

Specification Writing

Selecting and specifying the most appropriate materials and systems for a project to meet the client's requirements and expectations of quality, time, value, environmental impact, and maintenance and durability is a fundamental part of building design.

This paper highlights the importance of specifications, specification methods, structure of technical information, using the NATSPEC system, specifying ESD, advice for specifiers and suggested standards for offices.

Prepared by

NATSPEC

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1 THE IMPORTANCE OF THE SPECIFICATION

There are many design decisions which cannot be expressed in drawn form. These must rely on being expressed in words. There are, also, many design decisions which would be too tedious, or too impractical for some other reason, to be recorded in drawings. The specification is thus created to complement the drawings so that together they convey all the design decisions. This is why a construction specification is primarily a design document. It is evidence of many design decisions which are not found elsewhere.¹

1.1 Definition

John Gelder, a former Chief Editor of NATSPEC, defines specification as both a process and a product. Specifications are written descriptions of the required quality of the built product and its component products. A specification may also include the procedures for determining that the requirements of the specification have been met.

1.2 Purpose

The specification links the drawings with the general conditions of contract. It complements, without duplication, the information in the drawings or the general conditions of contract. Drawings are graphic descriptions which primarily define quantity, position and sometimes quality. Specifications are written descriptions which define quality. Together they express the designer's intentions.

The specification has many roles including:

- A document demonstrating compliance with statutory requirements.
- A written record of design decisions, materials used and set standards.
- An estimating document.
- A tendering document.
- A legal, contractual document.
- An on-site working document.
- A dispute settlement document.
- A project management tool.
- A facilities management tool.
- A document to be analysed for feedback into the office master specification and office procedures.

1.3 Users

Designers, clients, certifying authorities, estimators, tenderers, contractors and subcontractors, contract administrators, legal representatives, project managers, construction managers and facilities managers all have an interest in the specification. It is important to ensure the various users interpret the specification in the same way. A good specification will:

- Answer the questions posed by the client, the BCA and local requirements.
- Cover the total range of the project elements.
- Have a logical structure which is easy to navigate.
- Cite other documents precisely and meaningfully.
- Have a consistent approach to grammar and language.
- Be unambiguous.
- Complement the drawings and be consistent with the other documents and the method of procurement.

Building Code of Australia (BCA)

NATSPEC cites BCA Volume One *Deemed-to-Satisfy* standards and clauses:

- A General provisions
- B Structure
- C Fire resistance
- D Access and egress
- E Services and equipment
- F Health and amenity
- G Ancillary provisions
- H Special use buildings
- I Maintenance
- J Energy efficiency

NATSPEC also cites BCA Volume Two *Acceptable solutions* standards and clauses:

- Part 3.1 Site preparation
- Part 3.2 Footings and slabs
- Part 3.3 Masonry
- Part 3.4 Framing
- Part 3.5 Cladding
- Part 3.6 Glazing
- Part 3.7 Fire safety
- Part 3.8 Health and amenity
- Part 3.9 Safe movement
- Part 3.12 Energy efficiency

The BCA clause locations for all cited standards, are provided in the reference documents list at the end of each NATSPEC worksection.

1. Standen (1995)

SPECIFICATION METHODS

2 TYPES OF SPECIFICATION CLAUSES

*It is not difficult to peruse a sampling of specifications and to discern some basic and distinct styles or methods adopted by different specifiers and even by the same specifier, for differing reasons, in the same specification.*¹

2.1 Descriptive

A descriptive specification clause describes in detail the materials, workmanship and installation required to be used by the contractor or tradesperson. In practice, many specification clauses are a combination of descriptive and performance specifications.¹

For example:

Fabrics: Piping: 3 mm diameter beads with core.

2.2 Reference

A reference specification clause is a reference to a published document, with which processes and products must comply. It is incorporated by a reference to the title or other identification of the document which may be a standard or often a manufacturer's manual.

For example:

Grading: DD to AS/NZS 2269.0, Bond type A.

*Know the standard before you use it, and enforce it after you have used it.*¹

On the currency of cited standards, the NATSPEC *General requirements* worksection contains the following text:

Use referenced documents which are the editions, with amendments, current 3 months before the closing date for tenders, except where other editions or amendments are required by statutory authorities.

Editions cited in the BCA for example, may not accord with the current edition, hence the exception.

2.3 Performance

A performance specification clause specifies an item in a construction project by prescribing a desired end result and the criteria by which the result will be judged for its acceptability.²

For example:

Pole taper: Maximum 1 in 120.

The BCA has both performance requirements and *deemed-to-satisfy* provisions which it defines as follows:

Performance requirements: a requirement which states the level of performance which a *Building Solution* must meet.³

Deemed-to-satisfy provisions: provisions which are deemed to satisfy the *Performance requirements*.³

2.4 Direct/Proprietary

A direct or proprietary specification clause nominates an item in a construction project by reference to a proprietary trade name.¹

For example:

Coating systems: Apply XYZ paints coating systems to the Exterior painting schedule and the Interior painting schedule.

Standards

Where relevant, NATSPEC cites standards for materials and installations.

The BCA cites almost 200 standards. Each of these standards cites, approximately, a further 10 secondary standards.

Some 110 of the BCA deemed-to-satisfy standards are cited in NATSPEC.

A further 1080 non-BCA standards are also cited in the NATSPEC worksection *Templates*.

In the *Guidance* text of NATSPEC, another 790 additional standards are cited.

Where standards are cited, the specifier may choose to retain it, replace it with a proprietary product or delete the standard altogether.

Where no standards exist for a specification item, NATSPEC provides performance criteria.

Many standards themselves are themselves explicitly performance based, such as: AS/NZS 2728:2007 *Prefinished/prepainted sheet metal products for interior/exterior building applications - Performance requirements*.

1. Standen (1995)
2. Standen (2000)
3. BCA 2010

DEFINING THE WORK

3 TECHNICAL INFORMATION

The technical matter in the specification must of necessity cover a very wide range of trades, materials, equipment, applications and practices...The grouping of this material into logical subdivisions is the obvious starting point in the preparation of a specification.¹

3.1 Technical worksection Templates

NATSPEC uses the term *worksection* to describe the foundation unit of a specification. Some worksections are trade based (e.g. brick and blockwork) and others follow processes (e.g. windows, lining).

In NATSPEC, each worksection is provided as a *Template* for the specifier to customise by completing prompts, adding relevant material and deleting material which is not applicable to the particular project.

Specification information typically includes finishes, standards, quality, material grades and thicknesses, tolerances, performance requirements, and requirements for fabrication and installation. Both drawings and specification must address the BCA and other relevant state and local regulations and reflect good practice in the particular activities.

NATSPEC worksections can be generic or branded. A generic worksection is general and comprehensive. Branded worksections are developed by NATSPEC, in conjunction with the manufacturer (known as a Product Partner). Each branded worksection is based on the associated generic worksection and shares the same classification number.

3.2 The National Classification System

Worksections need to be classified and sequenced in a logical order, responding to common local construction industry sequence. Locations need to be allocated for specification material provided by the various specialist designers and consultants.

The National Classification System provides locations for specification material produced by the architect and landscape architect, the interior designer, the civil and structural engineer, and the mechanical, hydraulic and electrical engineers. It is a modified version of the 1989 NATSPEC Classification system by Bryce Mortlock (the father of NATSPEC) and Hans Milton (a former chairman of the National Committee on Rationalized Building).

In 2007 NATSPEC incorporated AUS-SPEC, used by Local Councils for the life-cycle management of assets, into the National Classification System. Many new workgroups and worksections have been added as a result. At present the workgroups include:

NATSPEC	AUS-SPEC
1. General	00. Planning and design
2. Site, urban and open spaces	11. Construction - Roadways
3. Structure	13. Construction - Public utilities
4. Enclosure	14. Maintenance and operations - Urban and open spaces
5. Interior	15. Maintenance and operations - Buildings
6. Finish	16. Maintenance and operations - Roadways
7. Mechanical	17. Maintenance and operations - Bridges
8. Hydraulic	18. Maintenance and operations - Public utilities
9. Electrical	

As new worksections are produced, they are added to the system. Users of NATSPEC may add their own worksection titles and classification numbers where NATSPEC has no material.

Product Partners

NATSPEC Product Partners include:

- ALUCOBOND
- ANCON BUILDING PRODUCTS
- ARCHITECTURAL WINDOW SYSTEMS
- ARMSTRONG
- BGC
- BLUESCOPE STEEL
- BREEZWAY
- CUBIC
- DULUX
- DYNAMIC COMPOSITE TECHNOLOGIES
- EATON
- EUROSAFE SOLUTIONS
- FANTECH
- FIELDERS
- FLETCHER INSULATION
- FORBO
- GRANOSITE SPECIALIST ARCHITECTURAL COATINGS
- HETTICH
- HILLS
- INTERNATIONAL PAINT
- KABA/DOORWAYS
- LATCHWAYS MANSAFE
- MIKOR
- NUPLEX
- MAKMAX
- RAVEN PRODUCTS
- RESENE
- SIKA
- SOLVER PAINTS
- TASMAN ACCESS FLOORS
- TAUBMANS
- USG AUSTRALASIA
- VIRIDIAN GLASS
- WATTYL AUSTRALIA
- WRIMCO

Relevant TECHnote:
NTN GEN 008 *Branded vs generic worksections*

1. Standen (1995).

DEFINING THE WORK

3.3 Worksection structure

In NATSPEC, each worksection *Template* is generally divided into four parts: GENERAL, PRODUCTS, EXECUTION and SELECTIONS.

1. GENERAL contains clauses applying to the worksection as a whole, including:

- Responsibilities.
- Cross references.
- Standards.
- Quality, tests and verification.
- Interpretations.
- Inspection.
- Submissions.

2. PRODUCTS describes the basic materials, components and fabricated items.

3. EXECUTION sets out the performance criteria to prepare the substrate, assemble materials to produce an installation and carry out the works.

4. SELECTIONS contains schedules that refer to generic products by their properties or to the selection of actual proprietary products by the specifier for the project. These schedules can be included in the specification or on the drawings.

The *Templates* are further structured into a hierarchy of subsections, clauses, subclauses, paragraphs, prompts, tables, schedules and references with *Guidance* notes provided in hidden text. Some worksections also have an accompanying *Commentary* providing background information and references.



Quality Management

NATSPEC covers quality management systems in the *Tendering and Quality* worksections, and in each technical worksection where product quality, quality control and quality assurance are covered.

NATSPEC requires reports for various matters including:

- Emergency construction joints.
- Geotechnical investigation.
- Load tests.
- Nonconforming products.
- Physical performance.
- Termite control systems.
- Nominated tests.
- Waterproofing membranes.

NATSPEC'S *General requirements* worksection and other worksections where appropriate cover:

- Precompletion tests.
- Type tests.
- Production tests.
- Site tests.
- Completion tests.

Many standards cover tolerance. Where there is an absence of tolerance requirements, NATSPEC generally defines tolerance.

DEFINING THE WORK

4 PROJECT SPECIFIC INFORMATION

4.1 Tender

The tender documents are pre-contract documents. The tendering worksections note conditions of tender and do not form part of the contract. Items covered in NATSPEC's tendering worksections include:

- Description of works.
- Site description.
- List of tender documents.
- Contact details.
- Tender information (e.g. tender period, procedures).
- Tender requirements.
- Tender form.

AUS-SPEC worksections also include Schedule of rates.

Tendering is a separate self-contained transaction which terminates with the awarding of a contract. The technical worksections make no reference to tendering.

4.2 Preliminaries

Preliminaries cover project-specific and site requirements, not included in standard contracts, which do not constitute work that could be allocated to a particular worksection. Items might include:

- Contract documents.
- Surveys.
- Protection of property
- Railings and hoardings.
- Temporary buildings.
- Signboard.
- Site meetings.
- Site noise control.
- Shop drawings.
- Provisional quantities.
- Temporary services.
- Completion.

NATSPEC provides both generic *Preliminaries* worksections as well as preliminaries worksections for the following contracts:

- ABIC MW- 2008 Australian Building Industry Contract - Major works.
- ABIC SW- 2008 Australian Building Industry Contract – Simple works.
- AS 2124 (1992) General conditions of contract.
- AS 4000 (1997) General conditions of contract.
- AS 4902 (2000) General conditions of contract for design and construct.
- AS 4905 (2002) Minor works contract conditions (Superintendent administered).

4.3 General requirements

The *General requirements* worksection covers administrative topics common to all the technical worksections and each technical worksection cross references it. Items include:

- Interpretation.
- Inspection.
- Tests.
- Samples.
- Submissions.
- Substitution.
- Completion.
- Warranties.

4.4 Common requirements

The *Common requirements* worksections cover material relating to more than one worksection. Rather than repeating the same material over many worksections, NATSPEC gathers it into single worksections which include:

- Adhesives, sealants and fasteners.
- Timber products, finishes and treatment.
- Fire-stopping.
- Metals and prefinishes.
- Termite management.
- Building IT components.

Procurement methods

The NATSPEC material generally addresses a single contractor in a single prime contract but it may also be used to produce different types of specifications for different types of contract such as for:

Design and construct contracts, or for

Single trade packaging contracts.

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Update included:

- 2 Tendering worksections.
- 11 Contract preliminaries worksections.
- 205 Full technical worksections.
- 66 Basic technical worksections.
- 10 Shell technical worksections.
- 56 branded worksections.
- 185 AUS-SPEC worksections.

5 USING NATSPEC

5.1 General

NATSPEC is a National Master Specification for use with projects of many types and sizes. As a master specification it will not contain all the technical requirements for every project. For each project, the specifier will need to select the appropriate NATSPEC worksections and edit the material to suit the project.

Editing may include:

- Deletion of inappropriate options where the NATSPEC *Template* provides mutually exclusive options (e.g. different roofing or door frame assembly types).
- Deletion of lengthy prescriptive or performance material where a proprietary specification is appropriate and is permitted by the client.
- Deletion of clauses with prompts where schedules or drawings are better suited to conveying the information (e.g. location).
- Deletion of NATSPEC material intended only for custom-made options or for generic specifying. Many items are not usually custom-made (e.g. roller shutters and luminaires).
- Allowing silence in the documents, permitting the contractor to decide on the method, material, or quality to use, where the *Templates* offers acceptable alternatives from which the contractor must choose. The contractor may reasonably be expected to select some appropriate, minor materials (e.g. fasteners, adhesives) in any case.
- Deferral to the NATSPEC default provision (e.g. AS/NZS 4455 for bricks, AS/NZS 3982 for urinals) where satisfactory.
- Deletion of **Samples** and **Tests** clauses and subclauses where they are not warranted by the size and complexity of the project. Note that testing of structural elements such as concrete, and other elements built to a performance specification, is always advisable.
- Revising the quality level requirement above the industry standard or the requirement level found in the NATSPEC material after determining the revised quality level is available in the market.

5.2 Office edited worksections

NATSPEC *Templates* can be pre-edited to create Office edited worksections to include:

- Office policies on the use of some materials and components.
- Office specialist project material.

For example, a practice specialising in housing might delete the material which is never required for this class of project. Default proprietary items can also be pre-selected at this stage. The pre-edited document can then be used as an Office Master file for all housing specifications. Conversely, practices dealing with schools may need to prepare additional standard worksections or subsections.

Choosing an appropriate starting point is critical. Rather than altering NATSPEC material, which may complicate the updating process, consider preparing office or project type specifications.

Offices can also prepare standard prompts with office preferred schedules which specifiers can insert into the NATSPEC *Templates* at appropriate points.

5.3 Project specific worksections

NATSPEC does not cover everything. Where it is necessary to create your own project specific worksections, select the NATSPEC worksection that is closest to the one you need. Follow the sequence for creating an Office edited worksection, giving the worksection a new name and classification number. The classification number allows you to place the office edited where you wish it to appear in the specification.

Office Edited Worksections

Some offices have set standard design criteria for the majority of the projects. Office edited worksections can be developed and stored with the NATSPEC worksections as an Office Master System. This is useful where an office routinely:

- Includes office edited worksections not covered by NATSPEC.
- Reorders worksections to suit their documentation system.
- Includes performance text and standard selections.
- Incorporates text based on office and site experience.
- Customises to house style.

Create your own worksections if NATSPEC does not have one that you need. Consider sending these to NATSPEC for future reference.

Relevant TECHnote:
NTN GEN 007 *NATSPEC updates and office master specifications.*

5.4 Step-By-Step

The following is a step-by-step guide on how to produce a specification from NATSPEC *Templates*.

MAINTENANCE

Step 1 – Update NATSPEC files and any office edited master files

Make sure each project specification incorporates standards and mandatory requirements current at the time of writing.

GENERIC EDITING AND PLANNING

Step 2 - Reformat Templates

Refer to the *QUICKstart* guide on formatting NATSPEC *Templates* in line with office policy on document style if required.

Step 3 – Office edited worksections

Collect material such as office policy requirements, client requirements (e.g. preliminaries) and project type supplements (e.g. schools). If possible, obtain electronic copies of client requirements in a suitable format. Draft new text in NATSPEC style.

Step 4 - Select the working version of Templates for your project

Decide which updated *Template* version will best suit the project specification e.g. NATSPEC Domestic, Basic or Professional or Office edited worksection templates which have been pre-edited by an office to include office policy, client policy or building type requirements.

Step 5 - Select worksections required

Use SPECbuilder Pro to select worksections required for the new project specification and compile a draft specification.

Step 6 - Decide on working medium: Digital or hardcopy markups

Decide whether to customise the *Templates* directly on-screen, or by first marking-up paper copies. The first review - at worksection, sub-section and clause level - can be on-screen. Subsequent reviews can be marked up on printed copies. Print out as late as possible to reduce the bulk of the master document for marking up.

Step 7 - Decide on a working pattern

Be systematic and keep a record of work which is planned and completed. Take time and resource restraints (budget, number and grade of personnel, access to computers) into consideration when preparing the program.

The working pattern will be influenced by the procurement method. For example, in Multiple Contracting, a particular worksection package, such as windows, will be required early in the process (due to lead times off-site) whereas the painting package may commence later.

TECHNICAL CUSTOMIZING

Step 8 - Identify clauses not required

Delete unnecessary clauses from the worksections. Highlight uncertain clauses and leave until later.

At this stage, it is often best to concentrate on completing particular worksections rather than jumping from one to the other. Print the edited working document, if not already done, as it may be easier to work on the on the hard copy from now on.

Step 9 - Identify subclauses not required

Delete unnecessary subclauses (and associated prompts) from the worksection. Highlight uncertain subclauses and associated prompts and leave until later.

Step 10 - Identify paragraphs and subparagraphs not required

Delete unnecessary paragraphs and subparagraphs (and associated prompts). Refer to the hidden *Guidance* text.

NATSPEC is a system of specification worksection files for use with your word processor.

SPECbuilder is specification compilation software which helps you to manage, create and edit your project specifications.

Step 11 – Complete the write-in options

Complete the options, [complete/delete] prompts and schedules.

Step 12 - Add novel material

Add original material not dealt with by the NATSPEC *Templates* (although sometimes mentioned in the *Guidance* text) where required.

Check against standards and other technical literature, particularly for availability and the variables, which need to be specified. Begin with the worksections about which you know the most. Use the NATSPEC style.

Step 13 - Edit standard text

Systematically edit standard (default) NATSPEC *Template* text where it conflicts with project requirements, the drawings, completed prompts or with added new material. In particular, default standards or descriptions may conflict with proprietary items.

If required you may insert hyperlinks (on-screen) into the worksection text for office or client policy requirements. Standard NATSPEC *Template* text may also be modified to incorporate a preferred style or improve on a perceived lack of clarity for example. A word of warning; the more this is done, the less valuable the standard text becomes and the more work for the specifier.

Step 14 - Complete

Run through from Step 8 as often as required until the project specification is complete. In particular make sure all NATSPEC text options have been considered, all defaults evaluated and all prompts completed/deleted. Ensure that no uncertain items remain – if in doubt at this stage leave them out.

EDITORIAL CUSTOMIZING AND PRODUCTION**Step 15 - Check cross-references**

Check all cross-references in the project specification to other worksections, standards, referenced documents, and contract documents. Ensure, in particular, that cross-referenced material has not been accidentally deleted (thereby creating conflict).

Minimise repetition and ensure there is no conflict between drawings and the specification. The *Referenced documents* file (listing standards cited in the project specification) is intended to assist readers of the specification, by giving the titles of documents which the specification only references by number. It is optional for inclusion in a specification. If using, it should be edited (using the computer search facility to find which standards are included) listing only standards referenced in the project specification, not ones that you think might or should apply.

Step 16 - Proofread

Print and proofread (perhaps several times). Check the format, number the pages, finalise the contents and prepare an index. Delete hidden text using the NATSPEC Toolbar button.

Step 17 - Correct

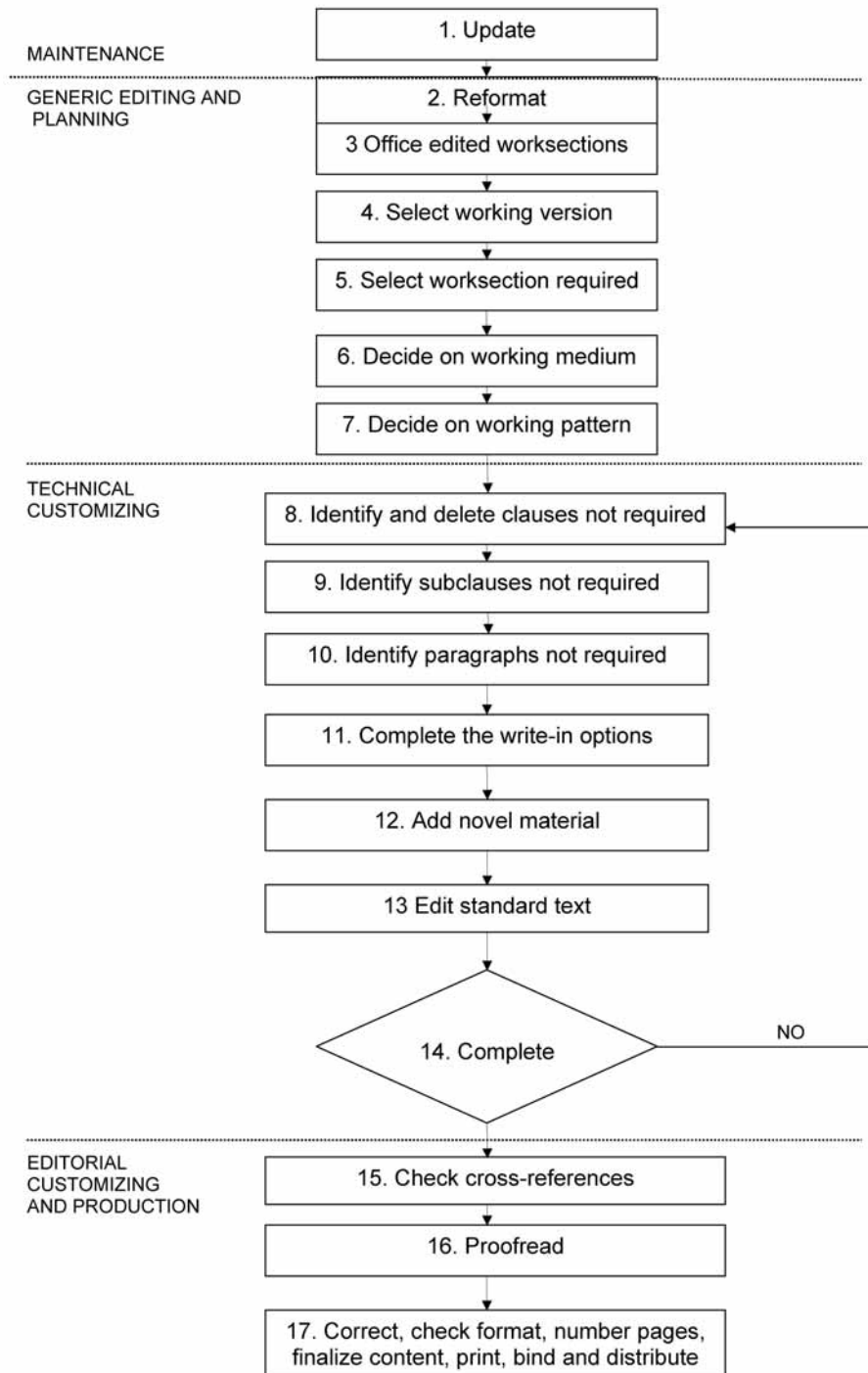
Check details again. NATSPEC SPECbuilder Pro allows you to easily renumber subsections and clauses. Add headers, footers and issue/revision tables in accordance with office policy. Distribute to the principal, consultants, tenderers and other relevant parties. Retain working and library/archive copies.

Styles and formatting

NATSPEC templates have an attached .dot file which holds information about format including headings.

NATSPEC formatting style allows easy reference to the hierarchy of the text within the specification->

NATSPEC SPECIFICATION WRITING PROCESS



Substitution

NATSPEC worksections are written in generic terms, though many worksections will be made proprietary by the specifier.

Where a specifier chooses a product, much of the NATSPEC material becomes redundant and will be deleted.

NATSPEC's *General requirements* worksection permits substitution of documented products, methods or systems provided certain conditions are met.

For example:

Evidence: If the documented products or systems are unavailable within the time constraints of the construction program, submit evidence from the supplier.

Relevant TECHnote:
NTN GEN 006 *Product specifying and substitution.*

6 ECOLOGICALLY SUSTAINABLE DEVELOPMENT (ESD)

6.1 The role of specifications in ESD

An ESD specification focuses on:

- Giving effect to ESD design decisions not shown on the drawings.
- Specifying ESD appropriate materials and methods of construction.
- Specifying components and products that permit the implementation of ESD.

6.2 Implementing ESD principles

The specification can be used to implement specific ESD principles in a number of broad categories:

- Energy conservation and greenhouse gas reduction.
- Conserving other consumables such as water.
- Using ESD appropriate materials with, for example, low volatile organic compounds (VOC) emissions.
- Creating a quality environment, both inside and outside the building, based on ESD principles.

6.3 Specifying ESD with NATSPEC

To assist the specifier in achieving the full ESD potential of the design, NATSPEC:

- Provides industry with a comprehensive specification system that can be used for varying means of building procurement.
- Recognises that most aspects of ESD relating to buildings are design issues and that a primary function of the specification is to give effect to design decisions.
- Does not mandate ESD but provides options for specifiers to choose and adopt ESD principles. *Guidance* text, highlighting areas of ESD potential, is included within the worksection *Templates*.
- Does not attempt to arbitrate on competing claims made for the sustainability or otherwise of materials or methods and instead aims to present specifiers with impartial information that can be used to make informed decisions.
- Provides material for use in specifying ecologically sustainable, non-traditional construction materials and methods such as 0321 *Monolithic stabilised earthwalling*.
- Provides a means for meeting mandatory ESD requirements to the extent that these can be handled through the specification process.

6.4 NATSPEC, ESD and the BCA

The BCA incorporates a number of mandatory environmental provisions. These primarily relate to energy conservation and greenhouse gas reduction but include improving the comfort and amenity of buildings for their occupants.

NATSPEC's TECHreport *Specifying ESD* indicates which worksections can be used to document provisions necessary to conform to BCA requirements and the ESD commitments necessary to meet BCA objectives. This is particularly relevant when the design is for a verification-based alternative solution, rather than the *Deemed-to-Satisfy* provisions of the BCA.

6.5 NATSPEC, ESD and environmental rating schemes

Many designers and specifiers adopting an ESD approach will also be seeking to achieve specific targets against voluntary environmental rating schemes such as NABERS and Green Star. NATSPEC provides material for specifying products and components to meet GBCA Green Star commitments. *Guidance* text relating to Green Star is included within the worksection *Templates*. NATSPEC worksections 0168 *Green Star – as built submissions* and 0169 *Green Star - Office as built submissions* facilitate specifying Green Star submission requirements to be made by the contractor.

ESD Rating

Achieving a star rating and complying with the Energy Efficiency in Government Operations (EEGO) policy largely involves design decisions, some of which need to be given effect through the specification.

The NATSPEC TECHreport, *Specifying ESD*, provides a valuable overview of how to use the NATSPEC system to specify buildings incorporating ESD principles and includes a matrix linking NATSPEC worksections and the ESD requirements of the BCA, NABERS and GBCA Green Star. The TECHreport, as well as TECHnotes about other ESD related issues, is available for download from the ecoRegister section of www.natspec.com.au.

ADVICE FOR SPECIFIERS

7 ADVICE FOR SPECIFIERS

Brevity

- Use the imperative form. For example, Lay tiles.... rather than.... Tiles shall be laid.
- Avoid lengthy verbal descriptions – use NATSPEC style (e.g. colons and keywords), draw it or schedule it instead.

Clarity

- Use precise, consistent language, structure and terminology.
- Avoid legal phraseology or stilted formal terms and sentences.

Content

- Develop an office policy regarding what material will be included in the drawings, schedules and written specifications.
- Do not include material in technical worksections which should be covered in preliminaries, general conditions annexures or the general conditions themselves, e.g., tendering, contractual material, project descriptions, drawing lists.

Compliance

- Establish if any alternative solutions to the BCA are to be pursued.
- Consider preparing a BCA compliance document comprising only those worksections relating to the BCA.

Consultants

- Check specifications and schedules provided by consultants for consistency.
- Do not duplicate material common to various project consultants.

Cross References

- Minimise cross-references between the specification, drawings and other contract documents.
- Do not use phrases such as *detailed on the drawings* or *unless otherwise specified*.

Fairness

- Be specific, so that a basis for pricing is clearly set.
- Do not specify anything which can not be verified or which the contract administrator or the principal does not intend to enforce.

Redundancy

- Say it once and in the right place.
- Do not use redundant reference paragraphs at the start of each worksection. The contractor is responsible for all work and must read all documents together.

Repetition

- Avoid repetition within the specification and between the specification, drawings and other contract documents.
- Do not specify the same thing using a mix of proprietary, descriptive, performance or reference specification – conflict is bound to arise.

Standards

- Do not rely on a blanket instruction to comply with all relevant standards.
- Have access to the standards you need and evaluate their scope and currency.

Structure

- Break long clauses into subclauses, paragraphs and subparagraphs with titles or bullet points in a logical hierarchy, each dealing with one item.
- Standardize text of common clauses and subclauses.

Substitution

- Do not use *equal* or *equal approved* – it is an invitation for substitution.

Time

- Start documenting as early as the receipt of the Client's brief.
- Establish the Conditions of Contract and check for items requiring early attention

Contract administration

It is beyond the scope of NATSPEC to offer any management system to handle the approval process. Consequently definitions and directions such as 'approved' do not appear as default text. If adding a definition, the following text may be useful:

Approved: 'Approved', 'reviewed', 'directed', 'rejected', 'endorsed' and similar expressions mean 'approved (reviewed, directed, rejected, endorsed) in writing by the contract administrator'.

8 ABOUT NATSPEC

NATSPEC *Development*

The development of NATSPEC material is driven by:

- The BCA, including state and territory variations on safety, health, amenity and energy aspects of buildings.
- Some 2,000 standards and documents, mostly Australian, relating to the worksections, *Templates*, *Guidance* and *Commentaries*.
- The knowledge base of NATSPEC editorial staff.
- The direction of the 21 stakeholders, expressed through a seven-member board.
- Constant feedback from its users including specifiers, contractors and manufacturers.

NATSPEC values feedback given by its users. Comments can be emailed to: mail@natspec.com.au.

NATSPEC *Updates*

NATSPEC issues subscribers with a CD containing all worksections including new, revised and branded twice a year. At same time, new and updated files are uploaded to SPECbuilder Live. NATSPEC subscribers are also kept informed via the quarterly publication, SPECnotes.

Information, available to subscribers only, on the NATSPEC website includes:

- A monthly listing of revised standards which relate to NATSPEC material.
- NATSPEC TECHnotes.

NATSPEC *TECHnotes*

TECHnotes are a series of one or two page notes prepared by NATSPEC to give specifiers general information on specification writing or technical topics that relate to more than one worksection. Titles are grouped into 3 categories: General, Design and Products.

NATSPEC *Branded worksections*

Branded worksections are developed by NATSPEC in conjunction with the manufacturer, known as a Product Partner. Branded worksections follow NATSPEC style and format and offer specifiers an alternative to NATSPEC generic worksections.

NATSPEC *Benefits*

NATSPEC is a master specification system. It is not a specification. It provides a benchmark for good building practice. It is not an Australian standard or a governmental regulation. No one is compelled to adopt NATSPEC but many in the industry believe that it is in the industry's best interest to do so.

The benefits of using NATSPEC are:

- Clear, simple and common language between the professional consultants.
- Up-to-date references to regulations and standards.
- Economy. NATSPEC is produced by a centralised agency monitoring construction industry developments and, as a not-for-profit organisation, the benefits of this are transferred to subscribers and the industry as a whole.

9 REFERENCES AND FURTHER READING

Books

Gelder, John (2001), *Specifying architecture*.

Norman, Douglas A (1977), *Specifications*.

Peaslee, Horace W (1939), *Streamlined specifications*.

Standen, David (1995), *Construction industry specifications*.

Standen, David (2000), *Construction industry terminology*.

Guides

The BEDP Environmental Design Guide, a product of the Australian Council of Built Environment Design Professions (BEDP), published by the Australian Institute of Architects (AIA)

Practice notes

Australian Institute of Architects (AIA) Practice Division, AIA Practice Services:

(2008), Advisory Note AN04.02.101, *Quality control in the preparation of specifications*.

(2004), Advisory Note AN14.03.100, *Specification writing*.

(2006), Advisory Note AN 10.05.102, *Methods of procuring buildings*.

(2006), Advisory Note AN 10.05.104, *Design and construct contracts*.

(2008), Advisory Note AN16.01.100, *Managing shop drawings*.

(2006), Advisory Note AN16.04.102, *Substitutions*.

Standards

AS/NZS 2269:2004 *Plywood - Structural*

AS/NZS 3700:2001 *Masonry structures*

AS/NZS 3982:1996 *Urinals*

AS/NZS 4000:1997 *General conditions of contract*

AS/NZS 4455:1997 *Masonry units and segmental pavers*

AS/NZS 4680:2006 *Hot-dipped galvanized (zinc) coatings on fabricated ferrous articles*.

AS/NZS ISO 9000:2006 *Quality management systems – Fundamentals and vocabulary*.

AS/NZS ISO 9001:2008 *Quality management systems – Requirements*.

SAA HB50-2004: *Glossary of building terms*.

Contracts

ABIC MW-2008 *Australian Building Industry Contract – Major works*

ABIC MW-1-2003 *Australian Building Industry Contract - Major works*

ABIC SW-1-2002 *Australian Building Industry Contract - Simple works*

AS/NZS 2124:1992 *General conditions of contract*

AS/NZS 4000:1997 *General conditions of contract*

AS/NZS 4902:2000 *General conditions of contract for design and construct*

AS/NZS 4905:2002 *Minor works contract conditions (Superintendent administered)*

Further reading



10 SUGGESTED STANDARDS FOR OFFICES

The following are lists of suggested references appropriate to offices dealing with typical projects. Many are design standards that must be complied with in order to meet BCA and other mandatory requirements while others are related handbooks. These are considered to be the foundation upon which other specialist and appropriate references are added. As with all standards, they must be kept up to date. Standards cited in BCA Volumes 1+2 are marked BCA 1, BCA 2 or BCA 1+2 as appropriate.

FOR ALL

AS 4120:1994	Code of Tendering
AS 4122:2000	General conditions of contract for engagement of consultants
AS/NZS ISO 9001:2008	Quality management systems – Requirements
SAA HB 50:2004	Glossary of building terms
BCA 2009	Building Code of Australia

ARCHITECTS

Design

	AS/NZS ISO 717.1:2004	Acoustics - Rating of sound insulation in buildings and of building elements - Airborne sound insulation
BCA 1	AS/ISO 717.2:2004	Acoustics - Rating of sound insulation in buildings and of building elements - Impact sound insulation
BCA 1	AS 1428.1-2009	Design for access and mobility - General requirements for access - New building work
	AS 1428.2-1992	Design for access and mobility - Enhanced and additional requirements - Buildings and facilities
BCA 1+2 (1992)	AS/NZS 1428.4.1:2009	Design for access and mobility – Means to assist the orientation of people with vision impairment – Tactile ground surface indicators.
BCA 1+2	AS 1657-1992	Fixed platforms, walkways, stairways and ladders - Design, construction and installation
BCA1+2	AS 1684.4-2006	Residential timber-framed construction - Simplified - Non-cyclonic
BCA 1	AS 1905.1-2005	Components for the protection of openings in fire-resistant walls – Fire-resistant doorsets
	AS/NZS 2311:2009	Guide to the painting of buildings
	AS/NZS 2312:2002	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings
BCA 1	AS 2890.1-2004	Parking facilities - Off-street car parking
BCA 1+2	AS/NZS 3500.3:2003	Plumbing and Drainage - Stormwater drainage
	AS 3660.1-2000	Termite management - New building work
BCA 1+2	AS 3959-2009	Construction of buildings in bushfire-prone areas
	AS 4055-2006	Wind loads for housing
BCA1+2	NASH 2005	Residential and low-rise steel framing

Products and Execution

BCA 1+2	AS 1288:2006	Glass in buildings - Selection and installation
BCA 1+2	AS 1562.1:1992	Design and installation of sheet roof and wall cladding – Metal
BCA 1	AS 1860.2:2006	Particleboard flooring - Installation
	AS/NZS 2589:2007	Gypsum linings - Application and finishing
BCA 1+2	AS 2047:1999	Windows in buildings – Selection and installation
	AS 2601:2001	Demolition of structures
	AS 2870:1996	Residential slabs and footings – Construction
	AS/NZS 2904:1995	Damp-proof courses and flashings
	AS 3700:2001	Masonry structures
BCA 1+2	AS 3740:2004	Waterproofing of wet areas within residential buildings
	AS 3958.1:2007	Ceramic tiles - Guide to the installation of ceramic tiles
	AS 3958.2:1992	Ceramic tiles - Guide to the selection of a ceramic tiling system
	AS 4072.1:2005	Components for the protection of openings in fire-resistant separating elements. Service penetrations and control joints
	AS/NZS 4200.2:1994	Pliable building membranes and underlays - Installation requirements
BCA2	AS/NZS 4858:2004	Wet area membranes
BCA1+2	AS/NZS 4859.1:2002	Materials for the thermal insulation of buildings - General criteria and technical provisions
	AS 5604:2005	Timber - Natural durability ratings

LANDSCAPE ARCHITECTS

	AS 1604.1-2005	Specification for preservative treatment - Sawn and round timber.
	AS 1720.2-2006	Timber structures - Timber properties
	AS 1725-2003	Galvanized rail-less chain-link security fencing and gates
BCA 1+2 (1993)	AS 1926.1-2007	Swimming pool safety - Fencing for swimming pools
BCA 1+2 (1995)	AS 1926.2-2007	Swimming pool safety - Location of fencing for private swimming pools
	AS 2423-2002	Coated steel wire fencing products for terrestrial, aquatic and general use
	AS 2820-1993	Gate units for private swimming pools
	AS 3704-2005	Geotextiles - Glossary of terms
	AS 3743-2003	Potting mixes
BCA 2	AS 3798-2007	Guidelines on earthworks for commercial and residential developments
	AS 4373-2007	Pruning of amenity trees
	AS 4419-2003	Soils for landscaping and garden use
	AS/NZS 4422:1996	Playground surfacing - Specifications, requirements and test method
	AS 4454-2003	Composts, soil conditioners and mulches
	AS/NZS 4486.1:1997	Playgrounds and playground equipment - Development, installation, inspection, maintenance and operation
	AS 4970-2009	Protection of trees on development sites
	BEDP EDG DES13-1996	An introduction to water sensitive design
	BEDP EDG DES14-1996	Design solutions for water efficiency
	BEDP EDG GEN32-2000	Contaminated land

INTERIOR DESIGNERS

	AS/NZS ISO 717.1:2004	Acoustics - Rating of sound insulation in buildings and of building elements - Airborne sound insulation
BCA 1	AS/ISO 717.2:2004	Acoustics - Rating of sound insulation in buildings and of building elements - Impact sound insulation
BCA 1+2	AS 1288-2006	Glass in buildings - Selection and installation
BCA 1	AS 1428.1-2001	Design for access and mobility - General requirements for access – New building work
	AS 1428.2-1992	Design for access and mobility - Enhanced and additional requirements - Buildings and facilities
BCA 1+2 (1992)	AS/NZS 1428.4.1:2009	Design for access and mobility – Means to assist the orientation of people with vision impairment – Tactile ground surface indicators.
BCA 1+2 (1998)	AS/NZS 1680.0:2009	Interior lighting - Safe movement
	AS/NZS 1680.1:2006	Interior and workplace lighting – Specific applications - General principles and recommendations
	AS/NZS 1680.2.1:2008	Interior and workplace lighting – Specific applications - Circulation spaces and other general areas
	AS/NZS 1680.2.2:2008	Interior and workplace lighting – Specific applications – Office and screen-based tasks
	AS/NZS 1680.2.3:2008	Interior and workplace lighting – Specific applications – Educational and training facilities
	AS/NZS 2208:1996	Safety glazing materials in buildings
	AS/NZS 2270:2006	Plywood and blockboard for interior use
	AS/NZS 2310:2002	Glossary of paint and painting terms
	AS/NZS 2311:2000	Guide to the painting of buildings
	AS 2454-2007	Textile floor coverings - Terminology
	AS/NZS 2589:2007	Gypsum linings - Application and finishing
	AS/NZS 2633:1996	Guide to the specification of colours
	AS/NZS 2668:2000	Glossary of terms used in the glass and glazing industry
	AS 2700-1996	Colour Standards for general purposes
	AS/NZS 2785:2000	Suspended ceilings - Design and installation
	AS 2796.1-1999	Timber - Hardwood - Sawn and milled products - Product specification
	AS 2946-1991	Suspended ceilings, recessed luminaires and air diffusers - Interface requirements for physical compatibility
	AS 3715-2002	Metal finishing - Thermoset powder coating for architectural applications of aluminium and aluminium alloys
	AS 3958.1-2007	Ceramic tiles - Guide to the installation of ceramic tiles
	AS 3958.2-1992	Ceramic tiles - Guide to the selection of a ceramic tiling system

AS 4154-1993	General access floors (elevated floors)
AS 4288-2003	Soft underlays for textile floor coverings
AS 4506-2005	Metal finishing - Thermoset powder coatings
AS 4785.1-2002	Timber - Softwood - Sawn and milled products - Product specification
AS/NZS 4858:2004	Wet area membranes
AS 4992.1-2006	Ceramic tiles - Grouts and adhesives - Terms, definitions and specifications for adhesives
SAA HB 161-2005	Guide to plastering
SAA HB 197-1999	An introductory guide to the slip resistance of pedestrian surface materials

STRUCTURAL ENGINEERS

BCA 1+2	AS/NZS 1170.0:2002	Structural design actions - General principles
BCA 1+2	AS/NZS 1170.1:2002	Structural design actions - Permanent, imposed and other actions
BCA 1+2	AS/NZS 1170.2:2002	Structural design actions - Wind actions
BCA 1+2	AS/NZS 1170.3:2003	Structural design actions - Snow and ice actions
BCA 1+2	AS 1170.4:2007	Minimum design loads on structures (known as the SAA Loading Code) – Earthquake loads
	AS/NZS 1554.1:2004	Structural steel welding – Welding of steel structures
	AS/NZS 1554.5:2004	Structural steel welding – Welding of steel structures subject to high levels of fatigue loading
	AS 1684.1-1999	Residential timber-framed construction - Design criteria
BCA 1+2	AS 1684.2-2006	Residential timber-framed construction - Non-cyclonic areas
BCA 1+2	AS 1684.3-2006	Residential timber-framed construction - Cyclonic areas
BCA 1+2	AS 1684.4-2006	Residential timber-framed construction - Simplified - Non-cyclonic areas
	AS 1720.1-1997	Timber structures - Design methods
	AS 1720.2-2006	Timber structures - Timber properties
	AS 1720.4-2006	Timber structures - Fire resistance of structural adequacy of timber members
	AS 2159-2009	Piling – Design and installation
BCA 1+2	AS 2327.1-2003	Composite structures - Simply supported beams
BCA 1+2	AS 2870-1996	Residential slabs and footings – Construction
BCA 1+2 (2001)	AS 3600-2009	Concrete Structures
	AS 3610-1995	Formwork for concrete
	AS 3610.1-2010	Documentation and surface finish
BCA 1+2	AS 3700-2001	Masonry structures
	AS 3735-2001	Concrete structures retaining liquids
	AS 3850-2003	Tilt-up concrete construction
BCA 1+2	AS 4100-1998	Steel structures
BCA 1+2	AS/NZS 4600:2005	Cold-formed steel structures
	AS 4678-2002	Earth-retaining structures

MECHANICAL ENGINEERS

	AS 1324.1:2001	Air filters for use in general ventilation and airconditioning - Application, performance and construction
	AS 1470:1986	Health and safety at work - Principles and practices
BCA 1	AS/NZS 1668.1:1998	The use of ventilation and airconditioning in buildings - Fire and smoke control in multi-compartment buildings
BCA 1+2 (1991)	AS 1668.2:2002	The use of ventilation and airconditioning in buildings - Ventilation design for indoor air contaminant control
	AS 1668.3:2001	The use of ventilation and airconditioning in buildings - Smoke control systems for large single compartments or smoke reservoirs
	AS/NZS 1677.2:1998	Refrigerating systems - Safety requirements for fixed applications
	AS 1682.2:1990	Fire dampers – Installation
	AS 1940:2004	The storage and handling of flammable and combustible liquids
	AS 2896:1998	Medical gas systems - Installation and testing of non-flammable medical gas pipeline systems
	AS/NZS 3666.1:2002	Air-handling and water systems of buildings - Microbial control - Design, installation and commissioning
	AS/NZS 3666.2:2002	Air-handling and water systems of buildings - Microbial control - Operation and maintenance

	AS/NZS 3666.3:2000	Air-handling and water systems of buildings - Microbial control – Performance-based maintenance of cooling water systems
BCA 1+2 (1995)	AS 4041:2006	Pressure piping
	AS 4254:2002	Ductwork for air-handling systems in buildings
	AS 4809:2003	Copper pipe and fittings - Installation and commissioning
	SAA/SNZ HB 32:1995	Control of microbial growth in air-handling and water systems of buildings
	SAA HB 40.1:2001	The Australian Refrigeration and Air Conditioning Code of Good Practice. Reduction of emissions of fluorocarbon refrigerants in commercial and industrial refrigeration and airconditioning applications
	SAA HB 40.2:2001	The Australian Refrigeration and Air Conditioning Code of Good Practice. Reduction of emissions of fluorocarbons in residential airconditioning applications
	ASHRAE 111	Practices for measurement, testing, adjusting and balancing of building heating, ventilation, airconditioning and refrigeration systems
	ICANZ:2003	Industry Code of Practice for the Safe Use of Glasswool and Rockwool

HYDRAULIC ENGINEERS

	AS/NZS 1221:1997	Fire hose reels
	AS 1470:1986	Health and safety at work - Principles and practices
	AS/NZS 1596:2008	Storage and handling of LP Gas
	AS 2032:2006	Installation of PVC pipe systems
	AS/NZS 2033:2008	Installation of polyethylene pipe systems
BCA 1	AS 2118.1:1999	Automatic fire sprinkler systems - General systems
BCA 1	AS 2118.4:1995	Automatic fire sprinkler systems - Residential
BCA 1	AS 2118.6:1995	Automatic fire sprinkler systems - Combined sprinkler and hydrant
BCA 1	AS 2419.1:2005	Fire hydrant installations - System design, installation and commissioning
	AS 2419.2:1994	Fire hydrant installations - Fire hydrant valves
BCA 1	AS 2441:2005	Installation of fire hose reels
	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
BCA 1+2	AS/NZS 3500.3:2003	Plumbing and Drainage - Stormwater drainage
BCA 1+2	AS/NZS 3500.4:2003	Plumbing and Drainage - Heated water services
BCA1	AS/NZS 3500.5:2000	National Plumbing and Drainage - Domestic installations
	AS 3660.1:2000	Termite management - New building work
	AS/NZS 3666.1:2002	Air-handling and water systems of buildings - Microbial control - Design, installation and commissioning
	AS/NZS 3666.2:2002	Air-handling and water systems of buildings - Microbial control - Operation and maintenance
	AS 4118.1.4:1994	Fire sprinkler systems - Components - Valve monitors
	AS/NZS 4645.2:2008	Gas distribution networks - Steel pipe systems
	AS 4809:2003	Copper pipe and fittings - Installation and commissioning
	AS 5601:2004	Gas installations
	SAA/NZS HB 32:1995	Control of microbial growth in air-handling and water systems of buildings
	ICANZ:2003	Industry Code of Practice for the Safe Use of Glasswool and Rockwool
	PCA:2004	Plumbing Code of Australia

ELECTRICAL ENGINEERS

	AS/NZS 1367:2007	Coaxial cable systems for the distribution of analogue television and sound signals in single and multiple unit installations
	AS 1470-1986	Health and safety at work - Principles and practices
BCA 1	AS 1670.1-2004	Fire detection, warning control and intercom systems - System design, installation and commissioning – Fire
BCA 1	AS 1670.4-2004	Fire detection, warning, control and intercom systems - System, design, installation and commissioning - Sound systems and intercom systems for emergency purposes
	AS 1670.6-1997	Fire detection, warning control and intercom systems - System, design, installation and commissioning - Smoke alarms
BCA 1+2 (1998)	AS/NZS 1680.0:2009	Interior lighting - Safe movement
	AS/NZS 1680.1:2006	Interior lighting - General principles and recommendations
	AS/NZS 1680.2.1:2008	Interior lighting - Circulation spaces and other general areas

	AS/NZS 1680.2.2:2008	Interior lighting - Office and screen-based tasks
	AS/NZS 1680.2.3:2008	Interior lighting - Educational and training facilities
	AS/NZS 2201.1:2007	Intruder alarm systems - Systems installed in client's premises
	AS/NZS 2201.2:2004	Intruder alarm systems - Monitoring centres
	AS/NZS 2201.5:2008	Intruder alarm systems - Alarm transmission systems
BCA 1	AS 2293.1:2005	Emergency escape lighting and exit signs for buildings - System design, installation and operation
	AS/NZS 3000:2007	Electrical installations (known as the Australian/New Zealand Wiring Rules)
	AS/ANZ 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
	AS/NZS 3013:2005	Electrical installations - Classification of the fire and mechanical performance of wiring system elements
	AS/NZS 3080:2003	Telecommunications installations - Generic cabling for commercial premises (ISO/IEC 11801-2002, MOD)
	AS/NZS 3084:2003	Telecommunications installations - Telecommunications pathways and spaces for commercial buildings
	AS/NZS 3439.1:2002	Low-voltage switchgear and controlgear assemblies - Type-tested and partially type-tested assemblies
	AS/NZS 3439.3:2002	Low-voltage switchgear and control gear assemblies - Particular requirements for low-voltage switchgear and controlgear assemblies intended to be installed in places where unskilled persons have access for their use - Distribution boards
	AS 4282-1997	Control of the obtrusive effects of outdoor lighting
	AS/ACIF S009:2006	Installation requirements for customer cabling (Wiring Rules)
	SAA HB 29-2007	Communications Cabling Manual, Module 2 Communications cabling handbook
	SAA HB 243-2007	Communications cabling manual - Module 1- Australian regulatory arrangements
	SAA HB 301-2001	Electrical installations - designing to the Wiring Rules

Corporate Information

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NATSPEC's aims are to provide economies of scale for its shareholders and to improve the quality of construction in Australia via the provision of information, tools, products and services.

STAKEHOLDERS

- // Air conditioning and Mechanical Contractors' Association of Australia
- // Australia Council of Building Environment Design Professions
- // Australian Elevator Association
- // Australian Institute of Architects
- // Australian Institute of Building
- // Australian Institute of Building Surveyors
- // Australia Institute of Quantity Surveyors
- // Building Commission Victoria
- // Construction Industry Engineering Services Group
- // Consult Australia
- // Department for Transport, Energy and Infrastructure (SA)
- // Department of Construction and Infrastructure (NT)
- // Department of Finance and Deregulation (Federal)
- // Department of Public Works (QLD)
- // Department of Services, Technology and Administration (NSW)
- // Department of Territory and Municipal Services (ACT)
- // Department of Treasury and Finance (TAS)
- // Department of Treasury and Finance (WA)
- // Engineers Australia
- // Master Builders Australia
- // Standards Australia

CONTACT INFORMATION

- Phone 1300 797 142
- Fax 1300 797 143
- Email mail@natspec.com.au
- Web www.natspec.com.au