

BSC Information

Vapor Permeance

of Some Building Materials

Sheet 312

Vinyl siding	Approximately 40 perms due to the air leakage of the siding joints	Vapor permeable
Wood siding	Approximately 10 perms due to the air leakage of the siding joints	Vapor permeable
Brick veneer	Approximately 40 perms due to air leakage from the "back venting" of the brick veneer	Vapor permeable
Building paper/asphalt impregnated felt	Approximately 30 perms	Vapor permeable
Housewraps	Range between 5 perms and 50 perms	Vapor semi-permeable to vapor permeable
OSB sheathing	Approximately 2 perms	Vapor semi-permeable
Plywood sheathing	Approximately 10 perms	Vapor semi-permeable
Traditional three-coat hard-coat stucco over building paper and OSB or plywood sheathing	Less than 1 perm and greater than 0.1 perm	Vapor semi-impermeable
External Insulation Finish System (EIFS) installed over 1-inch EPS and OSB or plywood or non-paper faced gypsum sheathing	Greater than 1 perm	Vapor semi-permeable
Extruded polystyrene insulation (XPS); less than 1-inch in thickness and unfaced	Greater than 1 perm	Vapor semi-permeable
Extruded polystyrene insulation (XPS); greater than or equal to 1-inch in thickness and unfaced	1 perm or less and greater than 0.1 perm	Vapor semi-impermeable
Extruded polystyrene insulation (XPS); any thickness and faced with polypropylene facings	Less than or equal to 0.1 perm	Vapor impermeable
Extruded polystyrene insulation (XPS); 3/4-inch or less in thickness and faced with perforated polypropylene facings	1 perm or less and greater than 0.1 perm	Vapor semi-impermeable
Expanded polystyrene insulation (EPS); less than 3 inches in thickness and unfaced	Greater than 1 perm	Vapor semi-permeable
Expanded polystyrene insulation (EPS); less than 2 inches in thickness and faced with perforated polypropylene facings	1 perm or less and greater than 0.1 perm	Vapor semi-impermeable
Expanded polystyrene insulation (EPS); any thickness and faced with polypropylene or foil facings	Less than or equal to 0.1 perm	Vapor impermeable
Coated/faced thin profile structural sheathing	1 perm or less and greater than 0.1 perm	Vapor semi-impermeable
Foil-faced isocyanurate; any thickness	Less than or equal to 0.1 perm	Vapor impermeable

Vapor Permeance Characteristics

The vapor permeance characteristic of the sheathing/cladding assembly is defined by the effective wet cup permeance of both the cladding and sheathing combined. Four categories are established:

- Vapor impermeable: 0.1 perm or less
- Vapor semi-impermeable: 1.0 perm or less and greater than 0.1 perm
- Vapor semi-permeable: 10 perms or less and greater than 1.0 perm
- Vapor permeable: greater than 10 perms

For example, an assembly using foil-faced isocyanurate rigid insulation is classed as *vapor impermeable* regardless of the cladding type installed external to the foil-faced isocyanurate.

OSB sheathing and plywood sheathing covered with a building paper or housewrap and vinyl siding are classed as *vapor semi-permeable*.

However, when the vinyl siding is replaced with a traditional three-coat hard-coat stucco the combined wet cup permeance of both stucco, building paper and OSB (or plywood) sheathing is below 1.0 perm and therefore, this assembly is classed as *vapor semi-impermeable*. The application of the stucco in this manner clearly affects the drying characteristics of the wall; the stucco is relatively "airtight" whereas the vinyl siding is "air leaky."

If, instead of being installed directly over building paper or housewrap, the traditional three-coat hard-coat stucco is "back vented" (i.e. installed over an airspace), the assembly is once again classed as *vapor semi-permeable*.

Wet cup permeances are used because it is the performance of the assembly under "wet conditions" that we are concerned with.