



# Optimizing Operational Efficiencies with Mobile Solutions Designed for Cold Chain Environments

Zebra Gives You a Performance Edge in Challenging Cold Conditions.

Mobility solutions are helping your business succeed in many strategic initiatives—from increased global presence to the need to reduce costs and cycle times, all while increasing sales and customer satisfaction. But your current mobility solutions stop short where your cold chain starts—from refrigerators and freezers in food and pharmaceutical manufacturing, warehousing and retail to transportation and outdoor storage yards in winter climates.

Consumer safety is the primary role of cold chain management. The food and pharmaceutical industries must take every measure to protect perishable goods from the manufacturing floor to the consumer's door—including transport, retail storage and merchandising in between. The Produce Marketing Association estimates that 25% of all food products are wasted each year due to breaches in integrity due to fluctuations in temperature leading to product degradation.<sup>1</sup>

With rugged and reliable mobility in your cold chain operations, you'll benefit from the end-to-end operational visibility you need to make better and more informed decisions. Important decisions that can help you reduce costs, while increasing overall efficiency, throughput, task accuracy and customer service and safety.

Zebra has the expertise and solutions to help your cold chain operations run smoothly, efficiently and more profitably.

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**\$750 Billion**

**Annual global food industry losses** primarily due to improper facilities, handling procedures and training for personnel working in the cold chain.<sup>2</sup>

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<sup>1</sup> Produce Marketing Association, Cold Chain Defined, PMA Research, 2016

<sup>2</sup> International Trade Administration, 2016 Top Markets Report Cold Chain, 2016

# Mobile Devices in Cold Chain Environments

## Make your cold chain logistics more productive

Working in extreme temperature conditions requires specialized devices that can operate in cooler, chiller or freezer environments. Which means equipment must be able to handle not only cold temperatures but, in many situations, constant movement between different temperature zones and changing levels of humidity. Otherwise, condensation can ruin sensitive electronics. Ice can build up on keyboards and prevent data entry. Foggy displays can be hard to read. And the cold can impact application performance and battery cycle times. However, mobile devices made for cold chain environments can streamline processes, increase accuracy and ensure safety.



### Streamline Cold Storage Handling

No matter how cold it gets, your workers don't have time to stop with a device that fogs over, freezes up, refreshes slowly or stops working in the middle of a shift. Cold temperatures and wide temperature swings can cause internal and external condensation resulting in lost time, as well as the potential for major device damage and increased repair costs. Mobile devices today are built to withstand a wide range of temperature and humidity conditions. Special cold chain features, such as heated scan windows, freezer-rated batteries, internal heaters and temperature sensors, will help to keep workers in constant motion in your cold environments and handling more orders per shift.



### Increase Accuracy and Productivity

Your job involves quickly and accurately entering and retrieving data—and many times this means with gloved hands. Carefully choosing the right device for this job means first identifying the environmental conditions the device must withstand, then selecting the form factor that fits the workflow and enables the freedom of movement required by the worker. Choices to consider are keypad and button size/layout, screen size, touch screen sensitivity and ergonomics. Creating a complete solution for every type of worker in every type of cold chain environment—from handheld and wearable mobile computers to ultra-rugged scanners, vehicle-mount computers, tablets, headsets and printers—ensures your data entry and retrieval needs are covered.



### Visibility Promotes Safety and Efficiency

Reducing waste and ensuring consumer safety are a top concern for decision makers in cold chain management. To prevent loss of perishable goods, implementing mobility at the edge of operations helps streamline and provide safe handling procedures to workers. Giving front-line workers the technology they need to communicate with team members and quickly reference proper handling instructions and temperature requirements with a simple scan or look-up is an invaluable resource to prevent loss or product degradation.

## The Solution: The Zebra Cold Chain Advantage

Zebra's Cold Chain portfolio lets you reap the benefits of mobility in all of your cold environments.

### Deep expertise, knowledge and experience

Designing high-performance, dependable mobile solutions for use in the cold chain requires deep technical expertise in mobile device development, plus proven knowledge of environmental and user requirements. As a long-standing leader in enterprise mobility solutions, Zebra has it all. We offer:

- **Industry-leading solutions** that work, not only in your environments, but also for your users.
- **Technical features** that ensure high-reliability in any cold chain environment.
- **Special usability features** that make it easy for workers wearing gloves to easily interact with the device and application.

### An unmatched portfolio to improve productivity and safety in the cold chain

We understand all the different types of cold chain environments, as well as the different types of users and applications in those extreme environments.

Zebra offers the richest cold chain mobility portfolio in the industry, including:

- **Rugged mobile computers, tablets, vehicle-mount computers and wearables** provide options for cold and condensation-producing environments.
- **Ultra-rugged handheld scanners** deliver unstoppable performance to improve productivity, enhance order accuracy and speed shipping times in demanding cold storage environments.
- **Durable, easy-to-use mobile printers and certified supplies** offer the latest connectivity interface with your mobile computers to bring high-quality printing and label application right into your cold storage areas, increasing productivity and efficiency.



## Use Cases and Deployment Environments

Before you select a device, assess how you will be using it and where you will be deploying it. The application descriptions below will help guide the type of device you should consider.



### Cold-Rated Devices

Cold-rated devices are designed for areas where temperature shock and condensation are not an issue. These workers spend their day primarily in a single temperature zone and are not constantly moving between cold and warm environments—either primarily in the cold and briefly in warm areas, or primarily in warm areas and briefly in cold areas.



### Condensation-Resistant Devices

These devices are designed to withstand moderate temperature shock and condensation, ideal for workers who travel constantly between refrigerators/coolers and temperature-controlled, less humid areas.



### Condensation-Free Devices







These devices are designed to withstand the severe condensation that occurs when workers are constantly traveling between the freezer and warm areas with high humidity.

## The Zebra Cold Chain Mobility Portfolio

Built for the cold: Rugged mobile computers (handheld, vehicle-mounted, tablets and wearables), ultra-rugged scanners, printers and supplies.





With Zebra's Cold Chain Portfolio, you'll find everything you need to create a complete solution for every type of worker in any type of cold chain environment.

### Handheld Mobile Computers





Products	Operating Temperature	Use Cases & Deployment Environments	Special Cold-Chain Features
<b>MC9300 Freezer</b>			
	-22° F to 122° F -30° C to 50° C		<ul style="list-style-type: none"> <li>• IP67 and IP65 per applicable IEC sealing specifications</li> <li>• Heated scanner exit window</li> <li>• Freezer-rated battery</li> <li>• Condensation-free with integrated heaters</li> </ul>
<b>TC8300 Freezer</b>			
	-4° F to 122° F -20° C to 50° C		<ul style="list-style-type: none"> <li>• Sealing rating: IP65</li> <li>• Includes industry-leading 7000 mAh Lithium Ion battery that has been designed to perform down to -4° F / -20° C</li> <li>• Desiccant cartridge to absorb moisture</li> <li>• Revolutionary, award-winning ergonomic design makes it easy to hold and operate with gloved hands to increase productivity</li> </ul>
<b>TC8000 Freezer</b>			
	-4° F to 122° F -20° C to 50° C		<ul style="list-style-type: none"> <li>• Sealing rating: IP65</li> <li>• Includes industry-leading 6700 mAh Lithium Ion battery that has been designed to perform down to -4° F / -20° C</li> <li>• Desiccant cartridge to absorb moisture</li> <li>• Revolutionary, award-winning ergonomic design makes it easy to hold and operate with gloved hands to increase productivity</li> </ul>



## Vehicle-Mounted Mobile Computers











Products	Operating Temperature	Use Cases & Deployment Environments	Special Cold-Chain Features
<b>VC8300</b>			
	-22° F to 122° F -30° C to 50° C		<ul style="list-style-type: none"> <li>• Sealing rating: IP66</li> <li>• True frost and condensation free operation with touchscreen, connectors, board and battery heaters</li> <li>• Smart temperature sensors that automatically control heater and heating speed</li> <li>• PC-like keyboard with heaters and drainage holes to avoid icing</li> <li>• Flat surface that is immune against catching ice, dust or water</li> <li>• User-replaceable heated battery keeps device stable under all conditions</li> </ul>
<b>VC80X/VC80</b>			
	-22° F to 122° F -30° C to 50° C		<ul style="list-style-type: none"> <li>• Sealing rating: IP66</li> <li>• True frost and condensation free operation with touchscreen, connectors, board and battery heaters</li> <li>• Smart temperature sensors that automatically control heater and heating speed</li> <li>• Optional rugged keyboard with internal heater to ensure frost, condensation free operation</li> <li>• User-replaceable heated battery keeps device stable under all conditions</li> <li>• Flat surface to avoid heavy icing on the front</li> </ul>

## Rugged Enterprise Tablets





Products	Operating Temperature	Use Cases & Deployment Environments	Special Cold-Chain Features
<b>ET51/56</b>			
	-4° F to 122° F -20° C to 50° C Non-condensing		<ul style="list-style-type: none"> <li>• Sealing rating: IP65</li> <li>• User replaceable battery for quick swaps</li> <li>• Vibration resistant for smooth-floor lift truck mounting</li> </ul>
<b>XSLate L10 and XPad L10</b>			
	-4° F to 140° F -20° C to 60° C Non-condensing		<ul style="list-style-type: none"> <li>• Sealing rating: IP65</li> <li>• Hot swappable battery for quick swaps</li> <li>• Vibration resistant for lift truck mounting</li> <li>• XPad available with integrated barcode imager</li> </ul>



## Wearable Solutions

Products	Operating Temperature	Use Cases & Deployment Environments	Special Cold-Chain Features
<b>WT6000 Wearable Computer</b>			
	-22° F to 122° F -30° C to 50° C	 	<ul style="list-style-type: none"> <li>Sealing Rating: IP65</li> <li>Capacitive touch display allows for use with gloves</li> <li>5000mAh extended battery recommended for freezer option</li> </ul>
<b>RS6000 1D/2D Two-Finger Bluetooth Imager Ring Scanner</b>			
	-22° F to 122° F -30° C to 50° C		<ul style="list-style-type: none"> <li>Sealing Rating: IP65</li> </ul>
<b>RS5000 1D/2D Single-Finger Corded Imager Ring Scanner</b>			
	-22° F to 122° F -30° C to 50° C		<ul style="list-style-type: none"> <li>Sealing Rating: IP65</li> </ul>
<b>RS4000 1D Single-Finger Corded Ring Scanner</b>			
	-22° F to 122° F -30° C to 50° C		<ul style="list-style-type: none"> <li>Sealing Rating: IP54</li> </ul>
<b>RS419 1D Single-Finger Corded Ring Scanner</b>			
	-22° F to 122° F -30° C to 50° C		<ul style="list-style-type: none"> <li>Sealing Rating: IP54</li> </ul>
<b>HS3100 and HS2100 Headsets</b>			
	-22° F to 122° F -30° C to 50° C	 	<ul style="list-style-type: none"> <li>Sealing Rating: IP67</li> <li>Bluetooth headset for speech-driven applications and voice communications</li> </ul>

## Ultra-Rugged Scanners





Products	Operating Temperature	Use Cases & Deployment Environments	Special Cold-Chain Features
<b>LI3600 1D Standard- and Extended-Range (-SR/-ER) Scanners</b>			
	-22° F to 122° F -30° C to 50° C (Corded)  -4° F to 122° F -20° C to 50° C (Cordless)		<ul style="list-style-type: none"> <li>Sealing Rating: IP65 and IP67 (Forklift Cradle IP65)</li> <li>Freezer-rated cables (down to -22° F / -30° C)</li> </ul>
<b>DS3600 1D/2D Standard- and Extended-Range (-SR/-ER) and High-Performance (-HP) Scanners</b>			
	-22° F to 122° F -30° C to 50° C (Corded)  -4°F to 122°F -20° C to 50° C (Cordless)		<ul style="list-style-type: none"> <li>Sealing Rating: IP65 and IP67 (Forklift Cradle; IP65)</li> <li>Freezer-rated cables (down to -22° F / -30° C)</li> </ul>

\*Heated scanner holder accessory is recommended to reduce condensation on the outside of the scan window when moving in and out of freezers







**Applications Key**  Cold-rated |  Condensation-resistant |  Condensation-free  
See page 4 for definitions.



## Mobile Printers

Products	Operating Temperature	Use Cases & Deployment Environments	Special Cold-Chain Features
<b>ZQ600 Series</b>			
	-4° F to 122° F -20° C to 50° C		<ul style="list-style-type: none"> <li>Sealing Rating: IP43</li> <li>Sealing Rating: IP54 with soft case</li> </ul>
<b>ZQ500 Series</b>			
	-4° F to 131° F -20° C to 50° C		<ul style="list-style-type: none"> <li>Sealing Rating: IP54</li> <li>Sealing Rating: IP65 with Exoskeleton case</li> <li>Cold temperature compensation automatically optimizes and balances print speed and print quality in cold temperatures</li> </ul>

## Zebra Certified Supplies

Products	Temperature Specifications	Use Cases & Deployment Environments	Special Cold-Chain Features
<b>Z-Perform 2000D All-Temp</b>			
	<p>Labels will stick to most surfaces as low as -20° F / -29° C</p> <p>Labels will remain adhered to most surfaces in temperatures as low as -65° F / -54° C</p>		<ul style="list-style-type: none"> <li>Coated paper label with an all-temp adhesive</li> <li>Meets FDA 175.105 indirect food contact requirements</li> </ul>
<b>PolyPro 4000D</b>			
	<p>Labels will stick to corrugate, paper, metal and glass surfaces as cold as -40° F / -40° C</p> <p>Labels will remain adhered to corrugate, paper, metal and glass surfaces in temperatures as low as -65° F / -54° C</p>	  	<ul style="list-style-type: none"> <li>Matte polypropylene label with an all-temp adhesive</li> <li>Meets FDA 175.105 indirect food contact requirements</li> </ul>

**Applications Key**  Cold-rated |  Condensation-resistant |  Condensation-free  
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## Software, Supplies and Support

### Zebra OneCare Support Services

OneCare Services ensure that Zebra devices achieve maximum uptime and peak performance. Multiple service levels are available to meet unique requirements and protect your operational investments.



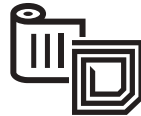
### VisibilityIQ™

Get instant business intelligence about your Zebra devices and leverage the most from your assets, workers and daily tasks with VisibilityIQ. Use easy-to-access comprehensive data to see how your devices are performing, or decide what your next steps are to take to improve your operations with actionable insights generated in one clear dashboard.



### Certified Supplies

Zebra's Certified Supplies improve efficiency and productivity of your cold chain operations with the highest-quality, pre-tested labeling—from ensuring they withstand harsh environmental conditions that include freezing temperatures and moisture to providing excellent print quality with each and every print command.



### Independent Software Vendors (ISVs)

Zebra's global ISV network offers innovative applications developed to work specifically with Zebra devices and systems. ISVs can help businesses identify the best applications to meet individual needs or provide customized solution development to address unique requirements.



## Purpose-Built Technology Solutions

### Lifeguard™ for Android™

Software security solution extends the lifecycle of Zebra Android mobile computers.

### Zebra DNA for Mobile Computing, Scanning and Printing

Every Zebra device comes with built-in software that provides time-saving applications, utilities and developer tools for managing devices, optimizing workflows and increasing accuracy.

To learn how Zebra can help you operationalize and streamline your cold chain management, visit [www.zebra.com/coldchain](http://www.zebra.com/coldchain).



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