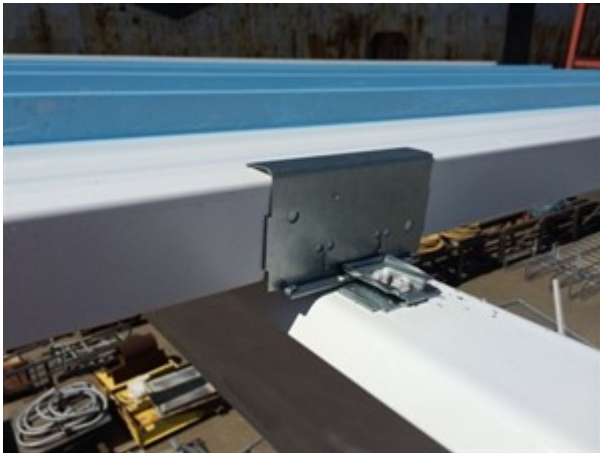




# The FAQs of Standing Seam Panel Clips

By Mark Robins, Posted 07/05/2017

*These questions and answers provide information about standing seam panel clips*



Structural standing seam panels mate a male interlock into a female leg creating a clip to ensure a continuous secure seam along the full length of a metal sheet. These metal clips secure the panels, and are applied and fastened to the purlins or building structure. It's a well-known industry expression, but the truth is: a standing seam roof is only as reliable as the clips that hold it together. To learn more, what follows are some of the most important questions and answers that provide a better understanding of standing seam panel clips.

## What are Clips' Benefits?

By using clips, panel installation occurs without penetration and produces a monolithic, weathertight system. Because they are concealed, clips help give the appearance of a sleek and streamlined finish.

But clips do much more than attach panels and make the roof look nice. "Standing seam metal roof clips are specifically designed to interact with their corresponding roof panels to accommodate design loads, allow movement caused by thermal changes and minimize deflection due to friction," says Duane Sailors, vice president of engineering and sales, [BPD, a LSI Group company](#), Logansport, Ind.

"Clips are designed to match the profile of the intended panel to allow for a nested installation. This nesting allows necessary movement as well as sealed seams and aesthetic appearance. It is important to understand the necessary movement is due to thermal influence: both interior and exterior."

"Standing seam metal panel clips are designed to enable dimensional change of the panel without fatigue of its fastening, allowing for the thermal cycling process," says Cindy DeBellis, sales director, [SFS Group USA Inc.](#), Wyomissing, Pa. "They provide durability and protection from the elements as well as improved aesthetics as they are a concealed fastening system as opposed to throughfastened systems."

Because standing seam panel clips are concealed, when compared to through-fastened panel systems, "[They] are not subject to fastener corrosion, seal deterioration and thermal-induced hole elongation," says Bobby Marks Jr., staff engineer, [Berridge Manufacturing Co.](#), Houston. "A standing seam panel in many applications is a permanent roof, wherein a through-fastened panel system has a limited life cycle."



### **What Clip Should I Use?**

Not all clips are alike. There are one-piece clips and two-piece clips. "One piece clips are typically only used on our snap-together profiles," says Jeff Haddock, technical representative, [AEP Span](#), Fontana, Calif. "One-piece clips are designed to allow the panel to expand and contract within the clip. This allows for unlimited thermal movement of the panel while still securing the panel to the substrate."

Two-piece clips are often referred to as floating clips. These types of clips are generally used with mechanically seamed profiles. This is due to the clip being seamed/folded into the panel's vertical leg. "Seaming it into the panel's vertical leg prevents the panel from expanding and contracting like a one-piece clip would allow," Haddock says. "A twopiece clip system includes the body of the clip and the base. The body is installed onto the male leg of the panel and the base secured to the substrate. The female leg of the next panel is installed over the male leg and seamed into place. This locks the clip into position requiring the main body and base to move independently of each other."

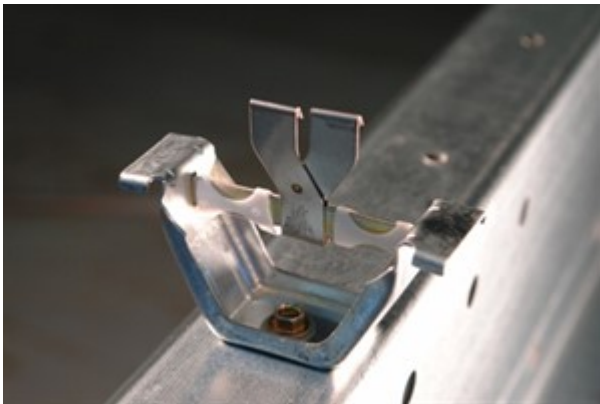
Small differences in clips can result in major performance differences. "Having a clear discussion with the designer helps to resolve any unexpected long-term performance differences," says Joseph

Mellott, vice president, [Innovative Metals Co. Inc. \(IMETCO\)](#), Norcross, Ga. "An educated discussion with the manufacturer or designer can reveal a lot about the design and performance differences of clips."

## What About Thermal Expansion?

Standing seam steel panels undergo a notable amount of thermal expansion. Brian Gough, senior engineer, [ASC Profiles](#), West Sacramento, Calif., says this varies depending on climate, panel coating, etc., but believes a good rule of thumb is around 1/8-inch of thermal expansion for every 10 feet of panel length. This means that, "An 80-foot panel will need to accommodate a full inch of expansion and contraction," he says. "Panel clips are key to managing this thermal expansion and contraction.

"One-piece clips are designed to slide freely within the panel seam. Two-piece clips are seamed into the panel hem, and have a slotted upper- and lower-clip half to accommodate the thermal expansion. It can vary based on panel design, but in general, one-piece clips offer unrestricted thermal movement as they can move freely within panel seam. Two-piece clips on the other hand have a slotted interface between the two clip halves and have limitations on maximum t These questions and answers provide information about standing seam panel clips hermal movement."



## What About Clip Spacing?

Haddock says spacing is the most common question he receives about clips. "Clip spacing can vary drastically based on project application, substrate, wind speed, uplift pressure and panel performance to name a few," he says. "Unfortunately, there isn't a one-size-fits-all spacing. Quality manufacturers should have ample testing such as UL, FM and ASTM that have tested the panel systems with specific clip spacing based on substrate application. When in doubt it's best to use the spacing of a qualified test result."

Mellot agrees that correct wind uplift calculations need to be performed to establish clip spacing based on panel widths, building type, and exposure and geographic requirements. "Quality manufacturers and designers perform wind uplift calculations on every job," he says.

## What About Clip Size?

Manufacturers should have predetermined clip sizes for use with their roof systems. There are a few factors that determine the clip size. "For snap seam clips, it is primarily the height of the male panel leg and to a lesser extent the shape of the panel rib," says Robert Harris, technical specialist and senior purchaser, [Marco Industries](#), Tulsa, Okla. "A drawing of the panel [can] be consulted to verify the clip dimensions needed. For mechanically seamed panels it is both the height of the panel rib and the width of the seam. The panel name of the rollformer is usually sufficient to determine the size requested."

Clip height can range from low profile, where the panel sits directly on the substrate, up to 1/2- inch or 1-inch taller than the panel profile. Haddock says using a taller clip creates an air gap between the substrate and the panel system. This gap can be used to ventilate the panel and prevent condensation build-up under the panel system.

## What Fastener Goes with the Clip?

Most fastener standards are based on a load test (ASTM E1592, UL580/1897) that defines panel capacity and sets the fastener parameters for the panel application. "Knowing the project design loads and the load capacity of the panel system, defined by a load test, will direct one to the correct fastening method," Marks says. "The panel system manufacturer should be able to assist. On applications with job-specific load calculations, then the engineer of record designs the fastener size and frequency."

DeBellis says fastener determination for clips is a result of what substrate (clips, metal) is being clipped and the material thickness that the fastener is going into. "This would determine if they need a type A point or a self-drill point," she says. "You would also need to determine the alloy, i.e., carbon steel or stainless steel."





## How Do I Reduce Visible Clip Read-Through?

With some installations, the panels hang from the clips and there is an air gap between the panel surface and the top of the clip base and fastener heads. In other assemblies the panels sit on, or just above the fasteners and clip base. In these applications the fasteners or clips may show (or read-through) to the panel surface.

"Quite often, clips in these applications utilize embossments on either side of the fastener holes to assist in providing an added bearing surface to reduce chance of fastener read-through," says Gough. "It is also important for installers to avoid walking on installed panels near the clip locations to help prevent this from occurring. Clips with embossments usually have restrictions on maximum fastener head height. Quite often, these panels require clip fasteners to be low, pan-head fasteners to reduce chances of fastener read-through."

## How Do I Install a Clip?

When installing standing seam metal roof clips, it's important to follow the manufacturer's directions, and use only manufacturer-supplied or specified components. "Variations in how the roof is assembled and secured to the building can have significant implications on its manufacturer warranty as well as code compliance," says Kevin Hutchings, product training manager, [Butler Manufacturing](#), Kansas City, Mo.

According to DeBellis, standing seam metal panel clips should be installed in such a manner that the panel fit with the clip is as accurate dimensionally as possible to fit over the male leg component. The female leg must fit securely over the top without having the fit too snug resulting in objectionably aesthetic read-through of the clip through the panel (commonly known as panel transfer). "In the case of a snap-lock profile, there would be no need for additional seaming," she says. "However, if the panel profile is a mechanically seamed profile, the use of either a hand crimper or mechanical seaming device if further required to complete the seaming process."





## **What About Compatibility?**

Marks says galvanized steel clips are compatible and acceptable for galvanized or Galvalume metal roof panels. "Aluminum roof panels require stainless steel clip systems," he adds. "All fasteners should be zinc coated as a minimum. Some fastener manufacturers have rust-resistant coatings that can be allowed."

## **What Else?**

Clips are critically important to ensure standing seam metal roofs function as intended, but they are just one part of the whole. "It's important to look at each component of the roof as a system, and even still, it really comes down to modularity," Hutchings says. "Always ensure the buildings' structurals are square and plumb before laying the panels. With a misaligned building, the clips may not facilitate adequate roof movement. Proper modularity is imperative for adequate movement and a weathertight roof. Misaligned modularity can lead to leaks because the panels stretch and tear when roof movement is hindered."