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Cellulose vs. 'Flash and Batt'

In an effort to improve upon the poor installed performance of fiberglass batts, the fiberglass and foam industries have started promoting a technique called 'flash and batt'. In a 'flash and batt' installation, a thin layer of closed cell foam is sprayed over the inside of a building's exterior sheathing (flash), followed by the installation of fiberglass batts (batt), in the framing cavities. From a building science perspective, this technique raises several red flags, including the possibility of reducing the building's durability and increasing the likelihood of mold growth within the framing cavity. From a performance perspective, 'flash and batt' offers limited performance improvement over typical fiberglass batt installations.

The first issue with 'flash and batt' system is that closed cell foam is a vapor barrier. Spraying it on the exterior sheathing puts the vapor barrier on the wrong side of the wall in the heating season. Because the foam is sprayed on in a very thin layer, it lacks sufficient R-Value to prevent the moist, conditioned air leaking through the fiberglass from condensing on its cold interior surface. This is especially prevalent along the connections of the framing and exterior sheathing, due to the increased thermal bridging from the solid wood framing in these areas. The shared hydrophobic properties of the fiberglass and foam are detrimental, since they allow liquid water to remain in place long enough for mold and rot to occur at framing junctions or the bottom of the framed cavity. If an interior vapor barrier is also used, this moisture is essentially trapped between the interior barrier and the closed cell foam on the exterior, leading to a 'self-composting' building system.

The second issue with the flash and batt system concerns air leakage. Closed cell foam products are very rigid after curing, lacking the flexibility to move with the wood framing in response to temperature and humidity changes. These dimensional changes in the framing are enough to crack or separate the closed cell foam, usually along the framing connections, which also tend to be the coldest areas due to thermal bridging, explained above. These air pathways increase the moisture concentration in these areas and put them at greater risk of mold and rot. The cracking of the foam air barrier over time also explains why the air leakage rates of wood-framed, 'flash and batt' insulated buildings typically increase over time.

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'Flash and batt' systems also fail to address the greatest sources of air leakage, which occur along the wood-to-wood connections of a building: subfloor to bottom plate, between the double top plate, and between the multiple framing members in walls, ceilings and slopes. Flashing cavities with foam does nothing to seal these joints, which must still be air sealed separately with a high quality, silicone based caulking to prevent this air leakage. The foundation-to-sill plate connection, wood-to-wood connections in the band joist area, and gaps around each window and door opening also need to be air sealed separately, since the foam flash coating isn't applied in these critical regions.

The final issue with this system is that fiberglass batts, installed against the irregular surface of the flash foam coat, leads to substantially more gaps, voids and compression than in a typical fiberglass batt only installation. These installation issues further reduce the installed performance of the fiberglass batts.

A higher performing, cost-effective alternative to the problematic 'flash and batt' system is to dense pack the wall behind Insulweb with Cel-Pak cellulose, or spray apply Nu-Wool cellulose. The high installed densities (3.5 lbs/cuft) of these cellulose systems, along with their ability to flow around obstructions and irregularities, effectively blocks air infiltration, and provides superior installed performance in low-rise buildings. This system, combined with comprehensive air sealing of the wood-to-wood framing connections, foundation-to-sill plate connection, and around the window and door openings, will achieve a much tighter building envelope than can be attained by 'flash and batt' installations.

The hygroscopic properties of the cellulose, together with the fact that cellulose requires no vapor barrier in the typical installation, work to disperse any diffusional moisture, while the flexibility of the cellulose will ensure that cracks, gaps and voids don't develop as the structure dries and moves over time, allowing cellulose insulated structures to offer superior durability and performance.

If you have any questions or would like to discuss this further, please contact our Technical Manager, Bill Hulstrunk at technical@nationalfiber.com.