

SUBJECT: VENTILATION OF METAL ROOFING

The ventilation of metal roofing when installed over Extreme SIPs provides many building science benefits. The primary benefit of venting above an Extreme SIPs roof deck is the removal of unintended moisture vapor that may emanate (known as “vapor drive”) from the interior of the building due to the misapplication of Extreme’s SIP sealant and SIP tape at spline joints and SIP-to-SIP intersections. The venting of moisture vapor between the metal roof covering and the top of the SIP roof deck reduces the risk of condensation and the potential for moisture damage to the SIPs’ upper facer. It should also be noted that vapor-permeable underlayments should also be used in metal roof assemblies when applied over SIP roof decks (See Extreme Panel Technical Bulletins R3 & R6).

In addition to venting moisture vapor, any rainwater or melting snow that bypasses the metal roofing materials is also removed by the ventilation space. Additional benefits of a ventilation cavity include:

- Reduction in the temperature of the SIPs’ upper facer from high heat generated by direct sunlight exposure in hot climate zones and the potential of concentrated heat from reflective surfaces, such as windows and reflective ponds.
- Protection of metal roofing systems, particularly Zinc and Copper, which can expose Extreme SIP roof decks to high temperatures, potentially damaging the rigid insulation core. Underlayments can also be damaged by excessive heat exposure.
- The vented cavity keeps temperatures at the Extreme SIP roof surface within safe operating limits for both the SIP and underlayment.
- In winter, the ventilated space creates a cold roof, reducing the potential for ice dams when snow depth on the roof is significant.
- Impact noise from rain and hail is also mitigated.

Extreme Panels have investigated a unique products that is compatible with Extreme SIPs for achieving a cost-effective above-the-roof deck ventilation cavity— Dorken Delta-Trela and Colbond’s Enkamat 7020. These products are commonly used in roofing applications to provide the ventilation, drainage, and thermal separation needed for the long service life of roof structures.



Enkamat 7020 from Colbond

These products are a three-dimensional mat made of continuous nylon filaments fused at their intersections. The 95% open structure of the entangled filaments facilitates drying of condensed water vapor from the building interior while providing full support to the metal roof. The nylon filaments withstand the load of the roof and the demands of the construction environment, including construction foot traffic. The space created between the Extreme SIPs roof deck and the roof covering allows moisture to flow away or evaporate.

Testing has been conducted on the temperature difference that an Extreme SIP surface experiences when ventilated with these products compared to no ventilation. A standing seam metal roof was applied over a small-scale Extreme SIPs roof structure for testing evaluation. Dark-colored standing seam metal roof panels were fixed to the SIPs roof over the ventilated material/roofing underlayment. An assembly of metal roof panels over roofing underlayment alone was also tested for comparison.

The top surface of both metal roofing assemblies was brought to a temperature of 194°F (90°C) using infrared heat lamps. This temperature was maintained for 6 hours to ensure stable temperature movement through the assembly.

The temperature recorded on the top surface of the Extreme SIPs was reduced by 18% with the use of a ventilated system. These results clearly demonstrate the effect of an air space in lowering the temperature of an Extreme SIPs roof deck when metal roofing is exposed to solar radiation, resulting in high surface temperatures.

SIP Ventilation	Temperature Reduction from Metal Roof to Top Surface of Extreme SIP
None	10°F
Enkamat 7020	43°F

Extreme SIPs recommends Dorken Delta-Trela or Colbond's Enkamat 7020 as a product that provides the important benefit of easy, cost-effective installation over Extreme SIPs, thereby achieving the additional building science benefits of ventilation: cooling the top of roof deck air temperature, allowing above-roof deck evaporation of moisture, and mitigating the sounds of rain and/or hail striking the metal roof.

Similar performing ventilating mats may be available in the marketplace. It is the responsibility of the designer and installer to determine if the manufacturer of these ventilating mats recommends the use of their products and to provide installation instructions and details for application when applied over SIP roof deck assemblies.