WHITE PAPER

MCM Best Practices:

Proper Surface Preparation for Stiffener Adhesion

Overview:

One benefit of MCM panels is the ability to deflect under load and return to flat after the load is removed. Even with this ability, MCM must meet the deflection requirements defined in the building code. To meet these deflection requirements, MCM panels are generally reinforced using stiffeners adhered to the non-exposed side of the panel. Depending on the surface finish on the non-exposed side of the panel, additional steps may be required to adequately attach these stiffeners.

While there are a number of adhesives available for stiffener adhesion, this paper will focus on the proper preparation for the two most predominant materials used: Dow Corning® 795 and 3M™ VHB™ Tape.

Discussion:

Stiffeners have long been used to limit the deflection of MCM panels. Since this application is intended to limit deflection only and not for structural purposes, the code requirement for special inspections is not required according to ICC ES. However, there are required performance criteria to ensure that the adhesive performs adequately over time. The initial work involves preparation of the substrates:

> Thoroughly clean all substrates to be sealed, removing all contaminants such as grease, oil, dust, frost or water. All metal, glass, or other surfaces should be cleaned with the recommended solvent, using a lint free cloth.

Most surfaces can be cleaned with a mixture of isopropyl alcohol (IPA) and water (50-70% IPA) or Acetone depending on environmental regulations. Whether a painted surface or not, proper adhesion will be obtained based on the following:

Dow Corning 795 Building Sealant[1]

Like most structural glazing applications, Dow Corning always recommends testing to verify if a primer is required or not for adhesion. Many panel fabricators make assumptions and do not always test for adhesion to verify if a primer is required.

- For chromate conversion and Alodine treated or anodized aluminum substates, no adhesive primer is required.
- For mill finish substrates, Dowsil™ 1200 OC manufactured by Dow Chemical Company is required as a primer to enhance adhesion.

- Dowsil™ 1200 OC manufactured by Dow Chemical Company may be used as an alternate to no primer. Dowsil™ 1200 OC is an air-drying primer composed of a dilute solution of moisture reactive materials in volatile siloxane. Dowsil™ 1200 OC will improve the quality and speed of adhesion development between room temperature vulcanizing silicone sealants and a variety of common nonporous substrates.
- MCM panels, with a Kynar, Duranar finish applied to the adhered surface, generally require the use of Dowsil™ Primer-C OS. Dowsil™ Primer-C OS offers low VOC and a unique fluorescing feature allowing for a visual quality control check to ensure the primer has been applied. Dowsil™ Primer-C OS is required for finishes such as: Kynar®, Duranar®, Fluoropon®, Duracron®, and Polyester Powder Coating. When Acrylic Latex is used additional lab testing may be required.

3M™ VHB™ Tape[2]

Arguably easier to use, adhesive tapes also require proper preparation. Surfaces should be cleaned with a 50/50 or 70/30 isopropyl alcohol and water mixture to remove any oil, heavy dirt, or other contaminants. A clean, lint-free cloth should be used. Unique MCM facers such as copper and copper containing metals may require special surface preparation. Contact 3M for further guidance in those instances.

For unfinished metal facers, 3M™ suggests cleaning and additional benefits including increasing the adhesion build rate from the use of a primer or adhesion promoter such as 3M™ Adhesion Promoter 111, 3M™ Tape Primer 94, or 3M™ VHB™ Tape Universal Primer UV.

For coil coated metal facers, 3M™ suggests cleaning followed by the use of 3M™ Adhesive Promoter 111, 3M™ Tape Primer 94, or 3M ™ VHB™ Tape Universal Primer UV to increase the adhesion to painted surfaces. 3M™ does not differentiate between the different types of coil coated finishes.

This information should be used as a guide only. The adhesive manufacturers recommend that all field and shop adhesion be tested prior to starting a project. Failure to verify and document adhesion results from this testing may result in poor initial adhesion or adhesion loss that is not covered by the adhesive manufacturer.

Further information can be found on either the Dow or 3M company websites. Refer to these websites for more complete information.

Conclusion:

While either sealant or tape provides the primary connection between the stiffener and the MCM, preparation of both the facer and the stiffener surface to be attached are required to ensure that the bond remains intact and performs as required.

Many manufacturers also mechanically fasten the end of the stiffener to either the return leg of the MCM panel or the perimeter extrusion for added strength in transferring the stiffener load to the panel anchorage system. The structural calculations for each project should outline any additional mechanical connections required.

References:

[1] Dow Americas Technical Manual – High Performance Building

[2] 3M Technical Data Sheet – May 2017 - 3M ™ VHB™ Tape Universal Primer UV

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