**Questions Log - AAH1704 webinar “Building Enclosure Fundamentals-Air Barriers for Health Care Facilities”**

Q: What type of sealant should be used in lieu of silicone to adhere to polypro flashing?

A: I believe the question relates to what type of sealant should be used to seal to polyethylene / polyethylene facers that are often used in conjunction with membrane flashings used for air barriers and flashing systems. Sealants that are capable of sealing to low energy surfaces are typically required when bonding to polyethylene. Options include Dow Corning 758 and Tremco Spectrem 1.

Q: What are your thoughts about eliminating the air moisture barrier behind systems like insulated metal panels that have been tested and say that the sheathing and air barrier can be eliminated? If so how are window details worked out?

A: I am not in favor of eliminating the sheathing and air barrier behind insulated metal panel systems (even ones that are designed to serve as the air/moisture barrier) especially in hospital construction or other facilities with low-risk tolerance for leakage or air infiltration. The main concern is at openings in the wall system. As a firm, we have observed failures with these systems at transitions and interface conditions. The use of a separate sheathing and air barrier system behind the metal panels provides a secondary level of protection that is generally desired in exterior envelope design.

Q: When running dew point analysis and figuring out insulation thicknesses and locations what software do you recommend using within the industry? Are Insulation manufacturers a good source to run these cals?

A: THERM is commonly used to perform heat flow simulations to analyze the effects of insulation placement, continuity, and thickness as it relates to dew point analyses and condensation potential. THERM is a free software package that was developed at Lawrence Berkeley National Laboratory and is capable of modeling two-dimensional heat-transfer effects in building components such as windows, doors, walls, foundations, and roofs. THERM's heat-transfer analysis can evaluate a product’s energy efficiency and local temperature patterns.

THERM’s two-dimensional conduction heat-transfer analysis is based on the finite-element method, which can model the complicated geometries of building products. It should be noted, however, that because THERM is only a two-dimensional analysis tool, corner geometries, anchorage, or other three-dimensional conditions cannot be analyzed. THERM also cannot effectively account for effects of airflow, internal heat sources, or solar radiation; conditions, which can alter the actual air temperatures adjacent to the exterior walls and floor. These conditions can only be modeled using more sophisticated analysis software such as computational fluid dynamic (CFD) software.

Insulation manufacturers, as well as fenestration manufacturers, often can provide THERM simulations. While this can be a good resource, often times the simulations provided will be specific to the manufacturer’s material/system and will not include the interfacing materials and project specific detailing that can affect the overall performance of the exterior envelope.

Q: I wonder if you can discuss the advantages/disadvantages of a fluid applied air barrier verses a sheet applied air barrier.

A: There is no “one size fits all” when it comes to selecting a sheet versus fluid applied air barrier. Some of the advantages/disadvantages of each include the following;

Liquid Applied:

Advantages: Monolithic properties, excellent adhesion, continuous bond (restricts the flow of moisture behind the air barrier in the event of a breach or failure), options for roller or spray applications, can be installed by single applicator.

Disadvantages: Installation temperature restrictions (for most), application thickness dependent on installer, may require different transition membrane materials, roller applications typically require multiple passes, potential for overspray/splatter

Sheet Applied

Advantages: Consistent thickness of applied material, less temperature restrictions, no overspray/splatter issues

Disadvantages: Not monolithic (reliant on laps and seams), priming of substrates is typically required for adhered systems, potential sagging issues for adhered systems, wind pressure limitations for mechanically attached systems (unadhered systems), potential for moisture flow behind sheet, typically cannot be installed by a single applicator

Q: Can you talk a little bit about fasteners for continuous insulation?

A: In order to meet the definition of continuous insulation the insulation must be continuous across all structural members without thermal bridges other than fasteners and service openings. When using rigid insulation, adhesives are ideal as they do not affect the thermal performance. Mineral wool insulation requires isolated fasteners, clips, or spindle type anchorage. Stainless steel is recommended not only for its resistance to corrosion but also for its lower thermal conductance. Proprietary products that utilize fiberglass clips or other thermal separators in conjunction with metal anchorage can also provide good thermal performance. With any of these anchoring systems, structural integrity and fire resistance must be accounted for.

Q: What are best practices for transitioning at below slab vapor barrier to air / weather barrier at exterior wall?

A: The vapor retarder and air barrier do not have to physically meet as the concrete foundation wall can serve as the transition. Be sure to extend the air barrier down past the base of the wall (on the exterior side of the foundation) and terminate/bond the air barrier to the top of the foundation wall in accordance with the air barrier manufacturer’s details. Extend the vapor retarder to joint between the edge of slab and the foundation and provide a vertical return.

Q: Shouldn't scrubbable epoxy paint be used on toilet room walls on exterior walls?

A: Where such conditions exist and an epoxy paint must be used, I would recommend limiting the epoxy paint coating system to only specific portions of the wall (lower areas) and use more breathable coating systems above. The same approach should be used for tiled wall areas.

Q: Any tips on keeping intent of continuous air/moisture barriers and continuous insulation from being "value engineered"? More specifically, tips for maintaining the basis of design intent to avoid substitutions.

A: Remind the Owner that roughly 80 percent of claims related to new building construction are related to problems with the exterior envelope. The extra money will be well spent.

Q: Most difficult continuity issue is at the slabs or tie back anchors. Would liquid or spray would have to be used on these bridging elements?

A: I’m sorry, but I do not understand the question.

Q: So this webinar should apply to all buildings, not just for healthcare facilities, correct?

A: Yes, the principals apply to all buildings. Problems, however, are often disproportionately represented in healthcare buildings due to interior design conditions (high relative humidity and areas of negative pressurization) that make them more susceptible to building envelope moisture issues.

Q: What are guidelines for using sheet vs sealant to tie between glass frames and surrounding structure?

A: Sealant joints can provide effective perimeter seals, however, their ability to accommodate movement may be limited and they cannot always accommodate offsets between the plane of the air/moisture barrier and plane of the air/water line within the fenestration/curtain wall system. Sealants require bond surfaces for adhesion, which can be problematic when the sealant joint must cross over the “hollow ends” of the vertical members. Caps are required in these locations. Where expected building movements (sway or inter-story drift) are beyond the capabilities gun-grade sealants, joints are unusually wide, or transitions between the curtain walls and surrounding framing do not align with the plane of the air/water line, the use of preformed silicone sheets can provide an effective solution. Note that while other membrane sheets (e.g. rubberized asphalt or butyl based membranes) are also sometimes bonded or glazed onto the shoulder of a curtain wall, the movement capability of these membranes is limited and bond surfaces of up to 3 inches are often required by the membrane manufacturer.

Q: It looks like cavity insulation is the best system. In order to get a high enough R-Value, you would need some wide insulation. Wouldn't this create a problem with adhering the finish material and creating a thermal break?

A: While continuous cavity insulation can provide the most efficient thermal performance and reduce risks of condensation, it is true that trying to meet current prescriptive code requirements with cavity insulation only can, at times, be difficult. Large thicknesses of insulation cause cladding materials to be located further away from the backup resulting in significant eccentricities. The eccentricities can require larger structural supports, which in turn can serve as thermal bridges. Depending on the type of cladding being used, however, options such as thermally broken ties, clips, or low conductive anchor systems may be available to support the cladding and maintain the integrity of the continuous insulation.

Q: Is vinyl wall coverings on exterior walls discouraged in general or only in high humidity environments?

A: The use of vinyl wall coverings on exterior walls is generally discouraged. The potential for issues is, however, heightened in high humidity environments.

Q: What are your thoughts about insulating parapets?

A: This question could be a presentation on its own. Where possible, I would recommend extending the roof slab to the exterior face of the backup wall and creating the parapet as a separate cantilevered structure with insulation along the base of the parapet (height of similar thickness of the roof insulation). This detailing prevents air flow into the parapet and reduces condensation potential while maintaining general thermal. If the slab or roof deck stops short and the studs run continuous up into the parapet then different options need to be considered. For short parapets, the air/moisture barrier and insulation may be able to be installed around the perimeter of the parapet and tied into the roof system. Tall parapets are more susceptible to condensation and may require the use of spray foam insulation along the base or even within the full depth of the parapet to restrict air flow into the parapet cavity as perimeter insulation may not be able to maintain temperatures above dew point within this extension. Insulation on the roof side of steel stud framed parapets is usually recommended on taller walls to keep the studs warmer in winter, if a thermal break cannot be provided.