



Insulating Glass Units (IGUs) are becoming an increasingly popular choice among Australian consumers for improved energy efficiency and the other benefits these glazing systems offer.

AS/NZS 4666 Insulating Glass Units is referenced by AS 1288 and provides principles and test methods intended to improve the longevity of these units in the field. It does not preclude the use of patented or proprietary systems or other methods or systems of glazing, provided that the alternative method or system can be demonstrated to satisfy the requirements for correctly supporting the insulating glass unit within the frame or glazing system. Examples include testing to AS 2047 or NZS 4211

Life Expectancy

An IGU consists of two or more glass panes separated by a spacer and sealed to prevent moist outside air from entering the unit. To prevent condensation forming, the spacers are typically filled with or contain a desiccant to remove moisture trapped in the gas space during manufacturing.

The edge seal of an IGU is particularly important to its long-term performance and the life span of IGUs may be significantly reduced and manufacturer's warranties against seal failure may be invalidated if they are installed incorrectly.

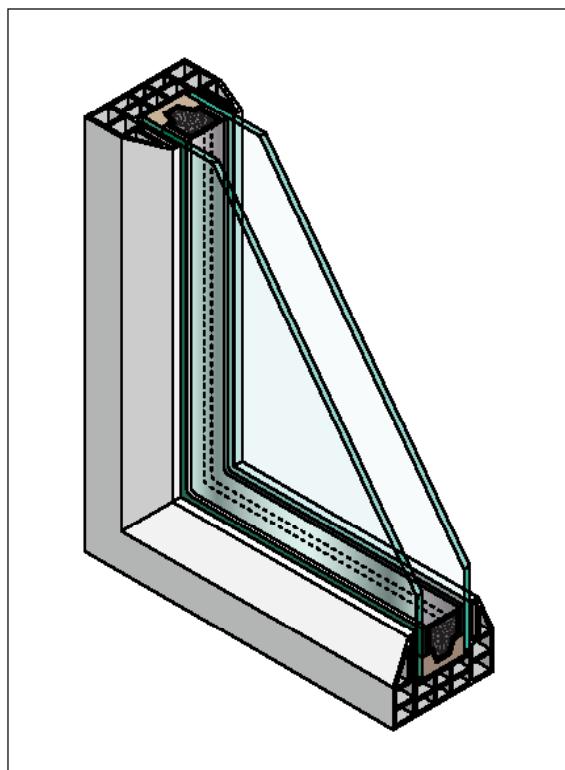


Figure 1 Insulated Glass Unit

Fundamental Principles

AS/NZS 4666 describes several fundamental principles for the correct glazing of IGUs. Compliance with AS/NZS 4666 requires that:

Installation of IGUs must prevent the edge seal of the unit being in prolonged contact with moisture

If water is trapped against the edge seal of a unit for a long period it may result in failure of the adhesive bond between the sealant and the glass allowing moisture (water, water vapour, or both) to penetrate the edge seal leading to condensation on the glass surface within the cavity.

The edge seal of the IGU must be protected from the adverse effects of weathering and solar radiation

The edge seal on most units can degrade if exposed to the sun or ultra-violet light. It is important to ensure that rebates and frame systems fully cover and adequately protect the edge seal. The two most common edge seal types are Polysulfide and Silicone. Polysulfide is used by most manufacturers but is more vulnerable to UV breakdown if left exposed. It is therefore recommended that Silicone seals are used where edge seals may be exposed.

Materials used in the installation of IGUs must be compatible with the edge seal

The compatibility of materials is essential to the long-term performance of any glazing installation. Chemical reactions from physical contact or close proximity exposure to incompatible materials can occur. Sealants and gaskets installed in glazing



areas must be compatible with the fabricated product as well as with the other materials used in the glazing operation. A list of compatible sealants should be available from the IGU supplier. These materials include:

- Glazing sealant
- Gaskets
- Glazing tapes
- Wedges and channels
- Insulating glass sealants
- Interlayers
- Setting blocks
- Structural silicone sealant
- Applied films
- Cleaning materials
- Sash joinery sealant
- Timber preservative treatments

Moisture Attack

In most glazing systems, a small amount of moisture can penetrate to the rebate area, either through or around the glazing system, or though frame joints into the glazing system from a variety of sources, most typically from rainwater, window cleaning, or condensation.

Water that becomes trapped in the glazing rebate for long periods of time may permeate the edge seal. It is important that glazing systems provide adequate protection and suitable drainage of the glazing rebate and edge seal of the IGU, either by preventing access of water to the seal or by ensuring that any water that penetrates as far as the edge seal is soon removed by drainage of the rebate area.

The use of open cell foam, or timber blocks that absorb moisture and hold it against the edge sealant, should be avoided.

Glazing methods for insulating glass units generally fall into two groups:

- Drained methods, including pressure-equalized systems.
- Non-drained or solid bedding methods.

Drained methods are based on the principle that some water may penetrate the glazing space and, while this is usually kept to a minimum, provision is made in the design of the frame to ensure that any water that does penetrate is removed by drainage and ventilation. An example is shown in Figure 2.

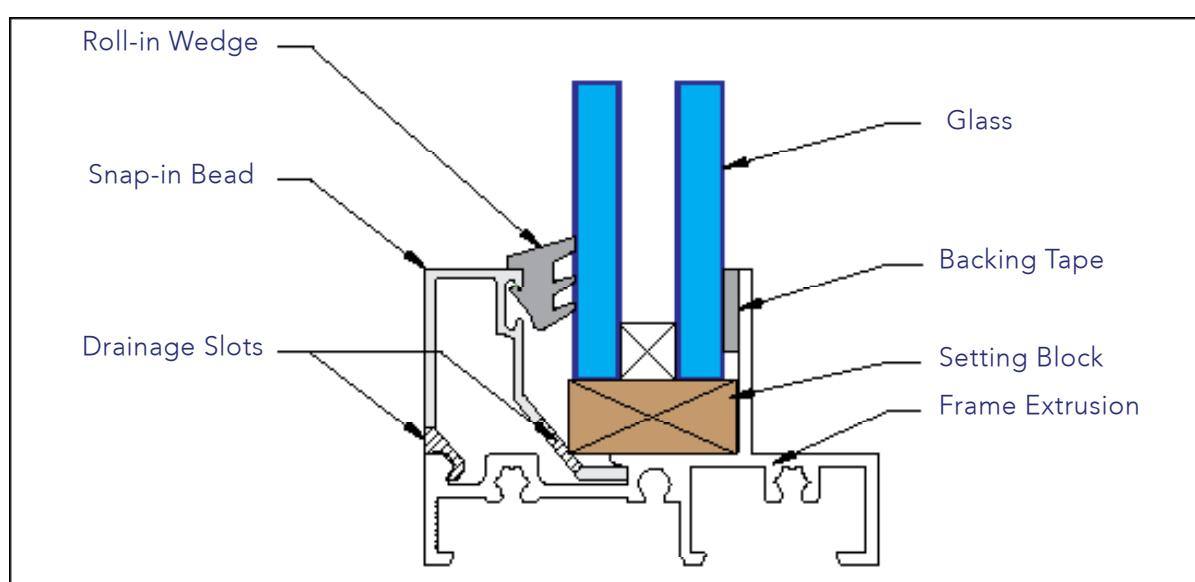


Figure 2 Drained Glazing Method: Wedge

Note: There are many variants to drained glazing systems. This example is for illustration purposes only.

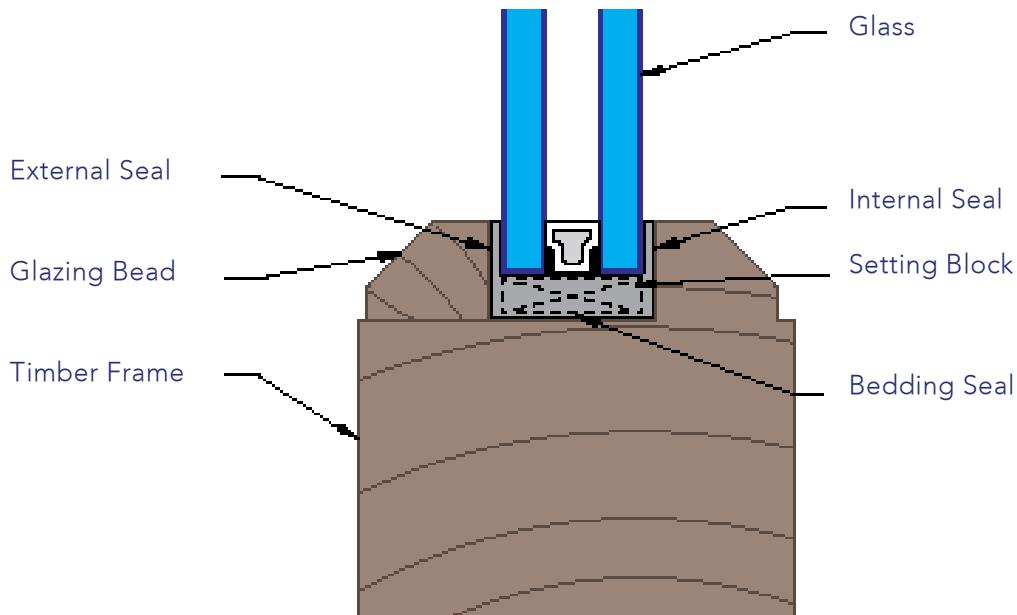


Figure 3 Solid Bedding Glazing Method: Timber

Non-drained or solid bedding methods protect the seal of the unit by embedding the edge in a compound or sealant to prevent ingress of moisture. It should be noted however that these methods are heavily reliant on the workmanship of the application and the durability of the sealant to prevent the creation of cavities which may allow water to become trapped. Non drained systems need to ensure the undersides of beads and rebates are sealed off from all moisture for the lifetime of the window, or at least the warranty period of the IGU which is usually 10 years.

Notes:

1. To ensure good performance at all times, all external junctions of glass and frame must be effectively sealed against the penetration of water.
2. IGUs must be installed so that the entrapment of water in the frame in the proximity of the edge is prevented, by either ensuring the edge seal is completely embedded in a good quality compatible sealant, or by providing adequate drainage and ventilation to the edge seal.
3. Timber, where in contact with glazing compounds, must be completely sealed with an appropriate sealant.

Edge Clearances, Location Blocks and Setting Blocks

IGUs should be centrally located in the opening with a minimum of 3 mm clearance at the head and jambs for smaller units such as those common in domestic applications and a minimum of 5 mm for panes greater than 2 m in height that are typically found in doors and in commercial applications.

IGUs must be installed with the bottom edge resting on two full-width setting blocks. Setting blocks should be a minimum of 3 mm in height for non-drained systems and 6 mm in height for drained systems and be made from non-absorbent, resilient neoprene, santoprene, EPDM or other as recommended by the IGU manufacture, with a hardness of 85 ± 5 Shore A durometer. Setting blocks should be 3 mm wider than the IGU that it supports and at least 25 mm per square metre of glass area and not less than 50 mm long.

Setting blocks should be positioned one-quarter of the width ($W/4$) from the glass edge, or alternatively with the edge of the setting block one-eighth of the width ($W/8$) or 150 mm from the edge, whichever is the greater

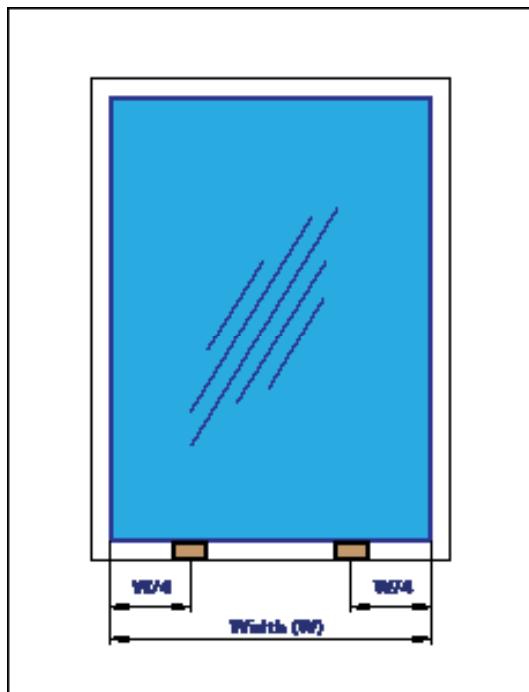


Figure 4 Setting Block Position for Fixed Lights.

Location blocks must be used opposite each other on each side of the IGU to maintain clearance and to prevent movement during sash operation and under wind pressure. Location blocks should be suitable for the respective clearances allowed (ie minimum 3 mm thick for small panes and 6 mm thick for larger commercial applications) and made from non-absorbent, resilient neoprene, santoprene, EPDM or other as recommended by the IGU manufacturer, with a hardness of 65 ± 5 Shore A durometer. The length of the location block should be not less than 25 mm.

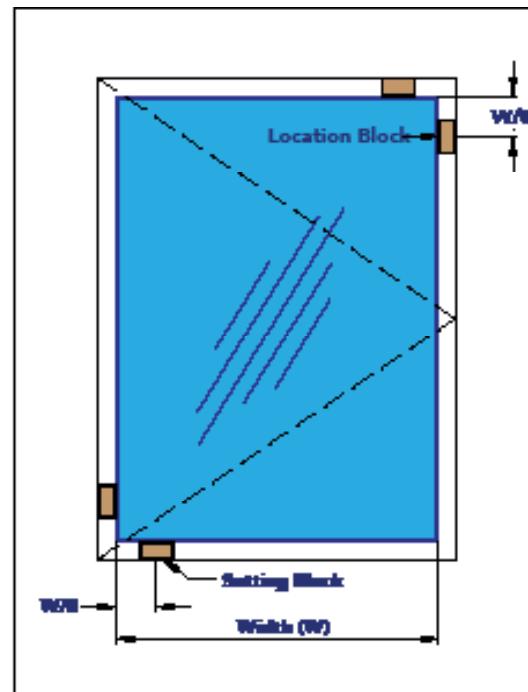


Figure 5 Setting and Location Block Positions for Casement Hinged Door.

Further Information

This Key Message is intended to provide an overview of the requirements for drainage and edge protection of IGU as provided by AS/NZS 4666. It is not a comprehensive specification and should be read in conjunction with the standard.

For further information, please refer to:

- AGWA Guide to Glass and Glazing. Download from www.agwa.com.au
- Insulating Glass Manufacturers Alliance: www.igmaonline.org

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