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CARLISLE COATINGS & WATERPROOFING

AIR & VAPOR BARRIER

Specifying Permeability of Wall Membranes

Air and water resistive barrier (WRB) membranes are essential elements of today's wall construction. These membranes typically consist of fully-adhered sheet or liquid membranes. Mechanically-attached sheet products are still used as well. A less understood feature associated with WRB membranes is water vapor permeability or "breathability". The "cutoff" between "permeable" and "non-permeable" products is little-defined and hotly-debated. To provide clarification, consult the table below, which provides a list of relevant water vapor permeability properties for all of CCW's wall membrane products.

Product	Water Vapor Permeance [US Perm]		Water Vapor Transmission [g/m²*24h]		Liquid-Applied Membranes: ICC-ES AC 212	Self-Adhered Membranes: ICC-ES AC 38
	ASTM E 96 A	ASTM E 96 B	ASTM E 96 A	ASTM E 96 B	A = "Very Impermeable" (max. 4g/m²*24h) B = "Impermeable" (max. 6g/m²*24h) C = no requirement D = "Permeable" (min. 35 g/m²*24h)	
CCW-705	0.08	0.10	0.6	0.7	N/A	A
705 FR-A	<0.01	<0.01	0.1	0.1	N/A	A
705 VP	9.03	10.53	63	73	N/A	D
Barriseal®-S/R	0.17	0.85	1.2	5.9	B	N/A
Barritech VP/VP LT	0.72	14	5.0	97	D	N/A
Barritech NP™/NP-LT	0.05	0.76	0.3	5.3	B	N/A

The most widely recognized reference for differentiating "permeable" and "non permeable" WRB products is International Code Council's Evaluation Services (ICC-ES). ICC-ES publishes Acceptance Criteria (AC) for various types of building materials and constructions. ICC-ES AC 212 is a published standard for acceptance criteria of fluid-applied water resistive barriers over sheathing. ICC-ES AC 38 is a published standard for acceptance criteria of sheet water resistive barriers.

Both ICC-ES AC 212 and AC-38 define different classifications for WRB materials according to their Water Vapor Transmission. These classifications – A, B, C and D are defined in the table above. Water Vapor Transmission is measured in g/m²*24h at 23°C [73.4°F] using ASTM E 96. AC-212 prescribes ASTM E 96, method B (water method) while AC-38 prescribes ASTM E 96, method A (desiccant method).

International Building Code (IBC) 2015 and earlier versions do not prescribe vapor permeability requirements for WRBs. WRB vapor permeability classifications are defined in the ICC-ES acceptance criteria to assist the design professional in selection of materials appropriate for the project's wall construction, exterior climate and building use.

Many attributes of wall membranes are important. The permeability of the membrane to water vapor is an important attribute, but it should not be the only thing considered. Please consult CCW's Wall Assembly Design Guide for guidance in wall membrane and insulation product selection for various wall assemblies within all North American climate zones.

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