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# ROOFING ELEMENTS

METAL ROOFING MAGAZINE SPECIAL SECTION

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WINTER 2025 • Vol. 5, Issue 4

**SOLAR  
TRAINING**

Where  
To Get It

What  
You Need  
To Know

## SEALING ROOF PENETRATIONS

**TECHNICAL BULLETIN**

Use of Self-Adhering  
Membranes as Underlayment

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Landmark® ClimateFlex® combines the beauty and dimensionality of wood shake roofing with the durable performance of polymer-modified asphalt. This results in resilient roofing shingles that deliver enhanced hail resistance, superior granule adhesion, and all-weather performance year-round. Photo courtesy of CertainTeed.

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# FLASHING A DRAIN WITH LIQUID FLASHING

**A** well-designed low-slope roof directs water towards drains and gutters to eliminate ponding water conditions. Defending against leaks and moisture seepage is essential for maintaining an effective roof system as well as warranty compliance. Yet all too often, an improperly flashed penetration leads to leaks and damage.

In Part 2 of this 5-part flashing series, I showed you how to flash a drain with CertainTeed Flintlastic® SA Cap, Flintlastic SA MidPly or Flintlastic SA PlyBase, FlintBond® SBS Adhesive and FlintPrime® Aerosol. In this installment, I cover how to flash a drain with SmartFlash® ONE, CertainTeed's one-part, seamless, durable liquid applied polyurethane bitumen waterproofing resin. Liquid flashing offers advantages when flashing penetrations due to its elasticity, ease of install, and efficiency. It can conform to irregular penetration shapes, requires no priming or component mixing, and unused resin can be stored and used on a future project.

Follow these steps to ensure that your liquid-applied drain flashing is effective and can last for years to come.

## STEPS TO FLASH A DRAIN

Using CertainTeed SmartFlash ONE, CertainTeed Flintlastic SA Cap, and CertainTeed Flintlastic SA PlyBase.

1. With any drain detail, you want to make sure you have positive slope from the field down into the drain. Our FlintBoard® Hinged Target Sump offers a quick, material-efficient way to achieve a positive slope.

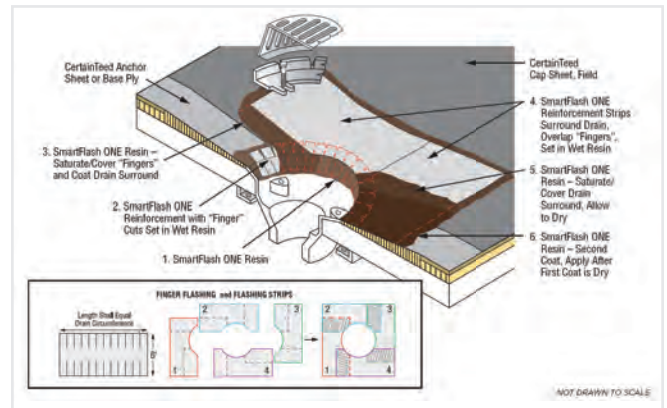
2. Position your base sheet and roll out over the drain. Allow the bolts to penetrate through the membrane before cutting out the drain access.

3. Do the same for the cap sheet. Your base and cap sheets should be positioned to avoid sidelaps or endlaps running across the drain.

4. With the membrane in place, cut flush with the edge of the drain bowl. You're now ready to flash in.

5. Start by preparing the SMARTFAB 500 Polyester Reinforcement. First, determine the length of the fabric, assuming a 2" overlap within the drain.

6. Once you have that length cut, cut fingers into the top and bottom of the polyester.



7. Prepare the target patch which will sit on top of the fingers. We have a schematic for achieving the target patch with 6" strips in the SmartFlash ONE brochure.

8. Take the 6" strips, each measuring a minimum 12" in length, and cut out the fabric to accommodate the bowl. Overlap the pieces as necessary to square the edge.

9. Tape off the edges for a clean aesthetic, though it's not necessary for waterproofing. Now we're ready for resin.

10. SmartFlash ONE is thick and can be applied easily with a brush or roller without dripping. First, apply the resin around the drain and 4" into the drain bowl at approximately 30 wet mils thick.

11. Lightly press in your finger flashings.

12. Fully cover the fabric with resin, making sure to put resin in the 2" overlap. You should not see any fabric.

13. Press in your target patches. Again, fully coating the surface and overlapped areas with resin approximately 30 wet mils thick.

14. While not required for warranty coverage, color-matched FlintRock Granules can be broadcast into the top coat for a more aesthetically pleasing look..

15. Once you've fully waterproofed the drain bowl, install the clamping ring. ●

*This is part 3 of a 5-part flashing series by CertainTeed's Joe Thompson.*



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# SOLAR TRAINING

EXPAND YOUR SERVICES WITH SOLAR

BY LINDA SCHMID

Opportunities have been expanding in the solar energy arena due to a resurgence of interest in solar energy in the last few years. Many people are interested in solar energy as a way to lower their energy bills and as a green source of energy, and as long as there is a demand, someone will fill that demand. The question is who will reap the benefit? There is definitely an opportunity for the guy who is already up there building the roof to take a piece of the pie.

Of course, no one should jump blindly on any opportunity; a contractor must consider his situation in regard to many things. Can his employees absorb the extra work? Can he hire more people to handle solar installation? Does he have the bandwidth to take on another trade to supervise? Is there room in the budget for some investment into the resources to bring this about? Certainly these are not all of the questions a contractor might ask before deciding to take on solar, but we are going to focus on one of the most fundamental questions: where can a contractor obtain the necessary training for himself and/or employees to take this on?

## WHY ROOFERS ARE A NATURAL FIT

Roofers build roofs, so it seems most natural that they would incorporate the portion of the solar system that is on the roof into the build. This is where roofers may be able to use some of their current skills:

- Assessing roof suitability. Experienced roofers have some background in assessing roof conditions, as well as material compatibility which may be applied to solar mounting.
- Installing racking systems and flashing. They ensure water-tight roof penetrations and structural integrity as part of the job.
- Coordinating array layout, planning panel placement for both performance and aesthetics.

Penetration sealing and weatherization are natural parts of the roofer's skillset while solar system installers may not have as much background in these things.

Meanwhile, ensuring well-sealed penetrations is something roofers already specialize in, and many of the problems in roof solar systems come from mounting errors and poorly executed roof penetrations.

## CHOOSING THE RIGHT PATH

Before exploring the training opportunities, an educational goal may be in order. After all, if a roofer is going to do the job from top to bottom, they could go so far as becoming a fully trained electrician. However, many may prefer to start with a lower goal in mind.

- If you want to dip your toe in, start with manufacturer programs and keep electrical work subcontracted.
- If you want to add credibility and close more jobs, earn the NABCEP PV Associate credential.
- If you want to be a full-service solar contractor: Combine NABCEP credentials with advanced training and in-house expertise.

No matter which route you choose, starting small and scaling up is a smart way to protect your bottom line while meeting customer demand.

## START SMALL: MANUFACTURER TRAINING

If you're not ready to dive into the deep end of solar, start with what you know best: roofing. Many major roofing and solar manufacturers now offer training specifically for roof-integrated solar. Here are some examples:

- GAF Energy Solar Roofing: Available to GAF-certified contractors, this training teaches roofers to install GAF's solar shingles alongside their standard roofing products.
- CertainTeed Solstice: Contractors can add CertainTeed's solar solutions through a short training program.
- Tesla Solar Roof: Training available for those who are part of the Tesla Certified Installer Program, but it sets the bar for advanced roof-integrated solar.

Manufacturer programs are often free if you are certified in the company's roofing system or low cost, and they can give you the confidence to start offering solar-ready roofs to your clients.

## BUILD A FOUNDATION: INDUSTRY CREDENTIALS

Once you've tried product-specific training, the next step is earning an industry-recognized credential. The North American Board of Certified Energy Practitioners (NABCEP) offers the PV Associate exam, which covers the fundamentals of solar technology, safety, and design.

The time commitment is about 18-40 hours of study. These credentials add credibility to your service and reassure homeowners you know what you're doing.

For many roofers, the NABCEP Associate is the entry ticket into solar.

## HANDS-ON TRAINING OPTIONS

Roofers who want to go further can find hybrid or in-person programs:

- Solar Energy International (SEI) offers online and in-person courses with NABCEP-aligned curriculum.
- HeatSpring offers online training and NABCEP prep.
- Midwest Renewable Energy Association (MREA) offers courses in-person or online to prepare students to take the

# TRAINING RESOURCES

## MANUFACTURER TRAINING

- GAF Energy Solar Roofing: [www.gaf.energy](http://www.gaf.energy)
- CertainTeed Solstice: <https://www.certainteed.com/solar-education-credentials>
- Tesla Solar Roof: <https://www.tesla.com/partner-with-tesla>

## INDUSTRY CREDENTIALS

- NABCEP PV Associate & Installer Certifications: [www.nabcep.org](http://www.nabcep.org)

## TRAINING PROVIDERS

- Solar Energy International (SEI): [www.solarenergy.org](http://www.solarenergy.org)
- HeatSpring: [www.heatspring.com](http://www.heatspring.com)
- Interplay Learning (SkillMill): [www.interplaylearning.com](http://www.interplaylearning.com)

## APPRENTICESHIPS & SCHOOLS

- IBEW/NECA Training Centers: [www.njatc.org](http://www.njatc.org)
- Local community colleges and technical schools (check regional offerings).

NABCEP exam.

- SkillMill by Interplay Learning offers simulation-based training that roofers can complete from their laptops or VR headsets.
- Apprenticeship Programs & Technical School Pathways (IBEW, Community Colleges) may have solar installer tracks in their electrical and construction courses.

If you want a more traditional path, many technical colleges and union apprenticeship programs (IBEW/NECA) are adding solar training modules to their electrical and construction courses.

- Some states (e.g. California, Illinois, New York) are pushing solar workforce development through trade schools.
- IREC Accredited Training Directory: [www.irecusa.org](http://www.irecusa.org) may offer other training options.

## LONG-TERM INVESTMENT: BECOMING A NABCEP CERTIFIED INSTALLER

Roofers who see solar as a major part of their future may want to pursue NABCEP's PV Installation Professional Certification. This is a higher-level credential that requires documented solar installations, advanced coursework, and a proctored exam. It's not for everyone, but for contractors who want to fully integrate solar into their business model it's the gold standard.

## FINAL WORD

Adding solar doesn't mean reinventing your business. It means expanding your roofing expertise into a growing market where customers are looking for trusted contractors. Roofers are already on the roof, so it makes sense to own the solar conversation too. ●

# SOLAR TRAINING

## WHAT IT DOESN'T TEACH YOU BUT YOU NEED TO KNOW

**T**here are some things you can only learn on a roof, elbow-deep in a circuit board, or buried in row 1000+ of an Excel spreadsheet. In the solar industry, as in many trades, experience often outpaces education.

The truth is, school doesn't often teach character. Yet the key characteristics of a good worker, whether a roofer, a solar panel installer, or otherwise, remain the same: work ethic, perseverance, and integrity.

### HANDS-ON EXPERIENCE

I began working at age 12. When I was young, I learned woodworking, painting, and varnishing, all of which showed me the value of paying attention to detail. Eventually, I worked on a farm and in a hardware store. Growing up in an Amish family proved to be the best preparation for running my own business. Spending time working gave me the knowledge and work ethic required to have a successful business and help bring solar energy to my community.

Education isn't everything. No amount of classroom time or training can fully prepare you for the curveballs of the real workday or teach you the satisfaction of a hard day's labor.

Solar was hardly in existence when I went to school, and my lifelong interest in electricity began with electrical circuits and battery-run lighting. That curiosity helped, but it wouldn't have gotten me anywhere without a solid base of work experience.

Now that I run a business, it's common to see people with great resumes and the right education, yet lacking the first-hand experience, practical thinking, or troubleshooting instincts you need in this industry. Education provides a great start, but experience shapes resilience, and resilience is what keeps a business alive.

### FRAMING THE GAPS

With my experience and passion for electricity, I wanted to further my education and earn a degree, so I chose an associate degree in electricity. I had imagined school would change or improve everything, but it didn't cover even half of what I needed to know.

Persistence and hard work got me further than any certificate could. I also had to learn humility, the wisdom of listening to others, and the importance of following directions, because to



ALL PHOTOS COURTESY OF BELMONT SOLAR, GORDONVILLE, PENNSYLVANIA.

be a good leader, you must first be a good follower.

These are skills and lessons that school can't necessarily teach. In the workplace, we must find the motivation within ourselves to navigate challenges; rarely is success as simple as finding the right answer or turning in a paper.

### BEYOND THE CLASSROOM

Perhaps the biggest lesson I've learned, both in school and since, is that real learning doesn't start or stop in a classroom.

That mindset is something I try to bring to every aspect of my work. After earning my master electrician's license two years ago, I continued pursuing certifications. Still, the most valuable lessons came from job sites, not textbooks.

Here are a few key things you can't just get from the classroom:

- **Building and implementing systems.** Learning how to

create clear systems ensures that everyone on your team can, for example, quote a job consistently based on company expectations and policies.

- **Pricing with precision.** Establishing and maintaining a company pricing guide or handbook is essential. You have to review it diligently and understand not just what the numbers are, but why they are.
- **Setting and following guidelines.** It's one thing to have standards in place; it's another to review, revise, and uphold them as your business evolves.
- **Navigating real-world curveballs.** From unexpected site conditions to logistical challenges, you learn quickly that flexibility and strong systems make all the difference.

## MENTORS

If there's one thing I'd wish for everyone, it's to have a trusted business mentor.

I've been blessed to find a group that meets monthly, where we challenge each other and hold ourselves accountable on our goals, mission, and values. Even just saying your goals out loud can keep you and your business moving in the right direction.

Wise counsel is invaluable. The Bible teaches us this. This can come from someone as simple as a trusted friend or elder who helps you see challenges from a different angle.

However, I would advise always being careful about who you learn from. The values you set for yourself will be reflected in the people you seek advice from.

## THE BIGGEST SURPRISE

Perhaps the biggest surprise after starting a business is how much of my job is actually education.

I thought everyone would be eager to adopt solar, simply because it makes sense; solar energy often costs less than traditional utilities. But I quickly learned that people aren't always aware of what's possible.

One of the setbacks the solar industry faces is a lack of education or general awareness. The more confidently you can talk about your work and invest in spreading knowledge, the more you fill knowledge gaps for your customers before they even arrive at your business.

## TROUBLESHOOTING

One of the best classes I took in school was called "Troubleshooting." The philosophy behind it was to be prepared for any problem that could come your way. Holding onto that mentality, hoping for the best, preparing for the worst, and expecting surprises has been key for me.

As long as you have the resilience to stay on your feet, change



*Belmont Solar's mission statement is "To provide solar power, with workmanship, trust, and friendship."*

and adapt, react with calmness, and the experience to know when to take risks, you can be prepared to meet challenges with confidence.

## THE #1 LESSON - DO IT WITH LOVE

If I can impart one lesson I've learned outside of the classroom, from my entire experience in this industry, it is this: to do it with love.

Love your clients, love your mentors, love your teachers, and love the process. Loving people and learning to trust the good ones can take you just as far (or farther) than any diploma.

## HOW TO BE THE COMPANY YOUR CLIENTS CHOOSE

At the end of the day, homeowners buy more than a product or service; they choose the people they trust to do the work. What sets a company apart is trust and integrity, clear values, commitment to problem-solving, longevity, and strong communication.

For us, Belmont Solar's mission statement, "To provide solar power, with workmanship, trust, and friendship," tells our clients what we stand for. Yours will be different, but what matters most is how you connect with customers and build a relationship based on trust.

If you're considering solar training or a new career in solar, my advice is this: find something you're passionate about and will love for the long haul. If that's solar training, then I can say, with good authority, to expect it to be a lot harder, but also more rewarding than you ever expected. ●

*Ben Zook is the founder, owner, and NABCEP Certified Master Electrician at Belmont Solar, a solar panel installation company based in Gordonville, Pennsylvania.*

# TECH BULLETIN

## USE OF SELF-ADHERING MEMBRANES AS UNDERLAYMENTS IN STEEP SLOPE ROOFING

By The Asphalt Roofing Manufacturers Association (ARMA)

**Editor's Note:** *The Asphalt Roofing Manufacturers Association (ARMA) has prepared many technical reports to aid roofers in the proper installation of various asphalt roofing systems. ARMA [<https://www.asphaltroofing.org/>] has granted Roofing Elements Magazine permission to publish this report for the benefit of roofers.*

**S**elf-adhering bituminous membranes have been used as underlayments in steep slope (greater than 2:12) roofing for many years. When applied as an underlayment, they are primarily used to help prevent water entry from ice dams at the eave areas of shingled roofs in cold climates. When used as ice dam protection, the underlayment is typically installed directly to the deck surface from the eave's edge to a point at least 24 inches (measured horizontally) inside the exterior wall line of the building prior to application of the shingles. If the membrane is not wide enough to reach that point, install additional course(s) of membrane as needed, overlapping the previous course by 2 inches or as specified by the manufacturer. Self-adhering bituminous membranes are required by building codes to meet the requirements of ASTM D1970, and newer codes require these products to have a label indicating compliance with ASTM D1970. Always check local building codes to confirm eaves protection requirements. The adhesive asphalt component effectively seals the membrane to itself and seals around the shanks of nails used in the overlying shingles so that any water forced underneath the shingle layers by wind or ice dams does not reach the deck or attic space below. These self-adhering underlayment membranes have also been used successfully in other "critical" roof situations, such as part of a flashing system in valleys or around roof penetrations (skylights, vent stacks, etc.), and are commonly applied to the entire deck beneath roofing materials on lower-sloped (2:12 to 4:12) roofs.

Where the roof area of one slope transitions to a roof area of a differing slope, the underlayment application should extend at least 24 inches up on the steeper slope roof. The transition area between the steeper slope and lower slope needs special attention due to potential water buildup.

In certain applications, such as lower-sloped (2:12 to 4:12) roofs or in areas where high winds or hurricanes are prevalent, homeowners and roofing contractors may apply the underlayment membrane over the entire roof area, not just the first few feet at the eaves. This application improves roof protection in the event that water gets under the shingles. Check local codes to confirm that a self-adhering bituminous membrane is acceptable for full-roof application.

When installed, self-adhering membranes restrict the flow of vapor and air through the roof assembly, and moist air entering the attic from the conditioned space inside the home may condense on the underside of the self-adhering membrane at the roof deck joints.

Condensation may lead to problems in roofing systems or attics, including but not limited to wood deck swelling, deterioration, mold growth, and staining on the interior ceilings below the attic. Potential condensation problems may be reduced by:

1. Confirming attic ventilation is adequate, balanced, and evenly distributed to assure proper airflow.
2. Installing a proper vapor retarder on the warm side of the attic floor, which can reduce intrusion of warm, moist air into the attic space.
3. Installing sufficient insulation that covers the entire attic floor.
4. Checking local energy codes for appropriate ceiling insulation R-values and air barrier requirements.

For more details on ventilation, see ARMA's Technical Bulletins "Considerations in Attic Ventilation System Selection" and "Why Ventilation Is Important." Check with a building design professional for advice if the home is in a warm, humid climate, as a different approach may be necessary. Following the four recommendations described above is sound practice for all steep-slope roofing systems. If your roofing application calls for applying a self-adhering underlayment or membrane over the entire roof deck, these good practices will help reduce condensation and the subsequent problems that can occur. ●

**\*DISCLAIMER OF LIABILITY:** This document was prepared by the Asphalt Roofing Manufacturers Association and is disseminated for informational purposes only. Nothing contained herein is intended to revoke or change the requirements or specifications of the individual roofing material manufacturers or local, state and federal building officials that have jurisdiction in your area. Any question, or inquiry, as to the requirements or specifications of a manufacturer, should be directed to the roofing manufacturer concerned. THE USER IS RESPONSIBLE FOR ASSURING COMPLIANCE WITH ALL APPLICABLE LAWS AND REGULATIONS.

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# SEALING ROOF PENETRATIONS

## KEYS FOR EFFECTIVENESS AND EASE

BY LINDA SCHMID

Every roof will eventually face one universal test: How well does it keep water out around penetrations? Whether it's a plumbing vent, flue pipe, skylight, or solar mount, the integrity of that joint determines how long the roof performs. Many people reach for a tube of sealant, but seasoned roofers know that flashing is essential; the sealant's job is to protect and support the flashing, not to take its place.

### FLASHING MATERIAL THAT FITS THE CLIMATE

Not all flashings are created equal, and not every roof or climate calls for the same material. The choice depends on chemistry, environment, and roof type.

Galvanized steel is often used for asphalt-shingled roofs. It's rigid, durable, and easy to form. The key is coating weight — G-90 galvanizing or better should be used to resist rust. Cheaper, thinner coatings corrode quickly, especially at cut edges. For regions with salt air, chemical exposure, or high rainfall, aluminum, copper, stainless steel, or silicone-based flashings may be better options.

Aluminum flashing is lightweight and corrosion-resistant, making it ideal for retrofits and areas where installers need flexibility. It does, however, react with alkaline materials such as mortar or concrete, so it should be isolated from masonry.

Copper is a popular choice, costly but nearly permanent. It develops a protective patina instead of corroding and is easy to form around chimneys and architectural details. Always use copper or stainless fasteners with it to prevent galvanic corrosion.

Stainless steel is a high-end performer for coastal and industrial environments. It's impervious to acid rain, salt, and thermal fatigue, and it lasts for decades when properly integrated into a roof system.

Flexible polymer and rubber flashings, made from EPDM, PVC, or butyl-based compounds, serve well for irregular shapes or areas subject to vibration or movement. They expand, contract, and seal without cracking, making them ideal beneath solar mounts or HVAC supports. UV-rated products are essential, but some low-cost plastics and PVC can become brittle in sunlight.

Silicone-based flashings are often one-piece, form-in-place

## RESOURCES

- Aztec Washer Company • [www.aztecwasher.com](http://www.aztecwasher.com)
- EPDM Coatings • [www.epdmcoatings.com](http://www.epdmcoatings.com)

or pre-molded systems made from cured silicone rubber. They adhere exceptionally well to metal, asphalt, and composite surfaces, tolerate extreme temperatures, and remain flexible for decades. Because silicone is naturally UV- and ozone-resistant, these flashings are particularly suited to high-sun or desert climates where other elastomers degrade. They can also bridge expansion joints and irregular penetrations without needing additional sealant. However, not all roofing adhesives bond to cured silicone, so installers should use compatible silicone sealants or mechanical retention where needed.

### MATCHING FLASHING TO ROOF MATERIALS

Flashing must complement the roofing system. Asphalt shingles rely on step and counter-flashings that follow the same direction as water flow — each shingle course covering the upper edge of the flashing below to keep water moving outward.

Asphalt shingle roofs rely on a layered flashing system that mimics the overlapping pattern of the shingles themselves. Each piece must be lapped in the direction of water flow.

- Step flashing is used where the roof meets vertical walls or dormers. Each small piece is installed with a single shingle course, creating a stair-step pattern that channels runoff outward.

- Apron flashing is used at roof-to-wall transitions, while counter-flashing covers the top edge to

prevent water entry.

- Pipe boots or vent flashings must sit on top of the lower shingles and under the upper course to maintain the water-shedding plane.

Use galvanized steel, aluminum, or copper, depending on environment, but ensure the metal is corrosion-resistant and matches the surrounding materials. On low-slope shingle roofs, it's wise to extend an ice-and-water membrane beneath flashing



PHOTO COURTESY OF AZTEC WASHER

zones for added backup.

Asphalt roofing (roll roofing, modified bitumen, or built-up systems) include flat or low-slope asphalt roofs and flashing becomes part of the membrane itself rather than a separate metal piece.

- Use reinforced bitumen or liquid-applied flashings that chemically bond with the field membrane.
- In multi-ply systems, each layer is stepped up the penetration, creating a watertight “boot” embedded in asphalt adhesive or heat-welded seams.
- Counter-flashing (metal or aluminum) is often installed at the termination point to protect the top edge from UV exposure.

For vent stacks or curbs, flexible metal flashings or formable lead can be integrated into the hot-applied system. Avoid standard shingle-style metal flashings — they can’t flex or bond properly in a low-slope environment.

Composite shingles created of recycled plastic, rubber, fiberglass, or blends) expand and contract differently than asphalt, so flexibility and chemical compatibility are crucial. Avoid asphalt-based adhesives or coatings unless the shingle manufacturer explicitly approves them. Use coated steel or polymeric flashings that tolerate movement. Silicone or EPDM boots perform especially well for pipe and vent penetrations because they flex with temperature swings and won’t become brittle. Always consult the shingle manufacturer’s installation guide to confirm which metals and sealants are acceptable — many composite shingle warranties specify compatible flashing materials.

Metal panels require high-temperature tolerant, UV-stable flashings and sealants designed for thermal movement. Flexible EPDM or silicone pipe boots with adjustable, ribbed collars are standard, secured with screws through the upper flange and sealed with compatible butyl tape beneath.

For standing seam or concealed-fastener systems, specialized retrofit flashings clamp to seams rather than penetrating panels, maintaining the weathertight integrity. High-temp underlayment beneath all penetrations is essential to prevent bleed-out and protect against expansion fatigue.

Concrete and clay tile roofs demand a two-part flashing system: base flashing below the tile and counter-flashing above. The challenge here is the tile’s irregular surface, which can trap water if flashing is too flat.

- Pan-style or channel flashings are used beneath tiles to direct runoff down the underlayment plane.
- Headwall and sidewall flashings are elevated to match the tile contour and must integrate into the tile course pattern.
- At ridges or valleys, special formed metal flashings (often aluminum or copper) are shaped to fit under tile edges, with weep holes for ventilation and drainage.
- Sealant is used sparingly — mainly on fastener heads or where the metal meets masonry. Never rely on caulk alone to fill tile gaps; the flashing geometry should do the work.

In high-wind zones, heavier-gauge metals and mechanical fastening are critical. Flexible flashings such as lead or malleable aluminum are preferred because they can be hand-shaped to conform to the tile profile and maintain watertightness over time.

## PROPER FLASHING INSTALLATION AND LAYERING

Good flashing installation follows this rule: water must always run over the layers, never into them. The sequence is nonnegotiable — underlayment first, then flashing, then shingles, and finally sealant if needed. The underlayment should lap over the lower edge of the flashing, while the shingles cover its upper flange.

At roof-to-wall intersections, step flashing pieces should overlap by at least 2 inches, with each new course integrated into the shingle layer. The vertical leg of the flashing should rise at least 4 inches — more in heavy-snow or high-rainfall regions. Counter-flashing protects the upper edge and prevents backflow.

Pipe penetrations and vents require factory-formed or pre-molded boots that fit snugly. Silicone or EPDM boots work especially well because they flex with movement and temperature changes. The base flange must rest flat, with fasteners only on the

## PIPE FLASHINGS THAT MOVE WITH THE ROOF

Aztec Washers’ Master Flash line is built around EPDM and silicone boots with malleable aluminum bases that conform to most roof profiles. Vice President of Sales Juan Roman said, “The flashing is engineered to move with vibration, thermal expansion, and contraction.”

EPDM is ozone-resistant and rated for continuous service up to 212°F, which covers most applications on residential and light commercial roofs. For hotter stacks and appliances, Aztec specifies silicone boots, which Roman notes “handle sustained high heat—think desert installs.” The company cites cold-weather durability to -50°F. Master Flash carries a 25-year flashing warranty.

The boots are common on plumbing vents, HVAC and furnace penetrations, wood-burning stove pipes, chimneys, and increasingly solar racking posts. Roman says the aluminum base “is very shapeable, so crews can adapt it to metal panels, shingles, and even many tile and composite profiles. On low-slope membranes (EPDM, TPO, PVC), check the roof manufacturer’s details first; the roof flashing is likely compatible, but “don’t jeopardize a system warranty without confirmation.”

Roman said, “A bead of silicone around a boot by itself isn’t a long-term seal. The compression fit of these boots does the sealing; the chemistry just supports it.” On asphalt, composite, and concrete/tile, use a polyurethane under the base to adhere the flashing and block capillary paths. Avoid petrochemical adhesives or foams; vibration and UV can crack those and invite leaks. Any sealant used should be buried under the flange, not exposed to the sun.

Most installation errors start at the snip. “Don’t cut the cone to the pipe’s exact dimensions,” Roman said. “Cut the opening about 10-25% smaller and stretch the boot down like a sleeve. That compression is your primary seal.” Slide the base under the upslope shingle/course, fasten in the upper portion of the flange, and let water shed over the lower edge.

Aztec has continuous R&D on flashing materials. One outcome is a FireBlock formulation, developed for wildfire-prone regions and tested to 1000°F, now proven in the Australian market. ●



PHOTO COURTESY OF AZTEC WASHER

upper portion so water cannot track through nail holes. Never rely on a thick bead of caulk as a permanent solution.

### FLASHING DESIGN FOR COMPLEX OR IRREGULAR AREAS

When penetrations occur near ridges, valleys, or seams, layout matters. Avoid placing penetrations directly in valleys where runoff concentrates. If unavoidable, install an ice-and-water shield beneath and extend it several inches upslope and to each side. Flashing pieces should then be layered to guide runoff around, not into, the intersection.

For irregular or custom mounts such as solar racks or HVAC supports, use a two-part system: flexible base flashing (silicone, EPDM, or butyl) beneath the shingles and rigid counter-flashing above. This combination absorbs motion while maintaining a positive water path. For large obstructions, use saddles or crickets to divert water around them — the hallmark of a professional install.

### COMMON FLASHING ERRORS

Flashing failures rarely stem from defective materials. The culprits are almost always installation shortcuts:

- Fastening through the wrong plane — for instance, through a vertical face where expansion opens the hole.
- Reverse layering that channels water behind the flashing.
- Mixed metals causing galvanic corrosion.
- Flattened or under-bent flashing that loses its drainage slope.

And the most persistent error: using sealant to make up for poor fit or alignment. Once thermal movement begins, the sealant shears and the leak begins.

### SEALANTS: THE SUPPORTING PLAYER

Sealants have an important though limited role — sealing small gaps, fastener heads, or vertical seams where flashing geometry can't do the job alone. Ensure that the sealant type is compatible with roofing material.

### DURABILITY AND MAINTENANCE

Sealant and flashing performance both depend on environment. Sunlight, heat cycling, standing water, and freeze-thaw cycles shorten service life. In sun-intense climates, even high-end polyurethanes age faster than the surrounding flashing; silicone products tend to outlast them.

Routine inspection once a year is good practice. Advise your customers to look for cracking, separation, or corrosion, then reseal as needed — typically every five to ten years for polyurethane or hybrid products, and every decade or more for silicone systems. Roofs that drain well and stay clean need less attention; shaded or flat areas need more.

### PUTTING IT ALL TOGETHER

A watertight penetration isn't about how much caulk you use; it's about how intelligently the system is layered. The flashing forms the armor, the underlayment is the shield beneath it, and the sealant fills only the smallest of gaps.

When materials are compatible and sequencing is correct, penetrations can remain watertight for the life of the roof. Choose your flashing material to match your climate and roof chemistry, your sealant to match your flashing, and inspect regularly. Done right, these details turn a roof's weakest points into reliable defenses. ●

## AFTERMARKET PENETRATION REPAIRS

EPDM Coating (liquid butyl rubber) is the only product of its kind — a true liquid butyl rubber that adheres to nearly anything except PVC or silicone. It bonds directly to any roof type as well as other third party coatings that were already applied.

Greg Kazmierczak, Sr. Vice President of Sales at EPDM Coatings said, "While our Liquid Butyl Rubber isn't intended for new construction, it excels at aftermarket repairs around roof penetrations, seams, and flashing transitions. When used with Seam-Tite, a high-build butyl rubber coating with a thick, honey-like consistency, the system can extend roof life by 18–20 years. Seam-Tite can even be applied over mild to moderate rust, acting as its own inhibitor, though heavy corrosion should be brushed and treated first."

Kazmierczak shared this application tip: "Brush Seam-Tite along the seam, embed polyester fabric into it, and coat again to "sandwich" the reinforcement. Once cured, it resists weathering, expansion, and contraction so effectively that only catastrophic events — like a tornado — are likely to tear it apart."

Great tensile strength and 500% elongation make EPDM ideal where metal expansion and contraction are issues. It can be used on roofs regardless of slope, including large flat roofs and industrial cooling towers. This material can handle temperatures as low as -50°F while maintaining its elasticity and it is resistant to UV radiation and ozone exposure while handling temperatures as high as 250°F.

Roof maintenance should include inspections of seams and penetrations twice yearly, clearing debris, and photographing possible problem areas for later comparison.

The bottom line is that Liquid Butyl Rubber and Seam-Tite can greatly extend roof life sealing difficult penetrations, but they're not "do-everything" solutions. The key is compatibility, correct thickness, and consistent inspection. Together they present a cost-effective alternative to roof replacement. ●