

## Customised Protective Packaging



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## Welcome to Storopack

This brochure presents the various alternatives for customised protective packaging made from expandable foams. Which value addition do they offer and how do they provide sustainable, efficient packaging? – you will find answers to those questions here.



Software packaging

Storopack is a specialist for protective packaging. Our promise to our customers is „Perfect Protective Packaging“ - packaging solutions adapted exactly to the individual requirements and integrated in the packaging process of the customer.

With our production locations in Europe and Asia, we are right in the middle of the market and close to our customers.

### Unique: Packaging with molded parts

All solutions have one thing in common: they contain expandable foams. This means that synthetic granules are expanded and formed into molded parts according to custom requirements:

- Expandable foams are very light
- They absorb shock
- They are excellent insulators
- They can take virtually any imaginable shape

In addition, there are many other benefits, which are illustrated in practical applications throughout the catalogue.



Customised Thermobox

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### Title theme: Modeled on nature

What has a physalis fruit got to do with protective packaging? As we find, quite a lot! The leaves shaped to form envelop the sumptuous fruit like a custom-made protective packaging and thus protect it against environmental influences.

This is exactly how the customised packaging made from expandable foam protects what is the most precious of all: your product.

For this reason, Storopack associates its own claim for „Perfect Protective Packaging“ with motifs from nature.





## On the Way to Perfect Protective Packaging

The products of our customers are the result of many diverse considerations and careful production. And they should also reach with exactly the same quality from there to the end consumer, by means of an efficient solution, which integrates seamlessly with the processing workflows of the company. In the Storopack process, this packaging work is divided in six business segments. Regardless of whether a single or all processing segments are required: The result is the perfect protective packaging for our customer.



Drop test equipment



Climate chamber

### One team for quick packaging solutions

CAD development, CNC prototyping and the know-how from years of experience of practical work - the design engineers at Storopack develop customised protective packaging based on this. Tests are conducted in our own test laboratory with drop test equipment and climate chamber. Construction of the tools is done in such a manner that optimal quality of molded parts is ensured. All this is done in team work. The benefits for the customer: short reaction times, no waiting periods as a result of outsourcing and the best conditions for simultaneous development.

CNC prototyping

**1. Analysis:** Study of the customer's product, the currently used packaging materials, vehicles of transportation and the general organisation of the packaging process.

### 2. Process and cost optimisation:

Together with the customer, Storopack works out measures for optimising the overall costs and making the packaging process ergonomic and efficient.

### 3. Development:

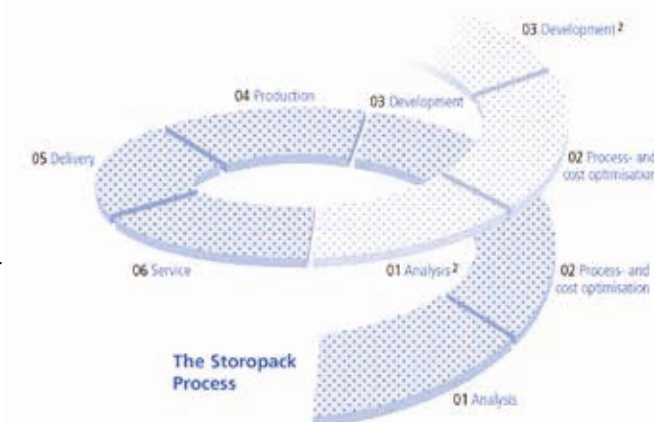
Based on the preceding analysis, the packaging solution is developed: at first as a CAD layout on screen, later as a prototype in the department for sample production. Apart from this, it also has a test laboratory with drop test equipment and climate chamber.

**6. Service:** Personal consultation also means continuous consultation. As a partner for new ideas, Storopack keeps updated about the innovations. Our customers are

kept informed about the advances in the state-of-the-art technology and the materials.

**5. Delivery:** The place and time is decided by the customer. Storopack ensures the delivery with its own fleet of about 70 HGVs. Just-in-time and if required several times a day.

**4. Production:** Molded parts for the packaging are mass produced using an aluminum tool. In all facilities, the same stringent quality routines are implemented. The project management functions transnationally.

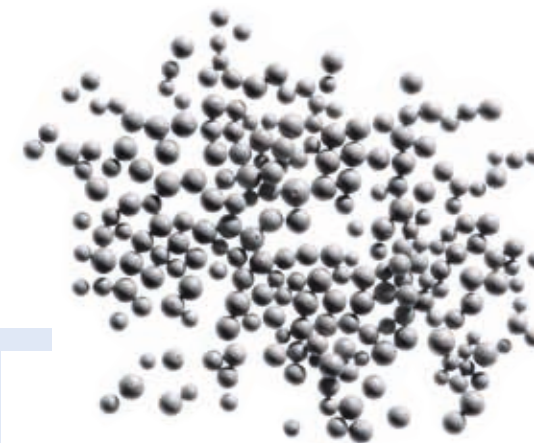




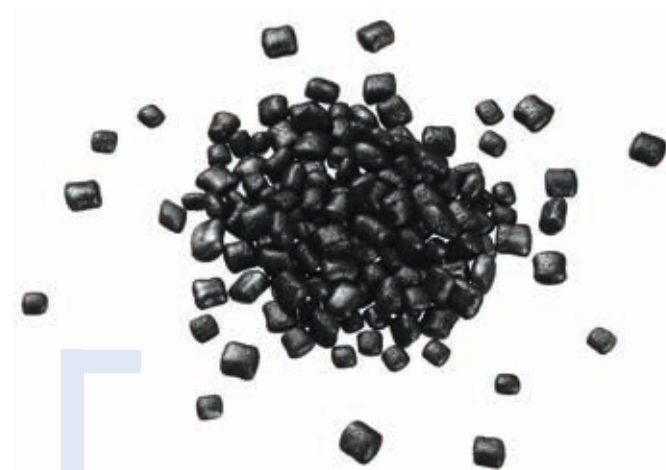
## The Materials: Expandable Foams



**Styropor®** is an all-rounder. Convenient and thereby also hygienic protective packaging protects all fragile products reliably. Styropor® is also very light because it consists of 98 percent air. Thermal conductivity up to 0.032 W/(mK).



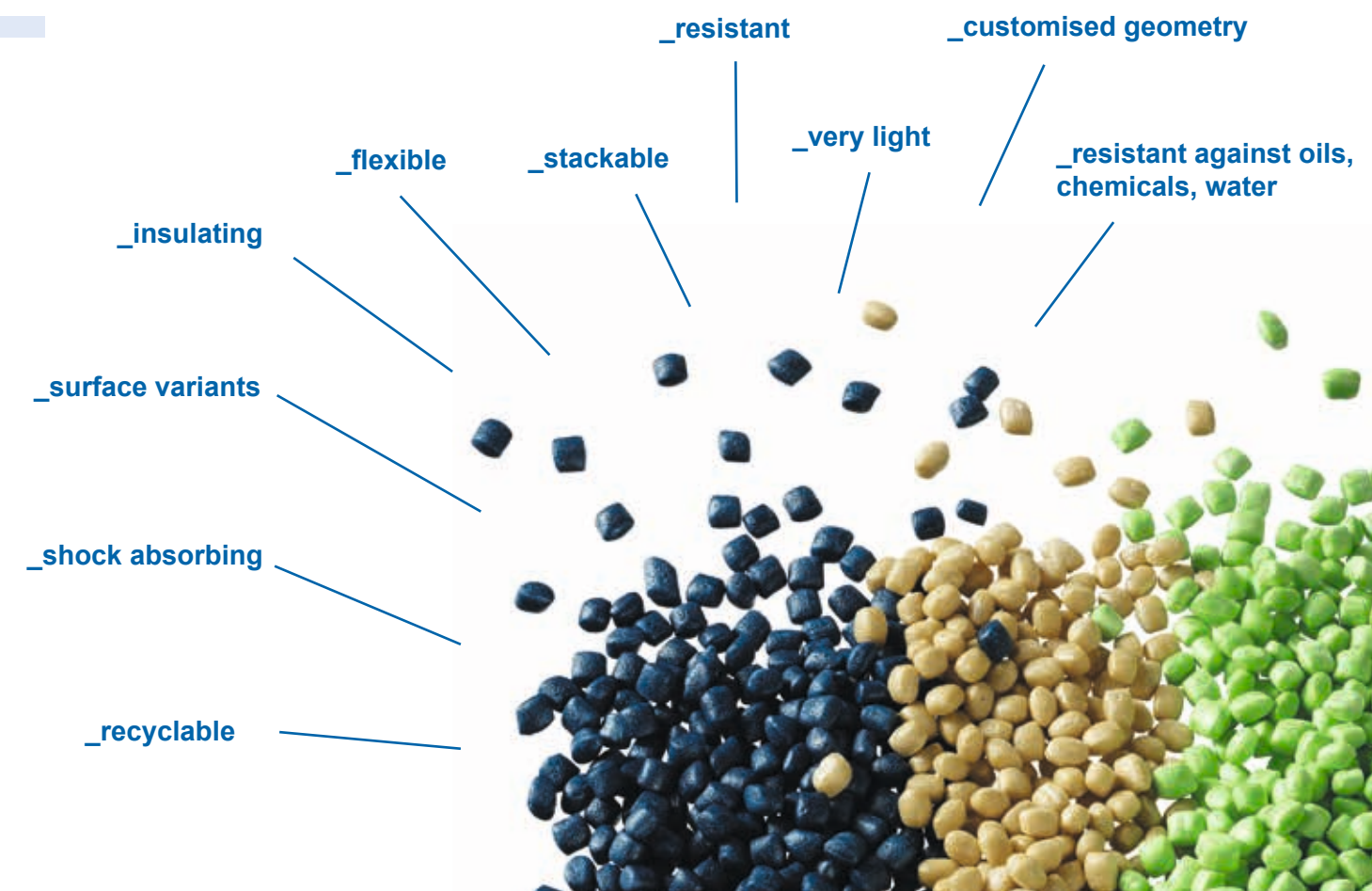
**Neopor®** is one step ahead in damping: its insulation efficiency is 20 percent higher than that of Styropor®. Therefore this silver-grey foam is especially suited for boxes involved in the transportation of chilled products. Thermal conductivity up to 0.030 W/(mK).



**EPP** is extremely tough. It is suitable for solutions involving multiple uses in several cycles, for example in carriers. The packaging can withstand repeated impact as EPP absorbs the incident energy very well. EPP is available in many different colors.

### Bulk density

Expanded Polystyrene (EPS, Styropor®), expanded Polypropylene (EPP) and Neopor® are available with various densities. Depending on the application and the requirements of the packaging, the molding can be foamed in the production with the appropriate optimal bulk density between 16 g/l and 50 g/l.



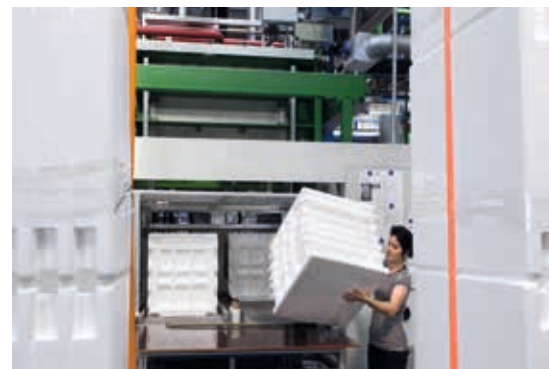


## Production: Molding the Raw Material

Storopack has production locations in Europe and Asia: This network means proximity to the customer. And it offers safety for the supply chains, which must remain consistent in all imaginable scenarios. The transnational Supply Chain Management enables our customers to implement international projects with one partner.

### How is the packaging produced?

For mass production, a two-part tool made of aluminum is prepared. The developer maximizes the use of the tools by mapping as many moldings as possible. The synthetic granules are at first pre-foamed and then foamed to the actual shape in the tool. The foaming process as well as the sealing of the molding is done by adding steam.



Stacking of molded packaging parts on pallets



Production of EPS packaging

Quality with system: Certificates by TÜV, AFAQ and Applus as well as audits according to DIN ISO 9001:2008 and ISO/TS16949:2009 authenticate the culture of quality.



Molded parts machine



Finished products warehouse

The quality management systems are continuously improved and our employees keep their technical know-how up to date through regular training.

In order to simplify the inventory management and the ordering process, an SAP and EDI link can be set up.



Loading of moldings on Storopack truck

Storopack has its own fleet with about 70 large capacity trucks with which the moldings are delivered to our customers.



## Protective Packaging Solutions

Storopack produces protective and transport packaging from EPS and EPP for various industries: electronics, optics, solar, sanitary, automobile and many others. Thereby the focus is always on our customers' products, which need to be transported to their partners, to dealers or directly to the end users, reliably and without damage.



EPP packaging for laptop

### Quantum leap in return packaging

A major laptop manufacturer was searching for new protective packaging for its returns management. The challenge: one universal package for all 100 model variants.

The solution is an extraordinary design achievement. The device is inserted in two EPP frames, the length, width and height of which are flexible. The smallest laptop does not get lost in it and the largest one does not burst open the frame. In each case, there is sufficient counterforce that fixes the device. Two carton sizes, with and without the enclosed add-on power supply pack, are enough.

The result for the customer: the complexity is radically reduced – in purchase and in packing space. Through leverage of scale effect, this results in considerable savings.



Packaging corners for solar collectors

Protective packaging made from expanded foams is stable and can be stacked: the moldings carry the weight reliably and remain fully serviceable under the stress of the transport – right down to the lowest layer of the pallet. In some cases, moldings for protection of the corners and edges are sufficient.



Protective packaging for inverter



Protective packaging for PCs

The moldings for packaging are built in such a way that

- optimal protection is provided with economical use of raw materials, the number of packaging units on a pallet is maximised
- accessories are integrated in space-saving layout
- the packaging process is ergonomic and efficient for the workers at the packing station



Protective packaging for printer

Moldings made from EPS and EPP provide excellent shock absorption: the cell structure of the expanded cellular plastic withstands the normal vibrations of the packaged goods as well as the energy of an impact in a crash. Solutions in the field of electronic devices must successfully pass as prototypes before the mass production crash tests are performed in the test laboratory.



## Thermoboxes

Regardless of whether there is active cooling available in the laboratory, warehouse or in the HGV, for temperature-sensitive products a defined temperature range must be guaranteed - with Thermoboxes made from EPS, EPP or Neopor®.

Consultation by Storopack offers expert answers for transportation requiring temperature-control taking all relevant factors into account. For example the climatic conditions during the transport, the pre-cooling of the packaged goods, the transportation time and the coolant used.

Storopack offers both customised solutions as well as a standard assortment with 22 different Thermoboxes and system solutions.

### Customised solutions include:

- Development of disposable and multiple use Thermoboxes, selection of different coolants
- Vacuum insulation panels
- CAD design, CNC prototyping
- Test laboratory with climate chamber and drop test equipment
- Qualification and validation of the packaging solution
- Mass production at consistently high quality

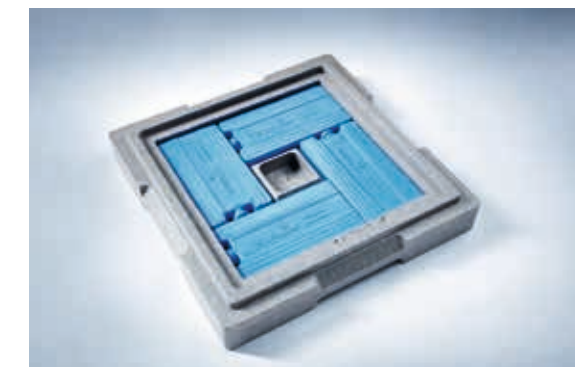


Thermobox with vacuum insulation panel



EPP multiple use shipper

For the pharmaceutical and biotechnology industry, Storopack has successfully completed diverse reference projects. Its other expertise is in insulation boxes for transport and shipping of fresh food products.



Battery compartment for standard box

### Standard assortment with 22 Thermoboxes

- Disposable boxes made from EPS and Neopor®, multiple use solutions made from EPP
- 1.5 l to 101.5 l internal volume
- System solutions with spacer rings for flexible extension of packaging space and slip-on freezing compartments for batteries or dry ice
- Coolants: thermal packs, gel cushion, dry ice



Thermo palette shipper

### Thermo palette shipper: A new parametric dimension

Is there a one-way palette shipper for air freight which guarantees a temperature range between +2°C and +8°C for 113 hours? And thereafter does not exceed an internal temperature of +25°C for the next 24 hours? This enquiry by an international pharmaceutical company was answered by Storopack with a solution which goes beyond the customary market limits in many ways.

The Shipper made from Neopor® has a capacity of 575 litres, but only weights 11 kg. Its delivery is economical, because it is assembled from six modules at the receiver's facility. The patented plug-in connections take care of the stability and the narrow joints. Packaging with an external carton is not necessary. Loading is done from the front side and is therefore ergonomically convenient.



## Carriers

Lower manufacturing depth puts higher demands on suppliers. Tight supply chains call for zero error tolerance.

The same applies to protective packaging: it must guarantee that products arrive in the same quality as when they left the factory.

EPP carriers do exactly this. The excellent energy absorption of the particle foam shields the packaged goods from the stresses of the transport.



Carrier for car ventilators

EPP is extremely robust and can be used for numerous cycles as a stackable multiple use solution, for example during the entire life cycle of a model series. The light weight of the carrier facilitates handling.

Storopack has many years of experience in the production of carriers, for example for tank caps, ventilation elements, electronic components or car body parts, decorative strips and lighting units.

### EPP: Plastics for stability

EPP is perfect for anyone searching for durable solutions for product protection; because the outstanding material properties of this synthetic remain intact even after prolonged use and intensive stress.

EPP has a high specific energy absorption capacity. Therefore if the material is set appropriately, it can protect the packaged goods against almost all normal stresses which arise during transportation. Even after repeated impact, the protective packaging made from EPP generally remains fully functional and free from any detectable damage.

The ideal solution for multiple uses.



Carrier for car lamps



Carrier for car components

### The quality production of Storopack is:

- Accurate: modern production technology takes care of a uniform foaming process, which means: no tolerances, accurately fitting holders
- Competent: know-how of sophisticated designs, for example, carriers with two densities
- Reliable: test routines for consistent quality
- Flexible: production shift to other international locations of Storopack
- Certified: according to DIN ISO 9001:2008 and ISO/TS 16949:2009



Carrier for armature elements

Carrier for tank cap



## Excursus: Technical Moldings for Maximum Product Use

Light weight, moldability, thermal insulation, shock absorption - these benefits of expandable foams are also made use of in various other branches of industries, beyond the application in protective packaging. With EPS, EPP and Neopor®, excellent products and production processes can be made even better. That is the function of the technical moldings.



Foam module and cast piece

### Lost Foam – an alternative casting method

- Moldings made of EPS for full mold casting („Lost Foam Casting“)
- Storopack provides consultation and support for Lost Foam-appropriate designing of the cast
- Production of the foam model: from prototype up to mass production



Fitted components made from EPP

### Automotive

- Fitting components made from EPP for cars for passive safety and passenger protection
- Combined with metals, EPP can fulfill many more safety functions
- In the visual field, lamination with films or materials



Insulation

### Building

- Molds made from EPS and Neopor® for insulation
- Construction components made from EPS and Neopor®, for example as modifiable element for drywell installation
- Formwork made from EPS
- The advantage at the construction site: low own weight, moisture-resistant



Perfume packaging

### Leisure and design

- EPS, EPP and Neopor® offer extraordinary material and form effects
- in all conceivable areas of life: as a packaging for perfume, as an article of furniture, as an ice chest



Insulation of heating regulator

### Heating and air conditioning

- Saves energy: insulation for pumps, heating circuits or boilers
- Double use: protective packaging and insulation in one
- Contour-fitting foaming: no thermal losses



## Sustainability and Environmental Protection

Customised protective packaging made from expanded foam synthetics ensures that the products, which were produced using a diversity of resources, are delivered to the recipient in undamaged condition or remain fresh longer. This way you contribute to environmental protection.



### REDUCE

Expanded foam synthetics are light in weight and reduce the consumption of fossil fuels during transport. They allow for intelligently designed protective packaging, which only uses materials when they are needed.

### REUSE

Depending on the design, the customised protective packaging can be used multiple times. This is particularly true for molds made from EPP.

### RECYCLE

Used moldings made from EPS, EPP and Neopor® are fully recyclable. The material cycles for these three substances are very well developed and contribute toward reducing the use of primary raw materials.

### EPS (Styropor®), EPP & Neopor®

EPS and Neopor® consist of 98 % air and only 2 % polystyrene; EPP consists of 95 % air and only 5 % polypropylene. The low weight of packaging made from expandable foams contributes to keeping the use of the fuels to a minimum during the transport.

Our technology centre develops packaging solutions with which materials can be saved through intelligent designs. EPS, EPP and Neopor® are re-usable, 100% recyclable and an excellent energy source for modern waste to energy facilities.



In the production of its protective packaging, Storopack uses a production process with steam and improves the utilisation of the raw materials and energy consumption through continuous optimisation of the production process.

Storopack supports its customers in the fulfillment of their climate targets and develops together with them the solutions which are customised precisely according to their requirements

### Vision & Guidelines

Storopack's commitment to economic and social responsibility is derived from the corporate philosophy. „Vision & Guidelines“ contains the formally agreed principles applicable to all employees.

