

Enter the Cold Spin Zone

Innovation keeps multi-temp trailers within precise temperature ranges. *By April Terreri*

We all know the challenges involved in keeping several different temperature zones within a trailer stabilized throughout the cold supply chain so that product integrity remains intact. Food must be kept not too cold and not too warm—but just right. Meeting these challenges head-on, the industry continues to offer more sophisticated and better-performing temperature control products using innovative technologies in equipment, accessories and even in configuration mapping.

“The same issues people have to deal with in single-zone trailers are just exacerbated in multi-zone trailers,” says Jeff Leshuk, general manager of professional services at Sensitech Inc., Beverly, MA.

“The days of two-temperature compartments are, for the most part, over,” notes Chuck Carey, national accounts manager at Randall Manufacturing, Elmhurst, IL. “Three or more temperature zones are now the norm in most trailers because customers are more demanding today in how they measure product integrity.”

Even day-to-day activities like opening and closing trailer doors during delivery, add more challenges to the mix. “Every time you open the door, mois-



SINGLE VS. MULTI: Multi-temp refrigeration is different than single-temp systems because there are a number of set points that have to be maintained accurately.

ture tends to be more of an issue and it can damage cases of product,” says Jack Ampuja, managing partner of Logistics Solutions International, Buffalo, NY.

The industry continues to produce more efficient remote evaporators for the diverse temperature zones now required in food distribution trailers, says Dan Caffrey, national accounts manager for ROM Corp., Belton, MO. “The faster compartments can return to set points, the sooner the refrigeration unit shuts off and fuel savings, reduced main-

tenance and increased product integrity are benefits associated with reduced run time,” he says. Industry experts recommend properly pre-cooling trailers to assure good air circulation.

Two issues arise when trailers are unloading. First is losing the prescribed zone temperature to the outdoor temperature. Because multi-zone trailers usually are delivering to multiple destinations on a single route, the doors are being opened frequently, which can allow heat to enter the interior, says Leshuk.

The other issue has to do with

a general misconception that keeping the reefer unit running while doors are being opened will hold temperatures better. “This says to me that some in the



TWO BULKHEADS: Creating multiple zones in a single trailer allows for greater product mix.

industry need education about what should happen,” Ampuja says. Reefer units should always be turned off during loading and unloading.

“It’s not one of those intuitive things,” Ampuja explains. “The reefer up in the nose of the trailer is pushing out cold air, which sinks as it travels to the back of the trailer. It exits the trailer down around the floor area and that creates a vacuum and draws the warm moist air in from the top, causing moisture dripping from the ceiling. So the unit winds up working that much harder to dry out the air.”

Mike Murdock at Carrier Transicold, Athens, GA, adds the industry sometimes overlooks proper loading practices. “People need to understand that multi-temp refrigeration is a whole different operation from single-temp systems because there are three set points that have to be set and maintained accurately,” says the trailer prod-

uct manager. Sufficient air flow to the trailer’s remote zones creates an envelope of air around the products, protecting them within their proper temperature requirements, says Murdock. Cooling capacity and efficiencies depend on managing refrigerant flow within the system. “We use cross-hatched tubing for better heat transfer. This is very important with a multi-temp trailer with remote evaporators because you are dividing up that capacity among several compartments,” he says.

Trailer size is related to the type of food distribution involved. “The standard size for our trailers is 36- to 42-feet long for the multi-stop, multi-temperature market,” says John Sommer Jr., sales and marketing manager for Kidron of Kidron, OH. “We offer low-deck trailers that make off-loading a lot quicker and simpler for drivers.” These trailers use the trailer’s air suspension system to dump air, thereby lowering the trailer by up to 12 inches.

Kidron’s trailer body walls are constructed with the company’s new UltraFoam insulation with an R-value of 36. “Since we are focused on the multi-stop, multi-temp trailer where doors are being opened many times throughout the day, we have to make sure the refrigeration unit can recover quickly, and this is where UltraFoam helps,” Sommer says. The foam’s light weight reduces the trailers’ weight by as much as 800 pounds, which helps when distribution companies are backhauling trailers.

Often overlooked in the multi-temp arena is heating capacity.

“Not only do you want to cool the compartments, but in some cases you will want to heat compartments,” Murdock says. “If you have perishable products that need to be kept at 38 degrees, and the outdoor temperature is minus 20 degrees, your unit will have to run in the heat mode,” he says, adding that Carrier uses an electric heating system to maintain consistent temperatures.

Because of the inherent nature of the industry—in loading and unloading products day in and day out—end users want damage-resistant trailer interiors, says Dale Frank, national sales manager, temperature-controlled products at XTRA Lease in St. Louis. “It’s a common problem, especially with people using load bars,” Frank says.

To help eliminate interior damage, XTRA Lease suggests using Great Dane puncture guard or Bulitex liners for interior trailer walls for lease opportunities. Bulitex is a thermoplastic composite using multi-layered woven fiber technology rather than traditional chopped fibers. “We also spec heavy aluminum liners over plywood for lining our ceilings for our lease customers to address this issue,” Frank says.

Smart Assets

“Probably one of the most exciting things happening in the trailer industry today is the influx of new technologies that help the industry thrive because carriers run on such low margins,” says Patrick Brennan, communications leader at GE TIP, Devon, PA. “We are turning what some might have referred to as dumb assets into smart assets.” Data

DIVIDING LINE

Efficient Configurations

A major challenge to the cold supply chain is designing a multi-temp trailer to suit current and future needs. “The challenge here is designing the unit with enough flexibility to handle any day-to-day or future changes in a customer’s business or product mix,” says Charlie Bronson, senior vice president of sales for PLM Trailer Leasing, Walnut Creek, CA.

Devon, PA-based GE TIP uses a center divider running the length of the trailer’s interior. Horizontal dividers can create a third or fourth zone. “Our units are suited for larger retailers who might need a larger load delivered at one time,” says Patrick Brennan, communications leader at GE TIP. “The advantage of this type of configuration is the ability to set a stack of pallets on a small forklift truck and have the truck move all the way to the nose of the trailer to load and unload pallets.”

Proper bulkhead selection is paramount to successful temperature control, says Dan Caffrey, national accounts manager for ROM Corp., Belton, MO. “Even significant cost savings attributed to the best cooling systems can be completely lost from installation of the wrong bulkhead system,” he says. Top-quality bulkheads can also help reduce reefer run time significantly.

Configuration designs, whether using linear dividers or horizontal bulkheads, depend on the types of products being transported. “For instance, you might have ice cream (stored at about minus 15 degrees) in one zone, frozen vegetables in another,” says Erik Pollack, rental and remarketing specialist at GE TIP. “By using a horizontal bulkhead to close off the two linear frozen sections, you can create another zone for bananas and fresh fruits and vegetables.”

Ron Hagen, the vice president of sales at F/G Products, Rice Lake, WI, notes center dividers are a popular choice for small and medium foodservice companies. “It’s easier to manage three temperatures with a center wall than with horizontal bulkheads,” he says. “And these companies typically make a lot more stops and their product mix can change every day so they can configure according to their load for that day. It also allows for more product to exit the back door without breaking the cold chain during offloading.”

Before designing a trailer for a customer, consultants at F/G Products develop a blueprint of how cube is utilized in a particular configuration, Hagen says. A common foodservice configuration might include a frozen zone in the nose of the trailer, with some of those products being unloaded from a side door. “The other two temperature zones would exit from the back,” he continues. “You could have a combination of horizontal bulkheads and a small center partition compartment, or you might just have a center partition system, which is most common.”

Today’s bulkheads are much more efficient than those of several years ago. “Our bulkheads have a much higher R-value and they retain about 96 percent of their R-value even after several years’ use,” says Chuck Carey, national accounts manager at Randall Manufacturing, Elmhurst, IL.

“We use dividers made with our composite technology so they can withstand hits during loading and unloading pallets,” says Matt Nelson, vice president of marketing for F/G Products.

“Our multi-temps allow storage of refrigerated goods for one customer on one side of the center divider—and the other side can travel at the ambient temperature with standard goods for another customer,” GE TIP’s Pollack says.

Temperature seepage is minimal, says Pollack, because the bulkheads—made of thick polyurethane insulation foam—are sealed. Temperatures are regulated by the main reefer unit—for the two linear zones—and by the evaporator in the back of the trailer for the third zone.

Strip curtains are experiencing a surge in demand, says Carey. “They are very effective in maintaining proper temperatures—and with HACCP and more customer expectations for better performance, the curtains continue to be popular products,” he says. —A.T.



SAFETY NET: An insulated bulkhead used to protect temperature in a van body has a little more intricate design than the typical bulkhead .

loggers feed data into the cab so drivers can see what’s happening in the trailer.

Our experts note cutting-edge technological developments include remote RF- and satellite-based communications, diagnostics and data-flow capabilities, as well as the ability to deliver records for compliance and food safety purposes.

“For example, in an untethered mode, a satellite-based unit can send data to the carrier or even to an end customer via the Internet, showing a record of the temperatures maintained and the associated times,” Brennan says.

Murdock at Carrier notes the industry is really tuned into RF communications. “Yard-monitoring systems are really making the job a lot easier,” he says. From a computer terminal, personnel can locate equipment and monitor set points. “You can change set points remotely or pre-trip the reefer unit to pre-cool it and make sure everything is working properly; whereas in the past you would have to send someone out to the yard to manually turn on all the units and then set all the set points.” Another time-saving and cost-effective RF-communications application is automatic data

Refrigerated Logistics
hotproducts



The Citadel Bulk container from **Buckhorn Inc.** is a 48-inch-by-45-inch-by-46-inch collapsible container that can hold up to 300 gallons 3,000 pounds through a number of distribution channels. It has smooth surfaces, rounded edges, a unique lid design with recessed latches to secure it from multiple anchor points, contoured channels and edges that lay flush with the side panel. The polypropylene container is resistant to temperature extremes and weather conditions. www.buckhorninc.com.

downloading at the completion of a delivery route.

While the technology hurdle has been achieved, the industry is still waiting to have this kind of technology available at a price point that can allow carriers to make good ROI decisions, Brennan says. Many in the industry say that is happening quickly. In fact, Susan Bonacci, director of marketing for Sensitech, says the company plans to launch the industry's first in-transit RF temperature monitor later this year.

Telematics, widely used in other industries, are finding practical applications in multi-temp refrigeration. "Telematics is a term used for data transfer and data utilization from moving assets," explains Michael Golden, product manager for telematics solutions at Minneapolis-based Thermo King Corp. This technology is used not only for gathering time-temperature data, but to satisfy compli-

ance mandates (HACCP and FDA, for example), exception reporting, asset utilization and load-loss claim protection.

Subway, for instance, mandates downloads every day. "Say you have 100 trailers in your yard," Golden says. "Having a lot of personnel walking around just downloading is expensive for a carrier. Using telematics, data can be transmitted wirelessly back when the trailer arrives in the yard."

When a large customer like Sysco Corp., Houston, rejects a truckload of lettuce because it is too warm, a carrier has some leverage with this kind of technology. "The truck driver can download data right there, proving he kept the temperature within range. So the liability falls off the transporter," Golden says. "These kinds of devices offer protection against liability and are a way to trace back the ownership of the problem."

Thermo King's TransScan is a temperature and conditions recorder that can monitor up to four temperature zones. "If a transporter wants to provide a journey ticket or proof of delivery from point A to point B, he prints it out then and there for the customer," Golden says.


Thermo King is working on an integrated solution for multi-temp trailers—similar to its DAS (data acquisition system) single-temp units—that does not need a data recorder because the recording capacity is integrated into the controller. "We are working on integrated solutions to bring costs down," Golden says.

Other issues finding solutions through technology include electronic sensors for security—such as monitoring unauthorized entry and unexpected load shifts. Compression technology continues to advance for increased efficiencies using microprocessor controls.

Cool Vistas

While manufacturers continue to develop products to maximize the assurance level of deliveries of top-quality foods, they point to issues of training needing to be addressed among the distributor community. In addition to fundamental operations procedures, they cite proper loading and unloading practices are critical to reducing issues of product loss.

"We provide personal training to help customers with the complex issues of loading and we understand there are factors such as personnel changes within companies," XTRA Lease's Frank says. "We're happy to provide this value-added service because we understand our customers don't always have time to learn the whole concept." Others in the industry also offer on-site training.

The industry looks to a future where training and product utilization merge to offer higher efficiencies for everyone. Taking into account the newest technologies available in equipment options, distribution routing and trailer interior configurations, and refrigeration capacities can produce reliable and cost-effective solutions for everyone. 



For information about Sensitech products and services, call:

978-927-7033

or visit their website:

www.sensitech.com