

Introduction

In recent years, external wall build-ups incorporating a sheathing board have become an important solution for construction projects. However, it is important to be aware of the potential risks associated with water ingress and inadequate sealing between the boards.

In this discussion, we will explore the necessity of incorporating breathable membranes in projects that use sheathing boards as backing walls.

Our goal is to explain the reasons for this requirement and emphasise its importance in ensuring the longevity and durability of building structures.

The vulnerability of sheathing board joints

While some weatherboard products have water-resistant properties, the joints and interfaces with the surrounding structure are vulnerable. Even when installed to a high standard, the ability of these jointing methods to withstand the long-term effects of building movement and interfaces is an issue. In this article we discuss the importance of breathable membranes for wall build ups using Steel Framing Systems (SFS) behind sealed or unsealed facades.

All building materials are subject to movement during use. This is due to a variety of factors, including temperature changes, moisture content, and deformation or variation under load of either the material itself or the adjacent materials.

Sheathing boards, being rigid panel elements with numerous joints and fixings, may not maintain a continuous, robust and durable degree of water tightness over the long term. In contrast, breathable membranes can be easily dressed, wrapped, and sealed around interfaces and penetrations, providing a reliable solution for maintaining water tightness whilst absorbing movement without loss of performance

How do breathable membranes work?

Breathable membranes allow water vapour to escape from inside a building while preventing liquid water from penetrating the building envelope. They are typically made of a synthetic material that has a high vapour permeability but a low water permeability.

Breathable membranes work by allowing water vapour to pass through them by diffusion. Diffusion is the process by which molecules of a substance move from an area of high concentration to an area of low concentration.

The pores in breathable membranes are small enough to allow water vapour molecules to pass through, but they are too small for liquid water molecules to pass through. This means that water vapour can pass through the membrane easily, but liquid water cannot and causes wicking, where water drains through the membrane via gravity. Wicking is the process by which a liquid is drawn through a porous material by capillary action, away from the substrate and greatly reduces the likelihood of water ingress into the building.

Resistance to water penetration and classification

Breather membranes should be tested to achieve a minimum W2 to BS EN 13859-2 with no water leakage during testing. Open jointed rain screen cladding systems should achieve a W1 Classification.

In contrast, sheathing board solutions may not achieve these levels of performance, and their joints have not undergone the same level of testing and classification.

Introduction of additional joints

By incorporating sheathing boards, more joints are introduced into the façade, creating potential weak points. There are various methods for joining the boards, each with its own set of considerations in terms of durability and the ability to accommodate building movement.

Breathable membranes offer a consistent and reliable solution for mitigating the risks associated with additional joints and workmanship.

What are the limitations of sealed façades?

Even sealed facades, such as brickwork, may still allow a significant amount of water into the cavity, especially in cases of wind-driven rain and when the building height increases. Breathable membranes act as the final line of defence, providing the required protection against water ingress.

Are there environmental benefits to using breathable membranes?

From an environmental perspective, a building that lasts longer due to measures taken to protect the building envelope will have a lower embodied carbon than a building with a shorter lifespan. Embodied carbon is spread out over a longer period of time, resulting in lower average annual emissions. This makes them more sustainable and environmentally friendly in the long run.

Conclusion

We fully acknowledge the potential impact that these requirements may have on our clients in the short-term build phase. However, our assessments are based on expert consultation, and experience which has led to the conclusion that there are currently no alternatives to the provision of breathable membranes in conjunction with sheathing boards to meet the minimum requirements of our technical manual and through the duration of the occupation of the building.

In addition to the requirement for breathable membranes, we emphasise the importance of adhering to other quality and installation standards, such as using sheathing boards with suitable quality and supporting BBA certificates.

Proper installation techniques, including sealants, fixing centres, and edge dimensions as identified in the BBA, are crucial.

The SFS design must accommodate the sheathing board installation and fixing pattern based on the calculation to demonstrate the board's ability to withstand project live loads. All other interface details should be considered with the sheathing board as the final line of defence in mind.

Why breather membranes in external walls are required

To ensure successful implementation, we encourage early provision of design information, allowing ample time for review and comment. This is particularly important in light of the upcoming introduction of Gateway 2 and Gateway 3 by October 2023, which will act as stop/go points in relevant buildings.

Early acceptance of proposals will help prevent potential disruptions and ensure a smooth construction process.

Please note, for all requirements relating to the installation of breathable membranes, please refer to the Premier Guarantee Technical Manual v15

Every care was taken to ensure the information in this article was correct at the time of publication (August 2023). Guidance provided does not replace the reader's professional judgement and any construction project should comply with the relevant Building Regulations or applicable technical standards. For the most up to date Premier Guarantee technical guidance please refer to your Risk Management Surveyor and the latest version of the Premier Guarantee Technical Manual.

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