Promat

HIGH PERFORMANCE MICROPOROUS INSULATION

etex inspiring ways of living

Promat

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Promat

GET TO KNOW PROMAT MICROPOROUS

Manufacturer

Promat® is a brand of Etex, an international construction and industrial materials manufacturer. Promat materials are used for passive fire protection as well as for high performance insulation applications. Next to our wide range of calcium silicate and intumescent products Promat microporous is one of the core technologies of the brand.

Promat NV - Sint Niklaas, Belgium

Nippon Promat
Tsu, Mie, Japan

Promat Inc.
Maryville, Tennessee, USA

Facilities

Microporous products are manufactured at our sites in Belgium, Japan and the USA. All manufacturing facilities are certified to ISO 9001, ISO 14001 and ISO 45001. Workshop services and engineering, including full 3D transient thermal analysis based on our CAD-modeling are brought together in these sites.

Sustainability

Due to the production process of microporous materials, we have a low energy consumption and support already the sustainable approach of our brand. Additional to that Maryville, Tennessee, USA is the first zero-landfill microporous manufacturing facility.(1) Following this example we already started to work on more sustainable Promat facilities across the globe. We believe passionately in preserving our environment for future generations.

Safety

Safety and health are core values of our Brand. Promat® microporous complies with REACH. Additional it is free of respirable fibres classified by the world health organization.(2)

(1) Acc. to iSustain Recycling
(2) Defined in the European Dangerous Substances Directive Amendment 97/69/EC

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MICROPOROUS ENABLING A SUSTAINABLE FUTURE

Save space - save energy - increase capacity - be more sustainable

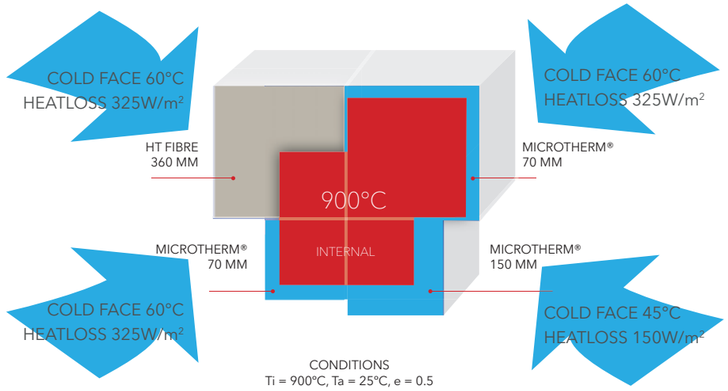
These are the most important advantages of Promat® microporous insulation.

- Reduce casing temperatures while maintaining an acceptable lining thickness
- Save space where space is limited
- Meet specified heat loss requirements (W/m^2)
- Reduce lining thickness to increase internal capacity

Promat is committed to providing the very best thermal insulation solutions.

Often, combinations of microporous materials with conventional insulation materials offer the best technical-economical solution. The unbeatable performance of Promat® microporous products can help in any application.

EXISTING INSULATION



SAVE SPACE!

INCREASE CAPACITY!

SAVE ENERGY AND REDUCE EMISSIONS!

Benefits at a glance:

- Lowest thermal conductivity in a wide range of temperature grades (1000 - 1200°C)
- Best thermal insulation for different temperature limits (up to 1200°C)
- Low shrinkage
- Thermal shock resistance at high temperature
- Non-combustible
- Hydrophobic versions available
- Resistant to most chemicals
- Environmentally friendly, free of organic binders
- No harmful respirable fibres
- Wide range of standard and custom made products, coverings, versions, … are available
- Clean & easy to install
- Simple to cut & shape
- Highest sustainbility levels for equipment installed with microporous

With the advantages of having an unbeatable combination of the most versatile product range backed by the best service and support package in the industry, Promat's high performance insulation is successful in a varied and extensive selection of markets all over the world:

Petrochemicals

- All categories of refining and petrochemical manufacturing plants
- Industrial process piping & equipment
- Offshore sub-sea "pipe-in-pipe" applications

Ferrous and non-ferrous metals

- Ladles, torpedo ladles and tundishes
- Aluminium launders
- Reduction cells
- Anode bake furnace

Glass

- Forehearths and feeder bowls
- Melting furnaces and recuperators

Energy

- Coal, oil, and gas fired conventional power stations
- Nuclear power generation
- Fuel cells (SOFCs, MCFCs) and reformers
- Concentrated solar power
- Energy storage

Furnaces

- Heat treatment furnaces
- Forging furnaces
- Holding/Melting furnaces
- Induction furnaces

Transportation

- Maritime, road, rail, and commercial aviation
- Thermal protection
- Exhaust systems
- Auxiliary power units
- Voyage Data Recorders (VDR) & black boxes
- Aerospace & defense

Chimney

- Fireplaces
- Stoves

Home appliances

- Storage heating
- Domestic ovens

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ENGINEERING SERVICES

Engineered solutions

All of our microporous products such as MICROTHERM® PANEL, PROMALIGHT®, FREEFLOW®, MICROTHERM® MPS, and many more, when integrated together with the full product range of Promat high performance thermal insulation, are the foundation of our “engineered solutions”, which are tailor made to customers’ specific needs.

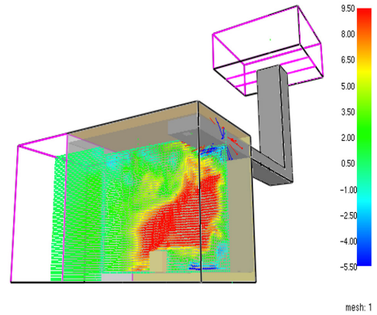
From analysis and 3D modeling to production and assembly

We offer professional, technically and commercially competent support and advice at every stage of your project, no matter how complex and challenging your project may be.

Simulations

Our simulations team supports the strategic development of systems and applications of our customers with numerical models. With these numerical models we can provide technical support to the customers towards specific development projects. Our main research areas are:

- Passive fire protection
- High temperature insulation
- Acoustics



Analysis
Problem analysis, IR thermal imaging (before & after), thermal calculations, …

Products
Product selection & design from Promat’s wide product range, including other technologies such as bio-soluble fibres, calcium silicate materials, refractory firebricks and cementitious sprays

Design
Design of customer focused solutions, product testing, installation support, IR verification, …

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WORKSHOP ACTIVITIES

We can provide prototypes or fully pre-installed solutions, and deliver **small batches** or set up **high-volume production** according to your specific requirements.

As part of Promat’s service commitment we have established several workshops that specialise in the conversion of our **high performance insulation** and **fire protection products** to achieve the full specifications and requirements of our customers. This unique service has allowed many of our clients to develop products, systems, and processes that may not have otherwise been realised. All our workshops are ISO certified, meeting or exceeding industry standards in quality.

Materials conversion

We can provide everything from a **simple cutting service** to a complete design service to meet the **specifications and requirements.**

Our **workshop activities** include CNC routing and cutting, water jet and laser cutting, coating, shrink-wrapping, heat sealing under vacuum, hand manipulation, and cutting and stamping of laminates.

Workshop services

Promat’s workshops have a wealth of engineering experience, providing guidance and support from concept and design, through to prototyping, build and installation. If you are dealing with a challenging temperature or fire protection problem, our workshops are able to machine or manipulate our full range of products to meet any specification and provide the required solution.

Our workshop teams can support manufacturers in developing new and innovative designs, applications and solutions to the most challenging of high temperature and fireproofing problems.

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MARKETS AND APPLICATIONS

Sustainable Energy

Transportation

Heavy Industry

Fire Rated Applications

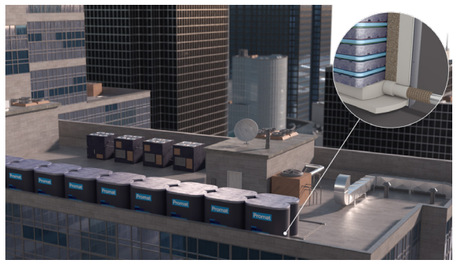
Home Appliances

Oil & Gas

Promat

MARKETS AND APPLICATIONS

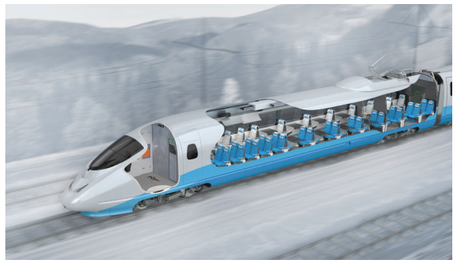
Sustainable Energy



For applications in renewable power generation, Promat's engineered solutions can tackle any thermal or fireproofing challenge. Our products are easy to install and enable us to provide customers with cost effective solutions that save time.

Specific advantages
- Applicable for Fire proofing and thermal challenges
- Easy to install and to handle
- Thin insulation, low impact on space

Transportation



In the transporation industry Promat's microporous is applicable in aerospace, railway, automotive and marine applications. The products improves the performance and the energy efficiency. At the same time it enhances passengers safety and acoustic comfort.

Specific advantages
- Very low impact on weight and space
- Use in extreme temperature conditions
- Aesthetic value
- Reduces carbon intensity
- Extremely robust

Applications - Sustainable energy
- Fuel cells (SOFCs, MCFCs)
- Batteries
- Concentrated solar power
- Energy storage systems

Applications - Marine
- Bulkheads, walls, and ceilings
- Hulls
- Fire doors
- Engine rooms
- Scrubbers
- Voyage data recorders
- Galleys

Applications - Aerospace
- Turbofan engines
- Nacelles
- Exhausts
- Hydraulics
- APUs
- Batteries
- Wings
- Radomes
- Galley ovens
- Guiding systems
- Electronics
- Weight sensitive applications
- Cockpit Voice Recorders (CVR) & Flight Data Recorders (FDR)

Applications - Rail
- Fire barriers
- Floors
- Structural and partition walls
- Doors
- Exhausts
- Event recorders
- Electronic cabinets
- Cable trays
- Roofs

Applications - Automotive
- Thermal runaway
- Battery fire protection
- Exhaust systems
- Refrigerated vehicles
- Heat shields

Heavy industry

Applications - Ferrous metal production
- Ladles
- Tundishes
- Blast furnaces
- Electric arc furnaces
- Annealing/heat treatment furnaces
- Coke oven batteries

Applications - Non-ferrous metal production
- Carbon bake furnaces
- Electrolytic reduction cells
- Tapping and transport ladles
- Melting and holding furnaces
- Induction furnaces
- Aluminum transfer, refining, and casting

Applications - Glass
- Forehearths
- Feeder bowls and covers
- Orifice rings
- Hot air recuperator furnaces
- Float glass manufacturing

Applications - Ceramics
- Tunnel kilns
- Periodic kilns
- Batch kilns
- Laboratory kilns

Applications - Industrial furnaces
- Induction furnaces
- Walking beam furnaces
- Top-hat kilns
- Annealing furnaces
- Tempering furnaces
- Conveyer ovens
- Batch furnaces
- Crackers and petrochemical furnaces
- Dryers
- Fire test furnaces
- Regenerative thermal oxidation systems

The high-performance microporous products from Promat **reduce heat loss** at each stage of the heavy industry production processes. These **ultra-thin and lightweight systems** are designed for both continuous high temperature operation and regular thermal cycling. Their **long service** life enables you to increase the number of production cycles and optimize **process efficiency**. We are continuously exploring new ways to make steel manufacturing **more sustainable** and provide steel workers with a **safer work environment**.

In glass and ceramics applications a high-performance insulation system from Promat allows for **more precise temperature control** at every stage of the production process. Not only do our systems **reduce energy loss**, they also make your processes more **efficient, cost effective and safe**. We are committed to saving energy in production processes and reducing heat loss by **optimizing the application design** while reducing the cost of our customers' production processes thanks to both significantly lower energy loss and carbon footprint.

Promat's insulation solutions **reduce energy** loss and maintain a **homogeneous temperature** inside the whole furnace during the heating cycle. Their excellent thermal and mechanical properties enable you to **increase efficiency** and **reduce temperatures at the cold face** of your furnace. The reduced weight and compact size of our materials require **thinner and fewer insulation layer**s, allowing for a more **compact design** and more **efficient use of space** inside your industrial complex.

We have a role to play in sustainability, specific in "heavy industry" or "Thermal Process Industries"

Construction market

Applications
- Flat roofs
- Terraces
- Floors

The construction market is rapidly evolving and the renovation of old houses becomes more and more important. With a 5 - 7 times better insulation than traditional insulations Promat® microporous contributes to more sustainable energy consumption of old houses.

Oil & Gas

Applications - Oil & Gas
- Coal, oil, and gas fired conventional power stations
- Nuclear power generation
- Petrochemical piping and equipment

Promat's solutions for on-shore, mid- and down-stream in oil and gas, petrochemical and chemical applications drastically enhance fire safety, is ideal to use when faced with limited space, and optimize process efficiency. Our solutions have a long service life, require low or even no maintenance and ensure a fast payback time. For some microporous products we can also offer hydrophobic grade. They are tested and certified to the most stringent international standards and are backed by full design support from concept to project realisation.

For applications in conventional and renewable, Promat's engineered solutions can tackle any thermal or fireproofing challenge. Our products are easy to install and enable us to provide customers with cost effective solutions that save time and provide design flexibility, while maintaining the highest level of thermal & passive fire protection.

Home Appliances

Applications
- Night storage heaters
- Domestic ovens
- Boilers
- Refrigerated transport

Fire Rated Applications

Applications
- Elevator doors

Promat offers the most complete microporous product range for thermal insulation and fire protection in the market. Our **extensive technical knowledge** and **expertise** enable us to develop customer-specific systems in a wide range of industries. All our products are **internationally certified** and **extensively tested** in-house and at internationally recognized facilities. As part of our services we can **offer extensive fire testing** and **thermal and acoustic simulations.**

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MICROPOROUS TECHNOLOGY

Definition of heat transmission & thermal conductivity

Microporous principles

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MICROPOROUS TECHNOLOGY

Definition of heat transmission & thermal conductivity

What is a thermal insulation? In the simplest terms it is “Any material that offers resistance to heat transmission”. So to understand insulation materials we need to understand the physics of heat transfer.

Heat transfer
Even the very best thermal insulation will not block heat completely. Every material will transfer some heat if a temperature gradient exists across its thickness. According to the known laws of thermodynamics, heat will always flow from a region of higher temperature to one of lower temperature. This is simple physics.

The effectiveness of a material as a thermal insulator can be expressed in terms of its thermal conductivity.

The energy transfer rate through a body is proportional to the temperature gradient across the body and its cross sectional area.

In the limit of infinitesimal thickness and temperature difference, the fundamental law of heat transfer is:

$$Q = \lambda A \frac{dT}{dx}$$

- Q is the heat transfer (W)
- A is the cross-sectional area (m2)
- dT/dx is the temperature/thickness gradient (K/m)
- λ is defined as the thermal conductivity value (W/mK)

Thermal conductivity λ
Not all materials transfer heat equally and the thermal conductivity (λ value) of a material is a physical property which describes its ability to transfer heat. The lower the thermal conductivity value, the more resistant a material is to the heat transmission. An insulator therefore has a low thermal conductivity, while a conductor has a high thermal conductivity.

Examples of the thermal conductivity of some common materials/substances at ambient temperatures

Copper - an excellent conductor	W/mK	401
Carbon steel	W/mK	54
Glass	W/mK	1.05
Air	W/mK	0.026
Microporous insulation - an excellent insulator	W/mK	0.021
Aluminium	W/mK	200

A good high temperature insulator has a very low thermal conductivity at high temperatures. Microporous insulation is the most efficient material available in that category. Its thermal conductivity stays extremely low over a wide temperature range… from 0.021 W/mK at ambient temperatures to just 0.038 W/mK at a mean temperature of 800°C.

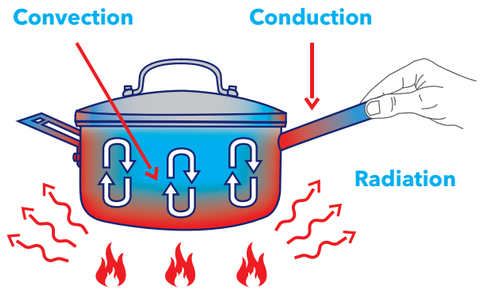
Furthermore, what makes microporous products really exceptional is the fact that they will also offer great performance right down to cryogenic temperatures. The thermal conductivity at a mean temperature of -170°C drops to an impressive 0.015 W/mK. It quite literally maintains its remarkable performance from the deep cold up to extreme temperatures of 1000°C and above.

Hence, knowledge of the λ value allows quantitative comparisons to be made between the thermal insulation efficiencies of different materials. The most effective thermal insulation will have very low thermal conductivity values. And since both thermal insulation & fire protection requirements are becoming more and more important, industries are constantly searching for materials with low λ values and thus high thermal performance.

Microporous principles

Heat transfer can occur through conduction (solid & gaseous), convection and radiation. Usually the overall heat transfer comes from a combined effect of all of them. The driving force in this process is the temperature difference.

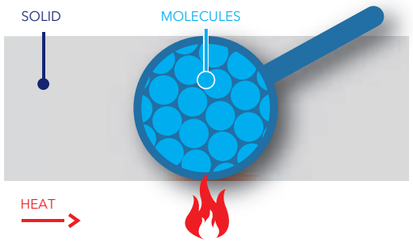
Limiting the physical processes of heat transfer and thereby containing the heat source is the essence of thermal insulation and there is no better technology to do this than our microporous technology. The reason why Promat's microporous products give the best performance comes down to simple physics.

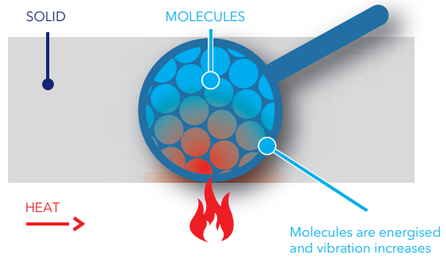


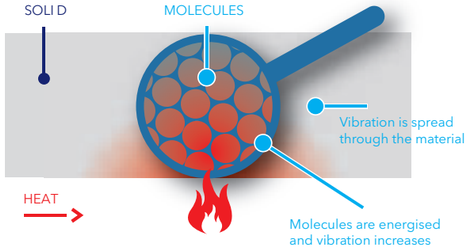
Solid conduction

In a solid, a liquid, or a gas, as individual molecules heat up they vibrate more and more.

In solid conduction, heat energy is transferred from one adjacent molecule to another by this vibration. The transfer rate is related to the material's density or mass. The higher the mass, the higher the conduction will be. It is also related to the length and cross section of the conduction path. The rate of solid conduction is directly proportional to the cross sectional area of the conduction path, and inversely proportional to the length of that conduction path.



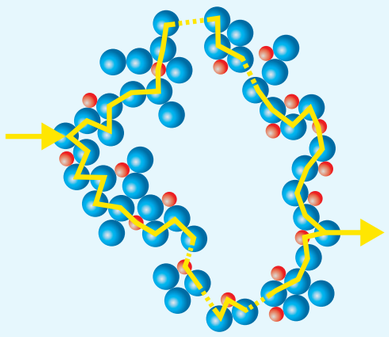




The base ingredient of most of our microporous products is pyrogenic silica (SiO2).

The particles making up microporous material have very restricted contact with one another, limiting thermal pathways (amount of heat conducted is directly proportional to the cross section of the conduction path).

The heat paths through the solid matrix are very tortuous, and therefore long. This decreases the rate at which heat can flow by solid conduction (amount of heat conducted is inversely proportional to the length of the conduction path).



Gaseous conduction

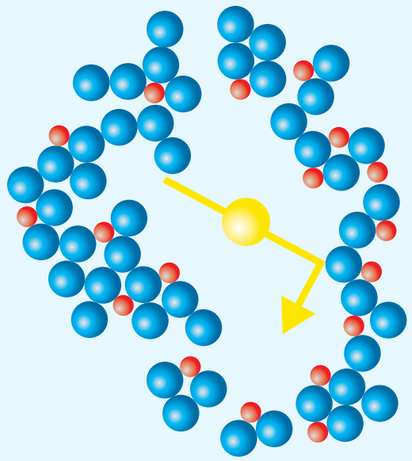
All materials whether solid, liquid, or a gas, have mass and a thermal conductivity and can therefore conduct heat. When gas molecules are heated, the heat energy is converted to kinetic energy and they start moving faster. Gaseous conduction occurs when adjacent gas molecules collide and transfer their kinetic energy.

The mean free path of a gas molecule is the average distance it will need to travel before it collides with another molecule. The mean free path of an air molecule at STP is around 93 nm (3.66 x 10-6 inches).

The thermal conductivity of microporous insulation is influenced by its density.

Gaseous conduction is restricted when the microporous chain is compressed to an optimum density that limits the freedom of molecular movement and collisions between the entrapped air molecules by ensuring that the voids in the material are smaller than the mean free path of those air molecules. This effectively blocks the ability of the gas to transfer heat energy.

Put simply, the higher the density, the more particles, the higher the thermal conductivity (solid conduction). Also, the lower the density, the larger the air pockets, the higher the thermal conductivity (gaseous conduction). By balancing the interaction between gaseous and solid conduction, an optimal thermal conductivity value for optimized performance can be found for each microporous product.



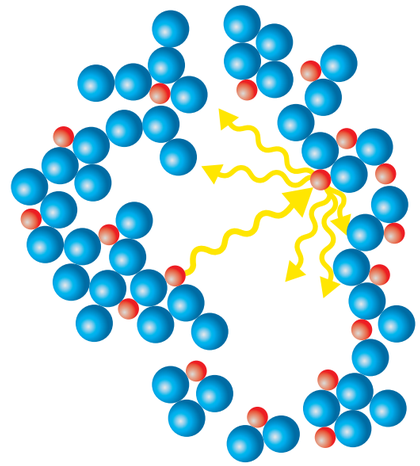
Radiation

All objects absorb and emit thermal radiation. Also called infrared radiation, the heat is transferred by the emission of electromagnetic waves.

No particles are involved, unlike in the processes of conduction and convection, so radiation can even work through the vacuum of space. This is why we can still feel the sun's heat, although it's 150 million km away from the earth. The hotter an object is, the more infrared radiation it emits.

The radiation rate is proportional to the fourth power of temperature, resulting in rapidly increasing heat loss when temperature rises. In fact, this is why radiation is the primary heat loss process at temperatures above 100°C.

Some surfaces are better than others at reflecting and absorbing infrared radiation.



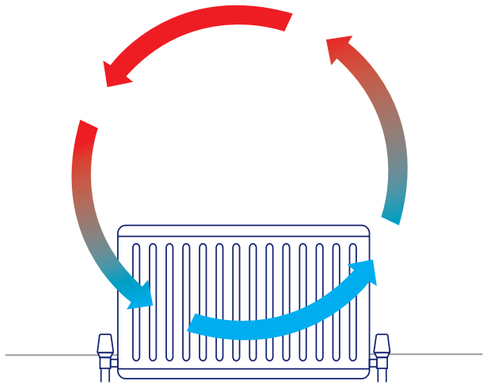
Convection

Convection is heat transfer by bulk movement within a heated fluid such as a liquid or a gas.

Free convection is caused by expansion of gas or fluid when heated, causing hot regions to become less dense and buoyant and to rise. Circulation occurs as the hot fluid cools and sinks down again. Free convection systems can be very large and convey massive amounts of heat, for instance in weather systems and the circulation of molten rock inside the earth.

The gas or liquid particles may be energized when passing by a warmer solid mass. A classic convection heater is a perfect example (hot air rises, and as it cools down, it falls).

Convection currents are avoided by the inability of the air molecules to flow inside the microporous structure. Since a microporous material consists mostly out of entrapped air (> 95%), it cannot act as an intermediary solid material to allow convection of the surrounding air.



ASTM INTERNATIONAL

A microporous insulation is defined in ASTM C168 as a “Material in the form of compacted powder or fibres with an average interconnecting pore size comparable to or below the mean free path of air molecules at standard atmospheric temperature and pressure. Microporous insulation may contain opacifiers to reduce the amount of radiant heat transmitted.”

EN ISO 9229:2007 describes microporous insulation in exactly the same terms.

QUALITY ASSURANCE MANAGEMENT ISO 9229 2007

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MATERIAL PROPERTIES & CHARACTERISTICS

Promat

MATERIAL PROPERTIES & CHARACTERISTICS

Thermal conductivity

All published data are based on conventional Guarded Hot Plate measurements complying with ISO 8302 and ASTM C177 standards. This technique produces precise data over a wide temperature range up to a mean temperature value of 800°C.

Normal atmosphere
Microporous products are known worldwide for their very low thermal conductivity (λ) values across a wide temperature range. As exposure temperature increases, the difference in λ value between microporous and conventional insulation materials increases dramatically due to the inability of most insulations to block IR radiation. The consistently low thermal conductivity over all exposure temperatures explains why the use of microporous materials is more easily justifi ed at higher temperatures.

In various gases and reduced atmosphere
The thermal conductivity of insulation materials is very much affected by the gas within the pores of the insulation. Normally this gas is air, but often there are requirements for these materials to be used in the presence of other gases such as nitrogen, hydrogen, helium, argon and krypton.

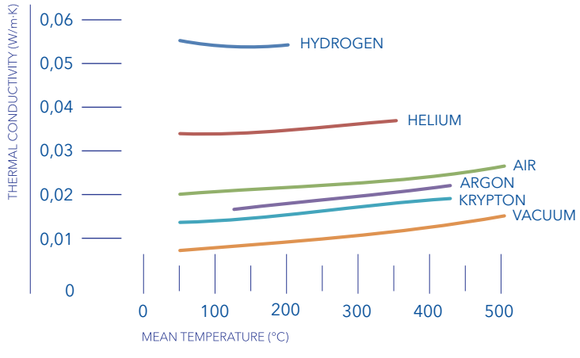
The manner in which a particular gas affects the thermal conductivity of a microporous product is governed not only by the thermal conductivity of the gas, but also by the mean free path of the gas (the average distance a molecule travels between collisions) and its interaction with the pores/cells of the insulation.

In general, the λ value of pure gases is higher than the λ value of microporous material in the presence of the gas. Inside the microporous insulation, various gases can have different effects:

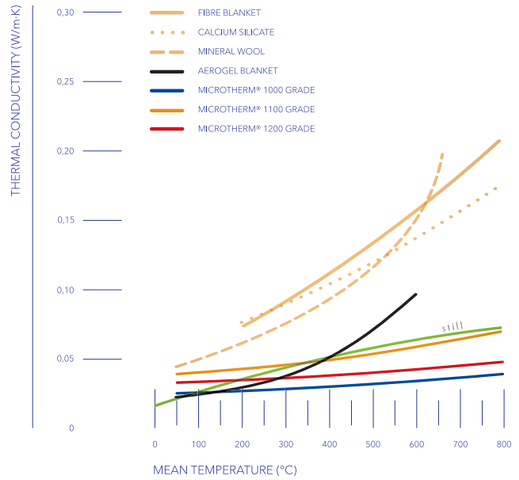
- The larger, slower particles such as krypton and argon collide less with one another and this results in a lower thermal conductivity.
- The smaller, faster particles such as helium and hydrogen will collide more with each other than with the wall of the cell and therefore contribute to a more rapid heat transfer.

Even though all insulation materials are affected by gases such as hydrogen, microporous material performs quite well in comparison with conventional materials. As mentioned earlier, the overall thermal conductivity of microporous products, is made up of contributions from the principal mechanisms of heat transfer by solid/gas conductions and radiation. The conduction mechanism under reduced atmosphere is governed by the type and amount of gas inside the structure. At reduced pressure levels, thermal conductivity depends more on solid conduction and radiation and less on gas conduction, thus lower values of thermal conductivity are achieved. A gradual increase in the pressure will induce more gaseous conduction which results in an increased conductivity.

Thermal conductivity of Promat®
Insulation in a range of gases



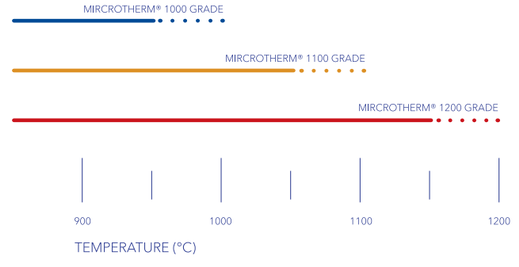
Thermal conductivity of Promat®
Insulation to conventional insulating materials



Classification temperatures

By varying the proportions and the specification of the constituent materials in PROMAT® microporous we are able to vary key performance characteristics to meet the demands of a wide range of challenging applications. Requirements such as temperature capability, water resistance, and compression resistance can all be modified when necessary. Match these variations with the choice of rigid, flexible, and powder products in the versatile Promat high performance microporous range and we can offer the optimum product solution for each application.

The upper temperature limits of microporous product grades are specifi ed by reference to acceptable limits of shrinkage after this testing.

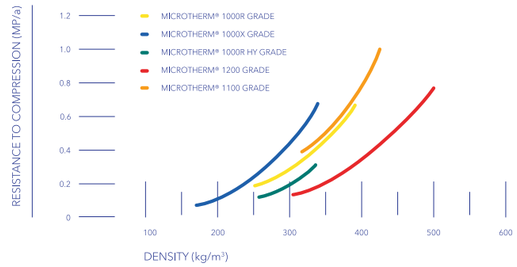


Classification temperature is based on <2% linear shrinkage at full soak for 24 hrs in accordance with ASTM C356.

Compressive strength

The compressive strength of our products depends on the material grade and the density.

Our products are often successfully used in applications where high pressures occur, for example back-up insulation in steel ladles. Typical values for a specific product are indicated on the technical datasheet.

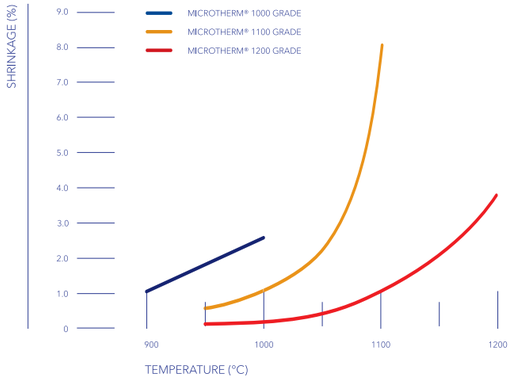


Shrinkage

As with all insulation materials, a small amount of irreversible lateral shrinkage will occur during exposure above the maximum rated temperature limit. As the temperature increases, the particles of silica begin to sinter and fuse together, changing the nature of the structure and increasing the solid conduction component of heat transfer. With our microporous insulation this shrinkage is extremely slight and rarely has any infl uence on the effective performance.

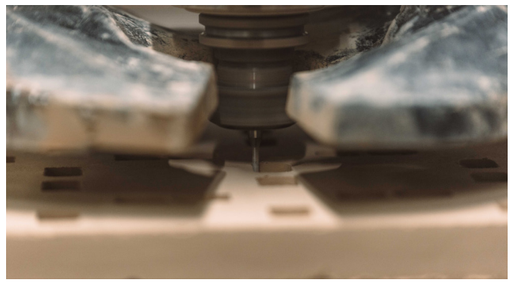
Microporous products can be used at their maximum continuous use temperature, and this for a very long time! Because of the inorganic character of the material the thermal shrinkage is minimal, and the lifetime maximal.

Etex's Innovation and Technology Centre (ITC) measures shrinkage according to ASTM C356, BS-EN 1094-6, ISO 2477, and dedicated "in-house" techniques. These methods of "full soak" exposure keep the material completely immersed in heat for a period of 24 hours, after which the dimensional changes are measured.



Machinability

The formulation and properties of our PROMALIGHT® boards offer a remarkable machinability, enabling easy cutting & shaping on-site and the in-house manufacture of complex custom made machined parts.



Non-Combustibility

Our microporous insulation meets the requirements of EN 13501-1 for non-combustibility.

With the combination of ultra low thermal conductivity and total non-combustibility, our microporous insulation products create excellent fire barriers to protect steel, aluminium, or composite (GRP) structures. The minimal thickness & weight make it the ideal passive fire protection (PFP) product for marine and railway applications.

IMO mca warringtonfire

Microporous products are also being used in building and & industrial fire protection applications

Moisture & humidity - resistance to liquids

Thermal and mechanical properties of PROMAT® microporous insulation are not significantly affected by severe changes in humidity. Steam & vapour pass through the structure of microporous insulation without causing damage. MICROTHERM® normally has a moisture content of 1 – 3% by weight. The presence of a small amount of absorbed water does not affect the performance of the material.

During installation (for example with a wet castable), or when condensation occurs in use (below dew point temperature), contact with water or other liquids may be anticipated. In that case we recommend using our Hydrophobic (HY) grade or a suitable waterproof protective outer covering like PE or aluminium.

MICROTHERM® Hydrophobic (HY) is not simply an external coating treatment. The material is based on silica particles which have been specially treated to render them, and hence the full thickness of insulation, water repellent. This means that even cutting and shaping the insulation will not affect the hydrophobic nature.

Whenever the presence of water is anticipated in an installation, a prior discussion with our specialists will ensure that the performance of the MICROTHERM® product is always optimized.

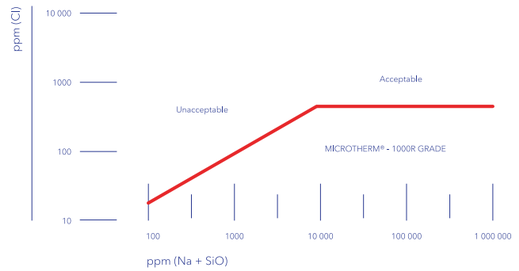
Also available in HYDROPHOBIC

Chemical properties

The leachable chloride content of our products is very low. On the other hand the leachable silicate content is much higher. This brings both values within an acceptable range. Typical pH values remain below 10.

All values are measured in accordance with ASTM C871.

Acceptability of insulation material on the basis of plot points of the CL and the (Na+SiO3) analysis



Chemical resistance

Microporous insulation is composed of inert ingredients that are not reactive to most chemicals. Contact with most liquids must be avoided. Liquid chemicals may damage the physical structure in the same way that water damages it.

Resistance to vibration

The vibration resistance of microporous materials depends mainly on installation technique. As long as the product is effectively contained it will not be damaged by vibration. We advise to apply the insulation in such a manner that any movement relative to the vibrating surface is prevented. If installed correctly the material will vibrate with the exact same frequency as the enclosing assembly preventing the risk of damage by vibration.

For specific, higher risk applications such as exhausts we have suitable materials such as MICROTHERM® OVERSTITCHED or QUILTED Panels that are ideal for this type of vibration exposure.

Acoustical properties

Microporous insulation has a highly porous interconnected cellular structure, but the cells are extremely small. The resistance to air flow through the structure, therefore, is very high and consequently MICROTHERM® thermal insulation is not a particularly good sound absorber.

This means that the acoustical properties of microporous materials are limited. However, the Promat group offers high quality acoustic insulation such PROMASOUND® TL & PROMADAMP® CL SK, which are often used in combination with MICROTHERM® products. MICROTHERM® sound absorption coefficient is tested in accordance to ISO 345:1985 and ASTM C423-08a methods and the results are available on request.

Covering materials

Promat uses a variety of covering materials for its different product lines, depending on exposure temperature, handling, and conditions of use. For rigid boards (PROMALIGHT®) this can either be PE foil, aluminium, or others … and there is a mica reinforcement option available. For the panel product range (= products which are actually pressed into the covering material, such as MICROTHERM® PANEL, MICROTHERM® OVERSTITCHED, …) we use materials such as non-woven polyester or in most cases E-glass cloth. These cloth coverings ensure a clean, dust free, and easy to install end product.

Recent investments into an automated aluminium gluing line for PROMALIGHT® products has resulted in a more sustainable and better performing product, with improved thermo-stability and reduces use of plastic and glue but better adhesion.

At exposures temperatures above 600°C the E-glass cloth will become brittle and will start to deteriorate. Since Promat® products are usually installed in a system between other materials such as metals or refractories, the deterioration of the E-glass cloth is not an important issue. The insulation performance is not altered in any way. In fact, in those cases, the covering actually acts for installation purpose only.

For some applications, full integrity of the covering material is required. PROMAT® microporous offers various solutions to meet these requirements:

- Alternative coverings with higher temperature resistance such as quartz cloth may be used. These are capable of withstanding direct flame impingement.
- For the most mechanically challenging applications MICROTHERM® products can be supplied fully encapsulated in stainless steel.
- Almost any other appropriate materials can be used as covering.

Promat

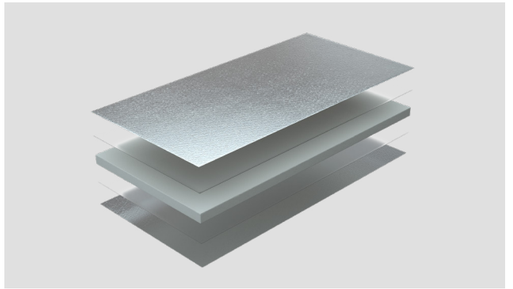
PRODUCT PORTFOLIO

Overview by key properties

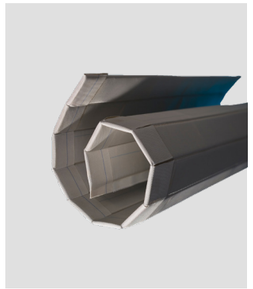
Promat

PRODUCT PORTFOLIO

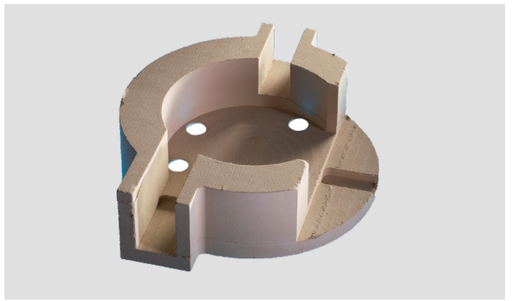
Rigid panels



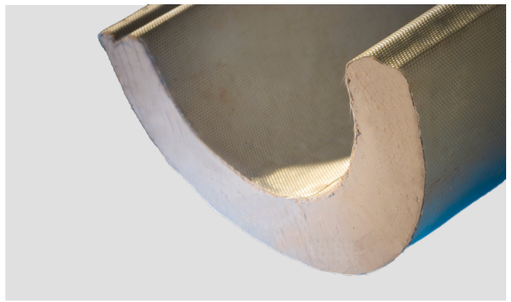
Flexible panels



Board products



Mouldable products



Pourable products

- PROMALIGHT is board type insulation pressed from automated machine
- MT PANEL is rigid panel in e-glass envelope
- MT QUILTED/OVERSTITCHED is a flexible panel ideal for 2D & 3D application
- SLIM&LIGHT for elevator door
- PROMAGUARD for marine
- AEROGUARD for aerospace
- STEELFLEX for steel industry
- MPS for pipe insulation
- FREEFLOW for difficult shapes where standard materials could not apply
- FLOPPY for pipe in pipe insulation
- ULTIMA VIP for cold & building insulation

	CLASSIFICATION TEMPERATURE (°C)	THERMAL CONDUCTIVITY AT 200°C (W/mK)	THERMAL CONDUCTIVITY AT 600°C MEAN (W/mK)	NOMINAL DENSITY (kg/m³)
RIGID PANELS				
MICROTHERM® PANEL-1000R	1000		0.031	240
MICROTHERM® PANEL-1000R HY	1000		0.031	260
MICROTHERM® PANEL-1200	1200		0.044	400
MICROTHERM® SLIM&LIGHT	1000		0.031	260
FLEXIBLE PANELS				
STEELFLEX®-1000	1000		0.029	320
STEELFLEX®-1100	1100		0.049	430
STEELFLEX®-1200	1200		0.039	450
MICROTHERM® SEMI-OVERSTITCHED-1000R	1000		0.038	220
MICROTHERM® SEMI-OVERSTITCHED-1000R HY	1000		0.038	260
MICROTHERM® SEMI-OVERSTITCHED-1200	1200		0.049	350
MICROTHERM® SEMI-QUILTED-1000R	1000		0.039	220
MICROTHERM® SEMI-QUILTED-1000R HY	1000		0.039	260
MICROTHERM® SEMI-QUILTED-1200	1200		0.050	350
MICROTHERM® SLATTED-1000R	1000		0.035	240
MICROTHERM® SLATTED-1000R HY	1000		0.035	260
MICROTHERM® FLOPPY	1000		0.031	250
MICROTHERM® OVERSTITCHED-1000R	1000		0.038	220
MICROTHERM® OVERSTITCHED-1000R HR	1000		0.038	260
MICROTHERM® OVERSTITCHED-1200	1200		0.049	350
MICROTHERM® QUILTED-1000R	1000		0.039	220
MICROTHERM® QUILTED-1000R HY	1000		0.039	260
MICROTHERM® QUILTED-1200	1200		0.050	340
SLIMFLEX®	1000		0.039	260
PROMAGUARD®	1000		0.038	240
AEROGUARD®-128	1000		0.066	128
AEROGUARD®-160	1000		0.051	160
AEROGUARD®-190	1000		0.047	190
AEROGUARD®-220	1000		0.039	220
BOARD PRODUCTS				
PROMALIGHT®-1000X	1000		0.030	280
PROMALIGHT®-1000R	1000		0.029	320
PROMALIGHT®-1200	1200		0.039	450
PROMALIGHT®-1000X M	1000		0.030	280
PROMALIGHT®-1000R M	1000		0.029	320
PROMALIGHT®-1200 M	1200		0.039	450
POURABLE PRODUCTS				
FREEFLOW®	1000		0.049	220
MOULDABLE PRODUCTS				
MICROTHERM® MPS (Moulded Pipe Section)	1000		0.029	320

	SHRINKAGE AT 1000°C 24H FULL SOAK (%)	COMPRESSIVE STRENGTH (Mpa = N/mm²)
RIGID PANELS		
MICROTHERM® PANEL-1000R	< 3	0.132
MICROTHERM® PANEL-1000R HY	< 3	0.12
MICROTHERM® PANEL-1200	< 0.1	0.36
MICROTHERM® SLIM&LIGHT	< 0.6	17
ULTIMA® VIP		
FLEXIBLE PANELS		
STEELFLEX®-1000	< 3	0.32
STEELFLEX®-1100	< 1.1	0.2
STEELFLEX®-1200	<0.1	0.54
MICROTHERM® SEMI-OVERSTITCHED-1000R	< 0.3	10
MICROTHERM® SEMI-OVERSTITCHED-1000R HY	< 3	0.12
MICROTHERM® SEMI-OVERSTITCHED-1200	< 0.1	0.22
MICROTHERM® SEMI-QUILTED-1000R	< 3	0.10
MICROTHERM® SEMI-QUILTED-1000R HY	< 3	0.12
MICROTHERM® SEMI-QUILTED-1200	< 0.1	0.22
MICROTHERM® SLATTED-1000R	< 3	0.13
MICROTHERM® SLATTED-1000R HY	< 3	0.12
MICROTHERM® FLOPPY	< 6	0.11
MICROTHERM® OVERSTITCHED-1000R	< 3	0.10
MICROTHERM® OVERSTITCHED-1000R HR	< 3	0.12
MICROTHERM® OVERSTITCHED-1200	< 0.1	0.22
MICROTHERM® QUILTED-1000R	< 3	0.10
MICROTHERM® QUILTED-1000R HY	< 3	0.12
MICROTHERM® QUILTED-1200	< 0.1	0.22
SLIMFLEX®	< 3	0.17
PROMAGUARD®	< 6	0.12
AEROGUARD®-128	< 3	0.04
AEROGUARD®-160	< 3	0.05
AEROGUARD®-190	< 3	0.07
AEROGUARD®-220	< 3	0.10
BOARD PRODUCTS		
PROMALIGHT®-1000X	< 3	0.32
PROMALIGHT®-1000R	< 3	0.32
PROMALIGHT®-1200	< 0.1	0.54
PROMALIGHT®-1000X M	< 3	0.44
PROMALIGHT®-1000R M	< 3	0.44
PROMALIGHT®-1200 M	< 0.1	0.74
POURABLE PRODUCTS		
FREEFLOW®	< 3	-
MOULDABLE PRODUCTS		
MICROTHERM® MPS (Moulded Pipe Section)	< 3	0.32

Promat

WE'RE LOOKING FORWARD TO ADVISING YOU ON YOUR PROJECT

Contact your Promat specialist today!

industry@promat.com
www.promat.com

Sustainable high-performance solutions

Promat is the leading reference in passive fire protection and high-temperature and sound insulation. For over 60 years we have been perfecting our products and systems, developing reliable, thin and lightweight solutions to fit your commercial and technical requirements. We specialise in high-performance solutions based on our comprehensive range of proven and certified calcium silicate and microporous boards and panels, intumescent fire stopping seals, cementitious fireproofing sprays, high-temperature wools and textiles, gypsum boards and sound insulation materials. Promat is proactively reducing its manufacturing footprint on the environment and meeting evolving customer needs by conducting life cycle assessments and attaining Environmental Product Declarations on a range of products, including our microporous range.

As an associate member of the European Battery Recycling Association, we are committed to making the battery lifecycle safer, circular and profitable. Promat is also a member of the Vacuum Insulated Panel Association, which drives acceptance of this high performing technology in a range of industries and applications. All our materials have an extended service life and require low or even zero maintenance. We are developing new products based on recycled and repurposed high-performance insulation and fire protection materials. At our manufacturing plants and workshops, we are continuously looking for ways to optimise our production processes, to reduce our energy water consumption, and to cut down waste and recycle where possible.

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