

Overcoming the challenge of the Polar Vortex

WHITE PAPER



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If you weren't previously concerned about the effect temperature can have on your cargo, you likely are now. Across the U.S., the winter of 2014 was the coldest in 20 years and made the weather phenomenon known as the "Polar Vortex" a household word—and created a troubling challenge for shippers of temperature sensitive freight.

The parade of winter storms paralyzed cities, shut down government, grounded airlines, and found freight transportation often grinding to a halt. According to reports, the winter of 2014 will become the fifth most costly on record in terms of insured losses once all the claims are filed.

For those managers in the business of transporting sensitive freight, the Polar Vortex now holds significant meaning to them, and the 2014 winter will go down as one of the most challenging winters on record. With refrigerated equipment at maximum capacity and quotas needing to be fulfilled, leaving your product to sit idle on the warehouse floor was not an option—and neither was shipping your cargo in a dry van and risking catastrophic losses.

In order to overcome the increasing worry, savvy shippers are turning to passive temperature protection to increase the reliability in their surface transportation and even reduce their transportation costs. Let's examine how passive temperature protection is working in the world of freight transportation.

Passive Temperature Protection: Filling the void

The technology behind passive insulation (thermal blankets) has been around since the early 1990's, says Justin Garcia, vice

president at Protek Cargo, and has only improved since due to advances in material properties and construction.

It's been used among temperature sensitive shippers for years as a way to save on the extra cost of reefer trailers—or for the added "peace of mind" that product will arrive fresh. Unlike active refrigeration units, passive insulation does not stop the passage of temperature or remove it by replacing it with CO² or N². Passive insulation works by slowing down the heat transfer allowing cargo more time to move through risk points.

The main concern with using passive insulation is the lack of temperature control during movements through the supply chain. Though passive systems resist temperature fluctuations, they do not actively maintain a specific range. Whether this concern is relevant should be determined by a risk assessment based on budget availability, the temperature profile of the route, and the temperature limits within which the products must be kept.

Logistics managers normally select the best thermal protection their budget affords, choosing refrigerated units whenever possible. But for many, refrigeration is simply cost prohibitive or illogical given the cost of replacement versus risk. In such cases passive insulation is the best solution.

The key to determining whether passive blankets and covers are suitable for particular products is an understanding of the shipper's required temperature limits. Sometimes guidance is necessary, as a shipper may not know the difference between the limits of distribution tem-

perature and the often tighter limits of storage temperature.

Shippers often want the lowest cost of logistics and may choose to forgo thermal protection altogether. Such a decision could prove fatal without properly understanding the consequences and risk involved with shipping under general conditions.

Furthermore a clear understanding of stability data is also critical. All too often a requirement may specify a product to be kept within 55°F and 77°F (very expensive to maintain), when in reality the product could tolerate (without quality degradation) a wider range of 35°F to 86°F which can be much easier and inexpensive to manage. (Present an example)

Bottom line: Passive insulation is designed for shippers who can't ship their product

in dry equipment, but don't need the overkill of a refrigerated unit. It fills the void for shippers that fall right in between a reefer and dry van.

Passive Temperature Controlled Intermodal

With the rising cost of fuel, refrigerated units hard to come by, and over the road driver restrictions intermodal (IM) transportation has become the fastest growing sector of the railroad industry.

However, IM is not as easy as "ship and forget" for temperature sensitive shippers. In fact, the longer transit time presents more risk points the cargo has to travel through.

Temperature sensitive shippers who transport their cargo in dry IM containers without any form of temperature protection are taking a huge risk and probably

How Passive Insulation Works

The mechanics behind these passive blankets are simple: The core material traps the convective air while the foil directs away radiant heat from the surface, reducing heat exchange between product and environment. Cargo blankets are generally installed over the top of the palletized freight (20 pallets to 22 pallets) creating an insulating buffer form the ambient air above.

Under the thermal blanket, the physical mass of the product is a key factor. For example, a bulk liquid in large containers will change temperature at a much slower rate than small capsules of liquid. Keeping the palletized goods packed closely together and reducing surface space will help maintain the thermal mass.

Since heat moves toward the cold source, during very cold weather the heat from product loaded against the walls and floor in a truck will move outward. The best methods of preventing this heat loss and subsequent freezing or chilling damage are reducing the amount of surface contact of the product with the floor and walls.

Various loading methods may be used to reduce product contact with the walls and floor. For example, a center-loading pattern reduces box contact with the walls by as much as 90 percent compared to traditional loading patterns. Palletized loads should always be center-load-

ed away from the walls. Reducing the amount of surface contact will improve product arrival temperatures and reduce the chance of product freezing or warming in extreme weather conditions.



don't get much sleep at night, lying awake at the thought of temperature damaged loads scattered throughout the country.

With the huge economic upside of IM transportation, the relatively low cost of passive insulation, and its effectiveness at providing the right amount of protection to move it

Shippers often make the mistake of paying the higher cost of reefer trailers over an entire long-haul run of 1,500 miles when temperature control was only necessary for 200 miles through the desert in the summertime.

through those risk points, has the savvy shippers turning to passive insulation.

Passive controlled systems offer shippers flexibility in routing and modes and save shippers the extra cost of reefer trailers. If the majority of the supply chain journey is within safe limits of temperature, it can be frustrating to have to pay for temperature control that is only really required for a couple of short duration points.

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Rail intermodal is an extremely competitive market, with hundreds of competitors vying for business. Use and availability of passive temperature control systems, says Kirk Bockelman, J.B. Hunt's director of passive temperature controlled intermodal, is a competitive differentiator and a potential driver of revenue growth.

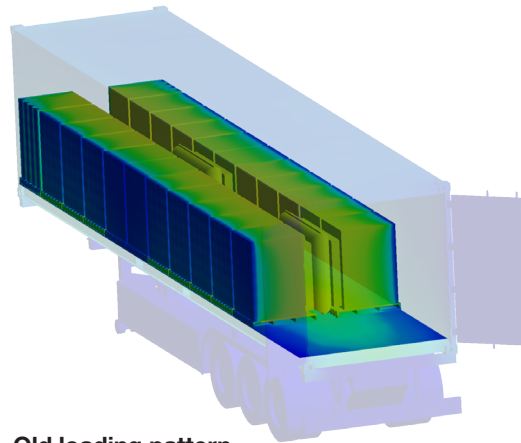
"If we've been awarded customer lanes on our dry intermodal business and we can keep them in a dry box with passive temperature control blankets during the winter, then we maintain the volume year round," Bockelman explains.

The alternative is that the customer will need to switch to a temperature-controlled option, "which may or may not be J.B. Hunt," Bockelman adds. "If passive temperature protection is a fit, it keeps the load volume with J.B. Hunt and provides a cheaper alternative than reefer equipment to the customer."

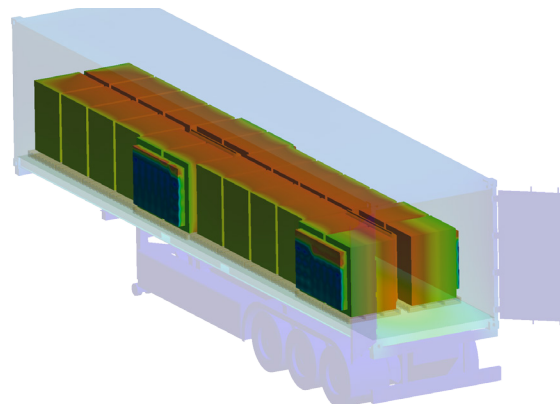
Constellation Wines: Cutting cost from vineyard to store

Constellation Wines (Lodi, Calif.) is one of the largest wine distributors in the world. The company ships 90 million cases of wine every year, about 90 percent of it from the Napa Valley.

Its wines include those from well-known Robert Mondavi Winery and many other vineyards.



Old loading pattern



Protek loading pattern

By any measure, Constellation is a huge user of freight transportation services. The shipper spends approximately \$80 million a year on domestic transport; and thanks to passive temperature control, Constellation's transportation spend now works out to between \$1.70 and \$2 per case, including the cost of warehousing. Rick Anderson, vice president of logistics for Constellation Wines, is the man responsible for such efficient shipping.

According to Anderson, Constellation ships 90 percent of its wine from California, which means moving its precious cargo through the California deserts where temperatures can approach 120 degrees in the summer and through the Midwest where temperatures can drop below zero in the wintertime can wreak havoc on wine. "In the wintertime, the wines can freeze and in the summertime the wines can expand and push the corks out of the bottle," Anderson says. "In any event, that's quality degradation."

For its outbound transportation, Constellation uses a mix of intermodal rail and truckload, depending on the distance traveled and available capacity in the market place. Anderson says that he tries to avoid more costly less-than-truckload (LTL) moves by using pool consolidation of such deliveries into full truckload shipments that move at lower freight rates.

Instate California shipments and those going to neighboring Arizona, New Mexico, Utah,

and Nevada go by truck. Longer shipments usually go by intermodal rail. But no matter the actual mode, Constellation's products are usually insulated by passive temperature-controlled blanket options provided by Napa Valley-based ProTek Cargo.

"My estimated cost is one-tenth of the incremental spend of what I would need to put a reefer in place to ship wine from California to New York," says Anderson. "To top it off, I don't lose any sleep at night because I know I have a cost-effective solution working for me."

"You can only produce so much wine," says Anderson. "I want to go to extraordinary ends to assure that I can celebrate this product and not have to worry because it might freeze in transit when we go through Chicago in the wintertime."

Another attraction for Constellation is that the process is environmentally friendly. Unlike reefer cars that product carbon dioxide, the blankets are carbon neutral and emit no noxious fumes or other gases.

The bottom line, says Anderson, is that the passive temperature control blanket systems have allowed him to protect his product against quality degradation at an extremely low shipping cost. "If I can find a more collective method to move product besides using an entire reefer trailer, that's a big financial win for my company," he says.



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