

Case Study:

Our solution helps get diabetics treated with active living cells

**DANGEROUS
GOODS** A DIVISION OF
BERLIN PACKAGING

A bioengineered product is improving care for diabetic patients who have painful foot ulcers—and a shipping solution from Berlin Packaging plays a key role in making it work.

Made by a leader in the research and development of regenerative medicine therapies, the product simulates human tissue. It contains living cells that work with the patient's own skin to better heal hard-to-treat ulcers. So far it has been used on more than 60,000 diabetic patients with proven performance.

A shipping container that serves as the hospital's freezer.

Because the product contains living cells, it must be kept cryogenically frozen to work—from the moment it is produced in the manufacturer's advanced labs, until the moment it is used to treat patients in the operating rooms of hospitals across the country.

Packing the tissue in dry ice maintains the required temperature of -75°C ($\pm 10^{\circ}\text{C}$), but the dry ice sublimates quickly at room temperatures, and even in conventional freezers. Few hospitals or physicians' offices have the special cryogenic freezing equipment to store the tissue for long periods. So in addition to making sure the samples arrive at dry-ice temperature, the shipping solution must maintain temperature at the receiving hospital until the procedure takes place.

PUR presents problems.

When this temperature-sensitive product was first introduced, the manufacturer delivered it using polyurethane boxes with three-inch-thick walls, and plenty of room to surround the tissue samples with dry ice. The dry ice was delivered in blocks, which had to be manually shaped to fit specially designed slots.

This typical solution for dry-ice shipping had several limitations. It was rated to maintain temperature for 48 hours, which meant that almost any overnight shipping delay could result in product failure. The short temperature window also presented a scheduling challenge: operations had to take place within hours of package arrival, and could never occur on Monday because a Friday or Saturday delivery would result in lost product over the weekend.

The polyurethane boxes provided room for two tissue samples per container, which limited the ability of physicians to choose the proper graft—up to five different options are available.

If an operation had to be rescheduled because of a change in the patient's condition, the short temperature window also limited the hospital's ability to return product so that it could help another patient.

PAYLOAD

Bioengineered tissue product

TEMPERATURE PROFILE

Dry ice (-75°C to $\pm 10^{\circ}\text{C}$)

CHALLENGE

Maintain temperature during shipping and at receiving hospitals or physicians' offices

SOLUTION

Custom, reusable Aerocore boxes that hold up to five tissue samples

RESULT

71% cost savings per shipment; zero failures after seven years and more than 100,000 shipments; temperature maintained for 110 hours at 40°C ambient temperature.



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For more information:



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Contact your DG Consultant

A temperature-sensitive solution.

A new shipping solution that would address these limitations was designed, employing one-inch thick Aerocore vacuum insulated panels (VIPs), which offer the highest insulating properties of any commercially available insulation.

Each Aerocore box holds up to five tissue samples with a relatively small amount of dry ice. The new solution maintains temperature for 110 hours, or nearly five days, with outside ambient temperature of 40° C—and longer at more typical ambient temperatures. This gives both the shipper and receiving hospitals much greater flexibility.

The durable Aerocore boxes are shipped in standard corrugated containers and are designed to be used multiple times. So in addition to being able to return samples that can't be used, most hospitals routinely ship the empty containers back to reduce waste, which lowers costs and benefits the environment.

Just as the tissue product represents an innovative new treatment option for diabetic patients, the shipping solution represents an

innovative new option for the physicians who use it. Aerocore boxes deliver dramatically lower shipping costs while eliminating the risk of product loss due to temperature failure.

- Physicians and hospitals using the product have greater scheduling flexibility and the ability to return product that can't be used.
- Tens of thousands of patients are being treated, in part because of more reliable access to an effective therapy.

"This solution design is the best we've seen—nothing matches their insulation value and longevity," the manufacturer's manager of engineering said.

	Standard Dry Ice Shipping	Aerocore Shipping	The Aerocore Difference
Insulating material	Polyurethane	Aerocore VIP (carbon-based)	
Box size	14" x 15.75" x 13.5"	10.25" x 12.25" x 13"	45% lower internal volume
Coolant	20 lbs. dry ice	8.8 lbs. dry ice	56% less coolant
Total weight (DIM weight)	25.4 lbs. (15.3 lbs.)	13.9 lbs. (8.4 lbs.)	45% less total weight
Shipping method	Next day air	Next day air	
Shipping cost	\$145	\$106	27% less cost per shipment
Rated temperature window	48 hours	110 hours	129% more time to use/return product
Samples per container	Up to 2	Up to 5	150% more product per box
Shipping cost per sample	\$72.50	\$21.20	71% cost savings per sample



Dangerous Goods is a Division of Berlin Packaging, North America's premier Hybrid Packaging Supplier of plastic, glass, and metal containers and closures. With over 33,000 available SKUs, over 120 packaging consultants, and more than 90 sales and warehouse locations across North America, the company has the right products, expertise, and geographic proximity to help customers increase their net income through packaging products and services. Berlin Packaging supplies billions of containers and closures annually as well as warehousing and logistics services for customers of all sizes in all industries.

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