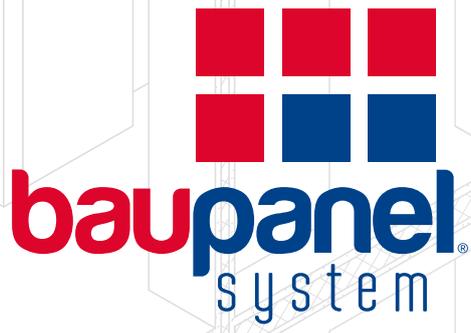


BUILDING SYSTEMS





Baupanel® System is a company born in Spain in 2003, created by a group of professionals with extensive experience in the field of construction and industrial processes technology.

OUR INITIAL OBJECTIVE

Developing a new construction system based on traditional materials such as steel, expanded polystyrene and concrete, combined in a single product to obtain a huge structural capacity as well as excellent thermo-acoustic behavior and also allowing a significant reduction in costs and time of execution.

Under these premises the **Baupanel® System** building system was born in Spain and has already become one of the best solutions for the full compliance of the Technical Building Code (CTE).

We have over 15 years experience in Spain and over 35 abroad, working with pre-industrialized systems, consolidating them into a refined product, which in recent years it has become a valuable alternative in the construction industry sector.

Baupanel® System is today present in the international arena with a progressive expansion in various countries in Europe, Asia, Africa and America.

RESEARCH + DEVELOPMENT + INNOVATION

Baupanel® System devotes great efforts in terms of R+D+i developing new fields of application. These works of permanent research have allowed us to possess numerous utility models and invention patents.

We are a world leader in the scope and technical performance of our products.

PERSONALIZED ENGINEERING

Baupanel® System is integrated by a dynamic commercial and technical experienced teams. Both are composed of architects, engineers and draughtsmen, who are responsible for the study, development and adaptation of each project from its conception in the design phase to the supervision of the correct implementation.

TECHNOLOGY TRANSFER

Baupanel® System also design and install industrial plants of its own technology to produce the construction system anywhere in the world, through licensing and transfer of know-how. It has the most advanced architecture of machinery and the best specialists in welding equipment and industrial automation.

INDUSTRIAL PLANT

Our industrial plant in Spain is located in Antequera (Málaga) with 6,800 m². of factory and office space and an annual production capacity of up to 1,600,000 m² of panel (equivalent to more than 6,000 homes of 75 m²).



Tel: +34 951 701 414

Email: info@baupanel.com

www.baupanel.com

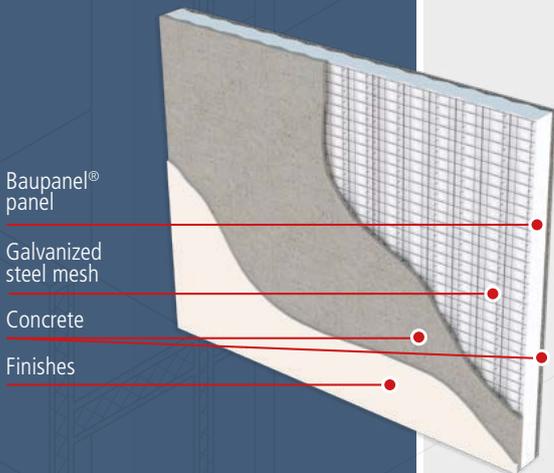


baupanel®

Reinforced concrete three-dimensional structure

Based on a set of structural panels, Baupanel® System is an integral construction system, resistant to all types of impacts, fireproof and high thermo-acoustic properties.

Baupanel® System is a construction system with a high mechanical capacity that allows buildings that can withstand earthquakes and hurricanes and at the same time has a high thermo-acoustic insulation and high resistance to fire.

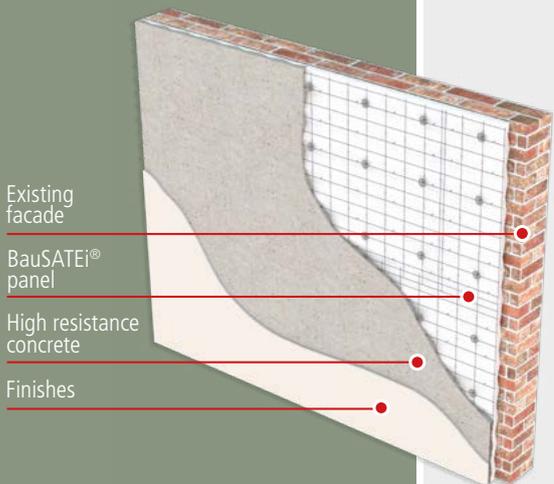


bauSATEi®

Interior and exterior thermal insulation resistant to impacts

BauSATEi® is designed to make the thermal envelope of non-insulated buildings and to thermally rehabilitate facades of existing buildings that do not meet the current energy efficiency regulations.

Highly resistant to impacts (+ 300 Joules), BauSATEi® helps keep comfort temperatures inside the buildings throughout the year. It leads to an energy saving that can reach up to 50 kW-h/m² year, depending on the thickness of the selected expanded polystyrene core and can reach up to Class A of the standard scale of energy efficiency of buildings.

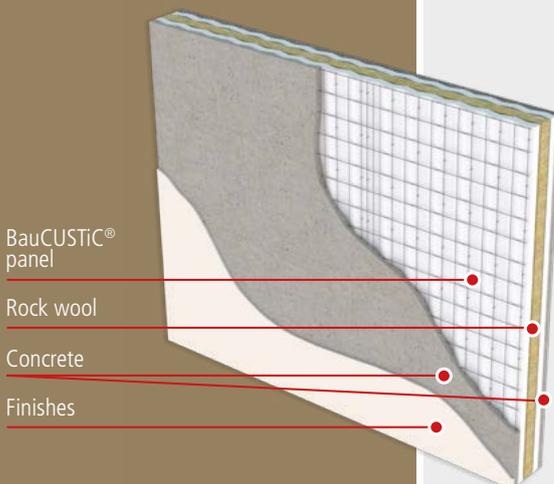


bauCUSTiC®

Thermo-acoustic insulation system

Designed to integrate high airborne sound insulation with a high bearing capacity.

The panel developed by the R+D+i department of Baupanel®, BauCUSTiC® is used where the requirements for airborne sound insulation are more severe. This system is a multilayer structure which defines a sequence of different materials that interfere in the passage of sound waves and allowing an R value higher than 60 dB(A).



Background

Baupanel® System has as a direct ancestor a material called ferrocement, whose origin dates back to 1848. Later, in 1957, the famous Italian engineer Pier Luigi Nervi, develops this idea by performing spectacular works with this material.

Previously, in 1925, expanded polystyrene was invented, but it was not until the late 1960s that its use as thermal insulating material began to be generalized.

In the following decade, the first individual experiences of incorporating expanded polystyrene into ferrocement in construction begin in several countries. And it is at the beginning of the 80s when the industrial development of the panels begins.

In 1983 we found the first mechanical strength test, where the panel withstood a load of 30 Tons without suffering any damage (test related by M. Zolezzi at the Instituto del Cemento Pórtland, Argentina).



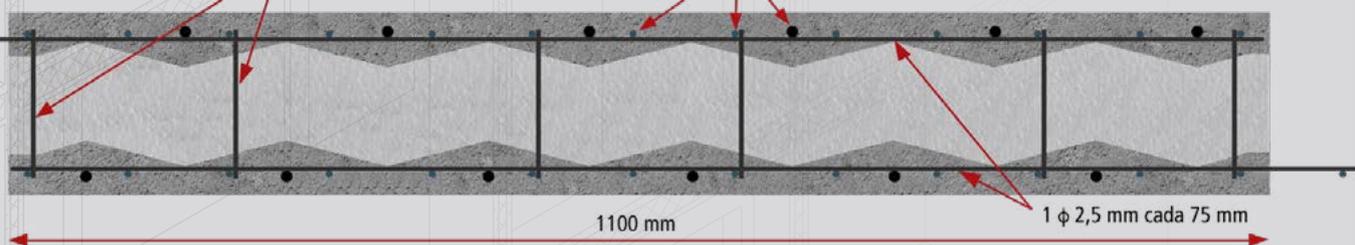
Work of 442 homes in Tucumán, Argentina, 1980

Baupanel® Panel Evolution

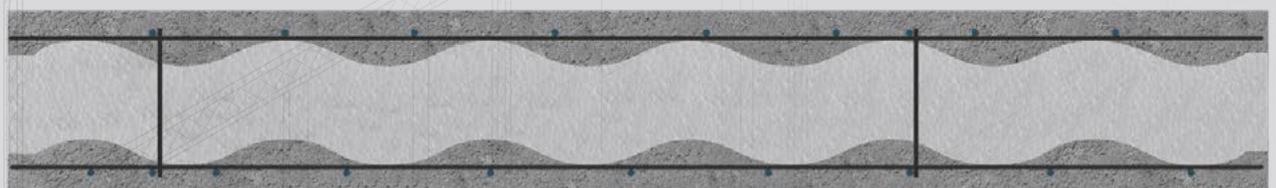
NEW PANEL BSR

Conectores 41 ϕ 3 mm / m²

Armadura principal 15 ϕ 2,5 mm + 6 ϕ 5 mm

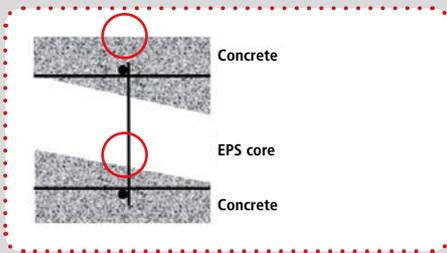


OLD PANEL



The new design of **Baupanel® System**, has a new shape, where from a new linear ripple that generates isosceles triangles, we achieve that all the longitudinal bars of the steel meshes keep the maximum separation to the surface of the expanded polystyrene core.

In this way, the panel design itself ensures an optimum concrete coating around each of the longitudinal steel bars.



This new design leads to a panel with greater resistance compared to everything seen before.

TESTING RESULTS

Comprehension: maximum load 1,255 kN

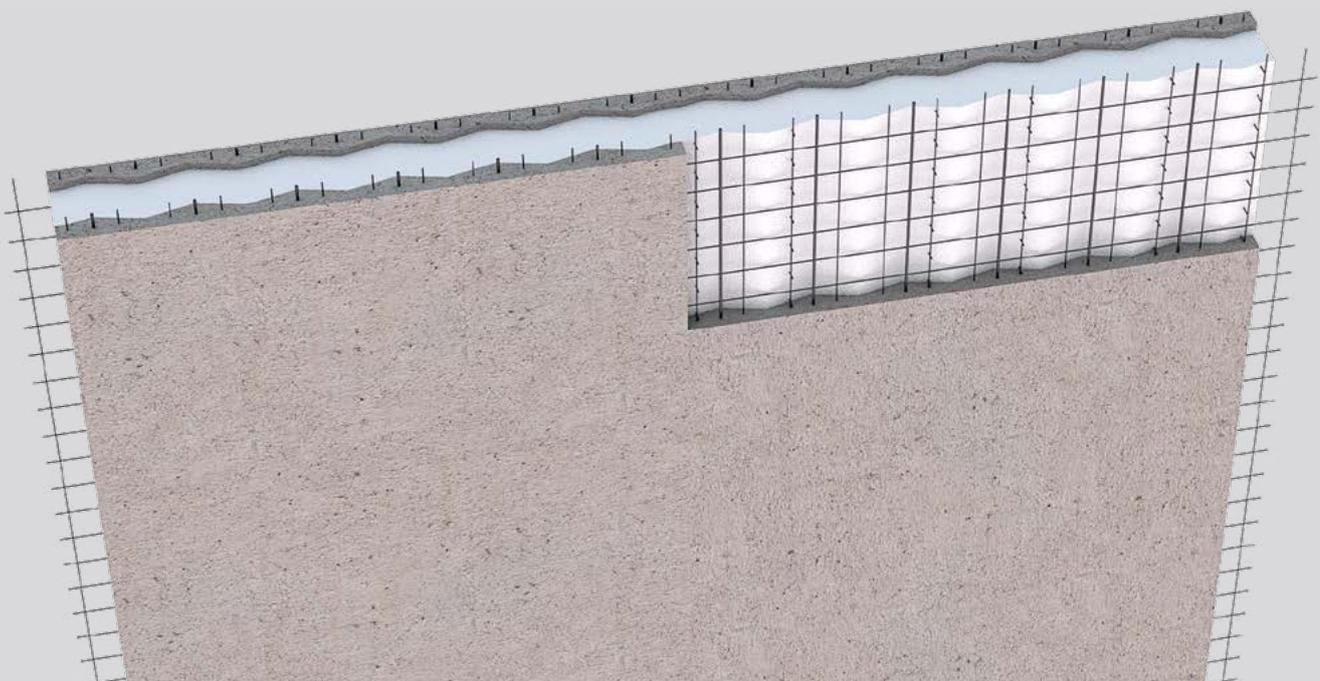
Flexion: maximum flexor moment 76.29 kN / m

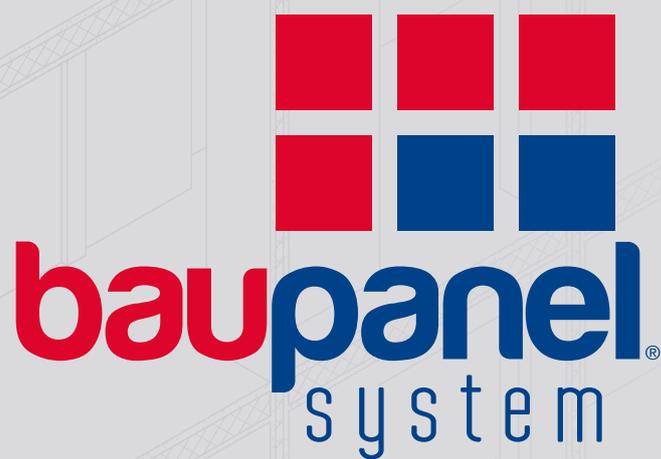
Maximum horizontal cyclic load: 225 kN at 3.38 m height, equivalent to a seismic acceleration of 1.1 to 1.2 g.

New Panel Advantages

- **Symmetric reinforcement mesh.** Use steel mesh with constant pitch.
- **Maximum use of steel.** All the elements of the steel mesh are fully active, even those corresponding to the mesh overlaps.
- **Greater useful section.** The edge of the composite section is increased with the same thickness of expanded polystyrene.
- **Better balance between materials.** The homogeneity of the reinforced concrete composite section is increased.
- **Greater resistance.** The value of the final flexor moment of the composite section is increased significantly to more than 55%.
- **Higher quality of the finished product.** The precision of the welding of the connector is increased because the clips do not bite the polystyrene core to be more distanced from it. The tweezers bit parts of expanded polystyrene, leaving traces of organic material that hindered the quality of welding.

baupanel





Three-dimensional Structures of Reinforced Concrete

EPS

Concrete

High strength

**Steel
Connectors**

**Flat
reinforcement
mesh**

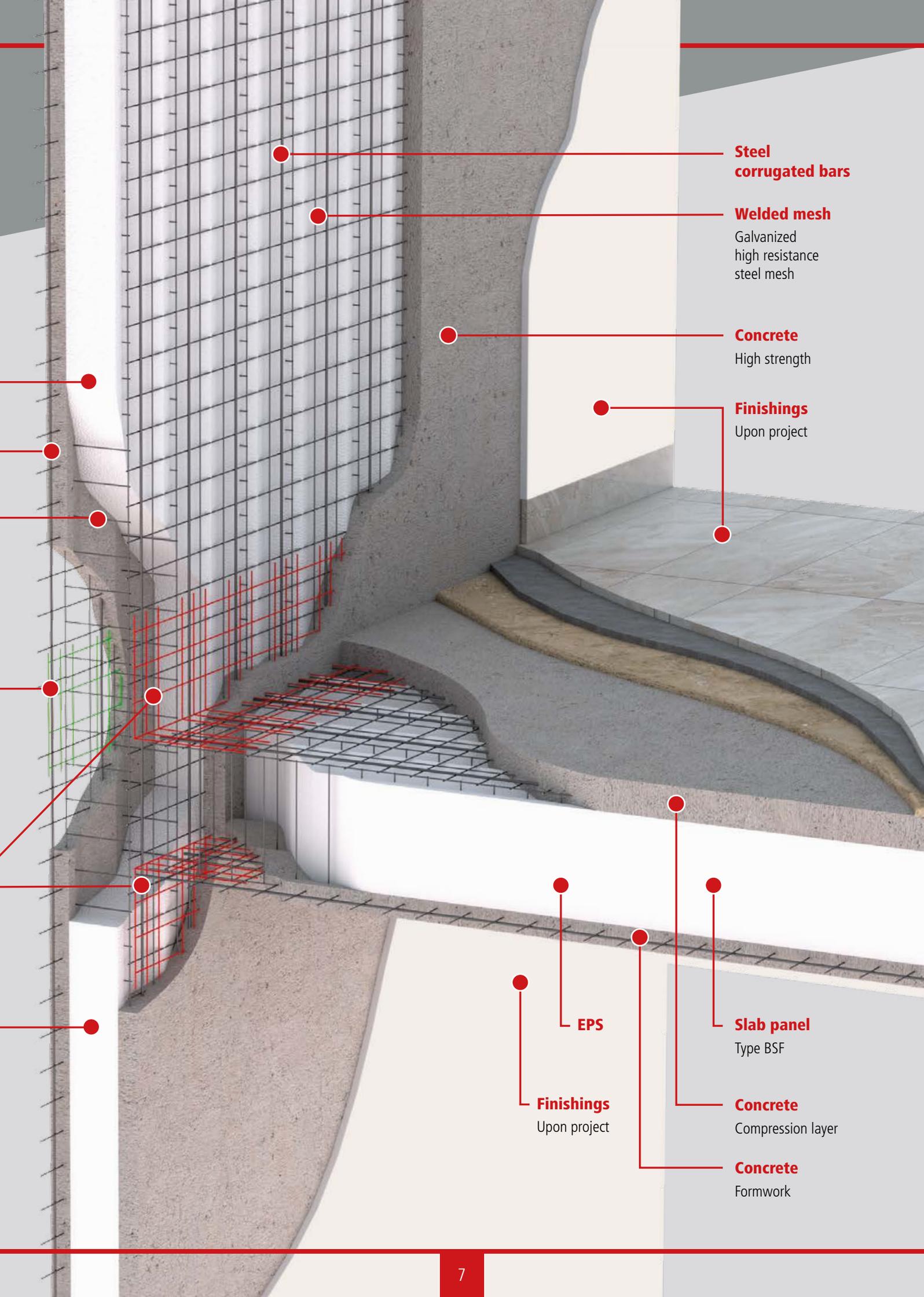
Galvanized
high resistance
steel mesh

**Angular
reinforcement
mesh**

Galvanized
high resistance
steel mesh

Vertical panel

Type BSR



Steel corrugated bars

Welded mesh
Galvanized high resistance steel mesh

Concrete
High strength

Finishings
Upon project

EPS

Finishings
Upon project

Slab panel
Type BSF

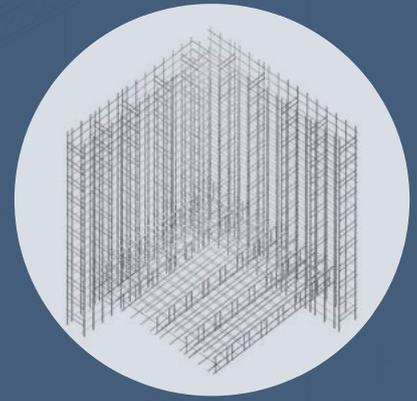
Concrete
Compression layer

Concrete
Formwork

baupanel® =

Complete Building Solution

Baupanel® is an integral construction system, earthquake resistant and extreme thermo-acoustic insulation based on a set of structural panels.



+

3D STEEL STRUCTURE

Each element is constituted by a high resistance steel 3D structure, formed by two flat meshes strongly interconnected by multiple perpendicular bars.

The space left between the steel meshes is occupied by the insulating EPS panel with the characteristics required to suit the needs of each project.

This set is completed on site by applying two layers of concrete of predetermined thickness, either by pneumatic projection or pouring into formwork.

Baupanel® System complies with the EHE, CTE and Eurocodes regulations, and also has numerous documents of technical suitability issued in Spain (Technical Suitability Document n° 558R/17, granted by the Institute of Construction Sciences Eduardo Torroja) and other countries.

By linking the panels in a monolithic manner, according to the arrangement of walls and slabs, without interposition of joints of any kind, a super-three-dimensional structure of reinforced concrete is generated and allows all kinds of architectural designs, from single-family homes to multi-storey buildings.

The final set of concrete with the insulation and steel mesh grant a combination of very high structural capacity, low weight and great thermal-acoustic insulation.

This building system can withstand projectile impacts, explosions, hurricanes and fires. Therefore, it also has many applications in civil and industrial works.

Thanks to these properties, **Baupanel® System** is the ideal construction system for building high-capacity earthquake resistant buildings, as each element that integrates it assists in the absorption of horizontal stresses.

Regarding the safety in case of fire, its elements are certified with a fire resistance of up to 240 minutes, being especially suitable as a fire protection element in high risk areas.

In addition, the very low thermal transmittance provided by the system's elements makes them optimal for the realization of bioclimatic housing. Very easily you can reach the highest ratings of the energy scale (A, B and Null Consumption).

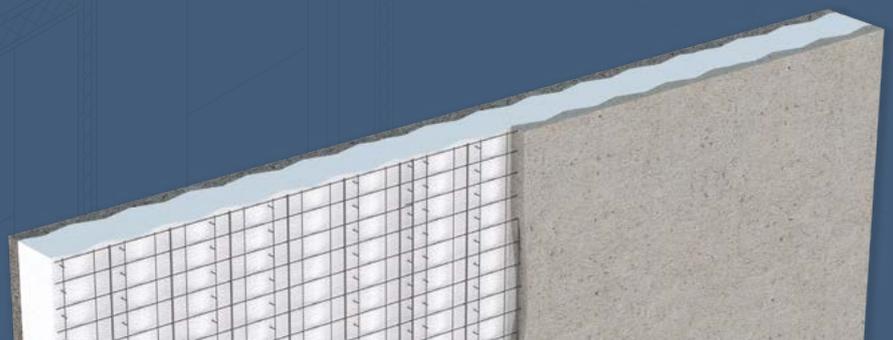
The constructive simplicity allows a significant reduction in construction times with respect to traditional building systems since with a single element is conformed the structure, facades, partitions, slabs, roof, lintels, braces and thermo-acoustic insulation.

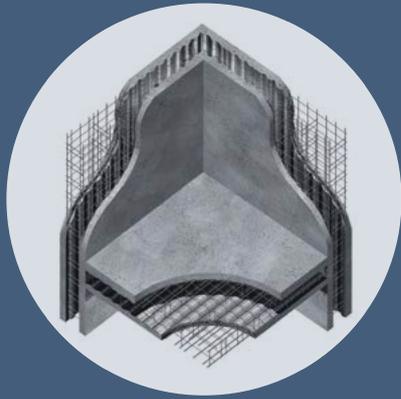
As a result of its low carrying weight (up to 50% less than the traditional system) the necessary volume of foundation will be reduced and therefore a considerable saving of materials and labor in these tasks will also be obtained.

Baupanel® System is a versatile system that allows a more flexible and creative architecture, achieving more economic buildings, linked to an efficient and sustainable construction.

Over 35 years of experience guarantee us

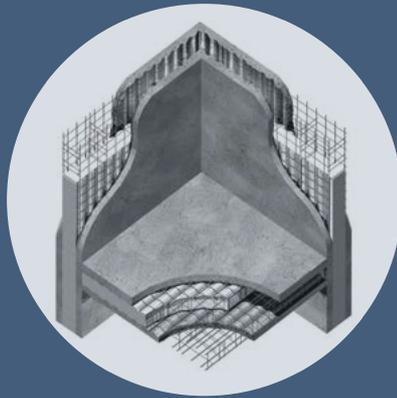
Added value for your building projects





2 CONCRETE LAYERS

+



THERMAL INSULATION

System applications

Currently **Baupanel® System** have mainly the following building applications:

- Modular homes, luxury villas, semi-detached or detached homes, with no design or shape limits.
- Buildings without height limitations, 100% integral, structures and slab walls.
- Building enclosures of traditional structures, facades, without limitation of heights. Avoiding thermal bridges between the steps of slabs and columns.
- Thermal insulation, exterior and interior, with **BauSATEi®** system that provides a thermal shock-resistant enclosure for buildings with enclosures executed with traditional system.
- Rehabilitations and extensions of historic buildings with adaptation to current use.
- Diving walls resolution with high level of acoustic insulation.
- Solutions for internal reinforcements and cavity walls.
- Ventilated facades
- Retaining walls
- Civil works
- Curved shapes
- Cantilevers
- Swimming pools
- Factory buildings
- Ornament elements for facades
- Massive industrialized construction with recoverable concrete formwork.
- Combination with other construction systems such as metal or concrete structures, prefabricated, etc.

Energy savings of up to 50kW-h/M² anual

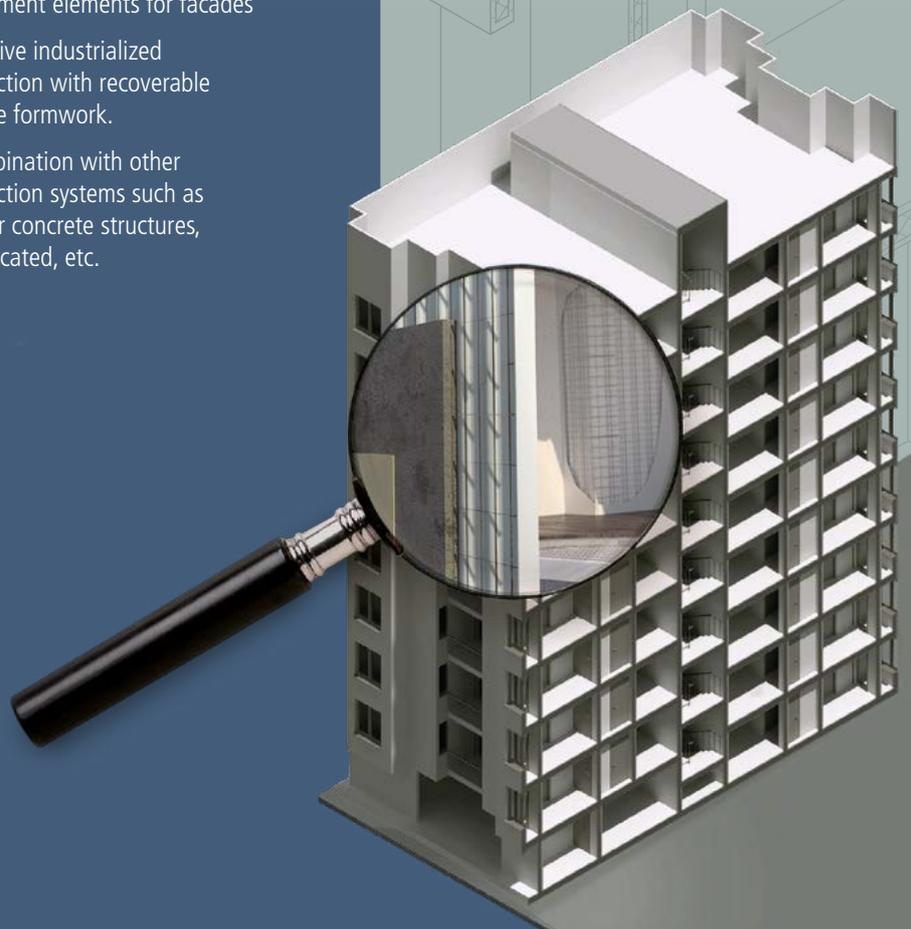


Saves the direct cost of construction work

BUILDING COSTS SAVINGS

The use of the Baupanel® System translates into a real advantage for users, developers and for construction companies, since it offers many economic benefits compared to traditional construction methods: the saving in costs derived from construction processes; execution time; combination of two elements in one: structure and thermal insulation.

Without limitation of heights



baupanel®

The versatility and flexibility of Baupanel® allows us to integrate other traditional or prefabricated materials in conjunction with our system, depending on the characteristics of the project.

**Angular mesh (MA)
for slab placement**

**Flat mesh (MP)
continuous
binding of walls**

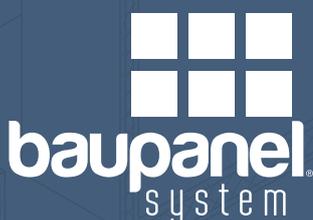
**Flat
reinforcement
mesh (MP)**

**Interior
load-bearing
panel**

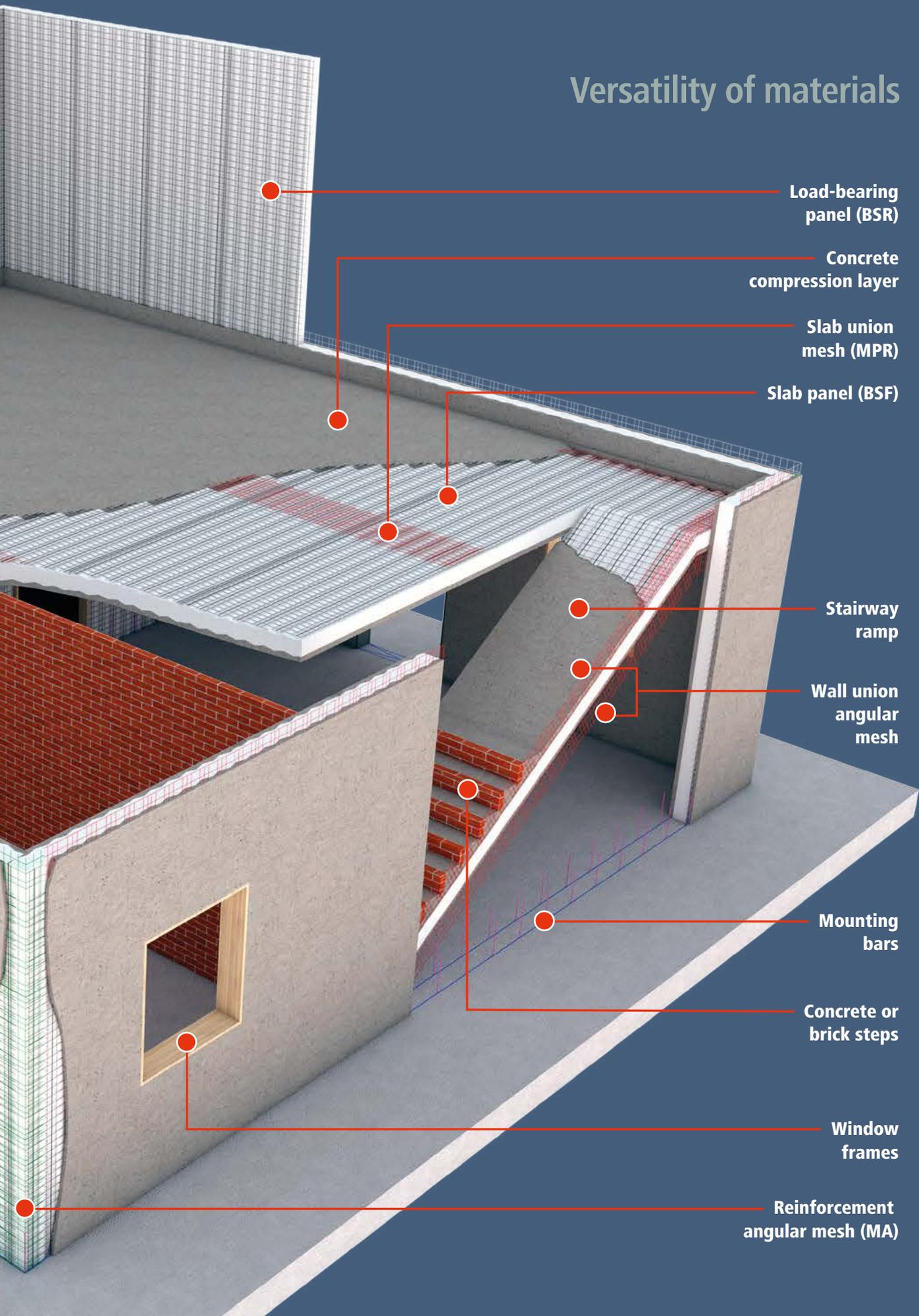
**Door
trim claws**

**Hollowed out in EPS
for electrical and
plumbing installations**

**Interior partitions
non-load-bearing walls,
brick or plasterboard**



Versatility of materials



Speed and lightness

Lightness

Ease of transport and installation. The weight per m² of panel before the application of the concrete depends on the type of panel, and ranges between 3.5 kg/m² & 5 kg/m². This makes it possible for only one operator to easily move more than 3m² of panel.

Fast Installation

The reduction of the execution time of a work compared to other construction methods can be up to 50%.

Comparison of Baupanel® wall and traditional wall:

	Baupanel® System	Cerramiento tradicional
Thickness	22 cm	31 cm
Thermal Transmittance (U)	0,26 W/m ² K	0,58 W/m ² K

Isolation and resistance

Thermal isolation

The U value of the total thermal transmittance of **Baupanel® System** composed of 4 cm thick EPS core with a density of 15 kg/m³ plus a 41 mm thick concrete layer on both sides (total thickness 12 cm) is 0.77 W / m²K. If the wall were made with an EPS core 8 cm thick (density 15 kg / m³), the thermal transmittance U would be 0.42 W / m²K. These levels of thermal insulation are much higher than those of traditional building enclosures. This translates into an energy savings of almost 40%, both for heating and cooling cycles.

Structural resistance

The laboratory tests carried out at the **Eduardo Torroja Institute** in Spain, as well as others carried out internationally, have demonstrated the great structural capacity of **Baupanel® System**.

The loads in buildings are normally distributed through linear elements (beam-pillar frames), while with **Baupanel®** the load is distributed over the surface of all the elements of the structure generating much lower voltages.

Seismic resistance

The latest laboratory tests carried out at the **Eduardo Torroja Institute** (2017-2018) have demonstrated the ability to withstand a vertical force equivalent to a 10-storey building combined with the horizontal actions of an earthquake of magnitude > 10 on the scale of Richter, exceeding by more than 5 times the maximum seismic acceleration of Spanish regulations.

Fire resistance

The EPS used in the **Baupanel® System** is the Euroclass E type (self-extinguishing, which prevents the spread of flames). The tests of fire resistance carried out, for example in panels with an 8 cm core, have given values of over 120 minutes, maintaining tightness to flames, smoke and gases, maintaining complete integrity.

Energy saving and respect for the environment

Currently the construction sector is responsible for the consumption of 40% of the energy produced worldwide

In addition, 25% of the waste generated in the world corresponds to the construction industry.

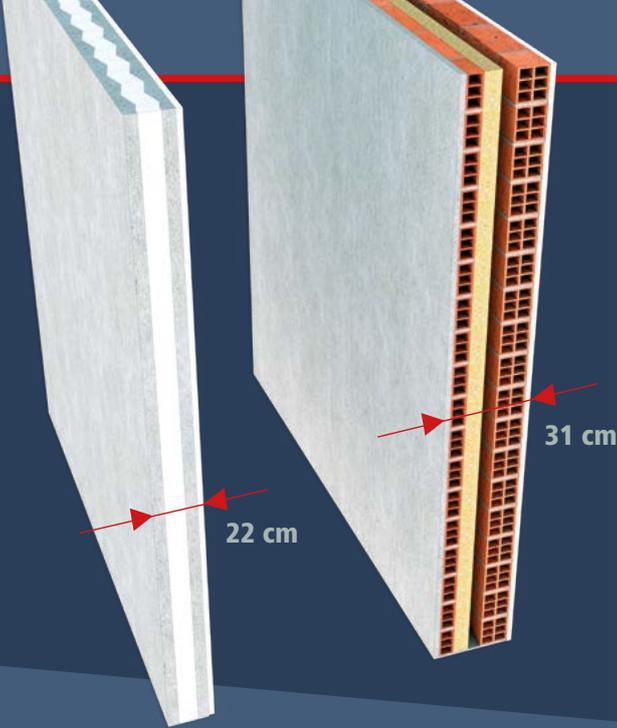
However, **Baupanel® System** has as its main component expanded polystyrene (EPS), an efficient, effective thermal insulation material that plays an important role in reducing CO² emissions to the atmosphere, making a very positive contribution to the decrease in global warming.



Greater living surface

Greater profitability in the sale by M²

The increase in the living area of any house built with **Baupanel® System** with respect to a traditional one is also of great importance. With equal total built surface, with **Baupanel®** you can increase the useful living area up to 5%. This is because the traditional walls are thicker than the **Baupanel®** walls. It is noteworthy that **Baupanel®** is the only construction system with which single-sheet facades are obtained that meet the most demanding functional requirements of national and international regulations.



Acoustic isolation

A single panel with a 41 mm layer of concrete on each side provides acoustic insulation of up to 40.7 dB (A) depending on the thickness of the panel. When higher values are required, we use our **BauCUSTiC®** panel, which allows us to exceed 61 dB (A).

Hurricane resistant



Baupanel® System buildings located in areas with high hurricane risk have demonstrated a great capacity to withstand the most devastating winds, such as Category 5 hurricanes.



EPS

Properties of Polystyrene Expanded (EPS)

Expanded polystyrene is a biologically inert material, non-toxic and stable.

It does not contribute to the formation of methane gas or contribute any other type of greenhouse effect gases. In addition, their waste does not pose any risk of contamination to groundwater.

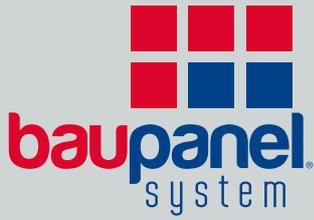
The expanded polystyrene is 100% RECYCLABLE. During the production of the **Baupanel®** panels, virtually no EPS waste is produced since the few wastes resulting from block cutting are recycled directly in the same production plant.

The expanded polystyrene used for **Baupanel®** panels is Class III, self-extinguishing type E that does not spread flames.

In the production of the EPS CFCs or HCFCs are not used as foaming agents, so that their manufacture does not cause any damage to the ozone layer.

Throughout the lifetime of the building made with **Baupanel® System**, its external energy input needs are drastically reduced, resulting in a lower consumption of fossil fuels, which in turn leads to a lower emission of CO² into the atmosphere .

For the purposes of the Energy Certification of Buildings, which is a requirement derived from Directive 2002/91/EC, and from Directive 2010/31/EU, **Baupanel® System** is an efficient construction system that allows to achieve the highest energy rating [Class A] at an affordable price. This is due to its enormous thermal insulation, which is an added value for both promoters and end users of buildings that will see their energy consumption bills for air conditioning reduced.



Thousands of projects built around the world with Baupanel® System in the last 35 years. Below we show you some of our projects.



Buildings without height limit

- Apartments 8 heights, Madrid, Spain, 2003



Townhouses & Villas

- Luxury villa in Madrid, Spain, 2008



Rehabilitations

- Building in Seville, Spain, 2017



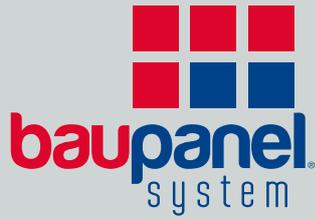
Basement Structures

- Málaga Villa, Spain 2017



Social Housing

■ 2000 homes in Morocco, 2007



Projects of all kinds build with **Baupanel® System** including homes, buildings of any height, civil works, renovations, closing of facades, industrial building, among others.



Civil Work

■ Underground Station Palma de Mallorca, Spain, 2015

Fachadas

■ Edificio en C/ Camilo Jose Cela, Madrid, 2002



Industrial Buildings

■ Building in Cádiz, Spain, 2017





■ San Pedro Tunnel, Marbella, Spain 2011



■ Underground Collectors, Spain, 2011

Curved Shapes

■ Mushroom Museum, Netherlands, 2014



Geometrical Shapes & Fountains

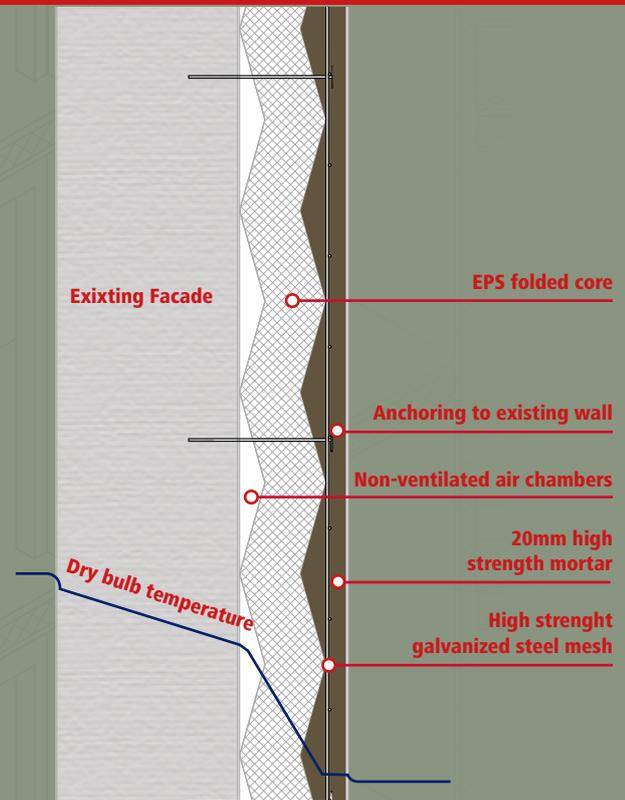
■ Islazul Shopping Centre, Madrid, Spain, 2008



bauSATEi®

Impact-resistant exterior and interior thermal insulation

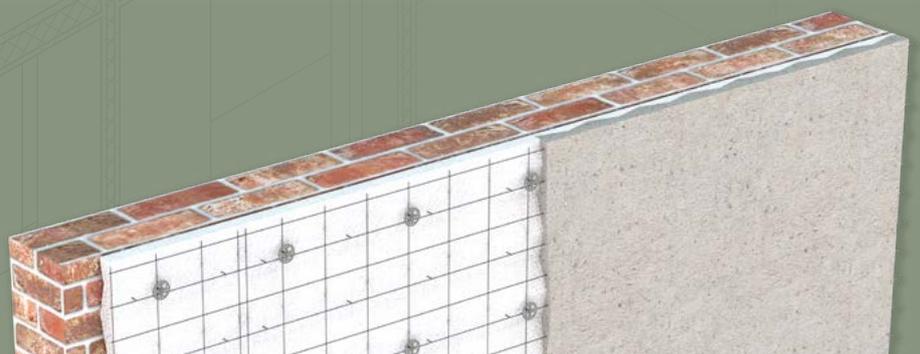
BauSATEi® is a system designed for the rehabilitation of the thermal envelope of buildings. It improves its thermal insulation in order to achieve an interior temperature of comfort throughout the year. The resulting energy savings can reach up to 50 KW-h/ m² per year depending on the thickness of insulation selected, and allows obtaining the green area of the Energy Efficiency Rating (A, B and null consumption).



Comparative advantages

- ✓ It provides a great saving in heating and air conditioning costs by reducing the U value of thermal transmittance of the building.
- ✓ Mechanically protects the enclosure of the building.
- ✓ Improves the energy efficiency of the building, making it possible to achieve sustainability criteria.
- ✓ Eliminates thermal bridges, avoiding the risk of interstitial condensation and heat loss.
- ✓ Reduces the thermal stress of the structure.
- ✓ Transfers the potential point of condensation outside the building structure.
- ✓ Optimizes the use of thermal inertia, limiting the fluctuations of the interior temperature of the building.
- ✓ It contributes to the elimination of internal health problems, such as humidity and condensation.
- ✓ Does not reduce the useful living surface (in rehabilitation of exterior facade).
- ✓ Renew the appearance of the facade and increase the value of the property.
- ✓ Contributes to the acoustic insulation of the facade.
- ✓ Correct cracks and fissures in the support, preventing possible leaks and improving waterproofing.
- ✓ It has low maintenance cost.
- ✓ Increase the useful life of the building.
- ✓ It can be installed in homes already inhabited.
- ✓ Excludes the need to remove the original coating.
- ✓ It is respectful with the environment by not dispersing harmful pollutants, being able to be recycled and reducing losses avoiding a greater emission of CO² into the atmosphere.

Designed for the rehabilitation of the thermal envelope of buildings.



100 times stronger than traditional SATE solutions

BauSATEi® is composed of a folded expanded polystyrene plate, with a steel mesh attached to it by means of connectors.

The thickness of the plate can vary between 30 and 300 mm according to the insulation requirements required for the building and its density is that corresponding to Class III (15 Kg/m³), with a thermal conductivity = 0.039 W/m K. It is completed on site by applying a layer of mortar with a compressive strength greater than 15 MPa and an average thickness of 20 mm, which gives it its characteristic strength.

It provides a great saving in heating and air conditioning costs by reducing the U value of thermal transmittance of the building.

BauSATEi® is the result of the research of the department R+D+i of **Baupanel® System** to improve everything existing up to today in terms of thermal insulation systems on the outside, commonly known in Spain as SATE systems.

Traditional SATE solutions have very low impact resistance (3 joules) making them very vulnerable to natural wear and tear and accidental or intentional damage.

BauSATEi® is 100 times more resistant (300 joules) since it has been developed from an expanded polystyrene plate reinforced with a galvanized high strength steel mesh; The zig zag profile of the plate allows a robust layer of high strength mortar to be housed.

It is also noteworthy that the folded shape of the **BauSATEi®** insulation plate, resting on the façade to be rehabilitated, interposes a series of mini channels that constitute an air chamber without ventilation, providing greater resistance against infiltration.

How are the panels placed?

BauSATEi® is anchored to the façade either by polypropylene studs with nylon nails or with 6 mm diameter corrugated steel bars. The number of fixings required is given by mechanical calculation applying the criterion of the CTE-DB-SE-AE, particularly in section 3.3 where the wind forces are collected according to the geographical location, degree of roughness of the environment, height above sea level, and the shape and orientation of the façade. Usually 5 fixings per m² are required.

Once the panels have been placed and anchored to the façade, we proceed to the application of the high strength mortar layer that will be given with 15 mm masters placed on the steel mesh. Taking into account the depth of the folding (11 mm) and the diameter of the elements of the steel mesh (2.5 mm), this layer acquires the average thickness of 20 mm. It is applied with a projecting machine and finished with a finished and floated finish.

The finished surface can be completed as indicated in the project by painting, acrylic mortar, plaster or similar.



High resistance to impacts

It is 100 times more resistant (300 joules) than traditional SATE systems (3 joules).



High resistance to flexion

It is 25 times more resistant to bending than traditional SATE systems.



It incorporates an air chamber

Improves the resistance to infiltration.



Safer placement

It can be fixed with steel bars, given a greater thickness of the resistant layer.



Reduce the execution times

BauSATEi® panels are supplied in plates of up to 4.4 m² that simultaneously incorporate the insulating element and the resistant reinforcement, providing a greater speed in the placement.



Simplifies the implementation

BauSATEi® consists of only two operations: plate fixing and subsequent application of the resistant layer, while traditional SATEs carry at least six operations.



Does not spread fire

The **BauSATEi®** expanded polystyrene insulating board is Class E, hardly flammable, so it does not spread the flame in case of fire.



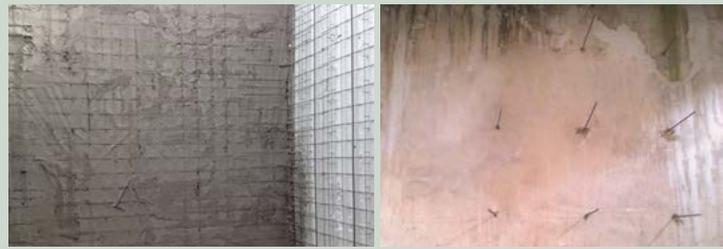
bauSATEi®

Below we show some **BauSATEi®** exterior and interior rehabilitation projects, carried out in Spain, improving the thermal envelope of the buildings, extending in many cases the structure and compatible with any finish.



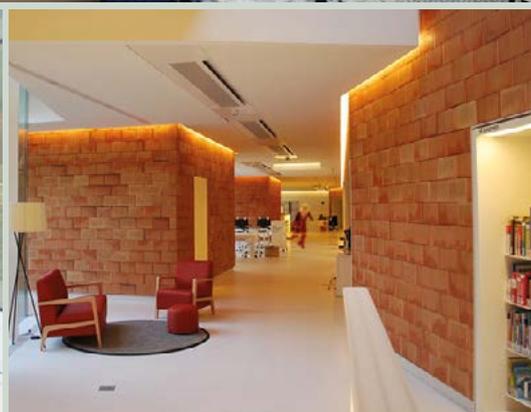
Interior Rehabilitation

■ Fiscalía Especial Anti-Corrupción, Madrid, 2007



Exterior Rehabilitation

■ Joan Maragall Library, Barcelona, 2013





Brick Facade Thermal Enveloping

■ Los Santos de Maimona (Badajoz), 2017



Brick Facade Thermal Enveloping

■ Villa en Sanlucar, Cádiz, 2018



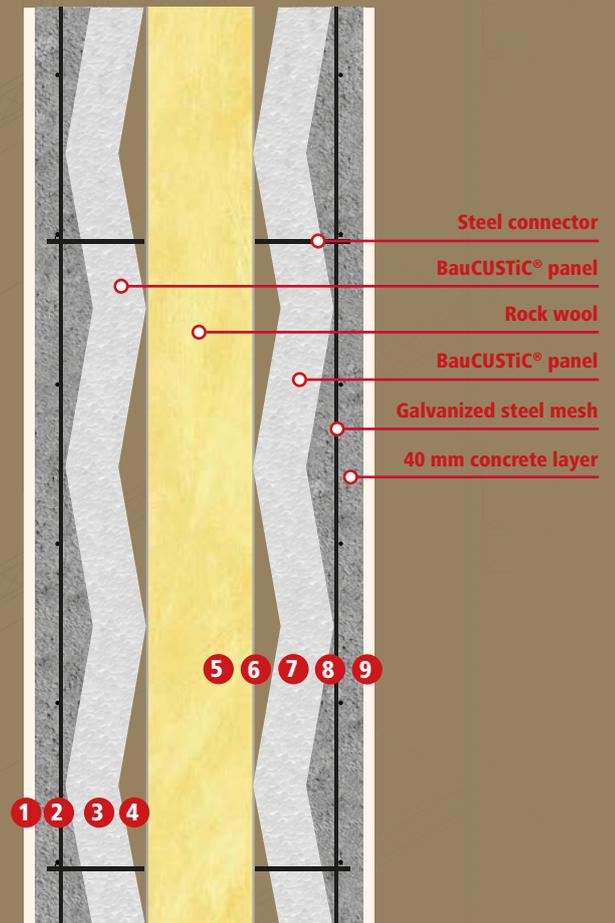
bauCUSTiC®

Thermo-acoustic insulation system

BauCUSTiC® is a panel designed by the R+D +i department of **Baupanel® System** for use as a high-capacity element for acoustic insulation against airborne noise. Its multilayer structure defines a sequence of numerous materials that block the passage of sound waves.

- 1 Plaster
- 2 Reinforced concrete layer 40 mm thick
- 3 30 mm expanded polystyrene sheet (= 15 kg/m³)
- 4 22 mm air chamber
- 5 Rock wool sheet of three thickness types: 40, 60 and 80 mm (= 40 kg/m³)
- 6 22 mm air chamber
- 7 30 mm expanded polystyrene sheet (= 15 kg/m³)
- 8 Reinforced concrete layer 40 mm thick
- 9 Plaster

BauCUSTiC® it is supplied from the factory in a pre-industrialized sandwich panel that incorporates layers 3 to 7 in a single element. These 5 layers have a steel mesh on the outer sheets, joined by non-through electro-welded connectors.



They are completed on site following the same criteria used for all panels, that is, with the application of 40 mm thick concrete layers.

The walls made of **BauCUSTiC®** panels, with expanded polystyrene core and the disconnection of the concrete sheets, allow to reach values higher than 61 dB (A).

When **BauCUSTiC®** is used as a dividing wall without structural function it is very important to place elasticized separation bands, made with materials of low dynamic rigidity in order to reduce the propagation of noise through the wall contours (flank noise).

Designed to be part of
the structure of buildings



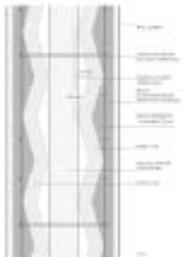
Acoustic insulation report BauCUSTIC®

Measurement results of the Architectural Acoustics Laboratory (IETcc Eduardo Torroja Institute of Construction Sciences).

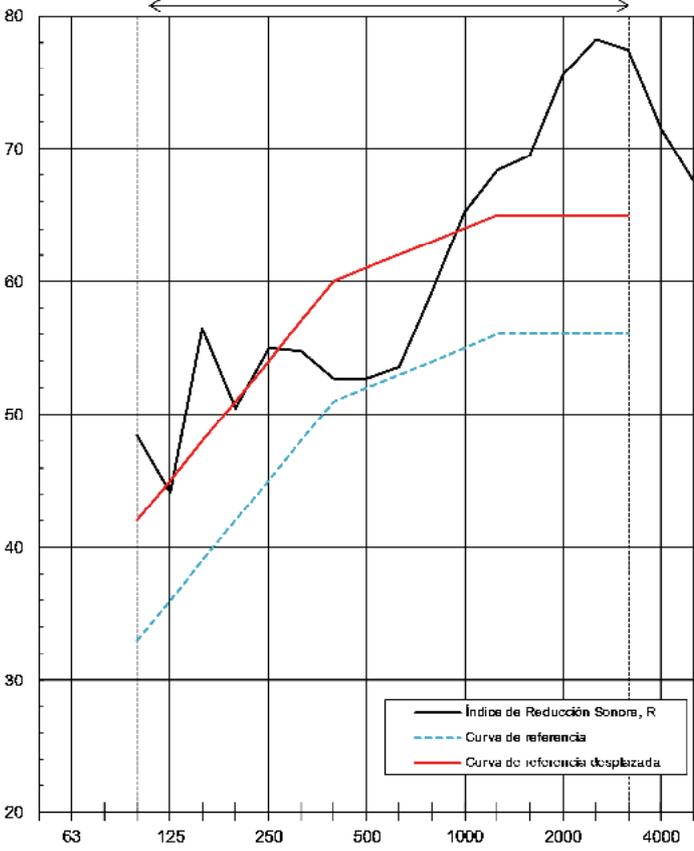
Medición en laboratorio del aislamiento acústico a ruido aéreo Índice de Reducción Acústica, R, de acuerdo con la Norma ISO 10140-2

Construcción bajo ensayo:	Estructura de doble panel de EPS con núcleo de LM de 8 cm en la cavidad. Amadura de malla electrosoldada de acero unidos mediante conectores de acero (CONECTORES NO PASANTES). Terminación in situ con proyectado de microhormigón (7,5 cm en promedio). PYL 1,5 cm a cada lado. Material
Identificación del ensayo LA-16001-03	
Fecha del ensayo: 27/05/2016	
Recinto Emisor: Cámara A	Solicitante: Marcelo Zolezzi
Recinto Receptor: Cámara B	Fabricante: Baupanel System S.L.
Área de la muestra: 10,0 m ²	Montaje supervisado por: Baupanel System S.L.

Tª ambiente: 18 °C
Humedad relativa: 5t %
Vol. emisor: 61 m ³
Vol. receptor: 53,6 m ³



Frec. (Hz)	R (dB)
50	-
63	-
80	-
100	48,4
125	44,1
160	56,4
200	50,5
250	55,0
315	54,8
400	52,7
500	52,7
630	53,6
800	59,3
1000	65,2
1250	68,4
1600	69,5
2000	75,5
2500	≥78,2
3150	≥77,4
4000	≥71,5
5000	≥67,6



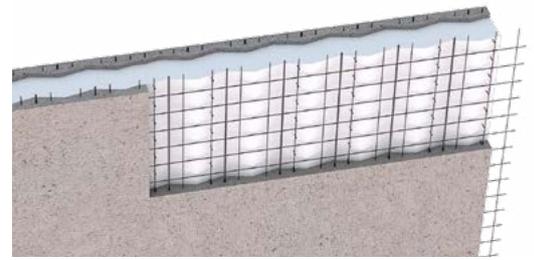
Rango de frecuencias de ensayo a los valores de la curva de referencia según la Norma 717-1

* Resultado limitado por ruido de fondo

Resultados globales según la Norma ISO 717-1:		Términos de adaptación espectral para rango de frecuencias ampliado	
Rango de frecuencias estándar (100-3150)		C₁₀₀₋₅₀₀₀ = -1 dB	C_{tr,100-5000} = -4 dB
R_w (C;C_{tr}) = 61 (-2;-4) dB	C₅₀₋₅₀₀₀ = - dB	C_{tr,50-5000} = - dB	
Evaluación según DB-HR del CTE			
R_{A, 100-5000} = 60,1 dBA			
R_{Atr, 100-5000} = 56,5 dBA			
Evaluación basada en los resultados de medición en laboratorio obtenidos mediante un método de ingeniería			
Ensayo realizado por: Amelia Romero		Revisado por: Amelia Romero	
Instituto de Medida: IETcc Instituto de Ciencias de la Construcción Eduardo Torroja - Laboratorio de Acústica Arquitectónica			

Report nº 20.807

23



BSR - Vertical panels

Three-dimensional reinforced concrete structures with expanded polystyrene core for indoor and/or outdoor use. These elements work vertically and resist the horizontal forces that are transmitted in their alignment. Also those forces produced by horizontal wind or earthquake. They can also work flexing as great-cantilever beams, placed vertically. The transverse reinforcement is 1 Ø2.5 per 75 mm.

Ref.	Polystyrene Depth mm	Ø Reinforcement Mesh	Ø Connectors mm	Nº of Connectors por m ²	Average concrete thickness mm	Finished panel thickness mm	Total weight finished panel Kg/m ²	Minimum insulation to air noise dB(A)	Thermal Transmittance (W/m ² K)
BSR 30	30	15 Ø2,5 + 6 Ø5	3,00	41	41 + 41	112	177	40,5	0,942
BSR 40	40	15 Ø2,5 + 6 Ø5	3,00	41	41 + 41	122	177	40,6	0,754
BSR 50	50	15 Ø2,5 + 6 Ø5	3,00	41	41 + 41	132	177	40,6	0,629
BSR 60	60	15 Ø2,5 + 6 Ø5	3,00	41	41 + 41	142	177	40,6	0,539
BSR 70	70	15 Ø2,5 + 6 Ø5	3,00	41	41 + 41	152	178	40,6	0,472
BSR 80	80	15 Ø2,5 + 6 Ø5	3,00	41	41 + 41	162	178	40,6	0,420
BSR 90	90	15 Ø2,5 + 6 Ø5	3,00	41	41 + 41	172	178	40,6	0,378
BSR 100	100	15 Ø2,5 + 6 Ø5	3,00	41	41 + 41	182	178	40,7	0,343
BSR 110	110	15 Ø2,5 + 6 Ø5	3,00	41	41 + 41	192	178	40,7	0,315
BSR 125	125	15 Ø2,5 + 6 Ø5	3,00	41	41 + 41	207	178	40,7	0,280
BSR 140	140	15 Ø2,5 + 6 Ø5	3,00	41	41 + 41	222	179	40,7	0,252
BSR 165	165	15 Ø2,5 + 6 Ø5	3,00	41	41 + 41	247	179	40,7	0,216
BSR 200	200	15 Ø2,5 + 6 Ø5	3,00	41	41 + 41	282	180	40,8	0,180
BSR 250	250	15 Ø2,5 + 6 Ø5	3,00	41	41 + 41	332	181	40,9	0,145
BSR 330	330	15 Ø2,5 + 6 Ø5	3,00	41	41 + 41	412	182	41,0	0,111

BSN - Vertical panels

Reinforced concrete elements with expanded polystyrene core for indoor and/or outdoor use. These elements work vertically and resist the horizontal forces that are transmitted in their alignment or those produced by horizontal wind or earthquake. The transverse reinforcement is 1 Ø2.5 per 75 mm. Recommended use: enclosures, buffe chambers, industrial buildings, etc.

Ref.	Polystyrene Depth mm	Ø Malla Refuerzo	Ø Connectors mm	Nº of Connectors por m ²	Average concrete thickness mm	Finished panel thickness mm	Total weight finished panel Kg/m ²	Minimum insulation to air noise dB(A)	Thermal Transmittance (W/m ² K)
BSN 30	30	15 Ø2,5	3,00	41	28 + 28	86	120	36,5	0,971
BSN 40	40	15 Ø2,5	3,00	41	28 + 28	96	121	36,6	0,772
BSN 50	50	15 Ø2,5	3,00	41	28 + 28	106	121	36,6	0,641
BSN 60	60	15 Ø2,5	3,00	41	28 + 28	116	121	36,6	0,548
BSN 70	70	15 Ø2,5	3,00	41	28 + 28	126	121	36,6	0,479
BSN 80	80	15 Ø2,5	3,00	41	28 + 28	136	121	36,6	0,425
BSN 90	90	15 Ø2,5	3,00	41	28 + 28	146	122	36,6	0,382
BSN 100	100	15 Ø2,5	3,00	41	28 + 28	156	122	36,6	0,347
BSN 110	110	15 Ø2,5	3,00	41	28 + 28	166	122	36,6	0,318
BSN 125	125	15 Ø2,5	3,00	41	28 + 28	181	122	36,6	0,282
BSN 140	140	15 Ø2,5	3,00	41	28 + 28	196	122	36,7	0,254
BSN 165	165	15 Ø2,5	3,00	41	28 + 28	221	123	36,7	0,217
BSN 200	200	15 Ø2,5	3,00	41	28 + 28	256	123	36,7	0,181
BSN 250	250	15 Ø2,5	3,00	41	28 + 28	306	124	36,8	0,146
BSN 330	330	15 Ø2,5	3,00	41	28 + 28	356	125	36,8	0,122



BSF · Horizontal panels

Panels intended to build the slabs, which can be horizontal, curved or inclined, flat or curved. They are elements designed to support the vertical loads that originate in the board of each floor or on the deck. They also fulfill the function of transmitting and distributing the horizontal loads to the vertical load-bearing elements. The transverse reinforcement is 1 Ø2.5 per 75 mm.

Ref.	Polystyrene Depth mm	Ø Reinforcement Mesh	Ø Connectors mm	Nº of Connectors por m ²	Average concrete thickness mm	Finished panel thickness mm	Total weight finished panel Kg/m ²	Minimum insulation to air noise dB(A)	Transmitancia Térmica (W/m ² K)
BSF 30	30	15 Ø2,5 + 6 Ø5	3,00	41	61 + 41	132	231	44,8	0,980
BSF 40	40	15 Ø2,5 + 6 Ø5	3,00	41	61 + 41	142	231	44,8	0,778
BSF 50	50	15 Ø2,5 + 6 Ø5	3,00	41	61 + 41	152	231	44,8	0,646
BSF 60	60	15 Ø2,5 + 6 Ø5	3,00	41	61 + 41	162	232	44,8	0,551
BSF 70	70	15 Ø2,5 + 6 Ø5	3,00	41	61 + 41	172	232	44,8	0,481
BSF 80	80	15 Ø2,5 + 6 Ø5	3,00	41	61 + 41	182	232	44,8	0,427
BSF 90	90	15 Ø2,5 + 6 Ø5	3,00	41	61 + 41	192	232	44,9	0,384
BSF 100	100	15 Ø2,5 + 6 Ø5	3,00	41	61 + 41	202	232	44,9	0,348
BSF 110	110	15 Ø2,5 + 6 Ø5	3,00	41	61 + 41	212	233	44,9	0,319
BSF 125	125	15 Ø2,5 + 6 Ø5	3,00	41	61 + 41	227	233	44,9	0,283
BSF 140	140	15 Ø2,5 + 6 Ø5	3,00	41	61 + 41	242	233	44,9	0,255
BSF 165	165	15 Ø2,5 + 6 Ø5	3,00	41	61 + 41	267	233	44,9	0,218
BSF 200	200	15 Ø2,5 + 6 Ø5	3,00	41	61 + 41	302	234	45,0	0,181
BSF 250	250	15 Ø2,5 + 6 Ø5	3,00	41	61 + 41	352	235	45,0	0,146
BSF 330	330	15 Ø2,5 + 6 Ø5	3,00	41	71 + 41	442	259	46,6	0,112

BPS · BauSATEI®

Panels designed to work as a thermal insulation enveloping system, both on the outside and/or inside. Used in buildings with enclosures executed with traditional system. The transverse reinforcement is 1 Ø2.5 per 75 mm.



Ref.	Polystyrene Depth mm	Ø Reinforcement Mesh	Ø Connectors mm	Nº of Connectors por m ²	Average concrete thickness mm	Finished panel thickness mm	Total weight finished panel Kg/m ²	Minimum insulation to air noise dB(A)	Thermal Transmittance (W/m ² K)
BPS 30	30	15 Ø2,5	3,00	20	23	53	50,0	30,2	1,009
BPS 40	40	15 Ø2,5	3,00	20	23	63	50,2	30,2	0,797
BPS 50	50	15 Ø2,5	3,00	20	23	73	50,4	30,3	0,658
BPS 60	60	15 Ø2,5	3,00	20	23	83	50,6	30,3	0,561
BPS 70	70	15 Ø2,5	3,00	20	23	93	50,7	30,3	0,488
BPS 80	80	15 Ø2,5	3,00	20	23	103	50,9	30,3	0,432
BPS 90	90	15 Ø2,5	3,00	20	23	113	51,1	30,4	0,388
BPS 100	100	15 Ø2,5	3,00	20	23	123	51,3	30,4	0,352
BPS 110	110	15 Ø2,5	3,00	20	23	133	51,4	30,4	0,322
BPS 125	125	15 Ø2,5	3,00	20	23	148	51,6	30,4	0,286
BPS 140	140	15 Ø2,5	3,00	20	23	163	51,9	30,5	0,257
BPS 165	165	15 Ø2,5	3,00	20	23	188	52,3	30,5	0,219
BPS 200	200	15 Ø2,5	3,00	20	23	223	53,0	30,6	0,182

BSU - Panels for unidirectional slabs

Panels intended to build the slabs, which can be horizontal or inclined. They are elements designed to support the vertical loads that originate in the board of each floor or on the deck. They also fulfill the function of transmitting and distributing the horizontal loads to the vertical load-bearing elements. They can carry 2 or 3 nerves for each panel, according to calculation. The transverse reinforcement is 1 Ø2.5 per 75 mm.

Ref.	Polystyrene Depth mm	Ø Reinforcement Mesh	Ø Connectors mm	Nº of Connectors por m ²	Average concrete thickness mm	Finished panel thickness mm	Finished panel thickness mm	Minimum insulation to air noise dB(A)	Thermal Transmittance (W/m ² K)	Cooncrete volume for 2 nerves/panel (m ³ /m ²)
BSU 125	125	15 Ø2,5	3,00	41	61 + 41	227	323	50,1	0,426	0,039
BSU 140	140	15 Ø2,5	3,00	41	61 + 41	242	336	50,7	0,393	0,045
BSU 165	165	15 Ø2,5	3,00	41	61 + 41	267	358	51,7	0,348	0,057
BSU 200	200	15 Ø2,5	3,00	41	61 + 41	302	388	53,0	0,300	0,073
BSU 250	250	15 Ø2,5	3,00	41	61 + 41	352	432	54,7	0,250	0,095
BSU 330	330	15 Ø2,5	3,00	41	61 + 41	442	502	57,1	0,198	0,132

Tolerance measures: ± 2 mm

Reinforcement elements

Ref.	Description	Ø Wire mm	Measurements mm	Unit
MP	Flat wire mesh	2.50	260x1.151	Unit
MPE	Flat wire mesh	2.50	width 1151	m ²
MPR	Flat wire mesh	2.5 / 5.0	520x1.151	Unit
MA	Angular wire mesh	2.50	227x227	Unit
MA 1	Angular wire mesh	2.50	162x292	Unit
MA 2	Angular wire mesh	2.50	162x422	Unit

Certifications

Patents, certificate of Technical Suitability and certifications of Fire and International Building



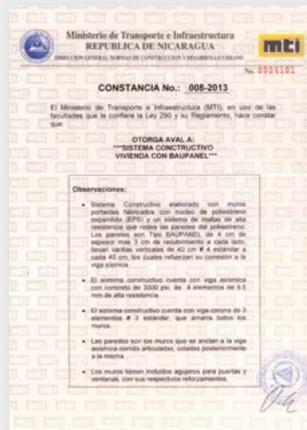
Certification DIT - Document of Technical Suitability, granted in 2003 and revised in 2017, eliminating any height restriction in the construction.



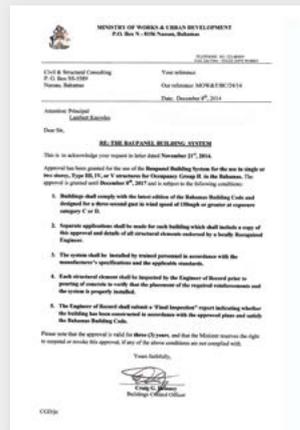
Patents granted for panels: BauSATEi®, Baupanel® y BauCUSTiC®.



London Underground Product Certification, obtained in the United Kingdom in 2015.



Certificate for construction in Nicaragua, obtained by the Ministry of Transport and Infrastructure in 2013.



Certificate for the construction in Bahamas, from the Ministry of Urban Planning and Development in 2014.



SIRIM QAS Fire Certificate (120 minutes) for construction in Malaysia in 2014.



AFITI Fire Certificate (150 minutes) for construction in Spain in 2018.



Certificate for construction in Abu Dhabi, obtained in 2010.



BUET Certification obtained by the Engineering University in Bangladesh in 2012.



Certificate for the construction in Algeria C.N.E.R.I.B. obtained in 2015.