GENERAL CATALOGUE

supercel®

RIGID PHENOLIC INSULATION

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01

01

RESINE ISOLANTI O. DIENA SRL

The company's history

Resine Isolanti was established in Milan in 1929 as a company specialised in civil insulation, namely in the production of cellular concrete and expanded clay bricks.

With the onset of the Second World War, the company focused its business in the naval and hospital sector with calcium silicate and fibreglass based products. At the end of the war, the company fully resumed its operations, which were especially aimed at serving the Country's reconstruction requirements. Research in the field of organic resins thus got underway for the purposes of developing expanded products to be used for civil and industrial applications. Chemical studies immediately showed the great potential of these materials. Expanded ureic was formulated (Aerocel Montecatini) together with the first prototypes in rigid expanded resin, materials which led the company to acquire Montecatini's production know-how and legally transform the company, which became larger and relocated its headquarters to Bresso in 1952. Expanded ureic resin, produced by extrusion, was immediately well received by the market and spurred on new research.

The highly advanced studies and in-depth analysis of the results achieved by running laboratory tests in rigid expanded resins enabled the company to make a great deal of progress and launch a production model focused on constant innovation: the company's objective was to constantly improve the performances of materials without ever losing sight of cost-effectiveness and environmental protection.

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Our products

SUPERCEL® is the result of years of endeavours in research with the aim of developing an insulation product for all-round thermal protection. It was immediately regarded as one of the best materials available on the market thanks to its ability to provide insulation to buildings with lower operating temperatures than the room temperature and to reach cryogenic temperatures.

SUPERCEL® is the solution to cold insulation problems in the industrial field. Due to its peculiar technical properties, the product has aroused much interest in several application sectors, such as the insulation of fixed and mobile refrigeration systems. The ongoing research investment then led to formulate different types of phenolic foams that are diversified according to the requirements. Aside from providing hot and cold insulation, the product also provides excellent thermal-acoustic insulation for civil purposes.

In the product formulation, the utmost attention was paid also with regard to health and safety related issues: the material obtained is not flammable and it does not emit dense or toxic fumes in the event of a fire. The result is in line with the increasingly tight safety regulations but not yet guaranteed by the majority of other products available on the market.

Thus, a good insulation must have the following properties:

- Low thermal conductivity
- Good fire reaction
- Water vapour permeability
- Long-term dimensional stability
- Elements to ensure personal health and safety (A+ class)
- No toxic fumes

The SUPERCEL® expanded product provides the best combination of these elements.

01

Supercel® in civil, commercial and industrial plant engineering

The high insulating power, due to the low thermal conductivity, the excellent fire resistance and the lack of emission of toxic fumes in the event of a fire make the SUPERCEL® insulation ideal to be used in civil, commercial and industrial plant engineering.

SUPERCEL® is produced in blocks and is cut with special machines capable of giving it the optimal shape and size: thermo-insulating shells, curved or spherical segments (to cover tanks or containers), slabs and all the necessary shapes to ensure excellent thermal insulation.

02

02

THERMAL INSULATION

Let's protect the environment

With the Kyoto protocol, industrialised Countries have committed to a 5% reduction in the emissions of CO_2 and the main harmful gases responsible for the green-house effect. For this same reason, thermal insulation has become increasingly important over the years. By exploiting insulation materials and technology to the full, it is possible to significantly reduce both energy consumption and polluting emissions.

One of the main concerns with environmental protection relates to the harmful effects of CFCs (chlorofluorocarbons) and HCFCs (hydrochlorofluorocarbons) on the ozone layer. The manufacturing process for the production of SUPERCEL® is completely free of CFCs and HCFCs. Our product is therefore compliant with health and safety standards and in line with the environmental agreements entered into by the European Community. In terms of resource consumption and waste production, the industrial sector represents one of the sectors of the economy with the highest impact. The choice of an insulation material cannot fail to take into account a correct analysis of the entire product life cycle.

SUPERCEL® contributes to limit CO_2 emissions because the energy required for its production and life cycle is extremely low. Many insulations available on the market promote their "environmentally friendly" aspect, but the ones that are able to boast an excellent ecobalance are still few and far between. Our company, which has long been mindful of environmental issues, produces materials that ensure excellent technical performances and an extremely low environmental impact. The advanced technology and production systems result in very high quality, drastically reducing the formation of industrial waste as well.

In line with environmental protection practices, we produce our materials by using only green electrical energy, generated by the photovoltaic plant with which the company is equipped. The National guidelines for energy certification are set out in Ministerial Decree 26/06/2009 published in the Official Journal on 10 July 2009 and in force since 25 July 2009.

Energy and cost savings

Energy costs for heating and refrigeration, aside from having a direct impact on the environment, also affect production and operation costs to a large extent and thus put a great deal of financial strain on the budget of companies and corporations.

Every business man's primary interest is to ensure that its own product is functional, efficient, in compliance with international regulations and, naturally, economically efficient. Proper insulation is a way forward because a well-insulated plant minimises energy consumption, limits waste and reduces the emissions produced. And there's more: proper insulation allows one to optimise resources and is the easiest and most forward-looking way to increase the efficiency and durability of industrial plants, bringing benefits of undeniable economic and environmental value.

HOW ARE SAVINGS ACHIEVED?

Limiting heat losses during transfer and storage phases drastically reduces energy consumption and in turn economic waste. In the production processes involving high or low temperatures inside pipes or tanks, proper insulation ensures temperature stability and significantly reduces maintenance work.

02

Supercel®

Resine Isolanti's constant commitment towards research and development activities and its compliance with the strictest quality standards has made it possible to increase the efficiency and operation of the plants that make use of SUPERCEL®.

Thanks to its characteristics, it is the best solution to meet the highest requirements.

MAIN TECHNICAL SPECIFICATIONS

- 300°C OPERATING RANGE:
  -180°C / +120°C
- THERMAL CONDUCTIVITY
  = 0,021 W/mK
- MOISTURE RESISTANCE
  > 95% percentage of closed cells
- FIRE REACTION
  Euroclass B - s1, d0
  Fire resistance
  Euroclass = B*
  Low smoke emission
  Euroclass = s1
  No drops
  Euroclass = d0
- ENVIRONMENTAL SUSTAINABILITY
  100% CFC - HCFC Free
- COMPRESSION RESISTANCE
  kPa=187

*(in descending order, classes A1 and A2 are reserved for mineral wools while classes B, C, D, E, F are reserved for synthetic products and vegetable fibres)

03

03

SUPERCEL®
Technical specifications

High and low temperature insulation
-180°C / +120°C (300°C operating range)

Thermal conductivity
λ = 0,021 W/mK (a 10°C)

Fire reaction
EUROCLASS B - s1, d0

fire resistance = B*
low smoke emission = s1
no drops = d0

Moisture resistance
> 95% percentage of closed cells

Environmental sustainability < CO_2
100% CFC - HCFC Free

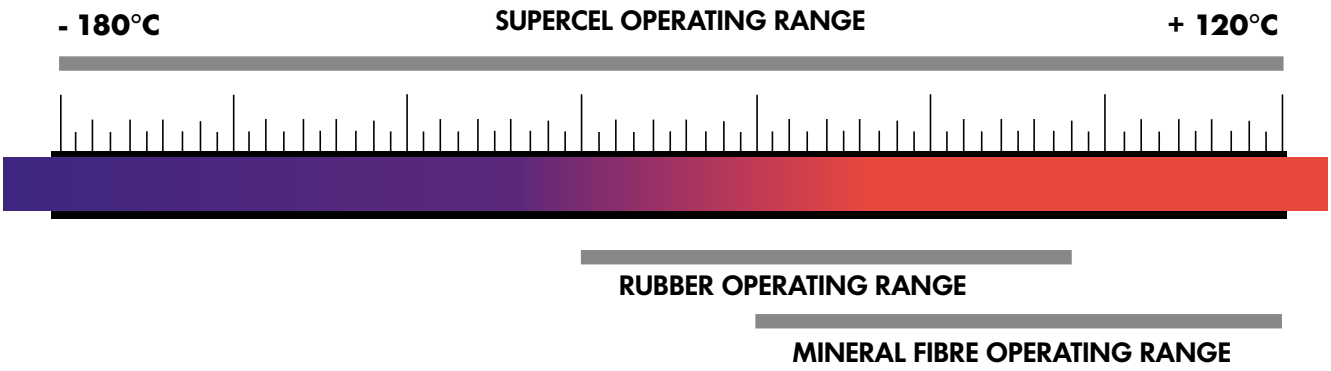
Compression resistance
kPa 187

High and low temperature insulation
300°C operating range
-180°C / +120°C

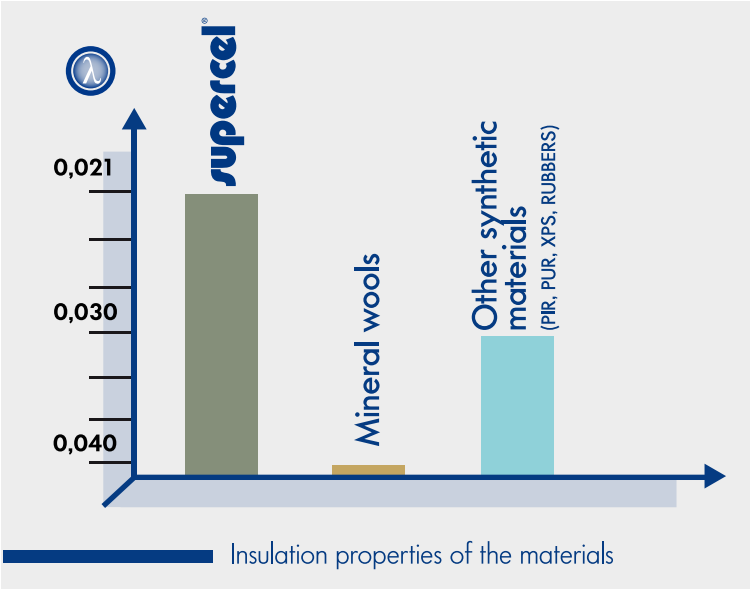
Thermal insulation

The technical properties and high and low temperature resistance make SUPERCEL® particularly suited to industrial applications.

SUPERCEL® was designed to insulate pipes and equipment operating at temperatures between -180°C and +120°C. In these 300°C of difference in temperature, the SUPERCEL® insulation has shown itself to be stable and highly performing both at very high and very low temperatures, thereby proving to be the best material for industrial and civil applications.

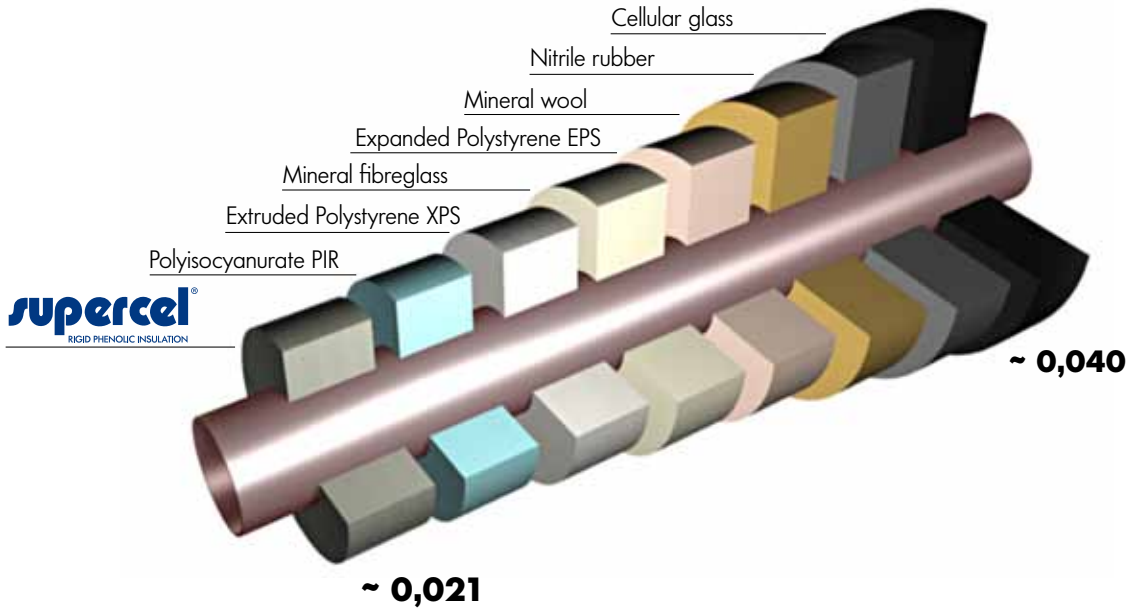


Thermal conductivity



The main purpose of thermal insulation is to prevent heat transfer. SUPERCEL®'s low thermal conductivity makes it ideal for this purpose.

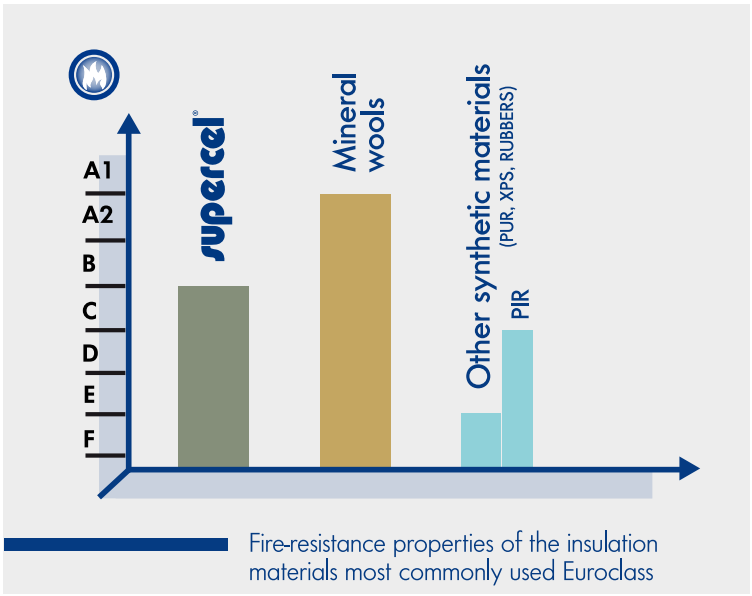
SUPERCEL® has a λ of 0.021 W/mK (at 10°C on average). Compared to the materials normally available on the market, SUPERCEL®, thanks to its extremely small, resistant and closed cells (> 95%), as well as ensuring excellent mechanical resistance, has the lowest thermal conductivity value (see graph). SUPERCEL®'s thermal efficiency is far superior to other types of materials available on the market, therefore it is possible to insulate by using considerably lower thicknesses. Covering plants with thinner materials means saving valuable space, providing better insulation in confined areas, handling smaller and lighter materials, and thus producing better results.



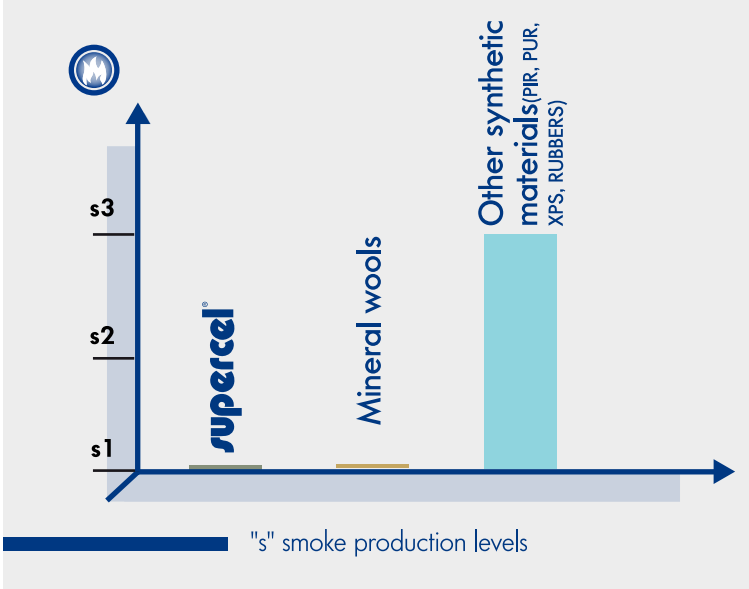
Fire resistance

A good insulation material must guarantee optimal safety standards in the event of a fire. This means that it must not increase the flames and must self-extinguish.

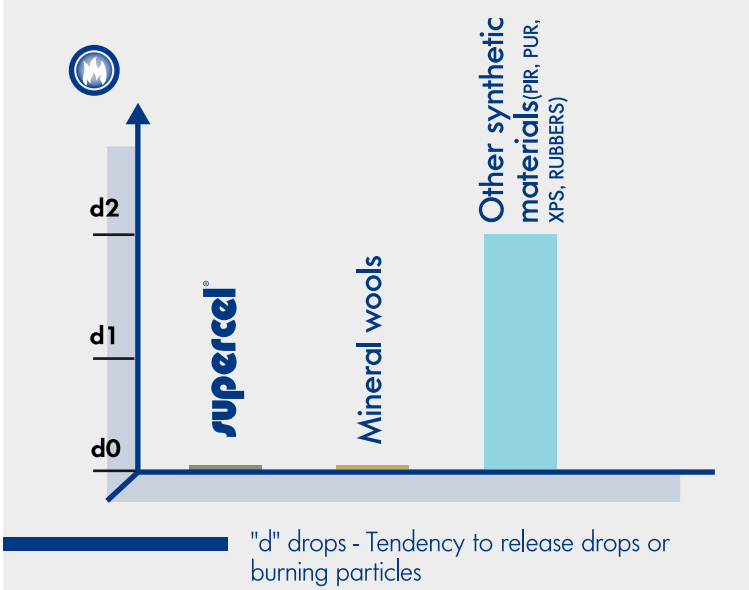
The "Euroclass" fire resistance class classifies each insulation material on the basis of its fire-resistant properties according to A1, A2 categories (attributed only to mineral wools), B, C, D, E and F (attributed to synthetic and vegetable fibre materials). It also classifies the levels of smoke production through the symbols s1, s2 s3 (s=smoke), as well as the tendency to release drops or burning particles, with the categories d0, d1, d2 (d=drops), which are developed during a fire. SUPERCEL® is tested in EUROCLASS as B - s1, d0.



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 letter B attributed by the "Euroclass" tests shows that SUPERCEL® has an excellent resistance when exposed to flames. SUPERCEL®'s B class certifies that, out of all synthetic materials, it is the one with the highest fire resistance (see comparative tab. on page 20). With the initials s1, SUPERCEL® proves to be (together with mineral wools) a material with extremely low smoke emissions (carbon dioxide, carbon monoxide and other gases), a feature that sets it apart from all other synthetic materials (xps, pir, pur, etc.) and vegetable fibres (see tab. on page 20). Finally, the initials d0 guarantee that SUPERCEL® stands out from other synthetic materials because it does not release drops or burning materials when exposed to fire.

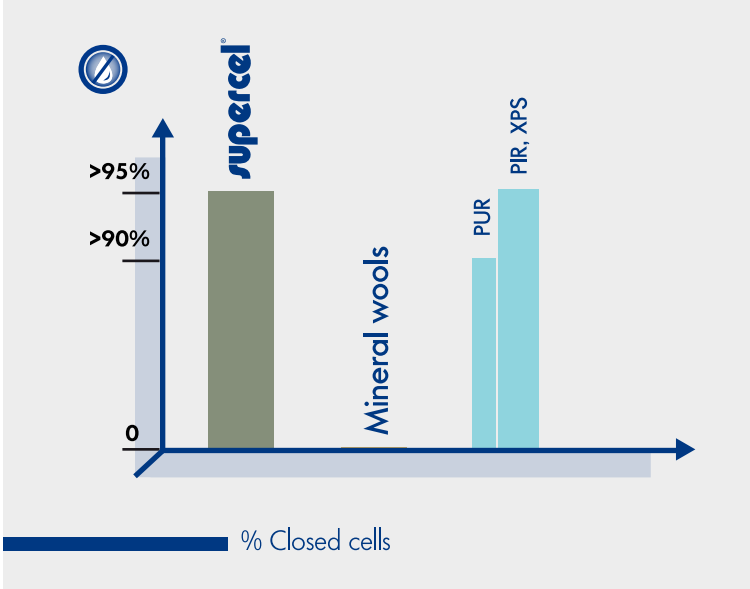
The SUPERCEL® insulation meets all the requirements set forth by international regulations by offering high safety and security standards.

Moisture resistance
> 95% percentage of closed cells

Water vapour permeability

Condensation may compromise the quality of insulation materials. SUPERCEL® was used successfully in applications where moisture resistance becomes an important factor. Its water vapour resistance is due to the morphology of extremely small, resistant and closed cells (> 95%).

SUPERCEL® can be covered externally with an aluminium sheet. This cover prevents the ingress of moisture, dust and dirt inside the insulation itself.



Compression resistance
kPa 187

Structural properties

In addition to its known insulation properties, SUPERCEL® provides other key features for the successful outcome and durability of insulation works, such as:

- Mechanical resistance
- High and low temperature dimensional stability
- Light weight
- Workability
- Compatibility with other materials

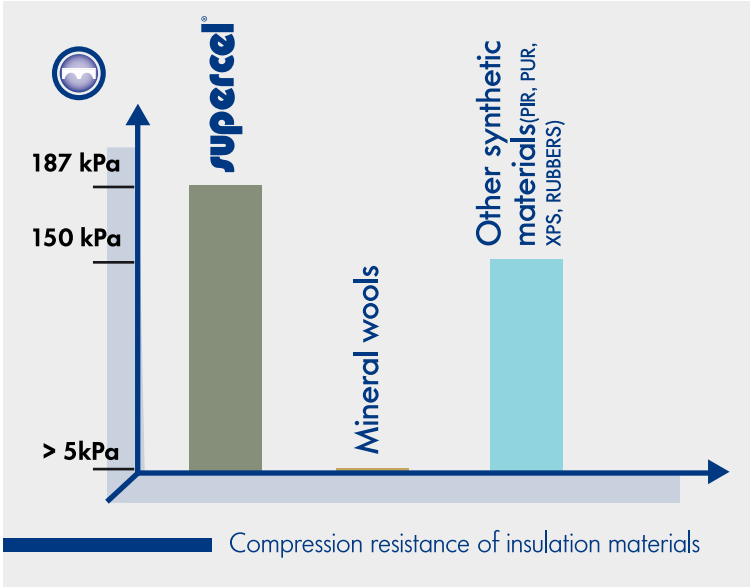
SUPERCEL® is an extremely light material: its low specific weight determines a high insulating power; it is robust (it has an excellent resistance to density ratio); it is easy to carry, store, handle and install. It is easy to assemble and also translates into significant cost savings since installation times are considerably reduced.

SUPERCEL®'s cellular structure consists of extremely small, compact and resistant cells to the point that its mechanical compression resistance has proven to be the best of all insulations. This enables the design of plants with very heavy loads.

SUPERCEL® can have different densities with relative mechanical resistances:

- 40 Kg/m^3 (compression of kPa 187);
- 60 Kg/m^3 (compression of kPa 293);
- 80 Kg/m^3 (compression of kPa 457);
- 120 Kg/m^3 (compression of kPa 820).

With high-density materials it is possible to develop layered concentric saddles for piping bracketing. This prevents the use of common mechanical fasteners, thus avoiding the creation of unnecessary heat bridges with consequent temperature dispersions.



Compression resistance of insulation materials

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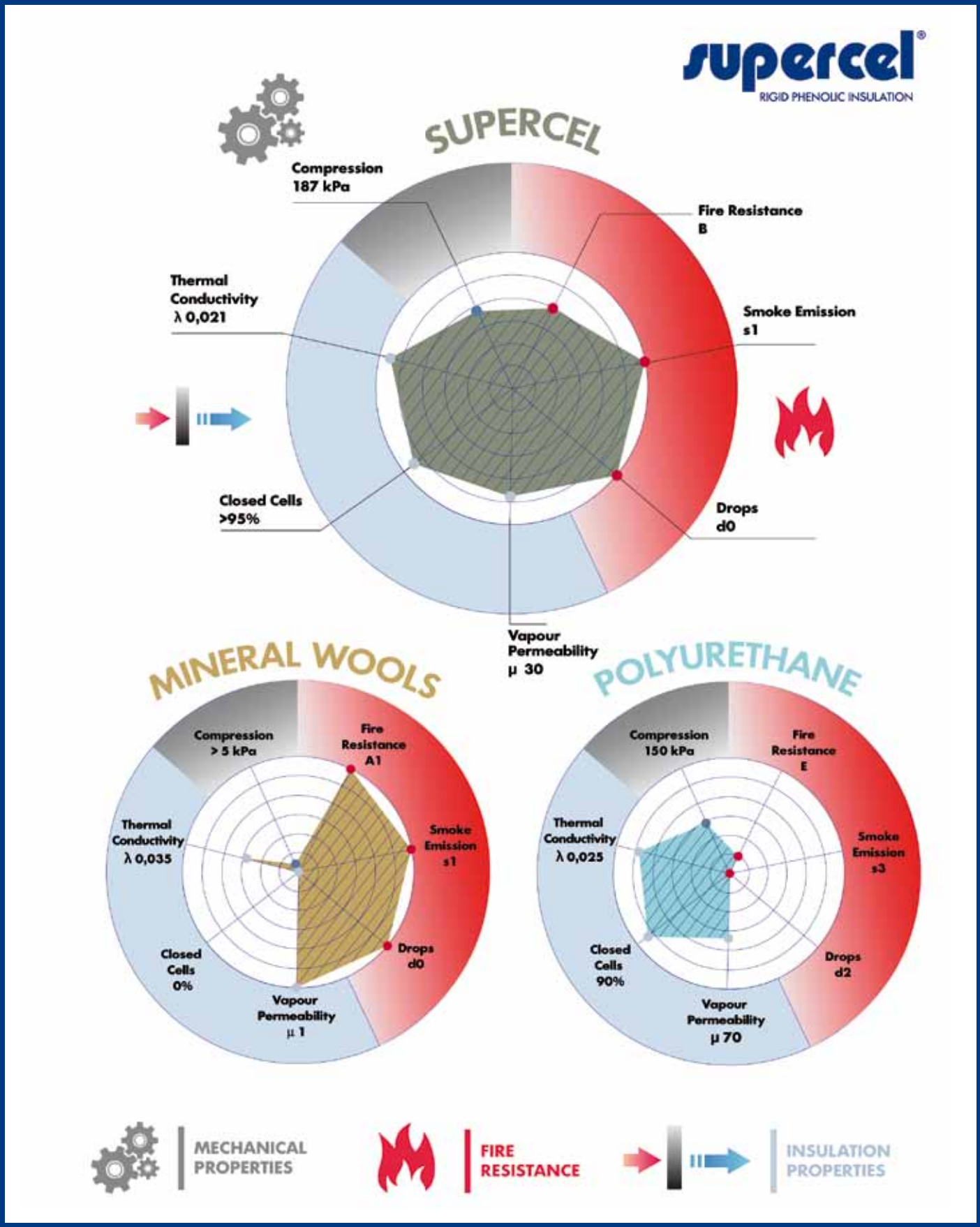
Technical specifications of the insulation materials

The table below shows the technical specifications of SUPERCEL® and of the most common insulation materials.

The table values were used in the graph on the following page in order to show the peculiarities of SUPERCEL® compared to mineral wools and polyurethane, for example.

COMPARATIVE TABLE

	SUPERCEL®	MINERAL WOOL	GLASS WOOL	POLYURETHANE (PUR)	XPS POLYSTYRENE EXTRUDED	PIR FOAM
Thermal conductivity λ	0,021	0,037	0,033	0,023/ 0,028	0,033/ 0,038	0,024
Fire resistance	B	A1	A1	E	E	C
Smoke emissions s	s1	s1	s1	(s3)	(s3)	(s3)
Drops d	d0	d0	d0	(d2)	(d2)	(d2)
Compression resistance	187 kPa	>5 kPa	>5 kPa	>150 kPa	da 200 a 300 kPa	150 kPa
% Closed cells	>95%	-	-	90%	>95%	>95%
Vapour permeability μ	30	1	1	70	150	33
Density	40 kg/m^3	40 kg/m^3	32 kg/m^3	40 kg/m^3	40 kg/m^3	45 kg/m^3

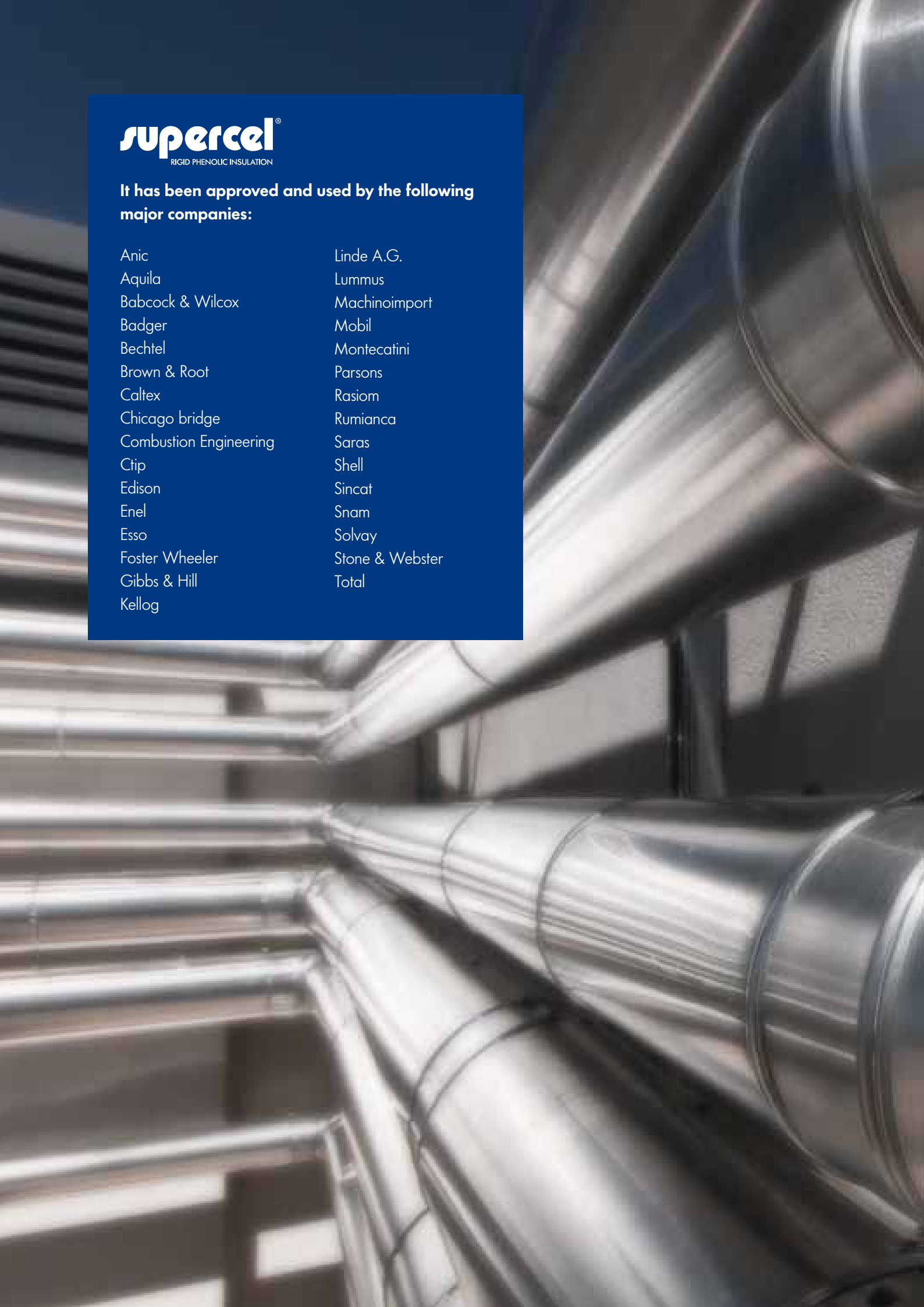


APPLICATION AREAS OF INSULATING MATERIALS

The above 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® possesses excellent insulating, mechanical and fire resistance properties.



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It has been approved and used by the following major companies:

Anic
Aquila
Babcock & Wilcox
Badger
Bechtel
Brown & Root
Caltex
Chicago bridge
Combustion Engineering
Ctip
Edison
Enel
Esso
Foster Wheeler
Gibbs & Hill
Kellog
Linde A.G.
Lummus
Machinoimport
Mobil
Montecatini
Parsons
Rasiom
Rumianca
Saras
Shell
Sincat
Snam
Solvay
Stone & Webster
Total

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