

# GLASS BUILDING CODES

## Flat glass: Building Code of Australia

There are a number of Standards which are important to the window film industry. Compliance with Standards is mandatory when the Standard is referred to in legislation such as the Australian Building Code. **WFAANZ recommends every member obtain their own copy of Standards relevant to their work and reference the Standard in their day to day activities.** By failing to comply with legislated Standards you may be doing yourself and your client an injustice and you may even find yourself at legal fault.

Here is a brief summary of some of the common standards encountered in the window film industry written from the point of view most relevant to the window film industry. WFAANZ cautions that this collection of Standards is by no means comprehensive and you may encounter the need to comply with Standards other than these. The information here is for reference only and it is the window film installer's responsibility to ensure they are complying with all legal requirements.

### AS/NZS 2208:1996

This Standard concerns the procedure for testing glazing material safety after breakage. It is especially true of annealed glass (also called float or plate glass) that when broken the glass can form large, sharp dangerous shards. There are two types of safety glazing certification specified in AS2208, Grade A and Grade B of which Grade A is the higher level certification. Many window film manufacturers have attained Grade A safety glazing certification for their 100 micron (4 mil) safety films and thicker.

Certification of window films to AS2208 requires both an Impact and a Weathering test. In short the impact test is designed to simulate the impact from a child's head if the child was at running speed. A large pane of annealed glass with safety film is held vertically in a frame and a lead shot bag is swung on a pendulum arm hitting the center of the pane. To pass the test the film must limit the size of any holes made in the pane and hold the glass shards together so the risk of cutting is minimised. The pane is subject to impacts on both the filmed side and the unfilmed side of the glass and must pass the impact test on both sides to attain certification. The weathering test is designed to prove that the safety film will still have satisfactory adhesion and tensile strength years after installation. This test subjects film samples to high levels of light exposure in a special weathering chamber. Following weathering, weathered and unweathered samples are tested for adhesion and tensile strength and the weathered samples must prove to have a minimum percentage of adhesion and tensile strength compared to the unweathered samples.

Product compliance to AS2208 is the responsibility of the window film manufacturer and/or importer, not the window film installer. It is then the responsibility of the window film manufacturer and/or importer to have available identification labels which are detailed in AS2208. WFAANZ produces these labels for the Distributor members who can then sell the labels with their window film. The application of the labels is covered under AS/NZS 1288, see below.

It is not necessary for a window film installer to have their own copy of AS2208 but it is important that window film installers understand what the Standard is and especially how it relates to AS1288.

### AS 1288:2006

This Standard is commonly encountered by window film installers. Titled 'Glass in Buildings – Selection and Installation' it is the Standard which nominates the types of glass which must be used in different areas of buildings and types of buildings. AS1288 covers many requirements such as the strength of balustrade glass, overhead glass, glass subject to wind loads, glass subject to human impact and much more but the main area of concern to window film installers is human impact.

The purpose of AS1288, Section 5, Criteria for Human Impact is to ensure that glass in positions where there is a risk of human impact is a safety glass and so will break safely. Safety glass can be laminated glass, toughened / tempered glass or Safety Organic Coated Glass (annealed glass with safety film). Examples of glass that are considered high risk of human impact are doors, low level windows, shopfronts etc. AS1288 also has specific sections dealing with glass in bathrooms, schools, aged care facilities etc. so there is no one size fits all approach to where safety glass is required in any building.

Annealed glass which is in a location requiring safety glass can be made a Grade A safety glazing by installing a safety window film. There are maximum permissible pane sizes for different glass thicknesses though. For example

a 3mm thickness pane may be safety filmed to attain Grade A status only if the pane is less than 2m<sup>2</sup>, if the pane is 6mm thickness then the pane can be up to 3m<sup>2</sup> and so on.

If you are installing safety film for the purpose of AS1288 compliance then you must also consider the following;

- AS1288 requires each pane to be permanently labelled as being a safety glass. Window film suppliers must provide you with an AS2208 compliance sticker which must be adhered to a corner of the pane **prior** to the window film installation. The window film will then be installed over the sticker ensuring its permanency.
- Some client's may also ask you for a paper certificate of compliance. This is not an AS1288 or AS2208 requirement but WFAANZ distributor members will be able to provide you with this if required.
- AS1288 requires most glass within 1m of the floor to be Grade A safety glass. This means that if the bottom of the glass pane is within 1m of the floor then the whole pane must be filmed. Do not install only a strip of film along the bottom of the pane to cover just the glass area that is within 1m of the floor.
- AS1288 has a section entitled 'Making Glass Visible (Manifestation)'. The purpose of this requirement is to help avoid people walking into the glass because they can't see it. This is common on glass doors, glass walls and the like. An opaque window film may be installed as a strip across the glass and this can also be computer cut with logos or decorations. Clause 5.19 covers what is permissible in detail. A word of caution, buildings where the BCA requires access for people with disabilities have different requirements for manifestation and these are detailed in AS1428.1.

WFAANZ cautions against any window film installer conducting glass safety audits on behalf of their client unless you are also a certified building inspector. On occasions window film installers will be asked to carry out safety glass audits on buildings by building owners who do not want to pay a building inspector for the service. It is important you advise the client that you are offering your *opinion* on which glass you believe should be window filmed in accordance with AS1288 but you are not qualified to provide a formal audit. It must remain the client's responsibility to ensure compliance via a building inspector.

Window film provides an excellent option for building owners needing to increase the safety of their glass without the expense of glass replacement and in turn AS1288 offers a great opportunity for window film installers. Remember though that we are talking about safety and in many cases the safety of children so AS1288 must not be taken lightly... get a copy!

## **AS/NZS 1170.2:2002**

This Standard is part of a series to do with structural design of buildings and this part, AS/NZS 1170.2, concerns wind actions. The most common application of window film in this Standard is window film for cyclonic wind protection.

Window film can be a useful protection measure but the requirements are very tough. A window representing the actual, size, glass, frame and window film construction is submitted for testing. The testing typically involves laying the window horizontally and dropping a heavy wood batten from a height end first, this is to simulate an airborne object hitting the window in a cyclone. The batten is then dropped numerous times at different locations. After all impacts the pane is inspected for penetrations and subjected to a compressed air test, if no air penetrates then the window has passed.

Cyclones are naturally very severe and the harshness of the test means that the glazing system will be able to withstand impact from heavy airborne missiles and the continue to provide an airtight membrane. It is commonly regarded that the most severe damage in a cyclone occurs not from airborne missiles but from the air pressure inside when the building fabric is breached.

Some WFAANZ Distributor members have done testing to AS1170.2 so speak to your supplier if you have a client seeking window film for this requirement.

## **AS 1428.1-2009, Design for access and mobility**

Clause 6.6 of AS 1428.1 regards "visual indicators on glazing", or manifestations.

This clause calls for all frameless or fully glazed doors, sidelights and glazing that could be mistaken for a door or opening to be "clearly marked for their full width with a solid and non-transparent contrasting line." The line must be at least 75mm wide and extend across the entire width of the glazing. The lower edge of the contrasting line must be between 900mm and 1000mm above the plane of the finished floor level.

The contrasting line must provide a minimum of 30% luminance contrast. To properly ensure adequate luminous contrast you must obtain a copy of the standard and consult appendix B. The justification for the luminous contrast

requirement is to ensure the marking band 'sticks out' and doesn't blend into the background on the other side of the door - it ensures a high contrast between the band and the view/light level on the other side of the door.

## **The BCA, BASIX and Energy Efficiency**

The Building Code of Australia is the document which details the construction requirements of every building from a garage to a skyscraper. Compliance with the BCA is mandatory and the BCA nominates requirements for minimum building energy efficiency for both residential and commercial buildings. For residential buildings it is Part 3.12 and for commercial buildings it is Section J. At this point in time only NSW requires energy efficiency measures for residential buildings outside of those required in the BCA and this program is called BASIX.

Window films can play an important role in building energy efficiency because solar control window films are an excellent means of reducing heat loads into buildings which helps cooling loads and some window films can help retain heat in buildings which can help heating loads. The thermal efficiency of any building is a complicated calculation which relies on many aspects such as the floor, walls, roof and window materials, the building shape, location, usage etc. and so it is impossible to know the net effect on the building's energy efficiency by considering just one aspect in isolation such as the glazing. The BCA and BASIX both have thermal efficiency calculation methods for buildings and from that calculation the requirements of the glazing can be determined. This is why your client must tell you as the window film installer the target U-Value and SHGC needed for their building. Once you have those target figures you can then match a window film product to their needs.

Matching a film for a residential application is as simple as selecting a WERS Rated film from your supplier's WERS rated product list which has a U-Value the same or lower than the target value and an SHGC +/- 10% of the target value. WERS ratings are a whole of window rating which is the mandatory requirement for residential applications under BCA and BASIX. Note you cannot use values simply measured as film on glass which are the standard values on film manufacturer product information cards.

Matching a film for commercial applications is not quite as simple because commercial WERS Ratings for film do not exist at this time. The commercial building's owner will need to use the film manufacturer's performance values in a thermal calculation software to account for the fact that the values are not whole of window values. This is typically not a problem for commercial projects though as there are normally engineers involved in the building design who can readily do this.