# Moisture control in commercial building projects

Specifying the right plasterboard solution

GYPROCK® CSR


ECOLAB
GOJO
Kimberly-Clark

While airtight construction has resulted in significant energy performance improvements, it has reduced the natural ventilation within buildings.

## INTRODUCTION

According to a scoping study into condensation in residential buildings conducted by the Australian Building Codes Board, up to 40% of new buildings in Australia showed signs of condensation and mould.[1] These findings indicate that there is a widespread problem across the country in relation to moisture control, exacerbated by inadequate design and building practices.

It is not a problem affecting only Australian homes. Condensation and moisture are major causes of damage to commercial structures. Mould growth, warping, rotting, and staining are only a few possible consequences, but perhaps more importantly, they can lead to unhealthy conditions and poor indoor air quality that can impact the health and wellbeing of workers, customers and other occupants.

Australia's moisture issues are becoming more prevalent, and the risk is only set to worsen given today's focus on airtightness and passive design. It is the responsibility of architects and builders to make sure that any new construction puts measures in place to manage dampness and condensation. One of these measures includes specifying the appropriate materials to prevent moisture-related issues from occurring.

Plasterboard is a commonly used material that is known to be sensitive to moisture; even the smallest amount of moisture can cause it to degrade. Moisture-resistant plasterboard is specially designed to resist moisture, condensation and water, making it the best choice for wet and high-humidity environments.

In this whitepaper, we explore some of the main causes and risks associated with poor moisture control, including the rise of 'airtight' buildings and how moisture-resistant plasterboard can benefit modern commercial spaces.

## RISE OF ‘AIRTIGHT’ BUILDINGS

Buildings in Australia are getting more airtight as construction methods evolve. This is partly due to the growing popularity of ‘Passive House’, a design standard that delivers healthy, comfortable and efficient buildings.

The objective of Passive House design is to achieve thermal comfort with minimal heating and cooling. Passive House design is based on several guiding principles, namely the use of insulation, airtightness, appropriate window and door design, ventilation systems with heat recovery, and the elimination of thermal bridges.

As per the Passive House design standard, building an airtight structure is one of the keys to an energy-efficient building. Buildings are designed to avoid any unexpected air leakage as well as warm or cold air infiltration. This is achieved through careful design of the building envelope, eliminating all unintended gaps, cracks, holes, splits and tears where air could enter or escape.

While airtight construction has resulted in significant energy performance improvements, it has reduced the natural ventilation within buildings. A lack of adequate ventilation in a building contributes to the buildup of moisture and increases the potential for mould growth. This is exacerbated by the significant temperature differential between inside and outside the building, which can cause condensation. Poor airflow also enables the accumulation of concentrations of pollutants and microbes, which negatively affect indoor air quality and can lead to “Sick Building Syndrome”.[2]

## UNDERSTANDING THE IMPACT OF MOISTURE

The rise of airtight buildings and poor ventilation are only two of the causes of moisture issues in Australian buildings. Excess moisture can enter a structure through moisture absorbed from the ground into a wall (rising damp). External water ingress and condensation also contribute to excessively wet conditions that could damage the building structure. Inadequate drainage can lead to problems such as the presence of water vapour and condensation from high humidity or water from flooding.

Occupants and building services may also contribute to moisture issues. High humidity levels can originate from moisture emissions from occupant activities, such as cooking and bathing. Both occupant respiration and perspiration can have an impact on humidity. There could also be a buildup of moisture from HVAC systems and other appliances, such as humidifiers.

Almost all buildings experience excessive moisture or leaks at some point. If such issues are not properly anticipated and mitigated through building design, damage to the structure is inevitable. Uncontrolled moisture can have devastating results due to metal corrosion, timber rot, and cladding rot. Any moisture trapped behind plasterboard linings can cause the panel to bend or stain, requiring costly repairs and increasing the risk of premature failure.

When plasterboard is impacted by moisture, it creates optimal conditions for mould growth. Mould growth may put older and younger people, as well as those with allergies or asthma, at risk for health issues. According to a long-term University of Melbourne study, people who had visible mould in their homes within the previous 12 months had a 26% higher overall risk of having active asthma.[3] In addition, it has also been shown that poor indoor air quality in buildings can decrease productivity.[4]

Any moisture trapped behind plasterboard linings can cause the panel to bend or stain, requiring costly repairs and increasing the risk of premature failure.

## WHAT IS MOISTURE-RESISTANT PLASTERBOARD?

Water damage can occur to standard plasterboard, so it is critical to minimise condensation and moisture on all plasterboard surfaces. Choose moisture-resistant plasterboard for locations where the product might be exposed to moisture and condensation.

In order to prevent moisture from seeping through the board, moisture-resistant plasterboards feature a multi-layer construction, with each layer specially treated to resist moisture and humidity without compromising its strength or integrity. Such products are manufactured to meet or exceed the requirements of water-resistant grade gypsum plasterboard as per AS/NZS 2588:1998 “Gypsum plasterboard”.

## WHEN TO SPECIFY MOISTURE-RESISTANT PLASTERBOARD

It is crucial to take the space's unique environmental conditions and the possibility of moisture exposure into account when specifying moisture-resistant plasterboard. To guarantee the efficacy of the moisture-resistant system, it is also essential to use compatible materials and adhere to the correct installation procedures.

Moisture-resistant plasterboard is typically specified for wet environments, such as the following:

- in commercial spaces, such as restaurants, gyms, spas, change rooms, hospital ward bathrooms and soffits;
- areas with poor ventilation or where water leaks are more likely to occur, such as basements and utility rooms; and
- areas that are prone to high levels of moisture due to activities like bathing, cooking, and washing.

## WHAT ARE THE BENEFITS?

In environments prone to dampness, the use of moisture-resistant plasterboard can help prevent damp from infiltrating walls. By resisting the effects of humidity and moisture, these boards also help reduce the risk of mould growth. Additionally, these boards contribute to improved thermal insulation alongside their moisture-resistant properties, enhancing overall thermal comfort and efficiency within a commercial space.

By resisting water damage, moisture-resistant plasterboards last longer and are generally more durable than standard plasterboard in the same conditions, which can lead to reduced future repair and replacement costs. Note that once standard plasterboard is water-damaged, it is impossible to fix and must be replaced.

In some cases, the use of moisture-resistant products is necessary to achieve compliance with the National Construction Code (NCC). For example, Specification 26 of the NCC sets out the waterproofing and water-resistance requirements for building elements in wet areas, requiring water-resistant walls for certain applications.

# MOULD AND MOISTURE RESISTANCE SOLUTIONS BY GYPROCK

## Tested Moisture Performance

Gyprock wet area plasterboard products are manufactured with special additives to enhance the moisture resistance of their core. The additives also permeate the face and back paper of the board, delivering superior performance in wet areas and high-humidity applications.

- Water resistance is tested by submerging a sample of plasterboard in a body of water for two hours.
- Surface water resistance testing sees the plasterboard sample weighed pre-and-post surface exposure to water.

Gyprock wet area plasterboard satisfies the requirements of the NCC for wet area wall linings in residential and commercial buildings.

## Aquachek™

Gyprock Aquachek is a moisture-resistant wall and ceiling plasterboard designed as the perfect lining for wet areas. It is available in 10mm and 13mm thicknesses for residential and commercial applications.

The core, face and back of Gyprock Aquachek are treated to make it resistant to moisture and humidity without compromising integrity. It is specifically designed for use as a wall and ceiling lining in wet areas of residential or commercial buildings. Because it is not subject to moisture movement and has extremely low water absorption characteristics, it provides an excellent, stable substrate for ceramic tiles. It can be easily identified by its blue coloured face paper.

## EC08™ Complete

EC08™ Complete 13mm and 16mm boards are ideal for internal linings where mould, moisture and impact resistance are imperative, such as in health care, aged care and child care facilities. This product is manufactured with a highly effective mould inhibitor to meet the increasing levels of focus on occupant health and comfort in specialised projects.

Gyprock's unique manufacturing process ensures that both the board's surface as well as its core effectively prevent the growth of mould. No other wall lining material available in Australia achieves a better result in the ASTM G-21 test for mould growth than EC08™ Complete.

## EC08™ Extreme

EC08™ Extreme is an Australian made, GECA certified, multi-function plasterboard with the highest level of specifications in the EC08™ range. It has been specifically designed to meet the highest standards across a broad range of performance requirements, but with a focus on superior impact resistance.

EC08™ Extreme is mould and moisture resistant, allowing the product to be specified for wet areas and high humidity applications. It is ideal for specialised construction projects including healthcare facilities, correctional facilities, sporting facilities, schools, shopping centres and anywhere where multifunction performance is imperative.

## REFERENCES


1 Dewsbury, Mark, T. Law, J. Potgieter, Desmond Fitzgerald, Bennet McComish, Thomas Chandler and A. Soudan. "Scoping Study of Condensation in Residential Buildings." ABCB. https://www.abcb.gov.au/sites/default/files/resources/2022/Scoping-study-of-condensation-residential-buildings.pdf (accessed 26 February 2024).

2 Kraus, Michal. "Airtightness as a Key Factor of Sick Building Syndrome (SBS)." 16th International Multidisciplinary Scientific GeoConference, SGEM, 2016: https://www.researchgate.net/publication/308039434_Airtightness_as_a_Key_Factor_of_Sick_Building_Syndrome_SBS (accessed 26 February 2024).

3 Burgess, John. "Is your home harming you? Asthma, allergies and indoor mould." University of Melbourne. https://findanexpert.unimelb.edu.au/news/4009-is-your-home-harming-you%3F-asthma--allergies-and-indoor-mould (accessed 26 February 2024).

4 Wyon, D.P. "The effects of indoor air quality on performance and productivity." Indoor Air, Vol. 14, Suppl. 7 (2004): 92-101.


All information provided correct as of March 2024

GYPROCK® CSR