

Reflective Insulation

Practical Tips for Post-Frame Builders

Reflective insulation is commonly used in post-frame construction for two straightforward reasons: It is effective and it fits the building system.

In most post-frame buildings, metal panels are installed over wood purlins. The framing does not provide the deep cavities needed for thick insulation products such as fiberglass, and compressing those products can reduce their effectiveness. Reflective insulation offers a thin alternative beneath metal roofing and siding while also addressing both radiant heat gain/loss, and condensation concerns.

The material is suitable for a range of low-rise structures, including agricultural buildings, garages, workshops, storage buildings, residences and other post-frame construction. The correct product and installation method will depend on the building design, interior conditions, local code requirements and the desired level of insulation.

The following practices can help builders get better results on the jobsite:

Understand What Reflective Insulation Does

Reflective insulation works differently from bulk insulation. Its reflective surface helps reduce radiant heat transfer, particularly when it faces an air space. This makes it especially relevant beneath metal panels, which can become very hot when exposed to sunlight. Metal panels easily transfer heat in all seasons as well.

The temperature difference between a hot exterior metal surface and the building interior can be significant. A properly installed reflective product can help reduce the amount of radiant heat moving through the assembly.

Reflective insulation can also help manage condensation. When warm,



PHOTOS COURTESY OF RFOIL

Applying insulation and metal together gives the installer a stable working surface and protects the insulation from wind and jobsite damage.

moisture-laden air meets a cold metal surface, condensation can form on the underside of roof or wall panels. Products with an insulating core, including bubble-core products, create a separation between the interior environment and the metal surface. Properly sealed seams also help the insulation function as a vapor-control layer.

Reflective insulation should not automatically be considered a replacement for every other type of insulation. In buildings with demanding energy requirements, conditioned residential space or specific code obligations, the complete wall or roof assembly should be designed accordingly. Check local requirements before installation.

The Proper Insulation Method Depends On the Application

The installation approach changes

depending on whether the insulation is being installed on a new post-frame roof, a new wall or a roof with a solid substrate.

For a typical new post-frame roof, there are two common methods:

- The insulation can be draped over the framing, allowing it to sag slightly between purlins.
- The insulation can be pulled tight over the framing, followed by installation of purlins/furring strips over the material.

The draped method creates an enclosed air space between the insulation and metal roofing. The furring method places the insulation beneath the purlins, which are then fastened through the material to the trusses.

Walls can also be installed using draped or furring methods as well, depending on the framing sequence and desired finish. In either case, the insulation should be installed on the interior side of the

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exterior panels and enclosed as part of the completed wall system. Reflective insulation is not intended for use as an exposed exterior covering or in a non-enclosed building system.

Residential roofing and reroofing require additional consideration. Where a solid substrate such as OSB is present, the insulation may be installed over the substrate with the reflective side facing upward. To create the necessary airspace, furring strips should then be installed before the metal roofing is applied.

Installing metal directly over the insulation and solid substrate can leave the material compressed against the metal, eliminating the air space needed for reflective performance. Furring also allows the metal panels to accommodate expansion and contraction as well.



Furring strips below metal panels help accommodate expansion and contraction.

Install Roofs In Manageable Sections

On a new post-frame roof, the most common installation sequence is to work from the ridge toward the eave. The insulation generally runs perpendicular to the purlins, in the same direction as the metal roof panels.

Begin by securing the first edge of the insulation to the framing with a hand stapler or hammer tacker. Use fasteners long enough to hold the material securely. For rFOIL, a leading reflective insulation supplier in the market, their installation sheets specify staples at least 5/16 inch long to adhere the insulation to the purlins.

With the draped method, unroll the insulation across the framing and allow it to sag slightly between the purlins. The sag does not need to be pronounced. A modest drape created by gravity can provide the air space required between the reflective surface and roof covering.

With the furring method, pull the insulation tight and staple it in place. Install the purlins over the insulation and fasten them to the trusses through the material. The roof panels can then be installed onto these furring strips using the normal roofing procedure.

In both methods, the metal is installed as the work progresses. Applying insulation and metal together gives the installer a stable working surface and protects the insulation from wind and jobsite damage. Installing all of the insulation first can make the roof more difficult and less safe to work on, particularly when the roof is steep.

Plan Roll Widths To Reduce Waste

A small amount of planning can make installation easier.

One field practice is to begin at the gable edge with a 4-foot-wide roll. After the first 3-foot-wide metal panel is installed, approximately 1 foot of insulation remains available at the next first seam. Subsequent 6-foot-wide rolls can then be installed so

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that each seam is easier to reach from the metal panel below.

This approach is not required for every project, but it can reduce awkward reaching for seams and simplify the sequence. Roll widths used should be coordinated with the building dimensions and product being applied.

Seam options should also be considered before material is ordered. Square-edge rolls can be butted together and sealed with compatible tape. Some products are available with a single tab that provides additional material for overlapping the adjacent roll. A tabbed seam can provide full coverage without requiring a wider overlap.

Products with an integrated adhesive tab can also reduce the need for separate seam taping. The important point is to select a seam design the crew can install easily and consistently.



Seal every seam for best performance. PHOTOS COURTESY OF RFOIL

Seal Every Seam

Sealing seams is one of the most important installation details.

Adjacent sections should be butted or overlapped according to the edge type

used. Then seal the joint on the exterior side with a metalized foil tape. If the project requires taping seams from the inside, use a tape that matches the interior facing. For example, a white poly tape can



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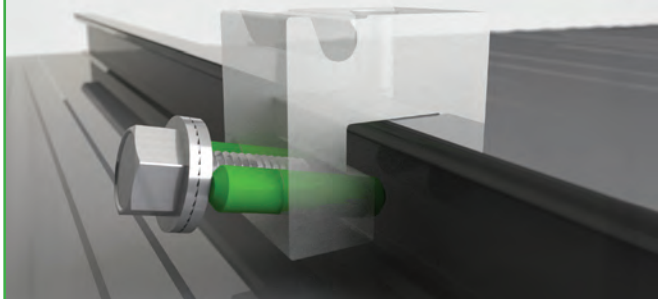


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be applied to a white interior insulation facing.

On both roofs and walls, taping on the exterior side as the work progresses helps keep moisture from reaching the metal panels through open seams. Unsealed joints can allow interior moisture to move between the open seams toward the underside of the metal, where it may collect between the insulation and metal. Over time, trapped moisture can contribute to corrosion concerns.

A sealed seam also helps the insulation function as a continuous vapor-control layer. Stapling the material to the framing is only part of the installation. Joints, edges, and penetrations must be properly sealed as well.

Keep wall installation tight and continuous

For a draped wall installation, attach the insulation at the top purlin and unroll it vertically. Keep the material reasonably tight as it is unrolled, allowing only the slight drape needed between purlins. Staple it to the framing as the installation progresses.

For a furring installation, secure the insulation to the top purlin, unroll it vertically and fasten it to the purlins. Install the furring members over the material and attach the wall panels as usual.

Continue each section from top to bottom. As with the roof installation, attach each layer of insulation and seal the seam. Sealing the seams is important to achieve a continuous vapor barrier at the wall system. If a white interior finish is desired, a white-faced reflective product can be installed.

Protect the Material During Construction

Reflective insulation is durable, but it should still be treated as part of the building envelope rather than a temporary jobsite covering. Avoid unnecessary cutting and tearing, and repair damaged areas with compatible seam tape where appropriate.

Plan around electrical wiring and devices, and exercise caution when installing reflective products near electrical components. The completed assembly should enclose the insulation as intended. It should not be left exposed to weather or used as an exterior finish.

The best results come from matching the product to the construction sequence, maintaining the intended air space, and sealing the seams. Whether the project is a farm agricultural building, garage, workshop or residence, reflective insulation is most useful when it is treated as a system component rather than simply rolled onto the framing.

For post-frame builders, the installation of reflective insulation is familiar: secure the material, maintain the correct orientation, create the appropriate air space, and seal the joints. Those details help determine how well the insulation performs once the building is complete. Properly installing reflective insulation will ensure long-term performance of the insulation system. **PB**