

Aiding Pharma in Airfreight

TEMAX, a global manufacturer of cold chain solutions, presents its view on how a special thermally engineered thermal blanket can aid in the temperature protection of ambient pharmaceuticals in an airfreight cold chain

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Setting up a quality cold chain in the airfreight of time- and temperature-sensitive pharmaceuticals is not an easy task. Airfreight is known for its unique conditions.

Airfreight cargo is subjected to the local weather conditions, sunshine or solar power on the products, greenhouse effects, wind chill, etc, and extreme temperature environments (hot and cold), especially on tarmac locations where the airplanes are loaded in open-air. Cost-efficiency is another consideration, especially on low-price products and bigger volumes. Also, what about regulations and laws or norms, what about processes at the actors so the products are handled correctly, and so on? These are all questions that are challenged within the complete airfreight industry to

create an efficient quality cold chain from shipper to receiver.

To offer a possible solution, the company Krautz-Temax engineered a unique thermal blanket that offers a high-performing thermal resistance (hot and cold), offers resistance against solar power and greenhouse effects, has a minimal payload impact, offers a Good Distribution Practice-compliant solution, and is fully recyclable and even reproducible to raw material level, guaranteeing a minimal impact on the ecological footprint.

Some Things to Think About

Did you know: that a thick metal spoon in a hot cup of coffee is hotter than a thin spoon? This is due to the thermal heat transfer through the spoon, which

is the result of the material thickness and its thermal conductivity. That is why the Temax thermal blankets are manufactured with specially developed ultra-thin thermal air-bubble foils that generate a low heat transfer.

Did you know: that a building with a cavity wall construction technique reduces the heat transfer significantly? It is used as an insulating technique where the wall of a building is not constructed out of one single concrete construction, but is built out of two neighbouring walls, separated by a cavity (air space). When heat is transferred through this wall, the cavity will change the heat energy from conduction to radiation. At the next wall, the radiation needs to change back into conduction. This change of energy slows down

“ Airports are increasing security by accepting only fully stretch-wrapped cargo. This closed foil-seal creates a greenhouse effect, increasing product temperatures ”

the heat transfer time. Within the Temax thermal blankets, this energy change is repeated nine times due to the 10-layer blanket setup in which the layers are not laminated, but loosely connected, thus creating multiple cavity walls.

Did you know: that the power of the sun on the earth is $1,367\text{W/m}^2$? This is a lot of thermal energy that is created continuously during the exposure in the open-air. If you realise that a loading process of an airplane (open-air on tarmac) takes several hours, you can have a better understanding of the impact of this solar power on the temperature of the products. To offer resistance against solar power, reflection can be used. An average metalised reflection foil reflects 97% of the solar power, allowing 3% to get through. This seems little, yet, when the products are subjected for hours, the heat energy is enormous. The engineering of the Temax thermal blanket led to a 4x multi-layer reflection technique, meaning that Temax is able to reflect four times the incoming solar power.

Did you know: that reflection of solar power is only possible when a clear distance is kept between the reflecting surface and the object that is radiating (minimum 0.7cm according to tests)? This is one of the reasons why the multi-layer reflection system within the Temax thermal blanket is engineered with special clear-transparent separating air-bubble foils. With this setup, each individual reflection layer (4x) of the

Temax thermal blanket reflects at 100% capacity.

Did you know: that if a packaging system with a reflection foil on the outside is placed against another object (two boxes against each other), it does not reflect any thermal energy, and heat-flow conduction is created? That is why the Temax thermal blanket has extra transparent thermal bubble foils on the outside to offer maximum reflection at all times.

Did you know: that if a packaging system with a reflection foil on the inside is used in which the products (packed boxes) are in direct contact with the reflection foil, it does not reflect any thermal energy, and heat-flow conduction is created? That is why the Temax thermal blanket has extra transparent thermal bubble foils on the inside to offer maximum reflection at all times.

Did you know: that Brussels airport is obligating all shipments (pallets, boxes, etc) to be sealed completely by stretch foil due to safety issues (no small objects can be inserted at the airport)? Complete sealing creates a greenhouse effect when the products are standing in open air (tarmac), which will enormously increase the temperature under the sealing foil. The Temax thermal blankets already have separated outer thermal bubble foils and are therefore always subjected to greenhouse effects, which were tested and qualified. The extra wrapping foil (transparent) will have no effect on the thermal performance of the Temax thermal blankets.

Did you know: that the Temax thermal blankets are successfully used in hot and cold protection without any thermal energy generators such as gelpacks, dry ice, or phase-change materials? This means that the impact on the precious payload and its transport cost are kept to a minimal.

Did you know: that the Temax thermal blankets can be recycled to raw-material due to the loose material composition and non-laminated construction? All used materials can easily be separated and recycled, which makes Temax the only thermal blanket with minimal impact on the ecological footprint.

Did you know: that you can read more about this on our website www.krautz.org

Krautz-TEMAX is a global manufacturer of cold chain solutions for the logistics of pharmaceuticals, food products, and chemicals.

About the Author

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