INTRODUCTION

There are a number of factors that need to be considered when selecting glass. In general AS1288–2006 is the governing Australian standard for selecting glass and is referred to in the BCA 2006. It is highly recommended that AS1288–2006 be carefully read. Also, energy ratings and acoustic insulation increasingly have an impact on glass selection, as do aesthetic considerations such as colour and appearance.

Some of the factors include:

1 Human Impact (AS1288–2006)
2 Thermal Insulation
3 Sound reduction
4 Solar transmission and absorption
5 UV resistance
6 Colour and appearance
7 Visible light transmission
8 Security

HUMAN IMPACT

The Australian Standard establishes minimum human impact safety requirements as set out in Section 5 when selecting glass. In particular it stipulates situations where Grade A safety glass (toughened or laminated) must be specified.

Human Impact: Doors

Glazing in all doors (including but not limited to hinged, sliding, stacking and bifold) shall be Grade A safety glass (Table 5.1 and Supplement 1).

Side panels next to doors are deemed to be subject to human impact where the nearest vertical sightline is less than 300mm from the nearest edge of the doorway opening and within 1200mm of the floor level. Grade A safety glass to be used.

Glazing capable of being mistaken for a doorway or opening must be Grade A safety glass. In particular the following conditions are deemed to be capable of mistakenly considering an opening to being a door:

- The daylight width is greater than 500mm
- The daylight height is greater than 1000mm
- The lowest sightline is within 500mm of the floor level
- The glazing is not opaque, patterned or leadlight
- Where the transom or hand rail is not incorporated within 700mm-1000mm of the floor level
- Where a louvre has blade widths greater than 230mm

Disclaimer: This document is based on certain parts of AS1288-2006 and its purpose is to provide guidelines to aid in selecting glass in housing. All information in this document is given in good faith and without responsibility and liability on the part of Lidco Corporation.

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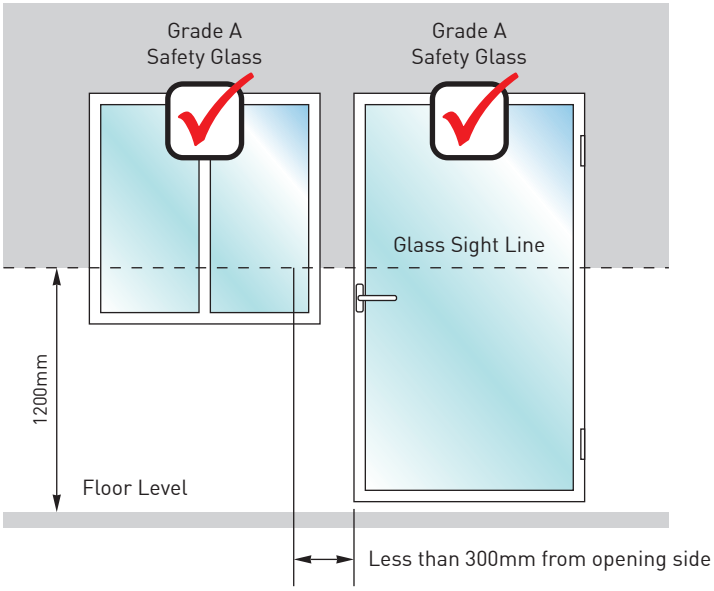
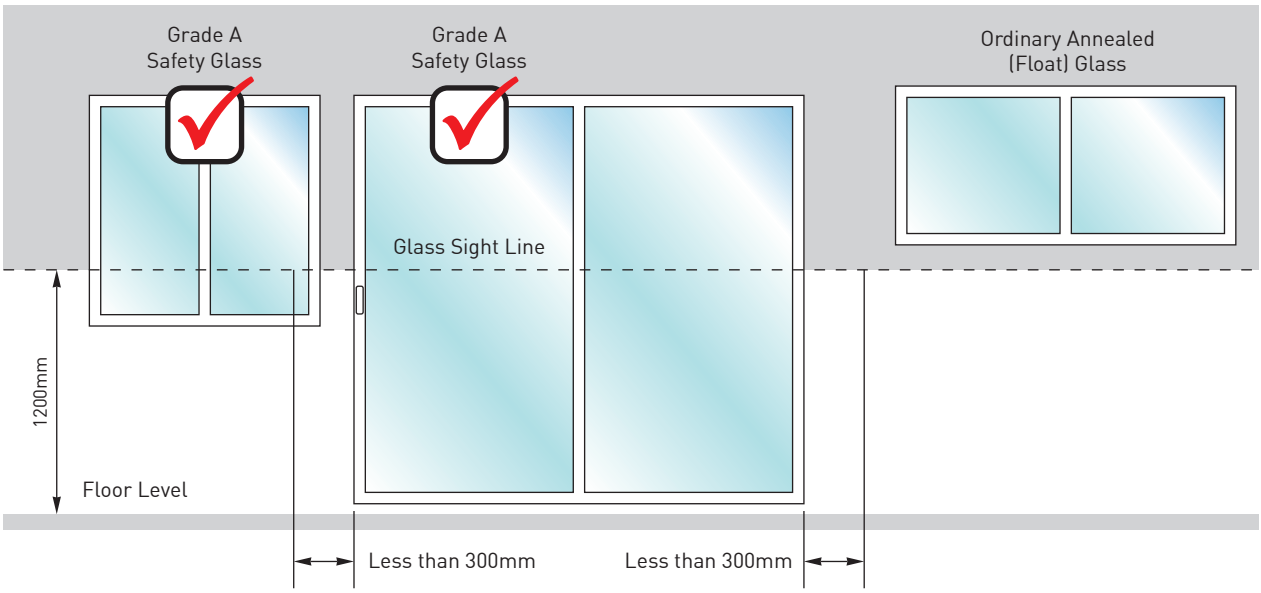
Example – Hinged Doors



Example – Sliding Doors



HUMAN IMPACT: MANIFESTATION

If the presence of glass in a door, side panel or a panel capable of being mistaken for a doorway or opening is not made apparent by transoms, colonial bars or other components of the glazing system or other decorative treatments, (such as being opaque or patterned) the glass shall be marked to make it visible. However, making glass visible by marking is not a substitute for safety glass where required.

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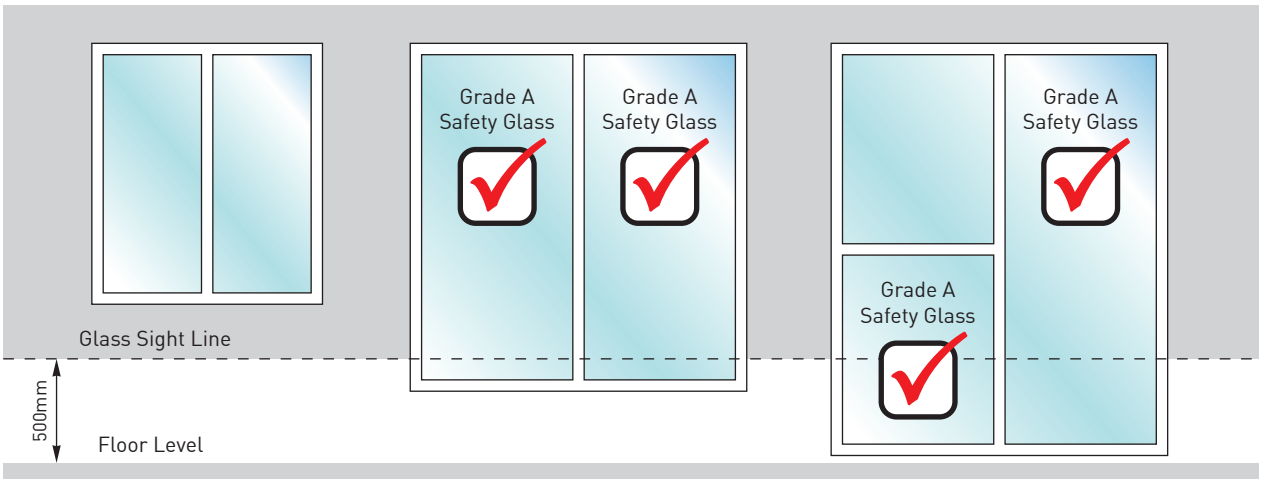
HUMAN IMPACT: LOW LEVEL GLAZING

Glazing where the lowest sightline is within 500mm of the floor level shall be Grade A safety glass. Ordinary annealed (float) glass may be used providing that the glazing is fully framed and not less than 5mm in thickness up to a maximum area of 1.2m^2. Larger areas are not permitted regardless of thickness.

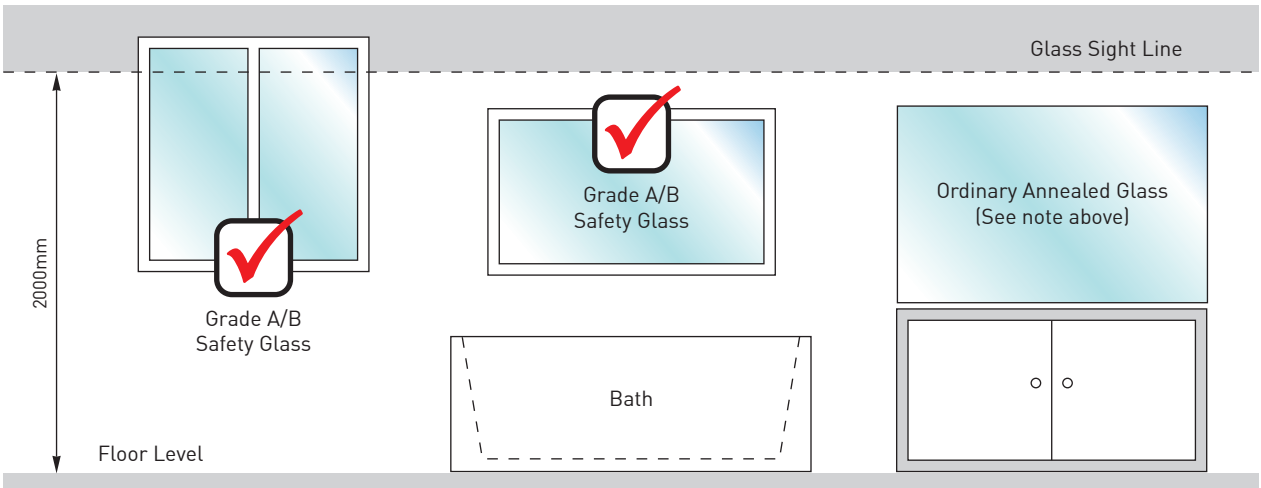
Example – Grade A Safety Glass Required



HUMAN IMPACT: WET AREAS

All glazing including mirrors within 2000mm of the floor level in wet areas shall be Grade A safety glass or Grade B safety glass.

Example – Bathroom



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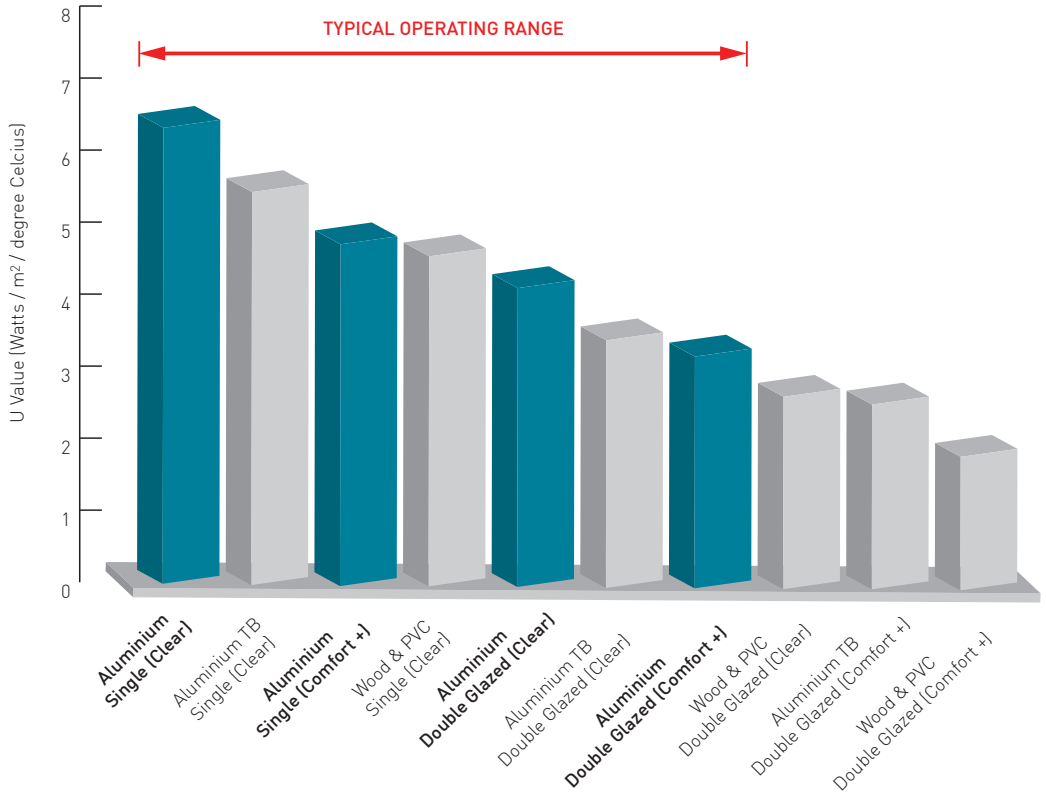
THERMAL INSULATION

The Building Code if Australia requires that windows be included in the calculation of the thermal efficiency of a building. Windows are energy rated by the Window Energy Ratings System (WERS) and a U Value assigned to each type of window frame/glass configuration. Glass selection is a predominant factor in lowering U Values.



How IGUs Work

Clear monolithic glass accounts for less than 5% of a window's insulation value, the rest being supplied by the still air layers of the environment on either side of the glass. Since the heat flow resistance of still air is much greater than that of glass, a glass unit made of two panes enclosing an air space will have about twice the insulation value of a single pane window (half the heat loss).

Double glazed units are called Insulating Glass Units as they provide insulation to the windows of a building, like fibre-glass insulation provides insulation to the wall.

Benefits of IGUs

- ✓ Reduce heat loss
- ✓ Reduce condensation
- ✓ Reduce noise
- ✓ Reduce glare
- ✓ Increase security
- ✓ Save energy
- ✓ Increase comfort
- ✓ Reduce heat gain
- ✓ Reduce fading

Insulating Glass Units retain much more heat in a room during winter thereby reducing heat loss and saving energy.

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THERMAL BREAK MISCONCEPTIONS

Specifiers, when pushed by the new energy ratings, are generally looking for U values in the mid to low 3's at most. A great deal has been said and published regarding the supposed advantages of a thermal break aluminium frame over a conventional aluminium frame. When the appropriate glass is selected, a well designed conventional aluminium window and door system easily meets these requirements without the unnecessary cost premiums associated with thermally broken systems.

Before deciding to specify thermal break, specifiers should take into account the following facts:

- As most of the energy loss occurs through the glass, correct glass selection is of paramount importance.
- Conventional non-thermally broken aluminium window and doors systems fit within the general operating range of U-Values specifiers need to consider.
- The choice of frame material generally has little effect on U-values. The claimed advantages of choosing thermally broken aluminium over conventional aluminium are highly exaggerated and misleading. In fact the U-Value improvement for a hinged door is only 11% and of a 100mm centre glazed frame only 13%*.
- The cost premiums of choosing thermal break are significant.

Apart from frame material selection, another important factor worth taking into account is air infiltration. This is a major source of thermal inefficiency when the window and door system is not well designed.

Lidco has a wide range of double glazed systems to suit the specifier's needs. In addition, Lidco has now launched an entirely new range of architectural and commercial windows and doors that achieve superb energy ratings. This new DuoTherm™ range is capable of accepting a wide range of insulating glass units up to 25mm and features very low air infiltration characteristics. The DuoTherm™ range comprises a modern window and door suite without the unnecessary complication and added expense of thermal break and easily achieves your energy ratings objectives.

*WERS ratings results AWS-053-34 and AWS-028-09 for door, AWS-053-34 and AWS-033-34 for frame

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SOUND REDUCTION

Thicker (heavier) glass transmits less sound than thin glass. Thick glass is very effective at stopping low frequency traffic noise, while thinner laminated glass is effective at controlling mid-range frequencies of human conversation, etc. Thick laminated glass combines the best of both methods.

Also, in cases where a significant reduction in sound is required, an air gap of 100mm generally provides satisfactory results and can be achieved by constructing effectively two window frames 100mm apart.

SOLAR TRANSMISSION AND ABSORPTION

The Solar Heat Gain Coefficient (SHGC) is the best measure of how much solar energy is admitted through a glazed opening. The SHGC compares the total solar heat gain through the glazing in question to the solar energy shining on the glazed area. Low SHGC values reduce the solar gain and save on air conditioning costs.

Residential glazing can use solar gain to advantage in winter. A high SHGC is desirable to maximize free passive solar heat gain in buildings where heating costs are greater than air conditioning costs.

Solar absorption makes a glass hot and causes thermal stress which, when excessive, can cause breakage of annealed glass. Reflective glasses also have solar absorption that cannot be ignored. Note that the visible and solar values, for transmission and reflection, usually differ from each other because glass absorbs differing amounts of energy at different wavelengths.

UV RESISTANCE

One of the advantages of selecting laminated glass is that the film between the glass layers provides 99% elimination of UV rays. This greatly assists in reducing the fading to curtains, carpets and furniture.

Choosing the Right Glass

When selecting the type of glass used for buildings a number of different characteristics should be evaluated.

Tinted Glass Tinted glass may be used to reduce solar heat gain, glare and minimise UV fading to furnishings. The most common colours for tinted glass are green, grey and bronze, which do not greatly alter the perceived colour of an outside view.

Coated Glass A thin film of polyester or metal is applied to the surface of the glass and gives it a mirror-like appearance. Particularly effective in reducing solar heat gain.

Laminated Glass Two or more panes of glass bonded together with a protective interlayer. Has excellent sound-dampening properties.

Low Emissive Glass A thin reflective coating on the glass surface reduces heat transfer through the pane by reflecting transmitted heat energy.

Double Glazing Insulated Glass Units (IGU) are two panes of glass with an air or gas gap in between. Insulation properties will depend on the type of glass used and the distance of the insulating gap.

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COLOUR AND APPEARANCE

There is a wide choice of colours available in today's glasses. The apparent colour of glass is the combination of the glass colour (clear, blue, blue-green, green, bronze, grey, dark grey, or coated), the colour of incident light (midday sun or sunset), the colour of any objects seen through the glass (drapes, blinds or insulation), and the colour of reflected objects (sky, clouds, etc.). The total appearance will continuously change as these individual components change. Combining different glasses in insulating and laminated units will typically change the overall colour and appearance.

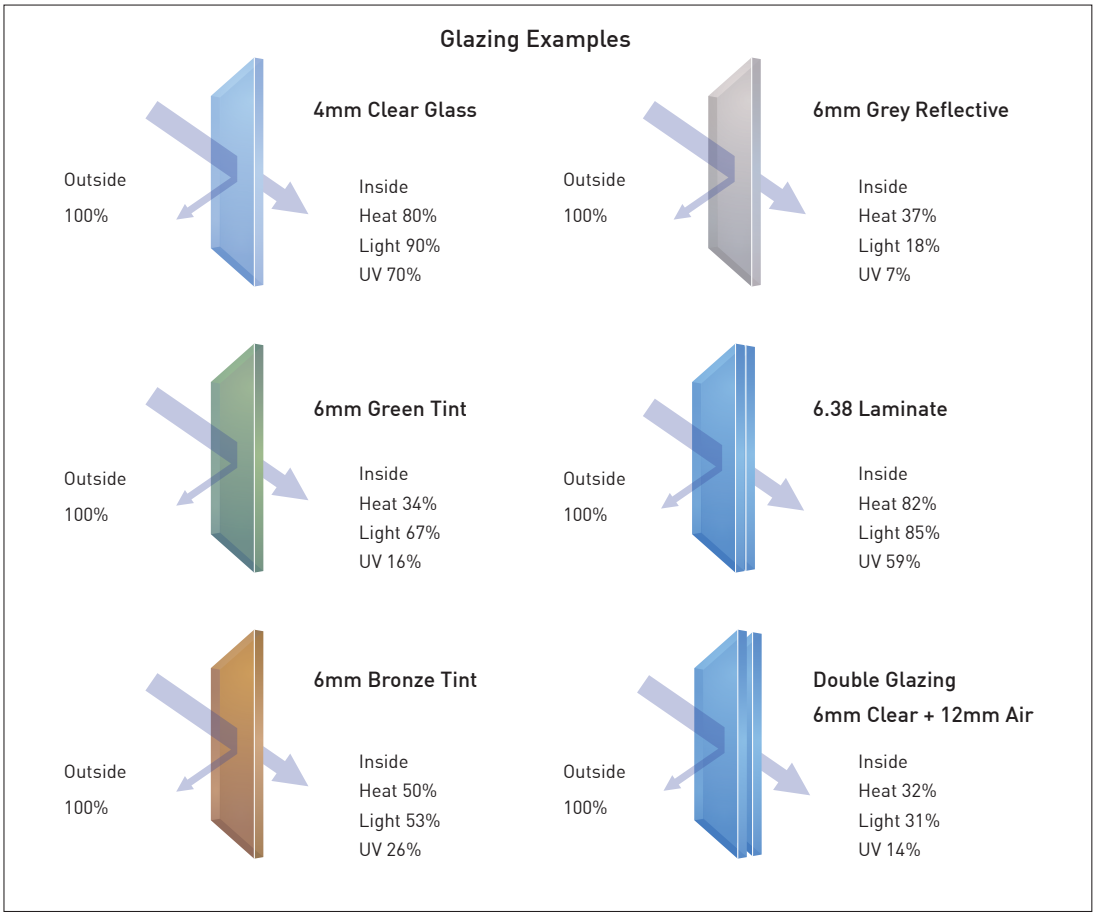
Reflections in glass will change in appearance depending on the heat treatment to the glass and on the distances of the viewer and the reflected objects from the glass. The use of a mock-up will help evaluate these effects.

VISIBLE LIGHT TRANSMISSION

Interior daylight levels will be determined by this value. Residential applications generally require higher levels than in commercial buildings.

SECURITY

Laminated glass is much more difficult to break through as the laminate assists in keeping the broken glass together after an impact.



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