0471P AMETALIN IN THERMAL INSULATION AND PLIABLE MEMBRANES

Branded worksection

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Worksection abstract

This branded worksection *Template* is applicable to AMETALIN reflective thermal insulation and pliable membranes for floors, walls, ceilings and roofs. It generally relies on AS 3999, AS/NZS 4200.1, AS 4200.2 and AS/NZS 4859.1. A pliable building membrane may be installed to act as a sarking membrane, vapour barrier, thermal insulation or any combination of the three. This worksection does not cover insulation for building services (e.g. for ductwork) or acoustic insulation.

Background

See NATSPEC TECHnote DES 004 and the *ABCB Condensation in buildings handbook* for information relating to the use of insulation and vapour control membranes to reduce condensation and moisture flow. Also see NATSPEC TECHnote DES 015 for information on the NCC energy efficiency provisions.

How to use this worksection

This worksection *Template* must be customised for each project. See A guide to NATSPEC worksections (www.natspec.com.au) for information on *Template* structure, word styles, and completing a worksection.

Related material located elsewhere in NATSPEC

If a listed worksection is not part of your subscription package and you wish to purchase it, contact NATSPEC.

Related material may be found in other worksections. See for example:

- *0421 Roofing – combined* for insulated panel systems, safety mesh and insulation spacers.
- *0431 Cladding – combined* for exterior insulation and finish systems (EIFS) and insulated panel systems.
- *0472 Acoustic insulation* for insulation for floors, walls and ceilings against the transmission of airborne and impact generated sound.

Material not provided by AMETALIN

This branded worksection Template includes generic material which may not be provided by the Product Partner including:

- Wet process fibreboard (softboard).
- Rigid cellular insulation.
- Fibre batts and rolls.
- Mesh support.

Documenting this and related work

You may document this and related work as follows:

- Show extent, type, location, arrangement, fixing and support details on the drawings.
- Where insulation and pliable building membranes are integral to other worksections, cross reference this worksection or take relevant text from here for inclusion in those other worksections. e.g. For IRMAs (inverted roof membrane assemblies) or PMRs (protective membrane roofs), relevant text may be taken for inclusion in *0411 Waterproofing – external and tanking* and deleted in this worksection.

The *Normal* style text of this worksection may refer to items as being documented elsewhere in the contract documentation. Make sure they are documented.

Search acumen.architecture.com.au, the Australian Institute of Architects' practice advisory subscription service, for notes on the following:

- Construction details for cool temperate climates.
- Guarantees and warranties.
- Thermal mass and insulation for temperate climates.
- Strategies and resources for material selection.

Specifying ESD

The following may be specified by retaining default text:

- Thermal break strips.

The following may be specified using included options:

- Thermal performance to reduce heating/cooling load by specifying the required R-Value for roofs, ceilings, walls and floors.

The following may be specified by including additional text:

- Recycled material content, e.g. recycled waste glass in glass wool insulation.
- Other natural materials such as cellulose insulation, perlite, agricultural fibres and cementitious foam.
- Cellulose insulation: Manufactured from recycled paper.
- Perlite: Volcanic minerals, e.g. used as loose fill insulation in concrete block cavities.
- Agricultural fibres: Manufactured from mill waste, low grade and recycled cotton treated with non-toxic fire retardant.
- Cementitious foam insulation: Made from magnesium from sea water.
- Wood foam: Made from wood particles.

Refer to NATSPEC TECHreport TR 01 on specifying ESD.

1 GENERAL

1.1 RESPONSIBILITIES

AMETALIN is a leading Australian manufacturer of reflective, air-vapour-water-thermal control building membranes used for weatherproofing, insulating and condensation management in residential, commercial, industrial, and non-combustible building systems. Products are designed for Australian climate zones to increase thermal comfort year-round while saving energy and reducing heating/cooling costs.

AMETALIN is a proud partner of the CRC for Low Carbon Living and Foundation Member of Carbon Neutral Adelaide, proactively driving the industry to design and build passive Net Zero-Ready and high-performance constructions.

General

Requirement: Provide pliable membrane systems and thermal insulation, as documented.

Documented is defined in *0171 General requirements* as meaning contained in the contract documents.

It is the responsibility of the designer to nominate and detail insulation and pliable membranes conforming to the requirements of the NCC.

1.2 COMPANY CONTACTS

AMETALIN technical contacts

Website: www.ametalin.com

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements*.

0171 General requirements contains umbrella requirements for all building and services worksections.

List the worksections cross referenced by this worksection. *0171 General requirements* references the *018 Common requirements* subgroup of worksections. It is not necessary to repeat them here. However, you may also wish to direct the contractor to other worksections where there may be work that is closely associated with this work.

NATSPEC uses generic worksection titles, whether or not there are branded equivalents. If you use a branded worksection, change the cross reference here.

1.4 INTERPRETATION

Definitions

General: For the purposes of this worksection, the following definitions apply:

- Batts: Flexible insulation supplied as factory cut pieces and composed of mineral wool (glass and rock fibre) or polyester fibre.
- Blankets: Flexible insulation supplied as factory cut rolls and composed of mineral wool (glass and rock fibre) or polyester fibre, and may be combined with reflective facings.
- Bio-soluble: A product that dissolves in bodily fluids and is quickly cleared from the lungs.
- Fire hazard properties: To NCC Schedule 3.

This includes the Flammability Index, Smoke-Developed Index and Spread-of-Flame Index of a material or assembly as applicable.

See NATSPEC TECHnote DES 003 for more information on fire hazard properties of insulation and pliable membranes and NATSPEC TECHnote DES 020 for fire behaviour of building materials and assemblies.

- Pliable building membrane: To AS/NZS 4200.1 and equivalent to sarking-type materials as defined in the NCC.

A pliable building membrane may be installed to act as a sarking membrane, vapour barrier, thermal insulation or any combination of the three.

- Thermal insulation terminology: To AS/NZS 4859.1.

See AS/NZS 4859.2 for additional definitions applicable when designing building components for thermal insulation systems.

- Vapour permeable (breathable) membrane: A flexible membrane material, normally used for secondary waterproofing that allows for the transmission of water vapour.

Edit the **Definitions** subclause to suit the project or delete if not required. List alphabetically.

1.5 MANUFACTURER'S DOCUMENTS

Technical manuals
Product information: www.ametalin.com

1.6 SUBMISSIONS

Fire performance
Fire hazard properties: Submit evidence of conformity to PRODUCTS, **FIRE PERFORMANCE**, **Fire hazard properties**.

Products and materials
Thermal insulation properties: Submit evidence of conformity to AS/NZS 4859.1 and AS/NZS 4859.2.

This is primarily to verify claimed Total R-Value for NCC compliance.

AS/NZS 4859.1 is applicable to the R-Value of bulk insulation only and excludes insulation built up from layers of different materials and the effects of air spaces and surface resistance. If the system or total R-Value relies on layers of different materials, air spaces or reflective surfaces, the R-Value must be calculated to AS/NZS 4859.2.

AS/NZS 4859.2 includes standard assumptions for calculating R-Values including de-rating of the insulation performance to compensate for dust, labelling ink and so on. The effect of the de-rating may be significant and in situations where reflective foil is used in combination with bulk insulation, a conservative approach would be to ignore the reflective surface effect, i.e. treat the surface as high emittance. Calculations performed to AS/NZS 4859.2 are not to be used for the purposes of labelling.

See NATSPEC TECHnote DES 031 for information on specifying R-Values.

Evidence of delivery: Submit delivery docket as evidence of delivery of [complete/delete]

If evidence of delivery to site is required for particular products, consider including this *Optional* style text by changing to *Normal* style.

Warranties
Manufacturer's published product warranties: Submit warranties to **COMPLETION, Warranties**.

1.7 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:

- Insulation or pliable membrane materials after installation and before concealment.

Amend to suit the project adding critical stage inspections required.

Hold points, if required, should be inserted here.

2 PRODUCTS

2.1 GENERAL

Product substitution
Other products: Conform to **Substitutions** in *0171 General requirements.*

The *0171 General requirements* clause sets out the submissions required if the contractor proposes alternative products. Refer also to NATSPEC TECHnote GEN 006 for more information on proprietary specification.

Product identification
General: Marked to show the following:

- Manufacturer's identification.
- Product brand name.
- Product type.
- Quantity.
- Product reference code and batch number.
- Date of manufacture.

Edit the list to suit the project or delete if not required.

Storage and handling

Labelling: Deliver mineral wool products to site in packaging with third party mark of conformity indicating product is bio-soluble and not listed as hazardous material in the Safe Work Australia *Hazardous Chemical Information System* (HCIS).

See NATSPEC TECHnote PRO 002 for more information on the manufacture, properties and safety issues related to the use of mineral wool. For information on the ICANZ (Insulation Council of Australia and New Zealand) FBS-1 BIO-SOLUBLE INSULATION label for Australian manufactured mineral wool, see icanz.org.au. For imported products, check availability of evidence such as EUCEB certification.

2.2 FIRE PERFORMANCE

Combustibility

Insulation: Tested to AS 1530.1.

Check if your construction is required to be non-combustible. Refer to BCA Section C. If non-combustible construction is required, change this *Optional* style text to *Normal* style text and add to **SUBMISSIONS**, **Fire performance**.

Non-combustible construction required: [complete/delete]

List any parts of the project that the NCC requires to be non-combustible or delete, if none. The NCC requires that construction required to be non-combustible (e.g. fire walls and spandrels with a specific FRL) must be constructed wholly of materials that are not deemed combustible. See BCA C1.9(e). In other situations the NCC does not prohibit the use of combustible insulation materials provided they meet the other fire properties.

If non-combustible construction is required, change this *Optional* style text to *Normal* style text.

Fire hazard properties

See NATSPEC TECHnote DES 003 for more information on the fire hazard properties of insulation materials and NATSPEC TECHnote DES 020 on fire behaviour of building materials and assemblies. See also BCA Spec C1.10 Table 4.

Insulation materials: Tested to AS/NZS 1530.3. Fire hazard indices as follows:

- Spread-of-Flame Index: ≤ 9.
- Smoke-Developed Index: ≤ 8 if Spread-of-Flame Index > 5.

Materials with reflective facing: Tested to AS/NZS 1530.3 and the recommendations of Appendix A6.

AS/NZS 1530.3 Informative Appendix clause A6 recommends that reflective surfaces of test specimens (which would otherwise generally pass this test) be blackened and diagonally scored in order to simulate soot deposition onto reflective surfaces in a real fire situation. Note that AS/NZS 1530.3 clause 4.12.2(c) requires insulation materials faced with reflective surface materials to incorporate a representative vertical joint in three test specimens.

Pliable membranes: Flammability Index ≤ 5 tested to AS 1530.2.

Flammability Index is determined under AS 1530.2. There has been some debate about the adequacy of the test procedure in predicting performance of material in real fire situations. Pliable membranes are tested to AS 1530.2 as they are not suitable for testing to AS/NZS 1530.3.

Exposed insulation/linings: Group number to AS 5637.1.

If insulation is exposed or used as a lining, add this *Optional* style text by changing to *Normal* style text.

Non-sprinklered buildings: Wall and ceiling linings must either have an *average specific extinction area* less than 250 m^2/kg or a *smoke growth rate index* not more than 100 as determined by AS 5637.1.

2.3 MATERIALS

Pliable building membranes

Standard: To AS/NZS 4200.1 and AS 4200.2.

Thermal insulation

Standard: To AS/NZS 4859.1.

AS/NZS 4859.1 categorises insulation as follows: Formed shapes, Formed in situ, Compressible, Loose fills, IR reflective and Vacuum panels. It also outlines requirements for the following types of insulation:

- Cellulosic fibre (loose fill): Section 4.
- Wool: See Section 5.
- Polyester (compressible): Section 6.
- Mineral wool blankets and cut pieces (compressible): Section 7.
- Rigid cellular foam insulation (EPS, PF, PIR, PUR and XPS): Section 8. These materials exhibit high combustibility (as do most of the organic fibre materials) and release various toxic products of combustion (e.g. hydrogen cyanide from polyurethane foam). Other alternatives include strawboard and woodwool.
- IR reflective (formed shapes and compressible with one or more external IR reflective surfaces): Section 9.

Wet process fibreboard (softboard): To AS/NZS 1859.4.

Mineral wool insulation: Bio-soluble and not listed as a hazardous material in the Safe Work Australia *Hazardous Chemical Information System* (HCIS).

Bio-soluble or low bio-persistence mineral wool fibres are eliminated by the biological function of the lung. They are not listed as hazardous in the HCIS.

Mesh support to roof insulation

Welded safety mesh: To AS/NZS 4389.

Welded safety mesh may be used for fall arrest if required by WHS authorities. Coordinate with *0421 Roofing – combined* which also cites AS/NZS 4389. Mesh support for roof insulation may not be required where fall arrest sarking is used.

2.4 AMETALIN THERMAL CONTROL PLIABLE MEMBRANES

AS/NZS 4200.1 Table 4 categorises vapour control membranes (VCMs) as vapour barriers when classified Class 1 or Class 2, and vapour permeable membranes when classified Class 3 or Class 4.

AS/NZS 4200.1 Table 4 documents minimum and maximum vapour permeance values (µg/N.s) tested to ASTM E96/E96M for vapour control membranes. Vapour permeance is the inverse of vapour resistance (MN.s/g), the higher the permeance value, the greater the permeability.

AMETALIN thermal break pliable membranes are designed to manage heat gain and heat loss and reduce thermal bridging and conductivity between building elements.

ThermalBreak 7

Description: Double-sided reflective, fibre-free thermo-reflective insulation, comprised of cross-linked, closed-cell core XPE foam with anti-glare foil facing on one side and foil facing on the other.

Vapour control classification: Class 2 vapour barrier, 0.0113 µg/N s.

Water control classification: Water barrier.

Air control classification: Air barrier.

Material R value: R 0.21 uncompressed, R 0.20 in-situ.

Duty classification to AS/NZS 4200.1: Extra Heavy.

Flammability classification: Low (≤ 5).

Fire performance group number assessment: Group 1.

Roof and wall insulation that meets NCC requirements for a thermal break of R0.2 in-situ performance for steel frame and purlin commercial construction. Also suitable for use in timber framed construction. Low flammability suitable for all BAL's in bushfire-prone areas.

ThermalLiner 4

Description: Double-sided reflective, fibre-free thermo-reflective insulation, comprised of cross-linked, closed-cell core XPE foam with anti-glare foil facing on one side and foil facing on the other.

Vapour control classification: Class 1 vapour barrier, 0.001 µg/N s.

Water control classification: Water barrier.

Air control classification: Air barrier.

Material R value: R 0.11.

Duty classification to AS/NZS 4200.1: Extra Heavy.

Flammability classification: Low (≤ 5).

For steel or timber framed residential and commercial constructions. Low flammability suitable for all BAL's in bushfire-prone areas.

ThermalCavity
Description: Double-sided reflective, fibre-free thermo-reflective insulation, comprised of cross-linked, closed-cell core XPE foam with anti-glare foil facing on one side and foil facing on the other.

Vapour control classification: Class 1 vapour barrier, 0.001 µg/N s.

Water control classification: Water barrier.

Air control classification: Air barrier.

Material R value: R 0.11.

Duty classification to AS/NZS 4200.1: Extra Heavy.

Flammability classification: Low (≤ 5).

For steel or timber framed residential and commercial constructions. Low flammability suitable for all BAL's in bushfire-prone areas.

2.5 AMETALIN FIRE PERFORMANCE PLIABLE MEMBRANES

AMETALIN fire-rated pliable membranes are designed for use where both condensation management and non-combustible construction are required.

Ametalin CeaseFire
Description: Single layer impregnated E Glass fabric pliable membrane for non-combustible construction, tested to AS 1530.1 and AS 1530.2.

Vapour control classification: Class 4 vapour permeable, 1.5767 µg/N s.

Duty classification to AS/NZS 4200.1: Extra Heavy.

Water control classification: Water barrier.

Air control classification: Air barrier.

Flammability classification: Low (≤ 5).

Fire performance group number assessment: Group 1.

Roof and wall insulation **s**uitable for all NCC building classes in commercial and single or multi-storey residential fire resisting external wall constructions in regions of Australia south of the Tropic of Capricorn (ABCB climate zones 2-8), where both condensation management and non-combustible construction are required.

FireSark
Description: Single-sided reflective pliable membrane for non-combustible construction, tested to AS 1530.1, AS 1530.2 and AS/NZS 1530.3.

Vapour control classification: Class 2 vapour barrier, 0.003 µg/N s.

Water control classification: Water barrier.

Air control classification: Air barrier.

Duty classification to AS/NZS 4200.1: Extra Heavy.

Flammability classification: Low (≤ 5).

Roof sarking and wall wrap suitable for external wall construction in all building classes, and particularly where superior fire performance is desired. The 97% reflective foil face provides extra R-value when installed facing an air cavity.

NOTE: Class 3 to 4 Vapour Permeable is required for walls in Climate Zones 6 - 8.

FireSark Micro-perforated
Description: Micro-perforated single-sided reflective sarking type material for non-combustible construction, tested to AS 1530.1, AS 1530.2 and AS/NZS 1530.3.

Vapour control classification: Class 3 vapour permeable, 0.8698 µg/N s.

Water control classification: Non-water barrier.

Air control classification: Air barrier.

Duty classification to AS/NZS 4200.1: Extra Heavy.

Flammability classification: Low (≤ 5).

Fire-resistant permeable reflective wall wrap insulation suitable for use in all roof and masonry drained cavity wall types in non-combustible constructions and ideal for use in all BAL zones.

NOTE: Class 3 to 4 Vapour Permeable is required for walls in Climate Zones 6 – 8.

2.6 AMETALIN VAPOUR BARRIER PLIABLE MEMBRANES

Vapour barrier pliable membranes: Class 1 and 2 vapour control classification to AS/NZS 4200.1.

SilverSark HVB

Description: High vapour barrier single-sided reflective laminate.

Vapour control classification: Class 1 vapour barrier, 0.002 µg/N s.

Water control classification: Water barrier.

Air control classification: Air barrier.

Duty classification to AS/NZS 4200.1: Extra Heavy.

Flammability classification: Low (≤ 5).

Reflective insulation for use where water barrier and Class 1 Vapour Barrier properties are required for use as a roof sarking and wall wrap in residential and commercial buildings in ABCB Climate Zone 1 and regions north of the Tropic of Capricorn in Climate Zone 2.

NOTE: Condensation risks should be addressed when the product is positioned on the cold side of constructions as the risks may increase.

For ABCB Climate Zones 6, 7, 8 use a Class 3 or Class 4 permeable wrap on the outside of the insulation to allow ambient vapour to escape without condensing into liquid. Class 3 and Class 4 Vapour Permeable, non-water barrier wrap for typical brick veneer and cavity constructions or Class 4 Vapour Permeable wrap, water barrier for light weight clad constructions.

SilverSark XHD

Description: Single-sided reflective laminate.

Vapour control classification: Class 2 vapour barrier, 0.02121 µg/N s.

Water control classification: Water barrier.

Air control classification: Air barrier.

Duty classification to AS/NZS 4200.1: Extra Heavy.

Flammability classification: Low (≤ 5).

SilverSark HD

Description: Single-sided reflective laminate.

Vapour control classification: Class 2 vapour barrier, 0.01367 µg/N s.

Water control classification: Water barrier.

Air control classification: Air barrier.

Duty classification to AS/NZS 4200.1: Heavy.

Flammability classification: Low (≤ 5).

Reflective roof and wall insulation for tile or metal roofs and walls in residential and commercial buildings.

SilverSark xR XHD

Description: Double-sided reflective laminate, with anti-glare coating.

Vapour control classification: Class 2 vapour barrier, 0.0147 µg/N s.

Duty classification to AS/NZS 4200.1: Extra Heavy.

Water control classification: Water barrier.

Air control classification: Air barrier.

Flammability classification: Low (≤ 5).

SilverSark xR HD

Description: Double-sided reflective laminate, with anti-glare coating.

Vapour control classification: Class 2 vapour barrier, 0.02141 µg/N s.

Duty classification to AS/NZS 4200.1: Heavy.

Water control classification: Water barrier.

Air control classification: Air barrier.

Flammability classification: Low (≤ 5).

SilverWrap MD

Description: Single-sided reflective laminate.

Vapour control classification: Class 2 vapour barrier, 0.0131 µg/N s.

Duty classification to AS/NZS 4200.1: Medium.
Water control classification: Water barrier.
Air control classification: Air barrier.
Flammability classification: Low (≤ 5).

SilverWrap xRS MD
Description: Single sided, extra R-value reflective wall wrap.
Vapour control classification: Class 2 vapour barrier, 0.0117 µg/N s.
Duty classification to AS/NZS 4200.1: Medium.
Water control classification: Water barrier.
Air control classification: Air barrier.
Flammability classification: Low (≤ 5).

SilverWrap LD
Description: Single-sided reflective laminate.
Vapour control classification: Class 2 vapour barrier, 0.0152 µg/N s.
Duty classification to AS/NZS 4200.1: Light.
Water control classification: Water barrier.
Air control classification: Air barrier.
Flammability classification: Low (≤ 5).

2.7 AMETALIN VAPOUR PERMEABLE PLIABLE MEMBRANES

Vapour permeable pliable membranes: Class 3 and 4 vapour control, water barrier membrane, classification to AS/NZS 4200.1.

VapourTech Brane VHP
Description: Very high permeance wall wrap.
Vapour control classification: Class 4 vapour permeable, > 1.1403 µg/N s.
Duty classification to AS/NZS 4200.1: Light Wall.
Water control classification: Water barrier.
Flammability classification: Low (≤ 5).

VapourTech Wall
Description: Very high permeance wall wrap.
Vapour control classification: Class 4 vapour permeable, 3.7982 µg/N s.
Duty classification to AS/NZS 4200.1: Light.
Water control classification: Water barrier.
Air control classification: Air barrier.
Flammability classification: Low (≤ 5).

2.8 AMETALIN THERMAL CONTROL, VAPOUR PERMEABLE SARKING TYPE MATERIALS

Vapour permeable reflective sarking type materials Class 3 and 4 vapour control membrane classification to AS/NZS 4200.1.

SilverWrap Micro-perforated XHD
Description: Vapour permeable single-sided reflective laminate.
Vapour control classification: Class 3 vapour permeable, 0.5727 µg/N s.
Water control classification: Non-water barrier.
Air control classification: Air barrier.
Duty classification to AS/NZS 4200.1: Extra Heavy.
Flammability classification: Low (≤ 5).

SilverWrap Micro-perforated HD
Description: Vapour permeable single-sided reflective wall wrap.
Vapour control classification: Class 3 vapour permeable, 0.3341 µg/N s.
Water control classification: Non-water barrier.
Air control classification: Air barrier.
Duty classification to AS/NZS 4200.1: Heavy.

Flammability classification: Low (≤ 5).

SilverWrap Micro-perforated MD

Description: Vapour permeable single sided reflective wall wrap.

Vapour control classification: Class 3 vapour permeable, 0.2433 µg/N s.

Water control classification: Non-water barrier.

Air control classification: Air barrier.

Duty classification to AS/NZS 4200.1: Medium.

Flammability classification: Low (≤ 5).

SilverWrap Micro-perforated LD

Description: Vapour permeable reflective wall insulation.

Vapour control classification: Class 4 vapour permeable, 1.600 µg/N s.

Water control classification: Non-water barrier.

Air control classification: Air barrier.

Duty classification to AS/NZS 4200.1: Light.

Flammability classification: Low (≤ 5).

SilverWrap xR Micro-perforated HD

Description: Vapour permeable double side reflective wall wrap with anti-glare coating.

Vapour control classification: Class 4 vapour permeable, 1.450 µg/N s.

Water control classification: Non-water barrier.

Air control classification: Air barrier.

Duty classification to AS/NZS 4200.1: Heavy.

Flammability classification: Low (≤ 5).

SilverWrap xRS Micro-perforated MD

Description: Vapour permeable reflective wall wrap with anti-glare coating.

Vapour control classification: Class 3 vapour permeable, 0.2028 µg/N s.

Water control classification: Non-water barrier.

Air control classification: Air barrier.

Duty classification to AS/NZS 4200.1: Medium.

Flammability classification: Low (≤ 5).

SilverFloor

Description: Vapour permeable double-side reflective underfloor insulation for suspended floors.

Vapour control classification: Class 3 vapour permeable, 0.3009 µg/N s.

Water control classification: Non-water barrier.

Duty classification to AS/NZS 4200.1: Heavy.

Flammability classification: Low (≤ 5).

ThermalFloor

Description: Vapour permeable double-side reflective underfloor insulation for suspended floors.

Vapour control classification: Class 3 vapour permeable, > 0.1429 µg/N s.

Water control classification: Non-water barrier.

Duty classification to AS/NZS 4200.1: Extra Heavy.

Flammability classification: Low (≤ 5).

2.9 AMETALIN COMPONENTS

See BCA J0.4 and BCA 3.12.1.2(c) on roof thermal breaks, and BCA J0.5 and BCA 3.12.1.4(d) on wall thermal breaks. R0.2 is a minimum and the NCC requires that Total R-Value and Total System U-Value calculations include allowance for thermal bridging.

Ametalin Non-combustible Insulation Flashing Tape

Description: 150 mm non-combustible self-adhering flashing and closure tape, used to compliment fire resisting sarking and wall wraps.

Product: High performance foil/E-Glass self-adhering acrylic membrane.

Ametalin R 0.22 Non-combustible ThermalBreak Strips
Description: 45 mm wide thermal break strips for use in commercial and non-combustible construction.
Product: Non-combustible, high temperature resistant insulation felt, with self-adhesive backing.

Ametalin R 0.25 ThermalBreak Strips
Description: 43 mm wide thermal break strips for use in steel frame construction.
Product: High density closed-cell XPE foam core self-adhesive strips.

Ametalin QuickTape
Description: 48 mm jointing tape for sealing overlapping edges of building membranes.
Product: High performance woven polymer fabric tape.

Ametalin Insulation/Ducting Tape
Description: 48 mm tape with vapour sealing properties suitable for reflective membranes on walls and roofs.
Product: High performance 0.08 mm UV-resistant metallised polyester tape.

Ametalin Reinforced Insulation/Ducting Tape
Description: 72 mm tape for joining and sealing reflective foam insulation, reflective membranes and for ductwork closure.
Product: High performance 0.178 mm UV-resistant PE scrim reinforced tape.

Ametalin EasySeal Insulation Flashing Tape
Description: 150 mm self-adhering membrane for flashing, joining and sealing wall wraps to doors, windows and other openings.
Product: Reinforced polypropylene film, self-adhering acrylic membrane.

Ametalin Double Sided Insulation Fixing Tape
Description: 38 mm wide tape for installing reflective foil insulation and permeable membranes to steel and timber stud framework.
Product: High performance 0.150 mm double sided tape coated with an aggressive acrylic adhesive.

Ametalin Cap Nails
Description: Fasteners for installing sarking, insulation and pliable membranes on timber frames.
Product: Strips of ten fixings comprising large impact resistant polymer caps on ring shank galvanized nails.

3 EXECUTION

3.1 GENERAL

Pliable building membrane
Installation: To AS 4200.2 and BCA J1.2 or BCA 3.12.1.1, as appropriate.

AS 4200.2 Table 2.6 documents the duty classification and allowable usage for the application and level of support. See the *ABCB Condensation in buildings handbook* for information on condensation and use of vapour barriers, vapour permeable membranes and sarking.

Thermal insulation
Requirement: To AS 3999 and BCA J1.2 or BCA 3.12.1.1, as appropriate.

AS 3999 includes vapour barriers used in conjunction with bulk insulation. Bulk insulation includes thermal insulation materials in the form of batts, blankets, rigid boards or loose fills as classified in AS/NZS 4859.1. For the purposes of AS 3999, segmented foil products are also considered bulk insulation.

Installation: Firmly butt together with no gaps except as follows:
- Access openings and vents: Do not obstruct.
- Light fittings: To AS/NZS 3000 clause 4.5.
- Electrical cables: To AS 3999 clause 2.6.

The flow of electric current in cables generates heat which needs to dissipate to the surroundings. The insulation should not be installed to completely surround the cable.

Glass wool and rock wool insulation: Conform to the
ICANZ Industry code of practice for the safe use of glass wool and rock wool insulation.

The *ICANZ Industry code of practice for the safe use of glass wool and rock wool insulation* has been jointly developed by AMWU, CFMEU, CEPU, and ICANZ (formerly FARIMA). Copies of the code are available from the respective unions, insulation manufacturers and ICANZ.

3.2 FLOORS

AMETALIN pliable membranes

AMETALIN reflective foil radiant barriers: Fit to underside of suspended floors to AMETALIN's instructions.

Under suspended framed floors

Fibre batts: Fit tightly between framing members. If other support is not provided, staple nylon twine to the framing and stretch tight.

AS 3999 includes directives on fixing of insulation, often deferring to the manufacturer's recommendations on the type and spacing of fixing devices. Preferably show fixing details on the drawings.

Rigid cellular insulation boards:

- Installation: Fix to the underside of timber strip flooring. Butt tightly to joists.

Alternatively: Fix to the underside of timber joists. Butt tightly to bearers.

If the insulation is exposed, check for fire hazard properties.

- Fixing: Adhesive or mechanical fasteners.

Over suspended framed floors

Rigid cellular insulation boards:

- Installation: Over sheet flooring and between battens supporting a final flooring finish.

Amend if only required at door thresholds.

Coordinate with the *065 Floor surfacing* subgroup for the flooring and adhesive system.

Below concrete slab on ground

Preparation: Sand blinding or working slab, as documented.

Rigid cellular insulation boards:

- Laying pattern: Stretcher bond, with edges tightly butted.
- Damp-proof membrane: Lay over insulation.

Over concrete slab on ground

Substrate preparation: Prepare substrate as follows:

- Clean and remove any deposit or finish which may impair adhesion or location of insulation.
- Remove excessive projections.
- Voids and hollows > 10 mm with abrupt edges: Fill with a cement:sand mix not stronger than the substrate or weaker than the bedding.

Rigid cellular insulation boards:

- Laying pattern: Stretcher bond, with edges tightly butted.
- Fixing: Adhesive fix directly to the concrete floor slab.

Coordinate with the *065 Floor surfacing* subgroup for the flooring and adhesive system, and *0612 Cementitious toppings* and requirements for separation strips.

Under suspended concrete slab

Use where slab incorporates in-slab heating or the slab separates a conditioned space from an unconditioned space.

Fibre batts:

- Fixing: Mechanical fasteners and support mesh or nylon twine.

Rigid cellular insulation boards:

- Fixing: Adhesive or mechanical fasteners.
- Joints: Apply reinforced foil tape to all joints.

3.3 WALLS

AMETALIN pliable membranes

AMETALIN vapour barrier membranes: Provide to completely seal external walls. Use AMETALIN vapour sealing tape to all edges, joins and penetrations to provide a vapour proof seal.

Selection: Specify tape appropriate to pliable building membrane and function specified.

Reflective insulation for use where water barrier and Class 1 or 2 Vapour Barrier properties are required for use as a roof sarking and wall wrap in residential and commercial buildings in ABCB Climate Zone 1 and regions north of the Tropic of Capricorn in Climate Zone 2.

NOTE: Condensation risks should be addressed when the product is positioned on the cold side of constructions as the risks may increase.

AMETALIN vapour permeable membranes: Provide behind external facing material that does not provide permanent weatherproofing or that may be subject to condensation forming on the internal face, including the following:

- Boards or planks fixed vertically or diagonally.
- Boards or planks fixed in exposed locations where wind driven rain can penetrate the joints.
- Unpainted or unsealed cladding.

The primary function of the membrane is to be a water control layer and direct any water that may penetrate the cladding, or exterior finish to the outside of the structure and act as a barrier to draughts, wind driven rain and dust. There must be adequate provision for the draining, absorption or diffusion of moisture so that moisture is not left trapped between the membrane and the external cladding.

If used as reflective thermal insulation, an air space adjacent to the reflective (low emittance) face is required.

See AS 4200.2 clause 3.7 for common requirements for walls, and the ABCB Condensation in buildings handbook for information on condensation and use of vapour barriers, vapour permeable membranes and sarking. Also see BCA F6.2 requirements for managing condensation in external walls of a sole-occupancy unit in a class 2 building and a class 4 part of a building.

Masonry and masonry veneer construction in the BCA contain a drained cavity which is the primary water control layer, separated from the building's water sensitive materials. Therefore non-water barrier, sarking-type materials can be specified to the exterior side of the of the main insulation in drained cavity constructions as a secondary weather barrier to the outside of the structure and act as a barrier to draughts, and dust.

Installation: Install to AMETALIN's instructions and run the membrane horizontally on the outer face of external wall framing, over the flashing, from the bottom plate up. Pull taut over the framing and fix to framing members.

Horizontal laps: At least 150 mm wide, lapped to make sure water is shed to the outer face of the membrane.

End laps or vertical overlaps: At least 150 mm wide made over framing.

Openings: Run the membrane over the openings and leave covered until windows and doors are installed. Cut the membrane on a 45° diagonal from each corner of the opening, fold the flaps inside and fix to the inside frame of the opening.

Airtight membrane: If the membrane is used to provide a continuous airtight layer, seal all joints with pressure sensitive adhesive tape.

Fixing: Install to AMETALIN's instructions and as follows:

Consider nominating stainless steel in areas of high corrosivity.

- Timber frames: Use AMETALIN cap nails or double-sided insulation fixing tape.
- Steel or aluminium frames: Use AMETALIN double-sided insulation fixing tape.
- Plywood: Use AMETALIN cap nails or double-sided insulation fixing tape.

Framed walls

Fibre batts: Friction fit between framing members. If other support is not provided, staple nylon twine to the framing and stretch tight.

AS 3999 includes directives on fixing of insulation often deferring to the manufacturer's recommendations on the type and spacing of fixing devices. Preferably show fixing details on the drawings.

Ametalin ThermalBreak Strips

Installation: To manufacturer's instructions.

Thermal Break strips

Installation: Provide to steel framing with lightweight external cladding:

- Screw fixing: Button head screws at 1 m centres.
- Adhesive fixing: Wallboard adhesive walnuts at 1 m centres.

See BCA J0.5 and BCA 3.12.1.4(d) on wall thermal breaks.

Masonry veneer cavity walls

Rigid cellular insulation boards:

- Installation: Fix boards horizontally with the tongue to the top edge, pushed over prefixed wall ties and held firmly against the wall frame. Keep boards clean, dry and free from mortar and grout. Do not bridge the cavity.
- Fixing: Hex head screws at 450 mm centres.

Flashings: Install flashings before installing insulation. Prevent entry of water behind the insulation boards.

Full masonry cavity walls – external face of internal leaf

Rigid cellular insulation boards:

- Installation: Fix boards horizontally with the tongue to the top edge and firmly against the inner masonry skin. Keep boards clean, dry and free from mortar and grout. Do not bridge the cavity.
- Fixing: Proprietary plastic clips on pre-installed wall ties.

Flashings: Install flashings before installing insulation. Prevent entry of water behind the insulation boards.

Full masonry cavity walls – internal face of internal leaf

Insulation fixed to the internal face of masonry walls may also be used for retrofitting of insulation to existing walls.

Substrate preparation: Conform to the following:

- Clean and remove any deposit or finish which may impair adhesion or location of insulation.
- Remove excessive projections and fill voids and hollows with plaster.
- Maximum surface deviation from a 2400 mm straightedge: 6 mm.

Substrate correction: Skim plaster.

Rigid cellular insulation boards:

- Installation: Fix boards horizontally with staggered vertical joints, all close butted and without crushing.
- Fixing: Proprietary adhesive compatible with the insulation. Apply sufficient pressure to evenly distribute adhesive.

If the construction is required to be non-combustible, see BCA Spec C1.10.

Masonry and masonry veneer construction in the BCA contain a drained cavity which is the primary water control layer, separated from the building's water sensitive materials. Therefore non-water barrier, sarking-type materials can be specified to the exterior side of the of the main insulation in drained cavity constructions as a secondary weather barrier to the outside of the structure and act as a barrier to draughts, and dust. (e.g. Reflective thermal control, Class 3 or 4 vapour permeable, Air barrier, Non-water control Ametalin Micro-perforated range.

3.4 CEILINGS

The following covers general applications for ceiling insulation. Delete materials and applications not required and add other materials and applications, as appropriate. See AS 3999 clause 5.3 on the installation of bulk insulation for ceilings. See also AS 4200.2 clause 3.6 for pliable membranes for ceilings and the ABCB Condensation in buildings handbook for information on condensation and use of vapour barriers, vapour permeable membranes and sarking.

Cathedral ceilings

Rigid cellular insulation boards:

- Installation: Lay boards with their long edges at right angles to the rafters and with the tongue pointing up the slope. Start laying at eaves and progress towards the ridge. Cut boards and tightly fit to abutments and penetrations.
- Fixing: Secure temporarily by occasional nailing to the rafters. Fix permanently by nailing counter battens to the rafters.
- Sealing: Seal gaps with polyurethane foam.

Alternatively use fibre batts installed between ceiling joists.

Framed ceilings

Fibre batts: Fit tightly between framing members. If support is not otherwise provided, staple nylon twine to the framing and stretch tight.

Suspended ceilings

Fibre batts and blankets: Lay batts/blankets over the ceiling system close butted to each other and to the suspension rods.

3.5 ROOFS

The following covers general applications for roof insulation. Delete materials and applications not required and add other materials and applications, as appropriate. See AS 3999 clause 5.2 on the installation of bulk insulation for roofing. See also AS 4200.2 Section 3 for pliable membranes for roofs.

General

Requirement: Provide insulation to the whole of the roof area including skylight shaft walls, except the following:

- Eaves, overhangs, skylights, vents and openings.
- Roofs to outbuildings, garages, and semi-enclosed spaces such as verandahs, porches and carports.

Amend if insulation is required in semi-enclosed spaces (balconies, verandahs) or ancillary buildings (garages, workshops, carports etc.).

AMETALIN pliable building membranes

See AS 4200.2 clause 3.3 for common requirements for roofs, and the *ABCB Condensation in buildings handbook* for information on condensation and use of vapour barriers, vapour permeable membranes and sarking.

See AS 3959 for BAL's in bushfire-prone areas. These require consideration on the use of vapour barriers, vapour permeable membranes and sarking under roofs.

AMETALIN pliable membranes: Lay over the roof framing with sufficient sag to allow the bulk insulation to achieve its full thickness. Install to AMETALIN's instructions.

Any separate bulk thermal insulation should be placed on the cold side of the vapour barrier. Specify roof spacers to avoid compression of bulk insulation at joists and purlins.

AMETALIN water control (sarking) pliable building membrane: Provide sarking under tile and shingle roofing. Install to AMETALIN's instructions.

AS 2050 specifies sarking requirements for tiled roofs. AS 2050 is cited in the NCC for structural sufficiency and weatherproofing.

If used as reflective thermal insulation, an air space adjacent to the reflective (low emittance) face is required.

Mesh support to roof insulation

Welded safety mesh may be required by WHS authorities for fall arrest. Coordinate with *0421 Roofing – combined*. Do not call up welded safety mesh in more than one clause in the specification.

Requirement: Provide support to the following:

- Water control (sarking) pliable building membrane, vapour barrier or reflective thermal insulation membranes laid over roof framing members that are spaced at more than 900 mm centres.
- Blanket type thermal insulation laid over roof framing members as sound insulation to metal roofing.

Installing welded safety mesh: To AS/NZS 4389.

Metal roofs

Fibre batts: Fit tightly between framing members.

Fibre blanket for sound insulation: Install over the roof framing, reflective thermal insulation (if any), and mesh support, so that the blanket is in continuous contact with the underside of the metal roofing sheets.

Combined fibre blanket and reflective insulation: Lay facing reflective insulation face downwards over safety mesh.

Thermal break strips: Provide to steel framing supporting metal sheet roofing.

- Screw fixing: Button head screws at 1 m centres.
- Adhesive fixing: Wallboard adhesive walnuts at 1 m centres.

See BCA J0.4 and BCA 3.12.1.2(c) on roof thermal breaks.

Ametalin ThermalBreak Strips

Installation: To manufacturer's instructions.

Thermal break strips

Installation: Provide to steel framing supporting metal sheet roofing.

- Screw fixing: Button head screws at 1 m centres.
- Adhesive fixing: Wallboard adhesive walnuts at 1 m centres.

See BCA J0.4 and BCA 3.12.1.2(c) on roof thermal breaks.

Waterproof membrane roofs

Roofs with insulating membrane protection are also known as IRMA (inverted roof membrane assembly) or PMR (protective membrane roof). Delete if documented in *0411 Waterproofing – external and tanking*.

Preparation: Make sure membrane is clean and free of loose material. Lay separation layer over membrane with edges lapped 300 mm and turned up at upstands and penetrations.

Rigid cellular insulation boards: Lay boards in brick pattern with shiplap edges pushed together firmly, cut neatly around penetrations and extend up upstands.

Document separation layer and surface finish in *0411 Waterproofing – external and tanking*, or delete if not required.

3.6 COMPLETION

Warranties

Requirement: Provide the manufacturers published product warranties.

Use only if warranties extending beyond the defects liability period are available for the particular system.

4 SELECTIONS

Schedules are a tool to specify properties required for products or systems. If the principal permits documentation of the product or system by proprietary name, some of the properties may be unnecessary and can be deleted. Document the product or system's location or application here and/or on the drawings with a matching project code. Refer to NATSPEC TECHnote GEN 024 for guidance on using and editing schedules.

4.1 AMETALIN PLIABLE MEMBRANES

Pliable membranes schedule

	A	B	C
Application			
Location			
Product			
Electrical conductivity classification			
Duty classification			
Surface emittance classification			
Membrane emittance category			
Vapour control membrane classification			
R-Value (m^2.K/W)			

The codes in the header row of the schedule designate each application or location of the item scheduled. Edit the codes to match those in other contract documents.

Select pliable membranes by product or by performance. Delete performance rows if selecting by product.

Application: Select from the following:

- Thermal control membrane.
- Fire performance membrane.
- Vapour permeable ((breathable) membrane.
- Vapour control membrane (vapour barrier).

Location: Describe location or show on the drawings.

Product. Select from the following AMETALIN pliable membrane products.

THERMAL CONTROL:

- ThermalBreak™
- ThermalLiner™
- SilverSark® xR

FIRE PERFORMANCE:

- Ametalin CeaseFire™
- FireSark®
- FireSark® Micro-perforated

VAPOUR BARRIER:

- ThermalBreak™
- ThermalLiner™
- SilverSark® HVB
- SilverSark®
- SilverWrap™
- FireSark®
- SilverSark®
- SilverSark® xR

VAPOUR PERMEABLE:

- Ametalin CeaseFire™
- VapourTech® Wall
- VapourTech® Brane® VHP
- FireSark® Micro-perforated
- SilverWrap™ Micro-perforated
- SilverWrap™ xR Micro-perforated
- SilverWrap™ xRS Micro-perforated
- SilverFloor™
- ThermaFloor™

Electrical conductivity classification: Select from Electrically non-conductive or Electrically conductive.

Duty classification: Select from Extra heavy, Heavy, Medium, Light, Light wall or Extra light.

Surface emittance classification: Select from IR Reflective, IR Semi-reflective or IR Non-reflective.

Membrane emittance category: Select from RR, RS, RN, SS, SN or NN. These categories describe the emittance of each surface, for example for RS, surface 1 is IR Reflective and surface 2 is IR Semi-reflective.

Vapour control membrane classification:

- Vapour barrier: Class 1 or Class 2.
- Vapour permeable (breathable) membrane: Class 3 or Class 4.

R-Value (m^2.K/W): AS/NZS 4859.1 requires that R-Value is declared at 23°C for insulation products sold in Australia.

4.2 THERMAL INSULATION

Thermal insulation schedule

	A	B	C
Application			
Type/Product			
R-Value (m^2.K/W)			
Thickness (mm)			
Airborne sound insulation			
Compressive strength (kPa)			
Rigid cellular sheet class			

The codes in the header row of the schedule designate each application or location of the item scheduled. Edit the codes to match those in other contract documents.

Application: Select from the following:

- Under suspended framed floors.
- Over suspended framed floors.
- Below concrete slab on ground.
- Over concrete slab on ground.
- Under suspended concrete slab.
- Framed walls.
- Masonry veneer cavity walls.
- Full masonry cavity walls - external face of internal leaf.
- Full masonry cavity walls - internal face of internal leaf.
- Cathedral ceilings.
- Framed ceilings.
- Suspended ceilings.
- Tiled roofs.
- Metal roofs.
- Waterproof membrane roofs.

Type/Product: Nominate product or select from the following types:

- Bulk insulation.
- Combined bulk insulation blanket and reflective insulation.
- Semi rigid sheets with heavy duty pliable building membrane.
- Pliable building membrane (foil) faced blanket.
- Rigid cellular insulation boards. Check the selected product for fire hazard properties if the insulation is exposed.

Product: If the system is specified by proprietary name, some of the other schedule items may be unnecessary and can be deleted.

R-Value (m^2.K/W): AS/NZS 4859.1 requires that R-Value is declared at 23°C for insulation products sold in Australia. If the system or total R-Value relies on layers of different materials, air spaces or reflective surfaces the R-Value must be calculated to AS/NZS 4859.2. Calculations performed to AS/NZS 4859.2 are not to be used for the purposes of labelling.

Thickness (mm): Nominate insulation thickness required to achieve the R-Value.

Airborne sound insulation: State the required rating to AS/NZS ISO 717.1 for either the weighted sound reduction index (R_w) or weighted sound reduction index with spectrum adaptation ($R_w + C_{tr}$). This rating is for a building system e.g. partition wall, of which the building element is only one component. It may be better to provide the rating in the appropriate system schedule. It is advisable to obtain the advice of an acoustic consultant on the selection of an R_w or $R_w + C_{tr}$ rating for airborne sound transmission reduction. Refer to NATSPEC TECHnote DES 032 for information.

Compressive strength (kPa): Refer to structural engineer and product manufacturer for advice.

Rigid cellular sheet class: Refer to AS 1366 series for information on the classification of rigid cellular sheet insulation, e.g. for rigid (moulded and extruded) cellular polystyrene AS 1366.3 Class SL (marked with a yellow colour stripe), or AS 1366.4 Class I (marked on each board).

REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

AS 1530		Methods for fire tests on building materials, components and structures
AS 1530.1	1994	Combustibility test for materials
AS 1530.2	1993	Test for flammability of materials
AS/NZS 1530.3	1999	Simultaneous determination of ignitability, flame propagation, heat release and smoke release
AS/NZS 1859		Reconstituted wood-based panels - Specifications
AS/NZS 1859.4	2018	Wet process fibreboard
AS/NZS 3000	2018	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS 3999	2015	Bulk thermal insulation - Installation
AS/NZS 4200		Pliable building membranes and underlays
AS/NZS 4200.1	2017	Materials
AS 4200.2	2017	Installation
AS/NZS 4389	2015	Roof safety mesh
AS/NZS 4859		Thermal insulation materials for buildings
AS/NZS 4859.1	2018	General criteria and technical provisions

AS/NZS 4859.2	2018	Design
NCC Schedule 3	2019	Schedule 3 Definitions
BCA 3.12.1.1	2019	Acceptable construction - Energy efficiency - Building fabric - Building fabric thermal insulation
BCA J1.2	2019	Energy efficiency - Building fabric - Thermal construction - General
ICANZ	2003	Industry code of practice for the safe use of glass wool and rock wool insulation
Safe Work Australia		Hazardous chemical information system
The following documents are mentioned only in the *Guidance* text:		
AS ISO 717		Acoustics - Rating of sound insulation in buildings and of building elements
AS/NZS ISO 717.1	2004	Airborne sound insulation
AS 1366		Rigid cellular plastics sheets for thermal insulation
AS 1366.3	1992	Rigid cellular polystyrene - Moulded (RC/PS - M)
AS 1366.4	1989	Rigid cellular polystyrene - Extruded (RC/PS-E)
AS 2050	2018	Installation of roof tiles
AS 3959	2018	Construction of buildings in bushfire-prone areas
AS 5637		Determination of fire hazard properties
AS 5637.1	2015	Wall and ceiling linings
ABCB Condensation	2019	Condensation in buildings handbook
BCA 3.12.1.2	2019	Acceptable construction - Energy efficiency - Building fabric - Roofs
BCA 3.12.1.4	2019	Acceptable construction - Energy efficiency - Building fabric - External walls
BCA Section C	2019	Fire resistance
BCA C1.9(e)	2019	Fire resistance - Fire resistance and stability - Non-combustible building elements
BCA Spec C1.10	2019	Fire resistance - Fire hazard properties
BCA F6	2019	Health and amenity - Condensation management
BCA F6.2	2019	Health and amenity - Condensation management - Pliable building membrane
BCA J0.4	2019	Energy efficiency - Energy efficiency - Roof thermal breaks
BCA J0.5	2019	Energy efficiency - Energy efficiency - Wall thermal breaks
ICANZ FBS-1	2009	Glass wool bio-soluble insulation
NATSPEC DES 003	2018	Fire hazard properties of insulation and pliable membranes
NATSPEC DES 004	2019	Air, moisture and condensation
NATSPEC DES 015	2019	NCC - BCA Volume One Energy efficiency provisions
NATSPEC DES 020	2018	Fire behaviour of building materials and assemblies
NATSPEC DES 031	2019	Specifying R-Values
NATSPEC DES 032	2018	Airborne sound insulation
NATSPEC GEN 006	2015	Product specifying and substitution
NATSPEC GEN 024	2021	Using NATSPEC selections schedules
NATSPEC PRO 002	2019	Mineral wool
NATSPEC TR 01	2021	Specifying ESD