STAMP by itecons

SYSTEM APPLICATION DOCUMENT

WALL CLADDING

REVESTIMENTO DE PAREDES

REVÊTEMENT MURAL

Tradename

MD FACADE

System Application

Cork cladding as external thermal insulation over metal sheet

Manufacturer

Amorim Cork Insulation S.A.

Rua de Meladas, n.º 105

4535-186 Mozelos

info.aci@amorim.com

www.amorimcorkinsulation.com

STAMP001/23

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1 - Description of the system

1.1 - General description

Facade cladding with special expanded insulation cork board (ICB), adhesive and mechanical fixings, used as exterior wall finishing. The system uses ICB boards of medium density (130 kg/m^3) with shiplap system, as external thermal insulation without any additional coating (uncoated cork), applied on metal sheet by one-component adhesive sealant based on MS-Polymer and mechanical fixings.

1.2 - Main characteristics

The system provides high thermal performance, adequate mechanical behaviour and aesthetically appealing coating to facades. ICB is a sustainable material with very low embodied energy, carbon negative and 100% natural.

The Section 3 presents the assessment of the system carried out, namely:

- Wind load resistance[1];
- Bond strength resistance[1];
- Thermal resistance.

Annex A presents the description of the components of the MD FACADE system.

1.3 - Commercialisation

The ICB boards are available with shiplap system, with dimensions of 1000 mm x 500 mm x 80 to 200 mm (l x w x t).

This product should be stored away from extreme temperatures and humidity.

1.4 - Hygiene and safety in the application

The handling of ICB does not involve risks of flammability or special risks of toxicity, as long as there is a renewal of air in the places where its application takes place. When applying the MD FACADE system, the contact of the adhesive with the eyes must be avoided, so it is advisable to use adequate personal protective equipment. Once the application is complete, it is recommended to wash your face and hands with soap and water. If the products come into contact with the eyes, it is recommended to wash them immediately with water. If there are symptoms of irritation, medical advice should be consulted.

2 - Manufacturing, storage and internal quality control

2.1 - Manufacturing and storage

The expanded insulation cork board is produced by Amorim Cork Insulation at its factory in Vendas Novas.

The manufacturing process includes: stock; grinding; autoclave agglomeration; stabilisation; squaring and cutting; packing and expedition. After packing, the material is stored at the factory's covered facilities.

The adhesive sealant and the mechanical fixings are not produced internally by Amorim Cork Insulation.

2.2 - Internal quality control

The company has appropriate manufacturing conditions and a factory production control system that focuses on raw materials and finished products.

The company's Quality Management System is certified according to the NP EN ISO 9001:2008 standard.

Amorim Cork Insulation performs factory production control of the ICB boards according to EN 13170 and consequent CE marking. The adhesive and the mechanical fixings (screws), that are part of the MD FACADE system, are also included in the factory production control.

3 - Assessment of the System

3.1 - Testing

The laboratory tests were carried out at Itecons. The test specimen consisted in a 2.60 m x 2.05 m metal sheet wall. The expanded insulation cork boards (ICB) of medium density (130 kg/m^3), with shiplap system, were glued to the wall by rows of one-component adhesive sealant based on MS-Polymer and mechanical fixings. ICB boards with 80 mm thickness were used.

[1] *Test report OEF025/23 issued by Itecons*

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Rua Pedro Hispano, s/n
3030-289 Coimbra
www.itecons.uc.pt
Tel: (+351) 239 79 89 49
(National landline)
itecons@itecons.uc.pt

3.1.1 Wind load resistance

The test principle consists in reproducing the effects of wind suction loads on the assembled exterior cladding solution. The test was performed based on the information stated in Annex E, section E.1 of EAD 090062-00-0404.

After the performance of the test, there were no events resulting from the test pressures that determine the failure of the product, nor was there any visible damage to the elements of the test specimen. The test ended after applying the step of 3000 Pa without any failure.

3.1.2 Bond strength resistance

The pull-off test aims to determine the adhesive strength of the layers that compose the cladding system, when subjected to perpendicular tension. The test was performed based on the information stated in section 2.2.11.1 of EAD 040083-00-0404.

The results showed a mean rupture load of 1403 N for a mean area of 413 cm^2, resulting in a mean adhesive strength of 34 kPa. The rupture pattern was cohesive rupture within the ICB.

3.2 - Calculation

3.2.1 Thermal resistance

The thermal resistance of the system MD FACADE was calculated in accordance with ISO 6946:2017. The thermal bridge effect of the mechanical fixings was neglected in the calculation. The calculated thermal resistance values of the MD FACADE are presented in Table 1.

Table 1: Thermal resistance values for medium density ICB**.**

Thickness [mm]	Thermal resistance [(m^2.K)/W]	Thickness [mm]	Thermal resistance [(m^2.K)/W]
80	**1.85**	160	**3.70**
100	**2.30**	180	**4.15**
120	**2.75**	200	**4.65**
140	**3.25**	---	---

4 - Application conditions on site

4.1 - Application domain

The assessed MD FACADE system is intended to be applied on metal sheet exterior surfaces of vertical walls, in new buildings or renovations.

4.2 - Application conditions

The MD FACADE must be applied on smooth and stable substrates. It should not be applied in the following situations:

- Ambient and support temperatures below 5ºC and above 35ºC;
- Rain or forecast of rain or showers, during and up to 48 hours after the conclusion of the system application;
- In the presence of strong, hot or dry wind;
- Under the direct incidence of intense solar radiation.

The persistent existence of high-water contents, even in periods without rain, advises against the application of this system. In these cases, the source of humidity must be checked and corrected in advance.

Annex B shows de applications steps of MD FACADE system.

4.3 - Application procedure

The application of the system requires an imperative recognition and preparation of the support and requires careful execution, namely in the treatment of singular points, in the mechanical fixing points, in the application method and in the regularity of the application thickness.

4.3.1 Substrate preparation

The metal sheets can be applied in support walls that are not in good condition, as the interposition of the metal sheet will ensure the waterproofing of the support.

The metal sheets must be stable, free of dust, oxidation or any type of material that affects the normal adhesion conditions.

When the metal sheet is applied directly to the

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Rua Pedro Hispano, s/n
3030-289 Coimbra
www.itecons.uc.pt
Tel: (+351) 239 79 89 49
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support wall by mechanical fixation (Figure B1.2-a), the screw holes must be sealed with silicone to ensure watertightness.

Prior to bonding the ICB boards, a degreasing and cleaning product based on 100% hydrocarbon solvent with neutral pH must be used to clean the metal sheets.

The top of the metal sheet must be properly covered and sealed. There must be drainage channels at the bottom to ensure that any infiltrated water or condensation can drain out.

4.3.2 ICB boards fixation

The bonding of the ICB boards to the metal sheets is made using the one-component adhesive sealant. Supplementary mechanical fixing is also needed.

Rows of adhesive must be applied to the metal sheet, vertically, with a maximum horizontal spacing between rows of 100 mm (Figure B1.2-b). The ICB boards are placed over the metal sheet and pressure is applied to ensure a good contact and adequate adhesion (Figure B1.2-c) between the metal sheet and the ICB boards.

The mechanical fixing of the ICB board is carried out directly to the metal sheet at the shiplap zone. For this purpose, each ICB board is fixed with a minimum of 4 screws (1 screw in each corner of the shiplap and 1 additional screw in the middle of the shiplap). Also, the adhesive sealant should be used in the shiplap layers in order to seal the ICB joints (Figure B1.2-d).

4.4 - Constructive details

There must be a project prior to the installation of the system. The project must include the appropriate constructive details for the type of building, in order to ensure a good performance and durability of the system. Examples of constructive details draws are given in Annex C.

4.4.1 Starting profile

The application should start with a perforated metal start-profile. This profile must be the same width as the board to be applied and is placed at a minimum distance of 50 mm from the ground or 5 mm from any other structure. Its function is to ensure support and prevent mechanical damage from accidental impact. The use of perforated material allows for water, that has been absorbed by the ICB (rain water, irrigation systems, etc.), to drain out.

When it is not feasible to apply a perforated metallic profile, a non-perforated metallic profile can be applied, in which case, the first ICB board must be applied at a minimum distance of 5 mm from the applied profile.

4.4.2 Roof / facade connection

Capping the walls has significant influence on the appearance of the facade over time. The spacing between the capping plates will originate water runoff in specific zones of the facade causing spots, the proliferation of fungi, mould and erosion of the boards. Therefore, the wall capping plates should protrude from the facade and joints must be sealed.

In the absence of eaves, it is essential to prevent water from running directly onto the surface of the cladding. In this way, it must be ensured that the slope of the capping finish is towards the interior of the roof and with a horizontal projection of 40 mm beyond the plane of the facade cladding and with a drip pan at its end.

4.4.3 Corners

Corners are weak singularities that frequently show early degradation. To reduce the likelihood of occurring failure, three main strategies may be followed:

- to build a special ICB one-piece component with a corner design;
- to cut the ICB boards at a 45° angle;
- to apply staggered ICB boards.

4.4.4 Windows sills

The application of a window sill is recommended to avoid the entrance of water directly on top of the ICB boards. Window sills must have an adequate design in order to assure the drainage of rainwater, without running on the surface of the system. In this way, an adequate slope, towards the outside, must be

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Rua Pedro Hispano, s/n
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www.itecons.uc.pt
Tel: (+351) 239 79 89 49
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ensured with a horizontal projection with a drip pan of 40 mm beyond the plane of the facade cladding, as well as a detail at the lateral ends (groove or vertical projection on the edge), that prevents the water from flowing sideways.

When connecting to window or door frames, the window or door perimeter must be sealed before applying the ICB boards. In the head and side jamb, the ICB board should be placed 3 mm away from the frame to prevent the accumulation of water.

4.4.5 Facade elements

Any construction element that may have to be fixed to the building facade needs to be treated directly at the base wall level, since ICB boards do not ensure the required watertightness.

4.4.6 Base wall details

The existence of an efficient rainwater drainage system should be foreseen, in order to avoid its accumulation in the surface layers of the soil or the upper part of the foundations, which could affect the durability of the system.

4.4.7 Rigid elements

When connecting the system to rigid elements (for example, window frames, overhangs, balconies etc.), an open joint of at least 5 mm must be left, to be filled with elastic and watertight material suitable for outdoor use.

4.5 - Durability and maintenance

Periodic maintenance procedures will help to preserve the initial visual characteristics of the MD FACADE system. The frequency needed for maintenance will depend on the geographic location of the building and on the orientation of the facade. A building located in a place with high levels of precipitation that may lead to accumulation of water in the ICB boards, or facades with high levels of surface moisture (e.g. North facing or heavily shaded facades) will have a greater need for maintenance when compared with a building located in a dry place or with facades receiving high levels of solar radiation.

Maintenance of the ICB boards can be carried out by washing or abrasion.

4.5.1 Washing

Water under pressure can be used to clean facades or roofs which exhibit the accumulation of lichens or mosses. The pressure of the water shall be controlled in order to avoid damage of the ICB boards. For areas of protruding material, such as corners, the use of lower pressure and greater distance from the material is advised.

4.5.2 Abrasion

When a facade coated with ICB is in good general condition, but the colour or roughness of the surface are the properties that need to be corrected, it is suggested to carry out a light abrasion of the surface of the ICB boards. This abrasion can be done with 230 grit sandpaper. After the abrasive action, the surface of the ICB boards must be washed to remove all dust.

4.5.3 Localised repair works

When inspections show the need for repairs, these must be carried out immediately by installers with specialised training for this purpose.

4.6 - Technical support

It is the responsibility of the manufacturer to provide information and support regarding the assessed system.

5 - Conclusions

5.1 - Final assessment

Itecons issues a favourable technical opinion regarding the use of MD FACADE as external thermal insulation applied on metal sheet walls. For this document to remain valid, the following conditions must be met:

- The company Amorim Cork Insulation ensures that manufacturing conditions of each component of the system are maintained, namely through adequate internal production control;

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Rua Pedro Hispano, s/n
3030-289 Coimbra
www.itecons.uc.pt
Tel: (+351) 239 79 89 49
(National landline)
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- The scope of application of the product, application on site and maintenance actions are in accordance with the specifics set out in sections 4.2 and 4.5;
- The characteristics and performance of the system and of each component are those presented in section 3 and Annex A.

5.2 - Validity

This document contains a total of 13 pages, including the front page and 3 annexes that are integral part of the issued STAMP.

Itecons reserves the right to suspend or cancel this STAMP in the event of situations that justify it, namely changes in production conditions or unsatisfactory results of tests and verifications carried out.

STAMP001/23 is valid until **12/05/2026**, and may be renewed upon timely request to Itecons.

Coimbra, 12th May 2023

Andreia Gil
Senior Official

(*Technical Assessment Unit Coordinator*)

Validated document

(Administration)

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Rua Pedro Hispano, s/n
3030-289 Coimbra
www.itecons.uc.pt

Tel: (+351) 239 79 89 49
(National landline)
itecons@itecons.uc.pt

A - Characteristics of the components of the MD FAÇADE system

A1 - ICB boards

The ICB boards, with medium density, are CE marked according to EN 13170. Table A1.1 describes the declared characteristics of these boards.

Table A1.1: Declared characteristics of the medium density ICB boards.

Test	Standard	Results
Tensile strength perpendicular to faces	EN 1607:2013	TR60
Compressive stress at 10% strain	EN 826:2013	CS(10)120
Compressive creep	EN 1606:2013	CC(0.8/0.4/10)5
Thermal resistance	EN 13170:2012 – Annex A	λ_D = 0.043 W/(m.K) R_D see Table A1.2 d_L see Table A1.2 | T2
Short term water adsorption by partial immersion	EN 1609:2013	WS
Water vapour diffusion resistance factor	EN 12086:2013	MU50
Reaction to fire	EN 13501-1	Class E

Table A1.2: Declared thermal resistance

Thickness d_L [mm]	R_D [m².K/W]
80	1.85
90	2.05
100	2.30
110	2.55
120	2.75
130	3.00
140	3.25

Thickness d_L [mm]	R_D [m².K/W]
150	3.45
160	3.70
170	3.95
180	4.15
190	4.40
200	4.65

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A2 - Adhesive sealant

The adhesive sealant used in the MD FACADE system is a one-component based on MS-Polymer with CE marking according to EN 15651-1, type F Class 20HM CC. Table A2.1 describes the declared characteristics of the adhesive.

Table A2.1: Declared characteristics of the one-component adhesive sealant.

Test	Standard	Results
Reaction to fire	EN 13501-1	Class E
Resistance to flow	4.3.3, EN 15651-1	≤ 3 mm
Loss of volume	EN ISO 10563	≤ 10 %
Tensile properties - Secant modulus at 23 °C	EN ISO 8339	> 0.4 MPa
Tensile properties - Secant modulus at - 20 °C	EN ISO 8339	> 0.6 MPa
Tensile properties at maintained extension	EN ISO 8340	NF
Adhesion/cohesion at variable temperatures	EN ISO 9047	NF
Adhesion/cohesion at maintained extension after water immersion	EN ISO 10590	NF
Tensile properties at maintained extension at - 30 °C	EN ISO 8340	NF
Elastic recovery	EN ISO 7389	≥ 60 %
Durability	5, EN 15651-1	Pass

A3 - Mechanical Fixings

The mechanical fixings used in the MD FACADE system are trumpet head nail point screws of adequate length (compatible with the thickness of the shiplap of the ICB boards), with double thread, in phosphated steel. The mechanical fixings are intended to help the correct positioning of the ICB boards and help the curing of the adhesive sealant.

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Rua Pedro Hispano, s/n
3030-289 Coimbra
www.itecons.uc.pt

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(National landline)
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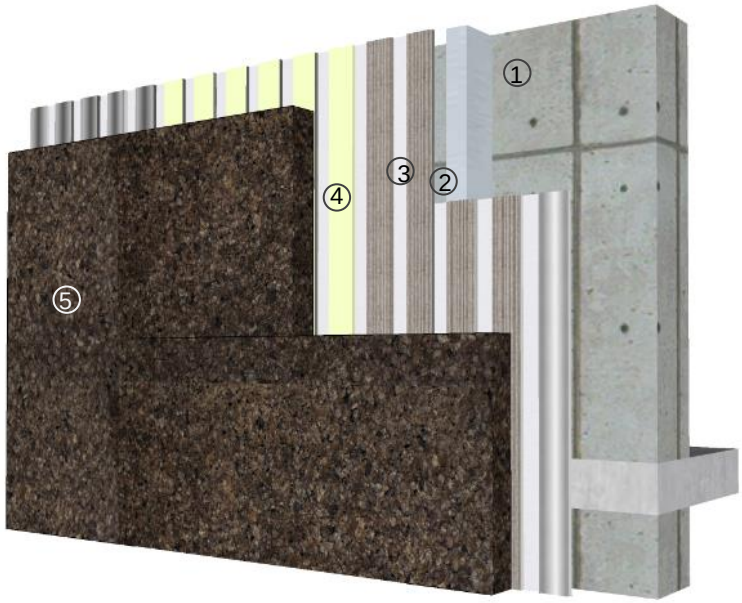
B - Application steps

This annex illustrates the MD FACADE system applied on metal sheets, including the application steps. Figure B1.1 shows a schematic illustration of the system and Figure B1.2 shows the installation steps of the cladding system.



Legend

(1) Wall
(2) Air layer
(3) Metal sheet
(4) Adhesive
(5) Medium density ICB board with shiplap system

Figure B1.1: Schematic illustration of MD façade system over metal sheets.

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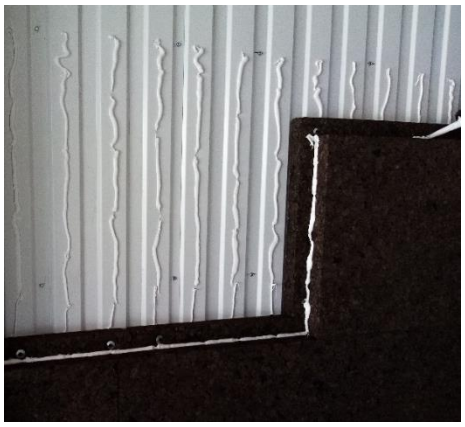
a)

b)



c)

d)

e)

f)

Figure B1.2: Installation of the cladding system: a) Fixation of metal sheets; b) application of adhesive sealant in rows; c) bonding of the ICB boards; d) hidden mechanical fixation and bonding through the shiplap system; e) detail of the shiplap system; f) final aspect of MD FACADE cladding system.

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3030-289 Coimbra
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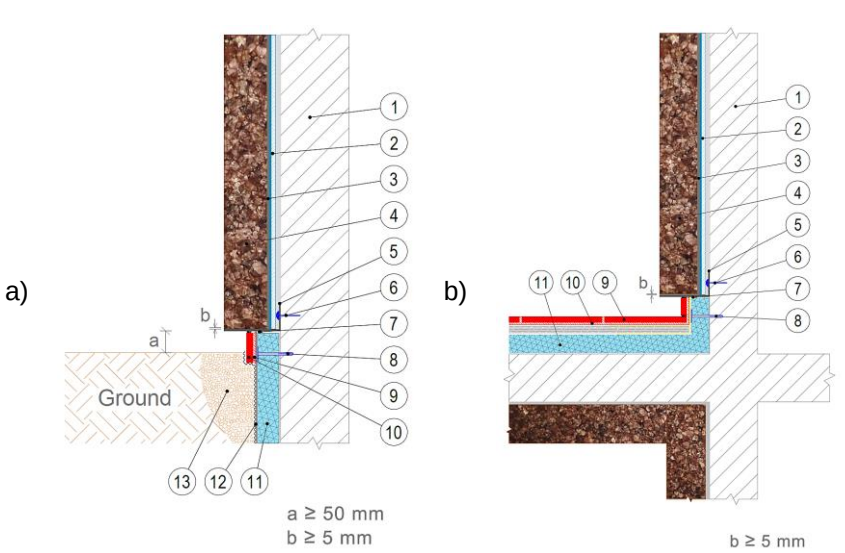
C - Constructive details

C1 - Base wall

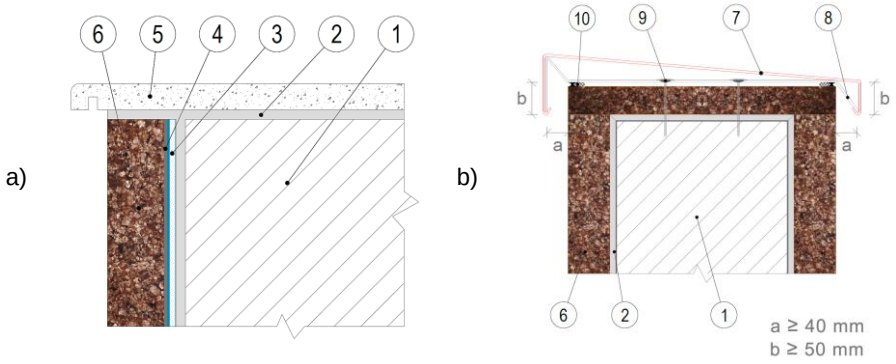


Legend

(1) Substrate
(2) Metal sheet wall
(3) Adhesive sealant
(4) ICB board
(5) Non perforated base wall profile
(6) Machanical fixing
(7) Sealed joint
(8) Facade anchor
(9) Bonding mortar
(10) Ground coating
(11) Insulating board
(12) Draining mantle
(13) Draining rainwater curtain

Figure C1.1: Base wall details: a) System starting off the ground; b) System starting off a balcony or terrace.

C2 - Walls capping



Legend

(1) Substrate
(2) Bonding and waterproofing mortar
(3) Metal sheet wall
(4) Adhesive sealant
(5) Stone wall capping
(6) ICB board
(7) Metallic wall capping
(8) Metal profile for attachment of the metallic wall capping
(9) Mechanical fixing
(10) Sealed joint

Figure C2.1: Wall capping: a) Top cover cross section; b) Metallic wall capping.

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3030-289 Coimbra
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(National landline)
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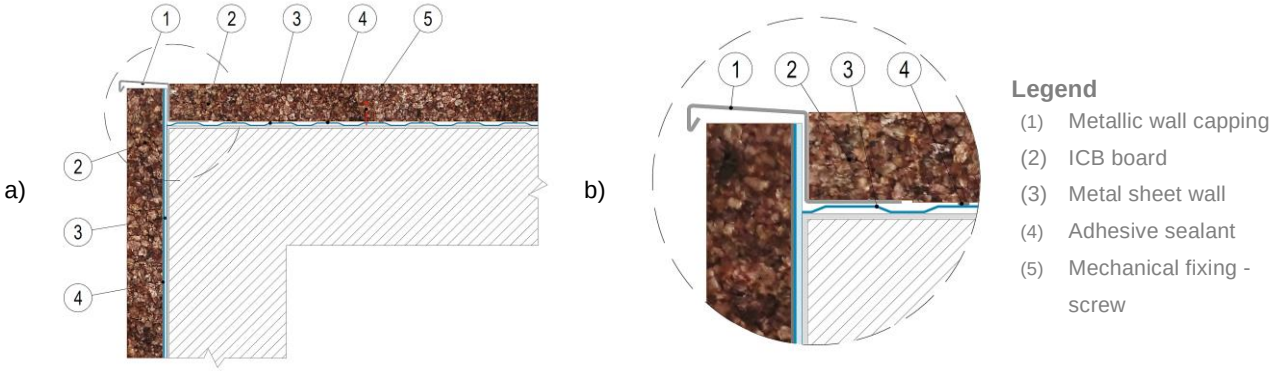

Figure C2.2: Connection facade/flat roof: a) General view; b) Detail of the wall capping application.

C3 - Corners

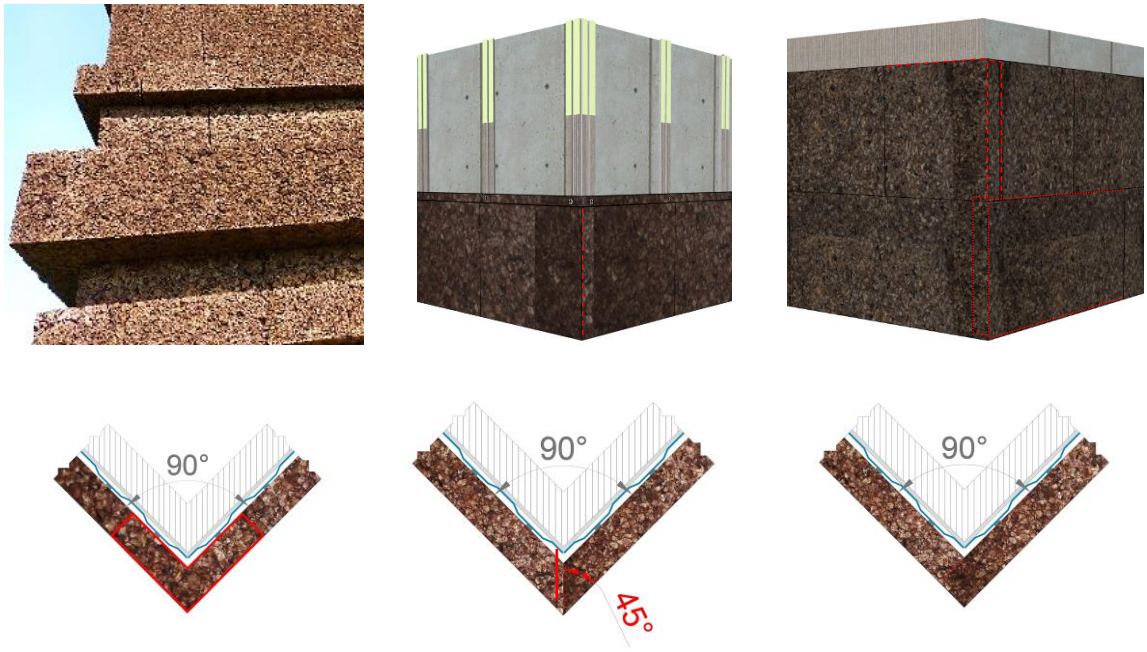

Figure C3.1: Corner connections: a) Special one-piece corner ICB; b) ICB half lap boards cut at 45° and c) Staggered ICB.

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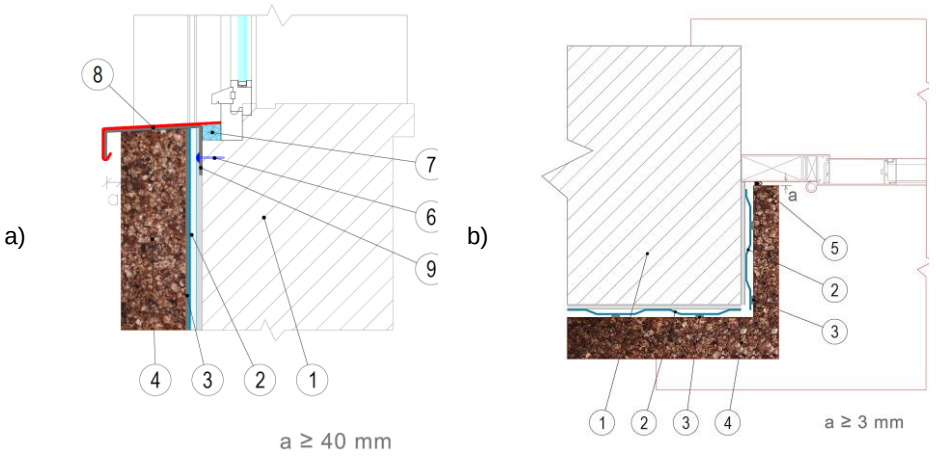
C4 - Window (door)/wall junction

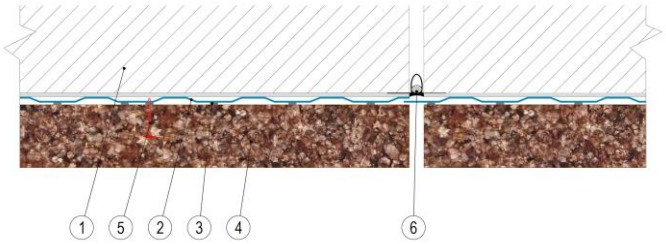


Legend

(1) Substrate
(2) Metal sheet wall
(3) Adhesive sealant
(4) ICB board
(5) Sealed joint
(6) Fixing the metal profile
(7) Insulating board
(8) Window sill
(9) Metal profiles for sill support

Figure C4.1: Connection with windows: a) Connection with window sill; b) Connections with side jambs.

C5 - Facade elements



Legend

(1) Substrate
(2) Metal sheet wall
(3) Adhesive sealant
(4) ICB board
(5) Mechanical fixing - screw
(6) Sealed joint

Figure C5.1: Elements on facade: Expansion joint.

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3030-289 Coimbra
www.itecons.uc.pt

Tel: (+351) 239 79 89 49
(National landline)
itecons@itecons.uc.pt