



# Designing an Adhered Masonry Veneer

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A look at weather resistive barriers.

Weather resistant barriers are commonly found on residential and light commercial construction projects. The discussion will give insight on properly selecting the correct material.

## House wrap, tar paper, Grade D paper

When selecting house wrap material, the perm rating should be part of your consideration as the vapor that passes into the wall must be able to escape to the outside.

**House wrap.** House wraps are a form of Weather Resistant Barrier (WRB) typically made from lightweight synthetic materials. They compete with other roll forms of building wrap material, such as Grade D paper, No. 15 building felt and No. 30 building felt. Synthetic house wraps have widely replaced No. 15 building felt during the last 20 years. House wraps are a commonly used product, known for the ease in installation, due to conveniently dimensioned roll sizes (typically 3- or 9-foot-wide rolls) that are light weight. Most framed walls are wrapped in at least one – typically two – layers of WRB, as governed by local code regulations, and the product can be perforated or non-perforated.

House wraps are designed to shed rain events during construction from saturating the substrate as well as to protect the air space from direct moisture transmission during the life of the building. The house wraps, though they are weather resistant barriers, are not completely waterproof and can allow moisture to penetrate the substrate from time to time. A WRB, whether it's a house wrap or a No. 15 building felt, is designed to allow the drying of the substrate. This function is critical to the overall performance of the wall. Whether house wrap or No. 15 felt is used, it is important that all vertical and horizontal joints be lapped a minimum of 6 inches and fastened every 12 to 16 inches vertically at the stud locations. Taping all joints will complete the wrap application's durability and overall performance.



Because house wrap is a non-directional material, when water or water-vapor passes through, it must have the ability to quickly dry to prevent the substrate from becoming saturated. Some critics feel that perforated house wrap products offer a faster drying cycle, while others take the opinion that moisture will not be as likely to get behind the house wrap without holes. The decision to use one product instead of another is based on many geographical and project-specific details.

Plastic wraps can deteriorate when placed directly against many stucco and cementitious mixes, since the surfactants can cause the wrap to disintegrate and allow moisture to penetrate to the substrate. Surfactants are chemicals in the wet mix that reduce surface tension and improve mortar workability. Several major house wrap manufacturers have developed products specifically for stucco applications that resist degradation and create a drainage plane, and perform well for stucco applications. Common house wraps are not widely used under many of today's stucco or adhered masonry veneer applications, unless a separate physical drainage plane is placed directly adjacent to the house wrap material to isolate it from direct contact with the mortar.

**Drainage planes.** Building science has determined that the design of a drainage plane in an adhered masonry wall has many positive effects on the performance of the veneer over the life of the building. Drainage planes are typically either constructed from a polymer-based mesh material made in several different configurations and attached to the building using the veneer anchoring, or using furring strips attached directly to the stud support system of the substrate.

The use of polymer-based, three-dimensional mesh allows the contractor and designer to eliminate one layer of WRB. This step can allow monies saved to be used for the drainage plane labor and installation. The polymer-based, three-dimensional drainage mats allow liquid to drain to the weep screed, and air to move between the WRB on the substrate and the interior face of the mortar scratch coat. This promotes rapid and complete drying of mortar in the adhered veneer system. This rapid drainage and drying of the veneer is key to creating healthy, long-lasting performance in all types of adhered veneers.

LathNet, by Mortar Net Solutions, is a new product on the market that has been successful as a labor-saving alternative to installing the second layer of WRB and an extruded metal lath in two individual steps. LathNet combines the two products into one easy-to-install product that overlaps and shingles as it is applied up the wall with code approved overlaps to ensure proper



installation. LathNet also can be successfully installed over rigid insulation with taped joints to offer a code-compliant system.

**NO. 15 felt.** No. 15 felt, as it is currently known, is asphalt saturated material made largely from recycled paper and saw dust particles. No. 15 felt was once considered suitable to use on vertical surfaces placed directly on the sheathing. The roll can be purchased dimensioned at 36 inches wide. The grandson of 15-pound felt, No. 15 felt is available weighing in anywhere from approximately 7.5 to 13 pounds per 100 square feet of material, less today due to economic efforts and manufacture compromised specifications. No. 15 felt has a perm rating of 5 when dry, the lowest code-approved perm rating permitted. However, when it's wet, it can achieve ratings close to 60. The higher perm rating when saturated does not correlate to linear increased drying times. No. 15 felt will wrinkle once saturated. After completing a drying cycle, the remaining wrinkles do add a small inconsistent air space between the layers of the felt, but do not create a functioning drainage plane. Typically, No. 15 building felt can meet ASTM D 4869 "Standard Specification for Asphalt-Saturated Organic Felt Shingle Underlayment Used in Roofing." However, it rarely meets the stricter requirements listed under ASTM D226 "Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing." Type I as discussed in the specifications for ASTM D 226 refers to the No. 15 or the 15-pound product, while Type II refers to the No. 30 or 30-pound material.

No. 15 felt differs slightly from "tar paper," which is made from impregnated fiberglass or paper with tar as the protective and flexible coating.

**Grade D paper.** Grade D paper is widely used as a house wrap across the entire United States, with its strongest concentration in the western states. Known for four basic grades of material (depending on the manufacturer they can vary from 10-minute material to over 2.5 hours), they can be purchased typically in 10-, 20-, 30- or 60-minute grades. The numbers refer to the rate at which paper absorbs water when tested using the boat method. The boat method is a test whereby the paper is basically folded like a boat, put in dish of water and a desiccant on the paper changes from light in color to dark in color. The dark color represents saturation. This is based on time using a stopwatch and, in a nutshell, is how they are rated.

Grade D paper is a system of an asphalt-saturated virgin paper with a tight, uniform matrix. Usually found to be lighter weight than a No. 15 felt and easy to crease when wrapped around corners. Grade D paper has many advantages. When used under adhered masonry veneers, it can be used with one or two layers when applied to the substrate, depending on the requirements of the individual project. Many local codes require a second layer only to shed direct water and can perform better with the added material. Continuous wetting of the grade D paper must be controlled, because it can deteriorate faster than other types of house wraps. This is mainly due to the selection of the virgin paper as the base paper.



Moisture  
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WRBs are necessary for the continued high performance of a wall system. Choosing the proper material can provide the customer with a high-performance veneer wall that remains dry from the exterior sheathing to the interior drywall.