



# **Guide to Standards - Building and Construction**

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**Your snapshot of Australian Standards®  
and Certification**

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## Introduction

This guide provides information on Standards, Certification schemes and other industry specific information that may be of interest to anyone working within the building industry, including information relevant to manufacturers, importers and suppliers of building products.

You can find Standards relevant to the building and construction industry via the SAI Global [InfoStore](#) Subject Area [Construction materials and building](#). Here, the Preface, Table of Contents, Foreword and Scope of most Australian Standards® are available.

**Disclaimer:** The information contained in these pages is provided by way of indicative guidance only and SAI Global Limited does not represent that it is accurate or complete or suitable for any particular specific purposes. The onus remains with users to satisfy themselves of their requirements and needs for their own particular circumstances.



An invaluable resource is **HB 50-2004, Glossary of building terms** which provides an alphabetical list of terms as well as over 80 illustrations of general and specific items used in the building and construction industry. Also, a number of the terms described in **HB 50-2004** are included in different types of Australian (AS) and Australian/New Zealand (AS/NZS) Standards listed in this guide.

## Building Regulations

The current edition of the Building Code of Australia (BCA) references approximately 200 Australian and International Standards.

On 1<sup>st</sup> May each year, the Australian Building Code Board (ABCB) releases the Building Code of Australia (BCA). In 2011, for the first time the ABCB will be releasing the National Construction Code (NCC) which is made up of the BCA (Volumes 1 and 2) and the Plumbing Code of Australia (PCA) forming Volume 3 of the NCC.

**Standards referenced in the NCC, BCA and PCA fall under the deemed-to-satisfy provisions and compliance with these Standards represents the most common method of satisfying the performance requirements which covers both Commercial and Residential sectors.**

To support each release from the ABCB, there are 3 services available from SAI Global:

- **NCC + Standards**
- **BCA + Standards**
- **PCA + Standards**

For information on Building and Construction industry regulators, refer to the section [Building regulators](#) of this guide.

## Renovating Homes and New Homes

[AS 4226-2008, Guidelines for safe housing design](#) is an excellent source of information for renovators, designers, and purchasers of new homes. It provides guidelines for the design of safe dwellings including factors that should be taken into account to reduce the likelihood of an injurious accident occurring in association with any building element, or fitting, either alone or in association with other elements. This Standard covers the following information:

- **Access and egress** – Requirements for stairs, railings and balustrades used in residential buildings. The information in this Standard should be read together with the details that are included in the BCA.
- **Floor planning** – Recommended layouts for doorways and furniture located in residential dwellings.
- **Kitchen layouts** – Diagrams providing information on layouts for different types of kitchens. Information on location requirements for kitchen units is included in **AS/NZS 4386.2:1996, Domestic kitchen assemblies – Installation** and **AS/NZS 5601 SET:2010, Gas installations Set**.
- **Hazards for children** – A diagram illustrating child-resistant catches for windows and doors.

## Building Contracts

Australian building contracts are covered by the information included in:

- **AS 2124, General conditions of contract - Annexures Series**
- **AS 4000, General conditions of contract Series**
- **AS 4300, General conditions of contract for design and construct Series**
- **AS 4902, General conditions of contract for design and construct Series**

The Australian Standard® contract for swimming pools and spas is **AS 2160.1-1998, Contract for the supply and construction of a swimming pool or spa – Concrete swimming pool or spa**.

Information on our range of options covering these areas is available from [www.saiglobal.com/Contracts](http://www.saiglobal.com/Contracts). In addition, if you require information on contractual terms as set out in a recognized Australian Standard® and only need to make minimal amendments in the annexures, you can refer to the **Contracts Catalog**.



Some of these **Australian Standards® Contracts** are available in fully editable format. Please contact Copyright Services for more information on Licensing.  
Phone: 131 242 and press 2  
Email: [copyright@saiglobal.com](mailto:copyright@saiglobal.com)

## Building Inspections

Information on pre-purchase inspections for residential buildings and timber pest inspections is covered in the **AS 4349, Inspection of buildings Series**.

**AS 4349.0-2007, Inspection of buildings – General requirements** provides information on what should be included in inspection agreements and building inspection reports.

**AS 4349.1-2007, Inspection of buildings – Pre-purchase building inspections – General requirements** indicates how inspection agreements and inspection reports should be prepared and completed by persons and organizations responsible for undertaking pre-purchase building inspections for different types of residential buildings.

**AS 4349.3-2010, Inspection of buildings – Timber pest inspections** provides information on methods used to undertake non-invasive timber pest inspections for different classes of buildings.

## Building Tolerances

Information on tolerances for building products manufactured from different types of materials is included in **HB 31-2002, Handbook of building construction tolerances – Extracts from building products and structural Standards**. This handbook includes extracts from information in **AS 3600-2001, Concrete structures**. Tolerances for concrete structures are also included in this Standard.

**HB 31-2002** does not include information on recommended tolerances for plastering and floor tiling. However this information is included in **HB 161-2005, Guide to plastering**. Tolerances for tiling floors with ceramic tiles are included in **AS 3958.1-2007, Ceramic tiles – Guide to the installation of ceramic tiles**.

In 2007 the Victorian Building Commission produced the publication '[Guide to Standards and Tolerances](#)' which sets out some of the regulated Standards and reasonable position on Standards that can be applied to non-regulated aspects of domestic building construction.

## Energy Efficiency Building Products

Energy efficiency requirements for different classes of buildings are included in the BCA and State and Territory legislation adopted under the BCA.

For Standards on sustainability and energy efficiency requirements for buildings and building materials, technical committees managed by the International Organization for Standardization (ISO) and the European Committee for Standardization (EN) have produced a number of Standards, technical reports and drafts.

A list of publications on this topic include:

- **ISO 15392:2008, Sustainability in building construction – General principles**
- **ISO 21930:2007, Sustainability in building construction – Environmental declaration of building products**
- **ISO 21931-1:2010, Sustainability in building construction – Framework for methods of assessment of the environmental performance of construction works – Part 1: Buildings**
- **ISO/TS 21929-1:2006, Sustainability in building construction – Sustainability indicators – Part 1: Framework for development of indicators for buildings**
- **I.S. EN 15643-1:2010, Sustainability of construction works – Sustainability assessment of buildings – Part 1: General framework**
- **PREN 15978:2009, Sustainability Of Construction Works – Assessment Of Environmental Performance Of Buildings – Calculation Method**
- **SR CEN TR 15941:2010, Sustainability Of Construction Works – Environmental Product Declarations – Methodology for Selection and use of Generic Data**

All European draft Standards are designated with a PREN prefix. Technical reports are provided with a SR CEN TR prefix.

## Solar Panels

### Connected to Hot Water Systems and Heat Pumps

Manufacturers of solar panels connected to hot water systems and heat pumps can apply for certificates under the Australian Government's Renewable Energy Certificates Schemes (RECS). In

order for certificates to be issued, manufacturers are required to certify their solar panels to the requirements covered in:

- **AS/NZS 2172:2007, Solar and heat pump water heaters – Design and construction**
- **AS/NZS 4234:2008, Heated water systems – Calculation of energy consumption**

Solar water heaters connected to water supplies are also required to be certified to **AS 3498-2009, Authorization requirements for plumbing products – Water heaters and hot-water storage tanks**.



The SAI Global [StandardsMark](#) and [WaterMark](#) schemes can be used to certify manufacturers of these types of solar panels to relevant Standards. For further information on the above schemes you can refer to the [SAI Global Product Certification Schemes](#) section of this guide.

Inverters used with solar panels should be designed and manufactured to the requirements specified in **AS 4777.2-2005, Grid connection of energy systems via inverters – Inverter requirements**. Grid protection devices used with inverters should be tested to the requirements defined in **AS 4777.3-2005, Grid connection of energy systems via inverters - Grid connection requirements**.

Installation Standard for these types of inverters are included in **AS 4777.1-2005, Grid connection of energy systems via inverters – Installation requirements** and **AS/NZS 3000:2007, Electrical installations (known as the Australian/New Zealand Wiring Rules)**.

All types of solar panels (also known as photovoltaic arrays – PV arrays) should be installed by following the details outlined in **AS/NZS 5033:2005, Installation of photovoltaic arrays (PV) arrays**.

### Stand-Alone Products (Not Connected to Hot Water Systems and Heat Pumps)

Standards Australia has not established any manufacturing Standards for solar panels that are not connected to hot water and heat pumping systems. However, there are number of **IEC Standards** and **I.S. EN Standards** covering Photovoltaic systems and devices for these types of solar panels.

## Lighting Products

Energy efficiency levels for interior lighting can be accessed by following the information that is included in **AS/NZS 1680.1:2006, Interior and workplace lighting – General principles and recommendations**. Information on characteristics for different types of lighting systems is also included in this Standard.

### LED Lights

Standards Australia has not established any specific manufacturing Standards for LED lights. However, modules and units supplied with all types of LED lights used indoors and outdoors should be tested to meet **IEC 62031 Ed 1.0, LED modules for general lighting – Safety specifications** or **I.S. EN 62031:2008, Led Modules for General Lighting - Safety Specifications**.

### Fluorescent Lamps

Australian and New Zealand energy efficiency Standards for fluorescent lamps are covered by the **AS/NZS 4782, Double-capped fluorescent lamps Series**.

### Fluorescent Lamp Ballasts

Energy efficiency Standards for fluorescent lamp ballasts are included in the **AS/NZS 4783, Performance of electrical lighting equipment Series**.

### Self-ballasted Lamps

Energy efficiency levels for self-ballasted lamps are determined by completing tests to the **AS/NZS 4847, Selfballasted lamps for general lighting services Series**.

### Transformers and Converters for Extra Low Voltage (ELV) Lamps

Australian and New Zealand energy efficiency tests for transformers and converters used with Australian Extra Low Voltage energy lamps are included in the **AS/NZS 4879, Performance of transformers and electronic step-down convertors for ELV lamps Series**.

### Incandescent Lamps

Australian and New Zealand energy efficiency tests for incandescent (tungsten filament and tungsten halogen) lamps are included in the **AS/NZS 4934, Incandescent lamps for general lighting services Series**.

## Water Heaters

The [Australian Government's Ministerial Council on Energy](#) (part of the Australian Government's Department of Resources, Energy and Tourism) along with all State Governments have prepared a [National Hot Water Strategic Framework](#). One of the key recommendations of the framework is to phase-out the use of conventional electric resistance water heaters.



Water heaters should be certified under the [WaterMark](#) scheme. The [WaterMark](#) certification Standard for these types of heaters is **AS 3498-2009, Authorization requirements for plumbing products – Water heaters and hot-water storage tanks**. For further information on the above schemes you can refer to the [SAI Global Product Certification Schemes](#) section of this guide.

The Australian and New Zealand energy efficiency Standard for different types of solar, gas and electric water heaters is **AS/NZS 4234:2008, Heated water systems – Calculation of energy consumption**.

## Thermal Insulating Materials

The manufacturing Standard for thermal insulating materials used to insulate walls and ceilings in domestic buildings is **AS/NZS 4859.1-2009, Materials for the thermal insulation of buildings – General criteria and technical provisions**. Early fire hazard tests for these types of materials are included in **AS/NZS 1530.3:1999, Methods for fire tests on building materials, components and structures - Simultaneous determination of ignitability, flame propagation, heat release and smoke release**.

These types of insulating materials are installed by following the information that is included in **AS 3999-1992, Thermal insulation of dwellings – Bulk insulation – Installation requirements**.

Information covering recommended clearance distances between insulating materials and lighting equipment is included in **AS/NZS 3000:2007, Electrical installations (known as the Australian/New Zealand Wiring Rules)**.

## Electrical Wiring

Low voltage electrical wiring used in buildings should conform to the requirements outlined in **AS/NZS 3000:2007, Electrical installations (known as the Australian/New Zealand Wiring Rules)**.



The Australian and New Zealand electrical wiring Standard for work undertaken on construction sites is **AS/NZS 3012:2010, Electrical installations – Construction and demolition sites**.

Low voltage cables should be selected by following the methods outlined in **AS/NZS 3008.1.1:2009, Electrical installations - Selection of cables - Cables for alternating voltages up to and including 0.6/1 kV - Typical Australian installation conditions**.

Electrical installations can be inspected and tested by following the methods outlined in **AS/NZS 3017:2007, Electrical installations – Verification guidelines**. Electrical wiring can be periodically inspected by following the recommendations described in **AS/NZS 3019:2007, Electrical installations – Periodic verification**.

Portable types of electrical equipment should be tested and tagged by following the information that is included in **AS/NZS 3760:2010, In-service inspection and testing of electrical equipment**. Fixed types of electrical equipment can be inspected by following the information that is included in **AS/NZS 3017:2007**. Intervals that should be followed when inspected and tagging this type of equipment is included in **AS/NZS 3019:2007**.

## Plumbing and Gas

Plumbers and gas fitters should purchase the **PLUMBING AND GAS SET-2005, Plumbing and Gas Installations Set on CD**. Purchasers of this product will receive the Standards listed below:

- **AS/NZS 3500.0:2003, Plumbing and drainage – Glossary of terms**
- **AS/NZS 3500.1:2003, Plumbing and drainage – Water services**
- **AS/NZS 3500.2:2003, Plumbing and drainage – Sanitary plumbing and drainage**
- **AS/NZS 3500.3:2003, Plumbing and drainage – Stormwater drainage**
- **AS/NZS 3500.4:2003, Plumbing and drainage – Heated water services**
- **AS/NZS 5601 SET:2010, Gas Installations Set**

The plumbing Standards that are included in the **AS/NZS 3500 Series** are regulated by the **Plumbing Code of Australia 2004** as well as different types of State acts and regulations. These Standards and the **Plumbing Code of Australia (PCA) 2004** are also available in the **PCA 3500 (Set)-2004, PCA with Plumbing & Drainage Set**. The SAI Global **PCA + Referenced Standards** service offers online access to the Plumbing Code of Australia and all Australian Standards® referenced within it.

More information on different types of water systems are outlined in the following paragraphs. It is important to note that these types of water systems should be installed by following the details outlined in **AS/NZS 3500.1:2003, AS/NZS 3500.2:2003, AS/NZS 3500.3:2003** and the **Plumbing Code of Australia 2004**.

## Greywater Systems

The Australian manufacturing Standard for greywater diversion devices is **ATS 5200.460-2005, Technical Specification for plumbing and drainage products – Grey water diversion device (GWDD)**. The Australian technical specification is used to certify manufacturers of these types of devices under the [WaterMark](#) certification scheme.

**HB 326-2008, Urban Greywater Installation Handbook for Single Households** provides detailed information on requirements for different types of greywater diversion (GSD) devices and greywater treatment systems (GTS).

A useful flowchart providing information on recommended procedures for approving, installing and maintaining treatment systems is included in **HB 326-2008**. Diagrams providing information on recommended methods for installing untreated systems using gravity feeds are also included in **HB 326-2008**.

Manufacturers of waste water treatment products can certify their products by obtaining assessment under the SAI Global [StandardsMark](#) and [WaterMark](#) certification schemes.



For further information on the above schemes refer to the [SAI Global Product Certification Schemes](#) section of this guide or you can contact the [Product Certification Services](#) Group:  
Phone: +61 2 8206 6322  
Email: [product@saiglobal.com](mailto:product@saiglobal.com)

## Rainwater Tanks

[HB 230-2008, Rainwater Tank Design and Installation Handbook](#) provides essential information required by plumbers to approve, install and maintain above-ground, underground and underfloor water tanks located in single households, multi-unit dwellings, community and commercial buildings. It also provides detailed information on recommended practises that should be followed to install tanks and technical details and specifications for pumps used with rainwater tanks.

As well as general applications for rainwater tanks, this publication also provides information on water tanks that can be used for garden irrigation, pools and spas, fire fighting and cooling towers.



It is important to note that [HB 326-2008, Urban Greywater Installation Handbook for Single Households](#) and [HB 230-2008, Rainwater Tank Design and Installation Handbook](#) are also available as a Set; [Rainwater and Greywater Set – 2009](#).

Manufacturers of rainwater tanks should follow the information outlined in:

- Rotationally moulded plastic rainwater tanks  
**AS/NZS 4766:2006, Polyethylene storage tanks for water and chemicals**
- Metal rainwater tanks  
**AS/NZS 2179.1:1994, Specifications for rainwater goods, accessories and fasteners – Metal shape or sheet rainwater goods, and metal accessories and fasteners**
- Concrete tanks  
**AS 3735-2001, Concrete structures retaining liquids**

## Septic Tanks

**AS/NZS 1546.1:2008, On-site domestic wastewater treatment units - Septic tanks** specifies performance requirements and performance criteria for the manufacture of septic tanks and the technical means of compliance. It is for septic tanks using treated blackwater and greywater systems and holding tanks including collection wells and pump wells.

Septic tanks that have been manufactured and tested to this Standard should be installed by following the methods described in **AS/NZS 3500.2:2003, Plumbing and drainage – Sanitary plumbing and drainage**.

The on-site management Standard for septic tanks using primary, secondary and other types of land application systems is **AS/NZS 1547:2000, On-site domestic wastewater management**. This Standard covers:

- Performance requirements for on-site wastewater management systems
- Management, operation and maintaining requirements for on-site wastewater management systems

- Methods used to demonstrate compliance with performance requirements for on-site wastewater management systems

## Aerated Wastewater Treatment Systems

Manufacturers of aerated wastewater treatment systems should follow the requirements in **AS/NZS 1546.3:2008, On-site domestic wastewater treatment units – Aerated wastewater treatment systems**. Septic tanks used to contain aerated wastewater should be manufactured to meet **AS/NZS 1546.1:2008**.

Aerated wastewater treatment systems should be installed, operated and maintained by following the details prescribed in **AS/NZS 1547:2000, On-site domestic wastewater management**.

## Applying Building Products

### Waterproofing

#### Internal Areas of Buildings

Information on processes used to design and install wet area membranes and flashings used in internal areas of buildings (such as bathrooms, kitchens and laundries) for residential buildings is included in **AS 3740-2010, Waterproofing of domestic wet areas**. Waterproofing membranes used for these types of applications should be manufactured and tested to **AS/NZS 4858:2004, Wet area membranes**.

Information on methods used to waterproof internal areas of residential buildings is also included in the BCA. The SAI Global **NCC + Referenced Standards** service offers online access to the National Construction Code which includes the current Building Code of Australia and Plumbing Code of Australia and all Australian Standards® referenced within it.

#### Exterior Areas of Buildings

Waterproofing membranes used for exterior applications (such as decks and roofs) should be designed and installed by following the principles outlined in **AS 4654.2-2009, Waterproofing membrane systems for exterior use – Above ground level – Design and installation**.

The manufacturing Standard for membranes used to waterproof exterior areas of buildings is **AS 4654.1-2009, Waterproofing membrane systems for exterior use – Above ground level – Materials**.

### Plastering

Drywall plastering should be completed by following the information included in **AS/NZS 2589:2007, Gypsum lining – Application and finishing** and **AS/NZS 2588:1998, Gypsum plasterboard**.

Detailed information on different types of plastering systems is included in **HB 161-2005, Guide to plastering**. This Handbook also includes information on recommended mixing ratios for rendered surfaces.

## Building Practises

### Scaffolding

Information on design, manufacturing requirements and test methods for different types of scaffolding is included in **AS/NZS 1576.1:2010, Scaffolding – General requirements**. Suspended scaffolding systems should be tested to meet the requirements outlined in **AS 1576.4-1991, Scaffolding – Suspended scaffolding**.



Please see the preface to **AS/NZS 1576.1:2010** for a warning statement concerning the use of scaffolding systems that do not meet the performance requirements of **AS/NZS 1576.1:2010**.

Scaffolding can be erected and dismantled by following the recommendations described in **AS/NZS 4576:1995, Guidelines for scaffolding**.

Couplers and tubes used with scaffolding should be manufactured and tested to:

- **AS/NZS 1576.2:2009, Scaffolding – Couplers and accessories**
- **AS/NZS 1576.3:1995, Scaffolding – Prefabricated and tube-and-coupler scaffolding**

**AS 6001-1999, Working platforms for housing construction** provides information on methods for constructing working platforms from scaffolding equipment, building timber and other equipment typically located on building sites.

## Temporary Edge Protection Systems

The Standards listed in this section only provide information on types of temporary protection systems for those who work on roofs slopes no greater than 35° on residential and commercial buildings.

**AS/NZS 4994.1:2009, Temporary edge protection – General requirements** sets out requirements for the design, manufacture and testing of equipment that is intended to provide protection at the roof edge to workers installing, altering, repairing or removing cladding on housing and residential buildings having roof slopes of not more than 35° to the horizontal.

Temporary roof edge protection systems can be installed and dismantled by following the methods outlined in **AS/NZS 4994.2:2009, Temporary edge protection – Roof edge protection – Installation and dismantling**.

The objective of **AS/NZS 4994.3:2010, Temporary edge protection – Installation and dismantling other than roof edges** is to improve the safety of people performing any work near openings in floors, near the edges, or other elevated level working surfaces not being roofs of residential or commercial buildings.



**Please note:** these Standards are not designed to replace scaffolding or fall-arrest systems that may be used for people who plan on working at heights. For more information on Scaffolding Standards, see the [Scaffolding](#) section of this document.

## Building Design Standards

### Limit State Design Standards and Loads Imposed On Structures

Australian and New Zealand building design Standards are based on limit state design engineering methods. Definitions for this term are included in **AS ISO 8930-2005, General principles on reliability of structures – List of equivalent terms**.

The structural engineering Standards referenced in the BCA are all based on limit state design engineering methods. Detailed information on concepts concerning limit state engineering is covered in:

- **AS/NZS 1170.0:2002, Structural design actions – General principles**



- **AS/NZS 1170.1:2002, Structural design actions – Permanent, imposed and other actions**
- **AS/NZS 1170.2:2011, Structural design actions – Wind actions**
- **AS/NZS 1170.3:2003, Structural design actions – Snow and ice actions**
- **AS 1170.4-2007, Structural design actions – Earthquake actions in Australia**
- **AS 4055-2006, Wind loads for housing**
- **AS 5104-2005, General principles on the reliability of structures**
- **AS ISO 13822-2005, Basis for design of structures – Assessment of existing structures**
- **ISO 13823:2008, General principles on the design of structures for durability**
- **ISO 15928-1:2003, Houses – Description of performance – Part 1: Structural safety**
- **ISO 15928-2:2005, Houses – Description of performance – Part 2: Structural serviceability**
- **ISO 15928-3:2009, Houses – Description of performance – Part 3: Structural suitability**

## Steel Structures

**AS 4100-1998, Steel structures** defines minimum requirements for the design, fabrication, erection and modification of steelwork in structures in accordance with the limit state design method. This Standard covers engineering applications for buildings, structures, cranes, roadways and pedestrian bridges constructed of steels. The commentary to this Standard is **AS 4100 Supp 1-1999**.

Cold-formed steels used for light engineering purposes can be used by the methods described in **AS/NZS 4600:2005, Cold-formed steel structures**. This Standard can also be used to design requirements for structures manufactured from steel pipes. The commentary to this Standard is **AS/NZS 4600 Supp 1:1998**.

There may be situations where persons are required to assess structures that were designed by using allowable stress (also known as working stress design methods). Engineering Standards using these methods are:

- **AS 3990(Int)-1991, Steelwork for engineering applications**
- **AS 4100-1990, Steel structures**
- **AS 3990-1993, Mechanical equipment – Steelwork**. This Standard is referenced in the conveyor design code; **AS 1755-2000, Conveyors – Safety requirements**.

## Concrete Design

Information on design requirements for the design and construction of concrete buildings, or members containing reinforcing steels or tendons are included in **AS 3600-2009, Concrete structures**.

**AS 3600-2009** also provides some general information on design requirements for pedestals and footings that do not contain reinforcing steels or tendons. Footings supplied with reinforcing steels should be designed by meeting the requirements described in **AS 2870-2011, Residential slabs and footings**.

The handbooks listed below provide commentaries and interpretations to the 2001 edition of **AS 3600-2009**:

- **HB 64-2002, Guide to concrete construction**
- **HB 71-2002, Reinforced concrete design in accordance with AS 3600-2001**

## Masonry

**AS 3700-2001, Masonry structures** is used to design structures that are manufactured from mortared joints and it covers:

- Structural design requirements for unreinforced masonry.
- Design requirements for reinforced masonry structures.
- Information on design requirements for prestressed masonry.
- Durability levels for masonry structures - including a list of durability requirements for mortar used with masonry. Durability levels for mortar can be assessed by following the tests outlined in **AS/NZS 4456.10:2003, Masonry units and segmental pavers and flags – Methods of test – Determining resistance to salt attack**.
- Exposure levels for different types of environments that can affect the durability and performance of masonry structures.
- Fire resistant tests for masonry units should be tested to **AS 1530.4-2005, Methods for fire tests on building materials, components and structures – Fire-resistance test of elements of construction**.

The commentary to this Standard is **AS 3700 Supp 1-2004, Masonry structures – Commentary (Supplement to AS 3700-2001)**. Both these Standards are available as **AS 3700 Set-2007, Masonry structures Set**. Earth-retaining structures that are not constructed from mortared joints should be designed to the requirements outlined in **AS 4678-2002, Earth-retaining structures**.

Masonry structures used with residential buildings and small non-habitable buildings (e.g. garages) may be designed by following the methods outlined in **AS 4773.1-2010, Masonry in small buildings – Design**. Designers of these types of structures also have the option of following the structural design requirements that are included in **AS 3700-2001**.

**AS 3700-2001** and **AS 4773.1-2010** are based on limit state engineering design methods. Masonry structures designed to either of these Standards will conform to the loads covered in the **AS/NZS 1170, Structural design actions Series**. Wind loads for masonry structures used with residential buildings can also be calculated by following the methods outlined in **AS 4055-2006, Wind loads for housing**.

## Glass

Buildings using safety glass should be designed to meet the requirements in **AS 1288-2006, Glass in buildings – Section and installation**. The commentary to this Standard is **HB 125-2007, The glass and glazing handbook (including guide to AS 1288, Glass in buildings – Selection and installation)**.

Tables providing information on thickness levels for glass calculated by using limit state design methods are included in **AS 1288 Supp 1-2006**. The information in this Standard is of particular use to those who require information on thickness details for glass used on different types of balustrades.

These Standards are available in the following sets:

- **AS 1288 Plus CD Set-2006**
- **AS 1288.Set-2006**

## Residential Slabs and Footings

Footings used with single dwellings and town-houses should be designed to the requirements defined in **AS 2870-2011, Residential slabs and footings**. This Standard provides details for the following types of footings:

- Pad footings
- Rafts
- Waffle slabs
- Strip footings
- Stiffened slabs
- Pier on Slab and Pier on Beam footings

## Timber Structures and Timber Frames

Information covering design, installation, fixing and erection requirements for timber frames used for structural applications in single and two-storey residential buildings is included in the **AS 1684 Series**:

- **AS 1684.1-1999, Residential timber-framed construction – Design criteria** which sets out the design methods used in preparation of span tables, uplift forces and racking pressures contained within the other parts in the **AS 1684 Series**.
- **AS 1684.2-2010, Residential timber-framed construction – Non-cyclonic areas** includes information on wind speeds for all non-cyclonic areas (N1, N2, N3 and N4).
- **AS 1684.3-2010, Residential timber-framed construction – Cyclonic areas** includes information on wind speeds for cyclonic areas (C1, C2 and C3).
- **AS 1684.4-2010, Residential timber-framed construction – Simplified – Non-cyclonic areas** is a simplified version of **AS 1684.2-2010** and covers framing requirements for basic non-cyclonic wind speed categories (N1 and N2).

The spans listed in **AS 1684.2 Supp Series** and **AS 1684.3 C Supp Series** are linked to wind speeds and grades for visually (F) and mechanically (MGP) graded timbers. Timber frames should be constructed on slabs and footings that have been designed to **AS 2870-2011, Residential slabs and footings**.

Information covering design, installation, fixing and erection requirements for timber frames used for all other structural applications is included in the **AS 1720, Timber structures Series**:

- **AS 1720.1-2010, Timber structures – Design methods** sets out limit state design engineering and design methods for the structural use of different types of timbers.
- **AS/NZS 1170.2:2011, Structural design actions – Wind actions** includes information on design and calculations for wind speeds for timber-framed buildings.
- **AS 1720.4-2006, Timber structures - Fire resistance for structural adequacy of timber members** provides a method for determining the fire resistance for structural adequacy of various timber structures.

Wind speeds for timber framed buildings can also be designed and calculated by following the methods described in **AS 4055-2006, Wind loads for housing**.

Timber trusses should be installed by following the methods outlined in **AS 4440-2004, Installation of nailplated timber trusses**.

## Composite Structures

Beams manufactured from steel and concrete can be manufactured and designed by following the requirements outlined in **AS 2327.1-2003, Composite structures – Simply supported beams**.

## Piling Code

**AS 2159-2009, Piling - Design and installation** defines the minimum requirements for the design and construction of piled footings for civil engineering and building structures on land or immediate offshore locations. Submerged piles should follow the information included in **AS 4997-2005, Design for the design of maritime structures**.

## Buried Corrugated Metal Structures (Pipes)

Buried pipes to be used as culverts using sinusoidal profile strips can be designed and manufactured by following the information included in **AS/NZS 2041.4-2010, Buried corrugated metal structures – Helically formed sinusoidal pipes**. Bolted plates used to produce buried corrugated structures that can be used as culverts should be designed and manufactured by following the information that is included in **AS/NZS 2041.6:2010, Buried corrugated metal structures – Bolted plate structures**.

Information on installation requirements for buried corrugated metal structures is included in **AS/NZS 2041.2:2011, Buried corrugated metal structures – Installation**.

## Earth-Retaining Structures

Earth-retaining structures (designed to retain soil, rock and other types of similar materials) that are not constructed from mortared joints should be designed to the requirements outlined in **AS 4678-2002, Earth-retaining structures**. Construction tolerances for these structures are also included in this Standard.

Manufacturing requirements for masonry products used with earth-retaining structures are included in **AS/NZS 4455.3:2008, Masonry units, pavers, flags and segmental retaining wall units - Segmental retaining wall units**.

## Long Span Structures

### Roads

Persons responsible for designing roads and similar types of structures may be interested in the information included in:

- **AS 1160-1996, Bituminous emulsions for the construction and maintenance of pavements**
- **AS 1348-2002, Glossary of terms – Roads and traffic engineering**
- **AS 2008-1997, Residual bitumen for pavements**
- **AS/NZS 2041.2:2011, Buried corrugated metal structures – Installation**
- **AS/NZS 2041.4-2010, Buried corrugated metal structures – Helically formed sinusoidal pipes**
- **AS/NZS 2041.6:2010, Buried corrugated metal structures - Bolted plate structures**
- **AS 3703.1-1989, Long-span corrugated steel structures – Materials and manufacture**
- **AS/NZS 3845:1999, Road safety barrier systems**
- **AS 3996-2006, Access covers and grates**
- **AS 4100-1998, Steel structures**

### Bridges

Information on engineering and design requirements for bridges is included in the **AS 5100, Bridge design Series**. Information on structural design requirements for bridges manufactured from different grades of steel is included in **AS 4100-1998**.



## Building Products

### Timbers

There are a number of Australian Standards® for [timber structures](#), [sawn timbers](#) and [wood-based panels](#). Typically, these types of engineered timber products do not need to be treated with timber preservatives. Manufacturing and test methods for these types of timber products are included in the **AS/NZS 4063, Characterization of structural timber Series**. Framing requirements for these types of timbers are also included in **AS 1684.2-2010, Residential timber-framed construction – Non-cyclonic areas**, **AS 1684.3-2010, Residential timber-framed construction – Cyclonic areas** and **AS 1684.4-2010, Residential timber-framed construction – Simplified – Non-cyclonic areas**. If you require information on timber flooring, refer to the [Building Products - Flooring](#) section of this guide.

Timbers used in Australia should be tested to the **AS/NZS 1080, Timber - Methods of test Series**. Manufacturing Standards for different types of timbers consist of specific moisture content levels for timbers. Moisture levels for timbers are determined by following the methods outlined in **AS/NZS 1080.1:1997, Timbers – Methods of test – Moisture content**.

Preservative treatment tests for sawn and round timbers are included in the **AS 1604, Specification for preservative treatment Series**. Natural durability levels for timbers can be determined by following the methods described in **AS 5604-2005, Natural durability ratings**.

Durability details for timbers used for above-ground and in-ground situations are included in **AS 1684.2-2010** and **AS 1684.3-2010**. Durability levels for timbers are expressed in terms H1-H6 ratings. A table listing natural durability levels for different types of timber species used for framing is also included in these Standards.

### Timber Structures (Timber Framing products)

Information covering design, installation, fixing and erection requirements for timbers used for structural applications in residential buildings can be found in the [Building Design - Timber Structures and Timber Frames](#) section of this guide.

### Conventional Timbers Requiring Preservative Treatment

Sawn and round timbers used for structural applications should be either visually (F Grades) or mechanically (MGP) graded timbers. Spans listing sizes for these types of timbers are included in **AS 1684.2-2010**, **AS 1684.3-2010** and **AS 1684.4-2010**.

Visual grades for timbers (such as softwoods, hardwoods and plywoods) are also linked to structural grades for seasoned and unseasoned timbers. Information on methods used to determine strength details for structural grades are included in **AS 1720.1-2010, Timber structures - Design methods**. The different visual grades for timbers is included in:

- **AS 2082-2007, Timber – Hardwood – Visually stress-graded for structural purposes**
- **AS 2858-2008, Timber – Softwood – Visually stress-graded for structural purposes**
- **AS 3818, Timber - Heavy structural products - Visually graded Series**

Information on methods used to determine requirements for mechanically (MGP) timbers are included in **AS/NZS 1748:2006, Timber – Mechanically stress-graded for structural purposes** and **AS 1720.1-2010**.

### Engineered Wood Products (EWP Timbers)

Manufacturing requirements and information on methods used to determine strengths for these types of timbers is included **AS/NZS 4063.1:2010, Characterization of structural timber – Test methods** and **AS/NZS 4063.2:2010, Characterization of structural timber – Determination of characteristic**

values. Building practises for engineered wood products are also described in **AS 1684.2-2010** and **AS 1684.3-2010**.

### Plywood Timber

Information on different types of plywood are included in:

- **AS/NZS 2269.1:2008, Plywood – Structural – Determination of structural properties – Test methods**
- **AS/NZS 2269.2:2007, Plywood – Structural – Determination of structural properties – Evaluation methods**
- **AS/NZS 2272:2006, Plywood – Marine**
- **AS/NZS 2097:2006, Methods for sampling veneer plywood**
- **AS/NZS 2098, Methods of test for veneer and plywood Series**
- **AS/NZS 2271:2004, Plywood and blockboard for exterior use**
- **AS 6669-2007, Plywood – Formwork**

### Metals

Australian Standards® for metals generally provide information on manufacturing requirements, sampling methods, chemical compositions, mechanical properties and heat treatment details for materials.

Steels used off-shore and in Australia should be designated with Workstuff or Unified Numbering System (UNS) numbers. Metals supplied or manufactured outside the United States are commonly designated with UNS numbers. A Workstuff number for steels will start with 1 and it will then have 4 digits (e.g. 1.222). Workstuff numbers can also be used to provide details on suppliers of different types of steels.

A list of UNS numbers, chemical properties for steels and details for Standards referencing UNS numbers is included in the ASTM publication **Unified Numbering System Ed.11 (2008), Metals and Alloys in the Unified Numbering System (uns)**.

Suppliers and purchasers of steels should check to see if the manufacturers of steels supply certificates conforming to the documentation requirements specified in:

- **I.S. EN 10168:2004, Steel Products – Inspection Documents – List of Information and Description**
- **I.S. EN 10204:2004, Metallic Products – Types of Inspection Documents**

Yield stress levels for metals conforming to Australian Standards® can be determined by completing the types of tests that are included in **AS 1391-2007, Metallic materials – Tensile testing at ambient temperature**.

There are a number of Australian Standards® for **destructive, non-destructive, mechanical** and **hardness** tests for metals. Methods used to assess properties for irons and steels are included in the **AS 1050, Methods for the analysis of iron and steel Series**.

The ideal product for organizations requiring comprehensive and up-to date information on metals is the SAI Global [Metals Infobase](#).

### Stainless Steels

There are no current Australian Standards® specifying chemical, mechanical, and heat treatment properties for stainless steels. However, a number of Australian Standards® reference different

editions of **ASTM A240M**. Stainless steels used in Australia and New Zealand may have chemical properties, mechanical properties, heat treatment conditions and tolerances conforming to the European (EN) and ASTM Standards referenced below:

- **ASTM A280M/A240M-09a, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications**
- **I.S. EN 10088-1:2005, Stainless Steels – Part 1: List of Stainless Steels**
- **I.S EN 10088-2:2005, Stainless Steels – Part 2: Technical Delivery Conditions For Sheet/plate and Strip of Corrosion Resisting Steels for General Purposes**
- **I.S EN 10088-3:2005, Stainless Steels – Part 2: Technical Delivery Conditions For Semi-finished Products. Bars, Rods, Wires, Section and Bright Products Of Corrosion Resisting Steels for General Purposes**

### Structural Steels

Information on chemical and mechanical properties, tolerances and dimensions for different types of structural steels is included in:

- **AS/NZS 1163:2009, Cold-formed structural steel hollow sections**
- **AS 1442-2007, Carbon steels and carbon-manganese steels – Hot-rolled bars and semi-finished products**
- **AS 1397:2001, Steel sheet and strip – Hot-dipped zinc-coated or aluminium/zinc-coated**
- **AS/NZS 3678:1996, Structural steel – Hot-rolled plates, floorplates and slabs**
- **AS/NZS 3679.1:2010, Structural steel – Hot-rolled bars and sections**
- **AS/NZS 3679.2:1996, Structural Steel – Welded I sections**

### Wrought Alloy and Hardened Steels

The Standard for wrought alloy and hardened steels is **AS 1444-2007, Wrought alloy steels – Standard, hardenability (H) series and hardened and tempered to designated mechanical properties**. Information on hardness steels is included in:

- **AS 1815, Metallic materials - Rockwell hardness test Series**
- **AS 1816, Metallic materials - Brinell hardness test Series**
- **AS 1817, Metallic materials - Vickers hardness test Series**

### Steels for Pressure Equipment

Material groupings for Australian, API and ASME Standards used to manufacture pressure equipment are included in **AS 4458-1997, Pressure equipment – Manufacture**. Information on chemical, mechanical, heat treatment properties, dimensions and tolerances for steels used to manufacture pressure vessels is included in **AS 1548-2008, Fine grained, weldable steel plates for pressure equipment**.

### Reinforcing Bars Used With Concrete and Masonry

Steel reinforcing materials used with structures should be tested to align with **AS/NZS 4671:2001, Steel reinforcing materials**.

### Cast and Forged Steels

Information covering manufacturing requirements (chemical compositions, mechanical properties and heat treatment conditions) for cast and forged steels is included in:

- **AS 1448-2007, Carbon steel and carbon-manganese steels – Forgings (ruling section 300 mm maximum)**
- **AS 2074-2003, Cast steels**

## Irons

Information on properties for different types of irons is included in:

- **AS 1830-2007, Grey cast iron**
- **AS 1831-2007, Ductile cast iron**
- **AS 1832-2007, Malleable cast iron**
- **AS 2027-2007, Abrasive-resistant cast irons**
- **AS 5049-2007, Cast iron – Designation of microstructure of graphite**
- **AS 5052-2007, Compacted (vermicular) graphite cast irons – Classification**

## Aluminium Alloys

Aluminium alloys should be anodized by following the methods described in **AS 1231-2000, Aluminium and aluminium alloys – Anodic oxidation coatings**. Information on different types of aluminium alloys are included in:

- **AS/NZS 1734:1997, Aluminium and aluminium alloys – Flat sheet, coiled sheet and plate**
- **AS/NZS 1865:1997, Aluminium and aluminium alloys – Drawn wire, rod, bar and strip**
- **AS/NZS 1866:1997, Aluminium and aluminium alloys – Extruded rod, bar and hollow shapes**
- **AS/NZS 1867:1997, Aluminium and aluminium alloys – Drawn tubes**
- **AS 1874-2000, Aluminium and aluminium alloys – Ingots and castings**

Thickness levels and mechanical properties for alloys used for structural purposes are referenced in **AS/NZS 1664.1:1997, Aluminium structures – Limit state design** and **AS/NZS 1664.2:1997, Aluminium structures – Allowable stress**.

## Coppers

There are number of Australian (AS) and Australian/New Zealand (AS/NZS) Standards for products manufactured from different types of copper. Plumbing products (e.g. taps, pipes and waste fittings) should be manufactured from dezincification resistance (DR) brass and information on this can be found in **AS 2345-2006, Dezincification resistance of copper alloys**.

## Masonry

Detailed information on definitions for masonry products and diagrams for bricks, blocks and masonry units are included in **HB 50-2004, Glossary of building terms**.

Reinforcing materials used with masonry structures should be tested to **AS/NZS 4671:2001, Steel reinforcing materials**.

## Manufacturing

There are a number of products used with masonry structures which require different types of manufacturing methods. Laboratory tests for these types of products are included in the **AS/NZS 4456, Masonry units and segmental pavers and flags Series**.

### Masonry Units Used for Walls

Masonry units (e.g. bricks) constructed from mortared joints should be tested to align with **AS/NZS 4455.1:2008, Masonry units, pavers, flags and segmental retaining wall units – Masonry units**. Masonry units tested to this Standard should also be designed to meet the requirements specified in **AS 3700-2001, Masonry structures**.

Alternatively, masonry units used to build earth-retaining structures that are designed to **AS 4678-2002, Earth-retaining structures** and do not use mortar connected joints should be tested to align with **AS/NZS 4455.3:2008**.

### Segmental Pavers and Flags

Pavers and flags used for pedestrian and road traffic control purposes should be tested to the methods prescribed in **AS/NZS 4455.2:2010, Masonry units, pavers, flags and segmental retaining wall units – Pavers and flags**. A definition for the term 'flags' is also included in this Standard.

### Mortar

Mortar used with masonry structures should be tested to align with **AS 2701-2001, Methods of sampling and testing mortar for masonry constructions**. Diagrams illustrating different types of mortar joints are included in **HB 50-2004**.

Durability levels for mortars are described in **AS 3700-2001** and **AS 4773.1-2010**.

### Masonry Cement

The Australian manufacturing Standard for cement used with masonry structures is **AS 1316-2003, Masonry cement**. Test methods for these types of cements are included in the **AS/NZS 2350, Methods of testing portland and blended cements Series**.

### Wall Ties, Anchors and Lintels

Wall ties used with masonry structures should be designed and manufactured to the requirements specified in **AS/NZS 2699.1:2000, Built-in components for masonry construction – Wall ties**.

Masonry anchors and other types of connecting devices should be designed and manufactured by following the information that is included in **AS/NZS 2699.2:2000, Built-in components for masonry construction – Connectors and accessories**.

Lintels and shelf-angles used with masonry structures should be manufactured and tested to **AS/NZS 2699.3:2002, Built-in components for masonry construction – Lintels and shelf angles (durability requirements)**.

Design and durability requirements for wall ties and other types of connecting devices used with masonry structures also included in **AS 3700-2001, Masonry structures** and **AS 4773.1-2010, Masonry in small buildings - Design**.

## Concrete Products

Information on **concrete** products and their requirements is included in:

- **AS 1012, Methods of testing concrete Series**
- **AS 1379, Specification and supply of concrete Series**
- **AS 1478, Chemical admixtures for concrete, mortar and grout Series**
- **AS 3600, Concrete structures Series**
- **AS 3610, Formwork for concrete Series**

Precast concrete products are not installed with reinforcing steels. Reinforced concrete structures use reinforced steels that have been tested to **AS/NZS 4671:2001, Steel reinforcing materials**.

Definitions for different types of concrete and related products is included in **HB 50-2004, Glossary of building terms**.

### Structural Design Publications

#### Concrete Structures

Information on design requirements for the design and construction of concrete buildings, or members containing reinforcing steels or tendons are included in **AS 3600-2009, Concrete structures**. This Standard also provides some general information on design requirements for pedestals and footings that do not contain reinforcing steels or tendons. Footings supplied with reinforcing steels should be designed by meeting the requirements described in **AS 2870-2011, Residential slabs and footings**.

There are commentaries to the 2001 edition of **AS 3600**:

- **HB 64-2002, Guide to concrete construction**
- **HB 71-2002, Reinforced concrete design in accordance with AS 3600-2001**

#### Precast Concrete

The National Precast Concrete Association of Australia is responsible for preparing and publishing **NP:PCH-2009, Precast Concrete Handbook**. It is the ideal publication for those who require detailed information on design requirements for buildings and other types of structures using precast and plain concrete products.

#### Concrete Tanks

Concrete tanks designed to contain liquids can be manufactured and designed to the details outlined in **AS 3735-2001, Concrete structures retaining liquids**. The commentary to this Standard is **AS 3735 Supp 1-2001**. Users of **AS 3735-2001** should also follow the design details that are included in **AS 3600-2009**.

#### Tilt-Up Construction

Flat reinforced concrete panels can be designed by following the methods described in **AS 3850-2003, Tilt-up concrete construction** and **AS 3600-2009**.

#### Concrete Septic Tanks

Information on manufacturing and design requirements for concrete septic tanks is included in **AS/NZS 1546.1:2008, On-site domestic wastewater treatment units – Septic tanks**.

#### Manufacturing

Laboratory tests for concrete are included in **AS 1012, Methods of testing concrete Series**.

Information on manufacturing requirements and comprehensive strength levels for normal, special class, hardened concrete and plasticized concrete are included in **AS 1379-2007, Specification and supply of concrete**. The commentary to this Standard is **AS 1379 Supp 1-2008**.

Sampling procedures used to manufacture concrete are described in **AS 1012.1-1993, Methods of testing concrete – Sampling of fresh concrete**.

Fire tests for concrete products which are tested to meet **AS 1379-2007** are included in **AS 1530.4-2005, Methods for fire tests on building materials, components and structures - Fire-resistance test of elements of construction**.

Chemical admixtures used to manufacture concrete should be tested to meet **AS 1478.1-2000, Chemical admixtures for concrete, mortar and grout – Admixtures for concrete.**

## Cement

Portland and blended cements supplied in Australia and New Zealand should be tested to blended cements used with concrete and masonry structures. These types of cements should be tested to align with **AS 3972-2010, General purpose and blended cements.**

Information on cement products and their requirements is included in:

- **AS 2350, Methods of testing portland and blended cements Series** defines the laboratory tests required for different types of cements.
- **AS 3582, Supplementary cementitious materials for use with portland and blended cement Series** defines tests for appropriate supplementary materials (such as fly ash) which can be used with cements.

## Doors

### Timber Doors

There are no current Australian Standards® for timber doors, however information on timbers for doors is included in:

- **AS 1909-1984, Installation of timber doorsets**
- **AS 2688-1984, Timber doors**
- **AS 2689-1994, Timber doorsets**

**Please note:** in September 2004 Standards Australia indicated that the status of these Standards was to be changed to 'obsolescent' as they were no longer recommended for new equipment or for best current practise. These Standards have only been retained in order to provide for those who are servicing existing requirements.

### Powered Doors for Pedestrians

Powered doors used by pedestrians should be designed, installed and operated by following the information that is included in **AS 5007-2007, Powered doors for pedestrian access and egress.**

### Fire Doors

Fire doors used and supplied in Australia and New Zealand should be tested to meet **AS 1905.1-2005, Components for the protection of openings in fire-resistant walls – Fire-resistant doorsets.** Fire tests for these types of doors are included in **AS 1530.4-2005, Methods for fire tests on building materials, components and structures - Fire-resistance test of elements of construction.**

### Aluminium Security Doors and Grilles

The manufacturing Standard for aluminium security doors and window grilles is **AS 5039-2008, Security screen doors and security window grilles.** Aluminium security doors and window grilles can be installed by following the methods outlined in **AS 5040-2003, Installation of security screen doors and window grilles.**

### Garage Doors

Standards Australia has not established any specific Standards for garage doors that are used for commercial and industrial applications. However, information on designing, manufacturing, installing and operating domestic garage doors is covered in:

- **AS/NZS 4504, Domestic garage doors - Methods of test Series**
- **AS/NZS 4505:1998, Domestic garage doors**

There is also a number of European Standards for garage doors used for commercial and industrial situations.

## Formwork

Formwork used with plasticized concrete can be constructed and designed by following the details that are included in **AS 3610-1995, Formwork for concrete**. Documentation and surface finishing requirements for different classes of formwork is included in **AS 3610.1-2010, Formwork – Documentation and surface finish**.

Plywood used with formwork should be tested to meet **AS 6669-2007, Plywood - Formwork**.

## Glass

Safety glass used in buildings should be designed to conform to the requirements that are included in **AS 1288-2006, Glass in buildings – Selection and installation**. The supplement to this Standard is **AS 1288 Supp 1-2008** which includes span tables for glass panels that are subjected to different types of wind speeds. The handbook to this Standard is **HB 125-2007, The glass and glazing handbook (including guide to AS 1288, Glass in buildings – Section and installation)**.

Wind speeds for glass panels should be calculated by following the methods described in **AS/NZS 1170.2:2011** or **AS 4055-2006**.

Glass insulating units can be selected and installed by following the methods described in **AS/NZS 4667-2000, Insulating glass units** and the requirements that are included in **AS 1288-2006**.

Glass installed to the requirements outlined in **AS 1288-2006, Glass in buildings – Selection and installation** should be manufactured to the test methods and marking requirements that are included in **AS/NZS 2208:2006, Safety glazing materials in buildings**. In addition, safety glass manufactured to the above Standards should be cut, finished and marked by following the details outlined in **AS/NZS 4667:2000, Quality requirements for cut-to-size and processed glass**.

## Windows, Glass Doors, Louvres, Shopfronts and Window Walls

**AS 2047-1999, Windows in buildings – Selection and installation** defines requirements for the types of building products listed below:

- Windows (Window frames)
- Sliding glass doors
- Adjustable louvers
- Shopfronts
- Window walls with one-piece framing elements

Glass thickness requirements for these types of building products is included in **AS 1288-2006, Glass in buildings – Selection and installation**.

Wind loads for windows can be determined by following the methods outlined in **AS/NZS 1170.2:2011, Structural design actions - Wind actions** or **AS 4055-2006, Wind loads for housing**. Laboratory tests for windows and window assemblies are included in the **AS 4420 Windows - Methods of test Series**.

Materials used to manufacture window frames should conform to the requirements described in **AS 2047-1999, Windows in buildings - Selection and installation**.



## Roofing Materials

### Cladding and Flashings

Persons working on metal roofs should follow the procedures that are recommended in **HB 39-1997, Installation code for metal roof and wall cladding**.

Metal sheet materials used for roof and wall cladding should be designed and installed by following the procedures described in **AS 1562.1-1992, Design and installation of sheet roof and wall cladding – Metal**.

Roofing materials manufactured from corrugated fibre-cement can be manufactured and installed by following the methods prescribed in **AS/NZS 1562.2:1999, Design and installation of sheet roof and wall cladding – Corrugated fibre-reinforced cement**.

Roofing materials manufactured from plastics can be manufactured and installed by following the details outlined in **AS 1562.3-2006, Design and installation of sheet roof and wall cladding – Plastic**.

Cladding manufactured from natural stone should follow the requirements in:

- **I.S. EN 1469:2004, Natural Stone Products – Slabs for Cladding – Requirements**
- **BS 8298:1994, Code of practice for design and installation of natural stone cladding and lining**

### Pliable Building Membranes

Building sheets providing an underlay to cladding should be manufactured by following the methods outlined in **AS/NZS 4200.1:1994, Pliable building membranes and underlays – Materials**. Installation for materials manufactured to this Standard should be followed by the requirements in **AS/NZS 4200.2:1994, Pliable building membranes and underlays – Installation requirements**.

Damp-proof courses should be designed to meet the manufacturing and performance requirements that are included in **AS/NZS 2904:1995, Damp-proof courses and flashings**.

Laboratory tests for damp-proof courses and flashings are included in the **AS/NZS 4347, Damp-proof courses and flashings - Methods of test Series**.

### Roofing Tiles

Roofing tiles manufactured from concrete, terracotta and composite materials should be manufactured to the details that are included in **AS 2049-2002, Roof tiles**. Test methods for roofing tiles are included in the **AS 4046, Methods of testing roof tiles Series** and installation methods for tiles manufactured to this Standard should follow **AS 2050-2002, Installation of roof tiles**.

## Flooring

### Ceramic Tiles

The Australian manufacturing Standard for ceramic tiles is **AS 4662-2003, Ceramic tiles – Definitions, classification, characteristics and marking**. This Standard is a modified edition of **ISO 13006:2008, Ceramic tiles - Definitions, classification, characteristics and marking**.

Test methods for ceramic tiles are included in the **AS 4459, Methods of sampling and testing ceramic tiles Series**. Some of these test methods are identical/modified to the test methods included in the **ISO 10545, Ceramic tiles Series**.

Grouts used with ceramic floor tiles can be manufactured and tested to the **AS 4992, Ceramic tiles - Grouts and adhesives Series**. These Standards are identical to previous editions of the **ISO 13007, Ceramic tiles - Grouts and adhesives Series**.

Ceramic tiles should be installed by following the methods described in **AS 3958.1-2007, Ceramic tiles – Guide to the installation of ceramic tiles**.

### Natural Stone (Granite and Marble Tiles)

Standards Australia has not established any Standards for natural stone tiles. Information covering manufacturing Standards for natural stone tiles is covered by:

- **I.S. EN 12057:2004, Natural stone tiles – Modular tiles – Requirements**
- **I.S. EN 12058:2004, Natural Stone Products – Slabs for Floors And Stairs – Requirements**
- **I.S. EN 12059:2004, Natural Stone Products – Dimensional Stone Work – Requirements**

Information covering design and installation requirements for natural stone tiles is included in:

- **BS 5385-1:2009, Wall and floor tiling. Design and installation of ceramic, natural stone and mosaic wall tiling in normal conditions. Code of practice**
- **BS 5385-2:2006, Wall and floor tiling. Design and installation of external ceramic, natural stone and mosaic wall tiling in normal conditions. Code of practice**
- **BS 5385-5:2009, Wall and floor tiling. Design and installation of terrazzo, natural stone and agglomerated stone tile and slab flooring. Code of practice**
- **BS 8000-11.2:1990, Workmanship on building sites. Code of practice for wall and floor tiling. Natural stone tiles**

### Carpets – Textile Floor Coverings

Carpets used in different types of non-residential buildings are required to meet critical radiant flux fire tests. Critical radiant flux levels for floor coverings are measured by following the methods described in **AS ISO 9239-1:2003, Reaction to fire tests for floor coverings – Determination of the burning behaviour using a radiant heat source** or **AS 2404-1980, Textile floor coverings – Fire propagation of the use-surface using a small ignition source**.

A list of Standards for textile floor coverings (carpets) is included below:

- **AS/NZS 1385:2007, Textile floor coverings – Metric units and commercial tolerances for measurement**
- **AS/NZS 2111, Textile floor coverings - Tests and measurements Series**
- **AS/NZS 2119:1997, Textiles for floor coverings – Machine-made – Sampling and cutting specimens for physical tests**
- **AS 2404-1980, Textile floor coverings – Fire propagation of the use-surface using a small ignition source**
- **AS 2454-2007, Textile floor coverings – Terminology**
- **AS/NZS 2455.1:2007, Textile floor coverings – Installation practice – General**
- **AS/NZS 2455.2:2007, Textile floor coverings – Installation practice – Carpet tiles**
- **AS/NZS 2914:2007, Textile floor coverings – Informative labelling**
- **AS/NZS 3733:1995, Textile floor coverings – Cleaning maintenance of residential and commercial carpeting**
- **AS 4288-2003, Soft underlays for textile floor coverings**

## Resilient and Laminate Floors

Standards Australia has not established any specific Standards for resilient floors, however information on recommended practises for laying and maintaining these types of floor coverings are included in **AS 1884-1985, Floor coverings – Resilient sheet and tiles – Laying and maintenance practices**.

**Please note:** in September 2004 Standards Australia indicated that the status of some Standards was to be changed to 'obsolescent' for those Standards which were no longer recommended for new equipment or for best current practise. These Standards have only been retained in order to provide for those who are servicing existing requirements.

## Timber Floors

Tongued, grooved strip, plywood and particleboard flooring can be installed by following the methods outlined in **AS 1684.3-2010, AS 1684.4-2010** and **AS 1684.2-2010**. Timber floors can be sanded by following the methods outlined in **AS 4786.2-2005, Timber flooring – Sanding and finishing**.

The manufacturing Standard for particleboard flooring is **AS/NZS 1860.1:2002, Particleboard flooring – Specifications**.

Information on grading requirements for sawn and round timbers used for flooring and decking is included in **AS 2796.2-2006, Timber – Hardwood – Sawn and milled products – Grade description** and **AS 4785.2-2002, Timber – Softwood – Sawn and milled products – Grade description**.

A list of recommended moisture levels for timbers and timber flooring is included in **AS 1684.2-2010** and **AS 1684.3-2010**.

## Fire Tests

Building materials used in Australia and New Zealand should be designed to conform to different types of fire tests.

Fire tests used to measure early fire hazard properties for building products:

- **AS 1530.1-1994, Methods for fire tests on building materials, components and structures – Combustibility tests for materials**
- **AS 1530.2-1993, Methods for fire tests on building materials, components and structures – Test for flammability of materials**
- **AS/NZS 1530.3:1999, Methods for fire tests on building materials, components and structures – Simultaneous determination of ignitability, flame propagation, heat release and smoke release**

Fire resistance levels (FRL) tests:

- **AS 1530.4-2005, Methods for fire tests on building materials, components and structures – Fire-resistance test of elements of construction**

Fire tests for buildings located in bushfire prone areas:

- **AS 1530.8.1-2007, Methods for fire tests on building materials, components and structures – Tests on elements of construction for buildings exposed to simulated bushfire attack – Radiant heat and small flaming sources**
- **AS 1530.8.2-2007, Methods for fire tests on building materials, components and structures – Tests on elements of construction for buildings exposed to simulated bushfire attack – Large flaming sources**

- **AS/NZS 3837:1998, Method of test for heat and smoke release rates for materials and products using an oxygen calorimeter**

Fire tests for smoke control doors:

- **AS 1530.7-2007, Methods for fire tests on building materials, components and structures - Smoke control assemblies - Ambient and medium temperature leakage test procedure.** (Note: This Standard is based on **ISO 5925-1:2007**, and is not used to complete tests on fire doors that have been manufactured to **AS 1905.1-2005** and only references tests that are included in **AS 1530.4-2005**).

## Acoustic Tests

Building panels, partitions and floor coverings supplied in different types of buildings should be tested to measure airborne sound (weight reduction indices) and impact sound levels.

Airborne sound (sound weight reduction indices):

- **AS/NZS 1276.1:1999, Acoustics – Rating of sound insulation in buildings and of building elements – Airborne sound insulation**
- **AS/NZS ISO 717.1:2004, Acoustics – Rating of sound insulation in buildings and of building elements – Airborne sound insulation**

Impact sound levels:

- **AS 1191-2002, Acoustics – Methods for laboratory measurement of airborne sound transmission insulation of building elements**
- **AS ISO 140.6-2006, Acoustics – Measurement of sound insulation in buildings and of building elements – Laboratory measurement of impact sound insulation of floors**
- **AS ISO 717.2-2004, Rating of sound insulation in buildings and of building elements – Impact sound insulation**
- **AS/NZS ISO 140.7:2006, Acoustics – Measurement of sound insulation in buildings and of building elements – Field measurement of impact sound insulation of floors**

## Balustrades

Balustrades located in residential buildings can be designed by following the information that is included in the BCA. The SAI Global **BCA + Referenced Standards** service offers online access to the Building Code of Australia and all the Australian Standards<sup>®</sup> referenced within it. Relevant information may also be included in Commonwealth and State building and workplace health and safety legislation.

Balustrades can be designed by following the methods described in **AS 1657-1992, Fixed platforms, walkways, stairways and ladders – Design, construction and installation**.

Balustrades located in different types of non-residential buildings accessed by persons with disabilities should be designed to the requirements covered in **AS 1428.1-2009, Design for access and mobility – General requirements for access – New building work**.

Information on clearances and heights for balustrades used in residential buildings is included in **AS 4226-2008, Guidelines for safer housing design**.

## Glass Balustrades

Glass balustrades should be designed by following the methods outlined in **AS 1288-2006, Glass in buildings - Selection and installation**. Span tables for glass panels are also included in **AS 1288 Supp 1-2006**.

## Loads and Safety Factors for Balustrades

Balustrades should be designed and engineered to conform to the types of loads and safety factors that are included in:

- **AS/NZS 1170.0:2002, Structural design actions – General principles**
- **AS/NZS 1170.1:2002, Structural design actions – Permanent, imposed and other actions**
- **AS/NZS 1170.2:2011, Structural design actions – Wind actions**
- **AS 4055-2006, Wind loads for housing**

## Fences and Gates

Metal fences can be painted and metal finished by following the methods prescribed in **AS/NZS 2311:2009, Guide to the painting of buildings** and **AS/NZS 2312:2002, Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings**.

### Chain Link Security Fences and Gates

Manufacturing requirements for chain link security fences are covered by the **AS 1725, Chain link fabric fencing Series**.

### Swimming Pool Fences and Gates

Manufacturing requirements for pool fences is included in **AS 1926.1-2007, Swimming pool safety – Safety barriers for swimming pools**. Swimming pool fences should be located by following the methods described in **AS 1926.2-2007, Swimming pool safety – Location of fencing for private swimming pools**. These Standards are referenced in the BCA as well as State and Territory building legislation.

The Australian manufacturing Standard for gates used with swimming pools is **AS 2820-1993, Gates units for private swimming pools**.

Glass pool fences should be designed and installed by following the techniques described in **AS 1288-2006, Glass in buildings - Selection and installation**.

### Electric Fences

The Australian and New Zealand installation Standard for electric fences is **AS/NZS 3014:2003, Electrical installations – Electric fences**.

## Slip Resistance

Information on pendulum and ramp (R) slip resistance tests for surfaces are included in **AS/NZS 4586:2004, Slip resistance classification of new pedestrian surface materials** and **AS/NZS 4663:2004, Slip resistance measurement of existing pedestrian surfaces**.

The only publication providing information on recommended pendulum and ramp slip resistance ratings for areas in different types of buildings is **HB 197:1999, An introductory guide to the slip resistance of pedestrian surface materials**.

## Painting and Metal Finishing

Persons storing large quantities of paints may also need to store products by following the details that are included in **AS 1940-2004, The storage and handling of flammable and combustible liquids**.

**AS/NZS 2311:2009, Guide to the painting of buildings** provides a guide to products and procedures for the painting of buildings for general domestic, commercial and industrial use. This Standard also includes tables listing recommended painting systems for new interior and exterior surfaces.

**AS/NZS 2312:2002, Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings** provides guidelines for selection and specification of coating systems for protection of structural steel work against corrosive environments.

## Building Design

Building designers and Architects can refer to the [Guide to Standards – Architecture](#) for information on Standards relating to this topic.

## Evacuating Buildings

All buildings with the exception of residential buildings (class 1A buildings as defined under the BCA) should be evacuated by following the procedures described in **AS 3745-2010, Planning for emergencies in facilities**. The critical aspects of this Standard are summarized in the scope of **AS 3745-2010**. Copies of emergency evacuation diagrams are also included in this Standard.

Persons and organizations responsible for arranging evacuations of buildings may be interested in:

- **AS 1670.4-2004, Fire detection, warning, control and intercom systems – System design, installations and commissioning – Sound systems and intercom systems for emergency purposes**
- **AS 1851-2005, Maintenance of fire protection systems and equipment**
- **AS 3806-2006, Compliance programs**
- **AS 4421-1996, Guards and patrols**
- **AS/NZS 5050:2010, Business continuity – Managing disruption-related risk**
- **AS/NZS ISO 31000:2009, Risk management – Principles and guidelines**
- **HB 167:2006, Security risk management**
- **HB 292-2006, A practitioners guide to business continuity management**
- **HB 293-2006, Executive guide to business continuity management**
- **HB 327:2010, Communicating and consulting about risk (Companion to AS/NZS 31000:2009)**

## Demonstrating Compliance to Building Standards

Generally, there are three methods available to persons and organizations in the building industry wishing to demonstrate compliance to building Standards. These methods are summarized below.

### Method 1 – Commissioning Assessments from Suitably Competent Persons

Suitably competent persons, organizations, industry bodies, industry associations and companies can be engaged to independently assess work undertaken in the building industry. This method of assessment should be used to demonstrate compliance to manufacturing Standards.

### Method 2 - Type Testing (ISO Type 1 Scheme)

This is a commonly applied method that involves the commissioning of an independent and relevant accredited test report of a sample product, prepared by an accredited test facility that is then reviewed for compliance requirements of relevant Standards. The result of the process is often referred to as a 'Type Test Certificate' that may provide the user, or stakeholder with an enhanced level of confidence in a manufacturer's or suppliers claim of compliance.

### Method 3 – Third Party Product Certification (ISO Type 5 Schemes)

Organizations and personnel wishing to provide a higher level of confidence to stakeholders in their claims of compliance may wish to engage the services of an independent third party to procure testing of an initial sample of a product, undertake an audit of the manufacturer's facilities, followed by ongoing batch and surveillance tests of products and audits at regular intervals. More detailed information on product certification schemes is included in **HB 18.67-2005, Conformity assessment – Fundamentals of product certification**.

## SAI Global Product Certification Schemes

SAI Global Limited is the largest provider of third party product certification and testing services within the Asia Pacific, and is accredited against a broad range of Australian and International Standards, via its wholly owned subsidiary SAI Global Certification Services Pty Limited. Further information can be sought by contacting us at [product@saiglobal.com](mailto:product@saiglobal.com).

The [Product Certification Services](#) Group offers a wide range of certification schemes tailored for building products.

### StandardsMark

StandardsMark™ is a [System 5 certification scheme](#) which is used to certify manufacturers of electrical equipment to specific product performance Standards. The '5 ticks' StandardsMark™ certification requirements are:

- Testing of sample products by independent accredited laboratories
- Verification of test reports
- Audit of the manufacturing site for initial and ongoing compliance

### CodeMark Scheme

SAI Global is accredited to certify manufacturers of building products under the [CodeMark](#) scheme.

### Post and Marking Scheme for Safety Glass

The Post Cutting and Marking Scheme (an ISO Type 5 Scheme) has been designed specifically for manufacturers or suppliers to demonstrate compliance to **AS/NZS 4667:2000, Quality requirements for cut-to-size and processed glass**.



Please contact the [Product Certification Services](#) Group if you require any further information on the above schemes.

Phone: +61 2 8206 6322

Email: [product@saiglobal.com](mailto:product@saiglobal.com)



## Online Resources

Do you need online access to the National Construction Code 2011 and all the Australian Standards® referenced within it?

[www.saiglobal.com/NCC](http://www.saiglobal.com/NCC)

Do you need online access to the Building Code of Australia and all the Australian Standards® referenced within it?

[www.saiglobal.com/BCA](http://www.saiglobal.com/BCA)

Do you need online access to the Plumbing Code of Australia 2011 and all the Australian Standards® referenced within it?

[www.saiglobal.com/PCA](http://www.saiglobal.com/PCA)

Do you need guidance on which Australian Standards® or parts thereof are referred to in legislation?

[www.saiglobal.com/Newsletters](http://www.saiglobal.com/Newsletters)

Would you like to be notified when Standards relevant to you are updated, amended or newly released?

[www.saiglobal.com/SW](http://www.saiglobal.com/SW)

Do you need online access to the full text of your own customised selection of Australian Standards® as well as optional access to international Standards?

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Do you need to stay current on Australian Legislative, Regulatory and Compliance News?

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Would you like to drive continued organizational success with results-focused training and professional development?

[www.saiglobal.com/training](http://www.saiglobal.com/training)

## Building Regulators

Australian Building Codes Board

Website: [www.abcb.gov.au](http://www.abcb.gov.au)

NSW Government – Department of Planning & Infrastructure

Website: [www.planning.nsw.gov.au](http://www.planning.nsw.gov.au)

Victoria Building Commission

Website: [www.buildingcommission.com.au](http://www.buildingcommission.com.au)

Queensland Government - Building Codes Queensland

Website: [www.dlqp.qld.gov.au/our-services/building-codes-queensland-2.html](http://www.dlqp.qld.gov.au/our-services/building-codes-queensland-2.html)

Government of South Australia

Department of Planning and Local Government - Planning in South Australia

Website: [www.planning.sa.gov.au](http://www.planning.sa.gov.au)

Government of Western Australia

Department of Regional Development and Lands

Website: [www.rdl.wa.gov.au](http://www.rdl.wa.gov.au)

Tasmanian Government

Department of Justice - Workplace Standards Tasmania

Website: [www.wst.tas.gov.au/industries/building](http://www.wst.tas.gov.au/industries/building)

ACT Government

ACT Planning and Land Authority

Website: [www.actpla.act.gov.au](http://www.actpla.act.gov.au)

Northern Territory Government

Department of Lands and Planning

Website: [www.dpi.nt.gov.au](http://www.dpi.nt.gov.au)

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[Building Products Certification Services](#)

[Product Certification Key Documents](#)