

PUR Living
Comfort: from
the roof to the
basement

Elastopor[®] H
Elastopir[™]
Elastocoat[®] C
Fixopur[®]

**Elastogran is
Polyurethanes**

Elastogran



■ BASF Group

Requests, Requirements, and Regulations

*»A new façade
will increase
the value.«*



*»My house
needs reno-
vating.«*



*»We want a
building with
an attractive
architectural
design.«*



*»A reduction in
heating costs
through efficient
thermal insula-
tion.«*



*»I'm looking
for ecologically
sound materi-
als.«*



*»Low cost –
yet prestigious,
that's what I
want!«*



*»What about
competitive-
ness?«*



*»Solid and
resilient that's
what we need,
we want to
play.«*

Nicely Wrapped up with Elastopor H and Elastopir

Behind each construction project are the owner and the authorities – with requests/demands and requirements and with the regulations to be observed during their implementation. This is no easy task for either the architect or the contractor.

Nicely wrapped up: with polyurethane materials made by Elastogran

With Elastopor H and Elastopir we can provide two materials which meet nearly all requirements.

Elastopor H is the multi-faceted polyurethane rigid foam system made by Elastogran which has been specially developed for the construction industry. It has proven itself for over 30 years and is employed world-wide for all types of construction.

Elastopir is one of a new generation of rigid foams with a polyisocyanurate (PIR) basis. These foams stand out from conventional PU foams due to greatly improved properties.

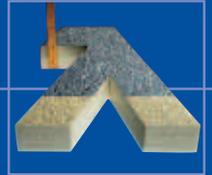
The areas of application of Elastopor H and Elastopir are just as diverse as the construction industry itself. A fact which is highly appreciated by architects and construction engineers alike.

These foam systems are developed, produced and sold by Elastogran, one of the world's leading enterprises in the field of polyurethane.

Our rigid foam systems: a solid foundation

- Outstanding thermal conductivity values/figures of 0.019 W/mK (thermal conductivity level 024).
- Buildings insulated with PU rigid foam save both expensive energy and natural resources.
- Both the energy employed and the costs of production of the insulation materials will be written off after a short space of time due to the great savings in heating costs (ecological efficiency).
- Thinner walls compared to other materials mean increased living space compared to conventional buildings with identical external dimensions.
- The Elastopor H/Elastopir sandwich element combines static and insulating functions.
- Elastopor H satisfies aesthetic aspects if employed as facades on all types of walls including brick walls.
- If properly specified Elastopor H and Elastopir even meet the fire safety rules of the new European DIN EN 13501-1.

The Facts:



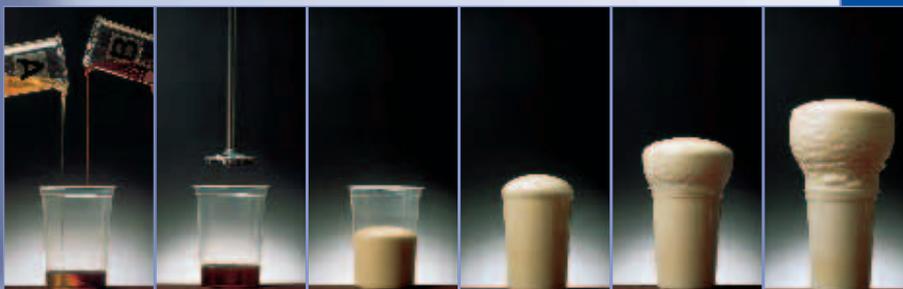
identical insulation properties in materials of different thicknesses: Top marks for Elastopor H and Elastopir



Please ask us for expert processors of our materials and manufacturers of finished parts.



The reaction process of Elastopor H and Elastopir



Elastopor H and Elastopir are both two or multi-component polyurethane rigid foams. When the individual components are mixed together, a reactive system is created. The foam can increase to 20 times the original volume of the two components.

Aesthetic Construction Elements Shaped to Please: self-supporting sandwich elements for walls and roofs

Elastopor H and Elastopir in sandwich elements combine the demands of planners, developers and architects under one roof. As wall and roof elements they fulfil both a static and an insulating function whilst shaping aesthetic parts of construction: for instance in the shape of a self-supporting element with a micro-lined surface.

By the way: sandwich elements are quick and easy to install, saving you both time and money. The multi-faceted sandwich elements offer an attractive, low cost alternative to solid constructions.

▷ A model of Europe's biggest skiing hall in Moscow. Over 80,000m² of sandwich elements with Elastopir shape the design of this building whilst putting a cap on heating costs. Inside skiers can enjoy a 60m wide, 400m long and 90m high artificial slope.



△ A good example of function combined with aesthetic design: a tyre service firm.

▷ Sandwich elements have been used to form the roof of this architecturally futuristic kindergarten.



◁ The design of this innovative multi-purpose building was possible with sandwich elements.

▷ PU rigid foam combined with wooden construction materials make this house stand out.



The facts:

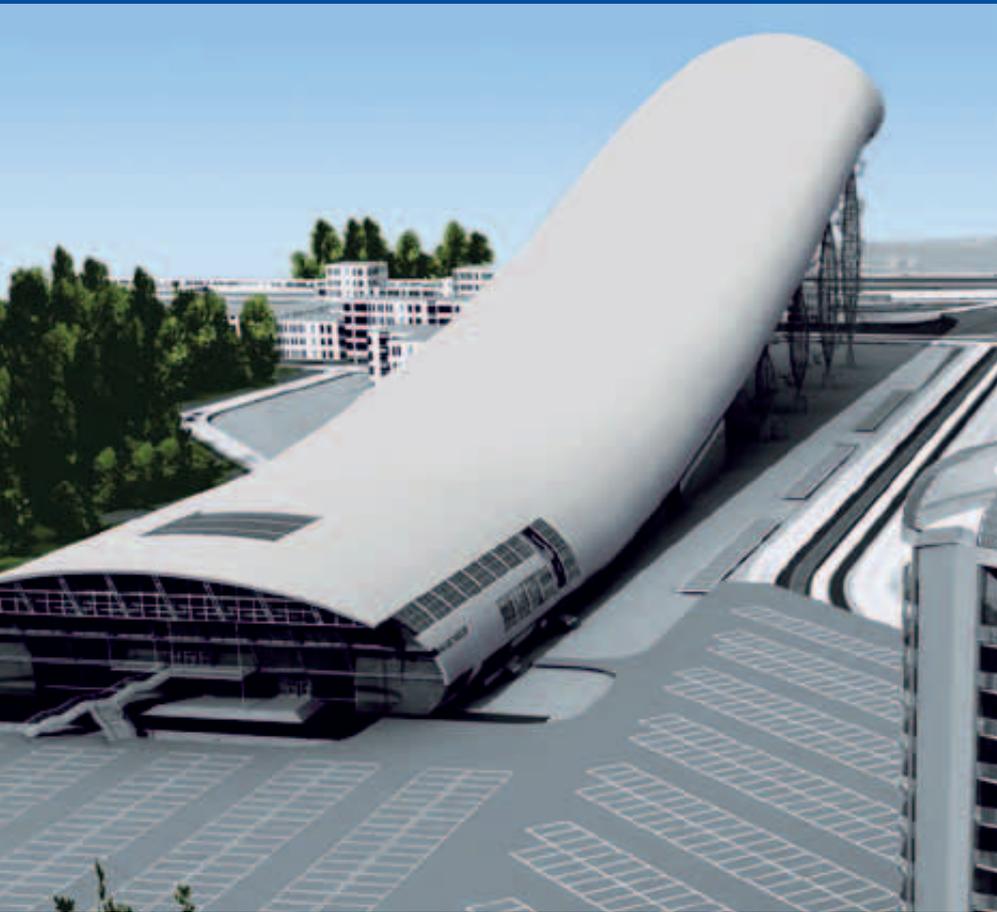


Sandwich elements made of Elastopor H or Elastopir:

- reduce construction time and costs
- allow for a highly economic design
- meet demanding architectural requirements for design
- increase available space through slim construction (parts/elements)
- create thermal comfort
- prevent heat loss and rising damp
- provide fire protection and noise reduction
- can be combined with solar panels
- can integrate heating and refrigeration areas
- take ecological aspects into account.

Areas of application:

- commercial and industrial buildings
- communal buildings
- gymnasiums
- refrigerated and cold storage rooms/warehouses
- office and living portable buildings
- clean rooms and clean room warehouses
- quick assembly systems for emergency accommodation
- detached and terraced houses.

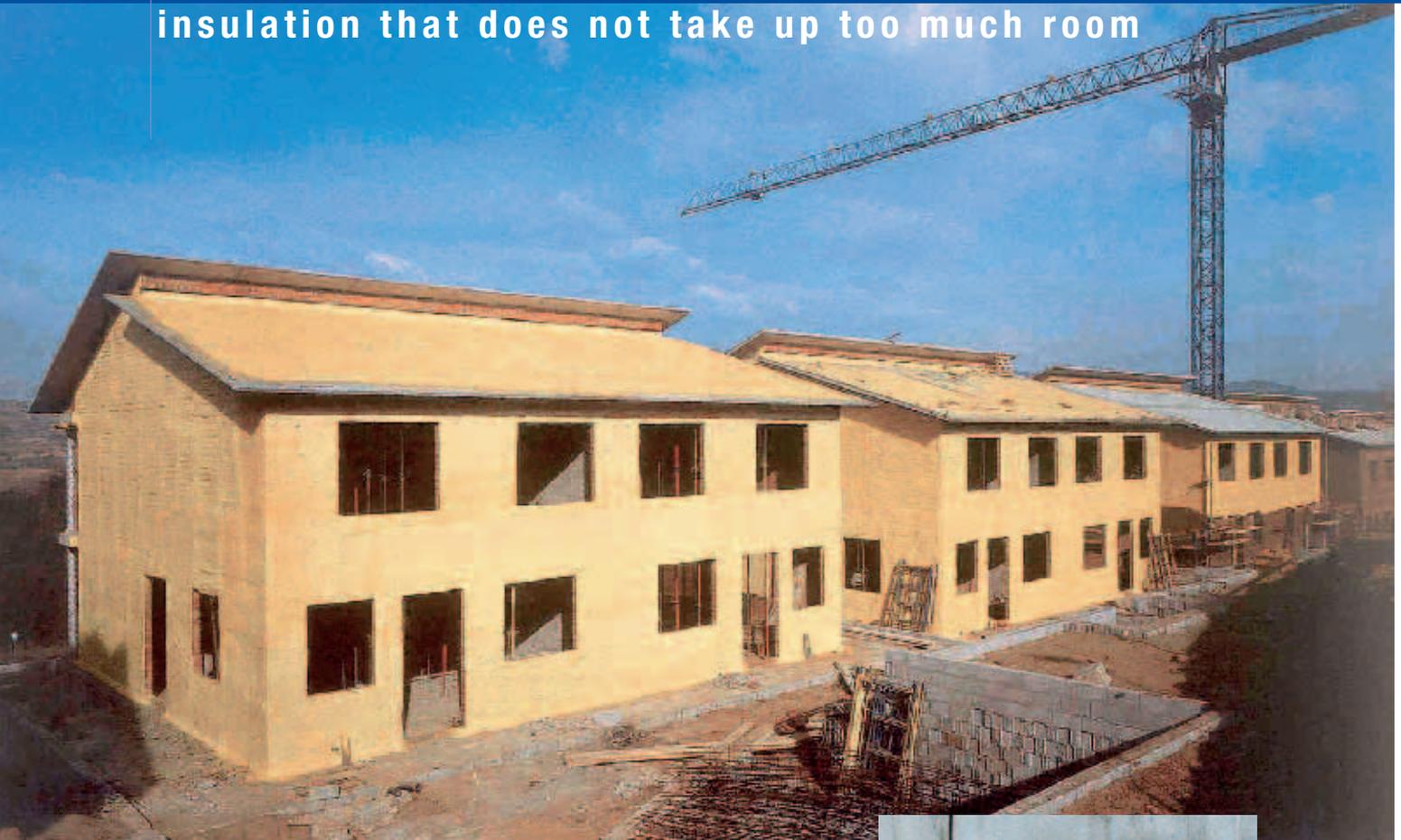


◁ Cold room made out of sandwich elements: no other material meets the requirements of both the catering and the refrigeration industry.



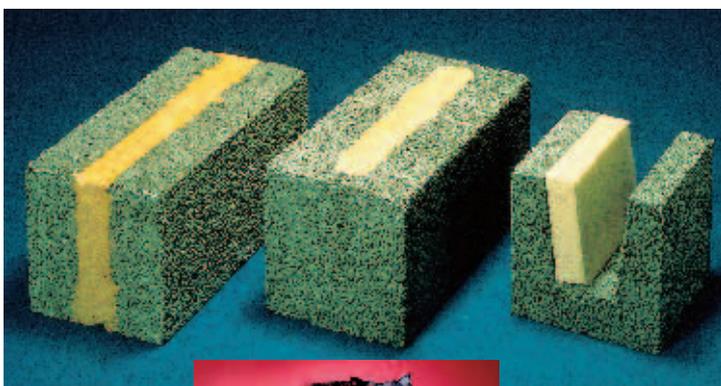
◁ Office and living portable buildings are easy to transport, light and robust. In addition they provide protection from both hot and cold weather.

Thin Walls Even under the Roof: insulation that does not take up too much room



There are two efficient methods of providing thermal insulation for walls with Elastopor H and Elastopir: one is a spray foam and the other an insulating wall panel. Both methods are easy and economic to use. Moreover: the unsurpassed low heat transfer coefficient only requires very thin layers of insulating material. This not only saves construction material, but also increases available floor space. Clinker insulation panels and large-sized wall elements combine the advantages of bricks and PU in one product.

△▷ Spray foam Elastopor H turns walls into "savings banks". These houses in Spain have been insulated without joints and avoiding thermal bridges.



◁△ Very popular in Scandinavia: expanded clay bricks incorporating insulation made of Elastopor H.



△▷ Warehouse in northern Germany: inside insulation with thin layers of material for a big increase in thermal insulation.

The facts:



◁ Successful symbiosis of design and thermal insulation: Elastopor H insulating wall panels behind the façade of an office building.



Spray foam Elastopor H:

- seam-free, air-tight, thermal bridge-free insulation even for awkwardly shaped walls
- big insulation effect with small layers of material

Sandwich elements and insulating panels made of Elastopor H and Elastopir:

- assembly is not dependant on favourable weather conditions
- quick, easy and low-cost processing
- big insulation effect with small assembly thickness
- façade elements of high design quality

Perimeter panels:

- special insulation for outside basement walls

Expanded clay bricks:

- with an Elastopor H foam core
- erecting and insulating walls in one step

Areas of application:

- renovation of old buildings
- detached, semi-detached and terraced houses
- municipal and commercial buildings
- warehouses and industrial buildings



◁ Living comfort in the basement: perimeter panels on the outside walls keep your basement snug.

▷ Elastopor H/ Elastopir: outside wall insulation. The extremely robust panels can be assembled in and are resistant to all weather conditions.



◁ Clinker insulation panels made of Elastopor H are used to refurbish houses: heat loss is reduced and the façade is improved at the same time. A further benefit: the external dimensions of the building only increase marginally.



△▷ Before and after the refurbishment of a detached house with clinker insulating panels made of Elastopor H.



Well Covered at the Top whilst Gaining Ground: Elastopor H and Elastopir for roof and floor



To meet the problems of heat loss in roofs and floors efficiently, Elastogran has developed robust insulating processes on the basis of Elastopor H and Elastopir together with its customers.

In a nutshell: traditional steep roofs can be insulated from both the outside and the inside as well as on or between rafters simply, cleanly and free of thermal bridges.

For flat roofs seam-free coating with Elastopor H in the form of a spray is the obvious solution.

Floors can be insulated with both spray foam and panels made of Elastopor H. It doesn't matter if these floors have under-floor heating or not.



△ Spray foam for roofs is the ideal solution for difficult geometric shapes: Elastopor H coating is free of thermal bridges and can be walked upon.



▷ Floor insulation with spray foam: rational processing without thermal bridges.



◁ Flat roof insulation panels: can be walked upon and are easy to lay.

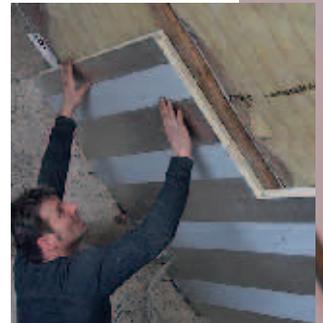
▷ Insulation panels for floors stand out due to being comparatively slim, whilst at the same time having good insulation properties.

▷▷ Roof in Hamburg's dock-land Speicherstadt renovated with Elastopor H insulation panels.

▷ Detailed build-up of a roof with Elastopor H insulation panels.



△▷ Steep roof insulation panels made of Elastopor H/Elastopir on, under or between the rafters for insulation without thermal bridges. Easy to process.



The facts:



Roof spray foam and roof panels made of Elastopor H:

- quick and easy processing
- excellent insulation values with thin layers of sprayfoam or thin panels
- free of thermal bridges
- can be employed inside and outside buildings
- spray foam adapts to difficult and problematical roof shapes
- outside applications can be walked on
- UV-resistant after application of a protective coat

Floor panels and floor spray foam made of Elastopor H and Elastopir

- suitable for normal floors and under-floor heating
- very low heat loss
- a thin layer of foam achieves high insulation
- pressure-resistant and can be walked on
- spray foam application, free of thermal bridges and air tight

Applications:

- renovation of old houses
- detached and terraced houses
- all types of business and municipal buildings
- warehouses

Highly stress-resistant floor coating with Elastocoat C:

- abrasion proof, resistant to chemicals, highly resistant to mechanical stress, easy care, seam free
 - full use 24 hours after coating
- (Would you like to know more? – Just ask!)



Speciality Flooring Elastocoat C

Elastocoat C is a compact PU elastomer made for industrial floors by Elastogran. Its characteristics are completely different from the rigid foam systems Elastopor H and Elastopir. Elastocoat C protects and seals floors.



◁ Floors coated with Elastocoat C are easy to care for, highly stress resistant and durable.

Concentrated Food for the Weak: Elastopor H strengthens doors, gates and windows

Doors, gates and windows are usually the weak points of a building. Heat loss, a lack of solidity, insufficient dimensional stability characterise the vulnerable condition of many doors and windows. And more often than not, house owners have to pay the price.

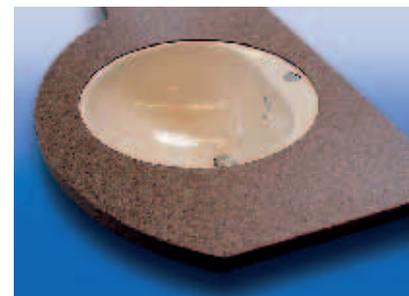
Elastopor H stabilizes and reinforces the mechanical resistance of the design of the door or of the construction. Elastopor H prevents heat loss and dampens the rattling noise doors and windows are so prone to make when being opened and closed. Strong arguments in favour of PUre concentrated feed.



◁△ Doors of refrigerated warehouses lined with Elastopor H to prevent heat loss.



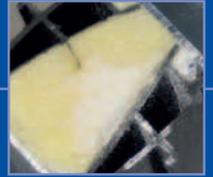
▷ Elastopor H waste recycled for a second life as high quality products such as surfaces for wash basins ...



▷ ... and kitchen work tops.



The facts:



Doors, gates and windows with Elastopor H:

- quick and easy processing
- stabilizes and strengthens mechanical solidity
- prevents heat loss
- dampens noise during opening and closing actions

Shutter profiles made with Elastopor H:

- rigid, quiet and insulated

Bath tubs and shower trays made with Elastopor H:

- installation support with insulating properties

Elastopor H waste:

- recyclable to form quality work tops and wash basin surrounds

Areas of application:

- refurbishment projects
- detached and terraced houses
- all types of business and municipal buildings
- warehouses

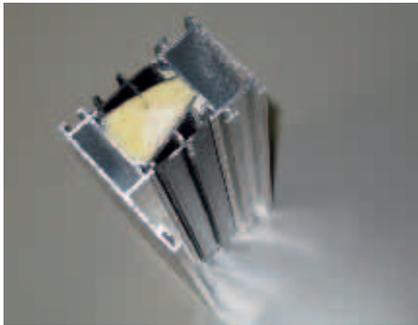
Assembly foam from the can: Fixopur

- fixes door and window frames to the brickwork
- soft-elastic adjustment balances out shrinkage and expansion
- thermal insulation properties
- easy to use directly from the can

(Would you like to know more? – Just ask!)



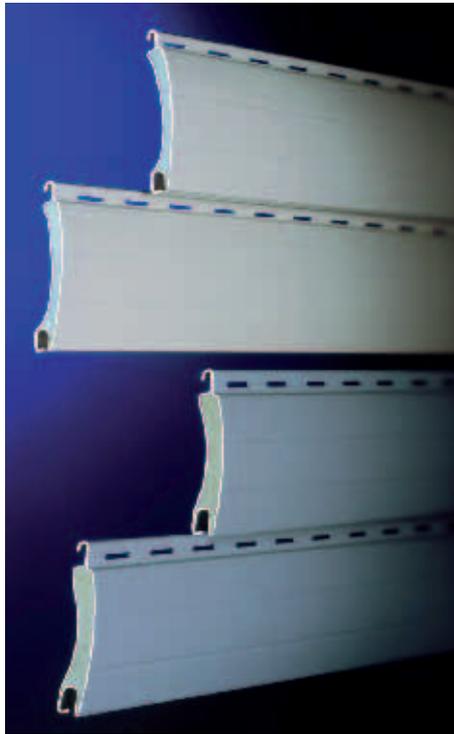
◁▷▷ Sectional gates, rolling and folding gates. Advantage: excellent insulation effect; more stable, quieter and of better quality than single-shell sheet metal plates.



△ Window profiles insulated with Elastopor H prevent heat loss.

◁ Doors for industrial buildings and houses: lined with Elastopor H spray foam they are more resistant to mechanical wear and tear.

▷ Profiles of rolling shutters with Elastopor H are noticeably more rigid and quieter when being opened or closed.



▷ Elastopor H as thermal insulator and installation support for bath tubs and shower basins.



Window special: Fixopur

Fixopur is our canned assembly foam. Due to its extremely high adhesion properties it can even fix doors and windows to the brickwork.



◁ Easy to handle, effective for installing doors and windows: Fixopur.



Hot Stuff to Keep Things Cool: tanks, pipes and devices



When liquid substances in storage tanks, pipes and devices need to be kept hot or cold long-term, Elastopor H and Elastopir are the first choice: with guaranteed insulation value and temperature-resistance to save both costs and energy.

Installation of the insulation system is both economic and simple: the double wall of containers and tanks are lined with spray foam. Single wall pipes are encased with half shells, double wall pipes are lined on site.

△ Half shells made of Elastopor H and Elastopir for thermal insulation for encasing pipes.



△ Once it has been lined with Elastopor H spray foam, this double-wall chemical tank is insulated for decades to come saving both costs and energy.

◁ Pipe segments and panels made of Elastopor H and Elastopir can be provided as semi-finished products in many sizes and dimensions.

The facts:



Containers and devices insulated with Elastopor H or Elastopir:

- quick and easy insulation even for objects with an awkward shape
- high insulation value and temperature resistance
- insulation of double wall pipes and containers on site (in situ)

Areas of application:

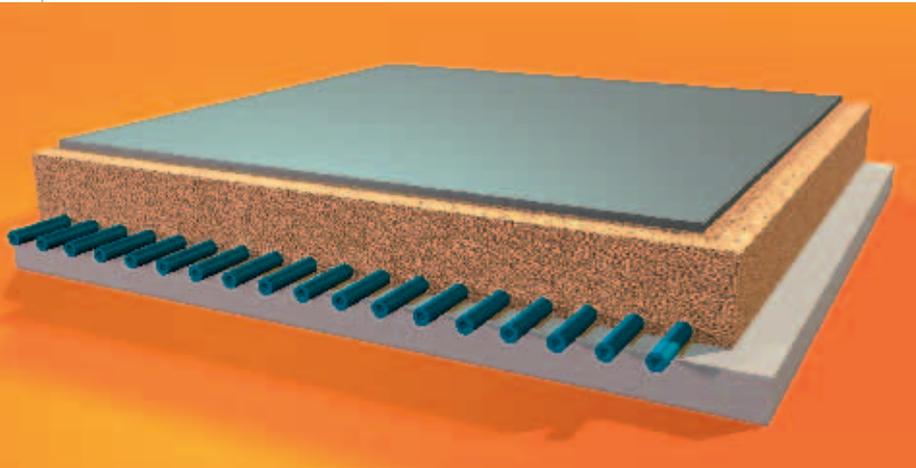
- storage tanks and containers for food stuffs and chemicals
- pipe segments and panels
- casting foam as insulation material for double wall pipes and containers
- half shells to encase single wall pipes
- LNG and LPG applications



△▽ Lined "in situ" with Elastopor H spray foam: the double-wall reactor including the necessary piping.



Wax and Comb: classy air conditioning and super sandwich



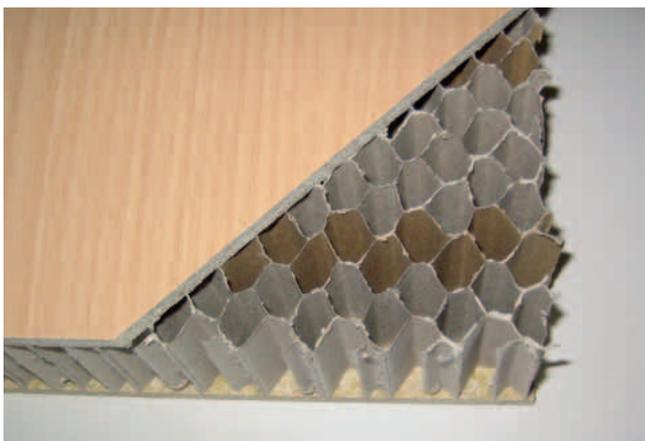
△▷ Millions of micro-encapsulated paraffin beads in the Elastopor H sandwich element regulate the temperature in rooms and minimize energy costs. This printer's shop in Karlsruhe uses the temperature elements as sails for cooling purposes.



Elastopor H combined with Micronal PCM® (phase change material) SmartBoard® creates new potential areas of application eg as construction material for "energy cost-free air conditioning systems": wax, micro-encapsulated as minute beads and embedded in wall boards provides additional cooling capacity in the event of increased heat. Thus it forms the basis for regenerative and low-cost cooling con-

cepts such as cooling with ground water.

A further example: "honeycomb" furniture. A honeycomb structure is glued between two wooden sheets with Elastopor H. The result is an ultra-light yet extremely robust panel for furniture.



<▷ Copied from the bees: the honeycomb structure. With a wooden exterior and Elastopor H as adhesive, high-quality, robust and light-weight board is created for the furniture industry.

The facts:



Temperature management with wax and Elastopor H:

- innovative »air conditioning« through PCM (phase change material, latent heat-storage unit,) combined with the excellent insulation properties of Elastopor H
- pleasant room temperature through micro-encapsulated wax as latent heat-storage unit, embedded in wall boards.
- if the cooling capacity is not sufficient, the melting wax provides further cooling capacity from 23°C onwards.

Areas of application:

- inside buildings for ceilings or partition walls

Sandwich panels with honeycomb structure and Elastopor H:

- extremely light yet robust board for the furniture industry
- sandwich elements with a honeycomb core made from cardboard and two wooden sheets
- low-cost non-order linked manufacture of board as master board
- powerful and air-tight adhesion with Elastopor H

Areas of application:

- finishings
- interior fitting of shops and furniture
- worktops for offices, kitchens, bath, living and hobby rooms



Elastogran is Polyurethanes



Portfolio:

Elastogran develops, produces and sells:

- PU elastomers as thermo-plastic specialty elastomers
- PU elastomers as cellular specialty elastomers
- PU base products, such as isocyanates, polyols, catalysts, auxiliary materials
- PU systems, divided into system groups such as rigid, flexible, integral, compact

Sites

- Germany (headquarters)
- France
- The UK
- Italy
- Russia
- Sweden
- South Africa
- Spain
- Turkey
- Hungary

Research and Development

World-wide BASF Polyurethane Research for PU systems and PU special elastomers has been centralized in the newly created Research Centre in Lemförde. Nearly 200 Elastogran staff work in this think tank of expertise and creativity for the fields of Research, Development and Applications Technology. With the know-how of this international technology centre we provide our expertise to other BASF Group companies in America and Asia which are active in the field of polyurethane.

Leader in its Field

Elastogran is one of the world's leading companies in the field of speciality plastics polyurethanes (PU). Elastogran, a company of the BASF Group can look back on over 40 years of PU know-how. Our headquarters in Lemförde, Lower Saxony, hosts the international technology centre of the BASF polyurethane world. Second to none: the range of the dynamic market and technology leader for speciality PU comprises nearly the entire polyurethane product portfolio.

Working hand in hand with our customers

The Elastogran Group has 11 sites in Europe. We distribute all BASF PU base products Europe-wide and develop, produce and distribute polyurethane systems as well as thermo-plastic and cellular speciality elastomers.

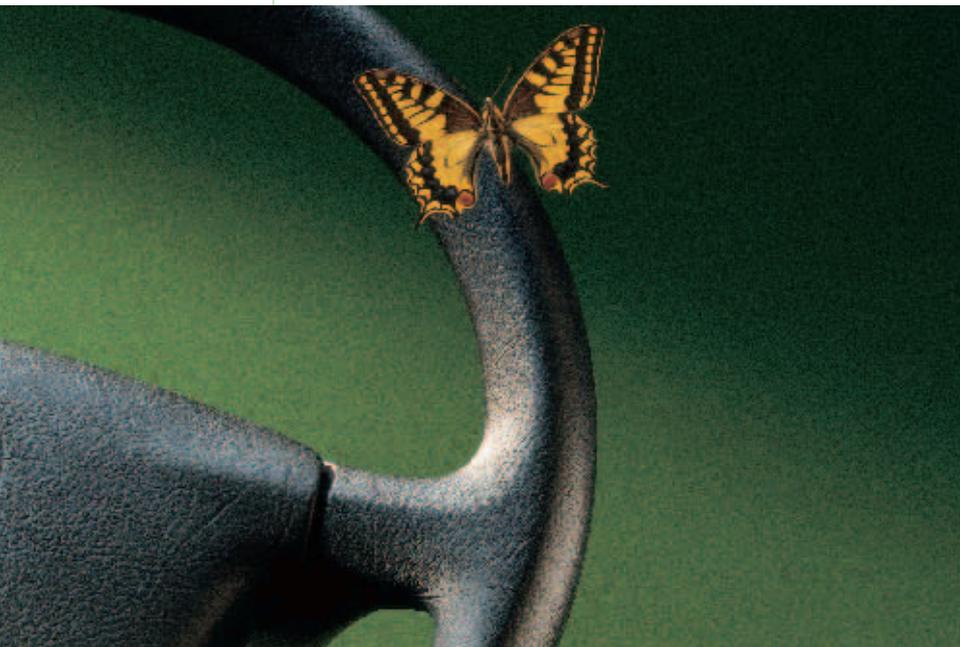
The entire BASF PU business in Europe, the Near East and Africa is concentrated at Elastogran. From here we have built a strong market position. Close customer contact is implemented world-wide through close co-operation: Elastogran representatives and BASF sales organizations work around the globe in close partnership with their customers.

Individual Innovations

No matter which PU application is involved – Elastogran turns the apparently impossible into an innovative reality. In close project-related co-operation with the customer our specialist teams of chemists, physicists, engineers and sales experts develop tailor-made, creative and economic solutions. We create a solid and reliable base with our customers through both active dialogue and combined experience. Our sectoral applications technology which stretches throughout Europe is strictly focused on value added benefit.

Integration

Our close links with BASF, one of the world's leading enterprises in the chemicals business (BASF – The Chemical Company), enables us, as part of the trans-national BASF Verbund, to access resources world-wide: for research, raw materials supply, infrastructure, sales and finance.



| Responsible Care®

Elastogran supports Responsible Care, the worldwide initiative of the chemical industry, and thus commits itself to continual safety, health and environmental protection.

Within the Elastogran Group, Responsible Care for safety, health and environmental protection is an issue, which – for the sake of environmental sustainability – is considered as being a corporate value as important as economic criteria for boosting the company's success.

The whole process of development, production and storage of our products as well as their transport, application and finally also their disposal or recycling is evaluated and continually further developed with respect to the reduction of possible environmental impact.

This includes, in particular, the protection of resources as well as prevention of emissions and waste. Elastogran appropriately informs customers, partners and neighbours about environmental aspects of products and processes. Our environmental management system is geared to the guidelines of Responsible Care and meets the requirements of the international standard ISO 14001.

| Recycling

Methods for recycling polyurethanes are as diverse as their use. In order to find the right method, it is necessary to clarify their specific origin and use.

Alongside thermal re-utilisation of PU products, the recycling of production waste also plays an important role. The following processes are already being introduced on a practical scale:

- Flock-bond
- Particle-bond
- Chemical recycling
- Raw material processes

It is generally not possible to state whether such processes are more ecologically beneficial than thermal re-utilisation.

| Quality Management

Customer satisfaction is the basis for sustained business success. Therefore, we want to meet the customers' requirements for our products and services now and for the long term futures.

To ensure success in a reliable way, Elastogran introduced a quality management system several years ago including all divisions.

Each business process is regularly assessed and further developed based on informative performance indicators. The target is to reach optimum efficiency and almost perfect coordination of all activities and operations. Each employee is asked to make a contribution to quality assurance and continuous improvement with its capabilities and ideas at its workplace.

The Elastogran quality management system is based on the international standard ISO 9001, supplemented by the additional requirements of the automotive industry ISO/TS 16949.

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