

Permeability to Water Vapor, Nordic X-Lam

Vapor Diffusion Control

The goal of vapor diffusion control is to prevent condensation from forming within the walls of a structure by limiting the movement of moisture through building materials by vapor diffusion. In traditional wood-frame walls, vapor diffusion is controlled by installing a vapor barrier within the wall, which prevents warm, humid air from passing through.

However, according to the test results presented below, the permeance of a Nordic X-Lam panel is less than 0.7 perm (desiccant method), which is suitable for controlling the flow of vapor through the assembly in most situations. On the outside, the components must be sufficiently permeable to the vapor to prevent moisture from being trapped. Therefore, it is recommended to use wood or mineral fiber insulation boards instead of polystyrene products.

Testing Procedures and Code Requirements

ASTM E96/E96M-16 provides two methods for assessing the water permeance of a product:

- A. Desiccant method (dry cup)
- B. Water method (wet cup)

Exterior wall coverings shall be designed and constructed in accordance with the applicable provisions of Section 1405 of the 2015 IBC. As stated in Section 202, vapor retarder class shall be defined using the desiccant method (dry cup) of ASTM E96 as follows:

- Class I: 0.1 perm or less.
- Class II: $0.1 < \text{perm} \leq 1.0$ perm.
- Class III: $1.0 < \text{perm} \leq 10$ perm.

Test Results

A. Desiccant Method (Dry Cup)

Thickness		Permeance		Result based on the 2015 IBC criterion
(in.)	(mm)	(perm)	(ng/(Pa-s-m ²))	
1-1/2	38 ^(a)	0.7 ± 0.1	38.0 ± 3.9	Class II vapor retarder
3	78	0.6 ± 0.2	36.2 ± 9.6	Class II vapor retarder
4	105	0.7 ± 0.1	39.1 ± 5.0	Class II vapor retarder
6-3/4	175	0.4 ± 0.1	23.2 ± 4.9	Class II vapor retarder

B. Water Method (Wet Cup)

Thickness		Permeance	
(in.)	(mm)	(perm)	(ng/(Pa-s-m ²))
1-1/2	38 ^(a)	3.4 ± 0.8	195.1 ± 65.6
3	78	1.4 ± 0.3	77.7 ± 17.2
4	105	0.9 ± 0.1	50.4 ± 7.4
6-3/4	175	1.0 ± 0.2	58.6 ± 9.9

- a) This thickness is required for testing in accordance with ASTM E96/E96M-16. Nordic Structures does not manufacture any cross-laminated timber (CLT) product with such thickness.

Note:

1. Data is provided by Nordic Structures for design purposes. Any misuse or interpretation of such data is the designer's sole responsibility. Nordic Structures does not act as a designer and cannot be held, in any way, liable in this respect.