



Basotect®

Melamine resin foam



 **BASF**
The Chemical Company



BASOTECT®			
	The unique property profile of Basotect®	4	04 – 05
	Global availability – with customers in almost all corners of the world	5	
BASOTECT AND ITS EXTENSIVE RANGE OF APPLICATION POSSIBILITIES			
	... in construction and industrial applications	6	06 – 15
	... in automotive construction	10	
	... in transportation	12	
	... in consumer applications	14	
BASOTECT RANGE – AN OVERVIEW			
	Basotect range	16	16
OTHER PROPERTIES OF BASOTECT			
	Fire resistance characteristics	17	17
	Sound absorption		
	Resistance to chemicals		
	Eco-friendliness		
PROCESSING OF BASOTECT			
	Machining	18	18 – 19
	Coating, bonding		
	Hydrophobing, oleophobing		
	Impregnating		
	Thermoforming	19	
	Processing notes		

Basotect®

Basotect® is a flexible, open-cell foam made from melamine resin, a thermoset polymer. Basotect's characteristic feature is its three-dimensional

network structure consisting of slender and thus easily shaped filaments.



The unique property profile of Basotect® ...

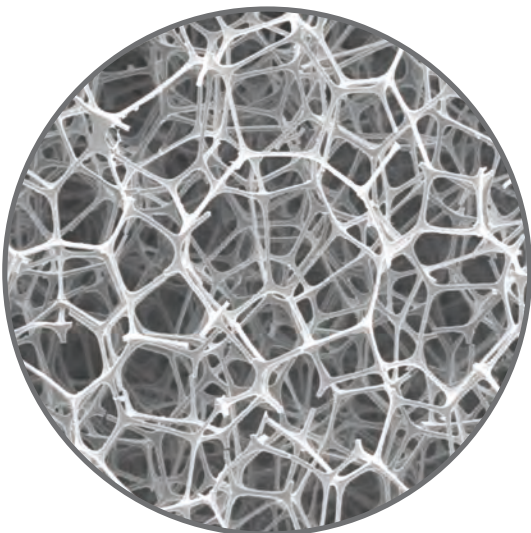
... resulting from the basic melamine resin:

- Flame resistance (without the addition of flame retardants)
- Application temperature up to 240 °C
- Abrasiveness
- Constant physical properties over a wide temperature range

... resulting from the open-cell foam structure:

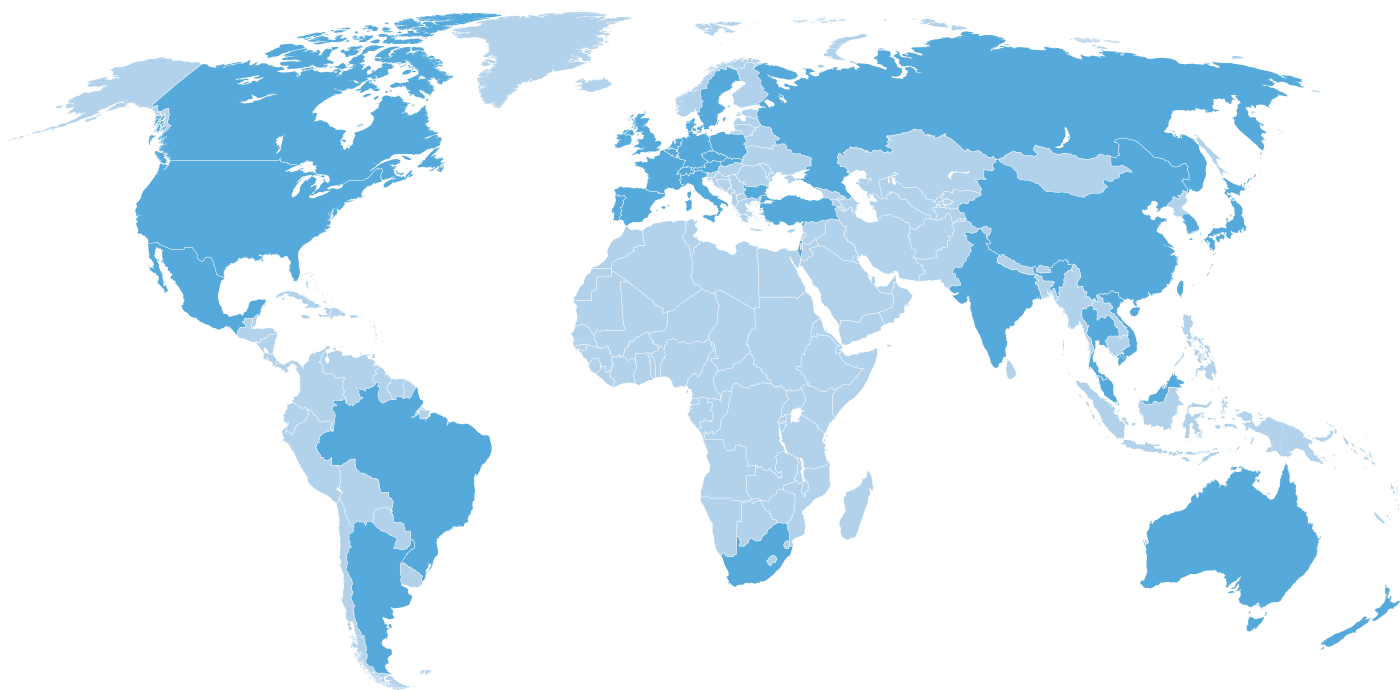
- Low weight
- Good thermal insulation properties
- High sound absorption capacity
- Low-temperature flexibility

These properties give rise to an extensive range of application possibilities.



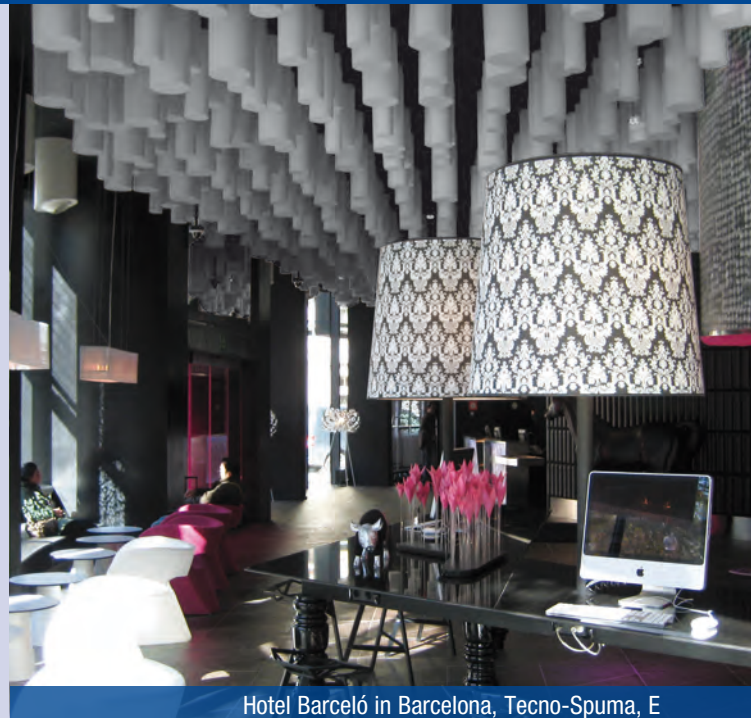


Global availability – with customers in almost all corners of the world



Basotect® in construction and industrial applications ...

Basotect®'s high sound absorption capacity and safe fire characteristics make Basotect G, G+ and UF ideal for use as sound insulation in buildings. Decoratively designed acoustic panels, suspended baffles and metal ceiling panels backed with Basotect significantly and measurably improve the acoustics. At the same time, Basotect paneling opens up interesting design options.



Hotel Barceló in Barcelona, Tecno-Spuma, E

... to improve acoustics

Ceiling sound absorbers are finding ever greater acceptance as an alternative to conventional ceiling systems. When constructed in a sandwich structure with a Basotect core and decorative cover layers, these sound absorbers create a pleasant acoustic environment. A sandwich composite made up of Basotect G and G+ with gypsum plasterboard, chipboard or plywood board and metal or plastic cover layers creates acoustically effective partition walls and room dividers. Due to its low weight, Basotect G and G+ allows the creation of large-surface elements that seem to be free-floating, giving rooms an attractive appearance.

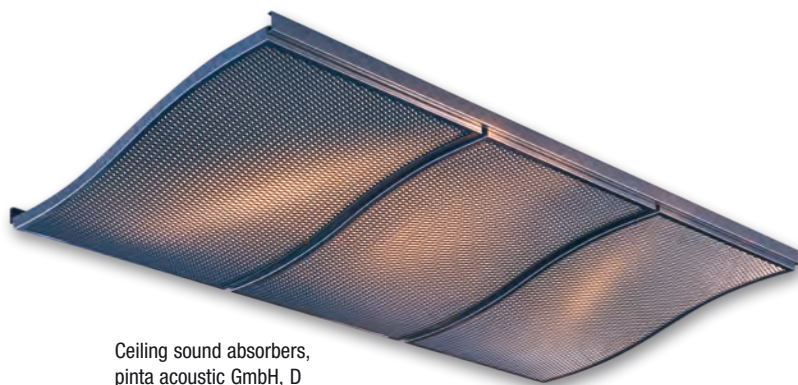
Work areas exposed to high levels of noise (heavy machinery and metalworking plants, among others) can be inexpensively restored to acoustic tolerability by retrofitting them with lightweight baffle

absorbers. Meeting rooms, offices and hotel foyers can be acoustically upgraded just as effectively and attractively using Basotect. The low intrinsic weight of Basotect baffles allows for simple methods of attachment during installation so that additional structural engineering calculations are not normally needed.

The absence of fibers in the foam results in a workplace that does not pose a burden to employees. Open-cell sound absorbers made of Basotect G and G+ improve the acoustics of rooms where good understanding of speech and audibility are especially important.

... as a decorative acoustic element

Colored Basotect offers new design options in sound insulation. Professional spraying and printing with specialty ink retain the foam's very good sound absorption capacity, so that ultra-sharp images with a velvet smooth surface can be produced without them looking obviously like sound absorbers.



Ceiling sound absorbers,
pinta acoustic GmbH, D



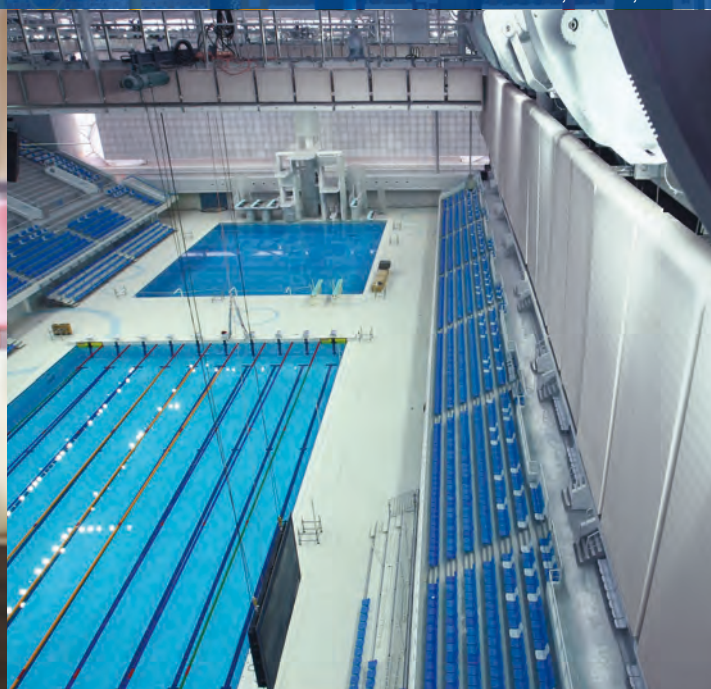
Baffle system, Eurofoam, A



Conical absorber elements, Texaa, F



Non-flammable upholstered furniture, Knoll, D



Soundproofing at the National Aquatics Center in Beijing, CN

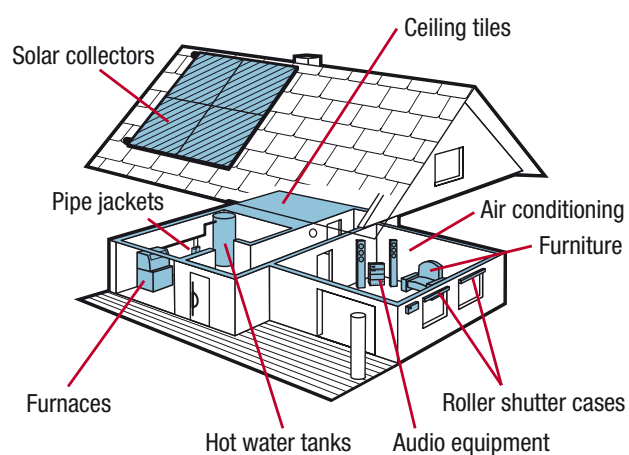
... in sport and leisure activities

Ceiling systems are also used to reduce noise in sports halls, ice rinks and swimming pools. This is where the special product advantages of Basotect® come to the forefront: enabling simple fastening with extremely thin cable structures, good sound absorption, low weight and high fire safety. Basotect's good sound absorption and high fire safety also make this foam ideal for use in shooting ranges.

Basotect is used in the National Aquatics Center in Beijing, the venue for the Olympic swimming events in 2008, to provide soundproofing for the interior of the building that meets fire safety and environmental requirements.

... for upholstered furniture

Upholstered furniture with a core of the specialty foam is particularly suitable for public areas such as movie theaters, hotel lobbies, offices and retirement homes that generally have high fire safety requirements and where uncomfortable steel seating has previously been the norm. The elasticity of Basotect UF, however, means that comfortable upholstered furniture with a higher level of fire retardance can be produced with a greater freedom in both processing and design.



Basotect® in construction and industrial applications ...



Combining sound insulation and ambience – Basotect®, digitally printed on the wall, Caparol, D

... for interior structures

Due to the foam's low rigidity, Basotect® is suitable for sound insulation in combination with layers of heavier material. Composite elements made up of gypsum plasterboard and Basotect in the form of cladding for interior structures provide a high degree of acoustic comfort.

Another area of application in the construction sector is the lining of the interior of roller shutter cases with Basotect. This serves as thermal insulation and reduces the noise that can be generated when a roller shutter is operated. Basotect also provides soundproofing against external noise.

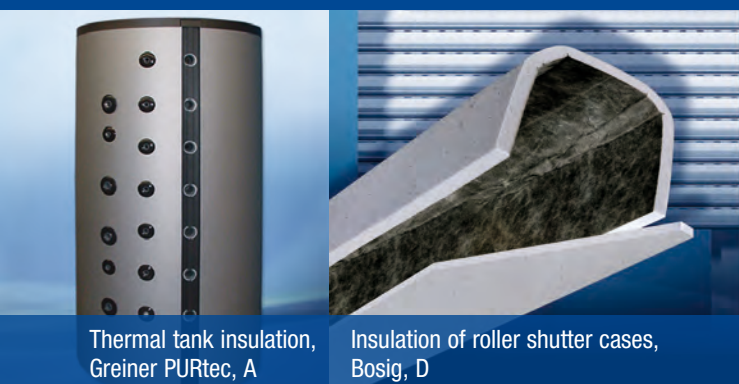
... thermal engineering

Insulation for pipes can be produced from Basotect G and G+ using contour cutting machinery. Even technically demanding thermal insulation projects can be successfully tackled because Basotect G and G+ can withstand very high temperatures and has low flammability. The complete absence of fibers in Basotect is a major advantage for use in clean rooms.

Additional applications in thermal engineering in buildings include the insulation of hot water tanks and equipment. System solutions based on the flexibility of Basotect allow the application of the insulating material over the entire tank wall. In this way, the chimney effects typical of conventional half-shell insulation can be reduced, energy losses cut and fitting simplified.

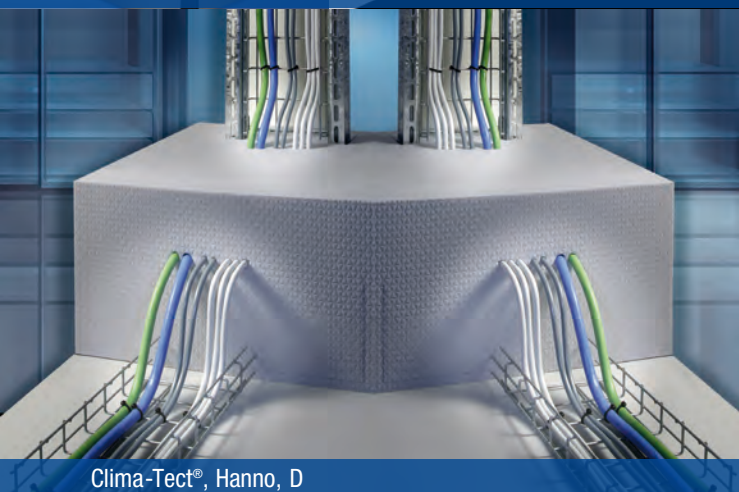


Pipe jacket insulation



Thermal tank insulation,
Greiner PURtec, A

Insulation of roller shutter cases,
Bosig, D



Clima-Tect®, Hanno, D



Thermal insulation of solar collectors, Viessmann, D

... acoustic test chambers, sound studios

Basotect®'s high sound absorption capacity and fire safety make this product suitable for use in acoustic test chambers, engine test benches, wind tunnels, sound studios and movie theaters.

Highly developed composite sheet resonators (CSR) made of Basotect constitute a modern form of resonance-like oscillating systems. These allow the soundproofing of test chambers in a way that is tailor-made to the customer's specifications.

... in solar collectors

Solar collectors should absorb as much energy from sunlight as possible and reflect very little back, so low thermal conductivity and a high long-term service temperature are key factors. Basotect provides good thermal insulation that is reliable even at high temperatures over a prolonged period. Basotect releases virtually no volatile substances that could reduce solar absorption and therefore reduce the efficiency of the solar panel.

... air conditioning

Excellent sound absorption and safe fire characteristics are the most important advantages of Basotect and thus account for its use in sound absorbing curtains, air conditioning equipment and ventilation systems. The inner walls of fan housings are also lined with Basotect to reduce noise levels.

Basotect® in automotive construction ...

Basotect® TG, G and G+ can ideally fulfill the rising demand for soundproofing in automotive construction. Thanks to Basotect's open-cell, fine structure, the sound absorption values are very good. Even when exacting demands are made of the sound absorption at low frequencies, the sound absorption

capacity of Basotect can be enhanced by acoustically effective laminates. Basotect is thermoformed with felt, fabrics, metal foil and plastic film to form contour-fitting parts that are then used as sound insulators and mufflers, or as heat shields.



Hood liner for the Lexus LS. Photo: Toyota/BASF



Soundproofing of the engine compartment and passenger area in buses

... automotive industry

Basotect TG, G and G+ are used in automotive construction together with felt or plastic covers. Aside from outstanding acoustic engineering properties, Basotect's high heat resistance, high fire safety, very favorable fogging behavior, chemical resistance and, last but not least, low weight are especially valued by the automotive industry.

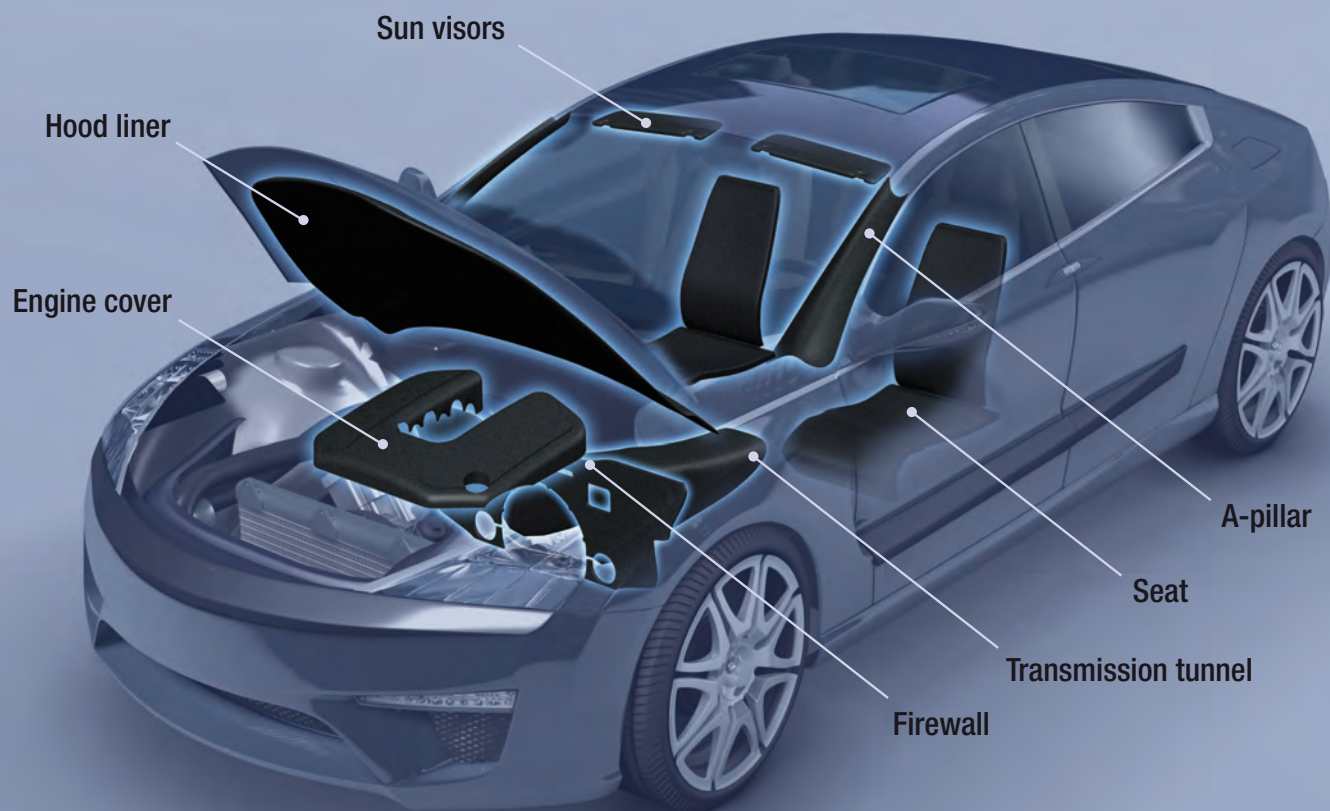
Laminated absorber elements are suitable for installation under the hood as well as for heat shields in front of automobiles' firewalls and in transmission tunnels. Due to the high flexural strength, covers made of Basotect allow the production of engine hoods that offer optimized protection to pedestrians. In this way, the more stringent requirements that are now necessary in terms of pedestrian protection can be met.

Due to this exceptional combination of properties, Basotect is used for sound insulation in engine covers. Other applications in the automotive industry include heat shields made of Basotect combined with aluminum foil.

Due to its memory effect, low weight and excellent acoustic properties, Basotect is also used for filling hollow spaces in vehicles, for example, as filling for the A-, B- and C-pillars.



Engine proximity shells, Benien, D



Basotect® in cars

... utility vehicles/buses

The acoustic properties of inserts made of Basotect® account for a reduction in noise levels in the driver's cab in trucks and agricultural machinery. Such inserts thus make an important contribution to protecting the health of occupants and to increased road safety.

Through optimal soundproofing of the engine compartment and of the passenger area of buses, Basotect G and G+ ensures the comfort that passengers have come to expect.



Basotect component of Carcoustics, D
in the Mercedes C class. Photo: Daimler AG, D

Basotect® in transportation ...



Internal insulation of rail vehicles

... rail vehicles

The excellent acoustic properties, safe fire characteristics and low weight of Basotect® UF, G and G+ make them ideal for use in backed wall and ceiling systems and for laminated interior fittings with decorative designs. Owing to the high elasticity and ease of processing of this product, complex installation work can be carried out cost-effectively. When it comes to applications in walls and ceilings, the high level of thermal insulation brought about by the low thermal conductivity is another strong argument in favor of using Basotect. In addition, the operating costs for climate-controlled passenger cars, for instance,

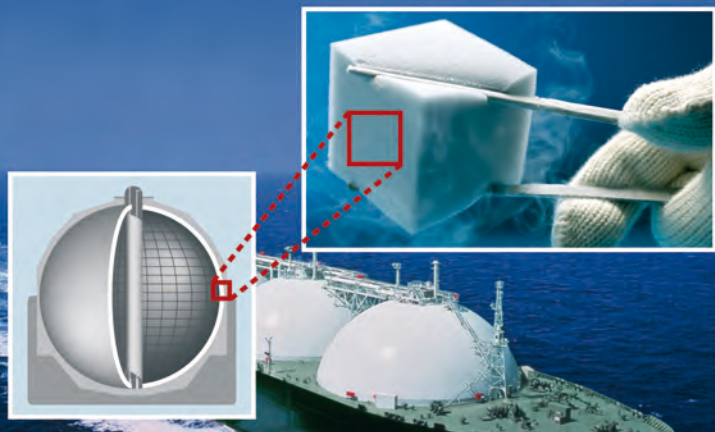
can be drastically reduced. Basotect meets the required fire safety standards for rail vehicles – the UF grade already satisfies the new European Union fire safety standards.

Due to the product's low weight in comparison to other insulating materials, Basotect also contributes to increasing the overall energy efficiency of the rail vehicle. Additionally, the weight reduction in the wall and ceiling areas lowers the center of gravity of the cars and thus increases safety when negotiating curves. This is of particular relevance for narrow-gauge railroads.

... ship building

Basotect G and G+ is employed as an acoustic system solution in ships. The good low-temperature stability of Basotect G and G+ means that it is also well-suited to insulate cryogenic liquefied gas on tankers. The product's elasticity and heat insulating capacity are retained even at -200°C.





Insulation of cryogenic liquefied gas on tankers



Cushions for airplane seats, Celso, F



Payload cladding of the Ariane 5 launcher rocket.
Photo: ESA/CNES/Arianespace 2006

... aircraft construction

Basotect® UL was specially developed for insulating aircraft cabins. It weighs just six grams per liter, which makes Basotect UL 30 percent lighter than conventional Basotect. This means it is possible to fulfill the rising demands on high noise safety and increasingly lower weight in aircraft construction; at the same time, Basotect UL meets the stringent fire safety standards set by the aviation authorities.

... aerospace

The advantages of the low density and sound absorption capacity of Basotect also permit its use in more and more system applications in the aerospace industry.

Basotect is used for cladding the payload section in the nose cone. This protects the sensitive satellites from the high acoustic pressure exerted on the rocket during the start-up phase. Three properties are key features for the use of thermoset polymers – the lightweight foam has a high sound absorption capacity, is very flexible due to its low density and is easy to process.

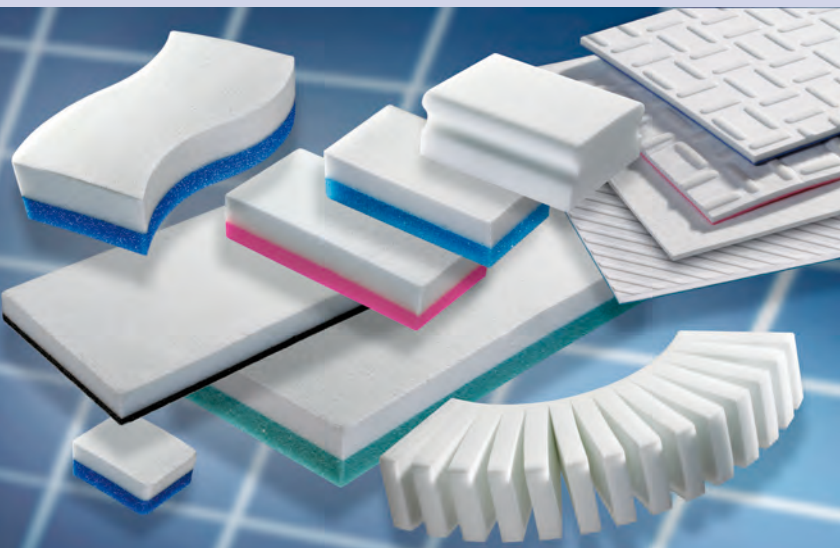


Internal insulation of the new Boeing 787

Basotect® in consumer applications ...

The outstanding properties of Basotect® V 3012 and Basotect W make it ideal for use in consumer applications.

Its good cleaning action and fine structure are clear advantages for the customer.



Various cleaning utensils made of and with Basotect®



Effective cleaning power on dirty floors

... cleaning applications

Basotect offers a completely new cleaning medium, both inside and outside the house. Heavy dirt on smooth, hard surfaces such as ceramic and glass tiles, stove tops, counter tops, walls, trim and doors, can be thoroughly erased with the white grade of Basotect. Basotect can also be used on leather seats and hubcaps in the automotive realm. Basotect acts in a manner that differs from that of other cleaning products available on the market. Basotect works without additional cleaners; in other words, only water is needed – the dirt is simply rubbed off.

The abrasive foam works like a very soft sandpaper since, unlike other foams, Basotect is as hard as glass, but the fine cell structure provides the product's flexibility. When Basotect is moistened, it slides easily and rubs the dirt off the surface.



Basotect works best when slightly moistened.

Basotect W, the improved Basotect grade for cleaning applications





The dirt eraser releases its magical powers even on wallpaper.

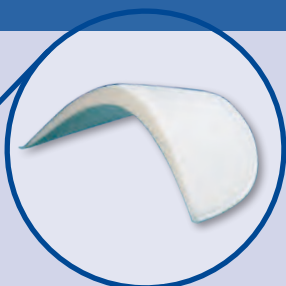
... clothing, textiles

Shoulder pads can be made of Basotect®. They are used primarily in white outerwear. Resistance to UV discoloration and low weight are the key factors in this application.

... erasers

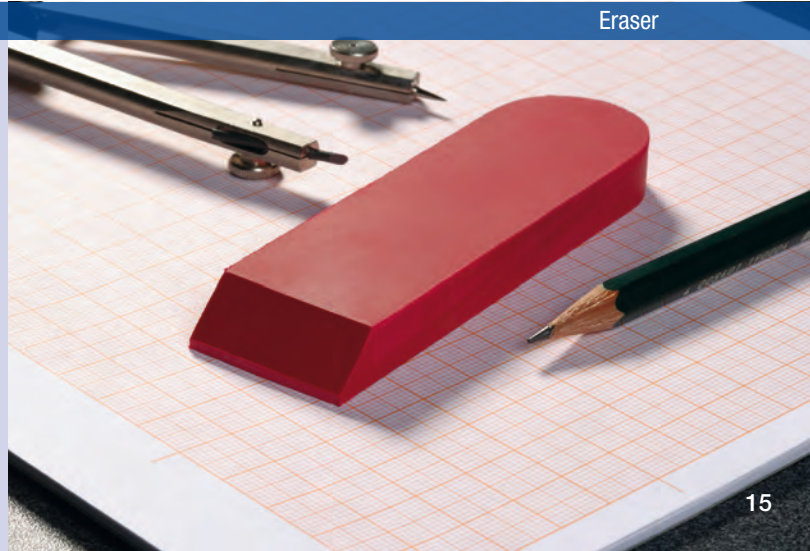
The melamine resin foam works well on paper, too. Basotect's abrasive properties mean that adding Basotect to an eraser makes it more efficient and gives the artist a clean sheet again.

Shoulder pads



**CONFIDENCE
IN TEXTILES**
Tested for harmful substances
according to Oeko-Tex Standard 100
No. 09.0.65861 Hohenstein

Eraser

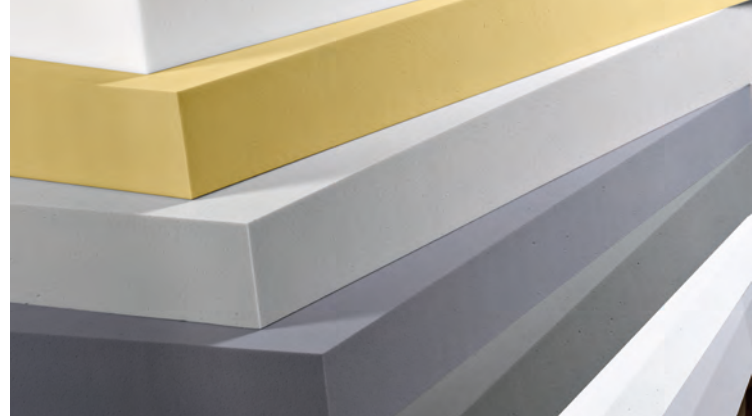


Basotect® range – an overview

Basotect® range

Basotect® is supplied in the form of blocks with standard dimensions of 2500 x 1250 x 500 mm to processors that produce shaped parts for diverse applications by cutting, stamping and pressing.

The different Basotect grades cater to a variety of applications:



The Basotect® range includes seven different grades.

- **Basotect G** is used in technical applications. Its light gray coloration prevents it from getting dirty, which makes the product particularly suitable for a variety of construction and industrial applications.
- The new light gray is called **Basotect G+**. It fulfills the Öko-Tex® Standard 100 in product class II. In addition to the proven properties of Basotect G, such as low thermal conductivity, flame retardance and simple, mineral fiber-free processing, the new material also has advantages for interior decorators and designers. The light reflectance value of the considerably lighter Basotect G+ is more than 30 percent higher than that of the gray Basotect G.
- Special technical applications that call for the thermoforming of Basotect can be manufactured with **Basotect TG**. Its dark gray coloration makes it a material of choice in automotive construction.
- The gray **Basotect UF** is characterized by a very high elasticity and by improved fire properties, which makes this elastic version of Basotect suitable for the construction industry and rail transportation, providing much greater freedom of processing and design.
- **Basotect UL** has an impressive ultralight weight and is thus especially well-suited for all applications that call for a low weight, for example, in aviation and aerospace.
- The white **Basotect V 3012** is used in numerous consumer applications.
- **Basotect W** is the advanced version of the cleaning version of Basotect. This grade has also been tested to Japanese Law 112, one of the most stringent tests for formaldehyde in the world.

Other properties of Basotect®



Acoustic test chamber, Hanno, D



Basotect® UF for use in construction and rail transport

Fire resistance characteristics

Basotect® meets the most important international fire safety standards. Basotect's long-term resistance to high temperatures and excellent fire characteristics are based on the melamine resin used. The high nitrogen content of the resin is responsible for the extremely flame-resistant property of the foam without the need to use fire retardants. Basotect is a thermoset, and thus, in the event of a fire, the material does not melt or produce burning droplets when it comes into contact with flames. The foam simply chars and produces a small amount of smoke, and there is no afterglow, making Basotect particularly suitable for applications with high fire safety requirements. In tests on the fire characteristics required to meet national and international standards, Basotect achieves the highest classification possible for organic materials.

Sound absorption

Basotect's open-cell surface guarantees that sound waves are not reflected as an echo but can penetrate the cell structure unhindered. The sound energy is reduced in the cell structure, giving Basotect an excellent sound absorption capacity. At low frequencies, improved sound can be achieved, by adding layers of a heavier material, for example.

Resistance to chemicals

Thanks to Basotect's highly cross-linked structure, it is resistant to all organic solvents. When it comes to acids and alkalis, the resistance has to be checked in actual application conditions since the temperature, the exposure time and the concentration all have a great deal of influence on the resistance of the foam to these media.

Eco-friendliness

Basotect is produced without using halogenated hydrocarbons, flame retardants and/or toxic heavy metals. Basotect does not contaminate water. The supplied product is free of blowing agents and is not subject to labeling requirements under the German hazardous material regulations. Basotect is certified to the Öko-Tex® Standard 100.

Solutions with Basotect reduce the weight of the components, thus contributing to energy savings and to a reduction in emissions in transportation applications. The excellent cleaning effect is achieved without the need for any other chemical cleaning agents.

Thanks to the product's property profile, Basotect contributes to efficient energy utilization and to improving the well-being of people in buildings and vehicles.

Processing of Basotect®



Cutting of Basotect® panels



Basotect shaped parts, Cellofoam, D

Machining

Basotect® is supplied in the form of foam blocks to processors for further processing. This is where the product is cut into multi-dimensional shapes by slitting, milling, sawing and stamping to form the required contour.

The elastic resilience of the Basotect panels also allows the use of shaped cutting.

Coating, bonding

Surface coatings for coloring purposes or for improving the mechanical properties can easily be applied to the fine-cell Basotect surface by spraying, for example.

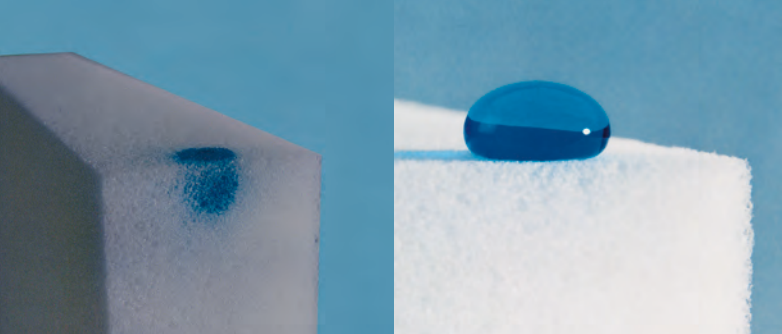
By the same token, a very wide range of adhesives commonly available on the market can be used for bonding Basotect sections. Adhesives containing solvents as well as reactive resins can also be used without any problem. This means that numerous material combinations are possible. It should be kept in mind, however, that processing with adhesives and dyes changes the flammability properties of the components.

Hydrophobing, oleophobing

Basotect is an extremely open-cell foam with highly hydrophilic and oleophilic properties. Cut sections of Basotect can be rendered water-repellent by impregnating them in silicon emulsions. Fluorocarbon resins allow hydrophobing and oleophobing in one single step. It is practical to carry out the hydrophobing and oleophobing in an impregnation process.

Impregnating

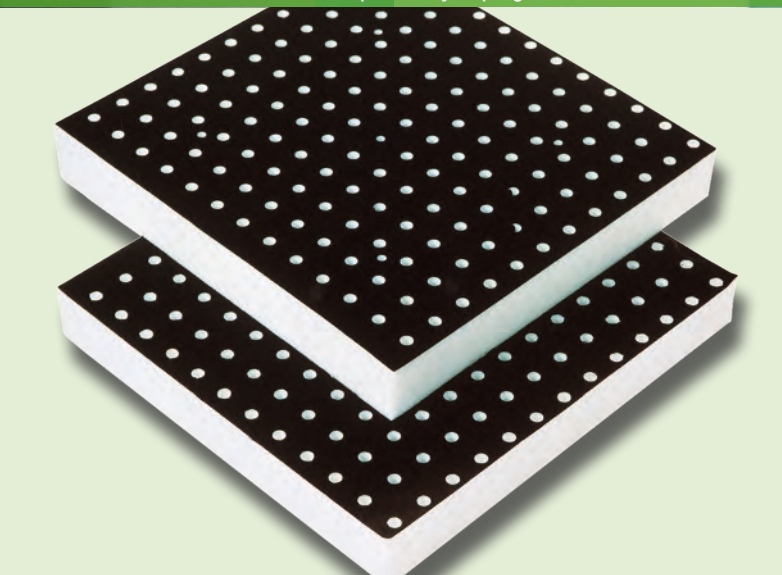
Numerous Basotect shaped parts are produced by thermoforming. Since conventional Basotect, a thermoset polymer, cannot be thermoformed, the product has to be impregnated with a thermally reactive adhesive liquid. This is done in post-production using so-called impregnating systems. In order to accelerate drying, the excess liquid is squeezed out by a two-roll mill after impregnation. The impregnated Basotect can then be processed by thermoforming.



Basotect® rendered water-repellent by impregnation



Shaped part with aluminum foil and felt



Stamped Basotect shaped part with felt



Stamped Basotect shaped parts, ENAC, F

Thermoforming

Composite materials consisting of a Basotect® core and felt, fabric, metal and plastic laminates can be manufactured in one new forming procedure. The hot-press process can also be used to emboss decorative patterns on the surface of the Basotect panels.

Intensive research work has led to the development of a thermoformable grade of Basotect – Basotect TG. Sections cut from Basotect TG can be formed at a temperature of $>200^{\circ}\text{C}$ to produce three-dimensionally shaped components. This dispenses with the impregnation step that is needed with standard Basotect grades in order to produce such shaped parts. This means greater cost-effectiveness in the processing steps. Along with the fact that Basotect TG can be thermoformed without a preceding impregnation step, Basotect TG also has the proven material properties of the standard grade.

Processing notes

Any dust that might be produced during certain processing steps should be removed by vacuum directly at the cutting site. Wearing a dust mask during these tasks is recommended.

Due to the absorption behavior of melamine resin and the open-cell structure of the foam, the moisture content of the material changes with the ambient conditions. This is associated with changes in dimensions that occur similarly in the case of wood, concrete or clay tiles. This behavior must be taken into consideration during processing. The foam blocks, which are delivered sealed in PE film, must be unpacked and stored for several days prior to processing under atmospheric conditions corresponding to the blocks' later use.



Thermoformed Basotect TG

Note

The data contained in this publication are based on our current knowledge and experience. In view of the many factors that may affect processing and application of our product, these data do not relieve processors from carrying out own investigations and tests; neither do these data imply any guarantee of certain properties, nor the suitability of the product for a specific purpose. Any descriptions, drawings, photographs, data, proportions, weights etc. given herein may change without prior information and do not constitute the agreed contractual quality of the product. It is the responsibility of the recipient of our products to ensure that any proprietary rights and existing laws and legislation are observed. (December 2012)

Additional information on our products, product properties and applications:

www.basotect.com
basotect@basf.com