

## GETTING HELP

With NATSPEC updates, in April and October every year, we don't only update the NATSPEC National Building Specification, but all of the Guidance Text, TECHnotes, TECHreports, TECHguides, and NATsource. All of these are provided for free with your subscription package.

Some practices have told us that the Guidance Text within the specification is one of the most important resources for their office as it not only acts as a check on their design, but is also available as a teaching and learning tool when designing with something new.

TECHnotes were originally developed as a free resource for the Institute of Architects CPD. Those updated last October include *Fire hazard properties of insulation and pliable membranes*; *Mineral wool*; *Formaldehyde – indoor air quality and, refrigerants*. No designer is expected to know everything, but it is important to know where to find trustworthy information.

Our TECHreport *Specifying ESD* was updated in October and outlines how a NATSPEC-based specification can be used to give effect to ESD principles and opportunities in the building context. We continue to work with multiple bodies regarding sustainable materials, embodied carbon, building resilience, and towards net-zero.

Twelve AUS-SPEC TECHguides, including *Guide to parks and open space maintenance system and documentation*; and *Guide to the building and facility maintenance management system and documentation* were also updated last October.

NATsource provides a list of over 1200 documents cited in the specification packages. It can be used to check document titles, currency, content and publishers. Changes to cited standards are summarised in your quarterly SPECnotes.

For new specification writers, we have a free monthly *Getting started with NATSPEC* webinars. See [www.natspec.com.au](http://www.natspec.com.au).

- > Air Conditioning and Mechanical Contractors' Association of Australia
- > Australian Elevator Association
- > Australian Institute of Architects
- > Australian Institute of Building
- > Australian Institute of Building Surveyors
- > Australian Institute of Quantity Surveyors
- > Construction Industry Engineering Services Group
- > Consult Australia
- > Department for Infrastructure and Transport (SA)
- > Department of Energy and Public Works (QLD)
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- > Department of Treasury and Finance (VIC)
- > Engineers Australia
- > Major Projects Canberra
- > Master Builders Australia
- > Public Works Advisory (NSW)
- > Standards Australia

### SPECnotes

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# REVISED AUSTRALIAN STANDARDS

The most significant new, amended or superseded Australian Standards in September, October and November 2023 which are referred to in NATSPEC or AUS-SPEC, and will be taken into account in the NATSPEC April 2024 Update and AUS-SPEC October 2024 Update, are listed below:

## **AS/NZS 1167.1 (2005): Filler metal for brazing and braze welding**

This standard has been replaced by AS/NZS ISO 17672 (2023).

Referenced documents: *0183 Metals and prefinishes; 0721 Packaged air conditioning; 0755 Medical gas systems; 0761 Refrigeration; 0762 Cool rooms.*

## **AS 1367 (2023): Coaxial cable and optical fibre systems for the RF distribution of digital television, radio and in-house analogue television signals in single and multiple dwelling installations**

This standard has been redesignated and supersedes AS/NZS 1367 (2016). It specifies requirements and guidelines for the design, installation, electrical safety aspects, working performance, final commissioning and maintenance of radio frequency (RF) distribution systems using passive and active components that enable the high quality distribution of off-air, in-house television and radio signals in single and multiple unit dwellings.

Referenced documents: *0902 Electrical design and install; 0962 Television distribution systems.*

## **AS 1743 (2023): Road signs - Specifications**

This standard supersedes the 2018 edition. It specifies graphics, fonts, layout and size requirements together with an abridged materials and manufacturing specification for the manufacture of the standard road signs provided for in the AS 1742 series.

Referenced documents: *1101 Traffic management; 1192 Signposting.*

## **AS 2858 (2023): Timber - Softwood - Visually stress-graded for structural purposes**

This standard supersedes the 2008 edition. It specifies requirements for visual stress grading of sawn softwood intended for structural purposes at the time of grading. This Standard does not apply to timber species with an average density at 12 percent moisture content below 360 kg/m<sup>3</sup>.

Referenced documents: *0185 Timber products, finishes and treatment; 0242 Landscape - fences and barriers; 0277 Pavement ancillaries; 0381 Structural timber; 1193 Guide posts; 1196 Boundary fencing for road reserves.*

## **AS 3958 (2023): Installation of ceramic and stone tiles**

This standard supersedes AS 3958.1 (2007) and AS 3958.2 (1992). It provides instruction on the preparation of the background and the bonded fixing and grouting of floor and wall tiles, including mosaic tiles and panels. It also provides information on the application of tiles in swimming pools, gradients on floors, screeds and rendering, cleaning and maintenance.

Referenced documents: *0275 Paving - mortar and adhesive bed; 0526 Terrazzo precast; 0631 Ceramic tiling; 0632 Stone and terrazzo tiling.*

## **AS 4029.1 (1994): Stationary batteries - Lead-acid Vented type (based on and including the full text of IEC 896-1)**

This standard has been replaced by AS 60896.11 (2023).

Referenced document: *0931 Power generation - engine driven.*

## **AS/NZS 4029.2 (2000): Stationary batteries - Lead-acid Valve-regulated type (IEC 60896-2:1995, MOD)**

This standard has been replaced by AS 60896.21 (2023) and AS 60896.22 (2023).

Referenced documents: *0931 Power generation - engine driven; 0937 Uninterruptible power supply; 0943 Switchboard components.*

## **AS/NZS 4282 (2023): Control of the obtrusive effects of outdoor lighting**

This standard supersedes the 2019 edition. It sets out requirements for the control of the obtrusive effects of outdoor lighting. It includes limits for the relevant light technical parameters to control these effects.

Referenced documents: *1197 Street and public lighting; 1474 Lighting.*

## **AS/NZS ISO 17672 (2023): Brazing - Filler metals**

This standard is new and replaces AS/NZS 1167.1 (2005). It identically adopts ISO 17672:2016, which specifies the compositional ranges of a series of filler metals used for brazing.

Referenced documents: *0183 Metals and prefinishes; 0721 Packaged air conditioning; 0755 Medical gas systems; 0761 Refrigeration; 0762 Cool rooms.*

## **AS IEC 60034.5 (2023): Rotating electrical machines - Degrees of protection provided by the integral design of rotating electrical machines (IP Code) - Classification**

This standard has been redesignated and supersedes AS 60034.5 (2009). It identically adopts IEC 60034-5:2020, which defines requirements for protective enclosures of rotating electrical machines including protection of persons against live or moving parts inside the enclosure and protection of the machine against ingress of solid foreign objects, water and dust.

Referenced documents: *0782 Mechanical electrical - minor; 0784 Motors and starters; 0882 Hydraulic electrical - minor; 0931 Power generation - engine driven; 1082 Fire services electrical - minor.*

## **AS IEC 60034.7 (2023): Rotating electrical machines - Classification of types of construction, mounting arrangements and terminal box position (IM Code)**

This standard has been redesignated and supersedes AS 60034.7 (2009). It identically adopts IEC 60034-7:2020, which specifies the IM Code, a classification of types of construction, mounting arrangements, and the terminal box position of rotating electrical machines.

Referenced documents: *0782 Mechanical electrical - minor; 0784 Motors and starters; 0814 Hydraulic pumps; 0882 Hydraulic electrical - minor; 0931 Power generation - engine driven; 1014 Fire services pumps; 1082 Fire services electrical - minor.*

## **AS 60034.8 (2023): Rotating electrical machines - Terminal markings and direction of rotation (IEC 60034-8:2007 (ED. 3.1) MOD)**

This standard supersedes the 2009 edition. It adopts and modifies IEC 60034-8:2007+AMD1:2014 CSV (ED. 3.1), which specifies terminal marking and direction of rotation requirements for rotating electrical machinery.

Referenced documents: *0782 Mechanical electrical - minor; 0784 Motors and starters; 0882 Hydraulic electrical - minor; 0931 Power generation - engine driven; 1082 Fire services electrical - minor.*

## **AS 60034.9 (2023): Rotating electrical machines - Noise limits (IEC 60034-9:2021, (ED. 5.0) MOD)**

This standard supersedes the 2009 edition. It identically adopts and modifies IEC 60034-9:2021 (ED. 5.0), which specifies test methods for the determination of sound power level of rotating electrical machines and specifies maximum A-weighted sound power levels for factory acceptance testing of network-supplied, rotating electrical machines.

Referenced documents: *0782 Mechanical electrical - minor; 0784 Motors and starters; 0882 Hydraulic electrical - minor; 0931 Power generation - engine driven; 1082 Fire services electrical - minor.*

## **AS 60034.11 (2023): Rotating electrical machines - Thermal protection (IEC 60034-11:2020, (ED. 3.0) MOD)**

This standard supersedes the 2009 edition. It adopts and modifies IEC 60034-11:2020 (ED. 3.0), which specifies requirements relating to the use of thermal protectors and thermal detectors incorporated into the stator windings or placed in other positions in induction machines.

Referenced documents: *0702 Mechanical design and install; 0782 Mechanical electrical - minor; 0784 Motors and starters; 0882 Hydraulic electrical - minor; 0931 Power generation - engine driven; 1002 Fire services design and install; 1014 Fire services pumps; 1082 Fire services electrical - minor.*

## **AS IEC 60034.12 (2023): Rotating electrical machines - Starting performance of single-speed three-phase cage induction motors**

This standard has been redesignated and supersedes AS 60034.12 (2009). It identically adopts IEC 60034-12:2016, which specifies the parameters for eight designs of starting performance of single-speed three-phase 50 Hz or 60 Hz cage induction motors up to a rated voltage of 1 000 V, intended for direct-on-line or star-delta starting, rated for S1 duty type and constructed to any degree of protection and explosion protection.

Referenced documents: *0702 Mechanical design and install; 0782 Mechanical electrical - minor; 0784 Motors and starters; 0882 Hydraulic electrical - minor; 1002 Fire services design and install; 1014 Fire services pumps; 1082 Fire services electrical - minor.*

## **AS 60896.11 (2023): Stationary lead-acid batteries - Vented types - General requirements and methods of tests (IEC 60896 11:2002 (ED 1.0) MOD)**

This standard is new and replaces AS 4029.1 (1994). It adopts and modifies IEC 60896-11:2002, which specifies general requirements and the main characteristics, together with corresponding test methods associated with all types and construction modes of lead-acid stationary batteries, excluding valve-regulated types.

Referenced document: *0931 Power generation - engine driven.*

## **AS 60896.21 (2023): Stationary lead-acid batteries - Valve regulated types - Methods of test (IEC 60896-21:2004 (ED 1.0) MOD)**

This standard is new and replaces AS/NZS 4029.2 (2000). It adopts and modifies IEC 60896-21:2004, which specifies the methods of test for all types and construction of valve-regulated stationary lead acid cells and monobloc batteries used in standby power applications.

Referenced documents: *0931 Power generation - engine driven; 0937 Uninterruptible power supply; 0943 Switchboard components.*

## **AS 60896.22 (2023): Stationary lead-acid batteries - Valve regulated types - Requirements (IEC 60896-22:2004 (ED 1.0) MOD)**

This standard is new and replaces AS/NZS 4029.2 (2000). It adopts and modifies IEC 60896-22:2004. Its objective is to assist the specifier in the understanding of the purpose of each test contained within AS 60896.21 and provide guidance on a suitable requirement that will result in the battery meeting the needs of a particular industry application and operational condition.

Referenced documents: *0931 Power generation - engine driven; 0937 Uninterruptible power supply; 0943 Switchboard components.*

## **AS 60947.3 (2023): Low-voltage switchgear and controlgear - Switches, disconnectors, switch-disconnectors and fuse combination units (IEC 60947-3:2020 (ED. 4.0) MOD)**

This standard supersedes the 2018 edition. It adopts and modifies IEC 60947-3:2020, which specifies requirements for switches, disconnectors, switch-disconnectors and fuse-combination units and their dedicated accessories to be used in distribution circuits and motor circuits of which the rated voltage does not exceed 1 000 V AC or 1 500 V DC.

Referenced documents: *0781 Mechanical electrical; 0782 Mechanical electrical - minor; 0882 Hydraulic electrical - minor; 0902 Electrical design and install; 0943 Switchboard components; 1002 Fire services design and install; 1082 Fire services electrical - minor.*



## WITHDRAWN STANDARDS

Standards and other documents withdrawn in September, October and November 2023, include:

**AS 60034.17 (2009): Rotating electrical machines - Cage induction motors when fed from converters - Application guide**  
This standard has been withdrawn and not replaced. Referenced document: *0784 Motors and starters*.

**AS 2726.2 (2004): Chainsaws for tree service**  
This standard has been withdrawn and not replaced. Referenced document: *1417 Care of trees and shrubs*.

**AS 2727 (1997): Chainsaws - Guide to safe working practices**  
This standard has been withdrawn and not replaced. Referenced document: *1417 Care of trees and shrubs*.

## OTHER STANDARDS

The most significant other standards published in September, October and November 2023 which are referred to in NATSPEC or AUS-SPEC, or which may be of interest to specifiers, and will be taken into account in the NATSPEC April 2024 Update and AUS-SPEC October 2024 Update, are listed below:

### AUSTRALIAN

**Austroads ATS 1160 (2023): Safety management systems**

This is a new technical specification, not currently cited in AUS-SPEC. It sets out the Contractor's obligations in regard to Work Health and Safety (WHS) for the work under the Contract. It applies to contracts where the Contractor is appointed to be the principal contractor for a construction project (as defined in the WHS Law).

Relevant worksections: *0136 General requirements (Construction); 0167 Integrated management*.

**Austroads ATS 5335 (2023): Normal class concrete**

This is a new technical specification, not currently cited in AUS-SPEC. It sets out the requirements for the supply and placement of normal class concrete used in applications with a maximum Design Life of 50 years, such as minor drainage structures, footings for small signs, kerbs and channel, paths, medians and driveways.

Relevant worksections: *0319 Auxiliary concrete works; 1130 Rural concrete base; 1131 Roller compacted concrete subbase; 1132 Lean mix concrete subbase; 1133 Plain and reinforced concrete base; 1134 Steel fibre reinforced concrete base; 1135 Continuously reinforced concrete base; 1341 Water supply - reticulation (Construction); 1351 Stormwater drainage (Construction); 1361 Sewerage systems - reticulation (Construction)*.

**Austroads ATS 5450 (2023): Protection of steelwork by the use of paint coatings**

This is a new technical specification, not currently cited in AUS-SPEC. It sets out the requirements for the protective treatment of structural steelwork by painting, including A) surface preparation; B) selection of the coating system; and C) application of the paint.

Relevant worksections: *0061 Bridges and related structures; 1192 Signposting; 1194 Non-rigid road safety barrier systems; 1197 Street and public lighting; 1341 Water supply - reticulation (Construction); 1342 Water supply - pump stations (Construction); 1361 Sewerage systems - reticulation (Construction); 1362 Sewerage systems - pump stations (Construction)*.

**Austroads ATS 5451 (2023): Supply of paint for steelwork**

This is a new technical specification, not currently cited in AUS-SPEC. It sets out the requirements for the supply of paints for the protective coating of steel bridges and other steel structures.

Relevant worksections: *0319 Auxiliary concrete works; 1192 Signposting; 1196 Boundary fencing for road reserves; 1197 Street and public lighting; 1352 Pipe drainage; 1361 Sewerage systems - reticulation (Construction); 1391 Service conduits*.

**Austroads ATS 5452 (2023): Hot dipped galvanizing**

This is a new technical specification, not currently cited in AUS-SPEC. It sets out the requirements for the hot dip galvanizing of steel articles where the galvanized coating is applied after fabrication.

Relevant worksections: *0319 Auxiliary concrete works; 1130 Rural concrete base; 1131 Roller compacted concrete subbase; 1132 Lean mix concrete subbase; 1133 Plain and reinforced concrete base; 1134 Steel fibre reinforced concrete base; 1135 Continuously reinforced concrete base; 1192 Signposting; 1194 Non-rigid road safety barrier systems; 1196 Boundary fencing for road reserves; 1197 Street and public lighting; 1341 Water supply - reticulation (Construction); 1352 Pipe drainage; 1361 Sewerage systems - reticulation (Construction)*.

**Austroads ATS 5850 (2023): Handling, storage, transportation and erection of structural members**

This is a new technical specification, not currently cited in AUS-SPEC. It sets out the requirements for the handling, storage, transportation and erection of aluminium, steel and/or precast concrete structural members with a dimension exceeding 4.2 m or mass exceeding 500 kg. It may apply to other structural members or products if specified in the Contract documents.

Relevant worksections: *0061 Bridges and related structures; 0292 Masonry walls; 0293 Crib retaining walls; 0294 Gabion walls and rock filled mattresses; 1130 Rural concrete base; 1131 Roller compacted concrete subbase; 1132 Lean mix concrete subbase; 1133 Plain and reinforced concrete base; 1134 Steel fibre reinforced concrete base; 1135 Continuously reinforced concrete base; 1192 Signposting; 1197 Street and public lighting; 1341 Water supply - reticulation (Construction); 1342 Water supply - pump stations (Construction); 1352 Pipe drainage; 1361 Sewerage systems - reticulation (Construction); 1362 Sewerage systems - pump stations (Construction)*.

### INTERNATIONAL

**ASTM A975 (2023): Standard specification for double-twisted hexagonal mesh gabions and revet mattresses (metallic-coated steel wire or metallic-coated steel wire with poly(vinyl chloride) (PVC) coating)**

This standard supersedes the 2021 edition. It covers gabions and revet mattresses produced from double-twisted metallic-coated wire mesh, and metallic-coated wire for lacing wire, stiffeners, and fasteners used for manufacturing, assembling, and installation of the product.

Referenced documents: *0241 Landscape - walling and edging; 0294 Gabion walls and rock filled mattresses*.

## IN DEVELOPMENT - 0925 Electric vehicle charging systems

In response to interest from industry and the National Construction Code (NCC 2022) requiring certain buildings to be EV charging ready, NATSPEC is currently developing a new worksection to cover the topic. *0925 Electric vehicle charging systems* will be applicable to electric vehicle supply equipment (EVSE) and the associated low voltage power system. The focus of this worksection is on EVSE in the context of building projects and will cover Mode 3 and Mode 4 charging, and is primarily based on AS/NZS 3000 (2018) Appendix P.

NATSPEC intends to publish this worksection as part of the April 24 Update. NATSPEC is working with relevant industry associations and charging infrastructure providers to develop this worksection and is also seeking feedback from organisations and individuals who are interested in contributing to the review of this new worksection.

As a not-for-profit industry organisation, NATSPEC is indebted to organisations and individuals who are willing to freely provide their input and time for the improvement of industry. If you are interested in providing feedback on this new worksection, please get in touch with us at [mail@natspec.com.au](mailto:mail@natspec.com.au) for further details.

## SLIP RESISTANCE - TYPE TESTS AND SITE TESTS

NATSPEC specifies slip resistance testing in two ways: type tests and site tests. Submission of testing results are included in the GENERAL, **SUBMISSIONS** clause of individual worksections, where applicable.

Type tests are tests that are carried out off site on an item identical to a production item, with respect to materials, material suppliers, manufacturing processes, dimensions and marking. NATSPEC calls for the submission of type test results under **Products and materials** as the contractor is generally not responsible for carrying out the testing.

Site tests are carried out on site as part of the contractor's responsibility, and NATSPEC calls for the submission of site test results under **Tests**, with details of the testing requirements included under EXECUTION, **TESTING**.

Some NATSPEC worksections include both type tests and site tests for slip resistance. These worksections include products that can be tested off site and installed on site without changes to the performance of the product, for example paving, tiling and resilient finishes. In these cases, the site test submission requirement in **SUBMISSIONS** and testing requirements in **TESTING** are included as Optional style text, as type testing is usually sufficient evidence of the slip resistance performance of the installed product, and site testing can be expensive and unnecessary.

Other NATSPEC worksections may only include site tests for slip resistance. These worksections typically document finishes that are produced on site, for example concrete pavement, cementitious toppings and timber flooring that has been sanded and finished on site. The site test submission requirement and testing requirements are included as Normal style text as site testing is the only way to verify the slip resistance of the completed installation.

If there are concerns about the ongoing slip resistance performance of installed products, specifiers can consider requesting accelerated wear test results, which will provide an indication of how slip resistance may change over long-term use. See also NATSPEC TECHnotes DES 001 *Slip resistance performance* and DES 039 *Universal design: Slip resistance* for information on documenting slip resistance for your project.

## ADDITIONAL INFORMATION IN AUS-SPEC

AUS-SPEC package subscription includes design, construction, and maintenance worksection specification *Templates*, in addition there is an extensive range of supporting information to assist with the preparation of your specification. These documents are updated and reviewed in collaboration with IPWEA and our key industry partners including AfPA, Austroads, AustStab, Councils etc. The following documents can be accessed under **Subscription Downloads** in SPECbuilder Live, the online specification compilation program that permits worksections to be easily compiled into a draft specification for editing by the specifier.

*AUS-SPEC Update summary:* Provides a summary of updates to all global changes, and the clauses updated in individual worksections.

*AUS-SPEC Case Studies:* Examples of how various Councils have benefited from using the specification system for asset delivery, maintenance, and management of their infrastructure assets. The 2023 AUS-SPEC Case studies brochure is also available at [www.aus-spec.com.au](http://www.aus-spec.com.au)

*AUS-SPEC Papers* are the papers presented at the IPWEA International Public Works and Sustainability conferences, Australian Society for Concrete Pavements conferences providing an overview of AUS-SPEC and implementing the AUS-SPEC specification system for asset delivery, asset maintenance, sustainability, and pavement preservation for both rigid and flexible pavements to assist the Councils in extending the life of local government assets. The AUS-SPEC papers are also available at [www.aus-spec.com.au/aus-spec-papers/](http://www.aus-spec.com.au/aus-spec-papers/)

*AUS-SPEC Schedules:* 1402 Maintenance schedules – parks and open space, 1404 Annexures to parks and open space maintenance plan, 1502 Maintenance schedules – Building and facility and 1504 Annexure to Building and Facility plan and 1602 Maintenance schedules – road reserves worksections and 1604 Annexures to road reserve maintenance plan are spreadsheets and includes series of worksheets for maintenance work activities.

*AUS-SPEC TECHguides:* 12 *TECHguides* provide guidance for the development and subdivision of land nationally and in NSW, preparing contract documentation for design, construction and maintenance of Local Government assets and sample documents to demonstrate tendering and contract documentation for different types of projects.

*Publications index:* All other publications which cover a large number of topics and relate to several worksections are listed as 88 *TECHnotes* and 8 *TECHreports* available here [www.natspec.com.au](http://www.natspec.com.au) and can be accessed here [www.natspec.com.au/resources](http://www.natspec.com.au/resources)

### Reference specifications:

*AUS-SPEC Design Reference Specification and Checklists:* The *Design reference* specification is available in PDF format and the checklists in Word format.

The checklists can be used to verify that all the design requirements have been addressed, provide a record of the design processes, and allow flexibility of additional design criteria to be integrated into the process as necessary. The scoring sheet included provides a guide to make an assessment to seal an unsealed road. It is based on the traffic, rainfall, defects and availability of material and haulage.

*AUS-SPEC Construction Reference Specification and Schedules:* The Construction reference specification available in PDF format provides essential quality management requirements for the construction of sealed and unsealed road reserves and associated infrastructure. Construction Schedules need to be completed with project specific requirements these include material selection schedules, Summary of hold points and witness points, Maximum lot sizes and test frequencies and pay items.

*NATSPEC Maintenance reference* is available to AUS-SPEC Complete and AUS-SPEC Buildings subscribers for building maintenance and repairs in conjunction with the AUS-SPEC building maintenance framework.

*Worksection pdfs:* Fully searchable pdfs of each Workgroup in your package, highlighted to indicate changes since the last Update.

More information on AUS-SPEC is available here [www.aus-spec.com.au](http://www.aus-spec.com.au) and all media releases can be accessed here [www.aus-spec.com.au/news-aus-spec](http://www.aus-spec.com.au/news-aus-spec)

If you have any feedback regarding the 2023 AUS-SPEC Update, please feel free to send us an email at [aus-spec@natspec.com.au](mailto:aus-spec@natspec.com.au)



## THE REQUIREMENT FOR A BIM MANAGEMENT PLAN

A BIM Management Plan is a formal document that defines how a project will be executed, monitored and controlled with regard to BIM. One of its main purposes is to make clear what members of the project team can expect from each other – who is meant to do what, and how, and when. NATSPEC National BIM Guide clause 3.1 requires that at project initiation a BIM Management Plan be developed to provide a master information/data management plan and to assign roles and responsibilities for model creation and data integration.

A set of templates that work with other National BIM Guide documents has been provided for download at [www.natspec.com.au](http://www.natspec.com.au).

NATSPEC BIM Management Plan Templates include:

- **Executive Summary:** A high level document covering goals for BIM, BIM Uses, project phases and procurement addressed to – and collaboratively developed by – Client, Project Managers, Principal Consultants, i.e. those with strategic focus and skills but limited expertise or direct involvement with BIM. It responds directly to the Project BIM Brief at a similar level of focus.
- **Design BMP:** For Principals, Project Team leaders and Model Managers, i.e. those with a management focus and intermediate BIM skills, for use during the project's design phase.
- **Construction BMP:** For a similar audience as the Design BMP's but for use during the construction phase. Technical Appendix: A document containing detailed technical information, schedules, etc for BIM Managers, Model Managers and Modellers, i.e. those with advanced BIM skills and/or knowledge responsible for the day-to-day modelling and management of project information.
- **BMP Schedules:** An Excel document that includes all the tables and schedules found in the other documents but in a spreadsheet form. It is for those who prefer to work with this file format or want a format that can be more readily used for the digital exchange of data between software applications.



## USING THE TEMPLATES

Completing the Templates in the order noted reduces the tendency to get bogged down in detail before more fundamental issues are resolved. In practice, all documents are interrelated and a certain amount working backwards and forwards between them will be required during the development of the BIM Management Plan. The important point is that overall strategic considerations should be addressed before launching into detailed planning.

Even though each document is targeted at different groups, much of the content of each is still relevant to all. As they are intended to be read in conjunction with each other, their content must be consistent. The responsibility for making sure of this and coordinating their development should fall to a single person, such as the Lead BIM Adviser or Lead Consultant.

# PRINCIPLES OF ENERGY EFFICIENT DESIGN

By Russell Harris, AGWA



Effective design is governed by the principles of passive solar, insulation and ventilation.

Designing for energy efficiency in homes involves considering a range of factors, including climate, house size, orientation, window selection, overshadowing, ventilation and window-to-floor area ratio. By taking these factors into account, homes can be designed to be more energy efficient, reducing the need for heating and cooling and saving energy and money.

AGWA's 7-Star Impact Analysis explores number of variables influencing the overall energy efficiency of a home and so driving appropriate window and glass selection.

## Climate

Designing for climate involves maximising solar access in colder climates and minimising solar heat gain in warmer climates. Taking advantage of natural light and ventilation, as well as using thermal mass to store and release heat helps achieve this.

In hot climates, the aim is to limit heat gain through the roof, walls and windows. Large roof overhangs and shading devices can block the sun during the hottest parts of the day and prevent overheating as does insulating the walls, roof, and windows. Good ventilation is important to promote air circulation and cool down the house.

In cold climates, the principles of passive solar design are used to maximise heat gain. Large north-facing windows and thermal mass materials are used to absorb and store heat from the sun during the day and release it at night. Good insulation helps retain the heat inside the house.

Houses in colder climates benefit from windows with higher Solar Heat Gain Coefficient (SHGC), while warmer climates require lower SHGC solar control and, optimally, external shading. Houses in milder, more temperate climates demonstrate lower sensitivity to solar heat gain due to winter gains offsetting summer losses.

## House size

The size of a house can have a significant impact on its energy efficiency. Larger houses require more energy to heat and cool and have more surface area for heat to escape. On the other hand, smaller houses have less surface area, meaning less heat is lost in the winter and less heat enters in the summer.

However, it is important to note that the relationship between house size and energy efficiency is not always straightforward. For example, a smaller, poorly oriented house may be less energy efficient than a larger house with a more optimal orientation. Additionally, the design and construction of the house, including the location of living areas and bedrooms, can have a greater impact on energy efficiency than the house's size alone. In two-storey homes, a stairwell (or lightwell) connecting upstairs and downstairs living spaces provides significant benefit in colder climates.

Our study showed that single-storey homes typically outperformed double-storey equivalents by around 0.7 stars on average, when using similar product specifications. The effects were more noticeable in warmer climates with Brisbane having a 0.9 average star difference in favour of single-storey homes. In Sydney, the difference was less apparent with single-storey homes outperforming their two-storey counterparts by around 0.5 stars. In Melbourne, there was only a moderate 0.3-star improvement in single-storey over double-storey homes.

Overall house size, layout and specific design attributes such as shading/eave projection or the location of windows in living spaces etc contribute to the home's performance. Larger homes require more significant thermal fabric specifications. Typically, we found that single-storey homes outperform equivalently specified two-storey home by around 0.9 stars in hot climates, 0.5 stars in mixed climates and 0.3 stars in cold climates.

## Orientation

Orientation is another important factor to consider. The orientation of the house, and the placement of windows and doors, can have a significant impact on the amount of sunlight entering the house. A house, oriented to take advantage of the sun's energy, can reduce the need for heating in winter, while reducing unwanted heat gain in summer.

For example, in cold climates a house with a lot of windows facing north will take advantage of the warmth from the sun in the winter. This can be used to reduce the need for artificial heating.

Orientation of windows, particularly with daytime living areas, is a significant influencing factor on overall house performance. Optimally sited houses typically perform around 0.6 stars better than worst performing orientations across all climates.

## Window Size

The relationship between window area and energy efficiency can be complex. On one hand, windows can provide natural light, which can reduce the need for artificial lighting and save energy. Windows can also provide solar gain, helping to heat the building in the winter. However, windows can also let in heat in summer and allow heat to escape in winter, which can decrease energy efficiency.

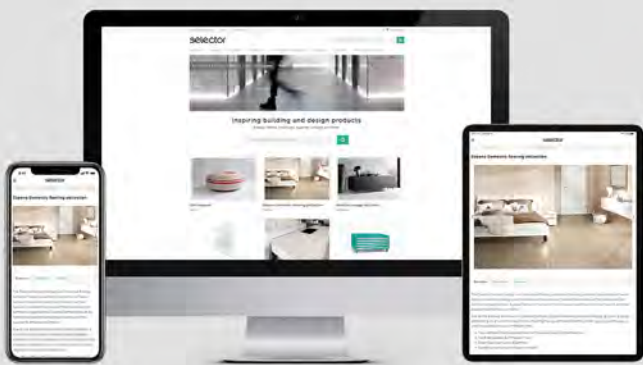
The size and the location of windows can be a significant contributor to the overall energy efficiency of a building. Larger windows can provide more natural light and solar gain, but they can also let in more heat and allow more heat to escape.

The AGWA study compared the results of both a high (27%) and low (20%) window-to-floor area ratios. It found that while the smaller window size, on average, yielded a slight improvement in the whole-of-house rating of around 0.15 stars, the specific benefit fluctuated greatly, depending on the climate and house size.

For example, a single-storey house in Brisbane actually benefits from bigger windows with the net difference being a dramatic 0.6-star gain for the larger window size.

While window size can influence the energy efficiency of the home, the influence of house size and orientation are far more significant. Optimising window size for climate, house size and specific orientation will yield the greatest benefits.





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