

Introduction

Biological pharmaceuticals are at an all-time high with the advent of COVID-19 as are the needs to find solutions for delivering these medicines to consumers under safety guidelines. The Vaccine Cold-Chain aims to satisfy these guidelines by utilizing a cold storage unit properly transport vaccines from the manufacturer to the patients. The CDC calls for refrigeration units to run at 2-8°C for the entire duration of transport 1. IPC aims to provide a single packout solution to maintain these temperature ranges across multiple temperature environments – reducing the cost and management of working with numerous packing loadouts for different environments while also keeping your vaccines safe. To accomplish this, IPC is using its own insulation box liners and phase changing materials (PCMs) to provide a simple shipper box for this cold-chain demand.

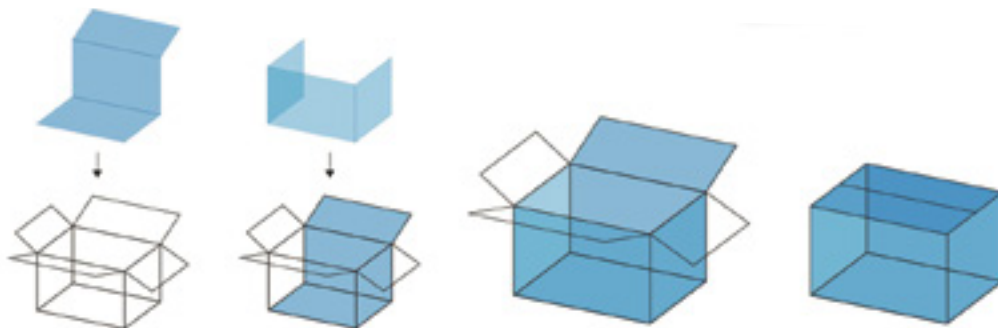
The Technology

PopupLiner thermal box liners are IPC's solution to a high performance thermal container. Each PopupLiner box liner is composed of two three-panel tri-fold liners for a six-sided box. The insulated boxes are unique in that they provide an alternative form of temperature-control packaging that is fully collapsible and compressible using IPC's patented technology.

(Patent #US 8,333,279)



Easy Assembly



PCM packs are passive thermoregulators that provide control over package temperatures by releasing and absorbing heat at a constant temperature. These materials allow this exchange of heat to occur at a desired temperature, in this case around 4°C. As the PCM packs continue this process, the PopupLiner insulation reduces the flow rate of heat allowing this process to continue for an extended duration.

Package and Payload

Medical Kit containing 40 pipets, 1 instruction sheet, and two vials refrigerated at 2-8°C weighing 4oz. Dimensions of 8" x 5" x 3".

Shipper	Insulation	Number of Medical Kits (Payload)	Number of Frozen Gel Packs	Number of 250g Frozen PCM Packs	Weight
10" x 9" x 6.5"	1.5" PopupLiner Insulated Box Liner	1	1 x 32oz.	1	4.0 lb.
13" x 11" x 9"	1.5" PopupLiner Insulated Box Liner	3	2 x 24oz.	1	6.0 lb.
15" x 15" x 15"	1.5" PopupLiner Insulated Box Liner	6	4 x 24oz.	1	11.55 lb.



Step 1 – 32oz. Gel Pack



Step 2 – Medical Kit



Step 3 – PCM Pack

Figure 1. 10" x 9" x 6.5" Shipper Assembly

Package and Payload



Step 1 – PCM Pack



Step 2 – Medical Kits



Step 3 – 24oz. Gel Packs

Figure 2. 13" x 11" x 9" Shipper Assembly



Step 1 – 24oz. Gel Packs



Step 2 – Medical Kits



Step 3 – PCM Pack



Step 4 Medical Kits



Step 5 – 24oz. Gel Packs

Figure 3. 15" x 15" x 15" Shipper Assembly

Profiles and Results

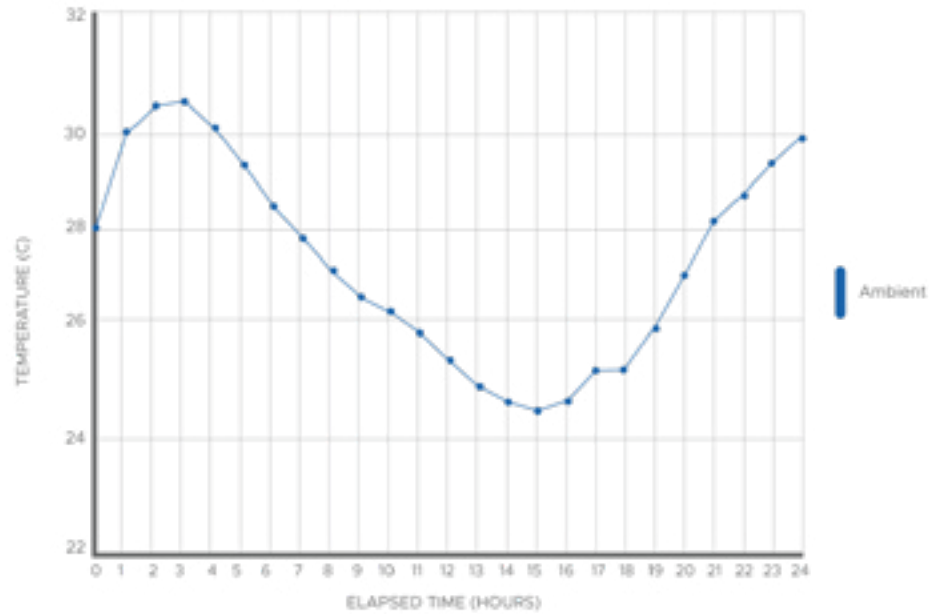


Figure 4. ISTA 24 Hour Summer Profile

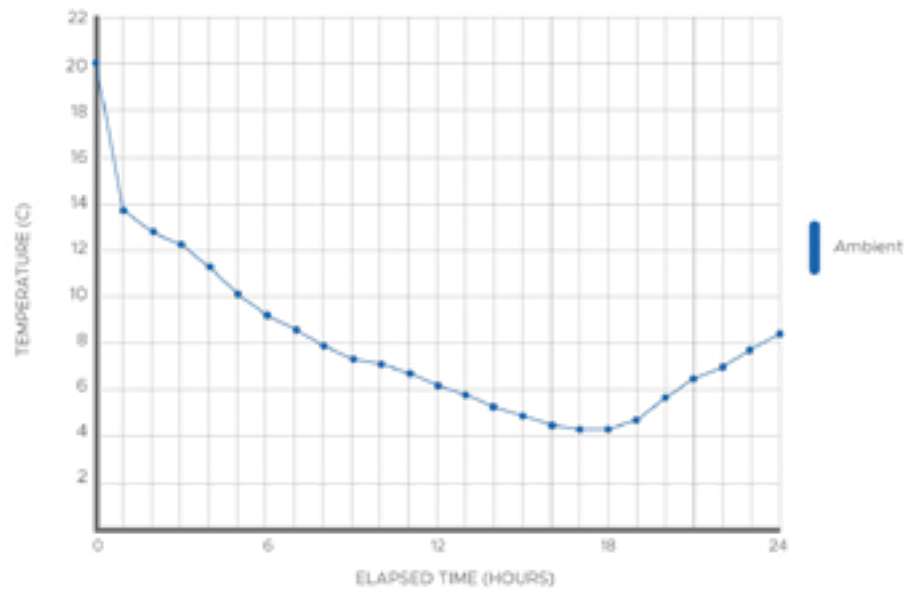


Figure 5. ISTA 24 Hour Winter Profile

Profiles and Results

Temperature profiles of refrigerated vials inside the CelluLiner for winter ambient temperatures

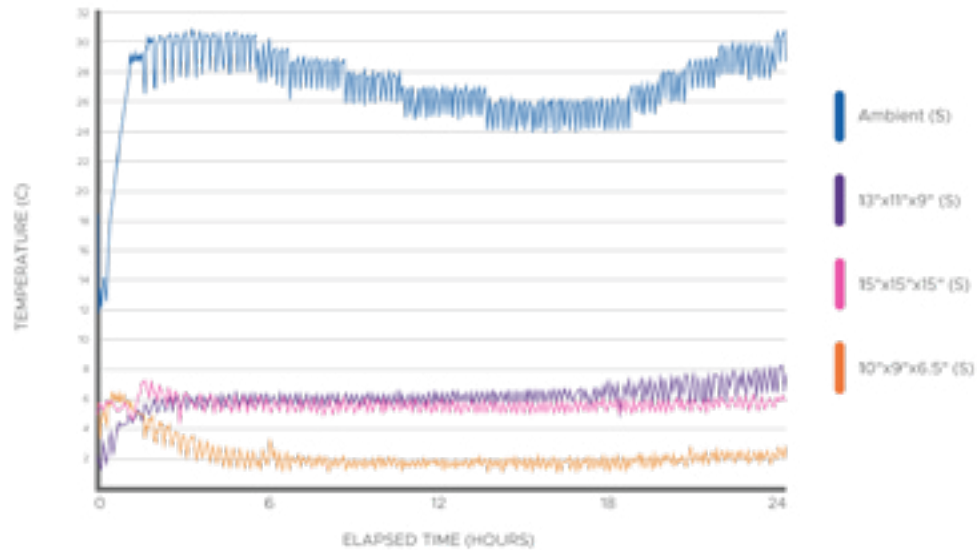


Figure 6. 24-hour Summer 7E test on refrigerated vials

Temperature profiles of refrigerated vials inside the CelluLiner for winter ambient temperatures

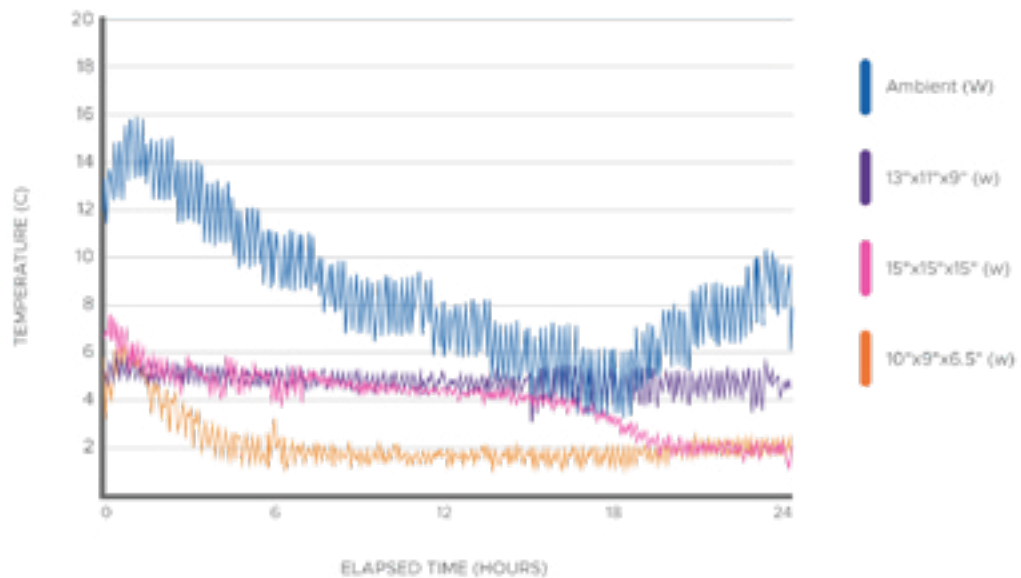


Figure 7. 24-hour Winter 7E test on refrigerated vials

T-Type thermocouples were inserted into the vials and sealed for proper measurement of the temperature of the liquid inside.

Summary

The experimental results presented herein indicate that IPC's PopupLiner box liner maintained the temperature range between 2-8C for all tests. This shows that IPC's PopupLiner and PCM packs are capable of keeping your vaccine fluids in optimal temperature range for 24 hours. Most importantly, it does this while using the same package loadout across multiple temperature environments – saving you time and money.

References

CDC: Vaccine Storage and Handling

<https://www.cdc.gov/vaccines/pubs/pinkbook/vac-storage.html>

About Insulated Products Corporation (IPC)

Since being founded in 1999, IPC has been an innovator of thermal packaging solutions. We have spent over a decade studying, perfecting, consistently producing and delivering effective cold chain thermal packaging to companies shipping medicines, foods, and industrial goods worldwide. IPC designs and manufactures, in-house, a variety of custom temperature control products for the cold chain shipping industry.

All of IPC's solutions provide high performance, while remaining space-efficient and green. We thrive on special requirements including custom sizes, extended shipping durations, unique temperature requirements, and sustainability.



Maintaining strict temperatures, maximizing payload, and minimizing weight and preparation time are the cornerstones of IPC cold chain solutions.

Contact us today to discuss your unique temperature assurance packaging requirements

