

**Temp-Ex<sup>®</sup>**

MULTI USE THERMAL  
COVERS + BAGS



MULTI  
USE



# Multi Use Temp-Ex Thermal Cover Solutions

Provide thermal protection recurrently against temperature fluctuations occurring in different stages for all temperature-sensitive products such as drugs, food and non-food commodities during;

- Distribution and storage,
- Supermarket operations,
- Online shopping deliveries,
- Community Supported Agriculture (CSA) networks and food-bank distribution operations.

# Multi Use Temp-Ex; Why?

Durable; long service life in harsh conditions.

Reduced operational costs; high insulation quality makes shipment without cooling equipment possible.

Protects against climatic conditions [rain, wind, etc.] and environmental contaminants [dust, pollen, insects, etc.].

Retained values; reduces carbon footprint, saves energy, prevents waste by reducing poor cold-chain related spoilage.

Can be produced with client-specific design and dimensions, as well as standard products.

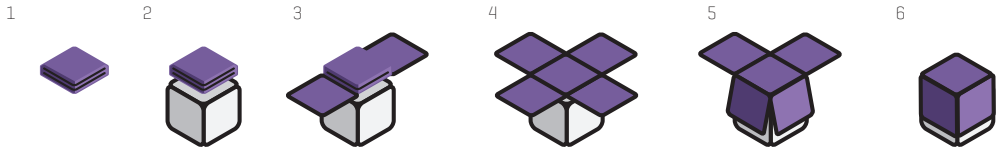
Fast and easy application. Facilitates operational flow.

WHO, IATA, GDP and UN CAT B compliant.

# How to Use?

Temp-Ex products are either standard manufacture, or client-specific.

All standard models, quad-winged or double-winged, are easy and fast to use.



Please don't hesitate to contact us for other standard models or operation-specific designs for your needs.

# Temp-Ex®

Performance testing of thermal covers is a crucial step in ensuring product protection throughout the whole cool chain. This critical step is nowadays carried out experimentally, which is a time and resource-intensive method. During these tests, thermal cover manufacturers are using different experimental setups and data processing methods. This non-standardized approach leads to numerous incomparable products in the market and confused clients with questions like "How many data loggers were used?", "Where were the data loggers positioned?", "How were the temperatures statically obtained?".

Besides the experimental performance tests, Sedef also utilizes also the numerical performance tests using computational fluid dynamics [CFD] simulations. These simulations are carried out within an hour, which makes it less time and resource consuming compared to the experiments. Continuous validation studies exhibit an excellent agreement between experimental and numerical performance tests.

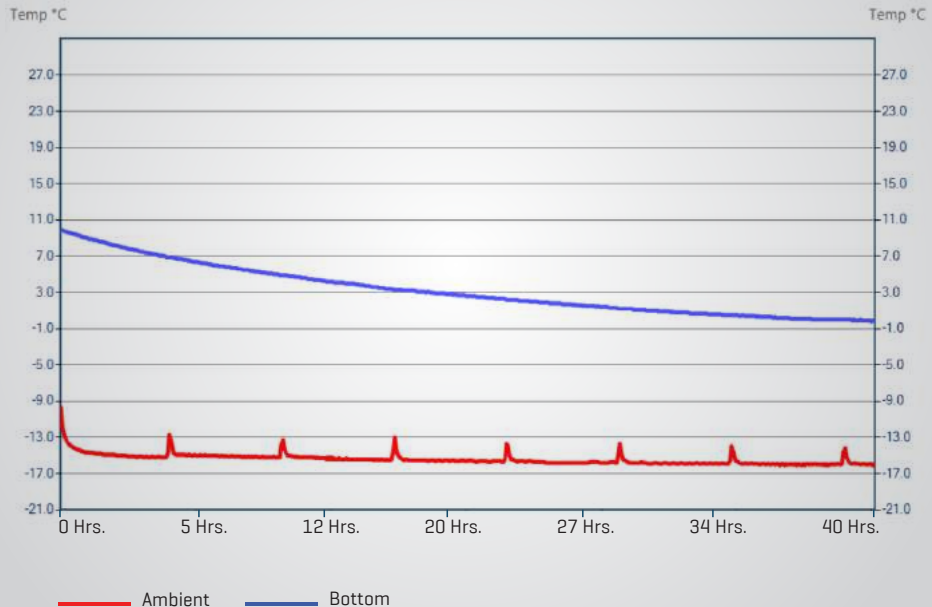


R&D



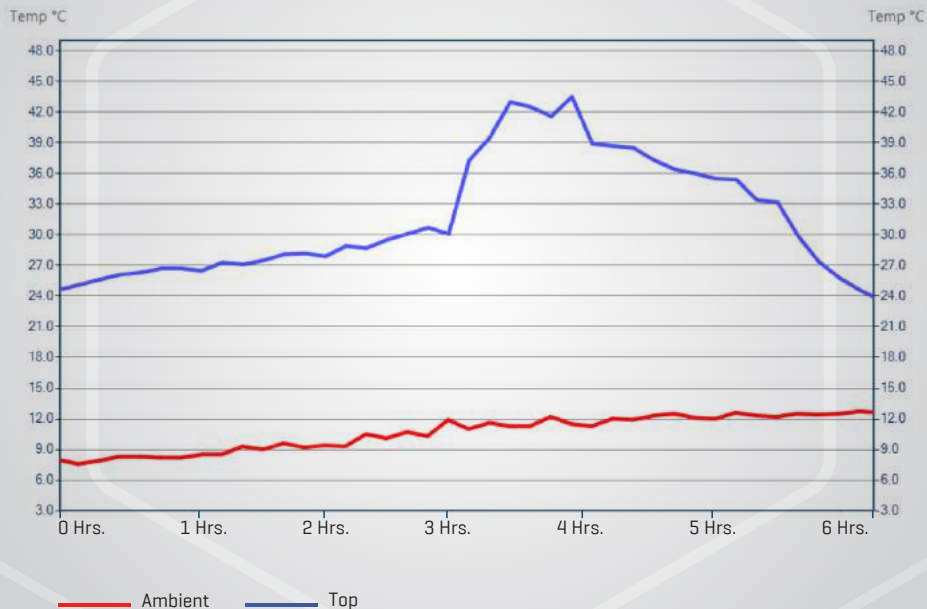
A result of such a CFD simulation is shown above. The high resolved temperature field in the product allows obtaining the minimum, maximum and average temperature statically. Flow simulation around the product leads to a more accurate convection calculation under different scenarios like in the cold store, on the tarmac and in the aircraft. The solar radiation calculation is carried out wavelength-dependent so that the direct, diffuse and ground-reflected radiation can be modelled. Such a detailed radiation calculation is crucial for an accurate assessment of the thermal covers reflectivity performance. Numerical performance tests are also capable of calculating complex tasks like phase change phenomena (e.g., PCMs).

## 2-8°C Cold Chamber Test at [-]15°C Pallet Cover



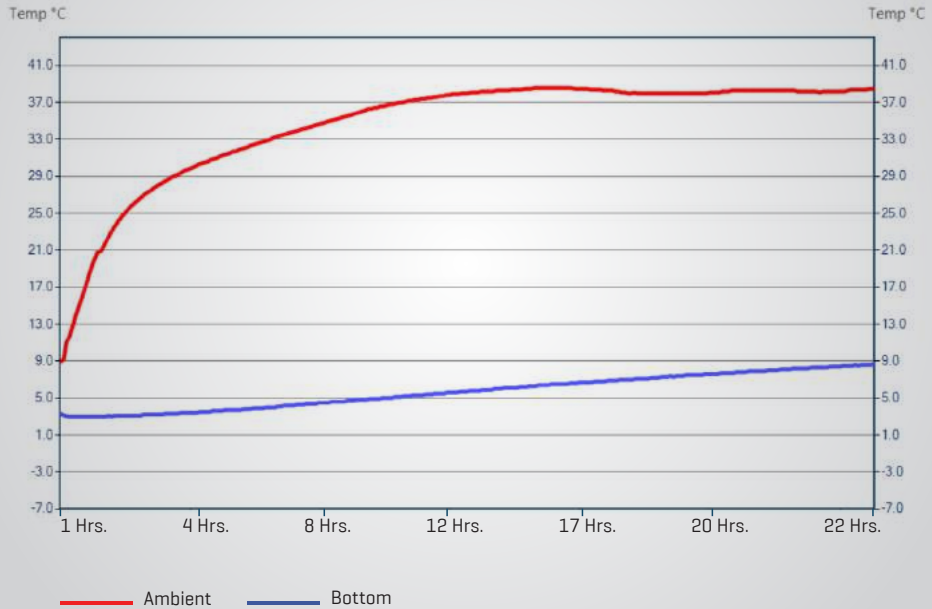
Product Start	Duration	1 Hrs	5 Hrs	12 Hrs	20 Hrs	27 Hrs	40 Hrs
Temperature	Product Temp	8°C	6°C	4.5°C	3°C	1.5°C	0°C
16°C	Difference	0°C	2°C	3.5°C	5°C	6.5°C	8°C

## 2-8°C Direct Sunlight Test at 44°C Pallet Cover



Product Start Temperature	Duration	1 Hrs	2 Hrs	3 Hrs	4 Hrs	5 Hrs	6 Hrs
8°C	Product Temp	8.5°C	9.4°C	11.4°C	11.5°C	12°C	12.5°C
	Difference	0.5°C	1.4°C	3.4°C	3.5°C	4°C	4.5°C

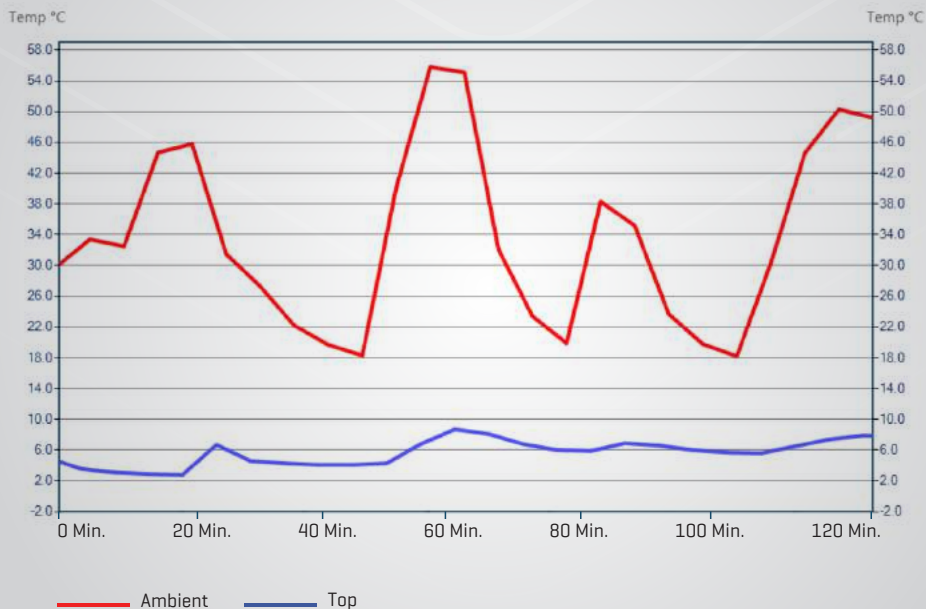
## 2-8°C Hot Chamber Test at 39°C Pallet Cover



Product Start	Duration	1 Hrs	4 Hrs	8 Hrs	12 Hrs	17 Hrs	22 Hrs
Temperature 3.5°C	Product Temp	3.6°C	4.0°C	4.8°C	5.2°C	7.5°C	8.8°C
	Difference	0.1°C	0.5°C	1.3°C	1.7°C	4°C	5.3°C



## 2-8°C Last Mile Delivery Bag Hot Ambient Test at 55°C



Product Start	Duration	0 Hrs	2 Hrs
Temperature	Product Temp	5.5°C	7.5°C
5.5°C	Difference	0°C	2.5°C

# Temp-Ex

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Temp-Ex declares that all the information released herein is based on the technical data of our best knowledge and belief and is reliable. Usage of this technical guide is intended to be undertaken by skilled staff at their own risk and discretion. The users of this guide can be sure, that no health or safety hazards will occur as a result of their particular conditions of use.



Because the final conditions of product usage is out of the control of Temp-Ex, Sedef make no warranties of any use of this information and therefore cannot accept any liability of use of this information. One should consider that the necessary pre-cooling and correct temperature management through out the cold chain is essential for optimal performance. Temp-Ex takes no liability for any damages may occur during the use of covers.

These informations supplied here cannot be taken as a licence of operation or a suggestion to infringe any patent.

For the best results, Temp-Ex Thermal Chain Solutions should be kept in their own original packages, under dry, normal temperature conditions. Temp-Ex Single Use range is for single or limited use to avoid any sanitary or pest problems.