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PRODUCT GUIDE SPECIFICATIONS

ROOF HUGGER RETROFIT SUB-FRAMING FOR RIBBED METAL ROOF PANELS

Specifier Notes: This metal-over-metal roof replacement sub-framing product's guide specification **must be carefully reviewed and edited by the architect, engineer or consultant to meet the requirements of the project and local building code; its use by the designer is discretionary.** Roof Hugger, LLC assumes no liability for the correct application or suitability of this information and expressly disclaims all liability for damages of any type arising from the use of or reference to this specification.

"Specifier Notes" are hidden text and are not intended to be printed as part of the final specification section. Carefully edit by deleting text that does not apply, and by editing or making choices where [bracketed text] gives one or more options.

This section covers standard "Roof Hugger" sub-purlins for retrofitting roofs, walls, and fascia over existing "Through-Fastened Metal Panels" and existing "Standing Seam Metal Panel systems" with either low clip or high/standoff clips. For existing "sine wave" type corrugated roofs with ribs less than 1.25" high, refer to the "Roof Hugger Corru-fit" specifications.

Roof Hugger recommends consulting a qualified design professional to determine the loads, a compliant roof panel and the proper sub-frame spacing. Framing is typically controlled by the chosen new metal roof system. To assist design professionals, Roof Hugger can perform a preliminary load estimate upon request (subject to final engineering confirmation by others). The new Roof Hugger sub-purlin type and spacing will be based on specified and/or required, snow loads, wind speeds and resulting loads, the existing roof purlin spacing, type of existing roof panel, and the tested maximum capacity of the proposed new roof panel. Different new roof systems may require different framing solutions.

Standing seam panels are known for their tendency to rumble in high winds if insulation is not used. Consult roof panel supplier for their specific recommendations. Consult Roof Hugger, if needed, for assistance in editing this section for the specific application.>

PART 1 - GENERAL

1.1 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 fabrication of retrofit roof sub-framing as indicated, in accordance with provisions of the Contract Documents.
- C. Completely coordinate work with other trades.
- D. Although such work is not specifically indicated, the contractor/installer shall coordinate with the metal roof system supplier to furnish and install supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.
- E. Reference Division 1 for General Requirements

1.2 RELATED WORK

<Specifier Notes: Edit or add to the following list of related sections as required for the project. List other sections (if any) with work directly related to this section.>

- A. Section 05 40 00 - Cold-Formed Metal Framing.
- B. Section 07 22 00 - Roof and Deck Insulation.
- C. Section 07 40 00 - Metal Roofing.
- D. Section 07 72 00 - Roof Accessories.
- E. Section 08 60 00 – Skylights.
- F. Section 13 34 19 - Pre-Engineered Structures (Metal Building Systems).
- G. Section 22 05 00 - Basic Mechanical Materials and Methods for Plumbing Piping.
- H. Section 23 31 00 Ventilation Ducts.
- I. Section 26 05 00 – Electrical Demolition and Modifications.

1.3 QUALITY ASSURANCE AND REFERENCES

<Specifier Notes: Verify reference publication title and date as applicable to local codes and practices. Delete references that do not apply to project.>

- A. ASTM International
 - 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, and Ultra-High Strength.
 - 3. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
- B. American Iron and Steel Institute (AISI)

1. AISI D100-13: Cold-Formed Steel Design Manual, [2013 Edition].
2. AISI S100-16: North American Specification for the Design of Cold-Formed Steel Structural Members, [2016 Edition].

C. American Institute of Steel Construction (AISC)

1. ANSI/AISC 360-16: - Specification for Structural Steel for Buildings, [2016 Edition].

D. 2015 Florida Product Approval FL9352-R3, FL17626

1. FL 9352.1 22 GA. 18" Wide 238-T over Roof Hugger Re-Roofing System
2. FL 9352.2 26 ga. PBR over Roof Hugger Re-Roofing System.
3. FL 9352.3 24 ga. PBR over Roof Huger Re-Roofing System.
4. FL 9352.4 22 ga. PBR over Roof Hugger Re-Roofing System.
5. FL 9352.5 Super Lok 16-24 over Roof Hugger Re-Roofing System.
6. FL 17626.1 24 GA. 18" Wide 238-T over Roof Hugger Re-Roofing System.
7. FM Project 3033681 McElroy 16"-22ga & 24ga 238-T over multiple Roof Hugger Re-Roofing Systems.

1.4 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittals.
- 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. "Standard" sub-purlins are typically produced 3/8inch – 1-1/2inch 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. Custom heights are available and can be specified.>

- 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.

1.5 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.

1.6 EXISTING ROOF SYSTEM AND PRE-CONSTRUCTION INSPECTION

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

<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 12inches o.c. major rib spacing x 1 ½inch major rib height, attached to existing zee-shaped purlins spaced 5feet o.c. supporting the metal panels]>

- B. Conduct a detailed inspection of the existing roof(s) to identify any existing roof elements that are a cause for concern such as: panel deterioration, structural deterioration, equipment curbs, plumbing and electrical penetrations, special flashing requirements, and any other items that should be submitted to the Architect [Engineer][Consultant] for review and evaluation.
- C. 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 high panel clips are existing, the standoff dimension must be determined.
- D. Record field measurements on the existing roof geometry including width, length, eave 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.

1.7 DESIGN REQUIREMENTS

A. General

- 1. Design for approval and installation in accordance with the Contract Documents, a complete retrofit sub-framing and metal roof panel assembly as a structural package.
- 2. Engineer and factory fabricate sub-framing system in accordance with applicable references.
- 3. Coordinate design with the retrofit sub-framing manufacturer and the metal roof panel manufacturer to perform as one engineered structural package where the metal roof system controls the placement of sub-framing members.
- 4. 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: Edit the following paragraph outlining the basic design criteria for the building to be retrofitted. This information, along with the building plans, will be the basis of design to determine the positive and negative pressures by roof zone. These zone pressures determine the type of roof panel and the spacing of the necessary sub-framing to support the panels. The most cost effective design will be one where the new panels achieve the current required loads in zones 1 and 2 on the existing purlin spacing. Different panels may require different sub-framing design solutions based upon the individual tested panel capacities. This information is typically placed in Division 1 General Requirements or Division 7 Thermal and Moisture Protection. The Engineering design criteria for retrofit metal roof panels and sub-framing should be consistent and in a format similar to the following:>

- 1. Building Code: [IBC 2021/ ASCE7-22, IBC 2018. /ASCE7-16, , IBC 2015/ASCE7-2010, FBC 2020, BOCA, Florida Building Code, Etc.]

<Specifier Notes: codes are Mutually Exclusive, specifier should confirm which code has been adopted by the State or local governing code body for the project, codes should not be mixed.

- 2. Additional Requirements: [None, Factory Mutual, Underwriters Lab, US Army Corps of Engineers Standard, Miami Dade, Texas Windstorm, Other]

<Specifier Notes: These criteria are Mutually Exclusive and can be significantly more stringent or in some cases less stringent than a specified building code. Determine if additional requirements are appropriate and should take precedence.

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 (Low Hazard), II (General), III (300+Occupancy), IV (Essential)]*.
5. Importance Factor: *[0.87, 1.0, 1.15] (IBC 2009 or earlier only)*
6. Minimum Roof Snow Load: *[XXX] PSF*.
7. Ground Snow Load: *[XXX] PSF*.
8. Wind Speed: *[XXX] MPH, 3 Second Gust. or [XXX] MPH, Ultimate Wind Speed*
9. Exposure Category: *[B, C, D]*.
10. Enclosure: *[Enclosed, Partially Enclosed, Open]*.
11. Analysis of Existing Purlin Capacities and Potential Increase from Retrofitting: *[I (Not Required), II (The existing purlin capacity is XX #/S.F. and XX #/S.F. is required), III (XXXXX Rooftop Equipment – is to be added and an additional XX #/S.F. of purlin capacity is required in the area specified)]*.

<Specifier Notes: Section 7, International Existing Building Code (IEBC) allows for the addition of a second layer of metal roofing provided the total weight of the framing system, roofing and accessories does not exceed 3 #/S.F. The typical total weight of a retrofit is between 1.5 – 2.5 #/S.F.>

<Specifier Notes: Should the existing roof purlin capacity be in question or additional equipment (IE: Photovoltaic panels) are to be added, upon request, Roof Hugger can do an analysis of the existing purlin capacity and determine any potential increase in capacity the Roof Hugger notched sub-purlins can provide. (Site visits and Primary frame analysis are excluded). Special “Purlin Analysis Form” is available upon request. >

PART 2 - PRODUCTS

2.1 MANUFACTURER QUALIFICATIONS

- A. Manufacturer shall have a minimum of five years’ experience in manufacturing and fabrication of retrofit sub-framing systems of this nature.
- B. 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.
- C. Acceptable Manufacturers
 1. Roof Hugger, LLC., PO Box 1560, Lutz, Florida 33548. Toll Free Phone (800) 771-1711. Toll Free Fax (877) 202-2254. Phone (813) 909-4424. Fax (813) 948-4742. Website: www.roofhugger.com. E-Mail: sales@roofhugger.com .

2. Other manufacturers must submit a request for approval prior to the established bid date according to applicable Division 1 Section(s) and shall be equal to Roof Hugger, LLC, demonstrated by 3rd party lab test data.

2.2 RETROFIT STEEL SUB-PURLINS

A. Standard Retrofit Factory-notched Sub-Purlins: "Roof Hugger".

B. Description:

1. 1-piece, custom-notched and punched, Z-shaped section.
2. Pre-punched to nest over existing through-fastened, low clip and high clip standing seam roof panel ribs for low-profile attachment.
3. Pre-punched for attachment fasteners.
4. Integrally formed Anti-Rotational Arm as required for high clip standing seam panels.
5. Fastens directly into existing purlins, joists or structural decking with fasteners.

C. Material:

<Specifier Notes: [Specify Yield Strength] Please note that the 50 KSI yield strength is critical to panel performance. All new purlin mounted roof panel systems are tested on 50 KSI steel. Panels attached to lower KSI steel, IE: 28-33KSI, will have test values below the new panel published values.>

1. Galvanized steel, ASTM A 653 or A 1011, G-90, yield strength 50 KSI.

<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, 0.60" min. thickness. Consult Roof Hugger for gauges other than 16-gauge for engineering values and lead time.>

2. Thickness: [0.060inch minimum, 16-Gauge] or [0.071inch minimum, 14-Gauge].

<Specifier Notes: Sub-purlins are typically produced 3/8 inch to 1-1/2 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.>

3. 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.>

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

D. Attachment Fasteners/Anchorage

<Specifier Notes: The following fasteners are typical minimum for attachment of new sub-purlins to existing metal building purlins. Fastener length of 1-1/4 to 1-1/2 inches is typical, but will vary with thickness of existing insulation. 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, decking) will require appropriate fasteners. Roof Hugger does not supply fasteners. Consult Roof Hugger for additional information regarding fasteners.>

1. "Standard" Roof Hugger Sub-Purlin:
 - a. Attachment to Existing Purlins/Joist: [Two- 1/4"-14 x 1-1/2", DP3, self- drilling screws, per L.F. or as specified] Decking: [Two- #14-13 x (Length as needed), DP1, self- drilling screws, per L.F. or as specified]
 - b. Existing Purlin Strengthening, Top Flange Lap Connection: [four- #10-16 x 1 inch] pancake head screws through overlapping sub-purlin top flanges, joining them into a continuous member, per lap connection or as specified.
 - c. Mid-Span Hugger Sub-Purlin to Sub-Rafter: [two, 1/4"-14 1 inch], DP3 self –drilling on each side of cutout and [one #10-16 x 1 inch] pancake head screw installed through sub-purlin top flange, into sub-rafter.
 - d. Mid-Span Hugger Sub-Purlin to Existing Panel: #17-14 fasteners shall be installed through the mid-span of sub-purlin into the existing roof panels as specified or per standard details (over-drilling of pre-punched hole will be required).
 - e. Fastener Length: As required to penetrate existing purlins in accordance with fastener attachment standards.
2. "Special" Roof Hugger Sub-Purlin w/ Anti-Rotational Arm:
 - a. Attachment to Existing Purlins/Joist: Typical 2-1/4"-14 x 2inches DP3 self-drilling fastener with 1inch standoff or as specified.
 - b. Attachment of Anti-Rotational Arm to Existing Panel: #17-14 fastener or as specified.
3. Integral Sub-Rafters beneath the rib cut out in the sub-purlin: ¼inch-14 threads per inch, DP3 self-drilling fasteners install through the sub-purlin, through the integral sub-rafter, through the existing panel and into the existing purlin, rafters or joist; quantity as specified by design (typically 4 per intersection).
4. Sub-Rafter Hat Channels for designated high load areas:
 - a. Attachment to Existing Purlins, Trusses, Rafters or Joist: 1/4"-14 threads per inch DP3 self-drilling screws.
 - b. Length as required for minimum required penetration into truss, rafter or joist.
5. Sub-Purlin Hat Channels: Attachment to installed sub-rafters: ¼ inch-14 threads per inch, DP3 self-drilling fasteners, quantity as specified.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine existing roof areas to receive sub-purlins. Notify Architect [Engineer][Consultant] 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 the standing seam panels have been installed using low clips (typically hold panel +/- 3/8" off purlins) or tall-standoff clips (typically hold panel +/- 1" – 1-1/2" off purlins). If tall clips have been utilized 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 for the most current application details.>

3.2 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 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.

<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 www.roofwinddesigner.com >

- E. If integral sub-rafters are used, 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] [applicable 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 [1/4"-14 DP3 screws] [fasteners shown on engineered Drawings] through the base flange of the sub-purlin, through the sub-rafter and then into the existing purlins being careful to maintain the alignment of the sub-rafters.

- G. Install sub-purlins onto the integral sub-rafter between the existing purlins as specified with 1/4"-14 threads per inch, DP3 fasteners, typically one fastener on each side of the sub-rafter unless otherwise specified.
- H. Where the sub-purlin 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 sub-purlin passes over the fitted sub-rafter, fasten through the top flange of the sub-purlin with a #10-16 pancake head fastener into the top of the fitted sub-rafter.

<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: 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: Do not remove old skylights unless required. 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. Skylights:
 1. Existing skylights are a fall hazard, protect as needed.
 2. Install sub-purlins over existing skylights prior to removal of the old skylight.
 3. Modify existing skylights according to provisions of Section 08 60 00.
 4. Seal gap between existing metal roof and new metal roof with sheet metal trim to prevent air infiltration into the newly created roof cavity.
- L. Existing Rooftop Components and Equipment
 1. 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. Submit construction details for this condition to the [Architect \[Engineer\]\[Consultant\]](#).
 2. When electrical service and equipment needs to be removed, extended and reinstalled at the new metal roof system height/plane, extend the wiring in accordance with the Section 26 05 00, local building and electrical codes.
 3. Comply with provisions Section 07 40 00, Section 22 05 00 and local building codes for extending, relocating and flashing vent pipes.
 4. Comply with provisions Section 07 40 00, Section 23 31 00 and local building codes for extending, relocating ducts and curbs.
- M. New Equipment within the New Roof Cavity
 1. Review all clearances, attachment requirements, penetrations, and other critical details as necessary for the proper installation of any equipment to be installed within the new roof cavity.

2. Obstructions with new sub-purlins shall be avoided. If cutting of sub-purlins is necessary, a continuous top flange must be provided to provide continuous bearing for the new metal roof system.

END OF SECTION