

INTRODUCTION TO COLD CHAIN SHIPPING



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WHAT IS COLD CHAIN?

Cold Chain, or Cool Chain, is the management of the temperature of perishable products in order to maintain quality and safety until delivered to the end customer. Insulated packaging enables you to do this.

At **KODIAKCOOLER®**, we supply insulated packaging. But we also help you design your packaging, test your solutions and manage your Cold Chain supplies. We work to make your packaging both efficient and cost effective.

By working with you to meet your specific requirements, we can design solutions that safely protect your product and your bottom line.

PACKAGING AND REFRIGERANTS



COLD CHAIN PACKAGING

From cross-town to cross-continent deliveries, **KODIAKCOOLER** has a packaging type to meet your needs.



Box Liners

Mailers

EPS FOAM

EPS Molded Foam Coolers

Foam Panel Shippers

Custom Cuts

Option to add
biodegradation-promoting
resin



REFLECTIVE



Box Liners

Pouches

Airline Container Kits

Roll Stock

Temp-Extend Bags

REFRIGERANTS

Gel Packs

Block Ice Packs





SUPERIOR INSULATION

RECYCLABLE + REUSABLE + BIOGRADABLE

USE WITH GEL OR DRY ICE

ABSORBS CONDENSATION + LEAKS

EXCEPTIONAL CUSHIONING

KWIKPACK® LOWERS SHIPPING COST + RE-
QUIRES LESS STORAGE SPACE



Innovative and effective. Recyclable, reusable and biodegradable, cotton is the ultimate sustainable material. An excellent insulator, it also absorbs moisture, stores compactly and is easily disposed of.

KODIAKOTTON® box liners are cotton pads sealed in a plastic film. The cotton insulates and absorbs; the film keeps your product free from cotton fibers.

We manufacture these pads from leftover textile manufacturing materials that would otherwise be waste. These post-production yarn and denim scraps are cleaned, ground, and blown into layers to the desired thickness. A small amount of low melt poly is mixed with the cotton and heat treated to fuse the fibers into rolls. The rolls are then cut to size and wrapped.

The plastic wrap is treated to encourage biodegradation. It can also be recycled with #4 plastics.

The outer cartons are higher ECT corrugated to provide extra strength and structural integrity.

KODIAKOTTON is also available in pouch form.

We go the extra step to make packing your product even easier: Our KODIAKOTTON box liners are bundled into KWIKPACK's to make transportation, storage, inventory and packing much SIMPLER!





EPS MOLDED FOAM COOLERS

RELIABLE TEMPERATURE CONTROL

ENHANCED STRUCTURAL INTEGRITY

REUSABLE + RECYCLABLE

BIODEGRADABLE OPTIONS

AVAILABLE NATIONWIDE

ECONOMICALLY RESPONSIBLE

STURDY + DEPENDABLE

STOCKED IN A VARIETY OF SIZES



Long the gold standard for insulated shipping, KODIAKCOOLER® EPS foam coolers offer performance, reliability and quality for an economical price. Although very lightweight at more than 95% air and 5% plastic, EPS is extremely sturdy, containing and protecting products many times its own weight.

EPS coolers are made by expanding styrene beads with steam to 40 times their original size. The expanded beads are then poured into molds and subjected to more steam. The beads fuse together in the form of the mold. No dangerous chemicals are used in production and none are found in our foam coolers.

EPS coolers are recyclable and reusable, not only insulating your product but cushioning and protecting it also. For more information on how and where to recycle EPS foam packaging, visit EPSPackaging.org.



FOAM PANEL SHIPPERS

RELIABLE TEMPERATURE CONTROL

LOW COST SHIPPING SOLUTION

EFFECTIVE INSULATION

SIZES EASILY CUSTOMIZED



Foam panel shippers offer an economical choice for products with less rigid temperature requirements or short transit times.



Easily customizable and quickly produced, foam panel shippers possess many of the same insulating characteristics as molded foam. Adding our Temp-Extend Bag or poly liners will mitigate the temperature loss from the panel seams.





ECONOMICALLY ATTRACTIVE SHIPPING
SOLUTION

CUSTOM + STOCK SIZES

REQUIRES LITTLE STORAGE SPACE

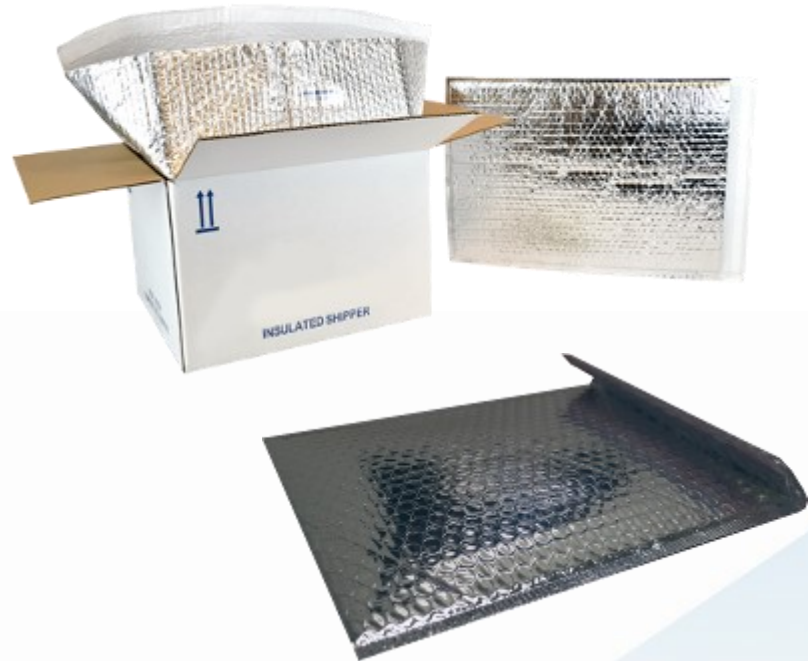
PREVENTS HEAT INTRUSION / HEAT LOSS

POLYETHYLENE BUBBLE FILM CORE
CUSHIONS AS IT INSULATES

REUSABLE

EXCELLENT FOR OVERNIGHT SHIPMENTS +
PRODUCTS THAT DON'T REQUIRE STRINGENT
TEMPERATURE CONTROL

REFLECTIVE BUBBLE BOX LINERS + POUCHES



AIR CARGO CONTAINER LINERS



Reflective bubble insulating material consists of a layer of bubble material laminated to an outer layer of metalized film. The bubble retains air that provides increased strength and puncture resistance. The outer layer reflects heat, keeping the contents cold.

Reflective bubble material is easily cut to size and formed. No matter the size of your shipping container, from an overnight parcel box to an air cargo container, reflective bubble can provide insulation for your shipment.

ROLL STOCK





LIGHTWEIGHT

INEXPENSIVE

CAN BE USED WITH OTHER INSULATION



TEMP EXTEND BAGS

KODIAKCOOLER® Temp Extend Bags are mylar liner bags that can be used alone or with KODIAKOTTON® box liners, KODIAKCOOLER® Foam Coolers or Foam Panel Shippers.

The bags are reflective and provide 4-6 extra hours of time in range during shipment. Just enough time for your customer to arrive home and unpack their order.

The bags also contain any condensation that develops, preserving the integrity of the corrugated shipper.

INSULATION COMPARISON

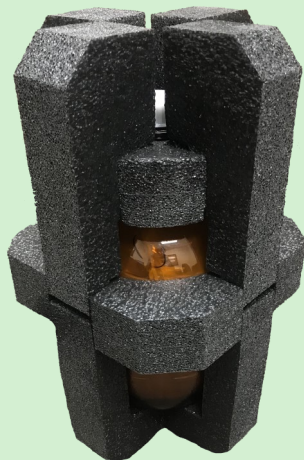
	KODIAKOTTON®	KODIAKCOOLER® EPS Molded Foam Coolers	Foam Panel Shippers	Reflective Bubble	Temp- Extend Bag
Biodegradable	X	X*			
Recyclable	X	X	X		
Reusable	X	X	X	X	X
Compact Storage	X		X	X	X
Overnight shipments	X	X	X	X	X
Extended Shipments	X	X	X		
Customizable	X	X	X	X	
Structurally Sturdy		X	X		

*Option to add biodegradation-promoting resin now available



CUSTOM PRODUCTS

Kitting of medical
supplies



High-tech shock
proof, crush proof
protection for a
shipper of filtration
fluids

Customized EPS
and polyurethane
foam inserts to fit
specific products



HAVE AN UNUSUAL SHIPPING NEED?

Let us help you design a packaging solution to meet your customized needs.

REFRIGERANTS

Refrigerants work with insulated packaging to provide the environment needed to keep your product in the correct temperature range.



GEL ICE

Composed of non-toxic compounds in a gel state. To use, freeze and place in your package. They are convenient, inexpensive and effective. The gel is enclosed in a vinyl pouch. The pouch can be covered with a non-woven fabric that absorbs moisture.

BLOCK ICE

Made from infusing foam blocks with the gel solution and wrapping the block in vinyl. The blocks retain their shape at room temperature, making certain pack-outs easier to achieve. Hard shell ice packs are available as a special order.

DRY ICE

Dry ice is solid carbon dioxide. At -109° , it is ideal for any shipment that must remain frozen. It also goes directly from a solid to a gas, bypassing the messy liquid stage. But it does require special handling, is regulated, must be purchased locally and stored in specialty freezers.

WET ICE/FROZEN WATER

Very effective insulator, but it's heavy, messy and inconvenient to store. It is used primarily for seafood and tissue shipments.

CONSIDERATIONS

CHOOSING YOUR REFRIGERANT

If it must stay frozen - Use dry ice.

For items that must remain cold or cool - Use gel packs in the appropriate size and quantity.

For critical tissue shipments – use wet ice.

CHOOSING YOUR GEL PACK SIZE

Perhaps the most important concept to consider is how fast it will return to the ambient temperature.

The greater the mass of the object, the longer it will require to lose its thermal energy. One of the best ways to visualize this is to think about a hamburger patty and a roast. If you set both out to thaw, the patty, with a mass of a few ounces, will thaw long before the roast that weighs several pounds. Or consider snowmen. Snowmen are left standing alone in the bright sunshine when all the rest of the snow has long vanished. Just like the large roast or the snowman, a large gel ice pack will last far longer than a small one.

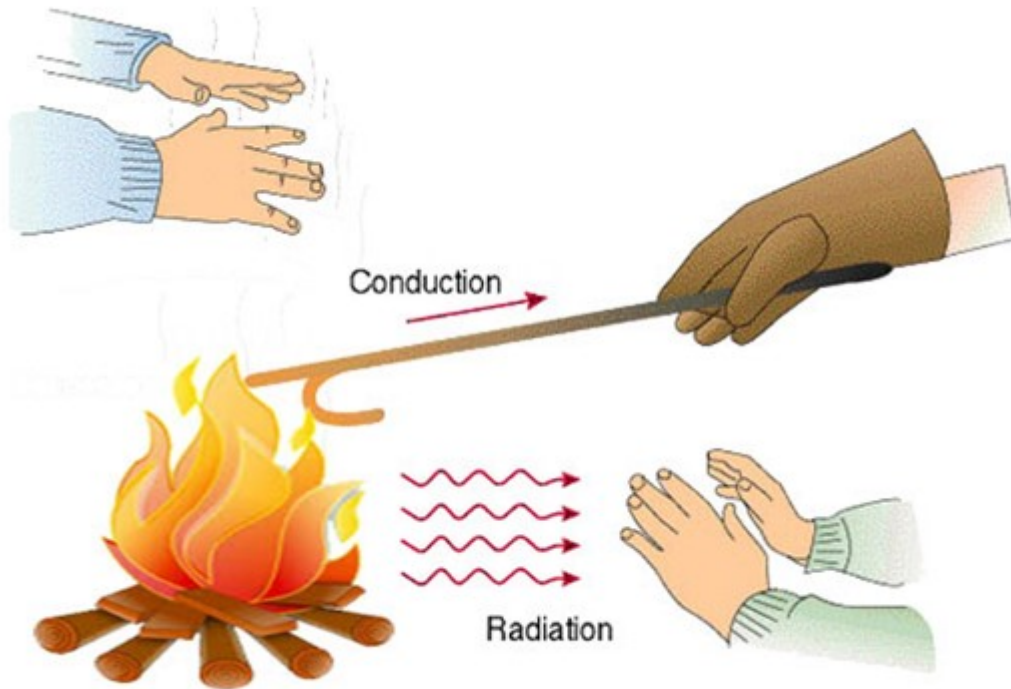
You can also combine dry ice and gel packs to prolong time in the desired temperature range.

Sensitive products must be buffered from the dry ice to prevent damage from freezing.

HEAT TRANSFER



METHODS OF HEAT TRANSFER IN TRANSPORT



CONDUCTION : heat flow through material

By passing from atom to neighboring atom, heat can move through one solid object to another. The denser the material the more conductive it is. R-Value measures conduction. Foam and cotton prevent conduction.

RADIATION : heat transfer by infrared waves

Like light, heat is transmitted by electromagnetic wave motion - this is radiation. Heat can jump from warm objects to cooler ones without heating the air in between, just like the sun's waves travel through space to reach us. Reflective bubble works by reflecting the radiant energy away.

R-VALUES

R-VALUE is the measure of thermal resistance or how well a material resists transferring heat and is used to measure heat flow by conduction. It is not applicable to other modes of heat transfer. It serves no purpose in rating a product's ability to reflect heat energy.

	AGE	DENSITY	R-VALUE
EPS Foam	At time of manufacture	1.0 pcf	3.85
		1.25 pcf	3.92
KODIAKOTTON	At time of manufacture	900 gsm (~1" thick)	3.979
		1400 gsm (~1.5" thick)	5.175

Foam and cotton have R-values,
reflective bubble does not.

DIM WEIGHT



What is Dimensional Weight?

...and why does it matter?



Dimensional weight, also called **DIM weight**, is a **pricing technique used by commercial freight services**. Since the amount of space on a delivery truck is limited, dimensional weight takes into account package density to determine shipping rates.

So, even if you have a lightweight package, it could be worthwhile to calculate DIM. Freight carriers like USPS, FedEx, and UPS calculate shipping charges based on whichever number is greater - the actual weight of the package or its calculated dimensional weight.

CALCULATING DIM WEIGHT



1 Measure the length, width and height of the package.

Box 24" long, 12" wide and 12" high

2 Multiply these package dimensions to get the cubic size of the package.

$24 \times 12 \times 12 = 3456$ cubic inches

3 The cubic size of the package is divided by a dimensional factor, also called a DIM divisor. DIM divisors are numbers set by the major freight carriers, such as UPS and FedEx. These factors represent cubic inches per pound. The current DIM is 139.

$3456 / 139 = 25$ lbs. of dimensional weight

Here's how a shipping carrier would charge for the package in this example:

If the actual weight of the package is less than 25 pounds, the carrier will charge for the dimensional weight of 25 pounds since it is the greater number.

If the actual weight of the package is more than 25 pounds, dimensional weight pricing will be based on the actual weight, not the dimensional weight, since they charge for the greater number.

REDUCING DIM WEIGHT

Size your
outer
carton to
fit the
contents.

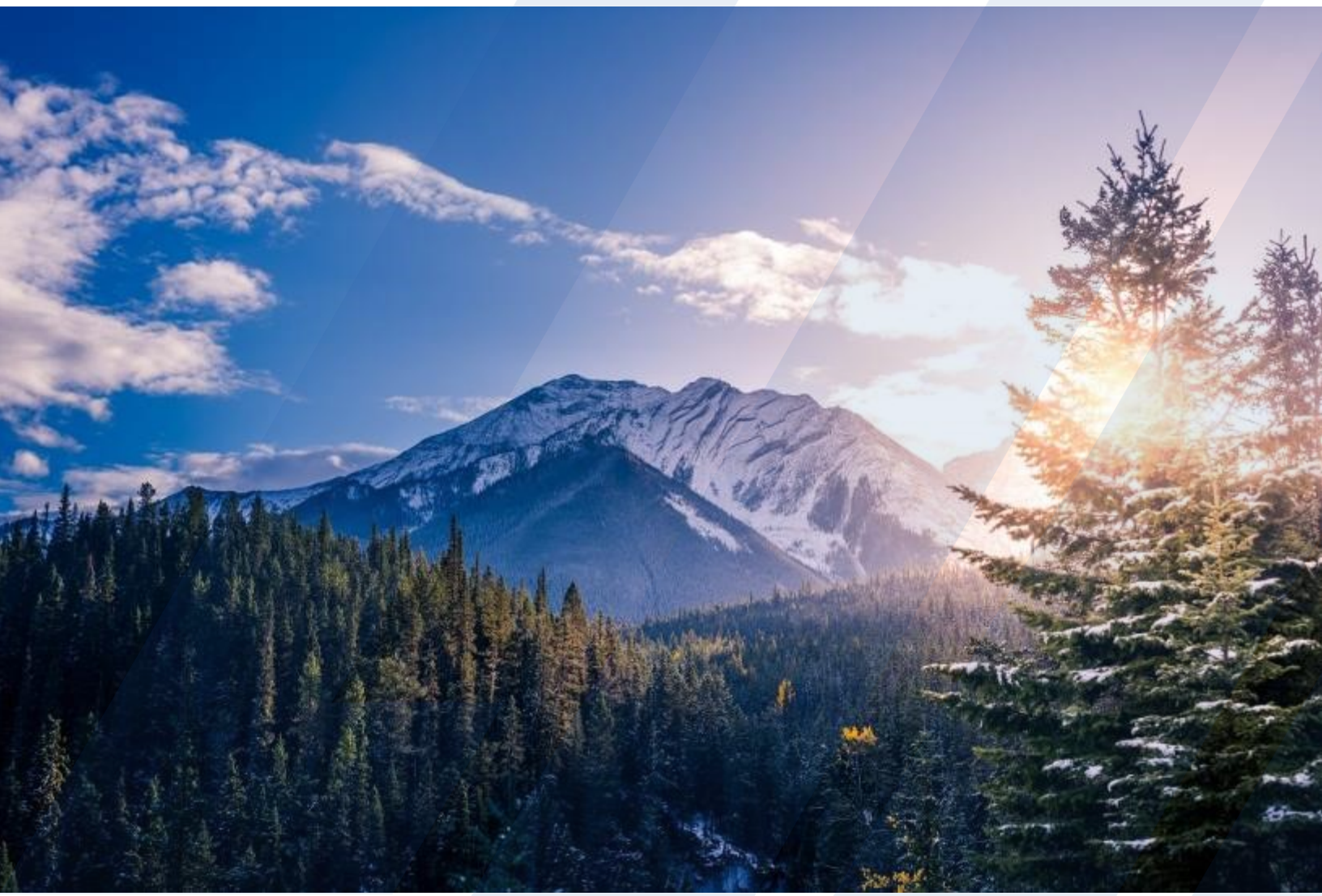
**DON'T
SHIP
AIR!**



BENEFITS OF DIM WEIGHT REDUCTION



PACKAGING PERFORMANCE CRITERIA



INDUSTRY STANDARDS

The industry has set standards that we will cover in the following pages:

HANDLING

STORAGE

FACILITY

TESTING

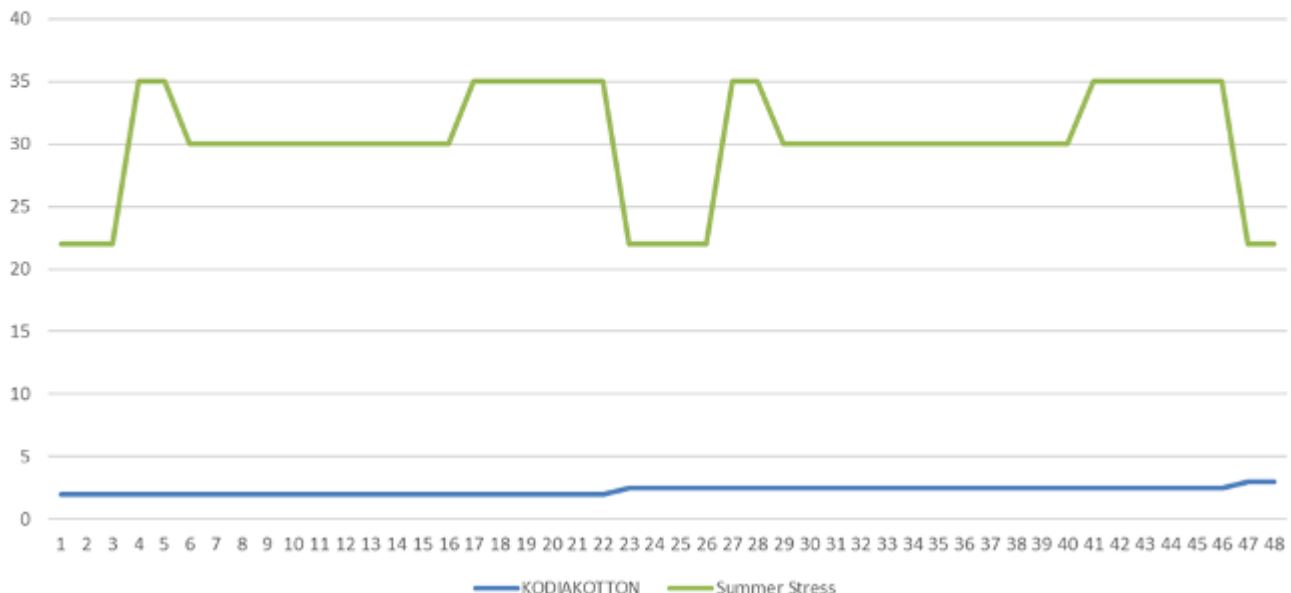
REQUIRED TEMPERATURE

MAINTENANCE

MCS Index	Spatial Streams	Modulation Type	Coding Rate	Theoretical Data rate (in Mbit/s)							
				20 MHz channels		40 MHz channels		80 MHz channels		160 MHz channels	
				800 ns GI	400 ns GI	800 ns GI	400 ns GI	800 ns GI	400 ns GI	800 ns GI	400 ns GI
0	1	BPSK	1/2	6.5	7.2	13.5	15	29.3	32.5	58.5	65
1	1	QPSK	1/2	13	14.4	27	30	58.5	65	117	130
2	1	QPSK	3/4	19.5	21.7	40.5	45	87.8	97.5	175.5	195
3	1	16-QAM	1/2	26	28.8	54	60	117	130	234	260
4	1	16-QAM	3/4	39	43.3	81	90	175.5	195	351	390
5	1	64-QAM	2/3	52	57.6	108	120	234	260	468	520
6	1	64-QAM	3/4	58.5	65	121.5	135	263.3	292.5	526.5	585
7	1	64-QAM	5/6	65	72.2	135	150	292.5	325	585	650
8	1	256-QAM	3/4	78	86.7	162	180	351	390	702	780
9	1	256-QAM	5/6	NA	NA	180	200	390	433.3	780	866.7
0	2	BPSK	1/2	13	14.4	27	30	58.5	65	117	130
1	2	QPSK	1/2	26	28.8	54	60	117	130	234	260
2	2	QPSK	3/4	39	43.3	81	90	175.5	195	351	390
3	2	16-QAM	1/2	52	57.6	108	120	234	260	468	520
4	2	16-QAM	3/4	78	86.7	162	180	351	390	702	780
5	2	64-QAM	2/3	104	115.2	216	240	468	520	936	1040
6	2	64-QAM	3/4	117	130.3	243	270	526.5	585	1053	1170
7	2	64-QAM	5/6	130	144.4	270	300	585	650	1170	1300
8	2	256-QAM	3/4	156	173.3	324	360	702	780	1404	1560
9	2	256-QAM	5/6	NA	NA	360	400	780	866.7	1560	1733.3
0	3	BPSK	1/2	19.5	21.7	40.5	45	87.8	97.5	175.5	195
1	3	QPSK	1/2	39	43.3	81	90	175.5	195	351	390
2	3	QPSK	3/4	58.5	65	121.5	135	263.3	292.5	526.5	585
3	3	16-QAM	1/2	78	86.7	162	180	351	390	702	780
4	3	16-QAM	3/4	117	130	243	270	526.5	585	1053	1170
5	3	64-QAM	2/3	156	173.3	324	360	702	780	1404	1560
6	3	64-QAM	3/4	175.5	195	364.5	405	NA	NA	1579.5	1755
7	3	64-QAM	5/6	195	216.7	405	450	877.5	975	1755	1950
8	3	256-QAM	3/4	234	260	486	540	1053	1170	2106	2340
9	3	256-QAM	5/6	260	288.9	540	600	1170	1300	2340	2600
0	4	BPSK	1/2	26	28.8	54	60	117	130	234	260
1	4	QPSK	1/2	52	57.6	108	120	234	260	468	520
										702	780
										936	1040
										1170	1300
										1404	1560
										1656	1848
										1908	2124
										2160	2400
										2412	2664
										2664	2928
										2916	3192
										3168	3456

Summer Stress Test - ISTA 7D - January 2017 Conducted by Biosystems Atlanta, A Unit of Biosystems America, Biosystems, Inc.

Material Specs: KODIAKOTTON® 100% Non-Woven, High-Loft Cotton, Blended w/ up to 15% of Low-Melt Polyethylene Terephthalat



INDUSTRY STANDARDS

The United States Pharmacopeia (USP) is an organization that creates and maintains public standards and related programs used in healthcare to ensure the



Strengthened by its abundance of dedicated volunteers, members, staff and by working collaboratively with key stakeholders across the globe, **USP helps you consistently produce quality pharmaceuticals to empower a healthy tomorrow while saving time and helping drive commercial success.**



What are the applicable standards?

USP 800 describes **the practice and quality standards for handling hazardous drugs (HDs)** to promote patient safety, worker safety, and environmental protection. **Handling HDs includes, but is not limited to, the receipt, storage, compounding, dispensing, administration, and disposal of sterile and nonsterile products and preparations.**

USP 800 applies to all healthcare personnel who handle HD preparations and all entities that store, prepare, transport, or administer HDs (e.g., pharmacies, hospitals and other healthcare institutions, patient treatment clinics, physicians' practice facilities, or veterinarians' offices).

Personnel who may potentially be exposed to HDs include, but are not limited to: Pharmacists, pharmacy technicians, nurses, physicians, physician assistants, home healthcare workers, veterinarians and veterinary technicians.

USP 797 describes **the minimum standards to be followed when preparing compounded sterile human and animal drugs [compounded sterile preparations (CSPs)]** based on current scientific information and best practices for sterile compounding.



STERILE COMPOUNDING

is defined as combining, admixing, diluting, pooling, reconstituting, repackaging, or otherwise altering a drug or bulk drug substance to create a sterile medication.

TEMPERATURE MAINTENANCE STANDARDS

Storage temperature is very important in maintaining the efficacy, potency and stability of drugs and must be sustained, controlled, and maintained appropriately.

The USP/NF has set **specific directions for storage temperatures** when data indicates temperature variations produce undesirable results.

These directions apply unless the label on the drug states different storage temperature based on study data for that particular formulation.



TEMPERATURE DEFINITIONS

FREEZER - A place in which the temperature is maintained thermostatically between -20° and -10°C (-4° and 14°F).

COLD - Any temperature not exceeding 8°C (46°F). Refrigerator is between 2° and 8°C (36° and 46°F).

COOL - Any temperature between 8° and 15°C (46° and 59°F).

ROOM TEMPERATURE - The temperature prevailing in a working area.

CONTROLLED ROOM TEMPERATURE – *Maintained* temperature of 20° to 25°C (68° to 77°F); mean kinetic temperature no more than 25°C (excursions allowed between 15° and 30°C (59° and 86°F)). May be stored in a cool place unless otherwise indicated.

WARM - Any temperature between 30° and 40°C (86° and 104°F).

EXCESSIVE HEAT – Any temperature above 40°C .

PROTECTION FROM FREEZING – Freezing can lead to loss of strength or potency and the risk of breakage of the container.

Determine Your Product's Requirements



Packaging
temperature
sensitive products
is challenging!

Every shipment, whether by ground or air, involves its own unique variables.

Understanding the specific details of each shipment will enable you to successfully meet this challenge.

PRODUCT TYPE - sensitive to heat, cold or both

TIME IN TRANSIT – 24 Hours vs 72 hours

Time in transit from your door until your customer opens the package

QUANTITY OF PRODUCT

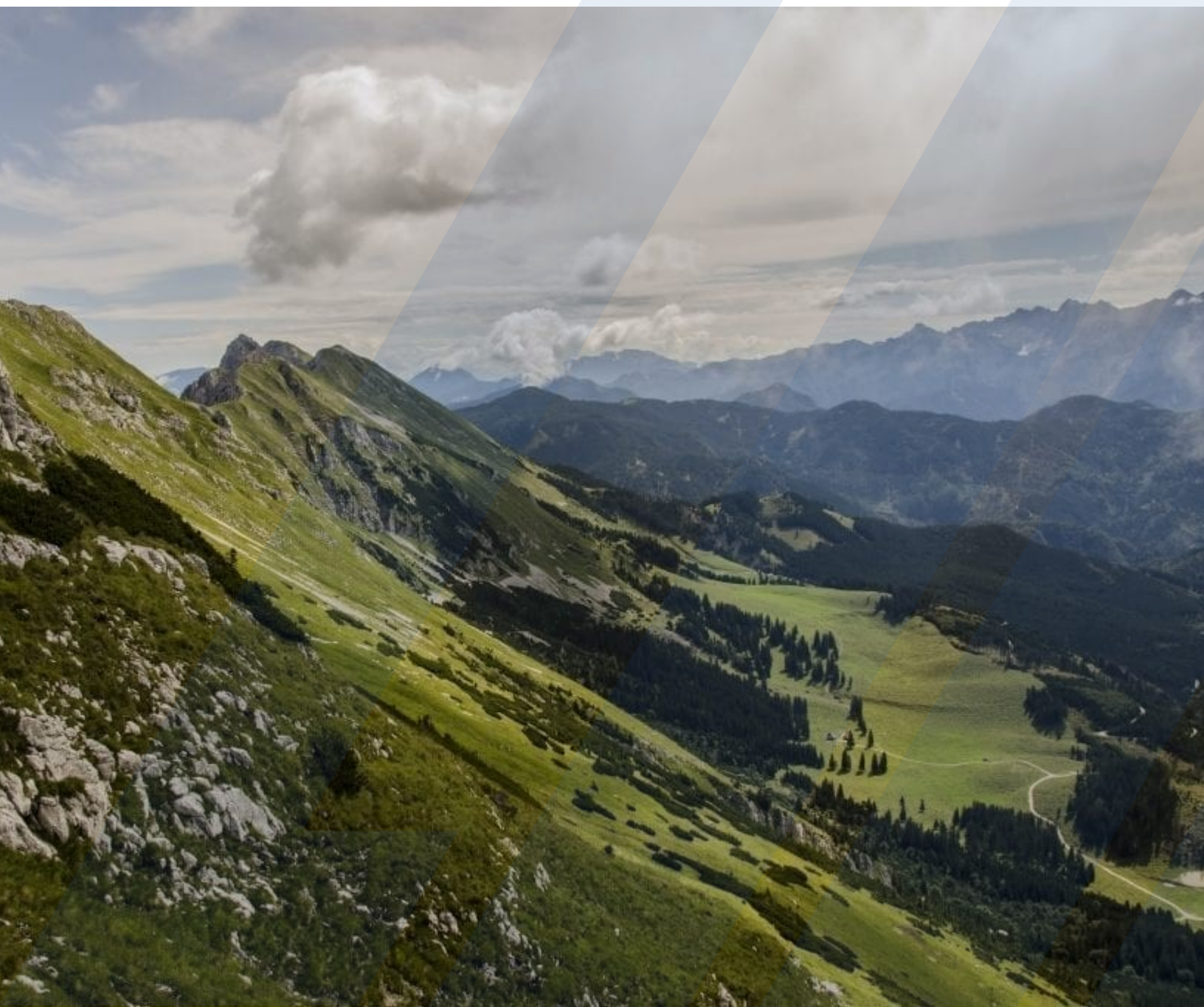
NUMBER OF DIFFERENT PRODUCTS PER SHIPMENT

ORIGIN AND DESTINATION OF SHIPMENTS

ACCEPTABLE RANGE IN TEMPERATURE DURING TRANSIT –
Strict refrigeration or controlled room temperature

INITIAL PRODUCT TEMPERATURE

TESTING



TESTING

overview

Your packaging needs to be reliable and dependable. Once it leaves your facility, it must protect your product and insure it arrives undamaged and at the correct temperature. ***Testing provides the evidence that the package works the way it was designed to and offers you peace of mind.***

The International Safe Transit Association (ISTA)

is an organization focused on the specific concerns of transport packaging. ISTA is the leading industry developer of testing protocols and design standards that define how packages should perform to ensure protection of their contents.

As a nonprofit, member-driven association it sets the standards for optimizing the resources in packages that are designed to be survivable, sustainable and successful. Worldwide, ISTA is the most trusted, knowledgeable and respected authority in predictive package-performance testing helping its members develop more effective packaging.

By following **7E and Standard 20 procedures** (outlined in the following pages), you are assured of a test that is comprehensive, applicable and widely accepted.

STANDARD 7E

testing standards

Standard 7E is designed to **evaluate the effects of external temperature exposures of individual packaged products shipped through a parcel delivery system**. It can be used as a stand-alone profile standard and is useful for general testing and qualification of insulated shipping containers.

Data was gathered over 12 months from 83 lanes, both outbound and inbound, processed and statistically evaluated for summer and winter months.

The profile is global, not geographically specific. By mapping the temperatures experienced in the 'shipping lanes' and not the temperature of a particular location, we documented the temperature the packages in transit will experience.

Experts in thermal shipping agree that these profiles encompass well over 90% of the shipping thermal challenge encountered in all seasons. (Severe or special conditions should be considered and treated logically.)

The 7E profiles are based on exposures of parcels in the hub and shipping environment during the coldest/warmest parts of the year. The test packages were not outdoors but in transit in trucks and planes, and in sort and storage facilities at the transit points. While seasonal effects are clearly apparent from the data collected, it is just as clear that the packages are buffered from the ambient extremes.

STANDARD 20

testing standards

Standard 20 specifies the testing laboratory procedures, equipment requirements, calibration, setting of acceptance criteria, documentary standards and data handling requirements to be used in conducting ISTA 7E testing. The standards produce uniform testing across facilities and allow for direct comparisons between tests conducted by various labs.



TYPES OF TESTING

CHAMBER TESTING

Using ISTA Standards

BENEFITS

Maintains controlled temperature profile

LIMITATIONS

Does not replicate the actual temperature spikes and drops encountered during shipment
No structural stress encountered



REAL-WORLD LANE TESTING

Using FedEx/UPS Parcel System

BENEFITS

Experiences actual environment of transit cycle

LIMITATIONS

Fluctuations in weather may under or over stress package—average environment may not be represented



TYPES OF TESTING

VALIDATION

is documented testing, **under highly controlled conditions**, that demonstrates that a process consistently produces a result meeting pre-determined acceptance criteria. Both your process and the components used are tested.

QUALIFICATION

is documented testing that demonstrates with **high degree of assurance** that a specific process will meet its predetermined acceptance criteria.

It is believed that the assumption used in describing validation is that when a process has key variables which are considered controlled for the specific technology, that it can be considered validatable.

For example, for the heat sealing of packaging components, temperature, pressure and dwell time are considered key variables. With today's technology, it is considered possible to control these temperatures, by means of thermocouples, pressure sensors and digital timers, therefore very high degrees of repeatability are achievable with today's heat sealing equipment. Such repeatability is demonstrated by achieving 6 sigma type of reproducibility for this process, where 99.999% repeatability is achieved.

Going back to cold chain

packaging, we should ask ourselves, what are the critical variables involved in heat transfer? Two key variables would be considered time and temperature differential. For the shipping application this would mean the length of shipment and the temperature of the environment - this also includes all the sub steps within the shipping process (truck time, air time, warehouse time, inside of a mailbox etc...).

With this in mind, if your particular distribution process is such that you have very good control of the time to ship and external temperatures, then depending on your thermal shipper technology and product requirements, you may be able to consider your cold chain shipping validated.

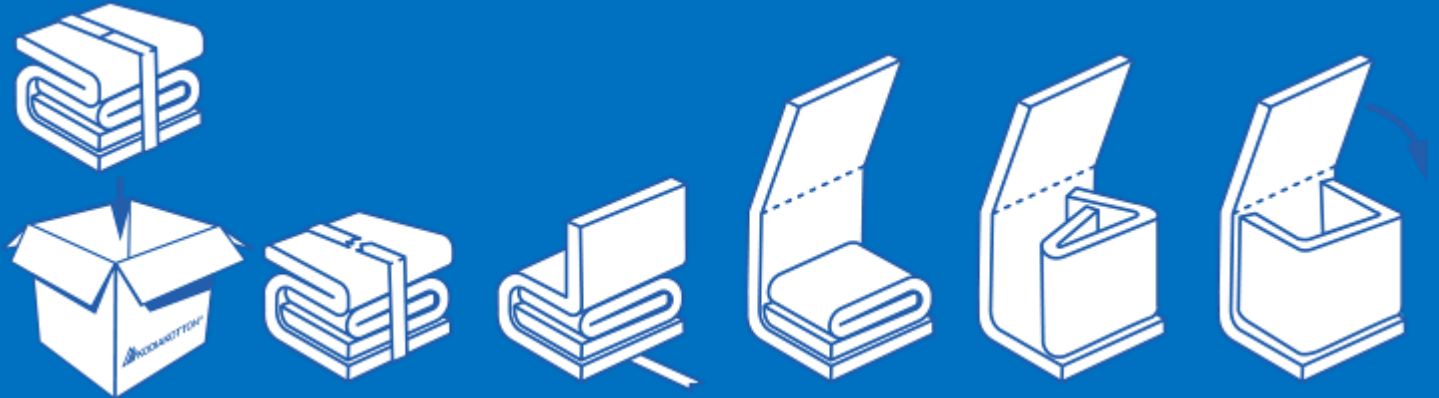
It is probably safe to say that for most shipping applications, it is

too costly to build on this level of control in the distribution of products, therefore the length of shipment and external temperatures are not controlled enough to label the process validatable. In this case, and probably in most cases, it is proper to talk in terms of cold chain qualification.

It should be noted that as technology advances occur, especially with active and hybrid technologies, that in the future the controversy will be over and all pharmaceutical type of shipments will be validated.

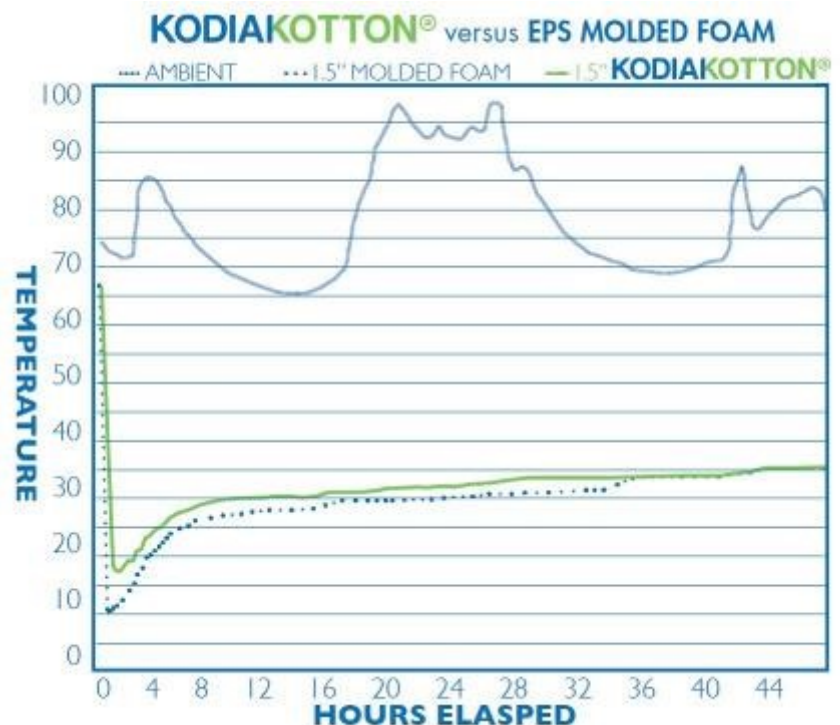
PACKOUT PROTOCOL DEVELOPMENT

Our packaging team will work with you to develop the protocol that delivers the best protection at the lowest price for your particular products and situation.



ONGOING TESTING BENEFITS

By testing your protocols at certain intervals, you can rest assured that your packaging and procedures are working as designed and avoid potential temperature deviations.



TIPS FOR SUCCESSFUL SHIPPING



SHIPPING OVERVIEW

We make it easy to receive KODIAKCOOLER products by utilizing a **variety of shipment methods**.

SMALL

SHIPMENTS

ship via **Fed Ex Ground**. We pay Fed Ex and pass the charge along on your invoice. We can also ship on your Fed Ex or UPS account.

PALLETS SHIPMENTS

are sent by **national less-than-truckload (LTL) carriers**. Our Third-Party Logistics (3PL) provider compares the rates between our facility and yours from several reliable carriers allowing us to select the one with the lowest rate or shortest transit time—depending on your needs.

WE ALSO SHIP FULL TRUCKLOADS

by a **variety of carriers** who bid on each load ensuring you get the best rate available.



Please let us know *at time of order* if you need any special services, a lift gate, inside delivery, an appointment for delivery, etc. We can arrange the delivery as you need it and not encounter delays or added fees for unplanned services.

HEAT SENSITIVE PRODUCTS SHIPPED IN A WARM TO HOT ENVIRONMENT

If you are shipping refrigerated, fresh or frozen products in a warm environment, condition your products to the minimum allowable temperature prior to packing.

Your packaging materials should be pre-chilled in a cold to freezing environment.

The environment where the product is packed into the container should be as cold as possible.

Add refrigerant to the shipment—**gel ice** for refrigerated and **dry ice** for frozen products.



COLD SENSITIVE PRODUCTS SHIPPED IN A COLD TO FREEZING ENVIRONMENT

When shipping refrigerated, fresh, ambient or heated products in a cold environment, condition your products to the maximum allowable temperature prior to packing.

Your packaging materials should be stored and packed in a warm environment.

The packing environment should be as warm as possible.

You may want to add **room temperature (ambient), warmed gel ice product, or heat packs to the shipment.**



PRODUCTS SENSITIVE TO BOTH HEAT AND COLD SHIPPED IN A COLD AND HOT ENVIRONMENT

Certain products, particularly live products, are sensitive to extremes of both heat and cold. Highly perishable products should be conditioned to a temperature as close as possible to the minimum allowable temperature when shipping in warm weather or the maximum allowable temperature when shipping in cold weather.

Your packing materials should be stored and packed in a cold environment for warm weather shipments or in a warm environment for cold weather shipments.

The packing environment should be as cold as possible for warm weather shipments or as warm as possible for cold weather shipments.

Add **frozen gel ice**, as necessary, for warm weather shipments.

Add **ambient or warmed gel ice product or heat packs** to cold weather shipments. Never use dry ice with live products.

To protect delicate products from damage due to shifting refrigerant packs, use a **filler material** as bubble wrap or “peanuts” to fill void space and prevent shifting of products.



SHIPPING FROZEN AND REFRIGERATED ITEMS IN SAME PACKAGE

In addition to the tips for shipping cold sensitive products above, **consider adding some sort of barrier between your frozen and non-frozen products when shipped in the same insulated package.** Dry ice is very cold and its inclusion with non-frozen items should be carefully evaluated and tested before actual use. Providing a barrier or loosely wrapping the dry ice will provide some protection for the non-frozen products. Always test first!



QUESTIONS?

Contact us at

info@kodiakooler.com

OR

866.779.4945

