Not All Glass-Mat Sheathings are Created Equal

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Gypsum panels made of a treated, water-resistant core, and fiberglass mats surfaces have been the exterior sheathing of choice for more than two decades. These sheathings are most often attached to outside framing members. They are designed for prolonged exposure (up to 12 months) to the elements during the construction process and provide flexibility to the building schedule. Exterior sheathings feature moisture- and mold-resistant gypsum cores that are encased in glass-mat facers on both sides. They meet ASTM C1177 the Standard Specification for Glass-Mat Gypsum Substrate for Use as Sheathing.

Over the last few years many sheathing manufacturers have introduced new glass-mat sheathings into the market. Carlisle Coatings & Waterproofing (CCW) offers a full line of wall membrane and flashing products that are often installed over glass-mat sheathing. Over the years, CCW and its installers have noticed significant differences in performance of CCW sheet- and liquid-applied products over these substrates. Because of these observations, CCW has conducted both field and laboratory investigations to determine the surface characteristics of various commercially available glass-mat-faced sheathing products.

The results show the glass-mat sheathings share similarities; however, significant differences are noted when examined under microscopes:

- Figures 1–4 depict four different glass-mat sheathing facers magnified at 50 times with a Scanning Electron Microscope/Energy Dispersive X-ray (SEM/EDX). Each board facer contains fiber-like structures with a chemical matrix.
- Figures 1–3 show a chemical binder connecting these fiber structures creating a compact, closed matrix. These surfaces have different profiles; however, the fibers appear to be fully incorporated into the chemical binder.
- Figure 4, however, does not have a closed matrix. The surface in Figure 4 shows a layer of un-incorporated fibers indicating a highly porous, textured surface.

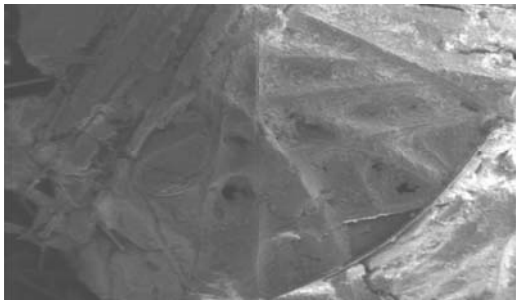

Figure 1 - Brand A

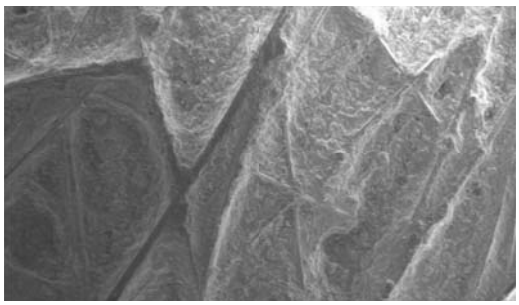

Figure 2 - Brand B

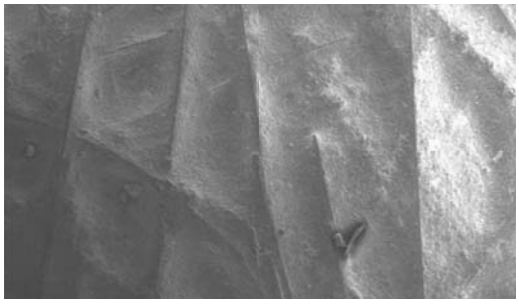

Figure 3 - Brand C

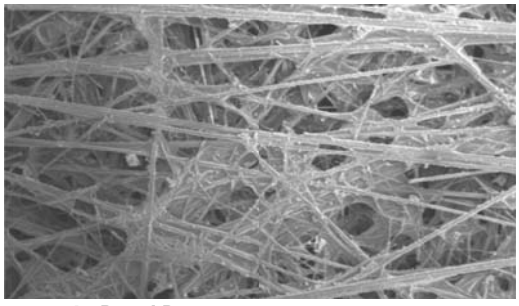

Figure 4 - Brand D

Coverage Rates Examined

These findings led to additional testing where various CCW contact adhesives were applied to sheathing brands A, B, C and D for evaluation. The CCW contact adhesives are used as surface preparation for CCW's self-adhered sheet membrane and flashing products. Minimal differences were noted in the coverage rate and absorption among brands A, B and C. The evaluation of Brand D, however, showed significant absorption of all the CCW contact adhesives tested, indicating that nearly twice the amount was required to achieve equivalent results compared to the other sheathing brands.

A side-by-side evaluation was conducted using sheathing brand A and brand D on a jobsite mockup. The CCW product (Barritech NP) was spray-applied over the two sheathings at a nominal 40-mil system, 54%-solids, water-based membrane. Product was installed at the manufacturer's recommended thickness of 80 mils wet on both sheathings. After the product was allowed to dry, thickness over sheathing brand A measured 40 to 45 mils, while dry thickness over sheathing brand D measured 30 mils. All mil thickness measurements were performed using CCW's 1 to 80 mil scale comb gauge. Though this gauge does not give a true analytical measurement, it is acceptable for giving comparative measurements. The difference in dry mil thickness was attributed to higher absorption into the facer of sheathing brand D compared to sheathing brand A. The Barritech NP applied to sheathing Brand D was acceptable, but the visible and measurable difference in dry mil thickness had to be explained.

Conclusion: Facer Texture Affects Absorption

The difference in glass-mat facer texture significantly impacts measurable dry thickness of CCW's fluid-applied membrane air barrier products. Of greater importance, the increased porosity of glass-mat facer brand D requires extra contact adhesive or multiple coats of contact adhesive to promote adequate adhesion of CCW self-adhered membranes and flashings. The increased amount of contact adhesive and the substrate porosity also require extended drying times. The high absorption rate of the contact adhesive into the facer of sheathing brand D creates higher risk of membrane de-lamination if extended drying time is not followed.

Estimators and applicators must understand the porosity and absorption of the sheathing substrates over which materials will be applied, to ensure accurate estimates and successful installations are achieved. Selecting installers with experience in using the different glass-mat faced sheathings will assist in proper application and will ensure that long-term performance is achieved.

For example, while magnified views of the facers on sheathing brands A, B and C look similar, some performance differences were noted during adhesion testing. Installers who understand how each brand of sheathing reacts to products being applied to them will avoid negative impacts related to coverage rates, drying time, and performance.

Material manufacturers like Carlisle Coatings & Waterproofing provide approximate coverage rates and general instructions to assist with the estimate and application. However, because sheathing surfaces vary, coverage rates and application technique can dramatically differ.

All sheathings are not created equal and we recommend having a clear understanding of the differences to ensure material and labor estimates are accurate and application requirements are satisfied.

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