



# Desert Farms uses TT Sensor Plus™ to optimize shipping



Walid Abdul-Wahad is owner of California-based Desert Farms. He was inspired to market camel's milk in the United States during a visit to Saudi Arabia. There, he first tried the product, which is typically sold by nomadic Bedouins. Camel's milk has been part of the Bedouin culture for millennia.

In modern times, many in the Middle East tout camel's milk for various health benefits. Realizing there might be demand for it in the U.S., Walid established Desert Farms. He now works with a network of three Midwestern farmers—all Amish—who raise camels, package their milk and ship it to customers across the country. The milk is packaged in 16-oz plastic bottles, then shipped either fresh or frozen in insulated containers packed with dry ice.

To ensure quality, Walid needs fresh milk to be kept below 40 degrees Fahrenheit during shipping, and frozen milk ideally

kept below 0 degrees. That's a challenge, as multiple variables can impact the milk's temperature while in transit. These variables include time of year (warm versus cold months), destination (warm versus cold climates) and shipping time (overnight versus ground).

“ *This kind of information helps make our operation more efficient and helps the customer understand why they might have to pay more to ship faster.* ”

*Walid Abdul-Wahad*  
owner of California-based Desert Farms

In each shipment a TT Sensor Plus was placed inside of the container and one on the outside in order to monitor the temperature of the product and the outside environment.

## Identifying potential shipping issues

To better understand the impact of these variables, and identify potential issues during shipping, Walid and Avery Dennison worked together on a trial using the TT Sensor Plus.

“TT Sensor Plus is a small, smart label that logs time and temperature,” says Mary Greenwood, director of new technology and business development, Avery Dennison. “It offers an innovative, easy-to-use, cost-effective way to record the temperatures a shipped item is exposed to throughout its supply chain journey. It was designed using sensor technology and temperature data logging capabilities, as an alternative to the bulky temperature data loggers commonly used.”

For the trial, credit-card-sized, single-use, TT Sensor Plus sensors were placed in eight Desert Farms shipments to customers in four states. The trial took place in March and April 2016. In each shipment, one sensor was placed inside the shipping container, while one sensor was adhered to the outside of the container. This let Walid track the temperature of the product and environment in which it was shipped, such as the inside of the trailer.

The TT Sensor Plus data was easily read by tapping the sensor with a near-field communication (NFC)-enabled mobile device. It showed six of the shipments arrived at their destination having made the journey within the preferred temperature range.

Two shipments showed temperature spikes outside of the range. One was due to cracking of the insulated container, and one was due to the evaporation of the container’s dry ice.

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director of new technology and business development,  
Avery Dennison





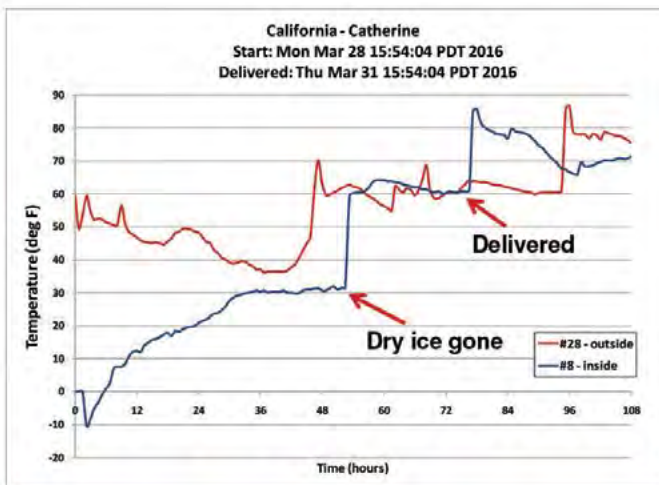
## Data that helps optimize shipping practices

Walid is now using the trial data to optimize his shipping practices. It's helping him understand, with greater precision, the best way to ship based on the variables mentioned above.

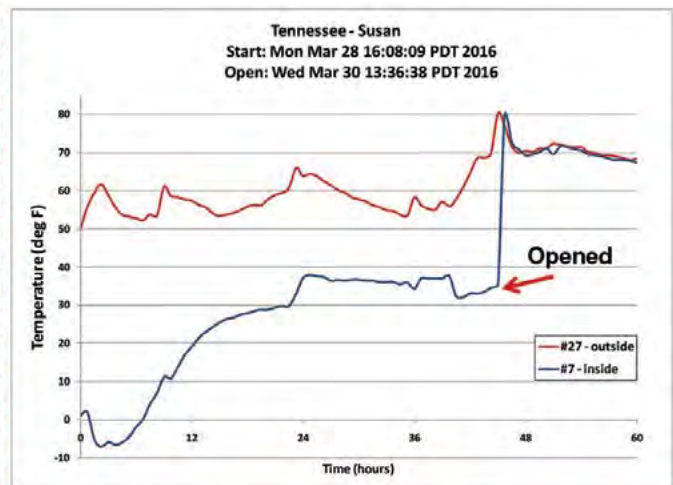
"We still want to do more testing, but the data has been helping us understand shipping challenges," says Walid. "So, maybe we only should ship second-day to a customer in a certain location, at a certain time of year. Another location might be fine with ground shipping. This kind of information helps make our operation more efficient and helps the customer understand why they might have to pay more to ship faster."

Walid also remarked on the ease of use of TT Sensor Plus. "I'm working with Amish farmers, and of course they don't use a lot of technology. The sensor is simple for them to use. Not having to train them definitely helps."

Going forward, Walid is planning additional trials with TT Sensor Plus to understand how to further optimize shipping. He aims to ensure customers enjoy fresh camel's milk—delivered to their door or store—even when temperatures in transit reach triple digits.



Temperature	Time	Note
>32 °F	53.25 hours	Dry ice gone
>45 °F	53.25 hours	<b>Before delivered</b>



Temperature	Time	Note
>32 °F	23.25 hours	
>45 °F	45.75 hours	Opened

TT Sensor Plus helped Desert Farms identify an opportunity to improve a two-day shipment to California on March 28, while suggesting a two-day shipment to Tennessee on the same day was optimized.

All comparisons are believed to be reliable and accurate. However, the furnishing of such information and comparisons is for reference purposes only and does not constitute a warranty of any kind. Actual product performance should always be tested for fitness-for-use

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