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**Thermal insulation products —  
Exterior insulation and finish systems  
(EIFS) —**

**Part 3:  
Design requirements**

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 163, *Thermal performance and energy use in the built environment*, Subcommittee SC 3, *Thermal insulation products*.

A list of all parts in the ISO 17738 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

This document provides specifications for architects, design professionals and builders on the integration of an exterior insulation and finish system (EIFS) into their projects.

This document is predicated on the selected EIFS assembly being in compliance with the requirements of ISO 17738-1, and system installation in compliance with ISO 17738-2.

The design criteria in this document are based on the principle that the building envelope contains five 'planes-of-control':

- water-shedding barrier;
- water-resistive barrier;
- thermal barrier;
- air barrier;
- vapour barrier.

Each plane-of-control corresponds to an individual function that the cladding assembly is designed to perform. The function of the planes-of-control are:

- Water-shedding barrier: This is designed to deflect rainwater away from the wall surface, thereby minimizing water penetration into the cladding assembly.
- Water resistive barrier: Accepting that some water could find its way behind the cladding, a continuous water resistive barrier is required to protect the substrate. Water that penetrates one cladding component should not be directed to drain behind another. Any water that reaches the water resistive barrier should have a clear drainage path to the exterior of the cladding.
- Continuous thermal barrier: The principle benefit of an EIFS cladding is the continuous thermal barrier installed on the exterior of the structure. Insulation should be adequate to prevent condensation within the wall assembly while meeting requirements for energy use. The designer should detail the thermal barrier to minimize thermal bridging, using ISO 14683 as a guide.
- Air barrier system: Effective thermal and moisture control requires a continuous air barrier system on all faces of the building envelope. With an EIFS, the air barrier function is provided by the water resistive barrier. Details should show connections with other airtight elements and materials within the building envelope.
- Vapour barrier: Where required by environmental conditions, a vapour barrier, may be a component of the EIFS. The vapour barrier might, for example be a vapour-impermeable water resistive barrier or another material in the wall assembly (e.g. polyethylene sheet). The function of the vapour barrier is to minimize water vapour penetrating through materials comprising the wall assembly then condensing on a cold surface where it has limited ability to drain or dry.

This document addresses the minimum number of locations in the wall assembly where the creation of architectural details is essential. When creating EIFS details for a project, the designer should be mindful of how the five planes-of-control within the building envelope are integrated across the various architectural components (e.g. the air barrier of a window functions as a hermetic part of the air barrier system when structurally sealed to the air barrier of the wall).

An important aspect of developing details is to specify materials that meet the function of each plane-of-control. The detail then illustrates how the control planes are connected. A series of illustrations showing sequence of installation and connection could be necessary. Each detail should clearly illustrate how a plane-of-control is integrated with the adjacent element to provide a continuous layer within the building envelope.

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# Thermal insulation products — Exterior insulation and finish systems (EIFS) —

## Part 3: Design requirements

**WARNING** — The use of this document can involve hazardous materials, operations and equipment. It does not purport to address all the health and safety considerations associated with its use.

### 1 Scope

This document specifies the design requirements, selection and application of exterior insulation and finish systems (EIFS) for use by building designers, building code officials, product manufacturers and contractors in order to sustain the installed performance and durability of EIFS.

**NOTE** This document does not address all aspects related to EIFS design, selection and use. A working knowledge of applicable regional building codes and regulations is helpful when working with this document. There could be other considerations for specific installations that are not addressed by this document.

This document contains design requirements for the design and installation of an EIFS as a wall cladding system. The document includes selection of materials that meet the requirements of ISO 17738-1, and installation requirements in accordance with ISO 17738-2 and covers the interfaces between EIFS and other building assemblies and components.

This document refers to adhesively fastened systems, although mechanical fastening could be required in specific circumstances (refer to [Annex A](#)). For information on EIFS resiliency, refer to [Annex B](#).

This document does not specify the structural design of the substrate to which the EIFS is attached, nor does it provide design requirements when the installation of EIFS uses mechanical fasteners.

This document is applicable to new and retrofit EIFS installations.

### 2 Normative reference

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. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7345, *Thermal performance of buildings and building components — Physical quantities and definitions*

ISO 9229, *Thermal Insulation — Vocabulary*

ISO 17738-1, *Thermal insulation products — Exterior insulation and finish systems — Part 1: Materials and systems*

ISO/ 17738-2, *Thermal insulation products — Exterior insulation and finish systems (EIFS) — Part 2: Installation*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7345, ISO 9229, ISO 17738-1, ISO 17738-2 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

### 3.1

#### **environmental separator**

above grade wall separating the interior and exterior environments

## 4 Materials

All of the EIFS specified for a project shall be tested for compliance with the requirements of ISO 17738-1. There shall be no alterations or substitution of the EIFS materials to be used in the EIFS assembly.

## 5 Design criteria

This document contains requirements for the design of exterior insulation and finish systems (EIFS) as a wall cladding system. Provisions for the functional aspects of the water shedding barrier, water resistive barrier, thermal control layer, resistance-to-air-movement and vapour movement are covered as functions of a wall assembly.

## 6 Design requirements

As a minimum, project design drawings, details, and specifications shall clearly indicate details of interfaces and joints, including flashings, required to maintain continuity of the water shedding barrier (lamina), the water resistive barrier assembly (WRBA), air barrier assembly and the vapour barrier assemblies at the following building locations: [ISO 17738-3:2019](https://standards.iteh.ai/catalog/standards/sist/14640498-cf6b-4aa6-a982-bb6ddcb94b1b/iso-17738-3-2019)

- a) foundation walls;
- b) window and door sills;
- c) window and door heads;
- d) window and door jambs;
- e) adjacent dissimilar cladding systems;
- f) building envelope penetrations, such as exhaust boxes, signs, guard anchors or mechanical equipment;
- g) joints intended to drain water;
- h) intersecting balustrades;
- i) roof-to-wall interfaces;
- j) above roofing (penthouses and return walls);
- k) roof parapets and overhangs; and
- l) balconies.

The minimum thickness of thermal insulation board shall be 50 mm. Exceptionally, a minimum thickness of 30 mm of thermal insulation board shall be permitted behind an aesthetic reveal as measured from the base of the reveal and the deepest point of the geometrically-defined drainage cavity (GDDC) pattern.

Project specifications shall stipulate that EIFS is installed in accordance with ISO 17738-2.



Project specifications shall require confirmation that the specified EIFS and connecting materials are compatible.

## 7 Substrate design requirements

EIFS shall only be used on a substrate and back-up structure that has been designed to possess adequate strength and rigidity to support:

- a) the EIFS cladding,
- b) lateral loads (typically wind),
- c) any other structural loads that are an inherent part of the building design.

Where EIFS is to be installed on an existing building, the structural adequacy of the building and proposed substrate shall be determined. Appropriate reinforcement and/or remedial measures to provide acceptable structural integrity shall be designed and implemented, where necessary, prior to installing the EIFS.

## 8 Water-shedding barrier

The design of the EIFS cladding shall minimize water penetration into the drainage cavity.

EIFS design shall redirect any water that reaches the water resistive barrier assembly (WRBA) to the exterior face of the cladding.

Windows, doors and claddings adjacent to the EIFS and their interfaces with the EIFS shall be designed to prevent water from draining behind the EIFS.

EIFS mouldings projecting out from the wall's vertical plane shall have a minimum 1:2 slope to ensure that water drains from the surface, unless:

- a) EIFS moulding is protected by metal flashing or other durable material; or
- b) there is an overhang in close proximity above the EIFS moulding. (Close proximity is considered to be a vertical distance between the top of the EIFS moulding and the underside of the overhang of not more than one quarter of the horizontal eave overhang.)

NOTE The presence of surface texture will influence the ability of a surface to drain.

The bottom surfaces of horizontal aesthetic reveals shall provide a minimum outward positive slope of 1:2 for shedding of precipitation.

Where manufacturer's installation instructions recommend steeper slopes or additional protection of horizontal surfaces, the manufacturer's installation instructions for projection limitations and flashing requirements shall be followed.

## 9 Water-resistive barrier assembly

The specified EIFS and water barrier assembly shall be compatible with the substrate.

Where the EIFS liquid applied water resistant barrier (LA-WRB) is also the air barrier material, the air barrier continuity and the incorporation of the rain penetration control measures shall meet the requirements in [Clause 11](#).

The water resistive barrier assembly shall be designed to control water that penetrates the cladding. It shall:

- be continuous with the water resistive barrier of windows, doors and adjacent cladding assemblies;

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- prevent water from penetrating into the interior space;
- provide a clear path for water to drain by gravity;
- incorporate flashing that will direct water out of the drainage cavity and beyond the face of the cladding below; and
- not drain into adjacent cladding assemblies.

### 10 Thermal barrier

The designer shall include an effective thermal control layer that meets the objectives of the building owner. The designer shall specify the thickness of the thermal insulation to meet all design objectives.

An effective thermal control layer design includes consideration of thermal bridges which are calculated in accordance with ISO 14683.

The design shall require a minimum 50 mm thickness for the thermal insulation board. Where aesthetic reveals are cut into the insulation board, a minimum thickness at the base of the reveal shall be 30 mm.

If the EIFS incorporates a GDDC, the thickness of the thermal insulation board shall be increased by the depth of the GDDC to maintain the minimum board thickness of 50 mm or 30 mm behind an aesthetic reveal.

Any patterns or drainage grooves cut into the back of the insulation shall not reduce this minimum thickness requirement.

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### 11 Air barrier assembly

An air barrier assembly shall be designed and detailed.

Where the EIFS WRBA or other materials are intended to provide the air barrier function, the designer or builder shall identify the materials, accessories and components comprising the air-leakage control layer (air barrier assembly) and shall detail their integration into the air barrier system in the wall assembly.

### 12 Vapour barrier

The designer shall consider the materials used in the vapour barrier assembly and their interaction with the environments on both side of the wall assembly. Where water vapour transmission is deemed to need control, the designer shall design and detail a water vapour control layer.

### 13 Fire protection

The selected EIFS shall be designed within the parameters of the system's fire test reports.

The selection of EIFS requires consideration of building height, limiting distances and whether or not the building is sprinklered.

When the thermal insulation board is foam plastic, the design of the thickness of the thermal insulation board shall be within the limitations of the fire tested wall assembly, inclusive of any architectural profiles or EIFS mouldings.

EIFS designs containing foam plastic thermal insulation board, shall not be used at locations on the building where a service temperature is in excess of +65 °C.

EIFS are noted for the potential to create three-dimensional features by carving the thermal insulation board and finishing. The designer or builder should be aware of limitations on foam insulation thickness due to fire resistance and exposures that may require flashing.

NOTE 1 Framing can be used to create larger profiles without excessively increasing insulation thickness and to provide structural support for flashing.

NOTE 2 Service temperatures in excess of +65 °C can occur in proximity to chimneys, heater vents, steam pipes, and materials of a dark colour that absorb solar radiation. Dark-coloured EIFS and EIFS in proximity to reflective surfaces can also experience temperatures in excess of +65 °C due to the absorption of solar radiation by the EIFS finish.

## 14 Impact resistance

The design shall anticipate where high impact loads occur and shall:

- a) incorporate a higher impact resistance EIFS; or
- b) incorporate physical means of protection to prevent the impact.

NOTE 1 The impact resistance of EIFS can be improved by providing heavier and/or additional layers of reinforcing mesh, as well as providing a thicker base coat at areas where impact damage is more probable to occur. The manufacturer's installation instructions can be consulted for system-specific methods.

NOTE 2 Physical means of protection include the use of bollards, parking barriers and similar structural elements.

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## 15 Hygrothermal performance

If the EIFS-clad wall assembly includes other layers of thermal control, the wall shall be designed to minimize the potential for condensation and/or moisture accumulation.

Notwithstanding any hygrothermal evaluation, the thickness of the foam plastic thermal insulation board shall be within the limitations of the fire-tested assembly, inclusive of any architectural profiles or EIFS mouldings.

Control of vapour diffusion shall take into consideration the combination of all components in the wall assembly.

The design of EIFS shall consider the air leakage characteristics of the wall assembly where mass transport of water vapour leads to potential condensation.

## 16 EIFS terminations and interface gaps

### 16.1 Terminations

Design of the thermal insulation board edges at EIFS terminations shall be treated in accordance with the requirements of ISO 17738-2.

Where EIFS is installed above projecting building elements (such as roofs, balconies, or other horizontal elements), the bottom edge of the EIFS shall be terminated a minimum of 50 mm above such projecting building elements.

A clearance of at least 200 mm shall be maintained between the EIFS termination and finished grade.

A minimum clearance of 13 mm shall be provided around openings or penetrations that are to receive sealants.

A minimum clearance of 20 mm shall be provided at terminations adjacent to other claddings that are to receive sealant.