



AMORIM Isolamentos, S.A.

Thermal Insulation | Acoustic Insulation | Anti vibration Insulation



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Thermal Insulation



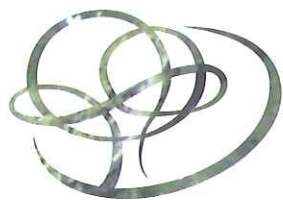
Acoustic Insulation



Anti vibration Insulation



AMORIM Isolamentos, S.A.



AMORIM

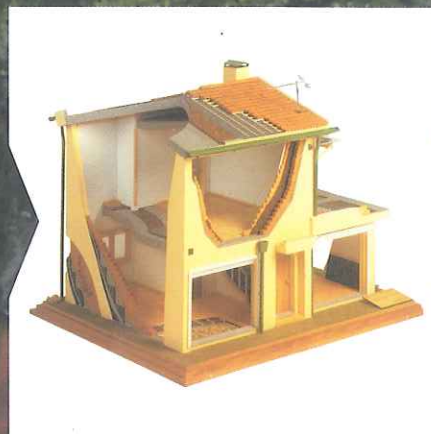
Comfort starts here



Building with natural
insulations



Ecological and healthy products, with a long durability without ever losing any of their characteristics



Highly efficient personalised technical solutions



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Cork and the environment

Cork forests and plantations have been naturally occurring or deliberately planted across Southern Europe and North Africa for many centuries. Substantial evidence exists which demonstrates usage of cork during Roman times.

The geographical position of Portugal, its climate and soil type have combined to produce **outstanding arboricultural conditions**. The result is that the vast majority of natural cork is indigenous to the Portuguese landscape.

A huge variety of **wildlife is dependent upon the maintenance of these cork oak forests** as is the prevention of desertification. This fragile **ecosystem is scientifically managed** by natural cork producers, led by Amorim Group.



Unlike any other insulant, the green credentials of natural cork are unsurpassed. Ecologically, the cork forests absorb carbon on a significant scale, assisting in reducing the impact of carbon emissions and other greenhouse gasses. The material is clearly **renewable and recyclable** unlike materials that are by-products of fossil fuels.



100% natural and ecological

this product
provides multiple
economic
advantages



recyclable



The farming and cultivation of the cork oak tree is an important contributor to the Portuguese economy. Entire rural communities are dependent upon continued and growing markets on a worldwide scale.

Commercial activity balanced with unique respect and awareness for this national resource has drawn man and nature inextricably together for the common good.

Environmental imperatives for the cork industry

- The preservation and expansion of the cork forests.
- Constant vigilance to minimise forest fires.
- The protection of important wildlife species.
- Stabilising rural economies, populations and culture.
- An active renewable resource programme.
- To maintain a 100% natural product.
- Develop global recognition for the insulation and acoustic properties of corkboard.
- Diversify into new markets – particularly recyclable options.
- Increased investment in research and development.
- Alert a wider audience to this simple, natural solution.



cork = environment protection



The Portuguese cork industry was traditionally reliant upon numerous small producers lacking the individual commercial strength to develop existing and new markets.

In 1963, the Amorim Group provided the dynamics to focus upon these important issues by virtue of a greater vision.

By 1987, the group had encouraged others by its progress and strategic development to establish an organisation known as Expocor, to effectively market the numerous innovative cork products produced by individual manufacturers.

The formation of this trade organisation helped substantially to promote a diverse natural cork offer, particularly to the E.U., America, Middle East and the Far East.

The entrepreneurial flair and willingness to invest in modern production technology has ensured that the Amorim Group remains comfortably the market leader in worldwide distribution of cork.



Silves industrial unit



The Company

Nature and technology...
the ideal solution



Vendas Novas industrial unit



In concert with various trading partners around the globe, the Amorim Group is able to establish acceptance for cork products by meeting national accreditation certificates within the membership of the E.U. and the world at large. Exacting quality control standards are frequently monitored by visiting standards officials, ensuring that production and quality issues are maintained at levels of excellence.

The result is that Amorim have an enviable international reputation embracing sales, marketing, manufacturing and quality.

The group is totally dedicated to preserving its status as a truly international organisation.

Cork insulators around the world

Marrying technology to a naturally occurring product is an enviable position to aspire to, and many would welcome the opportunity.

Amorim is aware therefore that it has considerable responsibility to ensure that the universal perception of cork as a material of choice for anyone voicing environmental concerns remains the first option.

Global warming has certainly marked a sea change for the Portuguese cork sector, creating many opportunities to exploit newly developing markets. A growing number of companies in the construction process are

conscientiously evaluating their approach to thermal and acoustic issues, presenting the cork industry with a wealth of opportunity.

The Amorim Group is implementing strategies to capitalise upon this scenario with a continuously evolving set of initiatives including forest management, further investment in production and increased R & D.

The express intent thereon is to accelerate export opportunities by harnessing the company to the ever increasing integration of the Portuguese economy into the global market.

Amorim fully intends to be viewed as an important contributor to tomorrows Portugal.



Agglomerado de Cortiça Expandida (ICB)	
ICB EN 12179 - CS 130 60 00	
Espessura Nominal	
Comprimento Nominal	1000 mm
Largura Nominal	500 mm
Nº de placas	
Condutibilidade Térmica	0,050 W/mK
Resistência Térmica Declarada	
Reacção ao Fogo	Euroclasse E

Fabricante:
Amorim Isolamentos, S.A.
Rua da Cortiça 16
4510-010 Espinho
Portugal

AMORIM **CE**

Data de Produção: Lote de Produção:

AMORIM

present in about 100 countries



Production process

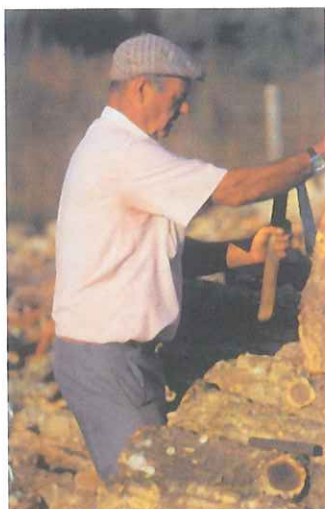
1 Raw material

Having initiated the introduction of expanded agglomerate cork to worldwide markets, the Amorim Group produces the product at two principal production sites. These are Silves, located in the Algarve and Vendas Novas situated approximately 90kms south of Lisbon.

Raw material extraction

Following the pruning of the cork oak, the material is extracted from the bark by both manual and mechanical means. The resultant cork is then stored externally to expose it to the elements.

The combined actions of sun, wind and rain act as a catalyst to the falca (virgin cork), prompting several transformations that improve its qualities prior to production.



manual extraction



It is important to highlight that **no inclusion of foreign matter** occurs anywhere in the process. Additionally, the process is renowned for its extremely **low embodied energy** during manufacture.



decortification



Renewable raw material
100% natural without additives



mechanic extraction



2 "Natural" industrial process

Raw material transformation

The next step following external exposure, is to granulate the product to various engineered sizes. These are judiciously selected by size and/or ratio for specific applications. Packed into autoclaves, the cork granules are subjected to superheated steam and pressure, which induces expansion. The natural resin (suberin) is released by this procedure, there by creating a 'free' adhesive encapsulating and permanently bonding the granules.

Blocks preparation

When formed in the autoclaves, the blocks are released and cooled down with recycled water at approximately 100°C.

Final process

Little else is required other than to convey the blocks to the penultimate process point, at which they are **cut dimensionally to various widths, lengths and thicknesses**.

Automated packaging and labelling completes the production cycle ready to transport by land or commonly by sea freight.

It really is as simple as described, underlining the obvious fact that nature does most of the work and man relatively little!

Post production

All broken blocks and sheets are entered into a recycling process and used in a host of applications. Any remaining dust or fragments are used to provide the main energy source for the heated process described. This **very low embodied energy** feature is indeed the envy of alternative insulant products, which require sophisticated and costly

Dust = waste = fuel/energy = renewable



use of cork dust has power source



Blocks production (without additives)



Raw material stock





3 The Product

As a **100% natural** product, cork is of all natural substances **the best insulator**.

Cork, in its agglomerated form, keeps all its properties indefinitely, and the fact of being unalterable gives it a multitude of uses that one can hardly find in other materials.

With unique characteristics, expanded agglomerated cork is a product that is more and more used in all kinds of constructions, either as a **thermal or acoustic or anti vibration insulator**.

With a versability of its own, this product can be prepared and supplied in standard quantities and densities for thermal insulation, in high density for vibration insulation, in special quantities and forms for decoration, insulation and acoustic corrections, wedge shaped for the insulation of flat roofs and also as isolating coating for industrial pipes.

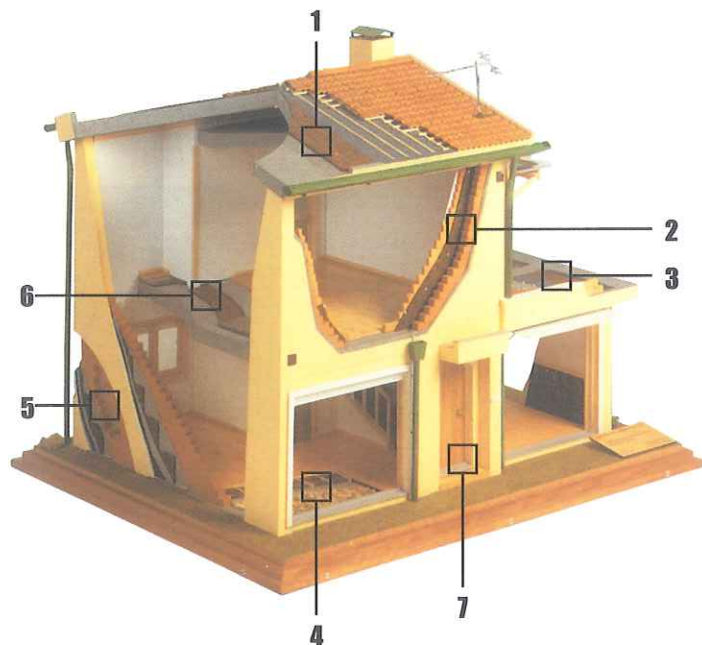
4 Applications

The expanded cork granule has a **wide range of low cost industrial applications** as a **thermal or acoustic insulator**.

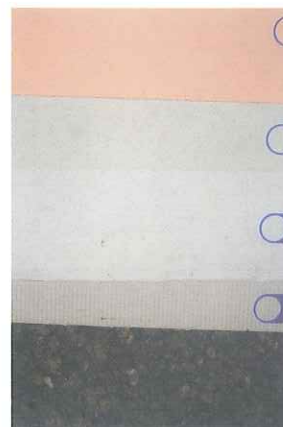
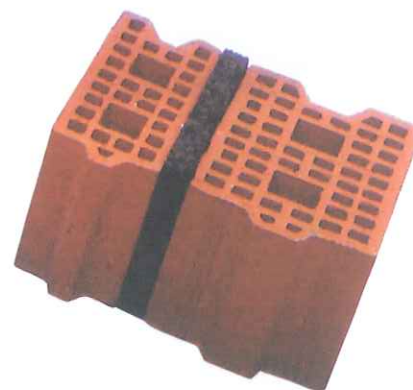
And is the perfect solution for the production of light concrete, when mixed with sand and cement, as well as for filling empty spaces in pavements.



...a wide interesting diversity of industrial applications...



- 1** Thermal insulation of roofs and attics
- 2** Thermal insulation of walls (ventilation space)
- 3** Thermal insulation of flat roofing
- 4** Thermal insulation of sub-pavements
- 5** Thermal and acoustic insulation of external walls (facades)
- 6** Insulation against vibrating noises
- 7** Anti fire + insulation doors





Checking and Controlling Quality

Amorim Isolamentos can not just state that expanded agglomerated cork is a product with clear unquestionable advantages for the environment.

Amorim Isolamentos constant concern in introducing products in the market that will satisfy the clients' needs is the reason why large investments are made in the protection and preservation of the agglomerates quality and prestige.

To accomplish this, products are submitted to **strict control processes, from raw material to production**, and later on analysed in independent labs, where numerous tests are undergone, according to established rules in force in the different existing markets.

All data collected from this process is issued by a central, and is later on analysed with the creation of quality files that allow a larger and better control.

Thus, keeping its clients' preference, Amorim Isolamentos is an enterprise whose objective is to **achieve excellence**, while assuming and preserving its leadership in a market so dynamic and in constant mutation.



Product Characteristics

- ☞ Standard density > 110/120 kg/m³
- ☞ Thermal Cond. from 0,036 to 0,040 W/mk
- ☞ Excellent resistance to breaking
- ☞ Dimensional stability
- ☞ Cork durability without losing any of its main characteristics *
- ☞ Thermal, acoustic, anti vibration insulation
- ☞ Natural and Ecological Insulation
- ☞ Does not react to chemical agents
- ☞ Does not release toxic gases when exposed to fire
- ☞ Recyclable
- ☞ Not attacked by rodents
- ☞

*survey presented in Brussels in April 96, by L. Gil and based on a 50 years old company

Technical characteristics

Weight by volume	approx. 120 kg/rñ
Thermal conductivity (20 °c)	0,037/0,040 w/mk
Normal tensile strength on plane of sheet	0,94 kg/cm ²
Bending strength	1,8 kg/cm ²
Compression strength	0,2 kg/cm ²
Elasticity limit	1 kg/cm ²
Deformation at compression	1,78 kg/cm ²
Specific heat	1,67 kJ/kg °C
Resistance to steam diffusion	u5-30
Working temperatures	-200°C a 130°C
Dynamic rigidity (for 50 mm of thickness)	126 N/cm ³
Modulus of elasticity	5 N/mm ²
Steam conductivity	0,017 a 0,003 g/mh mm section
Thermal expansion coefficient (20)	25 a 50 x 10 ⁻⁶
Dimensional stability	Stable. Doesn't expand or contract
Resistance to compression 10% of deformation	KPA 90/100 (EN 826)
Tensile strenght perpendicular to the fronts	TR 50 (EN 1607)
Resistance to fire (EN 13501-1)	E class (marked CE EN 13170)
Board dimension	1000x500 mm
Board thickness	10 a 320 mm
Does not desintegrate in boiling water (3 hour test)	



Regarding some products, and despite having inferior thermal conductivity, one verifies that the expanded agglomerated cork is not a weaker thermal insulator, as demonstrated by the thermal diffusivity levels.

$$D? \frac{?}{?.C_p} ?m^2/s? ?I?$$

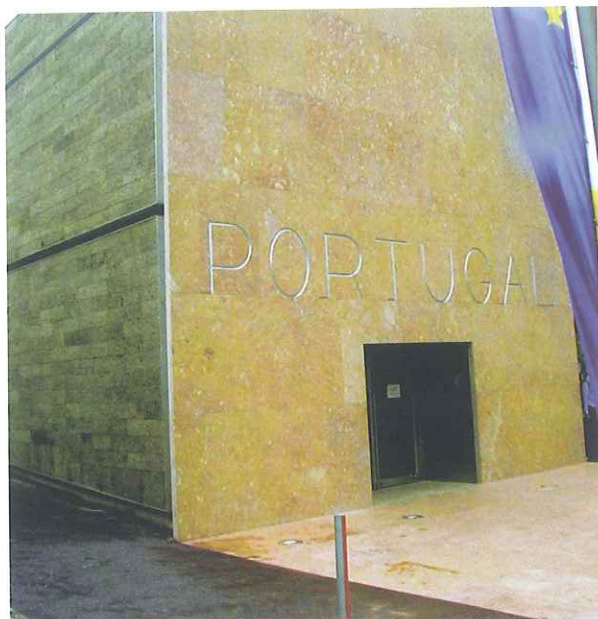
This characteristic measures the relation between the material capacity to conduct thermal energy and its capacity to accumulate thermal energy. For example:

As it is denser and has a higher heat capacity, the expanded agglomerated cork is a better heat accumulator, possessing thus a lower diffusivity and keeping the internal temperature of a specific location more constant, regardless of external temperature variations, in order words it is a better thermal insulator.

Thermal insulation valours

(R in m² K/W e K em W/m² K)

Thickness	R	K
10 mm	0,25	2,439
20 mm	0,50	1,595
25 mm	0,625	1,2739
30 mm	0,75	1,0989
40 mm	1	0,8620
50 mm	1,25	0,709
60 mm	1,50	0,602
70 mm	1,75	0,523
80 mm	2,00	0,4629
90 mm	2,25	0,4149
100 mm	2,50	0,3759



Portugal pavilion, Arc. Siza Vieira and Souto Moura

Reference Works

Expanded agglomerated cork has an important role in the building industry, where comfort depends on factors like temperature, moisture, air quality, acoustic conditions and vibrations.

It can be applied on all the surface, along with coating materials, thus allowing a diversity of interesting solutions.



Natural house - Mutenka - Japan

Process Cycle for Expanded Cork





AMORIM
Isolamentos, S.A.

Rua da Corticeira, nº 66 | Meladas 4535-173 Mozelos VFR | Portugal

Tel. +351 227 419 100 | Fax +351 227 419 101