

Australian Standard<sup>®</sup>

# Skylights



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The following are represented on Committee BD-075:

- Australian Industry Group
  - Australian Window Association
  - CSIRO Manufacturing and Materials Technology
  - Master Builders Australia
  - National Association of Testing Authorities Australia (NATA)
  - Plastics and Chemicals Industry Association
  - Skylight Industry Association of Australia
  - University of Technology, Sydney
- 

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Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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Australian Standard<sup>®</sup>

## Skylights

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## PREFACE

This Standard was prepared by the Standards Australia Committee BD-075, Skylights, to supersede AS 4285—1995.

The Standard was proposed by the Skylight Industry Association to cover areas of product performance, safety, design, construction and maintenance. Installation requirements, test conditions and procedures have also been addressed. The Standard is aimed at factory-manufactured skylight assemblies and their components.

The objective of this Standard is to provide the manufacturers and users of skylights with specifications covering the construction and performance of such skylights for use in building applications.

The changes to previous edition of this Standard comprise the following:

- (a) Modification of ‘Scope and General’—
  - (i) clarifying scope, application and limitations;
  - (ii) requirements for new designs and innovation; and
  - (iii) new definitions.
- (b) Addressing new materials used in manufacturing skylights.
- (c) Addressing issues related to the construction of skylight assemblies—
  - (i) fabricated metal bases;
  - (ii) glazing;
  - (iii) ventilation; and
  - (iv) bushfire-prone area.
- (d) New section for ‘Cleaning and Maintenance’—
  - (i) cleaning and maintenance of base components;
  - (ii) cleaning and maintenance of mechanical components, timber and glass; and
  - (iii) cleaning and maintenance of polymer surface.
- (d) Inclusion of commentary to some clauses.
- (e) New ‘Informative’ appendix for—
  - (i) size of skylights; and
  - (ii) skylights shaft or lightwell.

This Standard incorporates commentary on some of the clauses. The commentary directly follows the relevant clause, is designated by ‘C’ preceding the clause number and is printed in italics in a box. The commentary is for information only and does not need to be followed for compliance with the Standard.

Notes to the text contain information and guidance. They are not an integral part of the Standard.

Illustrations in this Standard are purely diagrammatic and are intended to show functional requirements only, not methods of construction.

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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## STANDARDS AUSTRALIA

**Australian Standard  
Skylights**

## SECTION 1 SCOPE AND GENERAL

**1.1 SCOPE**

This Standard specifies requirements for the manufacture and testing of skylights comprising a factory-manufactured assembly to permit natural light transmission. The Standard includes requirements for materials, fastenings and hardware, weatherproofing, ventilation, safety labels, marking and maintenance for skylights complete and ready for installation in a roof opening. It is designed for use by manufacturers, suppliers, designers and consumers alike.

This Standard applies to factory-manufactured natural lighting systems installed into roofs including skylights (roof lights), roof windows and tubular skylights (tubular roof lights).

This Standard does not apply to complex overhead roof glazing systems, including barrel vault, atriums, conservatories and roof systems constructed from light-transmitting materials.

## NOTES:

- 1 Alternative methods for determining compliance with this Standard are given in Appendix B.
- 2 While information on the choice of a skylight for a particular application is outside the scope of this Standard, information is provided in the Commentary C3.2.2 that provides some guidance in this respect.

**1.2 NEW DESIGNS AND INNOVATIONS**

Any alternative materials, designs, methods of assembly, procedures, etc., that do not comply with specific requirements of this Standard, but that give equivalent results to those specified are not necessarily precluded, however, equivalent performance may need to be demonstrated. Where materials are substituted they shall not only satisfy the specified component and assembly performance requirements of this Standard but, where not specifically identified in Section 2 'Materials and Hardware', shall demonstrate equivalent or better performance in these areas.

**1.3 NORMATIVE REFERENCES**

The normative documents referenced in this Standard are listed in Appendix A.

NOTE: Documents referenced for informative purposes are listed in Appendix I.

**1.4 DEFINITIONS**

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

**1.4.1 Base assembly**

A skylight base assembly is a fabricated or moulded frame and is the means of securing a dome or glazed panel to a roof in a weathertight manner. It is normally made up of the soaker tray, side and bottom flashings, ventilation areas, dome trims and condensation lip or gutter.

#### 1.4.2 Condensation lip or gutter

Designed to collect and direct all condensate to the outside roofing.

#### 1.4.3 Diffuser

Translucent polymer or glass installed at ceiling level of a lightwell shaft to diffuse or redirect incoming light. Also used to control heat gains (ventilated skylights) or losses (non-ventilated skylights) and glare. Open cell diffusers are also used with ventilated skylights.

#### 1.4.4 Glazing

A flat or formed translucent or transparent polymer or glass of various shapes.

#### 1.4.5 Roof glazing systems

Overhead glazing systems typically integrated into the roof construction using aluminium section (glazing bars) and can be glazed in a variety of materials.

#### 1.4.6 Roof windows

Typically operable and typically with timber sash and frame and glazed in glass. The size of the roof window is referred to by the external frame size.

#### 1.4.7 Shaft or lightwell

Used to bring light through the roof structure and help control light distribution. Local solar geometry, surface reflectance (influenced by structural material and colour) and shape are basic considerations (see Appendix C for more information on Skylights shaft or lightwell).

#### 1.4.8 Skylights (also known as roof lights)

Typically glazed in polymer or glass with a metal or timber frame. Can either be vented or non-vented, fixed or operable in any shape. The size of the skylight is referred to by the throat size.

#### 1.4.9 Soaker tray

Designed to direct and shed water from the high side of the roof around the skylight.

#### 1.4.10 Specular and diffuse

For lightwell surfaces the following applies:

- (a) A specular surface is one where the angle of incidence equals the angle of reflection. The light ray strikes and leaves the surface at the same angle.
- (b) A semi-specular surface is one where the light striking the surface leaves the surface scattered but in the same forward direction.
- (c) A diffuse surface is one where the light striking the surface is scattered in all directions.

#### 1.4.11 Throat size

Throat size is the manufactured aggregate light-transmitting size exclusive of framing members. The opening size at the ceiling level is not to be used to define throat size.

#### 1.4.12 Tubular skylights (also known as tubular roof lights)

Typically glazed in polymer or glass with a metal or polymer base. The lightwell reflectivity is typically specular or semi-specular. Typically supplied as a complete system including diffuser assembly. The size of the tubular skylight is referred to by the throat size.

#### 1.4.13 Ventilation areas

Designed to offer ventilation to the interior of a building. These ventilation areas must be vermin proof.

## SECTION 2 MATERIALS AND HARDWARE

### 2.1 MATERIALS

#### 2.1.1 Aluminium

Aluminium shall comply with AS 1734 if coil sheet or flat plate sheet and AS 1866 if extruded.

#### 2.1.2 Copper

Copper shall comply with the appropriate requirements of AS 1566.

#### 2.1.3 Glass

Glass shall comply with AS 1288.

#### 2.1.4 Polymer

Polymer glazing materials shall meet the performance requirements of Clause 3.2.1.1.

All polymer used in the construction of the skylight assemblies and components that are exposed to sunlight shall be ultraviolet-stabilized.

#### 2.1.5 Stainless steel

Stainless steel shall comply with the appropriate requirements of AS 1444.

#### 2.1.6 Steel

The material shall be coated steel as follows:

- (a) Except where the requirements of Item (b) apply, the material shall comply with the requirements of AS 1397 for coating Class Z 450 or AZ 150.
- (b) Prepainted and organic film/metal laminate products shall comply with the appropriate requirements of AS/NZS 2728.

#### 2.1.7 Timber

##### 2.1.7.1 Durability

Timber for skylight assemblies shall be of species recognized for its durability in accordance with AS 1720.2 Class 1 or Class 2 or when used with an adequate protective coating in external joinery, provided that species which would be excluded by this requirement shall be accepted when such timber is treated against decay with a non-leachable preservative in accordance with AS 1604.1, AS 1604.3 and AS 1604.4.

##### NOTES:

- 1 Information on timber species suitable for exterior joinery and on preservative treatment may be obtained from the CSIRO (Division of Building, Constructions and Engineering), State Forest Authorities or Timber Industry Associations.
- 2 Sapwood susceptible to lygid borers shall be immunized against such attack in accordance with AS 1604. The method of detection of lygid-susceptible borers is given in AS 1604.

##### 2.1.7.2 Moisture content

The moisture content shall be no less than 6% and no more than 15% at the time of fabrication and delivery as complete assemblies. The moisture content of the timber shall be determined in accordance with AS 1080.1.

##### 2.1.7.3 Surface finish

All timber surfaces which will be visible in the finished assembled skylight shall be milled.

#### **2.1.7.4 Unplasticized PVC (uPVC)**

For the manufacture of skylight profiles, virgin material, reclaimed material and recyclable material is used. Unplasticized PVC materials with a defined formulation which are used for the manufacture of skylights shall comply to the Standards relevant to the country of origin.

## **2.2 FASTENINGS AND HARDWARE**

### **2.2.1 General**

Fastenings shall be durable, corrosion-resistant in accordance with AS 3566.1, and compatible with any other material with which they may be in contact or, if not compatible, shall be electrolytically insulated from such material. Such platings or coatings shall be sufficiently robust to remain substantially undamaged by the fixing process. Fastening devices and hardware shall be of sufficient strength and quality to perform their designated function.

### **2.2.2 Aluminium**

Aluminium fastenings shall comply with the following requirements, as appropriate:

- (a) Nails and hook bolts made from extruded aluminium: 6000 series aluminium alloy.
- (b) Fastenings such as clips, brackets and washers made from sheet aluminium: 3000 series or 5000 series aluminium alloy.

### **2.2.3 Copper and copper alloys**

The fastenings used to retain copper and copper alloy sheeting shall comply with AS 1566 or AS/NZS 1573, as appropriate.

### **2.2.4 Steel**

Steel fastenings shall comply with the following requirements, as appropriate:

- (a) Non-self-drilling screws, nails and bolts in accordance with AS 1214, AS 1789; or
- (b) Clips, brackets, straps and washers, where applicable, the provisions of Clause 2.1.6 shall apply.

### **2.2.5 Stainless steel**

Stainless steel shall comply with the composition requirements of AS 1444.

### **2.2.6 Self-drilling screws**

Self-drilling screws shall comply with AS 3566.1.

### **2.2.7 Steel nails**

Steel nails shall comply with AS 2334.

### **2.2.8 Fastener sealing washers**

Fastener sealing washers shall be prepared from weather-resistant rubbers which comply with ASTM D2000 Specification 3BA 606 A 14 B13, such as EPDM or neoprene chlorinated rubber. Fillers in the rubber shall be completely encapsulated, especially when conductive materials such as carbon are used. Linear electrical resistance between contact points 20 mm apart shall be greater than 1 MΩ.

NOTE: The use of inert or non-conductive fillers is preferred, as the risk of a conductive EPDM with a carbon-aluminium corrosion cell is eliminated.

### 2.3 PROTECTION AGAINST CORROSION

Skylight systems shall be designed so that direct contact between incompatible metals or alloys does not occur.

Where the use of incompatible materials is unavoidable, they shall be separated by use of an impervious non-conducting material. However, it is preferred that systems be designed so that direct contact between two or more incompatible materials or alloys does not occur.

#### NOTES:

- 1 Table 2.1 is given as a general guide to acceptable combinations of metals in the light of current knowledge, based on the premise that the area of cladding and accessories is relatively large in comparison to that of the fastener material.
- 2 If the atmosphere inside a building with metal cladding contains corrosive gases or vapours, some roof materials may require extra protection against the corrosive agents, especially if the cladding is not lined. Such extra protection should also apply to the fastenings and accessories.

The resistance of external cladding of certain metals to corrosive agents is partly dependent on the beneficial washing action of rain and on freedom from ponding. Increased corrosion may result in areas protected from these effects.

The life of most metals in severe marine atmospheres and industrial areas with atmospheres contaminated by acid-bearing agents can be extended by the use of special painting procedures (see AS 2312).

- 3 As a rule of thumb if the wetted area of the corroding metal is 10 times the wetted area of the noble metal. Then the galvanic effects are not serious, although the larger the ratio the less the effect. This particularly applies where high strength fasteners of more noble metal are used.