water, wind, ice, flying debris or seismic events as well as protect the integrity of the roofing system—including roof-mounted structures and equipment.

They are engineered with a Universal Base. A range of head designs are available depending on the particular support application needed.

A 10-year warranty is available.

### Composition and Materials

KnuckleHeads are injection-molded from Green Link, Inc. Type 1 nylon resin which possesses high tensile strength. These resins have been used in applications that require high rigidity and strength.

Green Link, Inc. Type 1 is heat-stabilized and formulated to minimize



Light Pipe Supports

the oxidative and thermal degradation of the nylon polymer when exposed to elevated temperatures for extended periods of time. Type 1 provides improved retention of physical properties under exposure to long-term heat. The continuous maximum operating use temperature is 250 degrees F. Short-term peak temperatures as high as 400 degrees F can be tolerated.

## Features and Benefits

- UV stable
- Height-adjustable
- Molded glass-reinforced nylon
- Maximum allowed support load of 600 pounds each
- Features a universal 7-inch round base; 38 square inches
- Protects roof system from damage due to load movement
- Maximum allowed wind uplift force is 720 pounds each when mechanically fastened
- Round base eliminates risk of membrane tears caused by sharp corners and edges, while providing wind uplift and weight distribution advantages
- Supports can be loose laid on low slope roof systems, or can be adhered to substrate and or can be mechanically secured to satisfy seismic requirements as well
- Custom engineered products and services available

## Models and Sizes

Five KnuckleHead designs are available. Regardless of the design, all KnuckleHeads utilize the same Universal Base and install using the same steps. They can be installed using **Chem Link's M-1® Structural Adhesive/Sealant**, or M-1 combined with mechanical fasteners.

### Lite Pipe Supports (up to 1 inch nominal pipe size)

Lite Pipe Supports are commonly used for condensation pipes and electrical conduit. They are compatible with a single 1.315 inch round outside diameter pipe or two 0.840 inch round outside diameter pipes.



Solar Supports with Extension kit



Heavy Pipe Supports

### Heavy Pipe Supports (up to 2½ inch nominal pipe size)

Heavy Pipe KnuckleHeads can support pipes up to 3 inches round outside diameter such as PVC or natural gas lines.

### Strut Supports

Strut Supports are designed to accommodate square steel channels which in turn can be configured to support piping, mechanical equipment such as HVAC or extended metal walkways and solar arrays.

### Solar Supports

Solar Supports provide an angled structure for roof-mounted solar panels. The head is designed to position framing up to 15/8 inch at a fixed 15-degree angle. Each head is capable of resisting up to 750 pounds of wind uplift force.

### Paver Supports

Paver Supports are deployed to construct raised flooring that protects the roofing membrane and mechanical components from foot traffic. They can be used with concrete paver tiles and composite decking to create access flooring, garden terraces and plaza decks.

### Accessories/Options

**Adhesive:** KnuckleHeads can be attached directly to the roof substrate with mechanical fasteners combined with Chem Link M-1® Structural Adhesive/Sealant, or with M-1 alone. M-1 is polyether-based and bonds to a wide range of roofing substrates as well as to wood, concrete, metal and the KnuckleHead nylon base. M-1 by itself develops a strong bond of more than 400 psi shear strength, which contributes to KnuckleHead integrity under high wind conditions or seismic events.

M-1 is applied to the perforated base, which allows the adhesive to vent as the base is pressed into place. This method creates “adhesive rivets” which generate the strong bond. When mechanical fasteners are used in combination with M-1, adhesive should also be applied around the perimeter of the base as well as to each screw head to prevent possible leaks caused by the penetration.

M-1 is environmentally safe and presents no toxic risk to contractors or building occupants. It is solvent-free, isocyanate-free, nonflammable and odorless.

**Fasteners:** all-purpose mechanical fasteners such as roofing screws can be used to fasten the KnuckleHead base to the metal deck below the roofing substrate. For concrete decks, masonry fasteners should be used.

**Halo flashing:** allows for KnuckleHead installation to be consistent with the original single-ply membrane manufacturer and or warranty provider penetration protocol. Made from the original single ply membrane species, flashing is heat welded and or adhered to the KnuckleHead Universal Base. Flashing is permanently and concentrically bonded to the base and simultaneously welded and or adhered to the roofing membrane integrating the KnuckleHead support system with the roofing system.

**Extension kit:** allows for additional elevation from the roof's surface by an employment of a cylinder, threaded rod, a threaded coupling and an adhesive/sealant. Disassembling each KnuckleHead model allows for an extension cylinder to be inserted into the base. The cylinder in turn supports the Head; threaded rod ties the base and the Head into an integral assembly. Extensions achieve an 8, 12 or 18 inch clearance off the roof surface. Custom extensions and bases are also available.

Paver Supports





Strut Supports

## 4. Technical Data

### Applicable Standards

#### ASTM International

- **ASTM C1289** Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
- **ASTM D2863** Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)
- **ASTM D4066** Standard Classification System for Nylon Injection and Extrusion Materials (PA)

#### International Electrotechnical Commission (IEC)

- **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
- **IEC 60243** Electric strength of insulating materials - Test methods - Part 1: Tests at power frequencies
- **IEC 60093** Methods Of Test For Volume Resistivity And Surface Resistivity Of Solid Electrical Insulating Materials Second Edition
- **IEC 60112** Method for the determination of the proof and the comparative tracking indices of solid insulating materials

#### International Standards Organization (ISO)

- **ISO 62** Plastics - Determination of water absorption
- **ISO 75-1** Plastics - Determination of temperature of deflection under load - Part 1: General test method
- **ISO 179** Plastics - Determination of Charpy impact properties - Part 1: Non-instrumented impact test
- **ISO 180** Plastics - Determination of Izod impact strength
- **ISO 294-4** Plastics - Injection moulding of test specimens of thermoplastic materials - Part 4: Determination of moulding shrinkage

- **ISO 306** Plastics - Thermoplastic materials - Determination of Vicat softening temperature (VST)
- **ISO 527** Plastics - Determination of tensile properties - Part 1: General principles
- **ISO 1183** Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pycnometer method and titration method
- **ISO 3146** Plastics - Determination of melting behaviour (melting temperature or melting range) of semi-crystalline polymers by capillary tube and polarizing-microscope methods
- **ISO 11359** Plastics - Thermomechanical analysis (TMA) - Part 2: Determination of coefficient of linear thermal expansion and glass transition temperature

#### UL International

- **UL 746A** Standard for Polymeric Materials - Short Term Property Evaluations
- **UL 746B** Standard for Polymeric Materials - Long Term Property Evaluations

## 5. Installation

### Preparatory Work

Roofing surface must be properly cleaned and free of debris.

### Methods

The following steps feature a strut support KnuckleHead. All KnuckleHeads use the same Universal Base and can be installed in one of three ways:

- a. They may be loose laid.
  - b. For more secure installation, they may be bonded directly to the roof surface using M-1® Structural Adhesive/Sealant.
  - c. Where high winds or seismic activity are prevalent, KnuckleHeads may be installed using both M-1 and mechanical fasteners.
1. Lay out the assembly. Use a marker to indicate location of all KnuckleHead bases.
  2. 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.
  3. Apply M-1 Structural Adhesive/Sealant to the bottom of the base. Using a notch trowel, comb the entire surface leaving a uniform, approximately 60-mil layer of M-1.
  4. Position the base in the marked area and press gently. M-1 Structural Adhesive/Sealant should ooze out from the vent holes.
  5. For a more secure installation, attach the base to the deck using an appropriate fastener (0.235" ± 0.010" thread size). Coat the fastener heads with M-1 to create a waterproof seal. (optional)
  6. Mate the head to the base and level if necessary. Rotate the head to the desired height, but do not elevate above the "stop" mark which will compromise integrity of the KnuckleHead unit.

7. Set framing into place and apply light pressure. For a more permanent and secure installation, M-1 Structural Adhesive may be applied directly into the head before setting pipes, struts or pavers. Tool off excess M-1 from the KnuckleHead and base for a more finished appearance.
8. Fixture metal framing using all-purpose fastener. (optional)

## 6. Availability and Cost

Availability: KnuckleHeads are marketed throughout the United States through representatives and distributors. Contact Green Link, Inc. for more information.

## 7. Warranty

A manufacturer's limited 10-year warranty is available. Please contact the manufacturer for details.

## 8. Maintenance

Periodic inspection per roofing system warranty may be required.

## 9. Technical Services

Green Link, Inc. provides both pre-sale and post-sale technical support.

## 10. Filing Systems

- ConstructConnect
- Additional product information is available from the manufacturer upon request. ↪