



Solving Challenging Flashing Applications

By Mark Robins, Senior Editor, Posted 01/31/2017

How to apply flashing on challenging metal roof situations



The majority of roof leaks occur at flashing points. To prevent this water penetration, flashing forms the intersections and terminations of roofing systems and surfaces. Most professional roofers can easily install a flashing membrane on the flat, open space of a metal roof and then secure it. But roof lines and profiles are getting more creative and complex. Installers are finding more challenging flashing applications that require more technique and detailed procedures to complete successfully.

In a perfect world, a standing seam metal roof would have zero penetrations from the roof eave to the roof ridge. But these long metal field runs used in lateral series are rarely unbroken. On metal roofs, square ducts, skylights, large round pipes, expansion joints, parapet walls, flashing dissimilar roofing materials and profiles all pose challenging flashing applications, says Jim Sharp, president of [Deks North America Inc.](#), Chicago.

Jeff Haddock, technical representative at [AEP Span](#), Fontana, Calif., believes dead valleys, dormer valleys, slope transitions, field-fabricated roof curbs, odd-shaped or oversized roof penetrations, large sheet metal crickets, and ridge/hip intersections are among the most difficult conditions to properly flash for weathertightness. "Preventing these conditions is extremely difficult as most buildings and building conditions are designed with aesthetic features which must utilize these conditions," he adds. "Designers do not typically take application or installation of difficult conditions into consideration when designing roof layouts." What follows is information on challenging flashing applications.

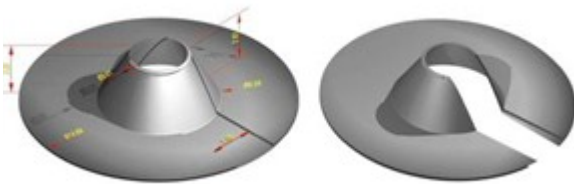


Challenging Pipe Flashing

All pipe and vent flashings that pass through metal roofs are challenging. "The 'common art' employed by metal roofing companies, installers, manufacturers and roofing specifiers for sealing pipe, vent and penetrations that exit through the surface of metal roofs are not even remotely acceptable to the National Roofing Contractors Association (NRCA) or any other legitimate roof specifying organization for other types of low-slope or steep-slope applications," says Lawrence P. Evensen, [All Style Industries](#), Henderson, Nev. "Surface-mounted, face-fastened and caulk-sealed flashings with up-slope edges are by definition, on any roofing installation, extremely poor trade craft." Evensen recommends cutting the pan at the penetration location, installing a flashing and then continuing with the pan to the ridge using an overlapping shingle fashion installation for pipe flashing applications.

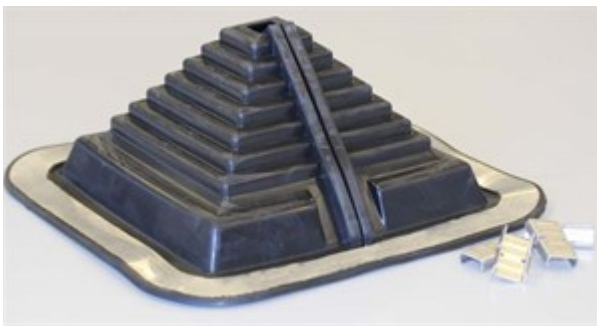
Challenging Thermal Movement

One of the most challenging flashing applications on metal roofs involves thermal expansion and contraction. This is especially so when tying a valley detail into the ridge detail as movement at these junctures can be severe.



John L. Pierson, PE, engineering services manager at [The Garland Co. Inc.](#), Cleveland, cites the below real-world example of how he solved an expansion problem for a roof owner who had been plagued with leaks for decades. It involved replacing a standing seam metal roof system with a large rooftop unit sitting across an expansion joint. The roof was flashed successfully using Pierson's following advice:

1. Determine how the expansion joint detail can move at this location. This is important for any metal flashing detail since metal panels and the flashing materials will expand and contract with temperature change.
2. Determine how water will drain across the flashing. Change of slope and change of plane in a flashing detail can force water, snow or ice in different directions.
3. Eliminate through fasteners.
4. Cover sealants, expandable flashing materials and underlayment membranes with the metal flashing material. When these components are exposed to the sun's ultraviolet rays, they will fail before the metal roof.
5. Figure out the detail before the job is bid. Provide a project-specific detail to all bidders to avoid costly change orders. The detail should be provided by the manufacturer to ensure compliance with warranty terms.
6. Provide inspection of the detail during installation to ensure compliance and assist the installer as needed.



When Todd Miller, president of [Isaiah Industries Inc.](#), Piqua, Ohio, replaced an asphalt shingle roof with a metal shingle system on a very large building with a unique construction, he faced a similar situation. "They had included expansion joints in the roof which, with the asphalt shingles, were being handled with a thick rubber material," Miller says. "When changing to a metal system, we did not want to trust the rubber material to last as long as the metal shingles. So, we created accordion-style expansion pleats out of 0.032-inch-thick aluminum and then flashed the metal shingles against those similar to an open style of valley. We had the opportunity to re-visit this project a few years later when the building was added on to, and the expansion joint was performing very well."

Challenging Dormers

Dormer flashings on the high side of the dormer, into the panel that transitions, require valley detailing at the correct width, flat panning at the high side of the dormer and tying the transition back into the downward slope. "Often diverters are installed or hand fabricated with literally no attention or the proper rise back up-slope on the dormer," says Mike Gwizdala, director of product management at [Duro-Last Inc.](#), Saginaw, Mich. "The cricket is not welded, which can allow moisture migration, dirt or debris build up. Contractors will seek the lowest cost curb, fabricate a diversion, all of which is improperly flashed and fabricated to meet known Sheet Metal & Air Conditioning Contractors' National Association (SMACNA) standards for water diversion or snow build up."

Challenging Curbs

Flashing curbs is requisite for most roof assemblies, but can be problematic. According to Gwizdala, the challenge occurs when trying to provide the proper clearance on either side of the curb, creating a cricket to divert snow and water (and still high enough on the up-slope side of the curb), followed by the correct spacing on the low side of the slope along with the setting of the curb, into the seam of the newly installed standing seam roof. "Curb flashings and size of the curb are very critical, and often overlooked due to cost controls that fail over and over again," he says. Nathan Plaxco, sales and marketing manager at [Design Components Inc.](#), Fayetteville, Ga., cautions that, "Many times, installers are not installing fasteners on the actual high rib [of the curb] and they are relying on the gasket and caulk to keep water out."



Challenging Shapes

Rounded surfaces on metal roofs offer challenges when flashing around them. And, "Obtaining arched or tapered standing seam panels is not real easy in some cases, and we often find that metal shingles offer greater flexibility for round or arched surfaces than do vertical seam panels," Miller says. "However, in all of these cases, it is critical to ensure that the minimum roof pitch required by the roof system being installed is never violated. In cases like that, going to a soldered copper system for the low-pitch area may be wise."

When flashing around large round objects, Miller suggests making sure the underlayment system is well sealed to the penetration. "Then, the metal panels can be cut, flashed and sealed as best as possible," he says. "If the watertightness of the system is dependent upon sealant or a neoprene boot of some sort, covering that sealant or boot with matching metal in order to protect it from the sun's rays will extend its life."

Challenging Formation

Exact formation and exact positioning of the flashing in challenging applications is critical. Creating a flashing with improperly sized sections can lead to failure. "Ensure the roof flashing has the proper

pleat design at the base; this will ensure the roof flashing provides a watertight seal when installed on various roof pitches and accounts for any roof movement," Sharp says. "A roof flashing with aluminum on the base edges will ensure the product can be formed to the metal roof profile."

Additionally, "Many of these situations [improperly sized sections] can result in flashings with negative pitch if they are not properly dimensioned and positioned on the roof," Miller says. "Therefore, good bending equipment is essential. If good portable bending equipment is not available, then it is best to have the flashings made in a sheet metal shop rather than try to make do in the field." Haddock advises using small hand folders, material benders, hemming tools and shears for successful field fabrication of custom trim and challenging flashing work.



Challenging Advice

To alleviate challenging flashing applications, Haddock agrees the layout of the panel system and roof geometry must be well thought out prior to any application. "Panel coverage, rib placement and the size of the condition should all be taken into consideration when dealing with difficult flashing applications," he adds. "Balancing panel layout around penetrations and rooftop equipment is essential to ensure the integrated flashing will tie in properly. Field fabrication capability also has a huge benefit for the installer as it allows the installer to fabricate flashing on-site to meet as-built conditions rather than manufacturing flashings off of the plans by a manufacturer or sheet metal shop."

Installers should always work with a material supplier that has an understanding of how to install challenging flashing. "Get the roof system manufacturer involved whenever possible," Miller says. "While manufacturers may not have the field experience that a seasoned contractor has, they do know their products well and they have seen a wide variety of installations in all situations. Getting their input and approval in advance can be very helpful." Gwizdala says manufacturers should provide engineered designs, dimensions and approved details for their warranty to perform.

Also, most roof plans do not match as-built conditions or show how to correctly install the conditions that have purposely been designed into the project. "The manufacturer is relied on heavily to provide supplemental details for handling tricky or difficult flashing applications," Haddock says. "Ensuring that you are using a qualified manufacturer with consistent details and a technical staff that understands how to install difficult conditions will greatly aid in the final installation." Plaxco agrees

that installation instructions are key to solving challenging flashing applications, if installers will, "Take the time to read them," he says.

Sidebar: Chimney and Skylights

All Metal Roofing Specialists feels roofing penetrations such as chimneys and skylights present some of the most challenging flashings on a metal roof. A stone-and-mortar chimney has an uneven surface, and it is difficult to cut into. You want the counter flashing to look good, be watertight and not take away from the appearance of the stone. We like to take a diamond cutting wheel with guides, cut into the stone keeping the line as straight as possible, fill our cut with a bead of butyl caulk and then take a preformed flashing with a 1/2-inch bend and form the flashing into the groove. We then install a mortar anchor into the joint of the concrete holding the stone. This ensures that our step flashing looks neat and clean.

Chimney placement also makes a big difference in how and where we flash. If a chimney is below the ridge line there is water that runs down the metal panels against the back side of the chimney. Some guys like to build a cricket. We choose instead to counter flash up the back of the chimney, then we will leave the panels about 1 foot from the back of the chimney making sure that we lay the panels out so that the ribs fall to the outside of the chimney. Water and snow will naturally flow around the chimney.

Skylights also present some interesting installation issues. First and foremost, we lay our roofing panels out so that they look symmetrical and so that the panels fall the best way possible behind the skylights. Our crews like to take the panels and bend them up alongside the skylight. We then will counter flash under the skylight cover and then over the panel. We do this on two sides and the bottom. At the top of the skylight we leave the panels back approximately 1 foot, taper the panels, and install a flashing up under the skylight cover and then under the standing seam panels, which are hooked to a metal z.

Neil Drebusenko, owner, [All Metal Roofing Specialists](#), Womelsdorf, Pa.



