Why Is Efficient Cold Chain Transportation Important?

The efficient management of a cold chain supply line is essential for maintaining the integrity of the product. Unlike shipping non-perishable products such as clothing or furniture, a break in the cold chain could result in damage or spoilage that makes the product unusable.

One example is the cold chain shipping of pharmaceuticals, many of which must be maintained at a precise temperature. A variation of more than one or two degrees could ruin an entire shipment and cost the manufacturer hundreds, thousands or even millions of dollars. For this reason, Klinge Corporation manufactures a line of cold chain containers designed for pharmaceutical and chemical industries.
Efficient cold chain transportation uses monitoring to track temperatures and reduces the number of hand-offs between the origin and destination. The cold chain industry has standardized temperature zones to maintain the products. A shipment will have one of five classifications, so any shipper or receiver knows how to store and manage the delivery:

- **Banana:** Bananas and many other tropical fruits undergo controlled ripening during transport. The category has a temperature range between 12° and 14°C. It is also used to store oranges, pineapples and potatoes.
- **Pharmaceutical:** Most pharmaceutical goods requiring temperature control must be kept between 2° and 8°C.
- **Chill:** The “chill” classification, with a range between 2° and 4°C, is used to transport many fruits, vegetables and fresh meat.
- **Frozen:** Frozen beef, poultry, pork, cakes and bread must stay between -10° and -20°C.
- **Deep-frozen:** Seafood, ice cream and other items requiring the coldest transport temperature are kept at -25° to -30°C.

How Is the Cold Chain System Important to Other Industries?

Keeping products cold is crucial when the temperature affects the integrity and usability of those goods. It becomes even more crucial when their temperature is a matter of public health or safety. Incorrect temperatures can lead to spoilage and even fires or explosions. In these sectors, a well-maintained cold chain is essential:

- **Food and beverages:** Temperature is crucial for transporting produce, meat and seafood. Any break in the cold chain can lead to rotting, bacteria or mold. Many fruits are ripened during shipment, so a stable temperature is vital. The way meats are frozen also affects their integrity. A fast freezing rate achieved through blast freezing forms smaller ice crystals, while a slow freezing process will form larger ice crystals that can damage meat’s cellular structure and change its texture. A gradual, unintended thawing can have the same effect. The FDA has strict regulations about how food can be transported, including temperature and sanitation requirements for vehicles.