



# Product Guide Specifications

**Specifier Notes:** This product guide specification is written according to the Construction Specifications Institute (CSI) 3-Part Format. The section must be carefully reviewed and edited by the Architect or Engineer to meet the requirements of the project and local building code. Coordinate this section with other specification sections and the Drawings. Delete all “Specifier Notes” when editing this section.

Section numbers and titles are from *MasterFormat 1995 Edition*, with numbers and titles from *MasterFormat 2004 Edition* in parentheses. Delete version not required.

## SECTION 13145 (13 34 21)

### RETROFIT STEEL SUB-PURLINS

**Specifier Notes:** This section covers “Roof Hugger” sub-purlins for retrofitting roofs, walls, and fascias over existing rib metal panels and solid roof deck systems. The one-piece, custom-punched, galvanized steel, Z-section fits into and over existing metal roof profile or has a continuous bottom flange for solid deck applications. For existing metal roofs, the sub-purlins are pre-punched to nest into and over the existing rib profiles, pre-punched for fasteners, and fastened directly into the existing purlins or joists with structural fasteners. For solid deck applications, the sub-purlin’s bottom flange are pre-punched at 8” on center to permit attachment directly to roof joists/trusses spaced at 16” or 24” on center.

The International Building code adopted by all U.S. states requires the roofs to be analyzed by zones IE: corner, edge and field zones. Each zone will have a different wind uplift load (negative pressure) requirement. Most older metal buildings were designed with uniform roof loading as a result the 5’ purlin spacing typically found in these buildings may not be adequate to meet current code requirements in higher wind zone areas.

**Roof Hugger recommends consulting a qualified design professional to determine the loads, a compliant roof panel and the proper sub-frame spacing.** Roof Hugger will run a free preliminary load analysis if requested (subject to final engineering confirmation by others). The new Roof Hugger sub-purlin type and spacing will be a function of the required, snow loads, wind loads, the existing purlin spacing, type of existing panel, and the tested maximum capacity of the proposed new roof panel. Different panels may require different framing solutions.

Retrofitting an existing roof will create a cavity between the new and existing roofs. Consideration for ventilating and/or insulating this cavity is recommended. Many benefits including reduced heating/cooling energy consumption and Federal/State and local tax incentives can be realized.

Standing seam panels are known for their tendency to rumble in high winds if insulation is not used. Consult your panel supplier for their specific recommendations.

Consult Roof Hugger, if needed, for assistance in editing this section for the your specific retrofit project application.

(Instructional Page)

# Product Guide Specifications

## SECTION 13145 (13 34 21) - SPECIFICATIONS FOR STRUCTURAL RETROFIT ROOF SUB-FRAMING SYSTEM

### PART 1 - GENERAL

#### 1.01 DESCRIPTION

- A. The structural retrofit roof sub-framing system will provide support for a new metal roofing system constructed over the existing building roof. It shall be engineered in accordance with the specified code and design loading and shall transfer positive acting loads at each attachment location into an existing structural member.
- B. Furnish labor, material, tools, equipment and services for the retrofit roof sub-framing as indicated, in accordance with provisions of the Contract Documents.
- C. Completely coordinate work with of other trades.
- D. Although such work is not specifically indicated, furnish and install supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.
- E. See Division 1 for General Requirements

#### 1.02 RELATED WORK

**Specifier Notes:** Edit the following list of related sections as required for the project. List other sections with work directly related to this section.

- A. Section 05400 (05 40 00) - Cold-Formed Metal Framing.
- B. Section 07220 (07 22 00) - Roof and Deck Insulation.
- C. Section 07400 (07 40 00) - Roofing and Siding Panels.
- D. Section 07720 (07 72 00) - Roof Accessories.
- E. Section 13120 (13 34 19) - Pre-Engineered Structures (Metal Building Systems).

#### 1.03 QUALITY ASSURANCE AND REFERENCES

- A. American Society for Testing and Materials (ASTM)
  - 1. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 2. ASTM A 1011/A 1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
  - 3. ASTM E 1592 - Structural Performance Test for Metal Panel and Siding Systems by Uniform Static Air Pressure Difference

# Product Guide Specifications

- B. American Iron and Steel Institute (AISI)
  - 1. AISI – 2008 Edition of the “Cold Form Steel Design Manual”
  - 2. AISI – 2007 Edition of the “North American Specification for the Design of Cold-Formed Steel Structural Members”
- C. American Institute of Steel Construction (AISC)
  - 1. AISC - “Specification for Structural Steel for Buildings”
- D. 2007 Florida Product Approvals
  - 1. FL9352.1-R1, FL9352.2-R1
  - 2. FL9561-R1
  - 3. FL10141-R1

## 1.04 SUBMITTALS

- A. Comply with Section 01330 (01 33 00) - Submittal Procedures.
- B. Product Data: Submit manufacturer's product data, including installation instructions.

**Specifier Notes:** Edit the following paragraph regarding shop drawings as required for the project. Sub-purlins are typically produced 3/8 inch to 1 inch taller than the height of the major ribs of the existing roof panels. Indicate on the shop drawings if a specific sub-purlin height is required.

- C. Shop Drawings: Submit manufacturer's shop drawings for sub-purlins indicating gauge, yield strength, flange and web sizes, cut-out dimensions, and punch pattern for attachment holes in base flange.
- D. Design Data: Submit design data from independent engineering firm indicating table of wind uplift capacity of sub-purlins.

## 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened bundles, containers, and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage:
  - 1. Store materials in accordance with manufacturer's instructions.
  - 2. Protect sub-purlins from corrosion, deformation, and other damage.
  - 3. Store sub-purlins off ground, with 1 end elevated to provide drainage.
- C. Handling: Protect materials during handling and installation from corrosion, deformation, and other damage.

## 1.06 EXISTING ROOF SYSTEM AND PRE-CONSTRUCTION INSPECTION

- A. The existing roof is a [Insert existing roof description here per instructions below]



# Product Guide Specifications

**Specifier Notes:** Briefly describe the construction of the existing roof support system, panel type, spacing and profile. Example: *[The existing roof system consists of through fastened metal panels with 12" o.c. major rib spacing x 1 ½" major rib height, attached to zee-shaped purlins spaced 5' o.c. supporting the metal panels]*

- B. The Contractor shall conduct a detailed inspection of the existing roof(s) to identify any existing roof elements that are a cause for concern IE: panel deterioration, structural deterioration, equipment curbs, plumbing and electrical penetrations, special flashing requirements, and any other items that should be submitted to the Architect for review and evaluation.
- C. The Contractor shall perform a detailed survey of the existing roof(s) and confirm the existing panel dimensions, type and profile. In the case of existing standing seam roofing it should be determined if the existing roof employs standard or tall clips. If tall clips are existing the standoff dimension should be determined.
- D. The Contractor shall obtain field measurements on the existing roof geometry including width, length, building height, roof pitch and purlin spacing. This information is to be forwarded to the retrofit sub-framing system manufacturer for coordination and integration into the design and installation documents.

## 1.07 DESIGN REQUIREMENTS

### A. General

- 1. Design for approval and installation in accordance with the included drawings and these specifications, a complete retrofit sub-framing and metal roof panel assembly as a structural package, engineered and factory fabricated in accordance with AISI, MBMA and ASCE references with the understanding the sub-framing system may be designed by the retrofit sub-framing manufacturer and the metal roof panel system may be designed by the metal roof manufacturer. However, both systems are to be designed to perform as one engineered structural package where the metal roof system controls the placement of sub-framing members.
- 2. Any additions/revisions to sub-framing members as a result of field conditions and/or demands, shall be the contractor's responsibility, and shall be submitted for review and approval by the manufacturer.

### B. Engineering Design Criteria:

**Specifier Notes:** The Engineering design criteria for retrofit metal roof systems should be consistent and in a format similar to the Design Criteria listing shown below. Both the metal roof system and the retrofit sub-framing system manufacturers use this criteria to determine the positive (gravity) and negative (wind uplift) pressures being imposed onto the new roof assembly thereby engineering their systems to satisfy the specified building code and local requirements to the project. Edit the listing by selecting from the choices provided that are applicable to your project. This information is typically included in Division 1 General Requirements or Division 7 Metals, but can be placed in this specification section if you wish.



# Product Guide Specifications

1. Code: [ASCE 7-05, IBC 2006, FBC 2007, BOCA, Etc.] Note: codes are Mutually Exclusive and should not be mixed.
2. Additional Requirements: [None, Factory Mutual, Underwriters Lab, US Army Corps of Engineers Standard, Other] Note: Mutually Exclusive
3. Occupancy Group: [Assembly-A, Business-B, Educational-E, Factory Industrial-F, High-Hazard-H, Institutional/Industrial-I, Mercantile-M, Storage-S, Etc.]
4. Occupancy Category: [ I, II, III, IV]
5. Importance Factor: [0.87, 1.0, 1.15]
6. Minimum Roof Snow Load: [insert load] PSF
7. Ground Snow Load: [insert load] PSF
8. Wind Speed: [insert wind speed] MPH, 3 Second Gust
9. Exposure Category: [B, C, D]
10. Enclosure: [Enclosed, Partially Enclosed, Open]

## PART 2 - PRODUCTS

### 2.01 MANUFACTURER QUALIFICATIONS

- A. Manufacturer shall have a minimum of five years experience in manufacturing and fabrication of retrofit sub-framing systems of this nature. Light-gauge steel sub-framing components specified in this section shall be produced in a factory environment by roll forming and press-brake equipment assuring the highest level of quality control.
- B. Acceptable Manufacturers
  1. Roof Hugger, Inc., PO Box 1027, Odessa, Florida 33556. Toll Free Phone (800) 771-1711. Toll Free Fax (877) 202-2254. Phone (813) 909-4424. Fax (813) 948-4742. Website: [www.roofhugger.com](http://www.roofhugger.com). E-Mail: [sales@roofhugger.com](mailto:sales@roofhugger.com) .
  2. Others manufacturers must submit a request for approval no later than two weeks prior to the established bid date and shall be equal to Roof Hugger, Inc.

### 2.02 RETROFIT STEEL SUB-PURLINS

- A. Retrofit Notched Sub-Purlins: "Roof Hugger".
  1. Description:
    - a. 1-piece, custom-punched, Z-shaped section.
    - b. Pre-punched to nest over existing roof panel ribs for low-profile appearance.
    - c. Pre-punched for attachment fasteners.
    - d. Fastens directly into existing purlins or joists with fasteners.
  2. Material:
    - a. Galvanized steel, ASTM A 653 or A 1011, G-90, yield strength 50 KSI.



# Product Guide Specifications

**Specifier Notes:** [Specify gauge] Please note that the gauge thickness is only a criteria for satisfying the new roof panel's attachment criteria to meet specified wind uplift loading. It is new roof panel system specific. All laboratory testing of Roof Huggers assemblies have been conducted using 16-gauge. Consult Roof Hugger for gauges other than 16-gauge for engineering values and lead time.

b. Thickness: [0.060" minimum, 16-Gauge] or [0.071" minimum, 14-Gauge].

**Specifier Notes:** Sub-purlins are typically produced 3/8 inch to 1 inch taller than the height of the major ribs of the existing roof panels. Consult Roof Hugger for cost-efficient sizes to meet project requirements if web height other than manufacturer's standard is needed to accommodate the addition of new insulation between the old and new roofs.

c. Web Height: [ \_\_\_\_\_ inches] [manufacturer's standard].

**Specifier Notes:** The number of holes provided in the base flange will be greater than or equal to the required number of fasteners to be installed per linear foot. Custom hole-punching of the base flange is available upon request. Roof Hugger may punch additional unused holes in the base flange to aid in installation or to minimize conflict with existing fasteners.

3. Base Flange Width: Pre-punch base flange to manufacturer's standard unless otherwise specified.
4. Top Flange Width: Nominally 2" with 0.25" minimum stiffening lip unless otherwise specified.
5. Length: Nominally 10'-0" long, plus an additional +/- 1" top flange extension for part lap or per manufacturer's recommendations.

B. Attachment Fasteners/Anchorage

**Specifier Notes:** The following fasteners are typical minimum for attachment of new sub-purlins to existing metal building purlins. Fastener length will vary with thickness of existing insulation. Fastener length of 1-1/4 to 1-1/2 inches is typical. Other fasteners may be specified based upon engineered load requirements or other special conditions. Attachment of sub-purlins to existing structural steel (i.e. bar joist/structural channels) will require appropriate fasteners. Roof Hugger does not supply fasteners. Consult Roof Hugger for additional information regarding fasteners.

1. Attachment to Existing Purlins: ¼"-14 or #12-14 threads per inch, DP3 self-drilling fastener.
2. Length: Required to penetrate existing purlins in accordance with fastener attachment standards.



# Product Guide Specifications

3. Sub-Purlins Installed Mid-Span: ¼"-14 or #12-14 threads per inch, DP3 self-drilling fasteners or equal into sub-rafter structure, #17-14 into existing panel when indicated and #10-16 DP3 pancake head through Hugger top flange into sub-rafter when indicated.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Examine existing roof areas to receive sub-purlins. Notify Architect if areas are not acceptable or structurally adequate. Do not begin installation until unacceptable conditions have been corrected.
- B. Verify existing purlins and eave struts are in good serviceable condition, without rust-thru of flanges.
- C. Field Verify Before Ordering of and Installation of Sub-Purlins:
  1. Existing panel profile and panel rib dimensions.
  2. Existing panel run-out by measuring roof over several 20-foot areas to confirm panels were installed on module and in-square. Note variations.

**Specifier Notes:** Indicate on the construction drawings, the details of the major and minor rib configurations of the existing roof panels. If the existing roof is a standing seam, verify whether thermal blocking has been installed. If thermal blocking exists consult Roof Hugger, Inc. regarding this situation because special details and parts may be required for this type of panel system. Roof Hugger existing panel details are available to aid in obtaining this information. Refer to [www.roofhugger.com](http://www.roofhugger.com) for the most current application details.

### 3.02 INSTALLATION OF SUB-FRAMING AND OTHER ROOFTOP APPURTENCES

**Specifier Notes:** Consult Roof Hugger for information regarding the installation of sub-purlins for special situations and visit [www.roofhugger.com](http://www.roofhugger.com) for specific details pertaining to installation

- A. Install sub-purlins in accordance with manufacturer's instructions at locations indicated on the standard details or Engineered Drawings if provided.

**Specifier Notes:** The existing roof is not weather-tight until new roof panels are installed over the sub-purlins. Installation of sub-purlins may need to be limited to the amount that can be roofed over each day. Consult Roof Hugger to discuss other options to minimize weather issues. Edit the following paragraph as required.

- B. Limit installation of sub-purlins to amount that can be roofed over each day.

# Product Guide Specifications

**Specifier Notes:** Specify number of fasteners (typically less than or equal to the number of holes specified in paragraph 2.2.B) required to be installed per linear foot, as determined by wind load criteria. Typically 2 fasteners per linear foot are required. Refer to Roof Hugger engineering data for allowable uplift loads. Edge zones and field can be specified separately if desired.

- C. Install [1] [2] [3] fasteners per linear foot or as directed by Manufacturer.
- D. Install sub-purlins directly over existing purlins and fasten to existing purlin through existing panel pan section.

**Specifier Notes:** In higher wind zones, special fitted sub-rafters may be required to allow for the installation of Huggers mid-span between existing purlins. Grids made of “Cee’s”, “Zee’s”, and/or “hats” may be needed in lieu of special fitted sub-rafters in the corner and/or edge areas to meet the load requirements. The selection of the fitted sub-rafter or grid system is a function of existing roof panel, the new roof panel and the corner, edge and field pressures. A preliminary estimate of the roof zone pressures can be made at <http://www.roofwinddesigner.com/>

- E. Loosely lay Sub-rafters over the existing panel high ribs and between the existing purlins. Sub-rafter spacing and number of fasteners shall be as specified on the engineered drawings or as specified in the Roof Hugger, Florida Product Approval.
- F. Press the Roof Hugger sub-purlins over the sub-rafters on the existing purlin lines in areas where they are specified and install #12-14 DP3 fasteners (or as specified) through the base flange of the Hugger sub-purlin, through the sub-rafter and then into the existing purlins being careful to maintain the alignment of the sub-rafters.
- G. Install Huggers onto the sub-rafters between the existing purlins as specified with #12-14 threads per inch, DP3 fasteners, typically one fastener on each side of the sub-rafter unless otherwise specified.
- H. Where the Roof Hugger is attached to the existing roof panel the pre-punched base flange hole should be drilled out to the correct diameter to allow for the installation of a #17-14 fastener through the Roof Hugger and into the existing roof panel.
- I. Where the Roof Hugger passes over the fitted sub-rafter a #10-16 pancake head fastener should be installed through the top flange of the Roof Hugger into the top of the new fitted sub-rafter.

# Product Guide Specifications

**Specifier Notes:** Removal of Existing Roof Fasteners: Typically, the existing roof fasteners are located adjacent to the major panel ribs and need not be removed. When the Hugger is installed atop these fasteners they may cause the base flange of the new Hugger to bend, this is normal. Fasteners located in the center of the existing roof pan can cause sub-purlins to roll or “porpoise” these fasteners would need to be removed. Special punching by Roof Hugger may be possible to minimize the removal of existing roof fasteners located in the center of the existing roof pan. Consult Roof Hugger to review options.

## J. Removal of Existing Roof Fasteners:

1. Do not remove existing roof fasteners unless installation of sub-purlins over fasteners causes sub-purlins to roll or “porpoise”. Some distortion of base flange of sub-purlins caused by existing roof fasteners is normal.

**Specifier Notes:** In colder climates, special attention should be given to flashing the opening created by removal of the existing skylights to minimize migration of warm, moist air into this cavity.

Delete the following paragraph if there are no existing skylights.

## K. Existing Rooftop Components and Equipment

### L. Skylights:

1. Install sub-purlins over existing skylights.
2. Cut out existing skylights after sub-purlins are installed if new skylights are to be installed over existing skylights.
3. Trim openings as required.

M. When mechanical equipment locations conflict with retrofit roof sub-framing components, the contractor will provide additional framing that accommodates the relocation, replacement or re-flashing of the equipment. Contractor shall submit construction details for this condition, if deemed necessary by the Architect.

N. When electrical service and equipment that requires to be removed, extended and reinstalled at the new metal roof system height/plane, the contractor shall extend the wiring in accordance with the specified building and electrical code. Junction boxes shall be provided at splices in wire or conduits and secured as required.

O. Existing sanitary plumbing vents shall be extended with new roof jacks located at the new metal roof plane. Extension of piping shall be accomplished with materials matching the existing piping composition subject to local building and plumbing code requirements. Use of elbow fittings to redirect the pipe to locate the penetration between the metal roof panel side seams shall be used.



Roof Hugger, Inc  
P.O. Box 1027  
Odessa, FL 33556

P: 1-800-771-1711  
F: 1-877-202-2254  
[www.roofhugger.com](http://www.roofhugger.com)

# Product Guide Specifications

- P. Existing flue stacks for high temperature apparatus shall be extended to the new metal roof plane and protected with a high temperature jack or curb. The contractor shall install the new equipment 3 feet higher than the elevation of any roof in accordance with the governing building code.
- Q. Existing gravity vents, power vents, fresh air make-up, and other vents are to be installed on new metal curbs at the new metal roof plane unless approved by the Architect to remove and re-install on new metal roof. The contractor shall construct new ductwork from the existing roof penetration to the new roof curb. Ductwork joints shall be sealed tight to provide a leak-proof assembly and shall be made with material of like composition and gauge of the ductwork being extended.

**END OF SECTION**