

6. F.A.Q. (Frequently Asked Questions)

6.1 Is it noisy?

There are two types of noise that people associate with metal roofs – the sound of rain on the roof, and the cracking of metal undergoing expansion and contraction.

Raindrops transfer their energy to the roof by hitting the surface. The sound they cause has two components – the high-pitched “splat” at the point of contact, and a lower-pitch “boinggg” that results from the vibration of the surface. All materials will have the “splat”, but metal roofs with air space beneath them generate the resonance that gives the “boinggg” sound. Tin roofs sound loud in the rain because they have a large surface between supports that can resonate. Since our shingles have almost no air space below them, and the size of the shingles is comparatively small, the natural resonance frequency would be high pitched and short. The resonance is also dampened by the contact of the underlayment with the shingle. Therefore, the amount of noise you will hear during a heavy rain will be comparable to that of asphalt shingles, or perhaps a little louder, but nowhere near that of the old-fashioned tin roofs.

The other noise people worry about is the crackling sound of expansion and contraction of metal, usually heard with aluminum

siding. The sound comes from the sudden flexing of the metal surface. This is usually a problem with older siding which was nailed onto the wall without using the expansion slots, or overnailed so that the metal could not move freely. With long strips of siding, there is enough expansion and contraction to cause strains in the metal which accumulate until the metal suddenly changes its configuration. That sudden release of energy pushes against the air and allows us to hear a pop or a crack. Since our shingles are held in place by tabs (no accumulation of strain), and since they are quite small (18 inches wide not 10 ft. wide), there is minimal expansion and contraction strain to be relieved. So we do not hear any noise from our roofs due to heating or cooling of the surface.

6.2 Do metal roofs attract condensation?

All objects exchange energy with the environment by conduction, radiation and convection. Objects that radiate infrared energy effectively (like most metals do) will cool faster than those that radiate poorly. Thin metal roofs have much less heat capacity (stored heat) to dissipate, so they will cool faster for this reason as well. Moist air will reach the dew point faster near a cooler surface, so if there is moist air around a roof in the evening, then condensation will form. However, if the moisture content of the ambient air is low, then the cooling will

not bring the air to the dew point. In practical terms, you will often see dew forming on the outside of a metal roof, but not on the inside.

If there is condensation inside the attic, it is usually due to an inadequate vapour barrier allowing the air from the home's living space to enter the attic. Since the moisture in the home air is quite high, once it leaks into the cold space of the attic, it cools down and reaches dew point quickly. The result is that the surface on which it condensed is wet. There are two tools that need to be employed to prevent this – an effective vapour barrier, and adequate ventilation of the entire attic.

6.3 Can you walk on it?

As indicated earlier, the shingles are designed to lie flat on the surface of the deck, and get their strength from the supporting wood. To install the product, you have to walk on it. To avoid causing cosmetic dents, it is useful to put the footstep on the middle of the shingle, and avoid the perimeter. That is not hard to do as the shingles measure 9 inches high by 18 inches wide.

On the other hand, the surface is a painted surface. If you walk on the roof with clean soles, no damage should happen. If you bring grit and sand onto the roof, then you can end up scratching the paint. So if you walk on the roof, make sure you have clean footwear, and don't walk on the roof when it is wet, as wet metal is very

slippery.

6.4 Is it water-proof?

The overall system is waterproof to a point. All steep slope materials are designed to shed water (low-slope systems are designed to hold it). Our shingle-to-shingle locks are effective at preventing water entry, but if there is sustained pressure, water will work its way past the locks. That is why we have spent much effort at developing the supporting flashings – we know at the most susceptible joints, water will get in, and needs to be safely conducted out. That is also why we emphasize the use of appropriate underlayments which should be in place in case water does work its way past the primary protection at the surface. To be truly waterproof, you need to have an sealed, unbroken surface such as provided by membrane systems for roofs of little or no slope. None of the steep-slope materials can promise that.

6.5 How long will the paint last?

There are many kinds of paint systems on the market for exterior application. Since paint has to meet various criteria (cost, resistance to UV (ultraviolet), resistance to corrosion, mechanical strength, ability to bend without cracking, strength of adhesion), the paints are usually formulated to best match their intended use. For the best UV resistance, the paints are formulated to be transparent to UV, so that the energy of the UV rays does not get deposited in the paint (the UV will not 'burn' the paint). There are two classes of paints that are comparable in

performance in this regard: PVDF (polyvinylimidinefluoride) paints which are marketed under the trade names Kynar and Hynar, and modified Polyester paints, marketed as Keldura. Both paints show good resistance to UV damage, but since all organic materials oxidize over time, the paints can be expected to last about 15-20 years before the colour shift becomes pronounced. We use the Keldura product, as it is somewhat more mechanically resistant than is PVDF paint.

6.6 Do you need to strip the roof?

Our shingles have been installed directly over asphalt shingles, but we strongly prefer to strip the roofs for a number of reasons.

- The building code in most areas allows a maximum of two coverings on a roof.
- Damage to the deck is often localized and cannot be found until the roof is stripped. This is especially true along the eaves and along the endwalls.



- If the old material is covered up, it continues to deteriorate

Why the PRS System is right for you.

(but more slowly) under the new covering. Its weight continues to stress the structure, and if there is a leak, the old covering makes it harder to find out where it is coming from.

- The old material is often already home to mold and fungi. So covering it up just leaves the mold starter in place.
- Water-proofing methods (such as use of ice-and-water shield membrane) usually need to be applied directly to the wood deck. They will not work if applied over old roofing.
- The old roofing will not give as good as support to the shingles as will a clean deck.
- You end up with a better quality install if you first strip the roof, and fix the deck problems.

When you change your clothes to look good, do you put new clean clothes over your old dirty ones?

6.7 Can the shingles be damaged by hail?

Our shingles have been hit by hail of about 2.5-3 inches in diameter twice. In one instance, the hail created light dents that could only be seen when looking up the slope-line of the roof. The shingles were laid directly on 5/8 inch plywood (with appropriate underlayment between them) and the wood apparently allowed sufficient support to prevent severe denting.

In the second instance, the product was laid over two layers of shingles (allowed in that jurisdiction), and since the support by the shingles was much less solid than the wood, the dents were

more prominent (the deepest was about $\frac{1}{4}$ inch). Although there were no perforations, the visual appearance was sufficiently marred to allow an insurance replacement.

We have also experienced hail of up to 1 inch in diameter without any visible damage.

From the above experience, we recommend that the shingles be laid over at least $\frac{5}{8}$ inch plywood (or thicker wood) to give sufficient support to the shingle surface.

6.8 Will snow slide off the roof?

Since metal roofs are slippery, the snow will slide off. The steeper the slope, the less accumulation there will be before the surface friction is overcome and the snow slides. Since fallen snow has some internal cohesion, it tends to detach in large sections.

If the snow was wet and the roof was cold when the snow fell, then the snow will freeze onto the roof, and snow will accumulate as on most roofs. Sooner or later, however, the snow will melt (either due to heat from the inside, or from the sun), and once enough of the ice bond to the shingle surface is broken, then the accumulated mass will come off. This is often experienced as an avalanche. While in most cases, you do want the snow off the roof, you don't want it falling on your head or where it can cause damage.

While in most cases you want the snow off your roof, at the same time you don't want its fall to cause

damage or danger. The first step in dealing with this issue is to study where the snow will fall from each section of roof, and determine if the landing zone will be dangerous to either property or people. Once you have identified the danger areas, you have at least three methods of controlling the snow:

- Snow Stoppers
- Snow Diverters
- Snow Fences



Snow stoppers are small aluminum brackets that hold the snow mass in place on the roof, and when the snow starts to melt, allow it to come down in small chunks, as opposed to one large mass. They work this way because the snow mass often does not melt equally across the entire roof, and some sections weaken before others.



Snow diverters are usually aluminum brackets that are designed to divert a snow fall away from a sensitive area.

They are often used over a doorway in an inverted V configuration, where they divert the snow slide to either side of an entrance. They can also be used to protect roof features that otherwise could be damaged or crushed by snow sliding down the roof.

Snow fences are made from sturdy brackets (steel or aluminum) which support bars (also either steel or aluminum) stacked from two to five rows high. These horizontal bars hold the snow in place and do not let it fall at all. Of course, given that snow can weigh between 40 and 50 lbs. per cubic foot, they are subject to very high loads in snow country, and must be both well engineered and well installed to prevent a catastrophic failure. The snow fence is used over walkway adjacent to a roof slope, and to protect sensitive surfaces such as sunroom roofs in a multi-level dwelling.

To properly assess the danger from falling snow, it is advisable to send us both a roof diagram (with slopes indicated) and photos of your roof from all angles, so that we can see if there is potential danger. We usually discuss with prospective DIY homeowners the different methods and come up with a solution that the homeowners can implement.

6.9 How long will the roof last?

The oldest residential aluminum roof that we are aware of is an install done in 1947 or 1948 in

Oregon, by the company that invented the shingle, as part of a movie promotion (Mr. Blanding builds his home). The



write up in the Portland Oregonian newspaper (1988) showed the 40-year old roof to be in excellent shape.

We have done repair work on some of the earliest aluminum roofs installed in the Montreal area (dating back to 1967), partly due to the fact that the workmanship on the early installs was generally poor, but found that while the paint used at the time did discolour, the aluminum shingles themselves were completely unaffected. By way of comparison, steel roofs are well known in Quebec and have been around for over



150 years. If the maintenance on them is done regularly (which means removal of any rust and repainting), they last over 100 years. If the steel is not maintained, then they rust in as little as 15 years, and have perforation damage by 25 years. Since aluminum does not rust, it should last much longer than steel does.

Of course, the base material is not the only factor in the longevity of a roof. The joints must remain water-tight, and the roof cannot have any condensation forming. If either of these conditions occur, and the moisture finds itself on the roof deck, then wood rot will follow. Therefore, for a truly long-lasting roof, you need to ensure that there is no possibility of condensation to happen, and you need to use construction methods which allow the roof joints to continue working for a very long time. By helping you address the vapour barrier/ventilation issues, and ensuring that you use the proper techniques (including several levels of waterproofing backup), we help you develop a truly long-lasting testament to your workmanship.

6.10 How does the roof handle wind?

Wind affects your roof in four ways: by exerting positive pressure on your roof perimeter, by exerting negative pressure at the roof surface, by pushing water into openings that otherwise would not get any water, and by changing the

way your ventilation works.

The most obvious effect of wind is to push against the house and roof. The wind can be especially strong at the roof edges (gable, eave), and under some conditions will lift up the flashings at those locations and tear them away from the roof. We designed the securing flashings to reinforce the gable and starter flashings at these sensitive areas. As far as I know, no other manufacturer has a comparable system for resisting damage from wind in these areas.

Positive pressure at the ridges can also cause the ridge shingles to be damaged. We use the v-strip flashing at the hips and ridges to reinforce the roof edge at those points, and to provide support for the caps. Again, we are the only manufacturer using this technique to improve weather-resistance.

Negative pressure will occur on the back side of a sloped roof structure. If the wind can get “underneath” the roof, and the sheathing is not air-tight, then there is a danger of shingles being pulled off the roof. This type of problem more commonly occurs with membrane systems applied over flat roofs. Since we feature extensive use of underlayment (which blocks wind), and since our fasteners have a very high pull-out strength, this type of wind damage should not affect our structures.

The third form of damage, by wind-driven rain, is difficult to withstand for most roofing systems, since the wind pushes the water into any available crack or opening. There are a number of different solutions to this

problem. One of the more basic methods is to use 180 degree bends at all shingle edges, thereby creating interlocking joints between shingles. This method is used by most metal shingle manufacturers. Next, one has to minimize any openings in the bends, and the PRS Century shingle has one of the smallest openings compared to the



Example of a competitor product where the corner joint let in water and the nailing tab cut through the underlayment

competition. The other susceptible place for water entry is the shingle-flashing joint. The PRS flashing systems fully anticipate this form of water entry, and make explicit provisions in our design and installation instruction, on how to prevent leakage and damage. Finally, one has to recognize that under extreme situations, water will still get in. That's where the second and third lines of defence against water entry come into play, namely the secondary gutters in the flashings, and the underlayment.

The fourth form of wind damage is the effect wind has on

ventilation. If the vents have been positioned incorrectly relative to the wind direction, it is possible for rain or snow to be blown into the roof. This is most common with gable vents, but also occurs with ridge vents, and to a lesser degree with the low-profile vents. In working with you, we will ask you for the prevailing wind direction and also the common direction if very high winds are involved. The choice of appropriate vents, and their positioning will follow this discussion.

6.11 Will my roof be hot in summer?

In summer, the primary energy transfer is the solar radiation heating up the roof, which then heats the attic, which then transmits the heat to the house. To reduce this heat transfer, there are a number of steps to take. The first is to reflect the majority of the heat away. Metal roofs do this better than asphalt shingles, and aluminum does this best of all (that's why telescopes mirrors are almost always coated with a reflective aluminum film, and why mylar "survival" blankets are aluminized). Aluminum will reflect up to 80% of the radiant heat falling on it, even if the surface is painted.

The rest of the energy (20% or more) is absorbed by the covering, and transmitted by conduction to the sheathing, which then transmits it to the attic air. If the ventilation is effective, then there will be enough air movement in the attic to exhaust this hot air, with cooler ambient air entering by the soffits. In well-ventilated attics, the attic temperature is often no more than 5-10 degrees warmer than the

outside air.

The third line of defence is the insulation between the attic and the inside ceiling. Insulation works by slowing down the heat transfer process, and by having adequate insulation, you can dramatically slow down the transfer of heat from the attic to the interior of the house.

Once the sun goes down, there is not more heat added to your roof, but if your roofing material has a high heat capacity (tile, slate, asphalt shingles), then it will continue to be a source of heat while it cools down. By contrast, thin metal roofs have very little heat capacity and cool down quickly. Aluminum is very efficient at conducting heat, and has a high emissivity, which allows it to cool down faster than steel.

Due to the above factors, an aluminum roof will help you keep your house cool in summer, and reduce the energy consumption of running the air conditioner. Of course, the roof is only one source of heat entry into the house – you also have to have energy-efficient windows, well-insulated walls, and a house design that minimizes the amount of solar energy absorbed during the summer.

6.12 Can I put the shingles over a low slope?

No. Our material is classified as a “steep-slope” material, which means it does most of its job by

shedding water. In contrast, materials classified as “low-slope” are designed to create a continuous water-proof surface that can hold water without letting it in.

In cold climates, the snow on a roof will act as a sponge for any moisture, and water under these conditions can develop a fair amount of pressure, which steep slope materials cannot stop as they have joints that are not completely water-proof.

In warm climates, the wind can drive water up a low slope, creating pressure which pushes water into any available crevice.

Low slopes (below 3:12) should be covered with materials that are engineered to hold water under pressure and form a continuous, water-proof surface. Traditional low-slope roofing material is tar and gravel, also known as BUR (built-up roofing). More modern versions of low-slope roofing are the membrane systems (single ply or double ply, torch-on or cold mop). There are also some metal systems available which feature standing seam panels, with the seams having special water-proofing to withstand water entry.

6.13 Are the PRS shingles expensive?

The PRS aluminum shingles are more expensive than regular asphalt roofing, but that’s not saying much since asphalt shingles are the cheapest form of roofing. When compared to the better quality roofing materials, the PRS aluminum shingles are competitive with other steel and aluminum products, and are less

expensive than concrete tile or slate.

The PRS system comes with a “foundation” of flashings that serve to protect the most vulnerable areas of the roof. Cheaper products, like asphalt shingles, use simple flashing methods and offer nowhere near the same level of protection as the PRS system.

In financial terms, the outlay for a depreciating asset is an expense, but for an appreciating asset it is an investment. Putting on a cheap roof diminishes the value of the property once the roof starts to deteriorate, and commits you to further outlays earlier than you may have planned. Putting on a high-quality roof will add value to your home and since the roof is now a permanent part of the house, it will continue to appreciate at the same rate as the house.

When you install a system with a strong and reliable foundation, you are giving yourself insurance that the system will withstand severe weather much better than can a cheaper system. Since the possible repair costs are usually several times more than the price of a new roof, a reliable roof is “insurance” against your needing to do those repairs.

Another component is the long-term reliability without constant maintenance. Most roofing materials have to be maintained to retain their effectiveness. Asphalt shingles lose granules and curl,

requiring tarring to keep flat. Modern cedar shingles need to be periodically waterproofed. Some steel panels need to be repainted after as little as 15 years. All systems that depend on caulking for water-proofing require recaulking in as little as 5 years after installation. By installing a PRS system you dramatically reduce (if not completely eliminate) the need for on-going maintenance.

Since part of your investment is to have the house look nice, just how long will that attractive appearance last? Products that are designed to be “permanent” change their appearance very gradually over time, and in doing so, retain their value much better and longer than the cheaper “consumable” products.

If you ever bought a cheap tool, you know that sooner, rather than later, if you rely on that tool, you will replace it with a more expensive, but durable and reliable product. Why? Because, in the end, it gives you much better value.