GENERAL CATALOGUE

Resine Isolanti O.Diena

supercel®
BUILDING INSULATION

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A STORY OF RESEARCH IN THE NAME OF INNOVATION.

Resine Isolanti O. Diena Srl was established in Milan in **1929** as a company specializing in thermal insulation for civil engineering and the production of autoclaved aerated concrete and expanded clay bricks. With the advent of the Second World War, the business addressed itself to naval and hospital sectors with calcium silicate and glass wool based products. The end of the conflict and the momentum created by **Italy's reconstruction** pushed the company to resume research at full capacity and to accelerate development with ever greater determination in the field of organic resins. The objective was to **produce expanded insulating materials** for both civil and industrial sectors. Chemical research had immediately shown the great potential of these new materials. These were years of great growth, in which **expanded urea** (Aerocel Montecatini) and the first rigid resin casting foams were conceived. In **1952**, the company continued expansion thanks to the production know-how of Montecatini, establishing its own factories in Bresso. The market success of urea resin foam, manufactured by extrusion, spurred on further research and development. Advanced research and extensive analysis of laboratory test results allowed the company to develop a **production model of constant innovation**. Today, as in the past, the company's mission is to continually improve the performance of materials, without ever losing sight of cost competitiveness and environmental protection.

TWO PRODUCT LINES, ONE PHILOSOPHY.

Resine Isolanti has developed and refined two product lines of recognized industry excellence, **SUPERCEL® PIPING** and **SUPERCEL® BUILDING**; the first plant for civil, commercial and industrial construction and the second for residential construction.

SUPERCEL® PIPING is considered one of the best insulating materials on the market and aims to be the **ideal thermal insulation solution for industrial applications**. It is able to insulate systems with operating temperatures significantly lower than that of the surrounding environment, even at cryogenic temperatures. It is manufactured in blocks and cut by special machinery to **all dimensions and forms** necessary to ensure optimal insulation, such as slabs, jacketing and curved and spherical segments for tanks and containers. Due to its peculiar technical qualities, it has stirred great interest across **multiple fields of application**, such as insulation for piping and fixed and mobile refrigeration systems.

Research and achievements in the field of phenolic resins for industrial use have also allowed Resine Isolanti to position itself as **leader in the residential construction sector. SUPERCEL® BUILDING** is a product line created from the experience and high performance standards of the best materials developed by the company in its history: a **minimal thickness panel with extremely high insulating value**, which reduces heating costs and ensures a constant level of comfort all year round. It is produced in sheets, but is **highly customizable** and available in sizes adaptable to customer needs. Depending on the specific application, it can incorporate various coatings, meshes and interior wooden plugs that simplify the installation and increase flexibility and strength.

SUPERCEL® PIPING and **SUPERCEL® BUILDING** have insulating capabilities that show off their best qualities in the most difficult and most specific use cases. Unlike the majority of products on the market, they **conform to the increasingly stringent European Community standards** on safety and environmental protection. They are non-flammable and, in case of fire, do not emit dense or toxic fumes.

Our mission

IMPROVING PERFORMANCE, REDUCING EMISSIONS.

Under the **Kyoto Protocol**, industrialized countries pledged to **reduce CO_2 and other harmful greenhouse emissions by 5%**. This is one of the reasons thermal insulation has become ever important in recent years. To optimize the efficiency of materials and technologies in our industry means to significantly reduce the consumption of energy and polluting emissions.

One of the biggest environmental concerns relates to the harmful effects of CFCs (chlorofluorocarbons) and HCFCs (hydrochlorofluorocarbons) on the ozone layer. **The manufacturing of SUPERCEL® PIPING** and **SUPERCEL® BUILDING is 100% CFC and HCFC free.** Both products are fully compliant with environmental and safety standards and in line with the environmental agreements signed by the European Community.

In terms of resource consumption and waste production, the industrial sector is one of the economic sectors with the highest impact. The choice of insulating materials therefore requires an extensive analysis of the entire life cycle of the product.

SUPERCEL® BUILDING and SUPERCEL® PIPING contribute to limiting CO_2 emissions because the energy requirements for their production and life cycles is extremely low. Resine Isolanti manufactures materials that coherently guarantee excellent performance and low environmental impact while reducing drastically the formation of industrial waste. **The electricity used for production comes exclusively from green energy** generated by the company's photovoltaic system.

INSULATE BETTER, CONSUME LESS.

To be aware of the consequences of global warming is of paramount importance today. Research conducted by the international scientific community indicates that the emission of carbon dioxide (CO_2), the gas that is most responsible for the greenhouse effect, derives mainly from the **consumption of energy within civil use buildings.**

In European countries, residential buildings account for approximately 40% of primary energy consumption. Therefore, to insulate efficiently means to actively contribute to climate protection. Many countries have legislation that formalizes insulation as a critical element of building design with the aim of reducing energy consumption and economic costs. **A well-insulated building minimizes consumption** and waste and increases the efficiency and duration of the residential environment. Furthermore, it significantly **reduces harmful atmospheric emissions.**

High performance insulation is the way forward in terms of energy efficiency and must be of primary concern for all of us. Its suffices to say that at least 57% of the energy consumed in buildings is for heating purposes. Thus the potential impact of suitable insulation on energy and cost savings is huge. Truly efficient and effective thermal insulation can even provide for almost zero energy consumption in terms of heating[1]. Seen in this light **energy efficiency is the most accessible and advantageous form of alternative energy.**

At the same time, the general welfare of the final user must also be carefully taken into account. To date, in Italy, most of the energy consumption within buildings (approximately 65%) is attributable to winter heating. However, there is also a steady growth in the use of air conditioning systems during the summer. For this reason, efficient insulation systems are needed as much in the summer, to keep temperatures down, as in the winter. The goal is **comfort 365 days a year.**

1 "Almost zero energy consumption" is given to mean less than 15 KWh per m² per annum compared with a current average consumption of more than 200 KWh per m² per annum.

FOCUS

Regulatory requirements

In 2002, in order to limit emissions, the European Union issued a directive known as the Energy Performance of Buildings Directive (2002/921/ EC), which provides for the implementation by Member States of a plan for the improvement of the efficiency of buildings. In Italy, the Directive has been implemented through various legislative acts, the last being the Ministerial Decree of 26/06/2015, which, since 1st July 2015, has provided for a minimum performance level of residential buildings and new methods for calculating energy loss in buildings. The minimum requirements are expressed in Thermal Transmittance (U in W/ m²K) values for the various components of the heated building envelope (i.e. roofing, walls and floors). The table below shows these limits according to climatic region.

MINIMUM REQUIREMENTS (W/m²K)			
CLIMATE ZONE	WALLS	ROOFS	FLOORS
	According to DM 26/06/2015	According to DM 26/06/2015	According to DM 26/06/2015
A	0,45	0,34	0,48
B	0,45	0,34	0,48
C	0,40	0,34	0,42
D	0,36	0,28	0,36
E	0,30	0,26	0,31
F	0,28	0,24	0,30

Schematic geographical division based on climatic regions and average daily temperatures (Presidential Decree No.412 of 26/08/1993 as supplemented).

MAXIMUM EFFICIENCY WITH MINIMUM THICKNESS.

SUPERCEL® BUILDING is the **fruit of our latest research and development** for civil and residential use. It provides **increased insulation with significantly reduced thickness** compared to other materials, thus improving the general comfort and well-being of end-users. Thanks to its fire resistance and zero toxin emission, it meets the highest standards of safety and environmental protection.

ALL ROUND EXCELLENCE.

In the past, the main objective for insulating materials was simply to improve heat retaining performance during the winter months.

Today, due to the new energy sector regulations, the greater expertise of technicians, designers and construction companies and the increased sensitivity of end-users, **new and more sophisticated factors** need to be taken into account:

- **Thermal insulating capacity**
- **Fire resistance**
- **No toxic emissions**
- **Vapour permeability**
- **Mechanical strength**

Phenolic expanded foam, the main component of SUPERCEL® BUILDING panels, meets all of these requirements.

TECHNICAL SPECIFICATIONS

THERMAL INSULATION

High and low temperature insulation
-50°C/+120°C (170°C operating range)

Thermal conductivity
λ = 0,019 W/mK

FIRE REACTION

Fire reaction
EUROCLASS B - s1, d0 / C - s1, d0
fire resistance = B/C
low smoke emission = s1
no drops = d0

VAPOUR PERMEABILITY

Moisture resistance
> 95% closed cells

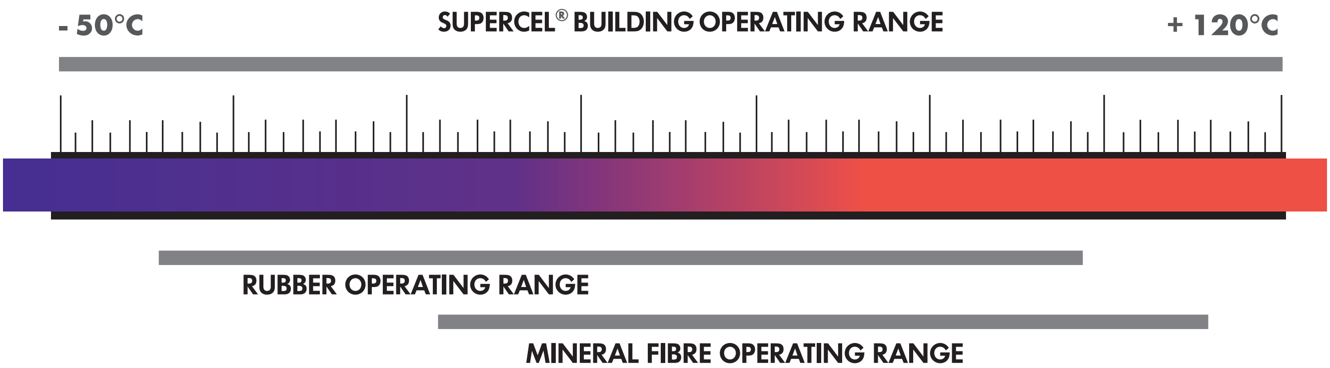
STRUCTURAL PROPERTIES

Compression resistance
≥ **150 kPa**

High and low temperature insulation
-50°C/+120°C (170°C operating range)

SUPERCEL® BUILDING
Over a range of 170°C always the best in performance.

SUPERCEL® BUILDING performs well in both extremely hot and extremely cold environments. With a temperature range of -50°C to +120°C, it is the insulating material able to offer **the widest range of applications on the market.** Its conception originated in the specialization and adaptation of the intrinsic technical characteristics of the SUPERCEL® PIPING line, designed to insulate industrial piping and equipment operating at temperatures of -180°C to +120°C. Resine Isolanti then created the **SUPERCEL® BUILDING** panel to optimize these technical characteristics to the temperature range and **specific needs of residential insulation.**



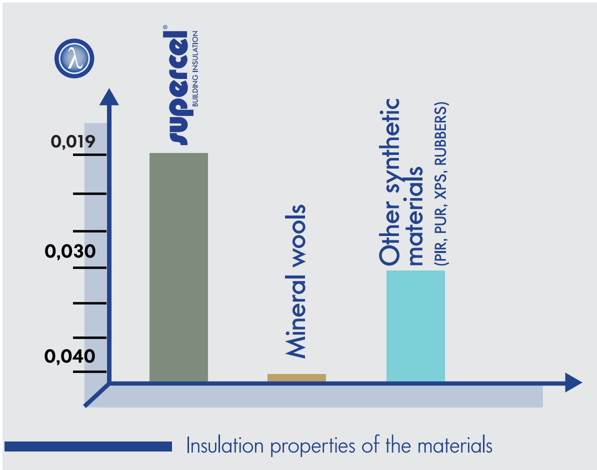
Thermal conductivity
λ = 0,019 W/mK

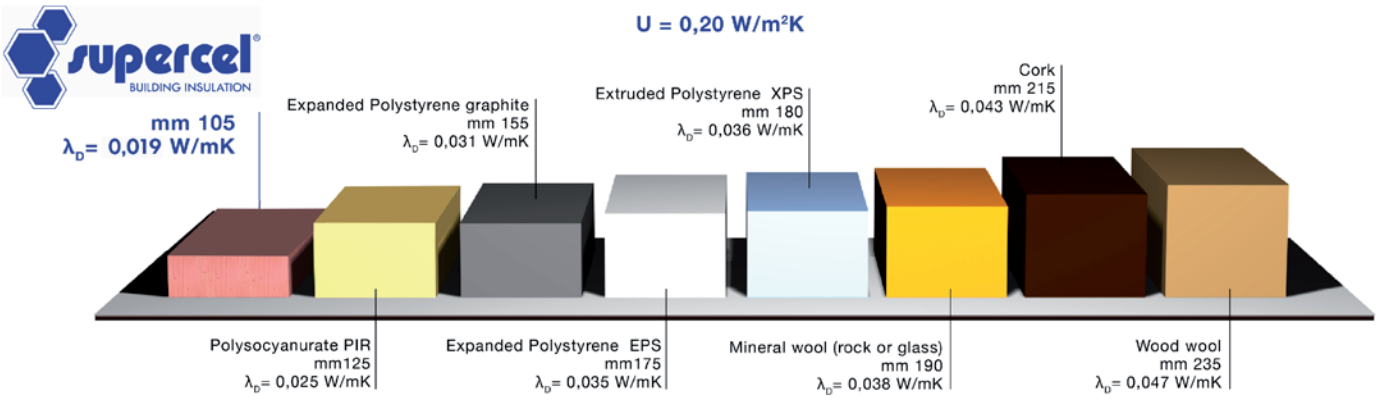
SUPERCEL® BUILDING
The lowest thermal conductivity on the market.

The main purpose of thermal insulation is to minimize heat transmission. The low thermal conductivity of SUPERCEL® BUILDING makes it ideal for such purpose.

SUPERCEL® BUILDING has a λ of 0,019 W/mK (at 10°C). Thanks to **extremely small, robust and closed cells** (>95%), in addition to ensuring excellent mechanical strength, it has the lowest thermal conductivity of materials currently on the market (*see graph*). **The thermal efficiency of SUPERCEL® BUILDING is simply better**, allowing greater insulation at reduced thicknesses.

Cladding buildings with thinner materials saves space, ensures insulation for tight spaces and **allows smaller and lighter materials to be used**. This means better working methods and a better end result.





FOCUS

Heat transmission mechanisms

In a building, there are three ways in which heat is transmitted; by conduction, convention and radiation.

Propagation by conduction is the transmission of heat through one or more elements in direct contact. The heat flow is always from the warmer to the colder element and never the opposite. The amount of heat transmitted from a material in a certain time interval is directly proportional to the thermal conductivity of the material itself and the temperature difference between the material and the element in direct contact. The less conductive the material, the lower is its thermal conductivity. The higher the heat propagation time, the more insulating is the material.

Propagation by convection is the transmission of heat from a solid body to a gaseous body or vice versa. The rate of heat transmission depends on the difference in heat between the two bodies, the incident air velocity and the contact surface area. In other words, a wall exposed to cold, strong wind will lose heat faster than a wall exposed to cold but moderate wind.

Propagation by radiation is the transmission of heat through two bodies by means of electromagnetic waves. Unlike conduction and convection, radiation does not require any direct contact between elements or a medium through which to propagate. It is a phenomenon that occurs at all temperatures, though only at fairly high temperatures will its contribution to overall heat transmission exceed those of the other two mechanisms.

MATERIAL CHARACTERISTICS
Thermal Conductivity λ [W/(mK)]

Each material has a specific thermal conductivity, which is an intrinsic property usually expressed with the symbol λ (lambda). Thermal conductivity indicates the capacity of the material to transmit heat in terms of the amount of heat that can pass through one square metre of the face of one cubic metre of the material with a temperature difference of one degree between the face and its opposite in a certain interval of time (usually one hour). Given that λ represents the amount of heat that can pass through the material, the smaller its value, the greater the insulating capacity of the material. To give a practical example, using 15 cm SUPERCEL® BUILDING, which has λ = 0,019 [W/(mK)], we obtain the thermal insulation equivalent to of 14 metres of concrete, which has a λ = 2,00 [W/(mK)].

Thermal Resistance R [m²K/W]

Thermal resistance represents the ability of a material to restrain the flow of heat passing through it. This is calculated through the relationship between the material thickness (in metres) and its thermal conductivity λ. The greater its value, the greater the insulating capacity of the material. Note that in the case of multi-layer constructions, thermal resistance is calculated to be the sum of the resistances of the individual layers.

Thermal Transmittance U [W/m²K]

Thermal transmittance describes the thermal characteristic of an element or set of elements in terms of its capacity to disperse heat. Thus thermal transmittance can be used to define the heat-insulating performance of the entire building envelope. The lesser the value, the slower is the heat dispersion and the greater is the effectiveness of the insulating material.

It is to be noted that the conductivity λ characterizes only homogeneous materials. Indeed, it is used in data sheets to indicate the performance of individual insulating materials. The thermal resistance R, on the other hand, indicates the ability to resist heat flow from one or more materials, for example, comprising a wall. The transmittance U is can be applied to heterogeneous materials, as it is calculated from the various values of R of the different layers. This allows an evaluation of the insulating capacity of a set of elements (e.g. an entire wall).

SUPERCEL® BUILDING
Complete protection from the cold.

To guarantee a comfortable temperature in winter, while keeping consumption to a minimum, the internal heat of a building must be preventing from dispersing into the exterior environment. Thermodynamic principles tell us that in winter interiors will tend to disperse heat in order to try to cancel out the heat differential with the exterior. To avoid excessive heat loss, it is necessary to insulate the entire covering of the building, including roof, walls and floors, in order to obstruct the thermal flow from the inside to the outside. Thanks to its highly insulating properties and low thermal conductivity, **SUPERCEL® BUILDING offers greater insulation in less material thickness.**

SUPERCEL® BUILDING
A shield against the heat.

In summer, in order to reduce the effects of radiation, it is wise to install panels that create an effective **shield against the high exterior temperatures** and prevent heat from passing through into the building envelope. To limit the use of cooling systems and excess energy consumption during the summer period, current legislation states that in areas exposed to radiation greater than 290 W/m²K, the covering of buildings must have a periodic thermal transmittance Y_{mn} less than 0,20 W/m²K.

Phase shift (s)	Attenuation factor (fa)	Performance	Envelope quality
s > 12	fa < 0,15	Excellent	I
12 ≥ s > 10	0,15 ≤ fa < 0,30	Good	II
10 ≥ s > 8	0,30 ≤ fa < 0,40	Average	III
8 ≥ s > 6	0,40 ≤ fa < 0,60	Sufficient	IV
6 ≥ s	fa ≥ 0,60	Poor	V

SUPERCEL® BUILDING provides effective shielding from the summer heat.

FOCUS

Periodic thermal transmittance Y_{mn} is the product of the stationary thermal transmittance (or simply thermal transmittance) U and the attenuation factor fa. Since Y_{mn} is representative both of the degree of thermal damping and the thermal wave phase shift from the outside, it is a good parameter for identifying the delay with which external dynamic thermal stresses are perceived in the interior. More specifically, the **thermal damping**, or attenuation factor, describes the phenomenon of thermal inertia, namely the ability of a material or structure to vary more or less slowly its temperature as a response to external temperature variations. This value is obtained from the relationship between the interior thermal wave amplitude and the thermal oscillation of the average outdoor air temperature. Therefore, the smaller fa is, the greater the attenuation or thermal damping and the better the insulation will be. The **phase shift** (also known as thermal lag) s is measured in hours and describes the time delay between the moment the exterior surface of the building reaches a maximum temperature and the moment the interior surface reaches the same maximum temperature.

Fire reaction

EUROCLASS B - s1, d0 / C - s1, d0

SUPERCEL® BUILDING
Fire resistant and no toxic emissions.

A good insulating material has to also have optimal **safety standards**. It should be fire resistant and self-extinguishing. It should also be efficient over a large temperature range.

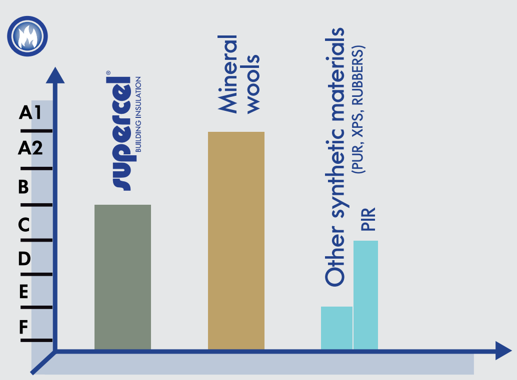
The Euroclass fire protection standard assigns 7 different classes to insulation materials according to their **fire resistance**:

- A1 and A2: only attributed to non-combustible inorganic materials
- B, C, D, E: attributed to organic or synthetic materials with various fire resistances.
- F: attributed to combustible materials or those with undetermined fire resistance.

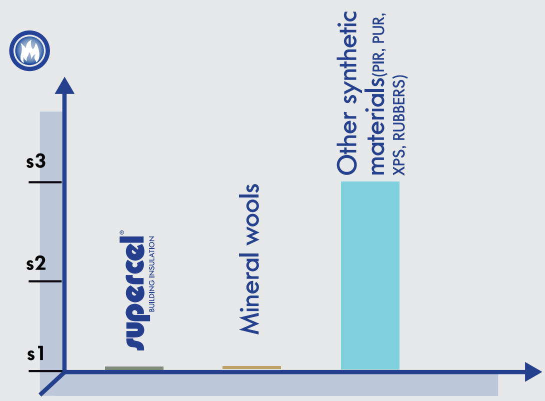
The Euroclass standard also consider other properties of insulating materials linked to their behaviour at high temperatures or in contact with a flame. These properties include the potential to emit toxic smoke (s = smoke), classified with the categories s1, s2 and s3, and to generate drops of burning material (d = drops), classified with the categories d0, d1 and d2.

SUPERCEL® BUILDING has been tested according to the most stringent criteria and has been shown to conform to EUROCLASSES ranging from C, s1 and d0 to B, s1 and d0.

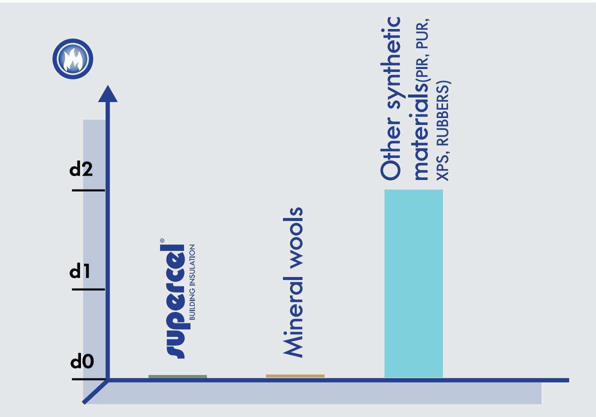
The letter B attributed by the Euroclass tests shows that, among all the organic and synthetic materials, SUPERCEL® BUILDING is the one with the **best fire resistance** (*see comparison table*).



Fire-resistance properties of the insulation materials most commonly used Euroclass



"s" smoke production levels



"d" drops - Tendency to release drops or burning particles

The category s1 guarantees that **SUPERCEL® BUILDING** (together with mineral wools, i.e. non-synthetic materials) is a product with extremely **low smoke emissions** and toxic gas emissions such as carbon dioxide and carbon monoxide. This distinguishes it from all other synthetic materials, such as XPS, PIR and PUR, and from vegetable fibres (*see table*).

The category d0 distinguishes **SUPERCEL® BUILDING** from other synthetic materials in terms of material **stability** when exposed to fire, meaning that it does not drip or disintegrate or form burning particles.

SUPERCEL® BUILDING conforms with all the requirements of international standards and regulations and guarantees the highest levels of safety.

FOCUS - MOISTURE RESISTANCE

Among the many parameters used to assess the transpiration of materials are **vapour permeability** δ (delta), **permeance** π (pi) and **water vapour diffusion resistance**.

Vapour permeability δ [kg/(msPa)], can be considered as equivalent to thermal conductivity λ, but for vapour transmission instead of heat transmission. It is defined as the amount of vapour that can pass through a metre of material thickness per second, with a given pressure differential measured in Pascals between the two opposite surfaces of the material.

Permeance π indicates the degree of water vapour permeability of a non-homogeneous material of a given thickness and is thus derived from the permeability δ by the formula $\pi = \delta/d$, where d indicates the thickness in metres of the material.

Vapour diffusion resistance, represents the material's ability to resist the diffusion of vapour into its interior, with d/δ [$(m^2sPa)/kg$]. In Europe, this resistance is commonly expressed with the water vapour diffusion resistance factor μ, which is obtained from the ratio of the vapour permeability of air to that of the material.

Taking SUPERCEL® BUILDING, as an example, with a value of $\mu = 50$, it follows that the layer of material resists water vapour diffusion 50 times more than an equivalent thickness of air.

Moisture resistance

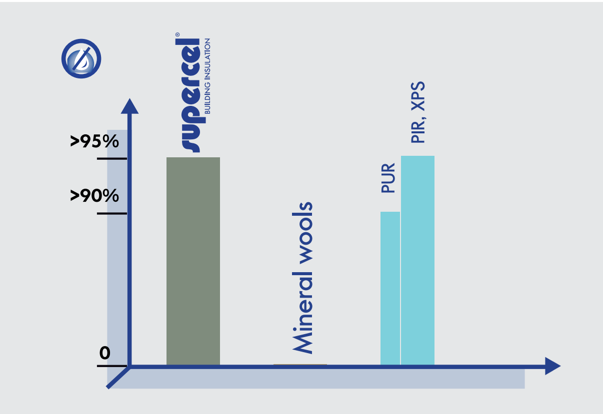
> 95% percentage of closed cells

SUPERCEL® BUILDING
Efficient also in terms of vapour permeability.

While it is important to control heat flows between the interior and exterior of the buildings, it is also imperative to control the **gaseous exchanges**, both in terms of air and water vapour. This is in order to prevent the build-up of condensation that can lead to discomfort, an unhealthy environment and the generation of moulds. Condensation may also affect the quality of insulating materials. The most simple and efficient solution is to install panels that **facilitate the natural transfer of water vapour** through the insulating envelope.

SUPERCEL® BUILDING has been used with success where moisture resistance is a critical factor. It has a μ value of 50, meaning that it resists moisture 50 times more than an air layer of equivalent thickness (*see the focus box*).

Its resistance to water vapour is due to the morphology of its extremely small, resistant and closed cells (> 95%). **SUPERCEL® BUILDING** may also be treated with **various coatings to prevent the penetration of moisture**, dust and dirt into the insulation.



% Closed cells

Compression resistance
≥ **150 kPa**

SUPERCEL® BUILDING
Lightweight, durable, flexible and stable.

In addition to its insulating qualities, **SUPERCEL® BUILDING** has other benefits in terms of efficiency, effectiveness and durability:

- **Mechanical strength**
- **Dimensional stability at high and low temperatures**
- **Lightness**
- **Workability**
- **Compatibility with other materials**

SUPERCEL® BUILDING is an extremely light material, with a **low specific weight** for its high insulation performance. It is robust, with **excellent mechanical strength** in relation to its density. It is easy to transport, store, handle and install, with ease of installation translating into **significant time and cost savings.**

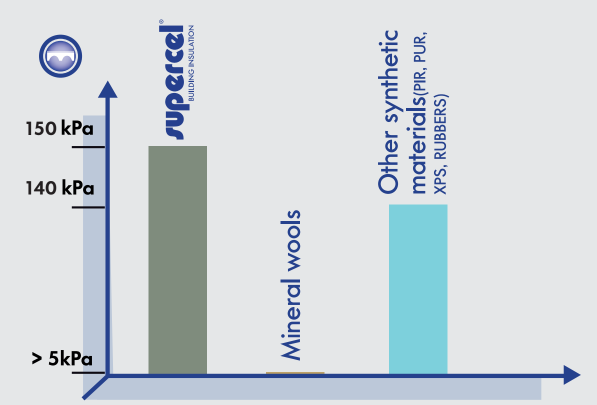
SUPERCEL® BUILDING has a structure formed by extremely small and compact cells, with **outstanding compressive strength.**

Compressive strength is the capacity of a material to resist a compressive stress applied at a predetermined speed perpendicularly to the material surfaces, expressed in kPa. Compressive strength thus describes the resistance of a material to an instantaneous and momentary stress. Constant load compressive strength is then used to evaluate the behaviour of materials subjected to constant loads.

SUPERCEL® BUILDING has a compressive strength that falls in the class ≥ **150 kPa.**

Among other advantages of SUPERCEL® BUILDING are its excellent dimensional stability, compressive strength and constant load compressive strength.

Dimensional stability, essential for many applications and critical for covering structures, represents a material's ability to maintain its original dimensions over time when exposed to different environmental conditions.



Compression resistance of insulation materials

SUPERCEL® BUILDING
Practical and competitive interior thermal insulation.

In some cases and, in particular, renovations, efficient internal insulation of perimeter walls and ceilings is the only way to achieve certain energy efficiency and comfort.

Some construction contexts may not allow radical restructuring, with, for example, the implementation of exterior insulation, as in the case of buildings in historic city centres or those with particularly articulated facades.

Similarly, if the insulation of a **single part of a building** is required, interior insulation allows efficient intervention without affecting the entire building.

It is also a viable solution for all **temporarily inhabited spaces**, such as offices, business premises and holiday homes. Without the need for radical intervention, you can quickly and easily ensure these environments are at desired temperatures.

In all these cases, it is essential to use materials with a high insulating capacity yet minimum thickness. The goal is to achieve the highest standards of energy efficiency without compromising the volumetric capacity of the building.

SUPERCEL® BUILDING is the perfect material. Thanks to its thermal conductivity, λ = 0,019, it can guarantee the desired outcome at lesser thicknesses.

SUPERCEL® BUILDING
Reliable, high performance exterior thermal insulation.

The insulation of perimeter walls and ceilings from the outside or in structural cavities offers considerable advantages in terms of performance, cost and feasibility.

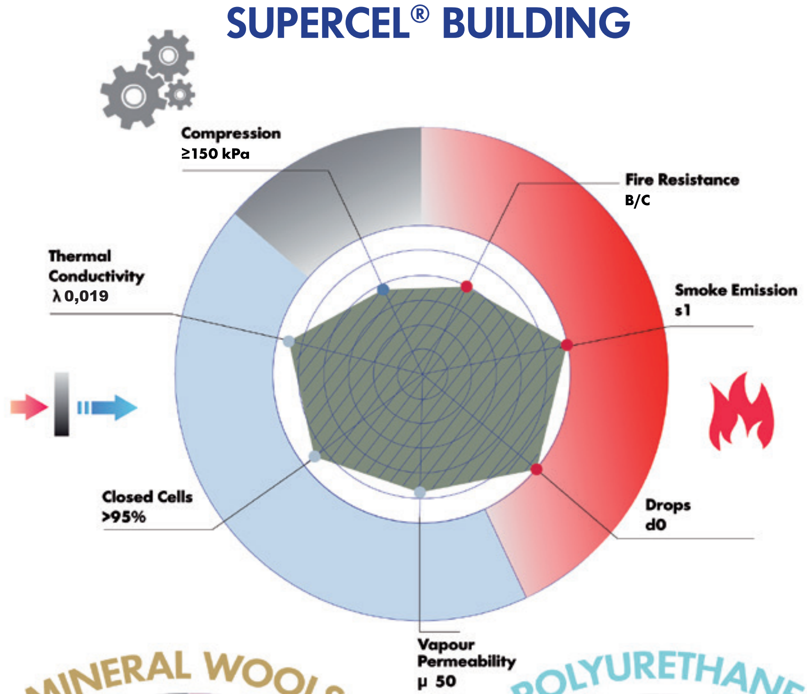
A continuous exterior insulating layer **eliminates thermal bridges,** the weak point in building envelopes. This prevents the dispersion of heat and the formation of moulds, a further threat to the structure as a whole and the health of end users. In terms of performance, the insulation guarantees a **greater protection of the structure** in general, shielding it from temperature variations, increasing its useful life and improving its thermal inertia and thus slowing down the rate at which its walls are heated and cooled.

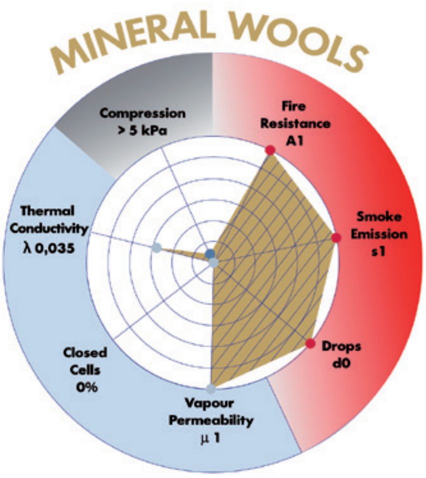
From the point of view of feasibility, exterior insulation does not reduce the useful volume of the building or compromise the usability of the building during installation. It also allows for the implementation of **single-walled buildings**, which are more cost effective than those that are double-walled.

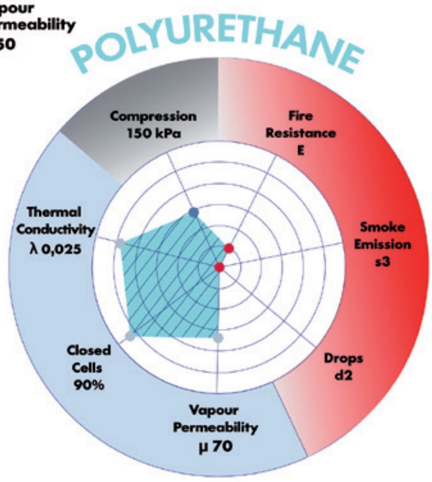
Application areas of insulating materials.

The below graph shows the suitability of an insulation to the various application sectors. The outer band shows the individual technical properties with the relative values; the dot represents the position on the corresponding radius. The centre of the radius corresponds to the minimum value, the outer border to the maximum value. Where these dots meet, they generate a more or less developed coloured area that represents the properties of fire resistance, insulating power and mechanical resistance. **It appears evident how SUPERCEL® BUILDING possesses excellent insulating, mechanical and fire resistance properties.**

SUPERCEL® BUILDING



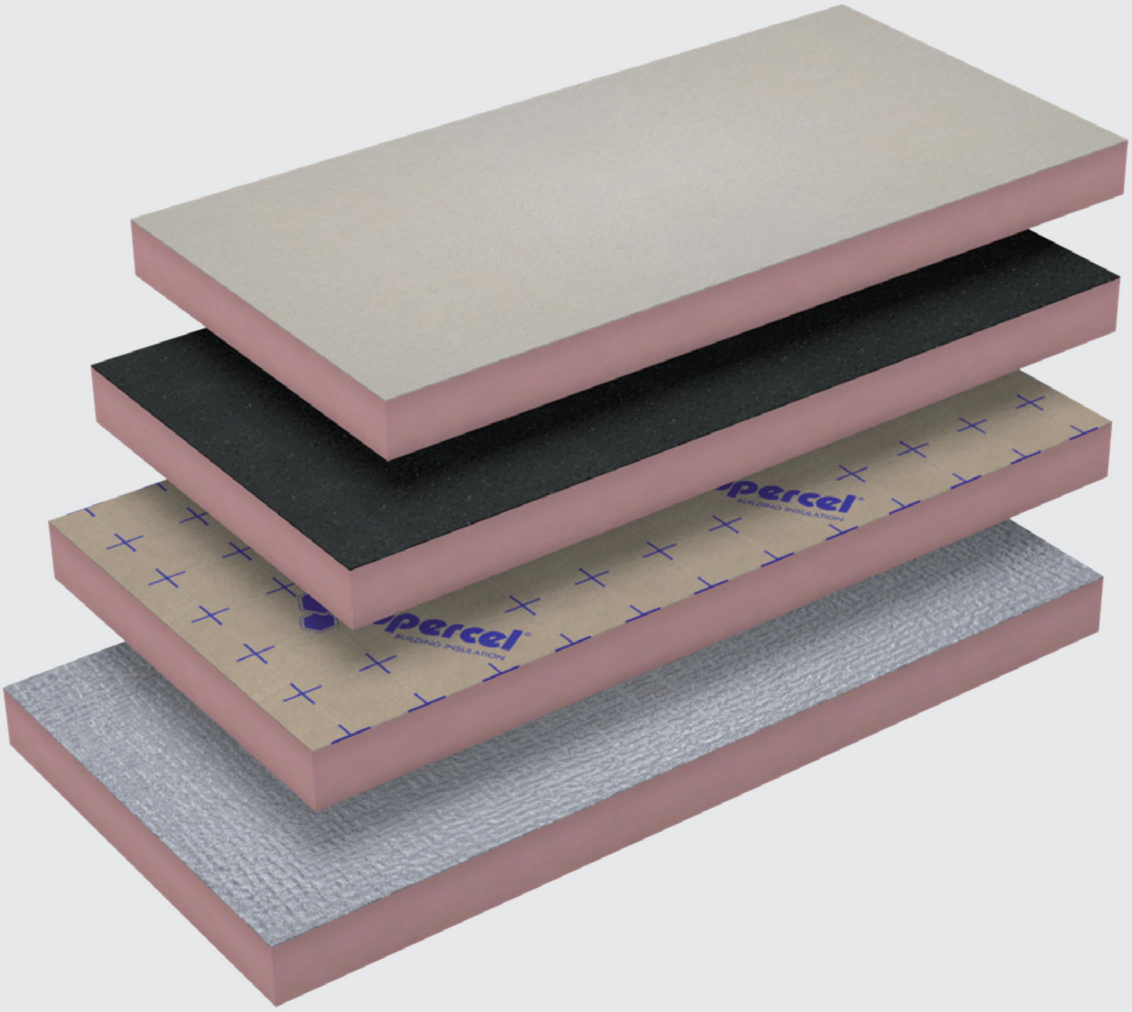




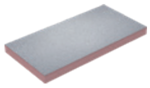
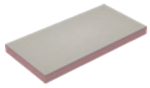
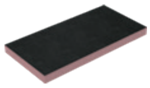
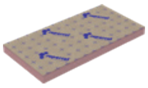
supercel®
BUILDING INSULATION

PRODUCT RANGE

Resine Isolanti O.Diena



PANEL APPLICATIONS

	ALUMEN	VITRUM	FLAMMA	PAPYRUS
				
FLAT ROOFS				
Ballasted roof, under heat bonded bituminous membrane		●		●
Warm roof, under cold bonded synthetic membrane	●	●		
Paved warm roof		●		●
Carriageable warm roof		●		●
PITCHED ROOFS				
Warm roofs, insulation under bonded bituminous membrane		●		
Ventilated roof, insulation under sheat	●	●	●	●
Ventilated roof, insulation above sheat	●		●	
WALLS				
External coating system, insulation of perimetric walls		●		
In cavity insulation of external perimetric walls	●	●	●	●
Ventilated façade, insulation of external perimetric walls			●	
Internal insulation of walls	●	●		●
FLOORS				
Insulation of slab on grade	●	●		●
Insulation of heated floors	●	●		●
Insulation of civil or industrial cold storage floors	●	●		●

supercel®
BUILDING INSULATION

SUPERCEL® BUILDING
MAXIMUM PERFORMANCE IN ALL CONDITIONS.

SUPERCEL® BUILDING is a panel formed by a layer of insulating expanded phenolic foam. It is resistant to chemical agents and maintains its technical characteristics in both extremely hot and cold environments, ranging from -50°C to +120°C. The material, available in a range of finishes, is one of the best insulators, with λ = 0,019.

The main component of each panel is phenolic foam, a rigid, closed cell foam which confers the essential properties of SUPERCEL® BUILDING:

- ***Thermal insulating capacity***
- ***Fire resistance***
- ***No toxic emissions***
- ***Vapour permeability***
- ***Mechanical strength***

The various types of finishes available are designed to increase the performance of the foam for specific applications to ensure that each panel gives maximum performance under all circumstances.

SUPERCEL® BUILDING is manufactured in sizes of 1200 x 600 mm and 1200 x 2400 mm. On request, lengths can be made up to 4800 mm. The panels can be further cut by special machinery to specific application requirements.

THE BENEFITS OF THE STOMATHERM® INSULATION PRODUCTS.

The SUPERCEL® BUILDING line, with an initial thermal conductivity of 0,019 W/mK, is among the most efficient on the market in terms of heat-insulating.

The SUPERCEL® BUILDING line is able to ensure minimum insulation thicknesses.

The SUPERCEL® BUILDING line, compliant with the fire reaction Euro-class parameters, has a phenolic foam core classified as B s1 d0 - ensuring maximum fire resistance for organic and synthetic materials (it does not feed the flames and is able of self-extinguishing) and the non-emission of toxic fumes.

The SUPERCEL® BUILDING line is produced without the use of CFCs (flurocarbidechlorine) and HCFCs (hydroflurocarbidechlorine) which have harmful effects on the ozone layer.

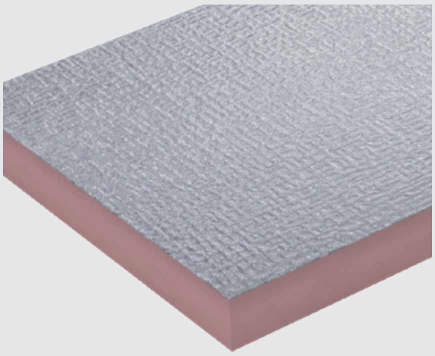
The SUPERCEL® BUILDING line, easy to handle and install, is a non-fibrous material which can also be used for dry coating systems and is ideal for new buildings and renovation of existing buildings.

The SUPERCEL® BUILDING line, due to its closed cell structure, is not affected by air infiltrations and is resistant both to moisture and water vapour - an aspect that differentiates it from materials with open cells as mineral fibres - which prevent a possible reduction of the thermal performance.

The SUPERCEL® BUILDING line, if installed properly, is able to provide long-term reliability.

supercel® BUILDING INSULATION ALUMEN

PRODUCT DETAILS



SUPERCEL® ALUMEN is a high performance rigid thermoset with a phenolic resin insulation core, an aluminum vapor barrier foil facing covering the upper side and an internal saturated glass tissue facing covering the lower side.

The panel is available in the following standard dimensions:
1200 x 2400 mm
1200 x 600 mm

SUGGESTED APPLICATION	Insulation for structural ceilings or flat roofs with synthetic membranes. Cavity walls. Civil or industrial floors. Heated floors.
THERMAL CONDUCTIVITY λ_D	0,019 W/mK - 0,021 W/mK
PROFILES	Standard flat profile edges or tongue and groove fastening system.
FACINGS	Aluminum vapor barrier foil / Saturated glass tissue.

PROPERTIES	**NORMS EN 13166**	**UNITS**	**VALUES**													
		mm	25	30	40	50	60	70	80	90	100	120	130	140	150	160
Thickness tolerance	EN 823	mm	-2 / +2			-2 / +3						-2 / +5				
Length	EN 822	mm	600 up to 4800													
Width	EN 822	mm	1200													
Compressive strength	EN 826	kPa	≥ 150													
Dimensional stability	EN 1604	%														
Thickness: 48 hrs at (70 ± 2) °C & relative humidity of (90 ± 5)%			≤ 1,5													
Length & Width: 48 hrs at (70 ± 2) °C & relative humidity of (90 ± 5) %			≤ 1,5													
Water absorption by immersion	EN 1609	Kg/m^2	≤1													
Water vapor permeability and transmission	EN 12086	μ	> 10000													
Reaction to fire	EN 13501-1	Euroclass	C s_1 d_0													
Operating temperature range		°C	-50 / +120													
Specific heat capacity		J/Kg K	1750													
Apparent mass	EN 1602	Kg/m^3	35 ± 1,5													

Thickness	mm	25	30	40	50	60	70	80	90	100	120	130	140	150	160
Thermal conductivity λ_D	**W/mK**	**0,021**						**0,019**							
Thermal resistance R	m^2K/W	1,19	1,43	1,90	2,38	2,86	3,33	4,21	4,74	5,26	6,32	6,84	7,37	7,89	8,42
Thermal resistance R_D	**m^2K/W**	**1,15**	**1,40**	**1,90**	**2,35**	**2,85**	**3,30**	**4,20**	**4,70**	**5,25**	**6,30**	**6,80**	**7,35**	**7,85**	**8,40**
Thermal transmittance U_D	W/m^2K	0,87	0,71	0,53	0,43	0,35	0,30	0,24	0,21	0,19	0,16	0,15	0,14	0,13	0,12

supercel® BUILDING INSULATION VITRUM

PRODUCT DETAILS

SUPERCEL® VITRUM is a high performance rigid thermoset with a phenolic resin insulation core and glass tissue based facings covering both the upper and lower side of the panel.

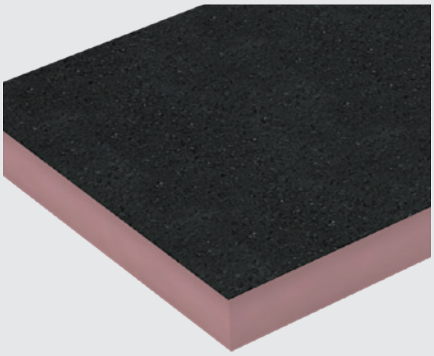
The panel is available in the following standard dimensions:
1200 x 2400 mm
1200 x 600 mm

SUGGESTED APPLICATION	Insulation of flat roofs under fixed synthetic membranes and/or cold bituminous membranes. Insulation for tiled or slanted pitched warm roofs. Insulation for walls and/or floors. External insulation system.
THERMAL CONDUCTIVITY λ_D	0,019 W/mK - 0,021 W/mK
PROFILES	Standard flat profile edges or tongue and groove fastening system.
FACINGS	Saturated glass tissue on both sides.

PROPERTIES	**NORMS EN 13166**	**UNITS**	**VALUES**													
		mm	25	30	40	50	60	70	80	90	100	120	130	140	150	160
Thickness tolerance	EN 823	mm	-2 / +2			-2 / +3						-2 / +5				
Length	EN 822	mm	600 up to 4800													
Width	EN 822	mm	1200													
Compressive strength	EN 826	kPa	≥ 150													
Dimensional stability	EN 1604	%														
Thickness: 48 hrs at (70 ± 2) °C & relative humidity of (90 ± 5)%			≤ 1,5													
Length & Width: 48 hrs at (70 ± 2) °C & relative humidity of (90 ± 5) %			≤ 1,5													
Water absorption by immersion	EN 1609	Kg/m^2	≤1													
Water vapor permeability and transmission	EN 12086	μ	40													
Reaction to fire	EN 13501-1	Euroclass	B s_1 d_0													
Operating temperature range		°C	-50 / +120													
Specific heat capacity		J/Kg K	1750													
Apparent mass	EN 1602	Kg/m^3	35 ± 1,5													

Thickness	mm	25	30	40	50	60	70	80	90	100	120	130	140	150	160
Thermal conductivity λ_D	**W/mK**	**0,021**						**0,019**							
Thermal resistance R	m^2K/W	1,19	1,43	1,90	2,38	2,86	3,33	4,21	4,74	5,26	6,32	6,84	7,37	7,89	8,42
Thermal resistance R_D	**m^2K/W**	**1,15**	**1,40**	**1,90**	**2,35**	**2,85**	**3,30**	**4,20**	**4,70**	**5,25**	**6,30**	**6,80**	**7,35**	**7,85**	**8,40**
Thermal transmittance U_D	W/m^2K	0,87	0,71	0,53	0,43	0,35	0,30	0,24	0,21	0,19	0,16	0,15	0,14	0,13	0,12

supercel® BUILDING INSULATION FLAMMA



PRODUCT DETAILS

SUPERCEL® FLAMMA is a high performance rigid thermoset with a phenolic resin insulation core, a mineral added paper based facing covering one side and a graphite based membrane covering the other side. The latter facing should be placed on the side that risks being exposed to flames, guaranteeing both high fire performance and hydro-repellency.

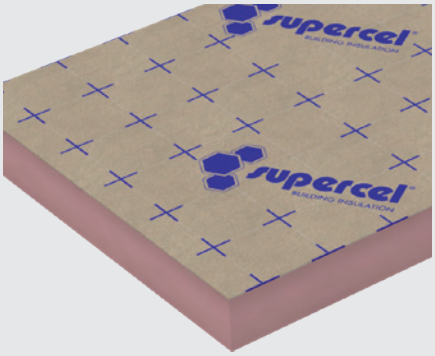
The panel is available in the following standard dimensions:
1200 x 2400 mm
1200 x 600 mm

SUGGESTED APPLICATION	Insulation for ventilated facades. Insulation for ventilated pitched roofs Ideal for all those applications that require a high fire resistance.
THERMAL CONDUCTIVITY λ_D	0,019 W/mK - 0,021 W/mK
PROFILES	Standard flat profile edges or tongue and groove fastening system.
FACINGS	Graphite based membrane / Mineral added paper based facing.

PROPERTIES	**NORMS EN 13166**	**UNITS**	**VALUES**													
		mm	25	30	40	50	60	70	80	90	100	120	130	140	150	160
Thickness tolerance	EN 823	mm	-2 / +2			-2 / +3						-2 / +5				
Length	EN 822	mm	600 up to 4800													
Width	EN 822	mm	1200													
Compressive strength	EN 826	kPa	≥ 150													
Dimensional stability	EN 1604	%														
Thickness: 48 hrs at (70 ± 2) °C & relative humidity of (90 ± 5)%			≤ 1,5													
Length & Width: 48 hrs at (70 ± 2) °C & relative humidity of (90 ± 5) %			≤ 1,5													
Water absorption by immersion	EN 1609	Kg/m^2	≤1													
Water vapor permeability and transmission	EN 12086	µ	55													
Reaction to fire	EN 13501-1	Euroclass	B s_1 d_0													
Operating temperature range		°C	-50 / +120													
Specific heat capacity		J/Kg K	1750													
Apparent mass	EN 1602	Kg/m^3	35 ± 1,5													

Thickness	mm	25	30	40	50	60	70	80	90	100	120	130	140	150	160
Thermal conductivity λ_D	**W/mK**	**0,021**						**0,019**							
Thermal resistance R	m^2K/W	1,19	1,43	1,90	2,38	2,86	3,33	4,21	4,74	5,26	6,32	6,84	7,37	7,89	8,42
Thermal resistance R_D	**m^2K/W**	**1,15**	**1,40**	**1,90**	**2,35**	**2,85**	**3,30**	**4,20**	**4,70**	**5,25**	**6,30**	**6,80**	**7,35**	**7,85**	**8,40**
Thermal transmittance U_D	W/m^2K	0,87	0,71	0,53	0,43	0,35	0,30	0,24	0,21	0,19	0,16	0,15	0,14	0,13	0,12

supercel® BUILDING INSULATION PAPYRUS



PRODUCT DETAILS

SUPERCEL® PAPYRUS is a high performance rigid thermoset with a phenolic resin insulation core and a polythene coated paper based facing covering both the upper and lower side of the panel.

The panel is available in the following standard dimensions:
1200 x 2400 mm
1200 x 600 mm

SUGGESTED APPLICATION	Insulation for flat paved roofs with synthetic membranes. Insulation for floors.
THERMAL CONDUCTIVITY λ_D	0,019 W/mK - 0,021 W/mK
PROFILES	Standard flat profile edges or tongue and groove fastening system.
FACINGS	Polythene coated paper based facing on both sides.

PROPERTIES	**NORMS EN 13166**	**UNITS**	**VALUES**													
		mm	25	30	40	50	60	70	80	90	100	120	130	140	150	160
Thickness tolerance	EN 823	mm	-2 / +2			-2 / +3						-2 / +5				
Length	EN 822	mm	600 up to 4800													
Width	EN 822	mm	1200													
Compressive strength	EN 826	kPa	≥ 150													
Dimensional stability	EN 1604	%														
Thickness: 48 hrs at (70 ± 2) °C & relative humidity of (90 ± 5)%			≤ 1,5													
Length & Width: 48 hrs at (70 ± 2) °C & relative humidity of (90 ± 5) %			≤ 1,5													
Water absorption by immersion	EN 1609	Kg/m^2	≤1													
Water vapor permeability and transmission	EN 12086	μ	150													
Reaction to fire	EN 13501-1	Euroclass	F													
Operating temperature range		°C	-50 / +120													
Specific heat capacity		J/Kg K	1750													
Apparent mass	EN 1602	Kg/m^3	35 ± 1,5													

Thickness	mm	25	30	40	50	60	70	80	90	100	120	130	140	150	160
Thermal conductivity λ_D	**W/mK**	**0,021**						**0,019**							
Thermal resistance R	m^2K/W	1,19	1,43	1,90	2,38	2,86	3,33	4,21	4,74	5,26	6,32	6,84	7,37	7,89	8,42
Thermal resistance R_D	**m^2K/W**	**1,15**	**1,40**	**1,90**	**2,35**	**2,85**	**3,30**	**4,20**	**4,70**	**5,25**	**6,30**	**6,80**	**7,35**	**7,85**	**8,40**
Thermal transmittance U_D	W/m^2K	0,87	0,71	0,53	0,43	0,35	0,30	0,24	0,21	0,19	0,16	0,15	0,14	0,13	0,12

INDICATIONS FOR USE

When using SUPERCEL® BUILDING panels it is worth taking into consideration the following:

The uniformity between the insulating panel and the plugs/fittings/support beams

- Accurately measure the existing distance between the plugs/fittings/support beams before cutting the panels, as these distances can vary.
- Ensure that the insulation panels are flush with each other and that there is a snug fit between the insulating panel and the beams/joints/studs.
- Fill all the gaps with a sealer.

The functions of the insulation panel

- Remember that the SUPERCEL® BUILDING insulating panel is not designed with the intention to provide a finished interior lining. For this reason it should be covered with an appropriate finishing panel (for example, plasterboard).

The cuts to be carried out

- Carry out the cut by using a toothed saw, or marking with a sharp knife the concerned section to then break the panel by applying pressure.
- Ensure an accurate cut so as to construct joints that are flush and which ensure continuity of insulation.

Daily working practices

- At the end of each working day, or whenever the work is interrupted for long periods of time, it is a good practice to protect the panels from moisture and possible bad weather.

Availability

- SUPERCEL® BUILDING is available through specialised distributors and retailers of building materials.

Packaging and storage

- Polyethylene packing of the SUPERCEL® BUILDING line, which is recyclable and biodegradable, must not be considered appropriate for external protection.
- Ideally, the panels must be stored inside a building. If, however, external storage cannot be avoided, the panels must not be in contact with the ground and must be covered with an opaque polyethylene sheet or a tarpaulin. The badly positioned panels, that have become wet, must not be used.

Health and safety

- The SUPERCEL® BUILDING product range is chemically inert and therefore safe to use/handle.
- It is possible to request a safety sheet with data concerning this product.

GENERAL RECOMMENDATIONS OF BUILD UP: LAYING AND SECURING SUPERCEL® BUILDING PANELS.

- **TREATMENT OF LAYING SURFACE.** Before laying **SUPERCEL® BUILDING** panels, it is advisable to remove from the surface sand, gravel and in general any roughness present from the laying surface that can compromise the adhesion or cause puncture of the waterproof coating and as a consequence the panel.
- **MANAGEMENT OF WATER VAPOUR.** Evaluate the thermo-hygrometric conditions of the environment below the cover and prepare the necessary layers for the management of water vapour. On insulated non-ventilated roofs, before laying **SUPERCEL® BUILDING** insulation panels, it is recommended to place a vapour barrier, combined with a layer of vapour diffusion membrane, in order to eliminate the risk of water absorption from the insulating material, which could lead to the deterioration of its thermal characteristics.
- **MANAGEMENT OF THERMAL BRIDGES.** In order to avoid thermal bridges, it is advisable to carefully align the panels, adopting all the precautions needed to avoid a potential detachment of the same during build up. In the case of pitched roof build up, the panels must be laid with staggered joints and on rows parallel to the eaves line. The use of panels with tongue and groove fastening systems is recommended, minimizing as much as possible the size of the joint, this compensates for the potential dilatation of the panels and the structure in general.
- **LAYING THE PANELS.** In roof applications, especially when insulating under membrane, it is important to properly fix the panel to the structure. **SUPERCEL® BUILDING** panels can be fixed following different methods described by the regulation standards *. Based on the application conditions and the type of cover adopted, the laying of insulation panels can be done in different ways. **Dry mortarless lining**, method applicable on roofs with a slope of less than 5% and with a heavy protection ballast or in the case of an inverted roof structure (with the insulating panel placed above the sealing element) and the presence of a heavy ballast. **Heat-bonding** with molten oxidized bitumen applied by sprinkler or **cold-bonding** with bituminous mastic, adhesives or polyurethane foams. By **torching**, reviving specific bituminous membranes. By **mechanical fixing**: in this case, for panels of a size of 600 x 1200 mm, there are usually 4 fixing points (at the corners, at a distance of at least 50 mm from the edge). For larger panels, the fixing points will be increased to a proportional extent and, in addition to the perimeter fixings, will also include central fixings. The type of fixing (dowels, screws, self-tapping screws, nails, etc.) varies according to the type of support*.
- **MECHANICAL FIXING.** If heavy protection is not applied, in environments with strong wind or on roofs with a slope of more than 30%, mechanical fixing of panels is mandatory. The minimum number of mechanical fixings will be defined during design and will vary according to climatic conditions and slope of the roof. As an indication, apply 5 fixings per 1200mm x 600mm panel (one in the centre and the others in the corners, at a distance of about 50 mm from the edges). The mechanical fixing is moreover **mandatory on unstable structures** subjected to cyclic movements (metal structures and tensile structures) and **in correspondence of the perimetric areas of the roof**, which are more exposed to wind depression and therefore subject to the risk of detachment of the cover.

* The adhesion between panel, vapour barrier and structure and, in general, an in-depth description of the laying of the insulating panels are contained and described in the UNI 11442 standard. Our Technical Office is available for any further information requested.

MEMBRANE POSITIONING, GENERAL APPLICATION SYSTEMS.

Membranes have the function of protecting against water infiltration and moisture penetration. The membranes in use are differentiated by their water vapour resistance/permeability and can be categorized as breathable or non-breathable. The breathable membranes have the function of slowing/regulating the vapour, adjusting its flow. The non-breathable membranes, which are also called "vapour barriers", completely exclude the passage of water vapour. The insulation panels are always in contact with the membranes, thus, in order to guarantee an efficient insulation package, it is very important that the adhesion between the two and the structure is carried out according to regulation standards, with the utmost precision and professionalism. There are different membrane types present on the market, which can be divided into two macro categories, these are: **bituminous** and **synthetic** membranes.

With the sole exception of laying by torching, the membranes can be placed on the **SUPERCEL® BUILDING** panels according to normal application methods.

- **DRY MORTARLESS APPLICATION.** The membrane is positioned on the surface, totally independent from the structure. It is a laying system applicable on roofs with a slope not exceeding 5%, because it requires a heavy ballast, which acts as protection layer (such as: gravel, cement tiles, cement casting, etc.).
- **COLD - BONDING APPLICATION.** The membrane is laid on the panel and fixed using polyurethane adhesives or monocomponent foams in canisters.
- **HEAT - BONDING APPLICATION.** The membrane is laid on the panel and fixed by means of of a sprinkler, with which molten oxidized bitumen is spread. The application must be uniform and the temperature of the bitumen must not exceed 150°C.
- **MECHANICAL - FIXING APPLICATION.** The membrane is laid on the panel and fixed with dowels or other fastening elements, it is always recommended when heavy protection is not contemplated/applicable, and in all those environments where there is presence of strong wind or on roofs with a slope of more than 30%. The type of fixing chosen varies depending on the support and the application. The minimum number of mechanical fixings is defined during design and varies due to climatic conditions and the slope of the roof*.
- **APPLICATION BY TORCHING.** It is carried out by reviving the bituminous membrane torching it with a propane gas torch. The laying by torching solutions are chosen according to the characteristics of the support and the slope of the roof. **This type of application is not compatible** with **SUPERCEL® BUILDING** panel coatings.

*For a detailed description of how to lay and fix the membranes, reference must be made to the UNI 11442 standard. We also advise to rely on specialised construction technicians.

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