Perfect Insulation







TECHNICAL DATA SHEET

ICB PRODUCTS	
Density	From 100 to 120 Kg/m ³
Thermal Conductivity Coefficient	From 0,037 to 0,040 W/mK
Thermal Diffusion	1,4x10 ⁻⁷ / 1,9x10 ⁻⁷ m²/s
Tension to Stress	From 1,4 to 2,0 Kg/cm ²
Tension to Compression at 10%	From 1,4 to 2,0 Kgs/cm ²
Elasticity	≥ 100 Kpa
Permeability to Steam	386 ng/Pa.sm ²
Resistance to the Diffusion of Steam	μ = 7 to 14
Fire Class	E (s1, d0)
Fire Class (ETICS System)	B (s1, d0)
Usage Temperature	-180°C to +140°C

	DIMENSIONS OF THE BOARDS
Length x Width	1000 x 500mm
Thickness	10 to 300mm

CERTIFICATIONS	
Certification / Normalization	(E EN13170
Emissions to the interior air	
Certification	FSC - Forest Stewardship Council
Environmental Declaration of the Draduct DAD Hebitat	

Environmental Declaration of the Product - DAP Habitat

Excellent thermal, acoustical and vibrations insulator, with high elasticity

100% Natural Product - The Cork agglutination process made without synthetic bonding agents, only overheated water steam is used

Eco-friendly product - Low energy consumption (over 90% of the energy consumed is biomass), the Cork forest consumes 5% of the CO2 produced in Portugal

Sustainable product - Renewable Raw material, 100% Recyclable

INSULATION (R in m2 k/W and			ECOLOGICAL INDICATORS
THICKNESS	R	К	Delay time (in hours per 20cm) 13
40mm	1,000	1,000	Primary energy Very low
50mm	1,250	0,800	Carbon sinks
60mm	1,500	0,667	100% recyclable
80mm	2,000	0,500	Reduces the greenhouse effect



SOFALCA

Sofalca is a Portuguese family company, founded in 1966. Based in the city of Abrantes, centers its activity in the production of Expanded Corkboard and of Regranulate of Expanded Cork, to be traded by ISOCOR – Aglomerados de Cortiça, A.C.E.

The industrial unit is located near to the Cork Forest, in order to optimize the circuit between the raw materials and the production. In parallel to the production activity, develops strategic partnerships with several entities from the ID Sector, in order to continuously improve its products, to identify new applications and/or products, new production processes that provide an answer to an ongoing demand of new products and applications, placing it in the frontline of its activity sector.

ISOCOR A.C.E

Isocor is the company that, mainly, promotes and trades worldwide the products produced by the mother-house SOFALCA. During its activity, trades the Expanded Corkboard and the Regranulate of Expanded Cork worldwide, searching and developing the required partnerships for it.

Although having a worldwide intervention, its main activities are in the European and Asian continents.

EXPANDED CORK BOARD

Expanded Cork Board is a natural, 100% vegetable product which derives from the cork taken from cork oak maintenance and cleaning operations.

Cork oak forest maintenance contributes to the sustainability of a vast and fragile ecosystem, on which many animal and vegetal species depend. Some of them at risk of extinction. It also contributes to a reduction in the occurrence of fires and also ensures the income of a large party of the Iberian rural population, thereby combating rural desertification. The cork oak area contributes to the annual sequestration of many tonnes of CO2. Cork production and use keeps the CO2 retained throughout its working life, contributing to a reduction in the greenhouse effect and global warming.

The Expanded Cork Board is made by

expanding cork grains through the action of steam. It is agglutinated from resins in the cork itself, without the use of any synthetic agents, namely glues or solvents.

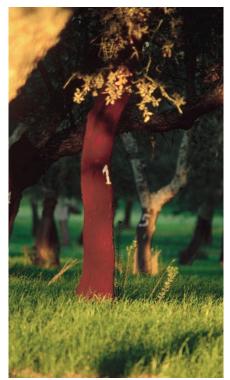
When heat is produced to generate steam, fossil fuels are not used. Biomass from the manufacturing process is mainly used, representing around 93% of the energy consumed. The physical and mechanical properties of cork afford the creation of an elastic product which is permeable to steam, long-life (without altering its properties) and endowed with excellent thermal, acoustic and vibration proofing characteristics.

Expanded Cork Board has the CE marking - European standard EN 13170 and its technical characteristics are checked periodically in accordance with said standard at the National Civil Engineering Laboratory - LNEC.

During the course of its commercial activity particular attention is paid to the goods transport to destination market factor, endeavouring to keep the ecological costs thereof to a minimum. With this in mind, low level pollutant transport options are always preferred or, failing that, large-scale transports (truck, container) so as to reduce the impact thereof.

This product thus proves to be environmentally-friendly and ecologically recommendable since it keeps the carbon sequestered and its production does not involve any synthetic, pollutant agent, contributing to a major reduction in energy consumption and it can be recycled after use and is 100% biodegradable.

© apcor









Facade insulation

EXPANDED CORK BOARD - ICB PROVIDES EXCELLENT THERMAL INSULATION AND SOUDPROOFING WHEN APPLIED OUTDOORS

Along with other components such as adhesive, framing and plastering, it provides an easy, modern and more economical finish which can be used on old and recent constructions. This facade lining and insulation system is characterized by: saving energy, reduction in thermal bridges, increase in thermal inertia, reduction in wall thickness, improvement in wall impermeability, reduction in condensation risk, increase in facade durability and facade rehabilitation without disturbing its occupants.



ETICS SOLUTION



K WITH INSULATION/THICKNE			N/THICKNESS	
Wall characteristics	e=4cm	e=5cm	e=6cm	e=8cm
Ceramic brick 22	0,580	0,529	0,450	0,370
Stone >40 t<60	0,740	0,675	0,540	0,420
Light concrete block t = 20	0,580	0,529	0,450	0,370
Normal concrete block t = 20	0,650	0,593	0,490	0,400
Reinforced concrete <10 t< 20	0,790	0,721	0,560	0,440

1. Wall 2. Expanded cork board - ICB 3. Roughtcast 4. Fibre net 5. Primer 6. Final finish

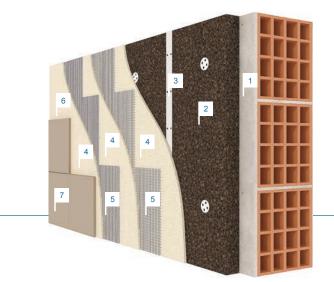
Facade insulation

VENTILATED FACADE



- 1. Expanded Cork board ICB
- 2. Risers
- 3. Stone lining

POLYSTERM SOLUTION



- 1. Wall
- 2. Expanded Cork board ICB
- 3. Polyethylene profile
- 4. Bar
- 5. Fibre glass net
- 6. Primer
- 7. Final finish (ceramic or paint)

Benefits

6

Usage temperature: -180°C to + 140°C
Overhead noise insulation (wall 22 cm + 5 cm cork) = 50 dB (LNEC test)
Excellent thermal delay

Good dimensional stability Fire resistance

Resistance to impact/drilling



Facade insulation

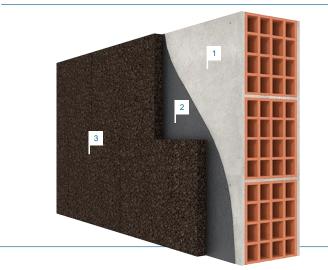
EXTERIOR FACADE COATING WITH CORK AS EXTERNAL FINISHING - TYPE REV

The Expanded Cork Board slabs of the REV type, for exterior facade coatings with cork as external finishing, are made from a careful selection of raw materials, with the right density, as a way of improving its mechanical resistance, as

well as reducing the water absorption.

Its unique characteristics allow an excellent behavior, even when submitted to the most adverse weather conditions.





CHARACTERISTICS	
Density	140 to 160 Kgs/m ³
Thermal Conductivity Coefficient	0,042 to 0,046 W/mK
Water absorption	< 0,3 Kg/m²
Dimensions	1000x500mm
Thicknesses	from 40mm to 240mm

1. Wall

2. Bonding

3. Expanded Cork Board (REV type)

Benefits

Facade insulation

Thermical and acoustic isolation

Natural and ecological product

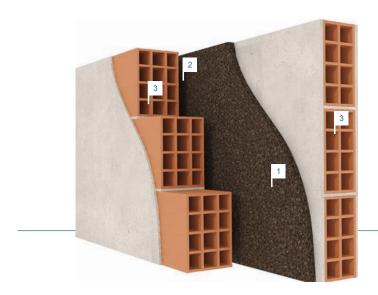
Wall insulation

REAL THERMAL AND ACOUSTIC COMFORT

The application of Expanded Cork Board in the insulation of double walls (air gap) provides excellent thermal insulation for a long time period plus suitable acoustic comfort. Double walls with an air gap tend to create serious problems with dampness which is why it is of paramount importance to create a groove at the bottom of the air gap, on the slab, with an outlet to the exterior, thereby creating ventilation of the air gap which, along with the barrier caused by the Expanded Cork Board, eliminates any dampness problems.



INSULATION OF EXTERIOR WALLS (AIR GAP)

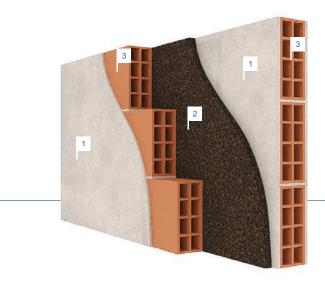


- 1. Expanded cork board ICB
- 2. Ventilated Air Gap
- 3. Double wall

* isocor

Wall Insulation

INTERIOR WALL INSULATION (IN MASONRY)



OVERHEAD SOUNDPR	OOFING
------------------	--------

11cm dual wall

4 cm expanded cork

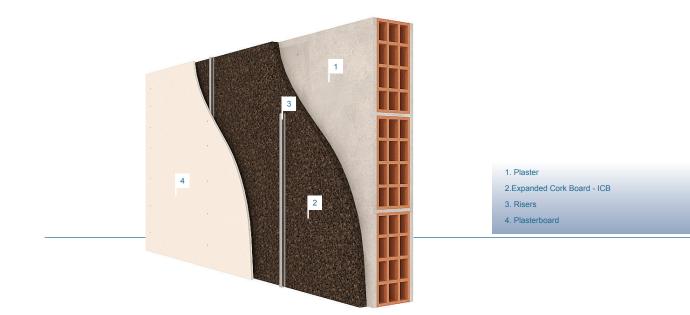
+ agglomerate - ICB in air gap

RW=53 dB (LNEC test)

1. Plaster

- 2. Expanded Cork Board ICB
- 3. Double wall

INNER WALL INSULATION (MADE OF PLASTERBOARD)



Benefits

Comfort - thermal insulation and soundproofing	Excellent transpiration capacity
Dimensional stability of the material	Energy savings
Natural product (healthier)	Effectiveness without time limit

Flat Roof Insulation Tradicional System

ROOFS ARE EXPOSED TO GREAT THERMAL AMPLITUDES

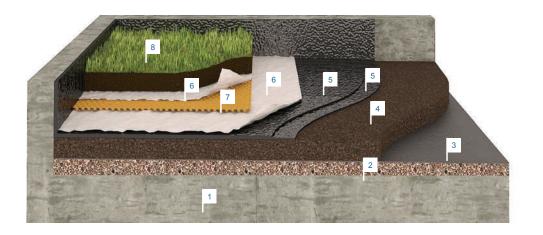
On a traditional roof, the insulation serves to support the waterproofing and there is a need to place a barrier to the steam under the insulating material owing to the permeability of this solution to steam. The protection layer (light or heavy) depends on accessibility to the roof. Expanded Cork Board are practically inert and wholly compatible with most of the materials deployed in civil construction, thereby accepting the application of the waterproofing system (asphaltic membrane, waterproofing mortars, membranes etc.), avoiding the carrying out of screeds, namely on roofs with limited accessibility when restoring buildings.

Traditional roofing types:

- Insulation with light protection (self-protected)

- Insulation with heavy protection (gravel, slab surfaces etc.). ICB is the most ecological solution, maintaining its characteristics over time, simultaneously satisfying thermal insulation and soundproofing requirements when faced by the most varied thermal amplitudes.

GREEN ROOF



1. Slab 2. Light concrete with cork/formation of slope 3. Steam barrier 4. Expanded Cork Board - ICB 5. Waterproofing 6. Geotextile layer 7. Drainage layer 8. Vegetal layer

Benefits

Stability to waterproofing	Usage temperature: -180°C to +140°C
Safe installation	Excellent soundproofing
Resistant to wind strength	Durability
Excellent thermal delay	

Excellent properties

THERMAL DELAY - The thermal calculation is based on the thermal conductivity value of the insulating materials and the exterior temperature differences are deemed to be negligible. However, the temperatures of the exterior surfaces (for example, on the roofs) are subject to thermal amplitudes 24 hours a day. This temperature variation, typical of Mediterranean countries, leads us to consider not only thermal conductivity, but also the thermal inertia of the materials, resulting in a delay in

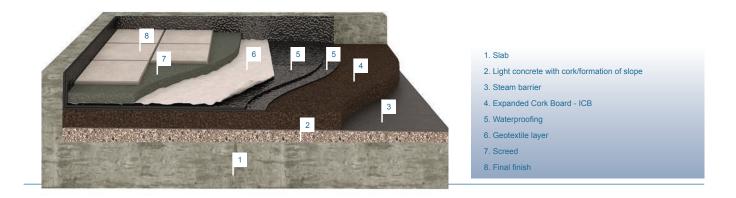
the propagation of heat flow from the exterior to the interior. This thermal delay will be greater, the larger the heat capacity and the lower the thermal diffusivity of the materials going to make up the roof. The economic thickness calculations of the thermal insulations should bear in mind not only the thermal conductivity value but also its thermal diffusivity. The Expanded Cork Board -ICB has the edge in the latter aspect compared with the thermal insulations usually used.



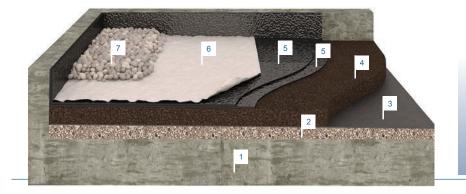
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Flat Roof Insulation Traditional System

THERMAL INSULATION AND SOUNDPROOFING - ROOFS WITH UNLIMITED ACCESSIBILITY

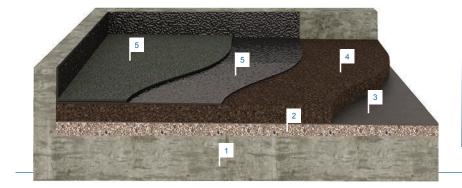


THERMAL INSULATION AND SOUNDPROOFING - REFLECTIVITY SOLUTION



- 1. Slab
- 2. Light concrete with cork/formation of slope
- 3. Steam barrier
- 4. Expanded Cork Board ICB
- 5. Waterproofing
- 6. Geotextile layer
- 7. Rolled pebble

THERMAL INSULATION AND SOUNDPROOFING - ROOFS WITH LIMITED ACCESSIBILITY



- 1. Slab
- 2. Light concrete with cork/formation of slope
- 3. Steam barrier
- 4. Expanded Cork Board ICB
- 5. Waterproofing with schist granulate finish

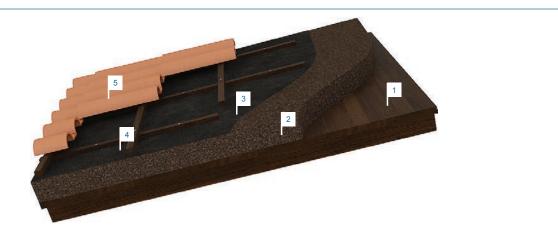
Sloping roof insulation

Owing to its properties, Expanded Cork Board – ICB is the appropriate insulating material for this system as it corrects, if not all, at least most of said thermal amplitudes. The use of

Expanded Cork Board is ideal thanks to its long durability and the fact that it represents an economical solution which meets all the necessary requirements.



THERMAL INSULATION AND SOUNDPROOFING OF SLOPING ROOFS



1. Ceiling 2. Expanded Cork Board – ICB 3. Transpiring ply and steam control 4. Lath and counter lath 5. Tile

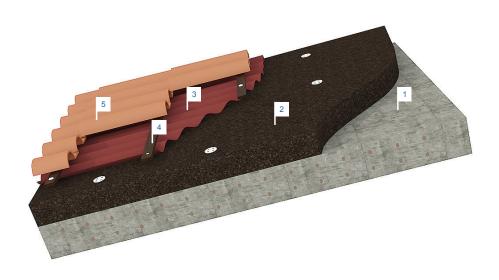


Sloping roof insulation

Benefits

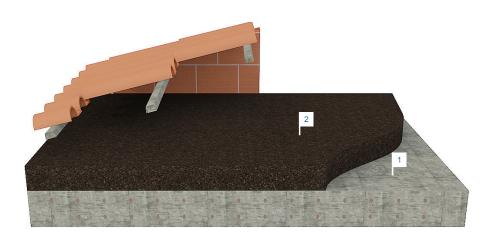
- Effective thermal insulation and soundproofing, resulting in energy savings
- Besides being a good insulator, it has unlimited durability
- Its characteristics remain unchanged and it is easily recyclable
- High transpiration capacity

THERMAL INSULATION AND SOUNDPROOFING ON THE CONCRETE SLAB



1. Slab or beams 2. Expanded Cork Board - ICB 3. Underlay 4. Lathing 5. Tile

THERMAL INSULATION AND SOUNDPROOFING – FLAGSTONES (unvisitable attics)



1. Slab 2. Expanded Cork Board – Regranulate of Expanded Cork

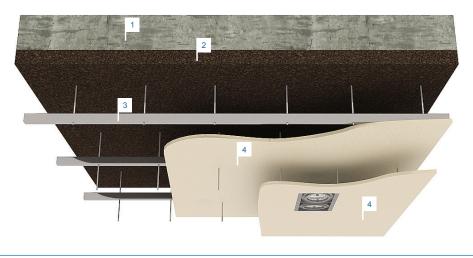
Acoustic Insulation

ACOUSTIC INSULATION IS CHARACTERIZED BY THREE DIFFERENT TYPES OF INSULATION:



1. INSULATION FROM OVERHEAD NOISE

INSULATION FROM OVERHEAD NOISE consists of reducing the transmission of noise produced outside or in adjoining rooms which is propagated via the structure of the buildings (walls, flooring, doors and windows).



1. Slab 2. Expanded Cork Board - ICB 3. Risers 4. Plasterboard



Acoustic Insulation

2. **ACOUSTIC CORRECTION**

ACOUSTIC CORRECTION consists of reducing the sound level in dB (decibels) of a certain environment as well as reducing its reverberation time. Expanded Cork Board proves to be an excellent material for the acoustic correction of certain



INSULATION FROM PERCUSSION NOISES 3.

The INSULATION OF PERCUSSION NOISE consists of reducing the noise sound level of impacts on the slabs, transmitted to the immediately lower storey. For effective reduction, total independence must be ensured between the property's flooring and structure. The interposition of an elastic element, the Expanded Cork Board, between the flooring and the slab, brings about a reduction in the transmission of vibrations and noises resulting from impacts. It will also be important to maintain the discontinuity between the flooring screed and the adjoining walls, thereby eliminating marginal transmissions.

environments such as theatres, classrooms, concert halls, me-

eting rooms etc. Expanded Cork Board reduces the sound le-

ICB 25mm=0,33

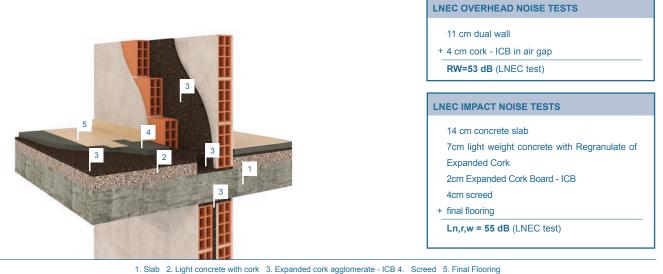
2. Lathing 3. Perforated panels

1. Expanded Cork Board – ICB

ABSORPTION COEFFICIENT P/500HZ

vel through absorption effects, allowing a

reduction in reverberation times.



Benefits

Excellent acoustic correction effectiveness

Major reduction in overhead and percussive noises

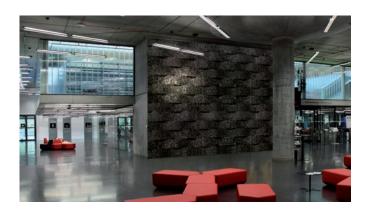
Avoids propagation of existing vibrations

Acoustic Insulation

CUSTOMIZED INSULATION SOLUTIONS FOR ARCHITECTURE AND CONSTRUCTION

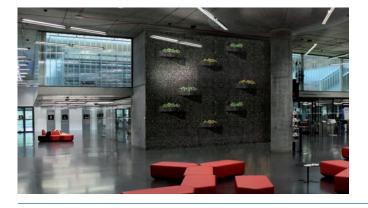


CORKWAVE ACOUSTIC



CorkWave system is the most recent creation from Sofalca, which consists of an acoustic and thermal insulation system, created from the waves present in the expanded cork sheet. Very pleasant to the eye, the CorkWave system allows the creation of interior and exterior facades and walls adjustable to the personal taste. This idea came up as a complement to architecture, combining the thermal and acoustic insulation properties of cork to its esthetic effect. Cork's ecological character and the new wavy look of CorkWave make it a very innovative solution, where originality and acoustic performance stand out.

CORKWAVE GREEN



CorkWave Green system is born from CorkWave, producing interior or exterior vertical gardens. The desire of having a vertical garden combined with the insolating characteristics of cork made it possible for the creation of this harmonious piece of design. The curves of the CorkWave sheets are the basis for the plants' vases, which will look as if suspended in mid air coming out of the wall. With this symbiosis it is possible to have an indoor garden in perfect harmony, at the same time it improves the acoustic conditions, thanks to the CorkWave system.

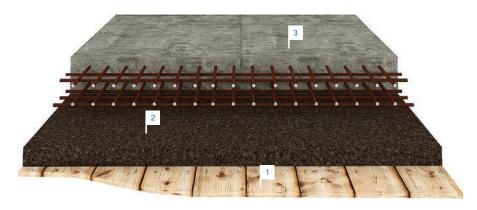


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Insulation of concrete structures

THERMAL INSULATION AND SOUNDPROOFING IS VITAL FOR DWELLING COMFORT

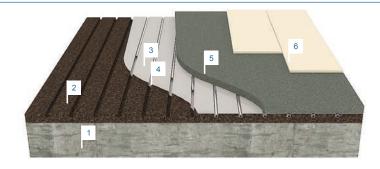
Mainly light materials are deployed in thermal insulation whilst in soundproofing heavy, absorbent and elastic materials are used. The application of Expanded cork agglomerate directly in the formwork allows a reduction in overhead noise between residential storeys as well as the structural discontinuity of interior walls.



1. Formwork 2. Expanded Cork Board - ICB 3. Concrete slab

Benefits	
Reduction in sound level of percussive noise	Reduction in thermal losses between adjoining floors
Reduction in sound level of noise transmitted by air	Easy application - directly on formwork (does not require adhesion)
Reduction in vibration transmission	Easy lining and low cost

THE EXCELLENCE OF CORK ON HEATED FLOORS



1. Slab 2. Expanded Cork Board- ICB 3. Reflective sheet or retractable film 4. Heating pipe 5. Screed 6. Final flooring

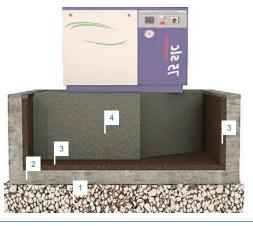
Radiant flooring consists of a piping circuit placed below the floor and a thermal regulation system which allows the atmospheric temperature to be controlled at any time through the circulation of hot water or electricity. Grooved SOFAFLOOR Expanded Cork Board - ICB boards serve as the base for heating pipes, allowing the easy application owing to the design of the boards themselves, acting as thermal insulation and avoiding the propagation of the cold transmitted by the ground.

By contrast, the structural discontinuity between the flooring screed and the slab, obtained by applying Expanded Cork Board for thermal insulation, will bring about a major reduction in the transmission of vibrations and noise resulting from impacts on the flooring. Hence, the interposition of Expanded Cork Board - ICB on radiant flooring serves a dual purpose: Thermo-insulating and Phono-insulating.

Antivibration Insulation

IN VIEW OF THE FACT THAT ALL THE VIBRATIONS ARE TRANSMITTED TO THE STRUCTURE OF THE BUILDINGS, THIS FACTOR SHOULD NOT BE IGNORED

In view of its elasticity Expanded Cork Board is endowed with remarkable anti-seismic qualities, proving to be an excellent antivibration insulating material.



When applying it, due consideration should be given to the ele-
ments submitted in terms of the density and thickness of the
Expanded Cork Board in line with the acting loads.

RECOMMENDED PRESSURES AND THICKNESSES							
THICKNESS IN CM	2,5	5	7,5	10			
Density of 145 to 160 Kg/m³ - Recommended pressure in Kgf/cm ² – daN/cm ²	0,8-1,0	0,7-1,2	0,5-1,5	0,3-1,8			
Density of 175 to 190 Kg/m³ - Recommended pressure in Kgf/cm² – daN/cm²	1,0-1,5	0,8-1,8	0,6-2,0	0,5-2,2			

1. Riprap 2. Reinforced concrete slab 3. Expanded Cork Board - ICB High Density 4. Reinforced concrete affixation

Benefits

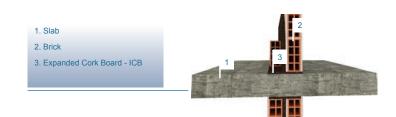
Highly effective insulation from the transmission of vibrations, it withstands heavy loads and is resistant to oils, water and acids

Unlimited durability and it is easy to transport and install

As its characteristics are not lost over time, it is considered to be ideal for this type of applications

STRUCTURAL DISCONTINUITY OF WALLS

In order to achieve the greatest possible elimination of resonance (vibration of a rigid body when hit by a sound wave of a specific frequency close to its own), it must firstly be sought to implement structures which are as heavy as possible and that will not vibrate as easily, simultaneously using structural discontinuities which can be carried out through the interposition of Expanded Cork Board strips.



EXPANSION JOINTS

Thermal type Expanded Cork Board agglomerate is an appropriate material for expansion joints in view of the fact that, because of its elasticity, it can perfectly accompany the expan-

Continuous expansion joints



sions and contractions of the structural elements, allowing its application in construction without any danger of settlements as the normal loads are around 300 kg/m².

Discontinuous expansion joints





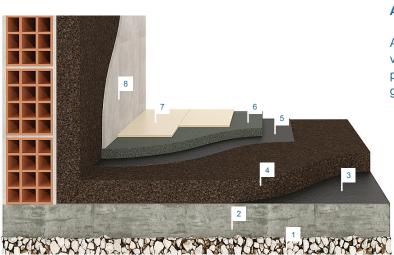
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Natural insulation for cold stores

COLD STORE INSULATION

Expanded Cork Board is the ideal insulating material for cold stores (upkeep, freezing and controlled atmospheres). The low thermal conductivity coefficient, affording high thermal resistance with low thicknesses, appropriate specific weight, associated with notable bending and compressive strength, elastic deformation for pressures of 2000 kg/m2, ease of application, perfect integration in structures and unlimited duration, proven by works carried out over half a century ago, all go to make up a series of characteristics that no other material can offer. Duly calculated cold store insulation constitutes an excellent investment with high dividends receivable in the short-term as not only energy in saved in the maintenance of the required temperatures, the power of the apparatus to be installed is also reduced and hence its cost.

STORAGE CHAMBERS



Application in Cold Stores

A technique which is usually deployed for storing fruit, vegetable products and flowers. It consists of storing products at very low - but above zero - temperatures, generally at between 0°C and 12°C.

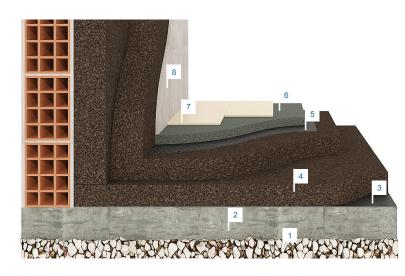
1.	Riprap	
2	Slab	

2. 3id0

3. Steam barrier

- 4. Expanded Cork Board ICB 50/100 mm
- 5. Waterproofing
- 6. Screed
- 7. Final flooring
- 8. Plaster

FREEZING CHAMBERS



Application in Freezing Chambers

The freezing technique extends to meat, fish, butters, cheeses and many other perishable products, to wit, certain fruits. It consists of storing products below zero, usually under the micro-organism development limits and temperatures of up to -40°C are standard.

- 1. Riprap
- 2. Slab
- 3. Steam barrier
- 4. Layers of Expanded Cork Board ICB 100/150 mm
- 5. Waterproofing
- 6. Screed
- 7. Final Flooring
- 8. Plaster

Regranulate

RECYCLED ECOLOGICAL PRODUCT

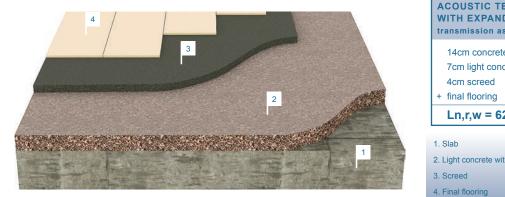
One of the characteristics which makes Expanded Cork Board an ecological product is its capacity to be recycled. The result of this recycling is Granulate of Expanded Cork which is obtained by crushing the Expanded Cork Board.

USE / BENEFITS

Direct incorporation into concrete (light concrete) makes residential floors more lightweight with thermal and acoustic advantages The filling of air gaps on flooring allows acoustic and thermal correction

Technical characteristics		Trace Volume		Weight/m ³	Compr. strength	trength Thermal cond.		Acoustic absorption		
Density	From 65 to 80 Kg/m ³	Cement	Sand	Regr.		Kg/cm ²	W/mk	Serious	Medium	Acute
Thermal conductivity coefficient	0,045 to 0,050 W/mK	1	0	4	500	6	0,18	0,22	0,70	0,84
Granulometry	0-2, 2-4, 4-8, 4-10, 2-9, 3-15	1	2	6	900	11	0,24	0,16	0,20	0,48

DIRECT INCORPORATION INTO CONCRETE (LIGHT CONCRETE)



ACOUSTIC TEST - LIGHT CONCRETE WITH EXPANDED CORK (Reduction in transmission as regards percussive sounds)

14cm concrete slab

7cm light concrete with expanded cork

Ln,r,w = 62 dB

- 2. Light concrete with cork/formation of slope

FILLING OF AIR GAP ON FLOORING



- 1. Slab
- 2. Expanded Cork Board ICB or Regranulate of Expanded Cork
- 3. Strips of compound cork agglomerate 3 to 5 mm
- (white cork)
- 4. Wooden flooring



Portfolio

Golegã Sports' Training Centre - Golegã, PORTUGAL (Sloping roof insulation)





Bar - Estoril, PORTUGAL (System ETICS with cork at sight)



Tágides Car Park - Lisbon, PORTUGAL (Light weight concrete)

LLL



Villa - Torres Vedras, PORTUGAL (System FACADES)



Portfolio

Garducho Biological Station - Mourão, PORTUGAL (Systems ETICS and FacadeS with cork at sight)



Hotel Penhas Douradas - Serra da Estrela, PORTUGAL (System ETICS with cork at sight)



Medical Clinic - Mirandela, PORTUGAL (System POLYSTERM)

Hotel Penhas Douradas - Serra da Estrela, PORTUGAL (System ETICS with cork at sight)









The mark of responsible forestry

Portugal is the country which has the biggest area of Cork Oak forest – about 600.000 ha – corresponding to the biggest quota of natural cork production worldwide. Cork Oaks can be found disseminated across all of the country's territory, in pure and mixed plantations, although predominating south of the Tagus River. Cork extraction from the Cork Oak does not destroy it. On the contrary, the renewal (every nine years) of the Cork Oak's exterior coating (cork) fits in the life cycle of this forest species, which often reaches 150 years in production.

For the improvement of the Cork Oak forest, density regularization and tree correction, thinning and pruning is done, these are needed cultural operations, from which its obtained 70 to 80% of the raw material ("falca") for the Expanded Cork Agglomerate industry.

This way one contributes to the rational usage of a natural renewable, although limited, element.

From the branches and twigs that result from the process of pruning falca cork, the main raw material used in the making of expanded cork agglomerate, is manually or mechanically extracted.

As a result of the constant care with the origin of the raw material and the respect from the environment, in the year 2013 SOFALCA won the FSC® - ForestStewardshipCouncil - label, which, when applied to the product, grants the warranty that the raw material used comes from the forest areas that respect the main principals to ensure a good forest management, as well as the responsibility criteria about the environment.



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