

August 28, 2013

Mr. Jason Roy
Plant Manager
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Sanford, ME 04073

RE: Use of Various Masonry Drainage and Flashing Products in Exterior Wall Assemblies with Brick and Concrete Exterior Veneers.
HAI Project No. 1AJP00102.000

Dear Mr. Roy:

Hughes Associates, Inc. (HAI) has completed our analysis of the usage of various Advanced Building Products masonry drainage and flashing products used in commercial exterior wall construction. The objective of this analysis was to review the individual product usage and demonstrate that the typical product installations would not substantially increase the flammability of the exterior wall assembly. To meet this objective, the flashing, drainage, and accessory products shown in Table 1 (Flashing Products), Table 2 (Mortar Deflection Products), and Table 3 (Accessory /Miscellaneous Use Products) were reviewed to document how they are intended to be installed in the field. The “worst-case” installation was evaluated in terms of the amount of exterior wall surface would be expected to be covered and the impact this may have on the fire performance of the wall assembly. The exterior wall assembly was assumed to incorporate a steel stud/gypsum wallboard or concrete masonry unit (CMU) base wall with a brick, CMU, or other thermally thick exterior veneers (artificial stone, natural stone, concrete, Terra Cotta, etc.). Walls which contain combustible components, such as full-coverage water-resistive barriers (WRBs), are currently required by the building code (e.g., International Building Code (IBC), 2012 Edition and later versions) to meet the conditions of acceptance described in NFPA 285, *“Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.”* The flashing and mortar deflection products are not WRB products currently required by the building codes to meet specific flammability requirements. Advanced Building Products does, however, want to be proactive by ensuring product compliance with the intent of current and future building code requirements.

The various Advanced Building Products’ accessories can be grouped into a number of broad categories: general flashing products, mortar deflection products, and miscellaneous/accessory use products. The mortar deflection products incorporate a polypropylene mesh which is typically applied at all flashing locations or at the base of the wall to collect excess mortar and maintain drainage paths. This analysis has specifically excluded the Mortaivent® and the Mortairvent® CW products as these products may be applied over the entire exterior wall surface which is beyond the scope of this project.

The flashing products prevent water migration into the wall assembly and are typically applied in limited quantities to discrete locations within the wall assembly, such as at door and window locations. The analysis which follows generically describes the various products and their typical/common usage.

Table 1 – Flashing Products

Product Name	Description	Usage Description	Max Product Height/Width	Usage Location
Copper Fabric	Copper sheet bonded on both sides to glass fabric with an asphaltic adhesive	Applied directly up against base wall and extends beyond of exterior wall	12, 16, 18, 20, 24, 32, 36-inch heights	At all flashing locations
Copper Sealtite 2000	Copper fabric flashing	Applied directly up against base wall and extends beyond of exterior wall	12, 16, 18, 24, 32, and 36-inch heights	At all flashing locations
Cop-R-Cote	Copper sheet bonded on both sides to two layers of plastic asphaltic compound	Applied directly up against base wall and extends beyond of exterior wall	12, 16, 18, 20, 24, 32, 36-inch heights	At all flashing locations
Cop-R-Kraft	Copper sheet bonded on one layer of waterproofed creped Kraft paper with a plasticized asphalt compound	Applied directly up against base wall and extends beyond of exterior wall	12, 16, 18, 20, 24, 32, 36-inch heights	At all flashing locations
Cop-R-Kraft Duplex	Copper sheet bonded between two layers of waterproofed creped Kraft paper with a plasticized asphalt compound	Applied directly up against base wall and extends beyond of exterior wall	12, 16, 18, 20, 24, 32, 36-inch heights	At all flashing locations
Cop-R-Corners	Pre-fabricated copper flashing	Applied directly to wall at corners	Universal	Corners of walls
Strip-N-Flash	Self-adhering rubberized asphalt laminated to high-density polyethylene film	Applied directly up against base wall and extends beyond of exterior wall	12, 16, 18, 24, 36-inch heights	At all flashing locations
Primer	High-quality, rubberized, low VOC primer	Applied directly on concrete, masonry, and metal surfaces	5-gallon pails	To be used behind Strip-N-FLASH

Table 2 – Mortar Deflection Products

Product Name	Description	Usage Description	Max Product Height/Width	Usage Location
Mortar Catch	Deflection mat that works in conjunction with flashing and weeping vents. Open mesh geomatrix design	Applied at all flashing locations in cavity walls.	5, 10, 19.5-inch heights	To be placed on all cavity wall flashings
Mortar Maze	Deflection device used in conjunction with standard masonry cavity walls	Applied directly on flashing at base of wall.	11 inch heights	To be placed on all cavity wall flashings
Mortar Break	Deflection mat that works in conjunction with flashing and weeping vents in 1" cavities	Applied directly on flashing at base of wall.	10, 13, 16, 39-inch heights	To be placed on all cavity wall flashings
Mortar Break II	Deflection mat that works in conjunction with flashing and weeping vents in 2" cavities	Applied directly on flashing at base of wall.	10 inch heights	To be placed on all cavity wall flashings
Mortar Break DT 1"	Deflection mat that works in conjunction with flashing and weeping vents in 1" cavities	Applied directly on flashing at base of wall.	10, 13, 16, 39-inch heights	To be placed on all cavity wall flashings
Mortar Break DT 2"	Deflection mat that works in conjunction with flashing and weeping vents in 2" cavities	Applied directly on flashing at base of wall.	10 inch heights	To be placed on all cavity wall flashings

Table 3 – Accessory/Miscellaneous Use Products

Product Name	Description	Usage Description	Max Product Height/Width	Usage Location
Mortar Maze Weep Vents	Polypropylene honeycomb drainage product installed between bricks	Installed in brick joint.	3/8" x 2-1/2" x 3-3/8" or 3/8" x 3-1/2" x 3-1/2"	Drainage cavities
Mortar Maze Weep Tubes	Drainage tubes containing cotton wicks and stainless steel screens installed between bricks	Provide drainage from cavities through exterior cladding.	3/8" dia. x 4"	Bottom of wall
Mortar Break Weep Vents	Nonwoven synthetic fiber pad	Installed in brick joint	25/8" x 3.5" x 0.5"	Drainage cavities
Advanced Termination Bars	Stainless Steel, Aluminum or Plastic	Applied at the base of wall	1" height	Top of flashing
Cop-R-Tite Mastic	Fibrated Mastic with Asphaltic Base	Seals all copper flashing	5 gallon pails or 30 oz. tubes	Edge of copper flashing
H2U Acrylic Urethane Sealant	High-performance superior urethane formula designed for siding and window industries	Seals around windows, doors, siding, hardboard, pressboard, OSB, etc, to seam flashing	10.2 oz. cartridges	Various cracks and seams
Grout Catch	Polypropylene mesh screen that prevents mortar overflow and seepage	Applied horizontally between CMU block courses. Fully contained within CMU block construction	6, 8, 10-inch widths	Between block courses

Flashing Products

Advanced Building Products requested the flashing products listed in Table 1 be reviewed as part of this analysis. Each of these flashing products can be substituted for one another, but typically, only one item will be installed in a project wall assembly, unless otherwise specified. The Copper Fabric, Copper Sealtite 2000, Cop-R-Cote, Cop-R-Kraft, and Cop-R-Kraft Duplex products incorporate sheets of copper bonded to a fabric or paper facer. An asphaltic coating is applied to the Copper Fabric and Cop-R-Cote products while the other copper based flashing materials incorporate non-asphaltic adhesive. The Cop-R-Corner products are light gauge pre-fabricated specialty copper flashing products for flashing at wall corners. The Strip-N-Flash product is a 40 mil thick membrane consisting of a 32 mil self-adhering rubberized asphalt laminated to an 8 mil high-density polyethylene film used behind the flashing materials. The primer is intended for use only behind the Strip-N-Flash product, if used. Specific installation instructions and additional application information is provided in each product data sheet.

The flashing products are used at the bottom of the wall, at the foundation sills, in the wall cavity space, as spandrel flashing, flashing for parapets and copings, as well as head or sill flashing at door and window locations. Figure 1 shows a common flashing application at the base of the wall and Figure 2 shows the flashing application over a window. Stock product sizes purchased by Advanced Building Products are 32- and 36-inch widths. These stock materials are then cut in the factory to the more commonly available 12-, 16-, 18-, 20-, and 24-inch sizes prior to resale to the end user. Some users will buy the larger uncut 32- and 36-inch widths and trim to size in the field. Common installation is to apply the material on the wall up to the second block course (nominally 16-inches above the wall base) and extend out under the wall as shown in Figure 1.

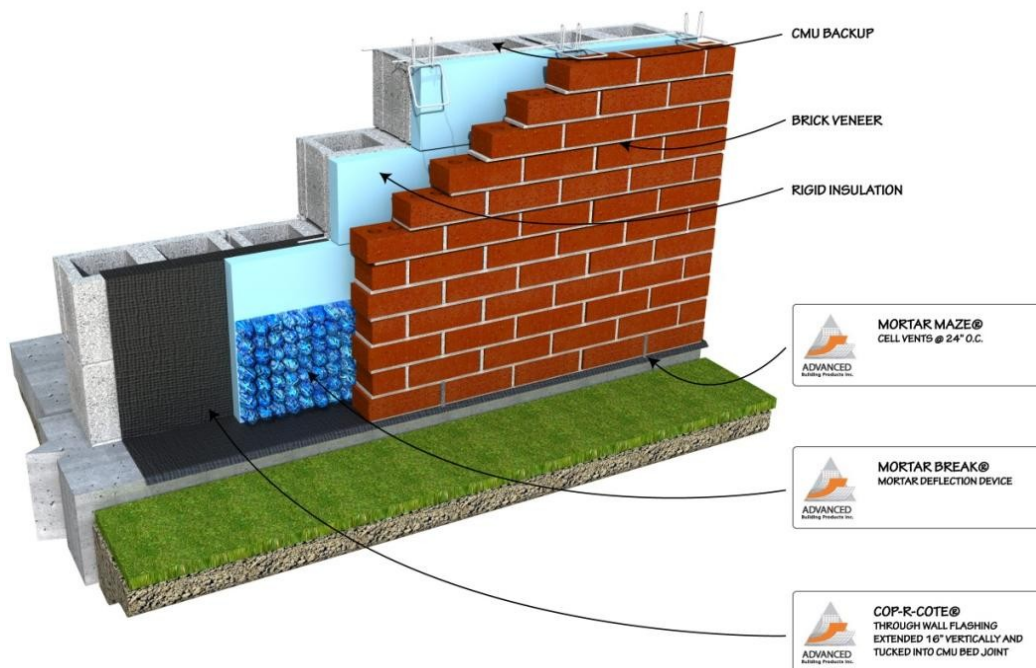


Figure 1 – Typical flashing detail at base of wall

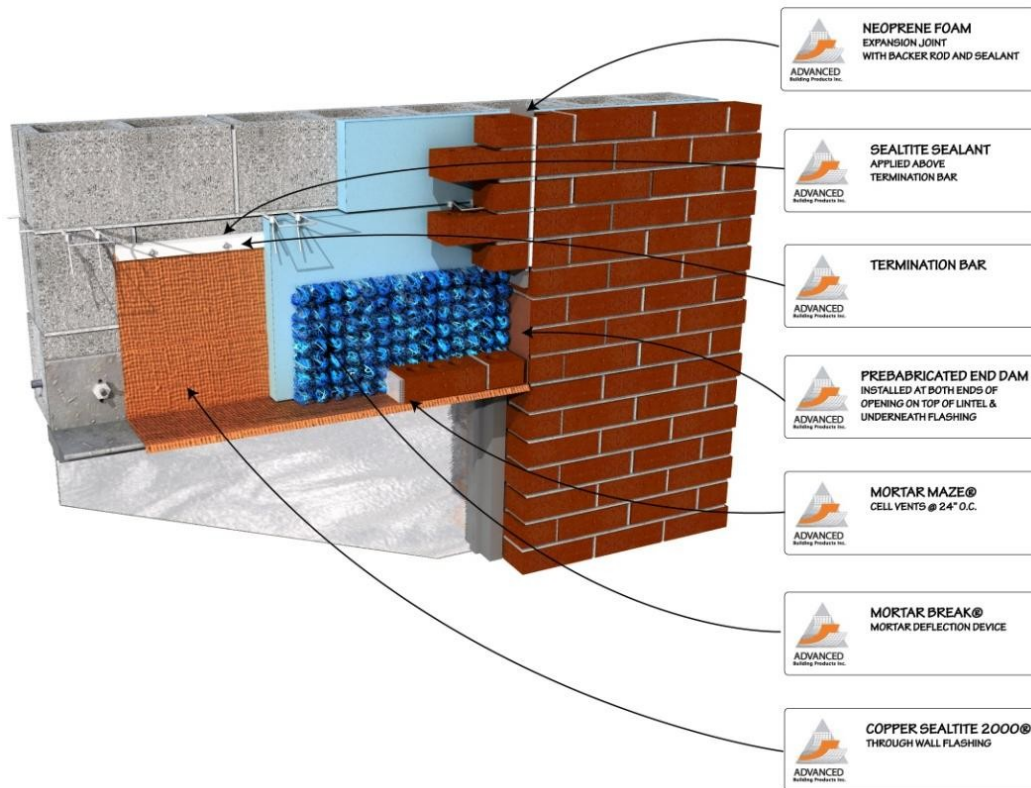


Figure 2 – Typical flashing detail over window opening/lintel

The flashing materials are only applied in limited areas. Flashing materials installed at the base of the wall would not be expected to contribute to fire spread within the exterior wall as these materials are below where the fire would be exiting the wall from a fire originating within the building. During an exterior fire (e.g., exposure from nearby building fire, combustibles located adjacent to the building), the thermally thick brick exterior will provide protection from ignition of the flashing materials. When applied at lintels or around door/window openings, the non-continuous application would not be expected to support vertical flame spread.

Mortar Deflection Products

The mortar deflection products are summarized in Table 2. The Mortar Catch, Mortar Maze, Mortar Break, and Mortar Break II products are intended to be installed at all cavity wall flashing locations (base of the wall, above windows and doors, steel lintels, spandrels, and shelf angles, etc.) as shown in Figures 1 and 2, to prevent mortar droppings from blocking and clogging base wall and head joint drainage channels. The mortar deflection products are installed on top of the flashing to ensure any water in the wall cavity will be able to drain and not collect on the wall surface. Water which forms within the wall cavity passes down past the mortar deflection products and out through the Mortar Maze Weep Vents and Weep Tubes, and Mortar Break Vent products installed in between the brick veneer. The Mortar Catch product is shaped into a “U” configuration resulting in a maximum 19-½ inch installation height. The Mortar Maze product is 11-inches high and available in either 1 or 2-inch depths compared to the Mortar Break II product which is 10-inches high and used in 2-inch wide wall cavities. The Mortar Break product is purchased in 39-inches widths and either cut to size in the factory prior to resale at the smaller widths, or cut in the field prior to installation in the wall cavity. When the 39-inch wide Mortar Break product is sold, it is typically folded in half prior to installation, reducing the installed height to approximately 19-½ inches.

Accessory/Miscellaneous Use Products

Advanced Building Products also provides a number of accessory/miscellaneous use products, as shown in Table 3, to support the flashing and mortar deflection products. These products include the mortar weep vents and tubes which are installed between bricks to provide water drainage paths, termination bars to secure the flashing products to the wall when the flashing product is not set in the mortar joint (typically between the 2nd and 3rd block course), mastics and sealants to seal the flashing wall joint, and the grout catch which is installed within a block wall assembly between the CMU blocks. These materials are installed in limited areas and in small quantities/surface area coverage. Given the limited use/surface area coverage, these products are intended to be used, along with their non-continuous application, their application within an exterior wall will have negligible impact on the fire performance of the wall assembly.

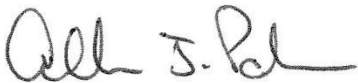
Typical Product Installation and Wall Fire Performance

The most common installation utilizes the flashing materials and mortar deflection products as shown in Figures 1 and 2. The amount of flashing installed in a wall assembly would include the portion extending up the face of the wall (approximately 16-inches) which may turn into the mortar joint or be secured to the wall using a termination bar, the material extending through the 1 to 2-inch wide air cavity, and extending under the nominal 4-inch wide brick. As mentioned above, the mortar deflection products would be installed up to approximately 1-inch below the top of the flashing. This common installation would be expected to result in conservatively 24-inch wide "bands" of material installed on the exterior wall. Continuous bands would be located at the base of the wall and at each brick support angle (commonly every three stories). Sporadic applications would occur over doors, windows, and other penetrations.

This analysis assumed a minimum number of continuous bands of material which would be expected to be installed over the limited exterior wall surface locations with sporadic application over windows, doors, etc., and a maximum expected 24-inch height of the "bands". The thermally thick exterior wall covering will contribute to provide additional fire protection to the flashing and mortar deflection products during an exterior fire exposure. Based on this, it is our opinion that the use of the construction materials provided by Advanced Building Products as described above in this report will not materially contribute to the flammability of an exterior wall assembly and will comply with the fire performance requirements specified in NFPA 285 as required by Section 2603.5 of the IBC.

We trust that the above information is of assistance to you. Please feel free to contact us should you have any questions regarding the analysis or our conclusions.

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