DOORWAY TO DREAMS... OR DISASTER?

THE PROBLEM OF NON-COMPLIANCE

wintecsystems

INTRODUCTION

Non-compliant building products have been a concern for industry bodies for many years. However, in more recent times "non-genuine and non-tested building materials" creeping into building sites have risen dramatically. This has prompted industry leaders to call for a greater focus on compliance and enforcement [1].

Unfortunately, many buyers source their materials from suppliers – both locally and from overseas – with seemingly lower upfront costs, but they do not always meet the compliance requirements for the Australian market. Whether manufactured in Australia or elsewhere, the reasons for non-compliance can be boiled down into two categories:

1. Ignorance – some manufacturers do not understand the regulations or are not aware of their obligations to comply 2. Arrogance – some deliberately ignore compliance codes to save on costs

Many in the industry support the compliance measures and believe in their enforcement. But keeping track with the constantly evolving number of codes and requirements can become a challenge, and it is possible to miss a vital part of the process.

To further complicate the issue for the window industry, there is the "non-policing of compliance" [2]. . This leads to reputable manufacturers, who do follow the rules, losing out to cheaper non-compliant manufacturers. And then there are manufacturers who aim only for the basic level of compliance, meaning that their windows and doors can only be used in certain areas. Here, an unwitting buyer can also fall into noncompliance, even with the aim of following the rules.

The important thing to keep in mind is that, while the initial price point gives immediate cost savings, the risks due to non-compliance, in the long run, can cost even more. From damage caused from leaking windows, to losing hard-earned reputations, and even to potential life-threatening situations, non-compliance is not a risk worth taking.

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ARMING YOURSELF WITH KNOWLEDGE

According to the Australian Window Association (AWA), manufacturers are "required to produce windows and doors that meet mandatory minimum specifications under Australian Standard AS2047, including AS1288". Windows sold into the Australian market must have the performance backed by test results from the AWA independent third-party NATA accreditation scheme or NATA internationally recognised test laboratory. And manufacturers must provide evidence of compliance, and that the compliance is verifiable (e.g. certification) [3].

The AWA has noted that, "[e]nergy efficiency provisions state that external glazing performance data must be determined in accordance with the guidelines of the AFRC (Australian Fenestration Rating Council)" [4]. And within these guidelines, the AWA's independent Window Energy Ratings Scheme (WERS) has broken down the different Climate Zones for different parts of the country:

- Climate Zones 1,2&3 (Darwin, Brisbane, Northern Australia)
- Climate Zones 4&5 (Sydney, Perth, Adelaide)
- Climate Zones 6,7 & 8 (Melbourne, Canberra, Hobart, Thredbo)

Meeting all of these requirements in a country with extremes of weather is challenging, which is why the AS2047 has different performance levels. It is important to work with a quality supplier who know the 'ins and outs' of these codes and can meet all of these performance levels.

ACOUSTICS

Although the layman may associate acoustics with a concert hall or theatre, building and design professionals know that acoustics is rarely a standalone science in the AEC industry. Referring to the qualities of a space that determines how sound is transmitted, acoustics is closely integrated with many other building elements and initiatives, including thermal comfort and day-lighting design.[4]

However, windows and doors are points of weaknesses when it comes to acoustics and soundproofing spaces. In fact, sound is more easily transferred through windows and doors than walls, with the Your Home guide noting that potential sound reduction from a highly insulating wall can be significantly compromised by poor window design.[5]

Unwanted sound, or noise, can negatively affect a building's function and its occupants. For example, a classroom with windows and doors that allow in too much noise from a busy street may detract from the learning process and "lead to cognitive fatigue, reduced access to speech and language acquisition skills, increased anxiety and poorer learning outcomes".[6] The same rule applies to offices – The University of Sydney's Indoor Environmental Quality (IEQ) Lab notes that sound has a great impact on an office worker's health, comfort and productivity.[7] In the same vein, restaurants, theatres, bars and pubs also require good noise insulation, with sounds produced within venues expected to stay contained, and not 'leak' and disturb neighbouring homes and businesses.

Under the Building Code of Australia (BCA), windows and doors are expected to meet the minimum specifications under AS 1191 – Method for laboratory measurement of airborne sound transmission insulation of building elements, which tests the sound insulating performance of an isolated building element to a Weighted Sound Reduction Index (Rw)[8,9]. The higher the Rw index, the better a sound insulator is, with an increase in Rw roughly equating to an approximate one decibel reduction in noise level.[10]
However, it is important to note that this test is carried out in a lab, and does not take into account individual use of a product. The BCA also does not have sound insulation requirements for main doors that open to the outside, so it is important to consult with an expert regarding the level of sound insulation needed for a window and door system. However, there are some noise-minimising tips that will guide your specification process:[11]

- **Glazing**: Double glazing can reduce traffic and voice noises in excess of 50 percent as compared to single glazing. However, the air space in a double glazed window needs to be at least 50-100mm wide to have an impact on acoustic performance

- **Sealing/Air leakage**: A well-sealed door or window frame will typically provide improved acoustic performance. When tested in accordance with the Australian Standard AS 4420.4 – Windows – Methods of test – Air infiltration test, products with higher air infiltration will yield lower sound insulation.[12]

- **Laminated vs Monolithic Glass**: Innovations within the industry means there is no real difference between laminated and monolithic glass except in some frequency ranges. They may have slightly greater sound insulation than the narrow gap type Insulated Glass Unit, provided the glass thickness is similar to the IGU

- **Type of Opening/Style**: There is reportedly no "systemic dependence" as to whether a window is fixed, sliding, double hung, casement or awning

In addition, the Australian Window Association notes that windows designed for good sound insulation should also be certified for structural performance and water infiltration, especially since there have been cases of acoustical windows leaking badly.[13]

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ENERGY EFFICIENCY

Closely tied with the sound insulation qualities of windows and doors is their thermal insulation properties. Although sustainability may be considered by some to be a mere buzzword, the pressure on designers and architects to build and deliver green buildings with excellent passive design is extremely high today, as issues surrounding climate change continue to grow in importance.

In Australia, architects and designers must adhere to specific sustainability guidelines, with the energy efficiency benchmark being lifted from a mandatory 5 Star energy rating for all new residential buildings to 6 Stars. This energy efficiency star rating is a measure of how much energy 'leaks' through a building skin, and applies to whole buildings as well as individual elements and materials. The higher the rating, the more energy efficiency a building, with 10 stars signifying that a building requires no additional heating or cooling.[14]
However, the strictness of these guidelines may prove to be a challenge when it comes to specifying windows, a major source of unwanted heat gain in summer and heat loss in winter.[15] Traditionally viewed as a 'hole in the wall', Windows lose and gain heat by conduction through the glass and frame, air leakage (AL) around the sashes and frame, radiation through the glazing, and convection across the space in double and triple glazed units.[16] According to established Australian company Wintec, up to 40 percent of internal heat can leak out through a window or skylight during winter, while the heat gain through an unshaded window during summer can be 100 times greater than through an insulated wall. Draughts caused by gaps and cracks around doors, windows and skylights can even add 25 percent to heating and cooling bills.

While the majority of products on the market today are engineered to be highly energy efficient, poorly designed windows, skylights and doors that have heat absorption and retention issues are still evident in many buildings. As the University of Kentucky points out, the wrong windows "can double the costs of keeping a house cool" in summer, while "year round, poorly designed windows can cause glare, fade fabrics, and reduce comfort".

As a good rule of thumb, energy efficient windows will have low U-factors, low air leakage rates, and low transmission rates of UV rays and infrared light energy. These are often achieved through thermal breaks, inert gas fills, and the popular low-emissivity (low E) coatings that hinder radiant heat flow.[17] The Window Energy Rating Scheme (WERS) by the AWA also sets out minimum requirements for Solar Heat Gain Coefficients (SHFC) and Visible Transmittance (VT). WERS-rated windows must meet Australian Standard AS 2047 – Windows and External Glazed Doors in Buildings.[18]

> "Specifying windows and doors that allow heat to escape or enter through gaps and cracks around sashes and frames has ramifications for long-term running costs"

ECONOMICS

Although not every client or stakeholder may be interested in ensuring the best sound and thermal insulation of the windows and doors installed in their project, money 'talks' at the end of the day, and specifying systems according to these two principles will have monetary benefits in the long run.

Windows and doors that allow unwanted external noise ingress will mean that other costs associated with insulation, including flooring and roofing sound insulation, must be paid to ensure the most functional and comfortable indoor environment is delivered. In some cases, this upfront design cost may be greater than simply choosing a good, albeit slightly more expensive, window and door system that works to the design's advantage. When considered under the budget constraint umbrella, this means less money may be dedicated to other initiatives that may lift the design and quality of a project significantly.

Similarly, specifying windows and doors that allow heat to escape or enter through gaps and cracks around sashes and frames has ramifications for long-term running costs. Households and commercial owners will not only incur higher electricity bills from excessive heating and cooling; a poorly designed window and door system ultimately contributes to a higher carbon footprint of a building and its emission of greenhouse gases.

An Australian company that understands the importance of getting these three principles right from the outset is Wintec Aluminium, who has successfully supplied architects and designers with a variety of energy and cost efficient door and window products for over a decade. Its products, ranging from sliding doors to awning windows, are manufactured on the basis of the latest innovations and designs, and boast the ability to reduce the annual cost of heating and cooling in homes.

The practicality of Wintec's range is formed on the cornerstone of well-sealed sashes and frames, with all products exceeding the requirements of AS 2047 and achieving air leakage rates of less than 0.5 litres per second, per square mere of the window area, thanks to various seal types.

The hollow aluminium extrusions used in Wintec windows and doors also give superior performance in water penetration resistance and structural rigidity. Wintec doors and windows furthermore incorporate a baffle in the drainage system that allows water to flow out, but restricts air from flowing through the window or door frame. This reduces the energy loss normally encountered through drain holes.[19]

In addition, Wintec subjects all of its products to tests conducted at the National Acoustic Laboratory in accordance with AS 1191, and air leakage tests in accordance with AS 4420.4 in NATA registered laboratory number 14093. This ensures its products are able to successfully mitigate any noise from external sources, with results of AS tests testifying to the acoustic excellence of Wintec's windows and doors. The airtight design of the Wintec range contributes to this acoustic performance, enhancing indoor comfort.

To learn more about the performance of Wintec's range, please click here.

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