NORDIC STRUCTURES

Permeability to Water Vapour, Nordic X-Lam

Vapour Diffusion Control

The goal of vapour diffusion control is to prevent condensation from forming within the walls of a structure by limiting the movement of moisture through building materials by vapour diffusion. In traditional wood-frame walls, vapour diffusion is controlled by installing a vapour 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 40 ng/(Pa-s-m^2) (desiccant method), which is suitable for controlling the flow of vapour through the assembly in most situations. On the outside, the components must be sufficiently permeable to the vapour 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)

As defined in Article 9.25.4.2. of the 2015 NBC, vapour barriers used in thermally insulated wall, ceiling and floor assemblies shall have a permance not greater than 60 ng/(Pa-s-m^2) measured in accordance with ASTM E96/E96M, "Water Vapor Transmission of Materials", using the desiccant method (dry cup). Furthermore, Note A-9.25.4.2.(2) indicates that the requirement for a 60 ng/(Pa-s-m^2) vapour barrier is based on the assumption that the building assembly is subjected to conditions that are considered normal for typical residential and business occupancies.

Test Results

A. Desiccant Method (Dry Cup)

Thickness		Permeance		Result based on the 2015 NBC criterion
(mm)	(in.)	(ng/(Pa-s-m²))	(perm)	
38 [(a)]	1-1/2	38.0 ± 3.9	0.7 ± 0.1	Water vapor barrier
78	3	36.2 ± 9.6	0.6 ± 0.2	Water vapor barrier
105	4	39.1 ± 5.0	0.7 ± 0.1	Water vapor barrier
175	6-3/4	23.2 ± 4.9	0.4 ± 0.1	Water vapor barrier

B. Water Method (Wet Cup)

Thickness		Permeance	
(mm)	(in.)	(ng/(Pa-s-m²))	(perm)
38 [(a)]	1-1/2	195.1 ± 65.6	3.4 ± 0.8
78	3	77.7 ± 17.2	1.4 ± 0.3
105	4	50.4 ± 7.4	0.9 ± 0.1
175	6-3/4	58.6 ± 9.9	1.0 ± 0.2

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.