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Exterior insulation and finish cladding systems



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Preface

This Standard was prepared by the Standards Australia Committee BD-109, Exterior insulation and finish cladding systems.

The objective of this document is to specify requirements for exterior insulation and finish systems (EIFS) as an exterior wall cladding system either in combination with a drained air space or directly fixed to a structural supporting element. It also specifies the requirements for water resistive barrier systems that are to be used with EIFS.

The terms “normative” and “informative” are used in Standards to define the application of the appendices to which they apply. A “normative” appendix is an integral part of a Standard, whereas an “informative” appendix is only for information and guidance.

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Exterior insulation and finish cladding systems

Section 1 Scope and general

1.1 Scope

This document specifies the requirements for exterior insulation and finish systems (EIFS) as an exterior wall cladding system either in combination with a drained air space or directly fixed to a structural supporting element. It also specifies the requirements for water resistive barrier systems that are to be used with EIFS.

Wall cladding systems comprising EIFS typically consist of a vapour-permeable membrane, rigid thermal insulation boards mechanically fixed to a structural substrate (either direct fix or cavity fix), glass fibre reinforcing mesh embedded in a cementitious polymer render base coat on the face of the thermal insulation boards and finished with a water-resistive coating system.

In EIFS, thermal insulation boards support the base coat with integral glass fibre reinforcing mesh. Systems where the reinforcement is the supporting element of the rendering, e.g. conventional stucco, are not covered by this document.

This document does not address all the health and safety aspects associated with the use of EIFS or maintenance requirements.

NOTE 1 Refer to relevant legislation and regulations for any health and safety requirements.

NOTE 2 Refer to product specifications for information on maintenance of EIFS and its components.

This document applies to Class 1 buildings and to Class 10a buildings that are associated with Class 1 buildings.

This document does not apply to —

- (a) building Classes 2 to 9;
- (b) pre-rendered thermal insulation boards;
- (c) insulated sandwich boards; and
- (d) external walls where required to be fire-resisting (as defined by NCC volume 2).

1.2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document:

NOTE Documents for informative purposes are listed in the Bibliography.

AS 1366.3, *Rigid cellular plastics sheets for thermal insulation, Part 3: Rigid cellular polystyrene—Moulded (RC/PS—M)*

AS 1366.4, *Rigid cellular plastics sheets for thermal insulation, Part 4: Rigid cellular polystyrene—Extruded (RC/PS-E)*

AS 1530.8.1, *Methods for fire tests on building materials, components and structures, Part 8.1: Tests on elements of construction for buildings exposed to simulated bushfire attack—Radiant heat and small flaming sources*

AS 1562.1, *Design and installation of metal roof and wall cladding, Part 1: Metal*

AS 1684.2, *Residential timber-framed construction, Part 2: Non-cyclonic areas*

AS 1684.4, *Residential timber-framed construction, Part 4: Simplified—Non-cyclonic areas*

AS 1720.1, *Timber structures, Part 1: Design methods*

AS 2047, *Windows and external glazed doors in buildings*

AS 2122.1, *Combustion characteristics of plastics, Part 1: Determination of flame propagation—Surface ignition of vertically oriented specimens of cellular plastics*

AS 2498.3, *Methods of testing rigid cellular plastics, Method 3: Determination of compressive stress*

AS 2498.5, *Methods of testing rigid cellular plastics, Method 5: Determination of water vapour transmission rate*

AS 2498.6, *Methods of testing rigid cellular plastics, Method 6: Determination of dimensional stability*

AS 3660.1, *Termite management, Part 1: New building work*

AS 3700, *Masonry structures*

AS 3959, *Construction of buildings in bushfire-prone areas*

AS 4200.1, *Pliable building membranes and underlays, Part 1: Materials*

AS 4200.2, *Pliable building membranes and underlays, Part 2: Installation*

AS 4773.1, *Masonry in small buildings, Part 1: Design*

AS 4773.2, *Masonry in small buildings, Part 2: Construction*

AS/NZS 1170.0, *Structural design actions, Part 0: General principles*

AS/NZS 2311, *Guide to the painting of buildings*

AS/NZS 2904, *Damp-proof courses and flashings*

AS/NZS 2918, *Domestic solid fuel burning appliances - Installation*

AS/NZS 4040.5, *Methods of testing sheet roof and wall cladding, Part 5: Resistance to impact (sandbag) for wall boards*

AS/NZS 4284, *Testing of building facades*

AS/NZS 4347.0, *Damp-proof courses and flashings—Methods of test, Part 0: General introduction, list of methods and test specimen requirements*

AS/NZS 4548.5, *Guide to long-life coatings for concrete and masonry, Part 5: Guidelines to methods of test*

AS/NZS 4600, *Cold-formed steel structures*

AS/NZS 4859.1, *Materials for the thermal insulation of buildings, Part 1: General criteria and technical provisions*

AS/NZS 4859.2, *Thermal insulation materials for buildings, Part 2: Design*

AS/NZS 5601.1, *Gas installations, Part 1: General installations*

NS 100, *Residential and low-rise steel framing, Part 1: Design criteria*

NS 200, *Residential and low-rise steel framing, Part 2: Design solutions*

NS 300, *Steel-framed construction in bushfire areas 2021*

1.3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

1.3.1

control joint

joint or gap constructed to control and absorb movement in the building

1.3.2

expanded polystyrene foam

EPS foam

rigid thermoplastic cellular material with an air-filled cellular structure, manufactured by moulding beads or granules of expandable polystyrene or one of its copolymers

1.3.3

expansion joint

joint to permit movement caused by the thermal expansion or contraction of any part of the system

[SOURCE: ISO 9229:2020, 3.5.10 modified – “arrangement of a” removed]

1.3.4

exterior insulation finish system

EIFS

exterior wall system with capacity to provide thermal, air, water and vapour control functions and inclusive of a water resistive barrier assembly, thermal insulation board, attachment method for securing the system to the substrate, and protected by a base coat material and glass fibre reinforcing mesh installed over the face and termination surfaces of the thermal insulation board and completed with a finish material

[SOURCE: ISO 9229:2020, 3.4.2.3 modified – “heat” replaced with “thermal”, “air” added, “moisture” replaced with “vapour”, “(3.4.1)” and “(3.5.11)” removed]

1.3.5

extruded polystyrene foam

XPS foam

rigid thermoplastic cellular material, manufactured by extrusion of polystyrene or one of its copolymers expanded with a blowing agent

1.3.6

flashing

as defined in the National Construction Code

1.3.7

may

indicates the existence of an option

1.3.8

paint

coating material manufactured with acrylic resins as the main base

1.3.8.1

textured paint

thick paint that produces a variety of rough, sandy, patterned or textured finishes

Note 1 to entry: The texture is achieved by the composition of the paint and its method of application by heavy brush, roller or trowel.

1.3.9**phenolic foam**

rigid thermoset cellular polymeric material, manufactured primarily from the polycondensation of phenol, its homologues and/or derivatives, with or without aldehydes or ketones, and expanded with a blowing agent

1.3.10**polyisocyanurate foam****PIR**

rigid cellular thermoset polymeric, manufactured from polymers mainly of polyisocyanurate groups expanded with a blowing agent

1.3.11**polymer-modified cement render**

mixture of one or more inorganic binders, aggregate, water, polymer and admixtures

1.3.12**shall**

indicates that a statement is mandatory

1.3.13**should**

indicates a recommendation

1.3.14**surface sealant**

material to protect the finished coating

1.4 New designs and innovations

This document does not prevent the use of materials, methods of assembly, procedures and the like that do not conform to the specific requirements of this document, or are not mentioned in it, provided the minimum dimensional and performance requirements specified herein are met.

Section 2 Design

2.1 Structure

2.1.1 General

Exterior insulation finish systems (EIFS) shall be installed to satisfy the design specification, intended purpose, performance properties and the function of EIFS.

The design shall —

- (a) specify the purpose and required properties of the EIFS; and
- (b) identify the following:
 - (i) Fixing, sealing and finishing requirements for thermal performance, weatherproofing and condensation management strategies.
 - (ii) Material properties of the EIFS with information to enable the selection of materials.
 - (iii) If EIFS is to be installed, the capability of the structural substrate within the building system to support the EIFS.

The wall supporting the exterior insulation and finish cladding system shall be constructed of —

- (i) masonry conforming to either AS 3700 or AS 4773.1 and AS 4773.2;
- (ii) steel framing conforming to either AS/NZS 4600 or NS 100, NS 200 and NS 300;
- (iii) timber framing conforming to AS 1720.1; or
- (iv) timber framing conforming to AS 1684.2 (N1 to N3 wind classification only) or AS 1684.4 (N1 and N2 wind classification only).

NOTE See [Clause 4.1](#) for fixing requirements.

2.1.2 Height limitation

The wall height from ground level to the underside of the eave shall not exceed 8.5 m.

NOTE 1 The overall height of Class 1 buildings does not typically exceed 10 m.

NOTE 2 For wall heights exceeding 8.5 m, a structural engineer should be consulted.

2.1.3 Wind speeds and terrain category

Buildings to which this document applies shall be located in an area with a design wind speed of not more than N3.

NOTE For wind areas in excess of N3, refer to AS/NZS 1170.2 or consult a structural engineer.

2.2 Weatherproofing

2.2.1 Coating system

Materials used for weatherproofing shall consist of a polymer-modified cement render and texture coating. This coating shall have a maximum water transmission rate of 8 g/24hr/m²/kPa conforming to AS/NZS 4548.5.

2.2.2 Flashing

Flashings required for weatherproofing or condensation management shall be comprised of materials that conform to AS/NZS 2904 and AS/NZS 4347.0.

NOTE For installation requirements, see [Clause 4.6](#).

2.2.3 Windows

Window installations shall conform to AS 2047.

2.3 Construction considerations

2.3.1 Control joints

2.3.1.1 Horizontal

Control joints shall be installed —

- (a) between different levels of the building structure; and
- (b) if there is a change in framing systems.

2.3.1.2 Vertical

Control joints shall be installed at a maximum of 7 m centres or positioned at articulation joints over articulated masonry or masonry veneer construction.

2.3.1.3 Interface between EIFS and other types of cladding

Horizontal and vertical control joints shall be installed where different cladding systems meet.

NOTE See [Clause 4.5](#) for installation requirements.

2.3.2 Top of wall detailing

NOTE 1 There are specific requirements for detailing around lined or unlined eaves soffits when using EIFS in relation to thermal insulation continuity, bushfire protection, weatherproofing and/or condensation management.

NOTE 2 The jointing to the underside of the roof should be sealed.

NOTE 3 See [Clause 4.7.3](#) and [Figures 4.7.3.2](#) and [4.7.3.3](#) for installation requirements and further details.

2.3.3 Footings

The footing design shall conform to AS 2870 for either articulated masonry veneer or the articulated masonry class.

NOTE Footings should be able to limit the amount of movement imposed on the wall system.

2.4 Other considerations

2.4.1 Termite management

For sites in a declared termite area, termite management shall conform to AS 3660.1.

2.4.2 Designated bushfire-prone areas

For sites in a designated bushfire-prone area, the Bushfire Attack Level (BAL) shall be determined in accordance with AS 3959.

EIFS shall —

- (a) be designed in accordance with the construction requirements of AS 3959; and
- (b) if required, be tested for the BAL of the site in accordance with [Clause 5.7](#).

NOTE 1 For guidance on EIFS BAL testing requirements, refer to AS 3959.

NOTE 2 For guidance on designated bushfire-prone areas, refer to the relevant state/territory regulator.

2.4.3 Water, water vapour and condensation management

If required to manage damp and condensation, a pliable building membrane shall be installed to the substrate (cavity fix or direct fix EIFS) in accordance with [Clause 4.2](#).

NOTE 1 A pliable building membrane is not required when EIFS is fixed directly to masonry or concrete.

NOTE 2 If a pliable membrane is installed, the installation of the cladding should not compromise the purpose and integrity of the membrane.

NOTE 3 In the event of weatherproofing failure, the cavity or insulation material should be dried.

2.4.4 Durability requirements for fixings, connectors, and accessories

Materials used for fixings, connectors and accessories shall conform to AS 4773.1:2015 Table C1.

NOTE Refer to product specifications for corrosion resistance, especially for proximity to coastal regions.

2.4.5 Providing for attachments

If attachments exceeding 10 kg are to be fixed to EIFS walls, the method of attachment shall be designed in accordance with AS/NZS 1170.0.

If EIFS is to be fixed to framed walls and attachments exceeding 10 kg are to be provided, the wall frame design shall nominate where noggings to anchor those attachments are to be placed.

Noggings shall be of the same profile, material and construction method used to construct the wall frame.

NOTE For attachments not exceeding 10 kg, see [Clause 4.10](#).

2.4.6 High temperature sources

EIFS shall be separated or protected from high-temperature fixtures and penetrations.

NOTE 1 EIFS component materials are combustible and heat sensitive.

Solid fuel burning appliances, chimneys, flues and any other high temperature fixed appliances or flue systems shall conform to AS/NZS 2918.

Fixed cooking appliances, including fixed BBQ's, cooktops and the like that are installed adjacent to either the external or internal side of an EIFS wall, shall conform to AS/NZS 5601.1.

NOTE 2 These requirements do not provide protection against movable, outdoor heating and cooking equipment.

Section 3 Materials

3.1 General

Exterior insulation and finish cladding systems shall consist of elements listed in [Clauses 3.2](#) to [3.13](#).

3.2 Thermal insulation board

3.2.1 General

The thermal insulation properties of insulation board shall conform to AS/NZS 4859.1.

3.2.2 Expanded polystyrene

Where expanded polystyrene (EPS) is used, it shall —

- (a) be at least M grade in accordance with AS 1366.3;
- (b) be flame retardant in accordance with AS 1366.3;
- (c) have vermin retardant added at time of manufacture; and
- (d) have a minimum thickness of 40 mm.

Prior to cutting, EPS blocks shall —

- (i) be oven-dried;
- (ii) be devoid of moisture; and
- (iii) achieve a constant weight.

EPS blocks shall be cut into thermal insulation boards and then placed into EIFS assembly.

NOTE [Table 3.2.2](#) specifies the general properties of M grade EPS board.

Table 3.2.2 — Properties of EPS board — M grade

Property	Unit	Value	Standard
10 % compressive strength	kPa	105	AS 2498.3
Thermal resistance	W/m.K	0.038	AS/NZS 4859.1
Dimensional stability of length, width, thickness (max.) 70 °C + 95 % dry condition seven days	%	1	AS 2498.6

3.2.3 Extruded polystyrene

Where extruded polystyrene is used, it shall —

- (a) be at least S grade in accordance with AS 1366.4;
- (b) be flame retardant in accordance with AS 1366.4;
- (c) have vermin retardant added at time of manufacture; and
- (d) have a minimum thickness of 40 mm.

3.2.4 Polyisocyanurate board

Polyisocyanurate (PIR) board properties shall be as specified in [Table 3.2.4](#).