TECHNote

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Coating Problems Caused by Differences in Glass-Mat Sheathing

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Introduction

Glass-mat gypsum board has long been the choice of builders for exterior wall sheathing. These sheathing boards are required to meet ASTM C 1177 Standard Specification for Glass-Mat Gypsum Substrate for Use as Sheathing and consist of a noncombustible water-resistant gypsum core, surfaced with glass-mat partially or completely embedded in the core.

Recently, a variety of new glass-mat sheathings have been introduced into the construction market. PROSOCO, Inc. and other producers of fluid applied air barriers are noticing that coverage rates typically achieved on glass-mat sheathing are different with these new types of sheathing boards. We know from a recent field event that one of the new sheathing boards require more product, and therefore the coverage rates of fluid-applied air and water-resistive barriers are lower than typically expected.

Applicators reasonably expect new sheathing boards to accept coatings in the same manner as their industry standard competitors' do, and they are unfairly penalized when they bid jobs accordingly, yet find the product consumption to be higher than expected.

Because of the discrepancies in coverage rates being seen in the field and in the laboratory, PROSOCO, Inc. enlisted AMT Labs to conduct a Scanning Electron Microscope/Energy Dispersive E-ray (SEM/EDX) evaluation of four common types of glass-mat sheathing. AMT Labs also conducted a coverage rate evaluation of each of these four types of sheathing, using a PROSOCO, Inc. fluid applied air and water resistive barrier membrane.

The results are in the following pages.

*This Tech Note was revised in April of 2016 to include a sheathing board referred to as "GlasRoc Sheathing V1" per request from CertainTeed. This board was not evaluated in the November 2013 evaluation.

SEM Examination of Glass-Mat Sheathing Surfaces

PROSOCO enlisted AMT Labs to provide Scanning Electron Microscope/Energy Dispersive E-ray (SEM/EDX) photographs of five common types of glass-mat sheathing. These photographs show significant differences in the surface structure of each sheathing:

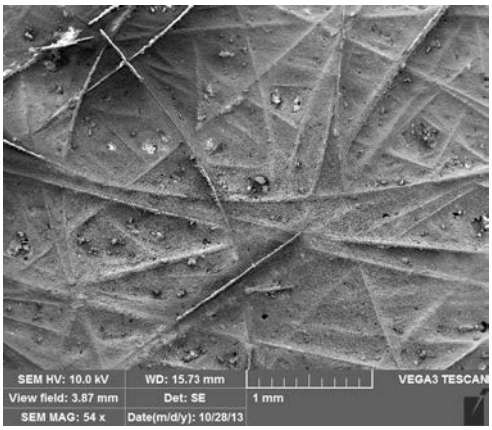

Figure 1: Brand A

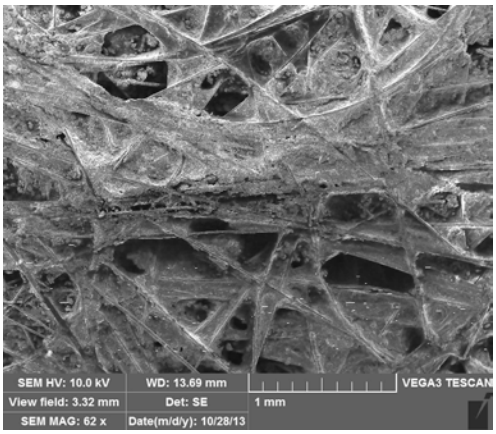

Figure 2: Brand B

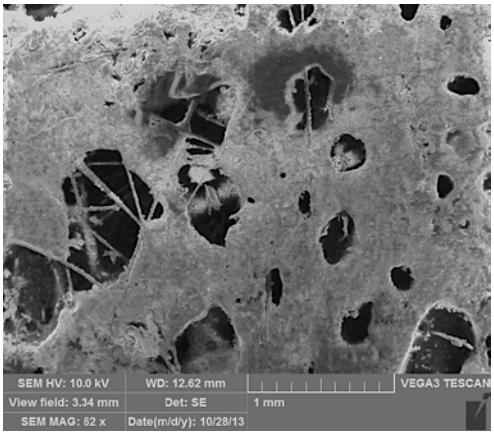

Figure 3: Brand C

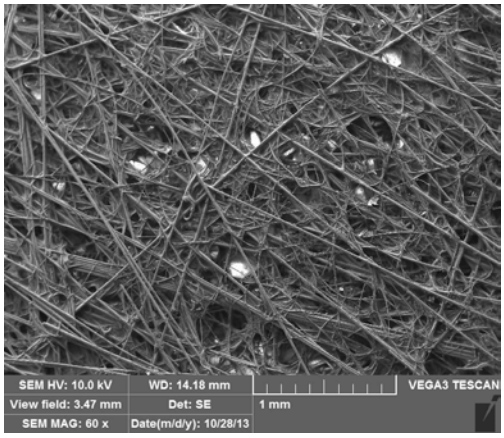

Figure 4: Brand D

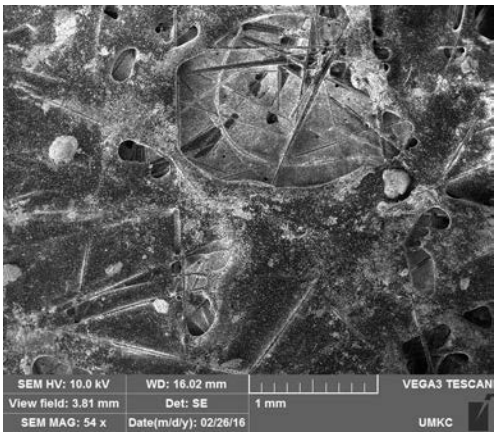

Figure 5: Brand E

Description of the SEM examination:

Brand A: Fibers are visible as coated, topographic ridges at the surface. The coating appears finely granular, and a few fibers emerge from the surface with uncoated portions. The coating forms a film web between the fibers, giving a surface that is nearly completely sealed.

Brand B: Fibers are visible topographically at the surface but are coated. The coating appears to contain a very fine-grained granular material, and seems to have been a moderately viscous material that stuck to the fibers and formed webbing between the fibers. Some powdery dry material partly fills some of the low areas between the fibers.

Brand C: The coating on the surface appears to have been formed or pressed against a very smooth surface before it hardened, giving the coating a flat, smooth surface. Fibers are visible only within some of the rounded holes that penetrate the flat surface. The coating appears to have been a slurry-like material, thick enough to make a nearly continuous coat against the forming surface. It does not appear to have soaked into the fibrous material.

Brand D: The sample's coating is visible only at high magnification (e.g., 700x). The numerous fibers do not appear to be coated at low magnification, but at higher magnification, the coating material can be seen filling in between and lapping up onto the fibers. The coating does not appear to contain any particulate material, so the hardened coating areas have a smooth surface texture. The sample also displays polygonal porous or textured areas bounded by fibers. Those areas appear to be filled with a spongey, possibly crystalline material. Overall, the specimen appears to have many open areas in the coating, creating a porous surface.

Brand E: GlasRoc Sheathing V1. The coating on the surface surrounds the surface fibers, but does not extend very far below the surface. The coating appears to be somewhat granular, and though it surrounds the fibers, it does not appear to react with or actually bond to the fibers. The coating is nearly continuous, but rounded openings in the coating reveal that the coating has not soaked into the board, but is a relatively thin layer on the surface.

Coverage Rates

PROSOCO's fluid applied air barrier R-GUARD Cat 5® was applied to a 12" x 12" piece of each of the four types of sheathings. First, Cat 5® was applied to each piece of sheathing to reach the target thickness of 12 mils. The amount of Cat 5® required to achieve 12 mils was recorded:

Sheathing Brand	Applied Cat 5®	Mils
Brand A	50.5 grams	12
Brand B	48.5 grams	12
Brand C	47.4 grams	12
Brand D	89.8 grams	12
Brand E	43.0 grams	12

In the first coverage rate evaluation, brands A, B, C, and E were similar. However, brand D required nearly twice the amount of Cat 5® to achieve 12 mils than the other brands.

In another evaluation, exactly 45 grams of Cat 5® was applied to 12" x 12" pieces of each of the four sheathings, and the mil thickness was measured 10 minutes after application.

Sheathing Brand	Applied Cat 5®	Mils
Brand A	45 grams	10
Brand B	45 grams	8-10
Brand C	45 grams	12
Brand D	45 grams	0
Brand E	45 grams	12

In this evaluation, brands A, B, C, and E were similar, and the application resulted in a mil thickness very close to the target 12 mils. However, brand D absorbed almost all of the applied Cat 5®, leaving zero mils of the product on the surface.

Coverage Rate Application Photographs

The below photographs show the four specimens after 45 grams of PROSOCO's fluid applied air barrier R-GUARD Cat 5® were applied to each one. Note Brand D appears to have hardly been coated.

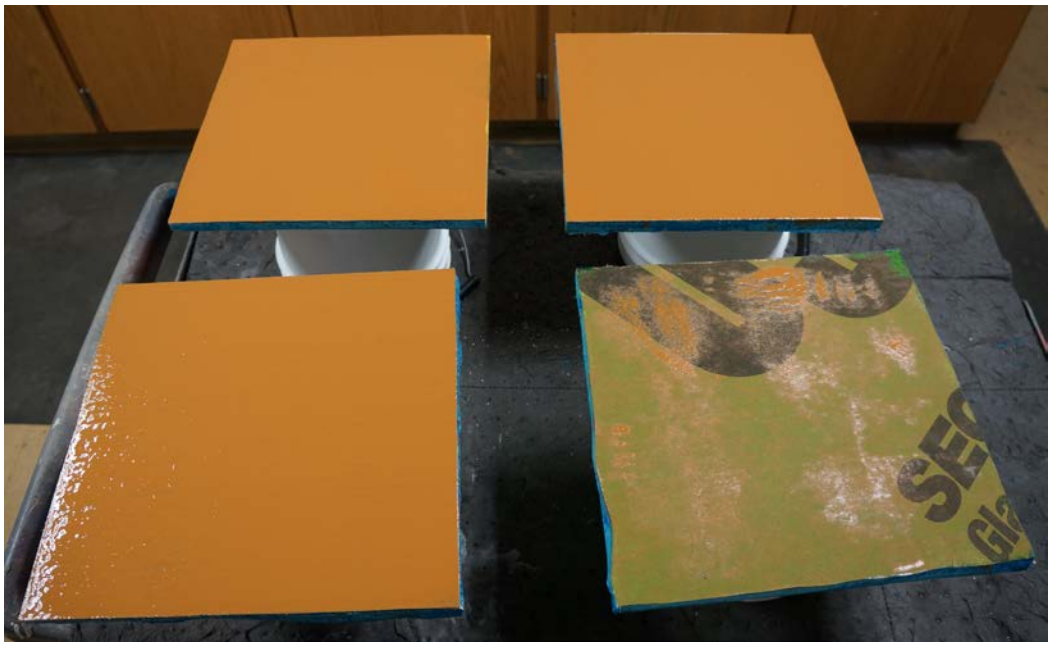

Figure 5, clockwise from top left: Brand A, Brand C, Brand D, Brand B.

Figure 6: Brand E

Summary

The differences in surface texture of various glass-mat sheathings can create a significant difference in the coverage rate of an applied product. Manufacturers of fluid applied air barriers like PROSOCO, Inc. provide an estimated coverage rate to help contractors, builders and specifiers determine accurate bids on products and labor. However, the differences in surface textures of the various glass-mat sheathings are creating large discrepancies in coverage rates and application techniques. It is vital for everyone involved in the bidding and application process to understand these differences in glass-mat sheathings to ensure accurate bids, orders, and product application.

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REVISED to include Brand E per request from CertainTeed in April 2016