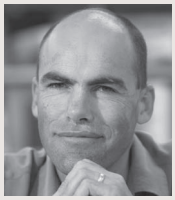

FADING, NOISE AND OTHER GLAZING ISSUES

The third article looking at the performance of residential window systems discusses fading, replacement glazing, safety glass, acoustic mitigation and condensation.

By John Burgess, BRANZ Senior Sustainability Scientist

Furnishings such as carpet, curtains, chair coverings and timber can fade when exposed to sunlight through glazing. Most of the fading is caused by ultraviolet light, which breaks down the chemical dyes used to produce the colour in fabric.

Plastic layer reduces fading

Typical plastics used in glazing can absorb 99% of ultraviolet light, so fading is virtually eliminated if sunlight passes through a layer of plastic. For new glazing, this is best done by specifying laminated glass, which has a plastic interlayer, and for existing glazing, replacing annealed (ordinary) glass with laminated glass, applying a plastic film to the glazing or by installing a secondary glazed pane of plastic inside the existing glazing. (Typical values for the reduction in fading are provided in Table 1.) Using plastic films and glazing is not always straightforward, so get advice from a specialist glazing or window/glazing treatment company.

Figure 1: Internal condensation forms on the cold single-glazed pane on the left but not on the warmer doubled-glazed pane on the right.

Broken glass requires the correct replacement

NZS 4223.3:1999 *Code of practice for glazing in buildings – Human impact safety requirements* requires glass in risky locations to be safety glass or ordinary glass thick enough to withstand a normal impact. It also requires broken glass to be replaced with glass that complies with the standard.

Ordinary glass can break into dangerous shards and cause serious injury, but safety glass is designed to break into relatively harmless small particles or be held together with a plastic interlayer (laminated safety glass) to prevent serious harm. Safety glass in New Zealand must comply with AS/NZS 2208:1996 *Safety glazing materials in buildings* and should be marked with an emblem, AS/NZS 2208 and the registered trademark of the manufacturer or supplier.

Old glass used in homes and buildings may not meet current glazing standards, particularly glass that must resist an impact from a person (for example, glazing in a sliding door).

All glass repairs and replacement glazing must comply with the New Zealand Building Code. NZS 4223.3:1999 is an Acceptable Solution for glazing, so glazing installed to this standard automatically complies with the Building Code. Other means of compliance will need to be accepted by the local Territorial Authority. Consequently, BRANZ recommends replacement glass is installed in accordance with NZS 4223.3:1999.

Reducing noise through windows

With smaller house section sizes, higher density living and the proliferation of heat pumps with outdoor compressor units, there is demand for glazing that reduces the transfer of noise. The most effective method to reduce noise through glazing is to eliminate gaps and cracks. Check the glazing gaskets and beads or putty used to hold the glazing into the frame or sash since they may need replacing. Improving these elements will also improve weathertightness and heat retention.

To reduce noise transfer through the glazing itself, the best option is the use of an acoustic laminate, which typically includes 1 mm layer of plastic filling sandwiched between two layers of 3 mm clear glass. Laminated safety glass has a thinner plastic layer, which enhances safety and can also provide good acoustic performance.

An insulated glazing unit (IGU) also reduces the transfer of noise. IGUs typically combine two panes of glass separated by an air- or gas-filled gap. A 4/12/4 IGU, for instance, refers to a 4 mm inner pane, 12 mm airspace and 4 mm outer pane.

While an IGU can use the same type of glazing for each pane, a system that uses dissimilar panes can offer a greater range of benefits, including enhanced thermal fading and acoustic properties. Table 2 shows the typical noise reductions from various glazing options.

Combined approach to reducing condensation

Condensation occurs on the inside of glazing because glass is often the coldest surface →

in a room, and moisture carried in the air condenses when it contacts the cold glass surface. Figure 1 shows a window where the glazing on the right-hand side is kept warmer by using secondary glazing, whereas the sash on the left is clear single glazing.

Condensation can be reduced by:

- using IGUs to keep the surface temperature of the glass warmer
- heating the room to keep the air warm
- ventilating or dehumidifying to reduce the amount of moisture in the air.

Dealing with only one of these processes (insulation, heating and ventilation) is not usually enough to eliminate condensation – all three should be addressed at once.

Table 1: Typical reduction in fading by glazing type when compared to 4 mm clear glass.

Type of glazing	Typical change in level of fading (%)
Clear glass (6 mm)	-5
Acoustic laminate	-20
Clear laminate	-45
Grey tint glass (6 mm)	-55
Solar control tint	-80
Dark green laminate	-90

Table 2: Typical noise reduction by glazing type when compared to 4 mm glass.

Glazing type	Typical change in noise level (%)
IGU (4/12/4)	-10
IGU (6/12/6)	-15
Laminated safety glass (6.38 mm)	-30
Clear glass (10 mm)	-30
Acoustic laminate (7 mm)	-45
Laminated safety glass (12.38 mm)	-50
IGU (6.38/12/4) with laminated safety glass	-50
Acoustic laminate IGU (7/12/4)	-50
Acoustic laminate (15 mm)	-60
Double acoustic laminated IGU (7/12/7)	-60
Double window with 200 mm between panes	-70