PEAK
TECHNOLOGIES

Can Your Mobility Solutions Weather the Cold?

Hot Tips for Profitable Cold Chain Logistics

In the distribution and warehousing industry, the cold chain is a hot market for growth, anticipated to reach a value of $293 billion at a CAGR rate of 7.6% by 2023. The rise in consumer demand of perishable food items, increase of international trade, and expansion of the organized food retail industry are all contributing factors heating up of this market opportunity.

The needs of the cold chain are vastly different from that of their temperature controlled counterparts. Cold chain logistics guarantee the storage, transport, and distribution of specific products, such as perishable food, or certain vaccines and medications, at the proper temperature to ensure integrity and quality.

Degradation of this quality leads to loss of product, and potentially threatens the safety of consumers. For example the International Trade Administration Top Markets Report on Cold Chain estimates that $750 billion in annual losses occur within the global food industry due to improper facilities, handling procedures and training for personnel working in the cold chain. The cost of pharmaceutical product losses due to temperature fluctuations from a break in the cold chain is estimated at $35 billion per year.

In addition to product revenue losses, a cold chain that isn't optimized to meet rising demand will see productivity, reliability and accuracy fall as quickly as the temperatures. This e-book offers solutions for more productive and profitable cold chain logistics today and in the future.

Cold Chain Logistics Freezing Your Mobility?

Your front lines staff wouldn't be able to function efficiently in sub-zero temperatures without wearing specialized gear including coats, hats, ear protection and gloves. Mobile solutions are essential for reducing costs, increasing sales and growing customer satisfaction. But crossing the threshold into temperature shock wreaks havoc on standard mobility solutions. The fact of the matter is, that for mobility solutions to perform optimally in cold environments, they need to be uniquely designed to do so. Common cold chain challenges that are solved with the properly designed equipment include:

Frost

Standard grade LCD screens are prone to frost that prevents users from seeing prompts and verifying data entry, which leads to errors and downtime. Additionally, frost obscures optical ports in barcode readers, which halts the functionality of the device. When frost sets in between entry keys, they stick hindering accurate entry and increasing errors exponentially.

Condensation

Device screens that are not designed for cold environments collect condensation—both outside and inside the device. This causes internal components to corrode, short-circuit, and fail. Damage from condensation is the number one cause of device repair and replacement in the cold chain.

Cold

Standard batteries can't release their energy when temperatures drop. As mobility is dependent upon battery operation, the cold chain is dependent upon batteries to keep the supply chain moving. Anything other threatens reliability and productivity.

Extreme Conditions Require Adaptation

In order for mobility solutions to function at maximum efficiency in cold environments they need more than superficial protection—they need to be custom-designed to have computer parts and materials that can effectively adapt to optimally function in freezing environments. Every component from the casing to internal circuitry can be optimized for use in the cold chain.

- **Heaters**—integrated heaters are the most vital of all the components that set cold chain devices apart from their standard counterparts. They prevent condensation, which is the most detrimental factor to device repair and replacement in cold storage environments.
- **Housing**—durable materials are specifically constructed to limit the effects of exposure. Strong Ingress Protection (IP) seal is required to prevent moisture from getting inside—which leads to condensation. A device with an IP68 rating is sealed for full immersion protection in water.
- **Batteries**—cold temperatures prevent common Li-Ion batteries from releasing their charge. Low-impedance lithium-ion batteries are ideal for cold environments.
- **Connectors**—when connecting computers to peripherals or power sources, screw-in connectors are superior to their clip counterparts. The compression force of a screw connector provides a better seal against moisture and is less likely to detach, causing the device to drop to the floor.
- **Ergonomics**—devices designed for below freezing temperatures need to be operated by hands protected from the elements with thick gloves. Easy maneuverability and glove-friendly data entry are essential.

Data Collection in Cold Chain Environments

Low temperatures don't need to be the culprit of reduced reliability or productivity. But what they do require is specialized equipment to streamline the handling and tracking of products through the supply chain. Manufacturers have developed devices that have the same reliability and functionality in cold environments as their standard model counterparts.

Mobile Computers

In many cases equipment must not only be able to handle cold temperatures but constant movement between different temperature zones and changing humidity levels. When selecting the most optimal devices for your application, the amount of exposure to extreme cold conditions, and the frequency of exposure are key considerations for determining the right cold-environment equipment for your operation.

Honeywell CK65

-22° F to 122° F

-30° C to 50° C

28-hour battery life with FlexRange engine with read rate from half an inch up to 30 feet away

Best for freezing environments where temperature shock is constant and condensation-free is critical

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Honeywell CN80

-22° F to 122° F

-30° C to 50° C

Glove-friendly keys and touchscreen provide the "best of both worlds" for high transaction applications

Best for freezing environments where temperature shock is constant and condensation-free is critical

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Zebra TC8300 Freezer

-4° F to 122° F

-20° C to 50° C

Desiccant cartridge absorbs moisture and battery performs down to -4° F / -20° C

Best for environments with limited temperature shock where resistance to condensation is adequate

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Zebra MC9300 Freezer

-22° F to 122° F

-30° C to 50° C

Integrated heaters and freezer-rated battery

Best for freezing environments where temperature shock is constant and condensation-free is critical

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Scanners

For unstoppable performance, cold chain scanners need to be ultra-rugged so that their housing doesn't crack and must feature optics that are resistant to fogging and condensation, which erode productivity.

Zebra LI3678 Extended Range Scanner

-4°F to 122° F

-20° C to 50° C

Cordless all-range 1D barcode capture

Read range of up to 56ft./17.1 m

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Honeywell Granit 1981i Scanner

-4°F to 122° F

-20° C to 50° C

Bluetooth wireless full-range area imaging of 1D and 2D barcodes

Read range of up to 52ft./16 m

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Forklift Mount

Freezer condensing environments need a vehicle mount computer that not only can function without sticky keys or fogging screens but ideally can be secured with screw-in connectors to prevent drops to the floor from clip connector failure.

Zebra VC8300 Vehicle Mount Computer

-22° F to 122° F

-30° C to 50° C

Ultimate ultra-rugged design on the Android platform

5% to 95% RH condensing ideal for freezing environments

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Honeywell VM3A Vehicle Mount Computer

-22° F to 122° F

-30° C to 50° C

Full-sized vehicle-mounted computer built on Mobility Edge Platform with Android OS

Industrial resistive touchscreen with integrated defroster ideal for environments with limited temperature shock

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Printing and Labeling in Cold Chain Environments

For labeling applications in cold environments, it's critical to not only have the right printing equipment, but the right labeling materials. Consult with a labeling solutions expert to determine the products that will be best suited for your application.

Zebra ZQ500 Series Mobile Printer

-4° F to 131° F

-20° C to 50° C-

High duty-cycle 3" and 4" print widths

Cold temperature compensation automatically optimizes and balances print speed/quality

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Cold Chain Labels

Stick to surface temps of -20° F / -20° C

Remain adhered to surfaces in temperatures as low as -65°F / -54°C

Meet Food and Drug Administration material requirements for indirect food contact

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Wireless Networking

The most modern mobile devices adapted for freezing environments could be challenged to perform optimally if the wireless networking within your supply chain environment is not up to par. Insulation within cold temperatures keeps air from escaping but it also restricts the movement of radio waves—which ultimately could impact your wireless networking negatively if not installed properly. Cold environments require access points (APs) to be installed directly in refrigerated or frozen storage areas to provide proper coverage.

However, this means that APs within the freezer environment require specialized heated enclosures to protect against condensation and cold. Specialized antennas with common access points are also ideal for correcting the "multipath effect" that occurs when cold temperatures cause RF signals to bounce off obstacles and arrive at APs at slightly different times. If your operation isn't experiencing rock-solid WLAN, a wireless site assessment will help.

FROM OUR BLOG

Considering RFID Alternatives

Speech recognition and RFID alternatives can be vital alternatives to other mobility solutions that help your operation increase accuracy in data entry within your cold chain environment. Speech recognition terminals can be worn on a belt or holster and worn under coats where they aren't exposed to cold temperatures. In fact, a recent report showed that nearly 1 million distribution center workers using Honeywell voice-directed solutions have achieved 35% productivity gains, 50% error reductions, and 30% fewer safety incidents.

The benefit of leveraging RFID to collect data is that it requires no line of sight. As condensation frequently occurs after pallets are shrink wrapped, it can be challenging for laser devices to read labels underneath, where RFID will be able to read data accurately and efficiently.

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Tackle Cold Environments with the Help of an Expert Provider

The cold chain market is one that requires specialized solutions for optimal productivity and profitability of your operation. A solutions provider with extensive knowledge and industry expertise can help you down the path to success. Let Peak Technologies assist in optimizing your cold chain logistics via our managed mobility services. Our team works with you to create a mobility roadmap that aligns the right services and solutions to your specific needs, choose the right devices, deploy them, and help you manage them throughout their entire lifecycle.

Let's Start a Conversation

PEAK TECHNOLOGIES

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