



# HIDDEN FASTENER DETAIL MANUAL



(888) 393-0335 | [www.gulfcoastsupply.com](http://www.gulfcoastsupply.com)



# About this Manual



## What's in this manual? It's 50 pages long...do I actually need to read it? What is this document for?

All fair questions. We hope this manual will be useful if you are curious about any of these questions.

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What kind of products does Gulf Coast have? What metal and color choices are available?  
See **Product Selection** (see page 3).

What should I be thinking about when I am designing or specifying a metal roof (as a property owner, a designer, and/or an installer)? What are some important considerations to keep in mind?  
See **Roof System Design** (see page 5).

How does a metal roof get installed? Can I do this myself? See **Installation** (see page 8).

How can I figure out how much material I need (and how much will it cost)? See **Estimating Materials** (see page 11).

What about trim? What kind of trim do I need and how is it installed? See **Trim Details** (see page 13).

How many fasteners do I need? What spacing should I use? How can I be sure my roof won't blow away?  
See **Load Tables** (see page 17).

What about building codes? See **Appendix B** (see page 33).

What is the HVHZ, and what do I need to know about it? Short answer: if you're not in Miami-Dade or Broward counties in Florida, you can ignore this. If you are working those two counties, see **Appendix C** (see page 36).

Even with 50 pages, it's just not possible to fit everything in one manual. Please check out our website at [www.gulfcoastsupply.com](http://www.gulfcoastsupply.com) for more information on panel profiles, colors, product approvals, project photos, and more. Or give us a call at (888) 393-0335.

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Gulf Coast Supply & Manufacturing reserves the right to change or delete information contained herein without prior notice or obligation to make changes to products previously purchased. Check [www.gulfcoastsupply.com](http://www.gulfcoastsupply.com) or contact Gulf Coast Supply for the latest version.

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# Product Selection

## Product Lineup

Gulf Coast Supply & Manufacturing produces the following hidden fastener (commonly referred to as standing seam) panels:



GulfLok™ is a nailstrip panel, which is a snap-lock, clip-less system. GulfLok™ has a 1" tall (nominal) seam or rib on a typically 16" coverage panel. The nailstrip design provides slots for fasteners and eliminates the need for clips. As a snap-lock panel, the system does not require any special seaming tools, making GulfLok™ a popular choice for residential markets and light commercial projects.



GulfSeam™ is a snap-lock, clip system. Similar to the GulfLok™, the snap-lock system does not require any special seaming equipment. The clip system gives more options to float out imperfections in the roof substrate. GulfSeam has a 1¾" tall seam and typically a 16" coverage. The seam is a thicker, bolder seam, making the panel most suitable for upscale residential and commercial projects.



VersaLoc™ and MegaLoc™ are mechanically seamed panels and require specific tools and equipment to seam together. This seaming process gives superior strength and weathertightness, at the cost of additional complexity of installation. The superior performance of these mechanically seamed systems make them the right choice for any project where strength and weathertightness are critical. Typically, these panels are installed on commercial projects, particularly metal buildings. VersaLoc™ has a 1½" tall seam, while MegaLoc™ has a 2" tall seam. Both panels are typically produced with a 16" coverage.

Most profiles are available with striations, mini-ribs, or flat. To reduce the risk and visibility of oil canning, striations are recommended in most cases.

## Panel Materials

Gulf Coast Supply produces roofing panels in 55% aluminum-zinc alloy coated 29ga, 26ga, and 24ga steel. Some panels are also available in 0.032 and 0.040 aluminum as well as stainless steel and pure copper. Depending on the project specifics, additional materials may be used for limited production runs.

## Paint Options

Most panels are offered in three paint options. The Kynar®<sup>1</sup> Fluoropon® 70% polyvinylidene fluoride (PVDF) is the highest performing paint available, with superior UV resistance and outstanding color retention. The PVDF resin provides excellent chalk resistance while mostly ceramic pigments hold color well over time. The silicone modified

<sup>1</sup> Kynar and Kynar500 are registered trademarks of Arkema Inc. Fluoropon is a registered trademark of The Valspar Corporation. Galvalume is a registered trademark of BIEC International Inc.



polyester (SMP) chemistry has improved vastly over the years, but still lags the PVDF resins in chalk and color performance. SMP paints are harder and can offer more scratch/abrasion resistance, but the hardness can also make them brittle. Finally, a mill-finish, bare/unpainted steel is available with an acrylic finish. The mill finish metal has a hot dip AZ55 aluminum-zinc coating (generally superior to galvanization and sometimes referenced by the tradename Galvalume®). Note that the mill finish will oxidize and darken over time and may not occur evenly. The mill finish is also susceptible to smudges or other markings during installation.

## **Warranties**

Gulf Coast Supply & Manufacturing offers warranties for both corrosion of the base metal, as well as paint performance (chipping/peeling/cracking, chalking, and fading). Please refer to [www.gulfcoastsupply.com](http://www.gulfcoastsupply.com) or contact a sales representative (888-393-0335) for the most recent warranty information.

## **Life-Cycle Costs**

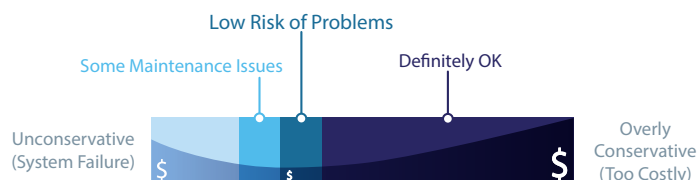
A common objection to metal roofing is the perception that it is more expensive. This is really only a high “initial cost” — when considered over the life of the facility, the total “life-cycle cost” of metal is often lower than other roof options. The life-cycle cost considers the total expected cost to maintain and repair a building system over the entire life of the building. For example, a shingle roof might be expected to last 20 years while a metal roof may be expected to last 40 years. This means the property owner would have to purchase two shingle roofs but only one metal roof over a 40-year period. When considering life-cycle costs, the durability of metal roofing often results in a lower total cost of ownership than shingles, despite a higher initial cost. See the “Metal vs Shingles” page at [www.gulfcoastsupply.com](http://www.gulfcoastsupply.com), which links to an ongoing study that projects 60-year life expectancies for some metal roofs.

# Roof System Design

## Design Philosophy

The instructions and details presented in this manual are the manufacturer's recommendation for a quality installation of metal roofing products produced by Gulf Coast Supply & Manufacturing. The manufacturer recognizes there are multiple acceptable methods of installation and that design and construction practices can vary widely by contractor, designer or locale. Furthermore, the recommendations contained herein are intended for a typical roof; the specifics of any installation may drive different requirements.

The design of a facility falls along a spectrum which must balance cost and risk. An attempt to completely eliminate risk would result in a cost-prohibitive design that is overly conservative (refer to image). On the other hand, a design which accepts too much risk may fail and cause property damage, serious injury, or death. **It is the responsibility of the designer to specify a design which establishes a balance between cost and risk that is acceptable for the intended facility use.** Even an outstanding design will still require some maintenance and/or repair throughout the lifespan of the facility.



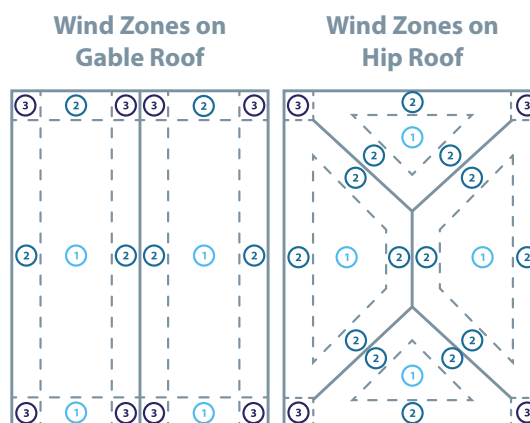
The minimum standards in this manual provide a low cost, generally low-risk installation. Recommended components or design standards will further reduce the risk of water intrusion, wind damage, or other maintenance/repair needs.

## Water Tightness:

- Pipes and other penetrations are common areas for leaks to develop. When these penetrations are necessary, take extra care to flash and seal properly.
- Installing the proper trim items and panel closure strips will reduce the risk of water intrusion at roof edges and transitions, which are high-risk areas for leaks to develop.
- Use of a quality underlayment on the decking beneath the metal panels provides an important secondary water barrier. Underlayment is required by code in many areas, and Gulf Coast Supply recommends it in most scenarios. Generally speaking, a synthetic self-adhering (peel and stick) underlayment provides the highest level of protection, synthetic through-fastened underlayment provides a mid-level water barrier, and asphalt roofing felt provides the minimum performance required by code (when applicable).
- Gulf Coast Supply highly recommends use of full length panels that run from ridge to eave in order to eliminate end laps (another common source of leaks).
- Exposed fastener panels (panels fastened directly through the panel) will have hundreds of holes where the fasteners are installed. The use of properly installed roofing screws with sealing washers should effectively seal these penetrations. A hidden fastener system (sometimes referred to as a standing seam roof) can virtually eliminate the risk of water intrusion at the fastener.
- Metal on metal connections are typically not watertight unless a sealant (butyl tape or caulk) is applied between the metal pieces. Therefore, it is critical that sealant be used when watertight connections are required. Some examples of metal on metal connections are panels attached to trim, trim attached to trim, and panels attached to panels.

## Wind Performance:

- The wind load which a roof experiences is based on location and dimensions of the building. Discontinuities, or areas where the roof changes direction/slope, will be exposed to higher pressures than the field of the roof. Typically roof pressures are described in three zones: zone 3 consists of corners, zone 2 includes edges (ridges, eaves, & gables), and zone 1 represents the field.
- In most cases, exposed fastener roof systems fail when the fasteners pull out from the decking. Therefore, ensuring proper installation of fasteners is critical to achieve the desired wind performance. Gulf Coast Supply provides load tables which indicate the required fastener spacing for each roof zone in different wind speeds.
- Roofs are typically designed primarily for “uplift” loads—the effect of a strong wind will essentially pull the roof upwards. Therefore, it is important to think of wind performance as a continuous “load path.” When the wind pulls upward on a roof, that force is transmitted by fasteners to the roof deck, which transfers the force by fasteners to the rafters/roof structure, which further transmits to the walls, and on to the foundation. The weakest link along the load path will cause the system to fail, even if all other components perform satisfactorily. A metal roof panel may be able to resist hurricane force winds, but if the fasteners have been overtightened and stripped out the plywood decking, the system may not perform as desired. Structural assessment and design can be a complicated endeavor, and the services of a qualified entity may be helpful/necessary.



## Oil Canning:

- Oil canning is a visible waviness in the flat areas of a roofing panel. It is an intrinsic aspect of cold formed, light gauge metal panels but is typically an aesthetic issue only. **Oil canning is not a defect and is not a reason for rejection.**
- The risk of oil canning can be reduced by selecting heavier gauge metals, specifying striations (large, flat areas are most prone to oil canning), ensuring a completely flat/square/level deck (deck imperfections will reflect through the panels), properly driving fasteners (over driving creates stresses in the panel), and ensuring proper handling and storage during construction (twisting/bending panels will introduce internal stresses).

## Dissimilar Metals & Galvanic Corrosion

Dissimilar metals in contact are at risk for galvanic corrosion. To avoid this, a roof system must be properly designed and specified to ensure that dissimilar metals are not in contact with roof panels or located upstream<sup>2</sup> of roof panels. Copper and lead present a particularly high risk of galvanic corrosion, and materials containing copper and/or lead must not be installed in contact or upstream<sup>2</sup> of metal roof panels. Damage due to galvanic corrosion is NOT covered by warranties. Note that most treated lumber contains copper-based substances—metal roof panels installed in contact or downstream from treated lumber are at increased risk of galvanic corrosion and rust-staining.

<sup>2</sup> Since virtually all metals will leach some particles into rainwater, any case of dissimilar metal installed such that rain runoff will travel from the dissimilar metal before contacting a metal roof panel is considered “upstream,” and presents an increased risk of galvanic corrosion and rust staining.

## Roof Slope/Pitch

All Gulf Coast Supply roofing panels can be installed on slopes of 3:12 and greater (3" of vertical rise/drop for every 12" of horizontal run). For low slope installation below 3:12, please contact Gulf Coast Supply. Most panels can be installed to 1:12 slope if the side laps are sealed, and even lower slopes may be permitted on a case-by-case basis.

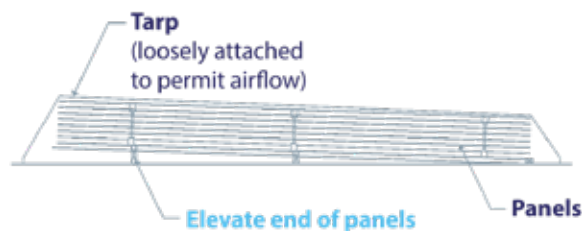


Determining Roof Pitch/Slope

# Installation

## Storage and Handling

Metal roofing panels are designed to *shed* water, not to *hold* water for an extended period of time. Thus, it is important to store panels dry—position a stack of panels away from standing water, elevate one end to allow water drainage, and cover loosely with a tarp as shown in the image. Storing panels under cover or indoors is recommended. Panels must NOT be stored in vicinity of: saltwater, corrosive chemicals, pressure treated lumber, fertilizer, or other chemicals. When handling panels, be sure to support the panel to avoid damage from bending of the panel. In general, no more than 1/3 of the length of a panel should be unsupported.



## Preparing the Roof Deck

In most cases, the rafters or roof trusses will be covered with a sheathing material (plywood, OSB, etc.) which is then covered with underlayment. The design and construction of the roof structure and decking is outside the scope of this document. However, it is important to note that a poorly prepared roof deck will likely result in a poorly installed metal roof. The roof panels will generally match the shape of the roof deck—if there are ridges in the underlayment, uneven decking or other high areas, these imperfections will likely show through the metal panels.

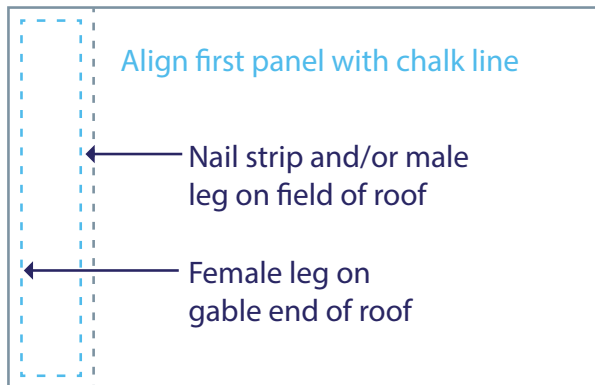
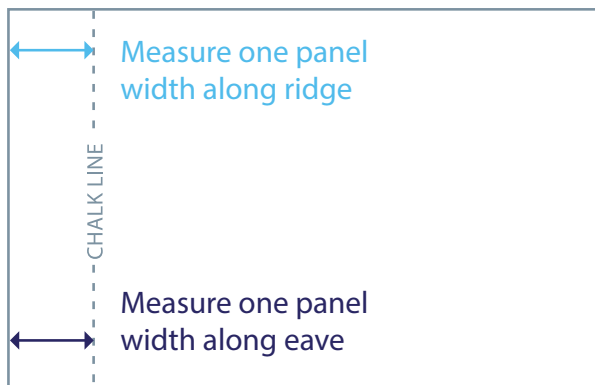
## Order of Installation

Typically, eave drip, valley trim, and transition trim are installed with the underlayment. Metal panels are installed next. Finally, ridge/hip caps, gable trim, and end/side wall trim are installed last. (Note that not all trims will be required in all cases.)

## Installing Metal Panels

Install the first panel with the overlap side along the gable. It is common to measure one panel width along the ridge and the eave, and to chalk a line between these points. (See images) Aligning the panel edge with this line will help set the first panel. **It is extremely important to set the first panel square; any deviation will ripple across all of the remaining panels.**

Typically, the first panel is attached **on the gable end** by driving fasteners through the panel directly to the deck. (This portion of the panel is then covered with Z-flashing and gable rake.) The other end of the panel will receive a clip or will be fastened through the nail strip.





## Installing GulfLok™ (snaplock, clipless system or nail strip)

GulfLok™ installation begins as described above. The first panel is fastened to the gable end by driving fasteners through the panel near the female leg (opposite the nail strip edge). Next, the other side of the first panel is fastened through the nail strip. The next panel is snapped on by pressing the female leg of the next panel onto the male leg of the previous panel. Firm pressure is required to make this snap. The use of a white rubber mallet may be helpful but should be used with care. (Black rubber is more likely to mark the panels.) Once the panel is snapped, the opposite end is fastened through the nail strip. Continue this pattern across the roof section. Refer to the product approvals and the load tables in this document for fastener spacing and other special fastener requirements.

The process of snapping and unsnapping the panels may cause permanent deformation of the outside edge of the female leg. It is recommended that the panels be snapped in place only one time. However, if the project requires it, the panels can typically be pried apart with a flat head screwdriver or claw hammer.

Some installations require a Titebond sealant (or similar) in the seam. This provides extra watertightness performance, but also acts as an adhesive. The sealant should be applied to the inside of the peak of the female leg prior to installation of the panel. Once set, the panels may be very difficult to separate.

## Installing GulfSeam™ (snaplock, clip system)

GulfSeam™ installation begins as described above. The first panel is fastened to the gable end by driving fasteners through the panel near the female leg (opposite the nail strip edge). Next, the male rib on the other side of the first panel is held down with clips. The clips are fastened to the roof deck with two or more low profile/pancake fasteners. The female leg for the next panel is snapped onto the first panel, clips installed, next panel snapped, and so forth. Continue this pattern across the roof section. Refer to the product approvals and the load tables in this document for clip spacing.

## Installing VersaLoc™ and MegaLoc™ (mechanical seam)

VersaLoc™ and MegaLoc™ require the use of clips and special seaming tools. Typically, hand seamers are used to begin the seam, and a mechanical seamer can complete the seam. Gulf Coast is proud to partner with DI Seamers to provide mechanical seamers tailor built for Gulf Coast panels. Please see Appendix E for a copy of DI Seamer's instruction manual and see <http://gulfcoastsupply.diroofseamers.com/> for more information. Refer to the product approvals and the load tables in this document for fastener spacing

## Fastening Nailstrip Panels and Clips

**Correct installation of fasteners is critical to ensure performance of the roof.** Overtightening can strip out the substrate, reducing the fastener pullout/withdrawal performance. Overtightening a nail strip panel can over-engage the panel and create a waviness the nail strip.

Use drill/drivers, screw guns or similar tools with maximum RPM of 2,500. Depth-sensing nose pieces are recommended to ensure consistent tightening of fasteners. Impact drivers are not recommended as they may overdrive or damage the fastener.

Install the number and spacing of clips and fasteners as required by the load tables contained in the product approvals and this document.

**Remove any metal shavings/fragments. Failure to brush off or otherwise remove all of these metal shavings will result in rusting.**

## Field Cutting Metal Panels

Tin snips or electric nibbler/shear tools are recommended for field cutting panels. Cutting a metal panel with any device will create small slivers of metal that must be removed from the panel to avoid rusting or damage to the panel. **The use of circular saws or other abrasive cutting tools is not recommended** as these tools will create significant heat which can burn the panel coating and may produce tiny, hot metal particles which can become embedded in the panel finish. Both of these conditions are likely to result in premature rust and corrosion of the panels.

## Care and Maintenance

Gulf Coast Supply recommends that a metal roof be assessed annually to check for any damage or deterioration. This can be done from the ground in most cases (binoculars may be helpful). Consider visually assessing the following items:

- a. Look for water stains both outside and inside the building (if possible) that may indicate a leak.
- b. Check for missing, loose, or deteriorated fasteners. Thermal expansion and contraction of the metal, foot traffic, and wind-induced movement may back fasteners out or otherwise compromise the fastener performance. Overtightened/over torqued fasteners are especially susceptible to back out over time. Tighten or replace fasteners as needed.
- c. Assess condition of any visible sealant. Metal roof longevity studies indicate that sealants are often the first component to fail. Replace cracked or peeling sealant.

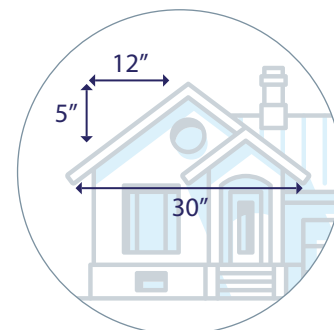
Remove loose debris and clean the roof as needed. Mild biodegradable cleaners, household ammonia, or household bleach may be used when necessary (dilute ½ cup of 5% bleach in 1 gallon of water). Consult the warranty information or contact the manufacturer for more information on your specific system.

# Estimating Materials

## Panel Length

Panel lengths can be determined by measuring the distance from ridge to eave, or estimated via the following method:

Divide the building width in half and multiply by the appropriate slope factor shown. Add 1'-3" as desired to hem the panel ends at the eave and take off ½" to 2" gap at the ridge (if desired). For example, a 30' wide building at a 5/12 slope would be: 30' divided by 2 is 15', times 1.083 is 16'-3" (round to nearest inch). Add 2" for hem and subtract 1" for a gap at the ridge for a final panel length of 16'-4".



## Number of Panels

Each panel has a specified "coverage." The actual panel width will be greater than the coverage, however part of each panel will be overlapped by the adjacent panels, so the net exposed width is the coverage. To determine how many panels will be required, divide the eave or ridge length by the coverage. Round up to the nearest whole number. For example, a 30'-6" ridge length with GulfLok™ panels (16" coverage) would need: 30'-6" divided by 16" for 22.875 panels, which is rounded up to 23 panels. It is often a good idea to order one or more extra panels at the longest length on the job.

Roof Slope	Slope Factor
1/12	1.003
2/12	1.014
3/12	1.031
4/12	1.054
5/12	1.083
6/12	1.118
8/12	1.202
10/12	1.302
12/12	1.414

## Number of Fasteners

The number of fasteners and clips depends on the panel selected and the fastener or clip spacing. The table below can be used to determine the number of fasteners by multiplying the square feet or linear feet by the factor shown. For example, consider a 5000-square foot roof with a GulfSeam™ panel using clips at 18" on center. This is pattern A18 for GulfSeam™, and will require 5000 square feet times 0.9 clips which gives 4500 clips. Clips are typically sold individually, while most fasteners are sold in bags of 250. Fasteners will likely also be used for some trim items (Z-flashing, panel starters, etc), and it is a good idea to order 10-15% extra fasteners just in case.

Panel Type	Fastener Pattern	Clip Spacing (o.c.)	Clips per sq. ft.	Clips per lin. ft.	Fasteners per sq. ft.	Fasteners per lin. ft.
GulfLok™ Pattern A	1 fastener in every hole	N/A	N/A	N/A	3.2	2.4
GulfLok™ Pattern B	1 fastener in every hole + caulk	N/A	N/A	N/A	3.2	2.4
GulfLok™ Pattern C	1 fastener in every hole + clip	N/A	N/A	N/A	3.2	2.4
GulfLok™ Pattern E	1 fastener in every other hole	N/A	N/A	N/A	1.6	1.2
GulfSeam™ Pattern A24	2 fasteners per clip, 16" panel	24"	0.7	0.5	0.8	1.0
GulfSeam™ Pattern A18	2 fasteners per clip, 16" panel	18"	0.9	0.7	1.0	1.3
GulfSeam™ Pattern A12	2 fasteners per clip, 16" panel	12"	1.3	1.0	1.5	2.0
GulfSeam™ Pattern A6	2 fasteners per clip, 16" panel	6"	2.7	2.0	3.0	4.0
Versa/MegaLoc™ Pattern D60	2 fasteners per clip, 16" panel	60"	0.3	0.2	0.3	0.4
Versa/MegaLoc™ Pattern D48	2 fasteners per clip, 16" panel	48"	0.3	0.3	0.4	0.5
Versa/MegaLoc™ Pattern D36	2 fasteners per clip, 16" panel	36"	0.4	0.3	0.5	0.7
Versa/MegaLoc™ Pattern D24	2 fasteners per clip, 16" panel	24"	0.7	0.5	0.8	1.0
Versa/MegaLoc™ Pattern S16/D16	2 fasteners per clip, 16" panel	16"	1.0	0.8	1.1	1.5
Versa/MegaLoc™ Pattern D12	2 fasteners per clip, 16" panel	12"	1.3	1.0	1.5	2.0
Versa/MegaLoc™ Pattern D12+	2 fasteners per clip, 16" panel	12"	1.3	1.0	2.3	3.0
Versa/MegaLoc™ Pattern S8/D8	2 fasteners per clip, 16" panel	8"	2.0	1.5	2.3	3.0

For estimates, the rough factors below can be used to calculate approximate clip and fastener requirements.

Panel Type	Clips per sq. ft.	Clips per lin. ft.	Fasteners per sq. ft.	Fasteners per lin. ft.
26ga GulfLok™	N/A	N/A	3.3	2.5
24ga GulfLok™	N/A	N/A	1.9	1.4
GulfSeam™	1.1	0.8	2.1	1.6
Versa/MegaLoc™	1.1	0.8	2.1	1.6
Notes: Sq. ft. values assume 16" panel. GulfSeam™ and Versa/MegaLoc™ clip spacing may vary widely—use these factors with caution.				

## Number of Trim Pieces

Most trims are sold in 10' lengths. To calculate the number trim pieces required, measure each ridge, valley, eave, gable, etc., and divide the measurement by 10'. See the trim details later in this manual for more information on trims. Note that most trims require a minimum overlap of 4".

## QuickQuote™ Service

Gulf Coast Supply is pleased to offer free of charge a QuickQuote™ service which can create a detailed estimate of the panel and trim requirements for any roof requirements. This estimate can be created from satellite imagery (if available), blueprints/drawings, or even a simple sketch with dimensions. Contact Gulf Coast Supply for more details about this service.

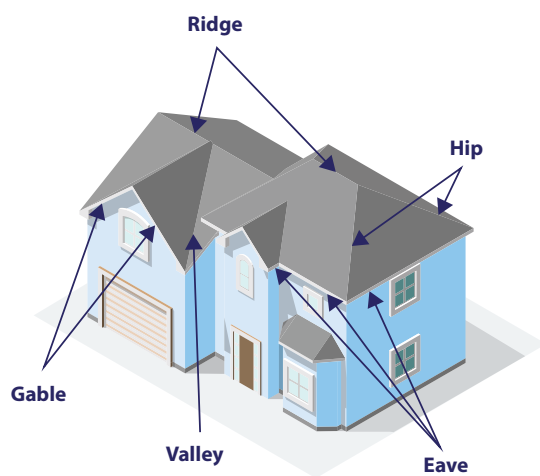
# Trim Details

Metal trim (referred to interchangeably as trim or flashing) is a critical component to provide a watertight roofing system and is required by code in specific areas. Flashing/trim consists primarily of specifically formed metal pieces to provide watertight details around corners, edges, penetrations, and other areas of the roof which are likely to leak. Some building codes may require more stringent or different standards than those contained herein—the more stringent requirement always takes precedence. **Consult the applicable building code for each project to ensure code compliance.** Gulf Coast Supply maintains a number of Florida Product Approvals (FPAs) that indicate code compliance with the Florida Building Code (FBC)<sup>3</sup> and the High Velocity Hurricane Zone (HVHZ, defined as Miami-Dade and Broward counties)<sup>4</sup>. These products must be installed per the requirements of the FPA and this detail manual.

Because intended uses of a structure and the design thereof will vary widely, it is not possible to prescribe a single standard that is suitable in every situation. Therefore, the owner, designer, and installer must develop and agree on the appropriate details and specifications to employ. For example, consider an unoccupied, 100 square-foot shed that is not located in a hurricane prone region. A much lower quality roofing system may be acceptable and appropriate for this use. Conversely, a large multiple story, multiple family residence on the beach in south Florida will have a much greater requirement for watertightness, structural performance, and resistance to wind driven rain.

The details and commentary in the following pages are intended to provide a baseline, minimum standard that is acceptable for a low-end application (e.g. the shed described above). It is ultimately the owner's responsibility (often delegated via contract to a designer and/or installer) to determine and select the details and specifications that are appropriate for each project. **As the requirements of each project will vary, Gulf Coast does not warrant the fitness or suitability of any details or design for any specific project.**<sup>5</sup> Gulf Coast Supply may provide advice on design and details; however this is strictly limited to a manufacturer's recommendation, and does not guarantee code compliance or fitness for use with a specific project. The services of a design professional should be employed if this is required.

## Common Trim Locations



<sup>3</sup> Refer to Appendix B for FBC excerpts.

<sup>4</sup> Note that the HVHZ has certain specific standards which are mandated by the FBC. These standards are summarized in Appendix C, but the FBC should be consulted as required to ensure compliance.

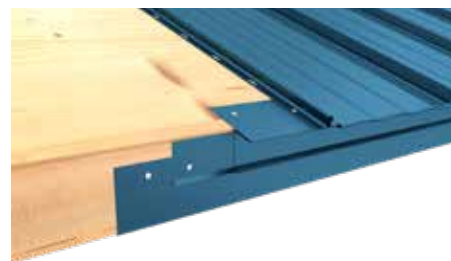
<sup>5</sup> The one notable exception is the weathertightness warranty program, which may warrant the weathertight performance of a roofing system under specific circumstances.



## Eaves

The bottom edge of the roof, or the eave, is protected with eave drip to provide a continuous metal surface for water to runoff from the roof to the ground. Fascia trim is recommended below the eave drip to fully cover the structural member. Except in unique cases, eave drip is installed before the panels.

- The panel end must be hemmed onto the extended eave drip. If a flat eave drip is used (no extended eave or bullnose), install a panel starter and hem the panel end onto the panel starter.
- 4" end lap (minimum). Sealant (caulk or butyl tape) to seal laps is recommended, but not required.
- Fasten into roof deck with low profile fastener (or other suitable fastener).
- Restraint of the exposed vertical face is not required for faces less than 4". If desired, attach with an eave cleat installed prior to the eave drip, or fasten through the exposed face using fasteners with sealing washers.



## Ridges

The top of the roof, or the ridge, is made watertight with a ridge cap. There are a variety of styles, sizes, and method of attachment, but the concept is the same. Butyl tape (or sealant) and foam closures are recommended to provide watertightness and protect against wind driven rain. Ventilated closures are available for most panels and should be used if ventilation is desired.

- 4" end lap (minimum). Sealant (caulk or butyl) to seal the laps is recommended, but not required.
- Slide open hem of ridge cap onto previously installed Z flashing.
- Z flashing must be cut or notched to fit between the panel ribs and must be sealed to the panel flat and the ribs with appropriate sealants. The gap between the panel rib and the Z flashing should be less than 1/8" and must be filled with sealant. Attach ridge cap to Z flashing with rivets as required.
- Box out the ends of the ridge cap.
- For extra watertightness performance, the panel ends underneath the ridge may be turned up and sealed to the ribs.

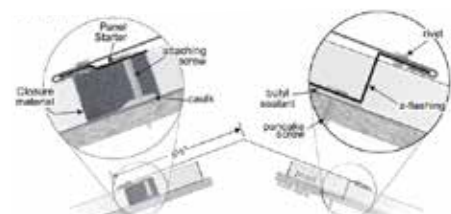


Fig. 11 Ridge caps can be sealed as vented (using panel starter and vent material) or sealed using a flashing, as shown also in Fig. 12.

## Hips

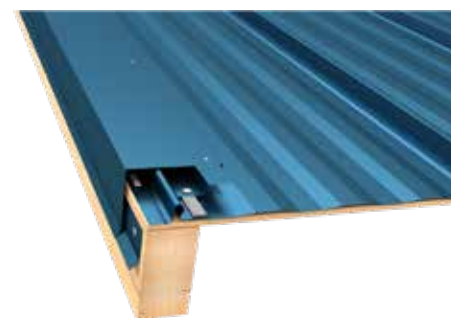
Hips are similar to ridges, in that it is a high point where panels meet. Where hips differ is that a hip is sloped while a ridge typically maintains a constant elevation. Hips are made watertight with ridge cap as described and shown above, with the following additional notes:

- Install from eave to ridge (bottom to top) so that runoff does not feed into an overlap.

## Gables

The open sides of a roof, or gable ends, are protected with gable trim. There is a variety of styles, sizes, and methods of attachments, but two primary designs. Use butyl tape and other sealants as required to ensure a watertight seal between the roof panel and the trim. Fascia is recommended to fully protect the structural member.

- 4" end lap (minimum). Sealant (caulk or butyl) to seal the laps is recommended, but not required.
- Install from eave to ridge (bottom to top) so that runoff does not feed



into an overlap.

- Slide open hem of gable rake onto previously installed Z flashing and gable cleat.
- Z flashing must be sealed to the panel flat with appropriate sealants. Attach gable rake to Z flashing with rivets as required.
- Box out the bottom end of the gable.

## Valleys

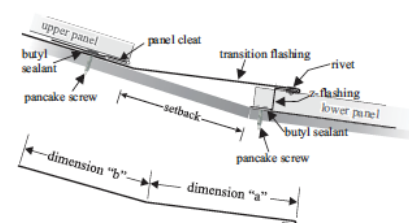
Valleys are low points where two slopes meet. Valleys are high risk areas for leaks and must be carefully flashed and installed. Valley trim is installed before the panels so that the panels can overlap and provide an uninterrupted drainage plane.

- Panel end must be hemmed onto a panel starter that is installed in the valley. Install butyl (or other suitable sealant) between the panel starter and the valley.
- 12" end lap (minimum). Sealant (caulk or butyl tape) to seal the laps is required.
- Install from eave to ridge (bottom to top) so that runoff does not feed into an overlap.
- The valley should be designed to keep the depth of water from the design rain storm from flooding the ribs.



## Transitions

Some roof designs will include roof sections at different slopes. Where these slope changes occur, install a transition trim. Working from bottom to top, install the lower panels, Z-flashing on the lower panels, then the transition trim. Next, install a panel starter on the top edge of the transition, and install the upper panels. The transition trim will overlap the lower panels and underlap the upper panels to provide a continuous drainage path. Use of butyl tape (or sealant) and foam closures is recommended to provide a watertight connection and to protect against wind driven rain. The upper panels are installed over the transition trim to complete the uninterrupted drainage plane.



A gambrel style roof may change slopes several times, with steeper slopes on the lower sections of the roof. Install gambrel flashing in the same manner as a typical transition trim.

- 4" end lap (minimum). Sealant (caulk or butyl tape) to seal the laps is recommended but not required.
- The top panel into a transition must be hemmed onto a panel starter installed in the transition trim itself. Install butyl (or other sealant) between the panel starter and the transition.
- Slide open hem of bottom edge of transition onto previously installed Z flashing.
- Z flashing must be cut or notched to fit between the panel ribs and must be sealed to the panel flat and the ribs with appropriate sealants. The gap between the panel rib and the Z flashing should be less than 1/8" and must be filled with sealant. Attach transition to Z flashing with rivets as required.
- Install from eave to ridge (bottom to top) so that runoff does not feed into an overlap.

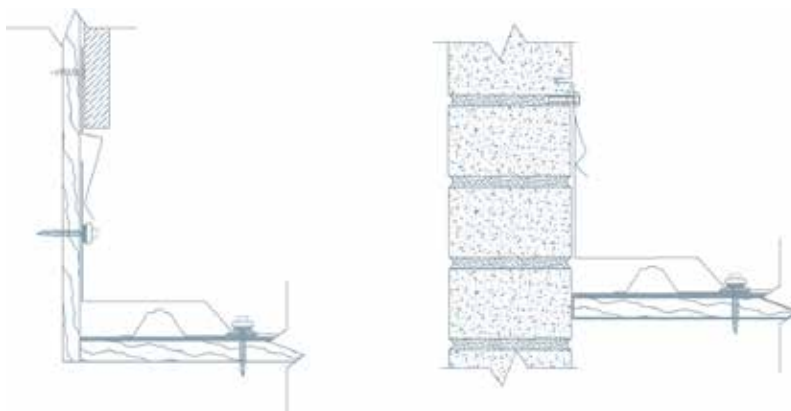
## Walls

Where the peak of a roof section meets a wall instead of a ridge, an end wall trim is used. As with most trims, many different styles, sizes, and methods can be employed. The use of butyl tape (or sealant) and foam closures is recommended to provide a watertight system and to protect against wind driven rain.



Similar to the end wall trim, when the side of a roof section meets a wall instead of a hip or a gable, a side wall trim is used. Side wall trim is installed similarly to the end wall.

- 4" end lap (minimum). Sealant (caulk or butyl tape) to seal the laps is recommended but not required.
- Both end and side wall trims are attached to Z flashings which have been previously installed.
- Z flashing must be cut or notched to fit between the panel ribs and must be sealed to the panel flat and the ribs with appropriate sealants. The gap between the panel rib and the Z flashing should be less than 1/8" and must be filled with sealant. Attach transition to Z flashing with rivets as required.
- Install from eave to ridge (bottom to top) so that runoff does not feed into an overlap.
- There are a number of wall flashing options—two additional methods are shown to the right.



## Roof Penetrations

Since penetrations are literally holes in the roof, and since holes in the roof cause leaks, it is of critical importance that all penetrations be properly flashed and sealed. Pipe boots are recommended for pipes (e.g. vent stacks) and should be installed as shown. Install pipe boots with a continuous bead of sealant and fasteners every 1" or more as needed to ensure a complete seal. Whenever possible, locate pipe boots in the flat of a panel, not on the rib. Skylights and chimneys are installed with a combination of end wall and side wall trims. Large penetrations (greater than 30" in width) typically require a structure called a cricket to divert water around the penetration.



1 Choose pipe opening and trim



2 Slide over pipe



3 Form to roof profile



4 Apply sealant



5 Fasten to complete

## Panel Laps

Gulf Coast recommends using full length panels, with a single panel running from ridge to eave. When this is not possible, the ends must be lapped a minimum of 12" and sealed completely with sealant or butyl tape.

# Load Tables

Gulf Coast Supply maintains load tables for each product in various installation conditions. These load tables indicate the fastening requirements for the roof zones and wind speeds shown. Because building design and site considerations impact the wind load and response characteristics, these tables only consider a generic “typical” installation. These tables ONLY APPLY when the indicated requirements are met. Refer to each load table for the specific requirements.

If unique considerations exist beyond the scope of this load table, the services of a design professional may be required. Subject to additional site-specific design fees, Gulf Coast Supply & Manufacturing is able to complete most engineering services required or to refer a third-party design engineer.

## How to use the load tables:

If the intended installation meets the requirements listed, the tables provide a prescriptive design basis for selecting the appropriate fastener pattern and fastener spacing. Follow these steps to properly apply the load tables:

1. Determine Wind Speeds. Check with the local building department to determine if the municipality has adopted a wind speed requirement. Some municipalities permit the use of [windspeed.atcouncil.org](http://windspeed.atcouncil.org). If a wind speed is not prescribed, there are tables in ASCE 7 and the Florida Building Code which can be used to determine the design wind speed (see next few pages). Furthermore, some project specifications may stipulate a different requirement. Be sure to check all applicable sources.
2. Select the page for the appropriate panel profile.
3. Find the material (e.g. 24ga/26ga/29ga steel) and the substrate (e.g. plywood, 1x4 purlins, OSB) being considered.
4. Find the wind speed column for the selected material and substrate; note the fastener pattern for each zone.
5. Use the roof layout images to determine the location and extent of zones 1, 2, and 3.
6. Reference the fastener pattern images to determine the fastening details. Install the roofing panels in each zone with the required fastener pattern and spacing.

## Notes:

- Fastener spacings shown are the maximum allowable spacings. Use of reduced spacing (i.e. installing more fasteners) is acceptable and meets the intent of these load tables.
- Material thicknesses are minimum values. Use of thicker material (e.g. using 26ga instead of 29ga or using 0.040 when the table lists 0.032) is acceptable and meets the intent of these load tables.
- Fasteners listed are minimum diameter fasteners. Larger diameter fasteners are acceptable and meet the intent of these load tables.
- **A dashed line indicates that the panel and substrate selected is NOT suitable for installation in that wind zone.**
- or exposure D locations, please refer to Appendix C.

## Methodology:

- Uplift requirements are calculated using method 1 in ASCE 7-10.
- Design uplifts are calculated from uplift requirements using ASD load combinations. No downward loads are considered as counteracting the design uplift.
- Panel rated uplift capacities are reduced by factors of safety as required by FBC.
- The de-rated panel capacities are compared to the ASD design uplifts calculated.



## Panel Uplift Ratings

Each panel has been tested to TAS 125, UL580/UL1897, and/or ASTM E1592 in the various fastener patterns and substrates shown in the table. These ultimate uplift values are reduced by a factor of safety of 2.0 or as required by the Florida Building Code.

For projects where the wind uplift calculations have been completed for a specific project, compare the ASD design uplift pressures to the panel capacity uplifts shown. (Note that the rated panel uplifts are reduced by a factor of safety of 2.0 or as required by FBC—therefore these panel capacity values may be compared to the ASD design uplift pressures.)

Refer to Appendix A for 1x4 attachment requirements.

GulfLok		
Fastener Pattern	Panel and Substrate	Uplift Capacity (psf)
A	24ga on plywood/wood plank	81.75
B	24ga on plywood/wood plank	96.75
C	24ga on plywood/wood plank	121.75
E	24ga on plywood/wood plank	161
A	26ga on plywood/wood plank	63.5
B	26ga on plywood/wood plank	121.75
C	26ga on plywood/wood plank	161
A	032 on plywood/wood plank	52.5
B	032 on plywood/wood plank	116

GulfSeam		
Fastener Pattern	Panel and Substrate	Uplift Capacity (psf)
A24	24ga 18in panel on plywood/wood plank	69.25
A12	24ga 18in panel on plywood/wood plank	108.5
A24	24ga 18in panel on 1x4 on plywood/wood plank	114
A12	24ga 18in panel on 1x4 on plywood/wood plank	159
A18	24ga 16in panel on 1x4 on plywood/wood plank	93.5
A18	032 18" panel on plywood/wood plank	86
A18	032 16" panel on plywood/wood plank	86
A6	032 16" panel on plywood/wood plank	138.5

VersaLoc		
Fastener Pattern	Panel and Substrate	Uplift Capacity (psf)
D24	24ga 16" panel on plywood/wood plank	59.75
D6	24ga 16" panel on plywood/wood plank	123.5
S16	24ga 20" panel on plywood/wood plank (NOA)	91.75
S8	24ga 20" panel on plywood/wood plank (NOA)	121.75
D8	24ga 20" panel on plywood/wood plank (NOA)	189.25
S16-S	032 20" panel on plywood/wood plank (NOA)	118.00
D8	032 20" panel on plywood/wood plank (NOA)	159.25
D16	16oz Copper 16" pan on plywood/wood plank (NOA)	82.25
D8	16oz Copper 16" pan on plywood/wood plank (NOA)	159.25

MegaLoc		
Fastener Pattern	Panel and Substrate	Uplift Capacity (psf)
D24	24ga 18" panel on plywood/wood plan	71
D12	24ga 18" panel on plywood/wood plank	108.5
D24	24ga 20" panel on 22ga steel deck (NOA)	112
D12+	24ga 20" panel on 22ga steel deck (NOA)	181.75
D60	24ga 18" panel on 16ga open framing	45.00
D48	24ga 18" panel on 16ga open framing	63.75
D36	24ga 18" panel on 16ga open framing	82.50
D24	24ga 18" panel on 16ga open framing	101.25
D12	24ga 18" panel on 16ga open framing	120.00
D24	032 18" panel on 22ga steel deck (NOA)	110.50
D12+	032 18" panel on 22ga steel deck (NOA)	166.75



# Wind Speed Map

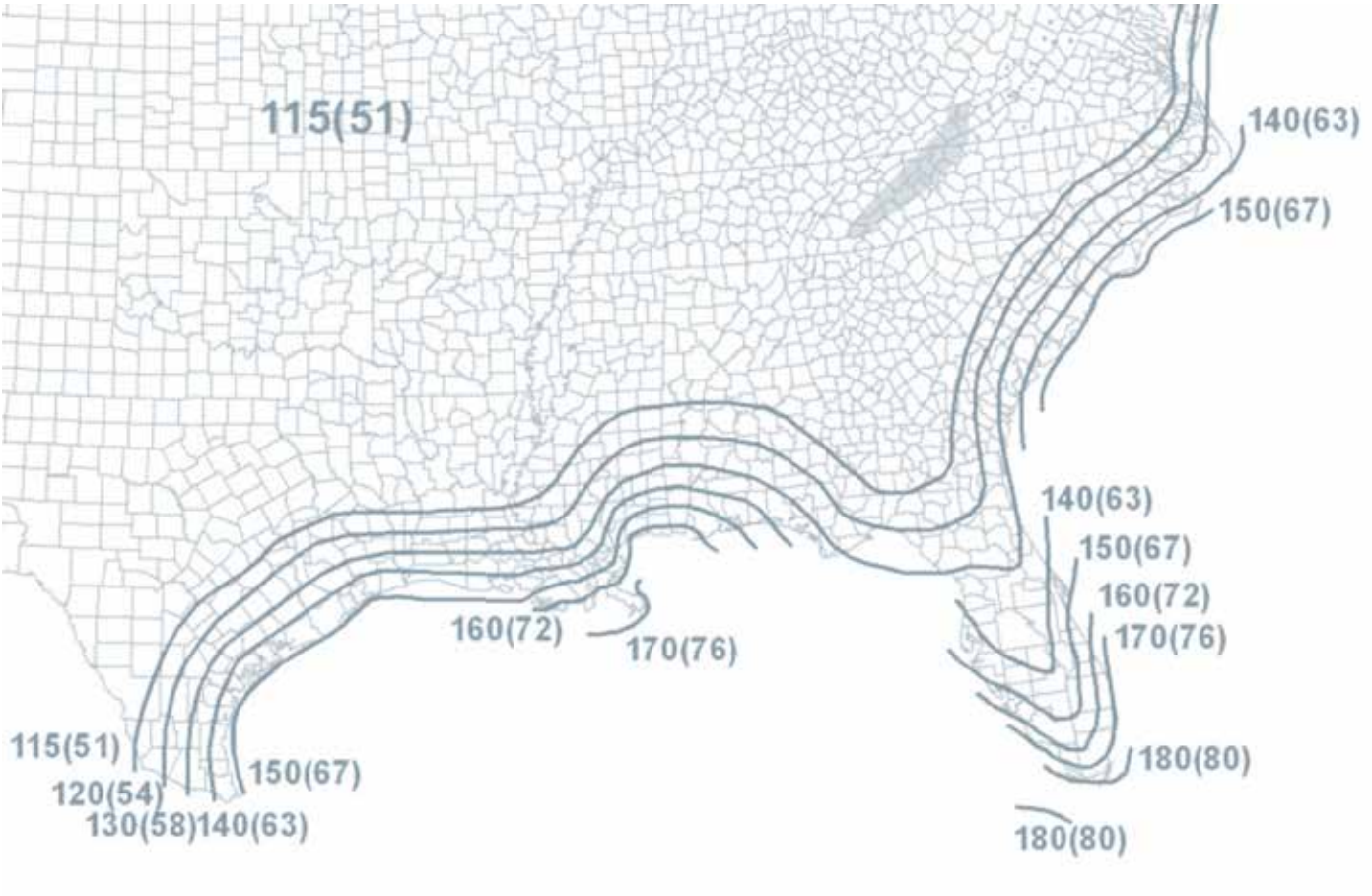
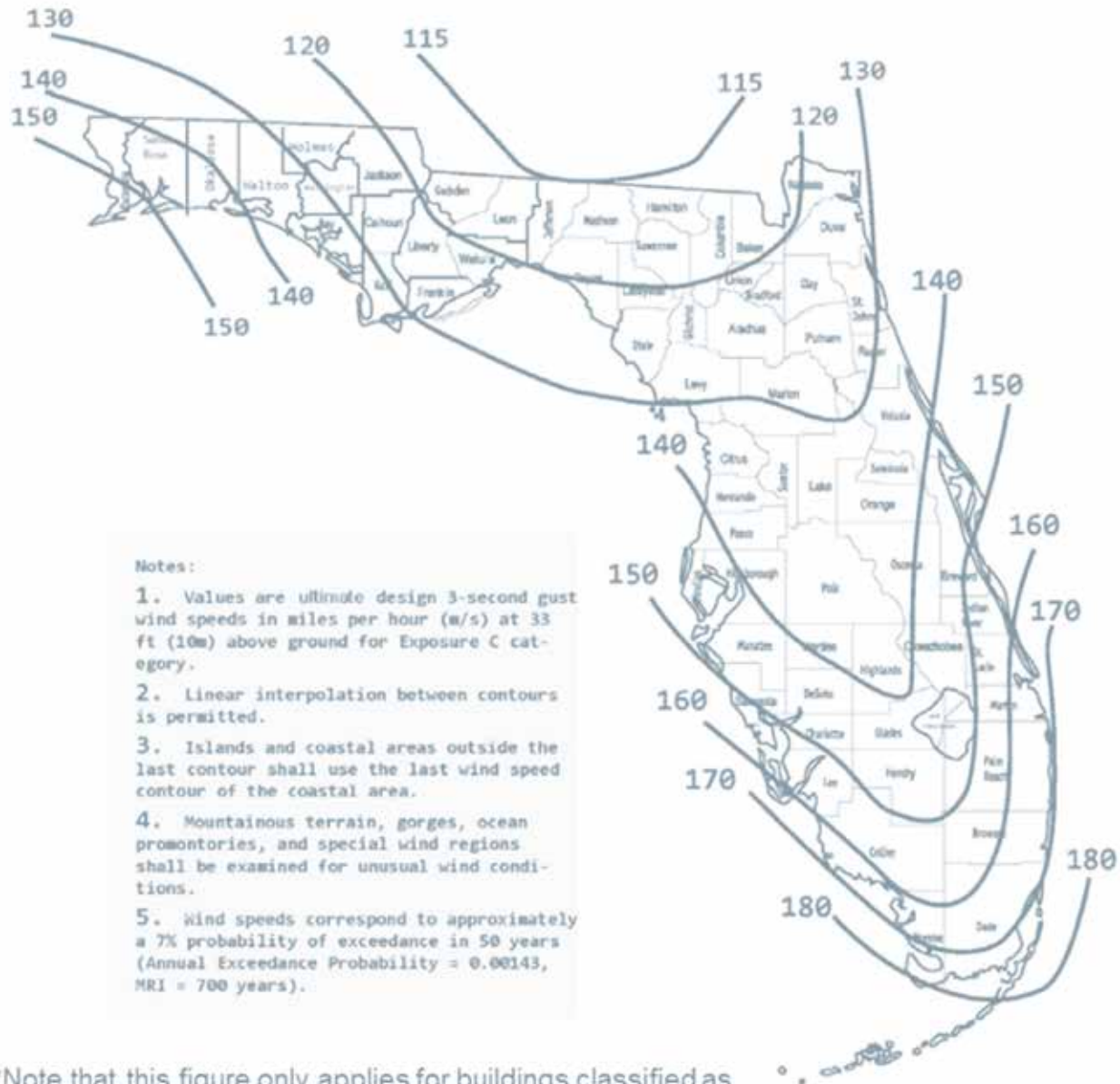


Figure 26.5-1A Basic Wind Speeds for Occupancy Category II Buildings and Other Structures (excerpt)  
From ASCE 7-10. Refer to ASCE 7-10 for full map and further details.

## Section 1609 Wind Loads



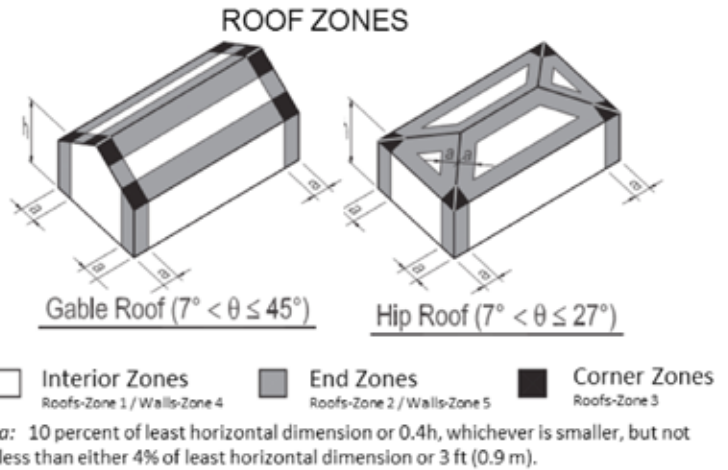
\*Note that this figure only applies for buildings classified as risk category II—this includes residential and most retail/office construction. Refer to FBC Table 1.5-1 for more information

Figure 1609A Ultimate Design Wind Speeds,  $V_{ULT}$  for risk category II buildings and other structures

## 24GA (MIN) GULFLOK

### REQUIREMENTS TO USE THESE LOAD TABLES

- Site is located in **Exposure B**
- Structure has a mean roof height of 30' or less
- Roof is either a **gable roof** with slope between 1.5:12 and 12:12, or a **hip roof** with slope between 1.5:12 and 6:12
- Structure is a low rise, regular shaped building, per ASCE 7-10
- Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).



### PATTERN A FASTENER EVERY HOLE (6" OC NOMINAL)



### PATTERN E FASTENER EVERY OTHER HOLE (12" OC NOMINAL)



### PATTERN B FASTENER EVERY HOLE (6" OC NOMINAL) WITH TITEBOND IN SEAM



### PATTERN C FASTENER EVERY HOLE (6" OC NOMINAL) WITH 2' CLIP



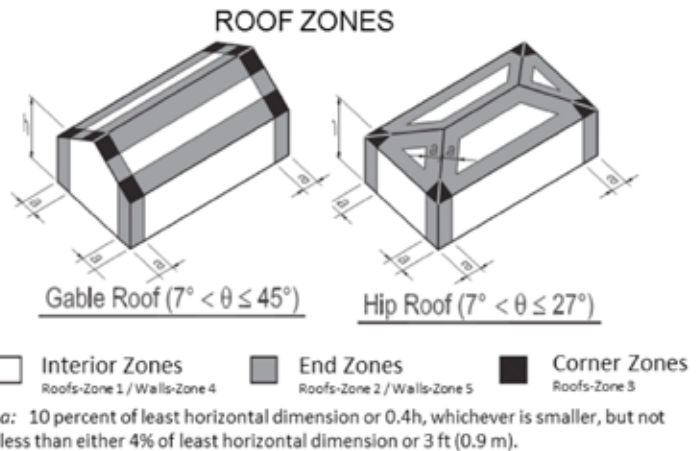
### LOAD TABLES

24ga (min) GulfLok on 15/32" plywood (min) with #10 screw (min) (NOT APPROVED FOR HVHZ)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	E	E	E	E	E	E	E	E
Zone 2	E	E	E	E	E	E	E	E
Zone 3	E	E	E	E	E	E	A	B

## 26GA (MIN) GULFLOK

### REQUIREMENTS TO USE THESE LOAD TABLES

- a.) Site is located in **Exposure B**
- b.) Structure has a **mean roof height of 30' or less**
- c.) Roof is either a **gable roof with slope between 1.5:12 and 12:12**, or a **hip roof with slope between 1.5:12 and 6:12**
- d.) Structure is a low rise, regular shaped building, per ASCE 7-10
- e.) Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).



### PATTERN A FASTENER EVERY HOLE (6" OC NOMINAL)



### PATTERN B FASTENER EVERY HOLE (6" OC NOMINAL) WITH TITEBOND IN SEAM



### PATTERN C FASTENER EVERY HOLE (6" OC NOMINAL) WITH 2' CLIP



### LOAD TABLES

26ga (min) GulfLok on 15/32" plywood (min) with #10 screw (min)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	A	A	A	A	A	A	A	A
Zone 2	A	A	A	A	A	A	A	B
Zone 3	A	A	A	A	B	B	B	B

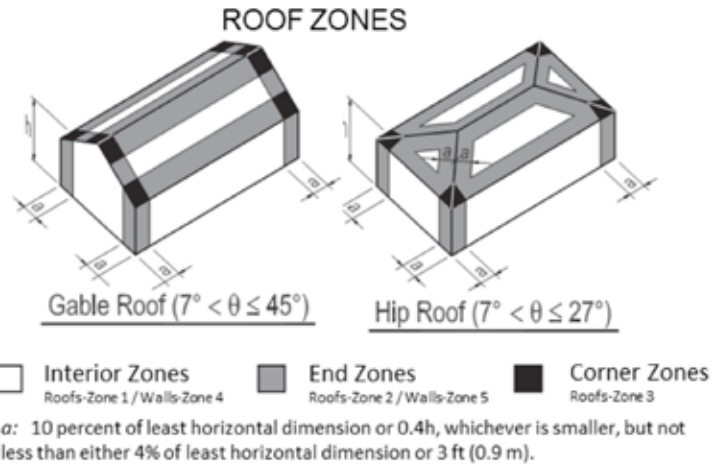
INSTALLATION IN MIAMI-DADE OR BROWARD COUNTY MUST MEET SPECIFIC HVHZ REQUIREMENTS. CONSULT THE FBC AND THE HVHZ SECTION OF THIS MANUAL.



## 032 ALUMINUM GULFLOK

### REQUIREMENTS TO USE THESE LOAD TABLES

- Site is located in **Exposure B**
- Structure has a **mean roof height of 30' or less**
- Roof is either a **gable roof with slope between 1.5:12 and 12:12**, or a **hip roof with slope between 1.5:12 and 6:12**
- Structure is a low rise, regular shaped building, per ASCE 7-10
- Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).



### FASTENER PATTERNS

#### PATTERN A FASTENER EVERY HOLE (6" OC NOMINAL)



#### PATTERN B FASTENER EVERY HOLE (6" OC NOMINAL) WITH TITEBOND IN SEAM



### LOAD TABLES

032 Aluminum (min) GulfLok on 15/32" plywood (min) with #10 screw (min) (NOT APPROVED FOR HVHZ)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	A	A	A	A	A	A	A	A
Zone 2	A	A	A	A	A	B	B	B
Zone 3	A	A	A	B	B	B	B	B

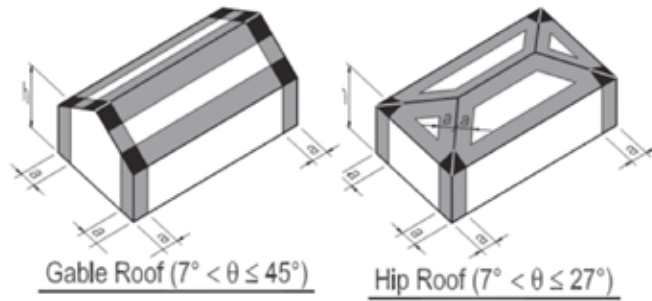


## 24GA (MIN) GULFSEAM

### REQUIREMENTS TO USE THESE LOAD TABLES

- Site is located in **Exposure B**
- Structure has a **mean roof height of 30' or less**
- Roof is either a **gable roof with slope between 1.5:12 and 12:12**, or a **hip roof with slope between 1.5:12 and 6:12**
- Structure is a low rise, regular shaped building, per **ASCE 7-10**
- Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).

### ROOF ZONES



- ☐ Interior Zones  
Roofs-Zone 1 / Walls-Zone 4
 ☐ End Zones  
Roofs-Zone 2 / Walls-Zone 5
 ☐ Corner Zones  
Roofs-Zone 3
- a: 10 percent of least horizontal dimension or 0.4h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).

### FASTENER PATTERNS

#### PATTERN A24

24" CLIP SPACING, (2) FASTENERS PER CLIP



#### PATTERN A18

18" CLIP SPACING, (2) FASTENERS PER CLIP



#### PATTERN A12

16" CLIP SPACING, (2) FASTENERS PER CLIP



### LOAD TABLES

24ga (min) GulfSeam on 15/32" plywood (min) with #10 screws (min), 18" wide panel (max) (NOT APPROVED FOR HVHZ)

Wind:	120	130	140	150	160	170	180	200
Zone 1	A24	A24	A24	A24	A24	A24	A24	A24
Zone 2	A24	A24	A24	A24	A24	A24	A24	A24
Zone 3	A24	A24	A24	A24	A24	A12	A12	A12

24ga (min) GulfSeam on 1x4's on 15/32" plywood (min) with #10 screws (min), 16" wide panel (max) (NOT APPROVED FOR HVHZ)

Wind:	120	130	140	150	160	170	180	200
Zone 1	A18	A18	A18	A18	A18	A18	A18	A18
Zone 2	A18	A18	A18	A18	A18	A18	A18	A18
Zone 3	A18	A18	A18	A18	A18	A18	A18	---

24ga (min) GulfSeam on 1x4's on 15/32" plywood (min) with #10 screws (min), 18" wide panel (max) (NOT APPROVED FOR HVHZ)

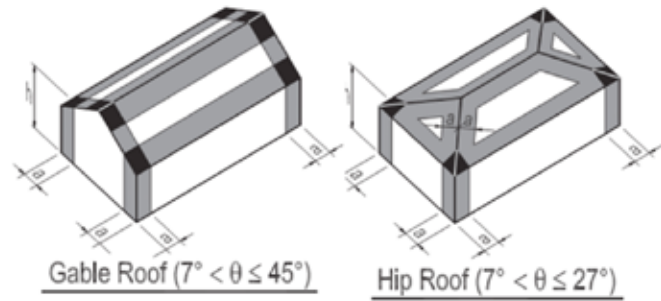
Wind:	120	130	140	150	160	170	180	200
Zone 1	A24	A24	A24	A24	A24	A24	A24	A24
Zone 2	A24	A24	A24	A24	A24	A24	A24	A24
Zone 3	A24	A24	A24	A24	A24	A24	A24	A24

## 032 ALUMINUM (MIN) GULFSEAM

### ROOF ZONES

#### REQUIREMENTS TO USE THESE LOAD TABLES

- Site is located in **Exposure B**
- Structure has a **mean roof height of 30' or less**
- Roof is either a **gable roof with slope between 1.5:12 and 12:12**, or a **hip roof with slope between 1.5:12 and 6:12**
- Structure is a low rise, regular shaped building, per ASCE 7-10
- Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).

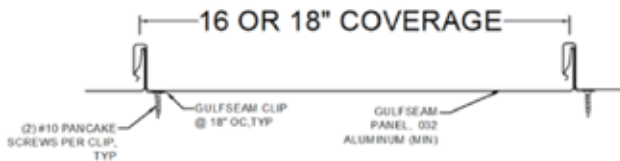


- ☐ Interior Zones  
 Roofs-Zone 1 / Walls-Zone 4
- ☐ End Zones  
 Roofs-Zone 2 / Walls-Zone 5
- ☐ Corner Zones  
 Roofs-Zone 3
- $a$ : 10 percent of least horizontal dimension or 0.4h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).

### FASTENER PATTERNS

#### PATTERN A18

18" CLIP SPACING, (2) FASTENERS PER CLIP



#### PATTERN A6

6" CLIP SPACING, (2) FASTENERS PER CLIP



### LOAD TABLES

032 Aluminum (min) GulfSeam on 15/32" plywood (min) with #10 screws (min), 18" wide panel (max) (NOT APPROVED FOR HVHZ)

Wind:	120	130	140	150	160	170	180	200
Zone 1	A18	A18	A18	A18	A18	A18	A18	A18
Zone 2	A18	A18	A18	A18	A18	A18	A18	A18
Zone 3	A18	A18	A18	A18	A18	A18	A18	---

032 Aluminum (min) GulfSeam on 15/32" plywood (min) with #10 screws (min), 16" wide panel (max) (NOT APPROVED FOR HVHZ)

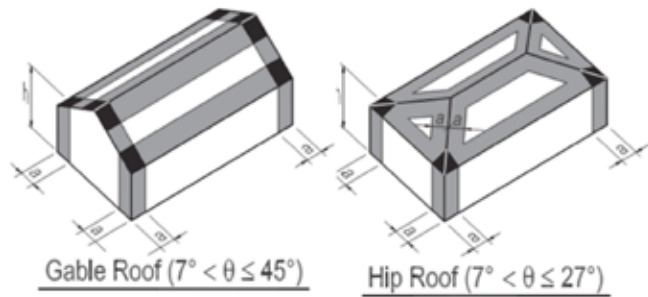
Wind:	120	130	140	150	160	170	180	200
Zone 1	A18	A18	A18	A18	A18	A18	A18	A18
Zone 2	A18	A18	A18	A18	A18	A18	A18	A18
Zone 3	A18	A18	A18	A18	A18	A18	A18	A6

## 24GA (MIN) VERSALOC

### REQUIREMENTS TO USE THESE LOAD TABLES

- Site is located in **Exposure B**
- Structure has a **mean roof height of 30' or less**
- Roof is either a **gable roof with slope between 1.5:12 and 12:12**, or a **hip roof with slope between 1.5:12 and 6:12**
- Structure is a low rise, regular shaped building, per ASCE 7-10
- Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).

### ROOF ZONES

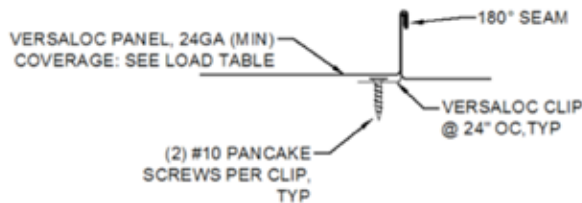


- Interior Zones  
 Roofs-Zone 1 / Walls-Zone 4
  End Zones  
 Roofs-Zone 2 / Walls-Zone 5
  Corner Zones  
 Roofs-Zone 3

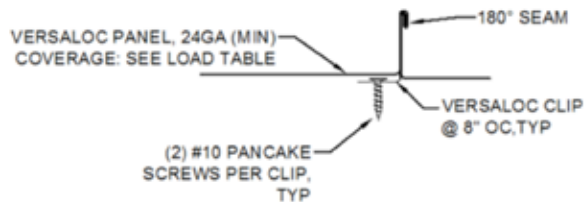
$a$ : 10 percent of least horizontal dimension or 0.4h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).

### FASTENER PATTERNS

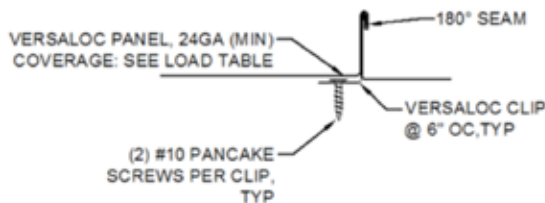
#### PATTERN D24 24" CLIP SPACING, 180° SEAM, (2) FASTENERS PER CLIP



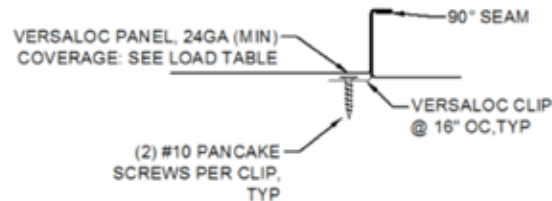
#### PATTERN D8 8" CLIP SPACING, 180° SEAM, (2) FASTENERS PER CLIP



#### PATTERN D6 6" CLIP SPACING, 180° SEAM, (2) FASTENERS PER CLIP



#### PATTERN S16 16" CLIP SPACING, 90° SEAM, (2) FASTENERS PER CLIP



### LOAD TABLES

24ga (min) VersaLoc on 15/32" plywood (min) with #12 screws, 16" wide panel (max)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	D24	D24	D24	D24	D24	D24	D24	D24
Zone 2	D24	D24	D24	D24	D24	D24	D24	D6
Zone 3	D24	D24	D24	D24	D6	D6	D6	D6

24ga (min) VersaLoc on 15/32" plywood (min) with #10 screws, 20" wide panel (max) (NOA only)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	S16	S16	S16	S16	S16	S16	S16	S16
Zone 2	S16	S16	S16	S16	S16	S16	S16	S16
Zone 3	S16	S16	S16	S16	S16	S16	S16	S8

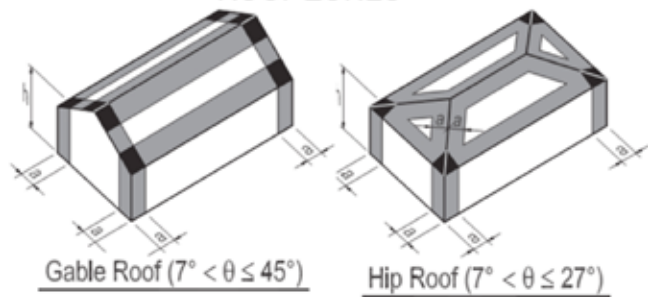
INSTALLATION IN MIAMI-DADE OR BROWARD COUNTY MUST MEET SPECIFIC HVHZ REQUIREMENTS. CONSULT THE HVHZ SECTION OF THIS MANUAL FOR MORE DETAILS.

## 032 ALUMINUM (MIN) VERSALOC

### REQUIREMENTS TO USE THESE LOAD TABLES

- Site is located in **Exposure B**
- Structure has a **mean roof height of 30' or less**
- Roof is either a **gable roof with slope between 1.5:12 and 12:12**, or a **hip roof with slope between 1.5:12 and 6:12**
- Structure is a low rise, regular shaped building, per ASCE 7-10
- Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).

### ROOF ZONES

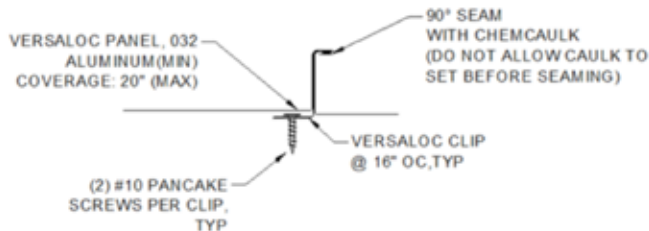


- Interior Zones  
 Roofs-Zone 1 / Walls-Zone 4
  End Zones  
 Roofs-Zone 2 / Walls-Zone 5
  Corner Zones  
 Roofs-Zone 3

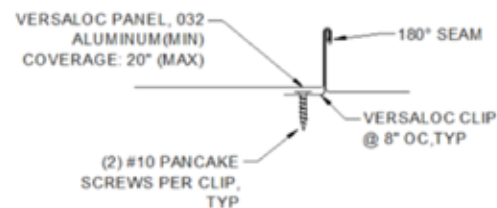
a: 10 percent of least horizontal dimension or 0.4h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).

### FASTENER PATTERNS

#### PATTERN S16-S 16" CLIP SPACING, 90° SEAM, (2) FASTENERS PER CLIP



#### PATTERN D8 8" CLIP SPACING, 180° SEAM, (2) FASTENERS PER CLIP



### LOAD TABLES

032 Aluminum (min) VersaLoc on 15/32" plywood (min) with #10 screws (min), 20" wide panel (max) (NOA only)									
Wind:	120	130	140	150	160	170	180	200	
Zone 1	S16s	S16s	S16s	S16s	S16s	S16s	S16s	S16s	S16s
Zone 2	S16s	S16s	S16s	S16s	S16s	S16s	S16s	S16s	S16s
Zone 3	S16s	S16s	S16s	S16s	S16s	S16s	S16s	S16s	S16s

INSTALLATION IN MIAMI-DADE OR BROWARD COUNTY MUST MEET SPECIFIC HVHZ REQUIREMENTS. CONSULT THE HVHZ SECTION OF THIS MANUAL FOR MORE DETAILS.

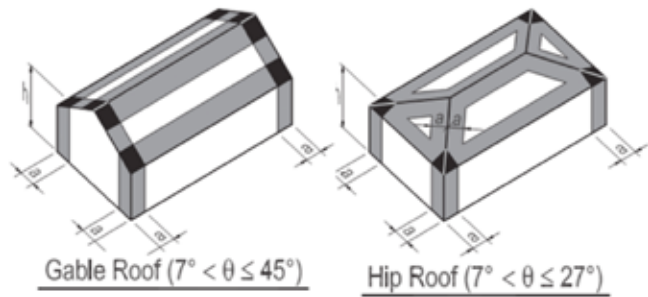


## 16OZ PURE COPPER (MIN) VERSALOC

### REQUIREMENTS TO USE THESE LOAD TABLES

- Site is located in **Exposure B**
- Structure has a **mean roof height of 30' or less**
- Roof is either a **gable roof with slope between 1.5:12 and 12:12**, or a **hip roof with slope between 1.5:12 and 6:12**
- Structure is a **low rise, regular shaped building**, per ASCE 7-10
- Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).

### ROOF ZONES

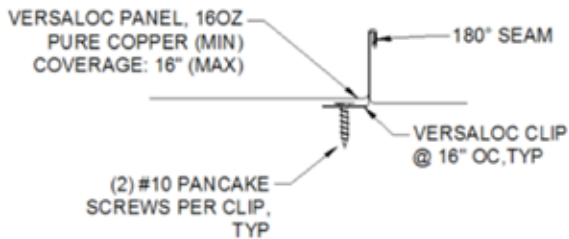


- Interior Zones  
 Roofs-Zone 1 / Walls-Zone 4
- End Zones  
 Roofs-Zone 2 / Walls-Zone 5
- Corner Zones  
 Roofs-Zone 3
- $a$ : 10 percent of least horizontal dimension or 0.4h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).

### FASTENER PATTERNS

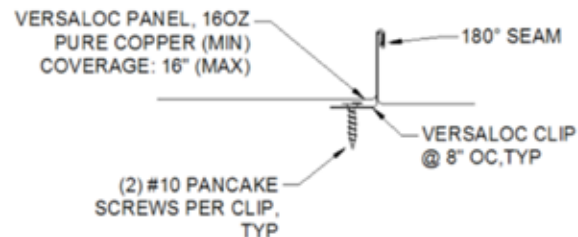
#### PATTERN D16

16" CLIP SPACING, 180° SEAM, (2)  
FASTENERS PER CLIP



#### PATTERN D8

8" CLIP SPACING, 180° SEAM, (2)  
FASTENERS PER CLIP



### LOAD TABLES

16oz pure copper (min) VersaLoc on 15/32" plywood (min) with #10 screws, 16" wide panel (max) (NOA only)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	D16	D16	D16	D16	D16	D16	D16	D16
Zone 2	D16	D16	D16	D16	D16	D16	D16	D16
Zone 3	D16	D16	D16	D16	D16	D16	D8	D8

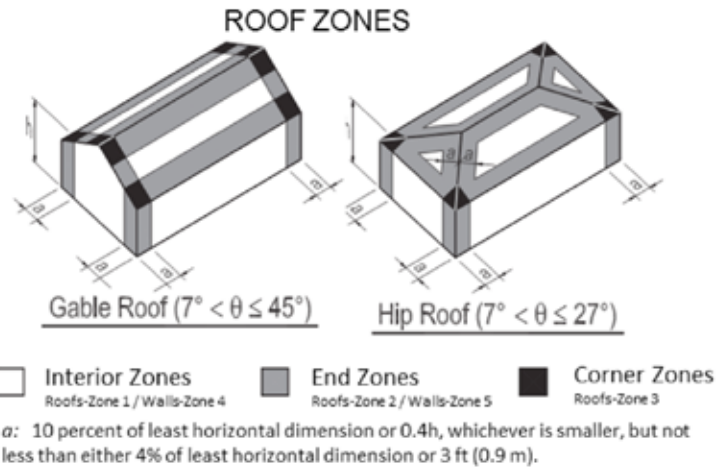
INSTALLATION IN MIAMI-DADE OR BROWARD COUNTY MUST MEET SPECIFIC HVHZ REQUIREMENTS. CONSULT THE HVHZ SECTION OF THIS MANUAL FOR MORE DETAILS.



## 24GA (MIN) MEGALOC

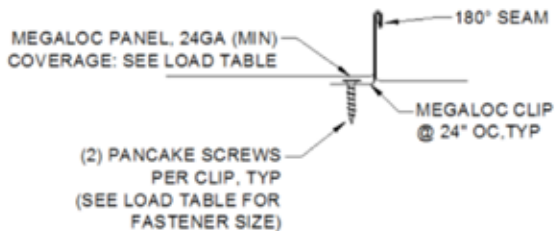
### REQUIREMENTS TO USE THESE LOAD TABLES

- Site is located in **Exposure B**
- Structure has a **mean roof height of 30' or less**
- Roof is either a **gable roof with slope between 1.5:12 and 12:12**, or a **hip roof with slope between 1.5:12 and 6:12**
- Structure is a low rise, regular shaped building, per ASCE 7-10
- Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).

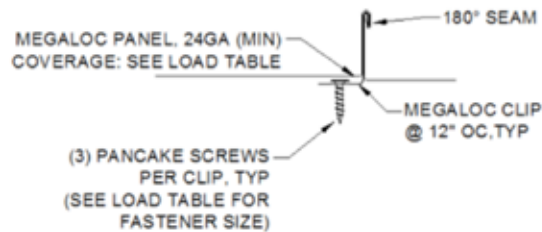


### FASTENER PATTERNS

#### PATTERN D24 24" CLIP SPACING, 180° SEAM, (2) FASTENERS PER CLIP



#### PATTERN D12+ 12" CLIP SPACING, 180° SEAM, (3) FASTENERS PER CLIP



### LOAD TABLES

24ga (min) MegaLoc on 15/32" plywood (min) with #10 screws, 18" wide panel (max) (NOT APPROVED FOR HVHZ)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	D24	D24	D24	D24	D24	D24	D24	D24
Zone 2	D24	D24	D24	D24	D24	D24	D24	D24
Zone 3	D24	D24	D24	D24	D24	D12	D12	D12

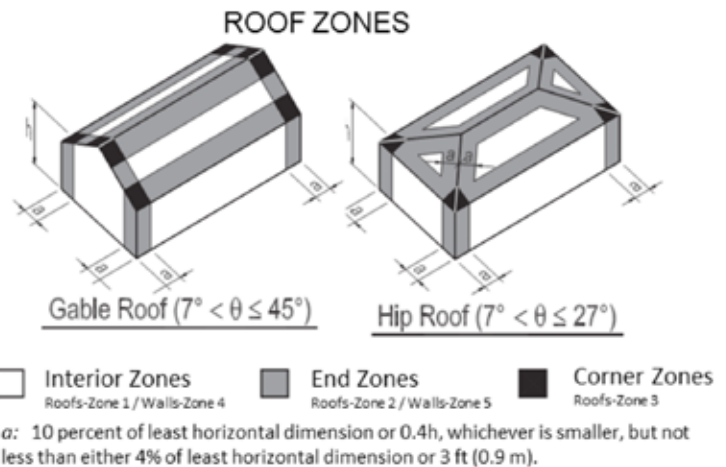
24ga (min) MegaLoc on 22ga steel deck (min) with #14 screws, 22" wide panel (max) (NOA only)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	D24	D24	D24	D24	D24	D24	D24	D24
Zone 2	D24	D24	D24	D24	D24	D24	D24	D24
Zone 3	D24	D24	D24	D24	D24	D24	D24	D24

INSTALLATION IN MIAMI-DADE OR BROWARD COUNTY MUST MEET SPECIFIC HVHZ REQUIREMENTS. CONSULT THE HVHZ SECTION OF THIS MANUAL FOR MORE DETAILS.

## 032 ALUMINUM (MIN) MEGALOC

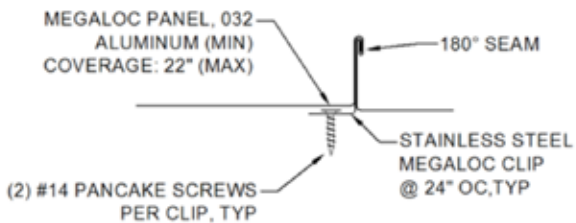
### REQUIREMENTS TO USE THESE LOAD TABLES

- Site is located in **Exposure B**
- Structure has a **mean roof height of 30' or less**
- Roof is either a **gable roof with slope between 1.5:12 and 12:12**, or a **hip roof with slope between 1.5:12 and 6:12**
- Structure is a low rise, regular shaped building, per ASCE 7-10
- Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).

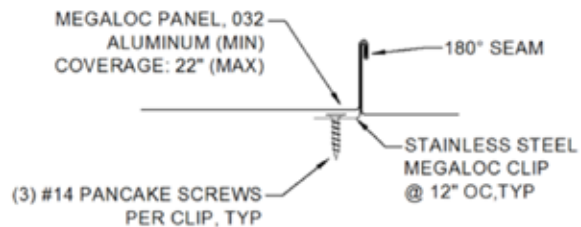


### FASTENER PATTERNS

#### PATTERN D24 24" CLIP SPACING, 180° SEAM, (2) FASTENERS PER CLIP



#### PATTERN D12+ 12" CLIP SPACING, 180° SEAM, (3) FASTENERS PER CLIP



### LOAD TABLES

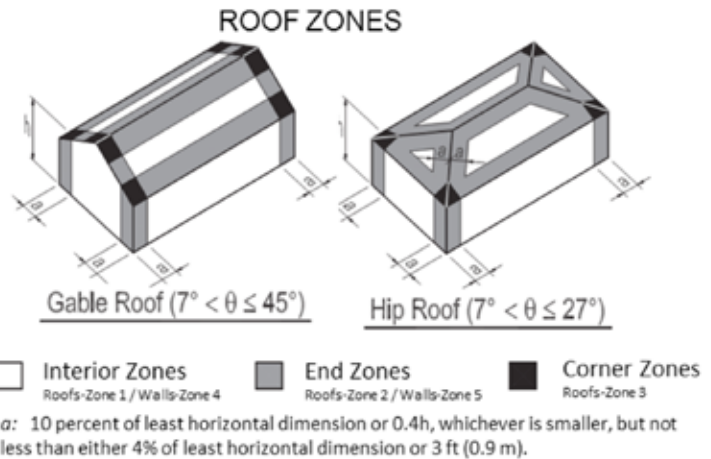
032 Aluminum (min) MegaLoc on 22ga steel deck (min) with #14 screws (min), 18" wide panel (max) (NOA only)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	D24	D24	D24	D24	D24	D24	D24	D24
Zone 2	D24	D24	D24	D24	D24	D24	D24	D24
Zone 3	D24	D24	D24	D24	D24	D24	D24	D24

INSTALLATION IN MIAMI-DADE OR BROWARD COUNTY MUST MEET SPECIFIC HVHZ REQUIREMENTS. CONSULT THE HVHZ SECTION OF THIS MANUAL FOR MORE DETAILS.

## 24GA MEGALOC STRUCTURAL

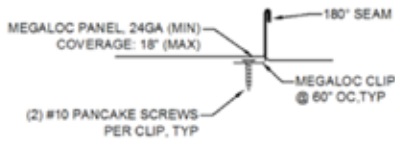
### REQUIREMENTS TO USE THESE LOAD TABLES

- Site is located in **Exposure B**
- Structure has a **mean roof height of 30' or less**
- Roof is either a **gable roof with slope between 1.5:12 and 12:12**, or a **hip roof with slope between 1.5:12 and 6:12**
- Structure is a low rise, regular shaped building, per ASCE 7-10
- Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).

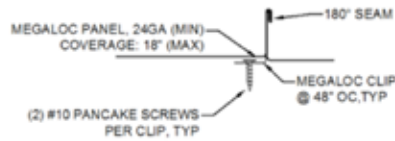


### FASTENER PATTERNS

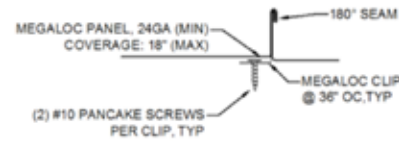
**PATTERN D60**  
60" CLIP SPACING, 180° SEAM, (2)  
FASTENERS PER CLIP



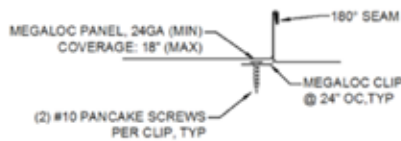
**PATTERN D48**  
48" CLIP SPACING, 180° SEAM, (2)  
FASTENERS PER CLIP



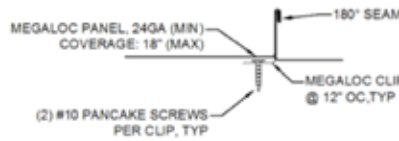
**PATTERN D36**  
36" CLIP SPACING, 180° SEAM, (2)  
FASTENERS PER CLIP



**PATTERN D24**  
24" CLIP SPACING, 180° SEAM, (2)  
FASTENERS PER CLIP



**PATTERN D12**  
12" CLIP SPACING, 180° SEAM, (2)  
FASTENERS PER CLIP



### LOAD TABLES

24ga (min) VersaLoc on 16ga steel framing (min) with #10 screws, 18" wide panel (max) (NOT APPROVED FOR HVHZ)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	D60	D60	D60	D60	D60	D60	D60	D60
Zone 2	D60	D60	D60	D60	D60	D48	D48	D36
Zone 3	D60	D60	D48	D48	D36	D36	D36	D12

# Appendix A: Reserved

# Appendix B: Building Code Excerpts

The following excerpts are from the 2017 Florida Building Code (FBC), which is publically available here: <https://codes.iccsafe.org/public/collections/FL>. The FBC is based on the International Building Code (IBC), and the section numbering is identical in most cases. Typically the FBC is more restrictive, so the excerpts below are from the FBC. Building codes for other states are available here: <https://codes.iccsafe.org/public/>.

*These excerpts are provided as a courtesy reference only; always consult the local building department and a complete copy of the applicable building codes.*

## FBC 2303.1.5 Wood Structural Panels

**Wood structural panels**, when used structurally (including those used for siding, roof and wall sheathing, subflooring, diaphragms and built-up members), **shall conform to the requirements for their type in DOC PS 1, DOC PS 2 or ANSI/APA PRP 210. Each panel or member shall be identified** for grade, bond classification, and Performance Category **by the trademarks of an approved testing and grading agency.**

## FBC 1503.2.1 Flashing Locations

**Flashing shall be installed at wall and roof intersections, at gutters, wherever there is a change in roof slope or direction and around roof openings.** Where flashing is of metal, the metal shall be corrosion resistant with a thickness of not less than that provided in Table 1503.2.

**Exception:** This requirement does not apply to hip and ridge junctions.

## FBC 1503.6 Crickets and Saddles

**A cricket or saddle shall be installed on the ridge side of any chimney or penetration greater than 30 inches (762 mm) wide as measured perpendicular to the slope.**

Cricket or saddle coverings shall be sheet metal or of the same material as the roof covering.

Material	Minimum Thickness (Inches)	Gage	Weight (lbs per sq ft)
Copper			1 (16 oz)
Aluminum	0.024		
Stainless Steel		28	
Galvanized Steel	0.0179	26 (zinc coated G90)	
Aluminum Zinc Coated Steel	0.0179	26 (AZ50 Alum Zinc)	
Zinc Alloy	0.027		
Lead			2.5 (40 oz)
Painted Terne			1.25 (20 oz)

## FBC 1506.2.1 Compatibility of Materials

Roofs and roof coverings shall be of materials that are compatible with each other and with the building or structure to which the materials are applied.

## FBC 1507.1.1 Underlayment

Unless otherwise noted, underlayment for asphalt shingles, **metal roof panels**, metal roof shingles, mineral surfaced roll roofing, slate shingles, wood shingles, and wood shakes shall conform to the applicable standards listed in this chapter. **Underlayment materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a label indicating compliance to the standard designation and, if applicable, type**



**classification indicated in Table 1507.1.1. Underlayment shall be applied and attached in accordance with Table 1507.1.1.**

**Exception:** A reinforced synthetic underlayment that is approved as an alternative to underlayment complying with ASTM D226 Type II and having a minimum tear strength per ASTM D1970 or ASTM D4533 of 20 pounds (9.1 kg) shall be permitted. This underlayment shall be installed and attached in accordance with the underlayment attachment methods of Table 1507.1.1 for the applicable roof covering and slope, except metal cap nails shall be required where the ultimate design wind speed,  $V_{ULT}$ , equals or exceeds 150 mph.

Table 1507.1.1 Underlayment Table				
Roof Covering Section	Roof Slope 2:12 and Less Than 4:12 Underlayment	Underlayment Attachment <sup>a</sup>	Roof Slope 4:12 and Greater Underlayment	Underlayment Attachment <sup>a</sup>
<b>Metal roof panels 1507.4</b>	ASTM D226 Type I or II ASTM D4869 Type II, III or IV ASTM D6757	1	ASTM D226 Type II ASTM D4869 Type IV ASTM D6757	2
	ASTM D1970	3	ASTM D1970	3

<sup>a</sup> Underlayment Attachment

- Roof slopes from two units vertical in 12 units horizontal (17-percent slope), and less than four units vertical in 12 units horizontal (33-percent slope). Apply a 19-inch (483 mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inchwide (914 mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm), end laps shall be 6 inches and shall be offset by 6 feet. The underlayment shall be attached to a nailable deck with corrosion-resistant fasteners with one row centered in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch into the roof sheathing.
- Roof slopes of four units vertical in 12 units horizontal (33-percent slope) or greater. Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 4 inches (51 mm), end laps shall be 6 inches and shall be offset by 6 feet. The underlayment shall be attached to a nailable deck with two staggered rows in the field of the sheet with a maximum fastener spacing of 12 inches (305 mm) o.c., and one row at the end and side laps fastened 6 inches (152 mm) o.c. Underlayment shall be attached using metal or plastic cap nails with a nominal cap diameter of not less than 1 inch. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch for ring shank cap nails and 0.091 inch for smooth shank cap nails. Cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than 3/4 inch into the roof sheathing.
- Roof slopes from two units vertical in 12 units horizontal (17-percent slope), and greater. The entire roof deck shall be covered with an approved self-adhering polymer modified bitumen underlayment complying with ASTM D1970 installed in accordance with both the underlayment manufacturer's and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed.  
**Exception:** A minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane complying with ASTM D1970, installed in accordance with the manufacturer's instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment in accordance with Table 1507.1.1 for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips.

## FBC 1507.4.2 Deck Slope

Minimum slopes for metal roof panels shall comply with the following:

- The minimum slope for lapped, nonsoldered seam metal roofs without applied lap sealant shall be three units vertical in 12 units horizontal (25-percent slope).

2. The minimum slope for lapped, nonsoldered seam metal roofs with applied lap sealant shall be one-half unit vertical in 12 units horizontal (4-percent slope). Lap sealants shall be applied in accordance with the *approved* manufacturer's installation instructions.
3. The minimum slope for standing seam of roof systems shall be one-quarter unit vertical in 12 units horizontal (2-percent slope).

#### **FBC 1507.4.4 Attachment.**

Metal roof panels shall be secured to the supports in accordance with the *approved* manufacturer's fasteners. In the absence of manufacturer recommendations, the following fasteners shall be used:

### **SECTION 1511 EXISTING ROOFING**

#### **FBC 1511.3 Recovering versus replacement.**

New roof coverings shall not be installed without first removing all existing layers of roof coverings down to the roof deck where any of the following conditions occur:

1. Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.
2. Where the existing roof covering is wood shake, slate, clay, cement or asbestos-cement tile.
3. Where the existing roof has two or more applications of any type of roof covering.
4. When blisters exist in any roofing, unless blisters are cut or scraped open and remaining Materials secured down before applying additional roofing.
5. Where the existing roof is to be used for attachment for a new roof system and compliance with the securement provisions of Section 1504.1 cannot be met.

#### **Exceptions:**

1. **Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.**
2. Reserved.
3. The application of a new protective coating over an existing spray polyurethane foam roofing system shall be permitted without tear-off of existing roof coverings.
4. Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507.

# APPENDIX C: HIGH VELOCITY HURRICANE ZONE EXCERPTS FROM THE FLORIDA BUILDING CODE

The following excerpts are from the 2017 Florida Building Code (FBC), which is publically available here: <https://codes.iccsafe.org/public/collections/FL>.

*These excerpts are provided as a courtesy reference only; always consult the local building department and a complete copy of the applicable building codes.*

## Key Requirements:

- Underlayment shall be installed, and shall have an approved HVHZ product approval or Miami-Dade Notice of Acceptance (NOA). (Per requirements of TAS 100 testing.)
- Roof deck shall meet the requirements of PS1, PS2, or ANSI/APA PRP 210. (FBC 2303.1.4)
- Maximum on center fastener spacing perpendicular to rib shall be 12" in the field and 8" at the ends of a panel. Maximum on center fastener spacing parallel to rib shall be 12". These spacing supersede the values listed in the load tables. (FBC 2222.4.2, 2222.5.1)
- Fastening shall be sufficient to provide resistance for lateral movement as required by rational analysis. Note that in most cases the roofing deck should be designed to provide all necessary lateral resistance; diaphragm design is excluded from Gulf Coast product approvals.
- Edge metal and flashing shall be installed in accordance with RAS 111. (FBC 1514.4.2)
- Minimum slope: 2:12. (FBC 1515.2.2)

## FBC 2222.4.2 Structural Sheets

Positive attachment of sheets shall be provided to resist uplift forces. Attachment shall be as set forth in Section 2222.3.1 and as required by rational analysis, and/or tests, but not less frequently than the following maximum spacing:

1. One fastener shall be placed near the corner of each sheet or at overlapping corners of sheets.
2. Along each supporting member, the spacing of fasteners shall not exceed 8-inches (203 mm) on centers at ends of sheets or 12-inches (305 mm) on center.
3. The spacing of edge fasteners between panels, and between panels and supporting members, parallel to the direction of span, where continuous interlock is not otherwise provided shall be not more than 12-inches (305 mm) on center.
4. Fastening shall be by bolting, welding, or other approved fastening device that provides a resistance to lateral movement as required by rational analysis or by test, but not less than 400 pounds per lineal foot (5838 N/m).

## FBC 1514.2 Flashings

All roof flashing and terminations shall be designed and installed to resist the windload requirements of Chapter 16 (High-Velocity Hurricane Zone) of this code, and **shall be in compliance with the provisions set forth in RAS 111.**

**FBC 1514.2.1 Locations.**

Where flashing is of metal, the metal shall conform with the provisions of RAS 111.

**1514.2.3 Metal Flashings and Terminations**

Metal flashing and terminations shall be of the material and thickness described in Section 1517.6 and RAS 111 of this code, and shall be designed and installed in accordance with RAS 111.

**FBC 1514.2.4 Metal Counterflashing**

Metal counterflashing shall be of the material and thickness described in Section 1517.6 and RAS 111 of this code, and shall be installed in accordance with RAS 111.

**FBC 1514.2.4.1**

**Metal counterflashing shall be built into walls, set in reglets or applied as stucco type and shall be turned down over base flashing not less than 3 inches (76 mm).**

**FBC 1514.2.4.2**

Metal counterflashing shall be side lapped a minimum of 4 inches (102 mm).

**FBC 1514.2.4.3**

Metal counterflashing, where set in reglets or surface-mounted, shall be waterproofed, in accordance with applicable application standards.

**FBC 1514.2.4.4**

Where metal counterflashing is used as the means of sealing (such as a vented system) it shall be set in an approved sealant, sealed with an approved adhesive on the top flange and all joints shall be sealed with an approved sealant and lapped a minimum of 4 inches (102 mm).

**FBC 1514.2.5 Roof Penetration Flashing**

**FBC 1514.2.5.1**

All pipes shall be flashed with approved lead sleeve-type, pitch pans or other approved methods detailed in the roofing system assembly product approval. Lead flashing shall not be less than 2.5 pounds per square foot (12.2 kg/m2). Flanges shall be a minimum of 4 inches (102 mm).

**FBC 1514.2.5.2**

Other roof penetrations shall be suitably flashed with curbs, collars, pitch pans, in compliance with RAS 111 or an approved method, in compliance with the roofing system assembly product approval.

**FBC 1514.2.5.3**

No roof penetration shall be located in roof valleys.

**FBC 1515.2.2 Minimum Slope**

All roofing assemblies must be installed in compliance with the slope requirements specified in the product control approval, in compliance with Table 1515.2.

System Type	Slope
Fibrous Cement Shingles	4:12
Metal Panels	
Architectural	2:12
Metal Shingles	4:12
Mortar or Adhesive Tile	2:12
Mechanically Fastened Tile	4:12
Asphalt Shingles	
Laminated	2:12
3-Tab	2:12
Quarry Slate	3 1/2:12
Wood	
Shakes	4:12
Shingles	3 1/2:12

**FBC 1515.2.5 Ridge Vents**

Ridge vents shall have a product approval, and shall be tested for wind driven rain in accordance with TAS 110 and Section 1523.

## FBC 1517.5 Fasteners

### FBC 1517.5.1

Nails shall be minimum 12 gage, annular ring shank nails having not less than 20 rings per inch, heads not less than 3/8 inch (9.5 mm) in diameter; and lengths sufficient to penetrate through the thickness of plywood panel or wood plank decking not less than 3/16 inch (4.8 mm), or to penetrate into a 1 inch (25 mm) or greater thickness of lumber not less than 1 inch (25 mm). Nails or wood screws shall be hot dipped electro- or mechanically galvanized to a thickness sufficient to resist corrosion in compliance with TAS 114, Appendix E, Section 2 (ASTM G 85). All nails shall be listed by a certification agency. All nail cartons or carton labels shall be labeled to note compliance with the corrosion-resistance requirements. No roofing material shall be fully or partially adhered directly to a nailable deck, unless otherwise noted in the roof assembly product approval.

### FBC 1517.5.2

Such fasteners shall be applied through "tin caps" no less than 15/8 inches (41 mm) and not more than 2 inches (51 mm) in diameter and of not less than 32 gage (0.010 inch) sheet metal. "Cap nails" or prefabricated fasteners with integral heads complying with this section shall be an acceptable substitute. All "tin caps," "cap nails" or prefabricated fasteners with integral heads shall be tested for corrosion resistance in compliance with TAS 114, Appendix E, Section 2 (ASTM G 85), and shall be product control listed. All cartons or carton labels of "tin caps," "cap nails" or prefabricated fasteners with integral heads shall be labeled to note compliance with the corrosion-resistance requirements.

## FBC 1517.6 Metal Roofing Accessories

All metal accessories for roofs shall be not less than 26 gage G-90 galvanized or stainless steel, 16 ounce copper, 0.025-inch (0.6 mm) thick aluminum, lead sheet with a minimum 2.5 pounds per square foot (12.2 kg/m<sup>2</sup>) or equivalent noncorrosive metal alloys or composite materials manufactured for use as roof termination. All composite and nonmetallic flashing materials shall have a product approval.

### FBC 1517.6.1

Metal accessories may be of a manufactured, shop-fabricated or field-fabricated type, providing the materials and fasteners are in compliance with the minimum requirements of this code and shall be sized, designed and installed in compliance with methods set forth in RAS 111.

### FBC 1517.6.2

Gravel stop or drip edge profiles shall be as follows.

#### FBC 1517.6.2.1

**The vertical face shall be a minimum of 1 1/2 inches (38 mm) and shall extend down not less than 1/2 inch (12.7 mm) below the sheathing** or other member immediately contiguous thereto. In all cases, the **deck flange shall be not less than 2 inches (51 mm) in width**. Gravel stop or drip edge shall be sized, designed and installed in compliance with RAS 111.

#### FBC 1517.6.2.2

**Gravel stop or drip edge shall be designed so that the bottom (the kick of the metal) of the drip edge shall have a minimum of 1/2-inch (12.7 mm) clearance from the structure.**



## **FBC 1518.2 Underlayments**

Underlayment shall be as defined in Section 1513. Underlayment shall be installed in compliance with the roofing component product approval and shall be in compliance with the following minimum requirements.

### **FBC 1518.2.1**

Underlayment shall be attached to a nailable deck in a grid pattern of 12 inches (305 mm) between the overlaps, with 6-inch (152 mm) spacing at the overlaps.

### **FBC 1518.2.2**

Where the architectural appearance of the underside is to be preserved, the underlayment shall be secured in accordance with Section 1519.5.2.

### **FBC 1518.2.3**

Tin caps and nails or cap nails shall be as defined in Section 1517.5.2.

### **FBC 1518.2.4**

Underlayment nails shall be as defined in Section 1517.5.1.

### **FBC 1518.3**

If the underlayment is a self-adhering membrane, the membrane shall be applied over a mechanically attached anchor sheet, attached in compliance with Section 1518.2.1.

### **FBC 1518.4**

All underlayment applications for prepared roof coverings shall be applied in compliance with the manufacturer roofing assembly product approval, and shall be not less than one of the following: (1) A double layer of an ASTM D 226 Type I, with a 19-inch (483 mm) headlap; or (2) A single layer of an ASTM D 226, Type II with a 4-inch (102 mm) headlap; or (3) A single layer of an ASTM D 2626 coated base sheet with a 4-inch (102 mm) headlap, and (4) All endlaps shall be a minimum of 6 inches (152 mm).

## **FBC 1518.9 Metal Panels/Shingles**

### **FBC 1518.9.2**

The entire application method of all metal panel/shingle systems shall be detailed in the product approval and RAS 133, as applicable.

### **FBC 1518.9.4**

**Metal panel/shingle systems shall not extend more than 1 inch (25 mm) beyond the roof eave.**

### **FBC 1518.9.5**

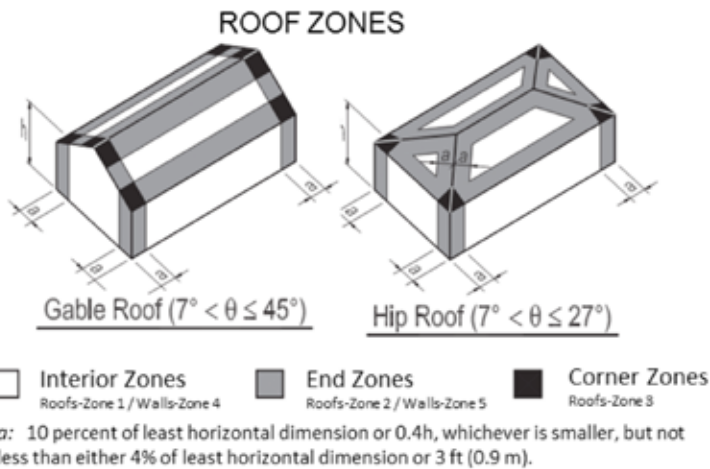
All intersections shall be flashed in metal as provided in Section 1517.6, RAS 111 and the roof assembly product approval.

# APPENDIX D: LOAD TABLES FOR EXPOSURE D

## 24GA (MIN) GULFLOK

### REQUIREMENTS TO USE THESE LOAD TABLES

- a.) Site is located in **Any Exposure**
- b.) Structure has a mean roof height of **30' or less**
- c.) Roof is either a **gable roof with slope between 0:12 and 12:12**, or a **hip roof with slope between 0:12 and 6:12**
- d.) Structure is a low rise, regular shaped building, per ASCE 7-10
- e.) Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).



### PATTERN A FASTENER EVERY HOLE (6" OC NOMINAL)



### PATTERN E FASTENER EVERY OTHER HOLE (12" OC NOMINAL)



### PATTERN B FASTENER EVERY HOLE (6" OC NOMINAL) WITH TITEBOND IN SEAM



### PATTERN C FASTENER EVERY HOLE (6" OC NOMINAL) WITH 2' CLIP



### LOAD TABLES

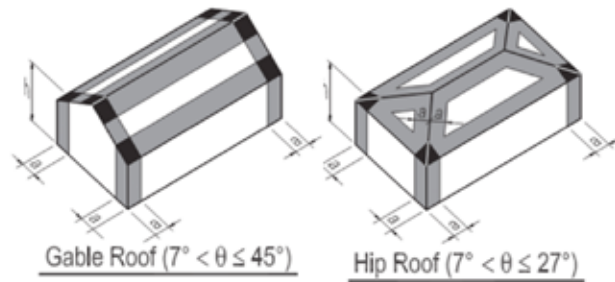
24ga (min) GulfLok on 15/32" plywood (min) with #10 screw (min) (NOT APPROVED FOR HVHZ)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	E	E	E	E	E	E	E	E
Zone 2	E	E	E	E	E	A	A	A
Zone 3	E	E	A	B	B	C	C	C

## 26GA (MIN) GULFLOK

### REQUIREMENTS TO USE THESE LOAD TABLES

- a.) Site is located in **Any Exposure**
- b.) Structure has a **mean roof height of 30' or less**
- c.) Roof is either a **gable roof with slope between 0:12 and 12:12**, or a **hip roof with slope between 0:12 and 6:12**
- d.) Structure is a low rise, regular shaped building, per ASCE 7-10
- e.) Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).

### ROOF ZONES



- ☐ Interior Zones  
Roofs-Zone 1 / Walls-Zone 4
  - ☒ End Zones  
Roofs-Zone 2 / Walls-Zone 5
  - ☒ Corner Zones  
Roofs-Zone 3
- a: 10 percent of least horizontal dimension or 0.4h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).

### PATTERN A FASTENER EVERY HOLE (6" OC NOMINAL)



### PATTERN B FASTENER EVERY HOLE (6" OC NOMINAL) WITH TITEBOND IN SEAM



### PATTERN C FASTENER EVERY HOLE (6" OC NOMINAL) WITH 2' CLIP



### LOAD TABLES

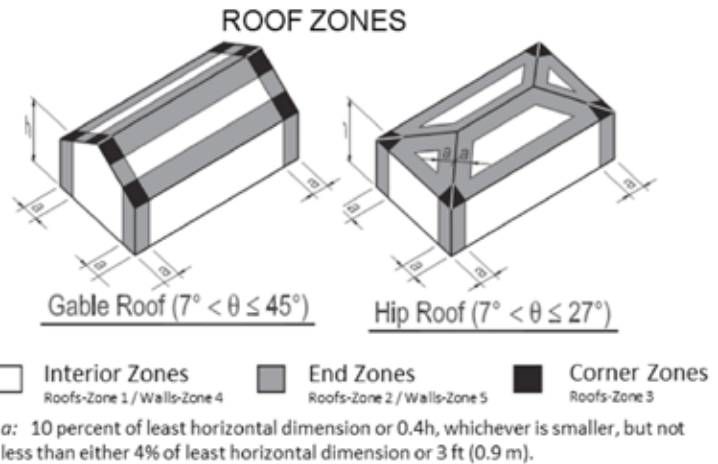
26ga (min) GulfLok on 15/32" plywood (min) with #10 screw (min)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	A	A	A	A	A	A	A	B
Zone 2	A	A	A	B	B	B	B	B
Zone 3	B	B	B	B	B	C	C	---

INSTALLATION IN MIAMI-DADE OR BROWARD COUNTY MUST MEET SPECIFIC HVHZ REQUIREMENTS. CONSULT THE FBC AND THE HVHZ SECTION OF THIS MANUAL.

## 032 ALUMINUM GULFLOK

### REQUIREMENTS TO USE THESE LOAD TABLES

- a.) Site is located in **Any Exposure**
- b.) Structure has a **mean roof height of 30' or less**
- c.) Roof is either a **gable roof with slope between 0:12 and 12:12**, or a **hip roof with slope between 0:12 and 6:12**
- d.) Structure is a **low rise, regular shaped building**, per ASCE 7-10
- e.) Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).



### FASTENER PATTERNS

#### PATTERN A FASTENER EVERY HOLE (6" OC NOMINAL)



#### PATTERN B FASTENER EVERY HOLE (6" OC NOMINAL) WITH TITEBOND IN SEAM



### LOAD TABLES

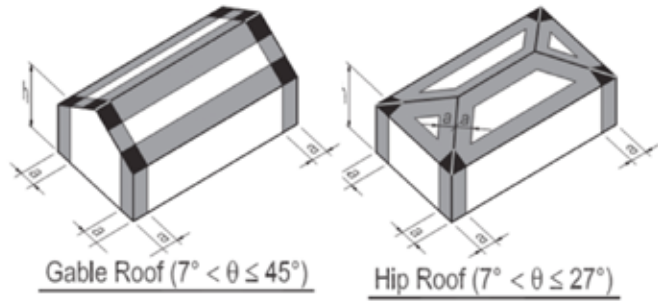
032 Aluminum (min) GulfLok on 15/32" plywood (min) with #10 screw (min) (NOT APPROVED FOR HVHZ)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	A	A	A	A	A	A	B	B
Zone 2	A	A	B	B	B	B	B	---
Zone 3	B	B	B	B	B	---	---	---

## 24GA (MIN) GULFSEAM

### REQUIREMENTS TO USE THESE LOAD TABLES

- Site is located in **Any Exposure**
- Structure has a **mean roof height of 30' or less**
- Roof is either a **gable roof with slope between 0:12 and 12:12**, or a **hip roof with slope between 0:12 and 6:12**
- Structure is a low rise, regular shaped building, per ASCE 7-10
- Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).

### ROOF ZONES



- ☐ Interior Zones  
 Roofs-Zone 1 / Walls-Zone 4
- ☐ End Zones  
 Roofs-Zone 2 / Walls-Zone 5
- ☐ Corner Zones  
 Roofs-Zone 3
- $a$ : 10 percent of least horizontal dimension or 0.4h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).

### FASTENER PATTERNS

#### PATTERN A24

24" CLIP SPACING, (2) FASTENERS PER CLIP



#### PATTERN A18

18" CLIP SPACING, (2) FASTENERS PER CLIP



#### PATTERN A12

16" CLIP SPACING, (2) FASTENERS PER CLIP



### LOAD TABLES

24ga (min) GulfSeam on 1x4's on 15/32" plywood (min) with #10 screw (min), 16" wide panel (max) (NOT APPROVED FOR HVHZ)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	A18	A18	A18	A18	A18	A18	A18	A18
Zone 2	A18	A18	A18	A18	A18	A18	---	---
Zone 3	A18	A18	A18	---	---	---	---	---

24ga (min) GulfSeam on 15/32" plywood (min) with #10 screw (min), 18" wide panel (max) (NOT APPROVED FOR HVHZ)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	A24	A24	A24	A24	A24	A24	A24	A12
Zone 2	A24	A24	A24	A24	A12	A12	A12	---
Zone 3	A24	A12	A12	A12	---	---	---	---

24ga (min) GulfSeam on 1x4's on 15/32" plywood (min) with #10 screw (min), 18" wide panel (max) (NOT APPROVED FOR HVHZ)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	A24	A24	A24	A24	A24	A24	A24	A24
Zone 2	A24	A24	A24	A24	A24	A24	A24	A12
Zone 3	A24	A24	A24	A24	A12	A12	A12	---

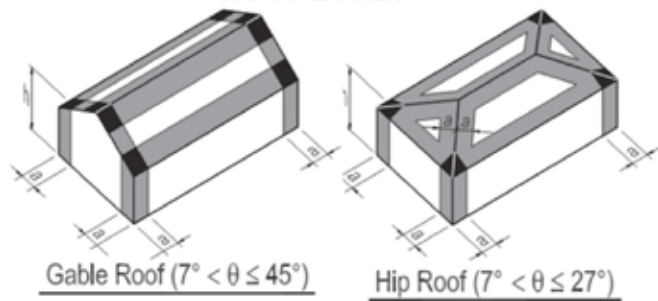


## 032 ALUMINUM (MIN) GULFSEAM

### REQUIREMENTS TO USE THESE LOAD TABLES

- a.) Site is located in **Any Exposure**
- b.) Structure has a **mean roof height of 30' or less**
- c.) Roof is either a **gable roof with slope between 0:12 and 12:12**, or a **hip roof with slope between 0:12 and 6:12**
- d.) Structure is a low rise, regular shaped building, per ASCE 7-10
- e.) Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).

### ROOF ZONES



- ☐ Interior Zones  
Roofs-Zone 1 / Walls-Zone 4
  - ☐ End Zones  
Roofs-Zone 2 / Walls-Zone 5
  - ☐ Corner Zones  
Roofs-Zone 3
- a: 10 percent of least horizontal dimension or 0.4h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).

### FASTENER PATTERNS

#### PATTERN A18

18" CLIP SPACING, (2) FASTENERS PER CLIP



#### PATTERN A6

6" CLIP SPACING, (2) FASTENERS PER CLIP



### LOAD TABLES

032 Aluminum (min) GulfSeam on 15/32" plywood (min) with #10 screw (min), 18" wide panel (max)  
(NOT APPROVED FOR HVHZ)

Wind:	120	130	140	150	160	170	180	200
Zone 1	A18	A18	A18	A18	A18	A18	A18	A18
Zone 2	A18	A18	A18	A18	A18	---	---	---
Zone 3	A18	A18	---	---	---	---	---	---

032 Aluminum (min) GulfSeam on 15/32" plywood (min) with #10 screw (min), 16" wide panel (max)  
(NOT APPROVED FOR HVHZ)

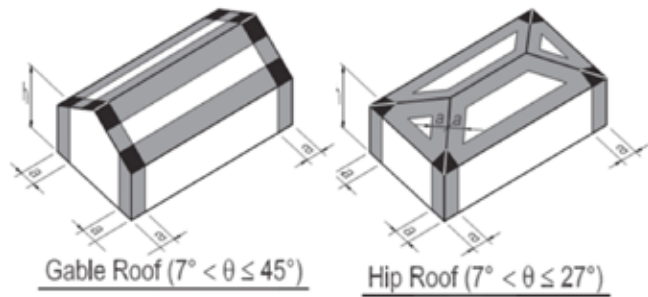
Wind:	120	130	140	150	160	170	180	200
Zone 1	A18	A18	A18	A18	A18	A18	A18	A18
Zone 2	A18	A18	A18	A18	A18	A6	A6	A6
Zone 3	A18	A18	A6	A6	A6	A6	---	---

## 24GA (MIN) VERSALOC

### REQUIREMENTS TO USE THESE LOAD TABLES

- Site is located in **Any Exposure**
- Structure has a **mean roof height of 30' or less**
- Roof is either a **gable roof with slope between 0:12 and 12:12**, or a **hip roof with slope between 0:12 and 6:12**
- Structure is a **low rise, regular shaped building**, per ASCE 7-10
- Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).

### ROOF ZONES

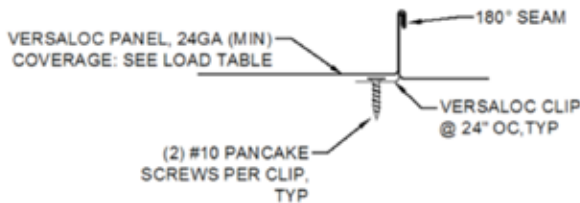


- Interior Zones  
 Roofs-Zone 1 / Walls-Zone 4
  End Zones  
 Roofs-Zone 2 / Walls-Zone 5
  Corner Zones  
 Roofs-Zone 3

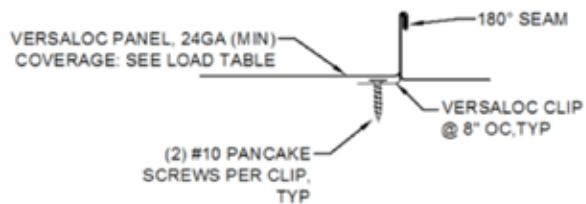
$a$ : 10 percent of least horizontal dimension or  $0.4h$ , whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).

### FASTENER PATTERNS

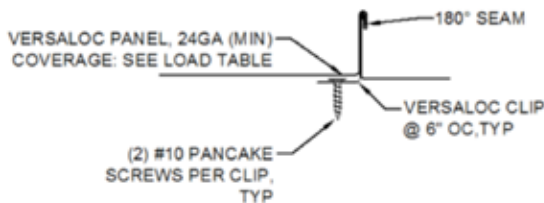
#### PATTERN D24 24" CLIP SPACING, 180° SEAM, (2) FASTENERS PER CLIP



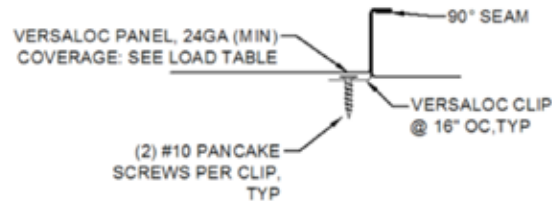
#### PATTERN D8 8" CLIP SPACING, 180° SEAM, (2) FASTENERS PER CLIP



#### PATTERN D6 6" CLIP SPACING, 180° SEAM, (2) FASTENERS PER CLIP



#### PATTERN S16 16" CLIP SPACING, 90° SEAM, (2) FASTENERS PER CLIP



### LOAD TABLES

24ga (min) VersaLoc on 15/32" plywood (min) with #12 screws, 16" wide panel (max)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	D24	D24	D24	D24	D24	D24	D6	D6
Zone 2	D24	D24	D24	D6	D6	D6	D6	D6
Zone 3	D6	D6	D6	D6	D6	---	---	---

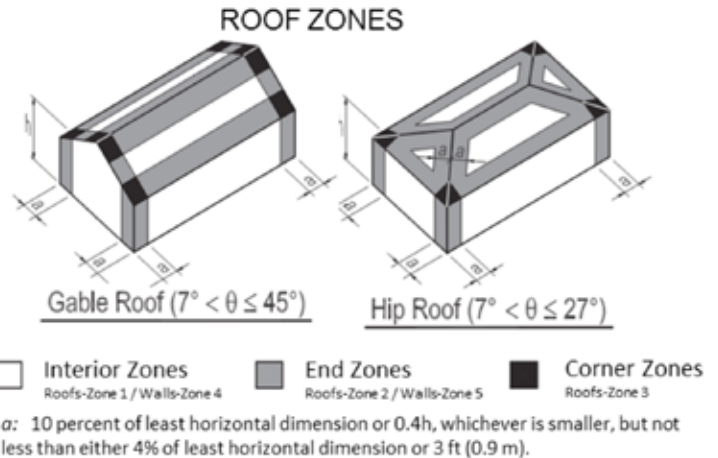
24ga (min) VersaLoc on 15/32" plywood (min) with #10 screws, 20" wide panel (max) (NOA only)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	S16	S16	S16	S16	S16	S16	S16	S16
Zone 2	S16	S16	S16	S16	S16	S16	S8	S8
Zone 3	S16	S16	S16	S8	S8	D8	D8	D8

INSTALLATION IN MIAMI-DADE OR BROWARD COUNTY MUST MEET SPECIFIC HVHZ REQUIREMENTS. CONSULT THE HVHZ SECTION OF THIS MANUAL FOR MORE DETAILS.

## 032 ALUMINUM (MIN) VERSALOC

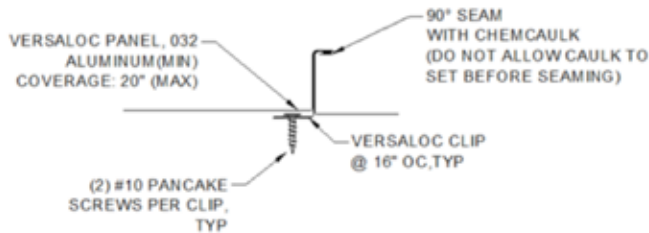
### REQUIREMENTS TO USE THESE LOAD TABLES

- Site is located in **Any Exposure**
- Structure has a **mean roof height of 30' or less**
- Roof is either a **gable roof with slope between 0:12 and 12:12**, or a **hip roof with slope between 0:12 and 6:12**
- Structure is a **low rise, regular shaped building**, per ASCE 7-10
- Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).

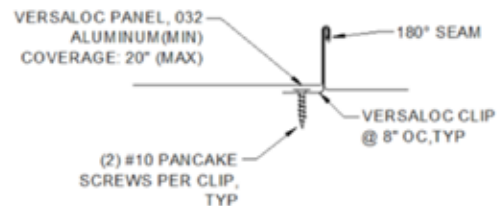


### FASTENER PATTERNS

#### PATTERN S16-S 16" CLIP SPACING, 90° SEAM, (2) FASTENERS PER CLIP



#### PATTERN D8 8" CLIP SPACING, 180° SEAM, (2) FASTENERS PER CLIP



### LOAD TABLES

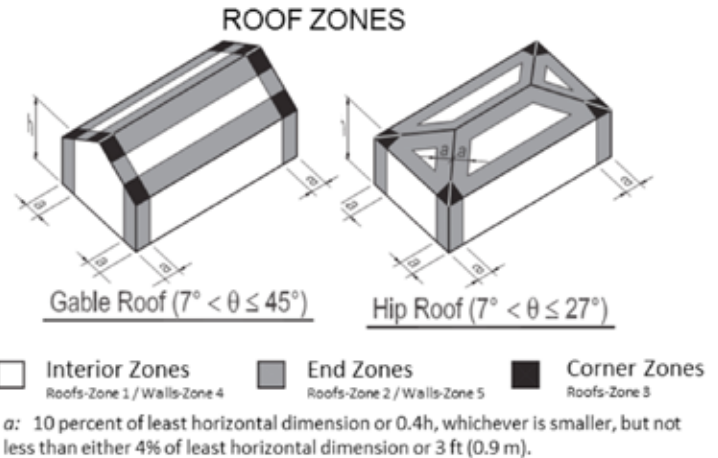
032 Aluminum (min) VersaLoc on 15/32" plywood (min) with #10 screws (min), 20" wide panel (max) (NOA only)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	S16s	S16s	S16s	S16s	S16s	S16s	S16s	S16s
Zone 2	S16s	S16s	S16s	S16s	S16s	S16s	S16s	D8
Zone 3	S16s	S16s	S16s	S16s	S16s	D8	D8	---

INSTALLATION IN MIAMI-DADE OR BROWARD COUNTY MUST MEET SPECIFIC HVHZ REQUIREMENTS. CONSULT THE HVHZ SECTION OF THIS MANUAL FOR MORE DETAILS.

## 16OZ PURE COPPER (MIN) VERSALOC

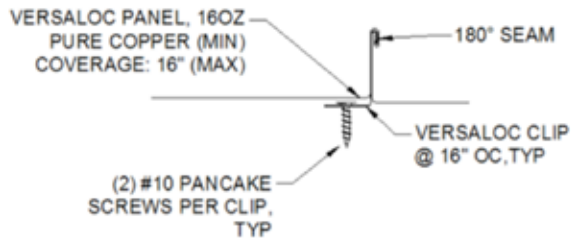
### REQUIREMENTS TO USE THESE LOAD TABLES

- a.) Site is located in **Any Exposure**
- b.) Structure has a **mean roof height of 30' or less**
- c.) Roof is either a **gable roof with slope between 0:12 and 12:12**, or a **hip roof with slope between 0:12 and 6:12**
- d.) Structure is a low rise, regular shaped building, per ASCE 7-10
- e.) Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).

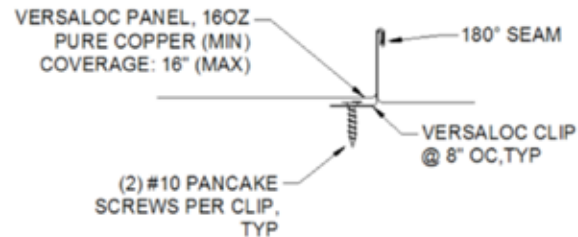


### FASTENER PATTERNS

#### PATTERN D16 16" CLIP SPACING, 180° SEAM, (2) FASTENERS PER CLIP



#### PATTERN D8 8" CLIP SPACING, 180° SEAM, (2) FASTENERS PER CLIP



### LOAD TABLES

16oz pure copper (min) VersaLoc on 15/32" plywood (min) with #10 screws, 16" wide panel (max) (NOA only)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	D16	D16	D16	D16	D16	D16	D16	D16
Zone 2	D16	D16	D16	D16	D16	D8	D8	D8
Zone 3	D16	D16	D8	D8	D8	D8	D8	---

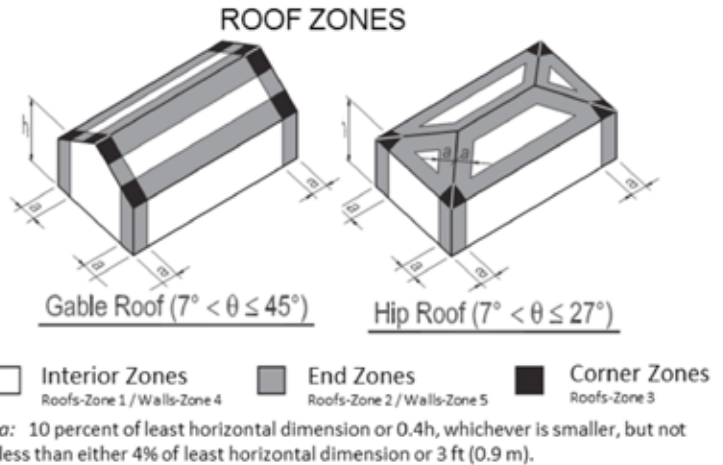
INSTALLATION IN MIAMI-DADE OR BROWARD COUNTY MUST MEET SPECIFIC HVHZ REQUIREMENTS. CONSULT THE HVHZ SECTION OF THIS MANUAL FOR MORE DETAILS.



## 24GA (MIN) MEGALOC

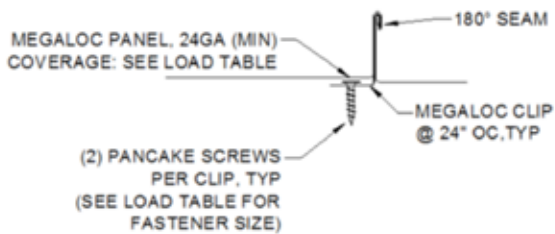
### REQUIREMENTS TO USE THESE LOAD TABLES

- Site is located in **Any Exposure**
- Structure has a **mean roof height of 30' or less**
- Roof is either a **gable roof with slope between 0:12 and 12:12**, or a **hip roof with slope between 0:12 and 6:12**
- Structure is a low rise, regular shaped building, per ASCE 7-10
- Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).

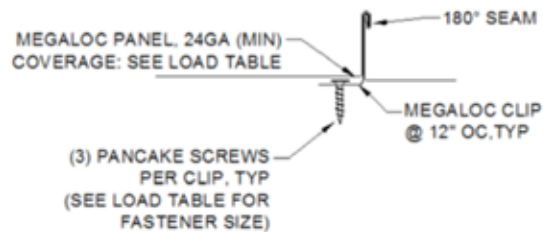


### FASTENER PATTERNS

#### PATTERN D24 24" CLIP SPACING, 180° SEAM, (2) FASTENERS PER CLIP



#### PATTERN D12+ 12" CLIP SPACING, 180° SEAM, (3) FASTENERS PER CLIP



### LOAD TABLES

24ga (min) MegaLoc on 15/32"plywood (min) with #10 screws, 18" wide panel (max) (NOT APPROVED FOR HVHZ)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	D24	D24	D24	D24	D24	D24	D24	D12
Zone 2	D24	D24	D24	D24	D12	D12	D12	---
Zone 3	D24	D12	D12	D12	---	---	---	---

24ga (min) MegaLoc on 22ga steel deck (min) with #14 screws, 22" wide panel (max) (NOA only)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	D24	D24	D24	D24	D24	D24	D24	D24
Zone 2	D24	D24	D24	D24	D24	D24	D24	D12+
Zone 3	D24	D24	D24	D24	D12+	D12+	D12+	D12+

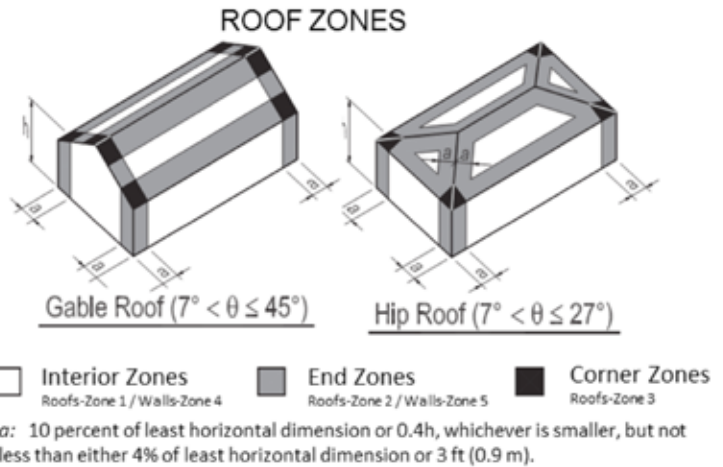
INSTALLATION IN MIAMI-DADE OR BROWARD COUNTY MUST MEET SPECIFIC HVHZ REQUIREMENTS. CONSULT THE HVHZ SECTION OF THIS MANUAL FOR MORE DETAILS.



## 032 ALUMINUM (MIN) MEGALOC

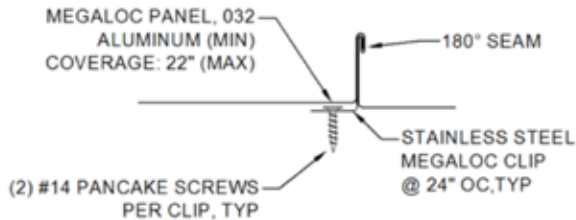
### REQUIREMENTS TO USE THESE LOAD TABLES

- Site is located in **Any Exposure**
- Structure has a **mean roof height of 30' or less**
- Roof is either a **gable roof with slope between 0:12 and 12:12**, or a **hip roof with slope between 0:12 and 6:12**
- Structure is a low rise, regular shaped building, per ASCE 7-10
- Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).

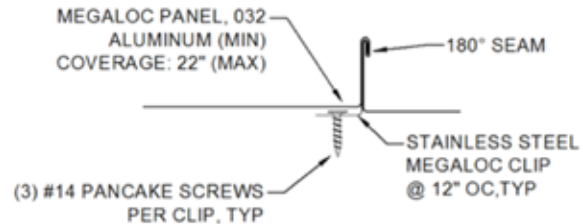


### FASTENER PATTERNS

#### PATTERN D24 24" CLIP SPACING, 180° SEAM, (2) FASTENERS PER CLIP



#### PATTERN D12+ 12" CLIP SPACING, 180° SEAM, (3) FASTENERS PER CLIP



### LOAD TABLES

032 Aluminum (min) MegaLoc on 22ga steel deck (min) with #14 screws (min), 18" wide panel (max) (NOA only)								
Wind:	120	130	140	150	160	170	180	200
Zone 1	D24	D24	D24	D24	D24	D24	D24	D24
Zone 2	D24	D24	D24	D24	D24	D24	D24	D12+
Zone 3	D24	D24	D24	D24	D24	D12+	D12+	---

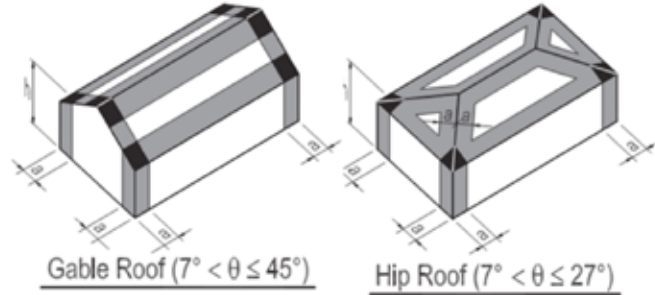
INSTALLATION IN MIAMI-DADE OR BROWARD COUNTY MUST MEET SPECIFIC HVHZ REQUIREMENTS. CONSULT THE HVHZ SECTION OF THIS MANUAL FOR MORE DETAILS.

## 24GA MEGALOC STRUCTURAL

### REQUIREMENTS TO USE THESE LOAD TABLES

- Site is located in **Any Exposure**
- Structure has a **mean roof height of 30' or less**
- Roof is either a **gable roof with slope between 0:12 and 12:12**, or a **hip roof with slope between 0:12 and 6:12**
- Structure is a **low rise, regular shaped building**, per ASCE 7-10
- Site and structure are free of characteristics which would require further analysis (e.g. wind channeling/buffeting, across wind loading, vortex shedding, or instability due to flutter or galloping).

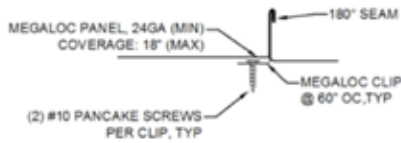
### ROOF ZONES



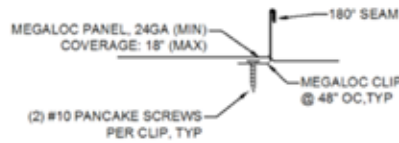
- ☐ Interior Zones  
 Roofs-Zone 1 / Walls-Zone 4
- ☐ End Zones  
 Roofs-Zone 2 / Walls-Zone 5
- ☐ Corner Zones  
 Roofs-Zone 3
- a: 10 percent of least horizontal dimension or 0.4h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).

### FASTENER PATTERNS

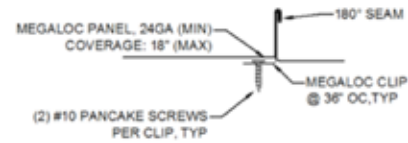
**PATTERN D60**  
60" CLIP SPACING, 180° SEAM, (2)  
FASTENERS PER CLIP



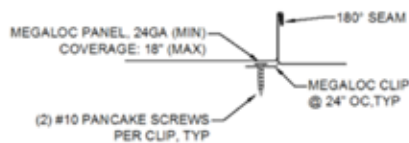
**PATTERN D48**  
48" CLIP SPACING, 180° SEAM, (2)  
FASTENERS PER CLIP



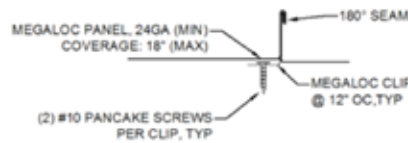
**PATTERN D36**  
36" CLIP SPACING, 180° SEAM, (2)  
FASTENERS PER CLIP



**PATTERN D24**  
24" CLIP SPACING, 180° SEAM, (2)  
FASTENERS PER CLIP



**PATTERN D12**  
12" CLIP SPACING, 180° SEAM, (2)  
FASTENERS PER CLIP



### LOAD TABLES

24ga (min) VersaLoc on 16ga steel framing (min)  
with #10 screws, 18" wide panel (max) (NOT  
APPROVED FOR HVHZ)

Wind:	120	130	140	150	160	170	180	200
Zone 1	D60	D60	D60	D60	D48	D48	D48	D36
Zone 2	D60	D48	D48	D36	D36	D24	D24	---
Zone 3	D36	D36	D24	D12	D12	---	---	---

# APPENDIX E: DI SEAMERS INSTRUCTION SHEET

Gulf Coast is proud to partner with DI Seamers to provide mechanical seamers built specifically for Gulf Coast panels. Please refer to <http://gulfcoastsupply.diroofseamers.com/> for more information and for the latest instructions. This instruction sheet is accurate as of March of 2018.

**GENERAL** This seaming guide is provided by Developmental Industries, Inc./D.I. Roof Seamers as the recommended procedure for seaming of your roof system. This guide is intended to be used with your Installation Guide and your project's erection drawings. You are responsible for proper seaming of the roof in accordance with the erection drawings and this seaming guide, and in accordance with good engineering and construction practices.

**SEAMING KIT** The seaming equipment will normally be provided as a seaming kit. The seaming kit will consist of the following: (1) Seaming Kit Shipping/Storage Container - Contains and protects the seaming tools during shipment and daily storage. (2) Roof Seamer - Electric Roof Seamer for forming your roof panel. The machine is specially equipped and setup for your particular roof panel. (3) Shipping Documents - Copies of your shipping information and certifications for each piece of equipment in the kit. (4) Seaming Guide - A Guide for basic use, operation and troubleshooting. (5) Hand Crimper(s) - These ARE NOT automatically included when you order your machine because some builders own their hand crimper(s). (6) Field Repair Kit - This kit contains some perishable items that may wear during your use of the machine and the tools to replace them with, if needed. Anything used from this kit must be replaced with the used part. Failure to do so will result in a charge for the missing items.

**RECEIVING & SHIPPING** Upon receipt of the seaming kit, and before signing the shipping receipt, verify that the seaming kit is received in good condition without damage or loss of contents. If there is damage or loss, immediately file the claim with the shipper and notify D.I. Roof Seamers at 1-888-343-0456. Upon completion of roof seaming, promptly return the seaming kit to the D.I. Roof Seamers facility that your equipment was shipped from.

**HANDLING & STORAGE** Always provide safe and secure handling of the seaming tools when in use. The machine and other parts can cause severe damage and injury if they fall, the machine should be tethered at all

times while on the roof. The machine may be too heavy to carry up a ladder. Always hoist the machine onto the roof with proper lifting equipment or with a proper sized rope/tether attached securely to the machine. When starting and finishing the seaming machine at the edges of the roof, the operator and machine must be securely positioned and tethered so that they can safely lift the machines on and off the seam. When running the machine in the down-slope direction, the machine will have greater inertia and coasting distance. When not locked on the seam, the machine can freely roll on its wheels. Always secure the machine to prevent its rolling or sliding off the roof. At the end of use or when the seaming tools are not in use, the machine must be stored in the seaming kit container, in a safe and dry area. The seaming tools must be cleaned and dried before storing.

**ELECTRICAL REQUIREMENTS & SAFETY** The seaming machine motor requires a minimum electrical power supply of 20 amp @ 120 Volts @ 60 Hz AC. The electrical service and cords to the seaming machine must be of sufficient capacity to provide the full 20 amp @ 120 Volts at the seaming machine. If other tools or equipment are being used on the same service, the service and cord capacity must be increased accordingly. Low voltage due to insufficient cord size or excessive cord length will cause overheating and burnout of the seaming machine's motor.

## RECOMMENDED EXTENSION CORD SIZE


Distance (Ft)	0-50	50-100	100-200	200+
Wire Gauge	12	10	8	6

Verify the power cords are fitted with the correct plug for safe and secure electrical connection to the seaming machine. Insure that the power cords are properly grounded and that the service has a ground fault circuit breaker. Insure that the electrical cord is sufficient length to extend the full length of the area to be seamed without stress on the cord or its connections. Insure that the path for the cord is clear and that the cord is clear of snagging on the panel edges or

entanglement into the seaming machine rollers. Insure that the cord is seated completely into the machine's power port to prevent a faulty connection and damage to the motor.

**INSURANCE** You should provide adequate insurance coverage on the seaming tools while they are in your possession and use. No credit will be issued if you lose the machine and you will be fully responsible for any and all rental charges plus the retail value of the Roof Seamer and the Seaming Kit including the case.

**SEAM TYPES** Your project's design and roof performance requirements govern which seam type is required. Different seam types may be required on specific areas of the same roof. In all cases, refer to the erection drawings to determine the required seam type and location. The 90° Seam requires seaming the roof panel with the 90° Hand Crimper at the eave, ridge end of the roof panel and at the endlaps. Then seaming the full length of the roof panels with the electric seaming machine.

 The 180° Seam requires that the roof panel be previously seamed or hand crimped with the 90° Hand Crimper. The starting point must be seamed with the 180° Hand Crimper. Then re-seaming specific areas of the roof with the electric seaming machine.

**ROOF PERFORMANCE** The roof panels must be correctly seamed before the roof system can provide its designed wind load and weather resistance capability. This means that an un-seamed or improperly seamed roof is subject to wind load failure and/or weather resistance failure. D.I. recommends that you "seam as you go". This means that the roof panels should be seamed as they are installed. This minimizes the opportunity for modulation issues and other common installation problems



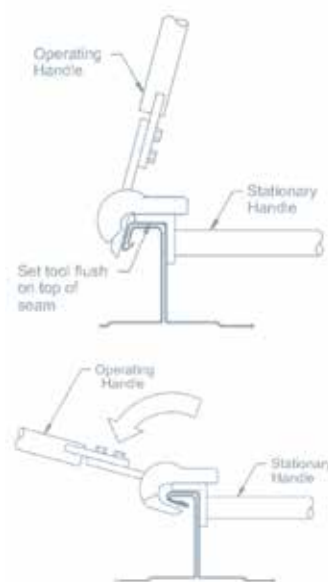
## PANEL INSTALLATION

Insure proper installation of your roof panels according to the panel manufacturer's instruction. Poor installation practices can result in faulty seaming. Such faulty seaming can result in seaming difficulty and objectionable seam appearance

and in severe cases reduction in roof performance specification. You may use D.I.'s Panel Clamps to assist you in the installation of you panels. Contact us at 1-888-343-0456 or online at [www.diroofseamers.com](http://www.diroofseamers.com) to order.

## 90° HAND CRIMPING

Orient the 90° Hand Crimper onto the roof panel seam as shown. The stationary handle must be in the horizontal position and the operating handle must be rotated up to the open position. When the tool is correctly positioned on the panel, push the stationary handle down solidly against the top of the seam. While holding the stationary handle in the horizontal position, rotate the operating handle down to the horizontal position. This will form the seam.



**CHECKING THE FINISHED SEAM** Rotate the operating handle to the open position, remove the tool and check that the seam is correctly formed. If the hand crimper does not correctly form the seam, DO NOT continue seaming and contact D.I. Roof Seamers Technical Support at 1-888-343-0456.

**ROOF SEAMER DIRECTION** The direction of the seaming machine will be noted near the power switch or on the motor. Note the seaming direction BEFORE attempting to use the tool.

**MACHINE POSITION ON THE ROOF PANEL** With the locking handle held up in the open position, set the seaming machine onto the starting end of the roof panel's seam over the hand crimped portion of the seam. Roll the seaming machine forward to align the front tooling over the un-seamed portion of the seam. When the machine is in the correct position on the seam, pull the locking handle out to the locked position. The locking handle should lock with minimal resistance when force is applied. If the locking handle will not readily lock, roll the machine forward or backward slightly until a position is found where the locking handle will readily lock. If the locking handle still does not lock, check the hand crimping to be sure it is in proper form. Once the locking handle is locked, check that the machine's tooling is properly engaged.

**CLEAN THE SEAMS** The roof panel must be thoroughly cleaned of abrasive dirt or dust that can cause scuffing



of scratching of the seam surface. The roof panel seams must be cleaned of grease or other contaminants which can cause seaming machine slippage and marking of the seam surface.

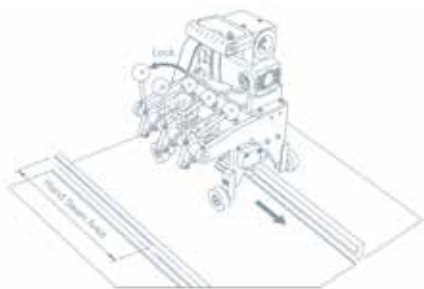
### **RUNNING THE SEAMING MACHINE**

**CHECK** Check that the machine's path is clear of power cords, tools, debris, tether lines, etc. Start the machine by turning on the machine's toggle switch. Watch the machine and finished seam carefully for any indications of machine malfunction or faulty seaming. Caution: The seaming machine must always be in the vertical position while seaming. Do not allow the machine to tilt sideways when locking the machine onto the seam or while the machine is running. On roofs with high stand-off clips, walking or standing on the panel next to the machine can deflect the panel and cause the machine to tilt. Do not walk or stand on the panel next to the machine while it is running.

**STOPPING THE MACHINE** Stop the machine by turning off the machine's toggle switch. Always allow sufficient space for the machine to coast after turning the machine off. Do not run the machine into previously installed end dams or other obstructions. Note: The 180° Seam will stop just short of the installed end dams approximately 12". The seam should already be 90° hand crimped at the ridge prior to installation of the end dams. The end dams are designed for 90° Seams only. This does not affect the performance of the roof system. Caution: Stop the machine immediately and investigate any indication of machine malfunction or faulty seaming. If the machine does not correctly form the seam, DO NOT continue seaming and contact D.I. Roof Seamers Technical Support at 1-888-343-0456.

**UN-LOCKING THE MACHINE** After the machine is turned off and has fully stopped, lift up the locking handle to the open position to un-lock the machine from the seam. Using the lift handle, the machine can be lifted from the seam. If the machine must be stopped and removed before completing the seam, use a felt marker to mark the position of the machine's front wheel on the panel. The machine can later be repositioned on the mark to complete the seaming.

**CHECKING THE FINISHED SEAM** At the completion of each seam, check the full length of the seam for any indications of faulty seaming. The seaming operation exerts high pressure bending forces on the seam.



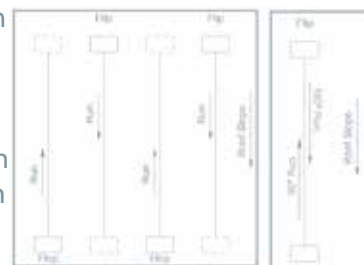
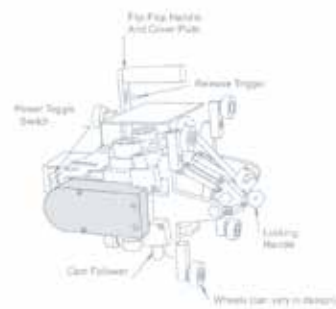
Under such conditions, minor burnishing, pressure marks and dark marking of the seam surface is normal and acceptable. Many markings may be removed with mild cleaning solutions or solvents.

### **"FLIP FLOP" MACHINE NOMENCLATURE**

The following information identifies the operational parts of the "Flip Flop" seaming machine.

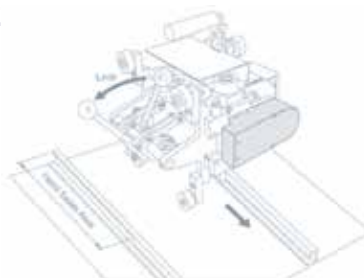
### **DIFFERENCE IN SEAMING DIRECTION**

This machine is a very unique labor saving machine because it can form bi-directionally or can be two machines in one. The 90°/90° machine can be run, then "flipped" to run on the adjacent seam to save "drag back" time. The 90°/180° machine can be run as 90° Seam then be "flipped" to run in the opposite direction on the same seam to form 180° Seam.



### **LOCKING THE MACHINE ON THE SEAM**

When the machine is in the correct position on the seam, pull the locking handle out to the locked position. The locking handle should lock with minimal resistance when force applied. If the locking handle will not readily lock, roll the machine forward or backward slightly until a position is found where the locking handle will readily lock. If the locking handle still does not work, check the hand crimping to be sure it is in the proper form. Once the locking handle is locked, check that the forming rolls are properly aligned.



**STARTING THE SEAMING PROCESS** The basic seaming process of starting, running and stopping the "Flip Flop" machine is the same as described previously in this guide. Follow the same basic safety tips such as use of tether lines, stopping the machine near the eave and ridge, unlocking the machine, etc. Note: The 180° Seam will stop just short of the installed end dams approximately 12". The seam should already be 90° hand crimped at the ridge prior to installation of the end dams. The end dams are designed for 90° Seams only.

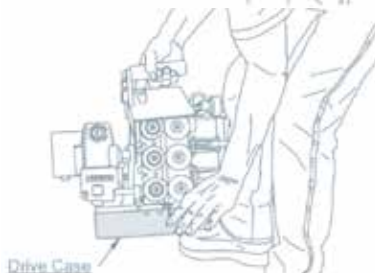


**FLIPPING THE “FLIP FLOP” MACHINE** Flipping the machine to change the seaming direction is a three step process. The machine will need to be held aloft during this process in order to not damage the panel finish.

**Step 1:** Using your index finger, lift up on the release trigger until you hear or feel the top plate disengage.



**Step 2:** While still holding the seamer aloft, use your free hand to rotate the forming rollers to the next stage.



**Step 3:** Continue to rotate the unit until the release trigger reengages and is stabilized with a clicking sound. The unit is now ready to be set onto the next work area.



**SEAMING MACHINE MAINTENANCE** The seaming machine is a precision fabricated, high performance, portable roll forming machine. This relatively lightweight machine does the tough job of forming the extra strong 90° and 180° Seam finished seam under often rugged field conditions. Although designed for tough industrial use, the seaming machine requires proper maintenance to assure proper seaming and efficient, trouble free operation. Caution: Failure to properly maintain the seaming machine as instructed below can result in faulty or damaged seams and costly break-down of the seaming machine.

**FORMING ROLLERS** The forming rollers require the following regular maintenance: (A) Assure that the forming rollers are free of dirt, grease, sealant/mastic, etc. (B) Spray the forming rollers with WD-40 (or equal). (C) Assure that the forming rollers are tight on their

shafts. Check and tighten the roller's retainer screws as necessary. (D) On painted roofs, especially during very hot or abrasive conditions, spraying or misting the seams with water, or a light lubricant such as WD-40, ahead of the seaming machine may significantly reduce burnishing and forming marking of the seam surface. (E) On very dry Galvalume roofs, spraying or misting the seams with water, or a light lubricant such as WD-40, ahead of the seaming machine may significantly reduce seaming friction and Galvalume build-up on the forming rollers. (F) When 180° Seaming, the increased seaming pressures may require spraying or misting the seams with water, or a light lubricant such as WD-40, ahead of the seaming machine, significantly reducing burnishing and forming marks of the seam surface.

**COOLING VENTS** To prevent motor overheating, the motor has vents and an internal fan to provide cooling air flow over the internal motor parts. Check frequently to assure that these vents are kept clean and clear of debris, etc. While the machine is running, never cover the machine or place it in a position where the cooling air flow to the vents will be restricted.

**HOUR METER** Your roof seamer may be equipped with an hour meter near the machine's power port. This is used by D.I. Roof Seamers to track the maintenance of the machine. This meter will only run when the power switch is in the "ON" position. DO NOT attempt to alter or otherwise tamper with this meter. Evidence of this will result in additional charges. If the meter displays anything other than normal numeric values, please refer to the ELECTRICAL REQUIREMENTS & SAFETY section of this guide to insure proper power supply and contact D.I. Roof Seamers Technical Support at 1-888-343-0456 for instructions.

**For more information, instructional videos and much more, visit [www.diroofseamers.com](http://www.diroofseamers.com) or call 1-888-343-0456.**

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# APPENDIX F: REVISION LOG

8 March 2018: First publication.

