

## NextGeneration Thermopack

A MODULAR PACKAGING SYSTEM FOR THE SHIPPING OF FROZEN GOODS



The project Next Generation Thermopack developed an innovative packaging system for the distribution of frozen goods. Compared to conventional solutions a longer period of refrigeration can be realized with the same amount of dry ice. This saves costs and reduces the environmental impact. The prequalified packaging system is exclusively distributed by the K+S (Kühl- und Spezialtransporte GmbH) from Bremerhaven, which developed the solution of insulated container and cooling element together with the BIBA.

The transport of frozen food involves special challenges for logistics. Besides general hygiene standards the temperature control and the job safety of the handling process are central aspects. The project NextGeneration Thermopack has developed an intelligent logistics solution in order to meet the demands of this market segment more efficient and more sustainable for the environment.

### Engineering: Technological innovation in system design

By means of special cooling elements, a dry-ice based packaging system was realized, which reaches a constant cooling power with a reduced amount of dry ice. In combination with the newly developed thermal packaging specific temperature ranges can be set and maintained over hours to days. Designed as a one-way solution, only 100%-reusable materials are used for this purpose. The use of simulation models allows the application-specific adjustment of temperature and cooling times for frozen goods.

### Cost optimization: Determination of material and coolant

The custom-designed adaption of the packaging system is supported by an optimization models which allows the use of minimum resources according to required features. Thereby, material as well as coolant can be saved which considerably reducing costs. Additionally, workflow studies concerning the production and transport of the packaging system are included in the

optimization. Thus, a cost improvement of the whole packaging system can be achieved.

### Eco balancing: Environmental safety in online food trade

The use of insulated containers, which are made of EPS (expanded polystyrene), demands a responsible handling of raw materials. That is why the whole product development has been accompanied by a life cycle assessment according to DIN EN ISO 14040. Possibilities to reduce the use of EPS and to substitute it with other materials have already been sought during the development process. In doing so, it has been proven that the packaging solution is also attractive considering environmental aspects.

### Certification: Verification of ensured product features

The development of the packaging system occurred in accordance to the guidelines and requirements of the International Safe Transit Association (ISTA). For that matter, the development has been adapted to the mechanical requirements of the ISTA 3A. The ISTA 3A is a general simulation test for individual packaged products that will challenge the capability of the package and products to withstand distribution disturbances in the small parcel delivery system. Additionally, the verification of the thermodynamic properties was conducted by using the ISCSilver standards, which were adapted to European Climate.



BIBA is an engineering research institute at the University of excellence Bremen. It's committed to basic research and to application-oriented development projects. It also engages itself in practice-oriented implementations, thereby building on cross-national, institutional and interdisciplinary cooperation as well as on transfer. BIBA always surveys the entire value-added chain: from the idea, the concept and the production of a product through to the use and the recycling.

### CONTACT

BIBA - Bremer Institut für  
Produktion und Logistik GmbH  
Hochschulring 20  
D-28359 Bremen  
Fax: +49 (0) 421 218 50003  
www.biba.uni-bremen.de

Dr.-Ing.  
Michael LÜTJEN  
Tel.: +49 (0) 421 218 50123  
LTJ@biba.uni-bremen.de