

Australian/New Zealand Standard™

Insulating glass units



AS/NZS 4666:2012

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee BD-007, Glazing and Fixing of Glass. It was approved on behalf of the Council of Standards Australia on 1 June 2012 and on behalf of the Council of Standards New Zealand on 28 May 2012.

This Standard was published on 21 June 2012.

The following are represented on Committee BD-007:

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Australian Building Codes Board
Australian Chamber of Commerce and Industry
Australian Glass and Glazing Association
Australian Industry Group
Australian Shop and Office Fitting Industry Association
Australian Window Association
Building Research Association of New Zealand
Housing Industry Association
Master Builders Australia
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Window and Door Industry Council
Window Association of New Zealand
Window Film Association of Australia and New Zealand

Additional Interests:

Insulating Glass Unit Manufacturers Association New Zealand

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This Standard was issued in draft form for comment as DR AS/NZS 4666.

Australian/New Zealand Standard™

Insulating glass units

Originated as AS/NZS 4666:2000.
Second edition 2012.

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Jointly published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001 and by Standards New Zealand, Private Bag 2439, Wellington 6140.

ISBN 978 1 74342 170 3

PREFACE

This Standard was prepared by Standards Australia Committee BD-007, Glazing and Fixing of Glass, in collaboration with, the Insulating Glass Manufacturers Alliance Australia (IGMA) and Insulating Glass Unit Manufacturing Association New Zealand (IGUMA) to supersede AS/NZS 4666:2000.

The main objectives of this Standard are to—

- (a) provide normative long term type test procedures and time frames intended to apply to all types of insulating glass units that are manufactured with the aim of complying with this Standard;
- (b) provide normative aspects and elements deemed essential to achieving the correct glazing of insulating glass units;
- (c) provide normative manufacturing and periodic test requirements for both, the components used in the manufacture of insulating glass units and completed insulating glass unit; and
- (d) provide informative detail and material to support the intent of the normative requirements of this Standard as well as supplying additional aspects deemed relevant to the manufacture, glazing, application and use of insulating glass units.

A statement expressed in mandatory terms in a note to a table is deemed to be a requirement of this Standard.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

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FOREWORD

In addition to revising the 2000 edition of this Standard, IGMA and IGUMA have looked to expand the content of this Standard by—

- (a) specifying time frame associated with long term type testing requirements; and
- (b) introducing an additional section that deals with the implementation of periodic manufacturing tests.

In the first case, it was considered that the previous requirement for a once only long term type test ran the risk of ignoring the accumulative effects that minor changes to both component supply and manufacturing activity, may have on the finished product.

In the second instance, IGMA and IGUMA were concerned that the nature of long term type testing, i.e. it deals only with completed units, is conducted in a laboratory environment where results are not known for a number of months, had little relevance to the day-to-day activity taking place in the manufacturing environment. Accordingly, IGMA sought the assistance of Standards Australia in developing a Standard that would help ensure that the inherent qualities deemed to exist in units that had passed long term type testing, would be incorporated into daily production.

Consequently, Standards Australia, Standards New Zealand, IGMA and IGUMA are hopeful that compliance with this Standard will help maximize the longevity and performance of insulating glass units that are produced for the Australian and New Zealand markets.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard
Insulating glass units

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out requirements and guidelines for the long term type testing, glazing, periodic manufacturing testing and other associated aspects to do with insulating glass units intended for use in the applications listed in Clause 1.2.

NOTES:

- 1 Achieving satisfactory test results to this Standard does not imply a fit for purpose status to any specific application, and any such determination should be in accordance with the criteria specified in AS 1288 or any relevant statutory requirement, or both.
- 2 Thermal, solar, light transmission and acoustic properties are excluded from this Standard. These and other design criteria including sealant type and sealant dimensional properties are considered to have been catered for as part of the architectural or engineering functions, or both.
- 3 Manufacturing tests covered in this Standard subject samples only to the ambient temperatures existing at the time of manufacture, whilst testing conducted in accordance with this Standard subject units to a defined laboratory controlled temperature range. Consideration should be given to environmental extremes during the design phase which should allow for thermal build up during operating extremes. In particular, consideration should be given to the actual operating temperature of the insulating glass unit when determining sealant types.
- 4 It is not the intention of this Standard to preclude new or existing products, or technologies where equal or superior performance can be demonstrated to that specified in this Standard. This applies equally to component types, test, installation and glazing methods.
- 5 Testing for compliance with this Standard may involve the use of materials, equipment and methods that could be deemed hazardous. This Standard does not purport to address all the relevant safety aspects inherent to the test procedures and test personnel should consult the appropriate authorities in order to ascertain adequate safety procedures or compliance with relevant statutory requirements, or both.

1.2 APPLICATION

This Standard applies to the following types of insulating glass units:

- (a) Hermetically sealed insulating glass units.
- (b) Insulating glass units constructed with glass panes.
- (c) Insulating glass units with one or more air spaces, where the glass panes are parallel to each other.
- (d) Stepped insulating glass units.
- (e) Insulating glass units containing introduced gases.
- (f) Insulating glass units intended for use in refrigerated applications.

Glass types include obscure, wired, coated, laminated and toughened glass, as well as sand blasted, acid etched and normal annealed glass.

This Standard does not apply to the following types of insulating glass units:

- (i) With non-glass panes.
- (ii) Incorporating capillary/breather tubes or bladder devices.
NOTE: Appendix B does, however, provide guidance on some aspects deemed essential for the inclusion of such elements.
- (iii) Containing lead lights or other decorative glass inside the insulating glass unit.
- (iv) Incorporating internal venetian blinds, regardless of the control method.
- (v) Incorporating painted or ceramic fritted glass panes where the paint or ceramic frit is located on the inside of the IGU.
- (vi) Containing colonial or muntin or spacer bar grids.
NOTE: Appendix H does, however, provide guidance on some aspects deemed essential for the inclusion of such elements
- (vii) With plastic film adhered to the glass surface.
- (viii) Where glass panes are not parallel to each other.
- (ix) Containing a vacuum between the glass panes.
- (x) Containing heat treated laminated substrate.
- (xi) Containing any point fixing.
- (xii) Incorporating heated panes.

1.3 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard:

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

AS

1288 Glass in buildings—Selection and installation

AS/NZS

1170 Structural design actions

1170.0 Part 0: General principles

ISO

20492 Glass in buildings—Insulating glass

20492-1 Part 1: Durability of edge seals by climate tests

20492-2 Part 2: Chemical fogging tests

20492-3 Part 3: Gas concentration and gas leakage

20492-4 Part 4: Methods of test for the physical attributes of edge seals

ASTM

E2188 Standard test method for insulating glass unit performance

E2189 Standard test method for testing resistance to fogging in insulating glass unit

E2190 Standard specification for insulating glass unit performance

EN

1279 Glass in Building—Insulating Glass Units

1279-2 Part 2: Long term test method and requirements for moisture penetration

1279-3 Part 3: Long term test method and requirements for gas leakage rate and gas Concentration Tolerances

1279-6 Part 6 Factory production control and periodic tests

NZS

4223 Code of practice for glazing in buildings

4223.1 Part 1: Glass selection and glazing

4223.3 Part 3: Human impact safety requirements

4223.4 Part 4: Wind, dead snow and live actions

1.4 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

1.4.1 Airspace

The space between the panes of glass in an insulating glass unit (also known as ‘cavity’, or ‘spacer width’, even when gas is used in the airspace gap/space instead of air).

1.4.2 Argon

An inert, non-toxic gas placed between glass panes in an insulating glass unit in order to improve the insulating properties of the unit.

1.4.3 Beads

A component of the frame, which is capable of restraining the glass under all design action conditions.

1.4.4 Bedding

1.4.4.1 Back bedding

The glazing material between the face of the units and the rebate upstand.

1.4.4.2 Front bedding

The glazing material between the face of the units and the bead.

1.4.5 Capping

A sealant used to fill the gap above a strip glazing material positioned between the unit and the rebate upstand or bead, or both.

1.4.6 Cavity

The space between the panes of glass in an insulating glass unit. See ‘airspace’

1.4.7 Clearance

1.4.7.1 Back clearance

The distance between the unit and the rebate upstand (see Figure 1.1).

1.4.7.2 Edge clearance

The distance between the edge of the unit and the rebate platform (see Figure 1.1).

1.4.7.3 Front clearance

The distance between the unit and bead (see Figure 1.1).

1.4.8 Colonial bar

A member that is added to a window construction to change the appearance of the window.

NOTE: It can be in the form into which the glass is glazed, clipped, or stuck onto either or both faces of the glass, also known as ‘muntin bar’ (see Appendix H).

1.4.9 Desiccant

A dehydrant incorporated in the hollow spacers used in an insulating glass unit to ensure a low water vapour pressure in the unit, reducing the likelihood of condensation forming in the unit.

1.4.10 Deviation

The difference between a specified dimension or parameter and the actual dimension or parameter.

NOTE: A deviation is always positive or negative.

1.4.11 Distance piece

Small blocks of resilient, non-absorbing material (such as extruded rubber), used to prevent the displacement of glazing compound or sealant by external loading. The blocks are positioned opposite each other between the glass and rebate, and glass and bead.

1.4.12 Edge cover

The distance between the edge of the unit and the sight line (see Figure 1.1).

1.4.13 Edge deletion

The complete removal of a coating from a glass substrate in an area parallel and adjacent to the edges of the glass.

1.4.14 Edge seal

The seal around the perimeter edge of the unit between the panes of glass.

1.4.15 Flush-edged insulating glass unit

An insulating glass unit in which the panes are of equal size and flush at edge.

1.4.16 Fogging

Fogging appears as a deposit on the internal surfaces of an insulating glass unit (IGU). It is the consequence of outgassing from or by the materials exposed to the air cavity.

1.4.17 Glazing

The installation of insulating glass units in prepared openings in windows, door panels, partitions and the like.

1.4.17.1 Glazing material

Material that provides a bedding for the unit and forms a joint between the unit and frame. The term includes glazing compounds, sealants, putties, glazing strips and tapes, and gaskets.

1.4.18 Insulating glass unit (IGU)

Two or more panes of glass spaced apart and factory sealed hermetically with dry air or special gases in the unit cavity (see Figure 1.1).

NOTE: Often abbreviated to IGU or referred to as 'the unit'.

1.4.19 Location block

Small blocks of resilient, non-absorbing material (such as extruded rubber), used between the edges of the insulating glass unit and the frame to prevent movement of the unit within the frame by thermal expansion or when the window or door is opened or closed.

NOTE: The blocks are to prevent the weight of the glass from causing the frame to become out of square.

1.4.20 Low emissivity glass (low-e)

A glass that has a special thin-film metallic or oxide coating that allows the passage of short wave solar energy into a building but reduces long wave energy from escaping outside.

NOTE: Commonly known as 'Low-E' glass and often used in IGUs it allows light to enter while also improving thermal insulation.

1.4.21 Molecular sieve

A desiccant used to adsorb moisture and solvents from the air or gas contained within the airspace of an IGU.

1.4.22 Permanent record

The duration of the warranty period plus 1 year.

1.4.23 Point fixed glazing

The fixing of unframed glass to a substructure using engineered mechanical connectors.

1.4.24 Primary seal

The seal which is in contact with the cavity of the insulating glass unit. It is a key component in restricting moisture vapour transmission and provides adhesion to the.

NOTE: In the case of a single seal IGU the single seal acts as both a primary and secondary seal.

1.4.25 Primer

A coating applied to a surface to improve the adhesion of compounds or sealants.

1.4.26 Rebate platform

The face of the rebate which makes an angle with the upstand to form a platform to support the unit (see Figure 1.1).

1.4.27 Rebate upstand

The face of the rebate which is parallel to the faces of the unit (see Figure 1.1).

1.4.28 Sealer

A coating applied to a porous surface to prevent migration from compounds or sealants subsequently applied to that surface.

1.4.29 Secondary seal

The seal which is in contact with the environment outside the insulating glass unit. The secondary seal provides structural strength to the insulating glass unit edge.

NOTE: In the case of a single seal IGU the single seal acts as both a primary and secondary seal.

1.4.30 Setting block

A block of resilient non-absorbent material used to support the deadload of the glass on the rebate platform and prevent glass-to-frame contact. Normally used in pairs located at quarter points of the glass width.

1.4.31 Sight line

The perimeter of the opening that admits daylight (see Figure 1.1).

1.4.32 Sight size

The actual size of the opening that admits daylight (see Figure 1.1).

1.4.33 Sloped and overhead glazing

Glazing that is inclined at less than 75° to the horizontal and located, wholly or partially, directly above an area that may be occupied by people.

1.4.34 Spacer

The component of an insulating glass unit which maintains the airspace between the panes of the unit. Also referred to as 'spacer bar'.

1.4.35 Spacer frame

The complete assembly of spacer bars around the edge of a unit.

1.4.36 Stepped insulating glass unit

An insulating glass unit in which the panes are of unequal size.

1.4.37 Structural silicone glazing

Is a glazing method in which the adhesion of a silicone sealant is the mechanism for both fixing the glazing to its supports and transferring loads from the glazing to the support system.

1.4.38 Substrate

A base material to which other materials are applied.

1.4.39 Tight size

The actual size of a rebate opening as measured from the rebate platform (see Figure 1.1).

1.4.40 Tolerance

A permitted variation from a standard dimension.

1.4.41 Muntin bar

See 'colonial bar'.

1.4.42 Transportation

The delivery of goods from the point of manufacture to specified delivery points including loading and unloading of goods.

NOTE: The delivery may include loading and unloading with framed vehicles or onto or into cases or special racks.

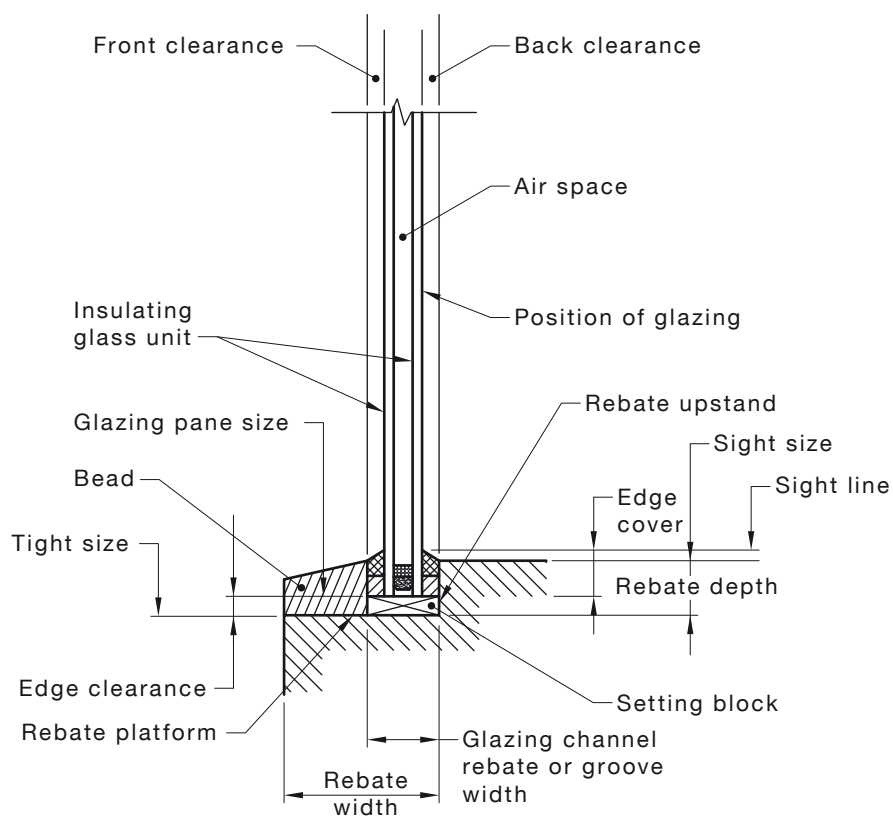


FIGURE 1.1 SIZES, REBATES AND RELEVANT TERMINOLOGY

SECTION 2 LONG - TERM TYPE TESTING

2.1 GENERAL

Long term type testing regimes differ from daily periodic testing during manufacture in that the testing regimes expose completed and fully cured units to long term cyclic, accelerated weathering and UV type tests that utilize laboratory based criteria.

2.2 APPLICABLE STANDARDS

2.2.1 General

In order for insulating glass units to comply with this Standard, the manufacturer shall provide evidence that the units have been type tested by an independent recognized testing facility and that they have passed the requirements of the nominated Standards.

Insulating glass units shall be tested in accordance with the long term type testing procedures specified in—

- (a) ASTM E2188-02 and ASTM E2189-02 and ASTM E2190-02; or
- (b) EN 1279-2 and where gas filling applies EN 1279-3; or
- (c) ISO 20492, Parts 1 to 4.

NOTE: Independent third party product certification may be used by a manufacturer to demonstrate ongoing manufacturing compliance of insulating glass units against the manufacturer's quality system and this Standard as specified in Section 5 of this Standard.

2.2.2 Acceptable period between type tests (Australia)

Satisfactory type testing in accordance with the Standards specified in Clause 2.2.1 will result in no further long term type testing being required for that configuration of insulating glass unit for a period of two years from acceptance of the original type test report. Thereafter, re-testing of the insulating glass unit shall be conducted every two years by an independent, recognized testing facility to demonstrate continuing compliance with this Standard.

NOTE: Configuration refers to the unique combination of component parts involved in the construction of an insulating glass unit, i.e. glass type, spacer type, primary and secondary seal materials and the like.

2.2.3 Acceptable period between type tests (New Zealand)

Satisfactory type testing in accordance with the Standards specified in Clause 2.2.1 will result in no further long term type testing being required for that configuration of insulating glass unit for a period of one year from acceptance of the original type test report. Thereafter, re-testing of the insulating glass unit shall be conducted every year by an independent, recognized testing facility to demonstrate continuing compliance with this Standard.

NOTE: Configuration refers to the unique combination of component parts involved in the construction of an insulating glass unit, i.e. glass type, spacer type, primary and secondary seal materials and the like.

SECTION 3 GLAZING

3.1 SCOPE OF SECTION

This Section provides the basic glazing requirements for the glazing of insulating glass units.

This Section does not cover the glazing of insulating glass units—

- (a) in point fixed glazing (planar or spider fittings); and
- (b) to be glazed using four sided structural silicone glazing.

NOTES:

- 1 This Standard does not preclude the use of other methods or systems of glazing, provided that the alternate method or system can be demonstrated to satisfy the requirements for correctly supporting the insulating glass unit within the frame, or glazing system.
- 2 Patent and other proprietary systems are not specified in this Section.

3.2 FUNDAMENTAL PRINCIPLES

The fundamental principles for the correct glazing of insulating glass units shall be as follows:

- (a) Prevention of prolonged contact of moisture with the edge seal of the unit.
- (b) Compatibility between the edge seal of the unit, the glazing materials and, if applicable, coatings on the glass.
- (c) Protection of the edge seal of the unit against sunlight or UV radiation, where necessary.

NOTES:

- 1 The life span of IGUs may be significantly reduced if they are installed incorrectly. In addition, manufacturer's warranties against seal failure may be invalidated if the insulating glass unit is installed incorrectly. Therefore, it is important to ensure the glazing system is suitable.
- 2 For information on the role IGUs play with thermal and sound insulation system, see Appendix C.
- 3 For information on typical visual characteristics of an IGU, see Appendix D.
- 4 For further information on principles of glazing, see Appendix E.
- 5 For information on glazing methods, see Appendix F.
- 6 For information on storage handling, transport and preservation, see Appendix G.

3.3 SITE WORKING AND DAMAGE

Insulating glass units with any damage to the edge or surface, not covered by Table 5.4 and Table 5.5, shall not be glazed.

3.4 GLAZING MATERIALS

3.4.1 Suitability of materials

A glazing material shall be used only for the purposes specified by the manufacturer.

3.4.2 Compatibility of materials

A glazing material shall be used only where compatible with contiguous materials, including the rebate and bead surface finish, setting and/or location blocks, distance pieces and glass type and coating.

3.4.3 Application of materials

The application of glazing materials shall be in accordance with the manufacturer's specification.

3.4.4 Life expectancy of materials

A glazing material shall only be used where its life expectancy (durability) has been established.

NOTE: The manufacturer's advice should be sought for information of the life expectancy, compatibility and suitability of the selected glazing materials.

3.5 SETTING BLOCKS

Setting blocks shall be of resilient, load bearing, non-absorbent, rot-proof materials that are compatible with all other glazing materials that may come into contact with them.

The number and location of setting blocks shall be as shown in Figure 3.1. All setting blocks shall be—

- (a) positioned at quarter points (see Figure 3.1(a)); or
- (b) an alternative position is with the end of the block within (width/8) or 150 mm of the glass edge, whichever is greater (see Figure 3.1(b)).

The minimum width of each setting block shall be not less than 3 mm greater than the unit thickness.

For drained glazing systems, the minimum thickness of the setting block shall be 6 mm.

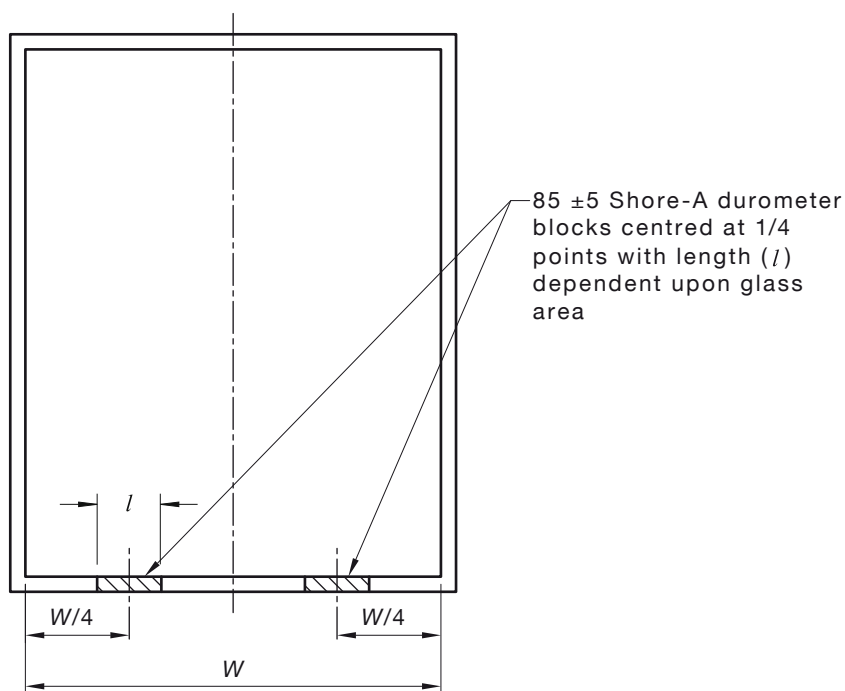
Setting blocks shall be located to equally support all panes of glass and shall be fixed to prevent displacement during glazing and service.

The minimum length of each setting block (or two blocks side by side) shall be 25 mm in length for every square metre of unit area, with a minimum length of 50 mm.

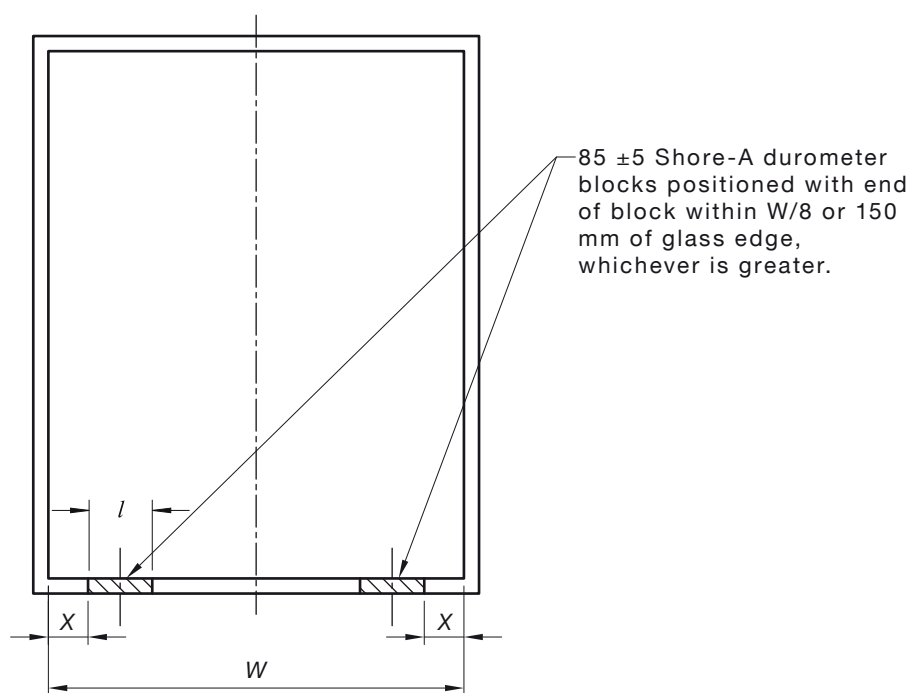
The width and location of setting blocks shall not restrict water drainage. Shaped setting blocks shall be required for a sloped glazing platform.

NOTES:

- 1 Setting blocks are used between the bottom edge of the insulating glass unit and the frame to centralize and equally support both panes of glass.
- 2 Material with 80-90 Shore-A hardness is recommended.
- 3 Two setting blocks are normally used, which support the glass and, by sufficient thickness, centralize it in the frame to prevent glass to frame contact as well as ensuring that the surface tension of any water in the rebate is overcome to assist drainage. The size of setting block is related to the thickness and weight of the glass and is not less than 25 mm in length.



(a) Setting block location (preferred)



(b) Setting block location (alternate)

NOTES:

- 1 The setting block is neoprene, EPDM or silicone.
- 2 Setting block length $l = 25 \text{ mm} \times \text{glass area (m}^2\text{)}$.

FIGURE 3.1 POSITIONS OF SETTING BLOCKS

3.6 LOCATION BLOCKS

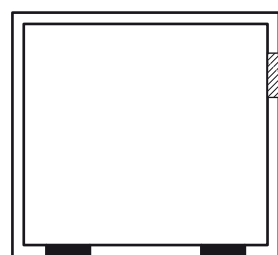
The number and position of location blocks shall be as shown in Figure 3.2. Location blocks shall be—

- (a) a minimum of 25 mm long;
- (b) at least as wide as the thickness of the insulating glass unit;
- (c) positively located to prevent displacement in service; and
- (d) sufficiently resilient to accommodate movement within the frame, without imposing stress on the glass. The blocks shall be of resilient, non-absorbent material.

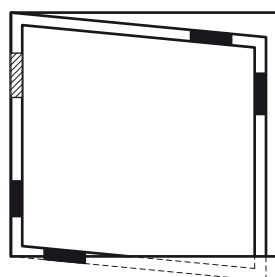
Location blocks are required to prevent the weight of the glass from causing the frame to become out of square.

NOTES:

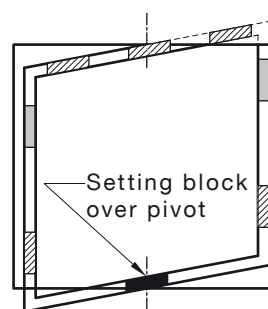
- 1 Location blocks are used between the edges of the unit and the frame to prevent movement of the unit within the frame by thermal expansion or when the window or door is opened or closed.
- 2 Extruded material with 55-65 Shore-A hardness is recommended.



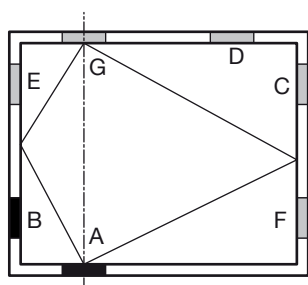
(a) Fixed light



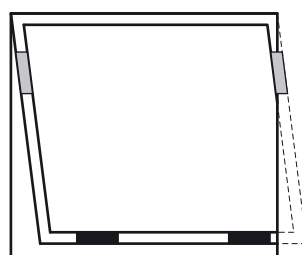
(b) Side hung, projected side hung or door



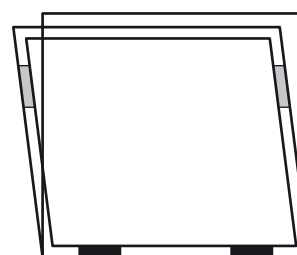
(c) Vertically pivoted hung centrally



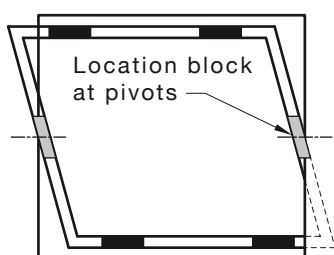
(d) Eccentrically vertically pivoted frame



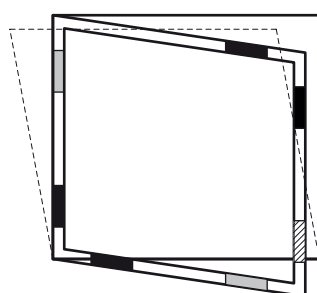
(e) Top hung or projected top hung



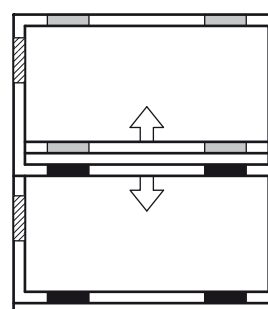
(f) Bottom hung



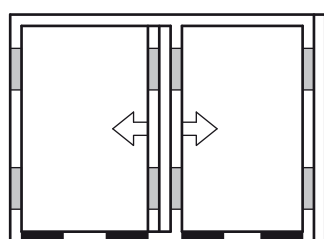
(g) Horizontally pivoted and opening



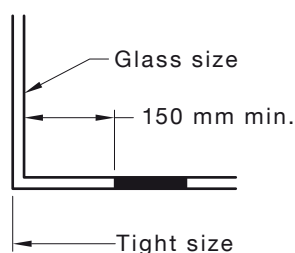
(h) Tilt and turn



(i) Vertically sliding



(j) Horizontal sliding (6 block to each pane)



(k) Minimum positions of blocks for all types of casements and sliding windows

LEGEND:

- Setting block
- Location block 1
- Location block 2

NOTES:

- 1 For designs where the actual positions are critical, block positions should be referred to the window manufacturer.
- 2 The design of sliding windows may affect the position of the blocks and the manufacturer should be consulted.

FIGURE 3.2 POSITIONS OF LOCATION BLOCKS

3.7 DISTANCE PIECES

Where required, distance pieces shall be—

- (a) a resilient, non-absorbent material;
- (b) 25 mm long and of a height to suit the depth of the rebate and the method of glazing; and
- (c) spaced opposite each other, approximately 50 mm from each corner and at intervals of not more than 300 mm apart.

To retain the unit firmly in the frame, the thickness of a distance piece shall be equal to the front and back clearance.

Distance pieces is required to prevent displacement of glazing compounds or sealant by external action, such as wind action.

NOTE: Extruded material with 55-65 Shore-A hardness is recommended.

3.8 PREPARATION OF REBATES AND GROOVES

Rebates, grooves and beads shall be cleaned, and shall be free from grease, moisture and other contaminants. All sealant surfaces shall be painted, primed or sealed in accordance with the specifications of the glazing material manufacturer.

3.9 GLAZING BEADS

Where used, glazing beads shall be capable of restraining the glass under all design actions.

3.10 STRUCTURAL SILICONE SEALANTS

Structural silicone shall be installed such that a full adhesive bond to the substrate is achieved. The substrate shall be cleaned or primed or both prior to structural silicone application. Applied structural silicones shall not be installed adjacent to other materials that may be chemically incompatible with the structural sealant.

NOTES:

- 1 The application of structural silicones adjacent to other materials may cause a loss of adhesion or adverse chemical changes within the structural silicone that could lead to a loss of strength in the structural silicone.
- 2 For guidance on installation of structural silicone, see Paragraph F2.5 of Appendix F.

3.11 SLOPED AND OVERHEAD GLAZING

When using insulating glass units in sloped or overhead glazing applications, Grade A safety glass shall be selected and installed in accordance with AS 1288 and AS/NZS 1170.0 or NZS 4223

NOTE: For guidance on installation of sloped and overhead glazing, see Paragraph E7 of Appendix E.

SECTION 4 MARKING

Insulating glass units shall be clearly marked.

Where practicable, the marking shall be permanent and located so as to be visible when the insulating glass unit is glazed in position.

Alternatively permanent marking shall be used which is visible on the edge of the IGU once the glazing bead is removed or the IGU removed from the opening.

As a minimum, marking shall include the following:

- (a) Manufacturer's or supplier's name or trademark, and unique manufacturing site identifier.
- (b) Reference to this Standard, i.e. Manufactured to AS/NZS 4666.
- (c) The date of manufacture as follows:
 - (i) For Australia, use month and year minimum.
 - (ii) For New Zealand, use year minimum.

NOTES:

- 1 An example of compliance marking by ABC company is as follows:

ABC Site 1	Manufactured To AS/NZS 4666	/12/2011
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- 2 Manufacturers making a statement of product compliance with this Standard on a product or on packaging, or promotional material related to that product, are advised to ensure that such compliance is capable of being verified.

SECTION 5 MANUFACTURING AND PERIODIC TESTING

5.1 SCOPE OF SECTION

This Section sets out testing and recording criteria for each component or assembly of components. Alternatively testing and recording criteria may be carried out in accordance with the procedures nominated in EN 1279. Compliance with this Section will be deemed to exist if it can be demonstrated by a manufacturer that the requirements of the procedures nominated in EN 1279-6 or in this Section have been met.

5.2 ATMOSPHERIC CONDITIONS

Barometric pressure, humidity and temperature readings shall be taken and recorded at the commencement of production and once every 4 h thereafter, until production ceases.

5.3 GLASS

5.3.1 Compliance with order

A permanent record shall exist in order to demonstrate a glass's substrate's date of receipt, and compliance with order specification, e.g. thickness, size, quality and quantity.

The acceptable thickness shall be deemed to exist when the thickness is within the limits given in Table 5.1 and shall be measured in accordance with Appendix A.

TABLE 5.1
GLASS—THICKNESS TOLERANCES—MONOLITHIC

Nominal thickness mm	Annealed float and toughened float mm	Patterned and toughened pattern mm	Laminated float mm	Laminated patterned mm	Wired glass mm
3	±0.2	2.5 to 3.5	N/A	N/A	N/A
4	±0.2	3.5 to 4.5	N/A	N/A	N/A
5	±0.2	4.5 to 5.5	4.6 to 5.4	N/A	N/A
6	±0.2	5.5 to 6.5	5.6 to 6.4	5.3 to 7.1	5.0 to 6.8
8	±0.3	N/A	7.6 to 8.4	7.4 to 8.7	N/A
10	±0.3	N/A	9.6 to 10.4	9.3 to 10.7	N/A
12	±0.3	N/A	11.6 to 12.4	N/A	N/A
15	±0.5	N/A	N/A	N/A	N/A
19	±0.7	N/A	N/A	N/A	N/A

NOTES:

- In instances where the glass thickness deviates from the nominal thickness, the tolerances associated with the nearest thickness will apply.
- The thickness ranges specified for laminated glass types excludes interlay material. Interlay thickness should be added to the specified range in order to reflect the overall thickness of laminated glass, i.e. allow tolerances of 0.03 mm per 0.38 mm of interlayer thickness. See the following example:

Thickness mm	Bottom tolerance mm	Top tolerance mm	Range mm
6.38	$5.6 + 0.35 = 5.95$	$6.4 + 0.41 = 6.81$	5.95 to 6.81
10.76	$9.6 + 0.70 = 10.3$	$10.4 + 0.82 = 11.22$	10.3 to 11.22

5.3.2 Traceability

Where appropriate, manufacturers shall establish and maintain a system that ensures glass, included into the insulating glass unit are traceable. The report shall be recorded and the records shall be maintained for an appropriate period.

5.3.3 Types of substrates

The types of glass shall be as follows:

- (a) Annealed glass.
- (b) Coated glass:
 - (i) Soft coating:
 - (A) *Orientation* Coating shall be installed to an internal surface (surface 2 or 3) as specified.
 - (B) *Edge deletion* Edge deletion shall be required, if the coating is susceptible to oxidation, e.g. silver based. The width of the edge deletion shall be greater than the combined depth of the spacer and sealant, but not by more than 2 mm.
 - (ii) Pyrolytic coating:
 - (A) *Orientation* The coating may be installed to any surface as specified.
 - (B) *Edge deletion* Edge deletion is not required unless specified.
- (c) Patterned glass:
 - (i) *Orientation* In the instances where full interface between the glass surface and sealant cannot be achieved, i.e. deep patterned glass, the textured face of the patterned glass shall be installed to an external face of an insulating glass unit.
 - (ii) *Direction* The direction of the patterned glass shall be specified.
- (d) Laminated glass:
 - (i) *Orientation and direction* Taking into consideration the requirements of glass types (a) to (c), orientation and direction shall be as specified.
 - (ii) *Edge alignment* Other than for heat treated laminated glass, the edges of all glass panes contained in a pane of laminated glass intended for use in an insulating glass unit, shall align to within 0.5 mm of each other. In the case of heat-treated laminated glass, the value of 1.5 mm shall apply.
 - (iii) *Interlayer protrusion* Interlayer shall not protrude more than 0.2 mm beyond the outer most glass edges of a panel of laminated glass.
- (e) Heat treated glass:

Taking into consideration the requirements of glass types (a) to (d), orientation and direction shall be as specified.

NOTE: In the case of more than one panel of toughened glass being used in insulating glass unit construction, common direction of toughened glass manufacture should be applied.
- (f) Wired glass.
- (g) Combination of glass types (a) to (e), e.g. patterned laminate, toughened patterned glass and the like.

All checks shall require an initial visual inspection and no record of the result need be kept. In the case of laminated glass, if edge misalignment or interlayer protrusion is evident, then the misalignment or interlayer protrusion shall be measured. In all cases, non-conforming glass shall be rectified or replaced.

5.3.4 Edge characteristics

Edge characteristics shall be as given in Table 5.2. Visual inspection shall be carried out once for every customer order or every half hour, whichever is the lesser. A failure shall require examination of a further three samples from the job lot and a second failure in all glass associated with the order requiring inspection, with the subsequent replacement of all faulty glass to follow. No records are required to be kept.